



A NEW SPECIES OF *ABYSSOCHRYOSOS* (GASTROPODA: LOXONEMATOIDEA) FROM THE OMAN MARGIN

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ABSTRACT

A new species of *Abyssochrysos*, *A. xouthos* n. sp. is described from south-west Oman in the northern Arabian Sea at a depth of 3150 metres. This represents the first record of this genus from the northern Indian Ocean. Of the five previously described extant species of *Abyssochrysos* *A. xouthos* is most similar to *A. melanioides* from which it differs in radular and shell characters.

INTRODUCTION

The superfamily Loxonematoidea has an extensive pre-Cretaceous history but little Tertiary representation and only two surviving families: the Provannidae and Abyssochrysidae (Goedert & Kaler 1996). Both *Abyssochrysos* and *Provanna* date back to the Middle Eocene of Washington state (Squires 1995, Goedert & Kaler 1996) and the extant species *A. melvilli* is known from the Miocene of Fiji (Houbrick 1979).

The extant species of the Abyssochrysidae were revised by Bouchet (1991) who summarised their morphology and distribution and gave illustrations of type material. Five living species are known: *A. eburneum* (Locard, 1897) off West Africa (depth 1128-1790m); *A. melanioides* Tomlin, 1927 from South Africa and south-east Asia (depth 1456-2800m); *A. melvilli* (Schepman, 1909) from South Africa and south-east Asia (depth 490-1472m); *A. bicinctum* Bouchet, 1991 from south-east Asia (depth 595-1080m); *A. brasilianum* Bouchet, 1991 from off south-eastern Brazil (depth 640-1575m).

The ecology of *Abyssochrysos* is poorly known. However, the recently described fossil species *Abyssochrysos raii* (Goedert & Kaler, 1996) was found amongst an assemblage interpreted as chemosynthetic in Middle Eocene cold-seep carbonates in the northeastern Pacific Ocean.

In 1994, RRS *Discovery* Cruise No 211/94 carried out a survey in the North Arabian Sea. The objective was to analyse the total benthic community and sediment fluxes along transects off the Oman Margin into deep water in relation to the oxygen minimum layer and to high organic fluxes to the sea bed. Samples taken over a depth range of 48 to 3370 metres revealed a diverse megafauna down the slope of SW Oman. Amongst the diverse molluscan fauna found at 3150m depth was a new species of *Abyssochrysos*.

SYSTEMATIC DESCRIPTION

ABYSSOCHRYSIDAE

Genus *Abyssochrysos* Tomlin, 1927

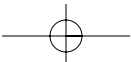
Type species: *Abyssochrysos melanioides* Tomlin, 1927

Abyssochrysos xouthos new species
(Figures 1A-C)

Holotype: NMW.Z. 1995.009.004 *Discovery* Cruise 211, Station 12719#1, 19°08'N 58°39'E, 3150m depth.

Paratypes: NMW.Z. 1995.009.002, 2 live collected specimens (one destroyed for radular examination) as holotype. NMW.Z. 1995.009.003, 8 shells as holotype.

Description: Shell medium sized, turritiform, holotype with 10 whorls but lacking protoconch and early teleoconch whorls, interpolation from other shells suggests that there could have been 13-14 teleoconch whorls when complete. Whorls rounded and bulging towards the abapical part of each whorl but not turreted. Suture weakly impressed. Spire with axial and spiral sculpture on all whorls. The axial ribs on the upper six whorls of the holotype are prominent, but fading at the adapical and abapical parts of each whorl, about 12-14 per whorl, opisthocline and





flexuous, becoming slightly prosocline towards the adapical part of the whorl. On the lower whorls the axial sculpture consists of weaker irregularly spaced primary ribs with finer intermediate ribs, more strongly opisthocline and flexuous on the central and abapical part of the whorl and more strongly prosocline at the adapical part. On the body whorl the axial sculpture is reduced to indistinct ribs only. The first 3 remaining whorls have distinct spiral cords with a particularly strong cord on the adapical part giving rise to a row of subsutural knobs. On the third to sixth whorls the spiral cords fade in prominence from the abapical to adapical parts of the whorls. On the remaining whorls the spiral cords become finer such that on the body whorl they are very fine and poorly defined. Periphery of the body whorl of holotype rather rounded with an indistinct basal disc. Smaller specimens have a more distinct basal disc. Base circled by a distinct cord and a

sculpture of 7–10 poorly defined, irregularly spaced finer inner cords. In smaller specimens the inner cords are more regular and more distinctly defined. No umbilicus. Aperture small, rounded to teardrop shaped with no siphonal canal. Outer lip simple thin and sharp. Columella concave with slight thickening towards the base.

Shell of holotype white with a shiny yellowish brown periostracum. The periostracum in some other specimens, particularly dead shells, is a darker brown.

Radula: (Figure 2) Taenioglossan, formula 2+1+1+1+2, rachidian with sickle shaped basal extensions, cusps small, central cusp the largest with adjacent cusps closely associated and with 1–3 smaller lateral cusps; lateral (L) large, spatulate with four major cusps of which the second innermost is the largest, also with 1–3 denticles (Ld) basal to the inner cusp; inner

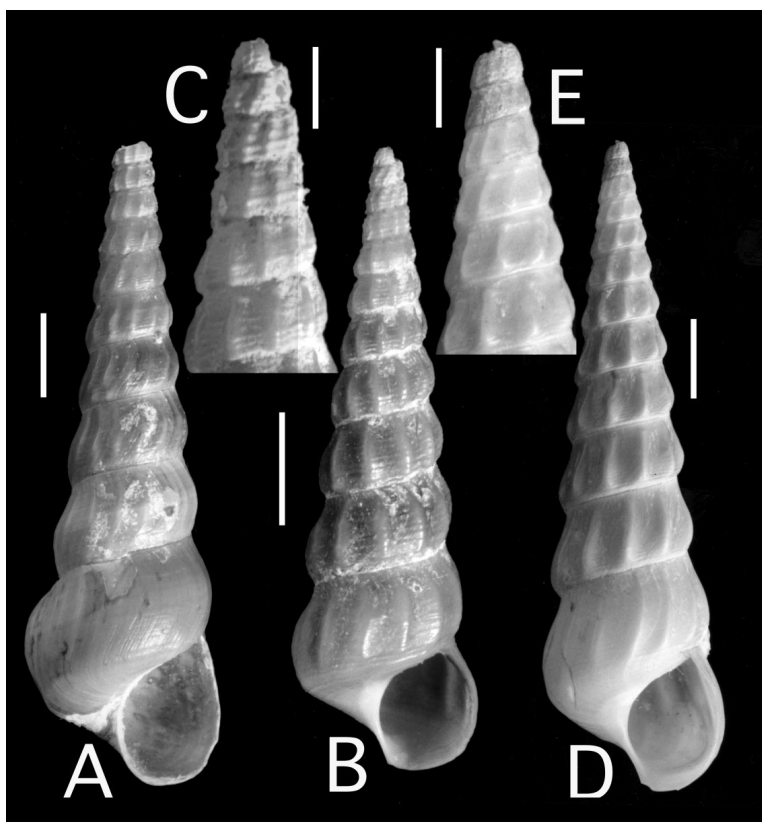
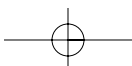


Figure 1 A–C *Abyssochrysos xouthos*. A. Holotype, Oman margin, 3150m, NMW.Z.1999.009.004. B. Paratype, Oman margin, 3150m, NMW.Z.1995.009.002. C. Apex of paratype, NMW.Z.1995.009.002. D–E *Abyssochrysos melanioides* Tomlin, paratype, off South Africa, NMW1955.158.1127. Scale bars A,B,D = 5mm, C,E = 2mm.



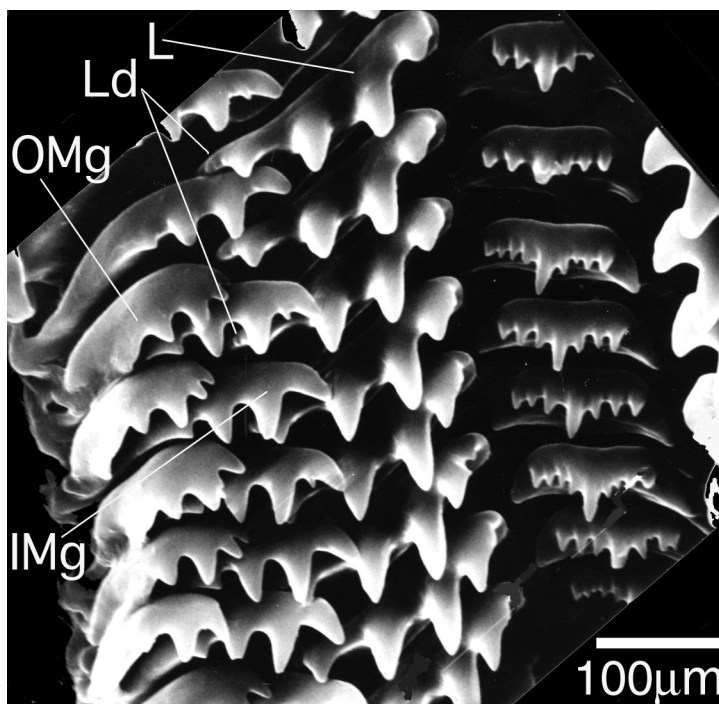


Figure 2. *Abyssochrysos xouthos*. Radula of paratype (shell dissolved); L – lateral tooth; Ld – basal denticles of lateral tooth; IMg – Inner marginal tooth; OMg – Outer marginal tooth. Scale bar = 100 μ m.

marginal (IMg) with four large cusps and an occasional denticle between cusps 1 and 2; outer marginal (OMg) with four cusps of which the third is the largest.

Measurements:

Most specimens are corroded or damaged in some way that makes measurement difficult. The dimensions of the 3 most complete specimens are given below.

	Height (H)	Width (W) of body whorl	H:W	No. of preserved whorls
Holotype	38mm	11.0mm	3.45	10
Paratype	28mm	8.7mm	3.22	8.5
Paratype	25mm	7.8mm	3.21	8

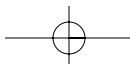
Derivation of name: *xouthos*, Gr. yellowish, yellowish-brown after the colour of the periostracum in living animals and fresh shells.

Distribution: Known only from the type locality

off SW Oman in the North Arabian Sea at a depth of 3150 metres.

Remarks: There are five extant species of *Abyssochrysos* of which three occur in the Indo-Pacific region: *A. melanioides* Tomlin, 1927; *A. melvilli* (Schepman, 1909) and *A. bicinctum* Bouchet, 1991. Of these *A. bicinctum* and *A. melvilli* differ markedly in having prominent nodular axial ribs, those in *A. melvilli* becoming biangulate and those in *A. bicinctum* developed only at the adapical margins of the whorls.

Abyssochrysos melanioides (Figures 1D–E) appears to be a rather variable shell in terms of sculptural development (Houbrick 1979) and those with weak sculpture can resemble *A. xouthos*. All specimens of *A. xouthos* examined have very weak or lack axial sculpture on the later whorls and this contrasts with the prominent ribs retained on most *A. melanioides* shells, however, an occasional *A. melanioides* may have weak sculpture on the body whorl (Bouchet 1991, Fig. 17 and Houbrick 1979, Fig. 1c). The earlier whorls of *A. melanioides* are consistently turreted and this is reinforced by the abrupt termination of the axial ribs





below the suture. In *A. xouthos* the whorls are evenly rounded and the axial ribs become obsolete near the suture. Spiral elements are more pronounced in *A. xouthos*, they persist on the body whorl and create a deeply cancellate sculpture on the early whorls.

The radula of *A. xouthos* differs from both *A. melanioides* and *A. melvilli* in that the outer marginal bears four cusps rather than the three described for the latter species (Houbrick, 1979).

DISCUSSION

The molluscan fauna associated with *Abyssochrysos xouthos* at *Discovery* Station 12719#1 was rich and diverse and not unlike those described from upper abyssal depths in the N. Atlantic (Gage & Tyler 1991, pp. 135–148). The *Discovery* fauna was dominated by protobranch bivalves, *Nucula*, *Ledella* and *Yoldia* species but large numbers of the suspension feeding *Limopsis* and *Bentharca* were also present. Relatively large numbers of gastropods were also present especially turrids giving the overall impression of both high diversity and a fauna consisting of primarily deposit feeders, some suspension feeders and associated predators. A few taxa were present which are often associated with chemosynthetic ecosystems; *Vesicomya*, *Solemya* and *Thyasira*. The suggestion raised by Goedert & Kaler (1996) that *Abyssochrysos* is associated with cold seep environments cannot be positively substantiated here unless such seeps were extremely localised enabling the epibenthic sledge to sample across seeps and typical abyssal habitats. It has been pointed out by McArthur and Tunnicliffe (1998) that the *Abyssochrysidae* are more likely to be members of the 'normal' deep sea fauna.

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