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(Weinkauff, 1881)

MINHN La planète revisitée

Koumac 2018

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**DESCRIPTION OF *ALVANIA ESMES* SP. NOV. (MOLLUSCA, GASTROPODA, RISSOIDAE)
FROM THE EASTERN MEDITERRANEAN SEA**

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Gastropoda, Greece, Mediterranean Sea, new species, Rissoidae, taxonomy, *Alvania*

Abstract

One new species of the genus *Alvania* is here described from the Aegean Sea and the Sea of Crete based on morphological characters of 59 shells. *A. esmes* sp. nov., bears a resemblance to those of *A. aartseni* Verduin, 1986, *A. aliceae* Amati, 2014, *A. amatii* Oliverio, 1986, *A. balearica* J. D. Oliver & Templado, 2009, *A. nestaresi* Oliverio & Amati, 1990, *A. oetyliaca* Amati & Chiarelli, 2017 and *A. subcrenulata* (Bucquoy, Dautzenberg & Dollfus, 1884) but it differs either in the sculpture of the protoconch or that of the teleoconch. The new species is rather invariable in morphological characters.

Introduction

The numerous family of Rissoidae Gray, 1847 within the superfamily of Rissooidea Gray, 1847 includes minute gastropods of all depths around the globe. Studies in the last decades have greatly increased the knowledge of Mediterranean members of the family and the genus *Alvania* in particular with most species also well illustrated (Amati & Oliverio, 1989; Verduin, 1976, 1983, 1984, 1985, 1986, 1988; Giannuzzi-Savelli *et al.*, 2002; Cossignani & Ardochini, 2011; Gofas *et al.*, 2011; Scaperrotta *et al.*, 2012, 2013, 2014, 2015; Amati *et al.*, 2020), while the Rissoidae of Azores, Canary Islands, Cape Verde Islands, Madeira and West Africa have also been studied (Moolenbeek & Rolán, 1988; Moolenbeek & Hoenselaar, 1989; Gofas, 1990; Hoenselaar & Goud, 1998; Moolenbeek & Hoenselaar, 1998; Gofas, 1999; Segers *et al.*, 2009) so that new species can more easily be identified. Among the genera of the Family, that of *Alvania* is the one with the largest number of species in the Northeast Atlantic Ocean and the Mediterranean Sea (Oliver & Templado, 2009) while the CLEMAM database (October 2022) includes more than 120 species of this genus for the above geographical areas. Of those species, just over half are present in the Mediterranean (Oliver & Templado, 2009) and about 50 of them have been cited in the Hellenic Seas (Manousis, 2021). According to Oliver & Templado (2009) the high diversity of *Alvania* species is a consequence of the strong endemism of the genus with in very small distribution areas,

a phenomenon that is especially evident in the different island groups. Within the Mediterranean, endemic species of this genus are known from the Tyrrhenian, Ionian, Adriatic, Aegean and Cyprus islands (e.g. Bogi, Coppini & Margelli, 1983; Oliverio, 1986, 1988; Giusti & Nofroni, 1989; van der Linden & Wagner, 1989; Amati, Nofroni, & Oliverio, 1990; Cecalupo & Quadri, 1995; Margelli, 2001; Buzzurro, 2003; Micali, Tisselli & Giunchi, 2005; Buzzurro & Landini, 2007; Buzzurro & Prkic, 2007; Tisselli & Giunchi, 2013; Amati, 2014). Newly described species have come to light either through faunistic studies on understudied areas or through the revision of some conflicting *Alvania* complex groups (Oliver & Templado 2009). This becomes especially evident with the list of the new *Alvania* species that is increasing year after year with new species such as *A. nestaresi* Oliverio & Amati, 1990, *A. clarae* Nofroni & Pizzini, 1991, *A. elisae* Margelli, 2001, *A. oliverioi* Buzzurro, 2003, *A. alboranensis* Peñas & Rolán in Peñas *et al.*, 2006, *A. claudoi* Buzzurro & Landini, 2007, *A. dalmatica* Buzzurro & Prkic, 2007, *Alvania balearica* and *A. josefoi* J. D Oliver & Templado, 2009, *A. aliceae* Amati, 2014, *Alvania oetyliaca* Amati & Chiarelli, 2017. The number of the described species of *Alvania* has also increased considerably due to the discovery of new species from the Macaronesian islands, the African coast and the seamounts of the northeast Atlantic Ocean (e.g. Amati, 1987; Gofas, 1989, 1990, 1999, 2007; Moolenbeek & Hoenselaar, 1989, 1998; Bouchet & Warén, 1993; van der Linden, 1993; Hoenselaar & Goud, 1998; Segers, 1999). We anticipated that the Hellenic Islands could not be an exception to the aforementioned insular endemism within the genus and we reconfirmed that with the discovery of the present new species which seems to be rather common in the Aegean Sea and the Sea of Crete. Apparently, insular endemism had been already confirmed by colleagues in the cases of *A. oetyliaca* Amati & Chiarelli, 2017 (Amati & Chiarelli, 2017) from the close to the Aegean Ionian Sea and *A. bozcaadensis* Tisselli & Giunchi, 2013 and *A. campanii* Tisselli & Giunchi, 2013 (Tisselli & Giunchi, 2013) and *A. marmarisensis* Bitlis & Öztürk, 2017 (Bitlis & Öztürk 2017) from the coasts of the Turkish Aegean Sea.

Materials and Methods

The specimens studied in the present work come mainly from the study of sediments and small gear fishing nets bycatch. Sampling and handling of the specimens were conducted according to Manousis & Galinou-Mitsoudi (2014)

and Manousis *et al.* (2019) from October 2008 to October 2022 in certain locations of Greece. The specimens have been examined, measured and photographed by means of a binocular stereoscope, a conventional camera and a scanning electron microscope (SEM). The protoconch whorls were counted according to Verduin (1976), the protoconch's visible height was measured parallel to its axis, from the tip to the intersection of the larval scar and the teleoconch suture, while for the shell's slenderness (h/w) the outer lip of the aperture was included in the shell's width. The species recognition was based on systematic guides and atlases, faunistic and review articles and studies on the Mollusca fauna in the Hellenic seas. Information from specific web sites was also taken into account. More specifically, for the species nomenclature update, besides the Marine Biodiversity and Ecosystem Functioning EU Network of Excellence (MarBEF) (<http://www.marbef.org>) and the World Register of Marine Species (WoRMS) (<http://www.marinespecies.org>), the Taxonomic on-line Database on European Marine Mollusca (CLEMAM) (<http://www.somali.asso.fr/clemam/biotaxis.php>) was also used. All previous referred web sites were accessed by October 2022. The holotype is deposited in the National Museum of Natural History in Paris (MNHN) (MNHN-IM-2000-38551), four paratypes are deposited in the National Museum of Natural Sciences in Madrid (NMNS) (ref: 1505/200190), paratypes 1-4 are deposited in the premises of Dr. T. Manousis and paratype 5 is deposited in the premises of G. Zaminos. Scientists are welcome to have access to the biological material for inspection by appointment.

Results

Systematics:

Superfamily **Rissooidea** Gray, 1847

Family **Rissoidae** Gray, 1847

Genus ***Alvania*** Risso, 1826

Type species: *Alvania europea* Risso, 1826 accepted as *Alvania cimex* (Linnaeus, 1758) (type by subsequent designation)

Alvania esmes sp. n. Manousis, J. D. Oliver & Zaminos (MNHN-IM-2000-38551)

Etymology: The species is named after Dr. Manousis' granddaughter Esme.

Abbreviations: **BB** - Biogenic Bottom Material; **CMNCN** - Collection MNCN; **CMNHN** - Collection MNHN; **CTM** - Collection Thanasis Manousis; **CGZ** - Collection Giannis Zaminos; **MB** - Mixed Bottom; **MNCN** - National Museum of Natural Sciences, Madrid; **MNHN** - National Museum of Natural History, Paris; **SEM** - Scanning Electron Microscopy.

Description of holotype: Shell (Fig. 1a) small for the genus, 2.40 mm high, 1.50 mm wide, (h/w = 1.6), hyaline, semi-transparent, robust and conical. Protoconch (Fig. 1b, c) paucispiral, 255 µm high and of 330 µm maximum diameter, with a distinctly tilted nucleus of some 125 µm, 1.2 curved whorls and 5 spiral equidistant spiral cords in the form of pressed chunky knitting yarn (not appreciable at low magnification) starting from the nucleus and ending at the onset of the teleoconch. Teleoconch starts with an axial rib,

bears 3.5 convex whorls and a shallow suture. Aperture oval, columella oblique, with 7 inconspicuous inner teeth of the outer lip which bears an external varix and a sharp edge. Sculptural decoration of fine and dense spiral furrows and slightly prosocline axial ribs and incremental lines. The ribs are crossed by equidistant spiral cords thus forming squares with mammillae on the crosses. There are 17 axial ribs on the body whorl and 2 spiral cords on the first whorl, 2 on the second and 7 on the body whorl of which 3 above the suture and 4 below it. The endings of the body whorl cords can be seen at frontal view in the form of equal number of mammillae on the varix at the periphery of the outer lip of the aperture. At high magnification, a microsculpture of tiny granules is observed on the whole surface of the shell, similar to that of *A. cancellata* (da Costa, 1778) formed by the crosses of the dense incremental scars and the fine but also dense spiral furrows (Fig. 2g). Shell vitreous, snow-white with two faint yellowish bands one by the suture and the other at the base of the body whorl. Soft parts unknown.

Type Material:

Holotype: (Fig. 1a-c), shell, CTM, Greece, MB, -120 m, Pyrgadikia, Chalkidiki, Siggitikos Gulf, North Aegean Sea, 40°14'N - 23°55'E, 2/3/2012, *Alvania esmes* sp. n. Manousis, J. D. Oliver & Zaminos, (MNHN-IM-2000-38551).

Paratype1: (Fig. 1d-f): shell, CTM, Greece, BB, -80 m, Skyros Island, Central Aegean Sea, 38°47'N - 24°28'E, 1/8/2017.

Paratype2: (Fig. 1g, h), shell, CTM, Greece, MB, -120 m, Pyrgadikia, Chalkidiki, Siggitikos Gulf, North Aegean Sea, 40°14'N - 23°55'E, 2/3/2012

Paratype3: (Fig. 1i, j), shell, CTM, Greece, MB, -120 m, Pyrgadikia, Chalkidiki, Siggitikos Gulf, North Aegean Sea, 40°14'N - 23°55'E, 2/3/2012

Paratype 4: (Fig. 1k, l), shell, CTM, Greece, MB, -120 m, Pyrgadikia, Chalkidiki, Siggitikos Gulf, North Aegean Sea, 40°14'N - 23°55'E, 2/3/2012.

Paratype 5: (Fig. 1m, n), shell, CGZ, Greece, MB, -100 m, Ayios Onoufrios, Chania Gulf, Crete Island, 35°33'N - 24°03'E, 10/2/2022.

Paratype 6: (Fig. 2a-c) (SEM), shell, CMNCN, Greece, MB, -100 m, Ayios Onoufrios, Chania Gulf, Crete - Island, 35°33'N - 24°03'E, 10/2/2022.

Paratype 7: (Fig. 2d-g) (SEM), shell, CMNCN, Greece, MB, -100 m, Ayios Onoufrios, Chania Gulf, Crete Island, 35°33'N - 24°03'E, 10/2/2022.

Paratype 8: (Fig. 2h, i) (SEM), shell, CMNCN, Greece, MB, -100 m, Ayios Onoufrios, Chania Gulf, Crete Island, 35°33'N - 24°03'E, 10/2/2022.

Type Localities:

Greece, Pyrgadikia, Siggitikos Gulf, North Aegean Sea, 40°14'N - 23°55'E

Greece, Skyros Island, Central Aegean Sea, 38°47'N - 24°28'E

Greece, Ayios Onoufrios, Chania Gulf, Sea of Crete, 35°33'N - 24°03'E

Distribution: Known only from the type localities.

Habitat: Our specimens were collected from MB and BB from 80-120 m.

Remarks: *Alvania esmes* n. sp. exhibits limited variability. More specifically, its protoconch number of whorls varies between 1.1 and 1.2, the larval shell maximum diameter between 320 µm and 340 µm, the spiral cords of the protoconch are usually 5 and rarely 6, the teleoconch starts always with an axial rib equally strong with the following ones, and the teleoconch bears 3.5 convex whorls. There are 15-18 axial ribs on the body whorl and always 2 spiral cords on the first whorl, 2 on the second and 7 on the body whorl with 3 of them above the suture and 4 below it.

Discussion

At first glance, *Alvania esmes* sp. n. (Fig. 1a-c) looks very similar to *A. balearica* J. D. Oliver & Templado, 2009 (Fig 2j-m) - a rather recently described species from the Balearic Islands (Oliver & Templado, 2009) - but the latter differs in the following characters: Number of protoconch whorls 1.35 (instead of 1.1-1.2); It bears three keeled cords (Fig. 2j-m) (instead of 5 thin) followed by 4 spiral interrupted cords of irregular thick and coarsely aligned granules (instead of 5-6 thin and continuous); First half whorl of protoconch 205 µm (instead of 250 µm); First whorl width 205 µm (instead of 240 µm); Visible protoconch height 305 µm (instead of 240 µm); The transition with the teleoconch is abrupt with two thick ribs (all ribs of similar strength); Less axial ribs on all the whorls (more in *A. esmes* sp. n.). The geographical separation of the two species and the fact that both bear a paucispiral protoconch (indicative of a very short larval stage and, therefore, limited dispersal capacity), and the differences in the sculpture of their protoconches rule out the possibility that they are conspecific. This opinion is particularly strengthened by the fact that no similar forms have been reported for the entire long distance and vast area that separates the Hellenic seas from those of the Balearic Islands. *A. aliceae* Amati 2014 is also a species very similar to *A. esmes*, even in the sculpture of its protoconch. It is distinguished by having much more developed the subsutural cord of its body whorl, that can be interpreted as a fourth cord, and by having smooth the surface of its teleoconch (microgranular in *A. esmes*). Superficially, *A. esmes* sp. n. looks similar to *A. subcrenolata* (Bucquoy, Dautzenberg & Dollfus, 1884) that is considered by Oliverio and Amati (1990) as an unclear taxon, *A. amatii* Oliverio, 1986 from the eastern Mediterranean, *A. aartseni* Verduin, 1986 from the coasts of North Africa and *A. nestaresi* Oliverio & Amati, 1990, from the southwestern Mediterranean, though all the aforementioned species bear 4 spiral cords on their body whorl (Oliverio, 1986; Scaperrotta *et al.*, 2012). Finally, *A. esmes* sp. n. shares some similar shell characters with *A. oetyliaca* Amati & Chiarelli, 2017, but the latter has a protoconch sculptured by coarse randomly arranged tubercles (instead of 5-6 thin and continuous) and its body whorl bears 6 spiral cords, 2 over the aperture and 4 on the base (instead of 7, 3 over the aperture and 4 on the

base).

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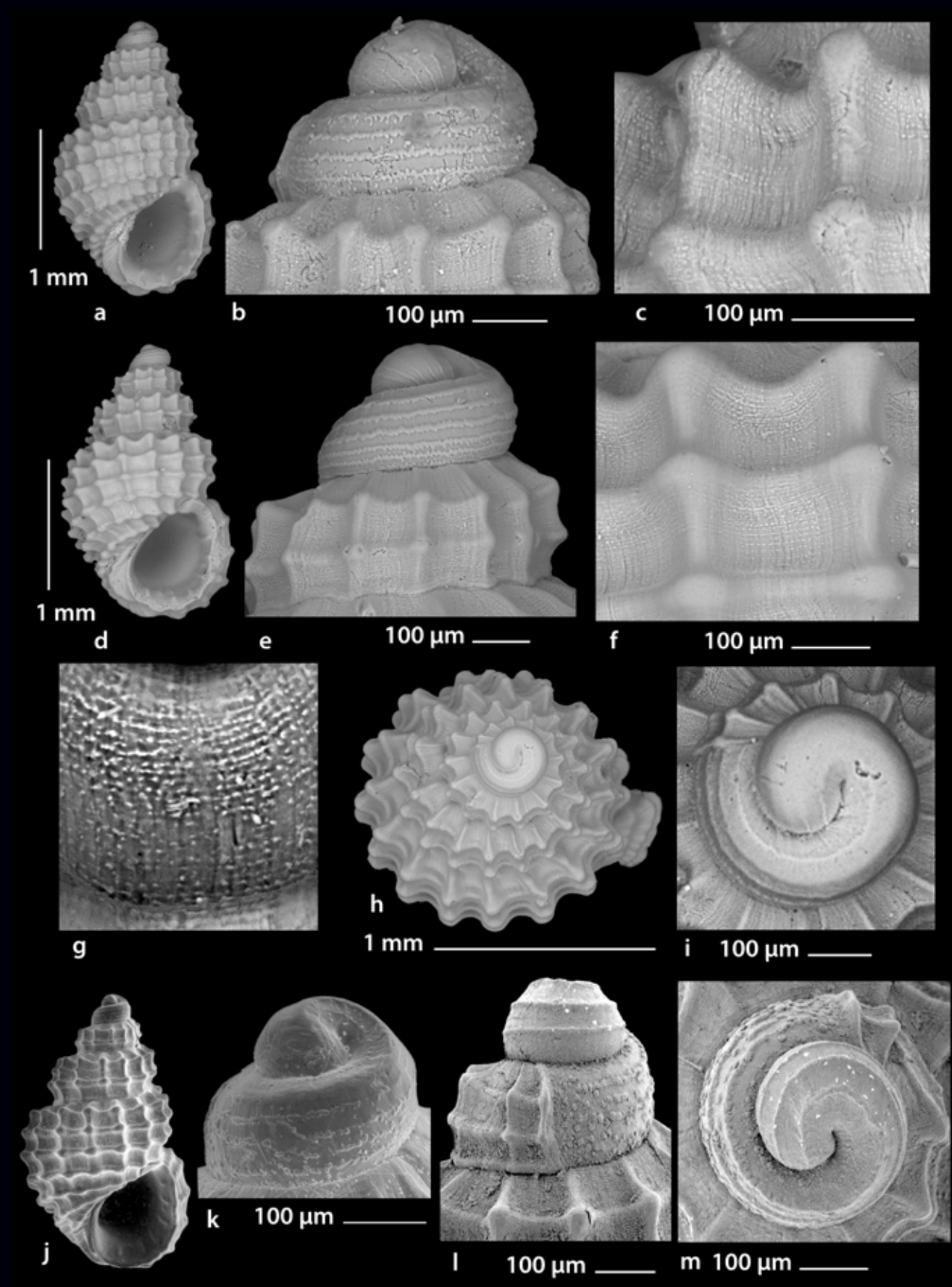
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Plate 1.



a-c. *Alvania esmes* sp. n., holotype (MNHN-IM-2000-38551); d-f. Paratype 1; g, h. Paratype 2; i, j. Paratype 3; k, l. Paratype 4; m, n. Paratype 5

Plate 2.



Alvania esmes sp. n., SEM images. a-c. Paratype 6; d-g. Paratype 7; h, i. Paratype 8; j-m. *A. balearica*

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Dans la livraison d'avril 2022 (n° 115) du magazine Malacologia Mostra Mondiale figure un article de Nguyen Ngoc Thach décrivant une nouvelle espèce de Cerithiidae sous le nom de *Rhinoclavis abbasi*.

Il indique que la nouvelle espèce n'est citée dans aucun livre sur les coquillages ni magazine conchyliologique.

La localité type est « Regency of Selawati, south of Sorong Town, Indonésie » sans autre indication. Une rapide recherche en ligne avec « Google Maps » permet de situer cette ville au nord ouest de la Papouasie Occidentale. L'habitat est donné comme (traduit de l'anglais) « boue dans un grand trou à marée basse (environ 2 mètres de profondeur) en mer ».

Il y a 5 spécimens types dont la taille varie de 31,8 mm à 38 mm. L'holotype sera déposé au Muséum National d'Histoire Naturelle de Paris sous le n° MNHN-IM-2000-37338.

La nouvelle espèce est placée dans le genre *Rhinoclavis*. Elle est comparée à *Rhinoclavis vertagus* (Linnaeus, 1758).

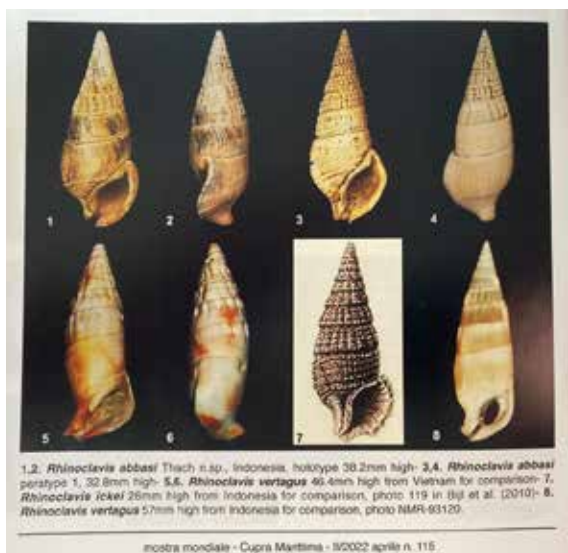


Fig. 1 planche de la description originale.

Des coquilles identiques à cette nouvelle espèce ont été proposées à la vente depuis environ deux ans. J'ai pu en acquérir 4 exemplaires dont la taille varie de 30,7 à 36,2 mm. La localité est exactement la même que celle de la nouvelle espèce.



Fig. 2 quatre spécimens Coll. Loïc Limpalaër (n° 10153), Sud de Sorong, Régence de Salawati, Ouest de la Nouvelle Guinée.

La régence de Salawati est située au nord-ouest de la Nouvelle Guinée, en territoire Indonésien. Lorsque je les ai acquises, mes quatre coquilles avaient l'ouverture remplie d'une boue séchée noirâtre. L'état de conservation est excellent mais il apparaît qu'elles ont perdu leur coloration d'origine après avoir été enfouies. Je ne peux pas déterminer l'âge de ces spécimens mais ils ne sont certainement pas récents. Il n'y a aucun doute que *Rhinoclavis abbasi* et mes spécimens appartiennent à la même espèce. Mais, s'agit-il vraiment d'une nouvelle espèce ? Dès que j'ai vu ces spécimens à la vente, je les ai identifiés comme *Clavocerithium (Indocerithium) taeniatum* (Quoy & Gaimard, 1834). Cette espèce est assez méconnue et n'a pas été fréquemment citée dans la littérature récente. La seule référence que j'ai identifiée est celle de Bunjamin Dharma (2005) dans « Recent & Fossil Indonesian Shells », planche 19, figures 30a-c. 3 spécimens de Monokwari, Papua, mesurant de 39 à 46 mm sont illustrés. Il s'agit de spécimens frais qui montrent une coloration orangée avec une bande épaisse plus pâle sous la suture. L'extrémité antérieure des coquilles porte une maculation plus sombre. L'aspect des spécimens frais diffère donc de celui des spécimens subfossiles qui ont perdu leur coloration d'origine.

La description originale de Quoy & Gaimard est basée sur deux syntypes. Ils sont déposés au MNHN de Paris sous le numéro MNHN-IM-2000-36300. La localité type est : « au Havre Dorey de la Nouvelle Guinée ». Les auteurs illustrent une coquille. En suivant le lien suivant, on peut voir deux photographies en haute résolution d'un des exemplaires types : <https://science.mnhn.fr/institution/mnhn/collection/im/item/2000-36300?listIndex=1&listCount=2>

C'est une grande coquille de plus de 52 mm. Cependant, il lui manque le haut de la spire et l'ouverture est cassée. La coloration est semblable aux exemplaires de Dharma, mais la bande pâle est étroite.



Fig.3 *Clava taeniatum* pl. 54 fig. 21 Atlas du Voyage de l'Astrolabe



Fig. 4 *Clava taeniatum* Syntype MNHN-IM-2000-36300 Atlas du Voyage de l'Astrolabe MNHN Paris (probablement le même spécimen que sur la figure de l'Atlas).

Quoy et Gaimard n'illustrent pas l'animal vivant au contraire de leur habitude dans l'Atlas quand ils ont pu observer celui-ci. Cela indique qu'ils n'ont obtenu que des spécimens récoltés morts. Pour trouver plus d'informations sur cette espèce évasive, il faut consulter les deux publications de Richard Houbriek qui

traitent de *Clavocerithium taeniatum* (Quoy & Gaimard, 1834). En plus de la localité type, des spécimens de la Baie de Geelvink (Ouest Papua) et de l'île de Kranket, Madang au nord-est de la Nouvelle Guinée ont été examinés par l'auteur. Il note qu'il existe une forte variation individuelle dans la sculpture et la coloration. Les derniers tours peuvent être lisses (comme dans le syntype) ou montrer des stries axiales et spirales plus ou moins prononcées (mes spécimens). Chez les coquilles « fraîches », l'extrémité antérieure est marquée par des maculations sombres.

Houbrick décrit l'écologie et l'anatomie de l'espèce à partir du matériel à sa disposition. L'espèce vit vraisemblablement dans la zone de marée sur des substrats souples dans des baies peu profondes. L'analyse du contenu de l'intestin indique que l'animal est un détritivore qui se nourrit de détritus contenus dans le sable ou la vase.

Selon Houbrick, deux synonymes de l'espèce sont connus : *Vertagus implicatus* Brancsik, 1895 – dont les syntypes déposés à Budapest ont été détruits en 1956 lors de la révolution hongroise – provenant de la Baie de l'Astrolabe, Nouvelle Guinée Allemande ; et *Clava altenai* Wissema, 1947, un fossile du Pliocène de l'île de Nias (Sumatra, Indonésie). Cette occurrence fossile est la seule connue en dehors de la Nouvelle Guinée.

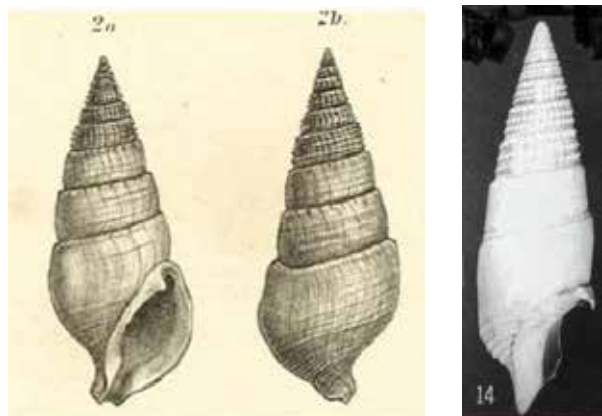


Fig. 5 *Vertagus implicatus* Brancsik, 1895. Figure originale (d'après Van Gemert, 2017, 2a,b).

Fig. 6 *Clava altenai* Wissema, 1947. Figure de l'holotype (d'après Houbrick, 1978, 14).

Qu'en est-il de la classification générique ? Il ressort de l'observation des coquilles de *C. (l.) taeniatum* que cette espèce ne peut pas être un membre du genre *Rhinoclavis* Swainson, 1840 car celui-ci se caractérise par l'existence d'un pli columellaire médian qui est absent chez *C. (l.) taeniatum*. Houbrick (1978, planche 94, fig. 3) démontre cet état de fait en illustrant une coupe longitudinale de *C. (l.) taeniatum*.

Ce n'est pas non plus un membre du genre *Pseudovertagus* Vignal, 1904 car le canal siphonal n'est pas suffisamment recourbé vers l'arrière.

La forme de l'ouverture avec son profil sinueux et son canal peu incurvé est compatible avec celle de *Clavocerithium* Cossmann, 1920. Et c'est pourquoi l'espèce de Nouvelle Guinée est rattachée à ce genre. Ce genre est connu de l'Eocène avec quelques espèces dont la plus connue est *Clavocerithium (Clavocerithium) lacazei* (Cossmann, 1898). Cette espèce est bien connue du Lutétien (Eocène moyen) de Loire Atlantique et notamment du gisement de Bois Gouët.



Fig. 7 *Clavocerithium lacazei* (Cossmann, 1898). Coll. Loïc Limpalaër (n° 10289), Le Bois Gouët, Loire Atlantique, Lutétien, Eocène. 54,75 mm.

Le genre disparaît des enregistrements fossiles ensuite pour réapparaître à la fin du Miocène dans l'ouest du Pacifique Tropical et l'Indonésie avec quelques espèces proches de *C. (l.) taeniatum*.

Conclusions :

- 1) *Rhinoclavis abbasi* Thach, 2022 est un synonyme de *Clavocerithium (Indocerithium) taeniatum* (Quoy & Gaimard, 1834).
- 2) *Rh. abbasi* est le troisième synonyme connu de *C. (l.) taeniatum*.
- 3) Quelques publications et un livre récent traitent de cette espèce.
- 4) *Rh. abbasi* est basé sur des récoltes de fossiles ou de sub-fossiles dont l'âge n'est pas déterminé.
- 5) *C. (l.) taeniatum* est une espèce qui reste fascinante, à la fois par sa rareté dans les collections et par sa situation d'espèce relict, dernière vivante d'un genre qui a une longue histoire paléontologique. La famille des Cerithiidae comprend plusieurs genres ayant connu une histoire comparable (*Gourmya*, *Cerithioclava*, *Ochetoclava*, *Fastigiella*...).

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A new species of *Macromphalus* (Gastropoda, Vanikoridae) from Weizhou Island, Guangxi, China)

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Abstract

Macromphalus liae sp. nov., is a new species of microgastropoda collected from the Weizhou Island of South China Sea. The striking shell characters are minute, thin, elongate, with a mamillate apex; large semi-moon aperture; wide and shallow umbilical area; numerous fine axial ribs and crossed with weaker spiral threads forming a reticulate sculpture on body whorl.

Keywords: Microgastropoda; *Macromphalus*; New species; Weizhou Island; South China Sea

Introduction

The Weizhou Island (21°02'N, 109°06'E) is the largest and youngest volcanic island in the China Seas, which is piled up by Quaternary basalt magma, with a total area of 24.7 km². Locate in subtropical monsoon climate zone, with an average annual temperature of 23°, sea water temperature of 24.6°, and precipitation of 1297 mm (Liu *et al.*, 1991; Qi *et al.*, 2003). The coast is 15.6 km, with 6 ~ 10 km of sandy beach. Coral reefs have been established and high marine biodiversity around the island (Liang, *et al.*, 2010; Jingke and Huang, 2019). The demarcation of Chinese molluscan faunal region, of which is a part of the Indo-West-Pacific region (Tchang *et al.*, 1963; Huang *et al.*, 2020).

According to published reports concerning the family Vanikoridae Gray, 1840, there are two genera of which occur in the China Seas, including ten species of *Vanikoro* Quoy & Gaimard, 1832 (Liu, 2008) and two species of *Macromphalus* S. V. Wood, 1842 (*i.e.*, *M. styliferinus* (G. Nevill, 1885) and *M. tornatilis* (Gould 1859)) (Okutani *et al.*, 2017). Now, we focus on the micromollusk fauna which are still poorly investigated in Weizhou Island and the progress of survey was executed from Sept. 2019 to Nov. 2021 (Chen, Tseng and Li, 2023). One result of this study, *Macromphalus liae* sp. nov., one minute and rare species of microgastropoda was collected, which also adds a new species to the South China Sea and first demonstrated in this report. The specimen is deposited in the College of Biology and Pharmacy, Yulin Normal University (YLNNU), Guangxi, China.

SYSTEMATICS

Class GASTROPODA Cuvier, 1795

Subclass CAENOGASTROPODA Cox, 1960

Family VANIKORIDAE Gray, 1840

Genus *Macromphalus* S. V. Wood, 1842

Type species: *Macromphalus reticulatus* S.V.Wood, 1842

Macromphalus liae sp. nov.

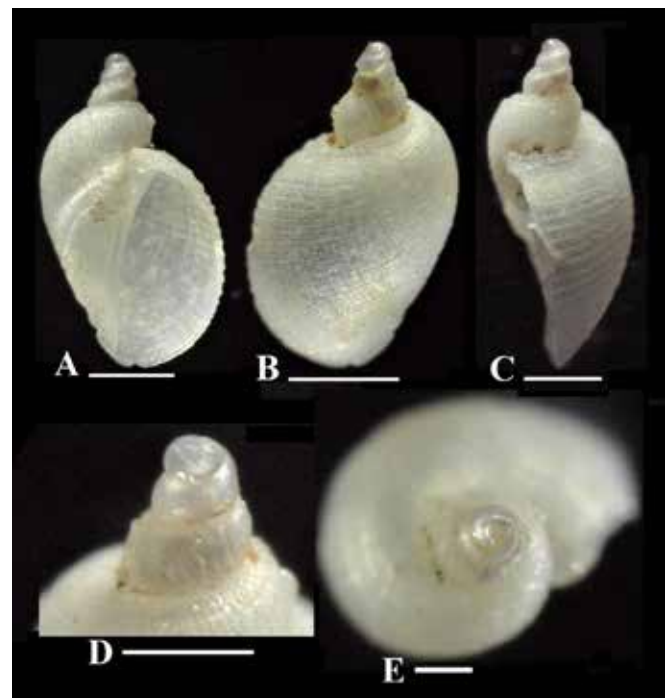


Figure 1. *Macromphalus liae* sp. nov. Holotype, YLNU19091101, 1.9 mm SL, 1.2 mm SW, Weizhou Island, China. **A.** Ventral view; **B.** Dorsal view; **C.** Lateral view; **D – E.** Protoconch. Scale Bar: **A – C,** 500µm; **D – E,** 250µm.

Holotype. YLNU19091101, 1.9 mm shell length (SL), 1.2 mm shell width (SW). One empty shell. Weizhou Island (21° 03'57.37" N, 109 ° 06'53.32" E), Guangxi Province, China; 11 September 2019.

Description. Shell minute, thin, elongate ovately conic, mamillate apex, spire angle about 60°, spire low: spire length/shell length ratio is 0.27. Protoconch helmet form, of about 2 3/4 whorls, last whorl in its later part with 3~4 slight spiral striae. Teleoconch with 2~3 whorls, outline modestly convex; the penultimate whorl is sculptured with fine axial ribs; the body whorl, obviously large and inflated, ornamented with about 26 closely spaced axial ribs when seen from the ventral side and crossed with weaker spiral striations forming a reticulate sculpture; the suture incised, shoulder with a somewhat inclined wide sutural ramp. The pseudumbilicus area is shallow, wide and stretched downward, with some oblique striae, which separating from body whorl by an irregular border. Aperture large, aperture height/shell length ratio is 0.63,

extended, semi-moon shaped, with a nearly straight columella; corrugated outer lip, upper labium connected body whorl by a wide and plain ledge. The shell is slightly translucent and pale yellow in colour.

Distribution. The coast of Shell Beach of Weizhou Island. Details of the microhabitat are unknown.

Etymology. The name, *liae*, is to express our sincere thanks and appreciation to Prof. Gui-Fen Li, College of Biology and Pharmacy, YLNU, China, expert in conservation biology. It is a sign of gratitude for her enthusiasm and help of this project.

Comparison and remarks

This species rather resembles *Macromphalus (Dialystostoma) lamellifer* (Cossmann) subsp. *arenularius* (Gougerot & Braillon) (Gougerot & Renard, 1981, p.30, fig. 8), from the Eocene of the Paris Basin, France, but has a much wider umbilicus area, and body whorl with a narrower spaced and more axial ribs sculpture. This species has no channelled fissure extending from the umbilicus to the posterior end of aperture. The *Macromphalus gracilis* (Brazier, 1894), from Watson's Bay, Sydney, figured by Brazier, 1894 (Pl. 16, fig.4) and from Middle Harbour of New South Wales, Australia, illustrated in Hedley, 1900 (Pl. 26, fig. 13), has a narrower body whorl and an even shorter aperture when compared to the shell height.

Acknowledgment

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Description of a new *Volvarina* (Volutoidea : Marginellidae) from North-East Brazil

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ABSTRACT: Description of a new mollusc species from the Cearean subprovince, North-East Brazil Atlantic Ocean seashore, at superior recifal depth, named *Volvarina vinosa* sp. nov.. The species is compared to *Prunum coltrorum* Cossignani, 2005 and to *Volvarina damasoi* Cossignani, 2007.

KEYWORDS: Brazilian Molluscan province, Cearean subprovince, Marginellidae, *Volvarina*, *Prunum*

Introduction

Some specimens of Marginellidae from the shores of Ceará were handed to us, and when compared with other species of the genera *Prunum* and *Volvarina* known from the region and nearby regions, they were substantially different, therefore we decided to describe these as a new species.

In the XXIst Century many species were added to the Mollusc fauna from Brazil, mainly by Boyer with *Volvarina brasiliiana* Boyer 2000 and *Volvarina tunicata* Boyer 2000, by Souza and Covert with *Bullata analucia* S & C 2001 and *Bullata guerrinii* S & C 2001, by Cossignani with *Prunum coltrorum* 2005, *Prunum negoi* 2005, *Prunum damasoi* 2006, *Volvarina bavecchii* 2006, *Volvarina tripartita* 2006, *Marginella purpurea* 2006, *Marginella hybrida* 2006, *Volvarina tessae* 2007, *Volvarina damasoi* 2017, *Volvarina mariaodetae* 2017.

Except the two *Bullata* these are all small species and except *Volvarina tessae* all are from Cearean and Bahian subprovinces, mainly from Northeast Brazil

We studied various genera of the Marginellidae family from the Brazilian coast, see Xenophora Taxonomy 35, 2022, describing *Volvarina megapex* Crabos, Queiroz, Pomponet and Passos, and revalidating *Volvarina germaini* (Bavay, 1913). This is a new contribution to this work.

We believe a major revision of the family is needed for Cearean and Bahian subprovinces from Brazil and intend to organize this work in the future.

Material & Methods

The material came from a dealer who bought it from Fortaleza fishermen. As often in this situation information is not very precise. The shells color seems to indicate they were caught alive.

Our study will focus on the shell shape and pattern, having no soft parts to study or DNA.

Systematic descriptions

Volutoidea Rafinesque, 1815

Marginellidae J. Fleming, 1828

Marginellinae J. Fleming, 1828

Volvarina Hinds, 1841

Type species *Volvarina mitrella* (Risso, 1826)

Type Material:



Fig. 1 Holotype *Volvarina vinosa* sp. nov.
MNRJ 24488

Holotype and 3 paratypes all found off Icapui, Ceara at superior recifal depth

Holotype: adult specimen. Length: 5,8 mm ; width: 3,2 mm ; in Museu Nacional do Rio de Janeiro under code MNRJ 24488 (fig 1-4).

Paratype 1: adult specimen. Length: 6,7 mm ; width: 3,6 mm; in the collection of Olivier Crabos (fig 5-7)

Paratype 2: adult specimen. Length: 6,7 mm; width: 3,2 mm; in the collection of Gregório Pereira de Queiroz;

Paratype 3: adult specimen. Length: 6,8 mm; width: 3,4 mm; in the collection of Gregório Pereira de Queiroz;

Paratype 4 : adult specimen dived at 20/30 m off Rio de Fogo, Rio Grande do North, Length: 5,5 mm; in the collection of Franck Boyer

Description

Medium to medium-small shell for the genus *Volvarina* (Length: 5.9 to 7.0 mm; width: 3.1 to 3.4 mm), having 3.5 whorls. In the analyzed specimens, the middle of the body is twice as wide as the anterior region and the apex. The apex measures one-ninth of the total length of the shell and can be considered standard for the genus. It moderately stands out from the body of the shell. The protoconch is rounded and merges in shape and color with the entire apex, being slightly whitish. Suture only

slightly marked, but with a continuous and evident thin white line that is one of its distinguishing features. Aperture measures approximately 4/5 of the total shell. It is narrower at the top, widens towards the bottom, and widens towards the end. The opening at the end is three times wider than at the beginning. The outer lip starts out thin, becomes much thicker in the upper third, becomes thin again near the opening. The outside of the outer lip forms an elongated callus at the top, while the inside of the outer lip forms a practically straight line, until it splits open at the end. In the specimens studied, the outer lip is entirely white. The columella has four folds, the third being the most marked, while the lower fourth fold is less distinct. The columella follows the color pattern of the shell's body, with the sequence of white or burgundy bands. The standard body color is dark burgundy. Two of the studied specimens have two very distinct white bands from just above the lower half of the body downwards. The other two specimens studied have the same stripes, but less distinct, being a whitish burgundy color. As already mentioned, but reinforcing, the stripes of different colors do not cover the outer lip, which is quite white. Only one specimen has a slight overlapping of a burgundy band slightly indenting the white and callused outer lip.

Type Locality

off Icapui Ceara at high reefal depth (2 to 5 meters)

Remarks

The first question that arose for *Volvarina vinosa* sp nov. is whether the specimens belong to the genus *Prunum* or *Volvarina*. According to Boyer, "the distinction between the genus *Volvarina* Hinds, 1844 and the genus *Prunum* Hermannsen, 1852 was never soundly established and it commonly relies on superficial features, such as the size of the shell and proportion of the spire, thickness of the shell, of the columellar plait and of the labrum, recurrence of labial teeth, pattern of decoration, etc." (2000, p. 46). According to the authors, the combination of such characteristics is well known and none of them define differentiation between genera. We assume here the oldest proposed genus, therefore *Volvarina* Hins, 1844. The size of the specimens and the general shape of the new species also point to this genus, although we know they are not definitive indicators.

Compared to *Prunum coltrorum* Cossignani, 2005 collected in the same region (fig 8), the new species is almost a quarter the size, its color is dark wine while *P. coltrorum* is "pale cream with slightly and imperceptibly darker bands" (Cossignani, 2005, p. 8). The apex and protoconch of this one are only barely revealed to the eye, whereas in the new species the protoconch and first whorls appear distinctly outward from the body.

Compared to *Volvarina damasoi* Cossignani, 2007, collected in the same region (fig 9-10, thanks to T Cossignani authorization), the new species is a little smaller (around 6.8 mm versus 7.5 mm for the *damasoi*), although there are few specimens of both species for a better differentiation of size. *V. damasoi* is pale cream in color, its outer lip is thicker below, its opening is narrower and the shell assembly is slightly more elongated, unlike the new species.

Distribution

Coastal region between the states of Rio Grande do Norte and Ceará, from Icapui to Rio do Fogo, Cearean subprovince in the

Northeast of Brazil.

Etymology

From Latin, *vinosa* means (red) wine colored, which is one of the distinguishing marks of the species.

Discussion

The fact *Volvarina vinosa* sp. nov. is compared with *Prunum coltrorum* and *Volvarina damasoi* proves that the limit between the two genera is thin.

First of all the size difference between *V. vinosa* sp. nov. and *P. coltrorum* does not give us the impression both are coming from the same origin.

And when looking at both genera, *Volvarina* species are relatively small (from 4 to 13 mm in Brazil), light and thin, when *Prunum* show blocky oval shells, heavy with fat reinforced lip, with dimension superior to 15 mm. But our species stands in a new category with small sized shell but relatively strong lip and compact shape with very flattened spire.

We will have more information in the future as we will get more caught alive shells which will allow us to understand better the positioning of both genera in the Brazilian North East region. So, the species diversity present in that region could be revealed in a safer way than today, as some of the species described until now were not safely distinguished from others.

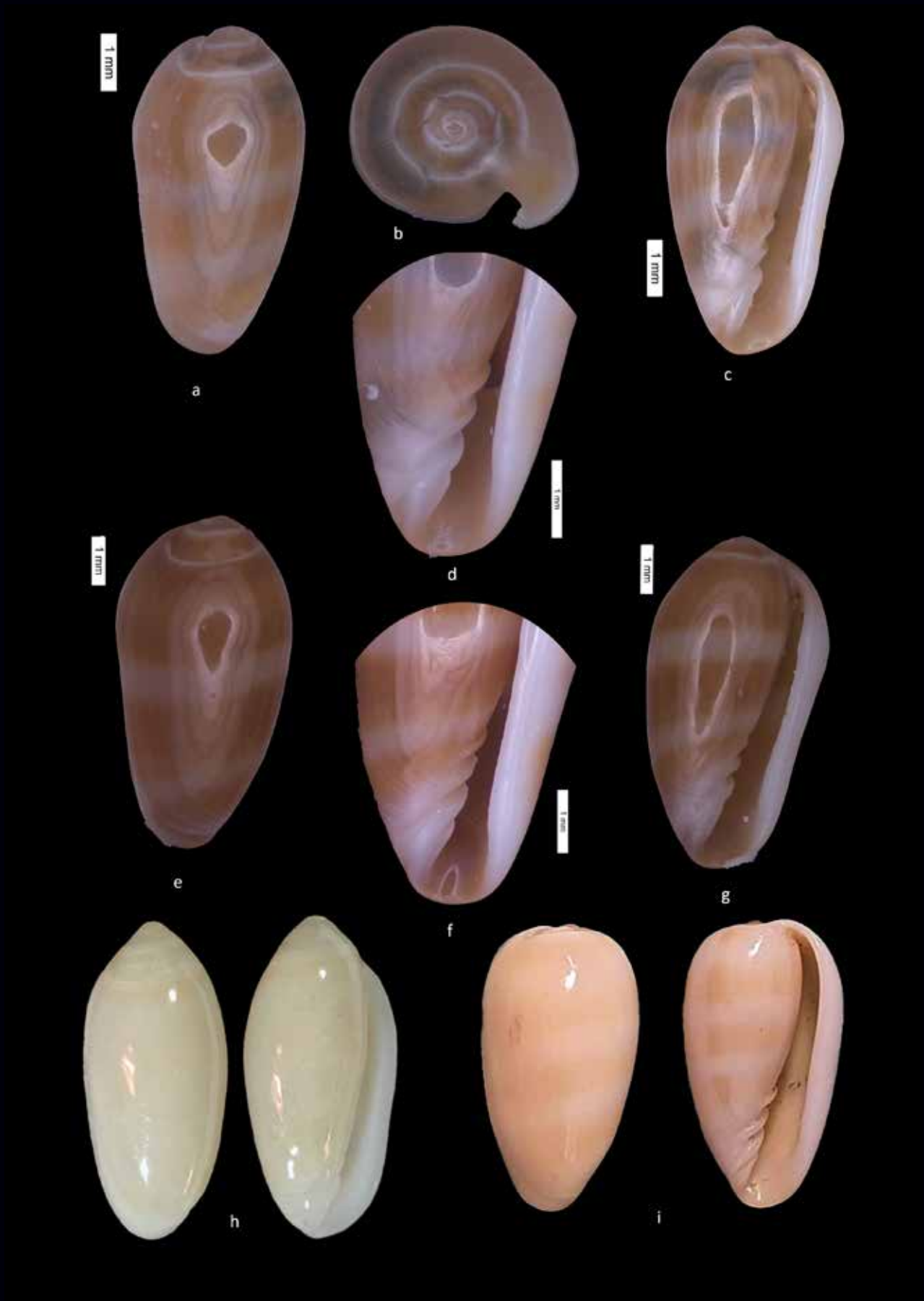
Acknowledgment

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Plate 1.



a-d. *Volvarina vinosa* sp. nov. Holotype MNRJ 24488, 5,8 x 3,2 mm ; e-g. *Volvarina vinosa* sp. nov. Paratype 1, 6,7 x 3,6 mm;
h. *Volvarina damasoi* Cossignani, 2017 ; i. *Prunum coltrorum* Cossignani, 2005

ANALYSIS OF CERITHIOPSIDAE OF THE JOUSSEAUME'S COLLECTION

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Résumé

Le présent travail analyse la famille des Cerithiopsidae de la collection Félix Jousseume conservée au Muséum National d'Histoire Naturelle (MNHN) à Paris (France). Le matériel se compose de 689 espèces, signalées à divers endroits de la mer Rouge, dont 8 sont nouvelles pour la science : *Clathropsis adenensis*, *Clathropsis suzeensis*, *Clathropsis gilvufasciata*, *Joculator albatu*, *Seila felici*, *Specula bisulcata*, *Specula perimensis*, *Specula yemenensis*, et 6 espèces sont signalées pour la première fois de la mer Rouge : *Clathropsis multispirae*, *Costulopsis noninii*, *Ondulopsis tricolor*, *Marshallopsis chirlii*, *Specula dagostinoi*, *Tubercliopsis miranda*.

Abstract

In the present work the Cerithiopsidae family of Felix Jousseume's collection preserved at the Muséum National d'Histoire Naturelle (MNHN) in Paris (France) is analyzed. The material is represented by 689 species, reported from various places in the Red Sea, of which 8 have been found to be new to science: *Clathropsis adenensis*, *Clathropsis gilvufasciata*, *Clathropsis suzeensis*, *Joculator albatu*, *Seila felici*, *Specula bisulcata*, *Specula perimensis*, *Specula yemenensis*, and 6 species are reported for the first time from Red Sea area: *Clathropsis multispirae*, *Costulopsis noninii*, *Ondulopsis tricolor*, *Marshallopsis chirlii*, *Specula dagostinoi*, *Tubercliopsis miranda*.

Keywords

Triphoroidea, Cerithiopsidae, Red Sea, Felix Jousseume's Coll.

Introduction (by Philippe Bouchet)

It takes on average 21 years between the collection of the first specimen of a new species and its description in the scientific literature (Fontaine et al. 2012). In the last decade, the authors have described over 560 new species of Cerithiopsidae based on specimens collected in the preceding 2-25 years. By contrast, the present work contains the descriptions of new cerithiopsid species based on specimens collected 125 years ago by Felix Jousseume and preserved in MNHN. Beside his medical profession, Jousseume (1835-1921) was a prolific malacological author, publishing no less than 134 works between 1869 and the year of his death (van Gemert 2007), touching all kinds of land, freshwater and marine taxa from all over the world. His legacy is perhaps nowhere as important as on Red Sea molluscs. Between 1889 and 1900, Jousseume travelled during nine winters to the southern Red Sea and the Gulf of Aden, collecting shells in Djibouti, Obock, Aden and Perim, resulting in the discovery

of such spectacular species as *Lampas bardeyi* Jousseume, 1894 [now *Tutufa bardei*; Bursidae] or *Conus milneedwardsi* Jousseume, 1894, beside numerous micromolluscs. On the latter, his more lasting papers deal with the Triphoridae (Jousseume, 1898) and Epitoniidae (Jousseume, 1912). Many families were left untouched and, after the donation of his collection to MNHN in 1916, Edouard Lamy, then assistant curator in malacology published many posthumous papers on the Red Sea species in various bivalve families. Jousseume was very passionate about the Red Sea. Beside conchological papers, he published a voluminous tome (Jousseume, 1899) of his (unconventional) thoughts on what today would be called ecology and evolution in the Red Sea, the scientific interest of which is quite debatable.

Among the collections donated by Jousseume to MNHN there are still much unstudied lots of microshells. Although the Gulf of Aden and adjacent southern Red Sea have in recent years been of interest to shell collectors (see, e.g., Coulombel 1994 and Blatteres, 2019), very little has happened since Jousseume on the micromolluscs of the region. Dekker & Orlin (2000) listed a mere 6 species of Cerithiopsidae from the Red Sea, of which 3 of doubtful provenance and/or identity. Jousseume's material was obviously collected from shell grit, and many specimens are in poor condition that do not permit proper identification or description. However, part of the material is in good condition, complete with protoconchs, and 125 years after it was collected still adds to our knowledge of the Cerithiopsidae of the Gulf of Aden and southern Red Sea, including several new species described below.

Material and methods

In Jousseume's collection there are 689 specimens of Cerithiopsidae from various places in the Red Sea; Egypt (Suez, 133), Saudi Arabia (Djedda, 40), Sudan (Souakin, 2), Yemen (Aden, 198; Hodeidah, 6; Perim Is., 239) and Eritrea (Massawa, 8).

216 species were identified and belonged to genera: *Clathropsis* (4), *Costulopsis* (1), *Horologica* (1), *Marshallopsis* (1), *Ondulopsis* (1), *Prolixodens* (1), *Seila* (1), *Specula* (4) and *Tubercliopsis* (1).

8 species proved to be new to science, belonging to genera: *Clathropsis* (3), *Joculator* (1), *Seila* (1), and *Specula* (3). The identification of the examined material is based only on the analysis of the morphological characters of the shell, because the totality of the material is composed of empty shells without soft parts. The material, clearly beached, was not washed with fresh water, selected specimens in good condition were photographed with digital camera and with ESEM. The size of the shells were measured manually with a

microscope 20/40x (lens with millimeter scale).

For generic assignment, we have always given priority to the features of the protoconch. However, based on our experience, we believe that an evaluation based only on the examination of the protoconch or teleoconch is sometimes not enough, leaving many doubts that can be clarified by the examination of the soft parts only. Our genus-level identifications are therefore tentative. The systematics follows Bouchet et al. (2017), to the level of subfamilies and is derived from Marshall (1978) for the genera, pending analysis of the soft parts.

Acronyms and abbreviations

auct.	auctores (lat.) authors
et al.	<i>et alii</i> (latin) and others
fig./figs.	figure/figures
juv.	juvenile form
MNHN	Muséum National d'Histoire Naturelle, Paris, France
ESEM	Environmental Scanning Electron Microscope
spm(s)	specimen (s)
W/H	width/height

SYSTEMATICS

Clade **Hipsogastropoda** Ponder & Lindberg, 1997

Informal Group **Ptenoglossa** Gray, 1853

Superfamily **Triphoroidea** Gray, 1847

Family **Cerithiopsidae** H. Adams & A. Adams, 1853

Clathropsis adenensis n. sp.

(Fig. 1 A-C)

Type material:

holotype - (MNHN-IM-2000-37708) dim. 3.50 x 1.15 mm, protoconch 0.57 x 0.25 mm, Yemen, Aden.

Type locality:

Red Sea, Yemen, Aden.

Distribution:

Known only from the type locality.

Material examined:

Red Sea: Yemen, Aden, spm 1.

Known only from the holotype.

Description of holotype:

Shell medium in size, conical with regular increase, very impressed sutures, base excavate. Protoconch conical, slender of 4.5 smooth slightly convex whorls; first 2.5 whorls whitish, subsequent whorls brownish, semitransparent. Teleoconch of about 6.5 convex whorls with reticulate sculpture of 3 equal spiral cords (1st cord immediately after suture less prominent), crossed by weaker axial ribs, 20 on last whorl, beads at each intersection. A fourth cord at the base of last whorl emerging from insertion of outer lip. Columella acuminate, smooth; columellar callus bordering a subcircular aperture, outer lip bordered by sculpture of the teleoconch, siphonal canal well defined. Color orange.

Comparison:

Clathropsis adenensis n. sp. is compared with *Clathropsis ornata* and *Clathropsis bugeae* both Cecalupo & Perugia, 2014 from South Madagascar: the first is similar in size and protoconch but has the teleoconch different with more convex whorls, sutures less impressed and color not uniform; the second differs mainly in a narrower conical shape (ratio W/H 0.22 vs 0.33) and golden yellow, semitransparent color.

Etymology:

adenensis from Aden, type locality.

Clathropsis gilvufasciata n. sp.

(Fig. 1 J-L)

Type material:

holotype - (MNHN-IM-2000-37710) dim. 3.90 x 1.25 mm, protoconch 0.42 x 0.27 mm, Yemen, Perim Is.

paratype 1 - (MNHN-IM-2000-37711) dim. 3.90 x 1.20 mm, protoconch 0.40 x 0.26 mm, Yemen, Perim Is.

paratype 2 - (MNHN-IM-2000-37712) dim. 3.65 x 1.15 mm, protoconch damaged, Yemen, Perim Is.

Type locality:

Red Sea, Yemen, Perim Is.

Distribution:

Known only from type locality.

Material examined:

Red Sea: Yemen, Perim Is., spms 25.

Description of holotype:

Shell medium in size, conical with regular increase, impressed sutures. Protoconch cylindrical, 2.5 smooth convex whorls, embryonic whorl mammillated; white in color. Teleoconch of about 7.25 whorls with reticulate sculpture of 3 equal spiral cords crossed by weaker axial ribs, about 19 on last whorl; beads at each intersection. A fourth cord at the base of last whorl emerging from insertion of outer lip; limit between columella and base highlighted by a thin cord. Columella short, acuminate, smooth, columellar callus bordering a subcircular aperture, outer lip bordered by sculpture of the teleoconch; siphonal canal and anal sulcus well distinct. Color white with first spiral cord and columella yellow.

Comparison:

Clathropsis gilvufasciata n. sp. has a color similar to *Clathropsis luteocincta* Cecalupo & Perugia, 2013 from Vanuatu which clearly differs having a sub-cylindrical protoconch of 4.5 whorls.

Etymology:

gilvufasciata from Latin *gilvus*, *a*, *um* and *fascia* in English pale yellow and band.

Clathropsis multispirae Cecalupo & Perugia, 2012

(Fig. 1 D-F)

Figured specimens:

dim. 8.50 x 2.20 mm, Yemen, Perim Is.

Type locality:

Philippines, Panglao Is., Momo Beach, 80 m.

Distribution:

Indopacific province.

Material examined:

Red Sea: Yemen, Perim Is., Strait of Bab el Mandab, spm 1.

Remarks:

First report from Red Sea.

Clathropsis suzeensis n. sp.

(Fig. 1 G-I)

Type material:

holotype - (MNHN-IM-2000-37709) dim. 4.25 x 1.25 mm, protoconch 0.35 x 0.20 mm, Egypt, Suez.

Type locality:

Red Sea, Egypt, Suez.

Distribution:

Known only from type locality.

Material examined:

Known only from type holotype.

Description of holotype:

Shell medium in size, conical with regular increase, impressed sutures, last whorl damaged. Protoconch conical of 3.5 smooth convex whorls, embryonic whorl white, subsequent whorls pale orange. Teleoconch of about 7.2 whorls with reticulate sculpture of 4 equal spiral cords crossed by axial ribs, about 30 on last whorl; beads at each intersection. A fifth cord at the base of last whorl emerging from insertion of outer lip; last whorl damaged. Color dark orange.

Comparison:

Clathropsis suezensis n. sp. is characterized by the 4 spiral cords on the teleoconch. Its shape is clearly similar to *Clathropsis eugenei* Cecalupo & Perugia, 2014 from South Madagascar which differs by being smaller with the same number of whorls, for a larger protoconch (0.61 x 0.36 vs 0.35 x 0.20), teleoconch with 24 axial ribs vs 30 and a pale color. Another species to compare is *Cerithiopsis quadrispiralis* Laseron, 1951 from Australia (New South Walls, Yamba), with shorter protoconch and teleoconch with 24 axial ribs.

Etymology:

suezensis from type locality.

Costulopsis noninii (Cecalupo & Perugia, 2012)
(not figured)

Tubercliopsis turgida Cecalupo & Perugia, 2012

Synthopsis noninii (Cecalupo & Perugia, 2012)

Type locality:

Philippines, Panglao Is., near Napaling, up to 30 m.

Distribution:

Indopacific range.

Material examined:

Red Sea: Yemen, Perim Is., spm 1; Djibouti, spms 2.

Remarks:

First report from Red Sea.

Horologica interiecta Cecalupo & Perugia, 2016
(Fig. 1 M-O)

Figured specimen:

(MNHN-IM-2012-25457) dim. 2.83 x 0.93 mm, protoconch 0.47 x 0.25 mm, Yemen, Perim Is.

Type locality:

Red Sea: Egypt, Ras Mubarak beach.

Distribution:

Red Sea: Egypt, Yemen.

Material examined

Red Sea: Yemen, Perim Is., spm 1.

Joculator albatrus n. sp.
(Fig. 1 P-R)

Type material:

holotype - (MNHN-IM-2000-37713) dim. 1.60 x 0.66 mm, protoconch 0.30 x 0.20 mm, Yemen, Aden.

Type locality:

Red Sea: Yemen, Aden.

Distribution:

Known only from type locality.

Material examined:

Known only from the holotype.

Description of holotype:

Shell small, conical, sutures impressed, color white. Protoconch conical of 3.5 smooth convex whorls. Teleoconch of 4.5 whorls with reticulate sculpture of 3 spiral cords crossed by weaker axial ribs, about 16 on last whorl, beads at each intersection. A fourth cord at the base of last whorl emerging from insertion of outer lip; limit between base and columella highlighted by a weak cord. Columella short, columellar callus bordering a circular aperture, anal sulcus inconspicuous, siphonal canal well defined.

Comparison:

Joculator albatrus n. sp. is compared with some species similar in size: *Joculator lokaroensis* Cecalupo & Perugia, 2014 from South Madagascar which differs by having more inflated shape, protoconch larger and less conical with rounded apex, 18 axial ribs vs 16 and color sandy yellow; *Joculator goubini* Cecalupo & Perugia, 2017 from New Caledonia mainly differs for the constricted base and the red brown color; *Joculator sbranaei* Cecalupo & Perugia, 2021 from New Caledonia has similar color but a more inflated shape and a more slender protoconch.

Etymology:

albatrus from latin *albatrus*, *a*, *um* in English white feature.

Marshallopsis chirlii Cecalupo & Perugia, 2014
(Fig. 2 D-F)

Type material:

(MNHN-IM-2012-25456) dim. 2.45 x 0.92 mm, protoconch 0.30 x 0.20 mm, Yemen, Perim Is.

Type locality:

South Madagascar, in front of lighthouse Flacourt, 12-16 m.

Distribution:

Yemen, South Madagascar.

Material examined:

Red Sea: Yemen, Perim Is., spm 1.

Remarks:

First report from Red Sea.

Ondulopsis tricolor Cecalupo & Perugia, 2012
(Fig. 2 A-C)

Figured specimens:

dim. 3.27 x 1.03 mm, protoconch missing, Egypt, Suez.

Type locality:

Philippines, Panglao Is., Napaling, 24 m.

Distribution:

Indopacific range.

Material examined:

Red Sea: Egypt, Suez, spm 1.

Remarks:

First report from Red Sea.

Prolixodens lutea (Cecalupo & Perugia, 2012)
(Fig. 2 G-I)

Marshallopsis lutea Cecalupo & Perugia, 2012

Figured specimens:

dim. 2.67 x 1.13 mm, Yemen, Perim Is.

Type locality:

Philippines, Pamilacan Is., 3-5 m.

Distribution:

Indopacific province.:

Red Sea: Yemen, Perim Is., spm 1.

Seila felicitis n. sp.
(Fig. 2 J-O)**Type material:**

holotype - (MNHN-IM-2000-37714) dim. 7.50 x 2.40 mm, protoconch 0.50 x 0.37 mm, Yemen, Aden.

paratype 1 - (MNHN-IM-2000-37715) dim. 5.60 x 1.80 mm, Yemen, Aden.

paratype 2 - (MNHN-IM-2000-37716) dim. 8.80 x 2.40 mm, Yemen, Perim Is.

paratype 3 - (MNHN-IM-2000-37717) dim. 7.50 x 2.10 mm, Yemen, Aden.

paratype 4 - (MNHN-IM-2000-37718) dim. 7.00 x 2.00 mm, Yemen, Aden.

paratype 5 - (MNHN-IM-2000-37719) dim. 5.10 x 1.66 mm, Yemen, Perim Is.

Type locality:

Red Sea, Yemen, Aden.

Distribution:

Known only from the type locality.

Material examined:

Red Sea: Yemen, Aden, spms 108, Yemen, Perim Is., spms 70; Djibouti, spms 2.

Description of holotype:

Shell large, conical with flat sides, sutures poorly visible, base excavate. Protoconch conical with impressed sutures of 3.5-4 smooth convex whorls; see under ESEM apex missing, subsequent whorls show a sub-sutural band of very minute grains; color yellowish. Teleoconch of 12 whorls with spiral sculpture of 3 spiral cords (second narrower and less prominent); under ESEM interspaces between spiral cords crossed by fine close-set axial threads. A fourth cord at the base of last whorl emerging from insertion of outer lip following by another thinner cord; limit between columella and base highlighted by a weak cord and a groove. Columella short, obliquely truncate, columellar callus bordering the circular aperture, siphonal canal well defined. Color red brown.

Remarks:

The missing embryonic whorl is a characteristic common to all the specimens examined.

Comparison:

Seila felicitis n. sp. is compared with species having similar shape and color: *Seila africana* Bartsch, 1915 (see Cecalupo & Perugia, 2014 fig. 2, W - fig. 13, A-B) has a dark brown color and a protoconch cylindrical with less impressed sutures and slightly convex whorls; *Seila japonica* Habe, 1970 has a more pupoid shape, red brown color but we have no images of the protoconch. Difficult comparisons with *Seila japonica* Habe, 1970 which has a more pupoid shape and red brown color and *Seila* cfr. *japonica* (see Cecalupo & Perugia, 2012: 115, pl. 35, fig. D and pl. 131, figs. A-C) more similar shape and pale brown color; for both we have no images of the protoconch. *Seila carinata* (Smith, 1871) from Atlantic area, has a similar protoconch with convex whorls and impressed sutures, a more conical shape and different color, brown with whitish flashes.

No other species shows a sub-sutural band of minute grains.

Etymology:

felicitis after Felix Jousseume, who collected the present material between 1889 and 1900, and donated it to MNHN in 1916.

Specula bisulcata n. sp.
(Fig. 3 A-C)**Type material:**

holotype - (MNHN-IM-2000-37720) dim. 2.15 x 0.95 mm, protoconch 0.30 x 0.22 mm, Yemen, Perim Is.

Type locality:

Red Sea, Yemen, Perim Is.

Distribution:

Known only from type locality.

Material examined:

Known only from the holotype.

Description of holotype:

Shell small, conical, sutures moderately impressed but distinct. Protoconch small of 2.5 smooth convex whorls, apex mammillated; color white, opaque. Teleoconch of 4.5 whorls with reticulate sculpture of 3 equal spiral cords (the first two closer one to each other), crossed by axial ribs, about 20 on last whorl, beads at each intersection. A fourth cord at the base of last whorl emerging from insertion of outer lip followed by a thin cord similar to a keel. Aperture incomplete; color orange.

Remarks and comparison:

The 2 spiral cords at the base are a peculiar feature found in the genus *Mendax* Finlay, 1926 (also present in the genera *Retilaskeya* Marshall, 1978 and *Seila* Adams, 1861, which have a completely different teleoconch sculpture). This 2 cords make *Specula bisulcata* n. sp. easily separable from similar species such as *Specula perplexa* Cecalupo & Perugia, 2017 from New Caledonia and *Specula naooe* Cecalupo & Perugia, 2019 from Okinawa.

Etymology:

bisulcata from Latin *bis* and *sulcatus*, *a*, *um* in English twice and furrowed.

Specula dagostinoi Cecalupo & Perugia, 2017
(Fig. 3 J-M)**Type material:**

J - (MNHN-IM-2012-25455) dim. 3.70 x 1.48 mm, protoconch 0.30 x 0.22 mm, Egypt, Suez.

K-M - dim. 2.60 x 1.34 mm, protoconch 0.29 x 0.23 mm, Egypt, Suez.

Type locality:

New Caledonia, Nouméa, Goéland Is., 10 m.

Distribution:

Okinawa, Vanuatu.

Material examined:

Red Sea: Egypt, Suez, spms 5.

Remarks:

First report from Red Sea.

Specula perimensis n. sp.
(Fig. 3 D-F)**Type material:**

holotype - (MNHN-IM-2000-37721) dim. 2.42 x 1.14 mm, protoconch 0.27 x 0.19 mm, Yemen, Perim Is.

Type locality:

Red Sea, Yemen, Perim Is.

Distribution:

Known only from type locality.

Material examined:

Known only from the holotype.

Description of holotype:

Shell small, oval, sutures distinct. Protoconch small of 2.5 smooth convex whorls, color white, opaque. Teleoconch of 5 whorls with reticulate sculpture of 3 equal spiral cords crossed by axial ribs, about 18 on last whorl, beads at each intersection. A fourth cord at the base of the last whorl emerging from insertion of outer lip; limit between base and columella highlighted by a cord. Columella very short crossed by crisp threads, columellar callus bordering an oval aperture with siphonal canal and anal sulcus well defined, thin outer lip. Color dark orange with paler beads.

Comparison:

Specula perimensis n. sp. is rather similar to *Specula churamaris* Cecalupo & Perugia, 2019 from Okinawa which mainly differs being less wide and having a color uniformly light brown.

Etymology:

perimensis from type locality.

***Specula yemenensis* n. sp.
(Fig. 3 G-I)**

Type material:

holotype - (MNHN-IM-2000-37722) dim. 2.45 x 1.00 mm, protoconch 0.37 x 0.28 mm, Yemen, Perim Is.

Type locality:

Red Sea; Yemen, Perim Is.

Distribution:

Known only from type locality.

Material examined:

Known only from the holotype.

Description of holotype:

Shell small, subcylindrical, slightly inflated, sutures moderately impressed. Protoconch small of 2.5 smooth convex whorls, apex rounded. Color white, opaque. Teleoconch of 5 slightly convex whorls with reticulate sculpture of 3 equal spiral cords crossed by axial ribs, about 18 on last whorl, beads at each intersection. A fourth cord at the base of last whorl emerging from insertion of outer lip; limit between columella and base highlighted by a furrow. Columella short, columellar callus bordering a circular aperture with siphonal canal well defined, aperture and outer lip incomplete. Color dark orange.

Comparison:

Specula yemenensis n. sp. is compared with *Specula vivifareii* Cecalupo & Perugia, 2014 from Vanuatu and New Caledonia more inflated with a shorter protoconch. It is also compared with *Specula queenslandica* Laserson, 1951 from Hope Is. (North Australia), having a protoconch of only 2 whorls and faded brown color.

Etymology:

yemenensis from type locality.

***Tubercliopsis miranda* Cecalupo & Perugia, 2012
(not figured)**

Type locality:

Philippines, Pamilacan Is.

Distribution:

Indopacific province.

Material examined:

Red Sea: Yemen, Perim Is., spms 2; Djibouti, spm 1.

Remark:s

First report from Red Sea.

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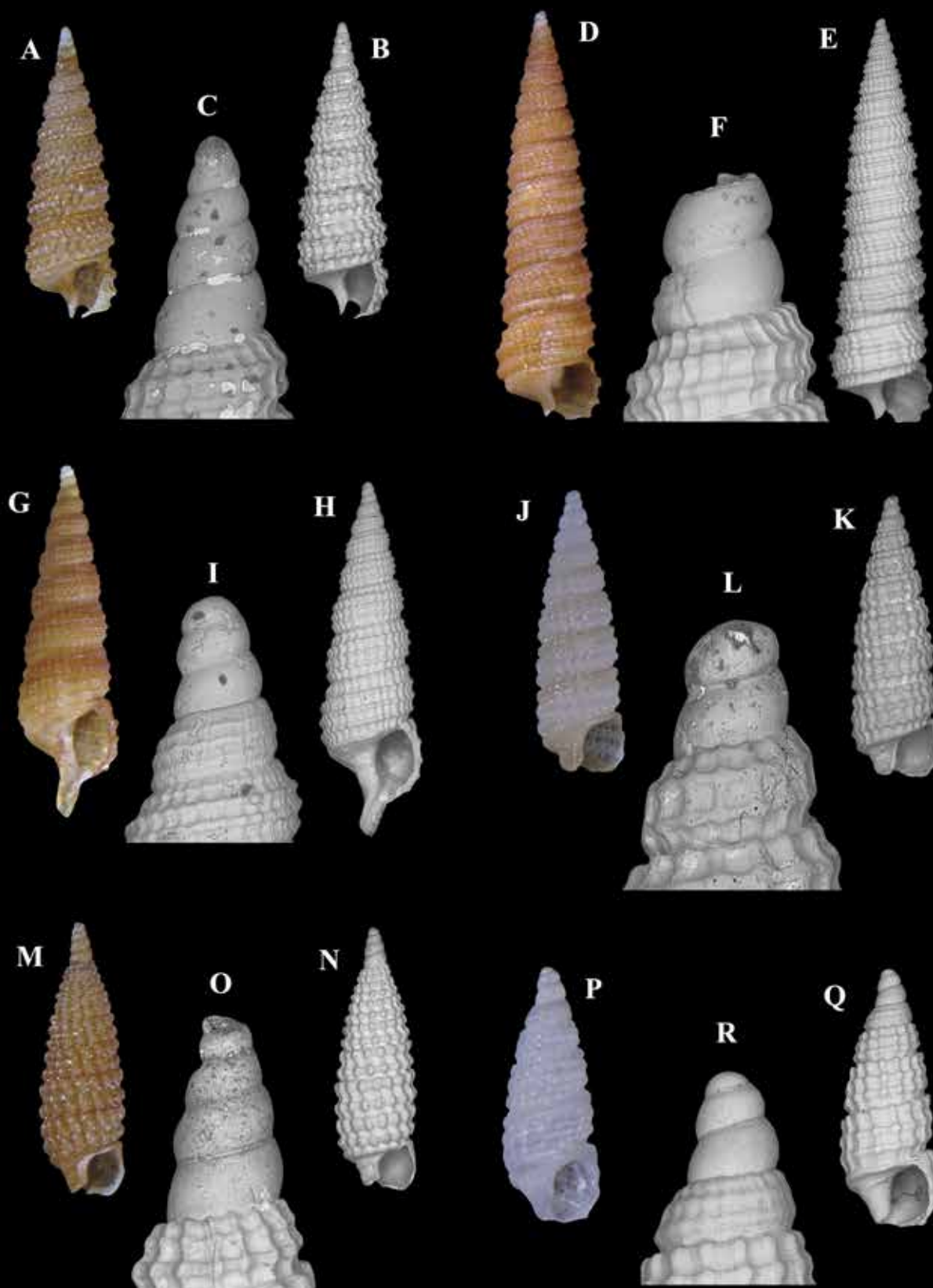


Plate 1. A-C. *Clathropsis adenensis* n. sp., holotype (MNHN-IM-37708), 3.50 x 1.15 mm, protoconch 0.57 x 0.25 mm, Yemen, Aden; D-F. *Clathropsis multispirae* Cecalupo & Perugia, 2012, 8.50 x 2.20 mm, Yemen, Perim Is.; G-I. *Clathropsis suzeensis* n. sp., holotype (MNHN-IM-37709), 4.25 x 1.25 mm, protoconch 0.35 x 0.20 mm, Egypt Suez; J-L. *Clathropsis gilvufasciata* n. sp., holotype (MNHN-IM-2000-37710), 3.90 x 1.25 mm, protoconch 0.42 x 0.27 mm, Yemen, Perim Is.; M-O. *Horologica interiecta* Cecalupo & Perugia, 2016 (MNHN-IM-2012-25457), 2.83 x 0.93 mm, protoconch 0.47 x 0.25 mm, Yemen, Perim Is.; P-R. *Joculator albatrus* n. sp., holotype (MNHN-IM-2000-37713), 1.60 x 0.66 mm, protoconch 0.30 x 0.20 mm, Yemen, Aden.

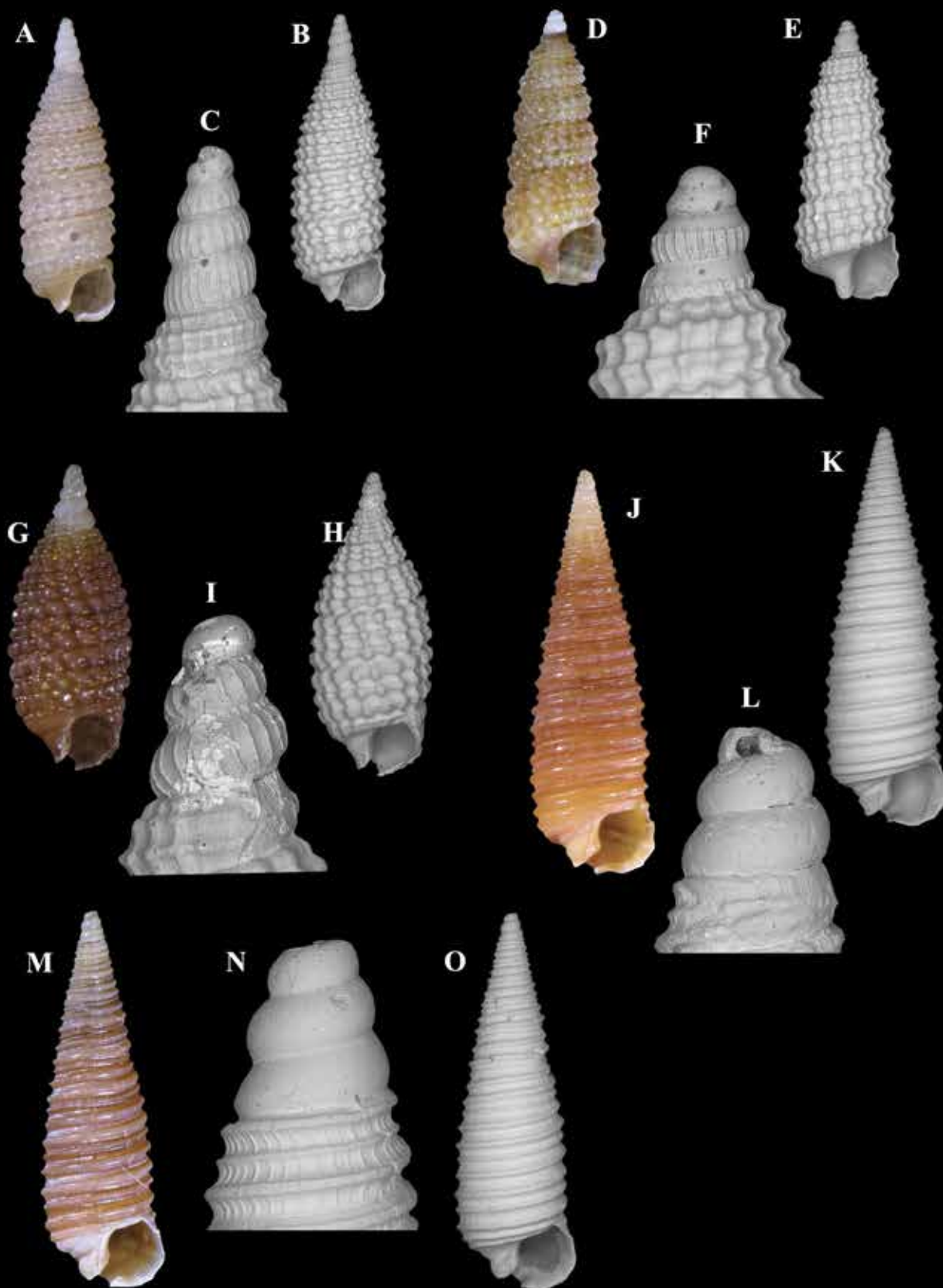


Plate 2. A-C. *Ondulopsis tricolor* Cecalupo & Perugia, 2012, 3.27 x 1.03 mm, protoconch missing, Egypt, Suez; D-F. *Marshallopsis chirlii* Cecalupo & Perugia, 2014 (MNHN-IM-2012-25456), 2.45 x 0.92 mm, protoconch 0.30 x 0.20 mm, Yemen, Perim Is.; G-I. *Prolixodens lutea* (Cecalupo & Perugia, 2012), 2.67 x 1.13 mm, Yemen, Perim Is.; J-L. *Seila felicitis* n. sp., holotype (MNHN-IM-2000-37714), 7.50 x 2.40 mm; M-O. Paratype 1, (MNHN-IM-2000-37715), 5.60 x 1.80 mm, Yemen..

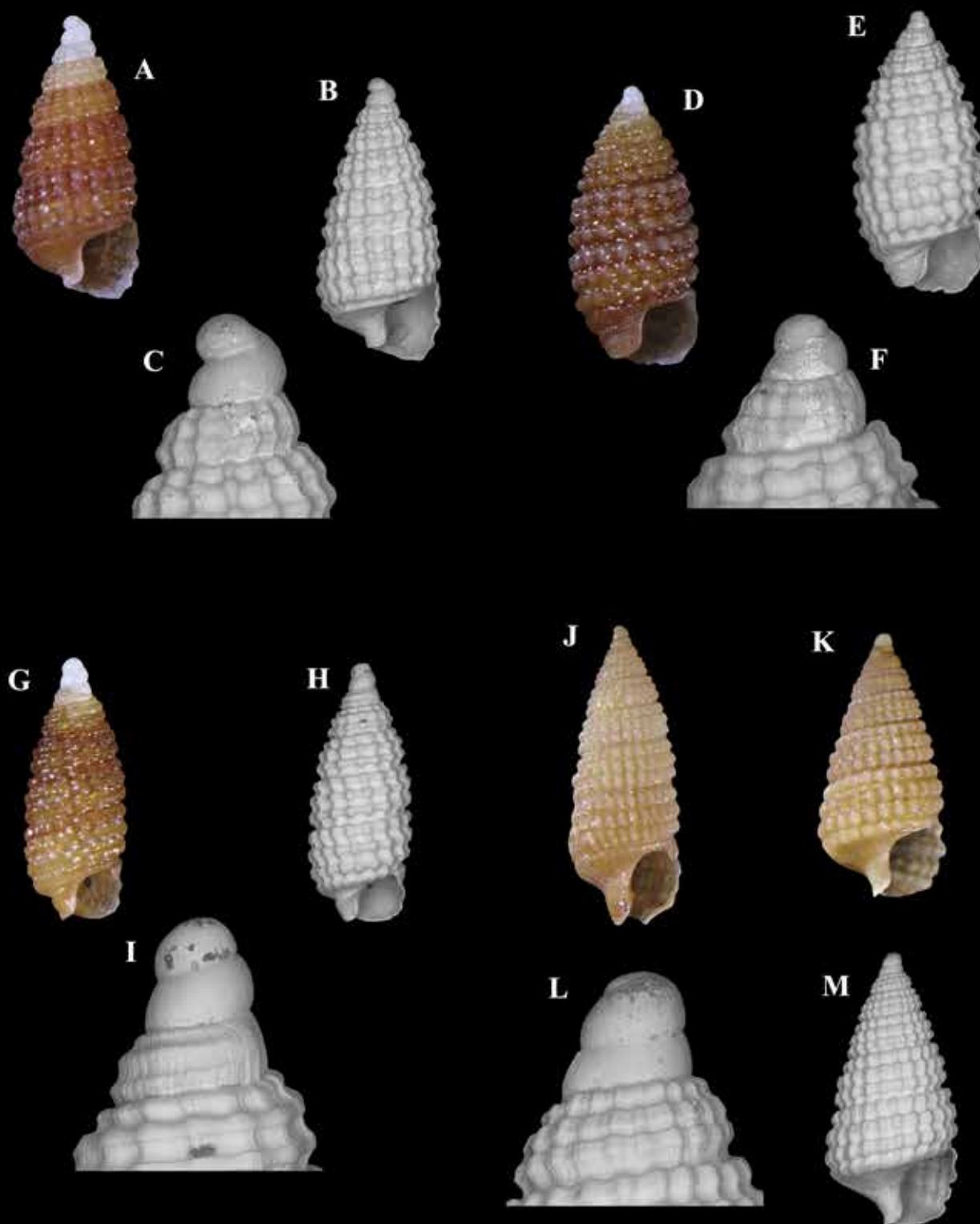


Plate 3. A-C. *Specula bisulcata* n. sp., holotype (MNHN-IM-2000-37720), 2.15 x 0.95 mm, protoconch 0.30 x 0.22 mm, Yemen, Perim Is.; D-F. *Specula perimensis* n. sp., holotype (MNHN-IM-2000-37721), 2.42 x 1.14 mm, protoconch 0.27 x 0.19 mm, Yemen, Perim Is.; G-I. *Specula yemenensis* n. sp., holotype (MNHN-IM-2000-37722), 2.45 x 1.00 mm, protoconch 0.37 x 0.28 mm, Yemen, Perim Is.; J-M. J. *Specula dagostinoi* Cecalupo & Perugia, 2017 (MNHN-IM-2012-25455), 3.70 x 1.48 mm, protoconch 0.30 x 0.22 mm, Egypt, Suez; K-M. 2.60 x 1.34 mm, protoconch 0.29 x 0.23 mm, Suez.

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Cyprus, Levantine Sea, Marine Molluscs, Mediterranean Sea, New Records

Abstract

The work is part of an ongoing study on the marine malacofauna of Cyprus by September 2022. It incorporates 28 species out of which 7 are new records for the Cypriot malacofauna, 3 exhibit a broader distribution, 17 are second image documented records for the territory and 1 comprises an uncommon finding. Main taxonomic characteristics and ecological data, such as habitat, distribution and origin, are presented and discussed.

Introduction

Molluscs comprise up to 25% of the marine benthic fauna worldwide - a significant component in the number of species and of individuals - thus, any significant change in the molluscan species composition is expected to have a considerable impact on the benthic communities as a whole (Gofas & Zenetos, 2003). The molluscan biodiversity can, apparently, also be affected by exotic species, especially in marine areas adjacent to gates of introduction such as the Suez Canal in the East Mediterranean Sea (Lessepsian migration, also called Erythrean invasion). In the past decades, human activities have exposed the Mediterranean molluscan fauna to extensive factors of change (Gofas & Zenetos, 2003). As result, thorough faunistic studies facilitate monitoring of the changes and their apprehension. Cyprus is situated in the Levantine Sea - the most oligotrophic basin in the Mediterranean (Öztürk, 2011) - close to the Suez Canal and in the way of the sea currents which are considered responsible for the expansion of the Lessepsian molluscs from the Suez Canal towards north up to the NW Aegean Sea (Manousis & Galinou-Mitsoudi, 2014). The existing published records on the marine molluscan species in the Cypriot waters are rather few, sometimes part of faunistic research and are mainly referred to the northern coasts of the Island (e.g. Di Monterosato, 1899; Stavrinos, 1974; Tornaritis, 1987; Barash &

Danin, 1988; Cecalupo & Quadri, 1994a, 1994b, 1995; Buzzurro & Greppi, 1997; Orr, 2000; Delongueville & Scaillet, 2008, 2009, 2010a, 2010b; Katsanevakis *et al.*, 2009; Zenetos *et al.*, 2009; Tsiakkios & Zenetos, 2011). The estimated reported species of Cyprus (some 750) represent, in absolute numbers, the nearly 100% of those 702 of Israel (Barash & Danin, 2013), nearly 67% of those 1065 of Turkey (Öztürk *et al.*, 2004) and nearly 50% of those 1424 of Greece (Manousis, 2021). In the case of Greece, in particular, this number is the result of a substantial increase by 27% to the previously reported marine malacofauna of the area through an extensive study during the last decade or so (Manousis, 2021). At the same time, a review of the relevant bibliography reveals the lack of smaller species (i.e. <5 mm) - an indication that the area is understudied. For that reason, the aim of this work is to initiate an investigation on the understudied Cypriot seas for the existence of new and the expansion of other known molluscan species with emphasis on those of smaller size and give reference information for the future. We are also of the opinion that sooner or later certain issues need to be addressed: 1. which is the current situation regarding the present Cypriot malacofauna; 2. how is that affected by migration-invasion.

Methods

Sampling, handling and species recognition were conducted according to Manousis & Galinou-Mitsoudi (2014) and Mbazios *et al.* (2020) from August 2021 to September 2022 in locations of the Cypriot Seas (Fig. 4). All 1st and 2nd documented records for the Cypriot Seas are listed in Table 1 with collection data and relevant literature. Adequate description of certain specimens is designated whenever supplemental information facilitates identification. All findings are presented in Figures 1-3. The specimens are deposited in the premises of D. Kolokotronis and K. Papavasileiou. Scientists are welcome to have access to the biological material for inspection by appointment.

Results

Abbreviations: **Co** – Common, **C1** – First record for Cyprus, **C2** – Second record for Cyprus, **EMS** – East Mediterranean Sea, **KLM** – Known Lessepsian Migrant, **MB** – Mixed Bottom, **MS** – Mediterranean Sea, **NL** – New Location, **RC** – Rocky Coast, **TP** – Tide Pool, **UF** – Uncommon Finding, **Un** – Uncommon.

The records

BIVALVIA

Lioberus ligneus (Reeve, 1858) (Fig. 1a). A known Lessepsian migrant recently verified for Cyprus by Albano *et al.* (2021) and known from the Karpasia Peninsula (Fig. 4a).

Isognomon legumen (Gmelin, 1791) (Fig. 1b). A known Lessepsian migrant in the Mediterranean Sea reported here for the first time for Cyprus.

Dendostrea cf. *folium* (Linnaeus, 1758) (Fig. 1c). A known Lessepsian migrant in the Mediterranean Sea reported here for the first time for Cyprus.

Fabulina fabula (Gmelin, 1791) (Fig. 1d). Its presence in Cyprus has been verified by Öztürk *et al.* (2004).

Gafrarium pectinatum (Linnaeus, 1758) (Fig. 1e). Here we verify its presence in a new location as the species has been reported for Orga (Fig. 4b) by Katsanevakis *et al.* (2009).

Lajonkairia lajonkairii (Payraudeau, 1826) (Fig. 1f). This is a second record since its original report by Cecalupo & Quadri (1995).

GASTROPODA

Diodora producta (Monterosato, 1880) (Fig. 1g). It has been already shown once from Famagusta Bay (<https://www.marinespecies.org/aphia.php?p=image&tid=139953&pic=70908>) (Fig. 4c).

Emarginula adriatica O. G. Costa, 1830 (Fig. 1h). First report for the area.

Cerithium renovatum Monterosato, 1884 (Fig. 2a). It has been already image documented once (<https://www.marinespecies.org/nmr/photogallery.php?album=3335&pic=141745>)

Viriola cfr. *bayani* Jousseaume, 1884 (Fig. 2b). A known Lessepsian migrant recently verified for Cyprus by Albano *et al.* (2021).

Melanella polita (Linnaeus, 1758) (Fig. 2c). Its presence in Cyprus has been initially verified by Öztürk *et al.* (2004).

Melanella pseudoglabra (Dautzenberg & H. Fischer, 1912) (Fig. 2d). Its presence in Cyprus has been verified by Demetropoulos (1969).

Rissoina bertholleti Issel, 1869 (Fig. 2e). It has been initially verified for Cyprus by Buzzuro & Greppi (1997).

Tonna galea (Linnaeus, 1758) (Fig. 2f). Even though the periostracum spines are almost destroyed, it was included in this paper as it is rather uncommon to find an intact and live protoconch of this common species that losses its operculum soon after metamorphosis (Gofas *et al.*, 2011).

Chauvetia brunnea (Donovan, 1804) (Fig. 2g). First image documented report for the area.

Tritia cuvierii (Payraudeau, 1826) (Fig. 2h). Initially reported by Cecalupo & Quadri (1995).

Bela minoica Bogi, Giannuzzi Savelli & Pusateri, 2021 (Fig. 2i). It has been reported for Ayia Napa (Fig. 4d) without image

documentation (Bogi *et al.*, 2021).

Mangelia callosa (F. Nordsieck, 1977) (Fig. 2j). First image documented report for the area.

Clathromangelia granum (Philippi, 1844) (Fig. 3a). Here we verify its presence in a new location as the species has been reported for Cyprus by Cecalupo & Quadri (1995).

Raphitoma farolita F. Nordsieck, 1977 (Fig. 3b). First image documented report for the area.

Raphitoma horrida (Monterosato, 1884) (Fig. 3c). First image documented report for the area.

Amathina tricarinata (Linnaeus, 1767) (Fig. 3d). Second report for Cyprus (Kletou *et al.*, 2019) but first image documented in this work. It is also known from Yumurtalık, Turkey, across the Sea from Cyprus (Çeviker & Albayrak, 2006; Delongueville & Scaillet, 2006; Giannuzzi-Savelli *et al.*, 2014).

Weinkauffia macandrewii (E. A. Smith, 1872) (Fig. 3e). Initially reported by Delongueville & Scaillet (2010) from Cape Kormakitis (Fig. 4e).

Mnestia girardi (Audouin, 1826) (Fig. 3f). Its presence in Cyprus (Cape Kormakitis, Fig. 4e) has been verified by Öztürk *et al.* (2004).

Elysia timida (Risso, 1818) (Fig. 3g). It has been reported for Cyprus (Kyrenia, Fig. 4f) without image documentation (Barash & Danin, 1988; Öztürk *et al.*, 2004).

Siphonaria crenata Blainville, 1827 (Fig. 3h). The species was first reported by Morrison (1972) and subsequently for the broader area by Gofas & Zenetos (2003) and Albayrak & Çağlar (2006, misidentified, though, as *Siphonaria belcheri* Hanley, 1858).

Leucophytia bidentata (Montagu, 1808) (Fig. 3i). Its presence in Cyprus has been verified by Öztürk *et al.* (2004).

Antalis rossati (Caprotti, 1966) (Fig. 3j). Its presence in Cyprus has been verified by Öztürk *et al.* (2004).

Discussion

The Island of Cyprus comprises a single geographical entity and we handle zoogeographical issues accordingly, i.e. we avoid using politically imposed geographical terminology but instead we use place names of both Greek-Cypriot and Turkish-Cypriot communities. Out of the 28 identified to the species level species 7 are referred for the first time for the Cypriot fauna while 17 are second records, 3 are collected from new locations and 1 comprises an uncommon finding. *Lioberus ligneus*, *Isognomon legumen*, *Dendostrea* cfr. *folium*, *Gafrarium pectinatum*, *Viriola* cfr. *bayani*, *Rissoina bertholleti*, *Amathina tricarinata*, *Mnestia girardi* and *Siphonaria crenata* are known Lessepsian migrants that seem to have established in the area as they are collected in good condition years after the original records and this probably indicates the presence of active populations in the areas where found. Apparently, the KLM species in this work represent more than 30% of the total number of species presented and this is also indicative of a change in the composition of the malacofauna in the Cypriot Seas. In addition, certain known Lessepsians seem to have spread to new areas as are the cases of *G. pectinatum* and *M. girardi*. The new records increase the reported local biodiversity which, in our opinion, is in need of thorough revision hence the need of cooperation between the two ethnic communities. The work continues on all molluscan families and expands in more areas and depths of the Cypriot Seas. We estimate that the Cypriot molluscan biodiversity is not explored adequately yet and more species are awaiting to see the light of publicity.

The clean oligotrophic waters of the East Mediterranean Sea, the plethora of substrates, depths and costal length and diversity, the climate change as well as the human activities (e.g. navigation, expansion of the Suez Canal) seem to be in support of our anticipations. Before that, an updated directory of the local molluscan fauna seems to be of paramount importance and we are currently working towards that direction.

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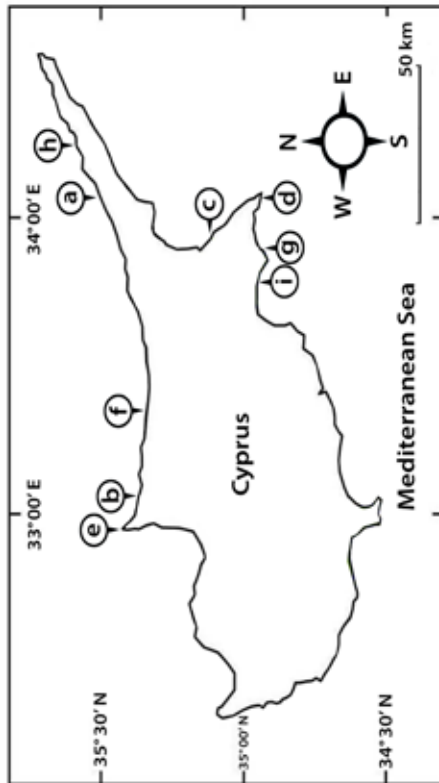
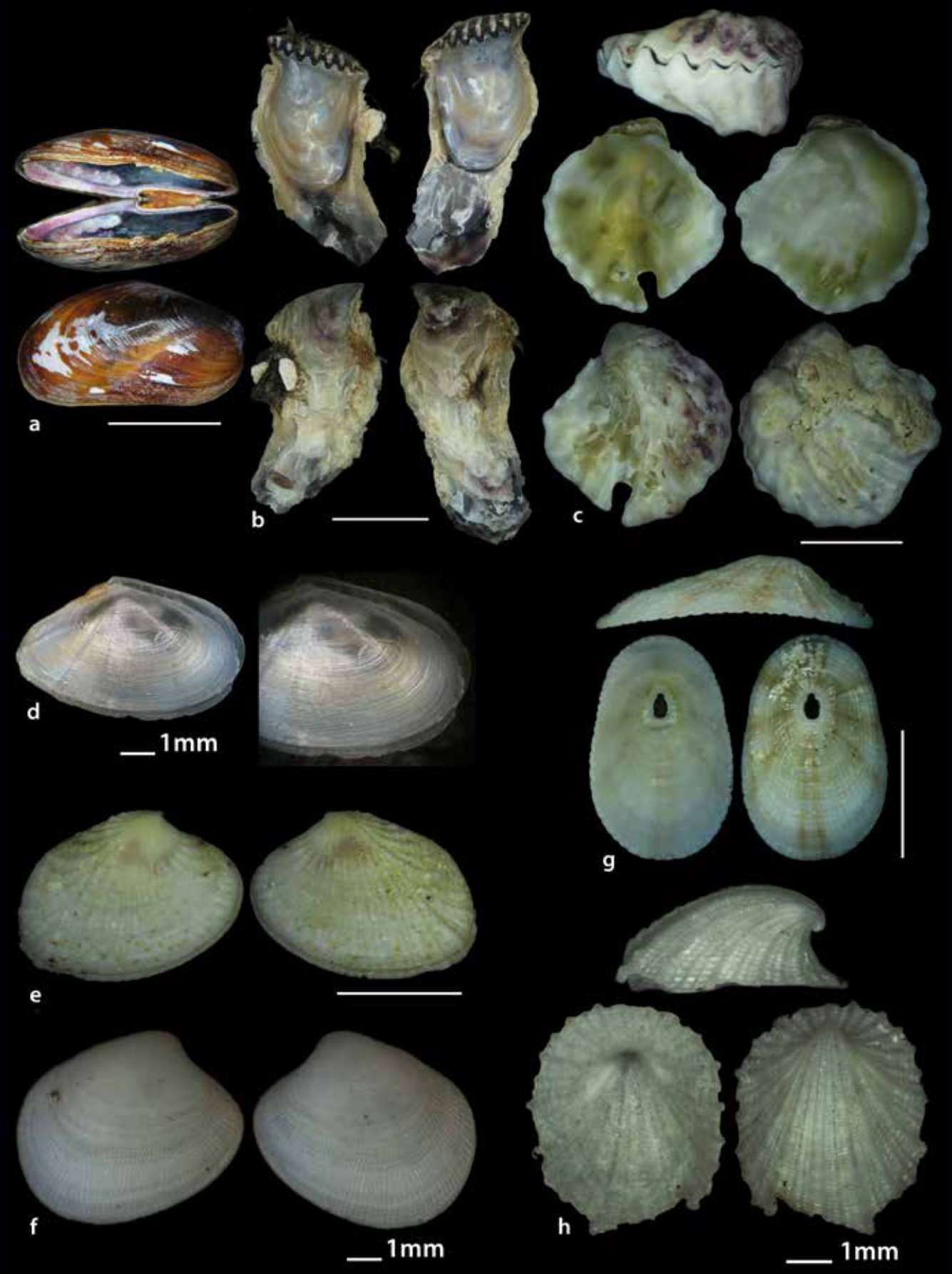


Figure 1: Map of Cyprus with locations mentioned in the text and Table 1: a. Karpasia-Karpaz; b. Orga-Kayalar; c. Famagusta Bay-Mağusa Körfezi; d. Ayia Napa-Aya Napa; e. Cape Kormakitis-Cap Koruçam; f. Kyrenia-Girne; g. Liopetri; h. Rizokarpaso-Dipkarpaz; i. Xylofagou.

Table 1: List of recorded species with collection data and corresponding references.

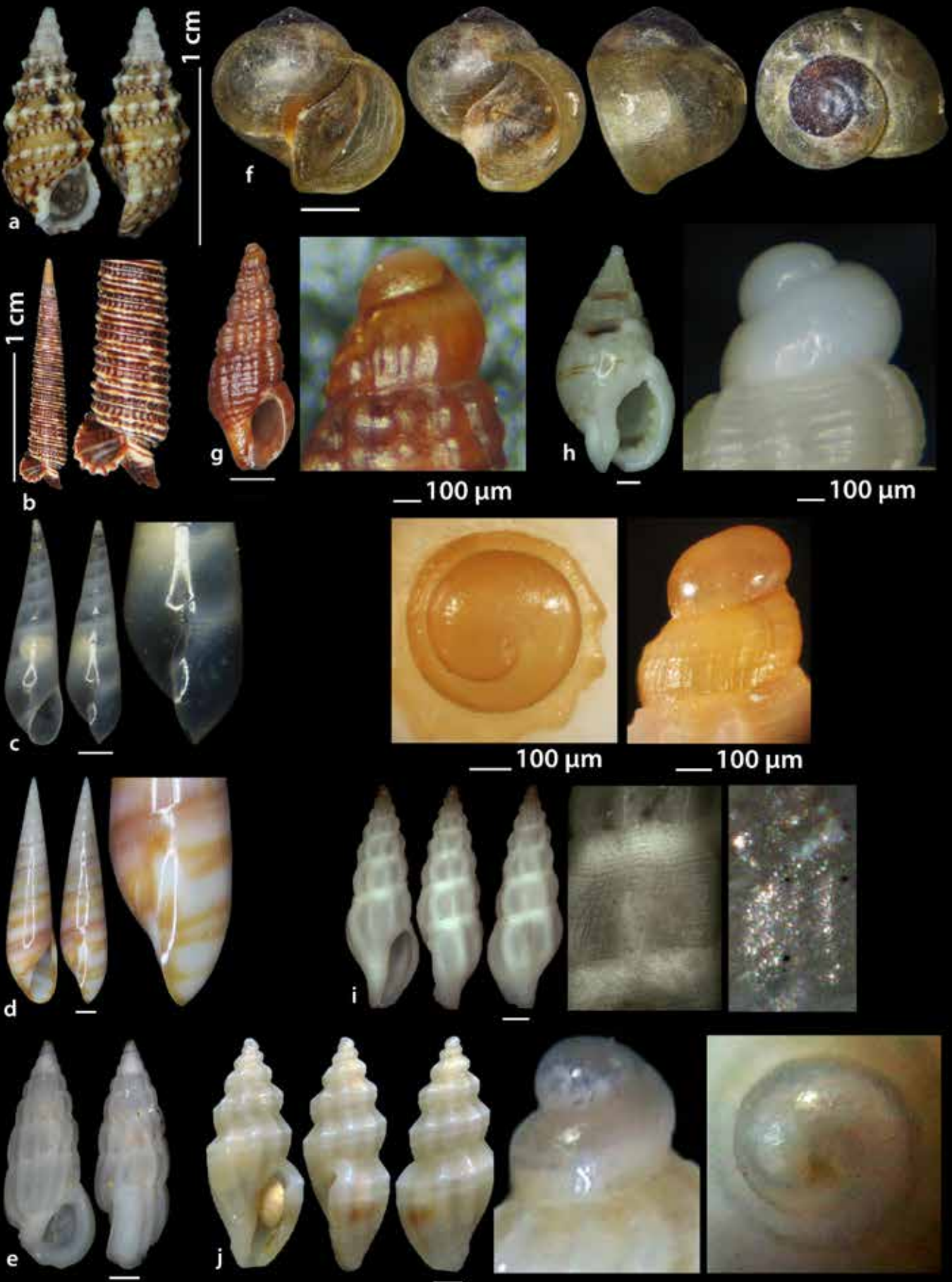
Class	Family	Species	Figure	Shells	Live	Depth m	Bottom	Area	Global coordinates	Rarity	Origin	Record
Bivalvia	Mytilidae	<i>Lioborus ligneus</i> (Reeve, 1858)	1a	2		beached		Liopetri (Fig. 4g)	34°58'N 33°55'E	Un	KLM	C2
	Isognomidae	<i>Isognomon legumen</i> (Gmelin, 1791)	1b	4	5	5	MB	Liopetri (Fig. 4g)	34°58'N 33°55'E	Un	KLM	C1
Gastropoda	Ostreidae	<i>Dendostrea</i> cf. <i>folium</i> (Linnaeus, 1758)	1c	1		beached		Liopetri (Fig. 4g)	34°58'N 33°55'E	Un	KLM	C1
	Tellinidae	<i>Fabulina fabula</i> (Gmelin, 1791)	1d	4		beached		Rizokarpaso-Dipkarpaz (Fig. 4h)	35°32'N 34°21'E	Un	MS	C2
	Veneridae	<i>Gafrarium pectinatum</i> (Linnaeus, 1758)	1e	1		5	MB	Liopetri (Fig. 4g)	34°58'N 33°55'E	Un	KLM	NL
		<i>Lajonkairie lajonkairii</i> (Payraudeau, 1826)	1f	11		beached		Liopetri (Fig. 4g)	34°58'N 33°55'E	Co	MS	C2
	Fissurellidae	<i>Diodora producta</i> (Montrosato, 1880)	1g	1		beached		Rizokarpaso-Dipkarpaz (Fig. 4h)	35°32'N 34°21'E	Un	MS	C2
		<i>Emarginula adriatica</i> O. G. Costa, 1830	1h	1		beached		Liopetri (Fig. 4g)	34°58'N 33°55'E	Un	MS	C1
	Cerithiidae	<i>Cerithium renovatum</i> Montrosato, 1884	2a	4		beached		Liopetri (Fig. 4g)	34°58'N 33°55'E	Co	MS	C2
	Triphoridae	<i>Viriola</i> cf. <i>boyani</i> Jousseaume, 1884	2b	4	1	5	MB	Liopetri (Fig. 4g)	34°58'N 33°55'E	Co	KLM	C2
	Eulimidae	<i>Melanelia palita</i> (Linnaeus, 1758)	2c	3		5	MB	Liopetri (Fig. 4g)	34°58'N 33°55'E	Un	MS	C2
		<i>Melanelia pseudoglabra</i> (Dautzenberg & H. Fischer, 1912)	2d	3		beached		Liopetri (Fig. 4g)	34°58'N 33°55'E	Un	MS	C2
	Rissoinidae	<i>Rissoina bertholletii</i> Issel, 1869	2e	3		beached		Liopetri (Fig. 4g)	34°58'N 33°55'E	Co	MS	UF
	Tonnidae	<i>Tonna galea</i> (Linnaeus, 1758)	2f	3	1	5	MB	Liopetri (Fig. 4g)	34°58'N 33°55'E	Un	MS	C1
	Chauvetidae	<i>Chauvetia brunnea</i> (Donovan, 1804)	2g	3		beached		Liopetri (Fig. 4g)	34°58'N 33°55'E	Co	MS	C2
	Nassariidae	<i>Tritia cuvierii</i> (Payraudeau, 1826)	2h	1	11	5	MB	Liopetri (Fig. 4g)	34°58'N 33°55'E	Co	MS	C2
	Mangelidae	<i>Bela minolca</i> Bogi, Giannuzzi Savelli & Pusateri, 2021	2i	2		8	MB	Liopetri (Fig. 4g)	34°58'N 33°55'E	Un	EMS	C2
Scaphopoda		<i>Mangelia callosa</i> (F. Nordsieck, 1977)	2j	5		beached		Liopetri (Fig. 4g)	34°58'N 33°55'E	Un	MS	C1
	Raphitomidae	<i>Clathromangelia granum</i> (Philippi, 1844)	3a	2		beached		Liopetri (Fig. 4g)	34°58'N 33°55'E	Un	MS	NL
		<i>Raphitoma farolita</i> F. Nordsieck, 1977	3b	3		beached		Liopetri (Fig. 4g)	34°58'N 33°55'E	Un	MS	C1
		<i>Raphitoma horrida</i> (Montrosato, 1884)	3c	1		beached		Liopetri (Fig. 4g)	34°58'N 33°55'E	Un	KLM	C2
	Amathinidae	<i>Amathina tricarinata</i> (Linnaeus, 1767)	3d	5		beached		Liopetri (Fig. 4g)	34°58'N 33°55'E	Un	MS	C2
	Haminoeidae	<i>Winkiauffia macandrewii</i> (E. A. Smith, 1872)	3e	5		beached		Liopetri (Fig. 4g)	34°58'N 33°55'E	Co	KLM	NL
	Mnemiidae	<i>Mnestia girardi</i> (Audouin, 1826)	3f	5		5	MB	Xylofagou (Fig. 4i)	34°58'N 33°49'E	Un	MS	C2
	Plakobranchidae	<i>Elysia timida</i> (Risso, 1818)	3g	1	1	1	TP	Rizokarpaso-Dipkarpaz (Fig. 4h)	35°32'N 34°21'E	Un	KLM	C2
	Siphonariidae	<i>Siphonaria crenata</i> Blainville, 1827	3h	1		0	RC	Liopetri (Fig. 4g)	34°58'N 33°55'E	Un	MS	C2
	Ellobiidae	<i>Leucophytia bidentata</i> (Montagu, 1808)	3i	1		beached		Liopetri (Fig. 4g)	34°58'N 33°55'E	Un	MS	C2
	Dentalidae	<i>Antalis rossati</i> (Caporatti, 1966)	3j	1		beached		Liopetri (Fig. 4g)	34°58'N 33°55'E	Un	MS	C2

Plate 1.



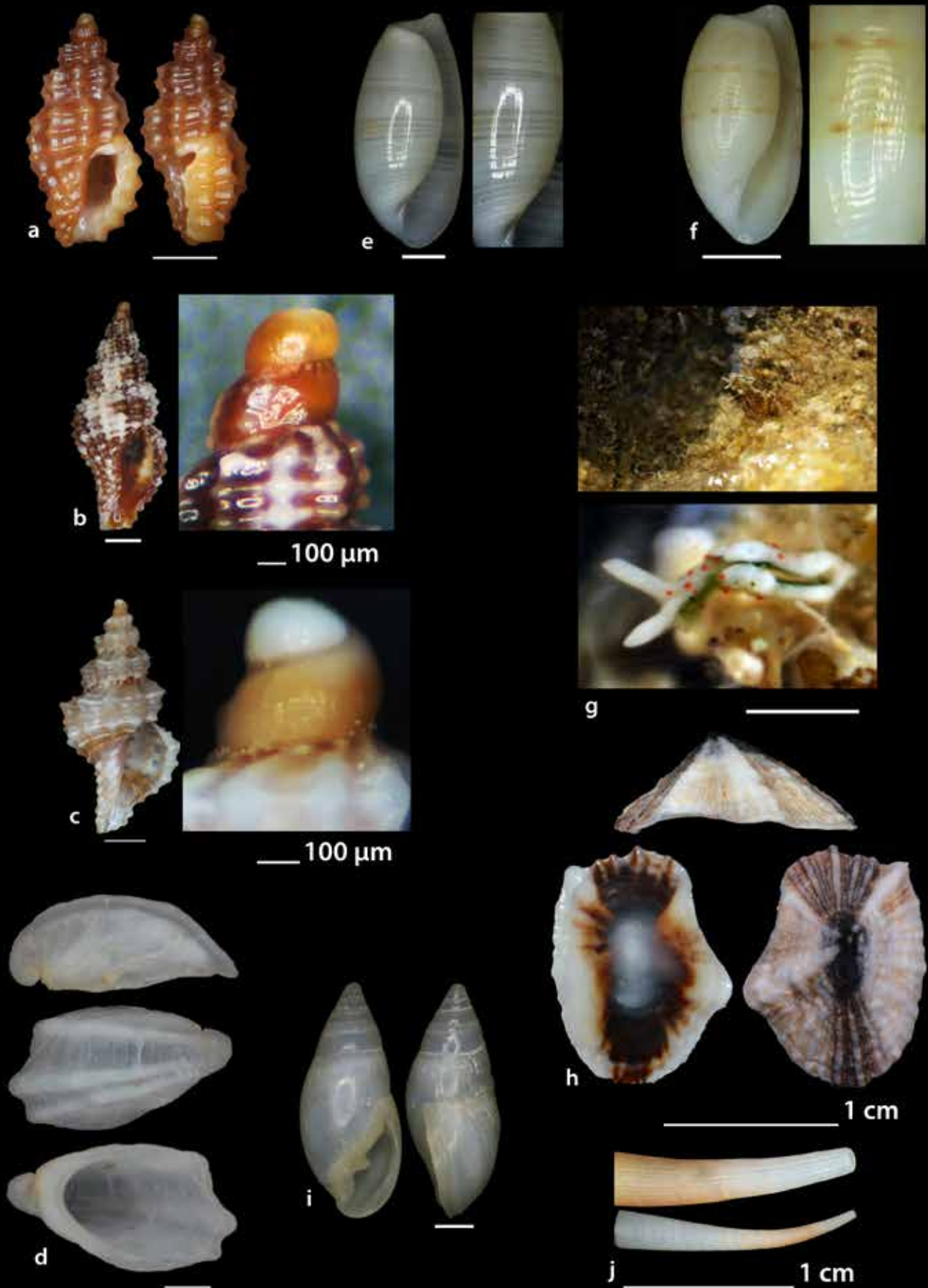
a. *Lioberus ligneus* (Reeve, 1858); b. *Isognomon legumen* (Gmelin, 1791); c. *Dendostrea* cfr. *folium* (Linnaeus, 1758); d. *Fabulina fabula* (Gmelin, 1791); e. *Gafrarium pectinatum* (Linnaeus, 1758); f. *Lajonkairia lajonkairii* (Payraudeau, 1826); g. *Diodora producta* (Monterosato, 1880); h. *Emarginula adriatica* O. G. Costa, 1830. Barr = 1 cm, unless otherwise indicated.

Plate 2.



a. *Cerithium renovatum* Monterosato, 1884; b. *Viriola* cfr. *bayani* Jousseaume, 1884; c. *Melanella polita* (Linnaeus, 1758); d. *Melanella pseudoglabra* (Dautzenberg & H. Fischer, 1912); e. *Rissoina bertholleti* Issel, 1869; f. *Tonna galea* (Linnaeus, 1758); g. *Chauvetia brunnea* (Donovan, 1804); h. *Tritia cuvierii* (Payraudeau, 1826); i. *Bela minoica* Bogi, Giannuzzi Savelli & Pusateri, 2021; j. *Mangelia callosa* (F. Nordsieck, 1977). Barr = 1 mm, unless otherwise indicated.

Plate 3.



a. *Clathromangelia granum* (Philippi, 1844); b. *Raphitoma farolita* F. Nordsieck, 1977; c. *Raphitoma horrida* (Monterosato, 1884); d. *Amathina tricarinata* (Linnaeus, 1767); e. *Weinkauffia macandrewii* (E. A. Smith, 1872); f. *Mnestia girardi* (Audouin, 1826); g. *Elysia timida* (Risso, 1818); h. *Siphonaria crenata* Blainville, 1827; i. *Leucophytia bidentata* (Montagu, 1808); j. *Antalis rossati* (Caprotti, 1966). Barr = 1 mm, unless otherwise indicated.

Description of a new Naticidae from North-East Brazil

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ABSTRACT: We describe a new Mollusc from Northeast Brazil Atlantic Ocean seashore, Bahian subprovince and Paulinian subprovince, *Notocochlis itapuanensis* sp. nov.,

KEYWORDS: Brazilian Molluscan Province, Bahia subprovince, Paulinian subprovince, Naticidae, *Notocochlis*,

Introduction:

We use to collect shells daily on Itapuã Beach, Salvador, Bahia, in order to improve the malacological knowledge of this very diverse region included in the Bahian Subprovince of central Brazil (Petuch and Berschauer, 2020).

Finding a Naticidae that had some common points with *Notocochlis isabelleana* (d'Orbigny 1840) but presenting differences we decided to check the neat divergence of the shell and operculum.

We describe in this paper *Notocochlis itapuanensis* sp. nov. from Brazil.

SYSTEMATIC DESCRIPTIONS

Order LITTORINIMORPHA Golikov & Starobogatov, 1975

Superfamily NATICOIDEA Guilding, 1834

Family NATICIDAE Guilding, 1834

Subfamily Naticinae Guilding, 1834

Genus *Notocochlis* Powell, 1933

Notocochlis itapuanensis sp. nov. Crabos, Pomponet, Queiroz and Passos

Type Material

Holotype: shell height 12,2 mm x width 11,1 mm/weight 0,349 grams, registered at MZSP under number 157111 (fig 1-4)

Paratype 1: shell 13,5 mm in Olivier Crabos collection (fig 5-7)

Paratype 2: shell 12,3 mm in Geraldo Pomponet collection (fig 8)

Paratype 3: shell 11,7 mm at Museu Nacional Rio de Janeiro

Type Locality: Itapuã beach, Salvador, Bahia, at low tide in sand,

Distribution:

From Itapuã Beach near the lighthouse at 500 meters maximum distance, Salvador, Bahia State, down to Ilhabela, Ilha dos Buzios, São Paulo State, where it was found by dredging at 40 meters (Eduardo Schirrmeister information).

Description:

Small to medium sized shell (10 to 15 mm, maximum at 18,7 mm), with a uniform grey cream to beige colour, porcelaneous shiny shell, translucent, smooth, 4 rounded whorls, carrying frequently two to three fainted striped lines around the body whorl, the more noticeable line being around the umbilicus, shoulder of the spire white, offering a contrast with shiny greyish body color, this characteristic is stronger than on other *Notocochlis* species, white narrow umbilicus, typical *Notocochlis* aspect. Thin but solid shell. This new species operculum is different from other species of the genus, as it carries two ribs separated by a clearly visible groove.

Ecology: in pools in fine yellow sands at low tide, down to 40 meters deep. Probably competes with *Polinices uberinus* (d'Orbigny, 1842).

Discussion:

In the beaches of Itapuã and Salvador we find 12 species of Naticidae:

Natica livida L. Pfeiffer, 1840;

Natica marochiensis (J.F. Gmelin, 1791);

Natica tedbayeri H.A. Rehder, 1986;

Naticarius canrena (C. Linnaeus, 1758);

Notocochlis itapuanensis sp. nov.;

Polinices hepaticus (P.F. Röding, 1798);

Polinices lacteus (L. Guilding, 1834);

Polinices uberinus (A. d'Orbigny, 1842);

Sinum maculatum (T. Say, 1831);

Sinum perspectivum (T. Say, 1831);

Stigmaulax cancellatus (J. Hermann, 1781);

Stigmaulax cayennensis (C.A. Récluz, 1850);

Stigmaulax sulcata (I. von Born, 1778)

Tectonatica micra (F. Haas, 1953).

Comparison

Notocochlis itapuanensis sp. nov. is an undescribed species from Itapuã Beach. Through years it was confused with young *Natica livida* L. Pfeiffer, 1840, but *livida* is bigger (18 to 23 mm), the shell is thicker and the umbilicus is tainted with brown.

In Southern Brazil (as well as Uruguay and Argentina) we find *Notocochlis isabelleana* (A. V. M. D. d'Orbigny, 1840) with an average size of 20 to 25 mm (fig 9-12). *N. itapuanensis* sp. nov. has a smaller shell (from 10 to 15 mm), thinner, shiny porcellaneous aspect, there are 4 stripped lines on *N isabelleana* against 2 to 3 on *N itapuanensis* sp. nov., the new species operculum has 2 ribs with a deep intermediate groove when *N isabelleana* operculum has only one rib (Costa and Pastorino, 2012).

In Colombia is *Notocochlis guesti* (Harasewych & Jensen, 1984) with a pattern often made of spots and a bigger shell, in addition its operculum shows serrate margin (Costa and Pastorino, 2012).

And finally in Mediterranean Sea and in Eastern Atlantic Ocean, in Europe and Africa, there is *Notocochlis dillwynii* (Payraudeau, 1826) (fig 13-16) with stronger spiral pattern, and operculum with a small mounticle in its middle, closer with *N. isabelleana*.

Etymology:

Itapuã (prononce Itapuan) is the name of the beach where it was found and it means erect rock (or round rock or snoring rock, there are different versions) in Tupi language.

ACKNOWLEDGMENTS:

José Carlos Tarasconi for supplying *N. isabelleana* shells
Luiz Simone from MZUSP for taking the pictures and giving advices

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Plate 1. *Notocochlis itapuanensis* sp. nov. and comparative species.



1-4. *N. itapuanensis* sp. nov., Holotype, MZUSP 157111, 12.2 mm, Itapuã beach , Salvador, Bahia, Brazil.

5-7. *N. itapuanensis* sp. nov., Paratype 1, 13.5 mm, Itapuã beach , Salvador, Bahia, Brazil.

8. *N. itapuanensis* sp. nov., Paratype 2, Operculum.

9-12. *N. isabelleana*, 19.5 mm, Mostardas, Rio Grande do Sul, Brazil.

13-16. *N. dillwynii* ,14.5 mm, Santa Maria, Sal island, Cabo Verde.

The genus *Amalda* (Neograstopoda, Olivoidea, Ancillariidae) in the Mozambican coast, with the description of a new species.

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Keywords: Taxonomy, Ancillariidae; North Mozambique

Amalda mozambicana n. sp.

Introduction

Up to 2018, the genus *Amalda* was represented, along the coast of Mozambique, southeastern Africa, by seven species. Three of these species are medium sized (for the genus): *A. contusa* (Reeve, 1846), *A. optima* (Sowerby III, 1897), both found in South Mozambique only, and *A. similis* Sowerby, 1859, found along the entire Mozambican coast. The remaining four species (*A. cupedula* Kilburn, 1993, *A. lindae* Kilburn, 1993, *A. obesa* (Sowerby II, 1859) and *A. roscoe* Kilburn, 1975) are of clearly smaller sizes.

R. N. Kilburn (1981, 1993, 1996) studied the species present in several subtropical locations of the western Indian Ocean, including South Africa.

In 2018, T. Cossignani described *A. degalleanae* Cossignani, 2018 as a new species. Before that date, the specimens he assigned to the new *taxon* were identified as forms of *A. contuse*, and we believe that further study, including the use of DNA sequencing, should be undertaken to ascertain the validity of the new species.

So, in all, the genus *Amalda* in Mozambique is represented by the following species:

Amalda contusa (Reeve, 1846)
Amalda cupedula Kilburn, 1993
Amalda degalleanae Cossignani, 2018
Amalda lindae Kilburn, 1993
Amalda obesa (Sowerby II, 1859)
Amalda optima (Sowerby III, 1897)
Amalda roscoe Kilburn, 1975
Amalda similis Sowerby, 1859

Recently, however, extensive dredging efforts in the province of Nampula, northern Mozambique, more precisely off the Island of Mozambique, in comparatively deep waters, led to the discovery of a new population that is so distinct from all other known populations of *Amalda* that clearly warrants specific status. For this reason, we are describing it here as a new species.

It should also be noticed that a few other specimens have been found (see Plate 4, # 4,6,7), also in deep water (160-190 m), that also differ considerably from all known species, but a full study, eventually leading to the description of still another new species will have to wait until further specimens are found.

Abbreviations:

MNHN Muséum National d'Histoire Naturelle, Paris, France
NHMUK National History Museum United Kingdom

Type Material

Holotype (35.00 x 17.00 mm) deposited in the Muséum National d'Histoire Naturelle, Paris, with the number MNHN-IM-2000-38215

Paratype 1 (38.65 x 17.40 mm), J. Rosado collection

Paratype 2 (41.50 x 19.10 mm), J. Rosado collection

Material Examined

3 specimens, all from offshore Sena Island and Injaca Islet
38.65 x 17.40 mm live collected off Sena Island (S15°06.700' E40°48.000') 120-130 m. 29.08.2019

41.50x19.10 mm off Injaca Islet (S15°00.100' E40°49.300') 125-135 m. 22.02.2022

35.00 x 17.00 mm dead collected off Injaca Islet (S15°00.100' E40°49.300') 125-140 m. 17.06.2021

Fragments off Sena Island (S15°05.980' E40°48.320') 125-135 m. 12.02.2022 (deposited in the MNHN)

Type Locality

Offshore Sena Island and Injaca Islet, off Mozambique Island.

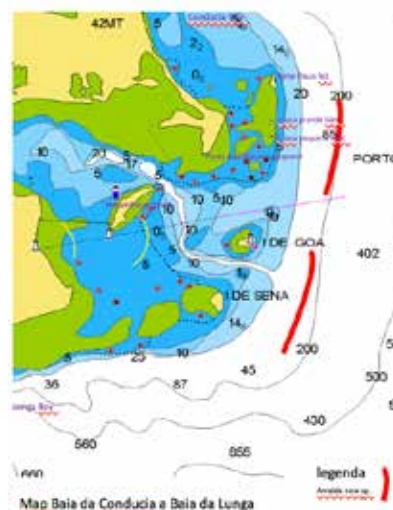


Figure 1 Map Baía da Conducia a Baía da Lunga

Description of the shell

Medium-sized shell, more or less fusiform, with a moderately high, slightly convex spire, and a broad, convex body whorl. The spire whorls are glazed, the glaze extending to the posterior area of the body whorl; apart from that, the body whorl has a smooth surface. The largest width of the body whorl is about two thirds of its length, in the posterior zone.

The columellar wall is slightly concave and has four plicae, extending to the dorsal anterior end of the body whorl.

The body whorl is white (the columellar plicae extending to its

anterior zone may be brownish), whereas the glaze covering the spire is honey colour to darkish brown, with a number of dark spiral lines visible on the lighter brown background.

The aperture is elongated and slightly oblongate, growing wider towards the anterior end. The operculum is thin, translucent and elongated, filling the entire aperture; its nucleus is eccentric.

Living animal

The living animal has a large, thick foot that, when extended, covers most of the shell, even extending to the ventral side of the spire. Its background colour is white, but it is covered with splashes of golden brown. The siphonal canal is grayish white.

Dimensions

30–45 mm. The size range for the species may eventually be corrected when more specimens are collected.

Distribution

Known only from the type locality. Further research may extend its geographical range to other locations in the northern coast of Mozambique, in the same bathymetric zone.

Habitat

Bottom of coarse sand, near sandstone slabs, with some coral and sponges, near slopes.

The area where the known specimens were collected has strong sea currents, usually from the north, but sometimes circular, under the influence of tidal currents originating in the Condúcia and Lunga canyons.

Remarks

The species has been very rarely found alive. In several occasions, fragments of specimens recently attacked and eaten by fishes, such as rays or small reef sharks, have also been found.

Discussion

This new species from North Mozambique has very distinct morphological characteristics – not only for its shell, but also for the soft parts of the living animal – that easily separate it from all other species.

In the South of Mozambique and in the same bathymetric range (100–140 m), *A. optima* – which in some measure may be considered to occupy the corresponding ecological niche as the new species – is quite different: the glaze covering the spire is much darker, the anterior part of the shell also shows a dark spiral zone, there is a dark brown callus on the ventral side of the shell that extends from the spire to the columella, the inside border of the lip is brown, the surface is much coarser, showing many thin axial grooves that extend from the spire to the columellar zone, and finally the soft parts of the living animal are entirely different, the foot not completely covering the shell and of a yellowish colour, with a dark brown border, and a brown speckled white siphonal canal.

Another species that can be compared with the new one is *A. contusa*, which is found on sand bottom near reefs, at a much lesser depth (15–115 m). But *A. contusa* has a shorter, lower-spired shell, with the spire covered by a whitish glaze, a deep groove separating the spire from the body whorl, a dark brown callus in the ventral surface extending to the columellar area, and a totally different general colouration on the body whorl, occasionally showing a number of brown spiral bands;

the soft parts of the living animal are also utterly different, with a whitish background colour covered with a multitude of dark brown dots and lines.



Figure 2 *Amalda contusa* Reeve, 1864
(Holotype: NHMUK 197836)(23 mm)

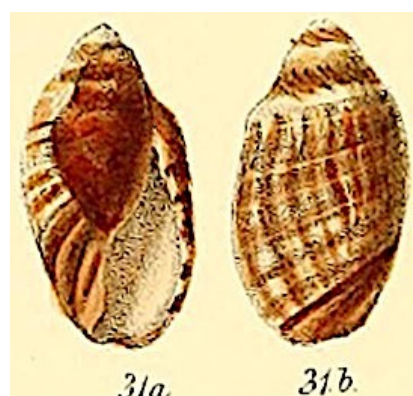


Figure 3 *Amalda contusa* Reeve, 1864
(Illustration of the holotype in *Conchologia Iconica*)

Also very distinct is *A. similis*, which can be found along the entire Mozambican coast, showing different colour forms, according to the location, habitat and depth where it is collected. It should be underlined that in North Mozambique, near Ponta da Cabaceira Pequena, at a depth of only a few metres, near the beach, a population was found that we assign to *A. similis*, especially in view of the characteristics of the soft parts of the living animals, but whose specimens are entirely shining white (see Plate 2, # 6, Plate 4, # 6 and Plate 5, # 3). When compared with the new species, the shell of *A. similis* is much slenderer, with a totally different colouration, the spire not completely covered with a brown glaze, the columella also very different in sculpture and colouration, an operculum not filling the entire aperture; the foot of the living animal is also completely different, of a milky white colour with sparse grayish brown markings.

It is curious to notice that a single species of *Amalda* has been described for the not too far shores of Madagascar, namely *A. miriky* Kantor, Castelin, Fedosov & Bouchet, 2020. It comes from deep water (250–450 m), but it is so different from all of the species occurring in Mozambique so that no detailed comparison is really required.

Etymology

The name *mozambicana* refers to the type locality, off the Island of Mozambique.

Acknowledgements

The first author wishes to thank his wife, who always accompanies him in his collecting expeditions and participated in the discovery of the new species. He also extends his thanks to the CAIRIM (Centro de Arqueologia, Investigação e Recursos da Ilha de Moçambique), in particular to Dr. Ricardo T. Duarte and Yolanda Duarte, for their valuable support.

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Plate 1. *Amalda mozambicana* sp. nov..



1. Holotype 35.00 x 17.00 mm
MNHN-IM-2000-38215
Injaca Islet 130-140 m.
North Mozambique

2. Paratype 1, 38.65 x 17.40 mm
Sena Isl. 128-132 m.
North Mozambique

3. Paratype 2, 41.50 x 19.10 mm
Injaca Islet 125-135 m.
North Mozambique



4. Living specimen



5. fragments

Plate 2. Other *Amalda* from the Mozambique channel.



1. *Amalda optima* (Sowerby III, 1897)
N.E. Inhaca Isl. 92-96 m.
South Mozambique (45.50 mm)



3. *Amalda optima* (Sowerby III, 1897)
Inhaca Isl. 108-116 m.
South Mozambique (51.30 mm)



2. *Amalda optima* (Sowerby III, 1897)
Inhaca Isl. 108-116 m.
South Mozambique (62.10 mm)



4. *Amalda similis* Sowerby II, 1859
Bazaruto Isl. 16-18 m.
South Bazaruto (41.70 mm)



6. *Amalda similis* Sowerby II, 1859
Ponta da Cabaceira 2-6 m.
North Mozambique (Albino Population)
(48.50 mm)



5. *Amalda similis* Sowerby II, 1859
Quelimane-Pebane 25-35 m.
North Mozambique
(Typical form) (49.50 mm)



7. *Amalda miriky* Kantor et al. 2020
320-340 m.
N. W. Madagascar (41.90 mm)

Plate 3. Other *Amalda* from the Mozambique channel, *A. contusa* complex.



1. *Amalda contusa* Reeve, 1864
Holotype 23 mm NHMUK 197836



2. *Amalda contusa* Reeve, 1846
Lacerda Light House 22-24 m. (24.70 mm)



3. *Amalda degalleanae* Cossignani, 2018
Ponta Abril 12-16 m.
South Mozambique (27.40 mm)



4. *Amalda degalleanae* Cossignani, 2018
Ponta Abril 12-16 m.
South Mozambique (24.90 mm)



5. *Amalda degalleanae* Cossignani, 2018
Holotype (21 mm)



6. *Amalda cf. contusa*
Quissico 60-80 m.
South Mozambique (62.20 mm)



7. *Amalda cf. contusa*
North Boa Paz-Quissico 100-115 m.
South Mozambique (56.30 mm)



8. *Amalda cf. contusa*
Xai-Xai/Quissico ex-pisces 45-65 m.
South Mozambique (36.70 mm)

Plate 4. Other *Amalda* from the Mozambique channel.



1. *Amalda roscoe* Kilburn, 1975
Massinga 12 m.
South Mozambique (17.10 mm)



2. *Amalda roscoe* Kilburn, 1975
N.E. Inhaca 90 m.
South Mozambique (18.8 mm)



3. *Amalda lindae* Kilburn, 1993
Ponta do Ouro 280 m.
South Mozambique (20.10 mm)



4. *Amalda cf. cupedula* Kilburn, 1993
P. Techobanine 170 m.
South Mozambique (10.20 mm)



5. *Amalda cupedula* Kilburn, 1993
P. Techobanine 170 m.
South Mozambique (11.20 mm)



6. *Amalda* sp. Techobanine 190 m.
Amalda cupedula albino ?
(9.80 mm)



7. *Amalda* sp.
Sete Paus Isl. 180-190 m.
North Mozambique (8.70 mm)



8. *Amalda obesa* (Sowerby II, 1859)
Xai-Xai 25-35 m.
South Mozambique (13.40 mm)

Plate 5. Living *Amalda* from the Mozambique channel.



1. *Amalda roscoae*
Kilburn, 1975



2. *Amalda similis*
(G. B. Sowerby II, 1859)
albino form



4. *Amalda mozambicana* sp. nov.



3. *Amalda similis*
(G. B. Sowerby II, 1859)



5. *Amalda cupedu'*
Kilburn, 1995



6. *Amalda degalleani*
Cossignani, 2018



7. *Amalda contusa*
(Reeve, 1864)



8. *Amalda optima*
(Sowerby III, 1897)

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