

**Contribution to the knowledge of the Muricidae (Gastropoda)  
collected during Belgian explorations in Papua New Guinea  
with the description of a new muricopsine species**

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**ABSTRACT** A new muricid species assigned to the genus *Favartia* is described from Madang Province in Papua New Guinea and is compared with similar-looking species from the Indo-West Pacific. The Muricidae species, excluding Coralliophilinae, collected during several Belgian explorations in Papua New Guinea is listed in the appendix.

**KEY WORDS** Papua New Guinea, Madang Province, Muricidae, list, *Favartia madangensis*

## INTRODUCTION

Laing Island is situated in the middle of Hansa Bay, in the western part of the Bismarck Sea, off the north coast of Papua New Guinea (4°10' 30" S and 144°52' 47" E) (Figure 1). The island is a low coral formation 850 m long and maximum 150 m wide and is the only emerged portion of a reef string aligned along a north-south axis in Hansa Bay.

A laboratory, the King Leopold III Biological Station, associated with the Free University of Brussels (Université Libre de Bruxelles - ULB), was built on the island in 1975.

The Leopold III Fund was created in 1972 to promote the exploration of nature and, in particular, to contribute to the conservation of fauna and flora. The Fund made a major contribution to the creation and functioning of this permanent biological station on Laing Island. It supported its operation until 1995 when it was closed (in part from Claereboudt *et al.* 1989).

Eighty-four muricid species, now deposited in the collections of the Royal Belgian Institute of Natural Sciences (RBINS), collected by the members operating from the biological station, have been identified (see Appendix), including one species new to science that is described in this paper. The coralliophilines have not yet been studied.

Unless otherwise stated, all the material mentioned here is deposited in the collection of the RBINS.

The new species described below is compared with a few similar species, especially two closely resembling taxa described by D'Attilio & Bertsch (1980). Both, *F. judithae* D'Attilio & Bertsch 1980 and *F. pelepili* D'Attilio & Bertsch 1980 are similar in size and form, but their spine ornamentation is invariably different. *F. judithae* having shorter, narrow, adapically bent varical spines while they are usually longer, less frondose, less upward bent and bifurcated at their distal end in *F. pelepili*. These differences have been illustrated, subsequent to the original publication, by drawings using a camera lucida

by D'Attilio (1987) and are also illustrated here with photos.

## ABBREVIATIONS

*Terminology used to describe the spiral cords and the apertural denticles (after Merle 2001 and 2005) (Figure 3E). Terminology in parentheses: variable feature.*

Convex part of teleoconch whorl and siphonal canal:

**ab**: abapical (or abapertural); **abis**: abapical infrasutural secondary cord (on subsutural ramp); **ad**: adapical (or adapertural); **adis**: adapical infrasutural secondary cord (on subsutural ramp); **ADP**: adapertural primary cord on the siphonal canal; **IP**: infrasutural primary cord (primary cord on subsutural ramp); **MP**: median primary cord on the siphonal canal; **P**: primary cord; **P1**: shoulder cord; **P2–P6**: primary cords of the convex part of the teleoconch whorl; **s**: secondary cord; **s1–s6**: secondary cords of the convex part of the

teleoconch whorl (example: s1 = secondary cord between P1 and P2; s2 = secondary cord between P2 and P3, etc.).

Aperture:

**D1 to D5**: abapical denticles; **ID**: Infrasutural denticle.

### *Other abbreviations.*

ad: adult shell

juv: juvenile shell

lv: live collected specimen

## DEPOSITORIES

RBINS: Royal Belgian Institute of Natural Sciences, Brussels, Belgium.

MNHN: Muséum national d'Histoire naturelle, Paris, France.

RH: Roland Houart, private research collection of the author, Landen, Belgium.

SDNHM: San Diego Natural History Museum, California, U.S.A.

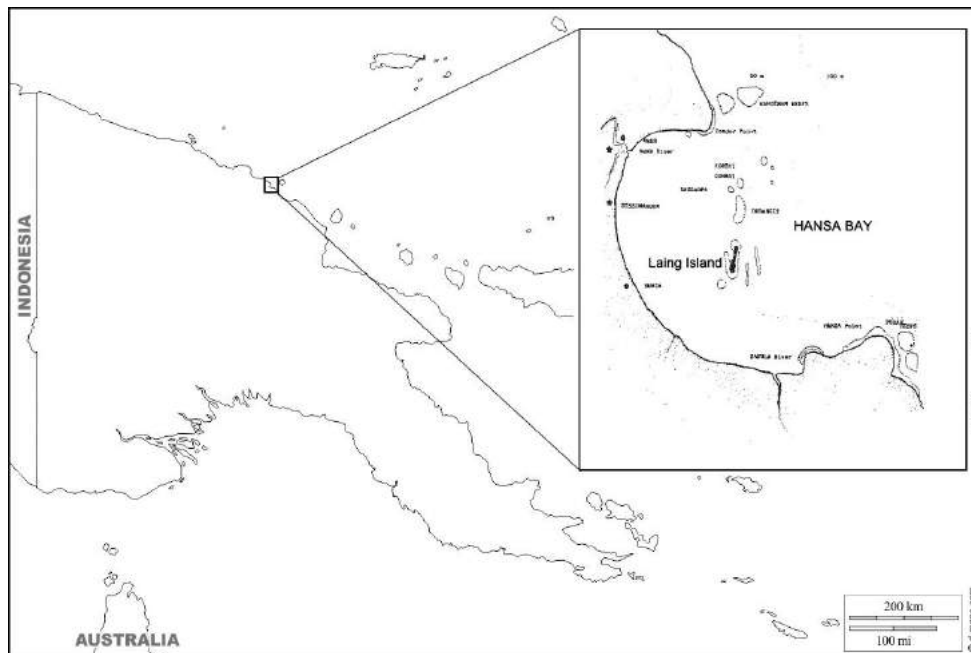


Figure 1. Map of Papua New Guinea and Laing Island Reef Complex (in part from Claereboudt *et al.* 1989).

## MATERIALS AND METHODS

**Material.** The material studied consists of the muricids collected by scientists of the RBINS and the ULB operating from the King Leopold III Biological Station in Hansa Bay, Madang Province, Papua New Guinea from 1975 to 1995.

Other material of the new species described here originates from the personal research collection of the author and from MNHN. A single, juvenile specimen was collected alive during the "Our Planet Reviewed" Papua Niugini expedition conducted by the MNHN with Pro Natura International and IRD in Papua New Guinea, from October 4 to December 26, 2012 during an intensive study of the Madang region. Another single, adult, empty shell was collected during the Santo 2006 expedition conducted by MNHN with Pro Natura International and IRD from August to December 2006 on the island of Espiritu Santo, in the Vanuatu archipelago.

Specimens of wet preserved material in RBINS were anesthetized in 3-5% MgCl<sub>2</sub> or MgSO<sub>4</sub> and fixed with  $\pm$ 4% buffered formalin (pH  $\pm$ 8) for several months. Upon arrival in RBINS, specimens were rinsed in water and transferred to  $\pm$ 70% ether-denaturated buffered ethanol for permanent storage.

MNHN material from Papua Niugini was processed in the field specifically for molecular analysis and was microwaved to separate the animal from the shell. Tissue clips of foot tissue were preserved in 95-98% ethanol.

**Morphological analysis.** The characters used to describe shell morphology address the general aspect of the shell, its shape, size, and colour, the shape of the spire including the number and features of the protoconch and teleoconch

whorls, details of the suture and of the subsutural ramp, details of axial and spiral sculpture, the aperture, the siphonal canal, and the characters of the operculum.

The method used to determine diameter and height, and to count the number of protoconch whorls, follows Bouchet & Kantor (2004) as shown in Figure 2. Unless otherwise indicated, species description is based on the holotype and the paratypes. The bathymetric ranges given herein are the inner values of the recorded depths: the deepest minimum and the shallowest maximum (Bouchet *et al.* 2008).

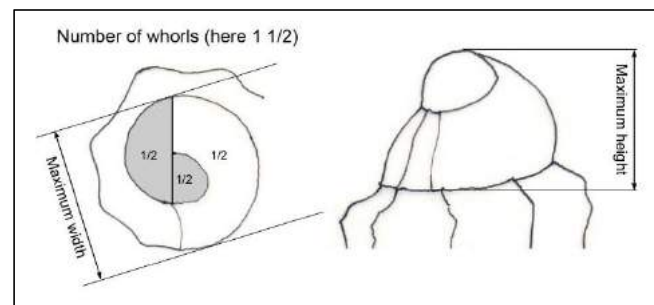


Figure 2. Measurements of the protoconch (scale bars: 500  $\mu$ m).

## SYSTEMATICS

Family	Muricidae Rafinesque, 1815
Subfamily	Muricopsinae Radwin & D'Attilio, 1971
Genus	<i>Favartia</i> Jousseau, 1880
Type	<i>Murex breviculus</i> Sowerby, 1834, Indo-West Pacific. (type species by original designation)

*Favartia madangensis* Houart, new species  
(Figure 3A–M)

**Description.** Shell medium-sized for the genus, up to 27.2 mm in length at maturity. Length/width ratio 1.4-1.6. Biconical, broadly ovate, lightly built, strongly spinose, squamous. Subsutural ramp broad, weakly sloping and concave.

Shell uniformly light tan or light brown. Spire high with 1.5 protoconch whorls and teleoconch up to 6 broad, convex, strongly shouldered, spinose whorls. Suture impressed, partially obscured by P3 spiral cord of previous whorl in adult specimens. Protoconch small, whorls rounded, smooth. Maximum width 650-700  $\mu\text{m}$ , height 600  $\mu\text{m}$ . Terminal lip shallow, thin, weakly curved, orthocline or weakly opisthocline. Axial sculpture of teleoconch whorl consisting of high, narrow, frondose varices; each varix with 6 short or moderately long, frondose, narrow primary spines. Shoulder spine longest. Other axial sculpture of low, narrow, almost indistinct growth lamellae. First and second teleoconch whorls with 5-9 varices, third and fourth with 5-8, penultimate 5-7, last whorl with 5 or 6 varices. Spiral sculpture of high, strong, rounded, narrow, squamous primary cords, weakly decreasing in strength abapically, topped with low, narrow, threads. First teleoconch whorl with visible P1 and P2; third to penultimate whorls with visible adis, IP, abis, P1, P2 and upper part of P3 covering suture of whorls. Last whorl with adis, IP, abis, P1, s1, P2, s2, P3, s3, P4, s4, P5, s5, P6, s6 on convex part of whorl and ADP, MP on siphonal canal. P1-P5 primary cords and spines weakly decreasing in strength abapically; P6 spine shorter and narrower. ADP and MP of same strength as P1-P5, extending as short broad, bifurcated spines. Aperture moderately large, roundly ovate. Columellar lip narrow, smooth, partially erect, a small portion adherent adapically, with weak, low parietal tooth at adapical extremity. Anal notch shallow, broad. Outer lip erect, with numerous, weak, low, narrow lirae within, corresponding to split ID, D1-D5. Siphonal canal moderately long, broad, straight, tapered adapically, dorsally recurved at tip, narrowly open, with 2 frondose ADP and MP spines. Operculum light brown, ovate, with apical nucleus in lower right. Radula unknown.

**Type material.** Papua New Guinea, Madang Province, Nagada, N of Madang, North Wongat Reef, 25 m, coral sand, stn 61, holotype RBINS I.G.26086/MT.3863, 1 lv, ad (wet), and 4 paratypes RBINS I.G.26086/MT.3864, 4 lv, juv (wet); Wongat, Mililat (11 km north of Madang), 17.5 m, on sandy bottom with Halimeda, stn 41, 1 paratype RBINS I.G.26080/MT.3865, 1 lv, ad (wet); Mililat Harbour (11 km north of Madang), small reef, 23 m, on sandy mud, stn 46, 1 paratype RBINS I.G.26080/MT.3866, 1 lv, ad (wet); Nagada, N of Madang, Natawan Reef, 25 m, sand-coral-algae, stn 50, 1 paratype RBINS I.G.26086/MT.3867, 1 lv, ad (wet); Hansa Bay, Laing Island, 1978, 2 paratypes RH, lv, ad, (dry); Madang Harbor, dredged 9 m, off small island, 1983, 1 paratype RH, lv, juv, (dry). Papua Niugini, Papua New Guinea, Madang Province, Astrolabe Bay, 05°11,8'S, 145°48,8'E, 11/11/2012, 7-15 m, stn PB12, paratype MNHN-IM-2013-11756, 1 lv, juv (wet).

**Type locality.** Papua New Guinea, Madang Province, Nagada, north of Madang, North Wongat Reef, 25 m, coral sand.

**Other material examined.** Papua New Guinea, Madang Province, Nagada, N of Madang, Tab Island, 25 m, dredge, muddy sand, stn 4, RBINS I.G.26086/INV.131208, 1 lv, juv (wet); Nagada, N of Madang, Wongat reef, 30 m, muddy sand, 30 m, 02.11.1979, stn 11, RBINS I.G.26086/INV.99281, 2 lv, ad (dry); Mililat (11 km north of Madang), 22 m, on sandy bottom, 1979, stn 38A, RBINS I.G.26080/ INV.99278, 1 lv, juv (dry); Mililat (11 km north of Madang), small reef, 22.5 m, on sandy mud, 1979, stn 40A, RBINS I.G.26080/ INV.99279, 1 lv, juv (dry); Mililat Harbour (11 km north of Madang), small reef, 25 m, on sandy mud, 1979, stn 45A, RBINS I.G.26080/ INV.99280, 1 lv, juv (dry); Mililat Harbour (11 km north of Madang), small reef, 23 m, on sandy mud, 1979, stn 46, RBINS I.G.26080/ INV.99277, 1 lv, ad (dry); Nagada,

N of Madang, Wongat Reef, 20 m, muddy sand, sponges, stn 57, RBINS I.G.26086/ INV.131211, 2 lv, juv, (wet); Nagada, N of Madang, North Wongat Reef, 25 m, coral sand, stn 63, RBINS I.G.26086/ INV.131212, 3 lv, juv (wet); Nagada, N of Madang, North Wongat Reef, 25 m, coral sand, stn 65, RBINS I.G.26086/ INV.131209, 1 lv, ad (wet). Santo 2006, Vanuatu, Espiritu Santo Island, 15°35' S, 167°14' E, 15/10/2006, 10-51 m, stn EP35, MNHN-IM-2012-11498, 1 dd, ad.

**Distribution.** Papua New Guinea, Madang Province, and Vanuatu, Espiritu Island, living at 9-30 m.

**Remarks.** *Favartia madangensis* n. sp., *F. pelepili* (D'Attilio & Bertsch, 1980) and *F. judithae* (D'Attilio & Bertsch, 1980) are three species, which morphologically are very similar, but whose shell differs by one or more very specific features, common to all the examined specimens. The geographic distribution of *F. pelepili* and *F. judithae* is Indo-West Pacific with a predominance for the Philippines, but they have not yet been reported from Papua New Guinea. However, *F. madangensis* n. sp. (MNHN-IM-2012-11498), and two juvenile specimens of *F. pelepili* (MNHN-IM-2012-1440 and MNHN-IM-2012-1552) were recorded in Vanuatu during Santo 2006 expedition.

*Favartia pelepili* (Figures 4A–H) differs from *F. madangensis* n. sp. in having the frondose spines obviously bifurcated at their extremity (Figure 4H) as opposed to usually shorter and not or very weakly bifurcated spines in *F. madangensis* n. sp. (Figure 3L). *F. pelepili* also has a less elongate shell with a comparatively lower spire, a broader shell and a single ADP spine on the siphonal canal, strongly bifurcated at its extremity compared to a higher spire and comparatively narrower shell in *F. madangensis*

n. sp. and two obvious ADP and MP spines on the siphonal canal and non-bifurcated spines. Length/width ratio, spines included, is of 1.2-1.4 in *F. pelepili* as opposed to 1.4-1.6 in *F. madangensis* n. sp.

*Favartia judithae* (Figures 4I-L; 5A-C) differs from *F. madangensis* n. sp. in having narrower, less elaborate and narrower varical spines. *F. madangensis* n. sp. also has a more elongate shell with two obvious ADP and MP spines on the siphonal canal while *F. judithae* has only one ADP spine, as does *F. pelepili*. Finally, the protoconch of *F. judithae* is also different, consisting of 2.5 narrow, globose whorls as illustrated by Myers & D'Attilio (1986), here reproduced in Figure 4K, rather than 1.5 rounded whorls in *F. madangensis* n. sp. (Figure 3M).

*Favartia balteata* (Sowerby II, 1841) (Figures 5D-F), also living around and off Papua New Guinea, differs from *F. madangensis* n. sp. in having a broader, heavier, less elongate shell with narrower primary cords, less frondose and narrower spines and more widely spaced P2 and P3 cords with an obvious s2 cord between them. It also has a comparatively shorter siphonal canal with narrower and shorter ADP and MP spines.

*Favartia cirrosa* (Hinds, 1844) (Figures 5G-I), living in the same area as *F. pelepili* and *F. judithae* and, to my knowledge, also not recorded in Papua New Guinea, is different in having a usually smaller and broader shell with a lower spire, a narrower and less sloping subsutural ramp, close-set, similarly sized P1-P6 primary spiral cords, while these are more widely spaced and the P6 cord and spine being strongly reduced in *F. madangensis* n. sp. The siphonal canal of *F. cirrosa* also bears only a single, broad, bifurcated MP spine, as opposed

to two obvious, broad ADP and MP spines in *F. madangensis* n. sp.

*Favartia voorwindei* Ponder, 1972 (Figures 5J-L), is close to *F. cirrosa* but rounder and also differing from it in having a less shouldered shell and a smaller, narrower protoconch with a different terminal lip. This species differs from *F. madangensis* n. sp. by the same characters as those which differentiate *F. cirrosa* from the latter.

*Favartia morisakii* Kuroda & Habe, 1961 (Figures 5M-O), from Japan, differs in having a smaller shell with a lower spire and a shorter siphonal canal. The primary spiral cords are narrower, more widely spaced, giving rise to short, narrow, not bifurcated spines. These cords are separated by narrow but quite obvious secondary cords rather than very narrow ones, or absent, in *F. madangensis* n. sp.

**Etymology.** *F. madangensis*: All the specimens from RBINS have been collected in the Madang Province, on the northern coast of Papua New Guinea.

## DISCUSSION

Surprisingly, no species of Aspellinae, Triterotyphinae or Typhinae, some of them usually occurring at the same depth as the other material, *i.e.* from the shoreline to approximately 40 – 45 m deep, were discovered in the examined lots.

A new *Dermomurex* species (Aspellinae) was recently described by Houart (2015) from the same area, in 22 m, during the Papua Niugini expedition, but no specimens assigned to Triterotyphinae and shallow-water Typhinae were collected during the shallow water sampling of this expedition either. That could

mean the absence or poverty of these subfamilies in the shallow waters of the Madang region.

The muricid collection of the Madang Province in the RBINS is highly representative of the shallow water muricid biodiversity of the region.

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**APPENDIX** Muricidae collected in Hansa Bay, Papua New Guinea, now housed in the Royal Belgian Institute of Natural Sciences, listed in their assigned subfamily.<sup>1</sup>

### Subfamily ERGALATAXINAE

*Cytharomorula benedicta* (Melvill & Standen, 1895)  
*Drupella cornus* (Röding, 1798)  
*Drupella fragum* (Blainville, 1832)  
*Drupella margariticola* (Broderip, 1833)  
*Drupella rugosa* (Born, 1778)  
*Lataxiena blosvillei* (Deshayes, 1832)  
*Maculotriron serriale* (Deshayes, 1834)  
*Morula (Habromorula) biconica* (Blainville, 1832)  
*Morula (Habromorula) lepida* (Houart, 1995)  
*Morula (Habromorula) striata* (Pease, 1868)  
*Morula (Morula) nodicostata* (Pease, 1868)  
*Morula (Morula) parva* (Reeve, 1845)  
*Morula (Morula) uva* (Röding, 1798)  
*Murichorda fiscella* (Gmelin, 1791)  
*Muricodruga anaxares* (Kiener, 1836)  
*Muricodruga fenestrata* (Blainville, 1832)  
*Orania badia* (Reeve, 1845)  
*Orania fischeriana* (Tapparone Canefri, 1882)  
*Orania gaskelli* (Melvill, 1891)  
*Orania nodosa* (Hombron & Jacquinot, 1841)  
*Orania pleurotomoides* (Reeve, 1845)  
*Pascula darrosensis* (E.A. Smith, 1884)  
*Pascula muricata* (Reeve, 1846)  
*Pascula ochrostoma* (Blainville, 1832)  
*Pascula ozeneanna* (Crosse, 1861)  
*Phyllocoma convoluta* (Broderip, 1833)  
*Spinidrupa euracantha* (A. Adams, 1853)  
*Tenguella ericius* Houart, Puillandre & Zuccon, 2019  
*Tenguella granulata* (Duclos, 1831)  
*Tenguella musiva* (Kiener, 1835)

### Subfamily MURICINAE

*Attiliosa nodulifera* (Sowerby, 1841)  
*Chicomurex laciniatus* (Sowerby, 1841)  
*Chicomurex turschi* (Houart, 1981)  
*Chicoreus (Chicoreus) ramosus* (Linnaeus, 1758)  
*Chicoreus (Triplex) axicornis* (Lamarck, 1822)  
*Chicoreus (Triplex) banksii* (Sowerby II, 1841)  
*Chicoreus (Triplex) brunneus* (Link, 1807)  
*Chicoreus (Triplex) microphyllus* (Lamarck, 1822)  
*Chicoreus (Triplex) nobilis* Shikama, 1977  
*Chicoreus (Triplex) rossiteri* (Crosse, 1872)  
*Chicoreus (Triplex) torrefactus* (Sowerby, 1841)  
*Haustellum haustellum* (Linnaeus, 1758)  
*Murex (Murex) pecten* Lightfoot, 1786

*Murex (Murex) salomonensis* Parth, 1994  
*Murex (Murex) tenuirostrum* Lamarck, 1822  
*Murex (Murex) ternispina* Lamarck, 1822  
*Naquetia cumingii* (A. Adams, 1853)  
*Naquetia triqueter* (Born, 1778)  
*Pterynotus (Pteryarchia) barclayanus* (H. Adams, 1873)  
*Pterynotus (Pteryarchia) bipinnatus* (Reeve, 1845)  
*Pterynotus (Pteryarchia) martinianus* (Röding, 1798)  
*Pterynotus (Pteryarchia) tripterus* (Born, 1778)  
*Pterynotus (Pterynotus) elongatus* (Lightfoot, 1786)  
*Pterynotus (Pterynotus) pinnatus* (Swainson, 1822)  
*Vokesimurex bantamensis* (Martin, 1895)

### Subfamily MURICOPSINAE

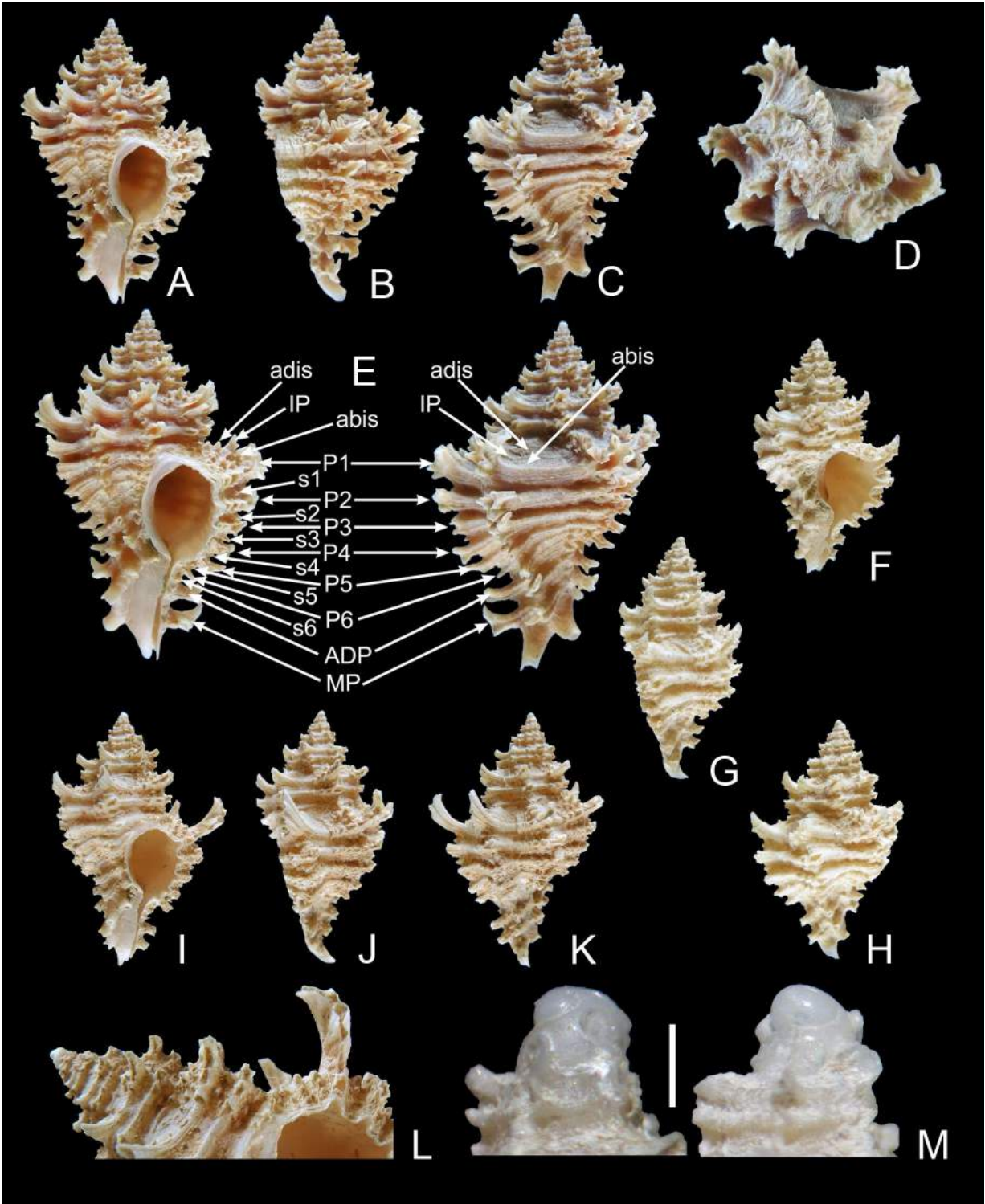
*Favartia madangensis* n. sp.  
*Favartia ponderi* Myers & D'Attilio, 1989  
*Favartia salmonea* (Melvill & Standen, 1899)  
*Favartia sykesi* (Preston, 1904)  
*Homalocantha anatomica* (Perry, 1811)  
*Homalocantha pele* (Pilsbry, 1918)  
*Homalocantha scorpio* (Linnaeus, 1758)  
*Vitularia miliaris* (Gmelin, 1791)

### Subfamily RAPANINAE

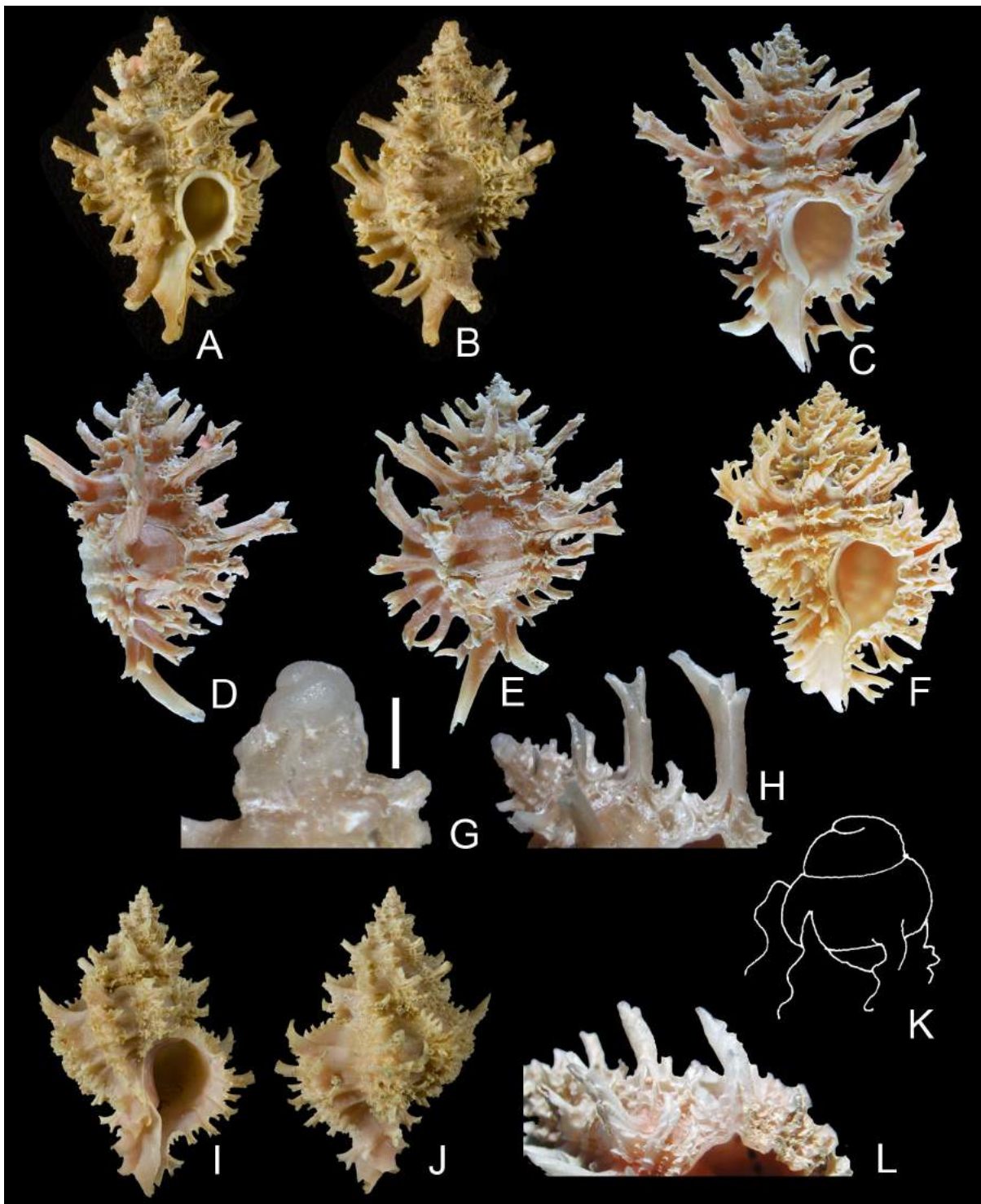
*Drupa albolabris* (Blainville, 1832)  
*Drupa clathrata* (Lamarck, 1816)  
*Drupa morum* Röding, 1798  
*Drupa ricinus* (Linnaeus, 1758)  
*Drupa rubusidaeus* Röding, 1798  
*Drupina grossularia* (Röding, 1798)  
*Mancinella alouina* (Röding, 1798)  
*Mancinella armigera* Link, 1807  
*Mancinella echinulata* (Lamarck, 1822)  
*Menathais intermedia* (Kiener, 1836)  
*Menathais tuberosa* (Röding, 1798)  
*Nassa sarta* (Bruguère, 1789)  
*Neothais marginatra* (Blainville, 1832)  
*Purpura persica* (Linnaeus, 1758)  
*Semiricinula konkanensis* (Melvill, 1893)  
*Semiricinula muricoides* (Blainville, 1832)  
*Semiricinula squamosa* (Pease, 1868)  
*Semiricinula turbinoides* (Blainville, 1832)  
*Taurasia striata* (Blainville, 1832)  
*Tylothais aculeata* (Deshayes, 1844)  
*Tylothais virgata* (Dillwyn, 1817)

<sup>1</sup> *Attiliosa*, *Homalocantha*, *Pterynotus*, *Pteryarchia* and *Vitularia* did not show clear relationships with any of the subfamilial clades in Barco *et al.* (2010). They are assigned here to their subfamily following Molluscabase (2019) awaiting additional analysis.



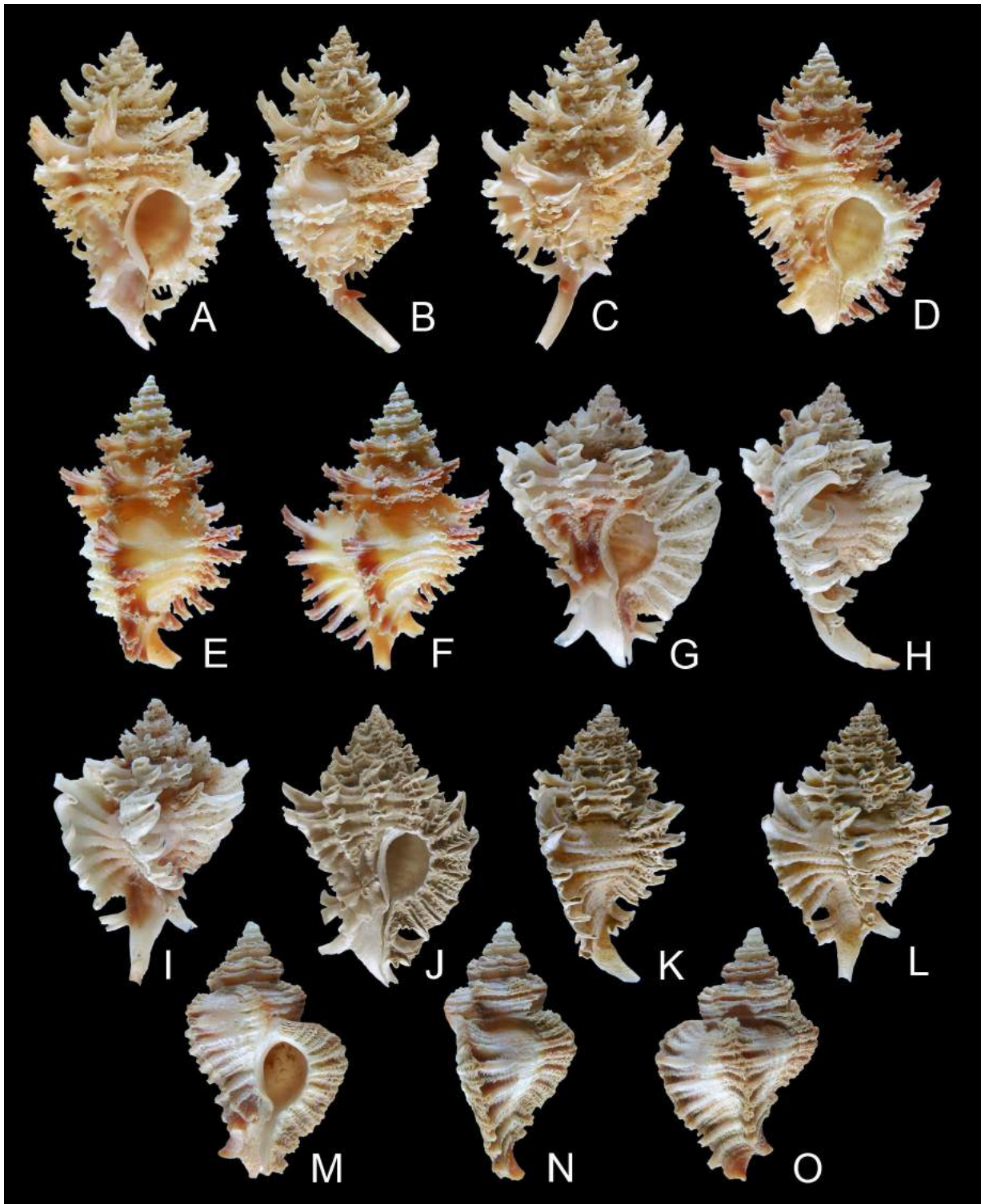


**Figure 3.** A–M. *Favartia madangensis* n. sp. A–E = Holotype IRSNB I.G.26086/MT.3863, 20.7 mm; F–H = Paratype IRSNB I.G.26086/MT.3864, 14.9 mm; I–L = Paratype IRSNB I.G.26086/MT.3867, 17.1 mm.



**Figure 4.** (scale bar 500  $\mu$ m) **A–H.** *Favartia pelepili* D'Attilio & Bertsch, 1980. **A–B** = Philippines, Bohol Straits, approximately 10°20' N, 124° E, holotype SDNHM T.S. 519, 33 mm (photo SDNHM); **C–D, H** = Philippines, Cebu, RH, 33.9 mm; **G** = Protoconch, Philippines, Cebu, RH. **I–L.** *Favartia judithae* D'Attilio & Bertsch, 1980. **I–J** = Philippines, Bohol Straits, between Cebu and Bohol Islands., approximately 10°20' N, 124° E, holotype SDNHM T.S. 521, 25 mm (photo SDNHM); **K** = Protoconch (reproduced from Myers & D'Attilio, 1986); **L** = Philippines, Mindanao, RH.





**Figure 5.** (scale bar 500  $\mu$ m) **A–C** = *Favartia judithae* D'Attilio & Bertsch, 1980, Philippines, Bohol Island, RH, 24 mm; **D–F** = *Favartia balteata* (Sowerby II, 1841), Philippines, Balut Island, RH, 20.6 mm; **G–I** = *Favartia cirrosa* (Hinds, 1844), Philippines, Bohol Straits, Mactan Island, RH, 18.2 mm; **J–L** = *Favartia voorwindeii* Ponder, 1972, New Caledonia, Thios, RH, 15.8 mm; **M–O** = *Favartia morisakii* Kuroda & Habe, 1961, Japan, Shizuoka, RH, 13.8 mm.