

A DEEP-SEA *AMALDA* (GASTROPODA: OLIVIDAE) IN THE NORTH-EASTERN ATLANTIC

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Abstract *Amalda sibuetae* n. sp., from off Mauritania in 1733–1855 m, represents the second deepest record for the family Olividae so far. The radular morphology of the new species differs markedly from that in other species currently classified in *Amalda*. No Neogene or Recent Atlantic species appears to be close enough to *A. sibuetae* to be considered its immediate ancestor. The world records of Olividae from depths greater than 400 m are listed.

Key words Gastropoda, Olividae, taxonomy, north-eastern Atlantic.

INTRODUCTION

To assess the impact of an environment with weak seasonal variations on deep-sea macrofaunal communities, the EUMELI expedition was carried out in January–February 1991 on board R.V. *Atalante* off Mauritania, focusing on three sites with contrasting trophic conditions (Cosson *et al.* 1997). In a total of 8 box cores taken at the "eutrophic site" in 1590–2040 m, the density of gastropods is only 0.59% of the total benthic invertebrates sampled, whereas aplacophorans and bivalves densities stand at respectively 2.42 and 8.24% of the total. In addition to box cores, sampling was also done by trawling and this yielded two specimens of the olivid genus *Amalda*. These represent not only a new species, described herein, but represent the first finding of Recent species of the subfamily Ancillariinae in the North-Eastern Atlantic.

SYSTEMATIC DESCRIPTION

OLIVIDAE Latreille, 1825

ANCILLARIINAE Swainson, 1840

Genus *Amalda* H. & A. Adams, 1853

Type species *Ancillaria tankervillei* Swainson, 1825, subsequent designation by Vokes (1939).

Remarks The subfamily Ancillariinae is generally known in the literature under the name Ancillinae H. & A. Adams, 1853, but the former name has priority. There exists no satisfactory subgeneric classification of the genus *Amalda*, and we have therefore avoided formal use of a subgenus.

Amalda sibuetae n. sp.

Material examined Holotype (live taken), R/V *Atalante*, off Mauritania, EUMELI 2, stat CP05, 20°30' N, 18°34' W, 1855 m, 06 February 1991; paratype (empty shell), EUMELI 2, stat CP06, 20°31' N, 18°32' W, 1733 m, 07 February 1991. Both in MNHN.

Description (holotype) Shell oblong-ovate, solid, consisting of one protoconch and

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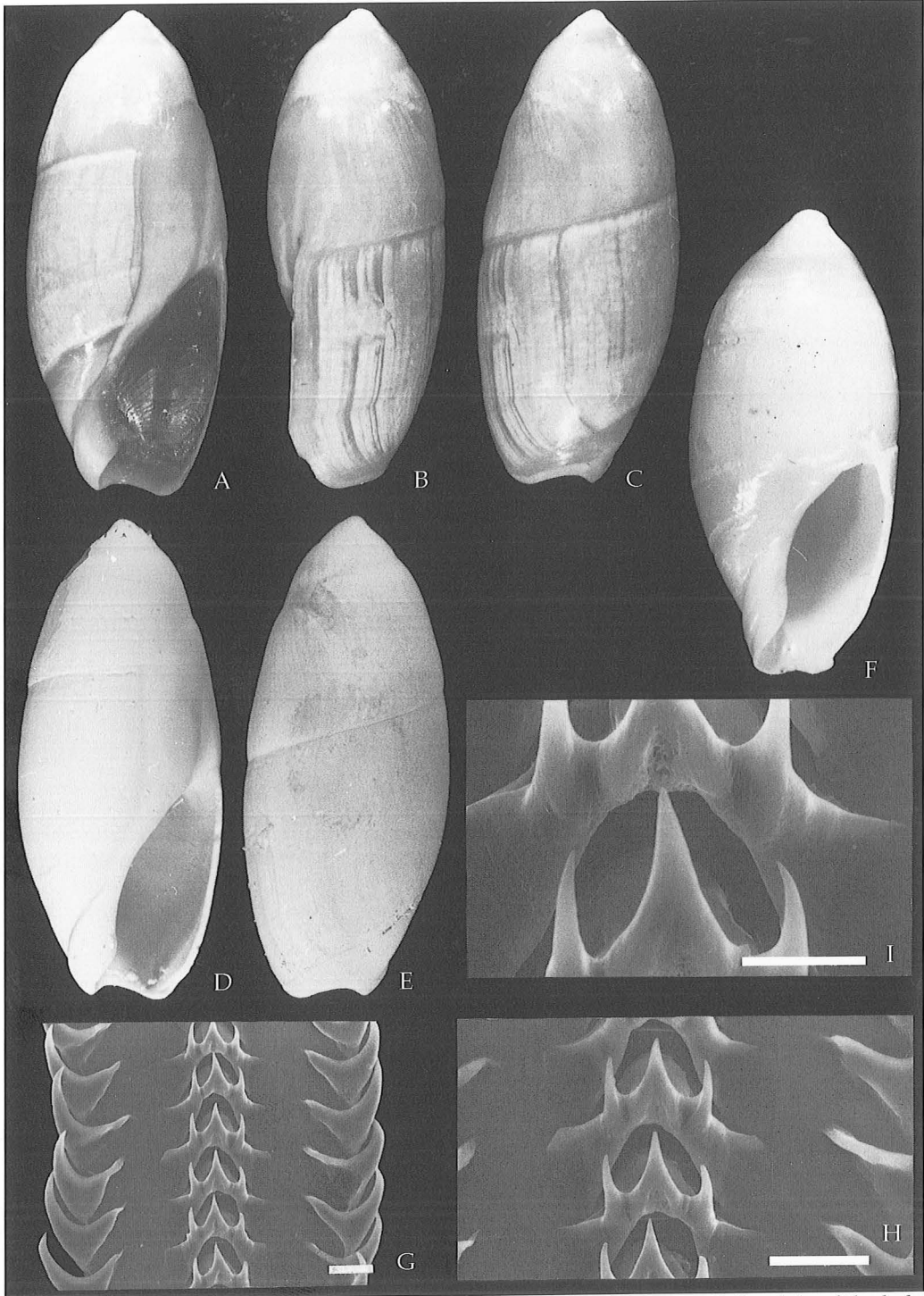


Fig. 1 *Amalda sibuetae* sp. nov. **A–E** holotype (**D, E** - coated), **F** paratype, **G–I** radula of the holotype, **G** dorsal view of the radular membrane, **H** enlarged rachidian teeth, **I** part of the rachidian to show the concavity on anterior edge of the tooth. Scale bars = 10 µm (**I**); 20 µm (**G, H**).

probably 4 teleoconch whorls (number of whorls difficult to determine due to extension of primary callus). Protoconch corroded on holotype, bulbous and glossy on paratype (Fig. 2 A-B), protoconch/teleoconch transition indistinct, whorl diameter 800 μm . Spire cyrtocoenoid with somewhat mamillate apex, greatest shell width slightly below mid shell height. Last whorl evenly convex on both sides, with relatively narrow base. Primary callus thick and enveloping entire spire, except protoconch, forming impressed false suture, anterior edge delimited by shallow but sharp groove, surface glossy and microshagreened. Secondary callus rather thick, microshagreened, tongue-shaped, covering right ventral side of spire, reaching penultimate whorl and entire parietal region. Aperture lanceolate, roundedly acute apically, widest medially, occupying 48% of total shell height; siphonal notch moderately deep, symmetrically U-shaped. Outer lip rather thin, slightly opisthoclinal with low and indistinct blunt basal denticle. Columellar pillar moderately twisted; pleats not pronounced. Anterior fasciolar groove broad and deep, fasciolar band distinct, microshagreened. Posterior fasciolar groove thin, sharp; ancillid groove indistinct, ancillid band weakly differentiated by change in direction of incremental lines. Colour white with slightly yellowish sutural band, overlaid by secondary callus.

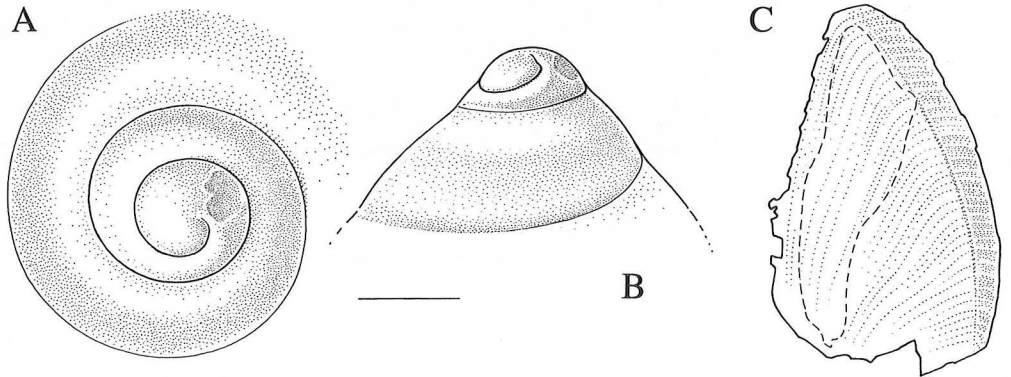


Fig. 2 A, B - protoconch of *Amalda sibuetae* sp. nov., paratype C - operculum, holotype. Scale bars = 1 mm.

Operculum Occupying $\frac{2}{3}$ of aperture (but partly worn), very thin and transparent, yellow (Fig. 2C). There is a distinct narrow longitudinal, slightly curved rib on its inner surface. Columellar muscle attachment zone long, ovate.

Measurements Shell height 12.9 mm, diameter 5.4 mm; last whorl height 8.9 mm, aperture height 6.7 mm.

Paratype The paratype (Figure 1F) is a small dead collected specimen, in all respects similar to the holotype. Columellar pillar with 3 weak pleats.

Anatomy Due to the fixation condition we were unable to remove the animal completely from the shell. The specimen appears to be a half mature male with a 1.3 mm long penis (10% of shell height). Although no comparative data are available on penial development in *Amalda*, in mature specimens of other olivids, particularly *Oliva*, penis length reaches 35–40% of shell height [unpublished observations of senior author]. Penis is simple, cylindrical, terminating in small seminal papilla.

Buccal mass terminal, situated close to the mouth opening, contrary to the situation

found in *A. montrouzieri* (Souverbie, 1860) (Kantor, 1991). Radula (Figure 1G–I) rather short, length 600 μm , or 8.9% of aperture height, width 150 μm (2.2% of aperture height) consisting of about 35 rows of teeth only. Shape of rachidians very unusual for Ancillariinae, with very deep notch on the anterior surface and long projection on the posterior, with 3 long and narrow cusps, the central one being the largest. On the midline of the tooth on its anterior edge there is a concavity with eroded surface (Figure 1I). The laterals are of typical shape, unicuspid.

Derivation of Name The specific name honours Dr Myriam **Sibuet**, of IFREMER, cruise leader of the EUMELI 2 expedition, and a former companion of the second author during many cruises in the North-East Atlantic.

DISCUSSION

The discovery of *Amalda sibuetae* off Mauritania is unexpected, since *Amalda* was thought to have become extinct in the eastern Atlantic and Mediterranean in the late Miocene (Lozouet 1992). The genus exists however in the tropical western Atlantic, where three species occur in shallow water: *Amalda pacei* (Petuch, 1987), from Honduras, in 50 m, *Amalda venezuelana* (Weisbord, 1962) and *Amalda tankervillei* (Swainson, 1825), both from Venezuela in 10–35 m (Petuch, 1987). Comparison of the new Recent species with European fossil representatives of the genus or with the Recent Caribbean ones did not reveal any close similarities, and *A. sibuetae* appears quite isolated morphologically and geographically in the Atlantic fauna. Two scenarios can account for its occurrence. *A. sibuetae* may be derived from a species from the European Oligocene and Miocene shelf faunas, and through its evolution it acquired morphological changes and migrated to lower bathyal depths. Alternatively, *A. sibuetae* may have its origin in the Caribbean stock, and may have migrated across the Atlantic undergoing significant morphological changes. Both hypotheses are equally possible, since we do not know any Atlantic species of *Amalda* which is close enough to *A. sibuetae* to be considered its immediate ancestor. However, so little is known of the Cenozoic faunas of tropical West Africa that a third scenario deriving *A. sibuetae* locally is equally likely.

The radular morphology of the new species is very different from what is known in other species of *Amalda*. Usually in *Amalda* the rachidian has nearly straight or slightly notched anterior edge (see e.g. Kilburn & Bouchet, 1988: Figs 50–58), with the central shorter than the lateral cusps. Conversely, in *A. sibuetae* the rachidian is very deeply notched anteriorly and the central cusp is significantly longer than the lateral. The overall tooth shape is closer to that of *Entomoliva incisa* (Bouchet & Kilburn, 1991: Figs 10–11) than of true *Amalda*. The rachidian tooth shape is also similar to that of *Ancillaria (Turrancilla) lanceolata* Martens, 1904 (Thiele, 1904: pl.9, Fig. 50). In the latter the teeth are also deeply notched anteriorly, although they lack the semi-rounded posterior projection of *Amalda sibuetae*. At the moment the taxonomy of Ancillariinae is based nearly entirely on shell characters and anatomical studies are necessary before we can re-evaluate the status of many nominal genera and subgenera.

The bathymetric occurrence of *Amalda sibuetae* is equally remarkable. At 1855 m, it is the second deepest record of a species of Olividae in the literature, being surpassed only by *Baryspira longispira* (Strebel, 1908) from subantarctic waters (Table 1). (Beside the published records we have seen in MNHN material containing several undescribed species of Ancillariinae, probably belonging to *Gracilancilla* Thiele, 1925, from the Philippines in 200–840 m, Reunion in 410–1180 m, and off Brazil in 450–1555 m). Ancillariines occur mainly on the midshelf, at depths between 30 and 200 m, and only

TABLE 1
Published records of Recent species of Olividae from depths below 400 m

Species	Range	Depth (m)	Source
<i>Amalda aureomarginata</i> Kilburn & Bouchet, 1988	Chesterfield, New Caledonia	300–580	Kilburn & Bouchet (1988)
<i>Amalda bathamae</i> (Dell, 1956)	New Zealand	140–882	Powell (1979), Marshall (pers. com.)
<i>Amalda benthicola</i> (Dell, 1956)*	New Zealand	358–1019	Dell (1956), Marshall (pers. com.)
<i>Amalda fuscolingua</i> Kilburn & Bouchet, 1988	New Caledonia	300–450	Kilburn & Bouchet (1988)
<i>Amalda hilgendorfi</i> (Martens, 1897)	SE Asia, Coral Sea	315–600	Kilburn & Bouchet (1988)
<i>Amalda mucronata</i> (Sowerby, 1830)	New Zealand	15–460	Marshall (pers. com.)
<i>Amalda sibuetae</i> n. sp.	Mauritania	1855	this paper
<i>Ancilla abyssicola</i> Schepman, 1911	Makassar Strait	1301	Schepman (1911)
<i>Ancilla edgariana</i> Schepman, 1911	Ceram Sea	835	Schepman (1911)
<i>Ancilla siberutensis</i> Thiele, 1925	Sumatra	750	Thiele (1925)
<i>Ancilla sumatrana</i> Thiele, 1925	Sumatra	470–660	Thiele (1925)
<i>Ancilla ventricosa</i> Lamarck, 1822**	Tanzania	404–463	Martens (1904)
<i>Ancillaria lanceolata</i> Martens, 1904	Tanzania	404–463	Martens (1904)
<i>Baryspira longispira</i> (Strebel, 1908)	SW Atlantic	2677	Strebel (1908)
<i>Entomoliva incisa</i> Bouchet & Kilburn, 1991	New Caledonia	400–700	Bouchet & Kilburn (1991)
<i>Olivella apicalis</i> Kay, 1979***	Hawaii	500–700	Kay (1979)

* Originally described as a subspecies of *Baryspira novaezelandiae* (Sowerby, 1859), but treated as a distinct species by Marshall (1996). ** Record considered unconfirmed or doubtful by Kilburn (1981). *** Although described in *Olivella*, which constitutes a separate family Olivellidae, it probably belongs to *Gracilancilla*.

14 species have been recorded from depths below 400 m, all of them in the tropical Indo-Pacific or New Zealand. A small radiation has apparently taken place in New Caledonia with two genera and four species, and in Indonesia with two genera and five species in the 300–600 m depth range (Table 1).

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