

Diversity of Coralliophilinae (Mollusca, Neogastropoda, Muricidae) at Austral Islands (South Pacific)

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ABSTRACT

The Coralliophilinae is a large subfamily of Muricidae, including 200-250 species that feed exclusively on anthozoans. The material collected during the expeditions BENTHAUS and RAPA 2002 at Austral Islands are reviewed. Twenty-eight species are recorded, one species is described as new, *Coralliophila australis* n. sp., diagnosed by its large size and elongated shape. All but one species showed a planktotrophic development, 10 species (36%) were from shallow waters and 15 species (54%) from deep waters. The smaller proportion of deep water coralliophiline species (compared to the range and average on a global scale) in this marginal area of the Pacific, suggests that marginality may affect the deep water faunas more than the shallow water ones.

KEY WORDS

Mollusca,
Neogastropoda,
Coralliophilinae,
South West Pacific,
Austral Islands,
new species.

RÉSUMÉ

Diversité des Coralliophilinae (Mollusca, Neogastropoda, Muricidae) des Îles Australes (Pacifique sud).

Les Coralliophilinae sont une grande sous-famille de Muricidae, comprenant 200-250 espèces se nourrissant exclusivement d'anthozoaires. Le matériel récolté durant les expéditions BENTHAUS et RAPA 2002 aux Îles Australes est révisé. Vingt-huit espèces sont mentionnées dont une nouvelle, *Coralliophila australis* n. sp., qui se caractérise par sa grande taille et sa forme allongée. Toutes les espèces sauf une possèdent un développement planctotrophique, 10 espèces (36 %) proviennent d'eaux peu profondes et 15 espèces (54 %) d'eaux profondes. La proportion plus petite d'espèces de Coralliophilinae d'eaux profondes (comparée aux intervalles et à la moyenne à l'échelle globale) dans cette zone marginale du Pacifique, suggère que la marginalité peut affecter de manière plus importante les faunes d'eaux profondes que celles d'eaux peu profondes.

MOTS CLÉS

Mollusca,
Neogastropoda,
Coralliophilinae,
Pacifique sud-ouest,
Îles Australes,
espèce nouvelle.

INTRODUCTION

Coralliophilinae is a subfamily of Muricidae distributed worldwide in temperate and tropical oceans. The approximately 200-250 described species are associated with anthozoan cnidarians (Alcyonacea, Gorgonacea, Antipatharia, Actiniaria, Corallimorpharia, Scleractinia, Zoantharia), from intertidal habitat down to over 1000 m depth. Based on a compilation of available data (M. Oliverio unpublished) Coralliophilinae display a significant radiation in the deep water, since 70-85% of Recent species live in deep water habitat. By “deep habitat” in the tropical Indo-West Pacific I consider those deeper than 100-150 m, the lower limit for the hermatypic scleractinians, where the latter become outcompeted for space occupation by Alcyonacea, Stylasterids and Porifera.

Oliverio (2008b) has recently revised the Coralliophilinae from the SW Pacific, based on samples from an area close to the high diversity core of the Indo-West Pacific. The possibility to study coralliophiline materials from marginal areas of the Pacific becomes thus of high relevance after such revision. The latter work in fact, on the one hand yielded several new species and records for the Pacific fauna, and on the other hand raised questions on the biogeographic patterns of this group, which successfully radiated in the deep waters. How do the biodiversity patterns vary in a group of mostly ectoparasitic gastropods, in comparisons with other groups (e.g., predators, herbivores, etc.)? Are there evidence of biogeographic marginality in this group? Is there any bathymetric pattern in this group? The present revision, along with a similar one on materials from the Marquesas (Oliverio 2008a) is aimed at providing the faunistic data for a better understanding of the biogeography of these ecto- and endobiotic corallivorous gastropods at the margins of the Indo-West Pacific (see Benton & Spencer 1995).

MATERIAL AND METHODS

This study is based mostly on the material collected during two of the expeditions that were part of the concerted research programme “Fauna and Flora

of Rapa”: the BENTHAUS deep water sampling campaign onboard RV *Alis* (lead by B. Richer de Forges, IRD), and the “RAPA 2002” land based workshop (lead by P. Lozouet, MNHN).

The BENTHAUS campaign sampled a total of 159 stations (including seven traps), in an area included between 17°25'S-29°S latitude and 140°14.07'W-152°50'W longitude, and in a depth range of 40-1800 m. Of these, a total of 45 stations, in an area included between 22°24.8'S-27°55'S latitude and 143°28.5'W-152°50'W longitude, and in a depth range of 40-1800 m, yielded 101 coralliophiline specimens. The “RAPA 2002” workshop (Lozouet *et al.* 2004, 2005) sampled a total of 99 stations around Rapa Island, between high tide mark and 52 m depth. A total of nine stations yielded 15 coralliophiline specimens (Fig. 1).

A total of 27 species have been identified and are listed in the Systematics section; one species is described as new to science. Supraspecific taxonomy in Coralliophilinae has been traditionally based nearly exclusively on shell morphology. The first attempts to draw a phylogenetic framework for the coralliophiline systematics (Oliverio & Mariottini 2001; Oliverio *et al.* 2002) addressed the need for a deep re-examination by refined morphology and molecular markers, which will likely render present systematics highly unstable. Therefore, a conservative approach is herein adopted, including the species in eight genera, conceived as in the “traditional” taxonomy (i.e. Kosuge & Suzuki 1985; Tsuchiya 2000; Oliverio 2008a, b): *Coralliphila* H. Adams & A. Adams, 1853, *Rhizochilus* De Gregorio, 1885, *Babelomurex* Coen, 1922, *Hirtomurex* Coen, 1922, *Magilus* Montfort, 1810, *Leptoconchus* Ruppell, 1834, and *Rapa* Bruguière, 1792. The protoconch of six species is illustrated with SEM picture for the first time. When more than one sample was available for a species, the depth range is given as internal range, which is the range within which the species has certainly been collected (compared to the external range, which is the range where the species may have been collected). Comparative reference is made to Oliverio (2008a, b) for distributional and ecological data, or taxonomical notes. Tables 1 and 2 sum up the biogeographical data and protoconch dimensions.

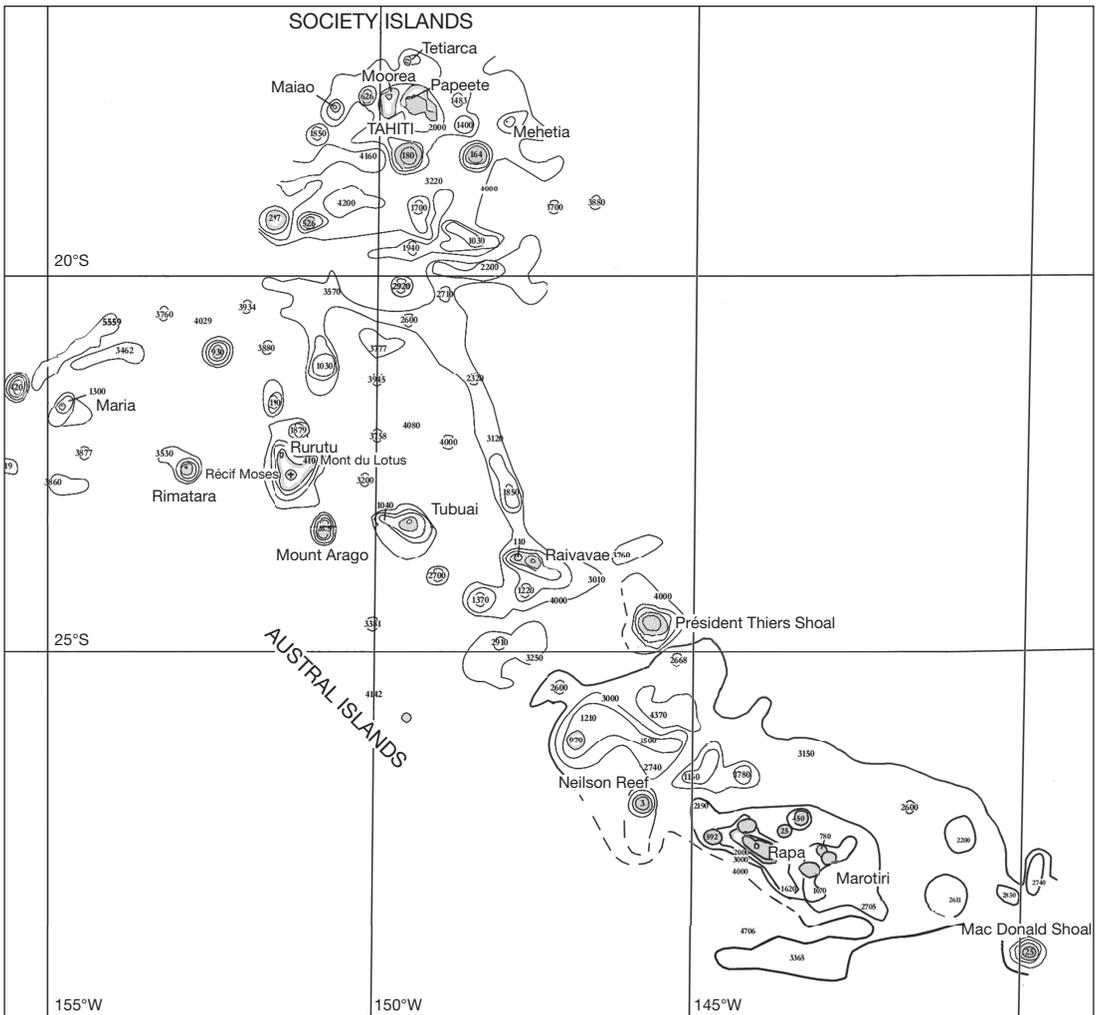


FIG. 1. — Study area: the BENTHAUS expedition (RV Alis, November 2002) left and returned in Tahiti; the RAPA 2002 workshop was entirely carried out on Rapa Is.

ABBREVIATIONS

- | | | | |
|------|---|------|--|
| dd | empty shell(s); | LACM | Los Angeles County Museum of Natural History, Los Angeles; |
| lv | live collected specimen(s); | MHNG | Muséum d'Histoire naturelle, Geneva; |
| AIM | Auckland Institute and Museum, Auckland; | MNHN | Muséum national d'Histoire naturelle, Paris; |
| AMNH | American Museum of Natural History, New York; | MZB | Museum of Zoology, University of Bologna; |
| BAU | Department of Animal and Human Biology, "La Sapienza" University, Rome; | NM | Natal Museum, Pietermaritzburg; |
| BMNH | Natural History Museum, London; | TA | Toba Aquarium, Toba; |
| IMT | Institute of Malacology, Tokyo; | USNM | National Museum of Natural History, Smithsonian Institution, Washington, DC; |
| IRD | Institut de Recherche pour le Développement (formerly ORSTOM), Nouméa; | ZMA | Zoological Museum, Amsterdam; |
| KPM | Kanagawa Prefectural Museum, Yokohama; | ZMB | Museum of Natural History, Humboldt University, Berlin; |
| | | ZMUC | Zoological Museum University of Copenhagen. |

TABLE 1. — Summary of the species of Coralliophilinae from Austral Islands included in the present revision. Biogeographical data (distribution, longitudinal and latitudinal ranges) integrate data from the present work and from the literature (see text). Depth ranges are internal ranges (see Introduction; †, based on empty shells only; #, deep records considered due to drift). Habitats are classified as **D** (deep water) and **S** (shallow water) if the depth range of the species is centered below or above 150 m, respectively; ?, undefined.

Species	Distribution	Longitudinal range	Latitudinal Range	Depth Range	Habitat
<i>Coralliophila costularis</i> (Lamarck, 1816)	Indo-West Pacific	34°E-147°W	27°N-30°S	93-120 † #	S
<i>Coralliophila latilirata</i> Rehder, 1985	South-Pacific	159°W-130°W	14°S-25°S	15-25 † #	S
<i>Coralliophila australis</i> n. sp.	Austral Islands	151°W-143°W	22°S-28°S	5-23 † #	S
<i>Coralliophila erosa</i> (Röding, 1798)	Indo-West Pacific	34°E-146°W	35°N-24°S	50-90	S
<i>Coralliophila monodonta</i> (Blainville, 1832)	Indo-Pacific	30°E-80°W	30°N-40°S	40-50 #	S
<i>Coralliophila fimbriata</i> (A. Adams, 1854)	Indo-West Pacific	40°E-140°W	31°N-24°S	93-920 #	S
<i>Coralliophila mitraeforma</i> Kosuge, 1985	West Pacific	128°E-147°W	32°N-24°S	120-280	D
<i>Coralliophila pulchella</i> (A. Adams, 1854)	Indo-West Pacific	30°E-152°W	34°N-30°S	920-930 †	?
<i>Coralliophila suduirauti</i> Smriglio & Mariottini, 2003	Indo-West Pacific	120°E-147°W	10°N-23°S	100-200	D
<i>Coralliophila</i> sp. A	Austral Islands	150°W	23°S	350-401	D
<i>Coralliophila</i> sp. B	Austral Islands	143°W	27°S	112-121 †	?
<i>Coralliophila</i> sp. C	Austral Islands	147°W	23°S	950 † #	?
<i>Rhizochilus antipathum</i> Steenstrup, 1850	West Pacific	135°E-150°W	34°N-33°S	100-107	D
<i>Babelomurex</i> sp. B cf. <i>B. yamatoensis</i> (Kosuge, 1986)	Austral Islands	150°W	23°S	200-640 †	D
<i>Babelomurex diadema</i> (A. Adams, 1854)	West Pacific	120°E-151°W	35°N-30°S	250-302 †	D
<i>Babelomurex santacruzensis</i> Kosuge, 1980	West Pacific	144°W-90°W	0°-27°S	600-900 †	D
<i>Babelomurex wormaldi</i> (Powell, 1971)	West Pacific	125°E-146°W	15°N-35°S	302-500 †	D
<i>Babelomurex sibogae</i> (Shepman, 1911)	Indo-West Pacific	19°E-146°W	1°N-24°S	350-489 †	D
<i>Babelomurex kawanishii</i> (Kosuge, 1979)	West Pacific	115°E-149°W	33°N-24°S	558-1000 †	D
<i>Babelomurex</i> cf. <i>B. miyokoeae</i> Kosuge, 1985	Austral Islands	151°W	144°W	456 †	D
<i>Babelomurex</i> cf. <i>B. mediopacificus</i> (Kosuge, 1979)	West Pacific	171°W-144°W	25°N-27°S	580-700 †	D
<i>Babelomurex fusiformis</i> (Martens, 1902)	Indo-West Pacific	30°E-151°W	5°S-24°S	270-500 †	D
<i>Hirtomurex filiaregis</i> (Kurohara, 1959)	West Pacific	125°E-150°W	33°N-23°S	200-350 †	D
<i>Hirtomurex taranui</i> Marshall & Oliverio, 2009	West Pacific	131°E-144°W	33°N-27°S	600-900 †	D
<i>Leptoconchus</i> sp. (spp.?) <i>peronii</i> group	Indo-West Pacific	?	?	120-100 †	S
<i>Leptoconchus lamarckii</i> Deshayes, 1863	Indo-West Pacific	56°E-144°W	25°N-27°S	5-15 † #	S
<i>Rapa</i> sp. cf. <i>incurva</i> (Dunker, 1852)	West Pacific	146°W	24°S	50-90 †	S
<i>Magilus antiquus</i> (Montfort, 1810)	Indo-West Pacific	55°E-140°W	31°N-27°S	3-24 † #	S
Total = 28 species				lv: 50-401 dd: 3-1000	10 S 15 D 3 ?

The material examined is housed in the MNHN, unless otherwise stated.

SYSTEMATICS

Order NEOGASTROPODA Wenz, 1938
 Superfamily MURICOIDEA Rafinesque, 1815
 Family MURICIDAE Rafinesque, 1815
 Subfamily CORALLIOPHILINAE Chenu, 1859

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

Coralliophila H. Adams & A. Adams, 1853: 135.

Coralliobia H. Adams & A. Adams, 1853: 138. Type species (by monotypy): *Concholepas (Coralliobia) fimbriata* A. Adams, 1854; Recent, Indo-West Pacific.

Galeropsis Hupé, 1860: 125 (type species by monotypy: *G. lavenayanus* Hupé, 1860; Lower Miocene, France).

Pseudomurex Monterosato, 1872: 15 (type species by original designation: *Murex meyenendorffii* Calcara, 1845; Recent, Northeastern Atlantic).

Quoyula Iredale, 1912: 221 (type species by original designation: *Purpura monodonta* Blainville, 1832; Recent, Indo-Pacific).

Rhombothais Woolacot, 1954: 38 (type species by original designation: *Rhombothais arbutum* Woolacot, 1954 Recent, Australia).

TABLE 2. — Summary of the species of Coralliophilinae from Austral Islands included in the present revision. Protoconch dimensions (height and width) are based on the present material; protoconch whorl number and larval development (P, planktotrophic; NP, non-planktotrophic; ?, unknown) integrate data from the present work and from the literature (see text).

Species	Whorl number	Height (µm)	Width (µm)	Development
<i>Coralliophila costularis</i> (Lamarck, 1816)	4.3	710	590	P
<i>Coralliophila latilirata</i> Rehder, 1985	c. 3	700+	720	P
<i>Coralliophila australis</i> n. sp.	3.6	750	720	P
<i>Coralliophila erosa</i> (Röding, 1798)	3.3	—	—	P
<i>Coralliophila monodonta</i> (Blainville, 1832)	3.8-4	—	—	P
<i>Coralliophila fimbriata</i> (A. Adams, 1854)	3.2	—	—	P
<i>Coralliophila mitraeforma</i> Kosuge, 1985	2.5	—	—	P
<i>Coralliophila pulchella</i> (A. Adams, 1854)	2.5	—	—	P
<i>Coralliophila suduirauti</i> Smriglio & Mariottini, 2003	—	—	—	NP
<i>Coralliophila</i> sp. A	2.6+	700+	750	P
<i>Coralliophila</i> sp. B	1.8	—	—	P
<i>Coralliophila</i> sp. C	2.8	—	—	P
<i>Rhizochilus antipathum</i> Steenstrup, 1850	3.2-3.3	—	—	P
<i>Babelomurex</i> sp. B cf. <i>B. yamatoensis</i> (Kosuge, 1986)	—	—	—	P
<i>Babelomurex diadema</i> (A. Adams, 1854)	1.7	550	625	P
<i>Babelomurex santacruzensis</i> Kosuge, 1980	2.6	—	—	P
<i>Babelomurex wormaldi</i> (Powell, 1971)	2.8	635	700	P
<i>Babelomurex sibogae</i> (Shepman, 1911)	3.3	710	680	P
<i>Babelomurex kawanishii</i> (Kosuge, 1979)	2.8	—	—	P
<i>Babelomurex</i> cf. <i>B. miyokoeae</i> Kosuge, 1985	2+	700+	710	P
<i>Babelomurex</i> cf. <i>B. mediopacificus</i> (Kosuge, 1979)	—	—	—	P
<i>Babelomurex fusiformis</i> (Martens, 1902)	2	—	—	P
<i>Hirtomurex filiaregis</i> (Kurohara, 1959)	2.8	625	800	P
<i>Hirtomurex taranui</i> Marshall & Oliverio, 2009	3	—	—	P
<i>Leptoconchus</i> sp. (spp.?) <i>peronii</i> group	—	—	—	P
<i>Leptoconchus lamarckii</i> Deshayes, 1863	—	—	—	P
<i>Rapa</i> sp. cf. <i>R. incurva</i> (Dunker, 1852)	—	—	—	P
<i>Magilus antiquus</i> (Montfort, 1810)	—	—	—	?
Total = 28 species	1.8-4.3	550 750	590 800	26 P 1 NP 1 ?

Reliquiaecava Massin, 1987: 81 (type species by original designation: *Leptoconchus robillardii* Liénard, 1870. Recent, Indo-Pacific).

TYPE SPECIES. — *Fusus neritoideus* Lamarck, 1816 (= *Purpura violacea* Kiener, 1836), by subsequent designation (Iredale 1912).

REMARKS

The genus *Coralliophila* is here used in a wide sense (*Coralliophila* s.l.), including species traditionally ascribed to it (Kosuge & Suzuki 1985; Tsuchiya 2000). However, I warn here that there is strong molecular evidence that *Coralliophila* as traditionally conceived is clearly polyphyletic (Oliverio & Mariottini 2001; Oliverio *et al.* 2002; Oliverio

et al. 2009). Therefore, the concept of the genus and also the list of synonymies for *Coralliophila* are destined to be deeply revised in a phylogenetic framework.

Coralliophila costularis (Lamarck, 1816) (Figs 2A-C; 12B)

Murex costularis Lamarck, 1816: pl. 419, figs 8a, b.

Coralliophila retusa H. Adams & A. Adams, 1863: 432.

TYPE MATERIAL. — *Murex costularis*: 2 specimens (the probable holotype MHNG 1099/60/1, 34.0 mm, and a specimen that is probably not a type, 1099/60/2, 26.4 mm: see Oliverio 2008b).

Coralliophila retusa: holotype, BMNH 1984094 (figured by Kosuge & Suzuki [1985: pl. 37, fig. 3] and Higo *et al.* [2001: 65, fig. G2386]).

TYPE LOCALITY. — *Murex costularis*: not designated. Locality indicated on its box reads “Oc. Indien”.
Coralliophila retusa: unknown.

MATERIAL EXAMINED. — The type material and: BENTHAUS, stn DW 2013, Rimatara Is., 22°38.6'S, 152°49.7'W, 80-93 m, 1 juv dd (Fig. 2C). — Stn DW 1948, Banc Lotus, 23°48.7'S, 147°43.5'W, 120-280 m, 1 dd (Fig. 2A, B).

DISTRIBUTION. — Indo-Pacific, intertidal and subtidal (Cernohorsky 1978). Indian Ocean, from the Red Sea southward to South Africa (Kosuge & Meyer 1999) and the tropical and subtropical zone, including Eastern Arabia “among corals” (Bosch *et al.* 1995). Western Pacific Ocean, intertidal to 20 m depth associated with scleractinians (Tsuchiya 2000). From the New Caledonia area and Fiji, alive in 12-40 m (Oliverio 2008b). Austral Islands, two empty shells in 93-120 m, probably drifted from shallower waters.

REMARKS

Coralliophila costularis is a common shallow water species throughout its Indo-West Pacific range. The present record is based on a single adult empty shell and a single juvenile, both dredged in deep waters. The protoconch of the juvenile was available for SEM (Fig. 12B), and showed 4.3 whorls, 590 µm high and 710 µm wide at the base. Protoconch I of one whorl, apparently smooth. Protoconch II of about 3 ¼ whorls, with two weak spiral keels (the abapical starting on the second protoconch whorl, the adapical starting on the third), sculptured by a series of subsutural threads and a series of opisthocline threads over each keel. A diffuse granulation is present in the interspaces. *Coralliophila mira* (Cotton & Godfrey, 1932) from southern Australia is very similar although relationships should be tested by genetic data.

Coralliophila latilirata Rehder, 1985 (Fig. 3A-C)

Coralliophila latilirata Rehder, 1985: 97-100.

TYPE MATERIAL. — Holotype (USNM 731531, Fig. 3B, C). Paratypes: type locality 1 dd (USNM 731831); 1 dd (USNM 789442); 3 dd (USNM 731765). — Cook

Islands, fragments (USNM 732270); fragments of at least two specimens (USNM 732262). — Society Islands, 1 dd (USNM 668779). — Tuamotu Islands, 3 dd (USNM 697685); 1 dd (USNM 697956); 1 dd (USNM 698743); 1 dd (USNM 725347); 1 dd (USNM 789879); 5 dd (USNM 845460). — Tuamotu, Anaa, beached, Jean Tröndlé coll., La Force, 3 paratypes (Rehder 1985: 97-100). — Austral Islands, fragments from at least two specimens (USNM 732217); 1 dd (USNM 732294).

TYPE LOCALITY. — Oeno, Pitcairn Islands (“lagoon, northshore, in 1-6 ft. [0.3-1.8 m] on hard bottom”, Rehder 1985: 99).

MATERIAL EXAMINED. — The type material. Particularly, two paratype lots from Austral Islands: USNM 732217, including fragments of at least two specimens (i.e. two of the fragments with the apical whorls) from the gut content of the fish *Coris aygula* speared at a depth of 25-30 m [80-100 ft] off the fringing reef on the N coast of Rurutu, stn w-203 [22°26'S, 151°20'W approx. coordinates]; USNM 732294, 1 dd, on top of reef in 15 m [50 ft], off the barrier reef on the N coast of Tubuai, stn w-200 [23°19'S 149°29'W approx. coordinates] (Fig. 3A). Rimatara Is., BENTHAUS, stn DW 2015, 22°38.2'S, 152°49.5'W, 250-280 m, 1 juv dd. — Banc Président Thiers, stn DW 1932, 24°40.8'S, 146°01.5'W, 500-800 m, 1 dd. — Banc Président Thiers, stn DW 1926, 24°38.2'S, 146°00.8'W, 50-90 m, 1 dd 1 juv dd. — East coast of Rurutu, stn DW 2005, 22°28.1'S, 151°18.3'W, 680-1800 m, 1 dd. — Stn DW 1977, Banc Arago, 23°22.3'S, 150°43.5'W, 90-95 m, 1 juv dd (with protoconch). Tuamotu, Anaa, beached, J. Tröndlé coll., La Force, 9 dd, 1 juv dd.

DISTRIBUTION. — Southern Cooks, western Austral Islands, Society Islands, Tuamotu, and Pitcairn Group, “alive under and near corals” in 12-17 m [40-55 ft] (Rehder 1985: 99), empty shells from Austral Islands in 15-25 m (paratypes) and 90-680 m (BENTHAUS).

REMARKS

The protoconch (tip missing) of a juvenile from Anaa (Tuamotu, J. Tröndlé coll., La Force) is of 2.8+ whorls, 700+ µm high and 720 µm wide at the base, with 2 equally strong spiral keels, sculptured by a series of subsutural prosocline threads and a series of similar threads over each keel. General shape, approximate number of whorls (*c.* 3) and size are confirmed by the examination of the eroded protoconch in the juvenile shell from Banc Arago (BENTHAUS stn DW 1977).

Only during the BENTHAUS dredging, were specimens of this shallow water species recovered.

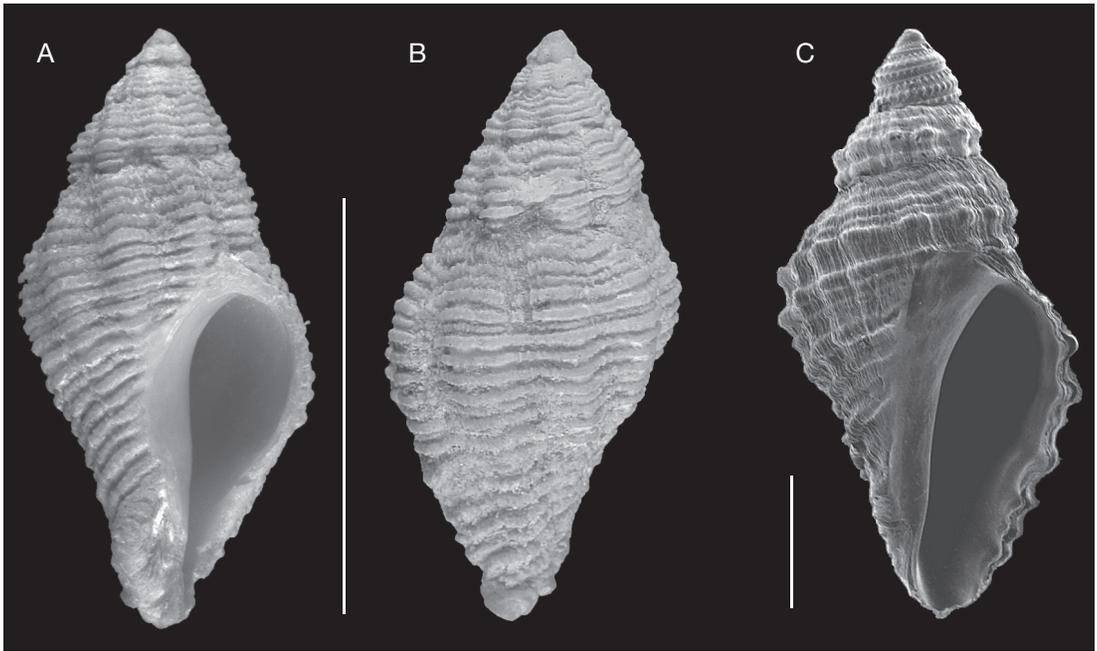


FIG. 2. — *Coralliophila costularis* (Lamarck, 1816): **A, B**, Banc Lotus, BENTHAUS, stn DW 1948, 23°48.7'S, 147°43.5'W, 120-280 m; **C**, Rimatarā Is., BENTHAUS, stn DW 2013, 22°38.6'S, 152°49.7'W, 80-93 m. Scale bars: A, B, 10 mm; C, 1 mm.

I have also examined the type material and can confirm the morphological homogeneity of the entire type series, including the paratypes from western Austral Islands. The records of *C. latilirata* from Austral Islands are congruent with the hypothesized range (Rehder 1985: 98, fig. 4) centered in French Polynesia, yet excluding Rapa, in the southernmost Austral Islands. It is a shallow water species, thus the deepest records (BENTHAUS) are likely due to drift from shallower habitat.

Coralliophila australis n. sp.
(Figs 3D-H; 12A)

TYPE MATERIAL. — Holotype: Rapa Is., East of Tupuaki Bay, ATELIER RAPA 2002, stn 21, 27°34.2'S, 144°20.6'W, 5 m, dd crabbed (MNHN 20965; Fig. 3D, E).

Paratypes: West of Rapa, BENTHAUS, stn DW 1894, 27°40.1'S, 144°21.5'W, 100 m, 1 dd (MNHN 20966). — Marotiri Is., stn DW 1879, 27°55'S, 143°30.1'W, 52 m, 3 dd (Fig. 3F, G), 1 juv dd (MNHN 20967; Fig. 3H). — SE of Tautourou Is., ATELIER RAPA 2002, stn 12,

27°40.5'S, 144°16.7'W, 52 m 1 dd (MNHN 20968).

TYPE LOCALITY. — Rapa Is., East of Tupuaki Bay, 27°34.2'S, 144°20.6'W, 5 m.

OTHER MATERIAL EXAMINED. — Banc Président Thiers, BENTHAUS, stn DW 1927, 24°39'S, 146°01.6'W, 95-105 m, 1 juv dd. — Rurutu (Avera), stn DW 1996, 22°29.1'S, 151°21.9'W, 489-1050 m, 1 dd. — Banc Président Thiers, stn DW 1926, 24°38.2'S, 146°00.8'W, 50-90 m, 1 juv dd.

Pointe Komire, ATELIER RAPA 2002, stn 3, 27°34'S, 144°19.7'W, 21 m, 1 dd. — Off Ahurei Bay, stn 6, 27°36.8'S, 144°16.7'W, 42 m, 2 dd. — NE of Pointe Komire, stn 26, 27°33.0'S, 144°19.1'W, 53 m, 1 dd. — Vavai, stn 32, 27°35.0-35.8'S, 144°22.7-23.0'W, 15-20 m, 1 dd.

DESCRIPTION. — Shell of medium size for the genus, 37.5 mm high, 22 mm wide, fusiform with rounded shoulder, thick. Protoconch missing in the holotype.

DISTRIBUTION. — *Coralliophila australis* n. sp. is known only on empty shells from Austral Islands, in 5-489 m (5-53 m ATELIER RAPA 2002; 52-489 m BENTHAUS).

DESCRIPTION

Teleoconch of 5+ whorls (tips missing in the holotype). Spire high, conical, with convex sides, suture incised. Last whorl about $\frac{2}{3}$ of total height, curved at periphery, moderately constricted at base. Aperture long, oval, tapering anteriorly. Outer lip crenulated on exterior, smooth internally. Inner lip gently arcuate posteriorly, straight anteriorly, callous. Siphonal canal long, broadly open; umbilical area wide, with twisted, imbricate fasciole, umbilical chink narrow and short.

Teleoconch spiral sculpture of irregularly alternating major cords and minor cordlets. A total of 14 cords and 7 cordlets on last teleoconch whorl; 7 cords and 4 cordlets visible above aperture. Cords and cordlets covered by imbricate scaly spines. Axial sculpture of 8 broad prosocline ribs on the last whorl (10 on the preceding ones), fading out over base.

Shell ground colour ivory-white, inside of aperture bright pink-lilac.

REMARKS

The protoconch of a juvenile paratype is of 3.6 whorls (Fig. 12A), 750 μm high and 720 μm wide at the base. Protoconch I of 1 whorl, with traces of pustules. Protoconch II of 2.6 whorls, with 2 weak spiral keels, sculptured by a series of subsutural prosocline threads and a series of similar threads over each keel. A diffuse granulation is present in the interspaces.

Coralliophila australis n. sp. is similar to several species of the (probably monophyletic) group of *C. violacea* (Kiener, 1836). The spiral sculpture of broad cords is very similar to that of *C. latilirata* Rehder 1985; *C. australis* n. sp. differs being more elongated and attaining a larger size. The juveniles are very similar to juveniles of *C. bulbiformis* (Conrad, 1837) which has not been found at Austral Islands.

A specimen of *C. australis* n. sp. has been figured by Salvat & Rives (1975: 310, fig. 190 as *C. costularis*) supposedly from Fatu Hiva Is. (Marquesas), where in a recent revision based on extensive sampling (Oliverio 2008a), I have not found it.

Coralliophila erosa (Röding, 1798)

(Fig. 4A, B)

Cantharus erosus Röding, 1798: 133.*Pyrula abbreviata* Lamarck, 1816: 8, pl. 436.*Murex plicatus* Wood, 1818: 124, pl. 26, fig. 56a.*Pyrula deformis* Lamarck, 1822: 146.*Rapana fragilis* A. Adams, 1854: 98.*Trichotropis dorbignyanum* Petit de la Saussaye, 1851: 261, pl. 7, fig. 2.*Rapana suturalis* A. Adams, 1854: 98.*Rapana coralliophila* A. Adams, 1854: 98.*Rhizochilus exaratus* Pease, 1861: 399.*Coralliophila stearnsiana* Dall, 1919: 339.*Coralliophila groschi* Kilburn, 1977: 190, figs 19, 20.TYPE MATERIAL. — *Cantharus erosus*: repository unknown.*Pyrula abbreviata*: 2 possible syntypes, 36.0 mm (MHNG 1098/69/1); 37.9 mm (MHNG 1098/69/2).*Murex plicatus*: repository unknown.*Pyrula deformis*: holotype (MHNG 1098/71).*Rapana fragilis*: holotype (BMNH 1984100; figured by Kosuge & Suzuki [1985: pl. 38, fig. 8]).*Trichotropis dorbignyanum*: probable holotype (MNHN; figured by Kosuge & Suzuki [1985: pl. 38, figs 3, 4]).*Rapana suturalis*: syntype (BMNH 1984113; figured by Kosuge & Suzuki [1985: pl. 38 figs 5, 6]).*Rapana coralliophila*: syntype (BMNH 1984111; figured by Kosuge & Suzuki [1985: pl. 46, fig. 6]).*Rhizochilus exaratus*: lectotype (BMNH 1961177; figured by Kay [1965: pl. 4, figs 19-21] and by Kosuge & Suzuki [1985: pl. 38, fig. 7, "ex Kay 1965"]); 2 paralectotypes (BMNH 1961178, selected by Kay [1965]).*Coralliophila stearnsiana*: holotype (USNM 46377; figured by Kosuge & Suzuki [1985: pl. 38, fig. 11]).*Coralliophila groschi*: holotype (NM H382-T2047; figured by Kosuge & Suzuki [1985: pl. 38, fig. 9]).TYPE LOCALITY. — *Cantharus erosus*: not designated.*Pyrula abbreviata*: not indicated.*Murex plicatus*: "East Indies".*Pyrula deformis*: unknown.*Rapana fragilis*: Philippines.*Trichotropis dorbignyanum*: "Taiti" on the probable holotype's label (MNHN), "Océan Pacifique, M. Bernardi" (Petit de la Saussaye 1851).*Rapana suturalis*: Bulusan, Province of Albay, Luzon, Philippines.

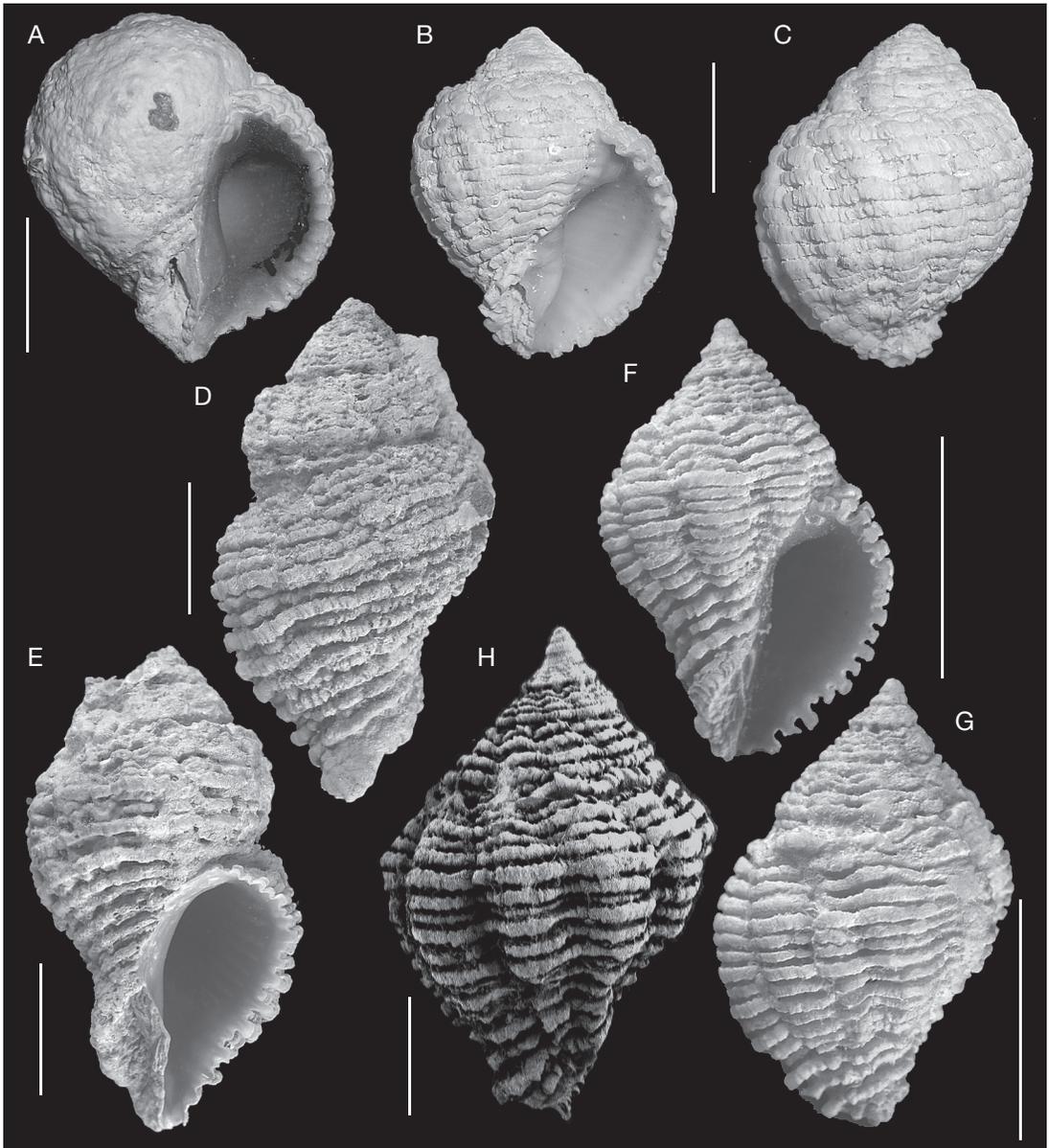


FIG. 3. — **A-C**, *Coralliophila latilirata* Rehder, 1985; **A**, paratype (USNM 732294), on top of reef in 15 m, off the barrier reef on the N coast of Tubuai [23°19'S, 149°29'W approx. coordinates]; **B, C**, holotype (USNM 731531), Oeno, Pitcairn Islands; **D-H**, *C. australis* n. sp.; **D, E**, holotype (MNHN 20965), East of Tupuaki Bay, ATELIER RAPA 2002, stn 21, 27°34.2'S, 144°20.6'W, 5 m; **F, G**, paratype (MNHN 20967), Marotiri Is., BENTHAUS, stn DW 1879, 27°55'S, 143°30.1'W, 52 m; **H**, paratype (MNHN 20967), Marotiri Is., BENTHAUS, stn DW 1879, 27°55'S, 143°30.1'W, 52 m. Scale bars: A-E, 10 mm; F, G, 5 mm; H, 2 mm.

Rapana coralliophila: Isle of Ticao, on reefs at low water.
Rhizochilus exaratus: Hawaiian Islands [Sandwich Is].

Coralliophila stearnsiana: Lower California.
Coralliophila groschi: East of Posto Lunga, Lunga Bay, northern Mozambique.

MATERIAL EXAMINED. — The type material and: BENTHAUS, stn DW 1926, Banc Président Thiers, 24°38.2'S, 146°00.8'W, 50-90 m, 1 lv (Fig. 4A, B).

DISTRIBUTION. — Indo-West Pacific (Kay 1979). From Izu Peninsula (Japan) to tropical Indo-Pacific (Tsuchiya 2000), “intertidal to 20 m, on *Acropora*, *Scleractinia* [sic] and other corals” (Higo *et al.* 2001: 216). Coral Sea, New Caledonia and Loyalty Islands, empty shells intertidal to 57 m (Oliverio 2008b). Austral Islands, living in 50-90 m.

REMARKS

This is a common shallow water species throughout the Indo-Pacific, found mainly on *Acropora*-like corals. The record of a single specimen (dredged by RV *Alis*), notwithstanding the relevant collecting effort by the land based RAPA 2002 workshop, indicates a scarcity of this species.

Coralliophila monodonta (Blainville, 1832) (Fig. 4C, D)

Purpura monodonta Blainville, 1832: 241.

Purpura monodonta Quoy & Gaimard, 1833: 561, pl. 37, figs 9-11.

Purpura madreporarum G. B. Sowerby I, 1834: pl. 237, fig. 12.

Quoyula madreporarium [sic] – Oliver 1915: 537.

Coralliophila madreporara [sic] – Kosuge & Suzuki 1985: 35, pl. 46, fig. 7. — Bosch *et al.* 1995: 125, fig. 501.

Galeropsis madreporarus [sic] – Lozouet & Le Renard 1998: 181, figs 7/4, 5.

Coralliophila madreporaria [sic] – Tsuchiya 2000: 419, pl. 208, fig. 291.

TYPE MATERIAL. — *Purpura monodonta*: lectotype MNHN 0173 (Oliverio 2008b) and 1 paralectotype MNHN 20579.

Purpura madreporarum: 3 possible syntypes (BMNH 1985104).

TYPE LOCALITY. — *Purpura monodonta*: Tonga-Tabou. *Purpura madreporarum*: unknown.

MATERIAL EXAMINED. — The type material and: Banc Arago, BENTHAUS, stn DW 1985, 23°26.3'S, 150°44.2'W, 100-107 m, 1 dd. — Banc Arago, stn

DW 1984, 23°26.4'S, 150°43.9'W, 40 m, 6 lv (Fig. 4C, D). — Banc Président Thiers, stn DW 1926, 24°38.2'S, 146°00.8'W, 50-90 m, 1 sh, 1 lv. — Banc Président Thiers, stn DW 1937, 24°39.8'S, 146°56.4'W, 469-500 m, 1 dd. — Banc Président Thiers, stn DW 1933, 24°40.7'S, 146°01.3'W, 500-850 m, 1 dd. — Recif Neilson, stn DW 1917, 27°03.3'S, 146°03.8'W, 50-60 m, 1 lv. — West of Tauna Is., ATELIER RAPA 2002, stn 16, 27°36.3'S, 144°18.4'W, 5 m, 1 dd.

DISTRIBUTION. — The Red Sea and the Indian Ocean, from East Africa to Indonesia, including Eastern Arabia “in corals” (Bosch *et al.* 1995). Throughout the tropical Pacific Ocean (Cernohorsky 1972), including Hawaii (Kay 1979) and Easter Island (Rehder 1980), extending in the eastern Pacific to the Galapagos Islands (Finet 1994) and the American west coast (Keen 1971). From the New Caledonia area alive in 4-40 m (Oliverio 2008b). Austral Islands, empty shells in 5-500 m, living in 40-50 m.

REMARKS

This is the type species of the genus *Quoyula* Iredale, 1912. It is here conservatively included in *Coralliophila*. The question of the valid name for this species is dealt with by Oliverio (2008b), who established date and authorship for the binomen *Purpura monodonta*. Larval shell characters somewhat variable, protoconch of 3.8-4.0 conical whorls, 650-690 µm high and 700-720 µm wide at the base (Oliverio 2008b). It lives on *Pocillopora*-like corals. Feeding activity was described by Guzmán (1988). Relationships with *Purpura porphyroleuca* Crosse, 1870 (described from “Polynésie” (Crosse 1870): syntype in MNHN 0946, figured by Kosuge & Suzuki 1985: pl. 41 figs 3, 7) need to be ascertained. However, the present material is more concordant with the type material of *Purpura monodonta*.

Coralliophila fimbriata (A. Adams, 1854) (Fig. 4E-I)

Concholepas (*Coralliobia*) *fimbriata* A. Adams, 1854: 93.

Coralliobia cancellata Pease, 1861: 399.

Coralliobia sculptilis Pease, 1865: 513.

Coralliobia smithi Yen, 1942: 226.

Coralliobia densicostata Shikama, 1963: 62, fig. 1.

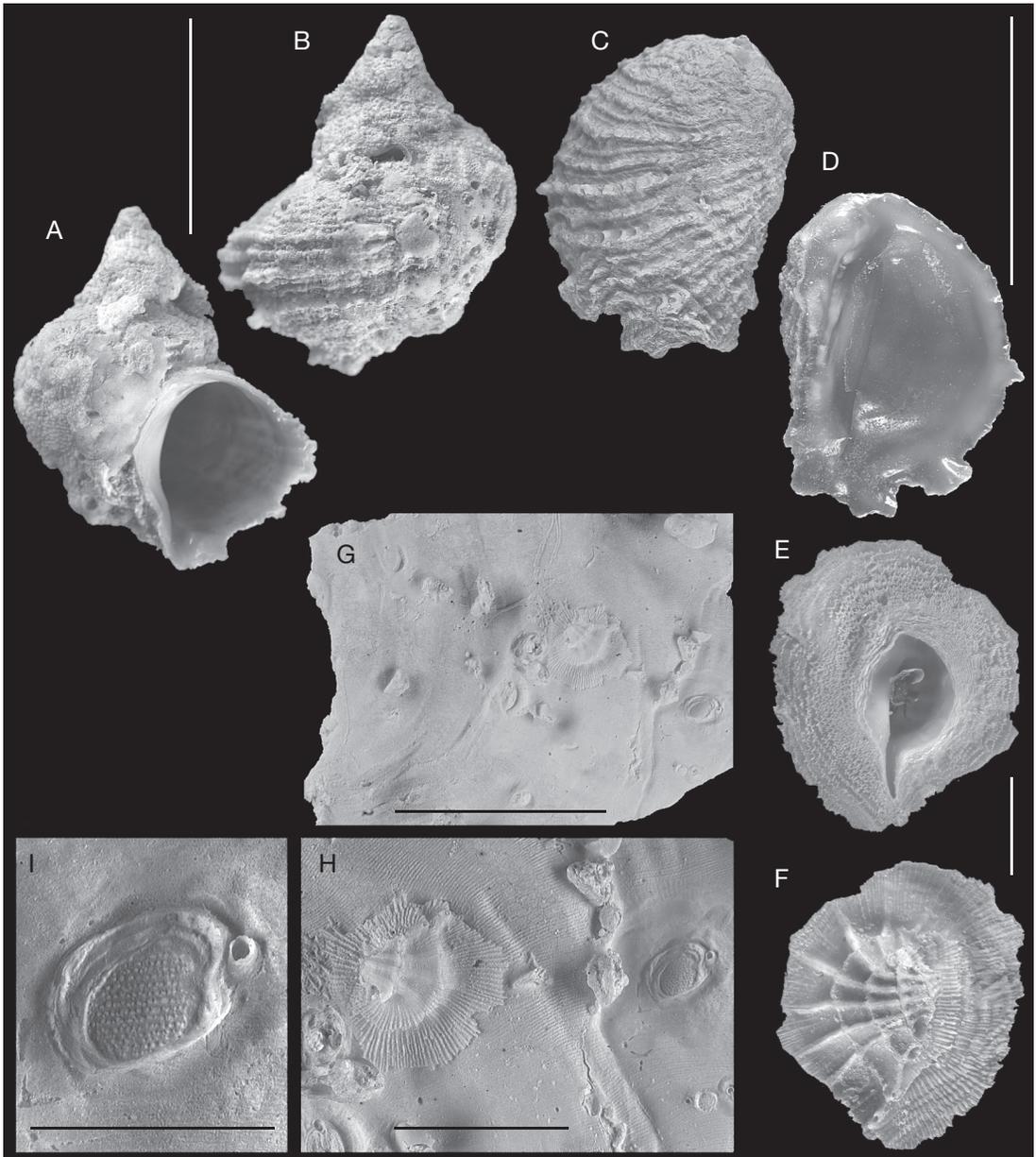


FIG. 4. — **A, B**, *Coralliophila erosa* (Röding, 1798), Banc Président Thiers, BENTHAUS, stn DW 1926, 24°38.2'S, 146°00.8'W, 50–90 m; **C, D**, *C. monodonta* (Blainville, 1832), Banc Arago, BENTHAUS, stn DW 1984, 23°26.4'S, 150°43.9'W, 40 m; **E–I**, *C. fimbriata* (A. Adams, 1854); **E, F**, North of Raivavae Is., BENTHAUS, stn DW 1939, 23°49.7'S, 147°41.6'W, 100 m, (detached from the original coral); **G–I**, Rimatara Is., BENTHAUS stn DW 2013, 22°38.6'S, 152°49.7'W, 80–93 m, 17 dd (arrows point to the mark on the coral skeleton). Scale bars: A–F, H, 10 mm; G, 30 mm; I, 5 mm.

TYPE MATERIAL. — *Concholepas fimbriata*: syntype BMNH 1985103, figured by Kosuge & Suzuki (1985: pl. 48, fig. 8).

Coralliobia cancellata: not found (Kay 1965: 85).

Coralliobia sculptilis: not found (Kay 1965: 86).

Coralliobia smithi: holotype (BMNH 94.4.5.17; figured

by Kosuge & Suzuki [1985: pl 45, fig. 5]).

Coralliobia densicostata: syntype (KPM NG0120043; figured by Kosuge & Suzuki [1985: pl. 45, fig. 6]) and by Higo *et al.* [2001: 66, G2411]).

TYPE LOCALITY. — *Concholepas fimbriata*: Cagayan, Mindanao, Philippines.

Coralliobia cancellata: Hawaiian Islands [Sandwich Islands].

Coralliobia sculptilis: Hawaiian Islands [Sandwich Islands].

Coralliobia smithi: Macclesfied Bank, China Sea.

Coralliobia densicostata: Nase, Amami-Oshima, Japan.

MATERIAL EXAMINED. — The type material of *Concholepas fimbriata* and *Coralliobia smithi* and:

Rurutu, BENTHAUS, stn DW 1997-2001, 22°26'–27'S, 151°20'W, 200-1000 m, 2 dd. — Port of Rurutu, stn DW 2001, 22°26.6'S, 151°20.1'W, 200-550 m, 2 dd. — East coast of Rurutu, stn DW 2003, 22°27.6'S, 151°18.9'W, 250-330 m, 1 dd. — East coast of Rurutu, stn DW 2005, 22°28.1'S, 151°18.3'W, 680-1800 m, 1 dd. — Rimatara Is., stn DW 2012, 22°28.4'S, 152°49.8'W, 270-320 m, 1 dd. — Rurutu (Avera), stn DW 1996, 22°29.1'S, 151°21.9'W, 489-1050 m, 1 dd. — Rimatara Is., stn DW 2020, 22°37'S, 152°49.1'W, 920-930 m, 7 dd. — Rimatara Is., stn DW 2018, 22°37.1'S, 152°49.1'W, 770-771 m, 2 dd. — Rimatara Is., stn DW 2015, 22°38.2'S, 152°49.5'W, 250-280 m, 1 dd. — Rimatara Is., stn DW 2013, 22°38.6'S, 152°49.7'W, 80-93 m, 17 dd (one shell cemented to the coral in position, Fig. 4G-I). — Banc Lotus, stn DW 1947, 23°48.5'S, 147°53.5'W, 120-150 m, 1 dd. — Stn DW 1939, North of Raivavae Is., 23°49.7'S, 147°41.6'W, 100 m, 1 dd, 1 lv (detached from the original coral, Fig. 4E, F).

DISTRIBUTION. — Tropical and subtropical Indo-West Pacific (Kay 1979; Kosuge & Suzuki 1985). New Caledonia, empty shells in 5-487 m, alive in 90-367 m (Oliverio 2008b). Austral Islands, empty shells in 93-920 m, living in 100 m.

REMARKS

This species lives on the underside of corals of the family Agariciidae Gray, 1847, where a characteristic scar is produced by each individual on the coral. They are usually present in clusters of two or more animals, of which at least one is of larger size, surrounded by one to several smaller ones. Investigations are in progress to check if this species also is a protandric hermaphrodite as other coralliophilines (Richters & Luque 2002, 2003), as it would be suggested by the size distribution in the clusters. Each individual uses a small hole in the coral skeleton (Fig. 4G-I) to reach the upper side

of the colony, presumably to feed on the cnidarian tissues. The protoconch of 3.2 whorls, 650 µm high, 620 µm wide at the base, is sculptured with pustules over the embryonic whorl, and with two spiral keels, subsutural prosocline threads and a series of tubercles over each keel on the 2.2 larval whorls. *Coralliophila fimbriata* is the type species of *Coralliobia* H. Adams & A. Adams, 1853. I prefer to keep this species in *Coralliophila* until the systematics of coralliophilines is clarified.

Coralliophila mitraeforma Kosuge, 1985 (Fig. 5A, B)

Coralliophila mitraeforma Kosuge, 1985: 56, pl. 21, figs 1, 2.

TYPE MATERIAL. — Holotype (IMT 85-21; not examined; figured by Higo *et al.* [2001: 66, G2401]).

TYPE LOCALITY. — Mactan, Cebu, Philippines.

MATERIAL EXAMINED. — BENTHAUS, stn DW 1948, Banc Lotus, 23°48.7'S, 147°53.5'W, 120-280 m, 1 lv (Fig. 5A, B).

DISTRIBUTION. — Pacific Ocean, from off Danjo Islands, Western Kiūshū (Higo *et al.* 1999: 217; Tsuchiya 2000), to the Philippines and the New Caledonia area, alive in 245-400 m (Oliverio 2008b). Austral Islands, alive in 120-280 m.

REMARKS

The protoconch, partly eroded, of the single specimen, is concordant in the general aspect with the known protoconchs of this species, indicating a planktotrophic larval development. *C. mitraeforma* is very similar to *C. solutistoma* Kuroda & Shikama, 1966, differentiation relying on its higher ratio total height/apertural height (h/a).

Coralliophila pulchella (A. Adams, 1854) (Fig. 5C, D)

Rapana (Rhizochilus) pulchella A. Adams, 1854: 98.

TYPE MATERIAL. — Syntypes (BMNH 1984112, three figured by Kosuge & Suzuki [1985: pl 40, figs 4, 5] and Higo *et al.* [2001: 66, G2402]).

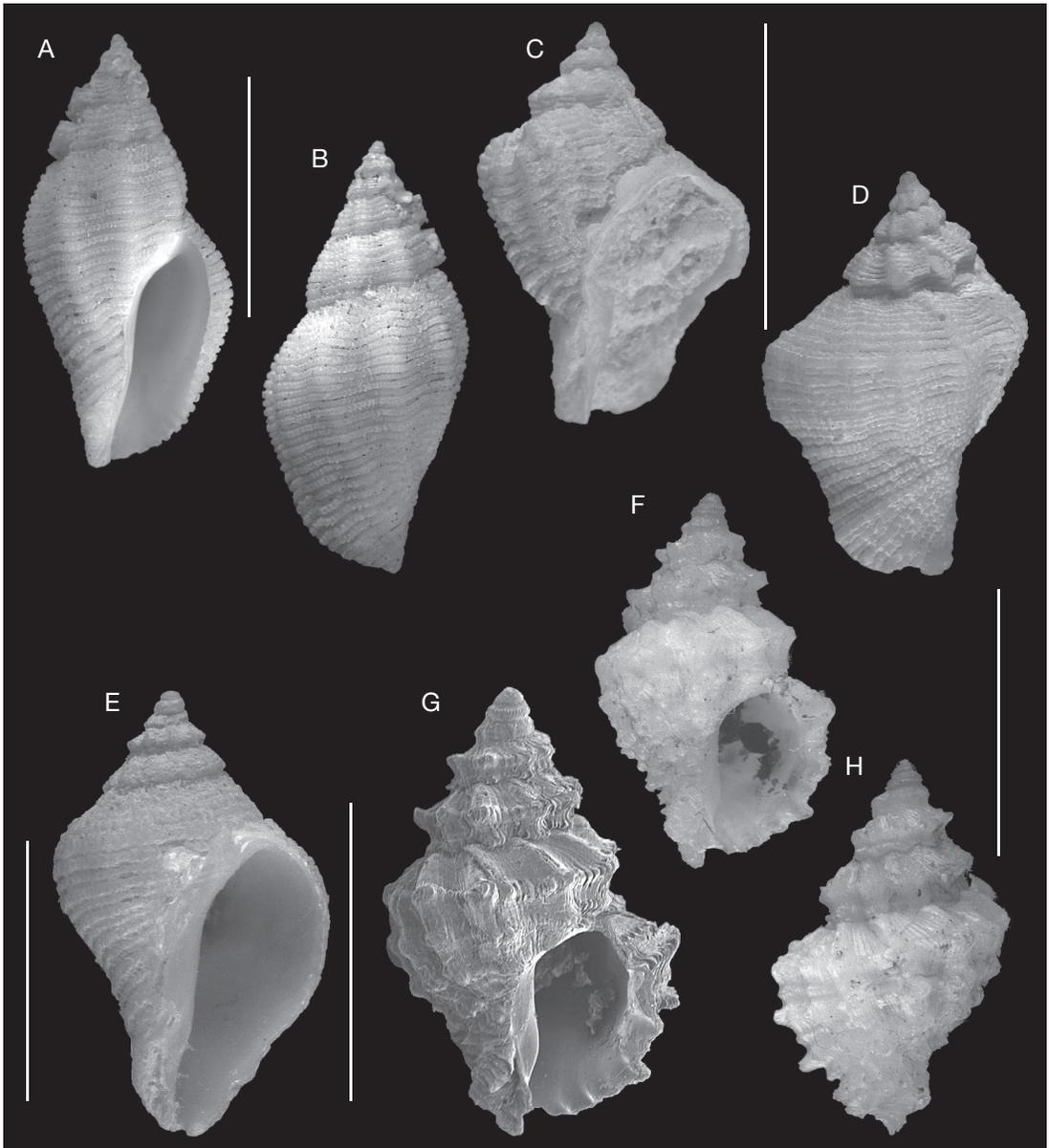


FIG. 5. — **A, B**, *Coralliophila mitraeforma* Kosuge, 1985, Banc Lotus, BENTHAUS, stn DW 1948, 23°48.7'S, 147°53.5'W, 120-280 m; **C, D**, *C. pulchella* (A. Adams, 1854), Rimatara Is., BENTHAUS, stn DW 2020, 22°37'S, 152°49.1'W, 920-930 m; **E**, *C. suduirauti* Smriglio & Mariottini, 2003, Banc Lotus, BENTHAUS, stn DW 1946, 23°49.2'S, 147°41.2'W, 100-200 m; **F-H**, *Coralliophila* sp. A, Banc Arago, BENTHAUS, stn DW 1970, 23°22'S, 150°43.2'W, 350-401 m. Scale bars: A-D, 10 mm; E-H, 5 mm.

TYPE LOCALITY. — Philippines.

920-930 m, 1 dd (Fig. 5C, D).

MATERIAL EXAMINED. — The type material and: Rimatara Is., BENTHAUS, stn DW 2020, 22°37'S, 152°49.1'W,

DISTRIBUTION. — Indian Ocean, from Natal, South Africa (Kosuge & Meyer 1999) and Somalia (Oliverio unpublished).

Pacific Ocean, from Kii Peninsula, Japan, southward to the Philippines (Higo *et al.* 1999), “rocky bottoms or coral reefs 20–50 m” (Tsuchiya 2000). New Caledonia area, alive in 140–152 m (empty shells in 12–433 m; Oliverio 2008b). Austral Islands, one empty shell in 920–930 m.

REMARKS

Coralliophila pulchella is very similar to *Coralliophila carolae* D’Attilio & Myers, 1984, which has been established basing only on subtle features, i.e. a coloured shell and a finer sculpture than *C. pulchella*. The protoconch is multispiral (2.5+ whorls) with two spiral keels, subsutural prosocline threads and oblong tubercles over each keel. The single shell here recorded is quite probably a fossil, drifted downshore from shallower habitat.

Coralliophila suduirauti
Smriglio & Mariottini, 2003
(Fig. 5E)

Coralliophila suduirauti Smriglio & Mariottini, 2003: 49, figs 1–9.

TYPE MATERIAL. — Holotype MZB 42942.

TYPE LOCALITY. — Off Balicasag Island, Philippines.

MATERIAL EXAMINED. — The type material and: Banc Lotus, BENTHAUS, stn DW 1946, 23°49.2’S, 147°41.2’W, 100–200 m, 1 lv (Fig 5E).

DISTRIBUTION. — *Coralliophila suduirauti* was described from the Philippines and was known so far, only from this area and from Vanuatu (one empty shell in 200–260 m; Oliverio 2008b). The present record (1 juvenile living in 100–200 m) extends its range in the SW Pacific Austral Islands.

REMARKS

The single (somehow immature) specimen differs from the type material of *C. suduirauti* Smriglio & Mariottini, 2003 in its more pyriform profile, and the slightly finer sculpture. It is anyway sufficiently similar to be confidently ascribed to this species.

Coralliophila sp. A
(Figs 5F–H; 12C)

MATERIAL EXAMINED. — Banc Arago, BENTHAUS, stn DW 1970, 23°22’S, 150°43.2’W, 350–401 m, 1 lv.

DESCRIPTION

Shell of small size for the genus, 7 mm high, 4 mm wide. Protoconch (partly damaged) of 2.6+ whorls, 700+ µm high and 750 µm wide at the base, covered by pustules. Three series of axial threads, one subsutural, and two on spiral keels.

Teleoconch of 3.7 whorls, spire high, conical, with flat sides, suture incised. Aperture subquad-rangular, siphonal canal open; twisted, imbricate fasciole, umbilical chink narrow and short. Teleoconch spiral sculpture of 4 nodulose spiral keels, one visible above the aperture and on the upper whorls. Axial sculpture of 9 broad ribs, fading out over base. Foliaceous growth scars over the entire teleoconch. Shell ground colour ivory-white.

REMARKS

I have been unable to identify with certainty this shell, which does not seem an immature specimen. It bears some resemblance, in the foliaceous sculpture, to the species ascribed to *Emozamia*, but differs in the higher spire. I await describing a new species pending availability of more material.

Coralliophila sp. B
(Fig. 6A, B)

MATERIAL EXAMINED. — Marotiri Is., BENTHAUS, stn DW 1881, 27°54.6’S, 143°28.5’W, 112–121 m, 1 dd.

DESCRIPTION

Shell of small size for the genus, 8.1 mm high, 5 mm wide. Protoconch abraded of 1.8 whorls, with two spiral keels. Teleoconch of 4.5 turruculated whorls, spire high, conical, with flat sides. Aperture damaged, oval, siphonal canal long, open; twisted, imbricate fasciole, umbilical chink closed. Teleoconch spiral sculpture of 14 cordlets and two major cords, irregularly disposed; 6 cordlets and the adapical cord visible above the aperture. Axial sculpture of 8–10 broad orthocline ribs. Shell ground colour orange-pinkish.

REMARKS

I have been unable to identify with certainty this shell. It is a partly broken juvenile which

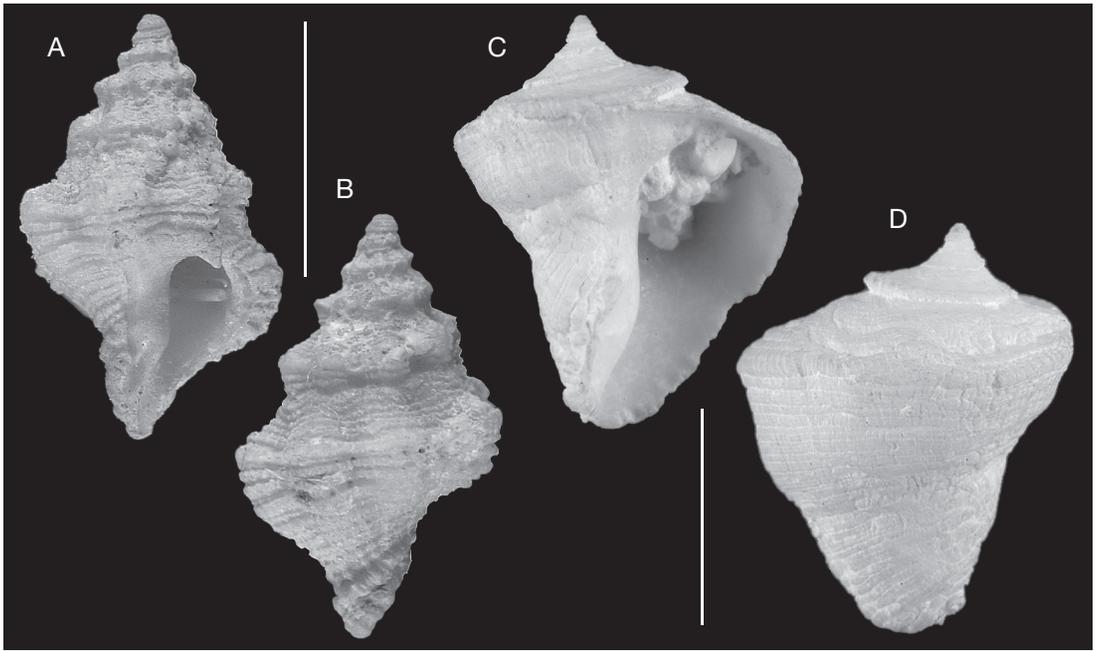


FIG. 6. — **A, B**, *Coralliophila* sp. B, Marotiri Is., BENTHAUS, stn DW 1881, 27°54.6'S, 143°28.5'W, 112-121 m. **C, D**, *Coralliophila* sp. C, BENTHAUS, stn DW 1943, N of Raivavae, 23°48.7'S, 147°39.1'W, 950 m. Scale bars: A, B, 2 mm; C, D, 5 mm.

superficially resembles to *Coralliophila abnormis* (E. A. Smith, 1878) and to juveniles of *C. fearnley* (Emerson & D'Attilio, 1965) but differs in the stronger spiral and axial sculpture, and the wider protoconch at the base. Due to the lack of additional material I refrain from describing a new taxon. The shell is in relatively good condition, but its habitat (shallow or deep waters) cannot be defined.

Coralliophila sp. C
(Fig. 6C, D)

MATERIAL EXAMINED. — N of Raivavae, BENTHAUS, stn DW 1943, 23°48.7'S, 147°39.1'W, 950 m.

DESCRIPTION

Shell of small size for the genus, 9.9 mm high, 5 mm wide. Protoconch of 2.8 whorls and a sinusigera lip. Sculpture (partly abraded) of two spiral keels with series of axial threads. Teleoconch of 3.3 whorls,

spire low, conical, with concave sides. Shoulder sharply angulated and base constricted. Aperture subquadrangular with a relatively long and widely open siphonal canal; twisted fasciole, umbilical chink closed. Teleoconch spiral sculpture on the last whorl of 39 smooth cords, 6 on the subsutural ramp, one major cord at the shoulder and 32 on the base. Axial sculpture of prosocline incremental growth lines. Colour withish.

REMARKS

I have been unable to identify this shell. Although it is probably not fully grown, it does not seem a juvenile. The spiral sculpture of very closely set, flat, broad spiral cords with no evident scaly spines, resembles that of *Coralliophila mallicki* (Ladd, 1976). Yet, the shell outline is different, more spherical and with a gently curved shoulder in *C. mallicki*. In the lack of additional material I refrain from describing a new taxon. The present shell is quite old, and its habitat (shallow or deep waters) cannot be defined.

Genus *Rhizochilus* Steenstrup, 1850

Rhizochilus Steenstrup, 1850: 75.

TYPE SPECIES. — *Rhizochilus antipathum* Steenstrup, 1850 (by monotypy); Recent, Indo-Pacific.

Rhizochilus antipathum Steenstrup, 1850
(Fig. 7A, B)

Rhizochilus antipathum Steenstrup, 1850: 75.

Rhizochilus teramachii Kuroda, 1953: 118, 125, 126, text figs 1, 2.

TYPE MATERIAL. — *Rhizochilus antipathum*: 7 syntypes (ZMUC; one figured by Kosuge & Suzuki [1985: pl. 50, fig. 6]).

Rhizochilus teramachii: holotype (TA 1921; figured by Kosuge & Suzuki [1985: pl. 45, fig. 12] and Higo *et al.* [2001: 66, G2412s]).

TYPE LOCALITY. — *Rhizochilus antipathum*: no locality is given either with the type material (Ole Tendal, pers. comm.) or in the original description.

Rhizochilus teramachii: East of Ashizuri-Misaki, Japan, 80-90 fms [146-165 m].

MATERIAL EXAMINED. — The type material of *Rhizochilus antipathum* and *R. teramachii*, and: BENTHAUS, stn DW 1985, Banc Arago, 23°26.3'S, 150°44.2'W, 100-107 m, 1 lv (Fig. 7B).

DISTRIBUTION

Indian Ocean (Oliverio 2008b). Pacific Ocean, from Kii Peninsula, Japan, “sessile on branches of Antipatharians, in 100-200 m” (Tsuchiya 2000), “on *Antipathes japonica* Brook” (Higo *et al.* 1999: 217, G2412), throughout the West Pacific including Hawaii (on *Antipathes grandis*: Gage 1962; Kay 1979). New Caledonia, shells only in 25-400 m. Austral Islands, living in 100-107 m.

REMARKS

The teleoconch of *Rhizochilus* is often strongly deformed due to the nearly sessile life habit (on antipatharians). Variation in the shape and sculpture (strong to reduced spiral cords, smooth or with scaly sculpture over the cords) should be examined in a phylogeographic context to check the status of the

different morphs. The multispiral protoconchs of 3.2-3.3 whorls, indicate a planktotrophic development. Nomenclature is discussed by Oliverio (2008b). The indication of “Indian Ocean” as type locality, as reported by Higo *et al.* (1999: 217, G2412), seems unjustified.

Genus *Babelomurex* Coen, 1922

Babelomurex Coen, 1922: 68.

Langfordia Dall, 1924: 89 (type species by original designation: *Murex cuspidifera* Dall, 1924).

Tolema Iredale, 1929: 186 (type species [ICZN 1970]: “*Tolema australis* Laseron, 1955”) (incorrect name used = *Rapana lischkeanus* Dunker, 1882).

TYPE SPECIES. — *Fusus babelis* Requier, 1848 (by original designation); Recent, north-eastern Atlantic and Mediterranean.

REMARKS

The species of *Babelomurex* have been classified in the past into several subgenera, based on shell features (e.g., Kosuge & Suzuki 1985; Higo *et al.* 1999, 2000). I have preferred a more conservative position, pending the establishment of a reliable phylogenetic scheme for these putative taxa. Preliminary DNA data (Oliverio *et al.* 2009) indicate that also this genus, as traditionally conceived, is polyphyletic, and probably also its synonymy list is destined to change.

Babelomurex sp. A

aff. *B. yamatoensis* Kosuge, 1986
(Fig. 7C, D)

Babelomurex yamatoensis Kosuge, 1986: 70, pl. 28, figs 1-5, pl 29, fig. 1.

TYPE MATERIAL. — Holotype (IMT 86-3; not examined; figured by Kosuge [1986: pl. 28, fig. 1] along with a paratype [figs 2, 4]).

TYPE LOCALITY. — South China Sea.

MATERIAL EXAMINED. — Banc Arago, BENTHAUS, stn DW 1969, 23°22'S, 150°43.2'W, 200-640 m, 1 dd (fragment, Fig. 7C, D).

DISTRIBUTION. — The *Babelomurex yamatoensis* group of species ranges from Japan (Kosuge 1986: pl. 28, figs 3, 5), to the South China Sea and the Philippines, New Caledonia, Loyalty Ridge, Norfolk Ridge and Vanuatu, mostly in deep waters (empty shells in 195–360 m, alive in 254–264 m [Oliverio 2008b]), found occasionally alive at shallower depth [40–80 m] in the Philippines). Range extension to SW Pacific.

REMARKS

The complex of species in the *B. yamatoensis* group is traditionally diagnosed basing on a combination of protoconch and teleoconch characters (Kosuge 1986). Both sets are mostly lacking in the fragment here recorded and thus, a definitive species identification is impossible.

Babelomurex diadema (A. Adams, 1854)
(Fig. 7E)

Murex diadema A. Adams, 1854: 70.

Latiaxis (Baberomurex) [sic] gemmatus Shikama, 1966: 24, pl. 2, figs 1–6.

Latiaxis macutanica Kosuge, 1979: 6, pl. 3, figs 6–10.

TYPE MATERIAL. — *Murex diadema*: syntype (BMNH 1985107; figured by Kosuge & Suzuki [1985: pl. 35, figs 1, 2]).

Latiaxis gemmatus: syntype (KPM NG0103749; the largest of those figured by Shikama [1966: pl. 2, figs 1–3] also figured by Kosuge & Suzuki [1985: pl. 35, fig. 11]) and Higo *et al.* [2001: 68, G2456]).

Latiaxis macutanica: holotype (IMT 79-5; not examined; figured by Kosuge & Suzuki [1985: pl. 35, fig. 10]; “transferred to the collection of Mr. Masaji Suzuki” [Kosuge 1992]).

TYPE LOCALITY. — *Murex diadema*: Philippines.

Latiaxis gemmatus: Okinoshima, SW Shikoku, Japan.

Latiaxis macutanica: Mactan, Cebu Island, Philippines.

MATERIAL EXAMINED. — The type material of *Murex diadema* and *Latiaxis gemmatus*, and:

BENTHAUS, stn DW 1998, North coast of Rurutu, 22°24.8'S, 151°22.2'W, 250–302 m, 1 dd (Fig. 7E).

DISTRIBUTION. — West Pacific, from southern Japan, South China Sea and the Philippines, “50–200 m, rocks” (Higo *et al.* 1999: 220). New Caledonia, Norfolk Ridge, Loyalty Islands, Vanuatu, Fiji and Tonga, empty shells

in 130–578 m (Oliverio 2008b). Austral Islands, one empty shell in 250–302 m.

REMARKS

In this group, variation in shell characters (including protoconch dimensions: Oliverio 2008b) suggests that more species may be involved. I lump under this name, specimens of the *Babelomurex diadema* group with smaller diameter protoconchs (1.6–1.8 whorls, 580–625 µm at the base), but the complex is in need of major revision. It is here stressed that information on the protoconch of the types is missing and thus identification of the nominal species remains severely hampered.

Babelomurex santacruzensis Kosuge, 1980
(Fig. 7F, G)

Latiaxis santacruzensis Emerson & D'Attilio, 1970: 272, 273, pl. 40, figs 1–4.

TYPE MATERIAL. — Holotype (AMNH 155901). — Paratypes (AMNH 155902; LACM 1234 [1 dry]) 88–134 m, off Isla Santa Fe (Barrington), Islas Galapagos (0°43'S, 90°01'W, RV *Velero III*, 26.I.1938), and in the collections De Roy and D'Attilio (Emerson & D'Attilio 1970: 273).

TYPE LOCALITY. — Galapagos Islands, Ecuador.

MATERIAL EXAMINED. — The type material and: BENTHAUS, stn DW 1904, Banc NE of Rapa, 27°26.5'S, 144°03.4'W, 600–900 m, 1 dd (Fig. 7F, G).

Galapagos Islands, imprecise collecting data, 2 lv (dealer source: MO).

DISTRIBUTION. — Previously considered endemic to the Galapagos Islands (Emerson & D'Attilio 1970; Keen 1971). Range extension to Austral Islands in the Indo-Pacific ecoregion, one empty shell in 600–900 m.

REMARKS

The single shell collected is worn, partly broken and lacks the tip. It is however perfectly concordant with the type material. The paratype AMNH 155902 and one specimen in MO coll., have usable protoconchs of 2.5+ and 2.6 whorls, respectively, which allow inferring a planktotrophic development for this species.

Babelomurex wormaldi (Powell, 1971)
(Fig. 7H, I)

Latiaxis wormaldi Powell, 1971: 220, figs 15, 16.

Latiaxis fenestratus Kosuge, 1980: 42, pl. 10, figs 10, 11.

TYPE MATERIAL. — *Latiaxis wormaldi*: holotype (AIM AM71329; Kosuge & Suzuki [1985: pl. 33, fig. 2] figured this specimen labelled AIM TM1329).

Latiaxis fenestratus: holotype (IMT 80-10) and paratypes (IMT 80-11; not examined), figured by Kosuge & Suzuki (1985: pl. 17, figs 8 [holotype], 9 [paratype]; pl. 33, fig. 3 [paratype]).

TYPE LOCALITY. — *Latiaxis wormaldi*: ESE of Poor Knights Islands, northeastern New Zealand, 329 m.

Latiaxis fenestratus: Off Mactan, Cebu Island, Philippines.

MATERIAL EXAMINED. — The type material of *Latiaxis wormaldi* and:

BENTHAUS, stn DW 1998, North coast of Rurutu, 22°24.8'S, 151°22.2'W, 250-302 m, 1 dd. — Stn DW 1932, Banc Président Thiers, 24°40.8'S, 146°01.5'W, 500-800 m, 1 dd (Fig. 7H, I).

DISTRIBUTION. — Philippines and the SW Pacific, to north-eastern New Zealand. Norfolk Ridge, New Hebrides Arc and Tonga, empty shells in 360-650 m depth, alive in 440-508 m (Oliverio 2008b). Austral Islands, empty shells in 302-500 m.

REMARKS

Protoconch of 2.8 conical whorls, 635 µm high, 700 µm wide at the base. Protoconch I of about one whorl, sculptured with pustules over the entire surface. Protoconch II of about 1.8 whorls, with two spiral keels, and sculptured with a series of subsutural threads and a series of nodulose threads over each keel; a diffuse granulation is present in the interspaces.

Babelomurex sibogae (Shepman, 1911)
(Fig. 7J, K; 12F)

Latiaxis sibogae Shepman, 1911: 359, pl 21, fig. 8.

TYPE MATERIAL. — Holotype (ZMA 3.11.092; figured by Kosuge & Suzuki [1985: pl. 34, fig. 8]).

TYPE LOCALITY. — Siboga exp. stn 89 Pulu Kaniungan ketjil Reef, Indonesia.

MATERIAL EXAMINED. — The type material and: BENTHAUS, stn DW 1996, Rurutu (Avera), 22°29.1'S, 151°21.9'W, 489-1050 m, 1 dd (fragment). — Stn DW 1973, Banc Arago, 23°23.5'S, 150°43.9'W, 200-350 m, 4 dd (Fig. 7J, K). — Stn DW 1951, Banc Lotus, 23°49.1'S, 147°53.4'W, 206-450 m, 1 dd. — Stn DW 1929, Banc Président Thiers, 24°38.6'S, 146°01.6'W, 350-370 m, 1 dd (Fig. 12F).

DISTRIBUTION. — From Indonesia (01°09'N, 018°52'E), Philippines and South China Sea (Kosuge & Suzuki 1985: 22). First record from the South West Pacific, Austral Islands empty shells in 350-489 m.

REMARKS

Protoconch of 3.3 whorls, 710 µm high, 680 µm wide at the base (Fig. 12F). Sculpture of two weak spiral keels, each sculptured by a series of opisthocline threads, and an additional series of subsutural prosocline threads. Sinusigera outer lip. *Babelomurex sibogae* apparently is not rare in the Austral Islands and in the Philippines and Indonesia. Yet it has not been found in the New Caledonia area (Oliverio 2008b) and this is apparently the third literature record of this species after the original description in 1911 and Kosuge & Suzuki (1985).

Babelomurex kawanishii (Kosuge, 1979)
(Fig. 8A, B)

Latiaxis (Echinolatiaxis) kawanishii Kosuge, 1979: 4, pl. 2, figs 4-6.

TYPE MATERIAL. — Holotype (IMT 79-2; not examined; figured by Kosuge & Suzuki [1985: pl. 17, fig. 13, pl. 34, fig. 2]; “transferred to the collection of Mr. Masaji Suzuki” [Kosuge 1992]). Higo *et al.* (2001: 68, G2460) cited the Sea Shell Specimen Museum, Shinjuku, Tokyo, as the repository for the same figured specimen.

TYPE LOCALITY. — South China Sea (near Paracel Islands, about 200 m depth).

MATERIAL EXAMINED. — BENTHAUS, stn DW 1957, Tu-buai Is., 23°18.8'S, 149°29.3'W, 558-1000 m, 1 dd.

DISTRIBUTION. — From Japan and the China Sea (Tsuchiya 2000: 411), “100-200 m, rocks” (Higo *et al.* 1999: 220), to the southwest Pacific, Norfolk Ridge and Loyalty Ridge, empty shells in 233-280 m. Austral Islands, one empty shell in 558-1000 m.

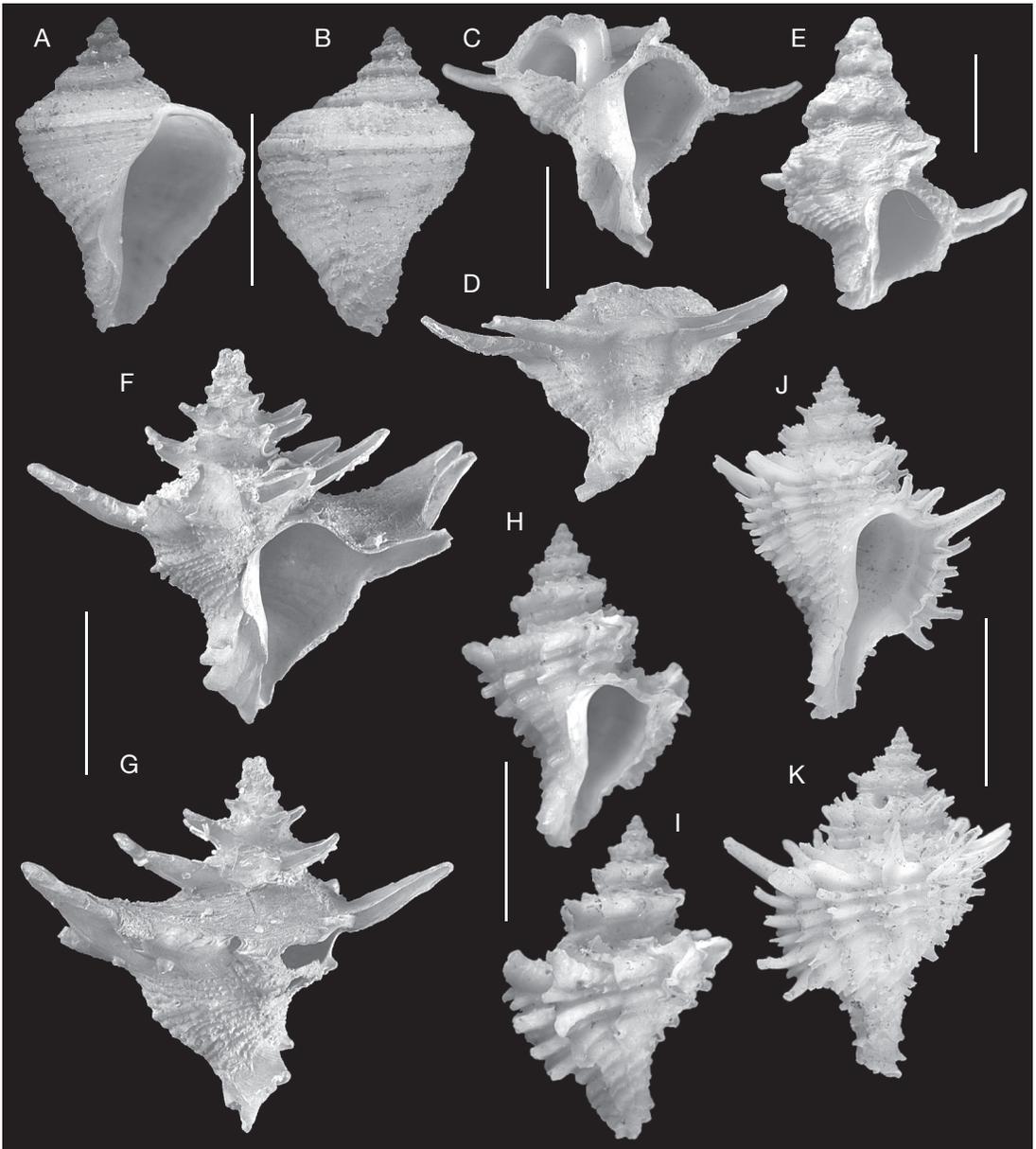


FIG. 7. — **A, B**, *Rhizochilus antipathum* Steenstrup, 1850, Banc Arago, BENTHAUS, stn DW 1985, 23°26.3'S, 150°44.2'W, 100-107 m; **C, D**, *Babelomurex* sp. A aff. *yamotoensis* Kosuge, 1986, Banc Arago, BENTHAUS, stn DW 1969, 23°22'S, 150°43.2'W, 200-640 m; **E**, *B. diadema* (A. Adams, 1854), North coast of Rurutu, BENTHAUS, stn DW 1998, 22°24.8'S, 151°22.2'W, 250-302 m; **F, G**, *B. sanctacruzensis* Kosuge, 1980, Banc NE of Rapa, BENTHAUS, stn DW 1904, 27°26.5'S, 144°03.4'W, 600-900 m; **H, I**, *B. wormaldi* (Powell, 1971), Banc Président Thiers, BENTHAUS, stn DW 1932, 24°40.8'S, 146°01.5'W, 500-800 m; **J, K**, *B. sibogae* (Shepman, 1911), Banc Arago, BENTHAUS, stn DW 1973, 23°23.5'S, 150°43.9'W, 200-350 m. Scale bars: A, B, 5 mm; C-K, 10 mm.

REMARKS

The shell is concordant with the type material and the other known samples, and constitutes a range extension eastward.

Babelomurex sp. B aff. *B. miyokoeae*
Kosuge, 1985
(Fig. 8C, D)

Babelomurex miyokoeae Kosuge, 1985: 54, 55, pl. 19, figs 4-6, 9.

TYPE MATERIAL. — Holotype of *Babelomurex miyokoeae* (IMT 85-11; not examined; figured by Kosuge & Suzuki [1985: pl. 21, fig. 12, pl. 32, fig. 5]).

TYPE LOCALITY. — *Babelomurex miyokoeae*: Bohol, Philippines.

MATERIAL EXAMINED. — Rurutu (Mont du Lotus), BENTHAUS, stn CP 1989, 22°36.2'S, 151°00'W, 456 m, 1 dd (Fig. 8C, D).

DISTRIBUTION. — *Babelomurex miyokoeae*: West Pacific. From Ogasawara Islands (Japan, Tsuchiya 2000: 411) Philippines, and Coral Sea (Oliverio 2008b).

REMARKS

Protoconch of 2+ whorls, 700+ µm high, 710 µm wide at the base. Sculpture of 2 spiral keels, each sculptured by a series of opisthocline threads, and an additional series of subsutural prosocline threads. Sinusigera outer lip. Shells of the real *miyokoeae* that I have examined from the Philippines and the Coral Sea have a protoconch with more than 3 whorls, larger than the present shell from the Austral Islands. Variation in the protoconch of shells of the *B. miyokoeae* species group is observed at several sites in the western Pacific (MO unpublished), with number of protoconch whorls ranging from 1.5 to 3.5. Since the species in this group (which are sometimes included in the subgenus *Lamellatiaxis* Habe & Kosuge, 1970, type species *Latiaxis habui* Habe & Kosuge, 1970) are very rare and adults tend to lose the protoconch, I refrain conservatively in this revision from describing a new species for this single record, pending availability of more material for a wider revision.

Babelomurex mediopacificus (Kosuge, 1979)
(Fig. 9A, B)

Latiaxis (Lamellatiaxis) mediopacifica [sic] Kosuge, 1979: 3, pl. 2, figs 1-3.

TYPE MATERIAL. — Holotype (IMT-79-1; not examined; figured also by Kosuge & Suzuki [1985: pl. 21, fig. 13, pl. 32, figs 3, 4]).

TYPE LOCALITY. — Off Midway Island (about 400 m depth).

MATERIAL EXAMINED. — Banc Président Thiers, BENTHAUS, stn DW 1932, 24°40.8'S, 146°01.5'W, 500-800 m, 1 dd. — Stn DW 1924, Recif Neilson, 27°00.6'S, 146°04.8'W, 340-800 m, 1 dd (Fig. 9A, B). — Stn DW 1898, West of Rapa, 27°34.3'S, 144°26.6'W, 580-820 m, 1 dd. — Stn DW 1897, West of Rapa, 27°34.3'S, 144°26.7'W, 480-700 m, 2 dd.

DISTRIBUTION. — So far known only from the type locality, off Midway Island (stated as having been collected by a Japanese deep sea coral fishing boat in 1973). Now Austral Islands, empty shells in 580-700 m.

REMARKS

The shells here recorded are concordant with the original specimens from off Midway, except that the sculpture in the present material is somewhat stronger. Particularly, the lamellar axial sculpture is diagnostic, as well as the angulated base and the enlarged aperture. This is a significant range extension southward.

Babelomurex fusiformis (Martens, 1902)
(Figs 9C, D; 12D)

Rapana (Latiaxis) fusiformis Martens, 1902: 96, 97, pl. 3, fig. 1.

Latiaxis helenae Azuma, 1973: 231, fig. 1.

Latiaxis nakamigawai io Kilburn, 1974: 201, fig. 12a.

TYPE MATERIAL. — *Rapana (Latiaxis) fusiformis*: holotype (ZMB 61037; figured by Kosuge & Suzuki [1985: pl. 28, fig. 7]).

Latiaxis helenae: holotype (Azuma coll. no. 15944; not examined).

Latiaxis nakamigawai io: holotype (NM A989; figured by Kosuge & Suzuki [1985: pl. 28, fig. 6]).

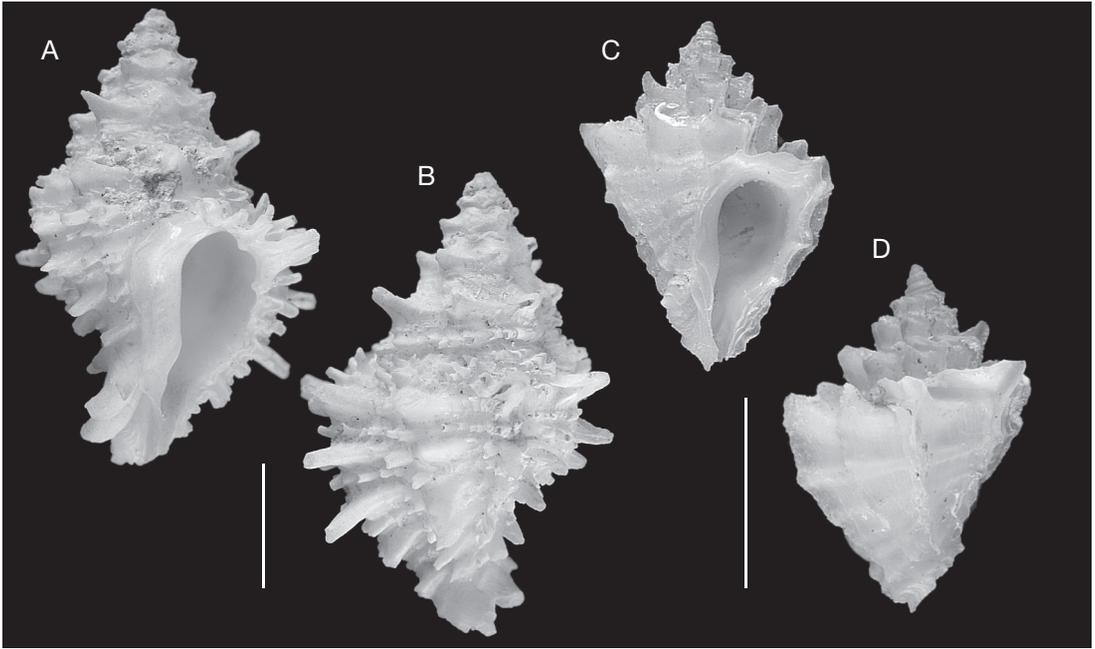


FIG. 8. — **A, B**, *Babelomurex kawanishii*, Tubuai Is., BENTHAUS, stn DW 1957, 23°18.8'S, 149°29.3'W, 558-1000 m; **C, D**, *Babelomurex* sp. B aff. *B. miyokoeae* Kosuge, 1985, Rurutu (Mont du Lotus), BENTHAUS, stn CP 1989, 22°36.2'S, 151°00'W, 456 m. Scale bars: 5 mm.

TYPE LOCALITY. — *Rapana (Latiaxis) fusiformis*: “Ost-Afrika”, “Valdivia” [Expedition], “Stat. [no.] 254, 974 m”, south of Brawa (0°29'S, 42°47'E), Somalia.

Latiaxis helena: 50 miles off Inhaca Islands, S. Mozambique Channel, 494 m [270 fms].

Latiaxis nakamigawai io: Off Durban, South Africa, in 150 fathoms [274.3 m].

MATERIAL EXAMINED. — The type material of *Rapana (Latiaxis) fusiformis* and *Latiaxis. nakamigawai io* and: BENTHAUS, stn DW 1999, North coast of Rurutu, 22°25.1'S, 151°22.1'W, 270-500 m, 1 dd (Figs 9C, D; 12D).

DISTRIBUTION. — Indian Ocean: Natal, South Africa (Kosuge 1992), Somalia (Kosuge 1993). Pacific Ocean: Coral Sea, Norfolk Ridge, Loyalty Ridge, Fiji, Tonga and New Hebrides Arc, empty shells in 227-700 m, alive in 433-532 m (Oliverio 2008b). Austral Islands empty shells in 270-500 m.

REMARKS

I am not totally convinced that the single shell here recorded in not a specimen of *B. mediopacificus* with a weaker sculpture. Also the use of the name

fusiformis for Pacific populations of this group may prove to be erroneous. Following Oliverio (2008b), Martens' name is here maintained pending a revision of the *B. japonicus* species group, which must include analysis of protoconchs over a large geographic range and possibly also the use of molecular markers, in a phylogeographic framework.

Genus *Hirtomurex* Coen, 1922

Hirtomurex Coen, 1922: 69.

TYPE SPECIES. — *Fusus lamellosus* Philippi, 1836 (by original designation) (not Borson, 1821, nor de Cristofori & Jan, 1832) = *Fusus squamosus* Bivona-Bernardi, 1838; Recent, Europe.

Hirtomurex filiaregis (Kurohara, 1959) (Fig. 10A, B)

Latiaxis filiaregis Kurohara, 1959: 342-344.

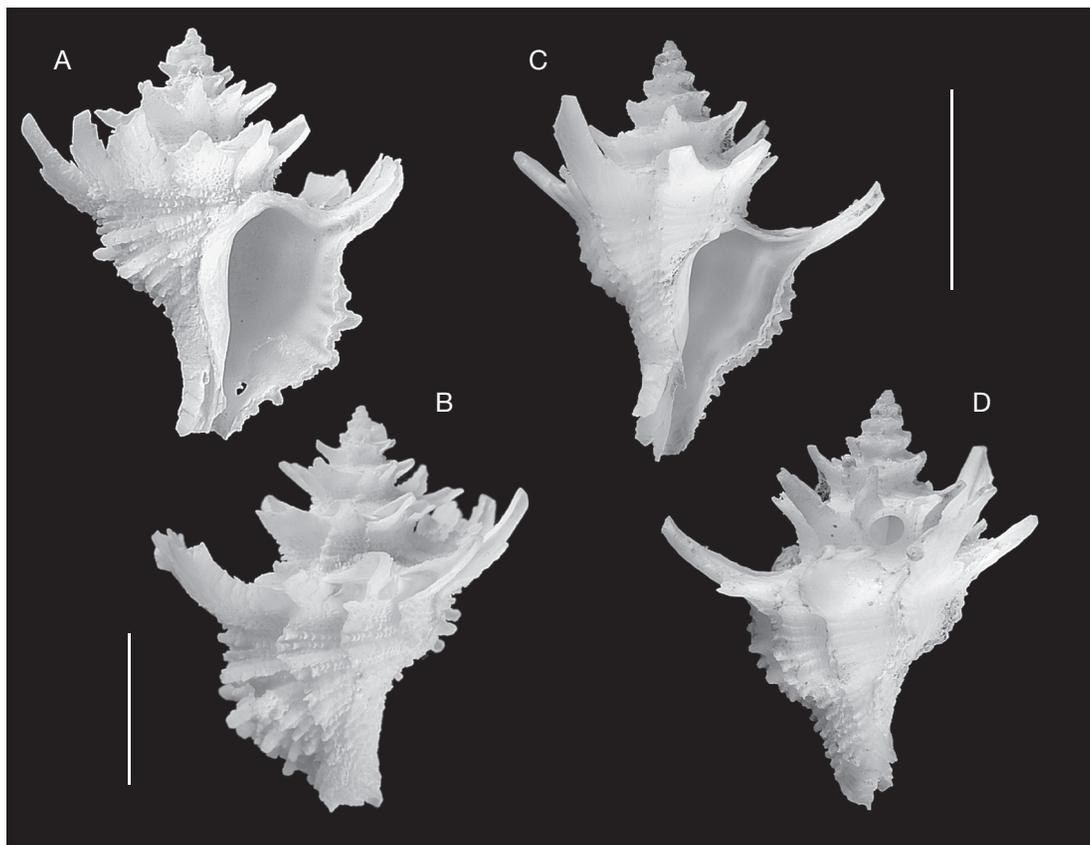


FIG. 9. — **A, B**, *Babelomurex mediopacificus* (Kosuge, 1979), Recif Neilson, BENTHAUS, stn DW 1924, 27°00.6'S, 146°04.8'W, 340-800 m; **C, D**, *B. fusiformis* (Martens, 1902), North coast of Rurutu, BENTHAUS, stn DW 1999, 22°25.1'S, 151°22.1'W, 270-500 m. Scale bars: 10 mm.

TYPE MATERIAL. — Possibly lost (Kosuge & Suzuki 1985: 25).

TYPE LOCALITY. — Tosa Bay, Southern Shikoku, Japan.

MATERIAL EXAMINED. — Banc Arago, BENTHAUS, stn DW 1973, 23°23.5'S, 150°43.9'W, 200-350 m, 1 dd (Fig. 10A, B).

DISTRIBUTION. — West Pacific. From southern Japan to the Philippines, 100-200 m, “rocks” (Higo *et al.* 1999: 221). Norfolk Ridge, alive in 390-540 m (Oliverio 2008b). Austral Islands, one empty shell in 200-350 m.

REMARKS

The single shell is worn and partly damaged, but it is easily identified. This is a significant extension eastward of its range.

Hirtomurex taranui Marshall & Oliverio, 2009 (Fig. 10C, D)

Hirtomurex taranui Marshall & Oliverio 2009: 166, fig. 3J, K.

Hirtomurex sp. A – Oliverio 2008b: 552, fig. 110.

TYPE MATERIAL. — Holotype: New Zealand, off Gisborne, 38°46'S, 178°48'E, 750-913 m, NIWA stn E719, alive (NIWA 48756).

Paratypes: New Zealand, Mercury Knoll, E of Mercury Island, 36°30.27'S, 176°30.45'E, , 990-1100 m, 1 alive (NMNZ M.152743). — Rumble V volcano, southern Kermadec Ridge, 36°08.75'S, 178°12.11'E, 712-924 m, 1 (NIWA TAN 0107/323).

MATERIAL EXAMINED. — Banc NE of Rapa, BENTHAUS, stn DW 1904, 27°26.5'S, 144°03.4'W, 600-900 m, 1 dd (Fig. 10C, D).

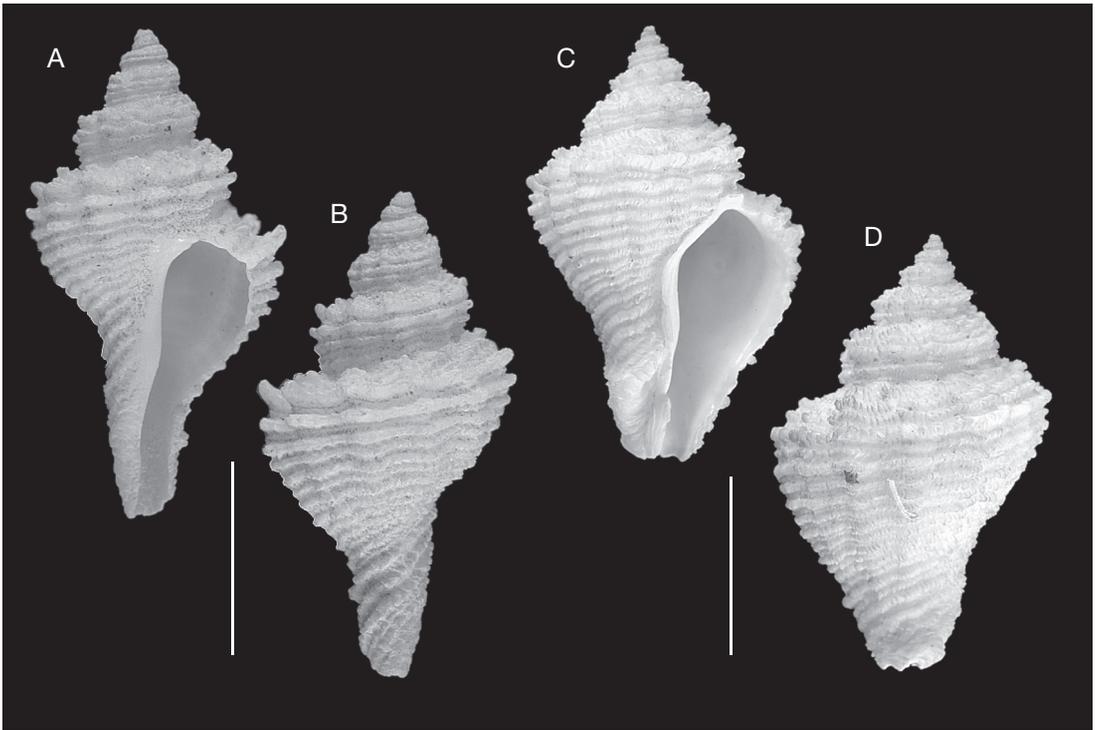


FIG. 10. — **A, B**, *Hirtomurex filiaregis* (Kurohara, 1959), Banc Arago, BENTHAUS, stn DW 1973, 23°23.5'S, 150°43.9'W, 200-350 m; **C, D**, *Hirtomurex* sp. A, Banc NE of Rapa, BENTHAUS, stn DW 1904, 27°26.5'S, 144°03.4'W, 600-900 m. Scale bars: A, B, 5 mm; C, D, 10 mm.

DISTRIBUTION. — Southern Japan (Tsuchiya 2000: 409, fig. 234). Southern New Caledonia, Loyalty Ridge and Norfolk Ridge, shells only in 537-780 m, alive in 508-532 m (Oliverio 2008b). Austral Islands, one empty shell in 600-900 m.

REMARKS

The present material is concordant with the type material of *H. taranui* from New Zealand. It has been confused in some collections with *Hirtomurex kawamurai* (Shikama, 1978) from which it differs in its less constricted base and more stepped spire.

TYPE SPECIES. — *Leptoconchus striatus* Rüppell, 1835 (by subsequent monotypy of Rüppell 1835); Recent, Red Sea.

REMARKS

Leptoconchus was introduced (Rüppell 1834) without associated species. *Leptoconchus striatus* Rüppell, 1835 is the type species by subsequent monotypy (ICZN 1999: Arts 67.2.2, 69.3). Massin (1982, 1983, 1990, 1992, 2000) studied the ecology and taxonomy of the species in this group. A revision of the *Leptoconchus* species is currently being undertaken by Dr Arjan Gittenberger at the Leiden Museum of Natural History (Naturalis).

Genus *Leptoconchus* Rüppell, 1834

Leptoconchus Rüppell, 1834: 105.

Magilopsis G. B. Sowerby III, 1919: 77 (type species by original designation: *Leptoconchus lamarckii* Deshayes, 1863; Recent, Indo-Pacific).

Leptoconchus sp.
[*L. peronii* (Lamarck, 1818) group]
(Fig. 11B)

Magilus peronii Lamarck, 1818: 374.

Leptoconchus striatus Rüppell, 1835: 259, pl. 35, figs 9, 10.

Leptoconchus schrenkii Lischke, 1871a: 40; 1871b: 45, pl. 4, figs 9, 10.

TYPE MATERIAL. — *Magilus peronii*: lectotype (MNHN 20694 [Massin 1990: 24]) and paralectotypes (MNHN 20685, 20686).

Leptoconchus striatus: Repository unknown.

Leptoconchus schrenkii: "type most probably in St Petersburg Museum" (Cosel 1998: 29).

TYPE LOCALITY. — *Magilus peronii*: Mauritius Island.

Leptoconchus striatus: Red Sea.

Leptoconchus schrenkii: Nagasaki, Japan.

MATERIAL EXAMINED. — The type material of *Magilus peroni* and:

BENTHAUS, stn DW 1888, Marotiri Is., 27°51.4'S, 143°31.4'W, 120-100 m, 1 dd (Fig. 11B).

DISTRIBUTION. — The species of this group are known from Red Sea and tropical Indo-West Pacific, 3-7 m in faviid corals (Massin 1990). New Caledonia and Loyalty Islands, shells in 2-55 m, alive (one juvenile) in 55-80 m (Oliverio 2008b). Austral Islands, a single empty shell in 120-100 m, possibly drifted from shallower habitat.

REMARKS

According to Gittemberger (2006), a large number of previously undetected, mostly unnamed, cryptic species that are difficult to identify are included in this group, with a largely misguiding shell morphology. At present only good data of association with the coral host species and diagnostic molecular markers can help in identification. It is here stressed, that at present it would be very hard (if not impossible), to identify with certainty empty shells or even specimens collected alive but not properly fixed.

Leptoconchus lamarckii Deshayes, 1863 (Fig. 11A)

Leptoconchus lamarckii Deshayes, 1863: 127, pl. 13, figs 1, 3.

TYPE MATERIAL. — Five syntypes (MNHN 0982).

TYPE LOCALITY. — Bourbon [Réunion Island].

MATERIAL EXAMINED. — The type material and: Tubuai Is., BENTHAUS, stn DW 1958, 23°19.6'S,

149°30.3'W, 80-150 m, 1 juv dd. — Banc Arago, stn DW 1985, 23°26.3'S, 150°44.2'W, 100-107 m, 1 dd. — N of Raivavae, stn DW 1943, 23°48.7'S, 147°39.1'W, 950 m, 1 dd (Fig. 11A).

SW of Rarapai Is., ATELIER RAPA 2002, stn 17, 27°34.6'S, 144°22.7'W, 9 m, 1 dd, 1 juv dd. — West of Tauna Is., stn 16, 27°36.3'S, 144°18.4'W, 5 m, 2 dd. — Hiri Bay, stn 10, 27°37.3'S, 144°22.2'W, 15-18 m, 1 dd.

DISTRIBUTION. — Throughout the Indo-West Pacific (uncommon in the Seychelles: Jarrett 2000), including Hawaii (Kay 1979). New Caledonia and Loyalty Islands, empty shells in 2-60 m. Austral Islands, empty shells in 5-15 m (ATELIER RAPA 2002) and 107-950 m (BENTHAUS), although the deep records (BENTHAUS) are probably drifted from shallower waters.

REMARKS

It is considered the commonest species of *Leptoconchus* in the Indo-West Pacific region (Massin 1982). Despite this, only a few shells of *L. lamarckii* are present in the samples studied. Sampling that is more focused on endobiotic gastropods would probably give a better idea of their regional diversity.

Genus *Rapa* Bruguière, 1792

Rapa Bruguière, 1792. Type species: *Murex rapa* Linnaeus, 1758 by original designation.

Rapella Swainson, 1840. Type species (by monotypy): *Pyrula papyracea* Lamarck, 1816.

Rapa sp. cf. *R. incurva* (Dunker, 1852) (Figs 11C-E; 12E)

Bulbus incurvus Dunker, 1852: 126.

TYPE MATERIAL. — *Rapa incurva*: Holotype (ZMB 103.967).

TYPE LOCALITY. — *Bulbus incurvus*: Uncertain: "China?" [no locality given on label of the holotype].

MATERIAL EXAMINED. — The type material of *R. incurva* and:

Banc Président Thiers, BENTHAUS, stn DW 1926, 24°38.2'S, 146°00.8'W, 50-90 m, 1 juv dd, 1 juv lv (Figs 11C-E; 12E).

DISTRIBUTION. — *Rapa incurva*: Pacific Ocean, from the Kii Peninsula, Japan, "intertidal to 20 m, in base of soft corals"

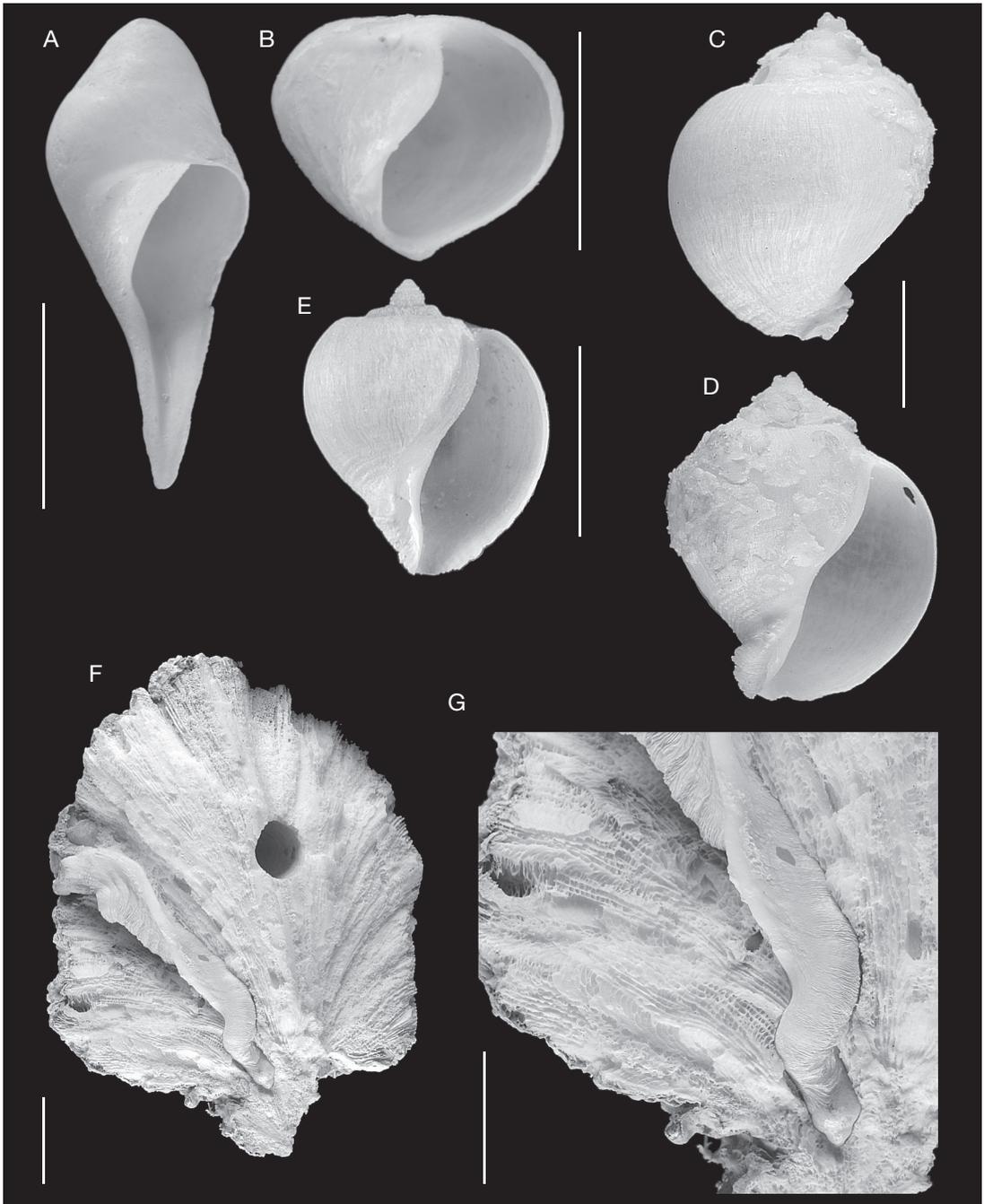


FIG. 11. — **A**, *Leptoconchus lamarckii* Deshayes, 1863, N of Raivavae, BENTHAUS, stn DW 1943, 23°48.7'S, 147°39.1'W, 950 m; **B**, *Leptoconchus* sp. [*peronii* (Lamarck, 1818) group], Marotiri ls., BENTHAUS, stn DW 1888, 27°51.4'S, 143°31.4'W, 120-100 m; **C-E**, *Rapa* sp. cf. *R. incurva* (Dunker, 1852), Banc Président Thiers, BENTHAUS, stn DW 1926, 24°38.2'S, 146°00.8'W, 50-90 m; **F, G**, *Magilus antiquus* (Montfort, 1810), Hiri Bay, ATELIER RAPA 2002, stn 9, 27°37.3'S, 144°22.2'W, 3-24 m (inside the faviid coral). Scale bars: A, 10 mm; B-E, 5 mm; F, 30 mm; G, 20 mm.

(Higo *et al.* 1999: 221). From New Caledonia and Loyalty Islands, empty shells in 20 m, alive in 17-31 m.

REMARKS

Protoconch of 3.7 whorls, 710 µm high and 730 µm wide at the base. Protoconch I of 0.8 whorls covered by pustules. Protoconch II of about 2.9 whorls, with 2 major spiral keels (the abapical starting on the early second protoconch whorl, the adapical starting at the end of the second protoconch whorl), and one minor subsutural keel, sculptured with a series of threads over each keel. Spiral microsculpture evident on the keels. The specimens of the present material, are somehow different from juveniles of *Rapa incurva* in having a more spherical shape. It is possible, similarly to what happens in *Leptoconchus*, that also *Rapa* includes cryptic species of difficult morphological interpretation.

Genus *Magilus* Montfort, 1810

Magilus Montfort, 1810: 43.

Type species. — *Magilus antiquus* Montfort, 1810 (by monotypy); Recent, Indo-West Pacific.

REMARKS

Relationships between *Magilus*, *Leptoconchus* and *Magilopsis* is being assessed on the basis of detailed anatomical and molecular datasets.

Magilus antiquus (Montfort, 1810) (Fig. 11F, G)

Magilus antiquus Montfort, 1810: 43, pl. 11.

TYPE MATERIAL. — Probably lost.

TYPE LOCALITY. — Undetermined (“East Indies”).

MATERIAL EXAMINED. — Rimatara Is., BENTHAUS, stn DW 2020, 22°37'S, 152°49.1'W, 920-930 m, 1 dd, 1 juv dd.

Hiri Bay, ATELIER RAPA 2002, stn 9, 27°37.3'S, 144°22.2'W, 3-24 m 2 dd (still inside the unidentified faviid colony) (Fig. 11F, G).

DISTRIBUTION. — Indian Ocean, Eastern Arabia “insinuated in stony corals” (Bosch *et al.* 1995). Tropi-

cal Indo-West Pacific, living in cavities within faviine scleractinian corals (Massin 1982). New Caledonia and Loyalty Islands, empty juvenile shells in 40-350 m, possibly having drifted from an original shallower habitat (Oliverio 2008b). Austral Islands, two empty shells in 920-930 m, certainly drifted from shallower habitat, and two empty shells in 3-24 m.

REMARKS

Specifically focused sampling is necessary to obtain adults from within coral.

CONCLUSION

In the first, and so far only, comprehensive revision of the malacofauna of Rapa, Richard (1987) reported a single coralliophiline species, *C. costularis*, as one of the dominant species on the sublittoral platform (20-30 m depth). I suppose it was a case of misidentification (probably with *C. australis* n. sp.) since *C. costularis* has not been found alive despite the collective effort during the workshop RAPA 2002.

A total of 28 species have been identified in this survey. Of these 10 species (36%) are from shallow waters, 15 species (54%) are from deep waters, and 3 species (10%) are of undefined habitat. The proportion of deep water species (54%) is significantly smaller than is usual for the Coralliophilinae (65-80%, with an average on a global scale of 75%: Oliverio unpublished). On the other side it is similar to what observed recently in another marginal area of the Pacific, the Marquesas Islands (50% of deep water species: Oliverio 2008a). I have suggested there that a possible explanation be that marginality affects the deep water faunas more than the shallow water ones. For epizoic organisms such as the coralliophilines, this can in turn be related to a reduced availability of suitable hosts (Anthozoa in this case) in deep waters. The presence of a single species with non-planktotrophic development or with a severely shortened pelagic larval phase (which together constitute 10-20% of the Indo-Pacific species: Oliverio 2008b) seems to support this interpretation. A stronger effect of marginality in deep water in the Pacific Ocean is a hypothesis

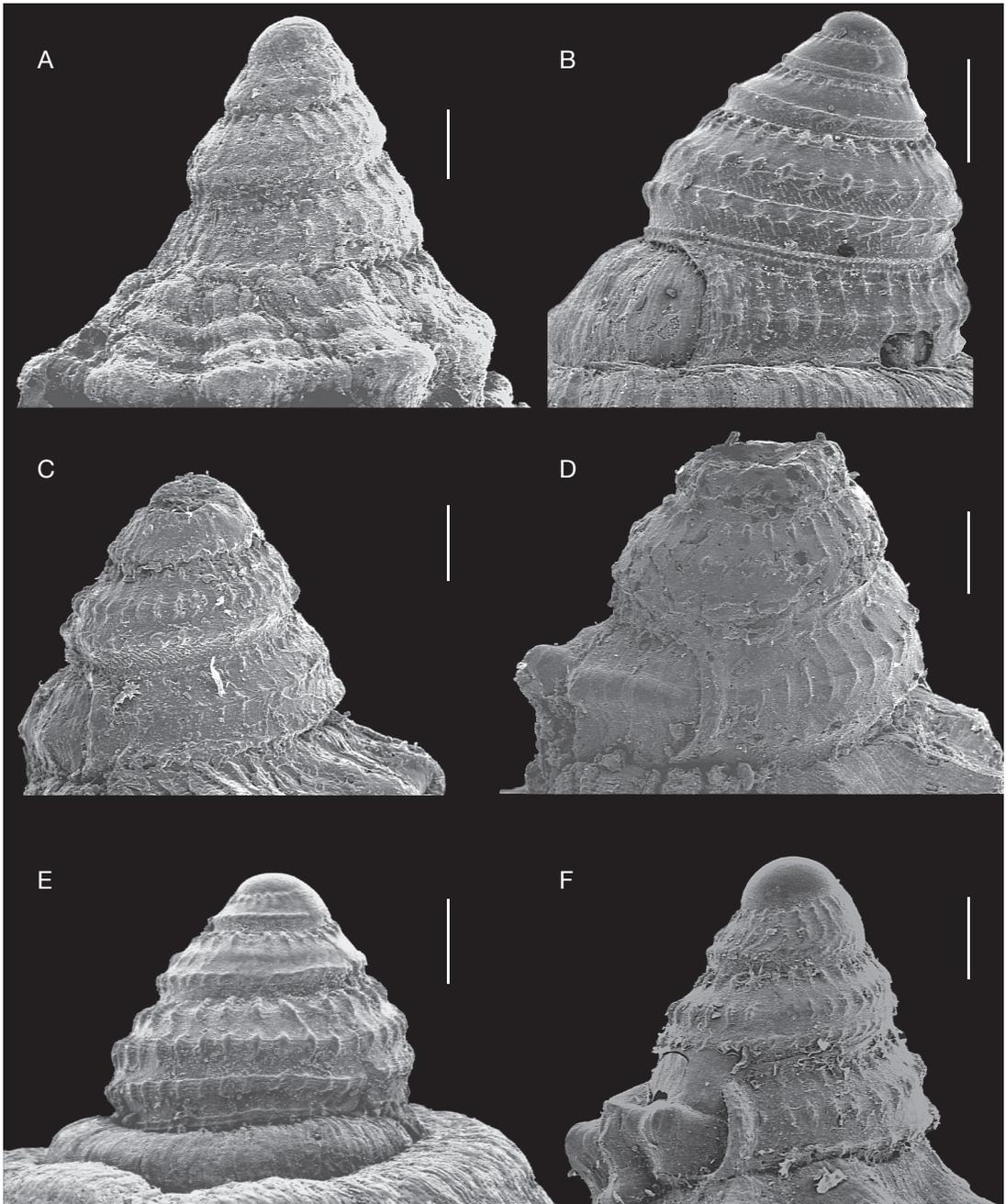


FIG. 12. — **A**, *Coralliophila australis* n. sp., paratype (MNHN 20967), Marotiri Is., BENTHAUS, stn DW 1879, 27°55'S, 143°30.1'W, 52 m; **B**, *C. costularis* (Lamarck, 1816), Rimatara Is., BENTHAUS, stn DW 2013, 22°38.6'S, 152°49.7'W, 80-93 m; **C**, *Coralliophila* sp. A, Banc Arago, BENTHAUS, stn DW 1970, 23°22'S, 150°43.2'W, 350-401 m; **D**, *Babelomurex fusiformis* (Martens, 1902), North coast of Rurutu, BENTHAUS, stn DW 1999, 22°25.1'S, 151°22.1'W, 270-500 m; **E**, *Rapa* sp. cf. *R. incurva* (Dunker, 1852), Banc Président Thiers, BENTHAUS, stn DW 1926, 24°38.2'S, 146°00.8'W, 50-90 m; **F**, *Babelomurex sibogae* (Shepman, 1911), Banc Président Thiers, stn DW 1929, 24°38.6'S, 146°01.6'W, 350-370 m. Scale bars: 100 μ m.

to test with larger databases, when more faunistic inventories will be available.

Nine species have been recorded on the base of living specimens. Of these, only five were shallow water species, a category which is more easily collected alive. Conversely, only empty shells were sampled of the shallow water *C. costularis*, *Magilus antiquus*, *Leptoconchus* sp. (*L. peronii* group), and *L. lamarckii*.

Several records from BENTHAUS were old specimens and they probably belonged to fossil assemblages (Pleistocene-Holocene? P. Lozouet pers. comm). This is not trivial, giving the evidence that a significant part of the Pleistocene fauna living in the coral reefs of the archipelago (especially its southernmost parts) became extinct during the Holocene. As an example, *C. costularis* is a common shallow water species through the Indo-Pacific, yet the single adult shell here recorded is a worn specimen likely to be a fossil.

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