

New records and new species of *Abyssochrysos* (Mollusca, Caenogastropoda)

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The family Abyssochrysidae, with the single genus *Abyssochrysos*, is revised, based on type material and new material from the bathyal and abyssal zones of the Atlantic and Indo-Pacific in tropical or subtropical latitudes. Of the five species recognized, two are described as new: *Abyssochrysos brasilianum* n. sp., from the continental slope off southeastern Brazil, and *A. bicinctum* n. sp., from Makassar Strait, Indonesia. *Abyssochrysos eburneum* (Locard, 1897) is recorded for the first time since its description and *A. melanioides* Tomlin, 1927 is recorded from the Philippines and Indonesia. All of the species in the family are illustrated.

KEYWORDS: Bathyal, abyssal, Atlantic ocean, Indo-Pacific region, *Abyssochrysos*, taxonomy.

Introduction

The Indo-Pacific species of *Abyssochrysos* were revised by Houbriek (1979), who pointed out the resemblance of the shells of Abyssochrysidae to those of the lower Mesozoic family Loxonematidae. Based on material collected during the period 1900–1960 Houbriek recognized two valid species of *Abyssochrysos* and suspected two further cerithioid shells from the North Atlantic to belong here. Of these, *Bittium eburneum* Locard, 1897 is discussed below, and *Cerithiopsis turbonilloides* Dautzenberg and Fischer, 1896 is concluded, from the radular morphology, to be a cerithiopsid (Bouchet and Warén, unpublished). The material reported in the present paper was accumulated over the past 10 years as a result of several deep-sea biological expeditions to tropical regions, both in the Atlantic and Indo-Pacific faunal provinces.

The fauna of the continental slope off southeastern Brazil was sampled in 1987 during a cruise MD55 of R.V. *Marion-Dufresne*, as a joint project of Muséum national d'Histoire naturelle, Paris and Universidade Santa Ursula, Rio de Janeiro. A species of *Abyssochrysos* was recognized among the molluscs sorted on board by José Leal, Bernard Métivier and the author. Considering the phylogenetic importance of the family Abyssochrysidae (Houbriek, 1979), specimens and gonads were preserved in formalin and glutaraldehyde for anatomical and spermiological investigation. The purpose of the present paper is essentially to provide a name for this undescribed species, the anatomy and relationships of which are discussed elsewhere (Healy, 1990; Ponder, in preparation).

In this paper I also report new material of *Abyssochrysos* from South east Asia, including a new species from Makassar Strait. All previously described species of the genus are figured for comparison. A key to the five known species of *Abyssochrysos* concludes the paper.

Abbreviations used in the text

BMNH: British Museum (Natural History), London; MNHN: Muséum national d'Histoire naturelle, Paris; MORG: Museu Oceanografico, Rio Grande; PPDPO: Pusat Penelitian Dan Pengembangan Oseanologi, Jakarta; SAM: South African Museum, Cape Town; sh(s): empty shell(s); spm(s): live collected specimen(s).

Taxonomic descriptions*Abyssochrysos brasilianum* n. sp.

(Figs 1–4, 9–11, 23)

Abyssochrysos cf. *eburneum*. Healy 1990: 510.

Type material. HOLOTYPE in MNHN; paratypes in MNHN, MORG, and Museu Nacional de Ciencias Naturais (Rio de Janeiro).

Type locality. Marion-Dufresne cruise MD55, sta. CB98, 21°35'S, 40°31'W, 900 m (northeast of Cabo de Sao Tomé, southeastern Brazil).

Material examined (all paratypes). Marion-Dufresne cruise MD55 sta. DC70, 18°59'S, 37°48'W, 1540–1550 m, 4 shs; sta. DC72, 19°00'S, 37°49'W, 950–1050 m, 1 spm; sta. DC73, 19°00'S, 37°48'W, 607–620 m, 1 sh; sta. CB77, 19°41'S, 37°48'W, 790–940 m, 2 spms, 11 shs; sta. CB78, 18°59'S, 37°48'W, 1200 m, 2 spms, 5 shs; sta. CB79, 19°02'S, 37°48'W, 1500–1575 m, 2 shs; sta. CB93, 19°36'S, 38°53'W, 640 m, 8 shs; sta. CB95, 19°38'S, 38°43'W, 960 m, 4 spms, 48 shs; sta. CB98, 21°35'S, 40°31'W, 900 m, 2 spms, 1 sh; sta. CB99, 21°36'S, 39°58'W, 1190–1205 m, 5 shs; sta. CB106, 23°54'S, 42°11'W, 830 m, 1 spm.

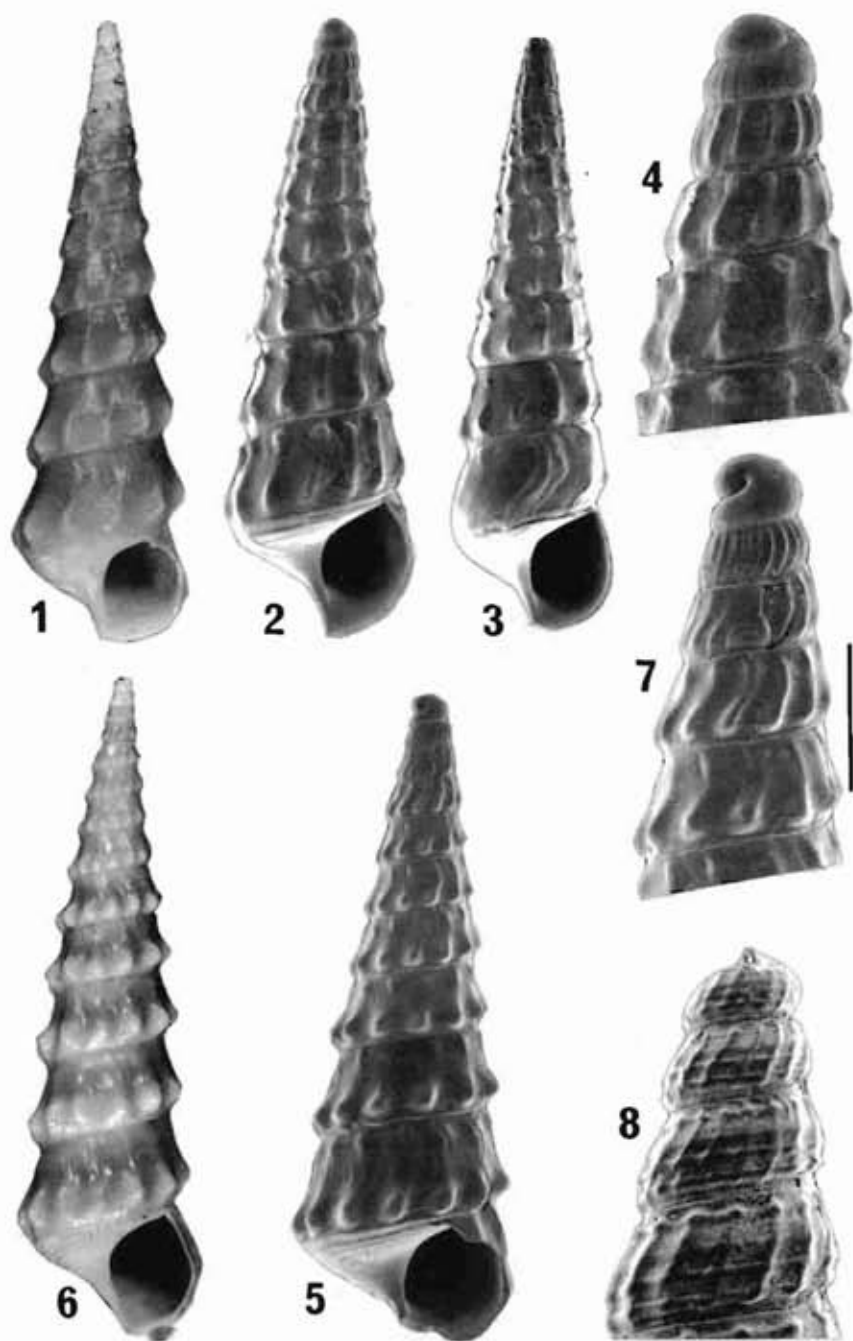
Distribution. Only known from off the states of Espírito Santo and Rio de Janeiro, southeastern Brazil, in 640–1575 m (Fig. 23).

Description

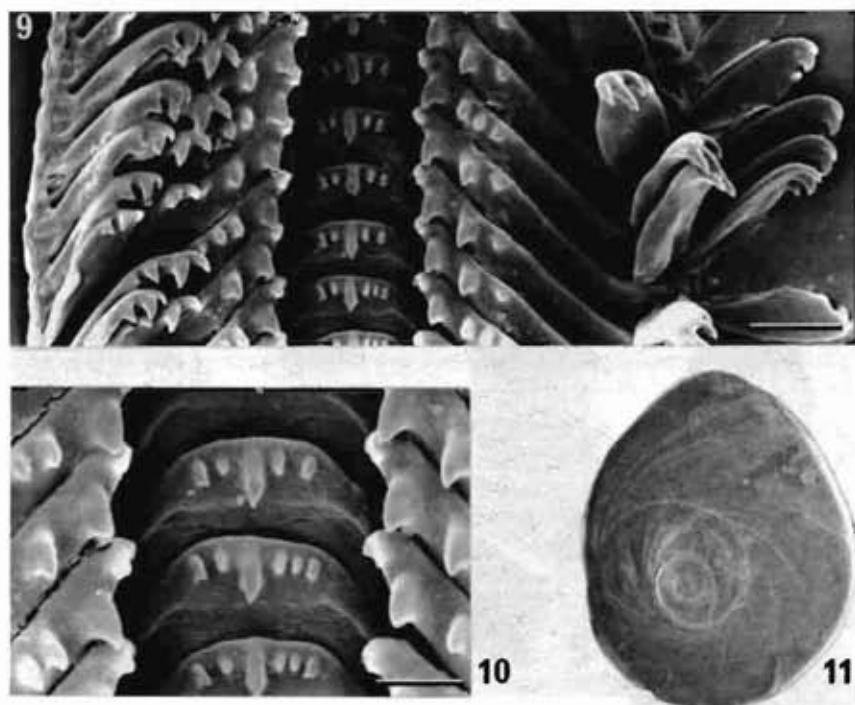
Shell (Figs 1–3) small, solid, slender consisting of 12.4 whorls. Protoconch (Fig. 4) bulbous, paucispiral, with one smooth whorl, diameter 650–750 µm. Protoconch/teleoconch transition indistinct. First teleoconch whorl convex, with 18–22 orthocone axial ribs. On the second whorl the ribs are fewer (12–14), and show a tendency to form a round tubercle near the suture. On whorls 3–8 the average number of ribs is 10 or 11 per whorl and they are distinctly opisthocline and straight, with incremental lines between them. On the lower whorls the ribs become gradually reduced to a subsutural spiny knob, and a stronger suprasutural bulging tubercle, while the middle part of the ribs become gradually lower and finally disappear. In some populations the subsutural knobs remain present in the largest shells (10 whorls, 14.5 mm); in other populations (including the holotype), the subsutural sculpture disappears after whorl 8, and only the suprasutural knobs remain. Body whorl with 10 or 11 knobs above periphery, and two strong spiral cords at periphery, on upper whorls usually concealed by the succeeding whorl, but one may be visible in certain specimens. No other spiral sculpture present on spire. Basal disc of holotype with very distinct spiral cords, which are less distinct on smaller shell. No umbilicus. Aperture small, rounded, without siphonal canal. Outer lip sharp, simple. No inner lip except for a shining smooth parietal callus.

Shell white with a shiny greyish-beige periostracum.

Radula (Figs 9 and 10) taenioglossate. Central tooth (Fig. 10) strongly arched, half-moon-shaped. Lateral tooth with 4 or 5 large strong cusps. Marginals typical of the genus, solid, about 4 times higher than broad, with 3 or 4 subterminal claw-like cusps.



FIGS 1-8. Genus *Abyssochrysos*. 1-4, *A. brasilianum*: 1, holotype, 22.2 mm; 2 and 4, paratype sta. CB78, 10.9 mm; 3, paratype sta. CB77, 16.2 mm. 5-7, *A. eburneum*: 5 and 7, syntype, 9.8 mm; 6, *Discovery*, sta. 10132-1, 38 mm. 8, *A. melanioides*, paratype. Scale line (figs 4, 7, 8): 1 mm.



FIGS 9–11. *Abyssochrysos brasilianum*: 9, radula, scale line 20 μ m; 10, central tooth of radula, scale line 10 μ m; 11, operculum, maximum diameter 1.85 mm.

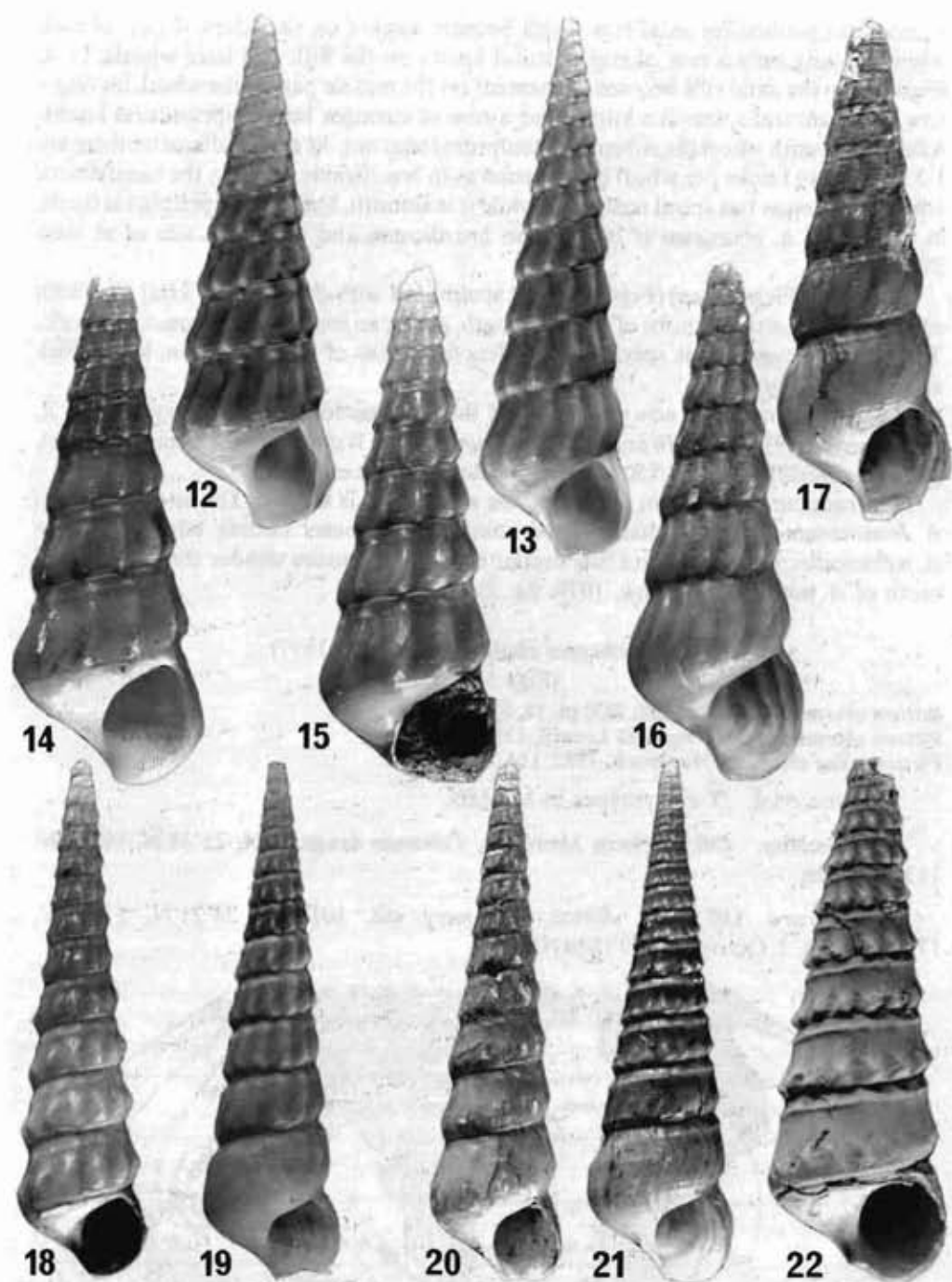
Operculum paucispiral (Fig. 11).

Dimensions of the holotype: length 22.2 mm, diameter 6.0 mm; diameter of the aperture 4.8 mm. The largest shell (destroyed for anatomical investigation) measured 23.6 mm (sta. CB98).

Discussion

I have examined the holotype (SAM A5116) and many additional specimens (SAM A5114, A5115, A5117, A33951) of *A. melanioides* Tomlin (Figs 12 and 13) from deep water off South Africa. It differs by reaching a much larger size. The largest shell (holotype) is 40.8 mm high, and there are fragments of specimens that must have been even larger, probably up to 45 mm. The shell is broader in *A. melanioides* at comparable size: $h/D = 3.35$ ($n = 10$) vs. 3.56 ($n = 10$) in *brasilianum*. The sculpture on the upper teleoconch whorls of *A. melanioides* consists of two abapical and one adapical spiral cord intersecting numerous slightly opisthocline axial ribs. In later whorls the spiral sculpture of the lower whorls tends to become obsolete with more spaced axial ribs which extend from suture to suture, although weaker in the upper part of the whorl. In half-grown and full-grown *A. brasilianum*, the axial ribs tend to be reduced to a bulky knob in the lower portion of the whorl, and there is no spiral sculpture except on the base of the body whorl. Finally, the general colour is different: the periostracum is richly yellowish brown in *A. melanioides*, and shining greyish beige in *A. brasilianum*.

Abyssochrysos eburneum (Locard, 1897) (Figs 5–7) has an overall general resemblance to *A. brasilianum*, including the shining greyish-beige periostracum, but the sculpture is different. On the earlier teleoconch whorls of *A. eburneum* there are



FIGS 12–22. Genus *Abyssochrysos*. 12–17, *A. melanioides*: 12, paratype, SAM 5115, 22.8 mm; 13, paratype, SAM 5114, 31.5 mm; 14–16, Musorstom 2 sta. 69, respectively 23 mm, 27 mm and 41.5 mm; 17, Estase 2 sta. CP4, 26 mm. 18–20, *A. melvilli*: 18, Musorstom 2 sta. 55, 25.7 mm; 19, Musorstom 1 sta. 49, 46.9 mm; 20, Corindon sta. 281, 57.0 mm. 21 and 22, *A. bicinctum*: 21, holotype, 56 mm; 22, paratype, Corindon sta. 231, 41.6 mm (coated with ammonium chloride to enhance sculpture).

numerous opisthocline axial ribs which become weaker on the adapical part of each whorl, leaving only a row of suprasutural knobs on the fifth and later whorls. In *A. brasilianum* the axial ribs become evanescent on the middle part of the whorl, leaving a row of subsutural spine-like knobs and a row of stronger blunt suprasutural knobs. After the seventh whorl the subsutural sculpture fades out. At similar diameter there are $1.3 \times$ as many knobs per whorl in *eburneum* as in *brasilianum*. Finally, the basal disc of adult *brasilianum* has spiral sculpture, while it is smooth, but for two peripheral cords, in *eburneum*. *A. eburneum* is larger than *brasilianum* and reaches a size of at least 37.8 mm.

A. melvilli (Schepman) (Figs 18–20) is sculptured with opisthocline axial ribs, with sub- and suprasutural knobs of equal strength, giving an impression of concave whorls. The periostracum of this species also differs from that of *A. brasilianum*, being thick and yellowish-brown.

The protoconch is known in three of the five species of *Abyssochrysos*, viz. *A. eburneum* (Fig. 7), *A. melvilli* and *A. brasilianum* (Fig. 4). It consists of one smooth whorl, 500 μm (*melvilli*) and 650–750 μm (*brasilianum*) in diameter.

The radulae are uniform in the species of which it is known. The lateral tooth of *A. brasilianum* lacks the denticulated comb on the outer cutting edge present in *A. melanioides*. In that respect it is similar to, although more slender than, the lateral tooth of *A. melvilli* (Houbrick, 1979: fig. 8).

Abyssochrysos eburneum (Locard, 1897)

(Figs 5–7, 23)

Bittium eburneum Locard, 1897: 389, pl. 19, figs 7–8.

Bittium eburneum var. *bicinctulata* Locard, 1897: 390.

Plesiotrochus eburneus. Nordsieck, 1982: 154.

Type material. Two syntypes in MNHN.

Type locality. Off southern Morocco, *Talisman* dragage 74, 25°38'N, 16°10'W, 1128–1193 m.

New record. Off West Africa, *Discovery* sta. 10132-1, 24°21'N, 17°09'W, 1775–1790 m, 1 October 1979 (BMNH).

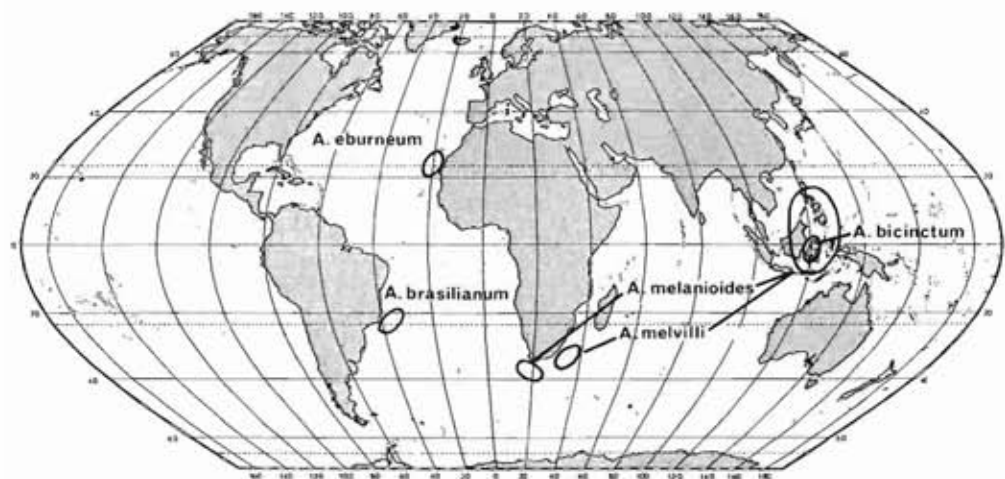


FIG. 23. Distribution map of the Abyssochrysidae of the world.

Remarks. Houbriek (1979) noted the similarity of *Bittium eburneum* with *Abyssochrysos melanioides* and suggested that they could be synonyms. Locard's two syntypes are juvenile shells, but the full-grown, live-taken specimen from the *Discovery* dredgings confirms *eburneum* as a valid, distinctive species of *Abyssochrysos*. This is the first record of this species since its description 90 years ago.

Abyssochrysos eburneum is characterized by its axial sculpture of strong knobs in the suprasutural zone, whereas the subsutural zone is almost smooth. A more detailed comparison with *A. brasilianum* is given under that species.

***Abyssochrysos melanioides* Tomlin, 1927**

(Figs 8, 12–17, 23)

Abyssochrysos melanioides Tomlin, 1927: 78, figs 1–3.

Abyssochrysos melanioides. Houbriek, 1979: 3, figs 1–6.

Type material. Holotype SAM A5116; numerous paratypes in SAM.

New records. Philippines, south of Luzon, Musorstom 2 sta. 69, 14°06'N, 120°03'E, 1800–1950 m, 21 spms + shs, Bouchet coll.; Celebes Sea, Estase 2 sta. CP4, 06°08'N, 125°58'E, 2800 m, 1 spm, Métivier and Vadon coll.; Estase 2 sta. CP6, 04°38'N, 119°49'E, 2570 m, 1 sh, Métivier and Vadon coll.

Remarks. *A. melanioides* was previously known only from bathyal and abyssal (1456–2712 m) material off South Africa. The new records extend the known range to Southeast Asia (Fig. 23).

***Abyssochrysos melvilli* (Schepman, 1909)**

(Figs 18–20, 23)

Argyropeza melvilli Schepman, 1909: 170, pl. 12, fig. 1.

Abyssochrysos melvilli. Houbriek, 1979: 10, figs 7–10.

Type material. Not examined.

New records. Philippines, south of Luzon, Musorstom 1 sta. CP49, 13°49'N, 120°01'E, 750–925 m, 2 spms; Musorstom 2 sta. CP55, 13°54'N, 119°58'E, 865 m, 1 spm, 7 shs, Bouchet coll.; Makassar Strait, Corindon 2 sta. 281, 01°57'S, 119°00'E, 1120–1150 m, 1 spm, Guille, Le Loeuff and Forest coll.

Remarks. *A. melvilli* was already known from several records in the Philippines and Indonesia, and a single record off Natal, South Africa (Fig. 23). Houbriek (1979) also considered *A. swaensis* Ladd, 1977, from the Miocene of Fiji, to be a synonym.

***Abyssochrysos bicinctum* n. sp.**

(Figs 21–23)

Type material. Holotype and one paratype (Corindon sta. 231) in MNHN; one paratype (type locality) in PPDPO, Jakarta.

Type locality. Makassar Strait, Corindon 2 sta. 214, 00°31'N, 117°50'E, 595 m.

Material examined. The holotype and one paratype from the type locality; Corindon 2 sta. 231, 00°05'S, 119°48'E, 1080 m, 1 sh (paratype, MNHN).

Description

Shell large, solid, slender consisting of 15 whorls. Apex (protoconch and an indeterminate number of early teleoconch whorls) corroded. Early spire whorls rather

the second expedition. B. Métivier and C. Vadon collected mollusc material for me during the Estase 2 expedition on board R.V. *Jean-Charcot*, under the direction of L. Labeyrie (CNRS, Gif). A Guille, J. Forest and P. Le Loeuff collected molluscs during the Corindon 2 expedition on board R.V. *Coriolis*. Finally I thank Drs M. Thurston and A. Rise (IOS, Wormley) for giving me access to the *Discovery* collections. J. Pether (SAM, Cape Town) loaned South African material of Abyssochrysidae. The photographs were taken by Pierre Lozouet. A. Warén and W. Ponder revised the language.

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