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Taxonomic study on the molluscs collected in Marion-Dufresne expedition (MD55) to SE Brazil: Xenophoridae, Cypraeoidea, mitriforms and Terebridae (Caenogastropoda)

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ABSTRACT

The deep-water molluscs collected during the expedition MD55 off SE Brazil have been gradually studied in some previous papers. The present one is focused on samples belonging to caenogastropod taxa Xenophoridae Troschel, 1852, Cypraeoidea Rafinesque, 1815, mitriforms and Terebridae Mörch, 1852. Regarding the Xenophoridae, *Onustus aquitanus* n. sp. is a new species, collected off the littoral of Espírito Santo and Rio de Janeiro, Brazil, 430–637 m depth (continental slope). The main characters of the species include the small size (c. 20 mm), the proportionally wide shell, the white colour, the short peripheral flange, the oblique riblets weakly developed and a brown multispiral protoconch. This appears to be the smallest living species of the family, resembling in this aspect fossil species. In respect to the Cypraeoidea, the following results were obtained: family Cypraeidae Rafinesque, 1815: *Erosaria acicularis* (Gmelin, 1791) and *Luria cinerea* (Gmelin, 1791) had the deepest record, respectively 607–620 m and 295–940 m, although the samples were all dead, eroded shells. Family Lamellariidae d'Orbigny, 1841: a total of three lots were collected, provisionally identified as *Lamellaria* spp. as the samples consist of only vestigial shells; possibly each lot represents a different species. Family Pediculariidae Gray, 1853: a sample of *Pedicularia tibia* Simone, 2005 was found, expanding the range c. 1000 km southwards, from Ceará to Espírito Santo. Family Ovulidae Fleming, 1822: *Pseudosimnia lacrima* n. sp., collected off Espírito Santo, 607–620 m depth, is described here and is mainly characterised by its strong biconic outline, small size (c. 7 mm), and a thick peripheral callus. Family Triviidae Troschel, 1863: *Cleotrivia antillarum* (Schilder, 1922) is recorded for the first time as deep as 620 m, and its distribution expanded from Rio Grande do Norte to Espírito Santo; *Dolichupis akangus* n. sp. with rounded outline and c. 15 transverse ribs; *D. pingius* n. sp. with the outer lip expanded posteriorly and c. 10 ribs. In respect to the mitriform neogastropods, the following species are emphasised: family Costellariidae MacDonald, 1860: *Vexillum* sp., 607–620 m depth; *Turricostellaria amphissa* n. sp., 295 m depth;

T. jukyry n. sp.; *T. apyrabi* n. sp., both 790-1575 m depth; *T. ovir* n. sp., 1200 m depth; *Nodicostellaria crassa* (Simone, 1995), 240-600 m depth, with extension northwards of the range up to Espírito Santo; *Austromitra decresca* n. sp., 60-105 m depth. Family Mitridae Swainson, 1829: *Subcancilla joapyra* n. sp., 295 m depth; S. cf. *straminea* (Adams, 1853), 607-620 m depth. Family Volutomitridae Gray, 1854: *Microvoluta corona* n. sp., 1500-1575 m depth. Family Mitromorphidae Casey, 1904: *Mitromorpha sama* n. sp., 607-940 m depth; *M. mirim* n. sp., 60-105 m depth. Regarding the conoidean Terebridae, this paper is a complement of a previous study. It deals with a new species – *Terebra assu* Simone n. sp., from the Abrolhos Bank, 295 m depth, characterised by its narrow outline, yellowish colour, weak sculpture on the last whorls, and a proportionally broad, paucispiral protoconch. A second finding of *Terebra alagoensis* Lima, Tenório & Barros, 2007 expands the geographic range from Alagoas to north Espírito Santo. A discussion on the systematics of the “complex *Terebra doellojuradoi*” in South American coast is also provided, highlighting the improbability of synonymy between *T. leptapsis* Simone, 1999 and *T. doellojuradoi* Carcelles, 1953. Differences in size, sculpture, spire angulation, aperture, and mainly in protoconch, indicate specific separations. The presently studied terebrids belong to the “complex *Terebra doellojuradoi*”, which encompasses closely related, deep-water, small species, possessing a relatively high degree of endemism.

KEY WORDS

Brazil,
MD55 expedition,
Xenophoridae,
Cypraeoidea,
mitriform,
Terebridae,
deep-water,
new species.

RÉSUMÉ

Étude taxonomique des mollusques collectés lors de l'expédition Marion-Dufresne (MD55) au large du sud-est du Brésil : Xenophoridae, Cypraeoidea, mitriformes et Terebridae (Caenogastropoda).

Les mollusques d'eau profonde collectés durant l'expédition MD55 au large du sud-est du Brésil ont été progressivement étudiés dans de précédentes publications. Le présent article se concentre sur les échantillons appartenant aux caenogastropodes : Xenophoridae Troschel, 1852, Cypraeoidea Rafinesque, 1815, mitriformes et Terebridae Mörch, 1852. Concernant les Xenophoridae, *Onustus aquitanus* n. sp. est une nouvelle espèce collectée au large du littoral d'Espírito Santo et de Rio de Janeiro, Brésil, à 430-637 m de profondeur (talus continental). Les principaux caractères de cette espèce sont sa petite taille (c. 20 mm), sa coquille proportionnellement large, sa couleur blanche, son court rebord périphérique, ses côtes obliques faiblement développées et sa protoconque multispiralée marron. C'est, semble-t-il, l'espèce vivante la plus petite de la famille, caractère qui la rapproche des espèces fossiles. En ce qui concerne les Cypraeoidea, les résultats suivants ont été obtenus : famille Cypraeidae Rafinesque, 1815 : *Erosaria acicularis* (Gmelin, 1791) et *Luria cinerea* (Gmelin, 1791) ont été récoltées à la plus grande profondeur, respectivement 607-620 m et 295-940 m, mais les échantillons étaient tous constitués de coquilles mortes, érodées. Famille Lamellariidae d'Orbigny, 1841 : un total de trois lots a été collecté, provisoirement identifiés comme *Lamellaria* spp., car les échantillons sont constitués uniquement de restes de coquilles ; il est possible que chaque lot représente une espèce différente. Famille Pediculariidae Gray, 1853 : un échantillon de *Pedicularia tibia* Simone, 2005 a été découvert, augmentant la répartition de cette espèce d'environ 1000 km vers le sud, de Ceará à Espírito Santo. Famille Ovulidae Fleming, 1822 : *Pseudosimnia lacrima* n. sp., collectée au large d'Espírito Santo, à 607-620 m de profondeur, est décrite ; elle se caractérise par un fort contour biconique, une petite taille (c. 7 mm) et un callus périphérique épais. Famille Triviidae Troschel, 1863 : *Cleotrivia antillarum*

(Schilder, 1922) est attestée pour la première fois à une profondeur de 620 m et sa distribution étendue de Rio Grande do Norte à Espírito Santo ; sont également décrites ici *Dolichupis akangus* n. sp. aux contours arrondis et avec *c.* 15 côtes transversales, et *D. pingius* n. sp., dont la lèvre extérieure s'étend postérieurement et qui possède *c.* 10 côtes. En ce qui concerne les néogastropodes mitriformes, les espèces suivantes sont abordées : famille Costellariidae MacDonald, 1860 : *Vexillum* sp., 607-620 m de profondeur ; *Turricostellaria amphissa* n. sp., 295 m de profondeur ; *T. jukyry* n. sp. et *T. apyrabi* n. sp., toutes les deux 790-1575 m de profondeur ; *T. ovir* n. sp., 1200 m de profondeur ; *Nodicostellaria crassa* (Simone, 1995), 240-600 m de profondeur, avec une extension de sa distribution au nord, jusqu'à Espírito Santo ; *Austromitra decresca* n. sp., 60-105 m de profondeur. Famille Mitridae Swainson, 1829 : *Subcancilla joapyra* n. sp., 295 m de profondeur ; *S. cf. straminea* (Adams, 1853), 607-620 m de profondeur. Famille Volutomitridae Gray, 1854 : *Microvoluta corona* n. sp., 1500-1575 m de profondeur. Famille Mitromorphidae Casey, 1904 : *Mitromorpha sama* n. sp., 607-940 m de profondeur ; *M. mirim* n. sp., 60-105 m de profondeur. En ce qui concerne les conoïdes Terebridae, cet article complète une étude antérieure. Une nouvelle espèce est présentée – *Terebra assu* Simone n. sp., originaire du récif d'Abrolhos, 295 m de profondeur, caractérisée par un contour étroit, une couleur jaunâtre, une sculpture fragile sur les dernières volutes et une protoconque paucispiralée large. *Terebra alagoensis* Lima, Tenório & Barros, 2007 a été découverte pour la seconde fois, ce qui étend sa distribution géographique d'Alagoas au nord d'Espírito Santo. La systématique du « complexe *Terebra doellojuradoi* » de la côte sud-américaine est également discutée, et la synonymie entre *T. leptapsis* Simone, 1999 et *T. doellojuradoi* Carcelles, 1953 invalidée, au vu des différences observées quant à leur taille, sculpture, angulation de la spire, aperture et principalement au niveau de la protoconque. Les térébrides étudiés ici appartiennent au « complexe *Terebra doellojuradoi* », constitué d'espèces étroitement apparentées, qui vivent en eau profonde, sont de petite taille, et possèdent un degré d'endémisme relativement élevé.

MOTS CLÉS
Brésil,
expédition MD55,
Xenophoridae,
Cypraeoidea,
mitriforme,
Terebridae,
eaux profondes,
espèces nouvelles.

INTRODUCTION

This paper deals with some taxa of Caenogastropoda Cox, 1960 collected off the southeastern coast of Brazil, in May 1987, during the cruise MD55 of the R/V *Marion-Dufresne*, operated by Terres Australes et Antarctiques françaises. It was a joint project of Muséum national d'Histoire naturelle, Paris (MNHN), and Universidade Santa Úrsula, Rio de Janeiro (USU). Malacologists on board were Philippe Bouchet, José H. Leal and Bernard Métivier. The cruise generated many new discoveries of deep-sea biota. The samples of molluscs have been gradually published in previous papers, however only a few taxa have so far

been considered (e.g., Volutidae Rafinesque, 1815: Leal & Bouchet 1989; Muricidae Rafinesque, 1815: Houart 1991; Cancellariidae Forbes & Hanley, 1851: Verhecken 1991; Terebridae Mörch, 1852: Simone 1999; Olividae Latreille, 1825: Absalão & Pimenta 2003; Nystiellidae Clench & Turner, 1952: García 2011; Pyramidellidae Gray, 1840: Pimenta *et al.* 2011). A more extensive and widespread approach on that important material is still missing. The present paper is the first one of a series dealing with a taxonomic treatment and formal descriptions of all collected mollusc taxa, this time focusing on the Xenophoridae Troschel, 1852, the Cypraeoidea Rafinesque, 1815, the mitriforms and the Terebridae.

The analysis of expeditions collected material gains importance as the Brazilian government has recently started the extraction of “Pré-Sal” (pre-salt) level of petroleum, raising intense oceanic activities in depths up to 2000 m off the SE Brazilian coast. The knowledge of a baseline of the local rich malacofauna is important for further comparisons and environmental analyses.

Regarding the Xenophoridae (Stromboidea), the family comprises a group of 25 species worldwide, normally living in temperate and warm waters of all oceans. They are popularly known as “carrier shells”, because of their peculiar habit of attaching foreign objects, such as shells, gravel and rocks to the dorsal surface of their shells (Ponder 1983). Several aspects of this family, including a thoughtful revision of the species, are present in the literature (Morton 1958; Lambiotte 1979; Ponder 1983), including anatomical and phylogenetic assessments (Simone 2005a). Two genera of xenophorids inhabit the Western Atlantic coast: *Onustus* Swainson, 1840 and *Xenophora* Fisher, 1780. The genus *Onustus* (type species: *Trochus indicus* Gmelin, 1791, by subsequent designation by Gray 1847) is composed of deep-water species. Its shell possesses, mainly, a porcellaneous ventral surface in the peripheral flange (Ponder 1983). The genus is represented in the western Atlantic by two species: *Onustus longleyi* (Bartsch, 1931) and *O. caribaeus* (Petit, 1856). The genus *Xenophora* is represented by *X. conchyliphora* Born, 1780 (type species of the genus) (Abbott 1974; Rios 1994, 2009; Simone 2005a).

Regarding the Cypraeoidea, a complete revision and history of the western Atlantic fauna has been published elsewhere (Simone 2004), where most of the local species have been taxonomically and anatomically treated. Normally, the cypraeoideans are pretty shelled species, with an involute, porcellaneous shell. The MD55 material represents five families, such as Cypraeidae Rafinesque, 1815 (two species), Lamellariidae d'Orbigny, 1841 (possibly three species), Pediculariidae Gray, 1853 (one species), Ovulidae Fleming, 1822 (one species) and Triviidae Troschel, 1863 (three species); all them treated herein.

In respect to the mitriform neogastropods, they are a set of families normally allocated in the

Muricoidea *sensu lato* (Ponder 1974), with normally fusiform, heavy shells and with 3–4 strong columellar folds. The usual mitriform families are Mitridae Swainson, 1829, Costellariidae MacDonald, 1860, Volutomitridae Gray, 1854 and Ptychatractidae Stimpson, 1865 (e.g., Ponder 1972; Quinn 1989; Turner & Callomon 2001). They normally are predator on other invertebrates, sometimes using modified foregut apparatus, such as, e.g., the epiproboscis of the mitrids (Ponder 1972; Simone & Turner 2010; Simone 2011). The species of mitriform gastropods collected during the cruise MD55 were herein taxonomically treated, including the Costellariidae (seven species), Mitridae (two species) and Volutomitridae (one species).

Regarding the Terebridae (Conoidea Fleming, 1822), most species collected in the MD55 expedition were studied elsewhere (Simone 1999). The present paper deals with additional material, representing a new species, formally described herein, and an extension of geographic distribution of another species – *Terebra alagoensis* Lima, Tenório & Barros, 2007. Because both species clearly belong to the complex *T. doellojuradoi*, and, some uncertainties on the validity of some species of this complex has been recently published (Faber 2007; Terryn 2011), a concise discussion of the taxonomy of some SE Brazilian species is also included, in order to clarify some points. The term “*Terebra doellojuradoi* complex” was informally coined by Simone & Gracia (2006), but accounts on it have been found in previous papers (Simone & Verissimo 1995; Simone 1999, 2000), and it has been followed by others (e.g., Lima *et al.* 2007). It encompasses species usually identified as “*T. doellojuradoi* Carcelles, 1953” in collections, as well as in papers by authors unfamiliar with east South American species. The species are normally small-sized (about 10 mm), reticulate-sculptured, with a deep suture and living in relatively deep waters. The anatomy of only two species is known (*Terebra crassireticula* Simone, 1999 and *T. leptapsis* Simone, 1999), revealing that these animals have complete venom apparatus, a medium to short rhynchodeal introvert, a small and narrow accessory proboscis structure,

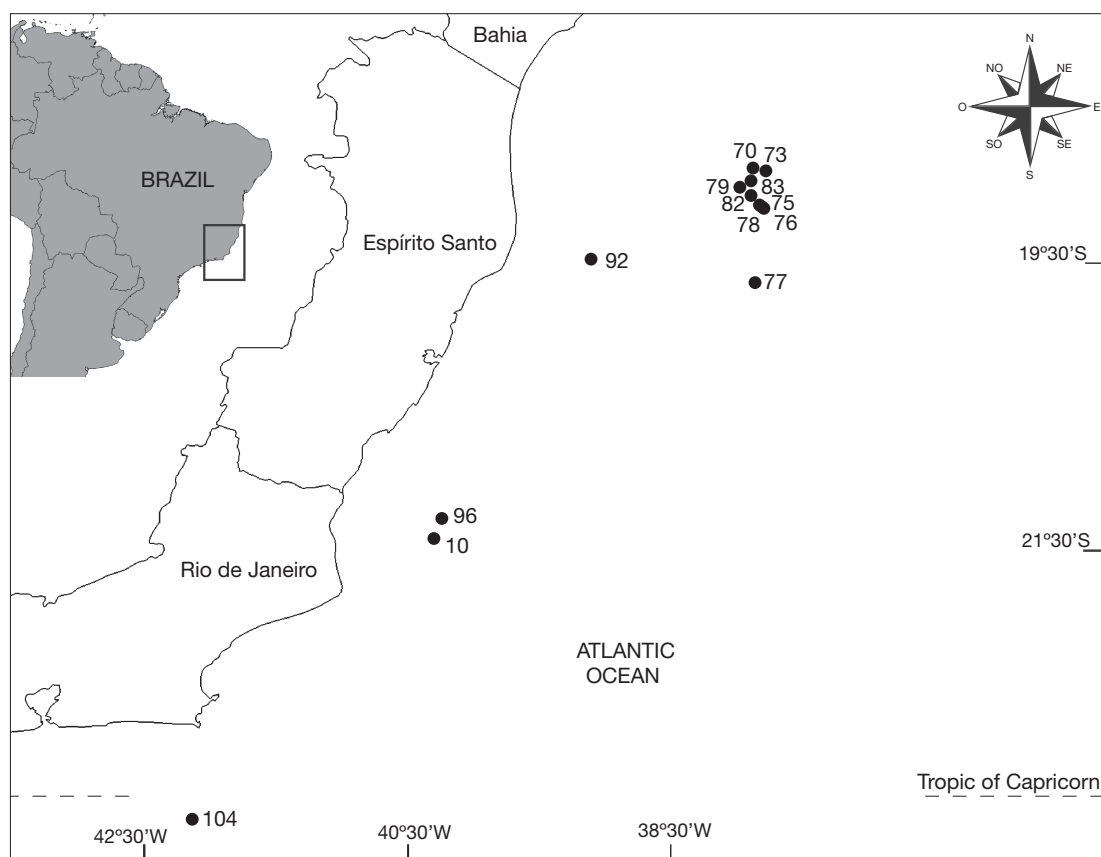


FIG. 1. — Mapping of MD55 stations studied in this paper.

and the penis has a broad terminal papilla protected by a preputial edge. In a phylogenetic analysis based on morphology (Simone 2000), three synapomorphies supported a branch with both species, being two of the gill and one of the pericardium.

MATERIAL AND METHODS

The samples of the species studied herein are dry-preserved, and belong to the following museums: MACN, MNHN and MZSP.

For the taxonomic discussion, beyond the data found in literature, types and samples of the other species were also examined, deposited in MZSP

collection and others, mainly those collected in the western Atlantic. On xenophorids, in particular, one of the more important samples is MZSP 35113, collected south of Rio de Janeiro state, 350-400 m depth (C. M. Cunha coll., IV.2002), comprising 60 specimens of *Onustus longleyi*. This lot permits a wide analysis of the growth and variation in a species of this family, convincing that the examined material really belongs to an undescribed species.

ABBREVIATIONS

MACN Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires;
 MNHN Muséum national d'Histoire naturelle, Paris;
 MZSP Museu de Zoologia da Universidade de São Paulo, São Paulo.

SYSTEMATICS

Superfamily STROMBOIDEA Rafinesque, 1815

Family XENOPHORIDAE Troschel, 1852

Genus *Onustus* Swainson, 1840

Onustus aquitanus n. sp. (Fig. 2)

TYPE MATERIAL. — Holotype: Brazil, Rio de Janeiro, off Arraial do Cabo, continental slope, 23°41'S, 42°06"W, 430-450 m depth, MNHN 25216 (Fig. 2A-E) (MD55, stn CB104, Bouchet, Leal & Métivier coll., 01.VI.1987). Paratype: Brazil, Espírito Santo, off Conceição da Barra, continental slope of Abrolhos, 18°59'S, 37°50'W, 637 m depth, MZSP 104032, 1 shell (Fig. 2F, G) (MD55, stn CB76, Bouchet, Leal & Métivier coll., 27.V.1987).

TYPE LOCALITY. — Brazil, Rio de Janeiro, off Arraial do Cabo, continental slope, 23°41'S, 42°06"W, 430-450 m depth (MD55, stn CB104).

DISTRIBUTION. — Continental slope from north Espírito Santo to middle Rio de Janeiro.

ETYMOLOGY. — The specific epithet is related to the word “aquitan” in the native Tupi language, meaning short, small.

DIAGNOSIS. — Size *c.* 20 mm. Spire angle *c.* 100°. Dense riblets sculptured dorsally and smooth ventrally. Moderate density of foreign objects attached.

DESCRIPTION

Shell: size *c.* 20 mm; bluntly conic; *c.* 1.75 times broader than tall. Spire angle *c.* 100° (Fig. 2A, B, F). Colour pure white. Protoconch dome-shaped, with three uniform whorls; pale brown; surface smooth, poorly shining, weakly convex (Fig. 2E, G); limit with teleoconch clear, orthocline. Up to five teleoconch whorls, profile weakly concave; suture somewhat well marked. Dorsal sculpture of opisthocline, rather wavy riblets, about three per mm, crossed by fine prosocline growth lines (Fig. 2A, D, G). Peripheral flange narrow (Fig. 2B). Inferior surface almost plane, weakly concave whorls; entirely covered by narrow, low, spiral riblets, crossed by concave growth lines parallel to aperture. Umbilicus opened, comprising *c.* 15% of maximum diameter; walls concave, simple, rounded; weak beige colour (Fig. 2C). Aperture elliptical, about twice wider than tall; comprising

about half of maximum diameter and about half of total shell height. Outer lip as flap covering aperture dorsally. Inner lip weakly concave in umbilical region, widely concave in inferior region. Presence of foreign objects in entire dorsal surface, with shell surface *c.* 40% exposed (Fig. 2A, B).

MEASUREMENTS (in mm). — Holotype: 18.3 × 10.1; paratype: 13.3 × 7.8 (broken).

HABITAT. — Muddy bottoms, 430-637 m depth.

REMARKS

The generic attribution to *Onustus aquitanus* n. sp. is not straightforward. It has an intriguing mixture of characters in common to *Onustus* and to *Xenophora* Fisher, 1807 as defined by Ponder (1983). The relatively wide umbilicus, the irregular riblets in upper surface, the lack of sculpture of inferior surface and the porcellaneous inferior surface indicate *Onustus* affinity. On the other hand, *O. aquitanus* n. sp. lacks a wide peripheral flange and has a good quantity of foreign objects attached to its whorls, which approach the species to *Xenophora*. The generic attribution in favor to *Onustus* is purely by parsimony.

Onustus aquitanus n. sp. differs from *O. longleyi* and from *O. caribaeus* in being proportionally wider, while the other two species are tall, highly conic in the region close to the apex. Besides, *O. aquitanus* n. sp. lacks a deep furrow at outer edge in each whorl, which is normally present in the other two species (Ponder 1983: fig. 31b). The spire angle of *O. aquitanus* n. sp. is *c.* 100°, while that of the other two species is *c.* 80°. Additional differences of *O. aquitanus* n. sp. are its sculpture of oblique riblets less dense (about three per mm, while the other species have about five per mm in second teleoconch whorl), the whitish colour (while the other two species are yellow to beige) and the convex shape of the whorls (for the other two species the whorls are planer). Anyway, by the shape of the aperture, *O. aquitanus* n. sp. appears to be more closely related to *O. longleyi*.

Beyond the generic features, *O. aquitanus* n. sp. additionally differs from *Xenophora conchyliophora* in being taller, by the presence of an umbilicus and in lacking brown pigmentation.

In regard to the protoconch, *O. aquitanus* n. sp. has an intermediary degree of multispirality. It is

not as multispiral as, e.g., the Pacific *Stellaria solaris* (Linnaeus, 1764) and *Onustus exutus* (Reeve, 1842). On the other hand, it is much more coiled than protoconchs of the Pacific *Xenophora flindersi* (Cotton & Godfrey, 1938) and others (Ponder 1983: fig. 13). The *O. aquitanus* n. sp. protoconch, in fact, is somewhat similar to those of *X. neozelanica* Suter, 1908.

The shell size is another interesting diagnostic feature. *Onustus aquitanus* n. sp. looks to be the smallest of the Recent xenophorids. The remaining species, mainly those from western Atlantic, are commonly over 100 mm. The sample studied here are not larger than 20 mm, although the paratype has the last whorl broken, its estimate maximum diameter is shorter than 50 mm. The small size if compared with other xenophorids is an interesting feature, mainly regarding the fossil record, which shows that the oldest species are of small size (Cottreau 1922; Ponder 1983; Simone 2005a).

Superfamily CYPRAEOIDEA Rafinesque, 1815

Family CYPRAEIDAE Rafinesque, 1815

Genus *Erosaria* Troschel, 1863

Erosaria acicularis (Gmelin, 1791)

(Fig. 3A, B)

Synonymy: see Simone (2004: 42, 43). Complement:

Erosaria acicularis – Simone 2004: 42–48, figs 7–10, 72, 154–173. — Simone & Gonçalves 2006: 13, 14, figs 1–3.

Cypraea (*Erosaria*) *acicularis* – Rios 2009: 132, fig. 313.

MATERIAL EXAMINED. — Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 18°59'S, 37°48'W, 607–620 m depth, MNHN, 2 shells (Fig. 3A, B), MZSP 104060, 1 shell (MD55, stn DC73, Bouchet, Leal & Métivier coll., 27.V.1987).

MEASUREMENTS (in mm). — MNHN (1): 23.1 × 15.3.

Genus *Luria* Jousseaume, 1884

Luria cinerea (Gmelin, 1791)

(Fig. 3C–F)

Synonymy: see Simone (2004: 52). Complement:

Luria cinerea – Simone 2004: 52–57, figs 13–15, 74, 75, 187–204, colour plates 46, 67–69.

Cypraea (*Luria*) *cinerea* – Rios 2009: 133, fig. 315.

MATERIAL EXAMINED. — Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 18°59'S, 37°48'W, 607–620 m depth, MNHN, 13 shells (Fig. 3C, D), MZSP 104061, 4 shells (MD55, stn DC73, Bouchet, Leal & Métivier coll., 27.V.1987). — 18°59'S, 37°50'W, 295 m depth, MNHN, 5 shells (Fig. 3E, F) (stn DC75). — Off Regência, 19°40'S, 37°48'W, 790–940 m depth, MNHN, 3 shells (stn CB77).

MEASUREMENTS (in mm). — MNHN (stn DC73): 17.0 × 10.3; MNHN (stn DC75): 7.4 × 3.6.

DISCUSSION ON CYPRAEIDS

A complete taxonomical treatment of *Erosaria acicularis* and *Luria cinerea* is given elsewhere (Simone 2004). In that paper, the deepest samples examined were collected in 81 m and 97 m depth respectively, although they are only constituted of shells. Reports up to 100 m have been found in literature (e.g., Rios 2009). Despite this, these species are far more common subtidal, up to c. 20 m depth, where they have been live collected. The presently studied samples appear to be the deepest ever collected for both species. *Erosaria acicularis* had been found in 607–620 m depth (Fig. 3A, B), while *L. cinerea* from 295 to 940 m depth (Fig. 3C, D). The conditions and state of preservation of these studied samples, however, are more indicative of transportation. As the oceanic topology of that region is rather abrupt, it is a quite possible that those samples are the result of the slide of dead shells from shallower depths. Those shells from the above illustrations are the best preserved ones, even though they are yet considerably eroded. Interestingly, the lot MNHN (stn DC75) are only constituted of shells of young, fragile specimens (Fig. 3E, F).

Family LAMELLARIIDAE d'Orbigny, 1841

Genus *Lamellaria* Montagu, 1815

Lamellaria spp.

(Fig. 3G, H)

MATERIAL EXAMINED. — Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 18°59'S, 37°48'W, 607–620 m depth, MNHN, 1 shell (MD55, stn DC73, Bouchet,

Leal & Métivier coll., 27.V.1987). — Off Regência, 19°40'S, 37°48'W, 790-940 m depth, MNHN, 1 shell (stn CB77). — Off Conceição da Barra, 18°59'S, 37°47'W, 1540-1550 m depth, MNHN, 3 shells (stn CD70, 26.V.1987).

MEASUREMENTS (in mm). — MNHN (stn DC73): 3.7 × 2.7.

DISCUSSION ON LAMELLARIIDS

Typical shells of *Lamellaria* were collected in the three above-mentioned stations. However, nothing more precise than the generic attribution is possible, as the identification of lamellariid species, only based on the vestigial shells, is complicated. Anyway, the shells of the three lots appear to belong to different species. Those of the MNHN lot (stn DC73) are more rounded and with a thicker-walled shell (Fig. 3G, H). The shell of the MNHN lot (stn DC77) is more elongated and thinner-walled. And the shells of the MNHN lot (stn DC70) are oval, with a wider aperture, and possess delicate transverse undulations on the last whorl. The first indication is that the three lots may represent different species, which only can be defined with additional samples.

Family PEDICULARIIDAE Gray, 1853
Genus *Pedicularia* Swainson, 1840

Pedicularia tibia Simone, 2005
(Fig. 3I-L)

Pedicularia tibia Simone, 2005b: 8-11, figs 13-30 [Canopus Bank, off Fortaleza, Ceará, Brazil, 02°14'25"S, 38°22'50"W, 260 m]. — Rosenberg 2009. — Braga-Henriques *et al.* 2010: 2, 4, 5.

Pedicularia bonfigliolii Cossignani, 2006: 12, 13 (3 figs) [Canopus Bank, 120 miles off Fortaleza, Ceará, Brazil]. — Rosenberg 2009 (in syn.).

TYPE MATERIAL (EXAMINED). — Holotype: Brazil, Ceará, Canopus Bank, off Fortaleza, 02°14'25"S, 38°22'50"W, 240-260 m depth, MZSP 78193 (XI.2005, Coltro coll. & leg.).
Paratypes: MZSP 52934, 53678, 53920, see Simone (2005: 6).

OTHER MATERIAL EXAMINED. — Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 18°59'S, 37°48'W, 607-620 m depth, MNHN, 1 shell (Fig. 3I-L) (MD55, stn DC73, Bouchet, Leal & Métivier coll., 27.V.1987).

TYPE LOCALITY. — Brazil, Ceará, Canopus Bank, off Fortaleza, 02°14'25"S, 38°22'50"W, 240-260 m depth.

MEASUREMENTS (in mm). — MNHN: 3.8 × 2.3.

REMARKS

The examined sample is the first outside the Canopus Bank, a bank located off Fortaleza, Ceará. This new occurrence expands the geographic distribution little more than 1000 km southwards. The weakly sculptured shell is one of the characters of this species (Fig. 3J, K), as well as the sinuous, high variable shell borders (Fig. 3I, L) which fit in the cnidarian colony in which the animal lives (Simone 2005b; Braga-Henriques *et al.* 2010).

Family OVULIDAE Fleming, 1822
Genus *Pseudosimnia* Schilder, 1927

Pseudosimnia lacrima n. sp.
(Fig. 3M-O)

TYPE MATERIAL. — Holotype: Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 18°59'S, 37°48'W, 607-620 m depth, MNHN 25217 (Fig. 3M-O) (MD55, stn DC73, Bouchet, Leal & Métivier coll., 27.V.1987).
Paratype: off Regência, 19°40'S, 37°48'W, 790-940 m depth, MZSP 104319, 1 shell (stn CB77).

TYPE LOCALITY. — Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 18°59'S, 37°48'W, 607-620 m depth (MD55, stn DC73).

DISTRIBUTION. — Only known from the type locality.

ETYMOLOGY. — The specific epithet is derived from the Latin "lacrima", meaning tear, an allusion to the general form of the shell.

DIAGNOSIS. — Shell length *c.* 7 mm, strongly biconic; width *c.* 60% of length. Periphery very thick, forming callus. Inner lip with *c.* 13 well-spaced teeth, protruded mostly inside.

DESCRIPTION

Shell: outline biconic, thick, strongly involute; length 7.5 mm. Colour pure white, weakly glossy. Width *c.* 60% of length; wider region located between $\frac{3}{5}$ and $\frac{4}{5}$ of shell length (Fig. 3M, O). Height *c.* 80% of width. Superior angulation *c.* 80°; inferior angulation *c.* 60°; left side more

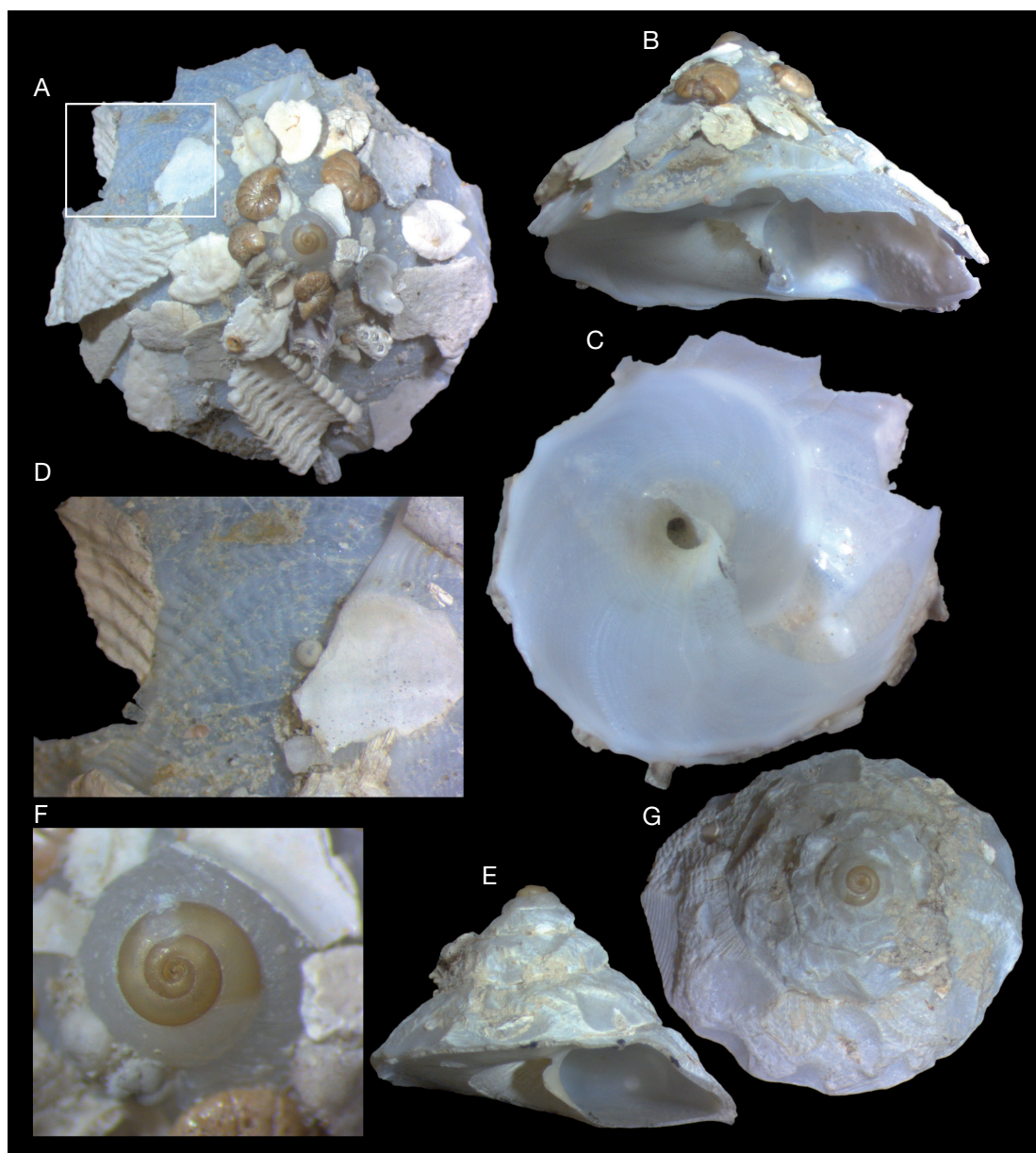


FIG. 2. — *Onustus aquitanus* n. sp. types: **A–E**, holotype MNHN 25216, maximum width = 18.3 mm; **A**, apical view; **B**, frontal view; **C**, umbilical view; **D**, detail of sculpture in region indicated by a rectangle in **A**; **E**, detail of apical region, apical view; **F**, **G**, paratype MZSP 104032, frontal and apical views, maximum diameter = 13.3 mm.

weakly rounded than right side. Periphery marked by strong callus, comprising *c.* $\frac{1}{3}$ of shell height (Fig. 3N). Aperture narrow, comprising *c.* 80% of shell length and *c.* 12% of shell width; uniform

width along its length, weakly arched, somewhat parallel to left shell edge. Outer lip thick, with *c.* 32% of shell width, thicker in middle, gradually narrowing towards both canals; *c.* 13 small, rounded

teeth more protruded inside (Fig. 3O), with weak radial fold in inner region of ventral surface, corresponding to each tooth; teeth uniformly sized from each other, and with interval equivalent to each tooth; teeth slightly closer with each other anteriorly. Inner lip simple, lacking teeth; weak callus at base of anal siphon, somewhat protruded ventrally (Fig. 3N). Canals with thick edges; anal canal weakly more pointed than incurrent canal (Fig. 3O).

MEASUREMENTS (in mm). — Holotype: 7.5×4.8 .

HABITAT. — Sandy-mud bottoms, 607-940 m depth.

REMARKS

Pseudosimnia lacrima n. sp. is somewhat similar in shape to *Primovula concinna* (Adams & Reeve, 1848) from eastern Africa (Cate 1973), but differs in lacking developed transverse striae, by a wider shell region in the middle (instead of upper third), a wider aperture and teeth protruding inside the aperture. It differs from *Pseudosimnia carnea* (Poiret, 1789), from the Mediterranean, in having thicker walls, fewer labial teeth and a more rounded siphonal canal. It differs from *P. perilla* Cate, 1973 in being wider and shorter, in having fewer teeth in the outer lip, and by possessing a closed anterior canal. In the same region, only two deep-water ovulids occur, *P. vanhyningi* (Smith, 1940) and *Spiculata bijuri* Cate, 1976 (Simone 2007); *P. lacrima* n. sp. differs from the former in being much smaller, in having wider anterior and posterior ends, and by having canals broader and less protruded; from the latter *P. lacrima* n. sp. differs in being shorter, in having much blunter anterior and posterior ends, thicker walls, callus less protruded and the teeth in inner lip.

Family TRIVIIDAE Troschel, 1863
Genus *Cleotrivia* Iredale, 1930

Cleotrivia antillarum (Schilder, 1922)
(Fig. 3P-T)

Cypraea triticea Blainville, 1826: 25 (*non* Lamarck 1810).

Trivia subrostrata Gray, 1827: 363, 364 (*non* Gray 1825).

Cypraea pulla Gaskoin, 1846: 24, 25 (*non* Gmelin 1791).

Trivia antillarum Schilder, 1922: 103, 111 (new name for *Cypraea triticea* Blainville, 1826). — Abbott 1954: 178; 1968: 106. — Rios 1975: 70, fig. 286. — Matthews & Matthews 1976: 75, 76, fig. 4. — Robinson & Montoya 1987: 386.

Trivia occidentalis Schilder, 1922: 103, 111 (new name for *Trivia subrostrata* Gray, 1827). — Rios 2009: 138, fig. 328.

Dolichupis (*Cleotrivia*) *antillarum* – Allan 1956: 158.

Niveria (*Cleotrivia*) *antillarum* – Schilder & Schilder 1971: 20.

Trivia (*Dolichupis*) *antillarum* – Abbott 1974: 149, fig. 1635.

Cleotrivia antillarum – Rosenberg 2009.

MATERIAL EXAMINED. — Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, $18^{\circ}50'S$, $37^{\circ}57'W$, 60 m depth, MZSP 104031, 1 shell (Fig. 3S, T) (MD55, stn DC83, Bouchet, Leal & Métivier coll., 28.V.1987). — $18^{\circ}59'S$, $37^{\circ}48'W$, 607-620 m depth, MNHN, 2 shells (Fig. 3P-R) (stn DC73, 27.V.1987).

MEASUREMENTS (in mm). — MNHN (1): 4.5×3.3 ; MZSP 104031: 4.1×3.0 .

Genus *Dolichupis* Iredale, 1930

Dolichupis akangus n. sp.
(Fig. 4A-D)

TYPE MATERIAL. — Holotype: Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, $18^{\circ}56'S$, $37^{\circ}52'W$, 85-105 m depth, MNHN 25218 (Fig. 4A-C) (MD55, stn DC82, Bouchet, Leal & Métivier coll., 28.V.1987). Paratypes: same data as holotype, MNHN 25233, 1 shell, MZSP 104028, 2 shells. — Off Regência, $19^{\circ}40'S$, $37^{\circ}48'W$, 790-940 m depth, MNHN 25219, 3 shells, MZSP 104027, 2 shells (stn CB77, 27.V.1987). — Off Itaúnas, $18^{\circ}59'S$, $37^{\circ}48'W$, 607-620 m depth, MNHN 25220, 6 shells, MZSP 104029, 4 shells (stn DC73, 27.V.1987). — Off Conceição da Barra, $18^{\circ}58'S$, $37^{\circ}49'W$, 637 m depth, MNHN 25221, 1 shell (Fig. 4D) (stn CB76, 27.V.1987).

TYPE LOCALITY. — Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, $18^{\circ}56'S$, $37^{\circ}52'W$, 85-105 m depth (MD55, stn DC82).

DISTRIBUTION. — Off Espírito Santo, Abrolhos continental slope.

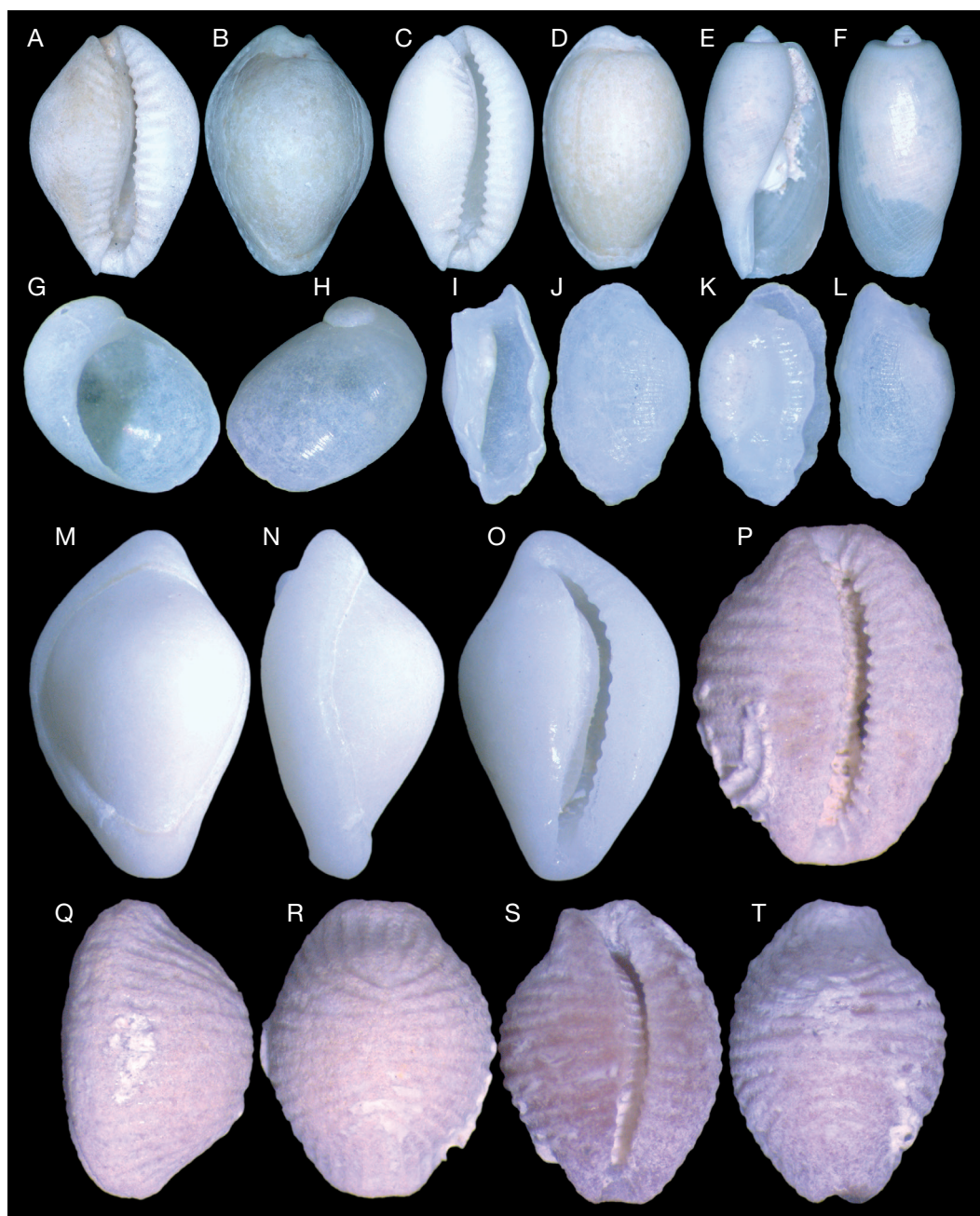


FIG. 3. — Cypraeoideans: **A**, *Erosaria acicularis* (Gmelin, 1791), MNHN (1), apertural view (L 23.1 mm); **B**, same, dorsal view; **C**, *Luria cinerea* (Gmelin, 1791), MNHN, stn DC73 (1), apertural view (L 17.0 mm); **D**, same, dorsal view; **E**, stn DC75 (1), young specimen, apertural view (L 7.4 mm); **F**, same, dorsal view; **G**, *Lamellaria* sp., MNHN (stn DC73), apertural view (L 3.7 mm); **H**, same, dorsal view; **I**, *Pedicularia tibia* Simone, 2005, MNHN (stn DC73), apertural view (L 3.8 mm); **J**, same, left view; **K**, same, right view; **L**, same, dorsal view; **M**, *Pseudosimnia lacrima* n. sp., holotype MNHN 25217, dorsal view (L 7.5 mm); **N**, same, right view; **O**, same, apertural view; **P**, *Cleotrivia antillarum* (Schilder, 1922), MNHN (stn DC73), apertural view (L 4.5 mm); **Q**, same, right view; **R**, same, dorsal view; **S**, same, MZSP 104031, apertural view (L 4.1 mm); **T**, same, dorsal view.

ETYMOLOGY. — The specific epithet is derived from the word “akanga’i” in the Brazilian native Parintintin language, meaning rounded (Betts 1981), an allusion to the rounded fashion of the shell.

DIAGNOSIS. — Shell of *c.* 5 mm, almost spherical; lacking dorsal groove; colour white. Sculpture *c.* 14 ribs, mostly continuous from side to side; *c.* 15 ribs in outer lip slightly protruding inside. Aperture in right side (far from central region).

DESCRIPTION

Shell of *c.* 5–6 mm; outline almost spherical, width *c.* 73% of length, height *c.* 64% of length. Colour pure white. Anterior and posterior canals similar from each other (Fig. 4B, C), slightly protruded, extending less than 10% of shell length. Spire entirely covered; apex not seen. Sculpture *c.* 14 narrow ribs, mostly perpendicular to longitudinal axis; interspaces about twice ribs width; most ribs running from side to side, entirely lacking dorsal groove; some shells with few ribs, mainly located in both, anterior and posterior regions, ending close to median line; 4–5 ribs, mainly in right side, ending in about half way between ventral region and median line (Fig. 4A, B, D); 4–5 ribs located on both canals positioned longitudinally, practically perpendicular to remaining ribs (Fig. 4A, D), those closer to median line touching with each other after distance *c.* 15% of shell length; remaining longitudinal ribs simply ending. Aperture narrow, arched only in both ends; comprising *c.* 10% of shell width and *c.* 80% of shell length; located on right third. Outer lip thick, with *c.* 26% of shell width, anterior and posterior regions extending beyond spire, posterior end more curved than anterior end (Fig. 4C); *c.* 20 transverse ribs, slightly protruding in inner edge, continuing as and similar to dorsal ribs; middle ribs perpendicular to longitudinal shell axis, gradually becoming oblique towards both canals. Siphonal and anal canals narrow, somewhat turned dorsally; siphonal canal more straight and located closer to median line; anal canal weakly more right located, turned to left. Inner lip lacking callus, fossular depression only in anterior half; *c.* 22 ribs weakly protruded inside aperture. Ribs in ventral region at left from aperture similar and continuous to dorsal ribs.

HABITAT. — Sandy-mud bottoms, 85–940 m depth.

MEASUREMENTS (in mm). — Holotype: 5.6 × 4.1; paratype MZSP 104028 (1): 5.2 × 3.8; paratype MNHN 25221: 5.3 × 4.1.

Dolichupis pingius n. sp. (Fig. 4E–H)

TYPE MATERIAL. — Holotype: Brazil, Espírito Santo, off Regência, continental slope of Abrolhos, 19°40'S, 37°48'W, 790–940 m depth, MNHN 25222 (Fig. 4E–G) (MD55, stn CB77, Bouchet, Leal & Métivier coll., 27.V.1987).

Paratypes: same data as holotype, MZSP 104030, 2 shells (Fig. 4H). — Off Itaúnas, 18°59'S, 37°48'W, 607–620 m depth, MNHN 25223, 2 shells (stn DC73).

TYPE LOCALITY. — Brazil, Espírito Santo, off Regência, continental slope of Abrolhos, 19°40'S, 37°48'W, 790–940 m depth (MD55, stn CB77).

DISTRIBUTION. — Off Espírito Santo, Abrolhos continental slope.

ETYMOLOGY. — The specific epithet is derived from the word “pi’ngi” in the native Parintintin language, meaning few (Betts 1981), an allusion to the low quantity of ribs of the shell.

DIAGNOSIS. — Shell of *c.* 5 mm, with outer lip highly expanded posteriorly; lacking dorsal groove; colour white. Sculpture *c.* 10 ribs, mostly continuous from side to side; *c.* 13 ribs in outer lip weakly protruding inside. Aperture in right side (far from central region).

DESCRIPTION

Shell of *c.* 5–6 mm; outline cuneiform, with outer lip expanded in upper, posterior region at right from apex; width *c.* 76% of length, height *c.* 65% of length. Colour pure white. Anterior and posterior canals similar from each other (Fig. 4B, C), weakly protruded, anterior canal extending less than 10% of shell length; posterior canal extending *c.* 20% of shell length, dislocated to right side (Fig. 4E, G, H). Spire entirely covered; apex not seen. Sculpture *c.* 10 narrow ribs, mostly perpendicular to longitudinal axis, weakly inclined to left (Fig. 4E, H); interspaces *c.* 3 times ribs width; practically all ribs running from side to side, entirely lacking dorsal groove; 1–2 ribs, mainly located in both, anterior and posterior regions, ending about half way

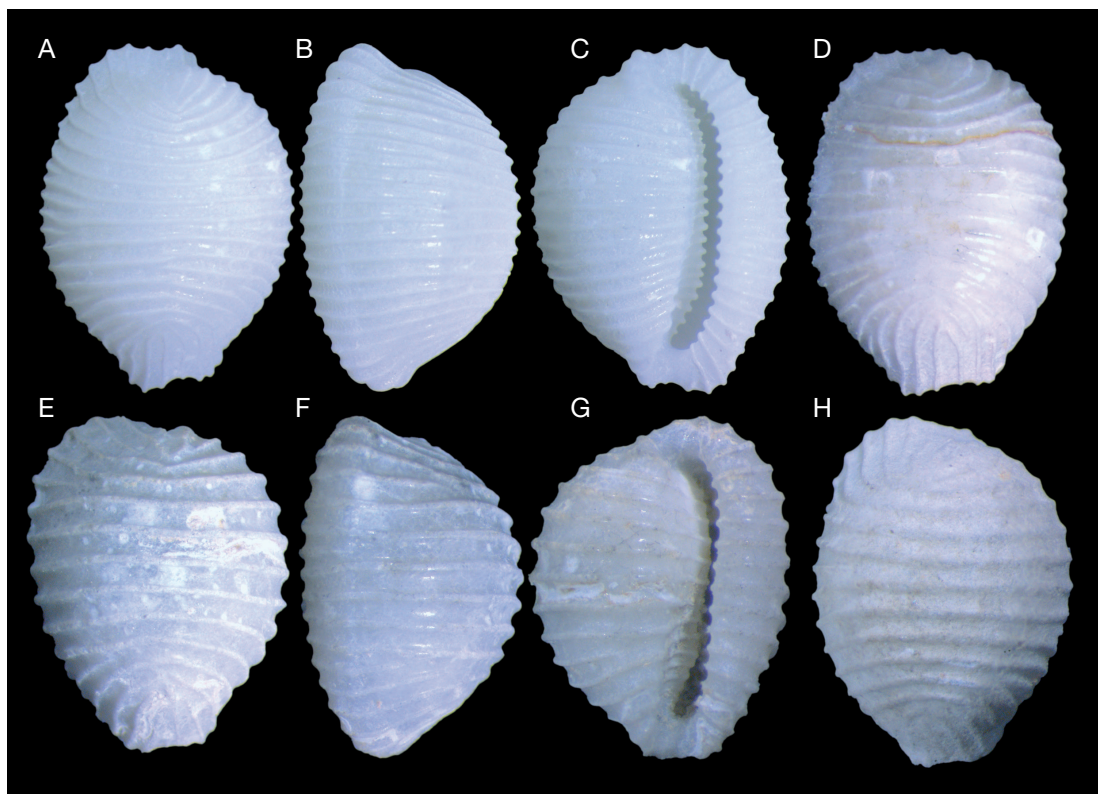


FIG. 4. — Triviids: **A**, *Dolichupis akangus* n. sp., holotype MNHN 25218, dorsal view (L 5.6 mm); **B**, same, right view; **C**, same, apertural view; **D**, paratype MNHN 25221, dorsal view (L 5.3 mm); **E**, *D. pingius* n. sp., holotype, MNHN 25222, dorsal view (L 5.6 mm); **F**, same, right view; **G**, same, apertural view; **H**, paratype MZSP 104030, dorsal view (L 6.2 mm).

between ventral region and median line (Fig. 4E, F, H); 4-5 ribs located on both canals positioned longitudinally, forming an angle of *c.* 30° in relation to remaining ribs (Fig. 4E, H), those more distant from median line touching with each other after distance *c.* 15% of shell length; middle longitudinal ribs simply ending. Aperture narrow, arched only in both ends, but more arched in anal canal (Fig. 4G); comprising *c.* 8% of shell width and *c.* 80% of shell length; located on right third. Outer lip thick, with *c.* 27% of shell width, anterior and posterior regions extending beyond spire, posterior end strongly more curved than anterior end (Fig. 4G); *c.* 14 transverse ribs, weakly protruding in inner edge, continuing as and similar to dorsal ribs; middle ribs perpendicular to longitudinal shell axis, gradually becoming oblique towards both

canals. Siphonal and anal canals narrow, weakly turned dorsally; siphonal canal more straight and located closer to median line; anal canal weakly more right located, strongly turned to left and about 50% longer than siphonal canal (Fig. 4G). Inner lip lacking callus, fossular depression only in anterior third; *c.* 11 ribs weakly protruded inside aperture; *c.* 5 ribs in fossular depression somewhat narrower and more obliquely positioned in relation to remaining ribs, further possessing small node in innermost region (Fig. 4G). Ribs in ventral region at left from aperture similar and continuous to dorsal ribs.

MEASUREMENTS (in mm). — Holotype: 5.6 × 4.3; paratype MZSP 104030: 6.2 × 4.9.

HABITAT. — Sandy-mud bottoms, 670-940 m depth.

DISCUSSION ON TRIVIIDS

Cleotrivia antillarum is the single triviid with dorsal groove, from those collected in MD55 expedition. The characteristic small size and the blunt anterior and posterior projections are the main feature for the identification. The southernmost record for the species was Rio Grande do Norte (Rosenberg 2009), the present record expands about 1000 km southwards the species geographic distribution. The bathymetric distribution, however, changes little, as the species have been collected up to 525 m, and is here reported to 670 m.

The remaining two species, which are here described as new, *Dolichupis akangus* n. sp. and *D. pingius* n. sp. are easily distinguishable by entirely lacking dorsal furrow, bearing ribs continuous from one side to another on dorsal region. This, associated with the small size and deep-water occurrence, are the main reasons for considering them in the genus *Dolichupis*, although the generic distinction in the triviids are not always forthright (Cate 1979; Fehse 2002; Fehse & Greco 2005). *Dolichupis akangus* n. sp. differs from *D. pingius* n. sp. mainly in having much more ribs (compare Figure 4A and E), in being more rounded and in lacking the outer lip so expanded posteriorly; furthermore, *D. akangus* n. sp. lacks the differentiation of the sculpture on the fossular depression of the inner lip (compare Figure 4C and G), which additionally possesses a shorter depression. The closest species from both *Dolichupis* here described is *D. virgo* Fehse & Greco, 2005; *D. akangus* n. sp. differs in being slightly more elongated, in having fewer ribs (c. 15 ribs, against 18–22 ribs of *D. virgo*), and by total absence of dorsal furrow, which are mostly present in *D. virgo*; *D. pingius* n. sp. differs mainly by the posterior expansion of the outer lip, in lacking dorsal furrow, and in bearing much fewer ribs (c. 10). Both new species are furthermore different from the Caribbean *Cleotrivia candidula* (Gaskoin, 1836) and *C. leucosphaera* (Schilder, 1931), which also lack dorsal furrow, in being slightly more elongated, in having fewer ribs (those species possess c. 25–30 ribs), and by wider and more left-placed aperture. Both new species still differs from *D. paucilirata* (Sowerby, 1870) and from *D. panamensis* (Dall, 1902) (Cate 1979; Fehse & Greco 2005) in being slightly larger, in having more ribs (those species have c. 8–10), and by wider and longer aperture.

Superfamily MURICOIDEA Rafinesque, 1815
Family COSTELLARIIDAE MacDonald, 1860
Genus *Vexillum* Röding, 1798

Vexillum sp.
(Fig. 5E, F)

MATERIAL EXAMINED. — Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 18°59'S, 37°48'W, 607–620 m depth, MNHN, 1 broken shell (MD55, stn DC73, Bouchet, Leal & Métivier coll., 27.V.1987).

MEASUREMENTS (in mm). — 8.4 × 5.0 (broken).

REMARKS

A single broken specimen of a typical *Vexillum* was collected, which does not correspond to any described species. It has strong axial threads, with practically no spiral sculpture, except for weak spiral furrows in threads, producing series of shallow nodes on the threads (Fig. 5E, F). The subsutural region of the threads is somewhat bulged and marked by a cream spot, differentiating it from the uniform dark beige of the remaining shell surface. The body whorl (practically the single region left) is not perfectly rounded, appearing slightly flattened in middle. These patterns are not indicative of any of the known species from the Atlantic, and possibly indicate a new species. However, based on the incompleteness of the single specimen collected, the description of a new taxon was considered premature.

Vexillum pulchellum (Reeve, 1844) has been collected in the Vitória-Trindade seamounts (Rios 2009), but it is much more colourful and the whorls are much shorter and rounded, with well-developed sculpture in the interspaces of the axial threads. The same can be evoked if compared with *V. histrio* (Reeve, 1844) and *V. trophonium* (Dall, 1889), which also occur in NE Brazilian coast.

Genus *Turricostellaria* Petuch, 1987

Turricostellaria amphissa n. sp.
(Fig. 5A–D)

TYPE MATERIAL. — Holotype: Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 18°59'S,

37°50'W, 295 m depth, MNHN 25230 (Fig. 5A) (MD55, stn DC75, Bouchet, Leal & Métivier coll., 27.V.1987). Paratypes: same data as holotype, MNHN 25231, 2 shells (Fig. 5B, C), MZSP 102691, 2 shells (Fig. 5D).

TYPE LOCALITY. — Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 18°59'S, 37°50'W, 295 m depth (MD55, stn DC75).

DISTRIBUTION. — Known only from type locality.

ETYMOLOGY. — The specific epithet refers to the similarity of the species in fashion and size with columbellid genus *Amphissa* H. & A. Adams, 1853.

DIAGNOSIS. — Shell up to 5 mm, wide (width *c.* half length). Sculpture axial, strong; shoulder narrow. Protoconch wide, paucispiral.

DESCRIPTION

Shell: size up to 5 mm, outline oval; width *c.* 48% of length. Colour pure white, translucent. Protoconch mammillate, comprising *c.* 15% of shell length and *c.* 35% of shell width; *c.* 1.5 rounded, smooth, glossy whorls; suture plane (Fig. 5B, C); transition with teleoconch unclear. Spire *c.* 50% of shell length, spire angle *c.* 40°. Teleoconch up to three glossy whorls; each whorl with narrow shoulder, remaining weakly convex. Sculpture of strong axial threads, slightly arched, from suture (shoulder) to suture; *c.* 12 in penultimate whorl; interspaces of axial threads roundly concave, with *c.* double threads width. Ventral region of body whorl with inferior 1/3 lacking spiral threads (Fig. 5A, D), with axial threads disappearing gradually. Aperture elliptic, weakly oblique; comprising *c.* 50% of shell length and *c.* 40% of shell width. Outer lip simple, rounded, lacking folds. Inner lip slightly concave, lacking callus; four oblique folds uniformly distributed in middle region, comprising *c.* 60% of inner lip area; upper and inferior folds smaller than second and third folds (Fig. 5A, D). Canal narrow, somewhat pointed, slightly projected forwards. No umbilicus.

MEASUREMENTS (in mm). — Holotype: 4.6 × 2.1; paratype MNHN 25231: 4.4 × 2.2; paratype MZSP 102691: 3.6 × 1.6.

HABITAT. — Sandy-mud bottoms, 295 m depth.

Turricostellaria jukyry n. sp. (Fig. 5G-K)

TYPE MATERIAL. — Holotype: Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 19°01'S, 37°47'W, 1500-1575 m depth, MNHN 25232 (Fig. 5G-J) (MD55, stn CB79, Bouchet, Leal & Métivier coll., 28.V.1987). Paratype: off Regência, 19°40'S, 37°48'W, 790-940 m depth, MZSP 102858, 1 shell (Fig. 5K) (stn CB77, 27.V.1987).

TYPE LOCALITY. — Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 19°01'S, 37°47'W, 1500-1575 m depth (MD55, stn CB79).

ETYMOLOGY. — The specific epithet is derived from the word “jukyry” in the native Parintintin language, meaning pale yellow (Betts 1981).

DISTRIBUTION. — Off Espírito Santo, Abrolhos continental slope.

DIAGNOSIS. — Shell up to 13 mm, elongated (length *c.* 3 times width). Sculpture axial, sparse, low; shoulder low, away from upper suture. Protoconch pointed, of four whorls. Aperture *c.* 1/3 shell length.

DESCRIPTION

Shell: size up to 12.3 mm, outline somewhat turritiform; width *c.* 39% of length. Colour white, in tip or spire and anterior half of body whorl, pale yellow in middle, with no clear limit between pigmentations (Fig. 5G, H, K); surface shining. Protoconch pointed and tall, colour pale brown, comprising *c.* 8% of shell length and *c.* 12% of shell width; about four rounded, smooth, glossy whorls; suture shallow but clear (Fig. 5I); transition with teleoconch clear, arched. Spire *c.* 65% of shell length; spire angle *c.* 35°. Teleoconch up to 6.5 whorls; each whorl with wide shoulder located between upper and middle thirds of each whorl, in angle *c.* 35° in relation to longitudinal shell axis; remaining weakly convex, almost vertical. Sculpture strong axial threads, vertical, from suture to suture, with small node on tip of shoulder; *c.* 9 in penultimate whorl; interspaces of axial threads roundly concave, with *c.* 3 times threads width. Anterior region of body whorl lacking spiral threads (Fig. 5G, H, K), axial threads disappearing gradually producing smooth, uniform surface. Aperture elliptic, weakly oblique; comprising *c.* 43% of shell length and *c.* 35% of

shell width. Outer lip simple, rounded, lacking folds. Inner lip weakly concave, with shallow callus, upper third *c.* 45° in relation to longitudinal shell axis; four oblique folds uniformly distributed in middle region, comprising *c.* 60% of inner lip area; upper folds larger, diminishing up to inconspicuous fourth fold flanking canal (Fig. 5H, J). Canal narrow, somewhat pointed, weakly projected forwards; with *c.* ½ of aperture width. No umbilicus.

MEASUREMENTS (in mm). — Holotype: 12.3 × 5.0; paratype: 7.8 × 3.4.

HABITAT. — Sandy-mud bottoms, 790-1575 m depth.

Turricostellaria apyrabi n. sp.
(Fig. 5L-R)

TYPE MATERIAL. — Holotype: Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 19°01'S, 37°47'W, 1500-1575 m depth, MNHN 25234 (Fig. 5P-R) (MD55, stn CB79, Bouchet, Leal & Métivier coll., 28.V.1987). Paratypes: same data as holotype, MNHN 25238, 1 shell (Fig. 5L-N), MZSP 102862, 1 shell (Fig. 5O). — Off Regência, 19°41'S, 37°48'W, 790-940 m depth, MNHN 25235, 1 shell (stn CB77, 27.V.1987). — Off Itaúnas, 18°59'S, 37°48'W, 1200 m depth, MZSP 102863, 1 shell (stn CB78, 27.V.1987); 19°00'S, 37°49'W, 950-1050 m depth, MNHN 25236, 1 shell (stn DC72, 27.V.1987).

TYPE LOCALITY. — Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 19°01'S, 37°47'W, 1500-1575 m depth (MD55, stn CB79).

DISTRIBUTION. — Off Espírito Santo, Abrolhos continental slope.

ETYMOLOGY. — The specific epithet is derived from the word "apyrahi" in the native Parintintin language, meaning a large pumpkin-like fruit (Betts 1981), an allusion to the outline of the shell shape.

DIAGNOSIS. — Shell up to 24 mm, elongated (length *c.* 3 times width). Sculpture axial, sparse, low, disappearing in last whorls; shoulder absent. Protoconch pointed, of three whorls. Aperture *c.* ⅓ shell length.

DESCRIPTION

Shell: size up to 13.7 mm, outline somewhat turritiform; width *c.* 29% (juvenile) to 35% (large) of length. Colour uniform pale yellow to white (Fig. 5M, O, R); surface shining. Protoconch pointed and tall,

colour pale brown, comprising *c.* 5% of shell length and *c.* 4% of shell width; about three rounded, smooth, glossy whorls; suture shallow but clear (Fig. 5N); transition with teleoconch clear, arched. Spire *c.* 55% of shell length; spire angle *c.* 32°. Teleoconch up to eight whorls; each whorl lacking shoulder (Fig. 5O, Q) or having shallow subsutural spiral fold located below superior quarter of each whorl; remaining weakly convex. Sculpture shallow axial threads, almost undulations, vertical, from suture to suture; sculpture disappearing after seven teleoconch whorls (Fig. 5L, M, Q, R); about nine in penultimate whorl; interspaces of axial threads roundly concave, with about twice threads width. Ventral region of body whorl in larger specimens lacking spiral threads (Fig. 5L, Q), present in smaller specimens (Fig. 5O). Aperture elliptic, weakly oblique; comprising *c.* 45% of shell length and *c.* 37% of shell width. Outer lip simple, rounded, relatively thick (Fig. 5L, Q) lacking folds. Inner lip weakly concave, with shallow callus, superior third *c.* 30° in relation to longitudinal shell axis; four oblique folds uniformly distributed in middle region, comprising *c.* 70% of inner lip area; upper folds larger, diminishing up to inconspicuous fourth fold flanking canal (Fig. 5L, P, Q). Canal narrow, blunt, slightly projected forwards; with *c.* 70% of aperture width. No umbilicus.

MEASUREMENTS (in mm). — Holotype: 23.7 × 8.6; paratype MNHN 25238: 17.9 × 6.3; paratype MZSP 102862: 15.9 × 5.9.

HABITAT. — Sandy-mud bottoms with organic blocks, 790-1575 m depth.

Turricostellaria ovir n. sp.
(Fig. 6A-D)

TYPE MATERIAL. — Holotype: Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 18°58'S, 37°48'W, 1200 m depth, MNHN 25237 (Fig. 6A, B) (MD55, stn DC78, Bouchet, Leal & Métivier coll., 27.V.1987). Paratypes: same data as holotype, MZSP 102860, 1 shell (Fig. 6C, D). — Off Conceição da Barra, 18°59'S, 37°47'W, 1540-1550 m depth, MZSP 102860, 1 shell (Fig. 6C, D) (stn CB70, 26.V.1987).

TYPE LOCALITY. — Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 18°58'S, 37°48'W, 1200 m depth (MD55, stn DC78).

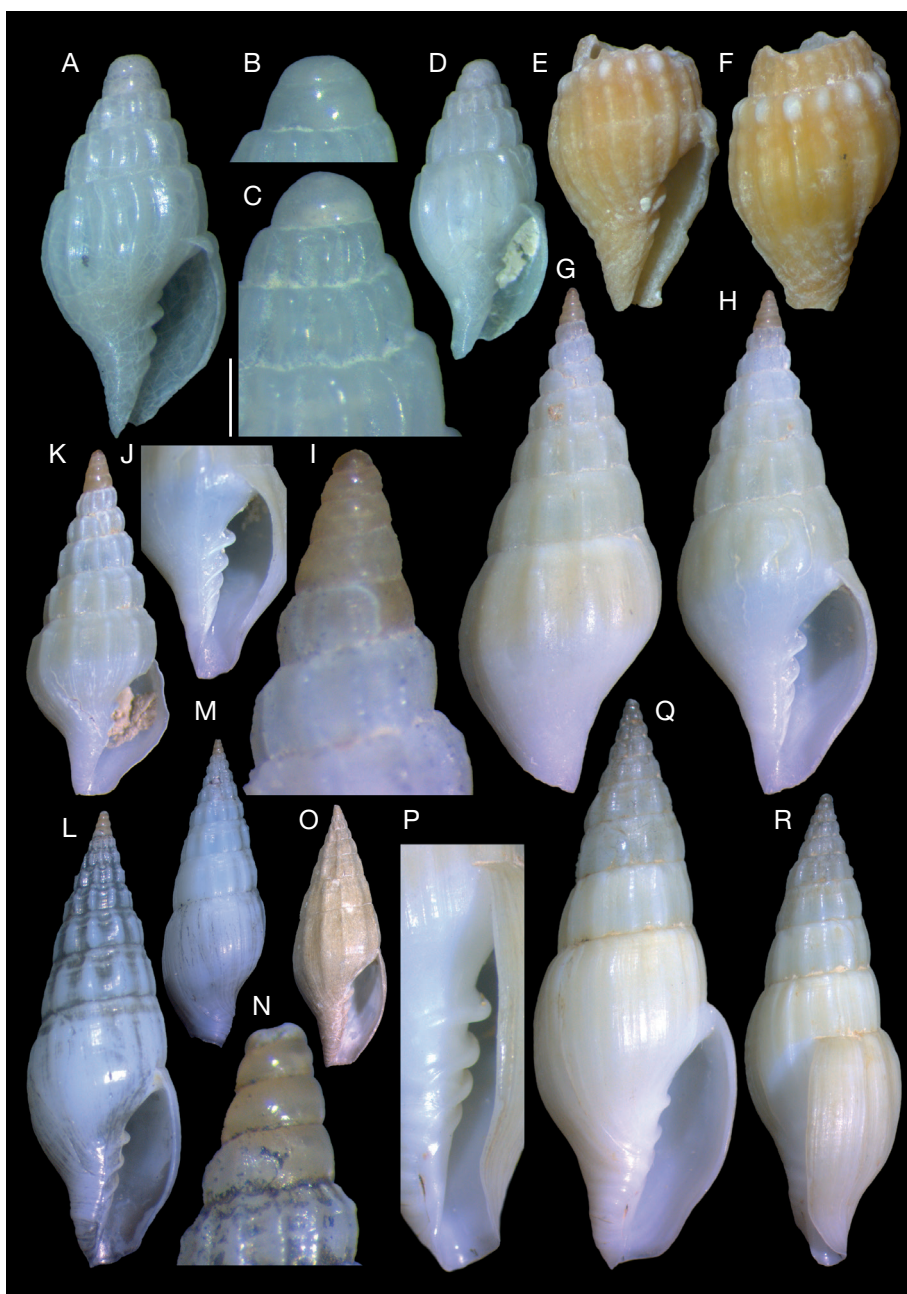


FIG. 5. — Costellariids: **A**, *Turricostellaria amphissa* n. sp., holotype MNHN 25230, apertural view (L 4.6 mm); **B**, paratype MNHN 25231 (1), detail of apex, apertural view; **C**, same, dorsal view; **D**, paratype MZSP 102691 (1), apertural view (L 3.8 mm); **E**, *Vexillum* sp., MNHN (stn DC73), apertural view; **F**, dorsal view (L 8.4 mm); **G**, *Turricostellaria jukyry* n. sp., holotype MNHN 25232, dorsal view (L 12.3 mm); **H**, same, apertural view; **I**, same, detail of apical region in profile; **J**, same, detail of aperture, apertural-slightly right view; **K**, paratype MZSP 102858, apertural view (L 7.8 mm); **L**, *Turricostellaria apyrahii* n. sp., paratype MNHN 25238, apertural view (L 17.9 mm); **M**, same, dorsal view; **N**, same, detail of apex in profile; **O**, paratype MZSP 102862, apertural view (L 15.9 mm); **P**, holotype MNHN 25234, detail of inner lip, apertural-slightly right view; **Q**, same, apertural view (L 23.7 mm); **R**, same, right view. Scale bar: C, 0.5 mm.

DISTRIBUTION. — Espírito Santo continental slope.

ETYMOLOGY. — The specific epithet is derived from the native Parintintin language, from “ovir”, meaning sharp pointed, arrow-like (Betts 1981), an allusion to the outline of the shell shape.

DIAGNOSIS. — Shell up to 10 mm, elongated (length *c.* 3 times width). Sculpture axial, strong, slightly prosocline; shoulder absent. Protoconch blunt, mammillate, of two whorls. Aperture *c.* 1/3 shell length. Canal narrow, relatively elongated.

DESCRIPTION

Shell: size up to 10 mm, outline somewhat turritiform; width *c.* 35% of length. Colour uniform white (Fig. 6A–C); surface opaque. Protoconch blunt, mammillate, comprising *c.* 6% of shell length and *c.* 16% of shell width; about two rounded, smooth, glossy whorls; suture shallow unclear (Fig. 6D); transition with teleoconch unclear. Spire *c.* 55% of shell length; spire angle *c.* 30°. Teleoconch up to 6.5 whorls; each whorl lacking shoulder in last whorls (Fig. 6A, B), and having shallow shoulder located below upper quarter of each whorl; remaining profile almost straight. Sculpture strong, uniform axial threads, slightly prosocline (angle *c.* 10° in relation to shell longitudinal axis), from suture to suture; small node on shoulder in first teleoconch whorls (Fig. 6C, D); *c.* 12 in penultimate whorl; interspaces of axial threads roundly concave, as wide as threads. Ventral region of body whorl lacking spiral threads in anterior third (Fig. 6A). Aperture elliptic, almost vertical; comprising *c.* 30% of shell length and *c.* 38% of shell width. Outer lip simple, rounded, lacking folds (Fig. 6A, B). Inner lip weakly concave, callus shallow, upper third *c.* 30° in relation to longitudinal shell axis; four oblique folds uniformly distributed in middle region, comprising *c.* 70% of inner lip area; upper folds larger, diminishing up to inconspicuous fourth fold flanking canal (Fig. 6A, C). Canal narrow, pointed, projected forwards along *c.* 13% of shell length; with *c.* 30% of aperture width. Dorsal surface of canal with pair of oblique, low folds as continuation of two upper columellar folds (Fig. 6B). No umbilicus.

MEASUREMENTS (in mm). — Holotype: 9.9 × 3.6; paratype MZSP 102860: 5.2 × 2.5.

HABITAT. — Sandy-mud bottoms, 1200–1550 m depth.

DISCUSSION ON *TURRICOSTELLARIA* SPECIES

The genus *Turricostellaria* was coined to hold two Venezuelan, deep-water species with “tabulate whorls and scalariform appearance” (Petuch 1987: 108), resembling a turrid. Despite some authors have considered it synonym of *Vexillum* (e.g., Rosenberg 2010), it appears to be sufficiently distinct to be considered valid. It encompasses, beyond the two originally described species, at least another four species described herein, representing a deep-water taxon with turritiform-like species, lacking spiral sculpture.

Despite the protoconch was never mentioned in the original description of *Turricostellaria*, neither afterwards, the species described here show that the structure can divide the species of the genus into two groups: one with paucispiral protoconch (*T. amphissa* n. sp. and *T. ovir* n. sp. – Figs 5B–D; 6C) and the other with multispiral protoconch (*T. jukyry* n. sp. and *T. apyrahi* n. sp. – Fig. 5I, N). There is no indication of the protoconch of *T. leonardhilli* Petuch, 1987 and *T. lindae* Petuch, 1987; in the figures the structure appears eroded or paucispiral. The protoconch of *T. amphissa* n. sp. is the shortest and widest, with a flattened suture; that of *T. ovir* n. sp. is slightly longer and pointed, with suture slightly clearer. The protoconch of *T. jukyry* n. sp. is the longest, bearing four whorls with deep suture; that of *T. apyrahi* n. sp. has three whorls and is blunter. Additionally, those multispiral protoconch-bearing species have it in a pale brown colour, distinct from the remaining whitish colour of the teleoconch; this does not happen in the species with paucispiral protoconch.

Turricostellaria amphissa n. sp. is the shortest and most inflated of the genus; it is also the smallest (*c.* 5 mm) and has the thinnest shell walls, being translucent. These are the main distinctions of the species. *Turricostellaria ovir* n. sp. is the most elongated and sharpest of the genus, in this aspect it resembles *T. lindae*, differing in lacking a developed shoulder and by the whorls much more elongated. The most difficult distinction is between *T. jukyry* n. sp. and *T. apyrahi* n. sp. Beyond the different protoconch mentioned above, *T. jukyry* n. sp. has

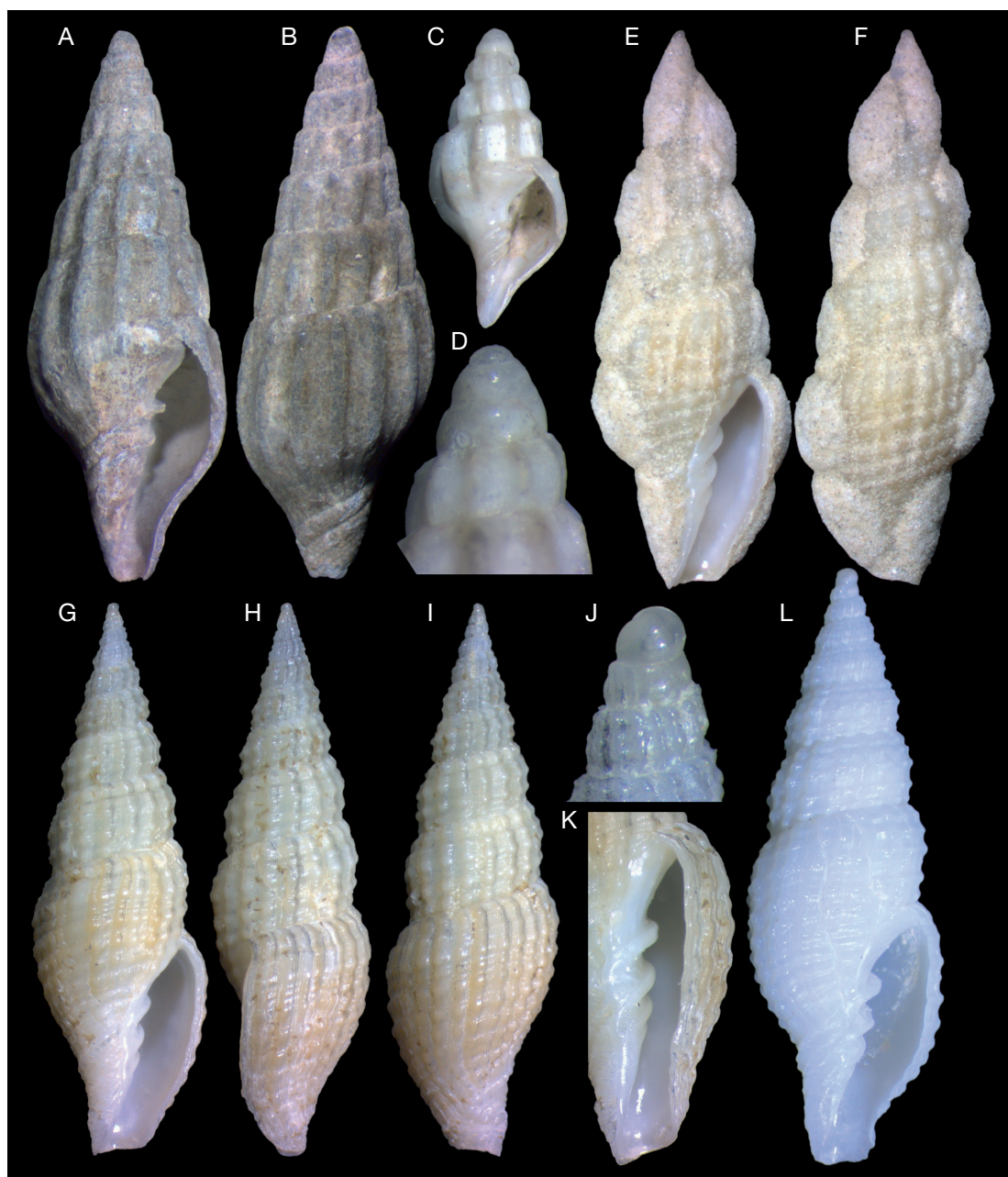


FIG. 6. — Costellariids: **A**, *Turricostellaria ovir* n. sp., holotype MNHN 25237, apertural view (L 9.9 mm); **B**, same, dorsal view; **C**, paratype MZSP 102860, apertural view (L 5.2 mm); **D**, same, detail of apex in profile; **E**, *Nodicostellaria crassa* (Simone, 1995), MNHN (stn CB104), apertural view with sponge coating (L 25.4 mm); **F**, same, dorsal view; **G**, same, cleaned shell, apertural view; **H**, same, right view; **I**, same, dorsal view; **J**, same, detail of protoconch; **K**, same, detail of inner lip, apertural-slightly right view; **L**, MZSP 102887, apertural view (L 14.1 mm).

the shoulder more distinct, mainly in the first teleoconch whorls (Fig. 5G, K), and the sculpture in this region is more developed and uniform than that of *T. apyrabi* n. sp. The colour of *T. apyrabi* n. sp. is more uniform, while that of *T. jukyry* n. sp. is in yellow bands. The body whorl of *T. apyrabi* n. sp. tends to be wider than expected for a uniform spiral growth (Fig. 5Q, R), which does not happen in *T. jukyry* n. sp. The aperture of *T. jukyry* n. sp. is slightly shorter and more rounded, and the upper region of inner lip slightly more horizontal than that of *T. apyrabi* n. sp. The axial sculpture is also distinctive, as that of *T. jukyry* n. sp. tends to be more uniform and strong (Fig. 5H, K) than that of *T. apyrabi* n. sp., which lacks the axial sculpture in the last whorls (Fig. 5L, Q).

Turricostellaria apyrabi n. sp. is the most similar to the Venezuelan *T. leonardhilli*; it differs in having a more elongated outline and whorls, axial sculpture more developed, aperture slightly ampler, body whorl wider, and, mainly, the multispiral and pointed protoconch. The species also resembles *Latiromitra bairdii* (Dall, 1889), from North Carolina (965 m depth); it differs in being shorter and wider, in having the aperture wider and longer, and the sculpture more developed. *Turricostellaria ovir* n. sp. still differs from *T. leonardhilli* in being more elongated, in having a small subsutural shoulder, more straight whorls profile, narrower body whorl and axial sculpture much more developed.

Genus *Nodicostellaria* Petuch, 1987

Nodicostellaria crassa (Simone, 1995)
(Fig. 6E-L)

Thala crassa Simone, 1995: 805-811, figs 1-11. — Rios 2009: 292, fig. 737.

Nodicostellaria crassa — Salisbury 2000: 222. — Simone 2011: 170.

Vexillum (*Nodicostellaria*) *crassum* — Turner 2001: 26. — Rosenberg & Salisbury 2003: 2.

MATERIAL EXAMINED. — Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 18°59'S, 37°50'W, 295 m depth, MNHN, 10 shells, MZSP 102887, 2 shells

(Fig. 6L) (MD55, stn DC75, Bouchet, Leal & Métivier coll., 27.V.1987). — Off Regência, 19°34'S, 38°55'W, 340-360 m depth, MNHN, 93 shells, MZSP 102872, 16 shells (stn CB92, 29.V.1987). — Rio de Janeiro, off Ponta do Retiro, 21°32'S, 40°09'W, 295-300 m depth, MNHN, 56 shells, MZSP 102886, 15 shells (stn CB96, 31.V.1987). — Off Arraial do Cabo, 23°42'S, 42°07'W, 430-450 m depth, MNHN, 27 shells, MZSP 102871, 5 shells (Fig. 6E-K) (stn CB104, 01.VI.1987). — Off Cabo de São Tomé, 21°35'S, 40°11'W, 300-307 m depth, MNHN, 1 shell (stn DC10, 10.V.1987).

TYPE LOCALITY. — Brazil, São Paulo, continental slope off Ubatuba, 24°25'00"S, 44°16'05"W, 320 m depth (R/V W. Besnard, stn 5365; 07.XII.1988).

MEASUREMENTS (in mm). — MNHN (DC104) (Fig. 6E-J): 25.4 × 7.9; MZSP 102887 (Fig. 6L): 14.1 × 4.5.

REMARKS

Following previous authors (Salisbury 2000; Turner 2001) this species was transferred from *Thala* H. & A. Adams, 1853 to the genus *Nodicostellaria* (Petuch 1987: 107; type species: *Costellaria kaicherae* Petuch, 1979, OD, from NE Brazil) by its larger size for a *Thala*, strong spiral and axial sculpture, both predominating, and convex whorls profile. However, unlike the original description of the genus, *N. crassa* possesses liration in outer lip, despite in being weak, and has only three folds in the columella, instead of four (Fig. 6K). These characters must be added to the genus' description or another genus must be erected for the species. Until the resolution of these features, a conservative approach, considering *Nodicostellaria*, is here adopted.

Nodicostellaria crassa so far was restricted to the continental slope off São Paulo state. The presently studied sample expands considerably the geographic distribution of the species c. 1000 km towards north, showing that the species is distributed in the slope along entire southeast Brazilian coast. The bathymetric range, however, remains the same, from 240 to 600 m depth.

Being the commonest mitriform species, *N. crassa* shows an interesting level of variation, with the southernmost specimens with white colour and more orthocline axial threads (Fig. 6L), while the northern specimens are pale brown in colour with sculpture normally prosocline axial threads (Fig. 6G, H). However, these patterns are variable

and redundancies exist. The live-collected animals are always covered by sponge, forming expansions accumulated laterally (Fig. 6E, F); the cover is easy to remove (Fig. 6G-I). The protoconch has been confirmed to bear two rounded whorls (Fig. 6J, L), somewhat cylindrical, with deep suture and clear limit with teleoconch. The upper fold is normally bifid along distal edge, mainly in larger specimens (Fig. 6K).

Genus *Austromitra* Finlay, 1927

Austromitra decresca n. sp.

(Fig. 7A-D)

TYPE MATERIAL. — Holotype: Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 18°56'S, 37°52'W, 85-105 m depth, MNHN 25239 (Fig. 7A-C) (MD55, stn DC82, Bouchet, Leal & Métivier coll., 28.V.1987). Paratypes: same data as holotype, MZSP 102687, 1 shell; 18°49'S, 37°57'W, 60 m depth, MNHN 25240, 1 shell (stn DC83).

TYPE LOCALITY. — Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 18°56'S, 37°52'W, 85-105 m depth (MD55, stn DC82).

DISTRIBUTION. — Off Espírito Santo, Abrolhos continental slope.

ETYMOLOGY. — The specific epithet is derived from the Latin word “decreasco”, meaning grow smaller, an allusion to the small size of the shell.

DIAGNOSIS. — Shell up to 6 mm, biconic (length about twice width). Sculpture mainly axial, strong, with interspaced equivalent to threads width; crossed by spiral threads forming reticulation, covering axial threads; shoulder absent. Protoconch blunt, cylindrical, of two whorls. Aperture *c.* ½ shell length. Canal narrow, relatively elongated, projected forwards.

DESCRIPTION

Shell: size up to 6 mm, outline biconic; width *c.* 45% of length. Colour uniform beige to pale brown (Fig. 7A, B, D); surface opaque. Protoconch blunt, cylindrical, comprising *c.* 8% of shell length and *c.* 22% of shell width; about two rounded, smooth, glossy whorls; suture clear (Fig. 7A, B); transition with teleoconch unclear. Spire *c.* 50% of shell length; spire angle *c.* 45°. Teleoconch up to four whorls;

each whorl lacking shoulder (Fig. 7A, D); whorls profile weakly concave; suture clear. Sculpture strong, uniform axial threads, orthocline, from suture to suture (Fig. 7A, B, D); *c.* 14 in penultimate whorl; interspaces of axial threads roundly concave, as wide as threads; spiral threads narrower and lower than axial threads running uniformly covering axial threads in undulated fashion, forming small nodes on axial threads' edge, four in penultimate whorl (Fig. 7B), *c.* 15 in body-whorl (Fig. 7A, D). Ventral region of body-whorl with anterior third with spiral threads predominating. Aperture elliptic, weakly oblique; comprising *c.* 35% of shell length and *c.* 32% of shell width. Outer lip simple, rounded; inner surface edged by liration, a series of nine short, transverse, small folds (Fig. 7D). Inner lip weakly concave, callus shallow, upper third *c.* 50° in relation to longitudinal shell axis; four oblique folds uniformly distributed in middle region, comprising *c.* 70% of inner lip area; upper folds larger, slightly diminishing towards canal (Fig. 7C). Canal narrow, pointed, curved, projected forwards and dorsally along *c.* 13% of shell length; with *c.* 70% of aperture width. Dorsal surface of canal with four oblique, low folds as continuation of columellar folds (Fig. 7A, C). No umbilicus.

MEASUREMENTS (in mm). — Holotype: 5.6 × 2.6; paratype MZSP 102687: 5.8 × 2.7 (apex broken).

HABITAT. — Sandy bottoms with coralline red algae debris, 60-105 m depth.

REMARKS

The liration in outer lip and in dorsal region of canal approaches *A. decresca* n. sp. to the species of the genus *Austromitra*, mainly the South African *A. hayesi* Turner, 1999, from which it differs in having a more biconic outline, by narrower and more elongated aperture, and by the stronger axial sculpture. There are no other species with which *A. decresca* n. sp. can be confused, as in the remaining species the axial threads are wider, with the spiral sculpture more dedicated and numerous (Turner & Simone 1998; Turner 1999).

Austromitra decresca n. sp. is also somewhat similar to the species of *Thala*; it differs from *Thala foveata* (Sowerby, 1874) from Florida region (1-91 m depth) in being smaller (that species is over 8 mm in length),

more conic outline, aperture and protoconch slightly wider, and by spiral sculpture much less developed. *Austromitra decresca* n. sp. is also similar to *Thalassidroma* Rosenberg & Salisbury, 2003, from Guam, which also has a rostrate projection anteriorly, a similar shape and sculpture. *Austromitra decresca* n. sp. differs by smaller size, fewer axial ribs, wider aperture and by less shouldered whorls.

Family MITRIDAE Swainson, 1829
Genus *Subcancilla* Olsson & Harbison, 1953

Subcancilla joapyra n. sp.
(Fig. 8A-D)

TYPE MATERIAL. — Holotype: Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 18°59'S, 37°50'W, 295 m depth, MNHN 25241 (Fig. 8A, B) (MD55, stn DC75, Bouchet, Leal & Métivier coll., 27.V.1987). Paratypes: same data as holotype, MNHN 25242, 1 shell (Fig. 8C, D), MZSP 102675, 1 shell.

TYPE LOCALITY. — Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 18°59'S, 37°50'W, 295 m depth (MD55, stn DC75).

DISTRIBUTION. — Only known from type locality.

ETYMOLOGY. — The specific epithet is derived from the native Parintintin language, from “joapyr”, meaning elongate (Betts 1981).

DIAGNOSIS. — Shell elongated; whorls weakly rounded, aperture as long as spire. Sculpture uniform, strong and relatively tall spiral cords (four in penultimate whorl), with uniformly conspicuous striae in interspaces. Four columellar folds.

DESCRIPTION

Shell: size up to 25 mm, outline narrowly fusiform; width *c.* 31% of length. Colour white, with wide, pale brown to beige spiral band in middle and inferior levels of each whorl, with irregular and unclear borders (Fig. 8A-C). Protoconch eroded, apparently with three whorls, surface smooth (Fig. 8A, B); limit with teleoconch clear. Spire *c.* 50% of shell length; spire angle *c.* 30°. Teleoconch with about five whorls; each whorl rounded, weakly concave; suture clear, but shallow. Sculpture strong, with relatively tall spiral cords, four in penultimate whorl, and *c.* 15

in body whorl; interspaces *c.* 3 times wider than cords, fulfilled by uniform, cord-like, axial striae (Fig. 8B, D), *c.* 60 in penultimate whorl, interspace between striae equivalent to their width. Ventral region of penultimate whorl spiral cords becoming more oblique and closer to each other towards anterior, keeping narrow smooth triangular region close to siphon (Fig. 8A, C). Aperture elliptic, weakly oblique, comprising *c.* 48% of shell length and *c.* 30% of shell width; about 3 times longer than wide. Outer lip simple, lacking striae inside. Inner lip weakly concave, with weak callus and narrow anal canal (Fig. 8A, C); four columellar folds uniformly distributed in middle third of inner lip, two upper folds large and similar with each other, two anterior folds successively diminishing, anterior fold *c.* 3 times smaller than upper folds (Fig. 8C), almost invisible outside. Canal relatively wide, short; slightly narrower than aperture. No umbilicus.

MEASUREMENTS (in mm). — Holotype: 23.3 × 7.4; paratype MNHN 25242: 24.2 × 8.0 (broken shell); paratype MZSP 102675: 15.6 × 5.7 (spire and lip broken).

HABITAT. — Sandy-mud bottoms, 295 m depth.

REMARKS

In the Atlantic, *Subcancilla joapyra* n. sp. has only a feeble similarity with *Subcancilla larranagai* (Carcelles, 1947), from south Brazil to north Argentina, and with *S. straminea* Adams, 1853, from North Carolina to north Brazil. It differs by its sculpture, which is constituted by relatively tall spiral cords, with evident uniform axial striae; the sculpture of the other two species is constituted by wide spiral threads, with no uniform holes in the interspaces (compare Figure 8D and H). Besides, *S. joapyra* n. sp. differs in having deeper suture, more convex whorls and more uniform sculpture patterns.

Subcancilla joapyra n. sp. is also similar to the fossil Miocene species *Ziba venezuelana* Hodson, 1931, from Venezuela, and *Z. senecta* (White, 1887), from Pará, Brazil; it differs in being more elongated, and in having more spiral cords per whorl. It differs from *Z. candida* (Reeve, 1845), which occurs from the Caribbean Islands to northeast Brazil, 16-100 m depth, in being much more elongated, in having whorls less convex, more elongated aperture, and



FIG. 7. — Costellariid and volutomitrid: **A**, *Austromitra decresca* n. sp., holotype MNHN 25239, apertural view (L 5.6 mm); **B**, same, dorsal view; **C**, same, detail of inner lip, apertural-slightly right view; **D**, paratype MZSP 102687, apertural view (L 5.8 mm); **E**, *Microvoluta corona* n. sp., holotype, MNHN 25243, apertural view (L 5.5 mm); **F**, same, dorsal view; **G**, same, details of aperture, apertural-slightly right view.

larger number of spiral cords. It differs from *Subcancilla leonardhilli* Petuch, 1987 and *S. lindae* Petuch, 1987 in having more developed sculpture between spiral cords, in being more elongated and whorls less concave.

Subcancilla joapyra n. sp. is somewhat similar to the Indo-Pacific species *Ziba abyssicola* (Schepman, 1911) (collected from 128–1340 m depth – Cernohorsky 1991), differing by the more elongated profile, by longer body-whorl, and the more acuminate profile

of the spiral cords. It is also similar to *Subcancilla rufogyratus* Poppe, Tagaro & Salisbury, 2009, from Philippines, differing in having fewer spiral cords, and in these not being coloured. Regarding to the delicate sculpture, *S. joapyra* n. sp. resembles *Ziba intersculpta* (Sowerby, 1870), from which it differs by deeper suture and more elongated outline.

Subcancilla cf. *straminea* (Adams, 1853)
(Fig. 8E-H)

MATERIAL EXAMINED. — Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 18°59'S, 37°48'W, 607-620 m depth, MNHN (MD55, stn DC73, Bouchet, Leal & Métivier coll., 27.V.1987).

MEASUREMENTS (in mm). — 14.7 × 5.3.

REMARKS

The single specimen collected is young, broken and relatively eroded, but some interesting information can be extracted from its analysis. Some similarity is found with two species, *S. larranagai* (Cernohorsky 1991: 31, 33, pl. 24, figs 1-3) and *S. straminea* (Cernohorsky 1976: 465, 466, pl. 416, figs 1-4), in both cases, the examined specimen is disjunct from their known distribution: *S. larranagai* is known from Santa Catarina, south Brazil, to Punta Médanos, north Argentina; while *S. straminea* occurs from North Carolina to Pará, north Brazil. Espírito Santo is approximately in the mid-way between both areas. The sculpture of the examined specimen (Fig. 8E, H) is somewhat similar to that of *S. larranagai*, consisting of wide spiral threads, with shallow pits, irregularly distributed in the interspaces; the sculpture of *S. straminea* is not so different, but the spiral threads usually are wider. *Subcancilla larranagai* is larger, with most specimens over 50 mm long, while *S. straminea* is not larger than 30 mm; the examined specimen is only 14.1 mm long, and the fashion of its whorls looks more similar to first teleoconch whorls of *S. straminea* than that of *S. larranagai*. The outline of *S. larranagai* is more elongated, with length c. 5 times longer than the width; in this aspect, the examined specimen is more similar to the *S. straminea*, which is c. 3 times longer than wide. However, the columellar folds of

the examined specimen are unlike any of the both species, having only three folds (Fig. 8E, G). The descriptions of *S. larranagai* normally refer to four folds, while those of *S. straminea* usually refer to five. This difference in columellar folds is the main reason for the doubt in the specific identification. A conservative approach is given here considering the specimen as a dubious *S. straminea*, with a consequent southward extension of its geographic distribution.

Family Volutomitridae Gray, 1854
Genus *Microvoluta* Angas, 1877

Microvoluta corona n. sp.
(Fig. 7E-G)

TYPE MATERIAL. — Holotype: Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 19°01'S, 37°47'W, 1500-1575 m depth, MNHN 25243 (Fig. 7E-G) (MD55, stn DC79, Bouchet, Leal & Métivier coll., 28.V.1987).

TYPE LOCALITY. — Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 19°01'S, 37°47'W, 1500-1575 m depth (MD55, stn DC79).

DISTRIBUTION. — Known only from type locality.

ETYMOLOGY. — The specific epithet is derived from the Latin word "corona", meaning crown, an allusion to the subsutural ornamentation of the shell.

DIAGNOSIS. — Shell up to 5.5 mm, elliptical (width c. 2 times length). Sculpture mainly axial, subsutural, uniform nodes, located on shoulder. Protoconch blunt, mammillary, with one whorl. Aperture wide, c. ½ shell length.

DESCRIPTION

Shell: size 5.5 mm, outline elliptical; width c. 54% of length. Colour pure white (Fig. 7E, F); surface smooth, glossy. Protoconch blunt, mammillate, comprising c. 6% of shell length and c. 20% of shell width; about two rounded, smooth, glossy whorls; suture unclear (Fig. 7E, F); transition with teleoconch indistinct. Spire c. 44% of shell length; spire angle c. 55°. Teleoconch up to four whorls; each whorl strongly shouldered; area between shoulder and upper suture horizontal, comprising c. ¼ of whorl length; remaining area weakly concave, with almost

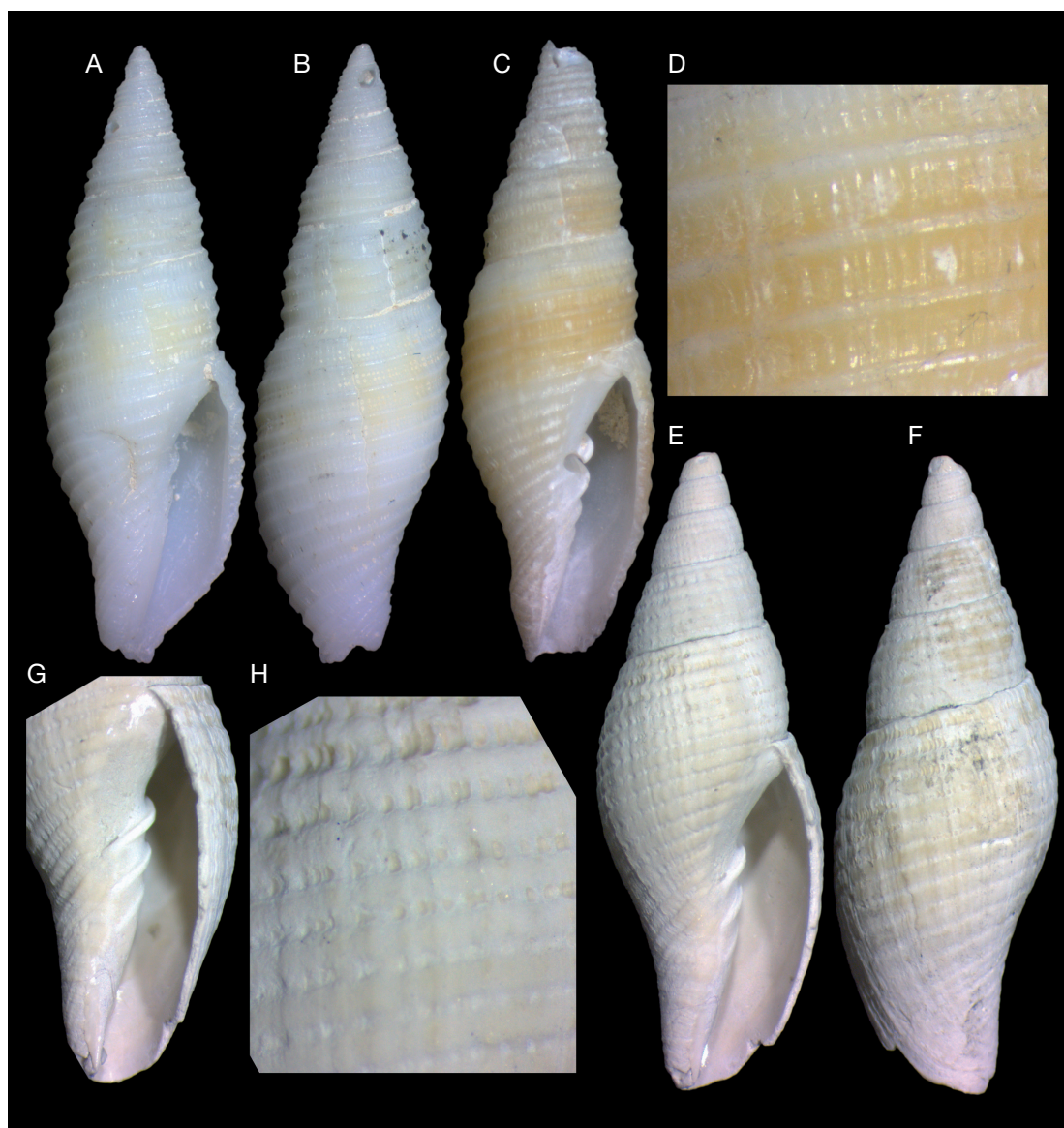


FIG. 8. — Mitrids: **A**, *Subcancilla joapyra* n. sp., holotype MNHN 25241, apertural view (L 23.3 mm); **B**, same, dorsal view; **C**, paratype MNHN 25242, apertural view (L 24.2 mm); **D**, same, detail of sculpture in penultimate whorl; **E**, *Subcancilla* cf. *straminea* (Adams, 1853), MNHN (stn DC73), apertural view (L 14.7 mm); **F**, same, dorsal view; **G**, same, detail of inner lip, apertural-slightly right view; **H**, same, detail of sculpture in penultimate whorl.

straight and vertical profile. Sculpture uniform, large nodes on shoulder, producing weak axial threads, below nodes, gradually disappearing before inferior suture; *c.* 10 in penultimate whorl; interspaces of axial threads roundly concave, as wide as threads.

Ventral region of body-whorl with anterior $\frac{2}{3}$ smooth. Aperture elliptic, oblique *c.* 30° in relation to shell longitudinal axis; comprising *c.* 53% of shell length and *c.* 40% of shell width. Outer lip simple, rounded, thick; with small upper notch

corresponding to shoulder (Fig. 7E, G). Inner lip weakly concave, callus inconspicuous; four oblique folds uniformly distributed and similar-sized in middle and inferior thirds, comprising *c.* 80% of inner lip area; upper folds more horizontal, becoming oblique towards canal (Fig. 7G). Canal wide and short; almost as wide as aperture width. No umbilicus.

MEASUREMENTS (in mm). — Holotype: 5.5 × 3.0.

HABITAT. — Sandy bottoms, 1500–1575 m depth.

REMARKS

Microvoluta corona n. sp. is somewhat similar to *M. blakeana* (Dall, 1889) from the Gulf of Mexico (146–1170 m depth), differing in having strong subsutural nodes, taller spire and wider aperture. Differs from *M. intermedia* Dall, 1890, from the Caribbean, in being shorter, fewer whorls, by subsutural nodes proportionally larger and fewer, lacking subsutural spiral thread. *Microvoluta corona* n. sp. still differs from *Peculator verconis* Iredale, 1924 by its subsutural nodes, and by whorls forming shoulder.

The generic attribution is not absolutely secure, because only the type species of *Microvoluta*, *M. australis* Angas, 1877, lacks subsutural nodes (Pechar *et al.* 1980). However, most of the species attributed to this genus have subsutural nodes (Bouchet & Kantor 2003). *Microvoluta corona* n. sp. has some similarities with above mentioned species, allowing the generic attribution, rather than other volutomitrid and even marginellid genera, such as protoconch mammillate of two whorls, and inner lip smooth inside.

DISCUSSION ON MITRIFORMS

The mitriform gastropods are not the most diverse group amongst the MD55 collected samples, and each species is represented by few and sometimes incomplete specimens. This is indicative that possibly they can be transported from shallower levels. The single exception is *Nodicostellaria crassa*, which was collected abundantly and alive. This species appears to be the dominant mitriform species in continental slope along the entire southeastern Brazilian coast, and one of the main gastropod predators.

As the above descriptions and taxonomic discussions demonstrate, the closest relatives to most species occur in northern Atlantic, mainly in Caribbean Sea. Despite the similarities, most species demonstrate to be different, which can indicate a relationship, but under different conditions in the western Atlantic deep-water environment, possibly because of the influence of large rivers like the Amazon River, oceanic currents, or some other environmental factor of isolation.

Superfamily CONOIDEA Fleming, 1822

Family MITROMORPHIDAE Casey, 1904

Genus *Mitromorpha* Carpenter, 1865

Mitromorpha sama n. sp.

(Fig. 9A–F)

TYPE MATERIAL. — Holotype: Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 19°00', 37°48'W, 607–620 m depth, MNHN 25224 (Fig. 9A, B) (MD55, stn DC73, Bouchet, Leal & Métivier coll., 27.V.1987). Paratypes: same data as holotype, MNHN 25225, 6 shells, MZSP 102973, 2 shells (Fig. 9C–F). — Off Regência, 19°40'S, 37°48'W, 790–940 m depth, MNHN 25226, 1 shell (stn CB77).

TYPE LOCALITY. — Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 19°00', 37°48'W, 607–620 m depth (MD55, stn DC73).

DISTRIBUTION. — Off Espírito Santo, Abrolhos continental slope.

ETYMOLOGY. — The specific epithet is derived from the Tupi-Guarani word “sama”, meaning cord, line; an allusion to the aligned fashion of the axial sculpture.

DIAGNOSIS. — Shell length *c.* 7 mm, biconic; protoconch paucispiral; sculpture delicate reticulate, with axial cords somewhat aligned along whorls. Aperture elongated; outer lip lyrate within, preceded by slope and axial thread; inner lip with pair of columellar folds.

DESCRIPTION

Shell: length up to 6.6 mm, outline biconic (Fig. 9A–D); width *c.* ½ length. Colour uniform pale beige. Protoconch whitish, of 1.5 whorls, mammillate (Fig. 9E); comprising *c.* 5% of length and *c.* 18% of shell width; surface smooth, glossy; transition with teleoconch clear, orthocline. Spire

conic, comprising *c.* ½ of shell length; spire angle *c.* 55°. Teleoconch of about five whorls, profile straight, suture plane. Sculptured by series of pustules, aligned both axially and spirally, forming uniform reticulation; *c.* 20 axial and four spiral lines of pustules in penultimate whorl (Fig. 9B, D); *c.* 20 spiral lines in initial region of body whorl (Fig. 9A, C); axial lines somewhat continuous with neighbour whorls; subsutural line slightly larger in *c.* ½ of specimens. Differentiable slope, preceded by axial, low thread, located *c.* ⅓ whorl preceding outer lip (Fig. 9D); outer lip thicker on thread, becoming thinner towards edge, with outer surface weakly sculptured. Aperture elliptic, *c.* ½ of shell length and *c.* ¼ shell width (Fig. 9A, D); *c.* 3 times longer than wide; weakly oblique related to longitudinal shell axis. Outer lip internally lyrate, with 4-5 spiral inner, weak cords, being upper cord larger, becoming gradually narrower in peri-siphonal region (Fig. 9C). Inner lip slightly concave, possessing pair of low, middle folds, being uppermost fold slightly larger than inferior fold (Fig. 9F). Siphonal canal short, slightly rostrate, projected forwards and dorsally (Fig. 9D). No broad callus or umbilicus.

MEASUREMENTS (in mm). — Holotype: 6.6×3.2 ; paratype MZSP 102973 (1): 5.6×2.6 .

HABITAT. — Sandy-mud bottoms, 607-940 m depth.

Mitromorpha mirim n. sp.
(Fig. 9G-K)

TYPE MATERIAL. — Holotype: Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 18°56'S, 37°52'W, 85-105 m depth, MNHN 25227 (Fig. 9G, H, K) (MD55, stn DC82, Bouchet, Leal & Métivier coll., 28.V.1987).

Paratypes: same data as holotype, MNHN 25228, 2 shells, MZSP 102674, 1 shell. — Off Itaúnas, 18°49'S, 37°57'W, 60 m depth, MNHN 25229, 2 shells, MZSP 102683, 1 shell (Fig. 9I, J) (stn DC83).

TYPE LOCALITY. — Brazil, Espírito Santo, off Itaúnas, continental slope of Abrolhos, 18°56'S, 37°52'W, 85-105 m depth (MD55, stn DC82).

DISTRIBUTION. — Off Espírito Santo, Abrolhos continental slope.

ETYMOLOGY. — The specific epithet is derived from the South American Tupi-Guarani word “mirim”, meaning small; an allusion to the small size of the shells.

DIAGNOSIS. — Shell length *c.* 4 mm, fusiform; protoconch paucispiral, broad; sculpture of spiral cords and axial undulations, with subsutural cord larger and dotted. Aperture elongated; outer lip lyrate, inner lip with pair of columellar folds.

DESCRIPTION

Shell: length up to 3.7 mm, outline fusiform (Fig. 9G-J); width *c.* ½ length. Colour uniform pale beige with perisutural white band. Protoconch whitish, of 1.5 whorls, mammillate (Fig. 9K); comprising *c.* 10% of length and *c.* 23% of shell width; surface smooth, glossy; transition with teleoconch clear, orthocone. Spire conic, comprising *c.* 40% of shell length; spire angle *c.* 53°. Teleoconch of about four whorls, profile straight to weakly convex, suture plane. Sculptured by spiral cords and axial undulations, forming weak reticulation; *c.* 18 axial and four spiral cords in penultimate whorl (Fig. 9H, I); *c.* 18 spiral lines in initial region of body whorl (Fig. 9G, I), with small smooth anterior area close to canal; subsutural line slightly larger and more nodulose. Distinct slope in outer lip short (less than ⅓ whorl) (Fig. 9J); outer lip thicker on thread, becoming thinner towards edge. Aperture elliptic, *c.* 60% of shell length and *c.* ⅓ shell width (Fig. 9G, I); *c.* 3 times longer than wide; weakly oblique related to longitudinal shell axis. Outer lip internally lyrate, with 4-5 spiral inner, weak cords, being upper cord larger, becoming gradually narrower in peri-siphonal region (Fig. 9G). Inner lip slightly concave, possessing pair of low, middle folds, being uppermost fold slightly larger than inferior fold. Siphonal canal short, slightly rostrate, projected forwards and dorsally (Fig. 9G, I). No broad callus or umbilicus.

MEASUREMENTS (in mm). — Holotype: 3.7×1.8 ; paratype MZSP 102683: 3.7×1.8 .

HABITAT. — Sandy-mud bottoms, 60-105 m depth.

REMARKS ON BOTH SPECIES OF *MITROMORPHA*

The generic attribution is based on the shell shape and the presence of a pair of small teeth in the inner

lip. The genus was naturally described in Mitridae, based on those teeth. It was transferred to Turridae H. Adams & A. Adams, 1853 afterwards (DuBar 1958). However, a close resemblance to the costellariid genus *Pusia* Swainson, 1840 is also clear, based on a set of characters, such as the relative small size, the elongated aperture lyrate within (Cernohorsky 1970: 55). The number of columellar plicae was decisive for the final decision.

Both *Mitromorpha sama* n. sp. and *M. mirim* n. sp. are very similar. They can be distinguished from each other only by some characters. The main one is the size; shells of *M. sama* n. sp. are almost double in relation to shells of equivalent degree of development of *M. mirim* n. sp. This feature is shown in Fig. 9L, where two typical specimens are illustrated at the same scale; the specimen of *M. sama* n. sp., on the right, and that of *M. mirim* n. sp. on the left. In Figure 9L is also clear the differences in size even of the protoconch. Beyond the size, *M. mirim* n. sp. still differs from *M. sama* n. sp. by proportionally wider protoconch, by protoconch slightly pointed (compare Figure 9E and K), by axial sculpture being mainly by undulation instead of aligned pustules, by more rounded outline, by proportionally longer aperture (c. 60% of shell length, instead of c. 50% for *M. sama* n. sp.), and by the short distinct slope preceding outer lip (compare Figure 9D and J).

The bathymetry is also a distinguishable feature, as *Mitromorpha sama* n. sp. occurs in 607–940 m depth, and *M. mirim* n. sp. in 60–105 m depth.

There are no other species in western Atlantic similar to both species described herein. They differ from *M. azorensis* Mifsud, 2001, from Azores, by the well-developed sculpture and in lacking reticulate colour spots. They differ from *M. biplicata* (Dall, 1889), from Atlantic coast of USA, in lacking so developed axial treads and by much axial sculpture. They differ from *M. dormitor* (Sowerby, 1844), from north Caribbean, in having well-developed axial sculpture and by taller spire length. They differ from *M. zilpha* Dall, 1927, from Georgia, USA, by darker colour (*M. zilpha* is dull white), in having about one more whorl in the teleoconch, and in lacking small shoulder close to suture. Additionally, both species still differ from the local *Pusia venusta*

Sarasúa, 1978, from Cuba and Colombia, in lacking strong axial sculpture, by its proportional longer aperture, thinner walls, more convex whorls, and pale, uniform colour (*P. venusta* is normally orange, with white and black spots) (Sarasúa 1978; Díaz & Puyana 1994).

Family TEREBRIDAE Mörch, 1852

Genus *Terebra* Bruguière, 1789

Terebra assu Simone n. sp.

(Fig. 10A–E)

TYPE MATERIAL. — Holotype: Brazil, Espírito Santo, off Conceição da Barra, continental slope of Abrolhos, 18°59'S, 37°50'W, 295 m depth, MNHN 25244 (Fig. 10A, C–E) (MD55, stn DC75, Bouchet, Leal & Métivier coll., 27.V.1987).

Paratypes: same data as holotype, MNHN 25242, 1 shell, MZSP 102598, 1 shell (Fig. 10B).

TYPE LOCALITY. — Brazil, Espírito Santo, off Conceição da Barra, continental slope of Abrolhos, 18°59'S, 37°50'W, 295 m depth (MD55, stn DC75).

DISTRIBUTION. — Known only for the type locality.

ETYMOLOGY. — The specific epithet refers to the elongation of the shell, from the Tupi native language “açu” (transliterated to assu), meaning elongated, slender.

DIAGNOSIS. — Narrow shell with pale yellowish colour. Protoconch paucispiral, with one whorl. Sculpture reticulate strong in 4–5 first teleoconch whorls, becoming weaker, with predominance of axial threads in remaining whorls. Subsutural ridge somewhat prominent.

DESCRIPTION

Shell: up to 9.8 mm long, width c. 1/5 of length, spire angle c. 13°. Colour predominantly white, with yellowish band in middle level of each whorl, comprising c. 80% of each whorl area (Fig. 10A, B); band margins unclear. Protoconch simple, smooth, of one whorl (Fig. 10D, E); width c. 35% of maximum teleoconch width; length c. 16% of shell length. Limit between protoconch and teleoconch indistinct (Fig. 10E). Teleoconch with up to 10 whorls; profile weakly convex, suture clear but shallow. Sculpture of first teleoconch whorls with only strong axial threads, c. 10 per

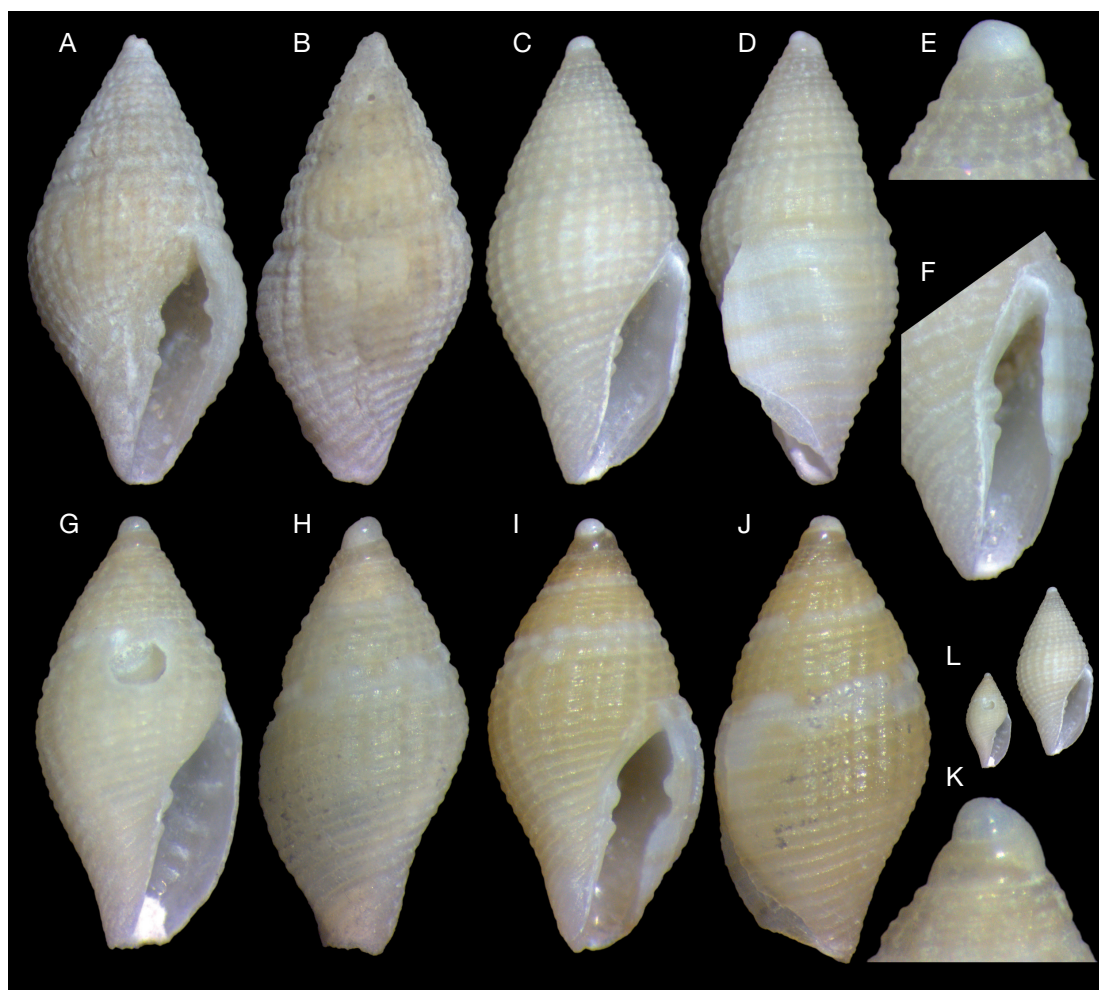


FIG. 9. — *Mitromorpha* spp.: **A**, *Mitromorpha sama* n. sp., holotype MNHN 25224, apertural view (L 6.6 mm); **B**, same, dorsal view; **C**, paratype MZSP 102973, apertural view (L 5.6 mm); **D**, same, right view; **E**, same, detail of apical region in profile; **F**, same, detail of aperture; **G**, *Mitromorpha mirim* n. sp., holotype MNHN 25227, apertural view (L 3.7 mm); **H**, same, dorsal view; **I**, paratype MZSP 102683, apertural view (L 3.7 mm); **J**, same, dorsal view; **K**, holotype, detail of apical region in profile; **L**, confrontation between specimens of Figure C and G at the same scale.

whorl, each thread smooth, with upper node, between both threads length equivalent to double their width; in third whorl spiral threads gradually appearing, becoming stronger in following whorls, equally predominating as axial threads; after sixth teleoconch whorl sculpture becoming weak, spiral threads almost disappearing, axial threads somewhat predominating, space between axial threads 3-4 times wider than threads; four spiral threads and 7-8 axial threads in penultimate

whorl. Subsutural thread somewhat prominent, being *c.* 50% larger than remaining threads; in first whorls mainly marked by nodes of axial threads, after 3-4 teleoconch whorls becoming similar to remaining threads. After sixth teleoconch whorl sculpture gradually becoming weaker than preceding whorls, both spiral and axial threads. In last whorl, *c.* 15 axial threads in penultimate whorl, with interspaces *c.* 3 times wider than threads width; 5-6 spiral threads in penultimate whorl,

being inferior threads narrower and closer with each other than upper threads; subsutural thread of similar size as remaining threads. Sculpture of peri-umbilical area composed of 7-8 spiral liration in upper half, and series of low transverse scales in inferior half (Fig. 10A, C). Aperture orthocline, oval, about twice longer than wide. Outer lip thick, simple, with blunt notches corresponding to spiral sculpture. Inner lip with weak callus; parietal region in upper third, marked by abrupt curve in *c.* 40°; siphonal region in inferior 2/3, somewhat straight and vertical, except for region close to anterior end, with bright curve to left (Fig. 10B, C). Canal short, slightly curved to left.

MEASUREMENTS (in mm). — Holotype: 9.8 × 2.0; paratype MZSP 102598: 8.3 × 1.8; paratype MNHN 25242: 5.4 × 1.6.

HABITAT. — Sandy-mud bottoms, 295 m depth.

REMARKS

Terebra assu Simone n. sp. differs from the other closely-related species in being small (smaller than 10 mm, while others usually reach 20 mm, such as *T. leptapsis* and *T. crassireticula* – Fig. 11I-L) in an equivalent number of whorls; with a pale yellowish pigmentation in middle region of each whorl (most species are pure white – *T. crassireticula*, *T. alagoensis* – Figs 10F-I; 11A-D, L; uniform pale brown – *T. doellojuradoi*, *T. leptapsis* – Fig. 11E-K; but it is somewhat similar to *T. simonei* Lima, Tenório & Barros, 2007: figs 1-6); and by the weaker sculpture of the last whorls both in number and in size. This last character produces a feeble reticulate sculpture on the last whorls, in such the axial threads surrounds 15 on the penultimate whorl, while the remaining species in the *T. doellojuradoi* complex normally possess over 25. The protoconch is proportionally broader than the other closer species. The aperture is more elongated and narrow (Fig. 10A-C) than those of the other close species, except for *T. crassireticula* (Fig. 11L). The subsutural spiral thread is only more developed in the first teleoconch whorls, resembling *T. alagoensis* (Figs 10F-I; 11A-D); the first whorls of *T. assu* Simone n. sp. can be distinguished from those of *T. alagoensis* in having more elongated whorls with a more concave profile.

Terebra alagoensis Lima, Tenório & Barros, 2007 (Fig. 10F-I; 11A-D)

Terebra alagoensis Lima, Tenório & Barros, 2007: 66, figs 13-17. — Rios 2009: 358, fig. 937. — Rosenberg 2009.

TYPE MATERIAL (EXAMINED). — Holotype: Brazil, continental slope off Alagoas, 10°05'57"S, 35°46'24"W, 720 m, MZSP 84238 (Fig. 11A-D) (R/V *Natureza*, stn D-29, 28.X.2000).

OTHER MATERIAL EXAMINED. — Brazil, Espírito Santo, continental slope of Abrolhos, off Rio Doce, Abrolhos bank, 19°34'S, 38°55'W, 340-360 m depth, MNHN, 10 shells, MZSP 102613, 2 shells (Figs 10F, H, I) (MD55, stn CB92, Bouchet, Leal & Métivier coll., 29.V.1987). — East of São Tomé Cape, 21°31'S, 40°08'W, 295-300 m depth, MNHN, 10 shells, MZSP 102607, 3 shells (Fig. 10G) (MD55, stn CB96, 31.V.1987).

TYPE LOCALITY. — Brazil, continental slope off Alagoas, 10°05'57"S, 35°46'24"W, 720 m (R/V *Natureza*, stn D-29).

DISTRIBUTION. — From Alagoas to Espírito Santo.

DESCRIPTION

See Lima *et al.* (2007: 66).

MEASUREMENTS (in mm). — Holotype: 10.5 × 2.8; MNHN (stn CB92) (1): 4.9 × 1.6; MZSP 102607 (1): 4.1 × 1.4.

HABITAT. — Sandy-mud, 340-720 m depth.

REMARKS

Terebra alagoensis is very distinct from the remaining *T. doellojuradoi* complex by its large subsutural spiral thread, producing almost a shoulder. The whorls have their periphery almost flat and vertical, giving it a scalariform effect in the spire. The MD55 material (Fig. 10F-I) is constituted of a single lot with 13 specimens, all of which considerably younger than the holotype (Fig. 11A-D); the largest specimen is 4.9 mm long; although the shell characters clearly allowed the identification. This new record considerably expands the geographic distribution of this species at almost 800 km southward. However, despite the distance, the environment and depth are equivalent.

Another interesting feature of *Terebra alagoensis* is the relatively wide protoconch (Figs 10H, I;

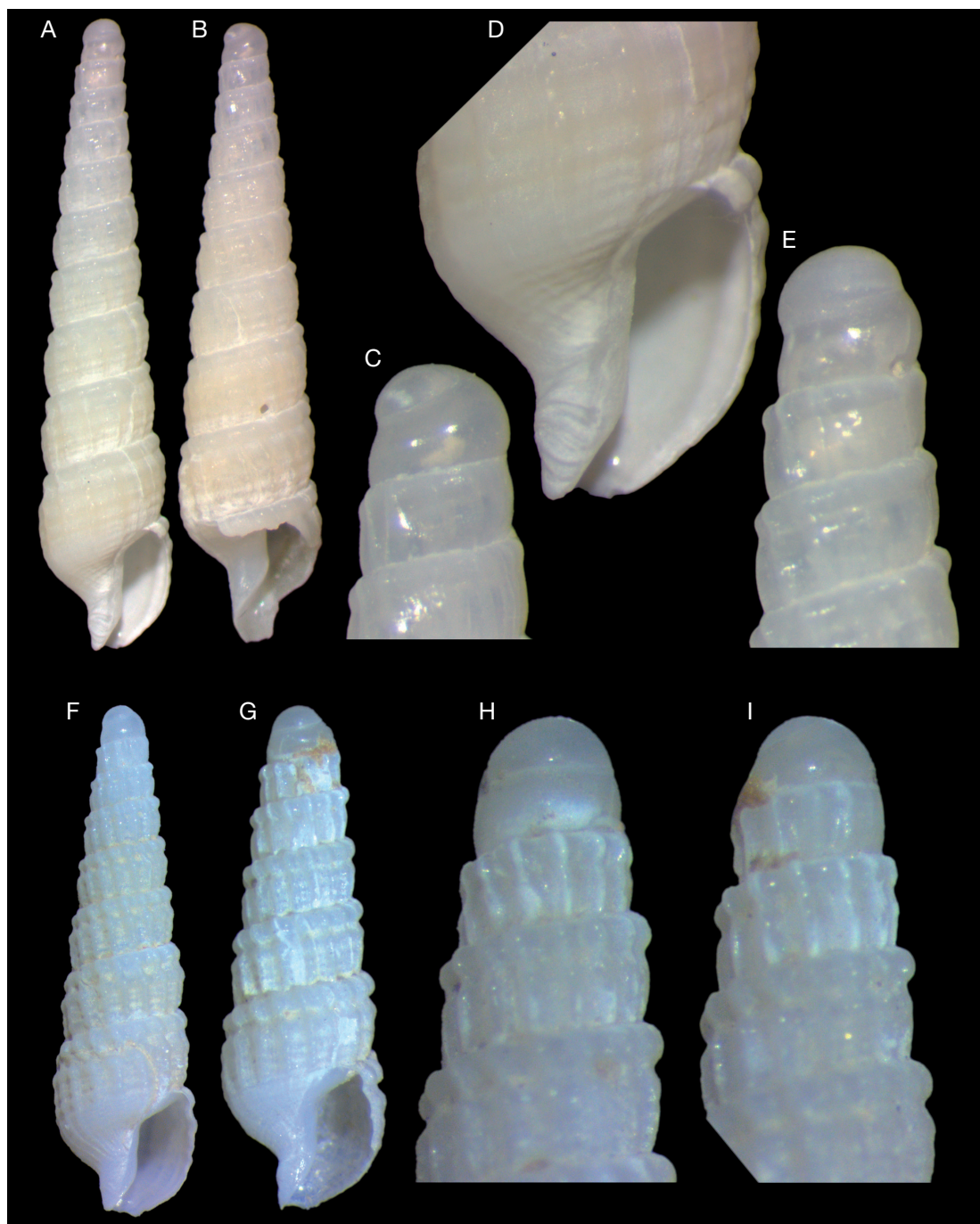


FIG. 10. — Terebrids: **A**, *Terebra assu* Simone n. sp., holotype MNHN 25244, frontal view (L 9.8 mm); **B**, paratype MZSP 102598, profile view (L 8.3 mm); **C**, holotype, detail of last whorl, frontal view; **D**, **E**, first whorls in two opposite views; **F**, *T. alagoensis* Lima, Tenório & Barros, 2007, MNHN (stn CB92), frontal view (L 4.9 mm); **G**, MZSP 102607 (1), frontal view (L 4.1 mm); **H**, **I**, protoconch of Figure F in two opposed views.

11B, C), comprising a wide portion of the shell apex (Figs 10F, G; 11A). The transition with teleoconch is not so clear (Figs 10I; 11C), and the first teleoconch whorl is marked by pure axial, lyrate sculpture (Figs 10G-I; 11B, C). The spiral sculpture gradually appears after the first teleoconch whorl.

The aperture of *Terebra alagoensis* is marked by a pair of oblique folds in the middle level of the inner lip (Fig. 11A, D), which are also evident, but lower, in the younger specimens (Fig. 10F, G). This is not a normal pattern for the *T. doellojuradoi* complex.

Terebra leptapsis Simone, 1999
(Fig. 11I-K)

Terebra leptapsis Simone, 1999: 229-233, figs 7F, 12B, C, 13F, 14C, G, 21, 22; 2000: 138, 144-149. — Faber 2007: 50 (in synonymy), figs 10, 11. — Lima *et al.* 2007: 65. — Rosenberg 2009 (in synonymy). — Terryn 2011: 66.

Terebra leptaxis – Faber 2007: 50 (error).

TYPE MATERIAL (EXAMINED). — Holotype: Brazil, Rio de Janeiro, Campos Bay, c. 21°7'S, 40°53'W, MZSP 28704 (Fig. 11I-K) (R/V *Austrogagoupa*).
Paratypes: same data as holotype, MZSP 28705, 1 specimen, MZSP 28706, 13 shells.

MATERIAL EXAMINED. — The same as Simone (1999: 229).

TYPE LOCALITY. — Brazil, Rio de Janeiro, Campos Bay, c. 21°7'S, 40°53'W (R/V *Austrogagoupa*).

DISTRIBUTION. — Rio de Janeiro to São Paulo.

DESCRIPTION

See Simone (1999: 229-233).

MEASUREMENTS (in mm). — Holotype: 16.0 × 4.5.

HABITAT. — Sandy bottoms, 32-64 m depth.

Terebra doellojuradoi Carcelles, 1953
(Fig. 11E-H)

Terebra doello-juradoi Carcelles, 1953: 14, 15, pl. 3, fig. 21.

Terebra doellojuradoi – Scarabino 2004: 323, 234. — Faber 2007: 50 (in part). — Lima *et al.* 2007: 63. — Rosenberg 2009. — Terryn 2011: 66.

N.B.: all remaining citations for samples north from Uruguay almost certainly represent misidentifications and belong to other species of the complex, and, therefore, were excluded from this synonymic list.

TYPE MATERIAL (EXAMINED). — Holotype: Uruguay, 35°53'S, 53°54'W, 61.88 m depth, MACN 23439 (Fig. 11E-G).

Paratypes: Uruguay, Mar del Plata, Banco de Mejillones, MACN 10319, 1 shell; 35°53'S, 53°54'W, 61 m, MACN 24278, 1 shell; 36°25'S, 54°38'W, 54 m, MACN 23439, 1 shell (Fig. 11H).

TYPE LOCALITY. — Uruguay, 35°53'S, 53°54'W, 61.88 m depth.

DISTRIBUTION. — Uruguay to north Argentina.

DESCRIPTION

See Carcelles (1953: 14). Complement:

Shell: up to 20 mm, width c. ¼ of length, spire angle c. 20°. Colour uniform beige to pale brown (Fig. 11E, G). Protoconch pointed, smooth, of three whorls (Fig. 11F); width c. 14% of maximum teleoconch width; length c. 5% of shell length. Limit between protoconch and teleoconch distinct, orthocone (Fig. 11F). Teleoconch up to 10 whorls; profile weakly convex, suture clear but shallow. Sculpture of all teleoconch whorls with about same arrangement of threads. Except for increment of axial and spiral threads; c. 24 axial threads and c. 10 threads in penultimate whorl, axial threads slightly broader and spiral threads; spiral threads not uniform in size and distance from each other, but lying in a somewhat equidistant arrangement from each other, space between neighbouring axial threads about twice each thread width; interval between axial threads equivalent to their width. Sculpture of peri-umbilical area composed of 8-9 spiral lirations along entire surface (Fig. 11E). Aperture somewhat prosocline, elliptic, about 1.5 longer than wide. Outer lip thick, simple. Inner lip with weak callus; parietal region in upper third, marked by abrupt curve in c. 90°; siphonal region marked by bright curve to left (Fig. 11E). Canal short, narrow, slightly curved to left.

MEASUREMENTS (in mm). — Holotype: 10.2 × 2.4; paratype MACN 24278: 8.5 × 2.2.

HABITAT. — "Rocky bottoms" (*sic* Carcelles 1953:14), 54-100 m depth.

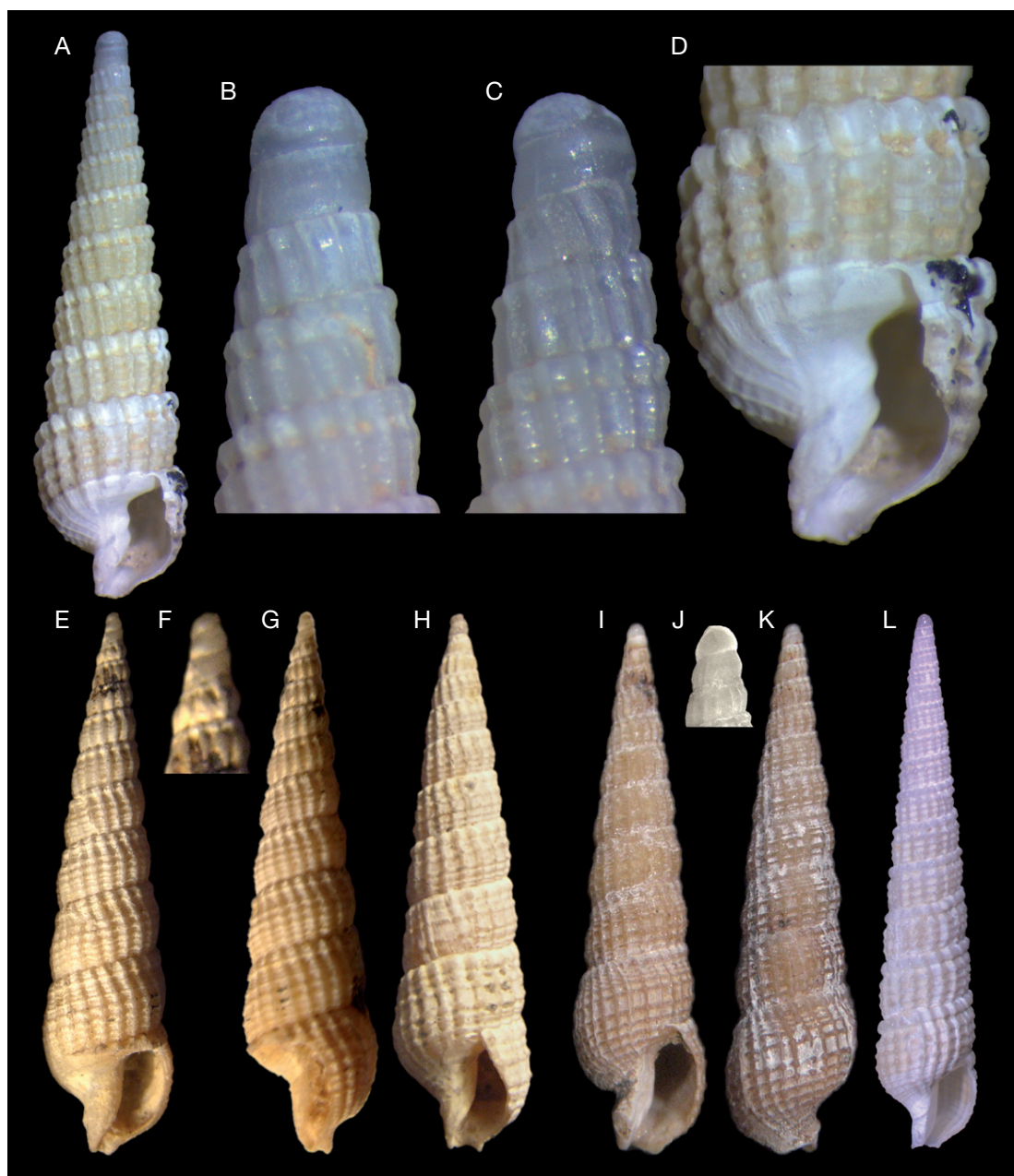


FIG. 11. — Terebrids: **A**, *Terebra alagoensis* Lima, Tenório & Barros, 2007, holotype MZSP 84238 (L 10.5 mm), frontal view; **B**, **C**, details of apical region in two opposite views; **D**, detail of last whorl, frontal-slightly profile view; **E**, *Terebra doellojuradoi*, holotype MACN 23439, frontal view (L 10.2 mm); **F**, same, detail of protoconch and first whorls; **G**, same, profile view; **H**, paratype MACN 24278, frontal-slightly profile view (L 8.5 mm); **I**, *T. leptapsis*, holotype MZSP 28704, frontal view (L 16.0 mm); **J**, detail of protoconch in SEM; **K**, dorsal view; **L**, *T. crassireticula*, holotype MZSP 27930 (L 22.0 mm).

DISCUSSION ON TEREBRIDS

Several aspects of the characters of the species belonging to the *Terebra doellojuradoi* complex can be found elsewhere (Simone 1999, 2000; Simone & Gracia 2006). The present paper was more focused on the four studied species, mainly concerning the MD55 collected specimens, and to the taxonomic problem related to *T. leptapsis*.

Terebra leptapsis has been considered a synonym of *T. doellojuradoi*, in such the differences pointed out in the original description of the former (Simone 1999) have been overlooked (Faber 2007: 50; Rosenberg 2009). However, a closer look of the type specimens of *T. doellojuradoi* deposited at MACN revealed additional characters which are incompatible with such interpretation. Two of *T. doellojuradoi* types are shown in Figure 11E-H (Fig. 11E-G: holotype; Fig. 11H: paratype) for a comparison with the holotype of *T. leptapsis* (Fig. 11I-K). *Terebra doellojuradoi* is smaller, with length around 18 mm (the holotype is 20.5 mm long), while *T. leptapsis* specimens commonly are over 25 mm long. The sculpture of both species is quite variable, possessing some overlap of characters, but both holotypes are good specimens to show that *T. doellojuradoi* normally bears more spiral threads than *T. leptapsis* (compare penultimate whorl in Figure 11E and I). The inverse happens with axial sculpture, in which *T. leptapsis* tends to possess more axial threads (c. 30 in penultimate whorls) than *T. doellojuradoi* (c. 20 in the same region). Regarding to the sculpture, both species are clearly closely related when compared to other species of the *T. doellojuradoi* complex, e.g., *T. crassireticula* (Fig. 11L) and others. The spire angle is also a quite different, *T. doellojuradoi* has about 20°, while *T. leptapsis* normally has 15-17°. The aperture is also informative, as *T. doellojuradoi* has a somewhat shorter and slightly broader one than *T. leptapsis* (Fig. 11E, H, I). However, the protoconch bears the solides features for distinction of both species; that of *T. doellojuradoi* is multispiral (about three whorls) (Fig. 11F) and proportionally narrower and smaller than the protoconch of *T. leptapsis*, which is paucispiral (c. 1.5 whorl) (Fig 11J).

Based on these differences, it looks improbable that *Terebra leptapsis* is a synonym of *T. doellojuradoi*, and represents a distinct species. The former occurs from Uruguay to north Argentina, the latter occurs in southeastern Brazil. Besides, based on this study and on the endemism of the species of the *T. doellojuradoi* complex, the occurrence of *T. doellojuradoi* in other regions is indeed questionable, such as Gulf of Mexico (Bratcher & Chernohorsky 1987). Those reports have not been neither considered here.

The presence of a columellar callus or tooth in the inner lip has been regarded as appearing only in the maturity (Faber 2007: 50). This is not accurate, as the columellar fold has been found running along columella in broken specimens (e.g., Terryn 2011: 65, fig. 5), which suggests its presence since immature phases. The columellar tooth is more common in northern species, and has been virtually absent in southern specimens, mainly those occurring in southeastern Brazil to north Argentina (Figs 10C; 11E, I), including *T. doellojuradoi*. Conversely, *T. alagoensis* possesses a pair of teeth in the inner lip (Fig. 11D), which is a distinction of this species amongst the other species of the *T. doellojuradoi* complex.

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