

## Pisces Gadiformes: Taxonomy of grenadiers of the New Caledonian region, southwest Pacific

*Tomio IWAMOTO*

Dept. of Ichthyology, California Academy of Sciences  
Golden Gate Park, San Francisco, California 94118, U.S.A.

&

*Nigel R. MERRETT*

Dept. of Zoology, The Natural History Museum  
Cromwell Road, London SW7 5BD, U.K.

### ABSTRACT

Studies of recent bathyal collections mainly made during MUSORSTOM cruises have shown an extremely diverse grenadier fauna in the New Caledonian region. A total of 932 grenadier specimens (families Bathygadidae and Macrouridae) representing 49 species in 16 genera were collected from 102 samples taken from depths between 395 and 2105 m (mid-depth sounding). Of the 49 species, 15 (31%) were found to be new (one recently described) and two are treated as indeterminate. The collections were dominated by the genera *Caelorinchus* (14 spp., 5 new), *Ventrifossa* (7 spp., 2 new, but one not named), *Hymenocephalus (sensu lato)* (7 spp., 2 new), and *Nezumia* (5 spp., 3 new). This paper reports the taxonomic findings on the collections. A subsequent paper will report on aspects of the distribution and biology of grenadiers in the New Caledonian region.

### RÉSUMÉ

**Pisces Gadiformes : Taxonomie des grenadiers de la région néo-calédonienne (Pacifique sud-ouest).**

L'étude des collections de poissons récoltés au cours des campagnes d'exploration du domaine bathyal de la zone économique de la Nouvelle-Calédonie, et plus particulièrement lors des campagnes MUSORSTOM, a mis en évidence la grande diversité des grenadiers dans cette région. Au total, 932 spécimens appartenant aux familles Bathygadidae et Macrouridae ont été étudiés: ils représentent 49 espèces, réparties en 16 genres. Ils ont été récoltés dans 102 stations situées entre 395 et 2105 m de profondeur. Sur ces 49 espèces, 15 (soit 31%) sont nouvelles: l'une a été décrite récemment par IWAMOTO & SAZONOV (1994), les 14 autres sont décrites dans le présent article; le statut de deux espèces demeure incertain. Les genres prédominants sont *Caelorinchus* (14 espèces dont 5 nouvelles), *Ventrifossa* (7 espèces dont 2 nouvelles, mais l'une sera nommée ultérieurement), *Hymenocephalus (sensu lato)* (7 espèces dont 2 nouvelles)

et *Nezumia* (5 espèces dont 3 nouvelles). Le présent article traite de la taxonomie des grenadiers de ces collections. Un article en préparation traitera de la biogéographie et de la biologie des grenadiers de la région néo-calédonienne.

## INTRODUCTION

The bathyal fauna of the region around New Caledonia in the southwestern Pacific had been little known prior to 1984, when ORSTOM (Institut français de Recherche scientifique pour le Développement en Coopération) and the Muséum national d'Histoire naturelle, Paris, began an extensive program of investigation of the bathyal environment. For background information on these explorations, see RICHER DE FORGES (1990, 1993), who provides a geological description and a brief history of exploration of the area, and includes an extensive list of publications resulting from these explorations with a list of vessel station data. LEHODEY *et al.* (1992) provide collection data for the cruise BERYX 11 on seamounts of the South East of New Caledonia and RICHER DE FORGES & MENOÛ (1993) do the same for the MUSORSTOM 7 expedition in the economic zone of the islands of Wallis and Futuna. Substantial fish collections accrued from these expeditions were deposited in the Muséum national d'Histoire naturelle (MNHN), where they were sorted into family group by Dr Bernard SÉRET and allocated to specialists to work up.

The grenadiers, families Macrouridae and Bathygadidae, constitute one of the most abundant fish group in the bathyal collections - representatives were found in 102 out of a total of 566 hauls made between 400 and 3690 m.

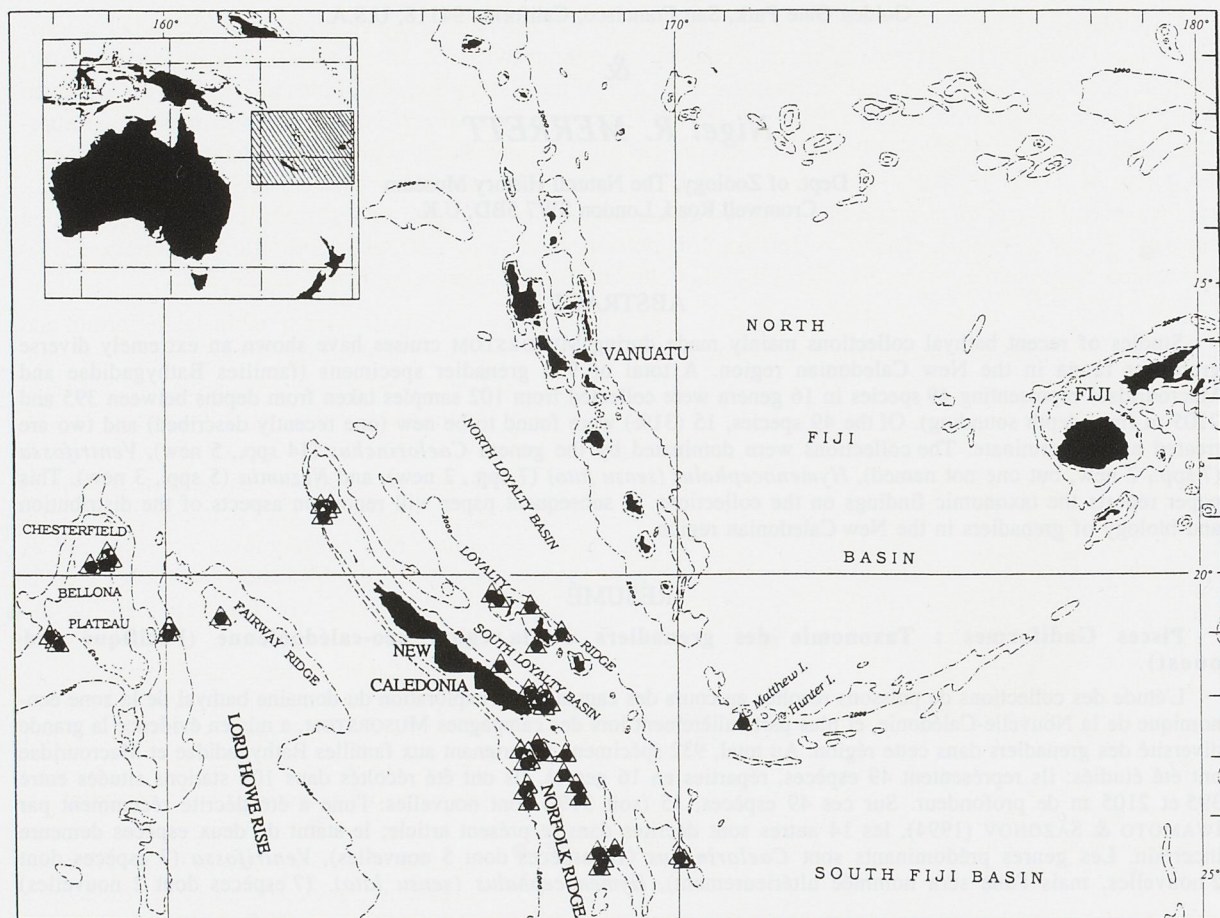


FIG. 1. — Map of region around New Caledonia with collection localities plotted as triangles with a solid circle. Hatched area within inset denotes area covered by larger map. MUSORSTOM 7 localities are not on this map.

These grenadier collections originated from between 395 and 2105 m, mid-depth sounding, but were concentrated in the 400-800 m range. In addition, two small grenadier collections made by Clive ROBERTS of the Museum of New Zealand (NMNZ) at localities to the south of New Caledonia were made available to us. The distributions of the grenadier collections used in this report are plotted on the map in Fig. 1.

This paper represents the first part of our report on the collection and will treat the taxonomy of the New Caledonia grenadiers. A subsequent paper will cover aspects of the distribution and ecology of the group. After the manuscript was submitted and accepted, the authors participated in a MUSORSTOM cruise (HALIPRO 2, see GRANDPERRIN *et al.*, 1997) during which additional grenadiers were collected. Also, we made a subsequent visit (April 1997) to the MNHN to examine an extensive collection of grenadiers from Vanuatu (MUSORSTOM 8 cruise, see RICHER DE FORGES, FALIEUX & MENOUE, 1996). It was not possible to incorporate all the new material into the current paper, but several had such important bearing on our concept of the species they represent that we felt it essential to include them. They included representatives of *Caelorinchus celaenostomus*, *C. shcherbachevi*, *Nezumia cliveri* and *N. coheni*. The remaining collections will be treated in our subsequent paper. Information on the collections provided here do not include these HALIPRO 2 catches nor the Vanuatu material.

## MATERIALS AND METHODS

A variety of collecting gears was used, but the majority of ORSTOM samples were taken with a beam trawl (CP; 80 samples), with the remainder collected by an otter trawl (CC; 14 samples), Warren dredge (DW; 6 samples), and a Charcot dredge (DC; 2 samples). Details of the distribution of samples by depth strata are given in Fig. 2, which indicates that the majority (85%) of the samples were from the 400-800 m strata. Representational coverage of species richness, therefore, was most complete only within this relatively narrow range. The variation of effectiveness of the gears used in sampling active species like grenadiers (DW and DC < CP < CC), together with the lack of accurate times of arrival and departure of the gear to and from the seabed, prevented meaningful analysis of fish density or biomass. It is noteworthy here that the large proportion of samples (81%) from which no grenadiers were available fell in the following sample categories: DW, DC, CP, CC.

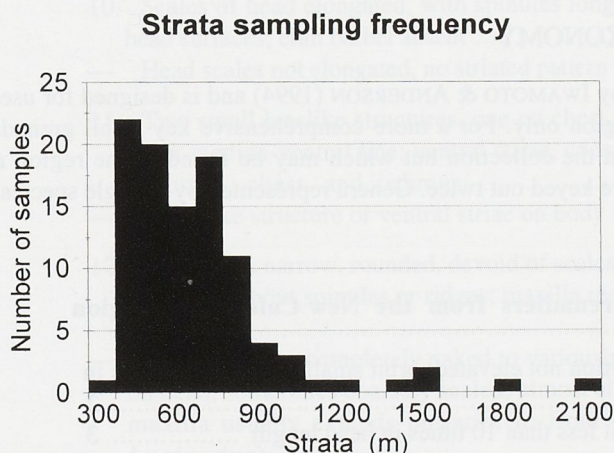


FIG. 2. — Distribution of grenadier samples by depth strata. A predominant portion (85%) of the 102 samples plotted were from 400-800 m strata.

are printed in capital letters.

Institutional abbreviations follow LEVITON *et al.* (1985) and LEVITON & GIBBS (1988). For more detailed references to genera, the reader is referred to ESCHMEYER (1990).

Samples were fixed in saline formol and later transferred into 70% industrial ethanol. Counts and length measurements were made on the preserved material in accordance with IWAMOTO (1970) and IWAMOTO & SAZONOV (1988). The latter reference is also followed for general taxonomic abbreviations. Diagnoses are abridged as much as possible, and characters given in the diagnoses are not repeated in the descriptions except where more details are considered necessary. The diagnoses are compilations of data from current and other sources; ranges for counts and measurements may therefore not agree with the data enumerated for New Caledonian material.

In the lists of material examined, the names of the vessels are in both italics and quotations marks. The names of the cruises

## RESULTS

A total of 932 specimens representing 16 genera and 49 species of grenadiers occurred in the samples examined. The collections were dominated by the genera *Caelorinchus* (14 species), *Hymenocephalus (sensu lato)* (7), *Ventrifossa* (7), and *Nezumia* (5). Thirty-nine of these species were represented by eight specimens or less, while

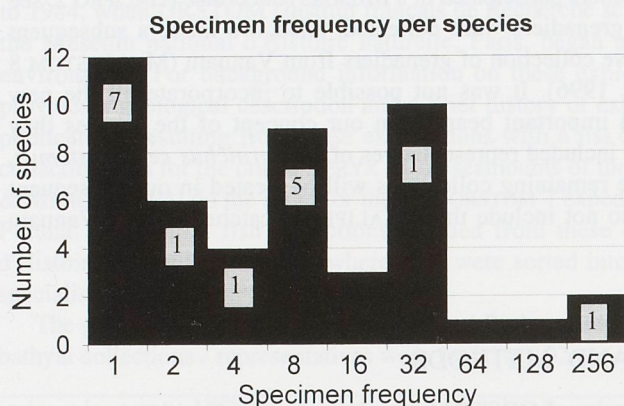


FIG. 3. — Bar graph relationship of species numbers and species frequency. Numbers within the bars indicate the number of new species with that specimen frequency (e.g., 12 spp. were represented by only one specimen, and of these 12, seven were new species).

only four species were represented by >32 specimens (Fig. 3). Fifteen species were found to be new (31%), although one of these was recently described by IWAMOTO & SAZONOV (1994). The representation of the species relative to abundance in the catches was not restricted to individual records (Fig. 3). Indeed, the most abundant species sampled was new (*Hymenocephalus megalops*, 209 specimens), together with another represented by 22 specimens (*Lucigadus acrolophus*), reflecting the novelty of the overall deep ichthyofauna of the area. Twelve of the new species and 18 already-named species are fully described. Two of the new species (in *Mataeocephalus* and *Ventrifossa*) are not formally named, although partial descriptions for them are included. These species are currently under study by others, who will describe them using more extensive material from Australia. For the remaining 17 species, good descriptions are already available, so we provide only a diagnosis and limited description.

## TAXONOMY

The following key is adapted from one provided by IWAMOTO & ANDERSON (1994) and is designed for use in identifying grenadiers from the New Caledonian region only. For a more comprehensive key to all grenadier genera, see IWAMOTO (1990). Genera not present in the collection but which may be found in the region are enclosed in brackets; those marked with an asterisk are keyed out twice. Genera represented by a single species in the collection are keyed out with the species.

## Key to genera and some species of grenadiers from the New Caledonian region

1. One continuous dorsal fin, anterior portion not elevated; orbit small, 10 or more times in head length ..... 2
- Two dorsal fins, the first elevated; orbit less than 10 times in head length ..... 3
2. Pelvic fins small, rays 5-6 ..... *Squalogadus modificatus*
- Pelvic fins absent ..... [*Macrouroides inflaticeps*]
3. Origin of second dorsal fin immediately behind first and equally or better developed than anal fin; outer gill arch free from gill cover; gill-rakers on first arch slender, not tubercular ..... 4

- A distinct gap between dorsal fins; anal fin usually much better developed than second dorsal fin; outer gill arch restricted by folds of skin connecting upper and lower limbs to gill cover; gill rakers tubercular ..... 5
- 4. Chin barbel well developed; first dorsal, pectoral, and pelvic fins with a greatly elongated ray; pelvic fin rays 8 ..... *Gadomus*
- No chin barbel; fins lacking a greatly elongated ray; pelvic fin rays 9 ..... *Bathygadus cottoides*
- 5. Second spinous ray of first dorsal fin smooth ..... 6
- Second spinous ray of first dorsal fin serrated (weakly or much reduced in some) ..... 9
- 6. Snout strongly pointed, armed with coarse spiny scales that form a stout continuous ridge extending from snout tip to preopercle angle and terminating in a sharp point ..... *Caelorinchus*
- Snout rounded to moderately pointed, no sharp ridge of modified scales extending from snout tip to preopercle angle ..... 7
- 7. Teeth large, widely spaced, in 1 row in lower jaw ..... *Malacocephalus laevis*
- Teeth small to moderate, in 2 or more rows in lower jaw ..... 8
- 8. Head fragile, the skin membranous, mostly naked; head bones paper-thin; body scales thin, deciduous; pelvic fin rays 8-14; small lenslike structure on chest and before anus ..... *Hymenocephalus\**
- Head stout, skin thick, entirely scaled; head bones well developed; scales thick, adherent; pelvic rays 7 (rarely 6); no lenslike structure on chest ..... *Trachonurus sentipellis*
- 9. Head massive, globose, soft; interopercle tightly adnate to preopercle; body scales along each side of second dorsal fin base enlarged ..... [*Cetonurus*]
- Head not especially massive or globose; interopercle not strongly adnate to preopercle; no enlarged scales along second dorsal fin base ..... 10
- 10. Scales of head elongated, with spinules longitudinally aligned to give striated pattern to head surfaces; chin barbel absent ..... [*Mesobius*]
- Head scales not elongated, no striated pattern to head surfaces ..... 11
- 11. Two small lenslike structures, one on chest, the other before anus, each connected by a black median-ventral line; ventral striae, consisting of fine parallel black lines on parts of abdomen, chest, and isthmus ..... *Hymenocephalus\**
- No lenslike structure or ventral striae on body ..... 12
- 12. Snout low, narrow, rounded, devoid of scales; no ridges on head; scales on head and front of body without spinules or ridges; maxilla reaches vertical to front margin of orbit ..... *Haplomacrourus nudirostris*
- Snout angular, completely naked to variously covered with scales; ridges usually present on head, sometimes coarsely scaled; almost all scales covered with spinules or low ridges; maxilla usually extends posterior to front of orbit (except in *Sphagemacrurus* and *Lucigadus*) ..... 13
- 13. Branchiostegal rays 7 ..... 14
- Branchiostegal rays 6 ..... 21
- 14. Pelvic fin rays 5-7 ..... *Pseudonezumia*
- Pelvic fin rays 8-14 ..... 15

15. Snout completely or almost completely naked; no tubercular scales at tip or lateral angles ..... *Kumba punctulata*  
 — Snout fully scaled or variously naked ventrally; scales present at tip and lateral angles .... 16
16. Anus closer to anal origin than to pelvic insertions ..... 17  
 — Anus closer to pelvic insertions than to anal origin ..... 18
17. Outer gill slit about 10% or less of head length; outer rakers of first arch rudimentary or absent; snout prominently pointed; dorsal fin base not elevated ..... *Mataeocephalus\* acipenserinus*  
 — Outer gill slit about 20% or more of head length; outer rakers of first arch tubercular and distinctly developed; snout blunt, upturned; dorsal fin base elevated ..... *Sphagemacrurus puniliceps*
18. A stout suborbital shelf formed of two rows of coarsely spined scales; ventral edge of shelf forming a sharp ridge; snout variously naked ventrally ..... *Nezumia*  
 — Suborbital shelf covered with several rows of small, relatively unmodified scales, no sharp ridge developed; underside of snout mostly scaled ..... 19
19. Ventral region of body appearing to have swung far forward so that gill membranes unite below orbit, pelvic fins below opercle ..... *Lucigadus*  
 — Ventral region of body more normal; gill membranes unite under interopercle; pelvic fins below opercle or pectoral base ..... 20
20. Inner gill-rakers of first arch 13-17 ..... *Ventrifossa*  
 — Inner gill-rakers of first arch 12 or fewer ..... [*Kuronezumia*]
21. Anus far removed from anal fin, closer to pelvic fins; pelvic rays 7 ..... *Mataeocephalus\* sp. nov.*  
 — Anus immediately before anal fin; pelvic rays 12-14 .... *Coryphaenoides striaturus*

#### Family BATHYGADIDAE

DIAGNOSIS. — Gadiform fishes lacking a caudal fin; two dorsal fins present, the first elevated and with a flexible spine, the second starting immediately behind first and equally or (usually) better developed than anal fin; the two fins extending and meeting at end of tail; outer gill arch free from gill cover; gill rakers on first arch slender, lathlike; small villiform to cardiform teeth present on premaxillary and dentary only; mouth terminal and large, lacking a protruding snout; retia mirabilia and gas glands 2 or 4; no spinules on scales.

REMARKS. — The Indo-Pacific species of this family continue to pose many difficult taxonomic problems, despite the recent attempt at a world-wide revision by HOWES & CRIMMEN (1990). Extensive collections of the family made by former-Soviet vessels in the Indian Ocean have yet to be adequately examined; their study may help resolve some of the problems, but more comparative material is still needed from the Philippines and Indo-Malaysian region. Two genera, about 25 species, three in the area.

#### Genus *BATHYGADUS* Günther, 1878

*Bathygadus* Günther, 1878: 23 (type species *Bathygadus cottoides* Günther, 1878, by monotypy).

*Melanobranchnus* Regan, 1903: 459 (type species *Bathygadus melanobranchnus* Vaillant, 1888, by monotypy).

*Regania* Jordan in JORDAN & STARKS, 1904 (type species *Regania nipponica* Jordan in JORDAN & STARKS, 1904, by original designation).

DIAGNOSIS. — Chin barbel absent or minutely developed; first dorsal, pectoral, and pelvic fin lacking stout, notably elongated rays; retia and gas glands 2.

REMARKS. — GILBERT & HUBBS (1920) recognized 14 species in the genus, 11 of which were of Indo-Pacific origin. Of those 11, HOWES & CRIMMEN (1990) recognized only seven as species of *Bathygadus*. They relegated *B. furvescens* Alcock to the genus *Gadomus*, and sunk three others as junior synonyms (*Regania filamentosa* Smith & Radcliffe, 1912, *B. garretti* Gilbert & Hubbs, 1920, and *Melanobranchus micronema* Gilbert, 1905). IWAMOTO & ANDERSON (1994: 4) questioned some of their actions, in particular, the synonymization of *B. filamentosus* and *B. dubiosus* Weber, 1913 with *B. cottoides* Günther, 1878. We in turn have some doubts about HOWES & CRIMMEN's inclusion of *B. furvescens* into *Gadomus*. Their concept of the species was based on a putative syntype (BMNH 1896.9.11:2) and a number of other specimens received from near the type locality, but the original description was based clearly on a single 52 mm specimen that must be considered the holotype and only type specimen (*vide* W. N. ESCHMEYER, CAS, personal communication, Nov. 1995). MENON and YAZDANI (1968: 137) listed the specimen (ZSI F.13470) as holotype in their type catalog. ALCOCK's (1894a) original description clearly stated that there was no barbel, and he gave no mention of elongated fin rays, although in his *Descriptive Catalogue* (ALCOCK, 1899: 121), he noted that the "first dorsal, upper pectoral and outer ventral rays broken." The excellent illustration of the holotype (ALCOCK, 1894b, pl. 16, fig. 1) clearly shows the absence of elongated fin rays so typical of *Gadomus* species. These characters were confirmed by Yuri I. SAZONOV (ZMMGU) and Yuri N. SHCHERBACHEV (IOAN), who examined the holotype and six other specimens that "...had been identified as *B. furvescens* but belong to another genus - *Gadomus*" (*in litt.*, to TI, 1989) during a visit to the Zoological Survey of India in 1987. The six "other" specimens (ZSI Reg. #962-967) all had small barbels and a notably higher number of gill rakers, similar to those enumerated by HOWES & CRIMMEN (1990) for their specimens. The holotype had 6+18 outer, 3+16 inner rakers on the first arch, 2+15 inner and outer rakers on second arch, as compared with (5-6)+(20-21) / (3-4)+(17-19) on first arch, (2-3)+(16-18) / (3-4)+(16-18) on second arch.

Only one species was found in the New Caledonian collection.

### *Bathygadus cottoides* Günther, 1878

*Bathygadus cottoides* Günther, 1878: 23 (between New Zealand and the Kermadec Islands, and Kermadec Is., 950-1280 m). — GÜNTHER, 1887: 154-155, pl. 42, fig. A (descr., fig.). — HOWES & CRIMMEN, 1990: 189.

MATERIAL EXAMINED. — 9 specimens.

**New Caledonia.** BIOCAL: stn CP 30, 23°08.44'S, 166°40.83'E, 1140 m, 29.08.1985: 1 specimen 59.0 mm HL (MNHN 1994-931). — Stn CP 57, 23°43.26'S, 166°68.06'E, 1490 m, 1.09.1995: 1 specimen 46.5 mm HL, 220 mm TL (CAS 86477). — Stn CP 68, 24°00.37'S, 168°07.03'E, 1430 m, 3.09.1985: 1 specimen 59.0 mm HL (MNHN 1994-930). — Stn CP 69, 23°51.38'S, 167°58.68'E, 1225 m, 3.09.1985: 1 specimen 57 mm HL, 275 mm TL (MNHN 1994-929).

**Norfolk Ridge.** HALIPRO 2: stn BT 43, 25°41'S, 167°11'E, 1030-1320 m, 15.11.1996: 3 specimens 17.9-33.8 mm HL, 75+-167 mm TL (CAS 90556). — Stn BT 55, 25°02'S, 168°45'E, 1098-1480 m, 17.11.1996: 1 specimen 96.8 mm HL, 460+ mm TL (CAS 90667). — Stn BT 59, 24°58'S, 168°42'E, 1312-1520 m, 18.11.1996: 1 specimen 62.1 mm HL, 285+ mm TL (CAS 90748). — Stn BT 66, 24°43'S, 168°28'E, 1126-1146 m, 19.11.1996: 1 specimen 71.1 mm HL, 427+ mm TL (CAS 90685). — Stn BT 75, 24°13'S, 167°36'E, 1128-1150 m, 21.11.1996: 2 specimens 72.7-74.0 mm HL, 350+-400+ mm TL (CAS 90992). — Stn BT 104, 25°23'S, 168°35'E, 1118-1124 m, 27.11.1996: 1 specimen 38.2 mm HL, 178+ mm TL (CAS 90835).

**Loyalty Ridge.** HALIPRO 2: stn BT 23, 25°04'S, 170°11'E, 1105-1360 m, 10.11.1996: 1 specimen 87.5 mm HL, 420+ mm TL (CAS 90993).

DIAGNOSIS (from current specimens only). — Pelvic fin rays 9; outer gill rakers first arch (5-6)+(19-20), 24-26 total; orbit 16-21% of HL; interorbital 30-37%; no chin barbel; gill rakers 8-14; color dark over entire body, including chest and gular membrane, head and fins black or blackish, gill filaments pale; pyloric caeca 18-25.

DESCRIPTION (*Counts and measurements*). — 1D. II,6-10; P. i13-i17; GR-I (inner) 3+(15-18), GR-II (outer/inner) 2+(15-17) / (2-3)+(15-17); pyloric caeca (7 spec.) 18-27. Total lengths 167+-460+ mm; HL 44.8-96.8 mm. The following in percent HL: snout 30-33; interorb. 30-37; suborb. 15-19 (fleshy measure), 12-17 (bony); postorb. 51-53; orb.-preop. 48-53; up.jaw 51-56; len. P. 55-62 (4 spec.).

SIZE. — To 97 mm HL and 46 cm TL.

DISTRIBUTION. — Off New Zealand, southern Australia, and New Caledonia, but possibly more widely distributed; depth range about 1030-1520 m.

REMARKS AND COMPARISONS. — *Bathygadus cottoides* is closely similar to *B. spongiceps*. According to HOWES and CRIMMEN (1990: 190), *B. cottoides* has a slightly longer upper jaw, slightly lower ascending premaxillary process, broader gap between premaxillary teeth bands, and fewer pectoral fin rays. Our New Caledonian specimens, however, obscure these differences and show almost complete overlap in characters. The pyloric caeca count in *B. spongiceps* is recorded by GILBERT and HUBBS (1920: 383) as 16, 17, and 21. In two (of three) specimens (CAS 86482) of *B. spongiceps* recently collected off the east coast of Luzon, we counted 15 each. These compare with the 18-25 we counted in seven New Caledonian specimens of *C. cottoides*. Our comparisons suggest that the two nominal species may be the same, but more specimens should be examined to verify this.

Specimens reported as *B. cottoides* from southern Africa by IWAMOTO and ANDERSON (1994: 3) should be re-examined, as they appear to differ significantly in several features from our New Caledonian representatives of that species. The low counts for pectoral fin-rays (i10-i14, rarely i15) and pyloric caeca (9-12), the somewhat wider interorbital space (35-40% of HL), the wide separation of anus and anal fin (about 5 scale rows), and the small adult size (large ovaries with individual eggs present in 41 mm HL specimen, CAS 82312, from off Cape of Good Hope, 1200 m) are sufficient to recognize them as distinct from our specimens of *B. cottoides*.

#### Genus *GADOMUS* Regan, 1903

*Gadomus* Regan, 1903: 459 (type species *Bathygadus longifilis* Goode & Bean, 1885, by original designation).

DIAGNOSIS. — Chin barbel usually long and well developed, rarely short; first dorsal, pectoral, and pelvic fins usually with one or more stout, elongated rays; retia and gas glands 4.

REMARKS. — Only two specimens of this genus were found in the collections, each representing a different species, one of which we are unable to assign to a known species. They can be distinguished by the following key:

- Barbel longer than head length; interorbital width about 1.5 into orbit diameter; outer gill rakers long, pointed, greatest length about 2.5 times least suborbital width .... **sp. indet.**
- Barbel less than half head length; interorbital width about equal to orbit diameter; gill rakers relatively short, bluntly tipped, greatest length about 1.5 least suborbital width ..... ***introniger***

#### *Gadomus introniger* Gilbert & Hubbs, 1920

Fig. 4

*Gadomus introniger* Gilbert & Hubbs, 1920: 401-405, fig. 5 (holotype USNM 78209, Buton Strait near Celebes; 1022 m; 7 paratypes, Philippines and East Indies).

*Gadomus multifilis* - RADCLIFFE, 1912: 106, text fig. 1 (part)(non *Bathygadus multifilis* Günther, 1887).

MATERIAL EXAMINED. — 1 specimen.

**Matthew and Hunter Islands.** VOLSMAR: stn CP 26, 22°22.80'S, 171°21.40'E, 980 m, 4.06.1989: 1 specimen male 67 mm HL, 390+ mm TL (MNHN 1997-656).

DIAGNOSIS. — Pelvic rays 8; greatly elongated ray in pectoral, pelvic, and first dorsal fins; barbel variable in length, from half eye diameter to two-thirds head length; interorbital width about equal to orbit diameter; outer gill rakers on first arch (4-6)+(20-25), short (about half interorbital), and bluntly tipped. Pyloric caeca about 30-52.



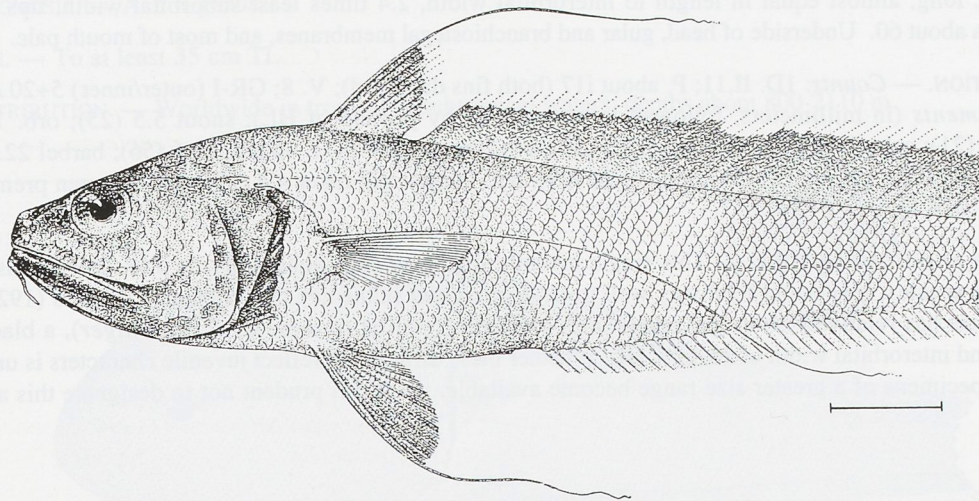


FIG. 4. — *Gadomus introniger* Gilbert & Hubbs (From GILBERT & HUBBS, 1920, fig. 5). Scale = 25 mm.

DESCRIPTION. — The reader is referred to the detailed and accurate original description of the species by GILBERT & HUBBS (1920).

Counts: 1D. II,10; P. i17/i18; GR-I (outer/inner) 5+22 / 4+17.

Measurements (in millimeters followed by percent of HL in parentheses): snout 19 (28); orb. 15.3 (23); interorb. 14.3 (21); suborb. 9.0 (13); postorb. 35.0 (52); orb.-preop. 31.5 (47); up.jaw 38 (57); barbel 6.4 (10); body depth 59 (88); ht. 1D. 92 (137); len. P. 160 (239); len. V. 101 (151); longest gill raker 6.2 (9.3); premaxillary teeth gap 2.5 (3.7); post. nostril 5.7 (8.5).

SIZE. — The Matthew and Hunter specimen appears to be the largest recorded at 39+ cm TL.

DISTRIBUTION. — Philippines to Indonesia (Borneo and Celebes) and Matthew and Hunter Islands, in 549-1280 m.

REMARKS AND COMPARISONS. — Our New Caledonian specimen agrees well with the original description except that the gular membrane in our specimen is not black but dusky to pale, and the branchiostegal membrane is black with paler areas over the rays and outer margin. The first dorsal in our specimen is black, whereas GILBERT & HUBBS (1920: 404) record it as "light throughout." The interorbital width is slightly wider than reported (21% HL compared with about 15-17%). We counted approximately 30 pyloric caeca, in contrast to the 35-52 recorded by GILBERT & HUBBS. Our count may have been inaccurate, however, because the caeca in our single specimen had to be removed from the everted stomach to be counted, and damage to the fragile caecal mass could not be avoided. HOWES & CRIMMEN (1990: 198) recorded 20 caeca in a single paratype.

The presence of this species in the collection is not surprising, as many *Gadomus* species appear to be widespread and New Caledonia would represent simply an extension of its known distribution. It should be expected also in tropical waters of Australia, especially off Queensland.

#### *Gadomus* sp. indet.

MATERIAL EXAMINED. — 1 specimen.

**Chesterfield and Bellona Plateau.** MUSORSTOM 5: stn CC 390, 21°00.90'S, 160°50.30'E, 745-825 m, 22.10.1986: 1 specimen 22.2 mm HL, 124 mm TL (MNHN 1996-962).

DIAGNOSIS. — Pelvic rays 8; greatly elongated ray in pectoral and pelvic fins (condition in first dorsal unknown); barbel very long, about equal to head length; interorbital narrow, 21% HL, 1.5 into orbit diameter; gill

rakers 5+20, long, almost equal in length to interorbital width, 2.4 times least suborbital width, tips pointed. Pyloric caeca about 60. Underside of head, gular and branchiostegal membranes, and most of mouth pale.

DESCRIPTION. — *Counts*: 1D. II,11; P. about 17 (both fins damaged); V. 8; GR-I (outer/inner) 5+20 / 3+15.

*Measurements* (in millimeters, followed in parentheses by percent of HL): snout 5.5 (25); orb. 7.0 (32); interorb. 4.7 (21); suborb. 1.8 (8); postorb. 11.0 (50); orb.-preop. 10.4 (47); up.jaw 12.6 (56); barbel 22.5 (101); body depth 15.5 (70); len. P. 35 (158); len. V. 22 (99); len. longest gill raker 4.4 (20); gap between premaxillary teeth bands 1.0 (4.5).

REMARKS AND COMPARISONS. — This single juvenile specimen does not readily fit into the circumscription of any known species. It keys out relatively well to *G. denticulatus* in the key by GILBERT & HUBBS (1920: 392), but that species has relatively short gill rakers with blunt tips (similar to those in *G. introniger*), a black gular membrane, and interorbital width of 15-17% HL. Whether these differences reflect juvenile characters is uncertain. Until more specimens of a greater size range become available, we feel it prudent not to designate this as a new species.

### Family MACROURIDAE

DIAGNOSIS. — Gadiforms with long dorsal and anal fins meeting at end of long tapered tail; caudal fin rudimentary (in Trachyrincinae) or absent; spinous dorsal ray present or absent; no teeth on palate; spinules usually present on body scales (rarely absent or rudimentary); retia and gas glands 2 to 6 (in some individuals of some species, as many as 7 to 11); nasal bones with median and lateral processes forming a distinctly protruding snout.

### Subfamily MACROUROIDINAE

DIAGNOSIS. — Gadiforms with exceedingly large, spongy, bulbous head; dorsal and anal fins long, low, converging at end of tail; outer gill arch free from gill cover; outer series of gill rakers lathlike; pelvic fins absent or very small, with 5 or 6 rays; chin barbel absent.

REMARKS. — Two genera, each with a single species.

### Genus *SQUALOGADUS* Gilbert & Hubbs, 1916

*Squalogadus* Gilbert & Hubbs, 1916: 156 (type species *Squalogadus modificatus* Gilbert & Hubbs, 1916, by original designation).

DIAGNOSIS. — Small pelvic fin present, with 5 or 6 rays.

REMARKS. — A single species, worldwide.

### *Squalogadus modificatus* Gilbert & Hubbs, 1916

Fig. 5

*Squalogadus modificatus* Gilbert & Hubbs, 1916: 156-158, pl. 8, fig. 2 (holotype USNM 76864; off Kyushu, Japan, 1317 m)

*Squalogadus intermedius* Grey, 1959: 330 (holotype USNM 185606, Gulf of Mexico; 1097 m).

MATERIAL EXAMINED. — 2 specimens.

**New Caledonia.** BIOCAL: stn CP 60, 22°09.02'S, 167°33.18'E, 2110 m, 2.09.1985: 1 specimen 40 mm HL (MNHN 1994-928). — Stn CP 72, 24°01.45'S, 167°08.43'E, 1530 m, 4.09.1985: 1 specimen 42 mm HL (MNHN 1994-927).

DIAGNOSIS. — As for genus.

SIZE. — To at least 35 cm TL.

DISTRIBUTION. — Worldwide in tropical to subtropical waters; depths about 800-2110 m.

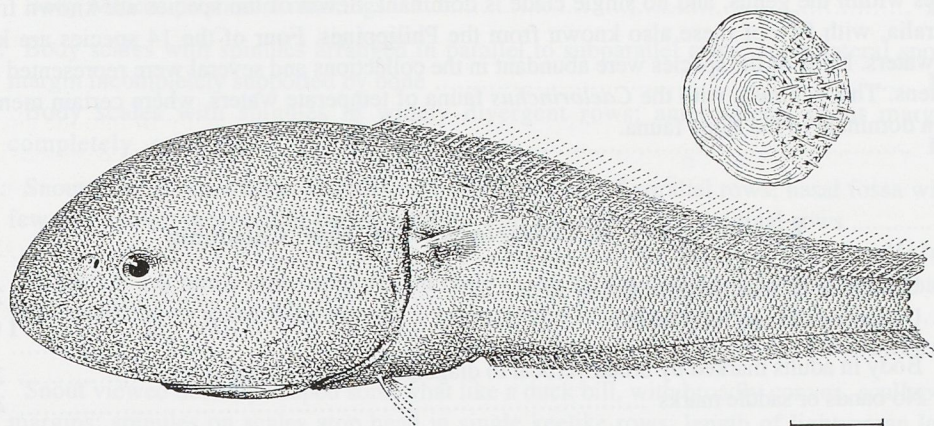


FIG. 5. — *Squalogadus modificatus* Gilbert & Hubbs (From GILBERT & HUBBS, 1916, pl. 8, fig. 2). Scale = 25 mm.

REMARKS AND COMPARISONS. — Only two juveniles (in poor condition) of this widely distributed species were collected. The species is distinguished from its only subfamilial relative, *Macrouroides inflaticeps* Smith & Radcliffe, 1912, by its small pelvic fins, which are absent in the latter species.

#### Subfamily MACROURINAE

DIAGNOSIS. — Two dorsal fins separated by a distinct gap, the first short and high, the second long and low, converging with better-developed anal fin at end of tail; an elongated spinous ray in first dorsal; outer gill arch attached to gill cover by membranes, restricting opening of gill slit; gill rakers all tubercular or tablike.

REMARKS. — This is the largest group of grenadiers with more than 250 species included among about 26 or more genera (depending on authority). Thirteen genera are found in New Caledonia.

#### Genus *CAELORINCHUS* Giorna, 1809

*Caelorinchus* Giorna, 1809: 179 (type species *Leidoleprus caelorhincus* Risso, 1810, by subsequent designation of FQWLER, 1936: 459).

*Paramacrurus* Bleeker, 1874: 370 (type species *Lepidoleprus australis* Richardson, 1839, by original designation).

*Oxymacrurus* Bleeker, 1874: 370 (type species *Macrurus japonicus* Temminck & Schlegel, 1842, by original designation).

*Abyssicola* Goode & Bean, 1896: 417 (type species *Macrurus macrochir* Günther, 1877, by monotypy).

*Quincuncia* Gilbert & Hubbs, 1920: 432 (as subgenus; type species *Coelorhynchus argentatus* Smith & Radcliffe, 1912, by original designation).

*Mahia* McCann & McKnight, 1980: 53 (type species *Mahia matamua* McCann & McKnight, 1980, by original designation).

DIAGNOSIS. — Branchiostegal rays 6; outer gill rakers absent; spinous dorsal ray lacking denticulations on leading edge (occasional few at tip of ray in rare individuals); snout armed with stout terminal scute; stout, spiny suborbital ridge extending continuously onto preopercle, ending in a sharp point; light organ well developed in

most species with dermal window on midline of belly and/or chest; pelvic rays almost always 7 (usually 6 in *Caelorinchus sexradiatus* Gilbert & Hubbs, 1920).

REMARKS. — This large genus of 100 or more species is represented in the New Caledonian fauna by 14 species, five of which are here newly described. Relationships of the 14 species appear to lie with several different clades within the genus, and no single clade is dominant. Seven of the species are known from the east coast of Australia, with five of these also known from the Philippines. Four of the 14 species are known from New Zealand waters. None of the species were abundant in the collections and several were represented by only one or two specimens. This contrasts with the *Caelorinchus* fauna of temperate waters, where certain members of the genus are often dominant in the slope fauna.

#### Key to species of *Caelorinchus* of New Caledonia

1. Underside of head naked or nearly so ..... 2
- Underside of head fully scaled ..... 10
2. Body in adults marked by broad vertical to diagonal bands or saddle marks ..... 3
- No bands or saddle marks ..... 4
3. A prominent dark horizontal streak behind orbits; black midventral strip expanded at both ends, anterior end just behind isthmus, posterior end before anus; anterolateral snout margin incompletely supported by bone ..... *C. cingulatus*
- No streak behind orbit; large fossa on chest but not connected to anus by dark midventral streak; anterolateral snout margin completely supported by bone ..... *C. cylindricus* sp. nov.
4. Snout length about equal to orbit diameter; branchiostegal membrane dorsally and tip of first dorsal black; chin barbel almost as long as orbit diameter ..... *C. melanobranchus* sp. nov.
- Snout much longer than orbit; branchiostegal membrane and first dorsal not pigmented as above; chin barbel short, 1.7 or more into orbit diameter ..... 5
5. Light organ long, extending from anus to just behind isthmus ..... 6
- Light organ short, not extending forward of pelvic bases ..... 8
6. Body prominently mottled with dark blotches, the blotches forming irregular longitudinal stripes ..... *C. argentatus*
- Body lacking mottled pattern ..... 7
7. A dusky to dark horizontal streak behind pectoral fin; first dorsal pale proximally, dusky distally; anterior 10-15 anal rays dark, remaining rays pale; anterolateral snout margin completely supported by bone ..... *C. acutirostris*
- No dark streak on flanks; first dorsal with prominent black blotch; anal rays pale to white; anterolateral snout margin incompletely supported ... *C. semaphoreus* sp. nov.
8. Snout long, about twice orbit diameter; membrane behind spinous second ray of first dorsal fin black; body scales deciduous, covered with short, greatly reclined conical spinules in 8-11 parallel rows ..... *C. spathulatus*
- Snout much less than twice orbit; first dorsal dusky, spine black or dusky, but membrane behind dusky to pale; scales adherent, spinules prominent, in 4-7 divergent rows ..... 9
9. Underside of snout immaculate; ventral half of trunk and tail white to pearly; body scales with 5-8 rows of sharp, narrow-bladed spinules ..... *C. anatirostris*

- Underside of snout covered with dark papillae and hairy filaments giving dirty appearance to surface; body uniformly brown to grayish brown, not whitish ventrally; body scales with 4 or 5 rows of broad, widely buttressed spinules ..... *C. shcherbachevi* sp. nov.
10. Body marked with prominent saddle marks ..... *C. celaenostomus*  
 — Body without prominent markings ..... 11
11. Body scales with spinules arranged in parallel to subparallel rows; anterolateral snout margin incompletely supported by bone ..... 12  
 — Body scales with spinules in widely divergent rows; anterolateral snout margin completely supported ..... 13
12. Snout 1.9-2.0 times orbit; spinules on body scales in 5-7 parallel rows; nasal fossa with few tiny scales; most scales between orbits with spinules in longitudinal rows .....  
 ..... *C. parallelus*  
 — Snout 1.5-1.8 times orbit; spinules on body scales in 4-6 subparallel rows; nasal fossa fully scaled; most scales between orbits with spinules in divergent rows .....  
 ..... *C. kermadecus*
13. Snout viewed dorsally shaped somewhat like a duck bill, with broadly convex, scalloped margins; spinules on scales atop head in single keelike rows; length of light organ less than diameter of posterior nostril; anus immediately before anal fin .....  
 ..... *C. platorhynchus*  
 — Snout viewed dorsally relatively narrow, margins roughened and convex, but not scalloped; spinules atop head scales in divergent rows; length light organ about equal to posterior nostril; anus slightly removed from anal fin origin ..... *C. sereti* sp. nov.

*Caelorhynchus acutirostris* Smith & Radcliffe, 1912

Fig. 6a

*Coelorhynchus acutirostris* Smith & Radcliffe, in RADCLIFFE, 1912: 134-136, pl. 30, fig. 2, text-fig. 10 (holotype USNM 72947, Philippines between Cebu and Bohol; 291 m).

*Coelorhynchus* sp. 1 - ARAI in GLOERFELT-TARP & KAILOLA 1984: 85, fig. on p. 84 and photograph of specimen without caption on p. 82 (Indonesia).

MATERIAL EXAMINED. — 13 specimens.

**New Caledonia.** MUSORSTOM 4: stn CC 245, 22°07.00'S, 167°11.00'E, 415-435 m, 3.10.1985: 1 specimen 44.6 mm HL, 181 mm TL (MNHN 1996-961).

**Philippines.** "Albatross", PHILIPPINES EXPEDITION 1907-1910: stn 5418, 10°08'50"N, 123°52'30"E, 291 m, 25.03.1909: holotype 205 TL (USNM 72947).

J.E. NORTON collection: Marinduque Island, Barrio Cowit, 234-256 m, 21.10.1966: 1 specimen 46.6 mm HL, 128+ mm TL (CAS 34171). — Southwest of Marinduque Island, east of Gaspar Island, 134-155 m, 29.09.1966: 4 specimens (CAS 34254).

**Australia.** Queensland, east of Murray Isles: 9°53'S, 144°23'E, 480 m, 28.05.1983: 2 specimens 47.5-67.9 mm HL, 147-221 mm TL (QM I.20657). — 9°51'S, 144°09'E, 464 m, May 1983: 4 specimens 38.3-69.2 mm HL, 110+-238 mm TL (QM I.20666).

Other specimens examined from Western Australia to be reported on in another publication.

**DIAGNOSIS.** — Snout length 47-58% HL; anterolateral margin completely supported by bone. Subopercle lacking prolonged ventral tip. Light organ extending from near isthmus to front of anus. Anus immediately before anal fin. Underside of head naked; nasal fossa usually naked, but small scattered scales in some specimens. Body scales small, covered with conical spinules in five to seven slightly divergent rows, 42-58 lateral line scales over a distance equal to predorsal length. Dark streak on belly extending horizontally from pectoral fin base to above anal fin origin; a curved dark streak (often faint or disrupted) passing below base of first dorsal fin from nape to second dorsal; chest and vent areas darkly punctulate to blackish; anterior 10-15 rays of anal fin blackish.

DESCRIPTION. — *Counts*: 1D. II, 7-10 (usually 8 or 9); P. i15-i17; GR-I (inner) 6-8, GR-II (outer/inner) 5-6/6-8; scales 1D. 7-9, mid-1D. 5-7, 2D. (6) 7-8.5.

*Measurements*: Total length 110-238+ mm; HL 38.3-69.2 mm. The following in percent HL: preoral (40)42-52; internasal 13-20; interorb. 18-22; orb. 20-23; suborb. 11-13; postorb. 23-30; orb.-preop. 27-32; up.jaw 17-22; barbel 4-7; gill slit 8-13; pre-A. 126-153; V.-A. 26-44; isthm.-A. 48-68; body depth 36-57; 1D.-2D. 8-13; ht. 1D. 32-42; len. P. 28-41; len. V. 23-34; nostril 4-9.

Snout notably long and sharply pointed, length more than twice orbit diameter. Mouth small, inferior; upper jaw restricted laterally, maxillary extends to below posterior 1/3 of orbit. Premaxillary teeth band short, broad; mandibular band longer and more narrow, extending to end of rictus.

Height first dorsal less than postrostral length of head; second dorsal begins close behind first, anterior rays relatively well developed but not as long as opposites of anal fin. Outermost ray of pelvic barely extends to anus.

Scales small, exposed fields covered with slender, conical, relatively erect spinules in slightly to moderately divergent rows. Scale spinules on head ridges short, numerous, but not enlarged or especially coarse. Supraoccipital scute and postoccipital scute weakly developed. Narrow naked clefts run longitudinally from behind terminal scute along each side of median-dorsal area of snout.

Light organ belonging to Group IV of IWAMOTO (1990); expanded anterior end recessed in a deep fossa, expanded posterior end partially surrounding anus but not within a fossa; all of light organ, including anterior fossa, covered with scales.

*Color* in alcohol light brownish gray dorsally, paler ventrally on body, white on underside of head. Chest black, with midventral black streak of light organ extending to front of anus; strong contrast between dark streak and pale, somewhat whitish lateral sides of belly. Mouth, jaws, barbel immaculate; gullet gray; gular and branchiostegal membranes completely pale. Gill cavity pale to dusky; darker over inner opercular surface. First dorsal pale at base, dusky distally; pectorals light dusky; pelvics coarsely peppered, blackish distally, outer ray white; anal pale or lightly dusky.

SIZE. — To about 25 cm TL.

DISTRIBUTION. — New Caledonia; Philippines; Indonesia; Australia, off Queensland and Western Australia. Depth range 134-480 m

REMARKS AND COMPARISONS. — *Caelorinchus acutirostris* is a peculiar species among IWAMOTO's (1990) Group IV species in that it has a long light organ typical of the group, but complete bony support of the anterolateral margins of the snout. All other Group IV species have the anterolateral margin incompletely supported. The small scales and distinctive body markings in fresh specimens coupled with other diagnostic features make it unlikely to be mistaken for any other species.

*Caelorinchus acutirostris* appears to be marginal to New Caledonia, as our collections contained only one small individual. The species is apparently rather common in upper-slope waters of the Philippines, Indonesia, and northern Australia, but it seems not to be anywhere abundant — the most collected at any one station was four.

### *Caelorinchus anatirostris* Jordan & Gilbert, 1904

Figs 6 c, c', c''

*Coelorhynchus anatirostris* Jordan & Gilbert in JORDAN & STARKS, 1904: 619-620, fig. (holotype CAS-SU 8550, Misaki, Japan; collected by K. AOKI by longline).

MATERIAL EXAMINED. — 7 specimens.

**New Caledonia.** BIOCAL: stn CP 40, 22°55.32'S, 167°23.30'E, 650 m, 30.08.1985: 2 specimens 22.5-30.5 mm HL, 92-125 mm TL (MNHN 1994-906). — Stn CP 75, 22°18.65'S, 167°23.30'E, 825 m, 4.09.1985: 1 specimen 54.0 mm HL, 212 TL, (MNHN 1994-904).

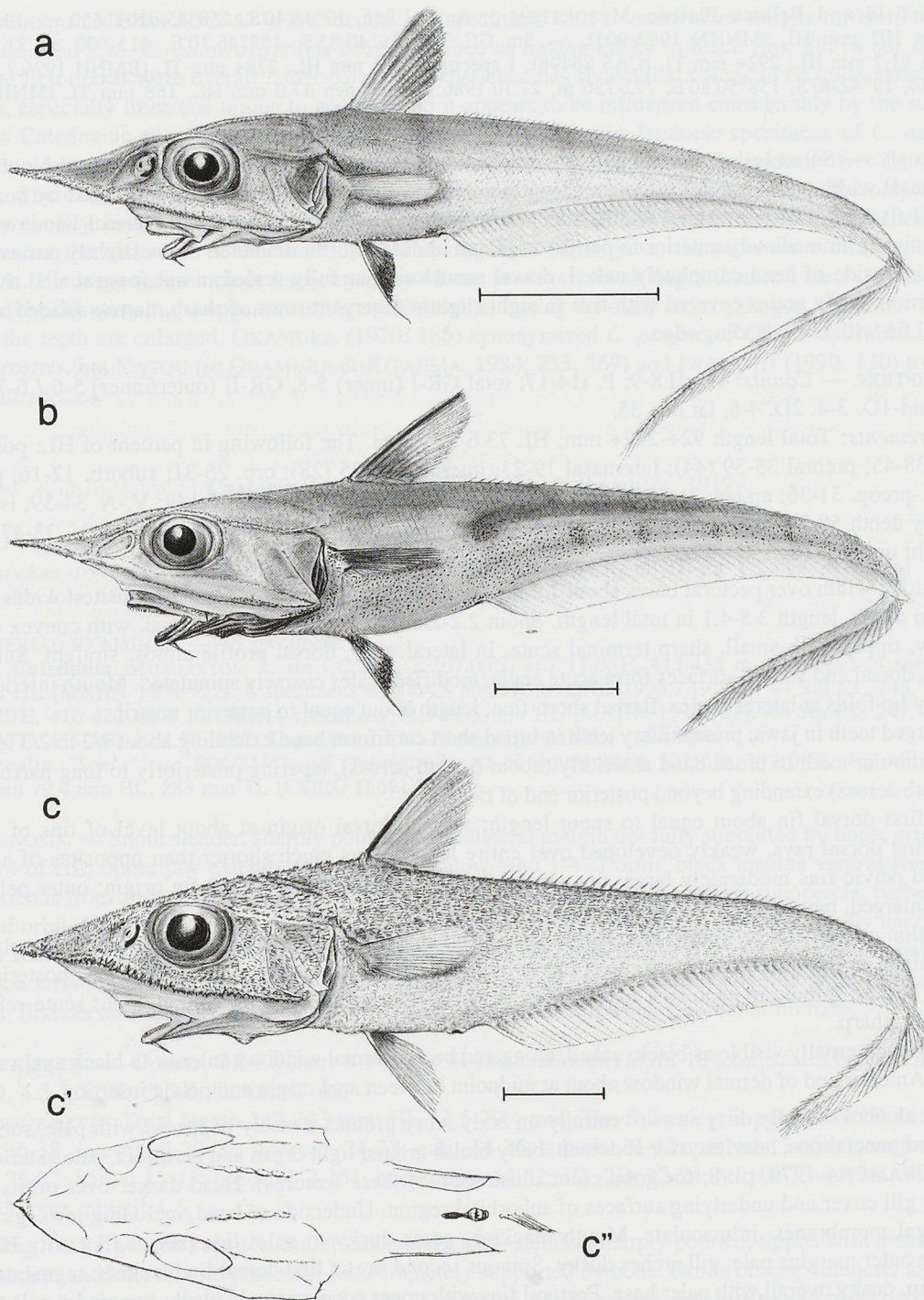


FIG. 6. — a, *Caelorinchus acutirostris* Smith & Radcliffe, 44.6 mm HL (MNHN 1996-961), off New Caledonia, MUSORSTOM 4, stn CC 245, 415-435 m. — b, *Caelorinchus argentatus* Smith & Radcliffe, 61.5 mm HL (BMNH 1996.7.19:2), off New Caledonia, MUSORSTOM 4, stn CC 245, 415-435 m. — c, *Caelorinchus anatrostris* Jordan & Gilbert, 81.7 mm HL (CAS 86496), off Chesterfield and Bellona Plateau, MUSORSTOM 5, stn CC 383, 615-600 m (c', dorsal view of head, c'', anus area). Scales = 25 mm.

**Chesterfield and Bellona Plateau:** MUSORSTOM 5: stn CC 366, 19°45.40'S, 158°45.62'E, 650 m, 19.10.1986: 1 specimen 102 mm HL (MNHN 1994-903). — Stn CC 383, 19°40.85'S, 158°46.10'E, 615-600 m, 21.10.1986: 1 specimen 81.7 mm HL, 292+ mm TL (CAS 86496), 1 specimen 73.6 mm HL, 278+ mm TL (BMNH 1996.7.19:1). — Stn CC 384, 19°42.40'S, 158°50.80'E, 772-756 m, 21.10.1986: 1 specimen 47.0 mm HL, 168 mm TL (MNHN 1994-905).

**DIAGNOSIS.** — Snout broad, sharply pointed, moderately long, tipped with small, short scute, orbit about 1.3-1.8, internasal width about 1.9-2.3 into snout length; anterolateral margins completely supported by bone; orbit diameter (1.0) 1.1-1.4 of interorbital width. Subopercle terminates in long, slender tip. Dermal window of light organ prominent, immediately anterior to periproct, length about 1/3 orbit diameter. Anus slightly removed from anal fin. Underside of head completely naked; dorsal snout surfaces fully scaled; nasal fossa scaled over most ventral portion. Body scales covered with five to eight slightly divergent rows of sharp, narrow-bladed spinules. First dorsal fin with black leading edge.

**DESCRIPTION.** — *Counts:* 1D. II,8-9; P. i14-17; total GR-I (inner) 5-8, GR-II (outer/inner) 5-6 / 6-7; scales 1D. 5-6, mid-1D. 3-4, 2D. 4-6, lat.line 35.

*Measurements:* Total length 92+-292+ mm; HL 73.6-81.7 mm. The following in percent of HL: postrostral 58; snout 38-45; preoral 35-39 (44); internasal 19-23; interorb. 20-25 (28); orb. 26-31; suborb. 12-16; postorb. 30-33; orb.-preop. 31-36; up.jaw 21-27; barbel 6-10 (12); gill slit 10-11; pre-A. 147-149; V.-A. 34-39; isthm.-A. 56-61; body depth 50-54; 1D.-2D. 21-26; ht. 1D. 38-49; len. 1D. base 18-19; len. P. 44-48; len. V. 33-47; nostril 10; len. light organ 9-10.

Trunk stout, width over pectoral bases about 1.2 into greatest depth; head broad, robust, greatest width slightly greater than depth, length 3.5-4.1 in total length. Snout 2.2-2.6 into head, relatively broad, with convex sides in dorsal view, tipped with small, sharp terminal scute. In lateral view, dorsal profile almost straight. Suborbital ridge sharp, dorsal and ventral surfaces form acute angle, modified scales coarsely spinulated. Mouth inferior, gape restricted by lip folds at lateral angles. Barbel short, fine; length about equal to posterior nostril.

No enlarged teeth in jaws; premaxillary teeth in broad short cardiform band extending about 1/2 to 2/3 length of rictus; mandibular teeth in broad band anteriorly (about 6 teeth across), tapering posteriorly to long narrow band (about 4 teeth across) extending beyond posterior end of rictus.

Height first dorsal fin about equal to snout length; second dorsal origin at about level of tips of longest depressed first dorsal rays, weakly developed over entire length, rays much shorter than opposites of anal fin. Pectoral and pelvic fins moderately large, tips extend beyond vertical through anal fin origin; outer pelvic ray somewhat enlarged, but tapers to hair-fine tip.

Squamation overall coarse, spiny; head ridges strong and spiny. Spinules on body scales greatly overlapping, closely adjoined to one another, posteriormost tips infrequently free, increasing in height and size posteriorly on scale field, largest spinule in each row overlapping posterior margin of scale. Terminal snout scute relatively small, narrow, sharp.

Light organ externally visible as black, naked, elongated body (dermal window) anterior to black anal surround (periproct). Anterior end of dermal window about at midpoint between anal origin and pelvic insertion.

*Color* in alcohol dorsally dirty straw; ventrally on body ivory ground, densely peppered with pale, somewhat violet-colored punctations, heaviest over abdomen; belly bluish around light organ and periproct, pale anteriorly on chest (see OKAMURA 1970, pl. 8, for good color illustration of these features). Head darker over orbits; ivory ground over gill cover and underlying surfaces of suborbital region. Underside of head, including jaws, gular and branchiostegal membranes, immaculate. Mouth blackish, gums dusky to pale; lips pale. Gill cavity blackish except along outer margins pale; gill arches dusky. Spinous second ray of first dorsal fin blackish; segmented rays blackish at tip, dusky overall with paler base. Pectoral fins with upper edge narrowly black; remainder pale to light dusky. Pelvic fins pale, whitish to light dusky. Anal entirely pale, whitish.

**SIZE.** — To at least 43 cm TL.

**DISTRIBUTION.** — Southern Japan and East China Sea in 300-550 m; New Caledonia and Chesterfield and Bellona Plateau, in 600-855 m.



REMARKS AND COMPARISONS. — We identify our specimens with *C. anatirostris* despite differences in color, scales, and orbit size. *C. anatirostris* has been described as having dusky to black fins, but in our specimens, all but the first dorsal were overall rather pale. Our experience has shown that color can be quite variable within a species, especially from one region to another, and it appears to be influenced considerably by the substratum. Our New Caledonian specimens were overall very pale. The scales in Japanese specimens of *C. anatirostris* (as illustrated by OKAMURA, 1970, textfig. 80) appear to have spinules that are individually free from adjacent spinules, whereas in our specimens, the spinules, including the tips, are closely adjoined, the only free tip in each row usually being that of the last spinule. OKAMURA (1970: 187) noted two scale patches in larger specimens on the underside of the head, one above the angle of the jaws, the other on ventral aspects of the preopercle. His large series included specimens to 40 cm, however, much larger than any we examined. He also described the dentition in the upper jaw of *C. anatirostris* as having the outer series enlarged, but in our specimens, none of the teeth are enlarged. OKAMURA (1970: 186) synonymized *C. productus* Gilbert & Hubbs, 1916 with *C. anatirostris*, but YATOU (in OKAMURA & KITAJIMA, 1984: 233, 369) and IWAMOTO (1990: 130) treated each as separate species.

*Caelorinchus argentatus* Smith & Radcliffe, 1912

Fig. 6 b

*Coelorhynchus argentatus* Smith & Radcliffe, in RADCLIFFE, 1912: 137-138, pl. 31, fig. 1 (holotype USNM 72949; Sulu Sea, near Jolo; 582 m).

MATERIAL EXAMINED. — 16 specimens.

**New Caledonia.** MUSORSTOM 4: stn CC 245, 22°07.00'S, 167°11.00'E, 415-435 m, 3.10.1985: 4 specimens 51-67.5 mm HL (MNHN 1994-922); 2 specimens 61.5-64.5 mm HL (BMNH 1996.7.19:2-3). — Stn CC 246, 22°08.50'S, 167°11.50'E, 410-420 m, 3.10.1985: 4 specimens 44.5-66.5 mm HL (MNHN 1994-921). — Stn CC 247, 22°09.00'S, 167°13.30'E, 435-460 m, 4.10.1985: 5 specimens 62.5-83 mm HL (MNHN 1994-920).

**Australia.** "Soela": stn SO6/85/47, off Queensland east of Hinchinbroo, 17°55'S, 147°06'E, 402 m, 29.11.1985: 1 specimen 79.4 mm HL, 283 mm TL (CSIRO H.691-02).

DIAGNOSIS. — Snout slender, sharply pointed; anterolateral margin not fully supported by bone; orbit diameter about 1/4 of HL; upper jaw extends posteriorly to below hind 1/4 of orbit; black median ventral streak of light organ extends from anus forward onto chest just behind isthmus; no projecting tab on subopercle; barbel about 1/2 or less of orbit. Underside of head naked except anterolateral margin of snout; nasal fossa wholly naked; spinules on body scales in widely divergent rows or in vaguely quincunx pattern. Faint dorsal stripe along half length of tail; black striations or punctations on gular membrane; mouth white; ventral edge of preopercle ridge often blackish; first dorsal fin dusky to blackish, spinous second ray black, no black border at fin base.

DESCRIPTION. — *Counts*: GR-I (inner) 8-9 total, GR-II (inner/outer) 6-7/8-10 total; scales below 1D. 8-9, mid-base 1D. 4.5-5.5, 2D. 5.5-6, lat.line 47-48.

*Measurements*: Total length 242-283 mm; HL 61.5-79.4 mm. The following in percent of HL: snout 44-45; preoral 36-38; internasal 20-22; interorb. 24-25; orbit 24-26; suborb. 11-12; postorb. 31-34; orb.-preop. 34-37; up. jaw 29-32; barbel 11-13; pre-A. 147-151; body depth 44-52; 1D.-2D. 22-24; ht. 1D. 33-44; len. P. 37-41; len. V. 28-33; post. nostril 4-6.

See Fig. 6b for general features. Snout moderately long, slender, sharply pointed, tipped with a sharp terminal scute; median and lateral nasal processes not completely supported by bone. Orbits oblong, diameter about 1.6-1.7 in snout length, about equal to interorbital width. Suborbital shelf between nasal fossa and orbit partially naked. Preopercle margin moderately angular, forming a moderate lobe. Gill opening relatively wide, extending forward to level of angle of lower jaws; gill membranes form a narrow free fold across isthmus.

Teeth small, fine, in long, moderately wide band in upper jaw, 6 or 7 teeth across widest point, extending to about end of rictus; in narrow band in lower jaw, about 4 teeth across widest point, extending slightly beyond end of rictus, inner teeth slightly larger.

First dorsal fin height less than postrostral length of head; pectoral and pelvic fins less than half head length; outer pelvic ray falling well short of anal origin. Second dorsal low throughout, height much less than well-developed anal fin.

Scales of head and body thin, finely covered with short, weak, erect, conical spinules. Those on body with spinules in irregularly quincunx pattern or in widely divergent rows. Scales over top of head with dense array of short spinules, most in somewhat divergent rows; a long, narrow, naked area immediately behind anterolateral snout margin; scales along anterolateral margin overlap broadly over ventral surfaces; median nasal ridge with slightly modified, somewhat rectangular-shaped scales covered with weak, short spinules. Suborbital ridge with modified scales, but spinules covering them not especially coarse and stout.

Luminescent organ long, expanded at each end, fully scale covered.

*Color* in alcohol. Body markings faint, somewhat blotchy over trunk; dorsum posteriorly from nape to about origin of second dorsal fin light brown. A rather faint, narrow stripe running dorsally below second dorsal fin, becoming narrower towards middle of tail and merging with dorsal profile; anterior end of stripe somewhat hockey-stick shaped, the head directed somewhat anteroventrally; seven or eight faint bands posteriorly on tail. Median nasal process black, readily visible through transparent head covering. Gular and branchiostegal membranes black, striated or reticulated pattern developed on former, outer border of latter pale. Jaws and lips blackish except at angle; mouth cavity immaculate; gill cavity dusky, heavily peppered over operculum. Black streak of ventral light organ slightly expanded around anus, extensively expanded at anterior end, forward to region behind isthmus. Second spinous ray of first dorsal and membrane immediately behind black or blackish to base, fin dark anteroventrally, pale posterodorsally; immediate base of fin rather pale. Pectoral fin light dusky, pale over ventralmost rays. Pelvic fin pale with small black blotch at base and tip. In life, the ventral aspects of head and body probably widely silvery.

*DISTRIBUTION.* — So far known only from New Caledonia and Queensland coast of Australia, but may extend across northern Australia and into Indonesian waters (see Remarks concerning populations). Depth range 402-460 m.

*SIZE.* — Probably attains at least 30 cm TL.

*REMARKS AND COMPARISONS.* — We have identified our New Caledonian specimens as *C. argentatus*. However, in our examination of the holotype and several Sulu Sea specimens, we found slight differences in some measurements and counts from those taken from our New Caledonian and Queensland material: snout length (40-43% HL cf. 44-45%); preoral length (29-35% vs. 36-38%); postorbital length (33-37% vs. 31-34%); distance orbit to preopercle (35-42% vs. 34-37%); lateral line scales over a distance equal to predorsal length (35-44 vs. 47-48). These differences are so slight, however, that they might simply reflect individual variation and small sample size. The holotype and Sulu Sea specimens were so faded that pigmentation patterns could not be compared.

In the Western Australian region, there appear to be two "forms" of *C. argentatus*, although each may represent distinct species. Compared with the New Caledonian/Queensland specimens, one of these forms has a slightly shorter snout (41-44% HL), and slightly longer postorbital (34-36%) and orbit-to-preopercle distance (38-41%). The second form has somewhat shorter preoral length (33-37% HL), longer orbit-to-preopercle distance (36-41%), longer upper jaw (31-34%), longer barbel (12-16%), fewer lateral line scales (37-43), notable differences in body pigmentation, very sparse to absent spinulation on scales of the snout, and a gular membrane that lacks a striated pattern. These forms are currently being studied by IWAMOTO and Alan WILLIAMS for a comprehensive work on Western Australian grenadiers.

### *Caelorinchus celaenostomus* McMillan & Paulin, 1993

Fig. 7

*Caelorinchus celaenostoma* McMillan & Paulin, 1993: 821-823, fig. 2 (New Zealand North Is., and Challenger Plateau in 606-975 m).

*Caelorinchus* sp. E - PAULIN *et al.*, 1989: 126 (in key).

MATERIAL EXAMINED. — 4 specimens.

**Norfolk Ridge.** BERYX 2: stn 3, Seamount B, 24°53.0'S, 168°22.3'E, 600-650 m, 24.10.1991: 1 specimen 57.9 mm HL, 224 mm TL (MNHN 1996-363, formerly NMNZ P.27431).

HALIPRO 2: stn 32, Mousquetaires Seamount, 25°19'S, 168°56'E, 697-1340 m, 12.11.1996: 1 specimen 143 mm HL, 52 cm TL (CAS 90982). — Stn 34, Mousquetaires Seamount, 25°23'S, 168°56'E, 643-1233 m, 12.11.1996: 1 specimen 116 mm HL, 32 cm TL (CAS 90670). — Stn 35, Mousquetaires Seamount, 25°23'S, 168°56'E, 640-740 m, 12.11.1996: 1 specimen 116 mm HL, 31 cm TL (CAS 90984).

DIAGNOSIS. — Snout long, about 2.5 into head length, laterally convex in dorsal view, bluntly tipped with small scute around which a small cluster of slightly coarsened scutelike scales; orbit about 1.7-1.8 in snout length, about 1.0 in interorbital width; internasal about 1.9 in snout length; anterolateral margins incompletely supported by bone; subopercle terminates in slender flexible flap. Light organ very small, scarcely noticeable as narrow naked margin anterior to anus. Underside of head completely and uniformly covered with small, finely spinulated scales, the spinules generally aligned in longitudinal series. Spinules on body scales narrow, closely imbricate, aligned in 4-8 divergent crestlike rows, largest spinule somewhat recurved bladelike. About 9 prominent saddle marks on body.

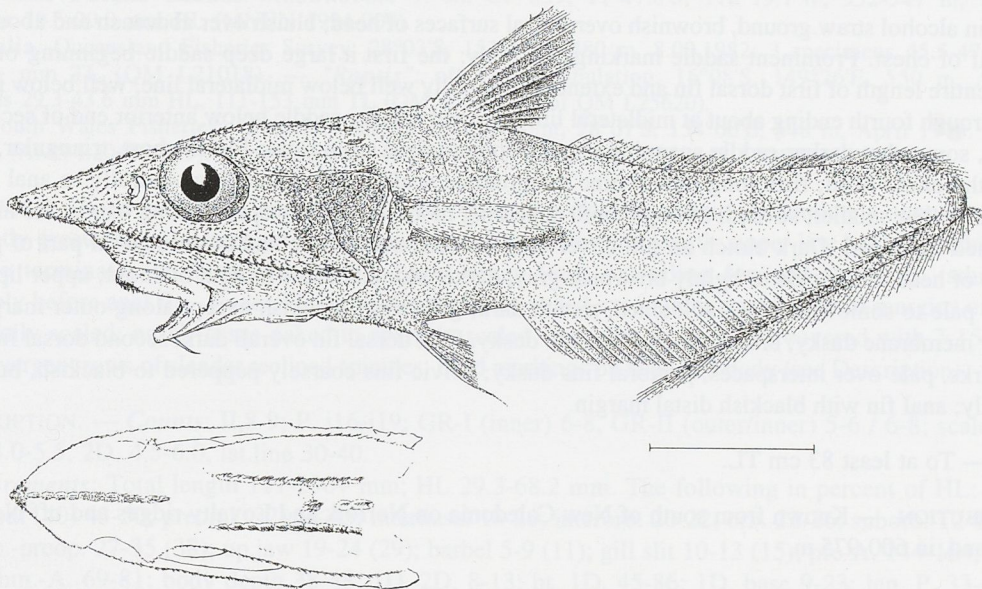


FIG. 7. — Juvenile of *Caelorinchus celaenostomus* McMillan & Paulin, 57.9 mm HL (MNHN 1996-363), Seamount B, southeast of New Caledonia, BERYX 2, stn 3, 600-650 m. Scale = 25 mm.

DESCRIPTION. — *Counts*: 1D. II, 7-9; P. i16-i19; GR-I (inner) 8-10, GR-II (outer/inner) 6/8-9; scales 1D. 6.5, mid-1D. 4-7, 2D. 5.5-8, lat.line 37-43.

*Measurements* in mm: snout 40-52; preoral 30-45; internasal 12-20; interorb. 19-24; orb. 17-25; suborb. 8-14; postorb. 27-38; orb.-preop. 29-44; up.jaw 26-33; barbel 5-13; pre-A. 133-145; body depth 36-57; 1D.-2D. 13-23; ht. 1D. 32-50; len. base 1D. 13-19; len. P. 33-43; len. V. 21-45.

General features of fish seen in Fig. 7 and in original description. Head large, about 3.5-4 in total length, greatest width slightly less than snout length. Body depth about 6-6.5 in total length, equal to distance snout to midorbit. Mouth relatively large, upper jaw extends to or beyond vertical through posterior 1/3 of orbit; rictus little restricted posteriorly. Chin barbel small, tapering to filamentous tip.

Premaxillary teeth small except few larger ones peripherally at anterior end; in moderately broad bands occupying about 3/4 length of rictus. Mandibular teeth small, in long, broad, coarse band, which extends beyond end of rictus.

First dorsal fin about half length of head or less, spinous second ray with two small spinules at distal end of juvenile (MNHN 1996-363), but smooth in adults. Second dorsal begins close behind first, rays relatively well developed for genus, height about half that of corresponding anal portions. Anal fin well developed, origin below posterior end of first dorsal. Pectoral fin length less than half head length; extends posteriorly to below origin of second dorsal, well behind origin of anal. Inner rays of pelvic fin short, not extending to anus; outer ray slightly prolonged, extending to just beyond anal origin.

Head entirely scaled dorsally and ventrally; no naked grooves or naked areas atop snout; nasal fossa finely and fully scaled. Scales on top of head between orbits in 1-5 longitudinal divergent rows, middle row largest. Terminal snout scute small, heavy, forming with adjacent scales a broad, spiny cluster. Underside of snout covered with small, nonimbricate scales armed with crestlike rows of 1-4 erect, usually recurved, spikelike to somewhat caninelike spinules; scales posteriorly under suborbital and preopercle with spinule rows aligned so as to give somewhat striated appearance. Scales of dorsum below anterior end of second dorsal covered with 4-8, usually 7, in slightly divergent rows of narrow, conical to bladelike spinules, median row generally highest, posteriormost median spinule often larger than others on scale field.

Anus immediately in front of anal fin. A small light organ, externally visible as a small, blackish, partially naked area in front of anus; no fossa or dark midventral streak on belly and chest.

*Color* in alcohol straw ground, brownish over dorsal surfaces of head; bluish over abdomen and about one-third to one-half of chest. Prominent saddle markings on body: the first a large deep saddle beginning on nape and spanning entire length of first dorsal fin and extending ventrally well below midlateral line, well below pectoral fin (second through fourth ending about at midlateral line); second smaller saddle below anterior end of second dorsal; third long, somewhat darker saddle spanning about 9 longitudinal scale rows; fourth short, triangular, about one head length behind head; fifth long (about nine longitudinal scale rows), extending ventrally to anal base; sixth similar to fifth but smaller; seventh through ninth appearing more like widely spaced, long bands; the ninth ending as blackened tip of tail. Dark blotch on gill cover over opercle, subopercle and posterodorsal part of preopercle. Underside of head rather pale to lightly brownish-gray, darker along anterior margin of snout; upper lips blackish, lower lips pale to somewhat black splotched, mouth dark; gill cavity blackish except along outer margin. Barbel pale, gular membrane dusky; branchiostegals pale to dusky. First dorsal fin overall dark; second dorsal fin dark over saddle marks, pale over interspaces; pectoral fins dusky; pelvic fins coarsely peppered to blackish, but outer ray pale distally; anal fin with blackish distal margin.

*SIZE.* — To at least 83 cm TL.

*DISTRIBUTION.* — Known from south of New Caledonia on Norfolk and Loyalty ridges and off North Island, New Zealand, in 600-975 m.

*REMARKS AND COMPARISONS.* — *Caelorinchus celaenostomus* and *C. cylindricus* are the only two members of the genus from the New Caledonian region that have prominent saddlelike markings on the body. In the New Zealand region, several species have these saddle markings, but only *C. celaenostomus* McMillan & Paulin, 1993, has a long snout that is considerably longer than the orbit diameter and a completely scaled underside of head.

Comparison of the species with specimens of *C. quadricristatus* Alcock, 1891 from the Indian Ocean reveals a striking similarity in color pattern and squamation features, especially the following: spinule shape, arrangement and number of rows; completely scaled underside of head; nasal fossa scaled; upper surfaces of snout completely scaled; scales on interorbital space somewhat elongated, with spinules usually in a long longitudinal row flanked by shorter rows on each side. The list of shared features is considerable and include important diagnostic characters such as: incomplete support of anterolateral snout margin; second dorsal fin beginning close behind first; a small inconspicuous light organ; relatively large mouth with long premaxillary band of teeth and enlarged outer series; mouth and gill cavities dark; and most counts and many proportional measurements. The chief differences appear to lie in *C. quadricristatus* having a snout tipped with a sharper, narrower scute, absence of a black margin on the anal fin, and somewhat shorter first dorsal fin (1D. about 30-35% HL cf. 32-40%). Specimens of *C. quadricristatus* examined include: RUSI 14867 (2: 170-179 mm HL, 515+-522+ mm TL) from off Kenya in 738 m; RUSI 14087

(56.7-61.1 HL, 172+-172+ TL) from off Kenya; and ZMMGU P.12129 (60.4 HL, 171+ TL) from off the north end of the Andaman Islands. Data for a syntype (ZSI 13070, 56.5 HL, 128+ TL) were provided by Yuri N. SHCHERBACHEV (IOAN) and Yuri I. SAZONOV (ZMMGU).

*Caelorinchus cingulatus* Gilbert & Hubbs, 1920

Fig. 8

*Coelorhynchus cingulatus* Gilbert & Hubbs, 1920: 480-484, fig. 15 (holotype, USNM 78221; China Sea near Taiwan; 421 m).

MATERIAL EXAMINED. — 17 specimens.

**New Caledonia.** MUSORSTOM 4: stn CC 202, 18°58.00'S, 163°10.50'E, 580 m, 20.09.1985: 2 specimens 39-65 mm HL (MNHN 1994-907): 1 specimen 50 mm HL, 173+ mm TL (BMNH 1996.7.19:4), 1 specimen 68 mm HL, 290+ mm TL (CAS 86495).

**Loyalty Islands.** MUSORSTOM 6: stn DW 465, 21°03.55'S, 167°32.25'E, 480 m, 21.02.1989: 1 specimen 40.5 mm HL (MNHN 1994-908).

**Wallis and Futuna Islands.** MUSORSTOM 7: stn CP 559, 11°47.8'S, 178°19.1'W, 552-547 m, 19.05.1992: 2 specimens 19.5-20.0 mm HL (MNHN 1994-909).

**Australia.** Queensland Fisheries Survey: 28°03'S, 153°58'E, 480 m, 8.09.1982: 3 specimens 45.5-47.5 mm HL, 174+-190+ mm TL (QM I.21018). — "*Raptis*": off Cape Tribulation, 16°08'S, 149°26'E, 550 m, April 1988: 3 specimens 29.3-43.6 mm HL, 111-153 mm TL (QM uncat., out of QM I.25620).

New South Wales Fisheries: "*Kapala*", east of Danger Point, 28°01'S, 154°00'E, 548 m, April 1978: 1 specimen 61 mm HL (AMS I.20459-019), 3 specimens 24-40 mm HL, 93+-112 mm TL (AMS I.20459-014).

DIAGNOSIS. — Snout long, slender, 1.6-2.2 of orbit, anterolateral margin incompletely supported by bone; orbit slightly greater than interorbital width, much less than postorbital length; upper jaw less than orbit diameter; subopercle terminates in short, slender tip. Light organ long, extending forward almost to isthmus. Anus immediately before anal fin. Underside of head completely naked except along anterolateral margins of snout; top of snout fully scaled; nasal fossae naked to sparsely scaled ventrally. Body scales covered with 7-15 parallel to slightly divergent rows of slender reclined spinules. Bold markings on head and body (see Description).

DESCRIPTION. — *Counts*: II,8-9; P. i16-i19; GR-I (inner) 6-8, GR-II (outer/inner) 5-6 / 6-8; scales 1D. 5-7, mid-1D. 4.0-5.5, 2D. 4.5-6.0, lat.line 30-40.

*Measurements*: Total length 111-290+ mm; HL 29.3-68.2 mm. The following in percent of HL: postrostral 50-61; snout (40) 43-50; preoral (32) 34-45; internasal 18-20; interorb. 20-22; orb. 22-26; suborb. 12-14; postorb. 28-36; orb.-preop. 27-35 (38); up.jaw 19-24 (29); barbel 5-9 (11); gill slit 10-13 (15); pre-A. 144-164; V.-A. (33) 37-53; isthm.-A. 69-81; body depth 38-48; 1D.-2D. 8-13; ht. 1D. 45-86; 1D. base 9-23; len. P. 33-44; len. V. 32-45; nostril 4-9.

Body slender, somewhat cylindrical, width over pectoral bases slightly less than body depth; abdomen long, distance isthmus to anal fin greater than postrostral length of head; head width about equal to head depth. Snout sharply pointed, tipped with slender sharp scute. Suborbital ridge sharply defined, forming obtuse angle between stoutly scaled dorsal and naked ventral surfaces. Preopercle forms acute lobe posteroventrally. Mouth small, inferior; jaws restricted at lateral angles by lip folds; barbel slender, tapering to hair-fine tip, its length less than suborbital width.

Teeth all small, in broad short bands; premaxillary band extending about half length of rictus, mandibular band narrowing posteriorly, extending to end of rictus.

First dorsal fin high, spinous second ray greater than postrostral length of head; second dorsal high, rays almost as high, but not as thick, as opposites of well-developed anal fin. Pectoral and pelvic fins well developed, pectoral falls short of vertical through anus; outer pelvic ray extends to anus.

Body scales large, rather deciduous, densely covered with conical, slightly reclined spinules. Nasal fossa in most specimens naked or with small scales scattered along ventral edge; in a few specimens, scales more broadly cover ventral surface of fossa.

Light organ dilated at both ends, the anterior dermal window in shallow, scale-covered fossa.

*Color* in alcohol pale brownish gray to somewhat tawny on dorsum, pearl-white lateroventrally. Bold markings on body, notably a dark horizontal streak from posterodorsal margin of orbit passing below postorbital ridge to end of opercle, joining irregularly defined blotch over pectoral base that merges with diagonal band below first dorsal fin; band appears to join broad streak across first dorsal. A second fainter band below origin of second dorsal fin, followed by a darker diagonal band below 9th-12th ray, directed downward and forward in New Caledonian and smaller Queensland specimens to below midlateral line; in larger Queensland specimens, band directed down and posteriorly, extending faintly to above anterior end of anal fin. Fainter bands or saddles variously developed more posteriorly on tail. Underside of head completely pale; mouth, lips, gums, barbel, jaws creamish; underside of belly and chest darker, bluish to blackish. Dorsal fins darkened above body bands; second spinous ray of first dorsal pale near base but blackish along most of shaft, variably pale or dark distally. Pectoral fin clear to lightly dusky dorsally with thin, dark upper edge. Pelvic fins dusky, fairly dark in some specimens. Anal fin clear. Branchiostegal membranes dark dusky to blackish dorsally behind opercle and subopercle.

*SIZE*. — To about 30 cm TL.

*DISTRIBUTION*. — New Caledonia; off Queensland, Australia; China Sea off Taiwan; and Okinawa Trough. Depth range about 250-550 m.

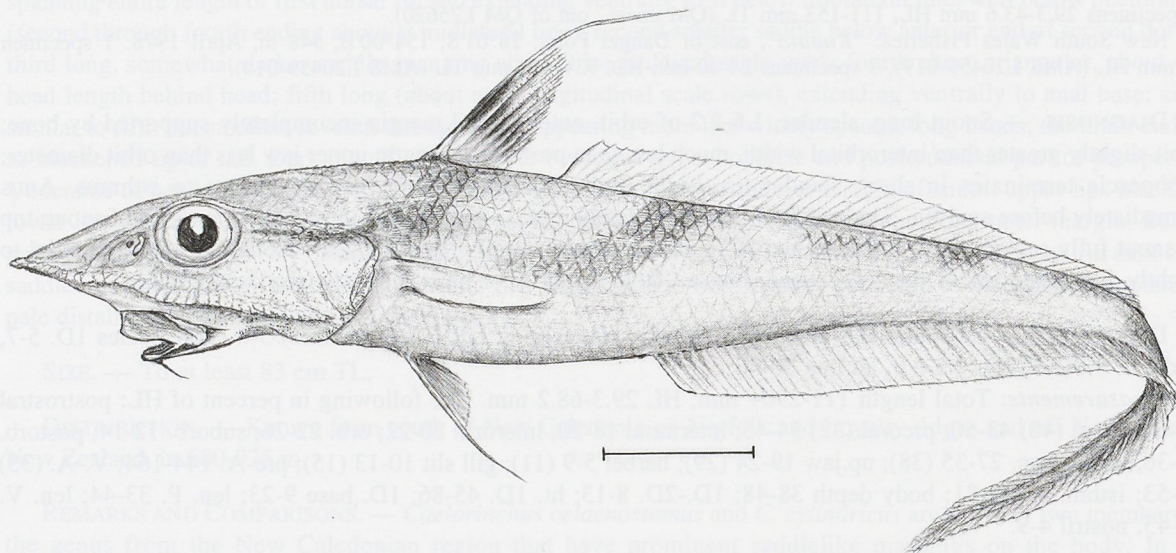


FIG. 8. — *Caelorinchus cingulatus* Gilbert & Hubbs, 61 mm HL (AMS I.20459-019), off Danger Pt., Queensland, Australia, 548 m. Scale = 25 mm.

*REMARKS AND COMPARISONS*. — Our New Caledonian and Queensland (Australia) specimens agree well with the original description of the species, which was based on two small specimens taken in the China Sea. In their description, GILBERT and HUBBS (1920: 483) described a dark oblique streak extending from the orbit to the preopercle angle that none of our specimens had. They also described the first dorsal fin as light dusky, without mention of the broad dark streak across the lower extent or the black membrane behind the spinous ray. The faded condition of the type specimens does not allow proper comparison of our specimens for these features, but the differences are so slight and agreement so strong, that we are confident of our identification. The small specimen described and figured by OKAMURA (*in* OKAMURA & KITAJIMA, 1984: 299, 366, pl. 161) from the Okinawa Trough agrees very closely with our specimens.

*Caelorinchus cingulatus* is closely similar to *C. spilonotus* Sazonov & Iwamoto, 1992, recently described from the Sala-y-Gomez Ridge in the southeastern Pacific. That species, however, lacks the anteroventrally directed bands

of *C. cingulatus*, the horizontal dark streak along the postorbital ridge, and the broad lateral streak on the first dorsal. The position of body bands differ, those in *C. spilonotus* being more forwardly placed (e.g., first band lies on nape anterior to first dorsal, second band below interspace of first and second dorsals). The first dorsal fin is also black-tipped, but otherwise pale, and somewhat shorter (34-49% of HL cf. 45-86%); the pelvic fin is somewhat shorter (27-39% HL cf. 32-45%).

*Caelorinchus cylindricus* sp. nov.

Fig. 9

MATERIAL EXAMINED. — 1 specimen.

**Norfolk Ridge.** BERYX 11: stn CP 4, seamount B, southeast of New Caledonia, 24°52.7'S, 168°21.8'E, 550-920 m, 14.10.1992: holotype, 42.2 mm HL, 192 mm TL (MNHN 1996-364).

DIAGNOSIS. — Snout shallow, somewhat dorsoventrally depressed; sharply pointed, tipped with small pointed terminal scute; orbit about 1.5 in snout length, about 1.2 of interorbital width; internasal about 2.0 in snout length; anterolateral margins completely supported by bone; orbit about 1.2 of interorbital width; mouth small, upper jaw about 1/4 of HL; subopercle terminates in short, acute angle without a prolonged tab. Anterior dermal window of light organ within large fossa far forward on chest, completely anterior to pelvic fin bases and lacking dark midventral streak connecting to periproct. Anus at anal origin. Underside of head entirely naked; nasal fossa naked except along ventral margin. Spinules on body scales narrow, spikelike to rather broadly bladelike, arranged in 9-11 parallel rows on scales below interspace between dorsal fins. A broad black blotch midlaterally on first dorsal; about 10 saddle marks on trunk and tail.

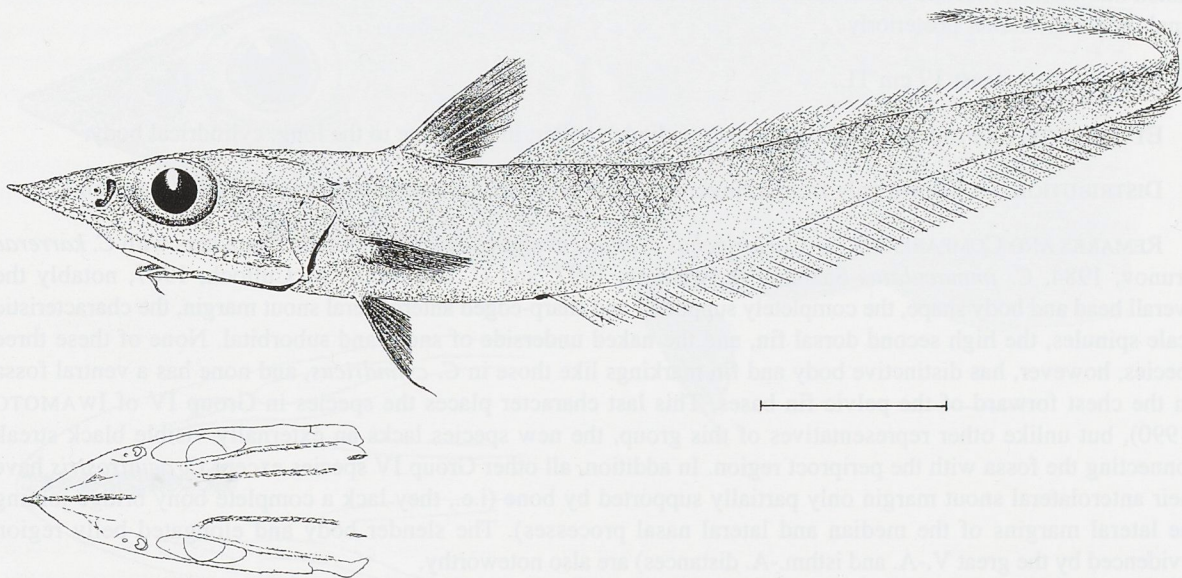


FIG. 9. — *Caelorinchus cylindricus* sp. nov., 42.2 mm HL, holotype (MNHN 1996-364), Seamount B, southeast of New Caledonia, BERYX 11, stn CP 4, 550-920 m. Scale = 25 mm.

DESCRIPTION. — *Counts*: 1D. II,9; P. i17/i17; GR-I (inner) 7, GR-II (outer/inner) 5/8; scales 1D. 8, mid-1D. 4.5, 2D. 6+1+11, lat.line 32.

*Measurements* in mm, percent HL in parentheses: postrostral 25.9 (61); snout 17.2 (41); preoral 16.3 (39); internasal 8.5 (20); interorb. 9.3 (22); orb. 11.5 (27); suborb. 5.8 (14); postorb. 14.0 (33); orb.-preop. 13.1 (31); up.jaw 10.1 (24); barbel 4.0 (10); pre-A. 68 (161); V.-A. 26 (62); isthm.-A. 38 (90); body depth 19 (45); 1D.-2D. 5.3 (13); ht. 1D. 23 (55); len. 1D. base 8.7 (21); len. P. 18 (43); len. V. 18 (43).

Head shallow, broad, greatest width about equal to greatest depth. Body rather terete, greatest width about equal to depth over anal fin origin; trunk long, anus behind head a distance equal to postrostral length of head. Barbel fairly stout at base, tapering to fine tip.

Short stout teeth in broad short bands in both jaws. No distinctly enlarged outer series in either jaw.

Height first dorsal less than postrostral length of head, no prolonged rays; spinous second ray with rudiment of a denticle near distal tip; second dorsal well developed throughout, height of fin rays about equal to opposites of anal fin. Tips of pectoral and pelvic fins fall well short of anus; outer pelvic ray filamentous, slightly prolonged. Origins of first dorsal and pelvic rays behind vertical through pectoral fin base, second dorsal begins close behind first dorsal, interspace less than length base of first dorsal.

Scales variable on body, those dorsally with spinules slender, spikelike and erect; scales ventrally on trunk and tail with broader bladelike spinules, often more reclined and in fewer rows. Dorsally on head, scales armed with short stout spinules in discrete, parallel, longitudinal rows, the spinules forming short comblike series. Dorsal surface of snout with narrow cleft on each side of median scaled section, but otherwise fully scaled; median nasal scaled ridge narrow. Head ridges with narrow, coarsened scales armed with stouter spinules than those on other scales. Small, elongated supraoccipital and postoccipital scutes developed.

*Color* in alcohol pale ground on body overlain with prominent saddle marks, most of which extend ventrally below lateral line. A faint saddle below origin of second dorsal followed by about eight more-prominent saddles. Trace of saddle marking below first dorsal fin. Scale pockets sharply outlined dorsally above midlateral line; fainter over abdomen and ventrally on tail; punctations rather heavy on tail below midlateral line. Chest and abdomen with bluish to violet tinge. Head dorsally somewhat swarthy; ventrally surfaces pale with small, scattered peppering; darker below snout tip. Gular membrane pale with scattered peppering; branchiostegal membrane black except along upper fringe. First dorsal fin dusky with black blotch midlaterally; second dorsal dark over saddle marks, paler between saddles. Pectoral and pelvic fins blackish. Anal fin dusky, darker posteriorly.

SIZE. — To at least 19 cm TL.

ETYMOLOGY. — From the Greek, *kylindros*, cylinder, roller, in reference to the long, cylindrical body.

DISTRIBUTION. — Known only from a single specimen collected on a seamount south of New Caledonia.

REMARKS AND COMPARISONS. — *Caelorinchus cylindricus* shares several important characters with *C. karrerae* Trunov, 1984, *C. immaculatus* Sazonov & Iwamoto, 1992, and *C. innotabilis* McCulloch, 1907, notably the overall head and body shape, the completely supported and sharp-edged anterolateral snout margin, the characteristic scale spinules, the high second dorsal fin, and the naked underside of snout and suborbital. None of these three species, however, has distinctive body and fin markings like those in *C. cylindricus*, and none has a ventral fossa on the chest forward of the pelvic fin bases. This last character places the species in Group IV of IWAMOTO (1990), but unlike other representatives of this group, the new species lacks an externally visible black streak connecting the fossa with the periproct region. In addition, all other Group IV species except *C. acutirostris* have their anterolateral snout margin only partially supported by bone (i.e., they lack a complete bony bridge joining the lateral margins of the median and lateral nasal processes). The slender body and elongated belly region (evidenced by the great V.-A. and isthm.-A. distances) are also noteworthy.

*Caelorinchus kermadecus* Jordan & Gilbert, 1904

Fig. 10

*Coelorhynchus kermadecus* Jordan & Gilbert, in JORDAN & STARK, 1904: 619 (reference to figure of specimen labeled *Macrurus parallelus* from Kermadec Islands in GÜNTHER, 1887, pl. 29, fig. A).

*Coelorinchus kermadecus* - PAULIN *et al.*, 1989: 126 (key to New Zealand macrourids). — McMILLAN & PAULIN, 1993: 837 (key).



MATERIAL EXAMINED. — 2 specimens.

**Norfolk Ridge and the Loyalties.** BERYX 2: stn 7, Seamount K, south of New Caledonia, 24°42.0'S, 170°06.7'E, 802-833 m, 25.10.1991: 1 specimen 128 mm HL, 430+ mm TL (MNHN 1996-965, out of NMNZ P.27467), 1 specimen 140 mm HL, 486+ mm TL (NMNZ P.27467).

DIAGNOSIS. — Snout viewed dorsally broad, sides convex, dorsal profile of snout essentially straight from snout tip to orbits; snout length about 2.4-2.6 into HL, anterolateral margin incompletely supported by bone; orbit about 1.5-1.8 into snout, about equal to interorbital width; upper jaw extends to below hind 1/4 of orbits; subopercle forms slender flexible flap posteroventrally. Light organ very short, no external fossa. Anus removed by 2 scale rows from anal fin. Underside of head completely scaled; top of snout and nasal fossa scaled; no naked areas below orbit on suborbital shelf. Body scales large, with 4-7 subparallel slightly divergent rows of broadly triangular, imbricate spinules, middle row distinctly larger. Body medium grayish-brown overall, lacking whitish undersides except over jaws and gular membranes, which are somewhat dirty white; all fins dark dusky.

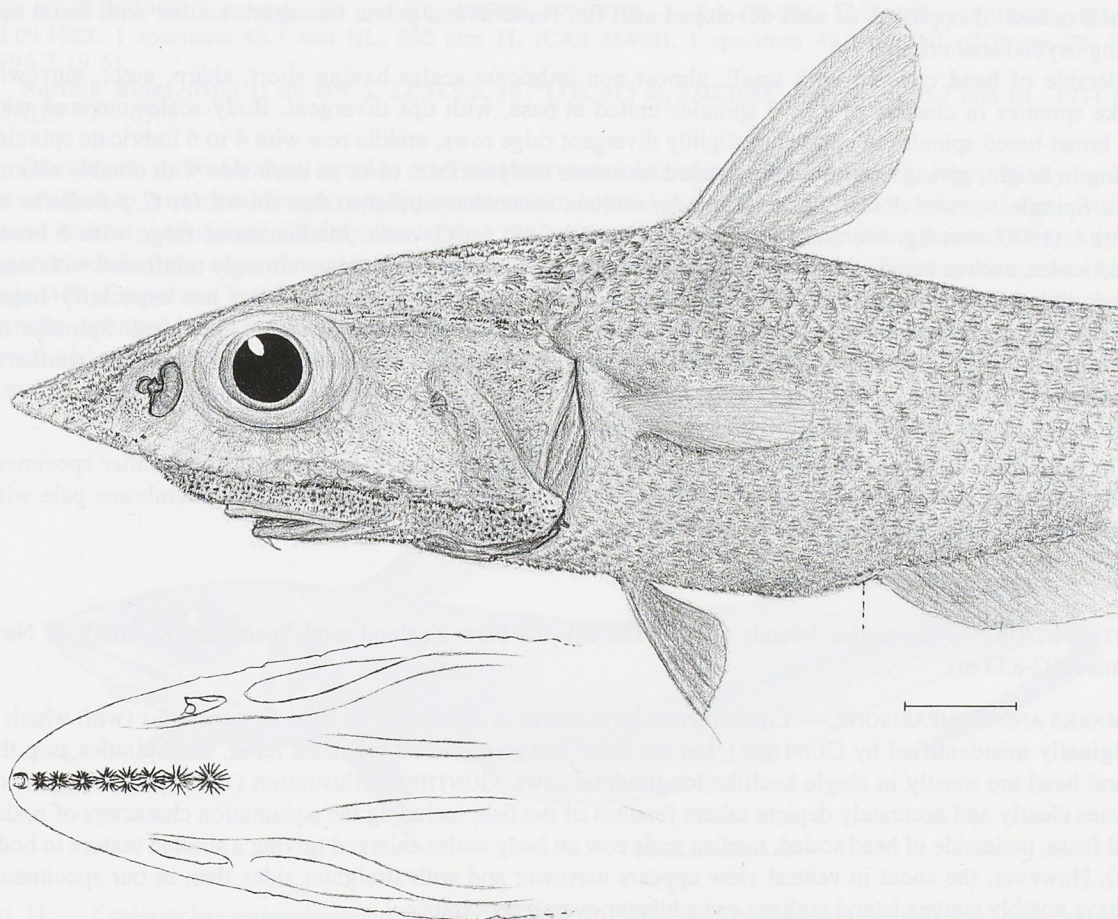


FIG. 10. — *Caelorinchus kermadecus* Jordan & Gilbert, 140 mm HL, 486+ mm TL (NMNZ P.27467), Seamount K, south of New Caledonia, BERYX 2, stn 7, 802-833 m. Scale = 25 mm.

DESCRIPTION. — *Counts*: 1D.II,8; P. i17-i18; GR-I (inner) 8-9, GR-II (outer/inner) 7 / 8-9; scales 1D. 6, mid-1D. 4.5, 2D. 5.5, lat.line 32-38.

*Measurements*: Total length 430+-486+ mm. The following in percent of HL: postrostral 61-62; snout 40; preoral 37-38; internasal 20; interorb. 25; orb. 25-26; suborb. 16; postorb. 36; orb.-preop. 39-40; up.jaw 27-28;

barbel 8-10; gill slit 13-14; pre-A. 141-150; V.-A. 45-476; isthm.-A. 69-73; body depth 51-55; ht. 1D. 44-45; len. 1D. base 17-18; len. P. 31-33; len. V. 33-40; nostril 8-10.

Head broad, about as wide as deep; body width across pectoral bases about 1.3 into greatest depth under first dorsal origin. Snout broadly spade-shaped viewed dorsally, acutely pointed in lateral profile, tipped with stout, blunt terminal scute (but possibly with protruding tip in smaller individuals with terminal scute complete). Suborbital ridge strong, heavily reinforced by coarsely modified spiny scales, sharply separating dorsal and ventral surfaces of head. Jaws inferior, mouth only slightly restricted at lateral corners by lip folds. Barbel small, fine, length slightly less than diameter posterior nostril.

Teeth in upper jaw in broad, short band, spanning somewhat more than half rictus length; mandibular teeth in holotype in cluster at anterior tip, narrowing abruptly to one or two irregular series posteriorly. In paratype, mandibular teeth in one to three irregular series. Mandibular teeth series long, extending past end of rictus.

First dorsal fin rather low, height much less than postrostral length of head; second dorsal low, height of rays about half or less of opposites of well-developed anal fin. Pectoral and pelvic fins short, neither with distal tips extending beyond anal origin.

Underside of head covered with small, almost non-imbricate scales having short, sharp, erect, narrowly bladelike spinules in clusters of 2 or 3 spinules united at base, with tips divergent. Body scales covered with coarse, broad-based spinules in parallel to slightly divergent ridge rows, middle row with 4 to 6 imbricate spinules ascending in height, giving longitudinally striated texture to body surface; rows on each side with notably shorter spinules. Spinules viewed dorsally have triangular outline, somewhat similar to that shown for *C. parallelus* by OKAMURA (1970, text-fig. 86) and IWAMOTO (1990, fig. 265) for *C. occa*. Median nasal ridge with 8 broad modified scales, each covered with low, radiating rows of spinules. Other head ridges strongly reinforced with stout modified scales. Posttemporal scute developed at anterior origin of lateral line, but not especially large; supraoccipital scute relatively inconspicuous. Scales along midline of nape somewhat thickened. Spinules on scales between parietal ridges erect, bladelike, aligned in 1 to 5 divergent, comblike rows. Small scales, similar to those on underside of head, cover most of nasal fossa.

Light organ length about half vertical diameter of posterior nostril, not externally visible.

Color uniformly light grayish brown. Fins all dark dusky. Mouth dark in larger, black in smaller specimen. Lips pale in larger, dark edged in smaller specimen. Barbel pale. Gill cavity black. Gular membrane pale with somewhat swarthy tinge; branchiostegal membranes dark.

SIZE. — Attains at least 58 cm TL.

DISTRIBUTION. — Kermadec Islands (1097-1152 m), off New Zealand, and Seamount K, south of New Caledonia (802-833 m).

REMARKS AND COMPARISONS. — *Caelorinchus kermadecus* is apparently close to *C. parallelus* (with which it was originally misidentified by GÜNTHER), but the latter has no scales on the nasal fossa, and spinules atop the snout and head are mostly in single keellike longitudinal rows. GÜNTHER's illustration (1887, pl. 29, fig. A) of the species clearly and accurately depicts salient features of the fish, including the squamation characters of scales on nasal fossa, underside of head scaled, median scale row on body scales enlarged (giving a striated texture to body surface). However, the snout in ventral view appears narrower and with straighter sides than in our specimens, which have notably convex lateral outlines and a blunter overall appearance.

The two New Caledonian specimens of *C. kermadecus* were compared with two paratypes of *C. smithi* Gilbert & Hubbs, 1920 (CAS-SU 23993) from the Sulu Sea. The two species appear superficially close and many diagnostic features agree. The chief difference between the two lies in the incompletely supported anterolateral snout margin in *C. kermadecus*. *C. kermadecus* also has a broader snout viewed dorsally, with convex sides and a blunt tip that blends in with the outline (protruding terminal snout scute in *C. smithi*, although young individuals of *C. kermadecus* may have a more acute terminal scute). The spinules on body scales are also broader-based in *C. kermadecus*, the greatest base width of the largest median spinule is about equal to its greatest height. The entire ridge of spinules appears broad, whereas in *C. smithi*, the spinules are narrow based and more erect, giving a

sharper, thinner spinule ridge, and the rows are much more divergent. Finally, the suborbital shelf and the median nasal ridge are distinctly narrower in *C. smithi*.

The widespread *C. acanthiger* Barnard, 1925, which has been recorded from New Zealand (PAULIN *et al.*, 1989), may be confused with *C. kermadecus* because of its close similarity in general morphology and in squamation features, but it can be differentiated by the lack of scales on the nasal fossa, the nakedness extending to the suborbital ridge.

*Caelorinchus melanobranchus* sp. nov.

Fig. 11

MATERIAL EXAMINED. — 5 specimens.

**New Caledonia.** MUSORSTOM 4: stn CP 216, off southern tip of New Caledonia, 22°59.5'S, 167°22.0'E, 490-515 m, 29.09.1985: holotype 41 mm HL, 210 mm TL (MNHN 1994-911). — Stn CP 213, 22°51.3'S, 167°12.0'E, 405-530 m, 28.09.1985: 1 paratype 33 mm HL (MNHN 1994-910). — Stn CP 215, 22°55.7'S, 167°17.0'E, 485-520 m, 28.09.1985: 1 specimen 46.3 mm HL, 202 mm TL (CAS 86493), 1 specimen 49.2 mm HL, 210 mm TL (BMNH 1996.7.19:5).

**Norfolk Ridge.** SMIB 1: stn DW 2, 22°51.9'S, 167°13'E, 415 m, 5.02.1986: 1 specimen 45.7 mm HL, 193+ mm TL (MNHN 1997-658).

DIAGNOSIS. — Snout about equal to orbit diameter; anterolateral margin incompletely supported by bone; orbit about equal to postorbital length; upper jaw extends to beyond vertical through middle of pupil, not restricted at lateral corners; barbel long, slightly shorter than orbit diameter; subopercle with narrow pointed ventral tip. Light organ extends from anus almost to isthmus. Anus immediately before anal fin. Naked areas on head include underside of snout and lower jaws, nasal fossae, and most of suborbital region. Body scales covered with needlelike spinules arranged in 10-14 more-or-less parallel rows, the individual spinules separate and non-overlapping. First dorsal and pelvic fins with distinct black tips; branchiostegal membrane with pronounced black blotch dorsally; posterior end of anal black; mouth pale.

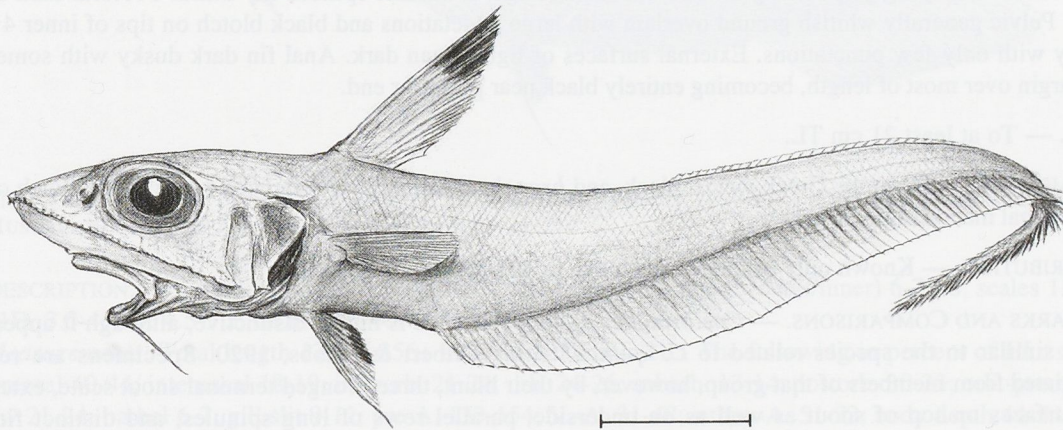


FIG. 11. — *Caelorinchus melanobranchus* sp. nov., 49.2 mm HL, paratype, (CAS 86493), off New Caledonia, MUSORSTOM 4, stn CP 215, 485-520 m. Scale = 25 mm.

DESCRIPTION. — *Counts*: 1D. II,9-11; P. i17-i18; total GR-I (inner) 7-10, GR-II (outer/inner) 6-9 / 8-9; scales 1D. 10-11, mid-1D. 6.5-7.5, 2D. 6.5-8, lat.line 42.

*Measurements*: Total lengths 193+-210 mm; HL 45.7-49.2 mm. The following in percent of HL: postrostral 67-69; snout 33-35; preoral 25-28; internasal 20; interorb. 19-20; orb. 32-35; suborb. 12-13; postorb. 34; orb.-preop. 33-34; up.jaw 34-35; barbel 26-30; gill slit 17-18; pre-A. 153-164; V.-A. 50-57; isthm.-A. 82-95; body depth 55-60; 1D.-2D. 13-14; ht. 1D. 70-78; len. 1D. base 27; len. P. 44-49; len. V. 42-52; nostril 9-10.

General features seen in Fig. 11. Body slender, greatest depth less than postrostral length of head. Head more than 4 in TL. Snout viewed laterally with gently convex dorsal and ventral profiles, from above, snout sides more convex; tip with rather blunt, 3-pronged terminal scute, median portion largest, 2 lateral prongs much smaller; leading edge of snout and suborbital ridge with row of embedded thickened scales passing to posterior angle; suborbital shelf well formed but lacking sharp ridgelike edge, posterior tip of ridge not protruding over remainder of preopercle bone. Barbel notably long and thick, gradually tapering and not forming hair-fine tip; more than twice least suborbital width.

Premaxillary band of teeth broad, about 3 to 4 teeth wide over most of length, tapering rapidly to posterior end; teeth all small, none especially enlarged. Mandibular teeth band about 3 teeth wide, tapering to 1 row.

First dorsal fin high, slightly greater than postrostral length. Pectoral and pelvic fins well developed, origin of former slightly before those of pelvic and first dorsal fins. Outer pelvic ray much thicker and longer than inner rays, extends posteriorly to anus. Origin of second dorsal fin close behind first dorsal; second dorsal fairly well developed anteriorly but height of anterior rays much less than opposites of well-developed anal fin.

Light organ of group IV type, as defined by IWAMOTO (1990), confined in a long midventral depression, anterior end expanded into broad oval fossa connected by groove or shallow channel to slightly expanded region immediately before small periproct area. Fossae and connecting groove lined with spinuleless scales.

Scales relatively small for genus, surfaces of head rather smoothly covered except for naked areas and ridges. Areas dorsally on each side behind anterolateral margins of snout, and area between median nasal and supranarial ridges naked. Scales of head ridges stouter than other head scales, but not especially spiny nor protruding. Body scales densely covered with slender, needlelike, slightly recurved and reclined spinules arranged in generally parallel rows, although some scales with spinule rows slightly divergent or convergent.

*Color* in alcohol somewhat grayish straw, darker over anterior portion of interorbital and at snout tip; abdominal region somewhat violet tinged, beneath whitish ventral surfaces. Lips, mouth, barbel, gills, and hyoid areas of gill cover pale; black blotch on branchiostegal, but gular and branchiostegal membranes otherwise dark dusky over exposed surfaces; opercle and part of subopercle blackish where black inner membranes show through. First dorsal black over tips of second spinous ray and anterior 3 rays; posteriorly and ventrally, fin membranes transparent with only light speckling over rays; leading edge of base of spinous ray black. Pectoral dark dusky overall. Pelvic generally whitish ground overlain with large punctations and black blotch on tips of inner 4 rays; outer ray with only few punctations. External surfaces of light organ dark. Anal fin dark dusky with somewhat paler margin over most of length, becoming entirely black near posterior end.

*SIZE*. — To at least 21 cm TL.

*ETYMOLOGY*. — From the Greek *melas*, black, and *branchos*, fish gills, in reference to the black blotch on the branchiostegal membrane.

*DISTRIBUTION*. — Known only off New Caledonia, in 405-530 m.

*REMARKS AND COMPARISONS*. — *Caelorinchus melanobranchus* is highly distinctive, although it appears to be most similar to the species related to *C. quincunciatus* Gilbert & Hubbs, 1920. Specimens are readily differentiated from members of that group, however, by their blunt, three-pronged terminal snout scute, extensive naked surfaces on top of snout as well as on underside, parallel rows of long spinules, and distinct fin and branchiostegal markings.

### *Caelorinchus parallelus* (Günther, 1877)

Fig. 12

*Macrurus parallelus* Günther, 1877: 439 ("off Inosima" [Enoshima, Japan]; no holotype designated).

*Macrurus (Coelorhynchus) parallelus* - GÜNTHER, 1887: 125-127 (in part; Japan, Kermadec Is., and off New Zealand; no type specimens designated, but 8 specimens from "Hyalonema-ground, off Inosima, Japan, Station 232; depth 345 fathoms" should be considered syntypes; the Kermadec Islands specimens, stations 170A and 171 are considered syntypes of *Caelorinchus kermadecus* Jordan & Gilbert, 1904).

See IWAMOTO (1990: 179) for additional comments on synonymy.

**MATERIAL EXAMINED.** — 3 specimens.

**Chesterfield and Bellona Plateau.** MUSORSTOM 5: stn CP 323, 21°18.52'S, 157°57.62'E, 970 m, 4.10.1986: 1 specimen 105.5 mm HL, 356+ mm TL (MNHN 1996-957). — Stn CP 337, 19°53.80'S, 158°38.00'E, 412-430 m, 15.10.1986: 1 specimen 57.0 mm HL, 172+ mm TL (CAS 86487).

**Japan:** 1 specimen 77.5 mm HL, 255+ mm TL (CAS-SU 8300).

**DIAGNOSIS.** — Snout 1.7-1.9 of orbit diameter, anterolateral margin not completely supported by bone; orbit about equal to interorbital width, less than postorbital length; upper jaw less than one-quarter of head length; subopercle with a long, slender, flexible ventral tip. Light organ scarcely developed; no external dermal window nor dark median-ventral black streak. Anus immediately before anal fin. Underside of head covered with tiny scales armed with a single crestlike row of tall spinules; top of snout completely scaled; scales between parietal ridges covered mostly with elongated scales having longitudinal row of crestlike scales; few minute scales on nasal fossa. Body scales covered with broad spinules arranged in 6-9 parallel rows, middle row largest; the 6 or 7 spinules in middle row increasing in height posteriorly. Fins vary from dark dusky to rather pale; mouth dark.

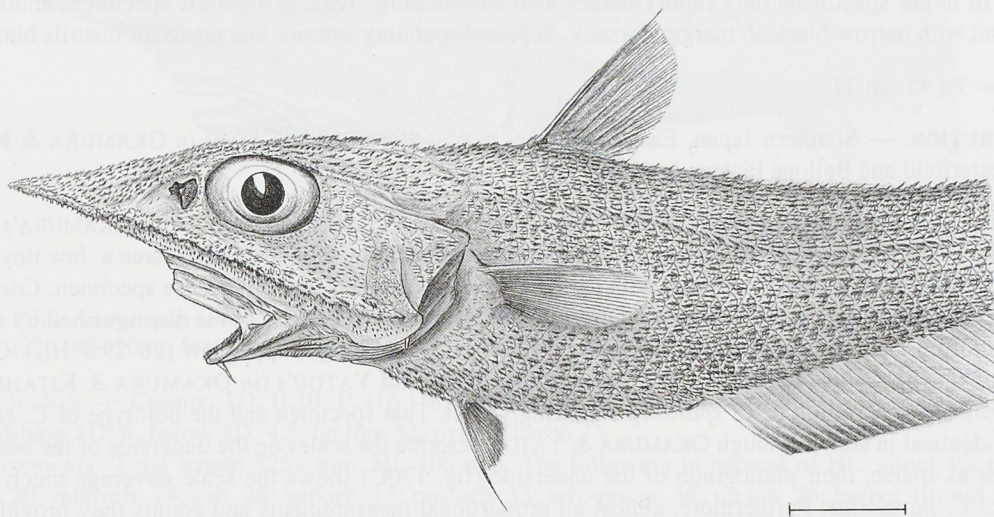


FIG. 12. — *Caelorinchus parallelus* (Günther), 105.5 mm HL (MNHN 1996-957), Chesterfield and Bellona Plateau, MUSORSTOM 5, stn CP 323, 970 m. Scale = 25 mm.

**DESCRIPTION.** — *Counts:* 1D. II,8-9; P. i17-i18; GR-I (inner) 8, GR-II (outer/inner) 6-7 / 8; scales 1D. 5.5-6, mid-1D. 3.5-4, 2D. 4.5-5.5, lat.line 35-40.

*Measurements:* Total length 172+ - 356+ mm, 55-105.5 mm HL. The following in percent of HL: snout 44-57; preoral 40-44; internasal 18-19; interorb. 21-24; orb. 24-26; suborb. 13-14; postorb. 30-33; orb.-preop. 30-33; up.jaw 21-24; barbel 6-7; gill slit 9-12; pre-A. 133-154; V.-A. 31-48; isthm.-A. 51-72; body depth 44-54 1D.-2D. 12-15; ht. 1D. 36-37; len. base 1D. 14-17; len. P. 36-37; len. V. 32-35; nostril 6-8.

The species is well described and illustrated by OKAMURA (1970: 198, pl. 42, text-fig. 86). Snout long, acuminate, ending in sharp spinous scute; viewed dorsally, margins of snout slightly concave near tip, but gently convex posteriorly. Head width about equal to height at isthmus. Mouth inferior, sides slightly restricted by lip folds; posterior end of maxilla under hind margin of orbit. Barbel small, slender.

Teeth all short, fine, none enlarged; those on upper jaw in broad short band, extending slightly more than half length of rictus; those on dentary in long narrow band, extending beyond end of rictus.

First dorsal rather low, height much less than postrostral length; interspace between first and second dorsal fins short, less than length base of first; second dorsal low throughout. Pectoral and pelvic fins short, each falling well short of anus. Anal fin well developed.

Underside of head extensively covered with small, non-imbricate scales having few (usually 2-4) erect, bladelike spinules, mostly in single row and closely adjoined, especially near base. Those between head ridges atop snout and orbits similar to those on underside of head, but with longer crestlike rows, and often with 2 or more parallel to slightly divergent rows. Ridge scales all strong, spiny; supraoccipital and posttemporal scutes moderately developed. Nasal fossa in Chesterfield and Bellona specimens with few tiny scales; that in Japan specimen (CAS-SU 8300) with substantially more and somewhat larger scales. Scales on mandibular rami sparse, confined posteriorly. Body scales as described and figured by OKAMURA (1970, text-fig. 86). Spinules bladelike with broad bases, in parallel rows, middle row largest with 3-5 highly imbricate spinules; rows immediately lateral often consisting of one slender, greatly reclined anterior spinule.

Light organ small, immediately before anus, length less than posterior nostril. Large specimen from station CP 323 (MNHN 1996-957; 356+ mm TL) had large fish (myctophid?) in stomach, in addition to remnant of small fish.

*Color* in alcohol overall medium to light brownish gray. Fins dusky, but anal somewhat blackish distally over anteriormost rays of large New Caledonian specimen. Mouth gray to blackish; lips dark or blackish; gill cavity and peritoneum black. Barbel pale; gular membranes darkish to pale; branchiostegal membrane blackish dorsally. Abdomen in larger specimens only faintly darker than surrounding areas; in smallest specimen, abdomen light bluish. Orbit with narrow blackish margin dorsally. Septum separating anterior and posterior nostrils blackish.

*SIZE*. — To 45 cm TL.

*DISTRIBUTION*. — Southern Japan, East China Sea, in 650-990 m (*vide* YATOU *in* OKAMURA & KITAJIMA, 1984); Chesterfield and Bellona Plateau in 412-970 m.

*REMARKS AND COMPARISONS*. — The two New Caledonian specimens agree well with OKAMURA's excellent description of *C. parallelus* and with a small CAS specimen from Japan. Our specimens have a few tiny scattered scales on the nasal fossae, which contrasts with the fairly numerous scales in the Japanese specimen. *Caelorinchus divergens* Okamura & Yatou, 1984 from the Okinawa Trough is closely similar but is distinguished by its shorter snout (about 40% HL), longer postorbital length (36-37% HL), and longer upper jaw (28-29% HL). Our Japan specimen of *C. parallelus* (CAS-SU 8300) follows OKAMURA and YATOU's (*in* OKAMURA & KITAJIMA 1984: 241-243) original description of *C. sparsilepis* strikingly well. That specimen and the holotype of *C. sparsilepis* are almost identical in size. Although OKAMURA & YATOU describe the scales on the underside of the head of their new species as sparse, their photograph of the underside (fig. 170C) shows the scale coverage much as in our specimen of *C. parallelus*. Furthermore, almost all proportional measurements and counts they provide in their table 19 fall within the ranges they give for *C. parallelus* in their table 18. The exceptions are the suborbital width (38% of orbit diameter, vs. 50-62.5% in *C. parallelus*) and orbit diameter (2.1 in snout, cf. 1.7-1.8).

### *Caelorinchus platorhynchus* Smith & Radcliffe, 1912

Fig. 13

*Coelorhynchus platorhynchus* Smith & Radcliffe, *in* RADCLIFFE, 1912: 133-134, pl. 30, fig. 1, text-fig. 8 ("form alpha" in text-fig. 9 was referred to *C. acantholepis* by GILBERT and HUBBS, 1920: 488) (holotype USNM 72946, 387 mm TL; off Sipadan I., Borneo; 4°07'00"N, 118°49'54"E, 871 m).

*Coelorhynchus platorhynchus* - GILBERT & HUBBS, 1920: 486-487 (redescription).

*MATERIAL EXAMINED*. — 1 specimen.

**Loyalty Islands.** BIOGEOCAL: stn CP 232, 21°33.81'S, 166°27.07'E, 760-790 m, 12.04.1987: 1 specimen, 100 mm HL, 325+ mm TL (MNHN 1996-954).

*DIAGNOSIS*. — Snout about 2.5 into HL, broadly convex in dorsal view; anterolateral margin completely supported by bone; orbit diameter greater than interorbital width, less than postorbital length, 1.4 in snout length; upper jaw extends to hind margin of pupil; subopercle forms long, slender flap ventrally. Light organ small, length about equal to periproct region, much less than diameter of posterior nostril. Anus immediately before anal

fin. Underside of head covered with tiny non-imbricate scales armed with a single, high, crestlike row of 3-5 adjoined spinules; top of snout between ridges and nasal fossa covered with similar scales; scales on space between occipital ridges with mostly single, elongated, narrow, crestlike row of adjoined spinules. Body scales large, with 4 or 5 widely divergent rows of long, sharp, closely overlapping spinules; middle row largest; spinules increasing in height posteriorly, the last extending beyond posterior margin of scale. No prominent markings on body or fins.

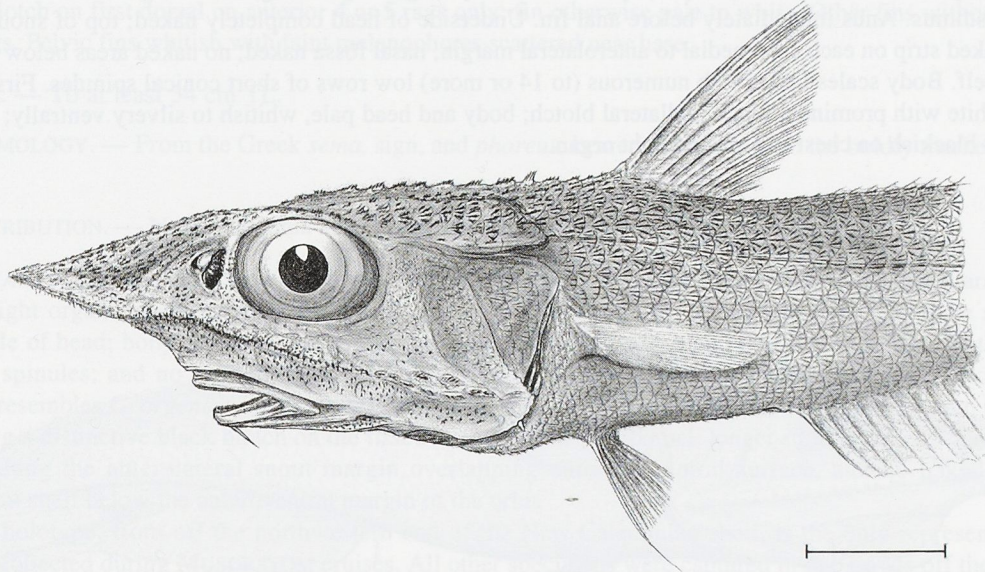


FIG. 13. — *Caelorinchus platorhynchus* Smith & Radcliffe, 100 mm HL (MNHN 1996-954), Loyalty Islands, BIOGEOCAL, stn CP 232, 760-790 m. Scale = 25 mm.

DESCRIPTION. — *Counts*: 1D. II,10; P. i16-i18; GR-I (inner) 8, GR-II (outer/inner) 7/9; scales below 1D. 5, below mid-base 1D. 4, below 2D. 4.5, lat.line 32; pyloric caeca 25.

*Measurements*: Total length 325+ mm; HL 100 mm. The following in percent of HL: snout 40; preoral 37; internasal 20; interorb. 24; orb. 28; suborb. 13; postorb. 33; orb.-preop. 36; up.jaw 26; barbel 10; gill slit 9; pre-A. 151; V.-A. 44; isthm.-A. 75; body depth 49; 1D.-2D. 22; ht. 1D. 49+; base 1D. 20; len. V. 27; nostril 8.

SIZE. — To 39 cm TL.

DISTRIBUTION. — Borneo, Philippines, Loyalty Islands, in 775-1033 m.

REMARKS AND COMPARISONS. — *Caelorinchus platorhynchus* has been well described by GILBERT and HUBBS (1920) and thus needs no repetition. The original illustrations (RADCLIFFE, 1912, pl. 30, fig. 1, and text-fig. 8) show important diagnostic features, especially the dorsal view of the head, where the broad, convex, scalloped margin of the snout and the peculiar, longitudinally aligned, crestlike rows of spinules are depicted.

The species appears to be closely similar in many diagnostic features with *C. smithi*, although that species has a more slender snout with slightly concave dorsal profile, and the scales on top of the head between the occipital ridges have several carinae, as opposed to the single keellike row on those scales in *C. platorhynchus*.

*Caelorinchus semaphoreus* sp. nov.

Fig. 14

MATERIAL EXAMINED. — 31 specimens.

New Caledonia. MUSORSTOM 4: stn CP 170, 18°57.0'S, 163°12.6'E, 485 m, 17.09.1985: holotype 104 mm HL, 335+ mm TL (MNHN 1996-956).

**Australia.** Queensland: "Raptis", 17°30'S, 149°36'E, 420-445 m, April 1988: 21 specimens 108-240+ mm TL (QM I.25549), 8 specimens 197-307 mm TL (QM I.25546). — "Soela": stn SO6/85/63, east of Flinders Reef, 17°31.2'S, 149°40.2'E, 402 m, 3 .12.1985: 1 specimen 162+ mm TL (CSIRO H.1188-06).

**DIAGNOSIS.** — Snout long, slender, 2.4-2.8 of orbit; anterolateral margin incompletely supported by bone; orbit about equal to interorbital width, much less than postorbital length; upper jaw extends to below hind margin of orbits; subopercle forms small short point posteroventrally. Light organ long, extending from anus to thorax just behind isthmus. Anus immediately before anal fin. Underside of head completely naked; top of snout scaled except for naked strip on each side medial to anterolateral margin; nasal fossa naked; no naked areas below orbit on suborbital shelf. Body scales large, with numerous (to 14 or more) low rows of short conical spinules. First dorsal fin pale to white with prominent black midlateral blotch; body and head pale, whitish to silvery ventrally; no bold marks except blackish on chest and around light organ.

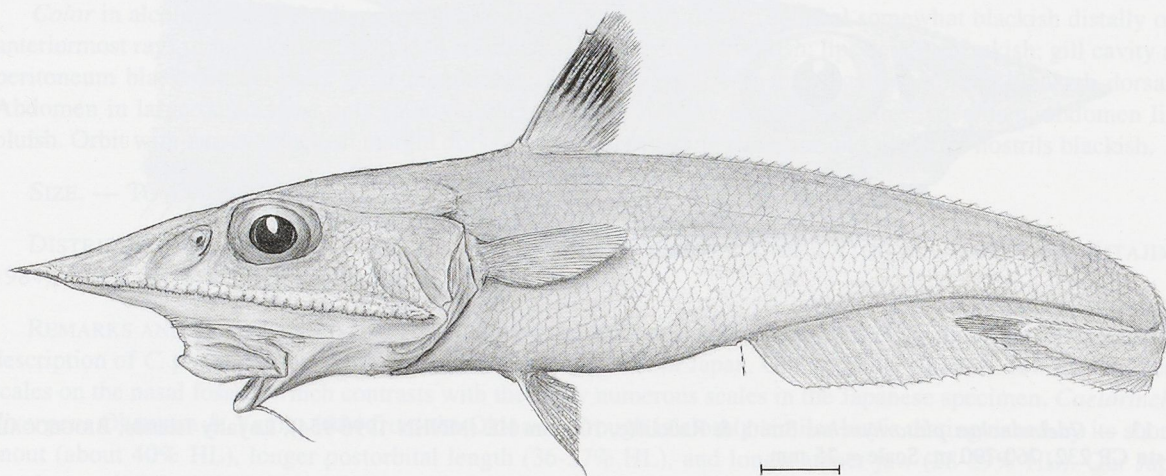


FIG. 14. — *Caelorinchus semaphoreus* sp. nov., 104 mm HL, holotype (MNHN 1996-956), off northwest point of New Caledonia, MUSORSTOM 4, stn CP 170, 485 m. Scale = 25 mm.

**DESCRIPTION.** — *Counts:* 1D. II,8-10; P. i14-i16; GR-I (inner) 7-8, GR-II (outer/inner) 5 / 7; scales 1D. 5-7, mid-1D. 4-6, 2D. 4.5, lat.line 45-48.

*Measurements:* Total lengths 119-307+ mm; HL 34.1-104 mm. The following in percent of HL: snout 47-53; preoral 37-52; internasal 16-21; interorb. 18-21; orb. 18-21; suborb. 11-13; postorb. 28-34; orb.- preop. 31-36; up.jaw 21-27; barbel 7-10 (17); gill slit 10-14; pre-A. 142-160; V.-A. 46-59; isthm.-A. 64-82; body depth 34-47; 1D.-2D. 11-17; ht. 1D. 32-37; len. base 1D. 11-18; len. P. 25-40; len. V. 24-36; nostril 4-8.

Body slender, somewhat cylindrical, width over pectoral bases almost equal to greatest depth of body; head width slightly greater than head depth. Abdomen long, distance isthmus to anal fin origin much greater than postrostral length. Snout sharply pointed, tipped with a narrow, spear-head shaped scute. Suborbital ridge sharply defined, forming obtuse angle between stout dorsal shelf and scaleless underside of head. Preopercle forming relatively narrow pointed lobe. Mouth small to moderate, 1/5 to 1/4 head length, jaws somewhat restricted laterally by lip folds; barbel short, finely tapered, its length less than least suborbital width.

Teeth all small, in broad short bands in premaxillary, extending about 2/3 length of rictus; mandibular band long, broad, 5 or 6 teeth across midlength, tapering posteriorly, extending well beyond end of rictus.

First dorsal fin low, height less than snout length; second dorsal much lower than anal fin; pectoral and pelvic fins rather small, each falling well short of vertical through anus.

Body scales relatively large, margin of scale pockets well marked dorsally. Larger body scales covered with low, slightly divergent rows of minute spinules, the longer rows with 12-18 spinules. Head scales generally stout, adherent, uniformly covered with short, erect, conical spinules, with slightly recurved tips. Modified scales on



ridges of head stout, strong, but not especially prickly. Scales over light organ fossae and midventral groove lack spinules.

Light organ prominent, dilated at each end into oval fossa with shallow connecting groove.

*Color* in alcohol light brown to grayish brown dorsally, paler laterally and ventrally, pearl-white to creamish over ventral 1/2 to 2/3 of trunk and tail, dark anteriorly on chest and midventrally on abdomen. Underside of head light dusky. Mouth, lips pale; gill cavity dark on medial wall, dusky laterally, pale along margin of gill cover. Black blotch on first dorsal on anterior 4 or 5 rays only; fin otherwise pale to white. Other fins without prominent markings. Pelvic fins whitish with faint melanophores scattered near base.

**SIZE.** — To at least 34 cm TL.

**ETYMOLOGY.** — From the Greek *sema*, sign, and *phoreus*, bearer; in reference to the boldly marked first dorsal fin.

**DISTRIBUTION.** — New Caledonia and Queensland, Australia, in 420-445 m.

**REMARKS AND COMPARISONS.** — *Caelorinchus semaphoreus* falls in that group of species characterized by: a long light organ extending from the anus to just behind the isthmus; a long, slender, acuminate snout; naked underside of head; bony support of anterolateral snout margin not complete; thin scales covered with short, fine, conical spinules; and no prominent pectoral blotch on trunk. In the lack of prominent body markings, it most closely resembles *C. argentatus* and its close relatives, but *C. semaphoreus* differs substantially from those species in having a distinctive black blotch on the first dorsal fin, a smaller barbel, longer snout, no characteristic series of scales along the anterolateral snout margin overlapping onto the ventral surface, and no naked area on the suborbital shelf below the anteroventral margin of the orbit. —

The holotype, from off the northwestern end of the New Caledonian shelf, is the only representative of the species collected during MUSORSTOM cruises. All other specimens were captured in two trawls off the Queensland coast of Australia.

*Caelorinchus sereti* sp. nov.

Fig. 15 a, a'

**MATERIAL EXAMINED.** — 8 specimens.

**New Caledonia.** BIOCAL: stn CP 75, 22°18.65'S, 167°23.30'E, 825 m, 4.09.1985: holotype 116.5 mm HL (MNHN 1994-925). — Stn CP 32, 23°06.98'S, 166°51.20'E, 825 m, 29.08.1985: 1 paratype 97 mm HL, 360+ mm TL (CAS 86492).

**Loyalty Islands.** BIOGEOCAL: stn 232, 21°33.81'S, 166°27.07'E, 760-790 m, 12.04.1987: 1 paratype 99.6 mm HL, 347+ mm TL (CAS 86484).

MUSORSTOM 6: stn CP 427, 10°23.35'S, 166°20.00'E, 800 m, 17.02.1989: 1 paratype 131 mm HL, 450 mm TL (BMNH 1996.7.19:6).

**Chesterfield and Bellona Plateau.** MUSORSTOM 5: stn DW 337, 19°53.80'S, 158°38.00'E, 412-430 m, 15.10.1986: 2 paratypes 114.0-114.5 mm HL (MNHN 1994-924). — Stn CC 384, 19°42.40'S, 158°50.80'E, 772-756 m, 21.10.1986: 1 paratype 61.5 mm HL (MNHN 1994-923), 1 paratype 121 mm HL (MNHN 1994-926).

**DIAGNOSIS.** — Snout long, narrow, sharply pointed; orbit about 1.4, internasal about 2.0 into snout length; anterolateral margin completely supported by bone. Orbit diameter 1.2 of interorbital width. Mouth small, upper jaw slightly less than orbit diameter. Subopercle terminates in long slender tip. Dermal window of light organ small but prominent, external length about equal to length posterior nostril. Anus slightly removed from anal fin. Underside of head covered with small prickly scales except along margins; nasal fossa and top of snout scaled. Body scales with 6 to 8 widely divergent spinule rows, middle row largest. First dorsal dark dusky, other fins dusky; body lacking distinctive markings in adults, but with faint to prominent saddles in young; mouth black, gums dark.

**DESCRIPTION.** — *Counts:* 1D. II,9; P. i17; total GR-I (inner) 9, GR-II (outer/inner) 7/9; scales 1D. 5, mid-1D. 3.5, 2D. 6, lat.line 33.

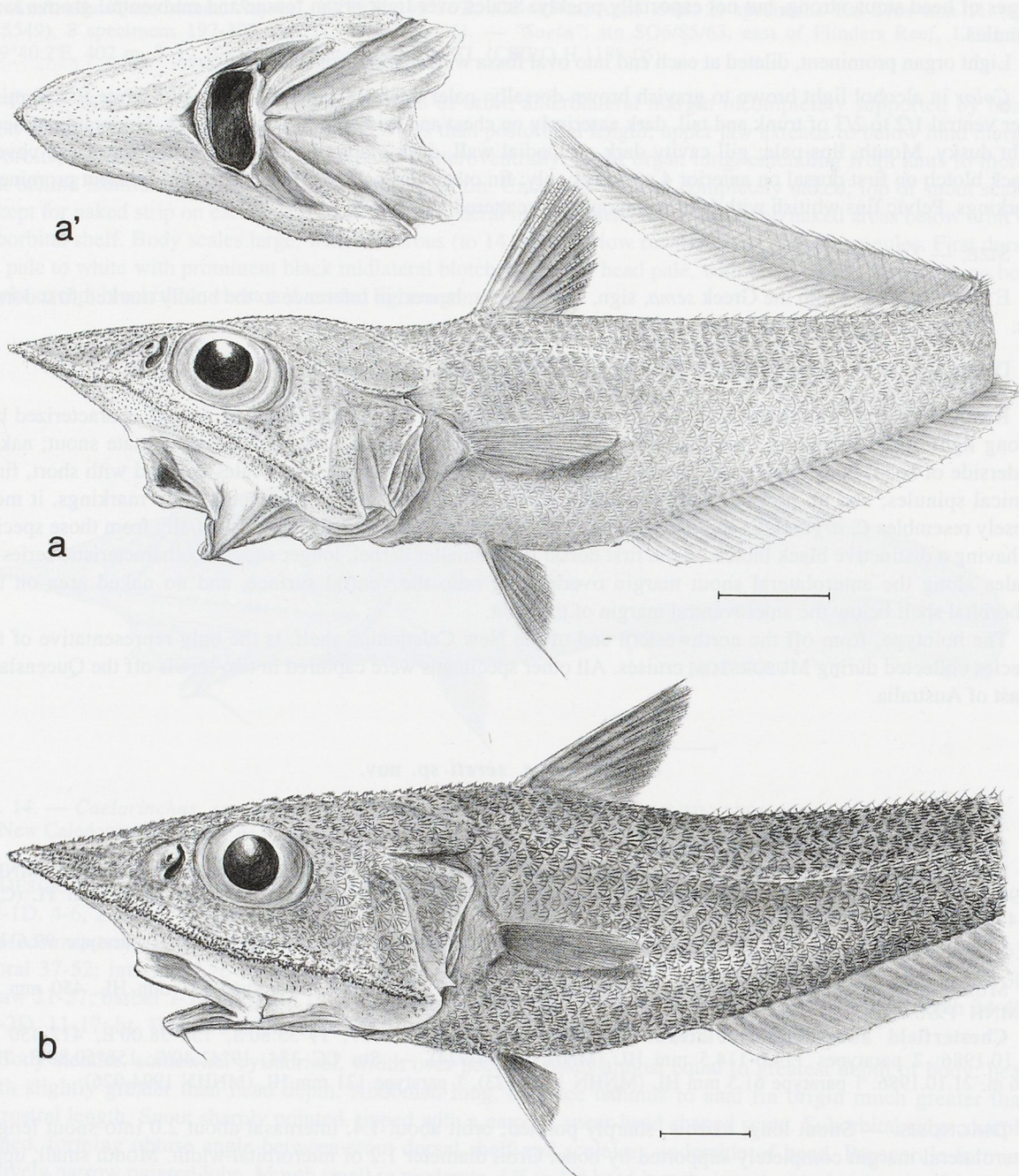


FIG. 15. — **a**, *Caelorinchus sereti* sp. nov., 97 mm HL, paratype (CAS 86492), New Caledonia, BIOCAL, stn CP 32, 825 m; and **a'** ventral view of head. — **b**, *Caelorinchus shcherbachevi* sp. nov., 126 mm HL, holotype (MNHN 1996-966), Seamount K, south of New Caledonia, BERYX 2, stn 9, 797-811 m. Scales = 25 mm.

*Measurements*: Total lengths 347+–459 mm; HL 61.5–131 mm. The following in percent of HL: snout 38–46; preoral 36–41; internasal 19–22; interorb. 21–25; orb. 26–29; suborb. 12–14; postorb. 26–33; orb.-preop. 29–36; up.jaw 22–27; barbel 8–13; gill slit 12–13; pre-A 154–156; V.-A. 41; isthm.-A. 62–67; body depth 53–56; 1D.-2D. 25; ht. 1D. 35–54; len. 1D. base 16–19; len. P. 37–50; len. V. 38–54; nostril 9.

Width over pectoral bases about 1.3 into greatest depth; head about 2.5 into total length; snout relatively narrow, gradually tapering to broad head, width over opercles slightly more than head depth. Preopercle forming rather narrow lobe posteroventrally; posterior tip of subopercle directed obliquely downward. Mouth gape wide, almost equal to horizontal orbit diameter, restricted at lateral angles by lip folds. Barbel short, fine, about equal to posterior nostril.

Small teeth in bands in both jaws; premaxillary band short, broad, 5 or 6 teeth across, extending about 2/3 length of rictus. Mandibular band long, narrow, 3 or 4 teeth across, extending beyond end of rictus.

Height of first dorsal fin much less than postrostral length of head; second dorsal weakly developed, rays much shorter than opposites of anal fin, which are well developed. Pectoral and pelvic fins moderate in size, longest rays of each fin extend about to origin of anal fin.

Underside of head covered with small, almost non-imbricate scales having short, sharp, erect, bladelike spinules in crestlike divergent rows; broad naked margin in front and around sides of mouth; anterior end of mandible naked; posteriorly, small scales cover median strip. Nasal fossa dotted with minute scales, each with few short, erect, conical to bladelike spinules. Scales atop snout and head with bladelike, erect spinules arrayed in divergent rows. Scales on trunk dorsally with broader, more reclined spinules, generally trihedral in cross section; spinules arrayed in widely divergent rows, middle row usually slightly higher than lateral rows; each row with 4 to 9 spinules.

Broad, short dermal window of light organ immediately anterior to anus, its anterior end about at midpoint between anal origin and pelvic insertion.

*Color* in alcohol light sandy-brown overall, paler ventrally, somewhat darker dorsally on head; belly (but not chest) somewhat darker; periproct and light organ black. Black lining of gill chamber showing through gill cover and branchiostegal membranes. Mouth entirely black; lips generally pale with streaks of blackish; membrane connecting premaxillary and maxillary black; maxillary dark, but terminal end pale. Barbel pale.

SIZE. — To at least 45 cm TL.

ETYMOLOGY. — Named for Bernard SÉRET, ORSTOM, in recognition of his studies of deep-sea fishes, his efforts in collecting deep-sea fishes off New Caledonia, and for making the grenadiers from those collections available to us.

DISTRIBUTION. — New Caledonia and Chesterfield and Bellona Plateau, in 412-825 m.

REMARKS AND COMPARISONS. — *Caelorinchus sereti* superficially resembles *C. flabellispinis* (Alcock, 1894a) and *C. trunovi* Iwamoto & Anderson, 1994, but differs primarily in its short premaxillary teeth band, which in the other two species is long, tapered, and spans most of the length of the rictus. The underside of the head in the two Indian Ocean species is also more fully scaled compared with *C. sereti*, the jaws are somewhat longer (maxillary extends to below hind edge of pupil, cf. about midorbit or slightly posterior), and the mouth is pale to grayish overall (not black).

*Caelorinchus smithi* Gilbert & Hubbs, 1920 shares many features with *C. sereti* but differs in having a more pointed snout, with long, slender terminal scute, and a completely scaled underside of head. *C. japonicus* (Temminck & Schlegel, 1842) is also closely similar, but it has a longer snout (slightly less than twice orbit diameter) and spinules on most scales between the occipital ridges are in single keellike rows (vs. divergent rows).

*Caelorinchus shcherbachevi* sp. nov.

Fig. 13 b

MATERIAL EXAMINED. — 3 specimens.

**Loyalty Ridge.** BERYX 2: stn 9, Seamount K, 24°44.55'S, 170°07.00'E, 790-825 m, 26.10.1991: female holotype 126 mm HL, 460+ mm TL (MNHN 1996-966, formerly NMNZ P.27508). — Stn 9, same data as for holotype: 1 paratype 118 mm HL, 435 mm TL (NMNZ P.27508).

HALIPRO 2: stn BT 13, Espoir Seamount, 24°18'S, 169°57'E, 805-835 m, 8.11.1996: 1 specimen 122 mm HL, 435+ mm TL (CAS 90995).

**DIAGNOSIS.** — Snout 2.5 in HL, viewed dorsally somewhat duck-bill shaped, lateral margins convex, completely supported by bone; terminal scute blunt; orbits large, about equal to interorbital width, 1.6-1.7 in snout. Subopercle terminates in slender acute flap. Dermal window of light organ prominent, immediately anterior to periproct, length about 1/3 orbit diameter. Anus slightly removed from anal fin. Underside of head covered with numerous dark filamentous and flaplike papillae; almost entirely naked except for patch above end of lower jaw and at end of preopercle; nasal fossa scaled over entire ventral surfaces. Spinules on body scales strong, bladelike, with broad buttresses; arranged in 4 or 5 divergent rows. First dorsal fin uniformly dark; other fins dark to dusky; mouth dark.

**DESCRIPTION.** — *Counts* (holotype first, if different): 1D. II,10, II,9-10; P. i16, i17-i18; total GR-I (inner) 8, 8-9, GR-II (outer/inner) 6/9, 8-9; scales 1D. 5.5, mid-1D. 4.5, 3.5-4.5, 2D. 5.5, 4.5-6.0, lat.line 33, 35.

*Measurements:* Total length 460+, 435-435+ mm, HL 126, 118-122 mm. The following in percent of HL (holotype first): snout 41, 42-42; preoral 35, 36-36; internasal 22, 20-22; interorb. 26, 25-26; orbit 25, 25-26; suborb. 14, 13-14; postorb. 35, 34-35; orb.-preop. 37, 37-38; up.jaw 29, 29-31; barbel 9, 9-10; gill slit 15, 14-15; pre-A. 148, 154-156; V.-A. 47, 47-49; isthm.-A. 76, 80-80; body depth 60, 48-54; 1D.-2D. 22, 20-22; ht. 1D. 51, 45+-48; len. base 1D. 21, 18-22; len. P. 37, 37-38; len. V. 36, 36-37; nostril 8.

Head large, stout, about 3.7 in TL; greatest width about equal to greatest height, much less than postorbital length; trunk moderately deep, width over pectoral bases about 1.3-1.4 in greatest depth. Snout viewed laterally shallow, sharply pointed, stoutly reinforced by scutelike scales, lateral margins sharp edged, underside somewhat concave in preserved specimens; dorsal profile straight. Mouth inferior, gape wide, scarcely restricted by lip folds; upper jaw extends posteriorly to below hind margin of pupil. Barbel short, fine, about 1/3 orbit diameter.

Teeth in cardiform bands in both jaws; teeth band in upper jaw broad, spanning about 3/5 length of rictus, that in lower jaw narrower, extending posteriorly beyond end of rictus. None of teeth enlarged.

Height of first dorsal about half head length, considerably more than postorbital length; second dorsal separated from first by distance about equal to or slightly more than length base of first dorsal; rays of second dorsal low throughout. Pectoral and pelvic fins rather short, tips of each falling short of vertical through anal fin origin; pectoral origin slightly in advance of pelvic origin, the 2 in advance of first dorsal origin. Anal fin well developed, origin about under that of second dorsal.

Squamation overall coarse, spiny; ridges of head stoutly reinforced by coarse, heavy, modified scales. About 10 broad scales on median nasal ridge, each with short spinules in low radiating rows, posteriorly pointing rows longest; supraorbital, occipital (or parietal), postorbital, and suborbital ridges strong, spiny. A distinct, somewhat coarsened scale at posterior end of occipital region; supraoccipital scute developed. Scales completely cover top of snout; large scales lateral to median nasal ridge with 4 to 7 narrowly crestlike divergent rows; those over areas immediately behind anterolateral margin of snout small and covered with sharply bladelike spinules or sharp, crestlike spinule rows; scales over interorbital with 4 or 5 divergent spinule rows. Ventral aspects of nasal fossa covered with small scales having small, erect, sharp, bladelike spinules. Underside of head almost completely naked, covered with somewhat scraggly appearing, dark, hairlike filaments and blackish, flaplike papillae of sensory lateralis system. Two patches of small, non-imbricate scales on underside of head: one immediately below suborbital ridge above posterior angle of lower jaw, the second at posterior end of preopercle. Body scales covered with strongly imbricate, relatively broad-based spinules; about 6 or 7 overlapping spinules in middle row of larger scales on dorsum below interspace of dorsal fins.

*Color* in alcohol light brownish to somewhat swarthy ground; slightly paler ventrally and over sides of head (but opercular region dark from blackish gill cavity). Gums pale; lower lips pale, upper lips pale to dusky; barbel lightly dusky. Uppermost margins of branchiostegal membrane dark; gill and gular membranes externally pale; gill cavity blackish except narrowly along outer margins. Abdomen with bluish tint, chest area light brownish gray. Dorsal, pectoral, and pelvic fins blackish; anal fin dusky, blackish posteriorly.

**SIZE.** — To more than 46 cm TL.

**ETYMOLOGY.** — Named for Yuri N. SHCHERBACHEV of IOAN, friend, colleague, and fellow student of grenadiers.

DISTRIBUTION. — So far known only from south of New Caledonia on the Loyalty Ridge, in 797-835 m.

REMARKS AND COMPARISONS. — This species is so closely similar to *C. anatirostris* that we considered recording our three large specimens as simply variants of that species. The two species share most of the diagnostic characters used to distinguish *C. anatirostris* from its congeners, but two important squamation features and the distinctive papillae on the underside of head of the new species appear to support specific recognition. The first scale feature concerns the number of spinule rows on body scales. In the *C. anatirostris* specimens we examined, the count ranged from 5-8, and OKAMURA (1970: 188) gave a count of 4-10, whereas our three specimens of *C. shcherbachevi* had only 4 or 5 rows. The low count in the new species is significant considering the size of our specimens (44-46+ cm), as compared with the *C. anatirostris* specimens we (9-29 cm) and OKAMURA (18-43 cm) examined. To a certain extent, the number of spinule rows increases with size in grenadiers, so we would expect the largest specimens of a species to have the highest number of rows, but our specimens of the new species have the lowest numbers.

The second scale feature concerns the shape of the spinules on body scales. In *C. shcherbachevi* the spinules increase in size and height posteriorly, with the largest spinule along the posterior margin of the scale in the middle row. When viewed from anteriorly, this large spinule is broadly triangular and somewhat pyramidal in shape, with the anterior edge somewhat thickened and forming a surface on which the adjacent spinule rests. Spinules in each row are closely imbricate and adjoined along their entire, or almost-entire, length, with only the tips free in some. Lateral spinule rows tend to be inclined towards the middle rows. In our New Caledonian specimens of *C. anatirostris*, the spinules are narrow, conical to narrowly bladelike, without broad lateral buttresses, and much more inclined than in the new species. OKAMURA's (1970, textfig. 80) figure of the scale in *C. anatirostris* is somewhat diagrammatic, but agrees rather well with the scales in the new species, except that the spinules are much less broad. In this feature, OKAMURA's specimens agree closer to the new species than does our New Caledonian specimens of *C. anatirostris*.

The underside of head in the new species has a somewhat dirty appearance from the dark hairlike and the larger flaplike sensory papillae covering the surface. These dark papillae are absent in *C. anatirostris*, and the underside of the head is immaculate.

Other differences include a broader interorbital space in the new species (about equal to orbit diameter, cf. 3/4ths orbit), longer upper jaw (29-31% HL, cf. 21-27%), uniformly blackish first dorsal (membrane between second spinous ray and first segmented ray black in *C. anatirostris*), and overall brownish-gray body color (cf. distinctly whitish or silvery ventrally on body in *C. anatirostris*).

### *Caelorinchus spathulatus* McMillan & Paulin, 1993

Fig. 16

*Caelorinchus spathulata* McMillan & Paulin, 1993: 832-833, fig. 9 (New Zealand).

MATERIAL EXAMINED. — 84 specimens.

**New Caledonia.** MUSORSTOM 4: stn CC 202, 18°58.0'S, 163°10.5'E, 580 m, 20.09.1985: 1 specimen 66.5 mm HL, 262 mm TL (MNHN 1994-912), 6 specimens 61-70.5 mm HL (MNHN 1994-913), 3 specimens (BMNH 1996.7.19:7-9).

**Chesterfield and Bellona Plateau.** MUSORSTOM 5: stn CP 363, 19°47.90'S, 158°44.30'E, 700-685 m, 19.10.1986: 3 specimens 44.5-58.0 mm HL (CAS 86486, formerly MNHN 1994-919). — Stn CC 365, 19°42.82'S, 158°48.00'E, 710 m, 19.10.1986: 9 specimens 28.0-64.5 mm HL (MNHN 1994-915). — Stn CC 366, 19°45.40'S, 158°45.62'E, 650 m, 19.10.1986: 1 specimen 44.0 mm HL, 352 mm TL (MNHN 1994-916). — Stn CC 383, 19°40.85'S, 158°46.10'E, 615-600 m, 21.10.1986: 1 specimen 47.5 mm HL, 352 mm TL (MNHN 1994-914), 5 specimens 41.6-66.6 mm HL, 149+-231+ mm TL (CAS 86479). — Stn CP 386, 20°56.21'S, 160°51.12'E, 770-755 m, 22.10.1986: 1 specimen 56 mm HL (MNHN 1994-918). — Stn CC 390, 21°00.91'S, 160°50.30'E, 745-825 m, 22.10.1986: 1 specimen 66.5 mm HL (MNHN 1994-917).

**New Zealand.** Wanganella Bank, northwest of North Island, 33°07.4'S, 166°52.1'E, 670-710 m, 7.06.1986: 2 paratypes 65.5-68.0 mm HL, 240+-258+ mm TL (NMNZ P.22991).

**Australia.** Queensland, off Marion Reef, 19°06'S, 152°30'E, 650 m, 1987: 1 specimen 62.6 mm HL, 220+ mm TL (QM I.23616). — Queensland off Cape Tribulation, "Raptis": 16°08'S, 149°26'E, 550 m, April 1988: 22 specimens, 165+-240 mm TL (QM I.25619), 15 specimens 76+-244 mm TL (QM I.25620).

"*Soela*", Queensland Plateau: stn SO6/85/34, 19°01.6'S, 150°43.1'E, 642 m, 24.11.1985: 1 specimen 225+ mm TL (CSIRO H1977-01). — Stn SO6/85/60, 16°59.8'S, 151°01.7'E, 696 m, 2.12.1985: 7 specimens 150-225+ mm TL (CSIRO H.1980-01). — Stn SO6/85/80, 16°59.8'S, 151°01.7'E, 696 m, 1985: 2 specimens 138+-160+ mm TL (CSIRO H1979-01). — Stn SO6/85/81, 17°03.2'S, 150°51.8'E, 610 m, 6.12.1985: 1 specimen 200 + mm TL (CSIRO H1976-01).

DIAGNOSIS. — Snout slender, sharply tipped, about twice orbit diameter; anterolateral margin completely supported by bone; orbit slightly greater than interorbital width, less than postorbital length; mouth restricted at posterior corners; length upper jaw much less than orbit diameter; subopercle terminates in long, slender tip. Large dermal window of light organ extends forward more than 2/3 distance to pelvic insertions, whitish naked groove extends beyond dermal window onto chest. Anus slightly removed from anal fin. Underside of head completely naked; top of snout covered with small, thin, finely spinulated scales; scales of median nasal ridge narrow; nasal fossa naked. Body scales highly deciduous, covered with short conical spinules in 8-11 parallel rows. First dorsal with black second spinous ray; mouth dark.

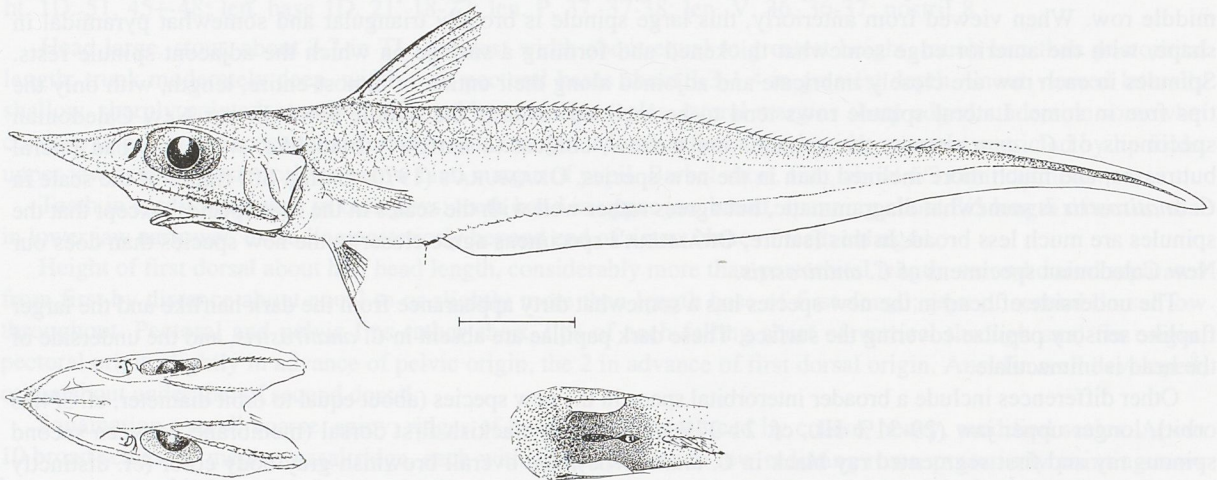


FIG. 16. — *Caelorinchus spathulatus* McMillan & Paulin, 66.5+ mm HL (MNHN 1994-912), New Caledonia, MUSORSTOM 4, stn CC 202, 580 m. Scale = 25 mm.

DESCRIPTION. — *Counts* (from 26 specimens): 1D. II,8-9; P. i13-i16; total GR-I (inner) 6-9, GR-II (outer/inner) 5-7 / 7-9; scales 1D. 4-5, mid-1D. 3-4.5 (6), 2D. 4.5-6 (7.5), lat.line 30-37.

*Measurements*: Total lengths 156+-262 mm; HL 41.6-70.5 mm. The following in percent of HL: postrostral 50-55; snout 45-52; preoral 41-53; internasal 17-23; interorb. 19-25; orb. 23-27; suborb. 10-14; postorb. 26-31; orb.-preop. 28-36; up.jaw (13, 14) 17-23; barbel 4-8; gill slit 7-9; pre-A. 133-153; V.-A. 27-39; isthm.-A. 49-62; body depth 37-48; 1D.-2D. 18-36; ht. 1D. 39-47; len. base 1D. 14-19; len. P. 28-43; len. V. 29-45; nostril 6-9.

Body slender, greatest depth less than greatest width of head, less than postrostral length. Head long, about 3.3-3.5 in TL. Snout about 2 or more times into HL, slender, sharply tipped with spearhead-shaped terminal scute. Suborbital ridge sharp, strong, forming acute angle between dorsal and ventral surfaces of head. Jaws short, less than 1/4 HL, restricted at angle by lip folds. Barbel short, fine; length about equal to or less than diameter of posterior nostril.

Teeth all small, none enlarged. Premaxillary teeth in short broad, untapered band, which falls well short of end of rictus. Mandibular teeth in bands, broad at symphysis (about 4 teeth across), narrowing abruptly laterally into tight band of teeth (about 3 teeth across), extending to end of rictus.

Height first dorsal fin much less than postrostral length, less than snout length; second dorsal low over length of fin, rays much lower than opposites of well-developed anal fin. Pectoral and pelvic fins short, outer pelvic ray barely extends to anal origin.

Scales on dorsum of trunk and tail large, covered with slender, greatly reclined, slightly recurved, conical spinules, aligned in 8-11 parallel rows, middle row with 6 or 7 spinules. Scales deciduous; body scales missing in most specimens.

Light organ externally visible as an elongated, rather broad, black scaleless structure immediately anterior to small periproct region. Organ situated in a shallow groove or fossa that continues anteriorly onto chest; floor of groove lined with transparent epidermis underlain with white, opaque membrane.

*Color* in alcohol: dorsum of trunk and tail pale, somewhat flesh colored, overlain with fine, netlike pattern of margins of scale pockets; ventrally pearl-white ground with numerous large, wide-spaced chromatophores having ivory centers (pearl-white overlay in New Caledonian specimens absent in New Zealand paratypes, and ventral half of specimens darkly peppered); dark violet on ventral surfaces of abdomen and most of chest; dermal window of light organ black. Head pearly white over gill covers, tawny or dusky over most other surfaces; entire underside of head immaculate in New Caledonian and Queensland specimens, but covered with fine melanophores in New Zealand paratypes. Median nasal bone dark. First dorsal fin with second spinous ray black, remaining rays pale or light dusky; upper edge of pectoral fin blackish, remainder pale; other fins pale or whitish to light dusky. Inner lining of mouth black, pale peripherally over oral valves, gums, lips. Inner lining of gill chamber black; peripheral margins pale; gill arches and rakers dark; filaments pale.

SIZE. — To more than 26 cm TL.

DISTRIBUTION. — New Caledonia, New Zealand (northwest of North Island), Chesterfield and Bellona Plateau, Australia off Queensland; in 550-825 m.

REMARKS AND COMPARISONS. — *Caelorinchus spathulatus* agrees in many important characters with *C. asteroides*, including naked underside of head; completely supported anterolateral snout margin; size of light organ; dark ventral surface of abdomen and chest, but with sides whitish; naked nasal fossa. The two species are readily differentiated, however, by their scale spinules and snout length, among other characters. The spinules in *C. asteroides* are broad-based, keel-shaped, with bases overlapping and adjoined, whereas those of *C. spathulatus* are conical, greatly reclined, and not adjoined. The snout in *C. spathulatus* is much longer than in *C. asteroides*, being about 1.7-2.0 times diameter of orbit, compared with only about 1.3-1.5 times. Another species in this complex, *Caelorinchus* sp. cf. *asteroides* Iwamoto & Williams MS from Western Australia, can be differentiated by its shorter snout, deeper body, smaller light organ, somewhat longer upper jaws (slightly longer than orbit diameter), and more upright scale spinules, which are arranged in widely divergent rows.

### Genus *CORYPHAENOIDES* Gunner, 1765

*Coryphaenoides* Gunner, 1765: 50 (type species *Coryphaenoides rupestris* Gunner, 1765, by monotypy).

DIAGNOSIS. — Branchiostegal rays 6; light organ absent; spinous ray of first dorsal fin serrated (rarely, serrations rudimentary or lost); chin barbel present; snout tipped with a stout, spiny, tubercular scale; anus usually immediately before anal fin origin (rarely removed by more than 1 or 2 scale rows).

REMARKS. — More than 60 species, of which only one was represented in the collection. More trawl hauls at depths exceeding 2000 m will probably result in additional species, especially those that are wide ranging like *C. armatus* (Hector, 1875) and *C. rudis* Günther, 1878.

### *Coryphaenoides striaturus* Barnard, 1925

Fig. 17

*Coryphaenoides (Chalinura) striatura* Barnard, 1925: 500-501 (off Cape Point, South Africa; 823-1737 m).  
*Coryphaenoides striaturus* - IWAMOTO & SHCHERBACHEV, 1991: 214-217, figs 6-7.

MATERIAL EXAMINED. — 4 specimens.

**New Caledonia.** BIOCAL: stn CP 30, 23°08.44'S, 166°40.83'E, 1140 m, 29.08.1985: 1 specimen 41 mm HL (MNHN 1994-933). — Stn CP 57, 23°43.26'S, 166°58.06'E, 1490 m, 1.09.1985: 1 specimen 81 mm HL (MNHN 1994-932). — Stn CP 60, 24°01.45'S, 167°08.43'E, 1530 m, 2.09.1985: 1 specimen, 58 mm HL (MNHN 1996-955). — Stn CP 68, 24°00.37'S, 168°07.03'E, 1430 m, 3.09.1985: 1 specimen 26.8 mm HL, 128 mm TL (BMNH 1996.7.19:10).

**DIAGNOSIS.** — Snout completely and uniformly covered with small scales; pelvic fin rays 11-12 (usually 12); premaxillary teeth in broad cardiform band flanked by enlarged outer teeth, mandibular teeth irregularly uniserial; orbit 18-24% HL, interorbital 23-30%, preoral 10-16%, barbel 18-26%; body scales on dorsum below dorsal interspace with short, weak, conical spinules in 9-14 parallel rows.

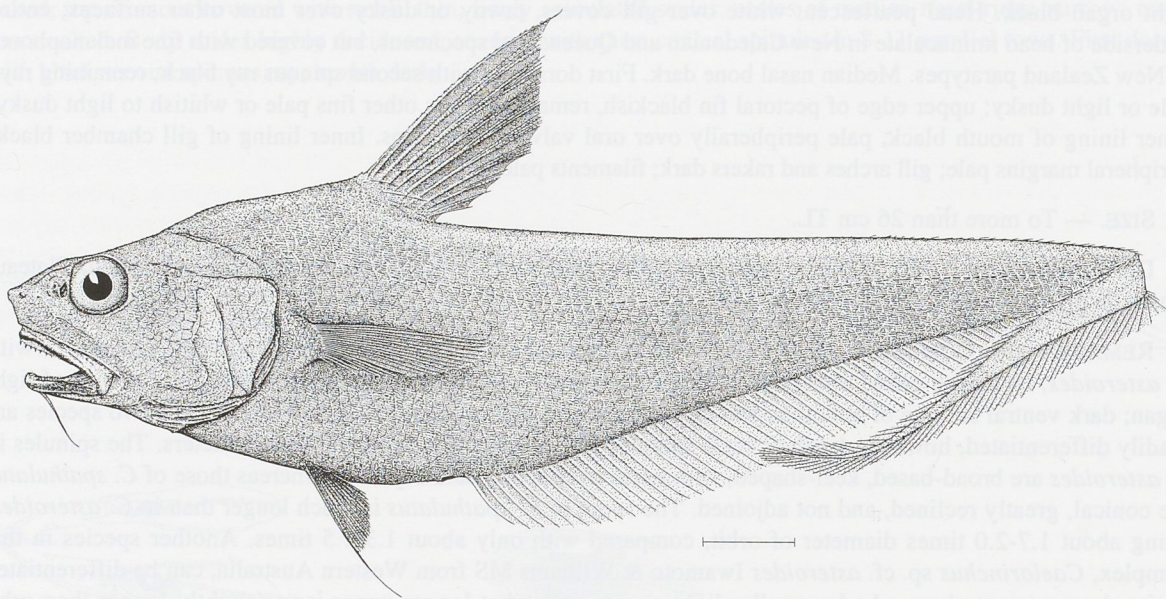


FIG. 17. — *Coryphaenoides striaturus* Barnard (From IWAMOTO & SHCHERBACHEV, 1991, fig. 6). Scale = 25 mm.

**SIZE.** — To at least 55 cm TL.

**DISTRIBUTION.** — Wide-ranging in southern hemisphere, from southeastern Atlantic across Indian Ocean to Australia and into western South Pacific (Tasman Sea, New Zealand, New Caledonia). Depth range 823-2010, most often between 1000 and 1400 m.

**REMARKS AND COMPARISONS.** — See IWAMOTO & SHCHERBACHEV (1991) for full description and illustration. This common deepwater species is first recorded from the southwest Pacific north of latitude 30°S. It appears to be most common in warm temperate waters and is probably marginally distributed in the New Caledonian region. That only one species of the genus was represented in the collections is somewhat unusual in that the deeper hauls were within the range occupied by other members of *Coryphaenoides*. Perhaps the use of larger nets at the deeper end of the sampling range would have resulted in other species being captured. The wide-ranging *C. armatus* (Hector, 1875), *C. carapinus* (Goode & Bean, 1883), and *C. rudis* Günther, 1878 should be expected.

#### Genus *HAPLOMACROURUS* Trunov, 1980

*Haplomacrourus* Trunov, 1980:3 (type species *Haplomacrourus nudirostris* Trunov, 1980, by original designation).



DIAGNOSIS. — Branchiostegal rays 7; jaws almost terminal, maxillary extends to vertical of anterior margin of orbits; scales on head and anterior part of body without spinules; snout and ventral aspects of head naked; head notably compressed laterally; snout smoothly rounded; a large, stout, serrated dorsal spine; pelvic rays 8; pectoral rays 26-29; light organ an elongated flattened pouch anterior to anus, lacking lens, but with a small dermal window between pelvic-fin insertions; anus about midway between pelvic and anal fins.

REMARKS. — A peculiar monotypic genus whose relationships are as yet obscure.

*Haplomacrourus nudirostris* Trunov, 1980

Fig. 18

*Haplomacrourus nudirostris* Trunov, 1980: 3-11 (holotype: ZIL 44345; southeastern Atlantic off southern Africa; 1230-1500 m; 10 paratypes from Indian Ocean, 790-1590 m).

MATERIAL EXAMINED. — **Wallis and Futuna Islands.** MUSORSTOM 7: stn CP 592, 12°32.4'S, 174°22.0'W, 775-730 m, 24.05.1992: 1 specimen 30 mm HL (MNHN 1994-934).

DIAGNOSIS. — As for genus.

SIZE. — To at least 58 cm TL (SHCHERBACHEV, 1987).

DISTRIBUTION. — Widespread in southern hemisphere from southeastern Atlantic off Africa, through Indian Ocean, Australia, and New Zealand, in 790-1590 m.

REMARKS. — This highly distinctive species is unlikely to be mistaken for any other grenadier except when very small. The forwardly placed mouth is unique among grenadiers, as is the combination of head greatly compressed and extensively naked.

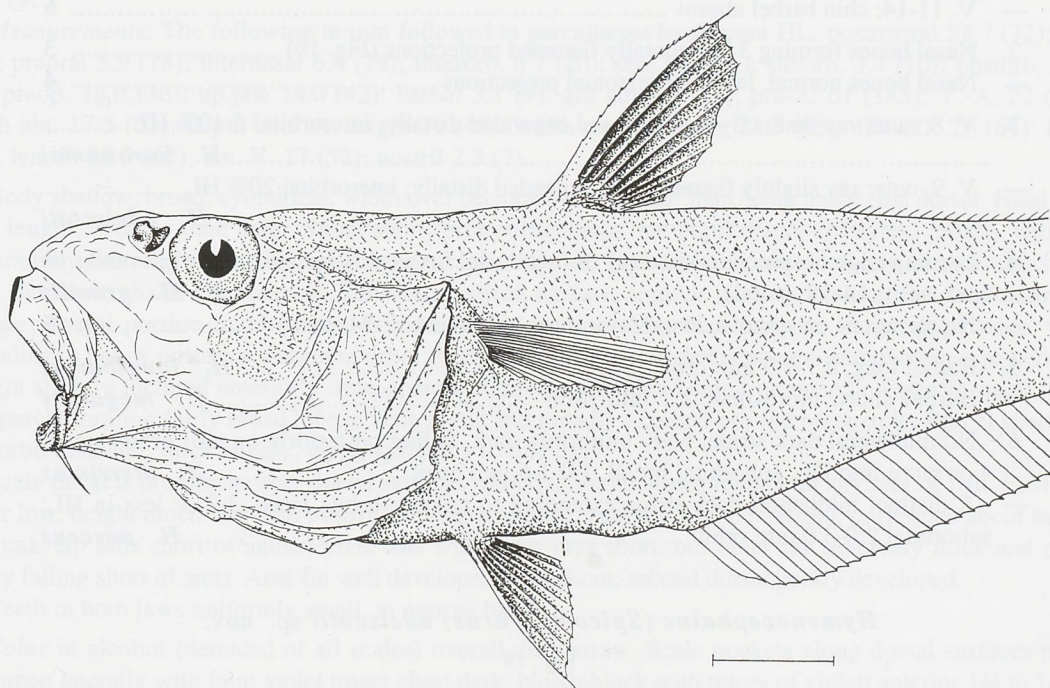


FIG. 18. — *Haplomacrourus nudirostris* Trunov, 89 mm HL (ZMMGU uncat.), Indian Ocean, "Mesiatzev" cruise 7, trawl 25, 1162 m. Scale = 25 mm.

Genus *HYMENOCEPHALUS* Giglioli

*Hymenocephalus* Giglioli in GIGLIOLI & ISSEL, 1884: 228 (type species *Hymenocephalus italicus* Giglioli in GIGLIOLI & ISSEL, 1884, by original designation).

*Hymenogadus* Gilbert & Hubbs, 1920: 521 (as subgenus; type species *Hymenocephalus gracilis* Gilbert & Hubbs, 1920, by original designation).

DIAGNOSIS. — Branchiostegal rays 7; spinous ray of first dorsal smooth, except in subgenus *Hymenogadus*; striae, consisting of fine, parallel black lines over silvery pigment on isthmus, pectoral girdle and chest; light organ tubular, 2 lenslike windows, 1 before pelvic base, the other before anus. Inner gill rakers usually more than 18; retia and gas glands 2; anus immediately in front of anal fin origin; barbel present or absent. Species all small, rarely more than 25 cm TL.

REMARKS. — We use the generic name in the broadest sense of SAZONOV & IWAMOTO (1992) and IWAMOTO (1990) to include the distinctive clades *Hymenogadus* and *Spicomacrurus* Okamura, 1970, each of which are represented by two species. The discovery of a new species of *Spicomacrurus* in the collections was most unexpected and further emphasizes the biogeographic uniqueness of the region.

Members of the genus were surprisingly well represented in the collection with seven species, two of which are here described as new. The species are generally western Pacific in distribution except for the wide-ranging species *H. gracilis* and *H. aterrimus*. Based on the number of specimens captured, *H. megalops* and *H. nascens* were the two most abundant grenadiers in the fauna. The latter species was the most often captured, having been taken in 20 separate hauls.

There are now 22 species of *Hymenocephalus* that we consider valid (including the two new ones here described), but we expect that number to increase as better studies with more extensive material become available.

Key to species of *Hymenocephalus* of New Caledonia and adjoining areas

- |  |                       |
|--|-----------------------|
| 1. V. 7-9; chin barbel present .....   | 2                     |
| — V. 11-14; chin barbel absent .....   | 6                     |
| 2. Nasal bones forming 3 horizontally flattened projections (Fig. 19) .....  | 3                     |
| — Nasal bones normal, lacking horizontal projections .....   | 4                     |
| 3. V. 8, outer ray distinctly flattened and expanded distally; interorbital 6-10% HL .....   |                       |
| ..... <i>H. kuronumai</i>  |                       |
| — V. 9, outer ray slightly flattened and expanded distally; interorbital 20% HL .....  |                       |
| ..... <i>H. adelscottii</i>  |                       |
| 4. Leading edge of spinous second ray of first dorsal fin weakly serrated; inner gill rakers on first arch 14-18 (total) .....                             | <i>H. gracilis</i>    |
| — No serrations on spinous dorsal rays; inner gill rakers 17-24 (total) .....  | 5                     |
| 5. Barbel long, 0.7-1.0 into orbit .....   | <i>H. longibarbis</i> |
| — Barbel short, more than 2.2 into orbit .....   | <i>H. megalops</i>    |
| 6. No midlateral dark stripe, body uniformly dark, fading posteriorly on tail; orbits small, 4 or more into HL; suborbital broad, 1.0-1.6 into orbit ..... | <i>H. aterrimus</i>   |
| — A distinct midlateral dark stripe extending to tail tip; orbits large, 3.2 or less in HL; suborbital 2.0-3.0 into orbit .....                            | <i>H. nascens</i>     |

*Hymenocephalus (Spicomacrurus) adelscottii* sp. nov.

Fig. 19

MATERIAL EXAMINED. — 1 specimen.

Wallis and Futuna Islands. MUSORSTOM 7: stn CP 631, about 250 nautical miles north of Vanua Levu, Fiji, 11°54.0'S, 179°31.6'W, 600 m, 29.05.1992: female holotype 33.0 mm HL, 162 mm TL (MNHN 1994-882).

DIAGNOSIS. — Three broad horizontal processes of nasal bones forming leading edge of snout; pelvic rays 9, outer prolonged ray slightly broadened and flattened distally; total gill rakers on first arch (outer/inner) 8 / 11.

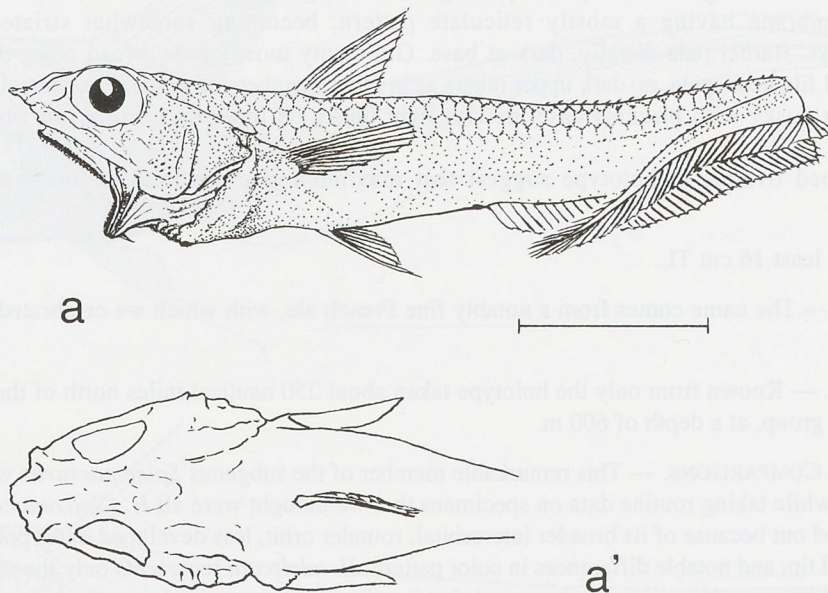


FIG. 19. — a, *Hymenocephalus adelscottii* sp. nov., 33.0 mm HL, holotype (MNHN 1994-882), near Wallis and Futuna Islands, MUSORSTOM 7, stn CP 631, 600 m; and a' dorsal view of head. Scale = 25 mm.

DESCRIPTION. — *Counts*: 1D. II,10; P. i19-i20; GR-II (outer/inner) 9 / 11; scales 1D. 5, 2D. 3.5, lat.line abt. 19.

*Measurements*: The following in mm followed in parentheses by percent HL: postrostral 23.7 (72); snout 9.7 (29); preoral 5.9 (18); internasal 6.4 (19); interorb. 6.7 (20); orb. 9.4 (28); suborb. 3.4 (10); postorb. 14.6 (44); orb.-preop. 12.0 (36); up.jaw 14.0 (42); barbel 3.1 (9); gill slit 8.2 (25); pre-A. 61 (185); V.-A. 22 (67); body depth abt. 17.5 (53); depth over A. origin 16 (48); width over P. bases 21.5 (65); 1D.-2D. 20 (61); ht. 1D. 20 (61); len. P. 20.5 (62); len. V. 17 (52); nostril 2.3 (7).

Body shallow, broad, cylindrical, width over pectoral bases greater than depth under first dorsal. Head about 5 in total length; broader than deep. Snout short, protruding about one pupil diameter beyond mouth, with 3 broad, horizontally flattened projections characteristic of subgenus. Interorbital space relatively narrow, much less than orbit diameter, shallowly concave. Suborbital region narrow, angular in cross section, forming distinct ventral surface; dorsal portion much narrower than ventral portion. Mouth subinferior, large, gape wide, upper jaw extending to below posterior margin of orbit. Preopercle broadly rounded at posteroventral corner; posterior vertical margin slightly inclined anteriorly. Interopercle completely hidden behind preopercle. Opercle small, triangular; subopercle forming fairly broad lobe at ventral end and broadly exposed beyond preopercle. Barbel short, less than half orbit diameter, thick at base, tapering rapidly to fine tip.

Scale pockets prominent over dorsal surfaces of body, but no scales remain on any part of fish. First dorsal fin rather low, height much less than postrostral length of head; pectoral well developed, positioned about midlaterally on trunk, tip falls short of anus. Pelvic fins with inner rays short, but outer ray relatively thick and prolonged, barely falling short of anus. Anal fin well developed throughout; second dorsal poorly developed.

Teeth in both jaws uniformly small, in narrow bands.

*Color* in alcohol (denuded of all scales) overall dirty straw. Scale pockets along dorsal surfaces prominent. Abdomen laterally with faint violet tinge; chest dark, bluish-black with traces of violet; anterior 1/4 to 1/3 of belly with same color, becoming paler towards anus. Ventral striae confined to shallow, broad, triangular area, the apex at pectoral base, anterior end along shoulder girdle, posterior end extending posteriorly toward, but not reaching,

anus. Striae confined on abdomen to lateral surfaces above pelvic fins, none over ventral surfaces of belly and chest. Snout with generically characteristic black leading margin of snout; no extensions of black margin on supranarial or suborbital ridges. Mouth pale; lips, edges of lower jaw, gular membrane, and branchiostegal rays black; gular membrane having a mostly reticulate pattern, becoming somewhat striated near bases of branchiostegal rays. Barbel pale distally, dark at base. Gill cavity mostly pale, broad outer margins dark; gill arches, rakers, and filaments pale, no dark upper rakers as in other members of genus. First dorsal distally blackish; pectoral fins light dusky with blackish base; pelvics light dusky on inner rays, outer ray white; anal fin pale throughout.

Well-developed ovaries in holotype suggest that maximum size for this species much less than for *H. kuronumai*.

SIZE. — To at least 16 cm TL.

ETYMOLOGY. — The name comes from a notably fine French ale, with which we celebrated the discovery of the new species.

DISTRIBUTION. — Known from only the holotype taken about 250 nautical miles north of the island of Vanua Levu in the Fijian group, at a depth of 600 m.

REMARKS AND COMPARISONS. — This remarkable member of the subgenus *Spicomacrus* was discovered by one of us (NRM) while taking routine data on specimens that we thought were all *H. (Spicomacrus) kuronumai*. The specimen stood out because of its broader interorbital, rounder orbit, less developed outer pelvic ray that lacks a notably expanded tip, and notable differences in color pattern. *H. adelscottii* represents only the second species in a subgenus (included in genus *Hymenogadus* by some) that is uniquely characterized among the macrourids in having the nasal bones forming three horizontally flattened processes. In their cylindrical body and low gill raker counts, the two species resemble members of subgenus *Hymenogadus* (*H. gracilis* and *H. tenuis* Gilbert & Hubbs, 1916), neither of which, so far as we know, exceed about 130 mm in total length.

### *Hymenocephalus aterrimus* Gilbert, 1905

Fig. 20 a

*Hymenocephalus aterrimus* Gilbert, 1905: 666-667, pl. 93 (holotype: USNM 51649; off Kauai, Hawaiian Is., 704-914 m).

*Hymenocephalus (Papyrocephalus) aterrimus* - GILBERT & HUBBS, 1920: 539 (name only, as type species of *Papyrocephalus* new subgenus).

MATERIAL EXAMINED. — 25 specimens.

**New Caledonia.** BIOCAL: stn CP 31, 23°07.26'S, 166°50.45'E, 850 m, 29.08.1985: 2 specimens 28-32 mm HL (MNHN 1994-872), 2 specimens 29.5-35.0 mm HL (CAS 86491).

**Norfolk Ridge.** BERYX 11: stn CP 58, Azteque Seamount, 23°19.20'S, 167°59.35'E, 850-920 m, 22.10.1992: 14 specimens 27-33 mm HL (NMNZ P.29053).

**Wallis and Futuna Islands.** MUSORSTOM 7: stn CP 564, Eaglestone Ridge, northeast of Rotuma, 11°46.1'S, 178°27.4'W, 1015-1020 m, 20.05.1992: 1 specimen 27 mm HL (MNHN 1994-873). — Stn CP 565, Alexa Bank, northwest of Rotuma, 11°47.4'S, 178°25.8'W, 900 m, 20.05.1992: 1 specimen 27 mm HL (MNHN 1994-874). — Stn CP 567, 11°47.0'S, 178°27.3'W, 1010-1020 m, 20.05.1992: 1 specimen 24 mm HL (MNHN 1994-875). — Stn CP 592, 12°32.4'S, 174°22.0'W, 775-730 m, 24.05.1992: 4 specimens 26-31 mm HL (MNHN 1994-876).

DIAGNOSIS. — Pelvic fin rays 12-14; no chin barbel; suborbital broad, 17-22% HL; orbit usually 4 or more into HL (22-28% HL), 1.0-1.6 into interorbital width; color in alcohol uniformly dark brown to black.

DESCRIPTION. — *Counts* (6 spec.): 1D. II,8-9 (11); P. i12-i14 (i15); total GR-I (outer/inner) 14-20 / 22-27, GR-II 22-25 / 20-26.

*Measurements*: Total lengths 102+-148 mm; HL 25-34 mm. The following in percent of HL: postrostral 73-74; snout 30-33; interorb. 36-39; postorb. 48-54; orb.-preop. 49-58; up.jaw 53-59; pre-A. 146-159; body depth 73-75; len. P. 63-75 (2 spec.); len. V. 99 (1 spec.).

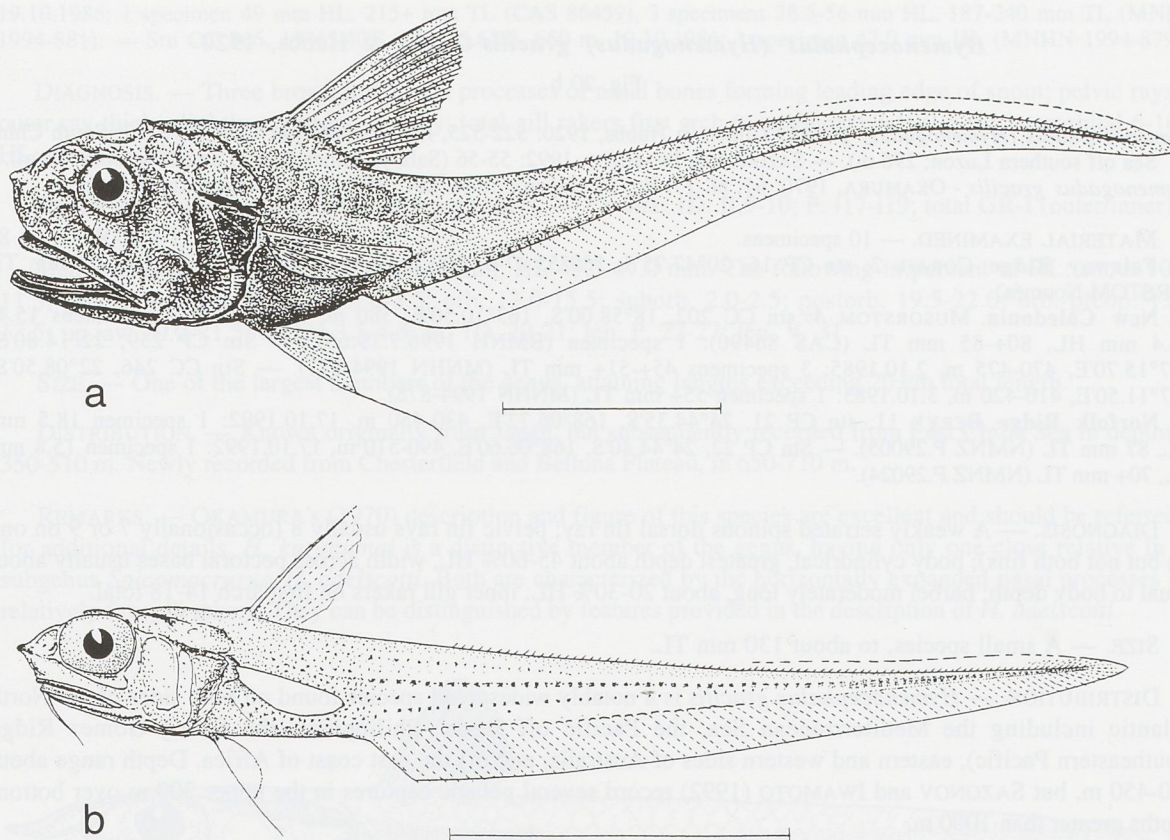


FIG. 20. — **a**, *Hymenocephalus aterrimus* Gilbert. Composite of specimens from NMNZ P.29053, Azteque Seamount, south of New Caledonia, BERYX 11, stn CP 58, 850-920 m. — **b**, *Hymenocephalus gracilis* Gilbert & Hubbs, 17.4 mm HL (CAS 86490), New Caledonia, MUSORSTOM 4, stn CC 202, 580 m. Scales = 28 mm.

SIZE. — To at least 18.5 cm TL.

DISTRIBUTION. — Recorded from Hawaii, Sala-y-Gomez and Nazca ridges (although questionably by SAZONOV and IWAMOTO, 1992; may be another species), New Caledonian region, tropical western North Atlantic, and Indian Ocean. Depth distribution approximately 340-1463 m.

REMARKS AND COMPARISONS. — See the original description by GILBERT (1905) for a good description and illustration of the species. MARSHALL and IWAMOTO (*in* MARSHALL, 1973) and SAZONOV and IWAMOTO (1992) provide additional information. This widespread species is readily distinguished from most of its congeners by the high pelvic ray count and absence of a chin barbel coupled with small orbits. The very membranous nature of the head bones, dark body color lacking silvery reflections, small eyes, and associated wide suborbital region led GILBERT and HUBBS (1920) to erect subgenus *Papyrocephalus* for this and related species. In the New Caledonian area, *H. aterrimus* is unlikely to be mistaken for any other member of the genus owing to these attributes.

SAZONOV and IWAMOTO (1992: 54-55) found differences in the head depth and width, and the height of the nasal ridge in their specimens, which led them to consider the Nazca and Sala-y-Gomez ridges specimens as only related to *H. aterrimus*. But they stated that "the poor condition of the specimens...might account for the apparent differences". So far as we can tell, our specimens from New Caledonia are no different from specimens from Hawaii and other areas from which we have representatives, although these specimens are generally in poor condition.

*Hymenocephalus (Hymenogadus) gracilis* Gilbert & Hubbs, 1920

Fig. 20 b

*Hymenocephalus (Hymenogadus) gracilis* Gilbert & Hubbs, 1920: 522-525, fig. 31 (holotype USNM 78227, South China Sea off southern Luzon; 296 m). — SAZONOV & IWAMOTO, 1992: 55-56 (Sala-y-Gomez Ridge, Zanzibar; 380-410 m).  
*Hymenogadus gracilis* - OKAMURA, 1970: 61, pl. 17, fig. 27 (Japan); 1984: 201, 359, fig. 143 (East China Sea).

MATERIAL EXAMINED. — 10 specimens.

**Fairway Ridge.** CORAIL 2: stn CP 16, 20°47.75'S, 160°55.87'E, 500 m: 1 specimen 12.3 mm HL, 61 mm TL (ORSTOM-Nouméa).

**New Caledonia.** MUSORSTOM 4: stn CC 202, 18°58.00'S, 163°10.50'E, 580 m, 20.09.1985: 2 specimens 15.4-17.4 mm HL, 80+-85 mm TL (CAS 86490): 1 specimen (BMNH 1996.7.19:65). — Stn CP 239, 22°14.80'S, 167°15.70'E, 470-475 m, 2.10.1985: 3 specimens 45+-51+ mm TL (MNHN 1994-877). — Stn CC 246, 22°08.50'S, 167°11.50'E, 410-420 m, 3.10.1985: 1 specimen 55+ mm TL (MNHN 1994-878).

**Norfolk Ridge.** BERYX 11: stn CP 21, 24°44.35'S, 168°06.72'E, 430-450 m, 17.10.1992: 1 specimen 18.5 mm HL, 87 mm TL (NMNZ P.29005). — Stn CP 22, 24°44.40'S, 168°06.60'E, 490-510 m, 17.10.1992: 1 specimen 15.8 mm HL, 70+ mm TL (NMNZ P.29024).

DIAGNOSIS. — A weakly serrated spinous dorsal fin ray; pelvic fin rays usually 8 (occasionally 7 or 9 on one fin but not both fins); body cylindrical, greatest depth about 45-60% HL, width across pectoral bases usually about equal to body depth; barbel moderately long, about 20-30% HL; inner gill rakers on first arch 14-18 total.

SIZE. — A small species, to about 130 mm TL.

DISTRIBUTION. — *Hymenocephalus gracilis* is a notably widespread species found on both sides of the North Atlantic including the Mediterranean Sea, the Pacific off Japan, Philippines, the Sala-y-Gomez Ridge (southeastern Pacific), eastern and western sides of Australia, and off the east coast of Africa. Depth range about 300-450 m, but SAZONOV and IWAMOTO (1992) record several pelagic captures in the upper 300 m over bottom depths greater than 1000 m.

REMARKS AND COMPARISONS. — The original description by GILBERT and HUBBS (1920) is excellent and should be referred to for details. The only species *H. gracilis* is likely to be confused with in the New Caledonia area is *H. longibarbis*, a much larger species that lacks serrations on the leading edge of the spinous dorsal ray and has more gill rakers on the first arch (usually more than 20 on inner side). Other differences are noted in the description of *H. longibarbis*. *H. tenuis* Gilbert & Hubbs, 1917 from Hawaiian waters is apparently most closely related to *H. gracilis*, but "differences between the two species are slight...and should be reevaluated..." (SAZONOV & IWAMOTO, 1992: 56).

*Hymenocephalus gracilis* was represented in the collections by only a few small specimens. Possibly, pelagic hauls may have resulted in more captures, as former Soviet vessels working off the Sala-y-Gomez Ridge in the southeastern Pacific collected numerous mesopelagic individuals between the surface and 300 m.

*Hymenocephalus kuronumai* Kamohara, 1938

Fig. 21 a

*Hymenocephalus kuronumai* Kamohara, 1938: 70 (Tosa Bay, Japan).

*Hymenogadus (Spicomacrurus) kuronumai* - OKAMURA, 1970: 64-67, pl. 3, text-fig. 28.

*Hymenogadus kuronumai* - OKAMURA in OKAMURA & KITAJIMA, 1984: 203, 359, fig. 144 (s. Japan, East China Sea; 400-510 m).

MATERIAL EXAMINED. — 6 specimens.

**Chesterfield and Bellona Plateau.** MUSORSTOM 5: stn CP 363, 19°47.90'S, 158°58.00'E, 700-685 m, 15.10.1986: 1 specimen 43.5 mm HL, 183 mm TL (MNHN 1994-880). — Stn CC 365, 19°42.82'S, 158°48.00'E, 710 m,

19.10.1986: 1 specimen 49 mm HL, 215+ mm TL (CAS 86459), 3 specimens 38.5-56 mm HL, 187-240 mm TL (MNHN 1994-881). — Stn CC 366, 19°45.40'S, 158°45.62'E, 650 m, 19.10.1986: 1 specimen 47.0 mm HL (MNHN 1994-879).

DIAGNOSIS. — Three broad, horizontal processes of nasal bones forming leading edge of snout; pelvic rays 8, outer ray thick, slightly expanded distally; total gill rakers first arch (outer/inner) 7-10/12-15; interorbital 6-10% HL; orbit 30-34%.

DESCRIPTION (New Caledonia specimens only). — *Counts*: 1D. II,9-10; P. i17-i19; total GR-I (outer/inner) 7-8 / 14, GR-II 9-12 / 12-13.

*Measurements*: Total lengths 183-240 mm; HL 43.5-47.0 mm. The following in percent of HL: snout 10-5-11.5; preoral 4.5-5.0; interorb. 3.0-3.5; orb. 13.0-15.5; suborb. 2.0-2.5; postorb. 19.5-22.0; orb.-preop. 13.0-13.5; up.jaw 20.0-21.5; barbel 3.5-4.5; ht. 1D. 20-21; len. P. 22-27; len. V. 31.

SIZE. — One of the largest members of the genus, attaining lengths exceeding 20 cm total length.

DISTRIBUTION. — Known originally from Japan, but subsequently recorded from East China Sea in depths of 350-510 m. Newly recorded from Chesterfield and Bellona Plateau, in 650-710 m.

REMARKS. — OKAMURA's (1970) description and figure of this species are excellent and should be referred to for additional details. *H. kuronumai* is a distinctive member of the genus, having only one close relative in the subgenus *Spicomacrurus*, *H. adelscottii*. Both are characterized by the horizontally expanded nasal processes and relatively few gill rakers. They can be distinguished by features provided in the description of *H. adelscottii*.

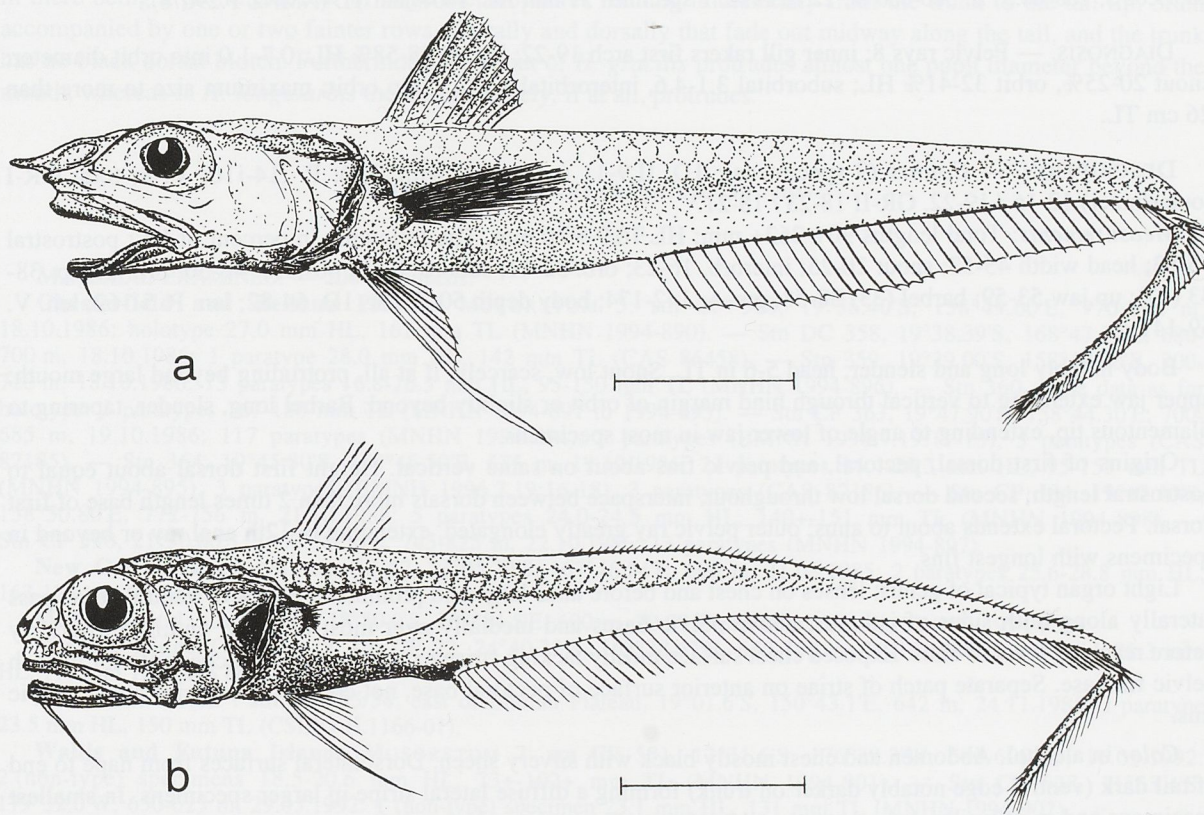


FIG. 21. — a, *Hymenocephalus kuronumai* Kamohara, 49 mm HL (CAS 86459), Chesterfield and Bellona Plateau, MUSORSTOM 5, stn CC 365, 710 m. — b, *Hymenocephalus longibarbis* (Günther), 35.5 mm HL (NMNZ P.29239), Seamount B, south of New Caledonia, BERYX 11, stn C4, 550-920 m. Scales = 25 mm.

*Hymenocephalus longibarbis* (Günther, 1887)

Fig. 21 b

*Macrurus (Mystacourus) longibarbis* Günther, 1887: 139-140, pl. 17, fig. C. (holotype, BMNH 1887.12.7.94, off Matu'ka, Fiji Islands, 576 m).

MATERIAL EXAMINED. — 29 specimens.

**New Caledonia.** MUSORSTOM 4: stn CP 158, 18°49.30'S, 163°15.00'E, 620 m, 13.09.1985: 1 specimen 37 mm HL (MNHN 1994-884). — Stn CP 169, 18°54.03'S, 163°11.20'E, 600 m, 17.09.1985: 2 specimens 37.6-50.0 mm HL, 210-262+ mm TL (CAS 86478). — Stn CP 194, 18°52.80'S, 163°21.70'E, 550 m, 19.09.1985: 2 specimens (MNHN 1994-889). — Stn CC 202, 18°58.00'S, 163°10.50'E, 580 m, 20.09.1985: 6 specimens 11-20 mm HL (MNHN 1994-888), 2 specimens 39-44.8 mm HL, 230-140+ mm TL (CAS 86489). — Stn CC 245, 22°07.00'S, 167°11.00'E, 415-435 m, 3.10.1985: 1 specimen (MNHN 1994-883).

**BIOCAL:** stn CP 67, 24°55.44'S, 168°21.55'E, 500 m, 3.09.1985: 2 specimens (MNHN 1994-885). — Stn CP 109, 22°10.03'S, 167°15.22'E, 495 m, 9.09.1985: 3 specimens (MNHN 1994-887).

**Norfolk Ridge.** CHALCAL 2: stn CC 1, 24°54.96'S, 168°21.91'E, 500-580 m, 28.10.1986: 4 specimens (MNHN 1994-886).

SMIB 3: stn CP 4, 24°54.00'S, 168°21.50'E, 530 m, 20.05.1987: 1 specimen 20.8 mm HL, 130 mm TL (ORSTOM-Nouméa).

**BERYX 11:** stn C 4, Seamount B, 24°52.70'S, 168°21.80'E, 550-920 m, 14.10.1992: 2 specimens 35.5-36 mm HL, 191-183+ mm TL (NMNZ P.29239). — Stn CP 8, Seamount B, 24°53.65'S, 168°21.60'E, 540-570 m, 15.10.1992: 1 specimen 10.9 mm HL, 55+ mm TL (NMNZ P.29063). — Stn CP 22, Seamount B, 24°44.40'S, 168°06.60'E, 490-510 m, 17.10.1992: 1 specimen 55+ mm TL (NMNZ uncat. [out of P.29024]). — Stn CP 60, Azteque Seamount, 23°19.00'S, 168°00.37'E, 580-600 m, 22.10.1992: 1 specimen 31 mm HL, 140+ mm TL (NMNZ P.29076).

**DIAGNOSIS.** — Pelvic rays 8; inner gill rakers first arch 19-22; barbel 38-58% HL, 0.7-1.0 into orbit diameter; snout 20-25%, orbit 32-41% HL; suborbital 3.1-4.6, interorbital 1.7-2.1 into orbit; maximum size to more than 26 cm TL.

**DESCRIPTION.** — *Counts* (9 specimens): 1D. II,9-11 (one spec. with II,8); P. i14-i16; V. 8; total GR-I (outer/inner) 12-16 / 19-22, GR-II 18-23 / 18-21.

*Measurements:* Total lengths 90+-262+ mm; HL 10.9-50.0 mm. The following in percent of HL: postrostral 75-83; head width 45-53; snout 20-25; interorb. 16-23; orb. 32-41; suborb. 8-10; postorb. 42-50; orb.-preop. 38-43 (47); up.jaw 53-59; barbel (33) 38-58; pre-A. 142-174; body depth 50-72; ht. 1D. 64-82; len. P. 51-62; len. V. 69-141.

Body notably long and slender, head 5-6 in TL. Snout low, scarcely, if at all, protruding beyond large mouth; upper jaw extending to vertical through hind margin of orbit or slightly beyond. Barbel long, slender, tapering to filamentous tip, extending to angle of lower jaw in most specimens.

Origins of first dorsal, pectoral, and pelvic fins about on same vertical. Height first dorsal about equal to postrostral length; second dorsal low throughout; interspace between dorsals more than 2 times length base of first dorsal. Pectoral extends about to anus; outer pelvic ray greatly elongated, extending to 12th anal ray or beyond in specimens with longest fins.

Light organ typical of genus; lenses on chest and before anus large and prominent. Bands of ventral striae pass laterally along both sides of isthmus, above pelvic bases and medially over most of belly, ending posteriorly before reaching level of anus. Exposed chest surface mostly lacking striae except for small patches anterior to each pelvic fin base. Separate patch of striae on anterior surface of pectoral base, not connected to striae above pelvic fins.

*Color* in alcohol. Abdomen and chest mostly black with silvery sheen. Dorsolateral surfaces from nape to end of tail dark (ventral edge notably darker on trunk) forming a diffuse lateral stripe in larger specimens. In smallest specimens and in juveniles, lateral stripe or blotch prominent on trunk, but fading posteriorly on mostly pale tail. Ventral aspects of tail completely lacking pigmentation at all sizes. Suborbital region with black underlying stripe extending from below nostrils to angle of lower jaw and horizontal arm of preopercle ridge. Margins and septa of lower jaws with narrow black edges. Subopercle and interopercle black. Septa and edges of occipital sensory canal



narrowly edged in black. Branchiostegal rays black; intervening membrane mostly pale. Gular membrane black, with striae underlying most of skin. Barbel pale, base black; lips black. First dorsal fin faintly blackish distally but otherwise pale. Pectoral and pelvic fins dusky; outer pelvic ray pale. Anal fin mostly pale, but base of each fin ray marked with black dot.

SIZE. — Attains at least 23 cm TL.

DISTRIBUTION. — New Caledonian region (500-620 m); possibly also Indonesia and northern Australia.

REMARKS AND COMPARISONS. — *Hymenocephalus longibarbis* appears to be relatively common in shallow tropical slope waters of the New Caledonian region. It was originally described from a single "Challenger" specimen taken off the Fiji Islands. GILBERT and HUBBS (1920) distinguished *H. longiceps* from this species by the higher pectoral ray count (14-17 cf. 11) and shorter barbel (length less than 2/3 head). However, the pectoral ray count given in the original description for *H. longibarbis* is erroneous; OKAMURA (in OKAMURA & KITAJIMA, 1984: 357) reported 15 for the holotype, and our data for New Caledonian specimens show i14-i16. Our data for barbel length as a percentage of head length agree well with the 34-49% of head length in five specimens (CAS-SU 25454) of *H. longiceps* that we examined, but compared with the orbit diameter, *H. longibarbis* shows differences (barbel 0.7-1.0 into orbit, cf. 1.0-1.4). Other differences of note include the shorter snout in *H. longibarbis* (20-25% HL, cf. 25-28%), and higher ratios of orbit/interorbital (1.7-2.1 cf. 1.1-1.3) and orbit/suborbital (3.1-4.6, cf. 2.0-2.3). A third species with which *H. longibarbis* may be mistaken at small sizes is *H. gracilis*, which does not exceed about 120 mm TL. Both species are slender and have long barbels, but the weakly serrated spinous dorsal ray of *H. gracilis* is distinguishing, if it can be seen. The pigmentation pattern of *H. gracilis* is also very different in there being a prominent row of large melanophores running midlaterally from the trunk to the tail tip, often accompanied by one or two fainter rows ventrally and dorsally that fade out midway along the tail, and the trunk has no black dorsal blotch. Furthermore, the snout of *H. gracilis* protrudes almost one pupil diameter beyond the mouth, whereas in *H. longibarbis* the snout scarcely, if at all, protrudes.

*Hymenocephalus megalops* sp. nov.

Fig. 22 a

MATERIAL EXAMINED. — 206 specimens.

**Chesterfield and Bellona Plateau.** MUSORSTOM 5: stn CP 360, 19°36.40'S, 158°49.60'E, 770-810 m, 18.10.1986: holotype 27.0 mm HL, 161 mm TL (MNHN 1994-890). — Stn DC 358, 19°38.39'S, 168°47.17'E, 680-700 m, 18.10.1986: 1 paratype 28.0 mm HL, 142 mm TL (CAS 86458). — Stn 359, 19°39.00'S, 158°49.00'E, 700-720 m, 18.10.1986: 13 paratypes 16.8-26.3 mm HL, 95-150 mm TL (MNHN 1994-896). — Stn 360, same data as for holotype: 3 paratypes 167-180 mm TL (MNHN 1994-891 to 1994-893). — Stn CP 363, 19°47.90'S, 158°44.30'E, 700-685 m, 19.10.1986: 117 paratypes (MNHN 1994-894), 5 paratypes (BMNH 1996.7.19:11-15), 5 paratypes (CAS 82185). — Stn 364, 19°45.30'S, 158°46.50'E, 675 m, 19.10.1986: 21 paratypes 14.4-28.3 mm HL, 95-155 mm TL (MNHN 1994-895), 3 paratypes (BMNH 1996.7.19:16-18), 3 paratypes (CAS 82186). — Stn CP 384, 19°42.40'S, 158°50.80'E, 772-756 m, 21.10.1986: 5 paratypes 24.0-24.5 mm HL, 140+-151 mm TL (MNHN 1994-898). — Stn CP 390, 21°90.00'S, 1°60'50.30'E, 745-825 m, 22.10.1986: 13 paratypes (MNHN 1994-897).

**New Caledonia.** BIOCAL: stn CP 52, 23°05.79'S, 167°46.54'E, 600 m, 31.08.1985: 2 paratypes 25.6-28.8 mm HL, 163-174 mm TL (MNHN 1994-899).

MUSORSTOM 4: stn CP 199, 18°50.0'S, 163°14.5'E, 600 m, 20.09.1985: 12 paratypes (MNHN 1994-900).

**Norfolk Ridge.** CHALCAL 2: stn CP 22, 24°40.32'S, 163°38.67'E, 650-750 m, 28.10.1986: 1 paratype 28.3 mm HL, 170 mm TL (CAS 86485).

**Australia:** "Soela": stn SO6/85/34: east of Marian Plateau, 19°01.6'S, 150°43.1'E, 642 m, 24.11.1985: 1 paratype 23.5 mm HL, 150 mm TL (CSIRO H.1166-01).

**Wallis and Futuna Islands.** MUSORSTOM 7: stn CP 531, 12°31.6'S, 176°39.3'W, 580-600 m, 16.05.1992: 2 (non-type) specimens 18.5-20.6 mm HL, 73+-102+ mm TL (MNHN 1994-901). — Stn CP 628, 11°53.4'S, 179°32.0'W, 650-625 m, 29.05.1992: 1 (non-type) specimen 23.1 mm HL, 131 mm TL (MNHN 1994-902).

DIAGNOSIS. — Pelvic rays 8; gill-rakers first arch (outer/inner) 12-19 / 20-24 [10-13 / 17-19 in MUSORSTOM 7 spec.]; barbel short 8-22% HL; orbits large 40-48%; snout usually 23-33%; orb.-preop. 36-47%; dorsolateral stripe on trunk fades out completely on tail.

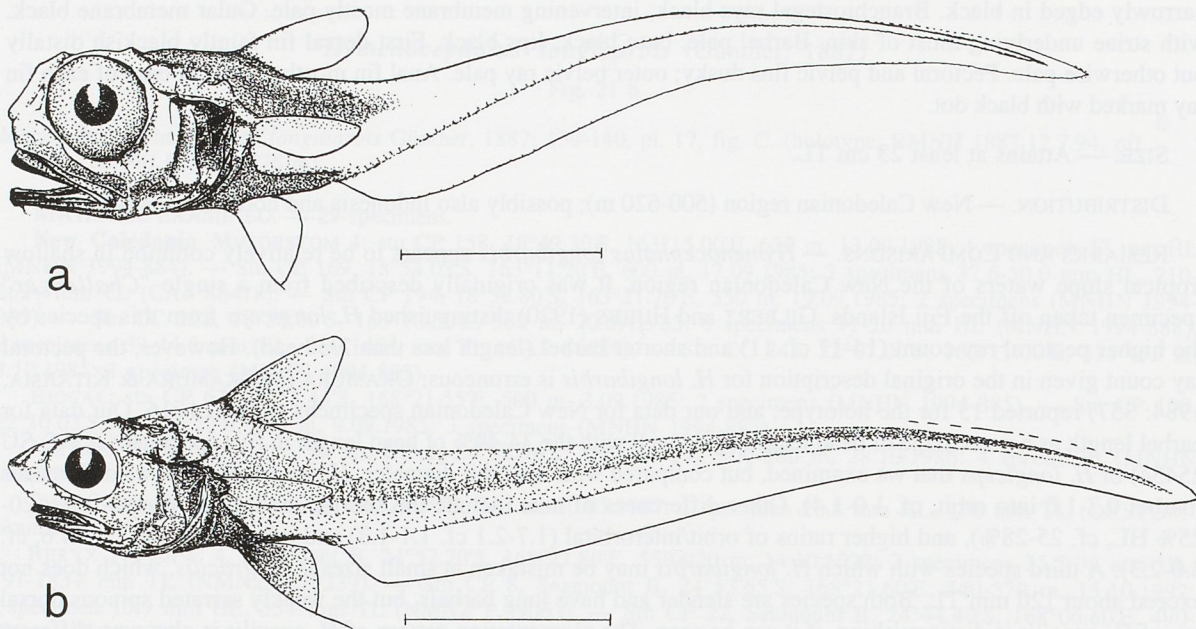


FIG. 22. — **a**, *Hymenocephalus megalops* sp. nov., 28 mm HL, paratype (CAS 86458), Chesterfield and Bellona Plateau, MUSORSTOM 5, stn DC 358, 680-700 m. — **b**, *Hymenocephalus nascens* Gilbert & Hubbs, 26.2 mm HL (NMNZ P.29101), Stylaster Seamount, south of New Caledonia, BERYX 11, stn DW 38, 550-690 m. Scales = 25 mm.

DESCRIPTION. — *Counts* (from 22 type specimens; see also Table 1): 1D. II,7-9, usually II,8; P. i13-i15.

*Measurements*: Total lengths 95-174+ mm; HL 14.4-28.8 mm. The following in percent of HL: postrostral 80-85; interorb. 24-36; suborb. 8-16; postorb. 39-53; up.jaw 53-59; pre-A. 140-158; body depth 56-79; ht. 1D. 61-78; len. P. 57-76; len. V. 63-91.

Head deep, broad, greatest width 1.2-1.5 into greatest depth; head covering membranous, transparent, bones firm to paper thin. Trunk short, length from pelvic base to anal origin about equal to combined lengths snout and orbit; tail slender, gently tapering to long fine tip. Snout short, barely if at all protruding beyond mouth; orbits large, greatest diameter steeply diagonal, about equal to postorbital length. Interorbital width about 1/2 to 2/3 orbit diameter. Mouth large, upper jaw extends posteriorly to below hind edge of orbit. Chin barbel short, fine.

Origin of first dorsal, pectoral, and pelvic fins about on same vertical. First dorsal length about equal to postrostral length; longest pectoral and pelvic rays extend past anal origin. Interspace between first and second dorsals about twice length base of first; second dorsal rudimentary; anal well developed.

Teeth all small, in narrow bands in both jaws, no enlarged teeth, as typical of genus.

Light organ with band of luminescent tissue (ventral striae) along sides of isthmus, passing posteriorly above pelvic base, then spreading posteriorly and mesially to each side of median ventral line, but falling well short of anus; a small patch in front of pelvic base. Lenses of light organ, at each end of median ventral line, small but prominent.

*Color* in alcohol. Nape and trunk above midlateral line black. Abdomen and chest also black, overlain with silvery, especially over ventral striae. Intervening areas on trunk (between black dorsum and ventrum) pale to silvery, with fine peppering. Posteriorly on tail completely pale, the black dorsal area on trunk rather abruptly ending, with fine peppering extending only a short distance beyond black area. Opercle and part of subopercle black. A black streak extending from angle of preopercle forward below orbit to snout above mouth. Anterior end of lower jaw and most of upper jaw black, but remaining parts of jaws pale. Fins generally pale, but pelvics proximally darker.

SIZE. — Attains at least 17 cm TL.

ETYMOLOGY. — From the Greek, *me-gas*, great, and *ops*, eye, in reference to the notably large eyes of the species.

DISTRIBUTION. — Known only from New Caledonia and adjacent regions and off Queensland, Australia. Three representatives (listed above as non-type material) of a possible subspecies from the northern margin of the North Fiji Basin were collected at two MUSORSTOM 7 stations. Depth range 600-825 m.

REMARKS AND COMPARISONS. — The new species belongs in that complex of species related to *H. striatissimus* Jordan & Gilbert, 1904 and appears to be most similar to two species recently described from the southeastern Pacific off the Nazca and Sala-y-Gomez ridges, viz, *H. neglectissimus* Sazonov & Iwamoto, 1992 and *H. semipellucidus* Sazonov & Iwamoto, 1992. *Hymenocephalus megalops* can be readily differentiated from those species by the gill-raker counts, which are generally higher in *H. megalops*, and by a combination of proportional measurements (see Table 1). *Hymenocephalus striatissimus* is most easily differentiated by its more heavily pigmented body, notably the tail region, which in the new species is immaculate (This pigmentation feature is noticeable even in old, faded "Albatross" specimens). Juveniles of *H. longibarbis* may on superficial examination be mistaken with *H. megalops* in that the color patterns are similar, but the long barbel in *H. longibarbis* is immediately distinguishing.

Three specimens collected on the Pacific Plate north of the North Fiji Basin during MUSORSTOM 7 differ from the type specimens in having lower gill raker counts (GR-I 10-13 lateral/17-19 mesial; GR-II 17-19 lateral/17-18 mesial). In this respect, they agree with *H. neglectissimus* and *H. semipellucidus*, but their suborbital is wider (12-17% HL cf. 5-10% and 9-11%, respectively) and barbel somewhat shorter (12-14% HL). Closer examination of more and better specimens may require their recognition as distinct species.

TABLE 1. — Comparison of selected counts and measurements of *Hymenocephalus megalops*, *H. neglectissimus*, and *H. semipellucidus*. Data for last two species from SAZONOV & IWAMOTO (1992). Figures in parentheses are means.

Character	<i>megalops</i>	<i>neglectissimus</i>	<i>semipellucidus</i>
Gill rakers (1st arch, lateral)	12-19(16)	11-15(13)	9-15(12)
Gill rakers (2nd arch, lateral; total)	20-23(21)	15-19(17)	15-20(17)
Gill rakers (2nd arch, mesial; total)	18-22(20)	16-19(17)	15-18(16)
Snout length	23-33(25)	16-24(20)	21-27(25)
Postorbital length	39-53(45)	38-43(41)	38-45(43)
Suborbital width	8-16(12)	5-10(7)	9-11(10)
Distance orbit to angle of preopercle	36-47(41)	28-37(32)	30-40(36)
Orbit diameter	40-48(43)	45-55(50)	43-51(46)
Barbel length	8-22(15)	15-28(22)	13-22(17)
Body depth	56-81(69)	75-92(83)	61-85(72)
Height first dorsal	61-85(74)	75-92(83)	66-96(77)
Length pectoral fin	57-76(67)	63-92(77)	58-78(70)

*Hymenocephalus nascens* Gilbert & Hubbs, 1920

Fig. 22 b

*Hymenocephalus nascens* Gilbert & Hubbs, 1920: 535-539, fig. 30 (holotype USNM 78229; Borneo, vicinity of Sibuko Bay; 759 m).

MATERIAL EXAMINED. — 206 specimens.

Celebes Sea. "Albatross", PHILIPPINES EXPEDITION 1907-1910: stn 5589, Celebes Sea, vicinity of Sibuko Bay; 4°12'10"N, 118°38'08"E, 475 m, 29.09.1909: 9 paratypes, 18-25.5 mm HL, 126-127+ mm TL (CAS-SU 25460).

**New Caledonia.** BIOCAL: stn CP 31, 23°07.26'S, 166°50.45'E, 850 m, 29.08.1985: 2 specimens (MNHN 1994-853). — Stn CP 40, 22°55.32'S, 167°23.30'E, 650 m, 30.08.1985: 43 specimens (MNHN 1994-858), 5 specimens (BMNH 1996.7.19:19-23). — Stn CP 52, 23°05.79'S, 167°46.54'E, 600 m, 31.08.1985: 5 specimens (MNHN 1994-859).

MUSORSTOM 4: stn CP 158, 18°49.3'S, 163°15.0'E, 620 m, 15.09.1985: 2 specimens (MNHN 1994-862). — Stn CP 199, 18°50.0'S, 163°14.5'E, 600 m, 20.09.1985: 4 specimens (MNHN 1994-861).

**Norfolk Ridge.** BERYX 11: stn DW 38, Stylaster Seamount, 23°37.53'S, 167°39.42'E, 550-690 m, 19.10.1992: 1 specimen 26.2 mm HL, 148+ mm TL (NMNZ P.29101). — Stn CP 59, Azteque Seamount, 23°19.45'S, 167°59.85'E, 750-800 m, 22.10.1992: 1 specimen 18.5 mm HL, 95+ mm TL (NMNZ P.29107), 2 specimens 18.7-23.5 mm HL, 85+ 102+ mm TL (NMNZ P.29108). — Stn CP 60, Azteque Seamount, 23°19.00'S, 168°00.37'E, 580-600 m, 22.10.1992: 3 specimens 22.4-25.5 mm HL, 80+-121+ mm TL (NMNZ P.29077).

**Chesterfield and Bellona Plateau.** MUSORSTOM 5: stn CP 359, 19°39.00'S, 158°49.00'E, 700-720 m, 18.10.1986: 1 specimen (MNHN 1994-856). — Stn CP 360, 19°36.40'S, 158°49.60'E, 770-810 m, 18.10.1986: 6 specimens 14.6-22.8 mm HL (CAS 86494), 5 specimens 14.4-24.4 mm HL (BMNH 1996.7.19:53-57). — Stn CP 363, 19°47.90'S, 158°44.30'E, 700-685 m, 19.10.1986: 13 specimens (MNHN 1994-854). — Stn CP 364, 19°45.30'S, 158°46.50'E, 675 m, 19.10.1986: 21 specimens 11.0-24.0 mm HL (MNHN 1994-855). — Stn CC 367, 19°36.80'S, 158°53.20'E, 855-830 m, 19.10.1986: 6 specimens 22.0-26.5 mm HL (MNHN 1994-860), 4 specimens 24.6-27.0 mm HL, 121+-134+ mm TL (CAS 86462). — Stn CP 390, 21°00.90'S, 160°50.30'E, 745-825 m, 22.10.1986: 2 specimens (MNHN 1994-857).

**Wallis and Futuna Islands.** MUSORSTOM 7: stn CP 531, 12°31.6'S, 176°39.3'W, 580-600 m, 16.05.1993, 5 specimens (MNHN 1994-863). — Stn CP 550, 12°14.8'S, 177°28.0'W, 800-810 m, 18.05.1993: 1 specimen 24.4 mm HL, 126+ mm TL (CAS 82173). — Stn CP 551, 12°15.3'S, 177°18.1'W, 791-795 m, 18.05.1992: 6 specimens (MNHN 1994-864). — Stn CP 552, 12°15.7'S, 177°22.8'W, 786-800 m, 18.05.1992: 11 specimens (MNHN 1994-865), 3 specimens (CAS 82174). — Stn CP 553, 12°16.8'S, 177°28.1'W, 780-794 m, 18.05.1992: 14 specimens (MNHN 1994-866). — Stn CP 554, 12°13.8'S, 177°28.0'W, 820-795 m, 18.05.1992: 2 specimens 24.5-28.0 mm HL (MNHN 1994-867). — Stn CP 562, 11°48.1'S, 178°22.1'W, 775-777 m, 19.05.1992: 21 specimens (MNHN 1994-871). — Stn CP 592, 12°32.4'S, 174°22.0'W, 775-730 m, 24.05.1992: 1 specimen (MNHN 1994-868). — Stn CP 631, 11°4.0'S, 179°31.6'W, 600 m, 29.05.1992: 4 specimens 20.0-22.5 mm HL (MNHN 1994-869). — Stn CP 632, 11°54.0'S, 179°56.3'W, 600-595 m, 29.05.1992: 8 specimens 17.0-27.0 mm HL (MNHN 1994-870).

**DIAGNOSIS.** — Pelvic rays 11-13 (usually 12 or 13); total gill-rakers first arch (outer/inner) 16-20 / 22-27, second arch 23-27 / 22-26; chin barbel absent; snout 26-31% HL; orbit 31-38%; suborb. 2.0-3.0, interorb. 1.0-1.4 into orbit; a prominent midlateral stripe; maximum size 16 cm TL.

**DESCRIPTION.** — *Counts* (20 spec.): 1D. II,9-12; P. i13-i17.

*Measurements:* Total lengths 79-148+ mm; HL 14.4-28.0 mm. The following in percent of HL: postrostral 74-77; preoral 13-19; interorb. 27-35; suborb. 12-16; postorb. 41-49; orb.-preop. 38-48; up.jaw 51-57; gill slit 29-35; pre-A. 139-160; V.-A. 43-52; depth 47-74; 1D.-2D. 48-67; ht. 1D. 68-83; len. P. 51-59; len. V. 71-94.

GILBERT and HUBBS (1920) provide a detailed description and an accurate illustration of the species, to which may be added the following notes: Scales deciduous and lacking in almost all specimens, but in NMNZ P.29101 (148 mm TL) a group of scales under first dorsal with short, spikelike spinules arranged in somewhat quincunx to roughly parallel rows; about 11 or 12 rows in the largest scale remaining.

*Pigmentation pattern* notable; midlateral to dorsolateral stripe rising posteriorly behind trunk quite prominent in most specimens. Stripe narrow, tapering posteriorly, and unbroken. No large black blotches present on trunk dorsally. Dorsolateral stripe, and ventrally on trunk and head, mostly silvery when fresh. Most silvery reflections disappear in formalin-preserved specimens, but some remain just over pelvic fins, where ventral striae persist. Chest and ventral (triangular-shaped) portion of belly black. Ventral striae in narrow strip along each side of isthmus, passing above and behind pelvic fin onto forward half of belly; striae on each side closely approximated but not meeting at ventral midline of belly; no striae on chest before pelvic bases. Black margin marking anterior and lateral borders of nape prominent. Cheeks relatively paler than in some species, especially anteriorly over preopercle; opercle and subopercle black; inner wall of suborbital bones with narrow black streak that extends onto preopercle. Underside of head, lips, gular membrane black. Snout ridges thinly marked in black. Fins generally dark dusky, with outer pelvic rays paler; anal fin light dusky.

**SIZE.** — Attains 16 cm TL.

DISTRIBUTION. — Widespread in western tropical Pacific, from South China Sea off Hong Kong, through Philippines and Indonesia, off northern Australia, to New Caledonia. Depth range from about 366 m to more than 800 m, although GILBERT and HUBBS (1920: 536) recorded one specimen from 183 m, which they suspected as possibly erroneous. In New Caledonian region, capture depths 600-855 m.

REMARKS AND COMPARISONS. — *Hymenocephalus nascens* is very close to the Japanese species *H. lethonemus* Jordan & Gilbert, 1904, the two being distinguished only by *H. nascens* having more pelvic fin rays. In *H. lethonemus*, the count is predominantly 11, whereas in *H. nascens* the count is usually 12 in Philippines and Indonesian specimens, usually 12 or 13 in New Caledonian specimens. *H. striatulus* Gilbert, 1905 from Hawaii and the Sala-y-Gomez Ridge is similar in many respects, but has a higher pelvic ray count (14-15), somewhat narrower interorbital space (21-29% HL,  $\bar{x}$  = 25%, cf. 27-35%), slightly larger orbits (35-42%,  $\bar{x}$  = 39%, cf. 31-38%), somewhat narrower suborbital (9-15%,  $\bar{x}$  = 11%, cf. 12-16%), and shorter postorbital (33-42%,  $\bar{x}$  = 37%, cf. 41-49%). *H. nascens* is also closely similar to *H. antraeus* Gilbert & Cramer, 1897 from Hawaii, but differs in having a narrower suborbital (3.7-5.0 into orbit, 7-10% of HL), somewhat narrower interorbital (1.3-1.5 into orbit, 24-28% HL), somewhat shorter postorbital (37-42% HL) and orb.-preop. distances (35-40%), longer V.-A. (58-63%), and longer P. (65-77%). In addition, all specimens of *H. antraeus* examined had a rudimentary barbel, whereas only one of the New Caledonian specimens we examined had such a rudiment.

#### Genus *KUMBA* Marshall, 1973

*Kumba* Marshall, 1973: 616 (type species *Kumba dentoni* Marshall, 1973, by original designation).

DIAGNOSIS. — Branchiostegal rays 7; anus in middle 1/3 of space between anal and pelvic fin bases, usually closer to latter; pelvic origin below or anterior to vertical of pectoral origin, anal origin below posterior half of first dorsal base; light organ present; most of dorsal surface of snout and almost entire ventral surfaces of snout, suborbital, and lower jaw naked; no terminal or lateral snout scutes; pelvic rays 8-12.

REMARKS. — This genus was recently revised by IWAMOTO and SAZONOV (1994), who described the new species *K. punctulata* from a MUSORSTOM specimen collected off New Caledonia and a juvenile from New Guinea. Nine species, only one from the New Caledonia region.

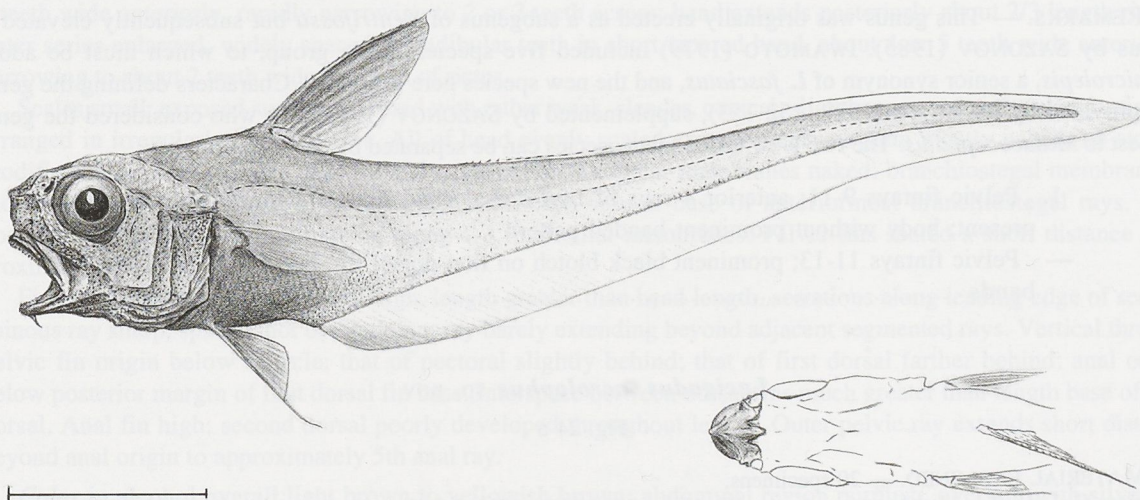


FIG. 23. — *Kumba punctulata* Iwamoto & Sazonov, 26.7 mm HL, holotype (MNHN-1994-34), Norfolk Ridge, 530 m (From IWAMOTO & SAZONOV, 1994, fig. 6). Scale = 25 mm.

*Kumba punctulata* Iwamoto & Sazonov, 1994

Fig. 23

*Kumba punctulata* Iwamoto & Sazonov, 1994: 233, figs 6-7 (holotype, MNHN 1994-34; New Caledonia, 530 m; 1 paratype from New Guinea).

MATERIAL EXAMINED. — 1 specimen.

**Norfolk Ridge.** SMIB 3; stn CP 4, 24°54.0'S, 168°21.5'E, 530 m, 20.05.1987: holotype 26.7 mm HL, 145+ mm TL (MNHN 1994-34).

DIAGNOSIS. — Snout almost entirely naked above and below; head not inflated, sensory pores large; V. 9-10; orbit 37-43% HL, upper jaw 40-41%, barbel 16-19%.

REMARKS AND COMPARISONS. — Among the New Caledonian grenadiers, this species is likely to be confused only with members of the genera *Nezumia*, *Lucigadus*, and possibly *Pseudonezumia*. The extensive naked areas on both the dorsal and ventral snout surfaces and the absence of a scutelike scale at the snout tip distinguish it from members of these genera.

Genus *LUCIGADUS* Gilbert & Hubbs, 1920

*Lucigadus* Gilbert & Hubbs, 1920: 553 (as subgenus of *Ventrifossa*; type species *Macrourus lucifer* Smith & Radcliffe, 1912, by original designation).

*Lucigadella* Gilbert & Hubbs, 1920: 552 (as subgenus of *Ventrifossa*; type species *Macrourus nigromarginatus* Smith & Radcliffe, 1912, by original designation).

DIAGNOSIS. — Branchiostegal ray 7; chin barbel present; spinous ray of first dorsal serrated; anus removed from anal fin, closer to pelvic insertions; light organ well developed, two dermal windows, one immediately before anus, the second between bases of pelvic fins; ventral region of body appearing to have swung far forward so that gill membranes unite below orbits, pelvic fins below opercle; suborbital shelf covered with several rows of small, relatively unmodified scales, with no sharp ridge developed; underside of snout mostly or completely scaled; teeth in both jaws small, in tapered bands, premaxillary band not reaching beyond posterior edge of maxillary process; scale spinules usually aligned in parallel rows.

REMARKS. — This genus was originally erected as a subgenus of *Ventrifossa* but subsequently elevated to genus by SAZONOV (1985). IWAMOTO (1979) included five species in the group, to which must be added *L. microlepis*, a senior synonym of *L. fasciatus*, and the new species here described. Characters defining the genus are provided by IWAMOTO (1979: 152-153), supplemented by SAZONOV (1985: 17), who considered the genus closest to *Malacocephalus*. The two New Caledonian species can be separated by the following key:

1. Pelvic finrays 9-11; anterior 4 rays of first dorsal dark, but no distinct black blotch present; body without prominent banded pattern ..... *L. acrolophus*
- Pelvic finrays 11-13; prominent black blotch on first dorsal fin; body with broad dark bands ..... *L. microlepis*

*Lucigadus acrolophus* sp. nov.

Fig. 24 a

MATERIAL EXAMINED. — 20 specimens.

**New Caledonia.** MUSORSTOM 4: stn CP 180, 18°56.80'S, 163°17.70'E, 450 m, 18.09.1985: holotype, 28.9 mm HL, 180 mm TL (MNHN 1994-957). — Stn CP 180, same data as for holotype: 2 paratypes 18.6-24.9 mm HL, 115-125+ mm TL (MNHN 1994-955 and 1994-956). — Stn CP 213, 22°51.30'S, 167°11.00'E, 405-430 m, 28.09.1985:

1 paratype 23.8 mm HL, 136 mm TL (MNHN 1994-954). — Stn CP 214, 22°53.80'S, 167°12.90'E, 425-440 m, 28.09.1985: 6 paratypes 10.4-26.4 mm HL, 66-158 mm TL (MNHN 1994-948 to 1994-953), 2 paratypes 22.2-22.8 mm HL, 129-135 mm TL (CAS 82184), 2 paratypes (BMNH 1996.7.19:24-25). — Stn CC 245, 22°07.00'S, 167°11.00'E, 415-435 m, 3.10.1985: 7 paratypes 19.8-28.5 mm HL, 135-168 mm TL (CAS 86480).

**Norfolk Ridge.** SMIB 1: stn DW 2, 22°51.9'S, 167°13'E, 415 m, 5.02.1986: 1 paratype 19.6 mm HL, 107+ mm TL (ORSTOM-Nouméa).

**DIAGNOSIS.** — Pelvic rays 10-11, rarely 9. Body plain, without prominent markings; first dorsal fin dark over anterior four or so rays, pale posteriorly, no black blotch; anal fin pale except for blackish distal margin of anteriormost rays. Scale patch on each side at base of anteriormost branchiostegal rays. Snout 28-32% HL, interorbital 28-35%, barbel 24-32%, scales below 2D. 8.5-10.

**DESCRIPTION.** — *Counts:* 1D. II,9-11 (usually 10); P. i18-i24; total GR-I (outer/inner) (7) 8-9/(9)10-12, GR-II (8)9-11/(8)9-11; scales midbase 1D. 7-10, lat.line 31-40.

*Measurements:* Total lengths 66-180 mm; HL 10.4-28.9 mm. The following in percent of HL: preoral 18-25; internasal 23-28; orb. 32-38; suborb. 14-18; postorb. 41-46; orb.-preop. 36-44; up.jaw 35-41; gill-slit 19-23; pre-A. (145)153-171; V.-A. 42-59; anus-A. 16-31; body depth 91-114; 1D.-2D. 46-75; ht. 1D. 108-129; len. P. 60-69; len. V. 60-73; nostril 6-15.

Head short, about 6 in TL, sides rather flat; trunk short, deep, compressed, ventral contours of body rising steeply behind anal fin origin, leveling off somewhat to end of long, laterally compressed tail. Head length about equal to or less than body depth. Snout short, blunt, rounded, protruding little beyond mouth, length less than orbit, about equal to or slightly less than broad interorbital. Mouth relatively small, upper jaw extends to below posterior 1/3 of orbit. Suborbital almost vertical with rounded contours, ridge low, inconspicuous in well-preserved specimens. Posterior preopercle margin almost vertical; opercle and subopercle form rather large surface of gill cover; a deep inflection in outer margin formed at juncture of opercle and subopercle; interopercle narrowly exposed at posteroventral corner. Gill membranes on each side narrowly joined far forward, below posterior margin of orbit or somewhat behind. Chin barbel moderately developed, slender, length greater than half orbit diameter. Large pores of cephalic sensory system along ventral margin of suborbital, margins of preopercle, and along ramus of lower jaw.

Light organ well developed; periproct large. Anus closer to pelvic insertions than to anal origin and located (with urogenital pore) at posterior end of periproct. A large lenslike structure immediately anterior to anus, with narrow connection to much smaller lenslike body between bases of pelvic fins.

Jaw teeth conical, slightly recurved, rather bluntly tipped. Premaxillary teeth in broad, tapered band, about 5 teeth wide anteriorly, rapidly narrowing to 2 or 3 teeth across; band extends posteriorly about 2/3 length rictus; outer series enlarged, widely spaced. Mandibular teeth in short tapered band, about 4 or 5 teeth wide anteriorly, narrowing to about 2 teeth wide near end of rictus.

Scales small, exposed surfaces covered with rather weak, slender, conical, slightly recurved and reclined spinules arranged in irregularly parallel rows. All of head evenly scaled except lower jaw rami mostly naked; no stoutly modified scales along ridges or at tip and angles of snout. Gular membranes naked; branchiostegal membrane in most specimens with patch of scales present on each side at base of anteriormost branchiostegal rays, with posterior extensions in some passing along 1-3 interradiar membranes. Pelvic fins scaled a short distance over proximal surfaces.

Fins well developed. First dorsal high, length greater than head length, serrations along leading edge of second spinous ray sharp, spaced, not overlapping; ray barely extending beyond adjacent segmented rays. Vertical through pelvic fin origin below opercle; that of pectoral slightly behind; that of first dorsal farther behind; anal origin below posterior margin of first dorsal fin base. Interspace between dorsal fins much greater than length base of first dorsal. Anal fin high; second dorsal poorly developed throughout length. Outer pelvic ray extends short distance beyond anal origin to approximately 5th anal ray.

*Color* in alcohol overall light brown to yellowish brown; abdominal region purplish, overlain with silvery in some. Prominent melanophores behind and above abdomen; inner surfaces of shoulder girdle heavily pigmented. Sides and underside of head heavily freckled with large melanophores, notably heavy over opercle and subopercle.

Gill membrane also more densely peppered, but pigmentation not solid. Lips lightly peppered. Barbel darkly pigmented over basal 1/5th to 1/2 of length, but pale distally. Gill arches and rakers sparsely dotted with large melanophores. All of oral cavity pale; gill cavity generally pale except along distal margin and along outermost gill slit. First dorsal fin blackish along anterior 4 segmented rays and interradiial membranes; rays posteriorly pale. Pectorals light dusky; pelvics blackish proximally and distally, less densely pigmented over middle of fin; outer ray distally pale; anal overall pale, but dark along thin distal margin of anteriormost rays.

SIZE. — To at least 18 cm TL.

ETYMOLOGY. — From the Greek, *akrolophos*, crest or mountain ridge, in reference to the submarine elevations in and around New Caledonia from which this species was collected.

DISTRIBUTION. — So far known only from off New Caledonia and the Norfolk Ridge, in 405-450 m.

REMARKS AND COMPARISONS. — *Lucigadus acrolophus* appears closely similar to *L. nigromarginatus* (Smith & Radcliffe, 1912) but is distinguished by its broader interorbital (28-35% HL cf. 22-26%), longer snout (26-32% cf. 24-28%), broader suborbital (14-18% cf. 12-15%), longer barbel (22-32% cf. 20-26%), deeper body (91-114% cf. 85-94%), higher 1D. (108-129% cf. 92-107%), and more scales below 2D. (8.5-10 cf. 7-8). The gular membrane in *L. nigromarginatus* is densely scaled, in contrast with the sparsely scaled or naked condition in the new species. Compared with *L. microlepis*, its congener from New Caledonia, the new species has a lower pelvic ray count, lack of prominent body markings, and prominent scale patches on the branchiostegal membrane.

### *Lucigadus microlepis* (Günther, 1878)

Fig. 24 b

*Coryphaenoides microlepis* Günther, 1878: 26 (holotype BMNH 1887.12.7.104; Fiji Islands, 576 m).

*Macrurus (Lionurus) microlepis* - GÜNTHER, 1887: 142 (re-described).

*Macrurus fasciatus* Weber, 1913: 157, pl. 1, fig. 5 (Madura & Arafura seas, "Siboga", stns 12 and 251, 204-289 m)(junior homonym of *Macrurus fasciatus* Günther, 1878).

*Macrurus vittatus* - WEBER, 1913: 157 ("misprint" *vide* WEBER & DE BEAUFORT, 1929: 73).

*Lionurus vittatus* - GILBERT & HUBBS, 1920: 559 (name only).

*Lionurus microlepis* - GILBERT & HUBBS, 1916: 146 (listed).

*Lionurus fasciatus* - WEBER & DE BEAUFORT, 1929: 73, fig. 15 (description from WEBER, 1913).

*Ventrifossa (Lucigadus) fasciata* - IWAMOTO, 1979: 153 (listed).

*Ventrifossa fasciata* - IWAMOTO, 1990: 293, 296, fig. 668 (in key, listed).

MATERIAL EXAMINED. — 85 specimens.

**Fiji.** "Challenger": stn 173, off Matuka, 576 m: holotype 15.5 mm HL, 95+ mm TL (BMNH 1887.12.7.104).

**Wallis and Futuna Islands.** MUSORSTOM 7: stn CP 606, 13°21.4'S, 176°08.3'W, 420-430 m, 26.05.1992: 5 specimens 14-20 mm HL (MNHN 1994-947).

**New Caledonia.** MUSORSTOM 4: stn CP 180, 18°56.8'S, 163°17.7'E, 450 m, 18.09.1985: 2 specimens 15-20 mm HL (MNHN 1994-935). — Stn CP 194, 18°52.8'S, 163°21.7'E, 550 m, 19.09.1985: 3 specimens 16-23 mm HL (MNHN 1994-944). — Stn CP 198, 18°49.4'S, 163°18.8'E, 590 m, 20.09.1985: 4 specimens 15.5-18.1 mm HL, 105-114 mm TL (CAS 84969). — Stn CP 199, 18°50.0'S, 163°14.5'E, 600 m, 20.09.1985: 1 specimen 14 mm HL (MNHN 1994-946). — Stn CP 202, 18°58.0'S, 163°10.5'E, 580 m, 20.09.1985: 1 specimen 14.8 mm HL, 92+ mm TL (MNHN 1994-945). — Stn CP 214, 22°53.8'S, 167°13.9'E, 425-440 m, 28.09.1985: 1 specimen 15.7 mm HL (CAS 86469). — Stn CP 216, 22°59.5'S, 167°22.0'E, 490-515 m, 29.09.1985: 3 specimens 16-20 mm HL (MNHN 1994-937). — Stn CP 239, 22°14.8'S, 167°15.7'E, 470-475 m, 2.10.1985: 5 specimens 13-21 mm HL (MNHN 1994-942). — Stn CP 240, 22°16.5'S, 167°16.5'E, 475-500 m, 2.10.1985: 1 specimen 20.4 mm HL, 126 mm TL (MNHN 1994-941). — Stn CC 247, 22°09.0'S, 167°13.3'E, 435-460 m, 4.10.1985: 2 specimens 13-14 mm HL (MNHN 1994-940).

**BIOCAL:** stn CP 67, 24°55.44'S, 168°21.55'E, 500 m, 3.09.1985: 11 specimens 13.9-20.3 mm HL, 95-127 mm TL (MNHN 1994-936).

**Norfolk Ridge.** SMIB 1: stn DW 2, 22°51.9'S, 167°12.5'E, 415 m, 5.02.1986: 1 specimen 13.3 mm HL (MNHN 1997-660).

SMIB 3: stn CP 4, 24°54.0'S, 168°21.5'E, 530 m, 20.05.1987: 2 specimens 19.0-22.6 mm HL, 116-127 mm TL (ORSTOM-Nouméa uncat.).



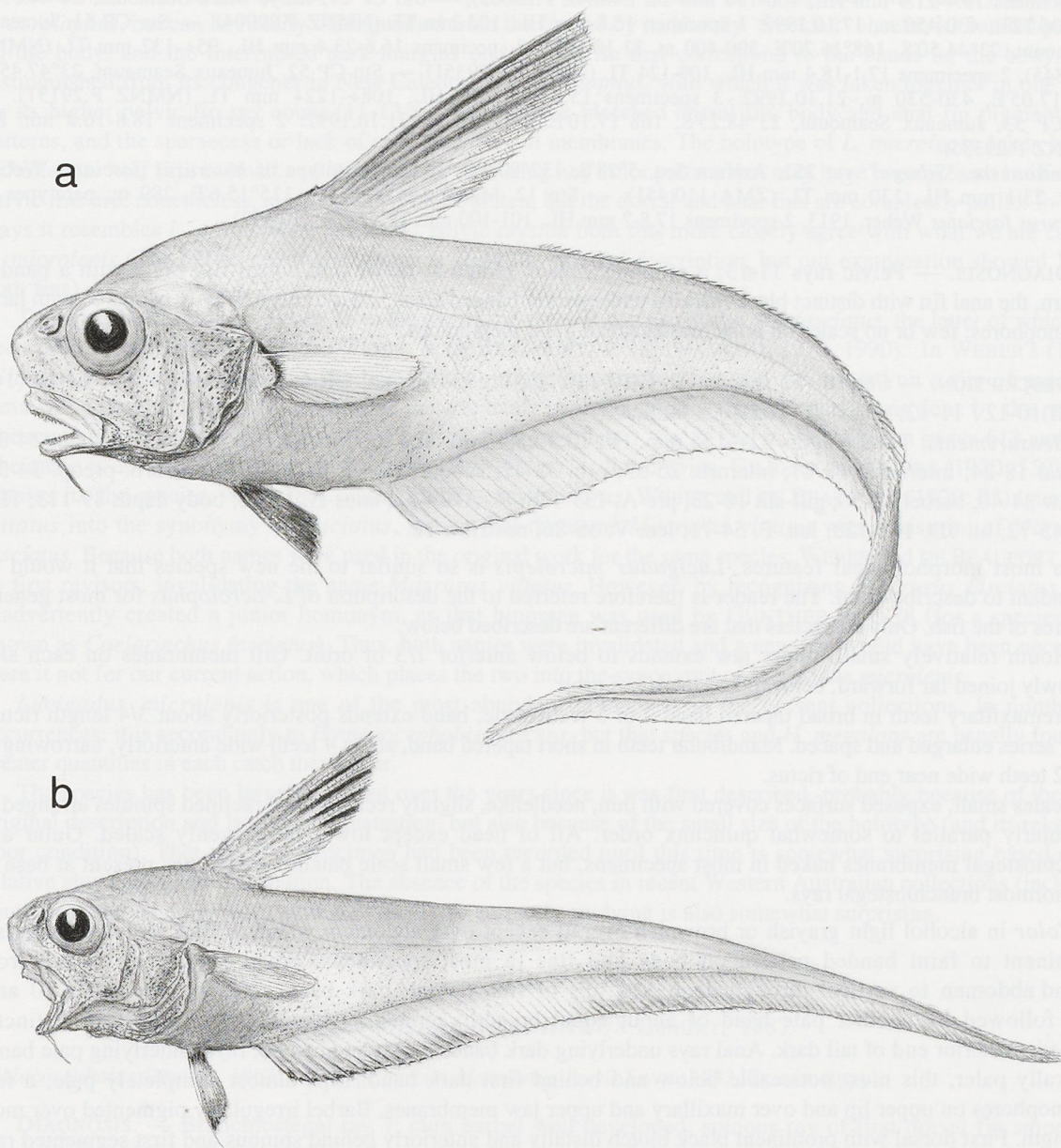


FIG. 24. — **a**, *Lucigadus acrolophus* sp. nov., 28.9 mm HL, holotype (MNHN 1994-957), New Caledonia, MUSORSTOM 4, stn CP 180, 450 m. — **b**, *Lucigadus microlepis* (Günther), 21 mm HL (MNHN 1994-943), Norfolk Ridge, CHALCAL 2, stn CC 1, 500-580 m.

CHALCAL 2: stn CC 1, 24°54.96'S, 168°21.91'E, 500-580 m, 28.10.1986: 12 specimens 15-21 mm HL (MNHN 1994-943), 3 specimens (CAS 82182), 3 specimens (BMNH 1996.7.19:58-60). — Stn CC 3, 23°39.03'S, 167°43.11'E, 424 m, 30.10.1986: 2 specimens 21.0-25.4 mm HL, 120-155 mm TL (MNHN 1994-938). — Stn CP 25, 23°38.60'S, 167°43.12'E, 418 m, 30.10.1986: 2 specimens 17-22 mm HL (MNHN 1994-939).

AZTEQUE: stn 7, Azteque Seamount, 23°37.5'S, 167°42.1'E, 460 m, 14.02.1990: 1 specimen 22 mm HL, 135 mm TL (ORSTOM-Nouméa).

BERYX 11: stn CP 7, Seamount B, 24°54.75'S, 168°21.30'E, 510-550 m, 15.10.1992: 7 specimens 13-23 mm HL, 76+-135 mm TL (NMNZ P.29212). — Stn CP 8, Seamount B, 24°53.65'S, 168°21.60'E, 540-570 m, 15.10.1992:

2 specimens 15.4-21.9 mm HL, 100-130 mm TL (NMNZ P.29062). — Stn CP 21, Kaiyo Maru Seamount, 24°44.35'S, 168°06.72'E, 430-450 m, 17.10.1992: 1 specimen 15.8 mm HL, 102 mm TL (NMNZ P.29004). — Stn CP 51, Jumeaux Seamount, 23°44.50'S, 168°16.70'E, 390-400 m, 21.10.1992: 2 specimens 16.6-23.4 mm HL, 95+-132 mm TL (NMNZ P.29345), 2 specimens 17.1-18.4 mm HL, 109-124 TL (NMNZ P. 29351). — Stn CP 52, Jumeaux Seamount, 23°47.45'S, 168°17.05'E, 430-530 m, 21.10.1992: 3 specimens 15.3-21.3 mm HL, 108+-122+ mm TL (NMNZ P.29131). — Stn CP 53, Jumeaux Seamount, 23°48.25'S, 168°17.10'E, 540-950 m, 21.10.1992: 2 specimens 18.8-16.3 mm HL (NMNZ P.29335).

**Indonesia.** "*Siboga*": stn 251, Arafura Sea, 5°28'S, 132°00.2'E, 204 m: lectotype of *Macrurus fasciatus* Weber, 1913, 23.1 mm HL, 130 mm TL (ZMA 110.451). — Stn 12, Madura Sea, 7°15'S, 115°15.6'E, 289 m: paratypes of *Macrurus fasciatus* Weber, 1913, 2 specimens 17.8-? mm HL, 101-100 mm TL (ZMA 110.452).

**DIAGNOSIS.** — Pelvic rays 11-13; a prominent black blotch at tip of first dorsal fin; body with a banded pattern, the anal fin with distinct black margins under darkly banded areas; sides of head heavily peppered with large melanophores; few or no scales on branchiostegal and gular membranes.

**DESCRIPTION.** — *Counts* (12 spec.): 1D. II,10-11 (12); P. i20-25; total GR-I (outer/inner) 8-10 / 11-12 (14), GR-II 10-12 / 11-12; scales 2D. 8.5-10.5, lat.line 37-40.

*Measurements:* Total lengths 92+-155 mm; HL 13.3-25.4 mm. The following in percent of HL: snout 24-31; preoral 18-24; internasal 19-27; interorb. 25-33; orb. 32-42; suborb. 12-16; postorb. 37-43; orb.-preop. 34-38; up.jaw 34-40; barbel 18-30; gill-slit 18-23; pre-A. 139-178; V.-A. 34-58; anus-A. 12-36; body depth 89-113; 1D.-2D. 45-72; ht. 1D. 102-128; len. P. 54-71; len. V. 55-86; nostril 6-12.

In most morphological features, *Lucigadus microlepis* is so similar to the new species that it would be redundant to describe them. The reader is therefore referred to the description of *L. acrolophus* for most general features of the fish. Only characters that are different are described below.

Mouth relatively small, upper jaw extends to below anterior 1/3 of orbit. Gill membranes on each side narrowly joined far forward, below posterior 1/3 of orbit.

Premaxillary teeth in broad tapered band 4 or 5 teeth wide; band extends posteriorly about 3/4 length rictus; outer series enlarged and spaced. Mandibular teeth in short tapered band, about 4 teeth wide anteriorly, narrowing to 1 or 2 teeth wide near end of rictus.

Scales small, exposed surfaces covered with thin, needlelike, slightly recurved and reclined spinules arranged in irregularly parallel to somewhat quincunx order. All of head except lower jaws evenly scaled. Gular and branchiostegal membranes naked in most specimens, but a few small scale patches sometimes present at base of anteriormost branchiostegal rays.

*Color* in alcohol light grayish or brownish overall except over abdomen, which is dark bluish to purplish. Prominent to faint banded pattern on body and fins in most specimens; broad pale band on tail from behind abdomen to vertical through depressed tips of first dorsal; dark band extends over about 10 anal rays, followed by another pale band of about equal breadth; remaining bands shorter and less distinctly marked; posterior end of tail dark. Anal rays underlying dark bands darkly pigmented; rays underlying pale bands generally paler, this most noticeable below and behind first dark band. Lips almost completely pale; a few melanophores on upper lip and over maxillary and upper jaw membranes. Barbel irregularly pigmented over most of length. First dorsal with prominent black blotch distally and anteriorly behind spinous and first segmented ray; anterior rays of fin otherwise dark dusky, posteriorly pale to light dusky. Pectorals dusky; pelvics dark with tips and base black, but heavily punctate otherwise except for paler outermost ray. Anal fin pale to light dusky overall, but thin black distal margin anteriorly, fading to blackish posteriorly; base of posteriormost rays with small black spots. Large melanophores liberally sprinkled over sides of head and on gular and branchiostegal membranes. Gill arches and rakers dark; gill cavity rather darkly punctate except anteriorly; oral cavity pale; gullet dark. Periproct black.

**SIZE.** — To 25.4 mm HL and about 16 cm TL.

**DISTRIBUTION.** — North Fiji Basin, Wallis and Futuna Islands, Norfolk Ridge, New Caledonia, in 418-600 m; Arafura and Madura seas, in 204-289 m.

REMARKS AND COMPARISONS. — This species is closely similar to *Lucigadus nigromarginatus* and *L. acrolophus*, but can be readily distinguished from the former by its heavily "freckled" cheeks, its banded pattern on the body, and the interrupted dark margins on the anal fin that correspond to the bands on the body. It is distinguished from its congener in New Caledonia, *L. acrolophus*, with which it was taken together in one haul, by its higher pelvic fin ray count (11-13 vs. 9-10), black blotched dorsal fin, body and anal-fin pigmentation patterns, and the sparseness or lack of scales on the gill membranes. The holotype of *L. microlepis*, taken by the "Challenger" off Fiji, is small and badly faded, obscuring any color pattern that may have been present in life. The pelvic fins are, nonetheless, marked with a black blotch, but the dorsal and anal fins are completely pallid. In these ways it resembles *L. acrolophus*, but the 11 pelvic rays on both fins more closely agree with what we are calling *L. microlepis* (The pelvic count was given as 10 in the original description, but our examination showed 11 on both fins).

There has been some confusion as to the use of the specific names *vittatus* and *fasciatus*, the latter of which has been used by most recent authors (WEBER & DE BEAUFORT, 1929; IWAMOTO, 1979, 1990). In WEBER's (1913) "Siboga" Expedition report, the heading for the original description has *vittatus* printed on a slip of paper (in a matching type-style) pasted on after the generic name in a manner that suggests that it was done by the printer. The name is also used in the legend for the original figure (plate 1, fig. 5) and in the tables on pages 618 and 642. The name is not listed, however, in the index, but *fasciatus* is listed twice. GILBERT and HUBBS (1920: 559) used *vittatus* for the species, which they placed in the genus *Lionurus*. WEBER and DE BEAUFORT (1929: 73) later sunk *vittatus* into the synonymy of *fasciatus*, stating that the name *Macrurus vittatus* was a misprint of *Macrurus fasciatus*. Because both names were used in the original work for the same species, WEBER and DE BEAUFORT serve as first revisors, invalidating the name *Macrurus vittatus*. However, by recognizing *Macrurus fasciatus*, they inadvertently created a junior homonym, as that binomen was used by GÜNTHER in 1878 (for a species now known as *Caelorinchus fasciatus*). Thus, both names were invalidated and a new one would have been necessary were it not for our current action, which places the two into the synonymy of *Lucigadus microlepis*.

*Lucigadus microlepis* is one of the most abundant grenadiers in the present collections. In number of occurrences, it is second only to *Hymenocephalus nascentis*, but that species and *H. megalops* are usually found in greater quantities in each catch they occur.

The species has been largely ignored over the years since it was first described, probably because of the brief original description and lack of an illustration, but also because of the small size of the holotype (and its relatively poor condition). That no other specimen had been recorded until this time is somewhat surprising based on its relative abundance and distribution. The absence of the species in recent Western Australian collections (including some from the Arafura Sea) that one of us (TI) is currently studying is also somewhat surprising.

#### Genus *MALACOCEPHALUS* Günther, 1887

*Malacocephalus* Günther, 1862: 396 (type species *Macrourus laevis* Lowe, 1843, by monotypy).

DIAGNOSIS. — Branchiostegal ray 7; chin barbel well developed; spinous ray of first dorsal fin smooth or serrated; anus removed from anal fin, closer to pelvic insertions; light organ well developed, two dermal windows, one immediately before anus, the second between bases of pelvic fins; head uniformly covered with small unmodified scales, with no sharp ridges, no enlarged terminal snout scute, lower branchiostegals scaled; lower jaw teeth enlarged, spaced, in single row, premaxillary teeth reaching beyond posterior edge of maxillary process.

REMARKS. — The ubiquitous *Malacocephalus laevis* is represented in the collection by only five specimens, two taken on the Pacific Plate to the north of Fiji, one off the Chesterfield and Bellona Plateau, and two to the south of New Caledonia. It was the only member of the genus taken. The number of valid species in *Malacocephalus* is still uncertain, although SAZONOV and IWAMOTO (1992: 68) provide a current update on the status of some of the seven nominal species. Relationships of the group are probably closest to *Lucigadus* and *Ventrifossa*.

*Malacocephalus laevis* (Lowe, 1843)

Fig. 25

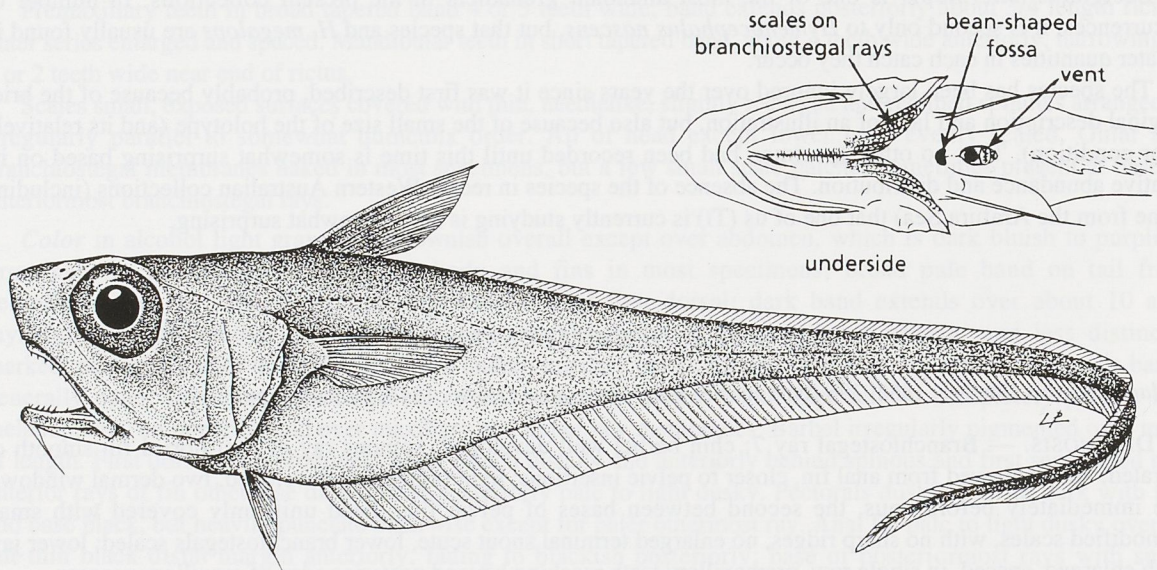
*Macrourus laevis* Lowe, 1843: 92 (off Madeira).

MATERIAL EXAMINED. — 5 specimens.

**Wallis and Futuna Islands.** MUSORSTOM 7: stn number lost: 1 specimen 51 mm HL (MNHN 1994-958). — Stn CP 550, 12°14.8'S, 177°28.0'W, 800-810 m, 18.05.1992: 1 specimen 57 mm HL (MNHN 1994-959).**Chesterfield and Bellona Plateau.** MUSORSTOM 5: stn CC 383, 19°40.85'S, 158°46.10'E, 615-600 m, 21.10.1986: 1 specimen 78 mm HL, 375+ mm TL (CAS 86470).**Norfolk Ridge and the Loyalties.** BERYX 2: stn 18, Seamount B, south of New Caledonia, 24°54.55'S, 168°21.28'E, 540-575 m, 30.10.1991: 1 specimen 61 mm HL, 360+ mm TL (NMNZ P.27492).**Norfolk Ridge.** BERYX 11: stn CP 60, Azteque Seamount, 23°19.00'S, 168°00.37'E, 580-600 m, 22.10.1992: 1 specimen 71 mm HL, 412 mm TL (NMNZ P.29012).

DIAGNOSIS. — Seven branchiostegal rays, lowermost scaled at base; gular membrane may or may not be scaled. First dorsal fin with smooth spinous second ray; pelvic rays 9. A prominent bean-shaped fossa in front of elongated periproct, which is well removed from anal fin. Premaxillary teeth in 2 rows, the outer distinctly enlarged; mandibular teeth in 1 row, enlarged and wide spaced. Snout smoothly rounded; no stout, coarsely scaled head ridges. Scales all small, finely spinulated, giving smooth, velvety texture to body and head surfaces. Total mesial gill rakers on first arch 11-14.

REMARKS. — The reader is referred to MARSHALL (1973) for references to descriptions and illustrations. The Chesterfield and Bellona Plateau specimen differed from others in being paler overall and having a black-edged anal fin, and black-tipped pelvic and first dorsal fins. In other specimens, these fins were completely dark, almost black.

FIG. 25. — *Malacocephalus laevis* (Lowe) (From IWAMOTO, 1990, fig. 545).Genus *MATAEOCEPHALUS* Berg, 1898*Mataeocephalus* Berg, 1898: 43 (type species *Coelocephalus acipenserinus* Gilbert & Cramer, 1897, by being a replacement name).*Coelocephalus* Gilbert & Cramer, 1897 (preoccupied by *Coelocephalus* Clark, 1860, in Coleoptera).

DIAGNOSIS. — Branchiostegal ray 6 or 7; chin barbel present; spinous ray of first dorsal fin serrated or smooth; anus in middle of broad or narrow periproct, usually removed from anal fin; a small dermal window of light organ in one or more species; underside of snout usually with naked areas; suborbital shelf formed of two rows of stout, coarse, modified scales, snout tipped with 2 adjoined tubercular scales; teeth in cardiform bands in both jaws, bands notably short and broad in some species, long and tapered in others.

REMARKS. — The genus was represented in the collections by two species, one of which is being described in a revision of the genus by our Russian colleagues, Y. I. SAZONOV and Y. N. SHCHERBACHEV. The second species is identified as *Mataeocephalus acipenserinus*, a species known originally from the Hawaiian Islands. IWAMOTO (1990: 245) recognized five species of *Mataeocephalus*, but that number is expected to change with a revision of the genus. The two New Caledonian species can be separated by the following key:

1. Branchiostegal rays 6; V. 7; underside of head almost entirely scaled; height 1D. 70-115% HL ..... *Mataeocephalus* sp.
- Branchiostegal rays 7; V. 8-9; underside of head almost entirely naked; height 1D. 55-64% HL ..... *M. acipenserinus*

*Mataeocephalus acipenserinus* (Gilbert & Cramer, 1897)

Fig. 26

*Coelocephalus acipenserinus* Gilbert & Cramer, 1897: 422-423, pl. 42, fig. 1 (holotype USNM 47721; Hawaiian Islands).

MATERIAL EXAMINED. — 11 specimens.

**Chesterfield and Bellona Plateau.** MUSORSTOM 5: stn CC 367, 19°36.80'S, 158°53.20'E, 855-830 m, 19.10.1986: 2 specimens 42-47 mm HL (MNHN 1994-963).

**Loyalty Islands.** BIOGEOCAL: stn CP 232, 21°33.81'S, 166°27.07'E, 760-790 m, 12.04.1987: 1 specimen 53.4 mm HL, 253+ mm TL (CAS 86463).

**Wallis and Futuna Islands.** MUSORSTOM 7: stn CP 550, 12°14.8'S, 177°28.0'W, 800-810 m, 18.05.1992: 1 specimen 48.5 mm HL (MNHN 1994-962). — Stn CP 551, 12°15.3'S, 177°28.1'W, 791-795 m, 18.05.1992: 1 specimen 46.5 mm HL (MNHN 1994-965). — Stn CC 553, 12°16.8'S, 177°28.1'W, 780-794 m, 18.05.1992: 1 specimen 50.5 mm HL (BMNH 1996.7.19:26). — Stn CP 562, 11°48.1'S, 178°22.1'W, 775-777 m, 19.05.1992:

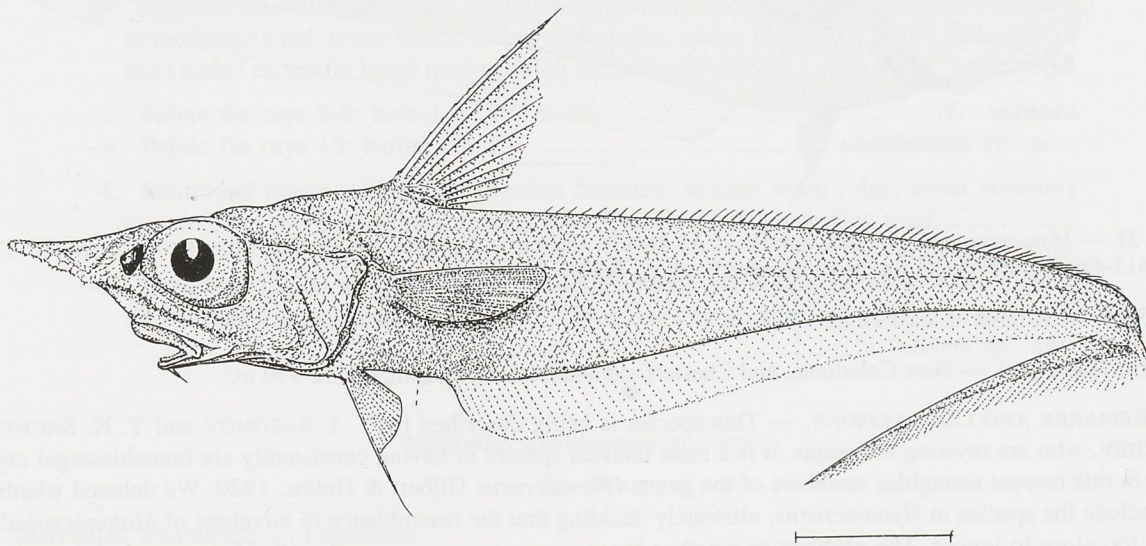


FIG. 26. — *Mataeocephalus acipenserinus* (Gilbert & Cramer) (Adapted from IWAMOTO, 1990, fig. 555). Scale = 25 mm.

2 specimens 36.0-46.1 mm HL, 152-183 mm TL (CAS 82175). — Stn CP 565, 11°47.4'S, 178°27.3'W, 900 m, 20.05.1992: 3 specimens 44.0-49.0 mm HL (MNHN 1994-964).

**DIAGNOSIS.** — Underside of snout naked (except for scales overlapping along leading edge); pelvic rays usually 8; denticulations on spinous dorsal ray well developed; teeth in both jaws in short patches, confined to anterior end; periproct region rather broad, with anterior dermal window present; usually 7-9 scale rows below origin of second dorsal.

**REMARKS.** — This species appears to be widespread in the Pacific, having been recorded in the southeastern Pacific (SAZONOV & IWAMOTO, 1992), Hawaii (GILBERT & CRAMER, 1897), and now the New Caledonian region. See the account of SAZONOV and IWAMOTO (1992: 70-71) for a detailed description of the species. IWAMOTO (1990: 246) provides a description and illustration.

*Mataeocephalus* sp. Sazonov & Shcherbachev MS

Fig. 27

**MATERIAL EXAMINED.** — 6 specimens.

**Loyalty Islands.** BIOGEOCAL: stn CP 232, 21°33.81'S, 166°27.07'E, 760-790 m, 12.04.1987: 2 specimens 40.5-54 mm HL (MNHN 1994-961), 1 specimen 51.5 mm HL (BMNH 1996.7.19:27).

**Chesterfield and Bellona Plateau.** MUSORSTOM 5: stn CP 324, 21°15.01'S, 157°51.33'E, 970 m, 14.10.1986: 1 specimen 56 mm HL, 225+ mm TL (MNHN 1994-960). — Stn DW 337, 19°53.80'S, 158°38.00'E, 412-430 m, 15.10.1986: 2 specimens 45.5-48.2 mm HL, 205+-214+ mm TL (CAS 86481).

**DIAGNOSIS.** — Six branchiostegal rays; pelvic rays 7; underside of snout mostly scaled; periproct removed from anal fin, anus closer to pelvic insertions than to anal fin; premaxillary teeth in broad short band, spanning about half rictus length.

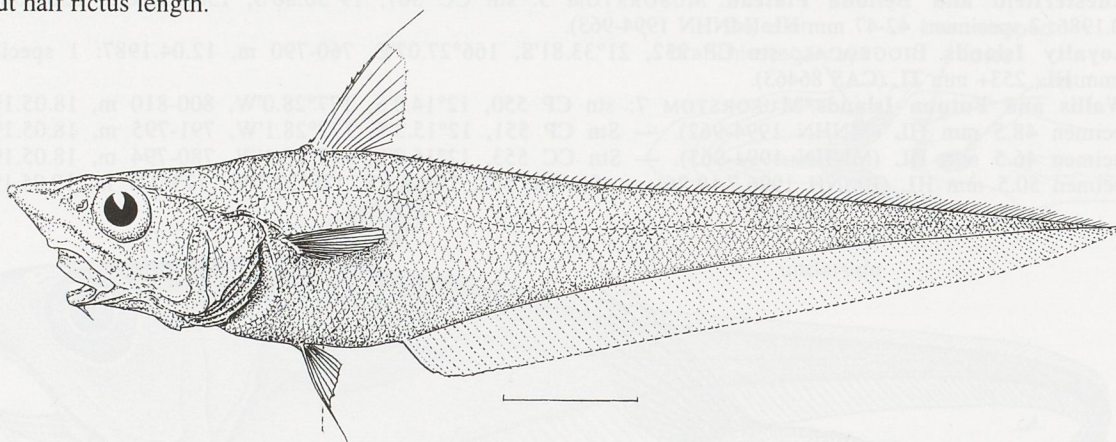


FIG. 27. — *Mataeocephalus* sp., 48.2 mm HL (CAS 86481), Chesterfield and Bellona Plateau, MUSORSTOM 5, stn DW 337, 412-430 m. First dorsal fin drawn incorrectly, short. Scale = 25 mm.

**SIZE.** — Attains at least 23 cm TL.

**DISTRIBUTION.** — New Caledonia, and Chesterfield and Bellona Plateau, in 412-970 m.

**REMARKS AND COMPARISONS.** — This species is being described by Y. I. SAZONOV and Y. N. SHCHERBACHEV, who are revising the genus. It is a most unusual species in having consistently six branchiostegal rays, and in this respect resembles members of the genus *Hyomacrurus* Gilbert & Hubbs, 1920. We debated whether to include the species in *Hyomacrurus*, ultimately deciding that the resemblance to members of *Mataeocephalus* was too close to ignore. The problem of whether *Hyomacrurus* is synonymous with *Mataeocephalus* is yet to be determined. *Hyomacrurus hyostomus* (Smith & Radcliffe, 1912), the type species of the genus, is

distinguishable from *M. sp.* by the higher pelvic ray count (8 or 9 cf. 7) and more scales below the second dorsal fin (5-7.5 cf. 4.5-5.5).

Genus *NEZUMIA* Jordan, 1904

*Nezumia* Jordan in JORDAN & STARKS, 1904: 620 (type species *Nezumia condylura* Jordan & Gilbert, 1904, by original designation).

DIAGNOSIS. — Branchiostegal rays 7; chin barbel well developed; spinous ray of first dorsal fin serrated; anus removed from anal fin, closer to pelvic insertions; periproct tear-drop shaped, connected to dermal window of light organ between pelvic fins; underside of snout usually with naked areas, suborbital shelf formed of two rows of stout, coarse, modified scales, snout tipped with 2 adjoined tubercular scales; teeth small, in bands in both jaws, premaxillary teeth not reaching beyond posterior edge of maxillary process; pyloric caeca usually less than 30 (more in few species).

REMARKS. — The collections contained five species of the genus, but none of them was abundant. In fact, the three new species here described were represented by only one or two specimens each, and the other two species by three (*N. spinosa*) and 10 (*N. propinqua*) individuals. The genus appears to reach its greatest abundance in temperate to subtropical waters such as the North Atlantic, where we have witnessed numerous trawls in which the genus constituted a high percentage of the biomass as well as individuals captured. Collections from Australia also show an abundance of specimens in temperate to subtropical waters, and a paucity in tropical waters. More than 40 species are known to us, including several from the Indian Ocean and Australian coast that have yet to be described.

**Key to species of *Nezumia* of New Caledonia and adjoining waters**

1. Pelvic fin rays 13-15; 1D. distinctly black tipped ..... *N. propinqua*  
— Pelvic fin rays 12 or fewer; 1D. variously black to dusky but not tipped with black ... 2
2. Spinules on scales needlelike, in parallel to somewhat convergent rows; V. 8-10; lower-jaw teeth in notably broad band, 6 or more teeth across; scales below 1D. 10-13; underside of head almost completely naked ..... 3  
— Spinules on scales lanceolate, in somewhat convergent rows; V. 11-12; lower-jaw teeth in moderate band, fewer than 6 across widest part; scales below 1D. 9-9.5; underside of head scaled except for broad median swath on underside of snout ..... 4
3. Pelvic fin rays 8-9; barbel 9-18% of HL ..... *N. spinosa*  
— Pelvic fin rays 10; barbel 6% HL ..... *N. aspidentata* sp. nov.
4. Suborbital region with gently rounded contours, lacking sharp ridge; snout smoothly rounded, the lateral angles not sharply set off; no dark band encircling trunk .....  
..... *N. coheni* sp. nov.  
— Suborbital region with sharp ridge separating dorsal and ventral surfaces; snout angular, tip and lateral angles notably prominent; a broad dark band encircling trunk .....  
..... *N. cliveri* sp. nov.

*Nezumia aspidentata* sp. nov.

Fig. 28 a

MATERIAL EXAMINED. — 1 specimen.

**Chesterfield and Bellona Plateau.** MUSORSTOM 5: stn CP 359, 19°39.00'S, 158°49.0'E, 700-720 m, 18.10.1986: holotype female 33.9 mm HL, 205 mm TL (MNHN 1996-958).

**DIAGNOSIS.** — Pelvic rays 10. Height first dorsal greater than head length. Underside of snout, suborbital and all of mandibular rami naked; prominent open pores on lower jaws and ventral margin of suborbital region. Spinules on body scales needlelike, in subparallel to convergent rows; about 38 lateral-line scales over distance equal to predorsal length. Snout conical, bluntly pointed, about 34% of HL. Mouth small, upper jaw 26% of HL. Teeth in notably broad, short, cardiform bands in both jaws. No dark band encircling trunk; first dorsal fin dusky overall. Anterior dermal window of light organ between pelvic bases, in advance of insertions. Barbel small, more than 3 into orbit, about 6% of HL; preoral length 28%; postorbital length 38%; orb.-preop. 30%.

**DESCRIPTION.** — *Counts:* 1D. II,8; P. i17/21; GR-I (outer/inner) 8/10, GR-II 10/10; scales 1D. about 13, midbase 1D. 8.5.

*Measurements:* The following in millimeters, percent of HL in parentheses: internasal 6.8 (20); interorb. 7.0 (21); orb. 11.0 (32); suborb. 4.3 (13); gill slit 3.3 (10); snout-anus 47 (139); pre-A. 55 (162); V.-A. 13.5 (40); body depth 28 (83); 1D.-2D. 13 (39); ht. 1D. 35 (104); len. P. 19 (56); len. V. 24 (71); post. nostril 2.9 (9).

Head relatively shallow, depth at hind edge of orbit less than postrostral length of head. Body depth at vent about equal to length of head behind posterior nostril; tail compressed, width behind abdomen less than orbit, depth at vertical 2 head lengths behind snout tip equal to length of head behind midorbit. Contours of head gently rounded; suborbital ridge low, not sharply separating dorsal and ventral surfaces. Snout bluntly pointed, terminal scute large but smoothly blending in with contours of snout. Orbit oval, long axis at a shallow diagonal. Dorsal profile of head rising from snout tip to above nostrils, leveling somewhat over orbit, then rising slightly over nape, before abruptly rising to first dorsal. Base of first dorsal steep, leveling abruptly behind fin to end of tail. Mouth subinferior, maxilla extending to below midorbit. Chin barbel about equal to greatest diameter of posterior nostril, about 2 times into least suborbital width.

Tooth band in upper jaw 7 or more teeth across widest (anterior) end; band tapering rapidly and extending only about 3/4 length of rictus; outer series slightly enlarged. Mandibular band similar to premaxillary band, about 6 teeth wide anteriorly, narrowing abruptly laterally, falling well short of end of rictus.

Two stout tuberclelike scales at tip of snout, not distinctly set off from adjacent scales. A narrow naked transverse groove behind leading edge of snout. Suborbital with slightly modified scales in 2 rows over narrowest part of suborbital shelf. Other head ridges not marked by modified scales. Body scales covered with long, slender, extremely fine-tipped, slightly recurved, greatly reclined spinules; those below interspace of dorsal fins with about 12 rows. Underside of head entirely naked except above posterior end of lower jaws and posteroventral corner of preopercle and interopercle; head otherwise completely scaled.

First dorsal fin with 16 strong, widely spaced denticles along leading edge of second spinous ray; rays posterior to 1st segmented ray abruptly decrease in height. Pelvic fins well developed, outer ray prolonged, extending well past anal origin to about 10th anal ray. Anal fin well developed; second dorsal rudimentary over most of length, rays long only near end of tail. Dorsal flexure of head affects relative position of fin origins, but first dorsal origin slightly behind that of pectoral, slightly in front of that of pelvic. Anal origin well behind vertical of hind end of first dorsal; second dorsal origin above 3rd to 5th anal ray.

Periproct region somewhat pear-shaped, relatively large, its greatest width about 2.5 times, its greatest length about 1.4 times, into orbit diameter. Narrow anterior end formed by anterior dermal window of light organ. Holotype a female with some eggs extruded from urogenital opening.

*Color* in alcohol overall straw; slight ivory cast over opercles and shoulder girdle; bluish over abdomen; blackish around periproct and area around base of pelvic fins. Branchiostegal membrane dark, somewhat paler along distal margins. Upper jaw membranes dusky; lips, gums, barbel, and lower jaw pale. First dorsal fin light dusky. Pectoral fin light dusky over dorsal rays, pale ventrally. Pelvic fin dark at proximal end, dusky over mesial rays, pale over lateral rays. Anal and second dorsal fins overall pale. Mouth dark but not black; walls of gill cavity dark posteriorly but pale over anterior and ventral walls; gill rakers and arches dark, but filaments pale.

**SIZE.** — To more than 20 cm TL.

**ETYMOLOGY.** — From the Latin *asper*, rough, and *dentatus*, toothed, in reference to the prominent cardiform bands of teeth in the jaws.



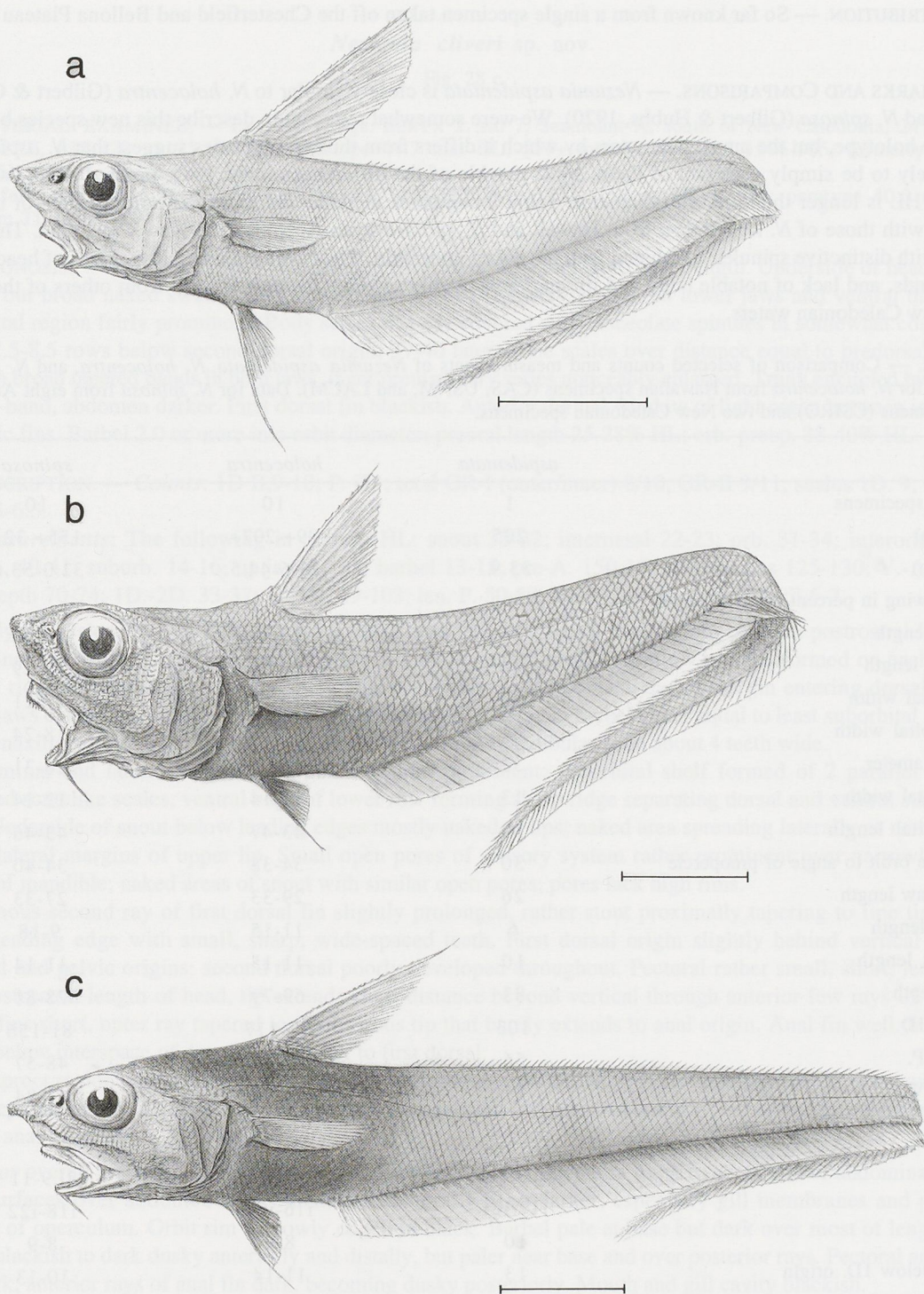


FIG. 28. — **a**, *Nezumia aspidentata* sp. nov., 33.9 mm HL, holotype (MNHN 1996-958), from Chesterfield and Bellona Plateau, MUSORSTOM 5, stn CP 359, 700-720 m. — **b**, *Nezumia coheni* sp. nov., 45.2 mm HL, holotype (MNHN 1996-960), New Caledonia, BIOCAL, stn CP 34, 710 m. — **c**, *Nezumia cliveri* sp. nov., 44.7 mm HL, holotype (MNHN 1996-365), Seamount K, south of New Caledonia, BERYX 2, stn 7, 802-833 m. Scales = 25 mm.

DISTRIBUTION. — So far known from a single specimen taken off the Chesterfield and Bellona Plateau in 700-720 m.

REMARKS AND COMPARISONS. — *Nezumia aspidontata* is closely similar to *N. holocentra* (Gilbert & Cramer, 1897) and *N. spinosa* (Gilbert & Hubbs, 1920). We were somewhat reluctant to describe this new species based on only the holotype, but the ample characters by which it differs from those two species suggest that *N. aspidontata* is unlikely to be simply a variant of them. Most notable of the differences is the long, pointed snout, which at 34% of HL is longer than the orbit diameter. Table 2 compares meristic and morphometric features of the new species with those of *N. holocentra* from Hawaii and *N. spinosa* from Australia and New Caledonia. The small scales with distinctive spinules, combined with the naked underside of head, short barbel, low ridges of head, broad teeth bands, and lack of notable body and fin markings readily separate the new species from others of the genus from New Caledonian waters.

TABLE 2. — Comparison of selected counts and measurements of *Nezumia aspidontata*, *N. holocentra*, and *N. spinosa*. Data for *N. holocentra* from Hawaiian specimens (CAS, USNM, and LACM). Data for *N. spinosa* from eight Australian specimens (CSIRO) and two New Caledonian specimens.

	<i>aspidontata</i>	<i>holocentra</i>	<i>spinosa</i>
No. of specimens	1	10	10
TL (mm)	205	99+-207+	155+-321
HL (mm)	33.9	25.6-44.5	32.0-53.6
Following in percent of head length			
Snout length	34	27-30	28-32
Preoral length	28	18-24	18-29
Internasal width	20	15-18	17-21
Interorbital width	21	17-20	18-24
Orbit diameter	32	27-34	26-31
Suborbital width	13	11-14	12-14
Postorbital length	38	43-47	43-46
Distance orbit to angle of preopercle	30	34-38	34-40
Upper jaw length	26	29-33	27-33
Barbel length	6	11-15	9-18
Gill-slit length	10	11-15	11-14
Body depth	83	69-79	78-81
Height 1D.	103	93-117	81-156
Length P.	56	56-86	48-57
Length V.	71	71-80	61-84
<i>Counts</i>			
1D. rays	II,8	II,9-11	II,9-11
P. rays	i17-i21	i16-i22	i18-i22
V. rays	10	8-9	8-9
Scales below 1D. origin	13	11-14	10-13
Scales below midbase of 1D.	8.5	7-9.5	6.5-9
Scales below 2D. origin	9.5	8-9.5	7.5-11
Lateral line scales over distance equal to predorsal length	38	37-43	34-40

*Nezumia cliveri* sp. nov.

Fig. 28 c

**MATERIAL EXAMINED.** — **Loyalty Ridge.** BERYX 2: stn 7, Seamount K, south of New Caledonia, 24°41.70'S, 170°06.82'E, 815-820 m, 25.10.1991: holotype 44.7 mm HL, 257+ mm TL (MNHN 1996-365, formerly NMNZ P.27466).

**Norfolk Ridge.** HALIPRO 2: stn BT 42, 25°34'S, 167°25'E, 1132-1160 m, 15.11.1996: paratype 40.0 mm HL, 228+ mm TL (CAS 90751).

**DIAGNOSIS.** — Pelvic fin rays 11-12. Height first dorsal about equal to head length. Underside of head mostly scaled, but broad naked swath below snout; open pores of sensory system on lower jaws and ventral margin of suborbital region fairly prominent. Body scales densely covered with lanceolate spinules in somewhat convergent rows; 7.5-8.5 rows below second dorsal origin; 37-40 lateral-line scales over distance equal to predorsal length. Teeth in broad tapered bands in both jaws, outer premaxillary series noticeably enlarged. Trunk encircled by a broad darkish band, abdomen darker. First dorsal fin blackish. Anterior dermal window of light organ between insertions of pelvic fins. Barbel 2.0 or more into orbit diameter; preoral length 25-28% HL; orb.-preop. 38-40% HL.

**DESCRIPTION.** — *Counts:* 1D II,9-10; P. i21; total GR-I (outer/inner) 8/10, GR-II 9/11; scales 1D. 9, midbase 1D. 5.5-6.5.

*Measurements:* The following in percent HL: snout 30-32; internasal 22-23; orb. 31-34; interorb. 23-23; postorb. 40-41; suborb. 14-16; up.jaw 31-31; barbel 13-15; pre-A. 150-153; snout-anus 125-130; V.-A. 30-47; body depth 70-74; 1D.-2D. 33-37; ht. 1D. 89-103; len. P. 50-50; len. V. 49-50; post. nostril 5-7.

Body long, slender, total length 5.7-5.9 times head length; greatest depth about equal to postrostral length of head. Snout acute in lateral view, not gently rounded in ventral profile; shallow troughs formed on each side of median ridge. Interorbital space shallowly concave. Orbits oval to oblate, dorsal margin entering dorsal profile. Upper jaws extend to vertical slightly beyond midorbit. Slender chin barbel about equal to least suborbital width.

Premaxillary tooth band 4-6 teeth across wider portions, mandibular band about 4 teeth wide.

Terminal and lateral snout scutes coarse, stout, prominent; suborbital shelf formed of 2 parallel rows of modified scutelike scales, ventral edge of lower row forming sharp ridge separating dorsal and ventral surfaces of head. Underside of snout below leading edges mostly naked to lips; naked area spreading laterally as narrow strip above lateral margins of upper lip. Small open pores of sensory system rather prominent over narrowly scaled ramus of mandible; naked areas of snout with similar open pores; pores lack high rims.

Spinous second ray of first dorsal fin slightly prolonged, rather stout proximally tapering to fine tip, armed along leading edge with small, sharp, wide-spaced teeth. First dorsal origin slightly behind vertical through pectoral and pelvic origins; second dorsal poorly developed throughout. Pectoral rather small, short, length less than postrostral length of head, tip extends short distance beyond vertical through anterior few rays of anal fin. Pelvic fins short, outer ray tapered to filamentous tip that barely extends to anal origin. Anal fin well developed, origin below interspace of dorsals, but closer to first dorsal.

Periproct region elongate, somewhat teardrop shaped; anterior dermal window small, inconspicuous, wider than long, separated short distance from periproct but connected by narrow isthmus. Vent closer to pelvic insertions than to anal origin.

*Color* overall grayish brown, with broad darkish band encircling entire trunk to about end of abdominal cavity; most surfaces over abdomen with bluish cast; ventrally head darker, especially gill membranes and posterior aspects of operculum. Orbit rim narrowly edged in black. Barbel pale at base but dark over most of length. First dorsal blackish to dark dusky anteriorly and distally, but paler near base and over posterior rays. Pectoral and pelvic fins dark; anterior rays of anal fin dark, becoming dusky posteriorly. Mouth and gill cavity blackish.

**SIZE.** — To at least 26 cm TL.

**ETYMOLOGY.** — Named for Clive D. ROBERTS (NMNZ), who collected the holotype and many other grenadiers, and made them available for our study.

DISTRIBUTION. — So far known only from two specimens from regions south of New Caledonia, in 815-1160 m.

REMARKS AND COMPARISONS. — *Nezumia cliveri* closely agrees with *N. coheni* in almost all meristic and morphometric features, as well as scale spinulation. The two species are notably different in overall physiognomy of the head, however, with *N. coheni* having more rounded features without sharp ridges on the suborbital and supranarial, and the preopercle ridge is not as sharply defined. The suborbital space is rounded in *N. coheni*, but rather sharply divided into dorsal and ventral portions in *N. cliveri*. The terminal and lateral snout scutes are similar in size in both species, but those in *N. cliveri* protrude more, especially the lateral scutes, and give that species a sharper snout profile. Other differences include a more elongated, somewhat oblate, orbit in *N. cliveri* (compared with more round in *N. coheni*), naked area on underside of snout more extensive, a slightly shorter barbel (13-15% HL cf. 15-20% in *N. coheni*), and slightly shorter dorsal interspace (33-37% HL cf. 39-44%). *Nezumia cliveri* differs from *N. aspidontata*, with which it has been taken, in dentition pattern (teeth bands not as broad), preoral length (longer), pelvic ray count (higher), and body scales (larger, with lanceolate rather than conical spinules). *Nezumia namatahi* McCann & McKnight, 1980, from New Zealand and Australian waters, is much darker overall with a generally black trunk girdle, has a more posteriorly placed anterior dermal window, more prominent sensory pores on underside of head (those on ventral margin of suborbital with raised rims), and 9 or 10 pelvic finrays. An undescribed species from Australia also has a more posteriorly placed anterior dermal window, an overall black first dorsal fin, and a stouter long spinous dorsal ray. A second undescribed species from southern and western Australia is very similar in most respects including position of dermal window, pelvic ray count, scale spinules, scale-row counts, and gill-raker counts, but the trunk is encircled by a faint girdle (or lacking), spinules on body scales are less dense, premaxillary outer teeth are not as prominent, and pores on the underside of the head are smaller.

*Nezumia coheni* sp. nov.

Fig. 28 b

MATERIAL EXAMINED. — 20 specimens.

**New Caledonia.** BIOCAL: stn CP 34, 23°11.88'S, 167°11.30'E, 710 m, 29.08.1985: holotype 45.2 mm HL, 250+ mm TL (MNHN 1996-960).

**Norfolk Ridge.** HALIPRO 2: stn BT 75, 24°13'S, 167°36'E, 1128-1150 m, 21.11.1996: paratype 51.8 mm HL, 305+ mm TL (CAS 90614).

**Loyalty Ridge.** HALIPRO 2: stn BT 104, 25°23'S, 162°35'E, 1118-1124 m, 27.11.1996: paratype 72.4 mm HL, 400 mm TL (CAS 90668).

**Kermadec Islands.** "Challenger": stn 170A, 29°55'S, 178°14'W, 1152 m, 14.07.1874: paratype 51.3 mm HL, 274+ mm TL [also paralectotype of *Macrurus rudis* Günther, 1878] (BMNH 1887.12.7.75).

**Australia.** "Kapala": New South Wales, east of Seal Rocks, 32°31'S, 152°59'E, 1006-1052 m, 15.08.1989: 1 paratype 47.5 mm HL, 265+ mm TL (AMS I.29754-002). — Off Port Stephens, 32°38'S, 152°57'E, 896-969 m, 29.06.1989: 2 paratypes 33.0-35.7 mm HL, 172+-195+ mm TL (AMS I.29823-013). — East of Broken Bay, 33°32'S, 151°45'E, 21.04.1986: 2 paratypes 57.4-66.8 mm HL, 323+-339+ mm TL (AMS I.29751-002). — East of Broken Bay, 33°37'S, 152°07'E, 1005 m, 1979: 2 paratypes 42.4-56.0 mm HL, 215+-303+ mm TL (AMS I.21724-026). — East of Broken Bay, 33°38'S, 152°07'E, 1024-1243 m, 11.11.1984: 3 paratypes 45.7-63.1 mm HL, 243+-327+ mm TL (AMS I.25264-003). — Off Broken Bay, 33°43'S, 152°03'E, 1043-1070 m, 4.09.1984: 4 paratypes 57.2-66.6 mm HL, 353+-370+ mm TL (AMS I.24993-007). — Off Sydney, 33°45'S, 152°03'E, 1120-1170 m, 30.06.1989: 1 paratype 49.8 mm HL (AMS I.29340-007). — East of Shoalhaven Heads, 34°47'S, 151°16'E, 10.10.1983: 1 paratype 64.7 mm HL, 335 mm TL (AMS I.25127-002). — Off Shoalhaven Bight, 34°56'S, 151°13'E, 1115 m, 16.10.1983: 1 paratype 61.6 mm HL, 332 mm TL (AMS I.24173-006). — East of Bawley Point, 35°27'S, 150°53'E, 935-960 m, 16.12.1987: 1 paratype 60.3 mm HL, 355 mm TL (AMS I.29741-004).

DIAGNOSIS. — Pelvic rays usually 11 (rarely 10 or 12). Underside of head mostly scaled, but a median-ventral naked swath below snout tip; pores of sensory system on head relatively small. Scales densely covered with narrowly to broadly lanceolate spinules in somewhat convergent rows; 7.0-8.5 rows below second dorsal origin; 34-40 lateral-line scales over distance equal to predorsal length. First dorsal fin dusky to black. Anterior dermal window of light organ between insertions of pelvic fins. Barbel 1.8-2.0 into orbit diameter, 15-20% of HL; preoral length 23-28%; orb.-preop. 38-44%.

DESCRIPTION. — *Counts*: 1D. II,9-10; P. i20-i22; total GR-I (outer/inner) 6-9/9-11, GR-II 8-10/10-11; scales 1D. 7-10, midbase 1D. 5.5-7.5.

*Measurements* of holotype, followed by those of paratypes, in percent of HL: snout 30, 30-34; internasal 24, 20-25; interorb. 22, 20-26; orb. 32, 29-34; suborb. 16, 15-16; postorb. 42, 39-45; up.jaw 32, 30-34; gill slit 15, 12-14; pre-A. 168, 143-166; snout-anus 144, 121-142; V.-A 44, 38-53; anus-A. 28, 17-33; body depth 80, 70-86; 1D.-2D. 41, 26-53; ht. 1D. 78-95; len. P. 55, 46-61; len. V. 42-65; post. nostril 5, 4-8.

Snout conical; suborbital ridge not sharply demarcated, infraorbital region gently rounded, almost vertical; orbit round, diameter slightly greater than snout length, about 1.2 into postorbital length; interorbital region flat, about 1.2 to 1.6 into orbit. Upper jaw extends to below midorbit; barbel slender, length greater than suborbital width, about 1.6-2.0 into orbit.

Premaxillary teeth in broad, short, tapered band, outer series slightly enlarged; band falls well short of end of rictus. Mandibular teeth in rather wide tapered band, extending to end of rictus; no teeth enlarged.

Scales densely cover most of head and body. A broad naked swath on ventromedian surface, spreading laterally along narrow ventral margin over upper lips. Head surfaces not covered with prominent open pores, but liberally dotted with sensory papillae. Suborbital shelf composed of 2 rows of scales along narrowest part, lower row of scales strengthened and forming relatively inconspicuous demarcation between upper and lower head surfaces. Spinules on body scales imbricate but not adjoined; posteriorly, marginal spinules on each scale slightly overlap edge.

First dorsal fin relatively high, much greater than postrostral length, almost equal to head; long second spinous ray stout, armed along leading edge with short, sharp denticles. Outer pelvic ray slightly prolonged, extending about to anal origin.

*Color* in alcohol gray-brown on head, dark ventrally and over operculum, lower jaws, and lips. Branchiostegal membranes blackish; abdomen dark, bluish, dark color extending completely around trunk to form broad, relatively inconspicuous girdle, probably not noticeable in completely scaled individuals. Naked ventral strip on underside of snout blackish. Tail sections with scales missing brown; scaled areas more grayish. First dorsal fin lacking prominent blotches or darker color ventrally or dorsally; pectoral and pelvic fins dusky, with blackish areas near base; anal fin dusky, but darker anteriorly.

SIZE. — To more than 40 cm TL.

ETYMOLOGY. — Named for Daniel M. COHEN (LACM), our esteemed colleague and fellow student of deep-sea fishes.

DISTRIBUTION. — So far known only from off New Caledonia, the Kermadecs, and eastern Australia, in 710-1032 m.

REMARKS AND COMPARISONS. — The relatively smoothly conical snout, the limited naked area on underside of head, the location of the anterior dermal window, the rather long barbel, and the lack of a prominent encircling trunk band distinguish *N. coheni* from other members of the genus with similar pelvic ray counts. It is similar in many respects to *N. brevibarbata* Barnard, 1925 from southern Africa, but differs in the above characters and the narrowly lanceolate spinules.

*?Nezumia propinqua* (Gilbert & Cramer, 1897)

Fig. 29 a

*Macrourus propinqua* Gilbert & Cramer, 1897: 424-425, pl. 42, fig. 2 (holotype, USNM 47741, from off Hawaii).

MATERIAL EXAMINED. — 21 specimens.

**New Caledonia.** BIOCAL: stn CP 31, 23°07.26'S, 166°50.45'E, 850 m, 29.08.1985: 2 specimens 20.0-21.0 mm HL (MNHN 1994-966). — Stn CP 32, 23°06.98'S, 166°51.20'E, 825 m, 29.08.1985: 1 specimen 20.1 mm HL, 120 mm TL (CAS 89739). — Stn CP 52, 23°05.79'S, 167°46.54'E, 31.08.1985: 1 specimen 28.3 mm HL, 163 mm TL (CAS 86460).

**Norfolk Ridge and the Loyalties.** BERYX 2: stn 9, Seamount K, 24°44.55'S, 170°07.00'E, 790-825 m, 26.10.1991: 1 specimen 22.5 mm HL, 140+ mm TL (NMNZ P.27531).

**Norfolk Ridge.** BERYX 11: stn CP 54, Jumeaux Seamount, 23°44.80'S, 168°16.85'E, 390-420 m, 21.10.1992: 2 specimens 22.0-22.3 mm HL, 131+-135+ mm TL (NMNZ P.29054). — Stn CP 60, Azteque Seamount, 23°19.00'S, 168°00.37'E, 580-600 m, 22.10.1992: 3 specimens 25.2-25.5 mm HL, 155+-158+ mm TL (NMNZ P.29078).

**Chesterfield and Bellona Plateau.** MUSORSTOM 5: stn CC 384, 19°42.40'S, 158°50.80'E, 772-756 m, 21.10.1986: 7 specimens 17.5-26.0 mm HL (MNHN 1994-967). — Stn CC 390, 21°00.90'S, 160°50.30'E, 745-825 m, 22.10.1986: 3 specimens (BMNH 1996.7.19:50-52).

**Wallis and Futuna Islands.** MUSORSTOM 7: stn CP 592, 12°32.4'S, 174°22.0'W, 775-730 m, 24.05.1992: 1 specimen 29.0 mm HL (MNHN 1994-968).

**DIAGNOSIS.** — Pelvic rays 13-15. First dorsal fin black tipped, with widely spaced denticles on spinous second ray. Undersides of snout and mandibular rami naked; pores on lower jaw large. Body scales small, 12-13 below origin of second dorsal fin, covered with needlelike spinules in 5-10 parallel rows. Chin barbel relatively long, usually 2 or fewer times into orbit, 16-22% of HL.

**DESCRIPTION.** — *Counts* (from 7 New Caledonian specimens): 1D. II,10-12; P. i18-i21; total GR-I (outer/inner) 7-9/8-11, GR-II 8-9/9-10; scales 1D. 12-16; midbase 1D. 8.5-13, lat.line 43-48.

*Measurements:* Total lengths 131+-163 mm; 22.0-28.3 mm HL. Measurements in percent HL: snout 29-33; preoral 23-26; internasal 22-26; interorb. 22-27; orb. 32-36; suborb. 14-16; postorb. 39-43; orb.-preop. 34-38; up.jaw 31-35; gill slit 12-14; pre-A. 148-161; snout-anus 127-136; V.-A 36-51; anus-A. 16-33; body depth 73-87; 1D.-2D. 21-42; ht. 1D. 85-99; len. P. 47-55; len. V. 60-79; post. nostril 6-10.

See SAZONOV and IWAMOTO (1992) for a detailed description and illustration of the species.

**SIZE.** — Probably not much larger than about 18-20 cm TL. A ripe female with large eggs measured 163 mm TL (CAS 86460).

**DISTRIBUTION.** — Probably extremely widespread in tropical to subtropical waters of the Pacific and Indian Oceans. Depth range in New Caledonian waters 390-811 m.

**REMARKS AND COMPARISONS.** — *Nezumia condylura* Jordan & Gilbert, 1904, *N. propinqua*, and *N. evides* (Gilbert & Hubbs, 1920) constitute a small but widely distributed complex of species that have posed difficult identification problems. All three species have a notably high pelvic finray count, usually numbering between 13 and 18, which distinguishes them from most other members of the genus. Characters used to distinguish the three species have been subjective, overlapping, or subject to ontogenetic and individual variation. We tentatively assign our specimens to *N. propinqua*, the oldest name available, recognizing that name changes may be forthcoming when the taxonomy of the complex has been adequately resolved.

### *Nezumia spinosa* (Gilbert & Hubbs, 1916)

Fig. 29 b

*Lionurus spinosus* Gilbert & Hubbs, 1916: 199, pl. 10, fig. 2 (Japan); 1920: 554 (4 spec., off Luzon, Philippines).

*Nezumia spinosa* - IWAMOTO & ANDERSON, 1994: 18-19 (22 spec., Natal, South Africa and Mozambique).

**MATERIAL EXAMINED.** — 8 specimens.

**Norfolk Ridge and the Loyalties.** BERYX 2: stn 7, Seamount K, south of New Caledonia, 24°41.70'S, 170°06.82'E, 815-820 m, 25.10.1991: 1 specimen 43.0 mm HL, 245+ mm TL (NMNZ P.33502). — Stn 9, Seamount B, south of New Caledonia, 24°44.55'S, 170°07.00'E, 790-825 m, 26.10.1991: 1 specimen 54.2 mm HL, 319 mm TL (NMNZ P.27511).

**Wallis and Futuna Islands.** MUSORSTOM 7: stn CC 553, 12°16.8'S, 177°28.1'W, 780-794 m, 18.05.1992: 1 specimen (MNHN 1994-971). — Stn CC 554, 12°13.8'S, 177°28.0'W, 820-795 m, 18.05.1992: 1 specimen (MNHN 1994-969). — Stn CC 565, 11°47.4'S, 178°25.3'W, 900 m, 20.05.1992: 1 specimen (MNHN 1994-970).

**Japan.** "Albatross": stn 4915, 31°31'00"N, 129°25'30"E, 781 m, 12.08.1906: holotype 46.5 mm HL, 280 mm TL (USNM 76868). — Stn 4918, southwest of Kyushu, 30°22'00"N, 129°08'30"E, 660 m, 13.08.1906: 1 specimen 20 mm HL, 133 mm TL (CAS-SU 22941).

South China Sea. "Cape St. Mary", Cruise 1/64: stn 26, MacClesfield Bank, 19°22.5'N, 114°07.5'E, 60-795 m: 1 specimen 44.8 mm HL, 150+ mm TL (USNM uncat.).

Australia. (Other specimens from Australia examined but not listed at AMS, CSIRO, and QM).

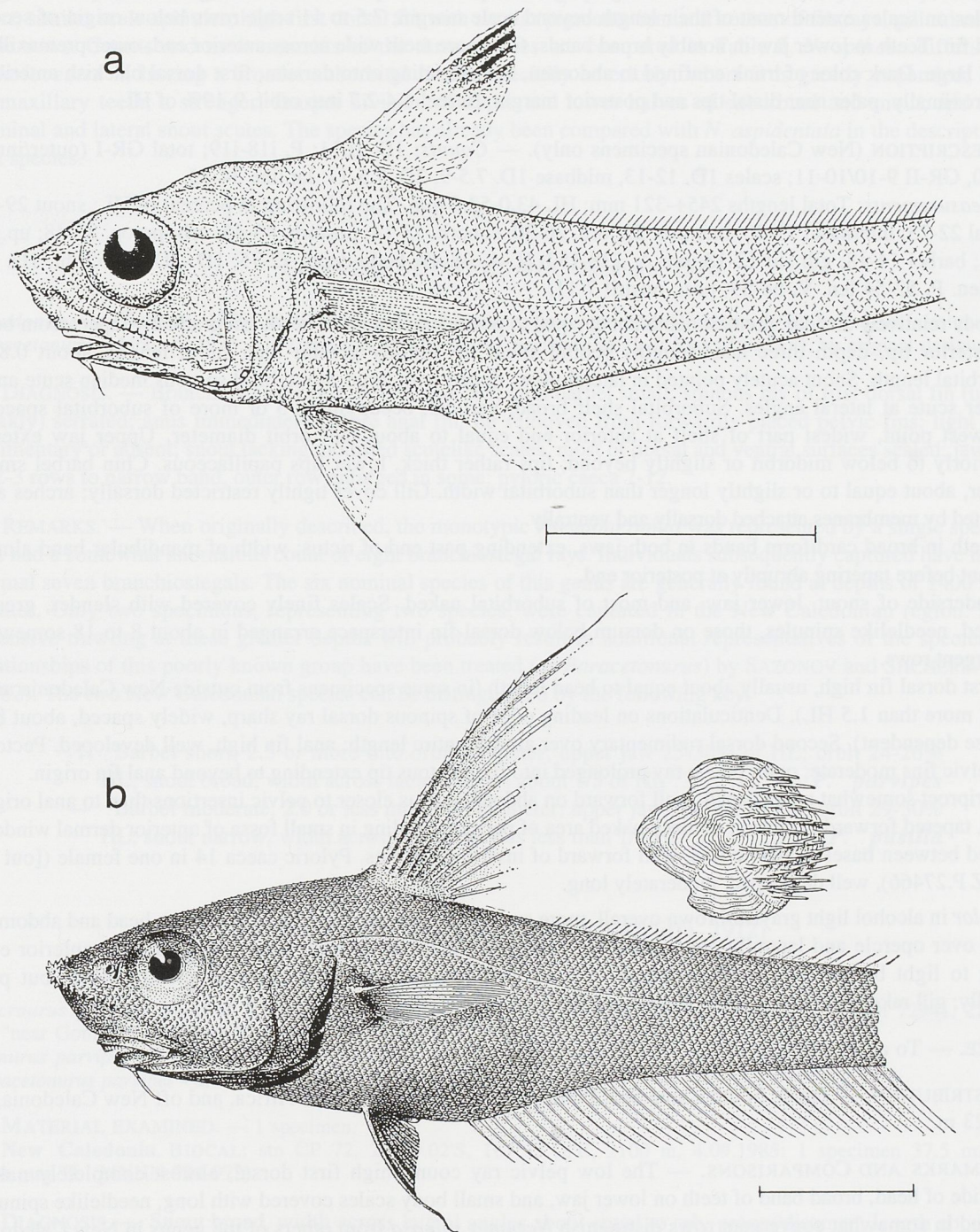


FIG. 29. — a, *Nezumia propinqua* (Gilbert & Cramer), 28.3 mm HL (CAS 86460), New Caledonia, BIOCAL, stn CP 52, 600 m. — b, *Nezumia spinosa* (Gilbert & Hubbs) (From GILBERT & HUBBS, 1916, pl. 10, fig. 2). Scales = 25 mm.

**DIAGNOSIS** (from all specimens). — Pelvic rays 8 or 9 (usually 8). Height first dorsal fin usually greater than head length. Underside of head almost completely naked, pocketed with rather prominent pores along mandible and ventral margin of suborbital region. Terminal and lateral snout scutes large, prominently protruding from outline of snout. Scales densely covered with long needlelike spinules in parallel to convergent rows, posteriormost spinules on scales extend most of their length beyond scale margin; 7.5 to 11 scale rows below origin of second dorsal fin. Teeth in lower jaw in notably broad bands, 6 or more teeth wide across anterior end; outer premaxillary series large. Dark color of trunk confined to abdomen, not extending onto dorsum; first dorsal blackish anteriorly and proximally, paler near distal tips and posterior margin. Barbel 1.4-2.7 into orbit, 9-19% of HL.

**DESCRIPTION** (New Caledonian specimens only). — *Counts*: 1D. II,11; P. i18-i19; total GR-I (outer/inner) 8/9-10, GR-II 9-10/10-11; scales 1D. 12-13, midbase 1D. 7.5-9, 2D. 7.5-11, lat.line 34-35.

*Measurements*: Total lengths 245+-321 mm; HL 43.0-53.6 mm. The following in percent of HL: snout 29-30; preoral 22-23; internasal 19-20; interorb. 22; orb. 26-30; suborb. 13-14; postorb. 43-45; orb.-preop. 37-48; up.jaw 30-32; barbel 14-18; gill slit 12-13; pre-A. 138-150; V.-A. 38-49; body depth 72-75; 1D.-2D. 34-52; ht. 1D. 81-104; len. P. 52-54 len. V. 58-59; post. nostril 7-11.

Body relatively slender, greatest depth about equal to postrostral length of head; tail gradually tapers from belly to posterior tip, depth three head lengths behind snout tip slightly greater than snout length, about 0.8 of postorbital length. Snout acutely pointed in lateral view, tipped with large, stout, bifid spinous median scute and a smaller scute at lateral angles. Suborbital shelf broad, vertical, occupying 2/3 or more of suborbital space at narrowest point, widest part of shelf at anterior end equal to about half orbit diameter. Upper jaw extends posteriorly to below midorbit or slightly beyond; lips rather thick, lower lips papillaceous. Chin barbel small, slender, about equal to or slightly longer than suborbital width. Gill cover tightly restricted dorsally; arches also restricted by membranes attached dorsally and ventrally.

Teeth in broad cardiform bands in both jaws, extending past end of rictus; width of mandibular band almost constant before tapering abruptly at posterior end.

Underside of snout, lower jaw, and most of suborbital naked. Scales finely covered with slender, greatly reclined, needlelike spinules, those on dorsum below dorsal-fin interspace arranged in about 8 to 18 somewhat convergent rows.

First dorsal fin high, usually about equal to head length (in some specimens from outside New Caledonia area, height more than 1.5 HL). Denticulations on leading edge of spinous dorsal ray sharp, widely spaced, about 8 to 16 (size dependent). Second dorsal rudimentary over almost entire length; anal fin high, well developed. Pectoral and pelvic fins moderate; outer pelvic ray prolonged into filamentous tip extending to beyond anal fin origin.

Periproct somewhat pear shaped, well forward on abdomen, anus closer to pelvic insertions than to anal origin. Broad, tapered forward extension of black naked area of periproct ending in small fossa of anterior dermal window, situated between bases of pelvic fins, well forward of insertions of fins. Pyloric caeca 14 in one female ([out of] NMNZ P.27466), well developed, moderately long.

*Color* in alcohol light grayish-brown overall, more swarthy over head; blackish ventrally on head and abdomen, bluish over opercle and laterally over abdomen. Paired fins blackish overall. Anal fin blackish at anterior end, fading to light brown over most of length. Mouth and lips blackish; gill chamber mostly black, but pale ventrally; gill rakers and arches dark, filaments pale.

**SIZE**. — To at least 26 cm TL.

**DISTRIBUTION**. — Japan, South China Sea, Philippines, Australia, southern Africa, and off New Caledonia, in 787-823 m.

**REMARKS AND COMPARISONS**. — The low pelvic ray count, high first dorsal, almost completely naked underside of head, broad band of teeth on lower jaw, and small body scales covered with long, needlelike spinules arranged in somewhat convergent rows distinguish *Nezumia spinosa* from others of the genus in New Caledonia waters. The specimen (CAS-SU 22941) from the East China Sea off the southwestern coast of Kyushu, Japan, was erroneously recorded by GILBERT and HUBBS (1916: 201-202) as *N. proxima* (Smith & Radcliffe, 1912), but



that species is readily differentiated by its lanceolate scale spinules, narrower naked region on underside of snout, and scaled mandibular rami.

*Nezumia spinosa* is closely similar to *N. holocentra* from Hawaiian waters and *N. aspidentata*, sharing most diagnostic features such as naked underside of snout with large pores, teeth bands in both jaws very broad and short, similar scale spinules, high first dorsal fin with similar pigmentation, and counts of fin rays, gill rakers, and scale rows. Counts and measurements of the three species are compared in Table 2. *N. spinosa* differs from *N. holocentra* in having a broader suborbital shelf, especially anteriorly, where it is greatly expanded; larger premaxillary teeth; a stronger, sharper division of upper and lower halves of suborbital and snout; and larger terminal and lateral snout scutes. The species has already been compared with *N. aspidentata* in the description of that species.

### Genus *PSEUDONEZUMIA* Okamura, 1970

*Pseudonezumia* Okamura, 1970: 38-39 (type-species *Pseudonezumia japonicus* Okamura, 1970, by original designation).  
*Paracetonurus* Marshall, 1973: 615 (type-species *Macrourus parvipes* Smith & Radcliffe, 1913, by original designation).

DIAGNOSIS. — Branchiostegal ray 7; pelvic rays 5-7; chin barbel small; spinous ray of first dorsal fin (usually weakly) serrated; anus immediately before anal fin, far removed from forwardly placed pelvic fins; light organ rudimentary or absent; snout lacking modified scutelike scales, most of dorsal and ventral surfaces scaled; jaw teeth in 2-3 rows to narrow band, outer row enlarged in some; pyloric caeca 7-12.

REMARKS. — When originally described, the monotypic *Pseudonezumia* was represented by a single specimen that had a somewhat anomalous count of eight branchiostegal rays. Individuals subsequently captured have had the normal seven branchiostegals. The six nominal species of this genus are generally found at depths of 1400 m and greater. Only two specimens, representing two species, were captured in the New Caledonian region. More-extensive trawling at these greater depths will probably result in additional representatives of the species. The relationships of this poorly known group have been treated (as *Paracetonurus*) by SAZONOV and SHCHERBACHEV (1982). The two New Caledonian species can be distinguished by the following key:

1. Barbel short, 2.5 or more into orbit diameter; upper jaw 25-30% of HL; orbit 24-26% HL; snout broad, width across lateral angles about 1/3 of HL ..... *P. parvipes*
- Barbel moderate, 2.0 or less into orbit diameter; upper jaw 30-39% of HL; orbit 29-30% HL; snout narrow, width across lateral angles less than 1/3 HL ..... *P. pusilla*

### *Pseudonezumia parvipes* (Smith & Radcliffe, 1912)

Fig. 30 a

*Macrourus parvipes* Smith & Radcliffe, in RADCLIFFE, 1912: 124-125, pl. 28, fig. 1 (holotype USNM 72941, 22.8 cm, "near Gomomo Is., Dutch East Indies," 1°55'00"S, 127°42'30"E, 2308 m).

*Lionurus parvipes* - GILBERT & HUBBS, 1916: 202, 205; 1920: 562-563.

*Paracetonurus parvipes* - SAZONOV & SHCHERBACHEV, 1982: 11.

MATERIAL EXAMINED. — 1 specimen.

New Caledonia. BIOCAL: stn CP 72, 22°09.02'S, 167°33.18'E, 2100 m, 4.09.1985: 1 specimen 37.5 mm HL, 200+ mm TL (MNHN 994-972).

DIAGNOSIS. — Snout broad, width across lateral angles about equal to orb.-preop. distance; length about 37% HL; protruding more than 2/3 orbit diameter beyond mouth; suborbital angular, distinct ridge formed; interorbital width 32% HL, upper jaw 30%, barbel 9%.

DESCRIPTION. — *Counts*: 1D. II,8; P. i19/i19; V. 6/6; GR-I (outer/inner) 9/2+10, GR-II 1+1+9/2+9; scales 1D. ca. 12, mid-base 1D. 8, 2D. 11, lat.line 61.

*Measurements*: The following in millimeters, percent of HL in parentheses: postrostral 25.1 (67); snout 13.7 (37); preoral 10.1 (27); internasal 10.7 (29); orb. 9.1 (24); suborb. 6.3 (17); postorb. 16.3 (44); gill-slit 4.5 (12); pre-A. 48 (128); isthm.-anus 19.5 (52); V.-A. 12 (32); body depth 27 (72); ht. 1D. 25 (67); len. P. 21 (56); len. V. 10 (27); post. nostril 3 (8).

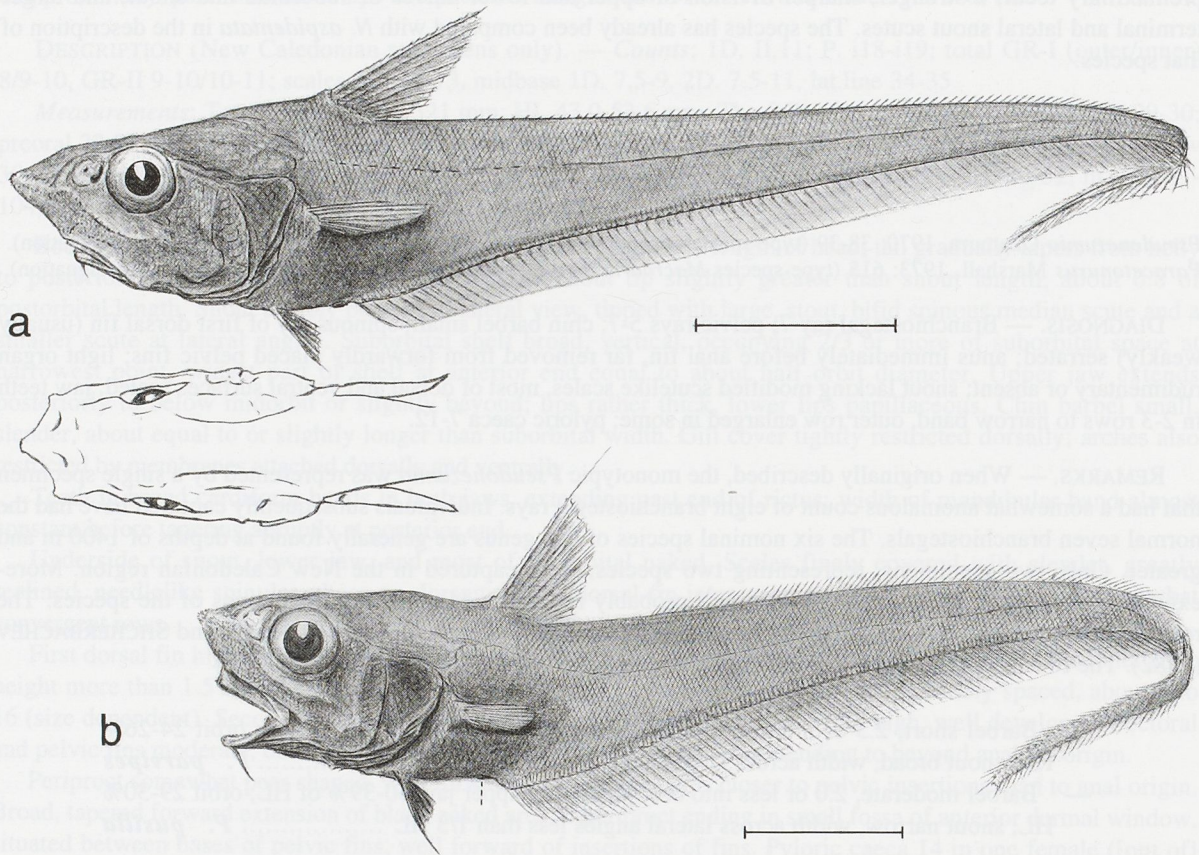


FIG. 30. — **a**, *Pseudonezumia parvipes* (Smith & Radcliffe), 37.5 mm HL (MNHN 1994-972), New Caledonia, BIOCAL, stn CP 72, 2100 m. — **b**, *Pseudonezumia pusilla* (Sazonov & Shcherbachev), 40.3 mm HL (MNHN 1996-964), off Loyalty Islands, BIOGEOCAL, stn CP 265, 1760-1870 m. Scales = 25 mm.

Head more than 5 in total length, broad, width about equal to height at hind edge of orbit. Trunk short, length of abdominal cavity much shorter than postrostral length of head. Snout broad, pointed, extending about  $2/3$  orbit diameter beyond mouth, width across lateral angles about equal to distance orbit to preopercle angle. Suborbital region angular, sharply demarcating dorsal and ventral surfaces of head; shelf and ridge lacking modified scales. Interorbital broad, much greater than orbit diameter, somewhat concave in preserved specimen but possibly convexly rounded in life. Mouth moderate in size, posterior end of maxilla below hind margin of pupil. Chin barbel small, slender, more than 2.5 times into orbit diameter. Lateral line interrupted along most of its course into series of dashed grooves.

Teeth short, slender, conical, slightly recurved, in short, narrow, tapered band in premaxillary, anterior teeth somewhat longer than those more lateral and medial. Mandibular teeth in 2 or 3 irregular rows, narrower posteriorly. Teeth in both jaws extend about 60% length of rictus; smooth toothless gum surface at posterior end of premaxillary.

Scales small, densely covering almost all of head and body and giving somewhat velvety feel to body surfaces. No enlarged scales along margins of dorsal or anal fins. Naked areas confined to narrow midventral strip under snout and along front of mouth, margins of lower jaw, gill membranes, nasal fossa, and broad periproct region. Scales armed with slender, conical, relatively short, slightly recurved and reclined spinules arranged in rather irregular rows, sometimes in quincunx pattern. None of spinules enlarged. No stout scutelike scales at tip and lateral angles of snout nor along head ridges.

Fins rather weakly developed. Spinous second ray of first dorsal narrowly triangular in cross section near base, tapering into a fine distal tip; leading edge armed with 14 widely spaced denticulations. Pectoral fin narrow based, relatively low on side of trunk, upper margin of base distinctly below midlateral line of body. Pelvic fin small, fine rays scarcely extending to level of anus; fin location far forward below operculum, well in advance of pectoral fin, which is slightly anterior to first dorsal. Anal fin far forward, origin below anterior half of first dorsal, well developed over most of length. Second dorsal rudimentary over almost entire length.

Periproct region large, broad, subtending about 1/3 distance between anal and pelvic fins, situated immediately in advance of anal fin; vent slightly posterior to center of periproct.

*Color* in alcohol overall dark brownish to swarthy; regions under snout, over opercles and abdominal cavity blackish; fins uniformly blackish.

SIZE. — To about 30 cm TL.

DISTRIBUTION. — Previously known from four "*Albatross*" collections in Indonesia, but now recorded off New Caledonia. Depth range 1992-2308 m.

REMARKS AND COMPARISONS. — *Pseudonezumia parvipes* is close to, if not conspecific with, *P. cetonuropsis* (Gilbert & Hubbs, 1916), which is known from only two "*Albatross*" specimens collected off Japan in 1679 m. Differences between the two are slight and may prove to be insufficient for continued recognition of the latter species. *Pseudonezumia pusilla* (Sazonov & Shcherbachev, 1982) differs from *P. parvipes* in having a longer barbel (14-23% HL), larger orbit (29-38%), and slightly shorter snout (31-35%). We are uncertain as to the differences between *P. parvipes* and *P. japonica*. *P. flagellicauda* (Koefoed, 1927) from the eastern North Atlantic appears to have a much broader head (interorbital width 47-47% HL), longer barbel (13-15%) and longer distance orbit to preopercle (41-45%).

*Pseudonezumia pusilla* (Sazonov & Shcherbachev, 1982)

Fig. 30 b

*Paracetonus pusillus* Sazonov & Shcherbachev, 1982: 12-14, fig. 4 (holotype, ZMMGU P15306, 219+ mm TL; Indian Ocean, Ninety-East Ridge; 11°24.3'S, 88°50.0'E; 1500-1600 m).

MATERIAL EXAMINED. — 1 specimen.

**Loyalty Islands.** BIOGEOCAL: stn CP 265, 21°04.09'S, 167°00.40'E, 1760-1870 m, 18.04.1987: 1 specimen 40.3 mm HL, 210+ mm TL (MNHN 1996-964).

DIAGNOSIS. — Snout narrow, width of snout across lateral angles about 1.5 into orb.-preop. distance; length about 32% HL, protruding a distance less than pupil diameter beyond mouth; suborbital relatively flat, without angular ridge; interorbital about 33% HL, upper jaw 34%, barbel 15%.

DESCRIPTION. — *Counts*: 1D. II,9; P. i20/i18; V. 6/6; GR-I (outer/inner) 9/2+9, GR-II 1+9/2+10; scales 1D. ca. 9, mid-base 1D. 10, 2D. 11, lat.line 62.

*Measurements*: The following in millimeters, percent HL in parentheses: postrostral 28.4 (70); preoral 8.5 (21); internasal 8.8 (22); orb. 12.0 (30); suborb. 5.2 (13); postorb. 16.6 (41); gill-slit 7.2 (18); pre-A. 55 (136); isthm.-anus 25 (62); V.-A. 16 (40); body depth 28 (69); ht. 1D. 29 (72); nostril 6.0 (15).

Head more than 5 in total length, relatively narrow, greatest width about equal to postorbital length. Trunk short, length of abdominal cavity shorter than postrostral length of head. Snout narrow, bluntly pointed, extending

less than pupil diameter beyond mouth, width across lateral angles about 1.3 into interorbital, about 1.5 into distance orbit to preopercle angle. Suborbital region relatively flat, almost vertical, not forming a sharp division between dorsal and ventral surfaces of head; shelf and ridge lacking modified scales. Interorbital concave in holotype but probably flat to slightly convex in life, width about equal to orbit diameter. Mouth moderate in size, posterior end of maxilla below midorbit. Chin barbel small, fine, length about half orbit diameter. Lateral line interrupted along most of its course into series of dashed grooves. Sensory papillae on underside of snout, but no enlarged sensory pores apparent on head. Posterior nostril large, diameter about equal to that of eye lens.

Teeth short, slender, conical, slightly recurved. Premaxillary teeth mostly in 2 rows (irregularly 3 at anterior end), occupying about 2/3 rictus length; outer series scarcely enlarged. Mandibular teeth in 2 or 3 irregular rows, narrowing to 1 posteriorly, extending about 2/3 length of rictus.

Scales small, densely covering all of head (including underside of snout and along mandibular rami) and body, giving somewhat velvety feel to body surfaces. No enlarged scales along margins of dorsal or anal fins. Gill membranes, nasal fossa, and small periproct region naked. Scales armed with slender, weak, relatively erect, needlelike spinules, usually around 10-12 spinules per scale. None of spinules enlarged. No stout scutelike scales at tip and lateral angles of snout nor along head ridges.

Fins rather weakly developed. Spinous second ray of first dorsal tapering into a fine filamentous tip; leading edge armed with about 9 irregularly spaced denticulation. Pectoral fin narrow based, relatively low on side of trunk, upper margin of base distinctly below midlateral line of body. Pelvic fin small, fine rays scarcely extending to level of anus; fin location far forward below subopercle, well in advance of pectoral fin, which is anterior to first dorsal. Anal fin origin below midbase of first dorsal, well developed over most of length. Second dorsal rudimentary over almost entire length.

Periproct region relatively small, subtending about 1/3 distance between anal and pelvic fins, situated immediately in advance of anal fin; anus slightly posterior to center of periproct.

*Color* in alcohol overall brownish; head dark, including all of jaws, gill membranes, mouth, and gill cavity. Nape, dorsally on trunk, and all of tail medium brown. Fins medium brown, but pelvics darker.

*SIZE*. — To more than 24 cm TL.

*DISTRIBUTION*. — Widespread in the tropical Indo-West Pacific, in depths of 1380-2000 m (SAZONOV & SHCHERBACHEV, 1982: 13).

*REMARKS AND COMPARISONS*. — The relatively narrow snout of this species distinguishes it from all other members of *Pseudonezumia*, so far as we know, and the barbel is longer than in all but *P. flagellicauda*. The New Caledonian specimen has a somewhat narrower suborbital width than recorded for the species, and the general outline of the head appears somewhat different from that illustrated for the holotype and for a specimen from the western Indian Ocean (BMNH 1995.8.5:1, 34.5 mm HL, Mascarene Ridge, "Vityaz" cruise 17, stn 2815, 1520-1720 m) that was used for comparisons. All other characters agree closely, however.

### Genus *SPHAGEMACRURUS* Fowler, 1925

*Sphagemacrurus* Fowler, 1925: 3 (as subgenus of *Macruropus*; type species *Macrurus hirundo* Collett, 1896, by original designation).

*Grenurus* Parr, 1946: 46 (type species *Grenurus grenadae* Parr, 1946).

*DIAGNOSIS*. — Branchiostegal rays 7; pelvic fin origin anterior to pectoral base, spinous ray of first dorsal serrated; anus in middle of broad periproct, closer to anal fin than pelvic fin bases; jaws at oblique angle; snout shorter than orbit, with terminal and lateral scutes, underside partially naked; coarse, modified scales forming suborbital ridge; jaw teeth small, in narrow bands.

*REMARKS*. — This is a problematic genus in which six species are currently recognized (IWAMOTO, 1990: 287). Our Russian colleague, Yuri I. SAZONOV (ZMMGU), informs us that half of the species are of doubtful

validity and that what we have treated as *S. pumiliceps* may be another species or a mixture of two. A thorough study of this group is needed.

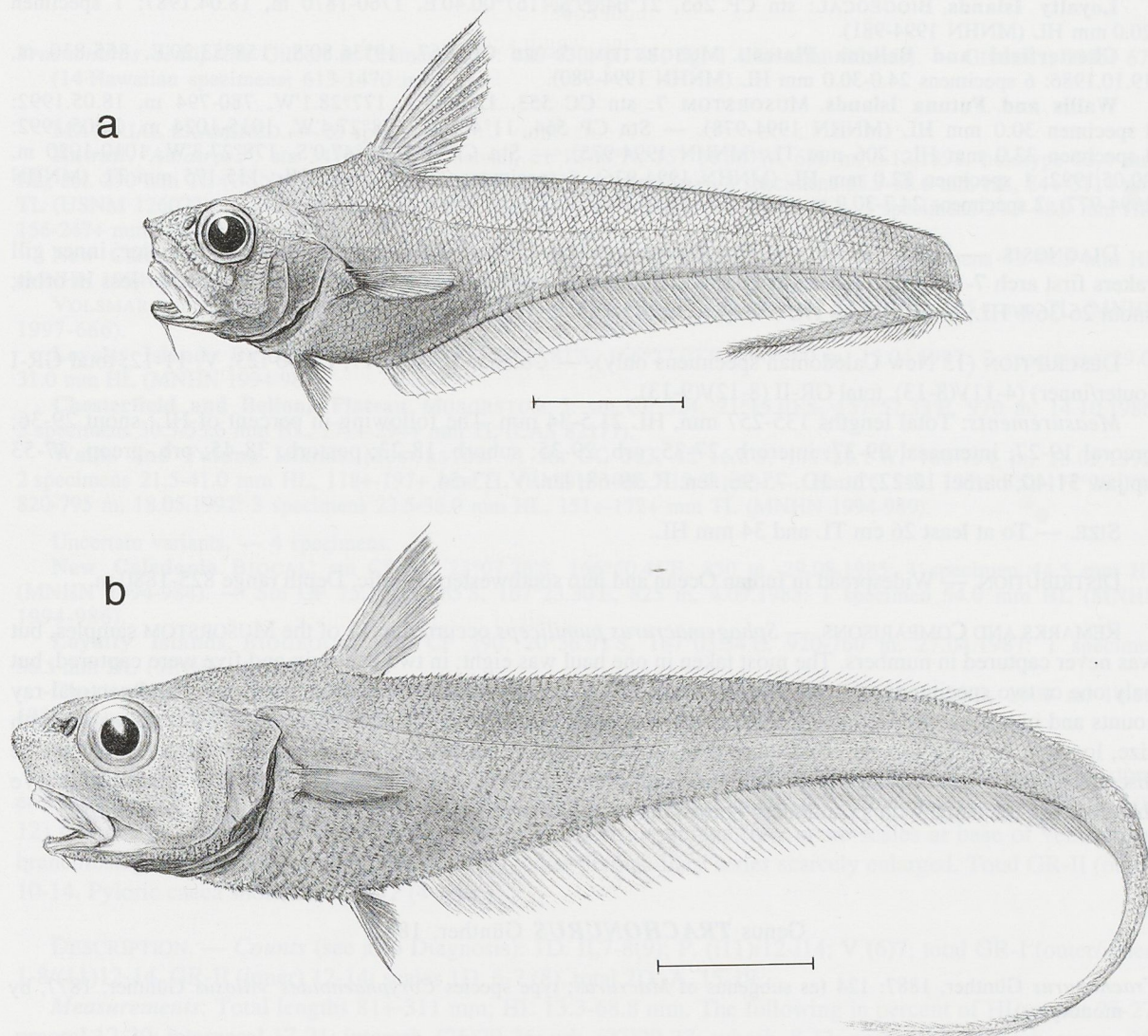


FIG. 31. — **a**, *Sphagemacurus pumiliceps* (Alcock), 32.3 mm HL (CAS 86461), New Caledonia, BIOCAL, stn CP 57, 825 m. — **b**, *Trachonurus sentipellis* (Gilbert & Cramer), 47.5 mm HL (MNHN 1996-666), New Caledonia, VOLSMAR, stn CP 26, 980 m. Scales = 25 mm.

*Sphagemacurus pumiliceps* (Alcock, 1894)?

Fig. 31 a

*Macrurus pumiliceps* Alcock, 1894a: 125 (lectotype ZSI 13562, Laccadive Sea, 1315 m; lectotype designation by MARSHALL & IWAMOTO in MARSHALL, 1973: 627).

MATERIAL EXAMINED. — 28 specimens.

**New Caledonia.** BIOCAL: stn CP 31, 23°07.26'S, 166°50.45'E, 850 m, 29.08.1985: 6 specimens 12.5-32.0 mm HL (MNHN 1994-979), 3 specimens (BMNH 1996.7.19:28-30). — Stn CP 32, 23°06.98'S, 166°51.20'E, 825 m, 29.08.1985: 1 specimen 26.0 mm HL (MNHN 1994-974). — Stn CP 60, 24°01.45'S, 167°08.43'E, 1530 m, 2.09.1985:

1 specimen 34.0 mm HL, 257 mm TL (MNHN 1994-973). — Stn CP 68, 24°00.37'S, 168°07.03'E, 1430 m, 3.09.1985: 1 specimen 34.0 mm HL (MNHN 1994-982). — Stn CP 75, 22°18.65'S, 167°23.30'E, 825 m, 4.09.1985: 2 specimens 32.3-35.4 mm HL, 185+190+ mm TL (CAS 86461).

**Loyalty Islands.** BIOGEOCAL: stn CP 265, 21°04.09'S, 167°00.40'E, 1760-1870 m, 18.04.1987: 1 specimen 20.0 mm HL (MNHN 1994-981).

**Chesterfield and Bellona Plateau.** MUSORSTOM 5: stn CP 367, 19°36.80'S, 158°53.20'E, 855-830 m, 19.10.1986: 6 specimens 24.0-30.0 mm HL (MNHN 1994-980).

**Wallis and Futuna Islands.** MUSORSTOM 7: stn CC 553, 12°16.8'S, 177°28.1'W, 780-794 m, 18.05.1992: 1 specimen 30.0 mm HL (MNHN 1994-978). — Stn CP 564, 11°46.1'S, 178°27.4'W, 1015-1024 m, 20.05.1992: 1 specimen 33.0 mm HL, 206 mm TL (MNHN 1994-975). — Stn CP 567, 11°47.0'S, 178°27.3'W, 1010-1020 m, 20.05.1992: 1 specimen 32.0 mm HL (MNHN 1994-976), 3 specimens 21.5-32.5 mm HL, 135-175 mm TL (MNHN 1994-977), 2 specimens 24.7-30.9 mm HL, 160+163+ mm TL (CAS 82176).

**DIAGNOSIS.** — Pelvic rays 11-14; first dorsal rays II,9-12; barbel 0.5 or more of orbit diameter; inner gill rakers first arch 7-13; pyloric caeca very short, stubby, 9-12; orbit-preopercle distance 1.2 times or less in orbit; snout 26-36% HL; orbit 29-36% HL (Adapted from IWAMOTO & ANDERSON, 1994: 22).

**DESCRIPTION** (13 New Caledonian specimens only). — *Counts*: 1D. II,9-11; P. i16-i23; V. 11-12; total GR-I (outer/inner) (4-11)/(8-13), total GR-II (8-12)/(9-13).

*Measurements*: Total lengths 135-257 mm, HL 21.5-34 mm. The following in percent of HL: snout 29-36; preoral 19-27; internasal 29-37; interorb. 27-35; orb. 29-35; suborb. 18-23; postorb. 38-45; orb.-preop. 37-53 up.jaw 31-40; barbel 12-22; ht. 1D. 75-96; len. P. 39-68; len. V. 33-54.

**SIZE.** — To at least 26 cm TL and 34 mm HL.

**DISTRIBUTION.** — Widespread in Indian Ocean and into southwestern Pacific. Depth range 825-1880 m.

**REMARKS AND COMPARISONS.** — *Sphagemacurus pumiliceps* occurred in 11 of the MUSORSTOM samples, but was never captured in numbers. The most taken in one haul was eight; in two hauls six and five were captured, but only one or two specimens were in the other hauls. We found considerable variation in gill-raker and pectoral-ray counts and in several proportional measurements but were unable to find any correlation of these characters with size, locality, or other factors. That more than one species may be represented in our study material cannot be discounted, but a more-detailed study with much additional material will be necessary to resolve this question. We therefore use the name with a cautionary note to our readers that the species may not represent *S. pumiliceps*.

### Genus *TRACHONURUS* Günther, 1887

*Trachonurus* Günther, 1887: 124 (as subgenus of *Macrurus*; type species *Coryphaenoides villosus* Günther, 1877, by monotypy).

**DIAGNOSIS.** — Branchiostegal rays 7; pelvic rays 6 or 7, rarely 8; spinous ray of first dorsal smooth; anus in middle of broad periproct, which spans most of short space between pelvic and anal fins; pelvic fins under first dorsal; snout rounded, head ridges absent; scales uniformly cover all of head and body, no modified scutelike scales or ridges on head; scales below second dorsal and along anal often enlarged and vertically elongated; branchiostegal and gular membrane heavily scaled in some species; color mostly dark brown, gray, or black.

**REMARKS.** — This is an enigmatic genus of five nominal species, with one other from the Philippines currently being described (by T1, manuscript submitted). Two or more additional species are known from the Australian coast, and it seems likely that more will be discovered when adequate material becomes available from poorly collected areas of the world's oceans. The species are all very similar in appearance and have consequently been difficult to characterize. We identify the *Trachonurus* from the New Caledonian region with a species known previously only from Hawaii. A few specimens did not fully agree with our concept of the species; they were not accorded separate taxonomic status but treated as variants.

*Trachonurus sentipellis* Gilbert & Cramer, 1897

Fig. 31 b

*Trachonurus sentipellis* Gilbert & Cramer, 1897: 429-430, pl. 45, fig. 1 (Hawaiian Islands). — GILBERT, 1905: 679 (14 Hawaiian specimens; 613-1470 m).

MATERIAL EXAMINED. — 29 specimens.

**Hawaii.** "Albatross": stn 3474, Kaiwi Channel, 21°12'00"N, 157°38'30"W, 686 m, 6.12.1891: holotype 53.4 mm HL, abt. 290 mm TL (USNM 47980). — Stn "off Hawaii" [no other data]: 4 specimens 15.3-68.6 mm HL, 84+-311+ mm TL (USNM 126072), 6 specimens 13.3-28.7 mm HL, 81+-178+ mm TL (USNM 55257), 3 specimens 24.3-48.9 mm HL, 156-247+ mm TL (CAS-SU 8530).

**New Caledonia.** BIOCAL: stn CP 31, 23°07.26'S, 166°50.45'E, 850 m, 29.08.1985: 2 specimens 43-44.5 mm HL (MNHN 1994-984), 2 specimens 22.0-23.0 mm HL, 140-144+ mm TL (MNHN 1994-988).

VOLSMAR: stn CP 26, 22°22.8'S, 171°21.4'E, 980 m, 4.06.1989: 1 specimen 47.5 mm HL, 265+ mm TL (MNHN 1997-666).

**Loyalty Islands.** BIOGEOCAL: stn CP 232, 21°33.81'S, 166°27.07'E, 760-790 m, 12.04.1987: 2 specimens 29.0-31.0 mm HL (MNHN 1994-987).

**Chesterfield and Bellona Plateau.** MUSORSTOM 5: stn CP 324, 21°15.01'S, 157°51.33'E, 970 m, 14.10.1986: 3 specimens 30.5-53.6 mm HL, 171+-294+ mm TL (CAS 82177).

**Wallis and Futuna Islands.** MUSORSTOM 7: stn CC 553, 12°16.8'S, 177°28.1'W, 780-794 m, 18.05.1992: 2 specimens 21.5-41.0 mm HL, 118+-197+ mm TL (BMNH 1996.7.19:31-32). — Stn CC 554, 12°13.8'S, 177°28.0'W, 820-795 m, 18.05.1992: 3 specimens 23.5-36.0 mm HL, 151+-172+ mm TL (MNHN 1994-989).

Uncertain variants. — 4 specimens.

**New Caledonia.** BIOCAL: stn CP 31, 23°07.26'S, 166°50.45'E, 850 m, 29.08.1985: 1 specimen 44.5 mm HL (MNHN 1994-984). — Stn CP 75, 22°18.65'S, 167°23.30'E, 825 m, 4.09.1985: 1 specimen 54.0 mm HL (MNHN 1994-986).

**Loyalty Islands.** BIOGEOCAL: stn CP 290, 20°36.91'S, 167°03.34'E, 920-760 m, 27.04.1987: 1 specimen 56.5 mm HL (MNHN 1994-985).

**Chesterfield and Bellona Plateau.** MUSORSTOM 5: stn DC 321, 21°20.40'S, 158°02.20'E, 1000 m, 14.10.1986: 1 specimen 69.0 mm HL (MNHN 1994-983).

DIAGNOSIS. — Grooved lateral line well developed; body scales relatively large, coarsely covered with stout, erect spinules, 30-37 lateral-line scales over distance equal to predorsal length, 4-7 below midbase 1D., (5-7)+1+(8-12) below 2D. origin; small scale patch or none on gular membrane, few or no scales at base of ventralmost branchiostegal rays. Teeth in both jaws all small, outer premaxillary series scarcely enlarged. Total GR-II (outer) 10-14. Pyloric caeca short, thick, 9-12 (4 spec.).

DESCRIPTION. — *Counts* (see also Diagnosis): 1D. II,7-8(9); P. (i11)i12-i14; V (6)7; total GR-I (outer/inner) 1-8/(11)12-14, GR-II (inner) 12-14; scales 1D. 6-7 (8), total 2D.-A. 15-19.

*Measurements*: Total lengths 81+-311 mm; HL 13.3-68.8 mm. The following in percent of HL: snout 23-27; preoral 12-20; internasal 17-21; interorb. (26)29-36; orb. (27)29-37; suborb. 8-13; postorb. 40-52; orb.-preop. 26-34; up.jaw (28)31-35(37); barbel 8-14; gill-slit 12-17; pre-A. 134-165; V.-A. 25-37; body depth 69-87; 1D.-2D. 17-52; ht. 1D. 48-64; len. P. 40-51; len. V. 30-48; nostril 5-11.

Head 5-6 in total length; greatest head width 1.7-1.8 into its length; body gradually tapering behind first dorsal fin, depth at 3 head lengths behind snout tip about 1.1-1.5 orbit diameter. Snout conically pointed in lateral view, bluntly obtuse viewed dorsally, protruding about 0.5-1.0 pupil diameter beyond mouth. Nasal bones strong, not easily distorted; internasal width about 1.5-1.7 into interorbital. Anterodorsal corner of orbit somewhat expanded laterally; anterior margin slightly depressed, together forming "viewing channel" directed anteroventrally. Suborbital region vertical and flat. Jaws subterminal, extending posteriorly to below midorbit or slightly beyond. Chin barbel small, slender, length about equal to least suborbital width. Preopercle posterior margin forming broad curve, opercle and subopercle forming deep, irregular, inverted triangle. Interopercle broadly exposed and scaled along ventral and posterior margins. Grooved lateral line prominent, well developed, broken in spots into closely spaced segments in some specimens.

Teeth fine, short, in narrow bands in both jaws, extending almost to end of rictus. Premaxillary band about 4 or 5 teeth wide, tapering to 2 irregular series, then to 1 row near posterior end; outer series scarcely enlarged. Mandibular teeth about 3 or 4 teeth wide anteriorly, becoming 2 irregular series, then 1 near posterior end; inner teeth slightly larger than outer.

Scales with 12-22 (size variable) short, erect spinules with low buttresses on larger scales dorsally on trunk. Enlarged, vertically elongated scales along anal fin base; these armed with stouter spinules with large interconnected buttresses forming high ridges. Scales along each side of second dorsal also somewhat enlarged, with larger spinules recurved and somewhat reclined. Scales over dorsal surfaces of preopercle and opercle platelike and enlarged; those along posterior margin of orbit stoutly elongated, other scales of head much smaller. About 6 scale rows across narrowest part of suborbital. Gular and branchiostegal membranes usually sparsely scaled or almost naked; but patch of small scales on gular membrane, and base of anteriormost branchiostegal rays with narrow series or isolated patches of small scales in others.

Fins all relatively small, with weak fin rays, tips broken in almost all fins. First dorsal origin slightly behind pectoral origin; pelvic origin below or anterior to middle portion of first dorsal base; anal fin below interspace between dorsals. Rays of pelvic fins scarcely reaching anal origin in our specimens, but GILBERT (1905:279) states that "all but the innermost ventral rays reach beyond origin of anal fin".

Periproct region typical of genus, very large round to somewhat oval with posterior margin close before anal fin; entire span between anal origin and inner rays of pelvic fins naked; anus about midway between or slightly closer to anal fin.

*Color* in alcohol medium brown overall; swarthy over abdomen, operculum, and laterally and ventrally on head. GILBERT (1905: 279) notes that "some young specimens are uniformly black". Branchiostegal and gular membranes dark gray to blackish; branchial cavity black, mouth, lips, jaws dark gray to black; barbel dark brown; peritoneal membranes black. Rays of first and second dorsal fins dusky, pectoral and anal usually darker, pelvic fins blackish.

**SIZE.** — To at least 31 cm TL.

**DISTRIBUTION.** — So far known from the Hawaiian Islands and the New Caledonian region, but probably more widespread. Capture depths off New Caledonian region 760-980 m.

**REMARKS AND COMPARISONS.** — Our New Caledonian specimens agree closely with Hawaiian specimens of *Trachonurus sentipellis* we examined. The species is distinctive among the genus in having a prominent lateral line coupled with large scales that are covered with short stout spinules, a relatively pale overall color, only small patches of scales or virtually none on gular and branchiostegal membranes, and small jaw teeth. It is very similar in almost all features to what appear to be two undescribed Australian species, both of which have somewhat larger teeth, and one of which lacks a grooved lateral line. *Trachonurus gagates* Iwamoto & McMillan, 1997, and *T. villosus* (Günther, 1877) differ from the new species in having smaller scales, a darker overall color, and larger teeth; the first lacks a lateral line, but the second has a grooved lateral line.

One of the specimens here included (CAS 82177; 30.5 mm HL) lacks a grooved lateral line, but in all other features it appears to be the same as its two larger congeners from the same station. It seems improbable that it could represent another species, although we have noted what seems to be species pairs, where one "species" has a well-developed grooved lateral line while the other "species" completely lacks this feature, and all other characters of the two agree. *Trachonurus gagates* and *T. villosus* appear to represent one of these pairs. A second pair is found in Australian waters, both undescribed large-scaled, large-toothed, pale "species," one having, the other lacking a grooved lateral line.

Four specimens from New Caledonian waters were closely similar to *T. sentipellis*, but they had somewhat higher scale row counts over the lateral line (39-43), slightly lower gill raker counts (GR-I 9-11 inner, GR-II 9-10 inner), slightly longer snout lengths (28-32% HL), and somewhat wider internasal (22-24%) and suborbital (13-14%) widths. Their teeth also appeared to be slightly larger. These may represent a closely related species or the same as an undescribed species from Australia, mentioned above, that one of us (TI) is currently studying. Because we are uncertain about their status, we list them as uncertain variants and do not include them in our description.



Genus *VENTRIFOSSA* Gilbert & Hubbs, 1920

*Ventrifossa* Gilbert & Hubbs, 1920: 543 (type species *Coryphaenoides garmani* Jordan & Gilbert, 1904, by original designation).

DIAGNOSIS. — Branchiostegal rays 7; chin barbel well developed; spinous ray of first dorsal fin smooth or serrated; anus removed from anal fin, closer to pelvic insertions; light organ well developed, two small dermal windows, one immediately before anus, the second between bases of pelvic fins; head uniformly covered with small unmodified scales, with no sharp ridges, terminal snout scute single or absent; gular and branchiostegals rays naked; lower jaw teeth small, in 2-3 rows or in narrow band, premaxillary teeth in band, reaching beyond posterior edge of maxillary process, outer row usually slightly enlarged; pyloric caeca about 30-75.

REMARKS. — *Ventrifossa* is well represented in the collections with seven species, one of which is here described as new and two others probably new but left unnamed. Several of the species in this genus are so closely similar that they pose problems in distinguishing one from the other. *Ventrifossa nigrodorsalis* is one of those species — within the New Caledonian collections we have been able to sort out at least three separate groups based on minor differences in color, counts and measurements, and shape of various head parts. These differences are generally associated with their distributions, with one group from the Pacific Plate north of Fiji, another group from the Chesterfield and Bellona Plateau, and the third from the general offings of New Caledonia. Of particular distributional note is the record of *V. macropogon*; it is a species formerly known only from the subtropical to tropical western North Atlantic. The species from the area can be identified by use of the following key:

1. Dorsal spine smooth; total gill-rakers on inner side of first arch 16-20; preoral length 8-14% HL ..... *V. atherodon*
- Dorsal spine serrated; total gill-raker on inner side of first arch 13-18; preoral length 12-22% HL ..... 2
2. Body scales very small, about 65-70 along lateral line over distance equal to predorsal length; suborbital shelf extremely narrow anteriorly, broadening posteriorly; total gill rakers on outer side of second arch 10-13 ..... *V. johnboborum*
- Body scales moderate, fewer than 50 along lateral line over distance equal to predorsal length; suborbital shelf not especially narrow anteriorly; total gill rakers on outer side of second arch 12-16 ..... 3
3. Mouth mostly blackish; snout prominently pointed and protruding, preoral length 19-25% of HL; body shallow, greatest depth about 65-72% of HL; scale rows below 1D. 7-8, below 2D. about 5.5-6.0 ..... *V. vinolenta* sp. nov.
- Mouth entirely pale or with small blackish areas over oral valves; snout blunt to pointed, preoral length 12-22% of HL; body depth 71-101% HL; scale rows below 1D. 8.5-12, below 2D. 6.5-9.5 ..... 4
4. Median nasal ridge lacking a blackish streak; a faint to intense midlateral black blotch on first dorsal fin, with base and tip of fin pale to light dusky (Figs 32a-b) ..... *V. nigrodorsalis*
- Median nasal ridge with prominent blackish streak (Figs 35, 37c'); first dorsal fin blackish over proximal half or so, paler distally (and sometimes also base), or uniformly dusky to blackish (Figs 32c-d) ..... 5
5. Barbel thick, long, about equal to or slightly longer than orbit diameter, 31-37% HL ....
- ..... *V. macropogon*
- Barbel slender, about 2/3-3/4 orbit diameter, 15-30% HL ..... 6

6. Snout narrow, internasal width 15-20% HL; orbit diameter 31-36% HL; suborbital 10-13%; orbit to preopercle 37-42%; upper jaw 42-47% ..... **V. species indet.**  
 — Snout 28-31% HL; orbit 28-32%; suborbital 14-16%; orbit to preopercle 43-47%; upper jaw 48-51%. ..... **V. species (NSW)**

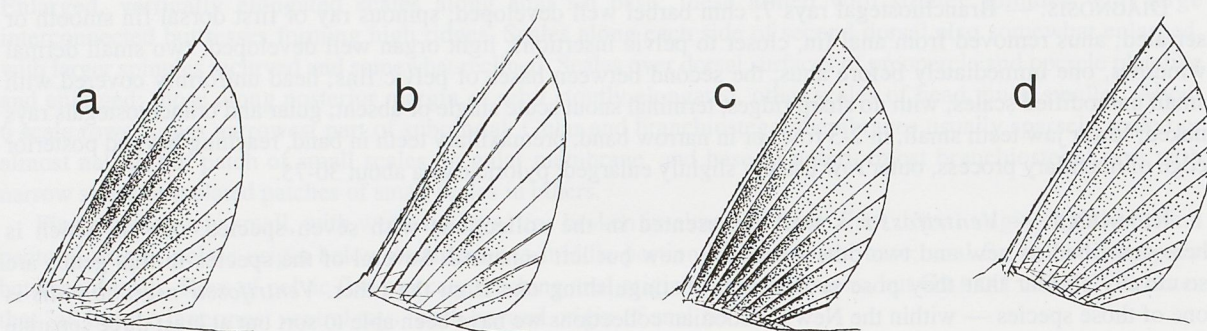


FIG. 32. — First dorsal fin of: **a**, *V. nigrodorsalis* Gilbert & Hubbs showing prominent black blotch; **b**, *V. nigrodorsalis*, uncertain variant, showing faint midlateral blackish streak; **c**, *V. macropogon* Marshall showing dark proximal region, fading distally; **d**, *V. sp.* (not named) showing overall dusky rays.

***Ventrifossa atherodon* (Gilbert & Cramer, 1897)**

Fig. 33 a

*Optonurus atherodon* Gilbert & Cramer, 1897: 431, pl. 46, fig. 1 (Kaiwi Channel, Hawaiian Islands, 686 m).

*Lionurus (Nezumia) atherodon* - GILBERT & HUBBS, 1916: 145.

*Ventrifossa (Atherodus) atherodon* - GILBERT & HUBBS, 1920: 544.

**MATERIAL EXAMINED.** — 27 specimens.

**New Caledonia.** BIOCAL: stn CP 32, 23°06.98'S, 166°51.20'E, 825 m, 29.08.1985: 1 specimen (MNHN 1994-993).

**Chesterfield and Bellona Plateau.** MUSORSTOM 5: stn CC 365, 19°42.82'S, 158°48.00'E, 710 m, 19.10.1986: 2 specimens 36.7-49.8 mm HL, 200+-267+ mm TL (MNHN 1994-995). — Stn CC 366, 19°45.40'S, 158°45.62'E, 650 m, 19.10.1986: 2 specimens 46.5-54.1 mm HL, 240-285 mm TL (CAS 86471). — Stn DC 376, 19°51.10'S, 158°29.80'E, 280 m, 20.10.1986: 2 specimens (MNHN 1994-990). — Stn CC 384, 19°42.40'S, 158°50.80'E, 772-756 m, 21.10.1986: 1 specimen 62.0 mm HL, 326+ mm TL (CAS 82178). — Stn CC 390, 21°00.90'S, 160°50.30'E, 745-825 m, 22.10.1986: 4 specimens 24.0-47.4 mm HL, 125+-245 mm TL (MNHN 1994-992), 1 specimen 68.5 mm HL, 366+ mm TL (MNHN 1994-991), 3 specimens (BMNH 1996.7.19:40-42).

**Norfolk Ridge and the Loyalties.** BERYX 2: stn 9, Seamount K, south of New Caledonia, 24°44.55'S, 170°07.00'E, 790-825 m, 26.10.1991: 1 specimen 34.5 mm HL, 162+ mm TL (NMNZ P.27532), 1 specimen 51.9 mm HL, 283+ mm TL (NMNZ P.33503).

**Loyalty Ridge.** MUSORSTOM 6: stn CP 438, 20°23.00'S, 166°20.10'E, 780 m, 18.02.1989: 3 specimens 31.0-68.5 mm HL, 155+-352+ mm TL (MNHN 1994-994).

**Wallis and Futuna Islands.** MUSORSTOM 7: stn DW 539, 12°27.3'S, 177°27.3'W, 700 m, 17.05.1992: 1 specimen 49.6 mm HL, 245+ mm TL (MNHN 1994-996). — Stn CP 551, 12°15.3'S, 177°28.1'W, 791-795 m, 18.05.1992: 1 specimen 71.0 mm HL, 365+ mm TL (MNHN 1994-997). — Stn CP 552, 12°15.7'S, 177°27.8'W, 786-800 m, 18.05.1992: 1 specimen 67.0 mm HL, 350+ mm TL (MNHN 1994-998). — Stn CP 553, 12°16.8'S, 177°28.1'W, 780-794 m, 18.05.1992: 2 specimens 58.7-67.7 mm HL, 310+-343+ mm TL (BMNH 1996.7.19:33-34). — Stn CP 627, 11°54.2'S, 179°31.4'W, 597-600 m, 29.05.1992: 1 specimen (MNHN 1994-999). — Stn CP 632, 11°54.0'S, 179°31.5'W, 600-595 m, 29.05.1992: 1 specimen (MNHN 1994-1000).

**DIAGNOSIS.** — No serrated spinous dorsal ray; first dorsal fin generally dusky but darker near base. Pelvic rays 9-11; total inner gill rakers on first arch 16-20. Barbel 13-23% of HL; preoral length 8-15%; pectoral fin length 51-68%. Black margins along leading edge of snout, along supranarial ridge, and over median nasal ridge prominent. No enlarged spinules on scales below second dorsal fin.

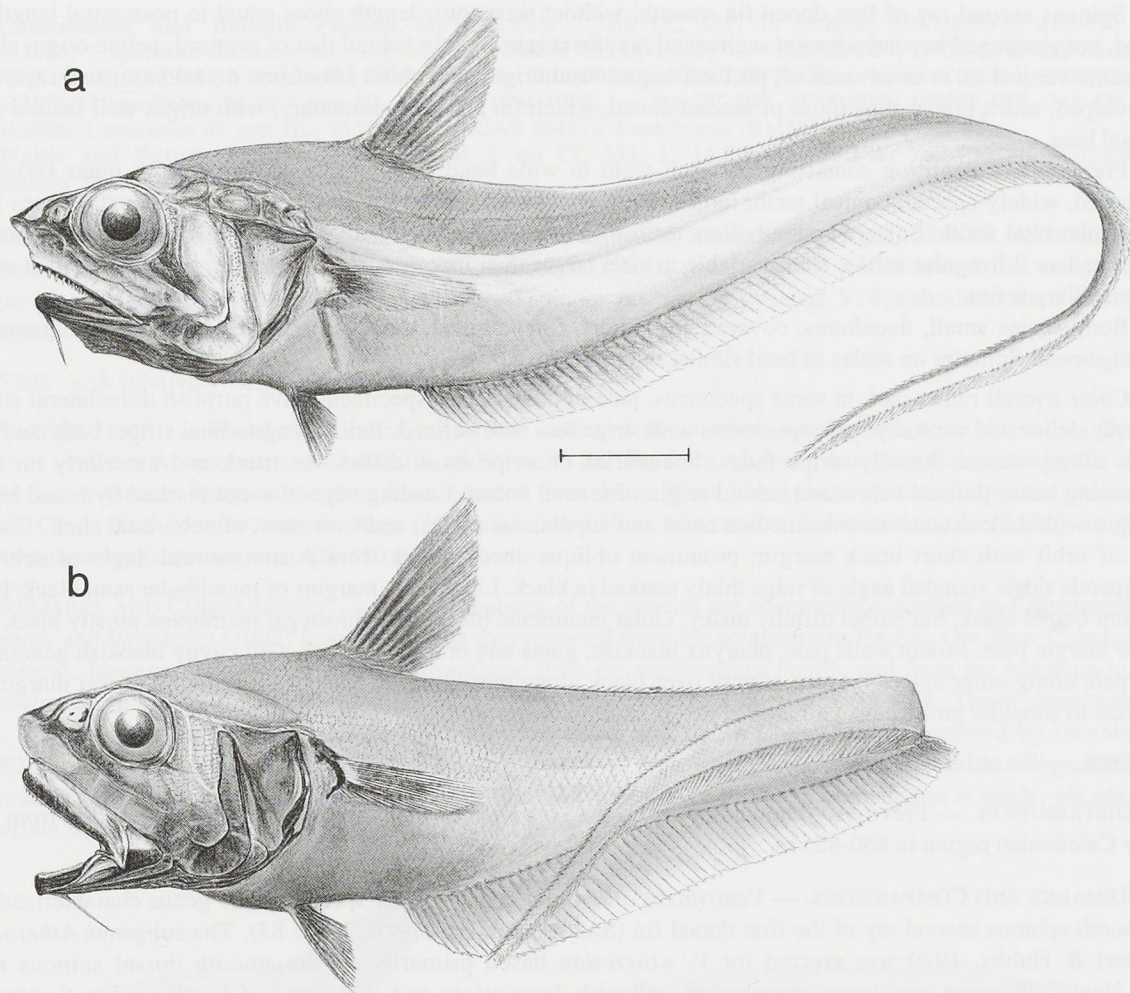


FIG. 33. — **a**, *Ventrifossa atherodon* (Gilbert & Cramer), 62 mm HL (CAS 82178), Chesterfield and Bellona Plateau, MUSORSTOM 5, stn CC 384, 772-756 m. — **b**, *Ventrifossa* sp. (not named), 56.4 mm HL (CAS 86476), New Caledonia, BIOCAL, stn CP 31, 850 m. Scale = 25 mm.

DESCRIPTION (of current specimens only). — *Counts*: 1D. II,9-11; P. i19-i23; total (outer/inner) GR-I 10-14 (usually 10-12)/16-20, GR-II 15-21 (usually 16-19)/16-19; scales 2D. 8.5-10.5 (n=5), lat.line 47-52 (n=5).

*Measurements*: Total lengths 125+-366+ mm; HL 24.0-68.5 mm. The following in percent of HL (smallest specimen, 24 mm HL, excluded); snout 25-29 (32); internasal 17-21; interorb. 21-26; orb. 29-35; suborb. 10-14; postorb. 43-48; orb.-preop. 40-46(49); up.jaw 47-50; gill slit 22-29; pre-A. 120-155; pre-anus 104-137; V.-A. 24-36; anus-A. 15-23; body depth 66-88; 1D.-2D. 46-71; ht. 1D. 56-66; len. V. 34-60 (n=6); post. nostril 3-6.

Snout low, minimally protruding beyond mouth, gently rounded in dorsal view in well-preserved specimens. Head moderately compressed, greatest width somewhat more than postorbital length of head; greatest body depth about equal to or greater than postrostral length. Dorsal profile rising in smooth gentle curve from snout tip to first dorsal fin, behind low base of first dorsal, profile levels off to end of tail. Ventral profile smoothly and gently rising from vent to end of tail. Mouth large, upper jaw extends to below posterior 1/4 of orbit. Chin barbel slender, relatively short for genus, somewhat more than half orbit diameter. Lower edge of suborbital shelf distinctly marked, but blends into rounded ventral surfaces of suborbital region; shelf gradually widens posteriorly to more than twice width at narrowest point. Posterior margin of preopercle inclined from vertical, but at a steep angle; ridge of preopercle sharply demarcated but blending smoothly in with head surface.

Spinous second ray of first dorsal fin smooth, without serrations; length about equal to postrostral length of head, not prolonged beyond adjacent segmented ray; fin origin slightly behind that of pectoral; pelvic origin about on same vertical as, or in advance of, pectoral origin. Anal origin under hind 1/4 of first dorsal base; anal rays well developed, much higher than those of second dorsal, which fin almost rudimentary, with origin well behind first dorsal base.

Premaxillary dentition consisting of small teeth in wide band 6 or more teeth wide, with outer series of enlarged, widely spaced, conical teeth; largest tooth about equal to length posterior nostril, almost 4 times into least suborbital width. Enlarged premaxillary teeth with low flanges, especially those laterally on jaw. Mandibular teeth in 1 or 2 irregular series; teeth variable in size, larger than inner premaxillary teeth, but smaller than outer premaxillary series.

Body scales small, deciduous, covered with short, fine, conical, recurved spinules in somewhat quincunx arrangement. Spinules on scales of head similar but more erect.

*Color* overall rather dark in some specimens, pale in others; dark specimens have purplish dorsolateral stripe sharply delineated ventrally; pale specimens with stripe less well defined. Below longitudinal stripe, body and tail with silvery sheen, dorsally stripe fades, boundaries of stripe more diffuse on trunk and anteriorly on tail, becoming better defined below and behind origin of second dorsal. Leading edge of snout marked by broad black margin with dark extensions over median nasal and supranarial ridges, and over most of suborbital shelf. Dorsal rim of orbit with short black margin; prominent oblique cheek streak from posteroventral angle of orbit to preopercle ridge; rounded angle of ridge thinly marked in black. Lips black, margins of mandibular rami black, base of chin barbel black, but barbel distally dusky. Gular membrane black; branchiostegal membrane mostly black but outer margin pale. Mouth walls pale, pharynx blackish, gums and oral valves dark. Gill cavity blackish generally, but pale along outer anterior walls, silvery over black along mesial walls. Membranes joining dorsal margin of opercle to shoulder girdle pale. Gill arches, rakers, and filaments pale.

SIZE. — To at least 37 cm TL.

DISTRIBUTION. — Previously known only from the Hawaiian Islands in 302-936 m, now recorded from the New Caledonian region in 650-825 m.

REMARKS AND COMPARISONS. — *Ventrifossa atherodon* is one of four species of the genus characterized by a smooth spinous second ray of the first dorsal fin (SAZONOV & IWAMOTO, 1992: 83). The subgenus *Atherodus* Gilbert & Hubbs, 1920 was erected for *V. atherodon* based primarily on the smooth dorsal spinous ray. The New Caledonian specimens agree rather well with descriptions and specimens of *V. atherodon*. SAZONOV & IWAMOTO (1992: 83), in their key to species of the complex, used gill-slit length as one of two characters for separating *V. atherodon* and *V. macrodon*, but measurements from our New Caledonian specimens overlap the two ranges so completely as to discount that as a usable character. A more-detailed study and comparisons are necessary to determine the validity of these taxa.

### *Ventrifossa johnborum* Iwamoto, 1982

Fig. 34

*Ventrifossa johnborum* Iwamoto, 1982: 55-61, fig. 1 (Bismarck Sea).

MATERIAL EXAMINED. — 21 specimens.

**New Caledonia.** BIOCAL: stn CP 31, 23°07.26'S, 166°50.45'E, 850 m, 29.08.1985: 1 specimen 88.5 mm HL (MNHN 1994-1001), 1 specimen 28.5 mm HL (MNHN 1994-1004). — Stn CP 32, 23°06.98'S, 166°51.20'E, 825 m, 29.08.1985: 1 specimen 47.9 mm HL, 245+ mm TL (CAS 86488). — Stn CP 75, 22°18.65'S, 167°23.30'E, 825 m, 4.09.1985: 1 specimen 68.0 mm HL (MNHN 1994-1002).

**Norfolk Ridge and the Loyalties.** BERYX 2: stn 7, Seamount K, south of New Caledonia, 24°41.70'S, 170°06.82'E, 815-820 m, 25.10.1991: 1 specimen 92.5 mm HL, 450+ mm TL (NMNZ P. 27469). — Stn 9, Seamount K, south of New Caledonia, 24°44.55'S, 170°07.00'E, 790-825 m, 26.10.1991: 2 specimens 82.5-87.8 mm HL, 378+-431+ mm TL (NMNZ P.27513), 1 specimen 85.0 mm HL, 325+ mm TL (NMNZ P.27514), 1 specimen 38.5 mm HL, 157+ mm TL (NMNZ P.27533), 2 specimens 26-30 mm HL, 145+-145+ mm TL (NMNZ P.27534).

**Chesterfield and Bellona Plateau.** MUSORSTOM 5: stn CC 337, 19°53.80'S, 158°38.00'E, 412-430 m, 15.10.1986: 1 specimen 28.3 mm HL, 146 mm TL (BMNH 1996.7.19:35). — Stn CC 367, 19°36.80'S, 158°53.20'E, 855-830 m, 19.10.1986: 2 specimens 54.0-59.0 mm HL (BMNH 1996.7.19:36-37). — Stn CC 384, 772-756 m, 21.10.1986: 2 specimens 28-32.5 mm HL (MNHN 1994-1003). — Stn CC 390, 21°00.90'S, 160°50.30'E, 745-825 m, 22.10.1986: 1 specimen 42 mm HL, 155+ mm TL (CAS 86457), 3 specimens (BMNH 1996.7.19:43-45).

**Wallis and Futuna Islands.** MUSORSTORM 7: stn CC 553, 12°16.8'S, 177°28.1'W, 780-794 m, 18.05.1992: 1 specimen 35.0 mm HL (MNHN 1994-1005).

**DIAGNOSIS** (from 7 New Caledonian specimens). — Head broad, interorbital width 27-28% HL, less than orbit diameter (29-38% HL); upper jaw 35-39% HL; barbel 7-14% HL; scales small, 64-70 lateral line scales from origin over distance equal to predorsal length; dorsal spinous ray weakly serrated; V. 8; suborbital shelf narrowly constricted at anterior end; mouth blackish.

**SIZE.** — A relatively large species, attaining 47.5 cm TL.

**DISTRIBUTION.** — Widely distributed in tropical waters of the southern hemisphere, from the Indian Ocean coast of southern Africa, across to Australia, and into the Pacific, from Australia and New Caledonia in the west, to the Sala-y-Gomez Ridge in the east. Also recorded from the northern hemisphere off the Philippines and in the South China Sea. Depths outside New Caledonia 540-810 m (SAZONOV & IWAMOTO, 1992: 80); in New Caledonia and adjacent regions, 421-850 m.

**REMARKS AND COMPARISONS.** — General features of the species are adequately described and illustrated by SAZONOV and IWAMOTO (1992) from specimens they reported from the southeastern Pacific. Our New Caledonian specimens, however, showed differences from those from the southeastern Pacific and from the holotype in the following: V. 8 cf. 9-10, barbel 7-14% HL cf. 13-19%, upper jaw 35-39% HL cf. 39-45%. These characters, in fact, are similar to those in specimens from the Philippines and South China Sea, as reported by IWAMOTO (1982), and to *V. fusca* Okamura, 1982. The dark mouth of these specimens appear to be the only character separating them from *V. fusca*, which has a pale mouth. Until a more thorough comparison is made, we are left uncertain whether or not these specimens are distinct from *V. fusca*.

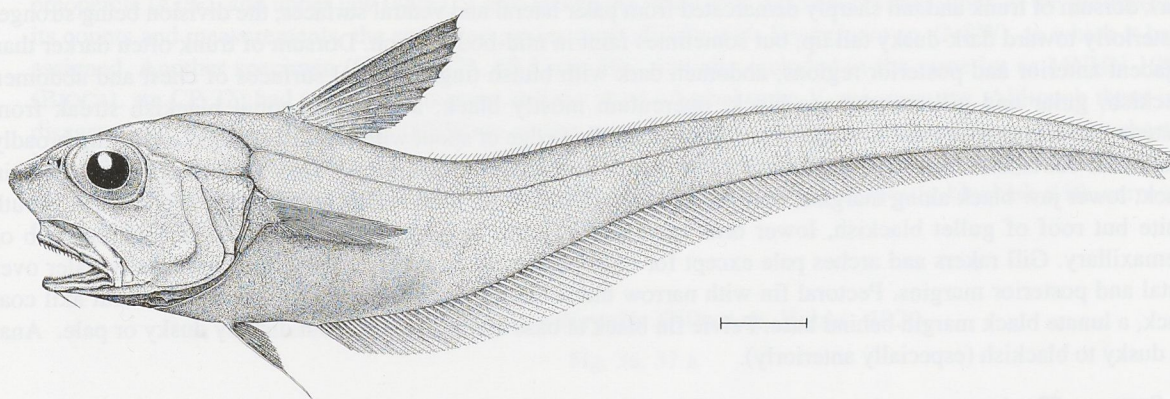


FIG. 34. — *Ventrifossa johnboborum* Iwamoto (From SAZONOV & IWAMOTO, 1992, fig. 30). Scale = 25 mm.

***Ventrifossa macropogon* Marshall, 1973**

Fig. 35

*Ventrifossa macropogon* Marshall, 1973: 658-660, fig. 5 (holotype, USNM 198187, nw. Caribbean, 576 m).

**MATERIAL EXAMINED.** — 8 specimens.

**New Caledonia.** BIOCAL: stn CP 32, 23°06.98'S, 166°51.20'E, 825 m, 29.08.1985: 1 specimen 46.8 mm HL, 265+ mm TL (MNHN 1997-667). — Stn DW 33, 23°09.71'S, 167°10.27'E, 675 m, 29.08.1985: 1 specimen 40.3 mm HL, 230 mm TL (CAS 86474).

**Loyalty Islands.** BIOGEOCAL: stn 232, 21°33.81'S, 166°27.07'E, 760-790 m, 12.04.1987: (?)1 specimen in poor condition questionably identified (BMNH 1996.7.19:49).

**Norfolk Ridge and the Loyalties.** BERYX 2: stn 7, Seamount K, south of New Caledonia, 24°41.70'S, 170°06.82'E, 815-820 m, 25.10.1991: 3 specimens 52.7-55.3 mm HL, 259+-310+ mm TL (NMNZ P27465). — Stn 9, Seamount K, south of New Caledonia, 24°44.55'S, 170°07.00'E, 790-825 m, 26.10.1991: 3 specimens 49.6-59.1 mm HL, 266+-320+ mm TL (NMNZ P27512).

**DIAGNOSIS.** — Pelvic rays 9-10 (usually 9); snout bluntly pointed, little protruding beyond mouth, preoral length 14-17% HL; suborbital 13-15%; distance orbit to preopercle 40-45%; upper jaw 44-47%; barbel thick, long, 31-37% of HL; leading margins of snout and nasal ridges (including median nasal ridge) prominently marked in black; first dorsal fin dusky to blackish, with rays proximally often dark. Scale rows below mid-1D. 8.5-10.

**DESCRIPTION.** — *Counts* (8 spec.): 1D. II, 10-11; P. i18-i22; total GR-I (outer/inner) 9-10 / 13-15, GR-II 13-15 / 13-15; scales below 1D. 10.5-11, below 2D. 8-10, lat.line scales abt. 42 (2 spec.).

Total lengths 230-320+ mm; HL 40.3-59.1 mm. The following in percent of HL: snout 30-32; internasal 21-23; interorb. 23-28; orb. 29-33; postorb. 42-46; gill-slit 24-28; pre-A. 130-149; V.-A. 29-40; body depth 83-95; 1D.-2D. 47-65; ht. 1D. 66-78; len. P. 53-65; len. V. 36-43; post. nostril 5-8.

Snout broadly rounded in dorsal view; width across lateral angles more than interorbital width, about equal to orbit diameter and snout length. Upper jaw extends to below posterior 1/4th of orbit; barbel long, relatively thick, about equal to or longer than orbit diameter.

Body scales densely covered with small, erect, conical spinules in more or less quincunx pattern; spinules black pigmented. Scales under margin of gill cover, beneath pectoral and pelvic fins, and a small patch behind first dorsal smooth.

Jaw teeth all small, in broad band 6-7 teeth wide in premaxilla with outer series slightly larger than inner band teeth; mandibular teeth small, conical in 2-4 rows (usually 3 irregular), none enlarged.

Leading edge of spinous second ray of first dorsal fin armed with small, closely spaced serrations, the ray not produced beyond adjacent segmented rays. Outer pelvic ray slightly prolonged, extending to 4th or 5th anal ray.

*Color:* Specimens variable in overall darkness, some with swarthy or dark areas more extensive than in others. Dark dorsum of trunk and tail sharply demarcated from paler lateral and ventral surfaces, the division being stronger posteriorly toward dark-dusky tail tip, but sometimes faint in mid-body region. Dorsum of trunk often darker than adjacent anterior and posterior regions; abdomen dark with bluish tinge. Ventral surfaces of chest and abdomen blackish; gular and gill membranes black; operculum mostly black; a broad diagonal blackish streak from posteroventral corner of orbit to angle of preopercle. Leading edge of snout with blackish margin extending broadly onto entire suborbital shelf, with dark streaks over median nasal and lateral nasal ridges. Lips sharply delineated in black; lower jaw black along margins, dark along ramus; barbel with base narrowly black but overall pale. Mouth white but roof of gullet blackish, lower oral valve black, gums grayish. A black spot on ascending limb of premaxillary. Gill rakers and arches pale except for light peppering on rakers. First dorsal fin usually paler over distal and posterior margins. Pectoral fin with narrow black basal margin, dark dusky overall; pectoral axil coal black, a lunate black margin behind base. Pelvic fin black at base and proximally, but distally dusky or pale. Anal fin dusky to blackish (especially anteriorly).

**SIZE.** — The largest specimen examined from New Caledonian waters was 32 cm TL, but in the western Atlantic, the species is known to exceed 45 cm (personal observations, TI).

**DISTRIBUTION.** — Originally recorded from temperate and tropical western North Atlantic, now recorded from New Caledonia and seamounts to the south. Depth range in New Caledonian region 675-833 m.

**REMARKS AND COMPARISONS.** — We compared our New Caledonian specimens with representatives from the western North Atlantic (including CAS 4547, 14549, 56871, 56920, 56931, 61138) and found no differences. The similarities were remarkable considering the vast geographical disjunction; we plan to cover this topic in a companion paper on distribution and ecology.

We are far from satisfied with our treatment of this species and three others that we are calling *V. nigrodorsalis*, *V. species* (NSW), and *Ventrifossa* sp. indet. We found substantial variation in our specimens of these species, and

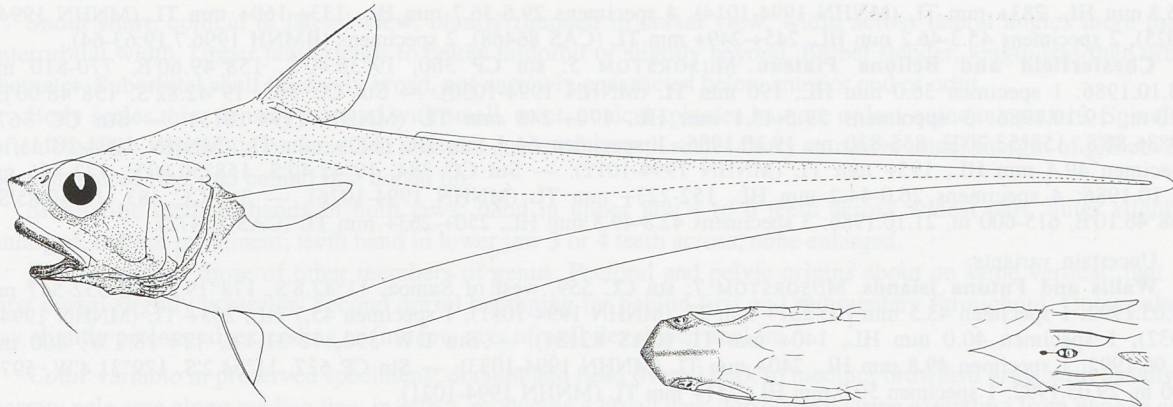


FIG. 35. — *Ventrifossa macropogon* Marshall (From IWAMOTO, 1990, fig. 680).

in our initial sort we included all specimens of the last species and some of the other two in the same group as our specimens of *V. macropogon*. Subsequently, however, after close analysis of our data, we were able to sort out what we considered to be distinct taxonomic entities, but there remain enough differences within our groupings that some specimens have had to be treated as uncertain variants. A more detailed study with many more specimens from throughout the area will be necessary before these perplexing problems can be adequately resolved.

Two *V. macropogon* specimens from BIOCAL stations CP 32 (MNHN 1997-667, 46.8 mm HL) and DW 33 (CAS 86474, 40.3 mm HL) had a blunter snout profile, and the fins and dorsal body parts were paler than the others. They also lacked the black spot on the ascending limbs of the premaxillary. A specimen from BIOCAL station CP 31 (CAS 86476, 56.4 mm HL), taken in the same general area as the two *V. macropogon*, appeared to be identical in its general features, but a closer look showed that it had a substantially shorter barbel (28% HL), higher gill-raker counts, and slightly greater dimensions of the interorbital (29% HL), suborbital (15%), orbit-preopercle (47%), and upper jaw (48%). It also lacked the black spot on the ascending limbs of the premaxillary. In its counts and measurements, the specimen agrees most closely with *Ventrifossa* sp. (NSW), to which it has been assigned. Another specimen (CAS 86473, 60.5 mm HL), initially included in the same lot as MNHN 1997-667 (BIOCAL stn CP 32) had too narrow a snout and too short a barbel to be *V. macropogon*. Although there is some disagreement with *Ventrifossa* sp. (NSW) in certain morphometric and meristic values (especially the short upper jaw, 44% HL, and orb.-preop. distance, 44%), we tentatively assign the specimen to that species because of its distinct median nasal snout streak and dark fins, the first dorsal of which is mostly blackish with narrow paler distal and proximal margins.

#### *Ventrifossa nigrodorsalis* Gilbert & Hubbs, 1920

Fig. 36, 37 a

*Ventrifossa nigrodorsalis* Gilbert & Hubbs, 1920: 546-549, fig. 36 (holotype, USNM 83627; Philippines off northern Mindanao in 391 m; numerous paratypes from Philippines and East Indies).

MATERIAL EXAMINED. — 38 specimens.

**New Caledonia.** MUSORSTORM 4: stn CP 169, 18°54.03'S, 163°11.20'E, 600 m, 17.09.1985: 2 specimens 41.2-44.2 mm HL, 223-232 mm TL (MNHN 1994-1029). — Stn CP 200, 18°53.80'S, 163°14.10'E, 545 m, 20.09.1985: 2 specimens 31.7-39.0 mm HL, 190+-230 mm TL (MNHN 1994-1028). — Stn CC 202, 18°58.00'S, 163°10.50'E, 580 m, 20.09.1985: 8 specimens 33.8-43.2 mm HL, 152+-244 mm TL (MNHN 1994-1027), 2 specimens 34.0-44.9 mm HL, 193+-260+ mm TL (CAS 82180).

**Norfolk Ridge and the Loyalties.** BERYX 2: stn 3, Seamount B, south of New Caledonia, 24°55.50'S, 168°21.25'E, 600-675 m, 24.10.1991: 2 specimens 41.3-43.6 mm HL, 250+-190+ mm TL (NMNZ P.27422).

**Loyalty Island.** MUSORSTOM 6: stn CP 427, 20°23.35'S, 166°20.00'E, 800 m, 17.02.1989: 1 specimen 59.6 mm HL, 275+ mm TL (MNHN 1994-1013). — Stn CP 438, 20°23.00'S, 166°20.10'E, 780 m, 18.02.1989: 1 specimen

56.3 mm HL, 283+ mm TL (MNHN 1994-1014), 4 specimens 29.6-36.7 mm HL, 133+-160+ mm TL (MNHN 1994-1025), 2 specimens 45.3-46.2 mm HL, 245+-249+ mm TL (CAS 86468), 2 specimens (BMNH 1996.7.19:63-64).

**Chesterfield and Bellona Plateau.** MUSORSTOM 5: stn CP 360, 19°36.40'S, 158°49.60'E, 770-810 m, 18.10.1986: 1 specimen 36.0 mm HL, 190 mm TL (MNHN 1994-1030). — Stn CC 365, 19°42.82'S, 158°48.00'E, 710 m, 19.10.1986: 3 specimens 39.5-45.1 mm HL, 170+-248 mm TL (MNHN 1994-1015). — Stn CC 367, 19°36.80'S, 158°53.20'E, 855-830 m, 19.10.1986: 1 specimen 64.4 mm HL, 320+ mm TL (MNHN 1994-1011), 1 specimen 49.4 mm HL, 195+ mm TL (MNHN 1994-1012). — Stn CC 384, 19°42.40'S, 158°50.80'E, 772-756 m, 21.10.1986: 4 specimens 26.0-44.2 mm HL, 152-223+ mm TL (MNHN 1994-1026). — Stn CC 383, 19°40.85'S, 158°46.10'E, 615-600 m, 21.10.1986: 3 specimens 42.8-49.3 mm HL, 250+-263+ mm TL (CAS 86472).

Uncertain variants:

**Wallis and Futuna Islands.** MUSORSTOM 7: stn CC 559, west of Samoa, 11°47.8'S, 178°19.11'W, 552-547 m, 19.05.1992: 1 specimen 43.5 mm HL 251+ mm TL (MNHN 1994-1031), 1 specimen 45.7 HL, 203+ TL (MNHN 1994-1032), 1 specimen 40.0 mm HL, 140+ mm TL (CAS 82181). — Stn DW 590, 12°31.4'S, 174°18.7'W, 400 m, 23.05.1992: 1 specimen 49.8 mm HL, 240+ mm TL (MNHN 1994-1033). — Stn CP 627, 11°54.2'S, 179°31.4'W, 597-600 m, 29.05.1992: 1 specimen 50.0 mm HL, 251+ mm TL (MNHN 1994-1021).

**DIAGNOSIS** (from current specimens only, but not including uncertain variants). — Pelvic rays 8-9 (usually 8); snout conically acute, protruding slightly beyond mouth, preoral length 16-21% HL; suborbital 12-14%; distance orbit to preopercle 38-42%; upper jaw 38-45%; barbel slender, 21-28% of HL; leading margins of snout and nasal ridges, but not median nasal ridge, marked with black; first dorsal fin with distinct black blotch or blackish streak. Scale rows below mid-1D. 5.5-7.5.

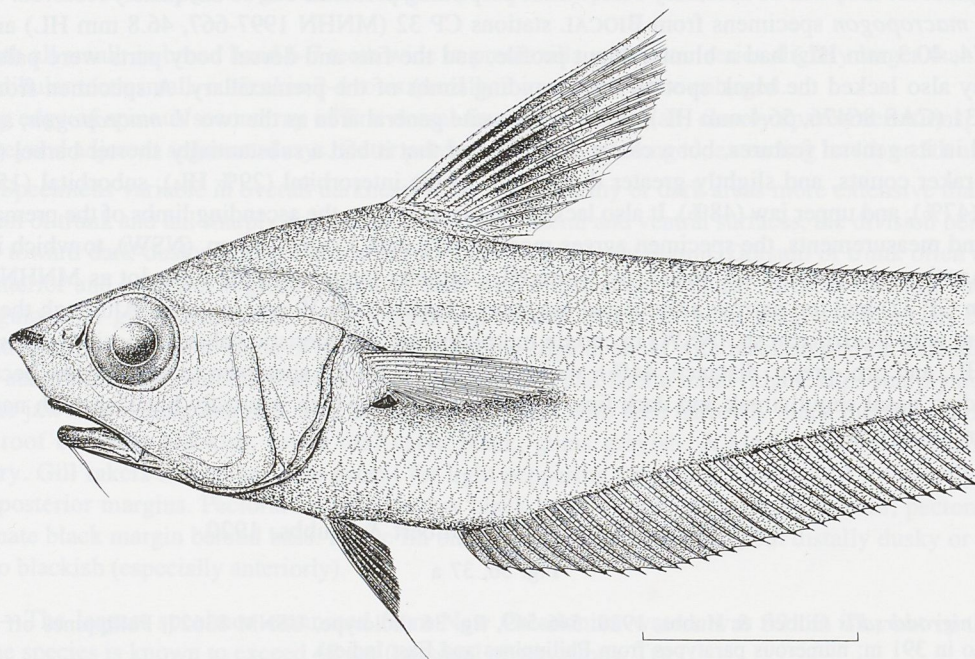


FIG. 36. — *Ventrifossa nigrodorsalis* Gilbert & Hubbs (From IWAMOTO, 1990, fig. 690). Scale = 25 mm.

**DESCRIPTION** (from current specimens only). — *Counts* (25 spec.): 1D. II,9-11; P. i17-i22; total GR-I (outer/inner) 8-12 / 12-15 (16), GR-II 12-15 (16) / 12-15 (16); scales below 1D. 9-12, below 2D. 6.5-8.5, lat.line 36-44.

**Measurements:** Total lengths 133-320+ mm; HL 29.6-64.3 mm. The following in percent of HL: snout 30-34; internasal 20-25; interorb. 24-29; orb. 30-37; postorb. 40-43; gill-slit 21-27; pre-A. 122-162; V.-A. 23-37; body depth 75-86; 1D.-2D. 47-69; ht. 1D. 61-90; len. P. 49-64; len. V. 33-42; nostril 4-7.



Snout short, conical in lateral view, bluntly rounded in dorsal view; width across lateral angles more than interorbital width. Upper jaw extends to below midorbit or slightly beyond. Barbel slender, length less than orbit diameter. Suborbital shelf relatively broad, not narrowly constricted below anterior end of orbit.

Body scales thin, densely covered with small, erect, conical spinules in more or less quincunx pattern. Spinules often blackish, especially on head and dorsum. Areas of smooth scales fairly extensive under margin of gill cover, beneath paired fins, and behind first dorsal fin.

Small fine teeth in bands in both jaws; band in upper jaw 4 to 6 teeth across widest part, outer slightly enlarged, but not prominent; teeth band in lower jaw 3 or 4 teeth across, none enlarged.

Fins about like those of other members of genus. Pectoral and pelvic origins about on same vertical; that of first dorsal slightly posterior. Second dorsal beginning far behind first and rudimentary throughout. Outer pelvic ray slightly prolonged, extending to first few rays of well-developed anal fin.

*Color* variable in preserved specimens; dorsum and head overall dark to medium brownish gray, with usually a narrow pale area along median line, in effect, producing a broad dark dorsolateral stripe extending from nape to end of tail; pale area often broken up by narrow vertical bands. Ventral aspects of tail variably pale to silvery; abdomen dark bluish laterally to blackish ventrally, but silvery in specimens still retaining silvery pigmentation. Leading edge of snout with broad black margin that joins intensely black suborbital shelf; supranarial ridges with some blackish margins, but only a trace over midorbit; a faint trace of median nasal streak in a few specimens, but dorsal snout surfaces between supranarial ridges usually translucent and without pigmentation. Lips black; mouth white, although upper oral valves often lightly peppered. Gums of upper and lower jaw dusky. Gill filaments and arches usually pale, but arches lightly to heavily peppered. Chin barbel dark at base, but free portion pale. Black blotch on first dorsal usually intense and small, limited to spinous ray and first 4 to 6 segmented rays, but in some specimens blotch extends across all rays as a broad horizontal streak, and in others (e.g., from Chesterfield and Bellona Plateau, MNHN 1994-1026, 1994-1011 and Loyalty Ridge, MNHN 1994-1014), blotch extensive and extends to just above base of fin. Pectoral fins black at base and proximally, but often much paler distally. Pelvic fins black at base and outer 2 or 3 rays, but pale distally over inner rays. Anal fin clear to light dusky, usually darker near anterior end.

**SIZE.** — To about 32 cm TL.

**DISTRIBUTION.** — Originally recorded from Philippines and East Indies, but subsequently found in Japan and Taiwan, and now in New Caledonian region. Depth range in region 545-855 m.

**REMARKS AND COMPARISONS.** — Our specimens of this species agreed reasonably well with type specimens from the Philippines, although specimens were often highly different in their condition of preservation. We found some variation in our study collections, however, which led us to much confusion. Specimens of *V. nigrodorsalis* were compared from the immediate vicinity of New Caledonia and seamounts to the south, the Wallis and Futuna Islands, the Chesterfield and Bellona Plateau, and the Loyalty Ridge. Those from the Chesterfield and Bellona Plateau and the Wallis and Futuna Islands were notably paler than those from the other two areas. This difference may have been a result of preservation; specimens from the Chesterfield and Bellona Plateau had more scales intact and they retained substantial areas of silvery pigmentation on their head and body. The Loyalty Ridge specimens had much more extensive areas of black on the first dorsal fin, with only the base and distal tips pale or dusky. Furthermore, near the terminal end of the tail, the dark dorsal area appeared to completely dominate the flanks. Other than those minor color differences, most specimens from one place or another were largely indistinguishable. One exception, however, was the specimens from the Wallis and Futuna Islands (Fig. 37a). They were generally very pale with faintly marked head and body regions, and for the most part lacked a prominent black blotch on the first dorsal fin. They also had a slightly broader interorbital space, a longer, more-protruding snout, and were somewhat shallower bodied. We had considered treating these specimens as a distinct species, but decided against doing so because of the apparent wide variability in characters inherent in a species with a broad distribution.

The absence of a dark median nasal streak and the distinctly black-blotched first dorsal fin distinguish *V. nigrodorsalis* from *V. macropogon* and *Ventrifossa* sp. (NSW). The longer barbel of *V. macropogon* and the longer jaws and outer gill slit and greater dimensions of the postorbital and orbit-to-preopercle distances of

*Ventrifossa* sp. (NSW) further separate these species. Other species of the genus are little likely to be misidentified with *V. nigrodorsalis* and can be readily distinguished from it by the key provided.

*Ventrifossa vinolenta* sp. nov.

Fig. 37 b, b'

MATERIAL EXAMINED. — 10 specimens.

**Chesterfield and Bellona Plateau.** MUSORSTOM 5: stn CC 390, 21°00.90'S, 160°50.30'E, 745-825 m, 22.10.1985: holotype 47.4 mm HL, 225+ mm TL (MNHN 1994-1006). — Stn CC 384, 19°42.40'S, 158°50.80'E, 772-756 m, 21.10.1986: 2 paratypes 33.7-38.8 mm HL, 160+-177+ mm TL (MNHN 1994-1008). — Stn CC 390, same data as for holotype: 3 paratypes 35.1-46.1 mm HL, 155+-213+ mm TL (MNHN 1994-1007), 3 paratypes 35.1-48.7 mm HL, 158+-193+ mm TL (CAS 86475), 1 paratype 25.5 mm HL, 214+ mm TL (BMNH 1996.7.19:39).

DIAGNOSIS. — Pelvic rays 8 (rarely 9); snout relatively long and pointed, 27-32% HL; preoral 19-25% HL, orbit diameter 32-36%, length upper jaw 37-38%; inner gill rakers first arch 12-14; dorsolateral dark streak extending from parietal region to end of tail, dorsum above dark streak distinctly pale; leading edge of snout with black margin, extending posteriorly over supranarial ridges and dorsal rim of orbits, no median snout streak; base of first dorsal pale, but rays proximally black, distally fading to pale; lips blackish, ascending process of premaxillary black; mouth mostly black but with pale areas; small species, probably less than 30 cm TL.

DESCRIPTION. — *Counts*: 1D. II,8-9; P. i17-i21; V. 8 (9 in one fin); total GR-I (outer) 9-12, GR-II (outer/inner) 11-14/12-15; scales 1D. 7-8, mid-1D. 4.5-6.6, 2D. 5.5-6.0.

*Measurements*: Total lengths of specimens 155+-225+ mm; HL 25.5-47.4 mm. The following in percent of HL: internasal 17-22; interorb. 22-26; suborb. 9-13; postorb. 37-41; orb.-preop. 35-41; barbel 17-21; gill slit 19-23; pre-A. 125-150; pre-anus 106-139; V.-A. 25-36; anus-A. 17-22; body depth 65-72; 1D.-2D. 42-72; ht. 1D. 57-59; len. P. 46-49; len. V. 28-30; nostril 4-7.

Head relatively broad, greatest width about equal to distance snout tip to midorbit. Trunk relatively shallow, greatest depth almost equal to postrostral length of head in larger specimens, less in smaller specimens. Dorsal profile smoothly and gently rising from snout tip to over nape, a steeper rise just before first dorsal, base of first dorsal low, profile gently descends to posterior end of base, then levels off and straightens to end of tail. Ventral profile rises moderately from vent to behind abdomen, thereafter rising gradually to tail tip. Snout conical in lateral profile, protruding beyond mouth a distance more than eye-lens diameter; viewed dorsally, snout forming an obtuse triangle, angle at apex approximately 100-110 degrees. Mouth wide, jaws long, length upper jaw about equal to greatest orbit diameter, maxillary extending to below posterior 1/3 of orbit. Orbit oval, ventral margin forming broader arch than dorsal margin, greatest diameter oblique. Interorbital space broad, about 1.5 into orbit diameter, almost flat, but probably slightly convex in life. Preopercle large, with shallow lobe formed at posteroventral angle; vertical and horizontal arms of ridge strongly demarcated. Chin barbel fairly stout proximally, tapering to fine tip; length about equal to or more than lens diameter.

First dorsal fin moderately developed, length spinous second ray less than postrostral length, origin slightly behind vertical through pectoral and pelvic origins, the latter slightly forward of former. Anal origin about under hind margin of first dorsal or somewhat posterior. Weakly developed second dorsal with origin far behind first dorsal base, slightly farther than tip of depressed longest first dorsal ray. Pectoral fin extends posteriorly well beyond point over origin of anal fin. Pelvic fins small, outer ray scarcely if at all prolonged, falling short of anal origin.

Premaxillary dentition consisting of a narrow to somewhat broad band of tiny, villiform teeth and an outer series of slightly larger teeth. Mandibular teeth all small, in a narrow band 2 or 3 teeth wide.

Scales weakly to moderately adherent, those on head surfaces generally covered with very short, erect, conical spinules. Tip of snout with a single, rather large, stout, scutelike scale, which, however, not distinctly set off from adjacent scales. Body scales covered with slender, conical, moderately reclined, only slightly recurved spinules in quincunx arrangement.

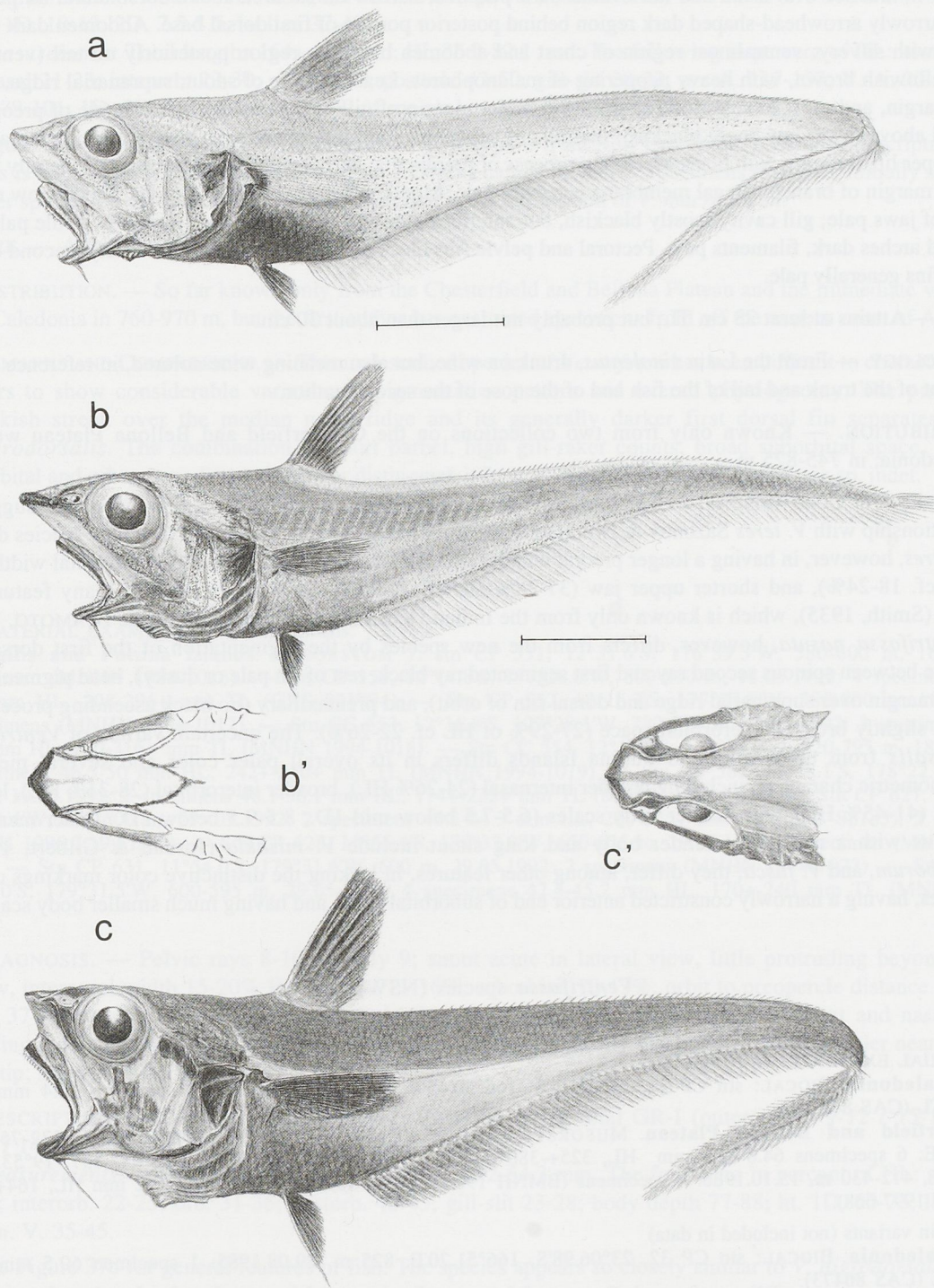


FIG. 37. — **a**, *Ventrifossa nigrodorsalis*, uncertain variant 40.0 mm HL (CAS 82181), Wallis and Futuna Islands, MUSORSTOM 7, stn CP 559, 552-547 m. — **b**, *Ventrifossa vinolenta* sp. nov., 48.7 mm HL, paratype (CAS 86475), Chesterfield and Bellona Plateau, MUSORSTOM 5, stn CC 390, 745-825 m; and **b'** dorsal view of head. — **c**, *Ventrifossa* sp. indet., 51 mm HL (CAS 82179), off Wallis and Futuna Islands, MUSORSTOM 7, stn CP 550, 800-810 m; and **c'** dorsal view of head. Scales = 25 mm.

*Color* in alcohol with trunk and tail overall dark purplish; narrow dorsal area above dorsolateral stripe pale, except narrowly arrowhead-shaped dark region behind posterior portion of first dorsal base. Abdomen dark bluish overlain with silvery; ventralmost region of chest and abdomen blackish; region posteriorly on tail (ventral to stripe) yellowish brown, with heavy peppering of melanophores. Leading edge of snout, supranarial ridge, upper orbital margin, and most of suborbital shelf black; upper margin of gill cover broadly black; angle of preopercle ridge and above lower jaw angle blackish; margins of subopercle and interopercle narrowly black; lips blackish, darker upper lip, merging with black ascending process of premaxilla; barbel pale; gill membranes generally black, but outer margin of branchiostegal membrane narrowly pale. Mouth generally black, but gums, and narrow region at angle of jaws pale; gill cavity mostly blackish, but anterior outer wall and region over shoulder girdle pale; gill rakers and arches dark, filaments pale. Pectoral and pelvic fins blackish overall, blacker proximally; second dorsal and anal fins generally pale.

**SIZE.** — Attains at least 23 cm TL, but probably not larger than about 30 cm.

**ETYMOLOGY.** — From the Latin *vinolentus*, drunk on wine, but also meaning wine-colored, in reference to the overall tint of the trunk and tail of the fish and of the nose of the second author.

**DISTRIBUTION.** — Known only from two collections on the Chesterfield and Bellona Plateau west of New Caledonia, in 745-825 m.

**REMARKS AND COMPARISONS.** — The relatively slender body and protruding snout of *V. vinolenta* suggest a close relationship with *V. teres* Sazonov & Iwamoto, 1992 from the Sala-y-Gomez Ridge. The new species differs from *V. teres*, however, in having a longer preoral length (19-25% HL cf. 11-18%), broader interorbital width (22-26% HL cf. 18-24%), and shorter upper jaw (37-38% HL cf. 39-45%). It is also similar in many features to *V. nasuta* (Smith, 1935), which is known only from the Indian Ocean off southern African (see IWAMOTO, 1990: 306). *Ventrifossa nasuta*, however, differs from the new species by the pigmentation of the first dorsal fin (membrane between spinous second ray and first segmented ray black, rest of fin pale or dusky), head pigmentation (no black margin over supranarial ridge and dorsal rim of orbit), and premaxillary (no black ascending process); it also has a slightly broader interorbital space (27-29% of HL cf. 22-26%). The uncertain variant of *Ventrifossa nigrodorsalis* from the Wallis and Futuna Islands differs in its overall paler color and several meristic and morphometric characters, including broader internasal (24-26% HL), broader interorbital (28-31% HL), longer upper jaw (41-45% HL), and smaller body scales (6.5-7.5 below mid-1D., 8.5-9.5 below 2D.) Other members of the genus with a relatively slender body and long snout include *V. misakia* (Jordan & Gilbert, 1904), *V. johnboborum*, and *V. fusca*; they differ, among other features, in lacking the distinctive color markings of the new species, having a narrowly constricted anterior end of suborbital shelf, and having much smaller body scales.

#### *Ventrifossa* species (NSW)

Fig. 33 b

**MATERIAL EXAMINED.** — 10 specimens.

**New Caledonia.** BIOCAL: stn CP 31, 23°07.26'S, 166°50.45'E, 850 m, 29.08.1985: 1 specimen 56.4 mm HL, 305+ mm TL (CAS 86476).

**Chesterfield and Bellona Plateau.** MUSORSTOM 5: stn CP 384, 19°42.40'S, 158°50.80'W, 772-756 m, 21.10.1.00'E: 6 specimens 64.8-82.1 mm HL, 325+380 mm TL (MNHN 1994-1010). — Stn CC 337, 19°53.80'S, 158°38.00'E, 412-430 m, 15.10.1986: 4 specimens (BMNH 1996.7.19:38, 46-48), 1 specimen 33.2 mm HL, 164+ mm TL (MNHN 1997-668).

Uncertain variants (not included in data)

**New Caledonia.** BIOCAL: stn CP 32, 23°06.98'S, 166°51.20'E, 825 m, 29.08.1985: 1 specimen 60.5 mm HL, 307 mm TL (CAS 86473).

**DIAGNOSIS.** — Pelvic rays 9-10; snout bluntly pointed, little protruding beyond mouth, preoral length 12-16% of HL; suborbital 14-16%; distance orbit to preopercle 43-47; upper jaw 48-51%; barbel relatively short for genus, 15-28% of HL; black margins of snout and ridges prominent, median nasal ridge with black streak; first dorsal fin mostly blackish, but distal margin paler; scale rows below mid-1D. 5.5-7.5.

DESCRIPTION. — *Counts*: 1D. II,9-10; P. i20-i24; total GR-I (outer/inner) 10-12 / 15-17, GR-II 15-16 / 14-17; scales 1D. 10-12, 2D. 7.5-8.5, lat.line 37-43.

*Measurements*: Total lengths 164+-430 mm; HL 33.2-82.1 mm. The following in percent of HL: snout 28-37; internasal 21-23; interorb. 23-30; orb. 28-32; postorb. 43-50; gill-slit 28-33; pre-A. 117-157; V.-A. 30-38; body depth 78-101; 1D.-2D. 39-59; len. P. 55-62 (4 spec.); len. V. 33-44 (4 spec.); nostril 4-6.

Figure 33b provides a general view of one of the specimens from New Caledonia. A detailed description of the species is being withheld until specimens from Australia can be included. Specimens that were initially sorted out as other species are discussed in the Remarks section in the description of *V. macropogon*.

SIZE. — Attains at least 43 cm TL.

DISTRIBUTION. — So far known only from the Chesterfield and Bellona Plateau and the immediate vicinity of New Caledonia in 760-970 m, but the first author has examined specimens from off the eastern coast of Australia.

REMARKS AND COMPARISONS. — This undescribed species of *Ventrifossa* has been difficult to characterize as it appears to show considerable variation in pigmentation pattern and overall physiognomy. The presence of a blackish streak over the median nasal ridge and its generally darker first dorsal fin separates it from *V. nigrodorsalis*. The combination of short barbel, high gill-raker counts, broad suborbital space, and long postorbital and orb-preop. distances further distinguish it from *V. macropogon* and *Ventrifossa* sp. indet.

### *Ventrifossa* sp. indet.

Fig. 37 c \_

MATERIAL EXAMINED. — 29 specimens.

**Wallis and Futuna Islands.** MUSORSTOM 7: stn CP 531, 12°31.6'S, 176°39.3'W, 580-600 m, 16.05.1992: 1 specimen (MNHN 1994-1016). — Stn CP 550, 12°14.8'S, 177°28.0'W, 800-810 m, 18.05.1992: 4 specimens, 49.8-58.1 mm HL, 208-296+ mm TL (CAS 821794). — Stn CP 552, 12°15.7'S, 177°27.8'W, 786-800 m, 18.05.1992: 6 specimens (MNHN 1994-1017). — Stn CC 553, 12°16.8'S, 177°28.1'W, 780-794 m, 18.05.1992: 3 specimens 44.3-64.3 mm HL, 220-316+ mm TL (MNHN 1994-1018). — Stn CC 554, 12°13.8'S, 177°28.0'W, 820-795 m, 18.05.1992: 2 specimens 48.5-50 mm HL, 242+-250+ mm TL (MNHN 1994-1019). — Stn CP 562, 11°48.1'S, 178°22.1'W, 775-777 m, 19.05.1992: 2 specimens 48.1-56.1 mm HL, 174+-232+ mm TL (MNHN 1994-1020). — Stn CP 627, 11°53.4'S, 179°31.4'W, 597-600 m, 29.05.1992: 2 specimens 40.2-44.3 mm HL, 200-225+ mm TL (CAS 82183), 2 specimens (BMNH 1996.7.19:61-62). — Stn CP 628, 11°53.4'S, 179°32.0'W, 650-625 m, 29.05.1992: 1 specimen (MNHN 1994-1024). — Stn CP 631, 11°54.0'S, 179°31.6'W, 600 m, 29.05.1992: 2 specimens (MNHN 1994-1022). — Stn CP 632, 11°54.0'S, 179°31.5'W, 600-595 m, 29.05.1992: 4 specimens 42.4-45.2 mm HL, 170+-240 mm TL (MNHN 1994-1023).

DIAGNOSIS. — Pelvic rays 8-10, usually 9; snout acute in lateral view, little protruding beyond mouth, narrow, internasal width 15-20% HL; preoral 11-16%; suborbital 10-13%; orbit to preopercle distance relatively short, 37-42%; upper jaw 42-47%; barbel slender, 23-30% HL; leading margins of snout and nasal ridges, including median nasal ridge) prominently black; first dorsal fin mostly black, but somewhat paler near base and distal tip; scale rows below mid-1D. 5.5-7.0.

DESCRIPTION. — *Counts*: 1D. II,(9)10-11; P. (i18)i19-i23; total GR-I (outer/inner) 9-12 / 15-17, GR-II 14-16 / 14-16; scales 1D. 9-11, 2D. 7.5-8.5, lat.line 38-45.

*Measurements*: Total lengths 170-316+ mm; HL 40.2-64.3 mm. The following in percent of HL: snout (25) 27-30; interorb. 22-25; orb. 31-36; postorb. 40-45; gill-slit 23-28; body depth 77-88; ht. 1D. 60-73; len. P. 51-64; len. V. 35-45.

See Figure 37c for general features of fish. The species appears so closely similar to *V. nigrodorsalis* that the reader is referred to the description of that species for general features. Only pertinent differences or characters to be emphasized will be described.

Snout appearing somewhat shorter and lower, suborbital shelf narrower than in *V. nigrodorsalis*. Areas of smooth scales behind first dorsal rather extensive. Premaxillary teeth band 6 to 8 teeth across widest part; outer teeth slightly enlarged and spaced, length about 1/4 that of least suborbital width.

*Color:* Dark markings on head and body very pronounced. Intensely black leading dorsal edge of snout splitting on each side into dorsal and ventral branches, with former continuing posteriorly and mostly laterally over supranarial ridges, fading over orbital rims, and ventral branch continuing broadly over suborbital shelf. Preopercle with broad dark streak running from posteroventral corner of orbit almost to preopercle ridge. A second broad black streak extends posteriorly from behind orbit along dorsal edge of preopercle, passing posteriorly to end of opercle. Opercle and subopercle bones black or very dark. Lips and margins of mandible black, as most of gular and branchiostegal membranes. Ascending processes of premaxillaries with limited black areas at dorsal tips. Chin barbel black at base but pale over free portion. Dorsal 1/2 to 1/3 of trunk and tail dark blackish-violet, but dorsalmost aspects somewhat paler, and distinct dark broad stripe apparent; about 2.5 head lengths behind head, the dark stripe completely encompassing tail. Abdomen blackish to dark violet. First dorsal fin very dark, black over most surfaces in most specimens, but slightly paler near base and distally, giving somewhat black-blotched appearance in other specimens. Pectoral fins black on base and proximally on fin, but dark over remainder. Pelvic fin entirely black to somewhat paler distally. Mouth white except dusky over gums and mandibles and thin black line of oral valves; gullet dark dorsally and laterally. Gill cavity black over lateral walls, blackish to pale over mesial and ventral walls. Gill filaments, arches and rakers generally pale.

REMARKS AND COMPARISONS. — These dark specimens from the Wallis and Futuna Islands on the Pacific Plate north of Fiji (MUSORSTOM 7 specimens) appear to lie somewhere between *V. macropogon* and *V. nigrodorsalis* in general characters. When compared with the NMNZ specimens of *V. macropogon* from Loyalty Islands, they are much darker, with markings on the head pronounced compared with the almost uniformly and smoothly gray to brownish-gray of the NMNZ specimens of *V. macropogon*. Even though the head scales in the NMNZ specimens remain, obscuring the dark markings of the nasal ridges, these markings are still not very prominent. Dorsally on the gill covers dark markings are hardly noticeable in the NMNZ specimens, whereas they are intensely black in the Wallis and Futuna specimens. The dorsum is dark and sharply delineated in the MUSORSTOM 7 specimens, but faint (though present) in the NMNZ specimens of *V. macropogon*. In the Wallis and Futuna specimens, the median-dorsal line is paler than immediately ventrally, producing the effect of a broad, dark, dorsolateral stripe, but in NMNZ specimens of *V. macropogon*, there is no hint of such a stripe. The pale translucency of the top of the head in the Wallis and Futuna specimens is not present in the NMNZ specimens, perhaps because of the complete scale covering in the latter, which gives the surface a brownish-gray color. The tip of the tail in the Wallis and Futuna specimens is very dark, entirely so towards the end, and violet to blackish-violet, but in NMNZ specimens of *V. macropogon*, the tip is dark dusky at most, without a violet hue, and the ventral portion is paler over most of the tail.

Whether this population from the Pacific Plate can be considered a distinct species or simply a variant of the widespread *V. nigrodorsalis* or *V. macropogon* remains unresolved. We are uncertain if the characters will maintain their integrity over a broader geographic range, but it seems that there is a uniqueness about the grenadier fauna of the Pacific Plate region as compared with those from further south and west on the Indo-Australian Plate. To that end, it would be of great interest to compare the situation with other organisms.

#### ACKNOWLEDGMENTS

We are most grateful to Bernard SÉRET (MNHN) for making the collections available to us and for his help and hospitality during visits to Paris to examine the material. We thank the NATO International Scientific Exchange Programmes for awarding us a Collaborative Research Grant (no. 940670) that provided travel funds to visit the institutions at which the necessary collections were housed. We thank Guy DUHAMEL, Jean-Claude HUREAU, and Patrice PRUVOST (MNHN) for their help and hospitality during our visit. Clive D. ROBERTS (NMNZ), Yuri I. SAZONOV (ZMMGU) and Yuri N. SHCHERBACHEV (IOAN) provided specimens and valuable information. Dr. SAZONOV critically reviewed a draft pointing out numerous errors and omissions, which helped improve the manuscript. For specimen loans, data, and assistance (to TI) during visits to Australian collections, we thank P. J. LAST, A. GRAHAM, and A. R. WILLIAMS at CSIRO; D. F. HOESE, M. MCGROUTHER, J. R. PAXTON, and

other staff at AMS: J. JOHNSON and R. J. MCKAY at QM; and M. F. GOMON at MOV. W. N. ESCHMEYER (CAS) gave advice on nomenclatural matters, including the confusing situation with the names *Lucigadus vittatus* and *L. fasciatus*; David CATANIA, Jon FONG, and Mysi HOANG (CAS) provided technical assistance. Lastly, we take this opportunity to thank the crew of the F.R.V. "Tangaroa" and the scientific complement, all of whom made our participation on the HALIPRO 2 cruise in November 1996 so enjoyable and productive. Special thanks are accorded to François JARRIGE, Director of ORSTOM Centre de Nouméa, René GRANDPERRIN, cruise leader, and Bernard SÉRET for making our participation possible.

We thank the following for permission to use figures from copyrighted publications: Food and Agriculture Organization of the United Nations (figs 25, 35, 36) and California Academy of Sciences (figs 17, 23, 34).

## REFERENCES

- ALCOCK, A., 1894a. — Natural history notes from H.M. Indian Marine Survey Steamer 'Investigator', Commander C. E. Oldham. R.N., commanding. Series 2, No. 11. An account of a recent collection of bathyal fishes from the Bay of Bengal and from the Laccadive Sea. *Journal of the Asiatic Society of Bengal*, **63** (pt. 2)(2): 115-137, pls 6-7.
- ALCOCK, A., 1894b. — Illustrations of the zoology of the Royal Indian Marine Survey Ship Investigator. Fishes. Part II, pls VIII-XIII.
- ALCOCK, A., 1899. — A descriptive catalogue of Indian deep-sea fishes in the Indian Museum, collected by the Royal Indian Marine Survey Ship Investigator. Indian Museum, Calcutta. iii+211 pp., 8 pls, 1 map.
- BARNARD, K.H., 1925. — Descriptions of new species of marine fishes from S. Africa. *Annals and Magazine of Natural History*, ser. 9, **15** (87): 498-504.
- BERG, C., 1895. — Sustitución de nombres genéricos. II. *Comunicado Museo Nacional de Buenos Aires*, **1** (2): 41-43.
- BLEEKER, P., 1874. — Typi nonnulli generici piscium neglecti. *Verslagen en Mededeelingen der Koninklijke Akademie van Wetenschappen Amstredam*, ser. 2, **8**: 367-371.
- ESCHMEYER, W. N., 1990. — Catalog of the genera of Recent fishes. California Academy of Sciences, San Francisco. 697 pp.
- FOWLER, H. W., 1925. — New taxonomic names of West African marine fishes. *American Museum Novitates*, (162): 1-5.
- GIGLIOLI, E. H. & ISSEL, A., 1884. — Pelagos. Saggi sulla vita e sui prodotti del mare. Esplorazione talassografica del Mediterraneo. Pp. 198-270. Istituto de' Sordo-muti, Genova.
- GILBERT, C. H., 1905. — The deep-sea fishes of the Hawaiian Islands. Pp. 575-713, figs 230-276, pls 66-101, in D. S. JORDAN & B. W. EVERMANN (eds.), The aquatic resources of the Hawaiian Islands. *Bulletin of the United States Fish Commission*, **22** (1903) (pt. 2, sect. 2).
- GILBERT, C. H. & CRAMER, F., 1897. — Report on the fishes dredged in deep water near the Hawaiian Islands, with descriptions and figures of twenty-three new species. *Proceedings of the United States National Museum*, **19**: 403-435, pls 36-48.
- GILBERT, C. H. & HUBBS, C. L., 1916. — Report on the Japanese macrouroid fishes collected by the United States fisheries steamer "Albatross" in 1906, with a synopsis of the genera. *Proceedings of the United States National Museum*, **51**: 135-214, pls 8-11.
- GILBERT, C. H. & HUBBS, C. L., 1920. — The macrouroid fishes of the Philippine Islands and the East Indies. *Bulletin of the United States National Museum*, **100**, 1 (pt. 7): 369-588, figs 1-40.
- GIORNA, M. E., 1809. — Sur des poissons d'espèces nouvelles et de genres nouveaux. *Mémoires de l'Académie impériale des Sciences, Littérature et Beaux-Arts de Turin, pour les années 1805-1808. Sciences Physiques et Mathématiques*: 1-180, pls 1-2.
- GLOERFELT-TARP, T. & KAILOLA, P. J., 1984. — Trawled fishes of southern Indonesia and northwestern Australia. Austr. Develop. Assist. Bur., Dir. Gen. Fish. Indonesia, and German Agen. Tech. Coop., 406 pp.

- GOODE G. B. & BEAN, T. H., 1896. — Oceanic ichthyology, a treatise on the deep-sea and pelagic fishes of the world, based chiefly upon the collections made by the steamers Blake, Albatross, and Fish Hawk in the northwestern Atlantic, with an atlas containing 417 figures. *Special Bulletin of the United States National Museum*, (2). Text: i-xxxv + 1-26 + 1-553. Atlas: i-xxiii + 1-26, 123 pls.
- GRANDPERRIN, R., RICHER DE FORGES, B., SERET, B., VIRLY, S., FARMAN, R., JOMESSY, T., HAMEL, P., LABOUBE, P., LABROSSE, P., LORANCE, P., 1997. — Campagne HALIPRO 2 de chalutages exploratoires dans le sud de la zone économique de Nouvelle-Calédonie (R.V. Tangaroa, 4-28 novembre 1996). *Rapports du Programme ZoNéCo d'évaluation des ressources marines de la zone économique de Nouvelle-Calédonie*, in press.
- GREY, M., 1959. — Deep sea fishes from the Gulf of Mexico with description of a new species *Squalogadus intermedius* (Macrouroididae). *Fieldiana Zoology*, **39** (29): 323-346, figs 53-57.
- GUNNER, J. E., 1765. — Efterretning om Berglaxen, en rar Norsk fisk, som kunde kaldes: *Coryphaenoides rupestris*. *Det Trondhiemske Selskabs Skrifter*, **3**: 50-58, pl. 3.
- GÜNTHER, A., 1862. — Catalogue of the fishes in the British Museum. Catalogue of the Acanthopterygii Pharyngognathi and Acanthini in the collection of the British Museum, **4**: i-xxi + 1-534.
- GÜNTHER, A., 1877. — Preliminary notes on new fishes collected in Japan during the expedition of H.M.S. "Challenger". *Annals and Magazine of Natural History*, ser. 4, **20**: 433-447.
- GÜNTHER, A., 1878. — Preliminary notices of deep-sea fishes collected during the voyage of H.M.S. "Challender". *Annals and Magazine of Natural History*, ser. 5, **2**: 17-28.
- GÜNTHER, A., 1887. — Report on the deep-sea fishes collected by H.M.S. Challenger during the years 1873-76. *Report of the scientific Results of the Voyage of H.M.S. Challenger 1873-76*, **22** (Zool.), (pt. 1)[text]: 335; (pt. 2)[plates]: pls 1-73.
- HOWES, G. J. & CRIMMEN, O. A., 1990. — A review of the Bathygadidae (Teleostei: Gadiformes). *Bulletin of the British Museum (Natural History)* (Zool.), **56** (2): 155-203, figs 1-32.
- IWAMOTO, T., 1970. — The R/V Pillsbury Deep-Sea Biological Expedition to the Gulf of Guinea, 1964-65. 19. Macrourid fishes of the Gulf of Guinea. *Studies in Tropical Oceanography*, Miami, Florida, (4) (pt. 2): 316-431.
- IWAMOTO, T., 1979. — Eastern Pacific macrourine grenadiers with seven branchiostegal rays (Pisces: Macrouridae). *Proceedings of the California Academy of Sciences*, **42** (5): 135-179, figs 1-17.
- IWAMOTO, T., 1982. — *Ventrifossa johnboborum*, a new grenadier from the western Pacific (Macrouridae: Pisces). *Australian Zoologist*, **21** (pt. 1): 55-61, fig. 1.
- IWAMOTO, T., 1990. — Macrouridae. Pp. 90-317, figs 173-708, in D. M. COHEN, T. INADA, T. IWAMOTO, & N. SCIALABBA, *FAO Species Catalogue*, vol. 10. Gadiform fishes of the world. An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. FAO, Rome.
- IWAMOTO, T. & ANDERSON, M. E., 1994. — Review of the grenadiers (Teleostei: Gadiformes) of southern Africa, with descriptions of four new species. *Ichthyol. Ichthyological Bulletin of the J.L.B. Smith Institut of Ichthyology*, (61): 1-28.
- IWAMOTO, T. & SAZONOV, Y. I., 1988. — A review of the southeastern Pacific *Coryphaenoides* (sensu lato) (Pisces, Gadiformes, Macrouridae). *Proceedings of the California Academy of (Natural) Sciences*, San Francisco, **45** (3): 35-82, figs 1-29.
- IWAMOTO, T. & SAZONOV, Y. I., 1994. — Revision of the genus *Kumba* (Pisces, Gadiformes, Macrouridae), with description of three new species. *Proceedings of the California Academy of (Natural) Sciences*, San Francisco, **48** (11): 221-237, figs 1-9.
- IWAMOTO, T. & SHCHERBACHEV, Y. N., 1991. — Macrourid fishes of the subgenus *Chalinura*, genus *Coryphaenoides*, from the Indian Ocean. *Proceedings of the California Academy of (Natural) Sciences*, **47** (7): 207-233, figs 1-17, tabs 1-7.
- JORDAN, D. S. & STARKS, E. C., 1904. — List of fishes dredged by the steamer *Albatross* off the coast of Japan in the summer of 1900, with descriptions of new species and a review of the Japanese Macrouridae. *Bulletin of the United States Fish Commission*, **22** (1902): 577-630, 52 textfigs, pls 1-8.
- KAMOHARA, T., 1938. — On the offshore bottom-fishes of Prov. Tosa, Shikoku, Japan. Maruzen Co, Tokyo, 86 pp., 43 figs.



- LEHODEY, P., RICHER DE FORGES, B., NAUGES, C., GRANDPERRIN, R. & RIVATON, J., 1992. — Campagne BERYX 11 de pêche au chalut sur six monts sous-marins du Sud-Est de la Zone Économique de Nouvelle-Calédonie (N.O. "Alis", 13 au 23 octobre 1992). *Rapports de Missions, Sciences de la Mer. Biologie marine du Centre ORSTOM de Nouméa*, (22): 1-93.
- LEVITON, A. E. & GIBBS, R. H., Jr., 1988. — Standards in herpetology and ichthyology. Standard symbolic codes for institution resource collections in herpetology and ichthyology. Supplement No. 1: additions and corrections. *Copeia*, 1988 (1): 280-282.
- LEVITON, A. E., GIBBS, R. H., Jr., HEAL, E. & DAWSON, C. E., 1985. — Standards in herpetology and ichthyology: Part I. Standard symbolic codes for institutional resource collections in herpetology and ichthyology. *Copeia*, 1985 (3): 802-832.
- LOWE, R. T., 1843. — Notices of fishes newly observed or discovered in Madeira during the years 1840, 1841 and 1842. *Proceedings of the Zoological Society of London*, **11**: 91.
- MARSHALL, N. B., 1973. — Family Macrouridae. Pp. 496-665, figs 1-53, in COHEN, D. M. (ed.), *Fishes of the western North Atlantic. Memoirs of the Sears Foundation for Marine Research*, New Haven, (1) (pt.6).
- MARSHALL, N. B. & IWAMOTO, T., 1973. — Genus *Coryphaenoides*. Pp. 565-600, figs 18-23, in D. M. COHEN (ed.), *Fishes of the western North Atlantic. Memoirs of the Sears Foundation for Marine Research*, New Haven, **1** (pt. 6).
- MCCANN, C. & McKNIGHT, D. G., 1980. — The marine fauna of New Zealand: Macrourid fishes (Pisces: Gadida). *New Zealand Oceanographic Institute Memoirs*, **61**: 1-91, frontis., figs 1-69.
- MCMILLAN, P. J. & PAULIN, C. D., 1993. — Descriptions of nine new species of rattails of the genus *Caelorinchus* (Pisces, Macrouridae) from New Zealand. *Copeia*, 1993 (3): 819-840, figs 1-22.
- MENON, A. G. K. & YAZDANI, G. M., 1968. — Catalogue of type specimens in the Zoological Survey of India. Part 2. Fishes. *Record of the Zoological Survey of India*, Delhi, **61**: 91-190.
- OKAMURA, O., 1970. — *Fauna Japonica. Macrourina (Pisces)*. Academic Press, Tokyo. 216 pp., 64 pls.
- OKAMURA, O. & KITAJIMA, T., 1984. — Fishes of the Okinawa Trough and the adjacent waters. I. The intensive research of unexploited fishery resources on continental slopes. Japan Fisheries Resource Conservation Association, Tokyo. 414 pp.
- PARR, A. E., 1946. — The Macrouridae of the western North Atlantic and Central American seas. *Bulletin of the Bingham Oceanographic Collection, Yale University*, **10** (1): 1-99, figs 1-28.
- PAULIN, C., STEWART, A., ROBERTS, C. & MCMILLAN, P., 1989. — New Zealand fish, a complete guide. *Miscellaneous Series, National Museum of New Zealand*, Wellington, **19**, 279 pp.
- PAXTON, J. R., HOESE, D. F., ALLEN, G. R. & HANLEY, J. E., 1989. — Zoological catalogue of Australia. Vol. 7, Pisces, Petromyzontidae to Carangidae. Australian Government Publications Service, Canberra, 664 pp.
- RADCLIFFE, L., 1912. — Descriptions of a new family, two new genera, and twenty-nine new species of anacanthine fishes from the Philippine Islands and contiguous waters. *Proceedings of the United States National Museum*, **43**: 105-140, pls 22-31.
- REGAN, C. T., 1903. — On the systematic position and classification of the gadoid or anacanthine fishes. *Annals and Magazine of Natural History*, ser. 7, **11** (65): 459-466.
- RICHER DE FORGES, B., 1990. — Les campagnes d'exploration de la faune bathyale dans la zone économique de la Nouvelle-Calédonie. Explorations for bathyal fauna in the New Caledonian economic zone. In: A. CROSNIER (ed.), *Résultats des Campagnes MUSORSTOM*, Vol. 6. *Mémoires du Muséum national d'Histoire naturelle*, Paris, (A) **145**: 9-54.
- RICHER DE FORGES, B., 1993. — Campagnes d'exploration de la faune bathyale faites depuis mai 1989 dans la zone économique de la Nouvelle-Calédonie. Liste des stations. In: A. CROSNIER (ed.), *Résultats des Campagnes MUSORSTOM*, Vol. 10. *Mémoires du Muséum national d'Histoire naturelle*, Paris, **156**: 27-32.
- RICHER DE FORGES, B. & MENO, J.-L., 1993. — La campagne MUSORSTOM 7 dans la zone économique des îles Wallis et Futuna. Compte rendu et liste des stations. In: A. CROSNIER (ed.), *Résultats des Campagnes MUSORSTOM*, Vol. 10. *Mémoires du Muséum national d'Histoire naturelle*, Paris, **156**: 9-25.
- SAZONOV, Y. I., 1985. — Two new macrourid species (Gadiformes) from northern Pacific seamounts [In Russian]. *Voprosy Ikhtiologii*, Moskva, **25** (5): 719-727 [English version in *Journal of Ichthyology*, **25**: 13-21].

- SAZONOV, Y. I. & IWAMOTO, T., 1992. — Grenadiers (Pisces, Gadiformes) of the Nazca and Sala y Gomez ridges, southeastern Pacific. *Proceedings of the California Academy of (Natural) Sciences*, San Francisco, **48** (2): 27-95, 37 figs, 7 tabs.
- SAZONOV, Y. I. & SHCHERBACHEV, Y. N., 1982. — A preliminary review of grenadiers related to the genus *Cetonurus* Günther (Gadiformes, Macrouridae). Descriptions of new taxa related to the genera *Cetonurus* Günther and *Kumba* Marshall [In Russian, with English summary]. *Voprosy Ikhtiologii*, Moskva, **22** (5): 707-721, figs 1-4 [English version in *Journal of Ichthyology*, **22** (5): 1-15].
- SHCHERBACHEV, Y. I., 1987. — Preliminary list of thalassobathyal fishes of the tropical and subtropical waters of the Indian Ocean [In Russian]. *Voprosy Ikhtiologii*, Moskva, **27** (1): 3-11 [English version in *Journal of Ichthyology*, **27** (2): 37-46].
- TRUNOV, I. A., 1913. — *Haplomacrourus nudirostris* gen. et sp. n. (Osteichthyes, Macrouridae), a new genus and species of rat-tails from the South Atlantic. *Voprosy Ikhtiologii*, **20** (1): 3-11, figs 1-2.
- WEBER, M., 1913. — Die Fische der SIBOGA-Expedition. *Siboga Expedition*, (57): 1-719, pls 1-12.
- WEBER, M. & DE BEAUFORT, L. F., 1929. — The fishes of the Indo-Australian Archipelago, **5**. E.J. Brill, Leiden. 458 pp., fig. 1-98.

