

The genera *Famelica* Bouchet & Warén, 1980
and *Aliceia* Dautzenberg & Fischer, 1897 (Conoidea,
Raphitomidae) collected by the MD55 expedition
in the Brazilian coast, with descriptions of two new species

Daniel ABBATE, Patricia Oristanio V. LIMA &
Luiz Ricardo L. SIMONE



DIRECTEUR DE LA PUBLICATION / *PUBLICATION DIRECTOR*: Bruno David
Président du Muséum national d'Histoire naturelle

RÉDACTRICE EN CHEF / *EDITOR-IN-CHIEF*: Laure Desutter-Grandcolas

ASSISTANTE DE RÉDACTION / *ASSISTANT EDITOR*: Anne Mabilie (zoosyst@mnhn.fr)

MISE EN PAGE / *PAGE LAYOUT*: Anne Mabilie

COMITÉ SCIENTIFIQUE / *SCIENTIFIC BOARD*:

Nesrine Akkari (Naturhistorisches Museum, Vienne, Autriche)
Maria Marta Cigliano (Museo de La Plata, La Plata, Argentine)
Serge Gofas (Universidad de Málaga, Málaga, Espagne)
Sylvain Hugel (CNRS, Université de Strasbourg, France)
Marco Isaia (Università degli Studi di Torino, Turin, Italie)
Rafael Marquez (CSIC, Madrid, Espagne)
Jose Christopher E. Mendoza (Lee Kong Chian Natural History Museum, Singapour)
Annemarie Ohler (MNHN, Paris, France)
Jean-Yves Rasplus (INRA, Montferrier-sur-Lez, France)
Wanda M. Weiner (Polish Academy of Sciences, Cracovie, Pologne)

COUVERTURE / *COVER*:

Shell of *Famelica pukua* n. sp. holotype MZSP 116406.

Zoosystema est indexé dans / *Zoosystema is indexed in*:

- Science Citation Index Expanded (SciSearch®)
- ISI Alerting Services®
- Current Contents® / Agriculture, Biology, and Environmental Sciences®
- Scopus®

Zoosystema est distribué en version électronique par / *Zoosystema is distributed electronically by*:

- BioOne® (<http://www.bioone.org>)

Les articles ainsi que les nouveautés nomenclaturales publiés dans *Zoosystema* sont référencés par /
Articles and nomenclatural novelties published in Zoosystema are referenced by:

- ZooBank® (<http://zoobank.org>)

Zoosystema est une revue en flux continu publiée par les Publications scientifiques du Muséum, Paris / *Zoosystema is a fast track journal published by the Museum Science Press, Paris*

Les Publications scientifiques du Muséum publient aussi / *The Museum Science Press also publish*:

Adansonia, *Geodiversitas*, *Anthropozoologica*, *European Journal of Taxonomy*, *Naturae*, *Cryptogamie* sous-sections *Algologie*, *Bryologie*, *Mycologie*, *Comptes Rendus Palevol*.

Diffusion – Publications scientifiques Muséum national d'Histoire naturelle

CP 41 – 57 rue Cuvier F-75231 Paris cedex 05 (France)

Tél. : 33 (0)1 40 79 48 05 / Fax: 33 (0)1 40 79 38 40

diff.pub@mnhn.fr / <https://sciencepress.mnhn.fr>

© Publications scientifiques du Muséum national d'Histoire naturelle, Paris, 2022

ISSN (imprimé / *print*): 1280-9551/ ISSN (électronique / *electronic*): 1638-9387

The genera *Famelica* Bouchet & Warén, 1980 and *Aliceia* Dautzenberg & Fischer, 1897 (Conoidea, Raphitomidae) collected by the MD55 expedition in the Brazilian coast, with descriptions of two new species

Daniel ABBATE
Patricia Oristanio V. LIMA
Luiz Ricardo L. SIMONE

Museu de Zoologia da Universidade de São Paulo,
Caixa Postal 42494; 04299-970, São Paulo, SP (Brazil)
danimalacologia@gmail.com (corresponding author);
patylima84@gmail.com; lrlsimone@gmail.com

Submitted on 14 March 2022 | Accepted on 22 July 2022 | Published on 13 December 2022

[urn:lsid:zoobank.org:pub:E4101C7F-6364-4E57-B219-223120A8A128](https://zoobank.org/pub:E4101C7F-6364-4E57-B219-223120A8A128)

Abbate D., Lima P. O. V. & Simone L. R. L. 2022. — The genera *Famelica* Bouchet & Warén, 1980 and *Aliceia* Dautzenberg & Fischer, 1897 (Conoidea, Raphitomidae) collected by the MD55 expedition in the Brazilian coast, with descriptions of two new species. *Zoosystema* 44 (23): 565-574. <https://doi.org/10.5252/zoosystema2022v44a23>. <http://zoosystema.com/44/23>

ABSTRACT

Samples of the genera *Famelica* Bouchet & Warén, 1980 and *Aliceia* Dautzenberg & Fischer, 1897 (Conoidea, Raphitomidae) collected mainly by the MD55 expedition in the Vitória-Trindade Chain, Brazil, and secondarily by MAPEM Project, are studied. *Famelica leucospira* n. sp. is described for the populations from the Brazilian coast (Bahia to Rio de Janeiro), previously misidentified as *F. mirmidina* (Dautzenberg & Fischer, 1896). The broader spire, the carinated protoconch, the weak superior carina in the teleoconch whorls, the growth line as wide chevrons, and the inner lip lacking folds of the new species are the main characters that distinguish it from *F. mirmidina*. That species appears restricted to the North Atlantic. *Famelica pukua* n. sp. is also introduced by a specimen collected in Campos Basin, Rio de Janeiro, 902 m, characterized by extreme elongation of the shell, sculptured by uniform, low, spiral cords and c. 5 protoconch whorls. *Aliceia aenigmatica* Dautzenberg & Fischer, 1897 described for the region from Azores and Portugal, and with a reported occurrence off Rio de Janeiro, is here also reported to the Vitória-Trindade Chain, Brazil.

KEY WORDS
MD55 expedition,
Brazil,
Raphitomidae,
Aliceia,
Famelica,
new species.

RÉSUMÉ

Les genres *Famelica* Bouchet & Warén, 1980 et *Aliceia* Dautzenberg & Fischer, 1897 (Conoidea, Raphitomidae) collectés par l'expédition MD55 au large de la côte brésilienne, avec la description de deux nouvelles espèces.

Des échantillons des genres *Famelica* Bouchet & Warén, 1980 et *Aliceia* Dautzenberg & Fischer, 1897 (Conoidea, Raphitomidae) collectés principalement durant l'expédition MD55 dans la chaîne Vitória-Trindade, Brésil, et secondairement lors du projet MAPEM, sont étudiés. *Famelica leucospira* n. sp. est décrite pour les populations de la côte brésilienne (Bahia à Rio de Janeiro), précédemment mal identifiée comme *F. mirmidina* (Dautzenberg & Fischer, 1896). Une flèche plus large, un protoconque caréné, un faible carène supérieure dans les verticilles du téléconque, une ligne de croissance en larges chevrons, et une lèvre interne dépourvue de plis de la nouvelle espèce sont les principaux caractères qui la distinguent de *F. mirmidina*. Cette espèce semble restreinte à l'Atlantique Nord. *Famelica pukua* n. sp. est également introduite par un spécimen collecté dans le bassin de Campos, Rio de Janeiro, 902 m, caractérisé par une extrême elongation de la coquille, sculptée par des cordons uniformes, bas et spiralés et c. 5 verticilles de protoconque. *Aliceia aenigmatica* Dautzenberg & Fischer, 1897 décrit pour la région des Açores et du Portugal, et présent au large de Rio de Janeiro, est ici également signalé de la Chaîne Vitória-Trindade, Brésil.

MOTS CLÉS
expédition MD55,
Brésil,
Raphitomidae,
Aliceia,
Famelica,
espèces nouvelles.

INTRODUCTION

The cruise of the R/V *Marion-Dufresne* (BRESIL-MD55; <https://doi.org/10.17600/87007211>) was a joint project of the Muséum national d'Histoire naturelle (MNHN), Paris, France, and the Universidade Santa Úrsula (USU), Rio de Janeiro, Brazil. It took place during May and June 1987 (Tavares 1999). The malacologists on board, Philippe Bouchet, Bernard Métivier (MNHN) and José H. Leal (then at Rosenstiel School of Marine and Atmospheric Science, Univ. of Miami), recovered a vast quantity of deep-water Mollusca from the southeastern Brazilian coast. Since then, the material has been studied with lots of new species and new occurrences (e.g. Leal 1991; Simone & Cunha 2012a; Fernandes *et al.* 2013). The present paper deals with some novelties in conoidean Raphitomidae Bellardi, 1875 in particular. The Brazilian deep-waters have been shown to harbour high diversity, including a high number of species and high proportion of endemic species (Simone & Cunha 2012a, b). Recently, the study of deep-sea material has become a priority in Brazil, as a more detailed knowledge of deep-water fauna became imperative for environmental analyses. The Brazilian government has effected the extraction of the “Pré-Sal” (pre-salt) level of petroleum, which may cause major disturbances in depths up to 2000 m off the SE Brazilian coast (Romero *et al.* 2011). The MAPEM project – Environmental Monitoring Offshore Drilling Petroleum Exploration – concerned mainly to Campos Basin, a petroleum deep-sea area, also has collected interesting deep-water material, including some samples studied herein.

Raphitomidae were traditionally classified as a subfamily of Turridae Swainson, 1840, defined mostly by characters of the shell and the radula (Powell 1966; Rosenberg *et al.* 2009). The traditional “Turridae” has been proved to be polyphyletic (e.g. Taylor *et al.* 1993; Puillandre *et al.* 2008, 2011; Simone 2011), and the present consensus is to consider it as a grade of families (Bouchet *et al.* 2005, 2011). The former family Turridae (*s.l.*, nowadays informally known as “turritiforms”, which means “turritiform Conoidea”) occurred throughout the world, highly diverse between the polar seas to the Equator line, from subtidal to abyssal depths (Kohn & Perron 1994; Bouchet *et al.* 2009). It was one of the largest mollusk groups, encompassing over 600 taxa at genera level and about 10 000 described (recent and fossil) species (Bouchet *et al.* 2009; MolluscaBase 2022). Traditional classifications divided the formed family Turridae into *c.* 20 subfamilies (e.g. Vaught 1989). However, in recent classifications, mostly based on molecular approaches, several subfamilies have been raised to the family level, e.g., Cochlespiridae Powell, 1942, Drilliidae Olsson, 1964, Raphitomidae Bellardi, 1875, Mangeliidae Fischer, 1883 (Bouchet *et al.* 2011). Although, a consensus regarding the number of families has not been reached (Powell 1966; Kilburn 1983-1995; Taylor *et al.* 1993; Bouchet *et al.* 2005, 2011; Abdelkrim *et al.* 2018). Despite the high already know turritiform diversity (Taylor *et al.* 1993), possibly this number will further increase with more deep-water surveys, as, e.g. the MD55 material (e.g. Simone & Cunha 2012a, b, 2014).

Despite the great diversity, relatively few papers have been recently published concerning to deep-water turritiforms from Brazilian waters (Absalão *et al.* 2005; Figueira & Absalão 2010, 2012), some of them (i.e., Absalão *et al.* 2005; Figueira & Absalão 2012) included species of Raphitomidae. The goal of the present study is continuing the revision of the Brazilian deep-water Raphitomidae, with an initial focus on the genera *Famelica* Bouchet & Warén, 1980 and *Aliceia* Dautzenberg & Fischer, 1897. This study is part of a large project on Brazilian deep-water mollusks trying to improve the taxonomy of the lineages dwelling in that environment, as a strategy to help political decisions of petroleum deep-sea explorations.

Famelica, type species: *Pleurotoma catharinae* Verrill & S. Smith, 1884 (OD), includes 15 species (MolluscaBase 2022) occurring worldwide in deep-waters, but with most species in Americas and North Atlantic. Two species have been reported to the Brazilian coast: *F. mirmidina* (Dautzenberg & Fischer, 1896); and *F. monotropis* (Dautzenberg & Fischer, 1896) (Absalão *et al.* 2005; Rios 2009; Figueira & Absalão 2012).

Aliceia, type species: *Aliceia aenigmatica* Dautzenberg & Fisher, 1897 (monotypy), has three species (MolluscaBase 2022), one from European coast and two from Japan deep-waters. The European species has also been reported from Rio de Janeiro (Figueira & Absalão 2012).

Species of both genera have relatively fragile shells, being rarely collected undamaged. They only habit deep-waters, usually in depths between 1000-2000 m.

MATERIAL AND METHODS

Part of the MD55 samples is provisionally in the malacological collection of the Museum of Zoology of USP (MZSP). They mostly belong to Museum national d'Histoire naturelle (MNHN). The turritiforms consist of 608 lots of empty shells divided into 67 collection stations, distributed between 3180 nautical miles, covering the coast of Rio de Janeiro, Espírito Santo, and the Vitória-Trindade chain (Fig. 1). These 608 lots were identified in 36 genera and among them, seven belong to Raphitomidae. All of them will be gradually published. Some additional specimens of the species studied herein were also in Instituto de Biociências da Universidade do Rio de Janeiro (IBUFRJ). Part of the collected material of the MAPEM Project was also deposited in MZSP, and pertinent samples are also studied here.

References on the review and classification of the turritiforms, and particularly on Western Atlantic Raphitomidae, were consulted (e.g. Powell 1966; Absalão *et al.* 2005; Figueira & Absalão 2010). Comparisons with type material were also performed. Particularly important are the holotype illustrations by Bouchet & Warén (1980) of *Famelica mirmidina* (fig. 188) and *Aliceia aenigmatica* (fig. 190). Both serve as further base for conchological comparison.

ABBREVIATIONS

IBUFRJ	Instituto de Biociências da Universidade do Rio de Janeiro;
MNHN	Muséum national d'Histoire naturelle, Paris;
MZSP	Museum of Zoology of the University of São Paulo.

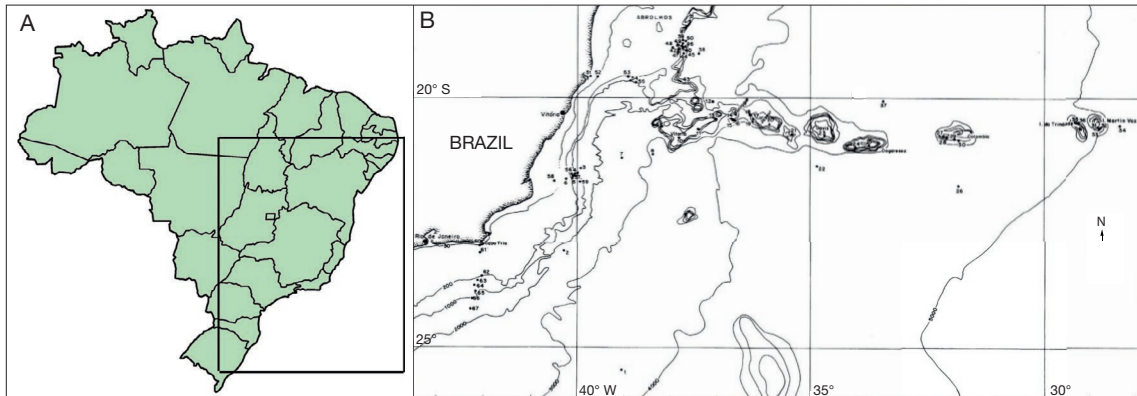


FIG. 1. — Illustrative map of collection area: **A**, Brazil, rectangle showing the region displayed in middle of the figure; **B**, region of Vitória-Trindade submarine mountain chain (from Tavares 1999).

SYSTEMATICS

Family RAPHITOMIDAE Bellardi, 1875
Genus *Famelica* Bouchet & Warén, 1980

Famelica leucospira n. sp.
(Figs 2; 3)

[urn:lsid:zoobank.org:act:D3A93B13-5608-44EA-BAFA-D7CD98D202E2](https://doi.org/10.21203/rs.3.rs-1111111/v1)

Famelica mirmidina – Absalão *et al.* 2005: 35, figs 104, 116. — Figueira & Absalão 2012: 6, figs 3, 4 (non Dautzenberg & Fischer, 1896).

HOLOTYPE. — Brazil • Espírito Santo, Vitoria-Trindade Chain; St. DC70, Dredge Charcot-Picard; 18°59'S, 37°47'W; 1540-1550 m depth; MD55; Bouchet, Leal & Métivier col.; 26.V.1987; **MNHN-IM-2000-38590** (Fig. 2A-C).

PARATYPES. — Brazil • 2 shells (Figs 2D-F; 3A, E-G); Espírito Santo; off Marataízes, sta. DS05; 21°26'S, 39°56'W; 1400-1420 m depth; 09.V.1987; **MNHN-IM-2000-38591** • 1 shell (Fig. 3B, C); same data; MZSP 157441 • 1 shell; off Vitoria; Vitoria-Trindade Chain; Bouchet, Leal & Métivier col.; Expedition MD55; sta. DC72, 18°59'S, 37°47'W; 950-1050 m depth; **MNHN-IM-2000-38592** • 1 shell; same data; 27.V.1987; MZSP 157439 (Fig. 2G-I) • 1 shell; 28.V.1987; sta. CB79; 19°02'S, 37°48'W; 1500-1575 m depth; **MNHN-IM-2000-38593** • 2 shells; Rio de Janeiro; Bacia de Campos (Mapem Project); 21°08'13"S, 40°10'23"W; 902 m depth; MZSP 114454 • 1 shell 21°08'27"S, 40°10'26"W; same data; 902 m depth; MZSP 114479 • 6 shells; same data; sta. OPII#68; 12.VI.2003; 22°48'05"S, 40°06'38"W; 1972 m depth; IBUFRJ 18465 (Fig. 3H-K).

TYPE LOCALITY. — Brazil, Espírito Santo, Vitoria-Trindade Chain, 18°59'S, 37°47'W, 1540-1550 m.

ETYMOLOGY. — The specific name is from the Latin *leuco*, an adjective that refers to the white colour; and *spira*, including the protoconch and the teleoconch of pure white colour.

DIAGNOSIS. — Shell *c.* 7 mm, spire angle 35-39°. Protoconch with low carina in inferior third mostly marked by axial nodes. Whorls weakly angled in superior third; sculpture lacking, except for very weak chevrons, showing past very shallow anal notch.

Canal shorter than 10% of total length. Inner lip rounded, concave, lacking folds.

DISTRIBUTION. — Brazil: Bahia to Rio de Janeiro.

HABITAT. — Muddy and sandy bottoms, bathypelagic zone, 760-3360 m.

DESCRIPTION

Shell (Figs 2; 3)

About 7 mm, fusiform, about twice as long as wide, with *c.* 7 convex whorls. Colour white to cream, sometimes with light orange spots throughout shell. Protoconch (Figs 2C, F, I; 3C, F, G, I) with low carina in inferior third; consisting of two parts (Fig. 3I): 1) first part blunt, smooth, gradually with small pustules, dome-shaped, light brown, with 1.5 whorls; transition indistinct; 2) second part *c.* 1.5-2 whorls, cream, sculptured by vertical ribs near inferior suture, interconnected by narrow cord in carina level (Fig. 3C, D). Teleoconch smooth, lacking sculpture, fragile, possessing only shallow chevrons of growth lines almost imperceptible (Figs 2B, E, G; 3A, E, H). Very shallow, weak angulation between middle and superior thirds (Figs 2A, B, G; 3E). Suture deep, well-marked. Spire angle 35-40°. Aperture wide, elliptical, about 1.5 as long as wide; length about ¼ of shell length (Figs 2A, D, G; 3A, B, E, H, J, K). Siphonal canal short, narrow, simple; turned forward; about 10% of total shell length (Figs 2A, G; 3J, K). Anal notch shallow, located between middle and superior thirds of outer lip (checked by growth lines) (Figs 2B; 3J, K). Outer lip thin, fragile, rounded, smooth without sculpture or lirae (Figs 2G; 3J, K). Inner lip similar arched as outer lip, weakly angled in middle (Fig. 2A, G). Callus very thin, almost absent, not folded. No umbilicus.

Measurements (length × width in mm)

Holotype **MNHN-IM-2000-38590**: 5.1 by 2.2 (Fig. 2A, B). paratypes **MNHN-IM-2000-38591**: 6.8 by 3.9 (Fig. 2D, E); MZSP 157439: 4.6 by 1.9 (Fig. 2G, H).



FIG. 2. — Shells of *Famelica leucospira* n. sp. type specimens: **A-C**, holotype MNHN-IM-2000-38590 (L 5.1 mm), frontal view (**A**), dorsal view (**B**), detail of apical region (**C**); **D-F**, paratype MNHN-IM-2000-38591 (Sta. DS05) (L 4.6 mm), frontal view (**D**), dorsal view (**E**), detail of apical region (**F**); **G-I**, paratype MZSP 157439, (L 6.8 mm), frontal view (**G**), dorsal view (**H**), detail of apical region (**I**). Scale bars: C, F, I, 0.5 mm.

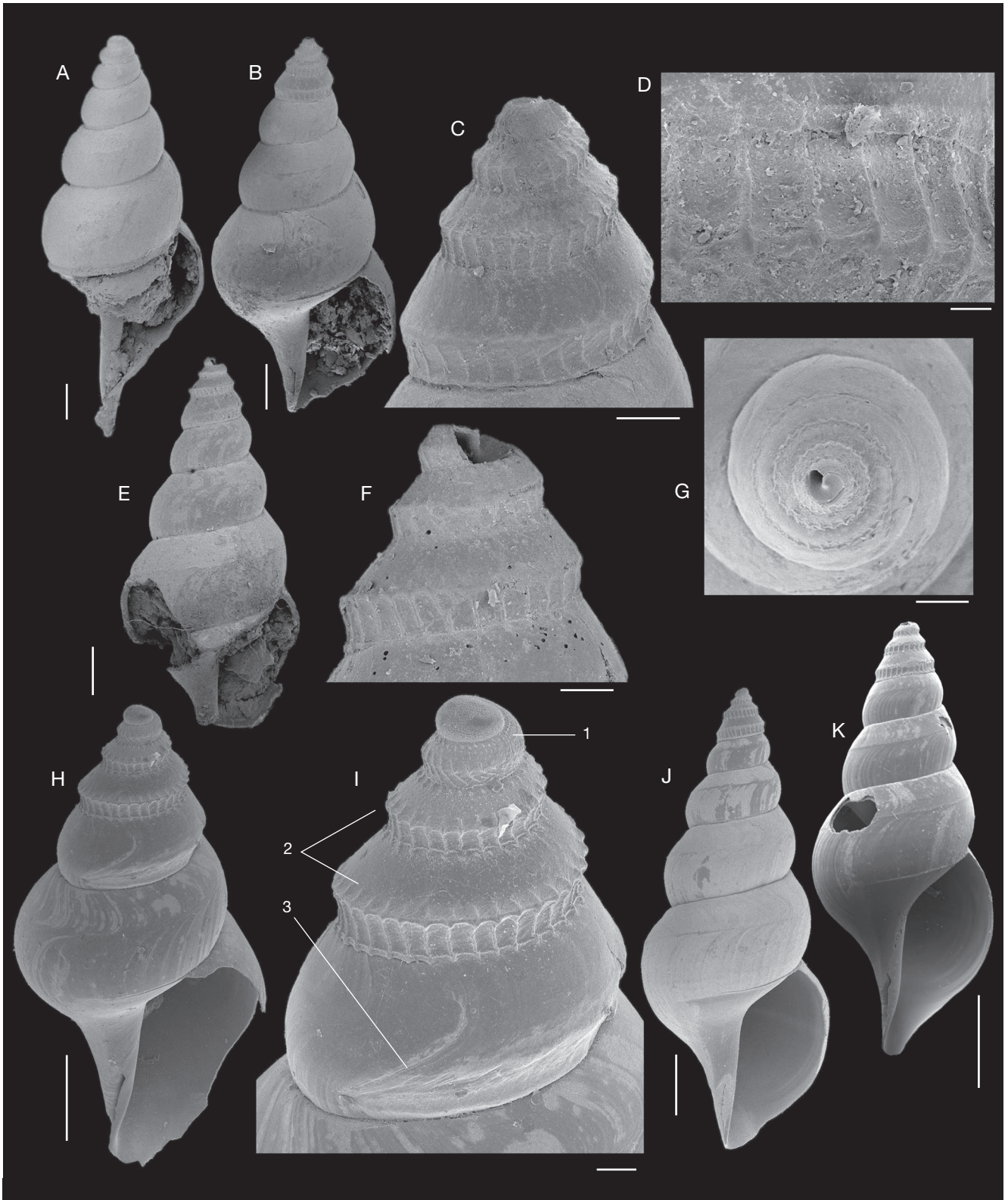


FIG. 3. — Shells of *Famelica leucospira* n. sp. type specimens in SEM: **A**, paratype MNHN-IM-2000-38591 sta. DS05, frontal-slightly apical view; **B**, paratype MZSP 157441, frontal-slightly apical view; **C**, same, detail of protoconch; **D**, same, detail of surface of protoconch third whorl; **E**, paratype MNHN-IM-2000-38591 sta. DS05, frontal view; **F**, same, detail of protoconch; **G**, same, partial apical view; **H**, paratype IBUFRJ 18465, frontal-slightly apical view; **I**, same, profile of protoconch, showing protoconch 1 and 2, and transition with teleoconch (3); **J**, **K**, two paratypes IBUFRJ 18465, frontal view. Scale bars: A, B, E, H, 0.5 mm; C, 200 μm; D, 50 μm; F, I, 100 μm; G, 200 μm; J, K, 1 mm. H, K, courtesy Cléo Oliveira, IBUFRJ.

Famelica pukua n. sp.
(Fig. 4)

urn:lsid:zoobank.org:act:47510106-D27C-4998-9E1E-163F6C85428C

HOLOTYPE. — Brazil • Rio de Janeiro; Bacia de Campos, off Campos dos Goytacazes; 21°09'43"S, 40°10'18"W; 902 m depth [Mapem Project]; MZSP 116406 (Fig. 4).

TYPE LOCALITY. — Brazil, Rio de Janeiro; Bacia de Campos, off Campos dos Goytacazes, 21°09'43"S, 40°10'18"W, 902 m.

ETYMOLOGY. — The specific epithet is a Latinization derived from Guarani native South America language, *puku*, meaning elongated, long, an allusion to the elongated shape of the shell.

DIAGNOSIS. — Shell *c.* 9 mm, spire angle 24°. Protoconch with low carina in inferior third mostly marked by axial nodes in its middle whorls only. Whorls weakly rounded; sculpture low spiral cords, with interspaces of equal width of cords; except for smooth subsutural region. Inner lip rounded, concave, lacking folds.

DESCRIPTION

Shell (Fig. 4)

About 9 mm, fusiform-elongated, width *c.* 27% of length; with about 9 convex whorls. Colour white, with yellowish protoconch (Fig. 4A, B). Protoconch (Fig. 4C) with middle carina, *c.* 5 whorls, *c.* 400 µm width; consisting of three parts: 1) first part blunt, smooth, with *c.* 1.5 whorls; transition indistinct; 2) second part *c.* 1.5-2 whorls, middle carinated, superior region of carina smooth, inferior sculptured by vertical regular riblets from carina up to inferior suture; and 3) last *c.* 1 whorl smooth, bearing only middle, low carina; transition with teleoconch sigmoid. Teleoconch whorls slightly and uniformly convex; sculptured by uniform set of spiral, low cords, *c.* 12 in penultimate whorl, with interspaces equal to their width; subsutural smooth region occupying about 1/5 of whorl height. Suture well-marked. Spire angle about 24°. Aperture and canal analysis precluded by fracture of about 1/4 whorl preceding peristome; elongated, about twice as long as wide. Inner and outer lips smooth. Canal short, pointed. No umbilicus.

Measurements (length × width in mm)

Holotype: 8.8 by 2.4.

Distribution

Only known from type locality.

Habitat

902 m.

Genus *Aliceia* Dautzenberg & Fischer, 1897

Aliceia aenigmatica Dautzenberg & Fischer, 1897
(Fig. 5)

Aliceia aenigmatica Dautzenberg & Fischer, 1897: 182 (pl. 4; figs 15-18). — Bouchet & Warén 1980: 91 (figs 190, 230). — Figueira & Absalão 2012: 5, 6 (figs 1, 2) (including other citations).

TYPE LOCALITY. — Azores Island, Princess Alice Bank.

DISTRIBUTION. — E Atlantic: Portugal and Azores (Dautzenberg & Fischer 1896, 1897; Dautzenberg 1927; Bouchet & Warén 1980). W Atlantic: Vitória-Trindade Seamount Chain (present paper) to Rio de Janeiro (Figueira & Absalão 2012).

HABITAT. — Mud and sand bottoms, bathypelagic zone; 290-1980 m.

MATERIAL EXAMINED. — Brazil • 4 shells; Espírito Santo; Vitoria-Trindade Chain; MD55; Bouchet, Leal & Métivier col.; V.1987; sta. DC72; 19°00'S, 37°49'W; 950-1050 m depth; MNHN-IM-2012-25417 • 2 shells; same data; 27.V.1987; MZSP 157438 • 4 shells; sta. DC 75; 18°59'S, 37°50'W; 295 m depth; MNHN-IM-2012-25416 • 1 shell; same data; 27.V.1987; MZSP 157437 (Fig. 5A, B) • 4 shells; sta. CB76; 18°59'S, 37°50'W; 637 m depth; MNHN-IM-2012-25415 • 2 shells; same data; 27.V.1987; MZSP 157435 (Fig. 5C, D) • 4 shells; sta. CB77; 19°41'S, 37°48'W; 790-940 m depth; 27.V.1987; MNHN-IM-2012-25414 (Fig. 5F) • 2 shells; sta. CB93; 19°36'S, 38°53'W; 640 m depth; MNHN-IM-2012-25413 • 2 shells; same data; MZSP 157436 (Fig. 5E).

MORPHOLOGICAL FEATURES

Shell (Fig. 5)

Fusiform, slender, spire high, about twice as long as wide, with *c.* 6-7 convex whorls, colour cream to white, translucent. Protoconch (Fig. 5E-G) in two parts: 1) slightly darker, with granulation near suture, with *c.* 1.5-2 whorls; transition between protoconch 1 and 2 distinguished only by difference of sculpture; 2) *c.* 1.5-2 whorls, sculpture numerous spiral and axial ribs, in cancellate pattern near suture, light cream. Teleoconch smooth, without sculpture, except for growth lines. Suture well-marked. Spire angle *c.* 46°. Outer lip of aperture with projection in shoulder region similar to elongated concave scale, structure periodically detected in previous regions of entire teleoconch, 3-4 per whorl (Fig. 5A, B, D). Aperture elliptical, 3 times as long as wide; *c.* 1/2 of shell length (Fig. 5A, C, F). Canal short, *c.* 1/8 of shell length. Anal notch marked by projected scales. Outer lip thin, fragile, smooth, without sculpture or lirae. Inner lip straight, without folds. Umbilicus opened, flanked by carinated area, ending in canal.

Measurements (length × width in mm)

MNHN-IM-2012-25415, sta. CB 76 (Fig. 5C, D): 3.2 by 1.8; MNHN-IM-2012-25413, sta. CB 93 (Fig. 5F): 2.7 by 1.3; MNHN-IM-2012-25416, sta. DC75 (Fig. 5A, B): 4.2 by 2.1; MNHN-IM-2012-25414, sta. CB 77 (Fig. 5G): 3.6 by 1.5.

DISCUSSION

Famelica leucospira n. sp. has almost smooth whorls, lacking sculpture, except for wide successive chevrons of growth lines. These characteristics show similarity of the new species with a single Atlantic species: *F. mirmidina*, rather than the remaining congeners. The holotype of this species was illustrated by Bouchet & Warén (1980: fig. 188), it originates from the NE .. the NE Atlantic, around the Azores. Comparing it with the MD55 specimens, as well as what has been identified as "*A. mirmidina*" from Brazil (Absalão *et al.* 2005: figs 104, 116; Figueira & Absalão 2012: figs 3, 4), some interesting differ-

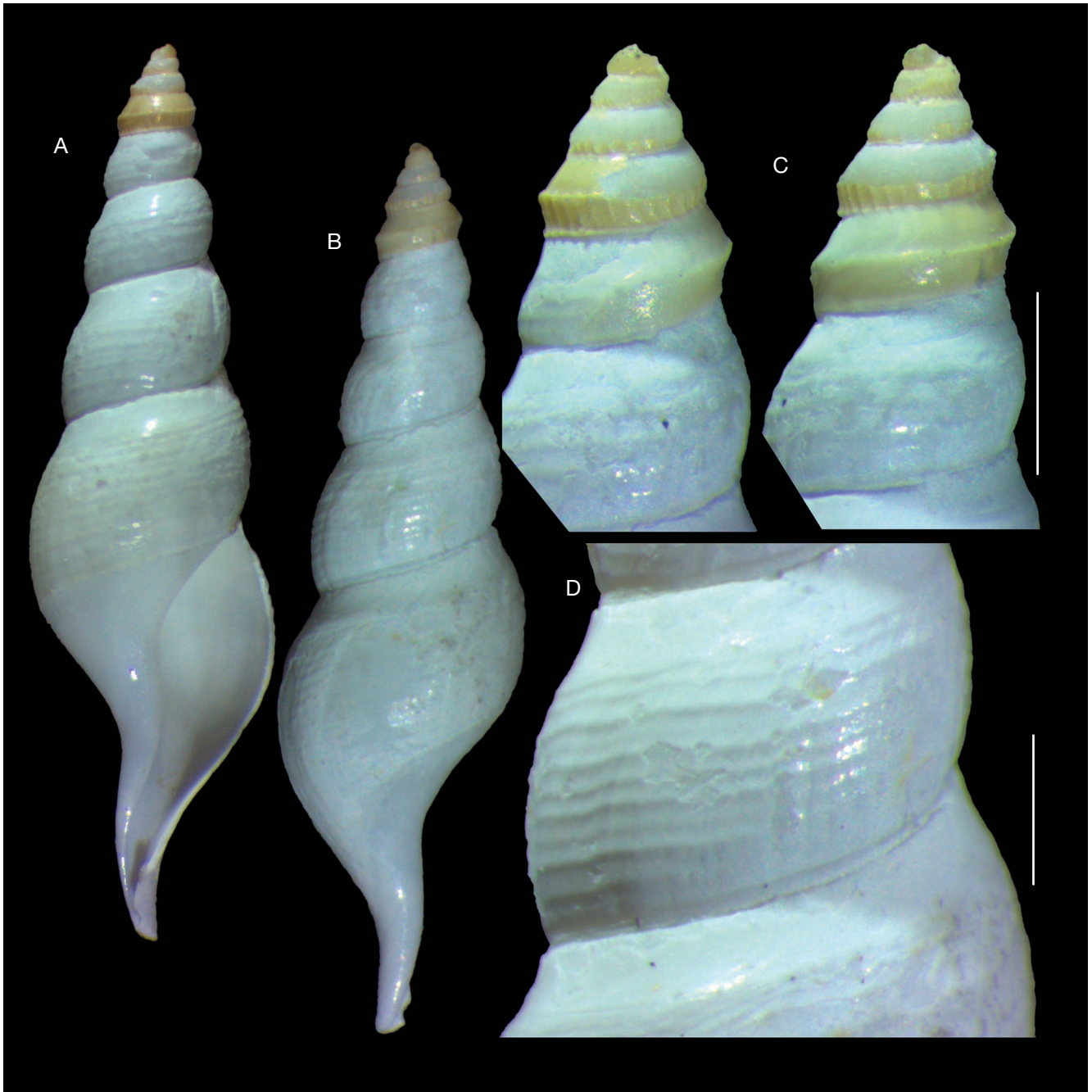


FIG. 4. — Shell of *Famelica pukua* n. sp. holotype MZSP 116406: **A**, frontal view (L 8.8 mm); **B**, dorsal view; **C**, apex, two views; **D**, detail of penultimate whorl. Scales bars: 0.5 mm.

ences can be evoked, convincing that the samples from the North and from the South Atlantic belong to different species. *F. leucospira* n. sp. has a carinate protoconch, in which carina is much broader than the inferior suture (Figs 2A-C, F, I; 3C, F-I) (Figueira & Absalão 2012: figs 4); no carina is present in *F. mirmidina*'s protoconch; additionally, its protoconch apparently is much richer sculptured, while that of *F. mirmidina* has only a spaced reticulate (Fig. 3C, D, F-I). The spire of *F. leucospira* n. sp. is wider, with spire angle 35-40°, and has a uniform growth; while that of *F. mirmidina* is narrower, with spire angle of 28-30°, and is slightly wider in the base of the

protoconch, breaking a profile of a uniform growth. The teleoconch sculpture of *F. leucospira* n. sp. is almost absent, with a surface even shining (Fig. 2A-C, G), while *F. mirmidina* has a rougher undulation in the surface; additionally, the chevrons kept by successive growth have a shallower angulation in *F. leucospira* n. sp.; those of *F. mirmidina* are deeper, showing that the anal notch of this species is deeper and more angulated. The inner lip of *F. leucospira* n. sp. is deeper, and lack any trace of “fold of which runs parallel to the columella and forms a narrow fissure or chink on it” stated by Bouchet & Warén (1980: 90) as characteristic of *F. mirmidina*.

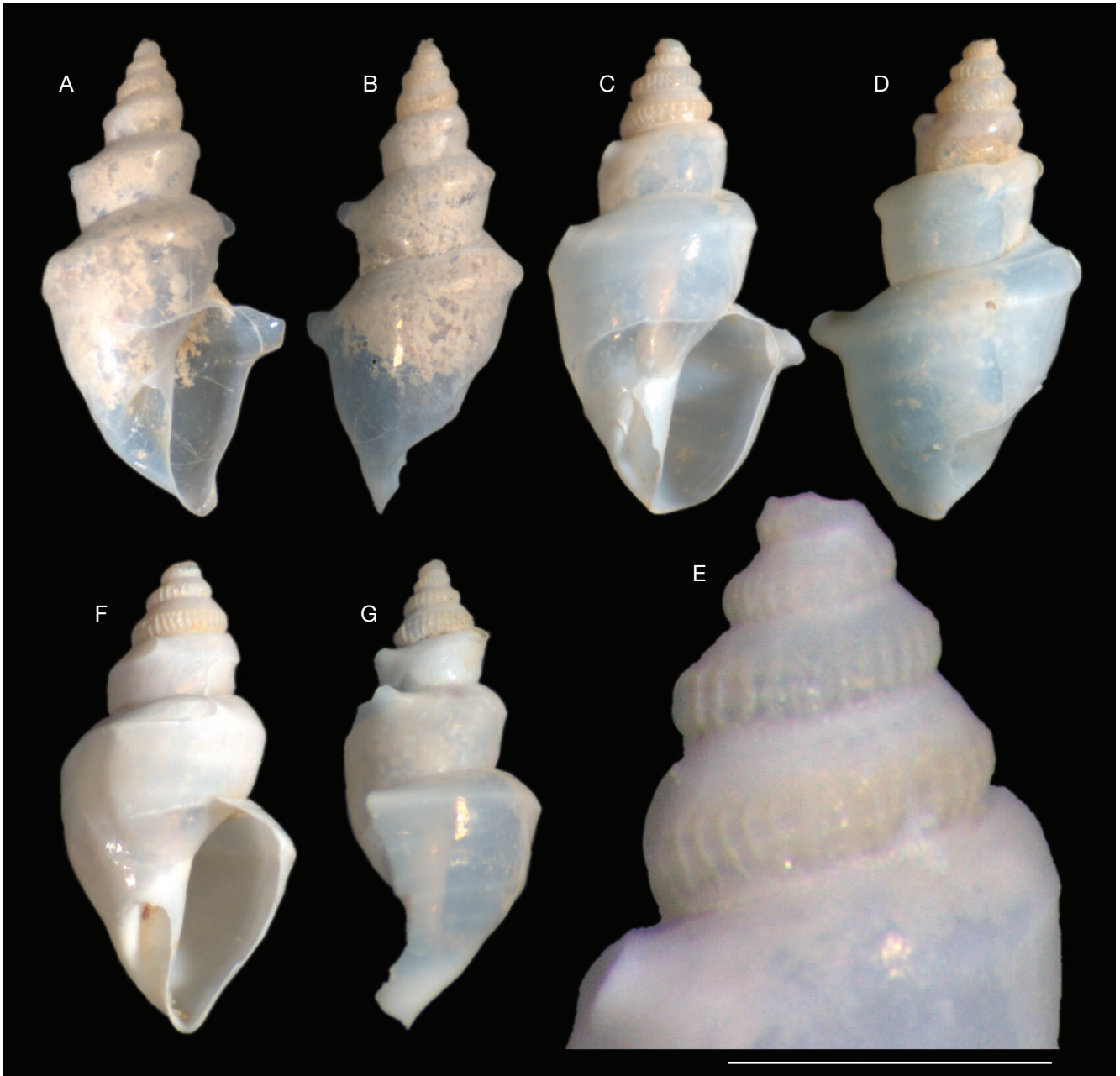


FIG. 5. — *Aliceia aenigmatica* Dautzenberg & Fischer, 1897 some MD55 specimens: **A, B**, MNHN-IM-2012-25416 sta. DC75, frontal and dorsal views (L 4.2 mm); **C, D**, MZSP 157437, sta. CB76, frontal and dorsal views (L 3.2 mm); **E**, same, detail of apical region in profile; **F**, MNHN-IM-2012-25413 sta. CB 93, frontal view (L 2.7 mm); **G**, MNHN-IM-2012-25414 sta. CB 77, right view (L 3.6 mm). Scale bar: E, 0.5 mm.

All other four species of *Famelica* that occur in the Atlantic (Bouchet & Warén 1980; Rosenberg *et al.* 2009; MolluscaBase 2022): *F. catharinae* (Verrill & Smith, 1884); *F. monoceros* (Watson, 1881); *F. monotropis* (Dautzenberg & Fischer, 1896); and *F. scipio* (Dall, 1889), have notorious spiral sculpture and longer canal, easily differentiating from *F. leucospira* n. sp. From the Indo-Pacific species, *F. leucospira* n. sp. has some resemblance with *F. nitida* Sysoev, 1990 (SE Pacific), which holotype (ZMMU LC5737) was illustrated by Criscione *et al.* (2021: fig 5A); *F. leucospira* n. sp. differs by the carinate protoconch, wider shell angulation (spire angle

35-40° against c. 30° of that of *F. nitida*), in lacking whorls slightly shouldered, and in lacking spiral lines; also the aperture of *F. leucospira* n. sp. is also proportionally wider.

Famelica pukua n. sp., by its elongation and spiral sculpture, is similar to *F. catharinae* and *F. monoceros*. However, the elongation of *F. pukua* n. sp. is still larger, the width is c. 27% of length, while *F. catharinae* is c. 30 and *F. monoceros* c. 36. Consequently, the spire angle is also different, *F. pukua* n. sp. is c. 24°, *F. catharinae* and *F. monoceros* c. 30°. The sculpture of *F. pukua* n. sp. is also different, being weaker, particularly if compared to *F. catharinae*, which possesses taller spiral

cords and more widely spaced; from *F. monoceros*, which possesses *c.* 20 spiral cords in penultimate whorl, *F. pukua* n. sp. differs in having 12, while *F. catharinae* has 6-7 spiral cords in that region. The subsutural smooth band is present in the three species; however, it is much more pronounced in *F. catharinae*, producing even a spiral concavity. The protoconch of *F. pukua* n. sp. apparently is the proportionally longest amongst its congeners. With *c.* 5 whorls and 3 differently sculptured regions. *Famelica pukua* n. sp. still differs from *F. monotropis* by elongation and in lacking carina, and from *F. mirmidina* and *F. leucospira* n. sp. by the elongation and by the spiral sculpture. In the Indo-Pacific species of *Famelica*, *F. pukua* n. sp. has some resemblance with *F. acus* Criscione, Hallan, Puillandre & Fedosov, 2021, but *F. pukua* n. sp. is less elongate (*F. acus* width *c.* 20% of length), with shallower suture, and its protoconch has not carina since its first whorls, the spiral sculpture in first teleoconch whorls is less evident, and the aperture is wider. The types of *F. acus* (MNHN-IM-2009-24922) were also illustrated by Criscione *et al.* (2021: figs 5C, D) and are available in MolluscaBase (2022).

Previous studies on deep-water turrids show animals with wide distribution, covering the entire Atlantic, Caribbean, and even seas of the Scandinavian Peninsula (Figueira & Absalão 2010; Bouchet *et al.* 2011). In the case of the genus *Famelica* this has been shown as a misidentification, as what was recognized as *F. mirmidina* in South Atlantic has shown to be another species described herein. On the other hand, in respect to the *Aliceia aenigmatica*, this wide distribution has been demonstrated. Despite some minor differences between the North Atlantic and Brazilian specimens can be shown, such as the less shouldered protoconch and teleoconch, and the sharper profile of the region that flanks the umbilicus, resulting in a sharper canal (Fig. 5A, C, F), these differences have been presently interpreted as variation. Thus, a conservative approach is herein applied.

Cases like *Aliceia aenigmatica*, and few others [e.g., *Theta byronuclea* (Clarke, 1959) Sánchez & Pastorino 2020)], confirming a wide distribution, have been exceptions in the deep-water malacofauna in the Western Atlantic. Analyzing the MD55 material, species supposedly widely distributed from the North Atlantic to Brazil, the southernmost populations have usually been shown as misidentifications and have been separated as new species (e.g. Simone & Cunha 2012a, b, 2014). Those studies have shown that the Brazilian deep-waters apparently have more narrowly distributed species. They are related to those from the North Atlantic, but the region possesses its own assembly. This must have implications in deep-water management, mainly regarding exploitation of petroleum (Pre-Salt Zone), and its potential dangers to the local environment.

It is important to emphasize that this paper is part of a larger project intending to understand the deep-sea mollusk fauna of the Brazilian region. The better the knowledge, the more precise protective strategies of preservation of that delicate ecosystem.

Acknowledgements

The molluscan material studied here was collected on board R/V *Marion Dufresne* by P. Bouchet, J. Leal and B. Métivier, under the authority of the two co-PIs Alain Guille (MNHN) and Fátima Ramos (Universidade Santa Ursula, Rio de Janeiro). We are very grateful to Philippe Bouchet (MNHN) for loaning the material of MD55 Expedition; to José Coltro for providing the trip to Paris; to Lara Guimarães (MZSP) for SEM examinations; to Cléo Oliveira, IBUFRJ for images and information on that collection, and by Fig. 3H; K; to both anonymous referees for important comments on the text. This work was supported by Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq, Brazil) proc. 150026/2018-8.

REFERENCES

- ABDELKRIM J., AZNAR-CORMANO L., FEDOSOV A., KANTOR Y., LOZOUET P., PHUONG M., ZAHARIAS P. & PUILLANDRE N. 2018. — Exon-capture based phylogeny and diversification of the venomous gastropods (Neogastropoda, Conoidea). *Molecular Biology and Evolution* 35 (10): 2355-2374. <https://doi.org/10.1093/molbev/msy144>
- ABSALÃO R. S., PIMENTA A. D. & CAETANO C. H. S. 2005. — Turridae (Mollusca, Neogastropoda, Conoidea) coletados no litoral sudeste do Brasil, Programa Revizee “Score” Central. *Biociências* 13: 19-49.
- BOUCHET P. & WARÉN A. 1980. — Revision of the northeast Atlantic bathyal and abyssal Turridae (Mollusca, Gastropoda). *Journal of Molluscan Studies* 6 Supplement 8: 1-119. https://doi.org/10.1093/mollus/46.Supplement_8.1
- BOUCHET P., ROCROI J. P., FRÝDA J., HAUSDORF B., PONDER W. F., VALDÉS A. & WARÉN A. 2005. — Classification and nomenclator of gastropod families. *Malacologia* 47: 1-397.
- BOUCHET P., LOZOUET P. & SYSOEV A. V. 2009. — An inordinate fondness for turrids. *Deep-Sea research II* 56 (19-22): 1724-1731. <https://doi.org/10.1016/j.dsr2.2009.05.033>
- BOUCHET P., KANTOR Y. I., SYSOEV A. & PUILLANDRE N. 2011. — A new operational classification of the Conoidea (Gastropoda). *Journal of Molluscan Studies* 77 (3): 273-308. <https://doi.org/10.1093/mollus/eyr017>
- CRISCIONE F., HALLAN A., PUILLANDRE N. & FEDOSOV A. 2021. — Snails in depth: integrative taxonomy of *Famelica*, *Glaciotomella* and *Rimosodaphnella* (Conoidea: Raphitomidae) from the deep sea of temperate Australia. *Invertebrate Systematics* 35 (8): 940-962. <https://doi.org/10.1071/IS21008>
- DAUTZENBERG P. 1927. — *Mollusques provenant des campagnes scientifiques du Prince Albert 1 de Monaco dans l’Ocean Atlantique et dans le Golfe de Gascogne*. Résultats des campagnes scientifiques accomplies sur son yacht par Albert 1 Prince Souverain de Monaco. Monaco 72: 1-400, 1-9 pls.
- DAUTZENBERG P. & FISCHER H. 1896. — Dragages effectués par l’*Hirondelle* et par le *Princesse-Alice*, 1888-1895. *Mémoires de la Société Zoologique de France* 9: 395-498, pls 15-22. <https://www.biodiversitylibrary.org/page/10117292>
- DAUTZENBERG P. & FISCHER H. 1897. — Dragages effectués par l’*Hirondelle* et par le *Princesse-Alice*, 1888-1896. *Mémoires de la Société Zoologique de France* 10: 139-234, pls 3-7. <https://www.biodiversitylibrary.org/page/10107630>
- FERNANDES M. R., PIMENTA A. D. & LEAL J. H. 2013. — Taxonomic review of Triphorinae (Gastropoda: Triphoridae) from the Vitoria-Trindade Seamount Chain, southeastern Brazil. *Nautilus* 127: 1-18.
- FIGUEIRA R. M. A. & ABSALÃO R. S. 2010. — Deep Water Turridae off Southeast Brazil. *Scientia Marina* 74 (3): 471-481. <https://doi.org/10.3989/scimar.2010.74n3471>

- FIGUEIRA R. M. A. & ABSALÃO R. S. 2012. — Deep-water Raphitomidae (Mollusca, Gastropoda, Conoidea) from the Campus Basin, southeast Brazil. *Zootaxa* 3527 (1): 1-27. <https://doi.org/10.11646/zootaxa.3527.1.1>
- KILBURN R. N. 1983-1995. — Turridae (Mollusca, Gastropoda) of Southern Africa and Mozambique, [part 1] Turrinae. *Annals of the Natal Museum* 25: 549-585.
- KOHN A. J. & PERRON F. E. 1994. — *Life History and Biogeography: Patterns in Conus*. Oxford University Press, 106 p.
- LEAL J. H. 1991. — *Marine Prosobranch Gastropods from Oceanic Islands off Brazil: Species Composition and Biogeography*. Universal Book Services. Oegstgeest, 418 p.
- MOLLUSCABASE EDS. 2022. — *MolluscaBase website*. <http://www.molluscabase.org/aphia.php?p=taxdetails&cid=137816> (last consultation on 01.IX.2022).
- POWELL A. W. B. 1966. — The molluscan families Speightiidae and Turridae. *Bulletin of the Auckland Institute and Museum* 5: 1-184.
- PUILLANDRE N., SAMADI S., BOISSELIER M. C., SYSOEV A. V., KANTOR Y. I., CRUAUD C., COULOUX A. & BOUCHET P. 2008. — Starting to unravel the toxoglossan knot: molecular phylogeny of the “turrids” (Neogastropoda: Conoidea). *Molecular Phylogenetics and Evolution* 47 (3): 1122-1134. <https://doi.org/10.1016/j.ympev.2007.11.007>
- PUILLANDRE N., KANTOR Y. I., SYSOEV A. V., COULOUX A., MEYER C., RAWLINGS T., TODD J. A. & BOUCHET P. 2011. — The dragon tamed? A molecular phylogeny of the Conoidea (Gastropoda). *Journal of Molluscan Studies* 77 (3): 259-272. <https://doi.org/10.1093/mollus/eyr015>
- RIOS E. C. 2009. — *Compendium of Brazilian seashells*. Fundação Universidade do Rio Grande, Rio Grande, 668 p.
- ROMERO A. F., RIEDEL O. S., MILANELLI J. C. C. & LAMMARDO A. C. R. 2011. — Mapa da vulnerabilidade ambiental ao óleo – um estudo de caso na Baía de Santos, Brasil. *Revista Brasileira de Cartografia* 63: 315-332.
- ROSENBERG G. 2009. — *Malacolog 4.1.1: A Database of Western Atlantic Marine Mollusca*. [WWW database (version 4.1.1), <http://www.malacolog.org/>]
- ROSENBERG G., MORETZSOHN F. & GARCÍA E. F. 2009. — Gastropoda (Mollusca) of the Gulf of Mexico, in FELDER D. L. & CAMP D. K. (eds). *Gulf of Mexico-Origins, Waters, and Biota*. Biodiversity. Texas A&M University Press, College Station, Texas: 579-699.
- SÁNCHEZ N. & PASTORINO G. 2020. — The North Atlantic Conoidean gastropod *Theta lyronuclea* (Raphitomidae) in deep-waters of the southwestern Atlantic. *Malacologia* 63 (1): 33-40. <https://doi.org/10.4002/040.063.0104>
- SIMONE L. R. L. 2011. — Phylogeny of the Caenogastropoda (Mollusca), based on comparative morphology. *Arquivos de Zoologia* 42 (2-4): 161-323.
- SIMONE L. R. L. & CUNHA C. M. 2012a. — Taxonomic study on the molluscs collected in Marion-Dufresne expedition (MD55) to SE Brazil: Xenophoridae, Zyptraeioidea, mitriforms and Terebridae (Caenogastropoda). *Zoosystema* 34 (4): 745-781. <https://doi.org/10.5252/z2012n4a6>
- SIMONE L. R. L. & CUNHA C. M. 2012b. — Taxonomical study on the mollusks collected in Marion-Dufresne (MD55) and other expeditions to SE Brazil: the Fissurellidae (Mollusca, Vetigastropoda). *Zootaxa* 3835 (4): 437-468. <https://doi.org/10.11646/zootaxa.3835.4.2>
- SIMONE L. R. L. & CUNHA C. M. 2014. — Taxonomical study on the mollusks collected in Marion-Dufresne (MD55) and other expeditions to SE Brazil: the Fissurellidae (Mollusca, Vetigastropoda). *Zootaxa* 3835 (4): 437-468. <https://doi.org/10.11646/zootaxa.3835.4.2>
- TAVARES M. 1999. — The cruise of the *Marion Dufresne* off the Brazilian coast: account of the scientific results and list of stations. *Zoosystema* 21 (4): 597-605.
- TAYLOR J. D., KANTOR Y. I. & SYSOEV A. V. 1993. — Foregut anatomy, feeding mechanisms, relationships and classification of Conoidea (Gastropoda). *Bulletin of the British Museum* 59: 125-170.
- VAUGHT K. C. 1989. — *A Classification of Living Mollusca*. American Malacologists Inc. Melbourne, Florida, 187 p.
- VERRILL A. E. 1884. — Second catalogue of Mollusca, recently added to the fauna of New-England coast and adjacent parts of the Atlantic, consisting mostly of deep-sea species, with notes on others previously recorded. *Transactions of the Connecticut Academy of Arts and Sciences* 6 (1): 139-294. <https://doi.org/10.5962/bhl.part.7412>

Submitted on 14 March 2022;
accepted on 22 July 2022;
published on 13 December 2022.