

Update of Muricidae (excluding Coralliophilinae) from French Polynesia with description of ten new species

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ABSTRACT. The French Polynesian species of Muricidae are reviewed and updated. A total of 116 species is recognized; 10 of those are described as new to science: *Poirieria (Paziella) tanaoa* n.sp., *Orania atea* n.sp. and *Pagodula atanua* n.sp. from the Marquesas Archipelago, *Aspella lozoueti* n.sp. from Rapa, *A. hildrunae* n.sp. and *A. helenae* from the Society Archipelago, *Favartia (F.) salvati* n.sp., *F. (F.) nivea* n.sp., *F. (Pygmaepterys) avatea* n.sp. and *Orania maestratii* from the Austral Archipelago. Four additional species remained unidentified.

The subfamily Typhinae is recorded for the first time from French Polynesia.

Favartia lillouxi Myers & Hertz, 1999 is considered as a new synonym of *F. conleyi* Houart, 1999 and *F. guamensis* Emerson & D'Attilio, 1979 is separated from *F. crouchi* (Sowerby, 1894).

Tables listing the species and their occurrence in the different Polynesian archipelagos are given for each subfamily. Twenty-six species are considered to be endemic.

RESUME. Révision et mise à jour des espèces de Muricidae de Polynésie Française. Sur les 116 espèces reconnues, 10 sont décrites comme nouvelles pour la science: *Poirieria (Paziella) tanaoa* n.sp., *Orania atea* n.sp. et *Pagodula atanua* n.sp. des Marquises, *Aspella lozoueti* n.sp. de Rapa, *A. hildrunae* n.sp. et *A. helenae* des Iles de la Société, *Favartia (F.) salvati* n.sp., *F. (F.) nivea* n.sp., *F. (Pygmaepterys) avatea* n.sp. et *Orania maestratii* des Iles Australes. Quatre espèces demeurent indéterminées.

Pour la première fois, la sous-famille des Typhinae est citée de Polynésie Française.

Favartia lillouxi Myers & Hertz, 1999 est considérée comme synonyme de *F. conleyi* Houart, 1999 et *F. guamensis* Emerson & D'Attilio, 1979 est séparée de *F. crouchi* (Sowerby, 1894).

Des tableaux présentent une liste des espèces dans chaque sous-famille avec leur répartition par archipel. Vingt-six d'entre elles sont considérées comme endémiques de Polynésie Française.

INTRODUCTION

Since the 18th century, many expeditions have contributed to the collecting and to the knowledge of marine molluscs of French Polynesia. The first important work drawing up an inventory of the malacological fauna of the area (Fig. 1) is that of Dautzenberg & Bouge (1933); it was followed by Salvat & Rives (1975) and by Richard (1985). Taking into account these studies and recent records, Tröndlé & Houart (1992) revised the Muricidae from French Polynesia. They commented and illustrated 74 species. The same authors (Houart & Tröndlé, 1997), in an addition to the former work, added 7 species to the previous total, giving a total of 81 species of

Muricidae (excluding Coralliophilinae) for French Polynesia.

Recently, the MNHN, in collaboration with IRD, organized MUSORSTOM 9. This mission was a very thorough one, having as its objective an inventory of the molluscs from the Marquesas. It consisted of a sea campaign (August-September 1997) with 168 dredgings and trawls, and of a workshop at Ua Huka (September-October 1997) with 40 stations of sampling by diving and hand dredging. Another important mission was carried out in the Austral Archipelago, involving the University of Polynesia, EPHE, IRD and MNHN. It consisted of the BENTHAUS campaign with dredgings and trawls between 50 and 1200 meters, and the "Atelier Rapa

2002" covering the littoral zone down to 52 m (99 stations: 55 by diving, 24 by dredging, and 20 hand collecting).

The present study is based mainly on a large amount of material obtained from these two expeditions and a few private collections (MB, JT, RH), and adds some 35 species of which 10 are described for the first time. All photographs were taken by R. Houart, unless otherwise indicated.

Abbreviations and text conventions

Depositories

AMS: The Australian Museum, Sydney, Australia.

ANSP: Academy of Natural Sciences of Philadelphia, U.S.A.

BMNH: The Natural History Museum, London, U.K.

FMNH: Florida Museum of Natural History, Gainesville, U.S.A.

IRSNB: Institut royal des Sciences naturelles de Belgique, Bruxelles, Belgium.

JT: in collection Jean Tröndlé.

MB: in collection Michel Boutet.

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

NM: Natal Museum, Pietermaritzburg, South Africa.

NMNZ: Museum of New Zealand Te Papa Tongarewa, Wellington, New Zealand.

NSMT: National Science Museum, Tokyo, Japan.

RH: in collection Roland Houart.

SBMNH: Santa Barbara Museum of Natural History, California, U.S.A.

SMNH: Swedish Museum of Natural History, Stockholm, Sweden.

USNM: National Museum of Natural History, Washington, D.C., U.S.A.

Tables

SCT: Society Islands

TMT: Tuamotu Archipelago

MRQ: Marquesas Islands

GMB: Gambier Archipelago

AUS: Austral Archipelago

RAP: Rapa

EXP: Expeditions

END: endemic.

Other abbreviations

ad.: adult.

dd: empty shell.

lv.: collected alive.

CAS: Casier (lobster pot)

CP: Chalut à perche (beam trawl)

DR: Drague à roches (rocks dredge)

CRIOBE: Centre de Recherches Insulaires et Observatoire de l'Environnement

DW: Drague Warén (Warén dredge)

EPHE: École Pratique des Hautes Études, Perpignan, France

IRD: Institut de Recherche pour le Développement, Noumea, New Caledonia (formerly ORSTOM).

Terminology used to describe the spiral cords and apertural denticles (after Merle, 1999 and 2001)

P :	Primary cord
s :	secondary cord
t :	tertiary cord
ad :	adapical (or adapertural)
ab :	abapical (or abapertural)
SP:	Subsutural cord
IP :	Infrasutural primary cord (primary cord on shoulder)
adis :	adapical infrasutural secondary cord (shoulder)
abis :	abapical infrasutural secondary cord (shoulder)
P1 :	Shoulder cord
P2-P6 :	Primary cords of the convex part of the teleoconch whorl
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.
ADP :	adapertural primary cord on the siphonal canal
MP :	median primary cord on the siphonal canal
ABP :	abapertural primary cord on the siphonal canal
ads :	adapertural secondary cord on the siphonal canal
APERTURE	
ID:	Infrasutural denticle
D1 to D6:	Abapical denticles



Figure 1. Map of French Polynesia (courtesy of J. Poupin)

SYSTEMATICS

Family MURICIDAE Rafinesque, 1815

Subfamily Muricinae Rafinesque, 1815

Remarks. There are additions and modifications since the publication of Tröndlé & Houart (1992) and Houart & Tröndlé (1997). Eight species are being added, of which three are new: *Poirieria (Paziella) tanaoa* from the Marquesas, *Aspella lozoneti* from Rapa and *A. helenae* from the Society Archipelago. A species recorded in Tröndlé & Houart (1992: 80) as *Aspella platylaevis* was misidentified by us in 1992 and is now described as a new species, *A. hildrimae* n.sp. It occurs in the Society Archipelago, in the Tuamotus, in Gambier and in Rapa.

It remains surprising and interesting to continue to note the absence of any species of *Murex* s.s. from French Polynesia. Ponder & Vokes (1988) recorded Tonga as the eastern limit of *Murex tenuirostrum* (Lamarck, 1822) and *Murex adimicospinosus* (Sowerby, 1841) in the Pacific Ocean (see Table 3).

Chicoreus (Triplex) torrefactus (Sowerby, 1841)

Chicoreus (Triplex) torrefactus Sowerby, 1841: pl. 199, fig. 120.

Material examined. Society Archipelago, Tahiti, Arue, 50-60 m, 1 dd, MB.

Distribution. Throughout the Indo-West Pacific.

Remarks. The name applied here seems to be the most appropriate for a small juvenile with intact protoconch collected off Tahiti. This species was already listed by Dautzenberg & Bouge (1933) but no recent records were mentioned until now. The specimen listed here was collected dead and worn.

Naquetia barclayi (Reeve, 1858)

Figs 87-88

Murex barclayi Reeve, 1858: 209, pl. 38, fig. 2.
Pterynotus amandalei Preston, 1910: 119, fig. 3.

Material examined. MUSORSTOM 9, Marquesas, Ua Pou, stn CP1265, 9°20.4' S, 140°07.3' W, 90-92 m, 1 dd, MNHN.

Distribution. Throughout the Indo-West Pacific.

Remarks. Houart (1992: 127) recorded no specimens closer than southern Queensland, Australia. The record of *N. barclayi* in the Marquesas extends its geographical range considerably.

Poirieria (Paziella) tanaoa n. sp.

Figs 32-35

Type material. MUSORSTOM 9, Marquesas, Nuku Hiva, stn DR1299, 8°49' S, 140°17' W, 405-418 m, holotype MNHN; paratypes: MNHN 20160: 6; RH: 1 (all dd).

Type locality. Marquesas, Nuku Hiva, stn DR1299, 8°49' S, 140°17' W, 405-418 m.

Distribution. Marquesas Archipelago, Nuku Hiva, 405-418 m.

Description. Shell small, up to 10.1 mm in length at maturity, biconical, heavy, lamellose, weakly spinose. Shoulder weakly sloping, slightly concave. White. Spire high with 1-1.25 protoconch whorls and teleoconch of up to 5 angulate, strongly shouldered whorls. Suture impressed, partially obscured by small axial lamellae of following whorl. Protoconch small; whorls rounded, smooth; terminal lip unknown (eroded).

Axial sculpture of teleoconch whorls consisting of high, strong, broad, lamellose varices, each with a single, short, open primary spine at shoulder. No other axial sculpture. First whorl with 8 varices, second 9, third 9 or 10, fourth 9, last whorl with 7 or 8 varices. Spiral sculpture of low primary cords: spire whorls with narrow IP, last whorl with IP and very low or obsolete P1.

Aperture small, angulate, narrow; columellar lip narrow, smooth, adherent; anal notch shallow, broad; outer lip broad, weakly erect, smooth, with 3 strong, broad denticles within (Fig. 35): D1 broad, largest denticle; D2 and D3 of same strength or decreasing in strength abapically. Siphonal canal short, broad, straight, broadly open, with low lamellae over whole length.

Operculum and radula unknown.

Remarks. With the exception of *P. galapagana* (Emerson & D'Attilio, 1970) described from the Galapagos Islands, *P. tanaoa* n.sp. is the first record of a primitive (living) species of *Paziella* in the Indo-Pacific. However, *P. galapagana* is more akin to the Caribbean *P. pazi* (Crosse, 1869) group, which Vokes (1992: 33) placed in her "Species Group 3", together with *P. nuttingi* (Dall, 1896) and *P. oregonia* (Bullis, 1964).

Poirieria (Paziella) tanaoa is obviously related to primitive species such as *P. levis* Traub, 1979 from the Lower Ypresian (Eocene) of Austria (Merle & Pacaud, 2002), *P. cretacea* Garvie, 1991 from the Maastrichtian beds (Cretaceous) of Eastern Texas or *P. harrisi* Vokes, 1970 from the Paleocene of Alabama (Vokes, 1992).

Etymology. Tanaoa, in the Marquesas mythology, is the god of primeval darkness, confined to the depths of the ocean.

***Ptery marchi a aparr ii* (D'Attilio & Bertsch, 1980)**

Fig. 36

Ptery notus aparr ii D'Attilio & Bertsch, 1980 : 172, figs 2 a-d.

Material examined. BENTHAUS, Austral Archipelago, stn DW1914, 27°03.52' S, 146°04.01' W, 150 m, 11v, MNHN.

Distribution. To our knowledge, *P. aparr ii* is known as occurring in the Bohol Straits, Philippine Islands. One other specimen was recorded from the Coral Sea, in 80-120 m by Houart (1987: 762, fig. 5). Its geographical distribution is greatly extended with this single record from the Austral Archipelago.

***Aspella helenae* n. sp.**

Figs 2, 26, 46-48

Type material. French Polynesia, Society Archipelago, Tahiti, Afaahiti, sediments, dd, holotype MNHN 20166; Tahiti, Arue fault, 10-20 m, dd, 1 paratype RH; 1 paratype MB.

Type locality. French Polynesia, Society Archipelago, Tahiti, Afaahiti, sediments.

Distribution. Society Archipelago, Tahiti, Afaahiti and Arue fault, in 10-60 m (dd).

Description. Shell small for the genus, up to 9.6 mm in length at maturity (paratype MB), slender, lanceolate, flat, weakly nodose. Shoulder slightly convex. Length/width ratio 2.17-2.25. White, covered by white or light cream cancellate intritacalx (Fig. 26). Aperture light cream.

Spire very high, acute, with 1.5 protoconch whorls (Fig. 2) and teleoconch up to 6 broad, flattened, nodose whorls. Suture impressed, partially obscured by narrow buttress connected to preceding whorl. Protoconch large, broad. Whorls rounded. Terminal lip thin, raised, slightly curved.

Axial sculpture of teleoconch whorls consisting of high varices. First and second whorls with six almost evenly sized varices, third and fourth whorl with ventral and dorsal varices reduced to low, almost indistinguishable axial ribs, with small, narrow buttress connecting to preceding whorl. Penultimate and last whorls with ventral and dorsal narrow buttresses, and narrow, high, lateral varices. Second and fifth varices high, slightly lower than lateral ones. Spiral sculpture of broad, occasionally slightly nodose low cords, indistinguishable on first two teleoconch whorls. P1 and P2 visible on third whorl. P1, P2 and P3 on fourth, P1-P4 on penultimate, and 1-6 on last

whorl. All cords evenly broad. Last whorl with P1-P3 most obvious, P4 very low, P5 and P6 almost indistinguishable.

Aperture small, narrow, ovate. Columellar lip narrow, smooth, rim partially weakly erect abapically, adherent at adapical extremity. Anal notch indistinguishable. Outer lip weakly erect with 5 or 6 moderately strong, broad denticles within: D1-D6. D3 and D4 probably fused in paratype RH, D6 split in paratype MB. Siphonal canal moderately long, narrow, slightly recurved dorsally, open. Operculum and radula unknown.

Remarks. *Aspella helenae* n.sp. differs from all its congeners in having a cancellate intritacalx, together with a broad, rounded, paucispiral protoconch consisting of 1.5 whorls, a flat shell with an ovate aperture, and narrow buttresses connecting to the teleoconch whorls. It also differs in the spiral cords morphology (see Table 1).

Aspella hildrunae n.sp. from French Polynesia differs in having a more irregularly sculptured intritacalx, a conical protoconch of 2-2.15 whorls, a broader and smoother shell and broader buttresses, twice the size of those of *A. helenae*.

Aspella lozoueti n.sp. from Rapa differs in having a smoother intritacalx, a comparatively broader aperture, a shorter and broader siphonal canal, more rounded, broader and lower varices, and much broader buttresses, twice the size of those of *A. helenae*.

Aspella platylaevis differs in having a very different smooth intritacalx, a smoother shell and much larger buttresses.

Aspella media differs in having a smoother shell with less apparent, almost indistinguishable spiral cords, less impressed suture, a broader aperture, a shorter siphonal canal, and also buttresses twice as broad.

All other Indo-West Pacific species also differ by having a different intritacalx and/or protoconch, and in having twice as broad buttresses. They do not need further comparison here.

Etymology. Named after H el ene Boutet, whose patience and sharp vision was of great help in collecting a number of small species, and who thus contributed to a better knowledge of the malacological fauna of French Polynesia.

***Aspella hildrunae* n. sp.**

Figs 3, 7, 12, 20-21, 41-43

Aspella platylaevis – Tr ondl e & Houart, 1992: 80, figs 28, 109; Houart, 1994: 78, fig. 88 (not *Aspella platylaevis* Radwin & D'Attilio, 1976).

Type material. French Polynesia, Society Archipelago, Tahiti, Punaauia, Amiral Reef, coral fragments, holotype MNHN 20165; 1 paratype ANSP 416361; 1 paratype BMNH 20070516; 1 paratype NM L7371/T2244; 1 paratype SMNH Type collection

7339; 1 paratype USNM 1107848; 9 paratypes JT (lv. & dd); Pirae, under coral, shallow water, 1 paratype AMS C.211917; 1 paratype IRSNB I.G. 30.869; 1 paratype NMNZ M.274463; 7 paratypes RH (lv. & dd).

Other material examined. French Polynesia, Marquesas Islands, Nuku Hiva, 2 lv., MB.

Society Archipelago, Raiatea, 1 dd, MB; Huahine, Tefarerii lagoon, under coral fragments, 0.6 m, 3 lv., MB; reef, under stones, 1 lv., JT; lagoon, under stones, 19/7/75, 4 lv., JT; Tahiti, under coral blocks, 2 lv., RH; Hitiaa, 2 lv., RH; Hitiaa and Tiarei, 3 lv., RH; Papara, reef, 8 lv. & dd, JT; Papara, Marae reef, 2 lv. & 1 dd, JT; Papara, reef, 1 lv., JT; Mahaiatea, Marae reef, 4 m, 14/7/81, 4 lv., JT; Papara lagoon, on reef flat, 11 lv. & dd, MB; Faaonc, reef, 2 lv., 1 dd, JT; Papeete, reef, 1 lv. & 1 dd, JT; Mahina, reef, 2 lv., JT; Mahina, Pointe Venus reef, 2 lv., JT; Punaauia, 20-30 m, 4 lv. & dd, MB; Pueu lagoon, under dead coral, 2 dd, MB; Moorea Is., Barrier reef between Cook's and Opunohu Bays (Vaipahu), outer part of barrier reef, 0-2 m, 1 lv., FMNH UF401131; Moorea Is., narrow reef flat around Pt. Faupo, narrow oceanic reef flat, under rock in 10-20 cm, 1 lv., FMNH UF400488; Moorea Is., Fore reef ca. 1 km W of Avaroa Pass, outer reef slope, under rocks, 5-10 m, 1 lv., FMNH UF400884.

Tuamotu Archipelago, Anaa, high tide line, 1 lv., JT. Gambier, Mangareva, high tide line, 1985, 1 dd., JT.

Type locality. French Polynesia, Society Archipelago, Tahiti, Punaauia, Amiral Reef, coral fragments.

Distribution. Society Archipelago, Tuamotus and Gambier, living at 0-4 m, on and under stones and dead coral.

Description. Shell large for the genus, up to 19.88 mm in length at maturity (paratype JT), slender, lanceolate, flat. Shoulder weakly or strongly concave. Length/width ratio 2.09-2.58. Light cream, covered by white, cream or light tan, axially and spirally striate

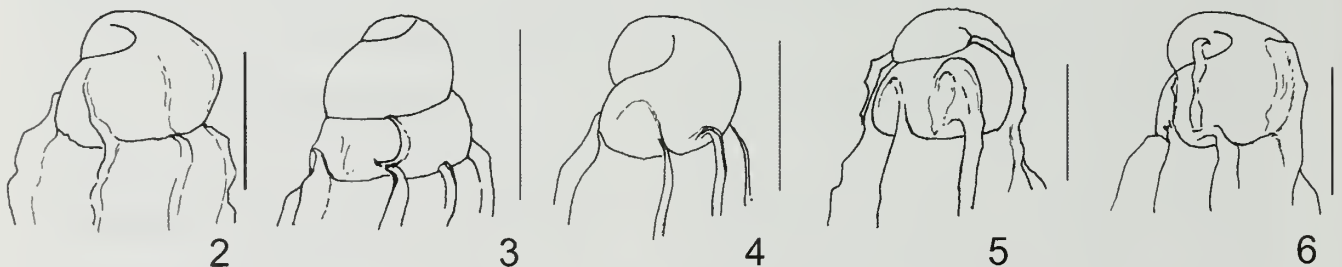
intritacalx (Figs 20-21). Aperture cream or glossy white.

Spire very high, acute with 2-2.15 protoconch whorls (Fig. 3) and up to 8 or 9 narrow, flattened, shouldered teleoconch whorls. Suture strongly impressed, partially obscured by broad buttress connecting to preceding whorl. Protoconch small, narrow, conical. Terminal lip thin, erect, of sinusigera type.

Axial sculpture consisting of low and high, narrow varices. First two whorls with 6 high varices, reduced to four high varices and two low ones with buttresses connecting to preceding whorl on third and fourth whorls, and to 2 high, 2 low and 2 reduced broad buttresses connecting to preceding whorl from fifth to last whorl. Two lateral varices on third or fourth to last whorl flat and high, giving a flattened and lanceolate appearance to the shell. Last whorl with first and fourth varices reduced to broad, flat buttresses connecting to preceding whorl; second and fifth varices low abapically, moderately high abapically, connected to preceding varix with narrow buttress; third and sixth varices high, flattened, narrow. Spiral sculpture indistinct on spire whorls. Last whorl with almost indistinguishable, broad, flat, primary cords: P1-P6. P4 highest, often only distinct cord, extending as broad, short node abapically on second and fifth varices, followed by occasionally distinct, narrow P5 and flat P6. ADP and MP occasionally distinct on second and fifth varices, not between them.

Aperture small, ovate; columellar lip narrow, smooth, rim adherent. Anal notch shallow, very broad. Outer lip weakly erect with 6-8 weak, narrow denticles within: D1-D6. D3 and D6 occasionally split. Siphonal canal short, narrow, weakly dorsally bent at tip, narrowly open.

Operculum (Fig. 7) strongly ovate with apical nucleus. Radula (Fig. 12) with rachidian bearing a broad, triangular, central cusp and on each side, a narrow, long, lateral denticle and a broad, long, lateral cusp. Lateral denticles and lateral cusps of similar length, approximately half the length of central cusp. Lateral teeth sickle-shaped, narrow.



Figures 2-6. Protoconchs (scale bars 0.5 mm)

2. *Aspella helenae* n. sp.; 3. *A. hildrunae* n. sp.; 4. *A. platylaevis* Radwin & D'Attilio, 1976; 5. *A. lozoueti* n. sp.; 6. *A. media* Houart, 1987

Remarks. *Aspella hildrunae* n.sp. was confused with *A. platylaevis* (Figs 44-45) by Tröndlé & Houart (1992: 80) due to its similar size and outline, however *A. hildrunae* differs by its more reticulated, less dense, and more roughly sculptured intritacalx (Figs 20-21 vs. 30-31) and by its different protoconch morphology, being rounded and consisting of 1.5 globose rounded whorls in *A. platylaevis*, while conical, consisting of 2-2.15 whorls in *A. hildrunae*. *A. hildrunae* also has a relatively slightly wider aperture.

Aspella hildrunae differs from *A. media*, a similarly shaped *Aspella* species, described from New Caledonia and also living in the Philippines and in Guam (coll. RH), in having a less densely reticulated intritacalx (Figs 20-21 vs. 28-29), strongly concave shoulder, and a conical protoconch of 2-2.15 whorls vs. rounded, of 1.5 whorls in *A. media*.

Aspella hildrunae differs definitively in many ways from the other species occurring in French Polynesia: *A. producta*, *A. helenae* and *A. lozoueti* n.sp., as well as from any other Indo-West Pacific species, which do not need to be compared further here (see also Table 1).

Etymology. Named after Hildrun Tröndlé, wife of the co-author, who collected several samples of the new species, in recognition for her extreme patience for about thirty years of his research.

Aspella lozoueti n. sp.

Figs 5, 8, 13, 22-25, 37-40

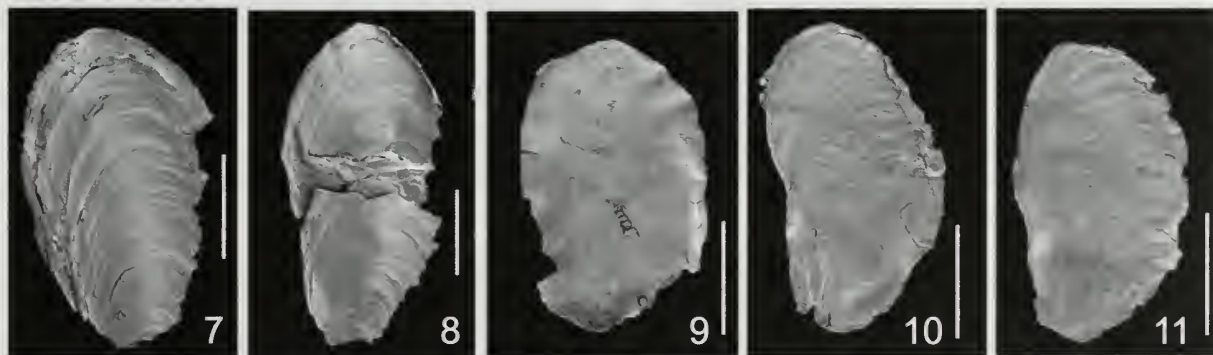
Type Material. Atelier RAPA, French Polynesia, Austral Archipelago, Rapa, north of Rapa Iti Is., stn 11, 27°37.2' S, 144°18.2' W, patch of sand on hard

substrate and dead coral, 2 m, holotype MNHN 20161.

Paratypes: SW of Pointe Gotenaonao, stn 27, 27°38.7' S, 144°19.2' W, 6 m, 1 lv., 1 dd, RH; Cave, SE of Pointe Tematapu, stn 34, 27°34.8' S, 144°19.0' W, 2-8 m, 8 lv., MNHN 20162; N of Baie de Anatakuri, stn 38, 27°37.4' S, 144°18.4' W, 2 m, 8 lv. & dd, MNHN 20163.; Baie Akatanui, stn 81, 27.35.9' S, 144°18.5' W, on rocks, 1 lv., MNHN 20164 (Fig. 40).

Other material examined. Atelier RAPA, French Polynesia, Austral Archipelago, Rapa, Rarapai Is., stn 4, 27°34.3' S, 144°22.1' W, 18 m, 2 dd; SE of Tauna Is., stn 8, 27°36.5' S, 144°17.7' W, 52-57 m, 5 lv.; Baie de Hiri, stn 9, 27°37.3' S, 144°22.2' W, 3-24 m, 1 lv.; S of Baie de Anatakuri, stn 19, 27°37.7' S, 144°18.7' W, 3 m, 1 dd; Vavai, stn 20, 27°35.4' S, 144°23.3' W, 5 m, 2 dd; E of Baie Tupuaki, stn 21, 27°34.2' S, 144°20.6' W, 5 m, 2 lv. & dd; off Cap Rukuaga, stn 22, 27°33.9' S, 144°21.7' W, 18-22 m, 1 lv.; Vavai, stn 32, 27°35.0'/35.8' S, 144°22.7'/23.0' W, 15-20 m, 1 dd; Baie de Haurei, stn 43, 27°36.8' S, 144°18.3' W, 45 m, 2 dd; NW of Tauna Is., stn 44, 27°36.3' S, 144°18.2' W, 30 m, 11 lv & dd; Baie de Haurei, stn 47, 27°36.7' S, 144°19.1' W, 33 m, 1 dd; off Pointe Rukuaga, stn 48, 27°34.1' S, 144°22.1' W, 36 m, 2 lv.; Baie Pake, stn 60, 27°37.2' S, 144°18.8' W, 1-1.5 m, 1 dd; Baie Pake, stn 61, 27°37.0' S, 144°18.6' W, 10-15 m, 1 lv.; Pointe Maomao, stn 78, 27°36.6' S, 144°18.9' W, tide, 1 lv.; Baie Pake, stn 82, 27°37.1' S, 144°18.5' W, 1 lv.; Baie Tupuaki, stn 93, 27°34.6' S, 144°20.6' W, tide, 2 dd; Pointe Komire, stn 98, 27°34.8' S, 144°22.8' W, 16-18 m, 5 lv. & dd (all MNHN).

Rapa, sediments, 35 m, 28/11/2002, 4 dd (JT).



Figures 7-11. Opercula. SEM A. Warén

7. *Aspella hildrunae* n.sp. (scale bar: 1 mm); 8. *Aspella lozoueti* n.sp. (scale bar: 500 µm); 9. *Orania ataea* n.sp. (scale bar: 1.2 mm); 10. *Pascula ozenneana* (Crosse, 1861) (scale bar: 1.2 mm); 11. *Usilla avenacea* (Lesson, 1842) (scale bar 1.5 mm)

Type locality. French Polynesia, Austral Archipelago, Rapa, north of Rapa Iti Is., stn 11, 27°37.2' S, 144°18.2' W, patch of sand on hard substrate and dead coral, 2 m.

Distribution. French Polynesia, Austral Archipelago, Rapa, living at 0-52 m.

Description. Shell small for the genus, up to 8.2-8.5 mm in length at maturity, slender, lanceolate, flat, weakly nodose. Shoulder slightly convex. Length/width ratio 2.06-2.32. White, covered by white, cream, or light tan, cancellate intritacalx (Figs 22-23). Aperture glossy white.

Spire very high, acute, with 1.5 protoconch whorls (Fig. 5) and teleoconch whorls up to 6 broad, very weakly shouldered whorls. Suture impressed, obscured by broad buttress connecting preceding whorl. Protoconch large, broad, whorls rounded, with minute rounded, pustules, more numerous and broader on last whorl and near terminal lip (Fig. 25), entirely covered by axial lamellae of first teleoconch whorl (Fig. 24); terminal lip weakly raised, gently convex.

Axial sculpture of teleoconch whorls consisting of high, narrow varices. First two whorls with 6 varices, reduced to four varices and two buttresses from third to last whorl. Ventral and dorsal varices reduced in strength abapically. Two lateral varices flat and high, giving a flattened and lanceolate appearance to the shell. Last whorl with first and fourth varices reduced to broad, flat buttresses connecting to preceding whorl; second and fifth varices low adapically, moderately high abapically, connected to preceding varix with narrow buttress; third and sixth varices high, narrow. Spiral sculpture of 6 low, occasionally nodose cords, more apparent under low-angled light (Fig. 39). Last whorl with low P1; P2 and P3 higher, of same strength and height, P4 broader and higher, P5 and P6 low, almost indistinct. Spiral cords not very distinct or absent on previous spire whorls. Other sculpture consisting of a minutely cancellate intritacalx (Figs 22-23).

Aperture small, roundly ovate; columellar lip narrow, smooth, rim adherent. Anal notch shallow, broad. Outer lip weakly erect, smooth, with 5-7 weak elongate denticles within: (ID), D1-D5. D1 occasionally split. Siphonal canal short, narrow, strongly bent dorsally, broadly open.

Operculum (Fig. 8) strongly ovate with apical nucleus. Radula (Fig. 13) with rachidian bearing a broad, triangular, central cusp and on each side, a narrow, long, lateral denticle and a broad, long, lateral cusp. Lateral denticles and lateral cusps of similar length, approximately half the length of central cusp. Lateral teeth sickle-shaped, narrow.

Remarks. *Aspella lozoueti* n.sp. resembles *A. media*

Houart, 1987, described from New Caledonia and currently also known from the Philippines and Guam (coll. RH). *A. lozoueti* differs from *A. media* in having a comparatively smaller shell with a broader protoconch and a wider aperture, a less flattened shell, and apparent pustulose sculpture and spiral cords, whereas *A. media* is smooth or with very low, almost indistinct, broad and flat spiral cords of same strength. *A. lozoueti* also has a cancellate intritacalx as in *A. media* (Figs 28-29), however being more conspicuous in *A. lozoueti*. *A. media* has not yet been recorded from French Polynesia.

Aspella lozoueti may be compared also with *Aspella platylaevis* Radwin & D'Attilio, 1976 (Figs 44-45). It differs from that species by its smaller, narrower and more strongly apparent spiral cords and more nodose shell, by its more denticulate aperture, its less concave shoulder, and mainly, by its different intritacalx (Figs 30-31) which is more cancellate in *A. lozoueti*. *A. platylaevis* has not yet been recorded from French Polynesia; previous records of that species turned out to be *A. hildrunae* n.sp.

Aspella lozoueti differs from *A. producta* (Pease, 1868), a species recorded in French Polynesia, in many ways: less cancellate intritacalx (Fig. 27), flatter shell, comparatively broader aperture and broad protoconch of 1.5 whorls vs. conical with 2.5 - 2.75 whorls in *A. producta*.

Aspella lozoueti differs greatly from other *Aspella* species from the Indo-Pacific; as a reminder: *A. acuticostata* (Turton, 1932), *A. hastula* (Reeve, 1844), *A. mauritiana* Radwin & D'Attilio, 1976, *A. media* Houart, 1987, *A. platylaevis* Radwin & D'Attilio, 1976, *A. ponderi* Radwin & D'Attilio, 1976, *A. producta* (Pease, 1861), *A. schroederi* Houart, 1996, *A. thomassini* Houart, 1985 and *A. vokesiana* Houart, 1983. Those need no further comparison here (see also Table 1).

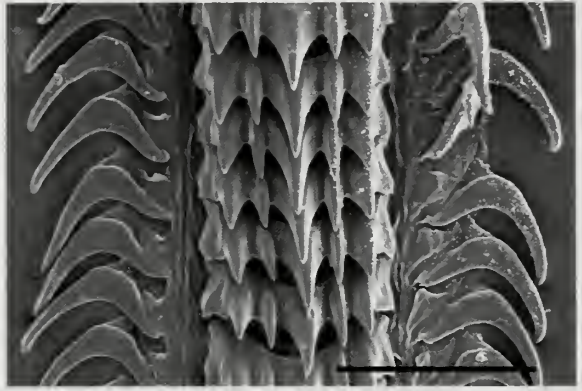
Etymology. The species is named after Pierre Lozouet, MNHN researcher and participant in the "Atelier Rapa 2002" where the species was recorded.

Figures 12-19. Radulae (scale bars: 12 & 13: 25 µm; 14, 15, 17, 18, 19: 60 µm; 16: 100 µm). SEM A. Warén

12. *Aspella hildrunae* n.sp.; 13. *Aspella lozoueti* n.sp.; 14. *Cytharomurula springsteeni* Houart, 1995; 15. *Orania atea* n.sp.; 16. *Pagodula atanna* n.sp.; 17. *Usilla avenacea* (Lesson, 1842); 18-19. *Pascula ozenneana* (Crosse, 1861).



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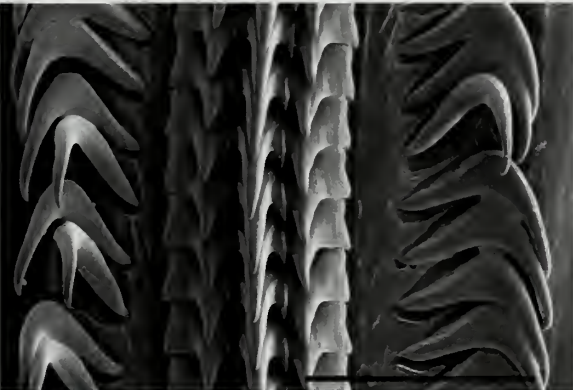
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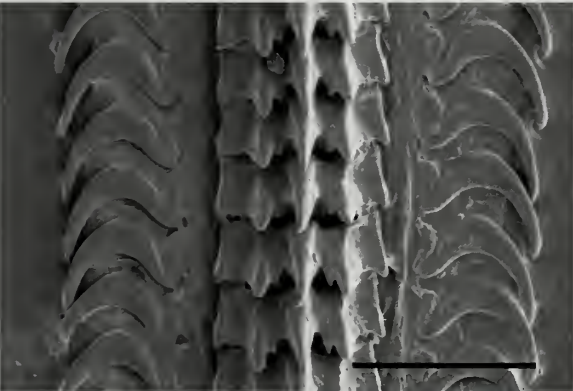
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	<i>A. helenae</i>	<i>A. hildrunae</i>	<i>A. lozoueti</i>	<i>A. platylaevis</i>	<i>A. media</i>	<i>A. producta</i>
Protoconch	Large, broad, with 1.5 whorls. Terminal lip thin, raised, slightly curved (Fig. 2)	Small, narrow, conical, with 2-2.15 whorls. Terminal lip thin, erect, of sinusigera type (Fig. 3)	Large, broad, with minute, rounded pustules, with 1.5 whorls. Terminal lip weakly curved, gently convex (Figs 5, 24-25)	Small, rounded, with 1.5 whorls. Terminal lip thin, weakly curved (Fig. 4)	Small, rounded, with 1.5 whorls. Terminal lip raised, thin, strongly curved abapically (Fig. 6)	Small, conical, with 2.5-2.75 whorls. Terminal lip erect, of sinusigera type
Spiral cords on last teleoconch whorl	Broad, low, occasionally slightly nodose. P1-P3 most obvious, P4 very low, P5-P6 almost indistinguishable	Almost indistinguishable, broad, flat cords. P4 highest, often only distinct cord; occasionally with distinct, narrow P5 and P6	Low, occasionally nodose cords. P2 and P3 higher, of same strength, P4 broader and higher, P5 and P6 low, almost indistinct	Low, almost indistinguishable cords. Occasionally with more apparent P2, P3 and P4. P4 most apparent	Indistinguishable or almost indistinct, low, broad, flat cords of same strength	P1, P2, P3 low, P4 high, more apparent on varices, P5 and P6 low. Pustolose
Intritalcax	Cancellate (Fig. 26)	Axially and spirally striate (Figs 20-21)	Minutely cancellate (Figs 22-23)	Axially striate with faint axial striae (Figs 30-31)	Axially and spirally striate (Figs 28-29)	Strongly cancellate (Fig. 27)
Buttresses	Narrow	Broad	Broad	Broad	Broad	Broad

Table 1. Details of shell morphology in some *Aspella* species.

***Dermomurex (Takia) infrons* Vokes, 1974**
Figs 49-50

Murex inermis Sowerby, 1841: pl. 192, fig. 87 (non Philippi, 1836).

Dermomurex (Takia) infrons Vokes, 1974: 2 (n.n. pro *inermis* Sowerby, 1841, non Philippi).

Material examined. BENTHAUS, Austral Archipelago, stn CAS 2008, 22°27.06' S, 151°18.88' W, 280-300 m, 1 dd, MNHN.

Distribution. South Africa, Transkei (NM), Indonesia, Tanimbar Is. (MNHN), Taiwan (MNHN), Japan (NSMT) and Austral Archipelago (MNHN).

Remarks. *Dermomurex infrons* was originally described from Japan by Sowerby (1841) as *Murex inermis*, an unavailable name because it had already been used by Philippi a few years before. Recent expeditions extended the geographical range of that species throughout the Indo-West Pacific.

Subfamily Muricopsinae Radwin & D'Attilio, 1971

Remarks. Five species were recognized in Tröndlé & Houart (1992). Ten additional species are now included, of which three are described as new, *Favartia (Favartia) salvati* n.sp. from the Marquesas and the Austral Islands, and *F. (F.) nivea* and *F. (Pygmaeapterys) avatea* from the Austral Islands. They were collected during BENTHAUS and MUSORSTOM 9 expeditions. The other species are identified as new records. Some additional species

remain unidentified and/or undescribed because of insufficient of material. The number of muricopsine species is thus increased from 5 to 15 (see Table 4).

***Favartia (Favartia) conleyi* Houart, 1999**
Figs 51-55

Favartia conleyi Houart, 1999: 14, figs 1, 4-5.

Favartia (Murexiella) lillouxi Myers & Hertz, 1999: 182, figs 1-4.

Material examined. MUSORSTOM 9, Marquesas, stn CP1159, 7°58.3' S, 140°43.7' W, 145 m, 1lv.; stn DR1257, 9°25.8' S, 140°08.2' W, 85-127 m, 2 dd, MNHN; Society Archipelago, Tahiti, La Faille d'Arue, 56 m, 1 lv, MB.

Type Material examined. *Favartia (Murexiella) lillouxi* Myers & Hertz, 1999, holotype SBMNH 144184 (photographs); *Favartia conleyi* Houart, 1999, holotype MNHN Moll 1023.

Distribution. New Caledonia, Guam and French Polynesia.

Remarks. *Favartia conleyi* was described from Guam, in the Mariana Archipelago. Since then, other specimens have been located in New Caledonia (MNHN) and in French Polynesia. However, the occurrence of *F. conleyi* in French Polynesia was already known since 1999, when *F. lillouxi*, a junior synonym of *F. conleyi*, was described from Tahiti in the Society Archipelago. *F. conleyi* was described in March 1999 while the description of *F. lillouxi* dates to April 1 of the same year.

Favartia (Favartia) guamensis
Emerson & D'Attilio, 1979

Favartia guamensis Emerson & D'Attilio, 1979: 4, figs 11, 12.

Favartia crouchi – Tröndlé & Houart, 1992: 83, fig. 33 (not *Murex crouchi* Sowerby, 1894)

Remarks. *Favartia guamensis* was considered a synonym of *F. crouchi* by Tröndlé & Houart (1992: 83); however, since then, we have had the opportunity to examine other specimens of both forms and we are now convinced that they are not conspecific. *F. guamensis* differs consistently from *F. crouchi* in having narrower penultimate and last whorls, a less conical spire, and chiefly, a noticeably different anal sulcus, which is deep, constricted into a narrowly open channel in *F. guamensis* vs. broad and obviously less deep in *F. crouchi*. The different number of varices, 4 in *F. guamensis* and 5 or 6 in *F. crouchi* cited by Shasky (1992), was not observed consistently and cannot be retained as a reliable character. However, Shasky (1992: figs 5-6) illustrated a beautiful specimen of *F. crouchi* from Kwajalein Atoll which confirms the differences observed between the two species.

Emerson & D'Attilio described the protoconch of *F. guamensis* as being low, consisting of 1.5 whorls, however, specimens from Guam and from French Polynesia present a conical protoconch of 3 whorls with a sinusigeral notch, which indicates planktotrophic larval development. That explains the wide geographical distribution in the Indo-West Pacific, from Mozambique to French Polynesia.

It has not yet been possible to examine specimens of *F. crouchi* with intact protoconch.

Favartia (Favartia) maculata (Reeve, 1845)
Fig. 56

Murex maculatus Reeve, 1845: pl. 33, fig. 136; Reeve, 1846: 108.

Murex (Ocinebra) salmonea Melvill & Standen, 1899: 162, pl. 10, fig. 2.

Favartia dorotheae Emerson & D'Attilio, 1979: 5, figs 3,4,15,16.

Material examined. MUSORSTOM 9, Marquesas, stn DW1144, 9°19.3' S, 140°03.8' W, 85-95 m, 1 dd, MNHN; BENTHAUS, stn DW1933, 24°40.72' S, 146°01.31' W, 500-850 m, MNHN, 1 dd.

Distribution. *Favartia maculata* is known from throughout the Indo-West Pacific, occurring from Mozambique to Tonga (Houart & Héros, in press). This is the first time that the species is mentioned from French Polynesia, the current eastern limit in the Pacific Ocean.

Favartia (Favartia) peregrina Olivera, 1980
Fig. 57

Murexiella peregrina Olivera, 1980 : 19, figs 1-3.

Material examined. MUSORSTOM 9, Marquesas, stn DW1242, 10°28.1' S, 138°41.1' W, 119-122 m, 1 lv., MNHN; stn DR1247, 10°34' S, 138°42' W, 1150-1250 m, 1 dd, MNHN.

Distribution. *Favartia peregrina* was described from Bohol Island in the Philippines. It was not recorded from another locality until now, although the multispiral conical protoconch of 2.15-2.30 whorls with sinusigeral notch indicates a planktotrophic larval development. It is thus expected that *F. peregrina* will prove to have a wider geographical range than currently known.

Favartia (Favartia) sp. cf. F. sykesi (Preston, 1904)
Figs 58-59

Murex sykesi Preston, 1904: 76, pl. 6, figs 7-8.

Material examined. MUSORSTOM 9, Marquesas, stn DW1203, 9°52.7' S, 139°02.2' W, 60-61 m, 1 dd, MNHN; coll. Von Cosel, Tröndlé & Tardy, Ua Huka, stn 34, 8°56'80"S, 139°35'70"W, 10-15 m, 1dd, MNHN; Nuku Hiva, Taiohae Bay, W Mataupuna, 8°56.22' S, 140°05.68' W, 10-20 m, 1 dd, MNHN; Nuku Hiva, 20-40 m, 2 dd, RH; Nuku Hiva, Taiohae, 40 m, 1 dd, RH; Uea, 30 m, 1 dd, RH.

Distribution. See remarks.

Remarks. *Favartia sykesi* (Preston, 1904) and *F. rosamiae* D'Attilio, & Myers, 1985 are probably not conspecific but certainly closely related to each other. Adults of *F. sykesi* apparently reach a larger size and have 5, or occasionally 6 varices on the last whorl instead of 4, rarely 5, in *F. rosamiae*. They also have slightly wider varices. Both species have a conical protoconch consisting of 3+ whorls with a sinusigeral notch. However, although adults can be easily separated, juveniles of both species are almost impossible to differentiate. *Favartia (Favartia) sp. cf. F. sykesi* from the Marquesas Archipelago also has a multispiral protoconch and seems to be a somewhat intermediate form between *F. sykesi* and *F. rosamiae*. The shell is smaller than *F. sykesi* reaching the same length as *F. rosamiae*, but bearing 5 varices on the last whorl as in *F. sykesi* while having narrower varices, like *F. rosamiae*.

To complicate things, one specimen of a typical *Favartia rosamiae* with 4 varices on the last whorl is included in a lot of 3 shells from Marquesas that was cited by Houart & Tröndlé (1997: 3) (Fig. 60).

Favartia sykesi was described from Sri Lanka and is currently known from a few scattered localities: Sri Lanka, Java, Thailand and Phuket (all RH).

Favartia rosamiae was described from the Philippines. Other specimens have been collected in Japan (Tsuchiya, 2000: 377), Papua New Guinea, Moluccas (RH) and New Caledonia (MNHN).

Examination of additional material from localities between the Philippines, Papua New Guinea and French Polynesia is necessary to reach a conclusion. If further studies confirm the French Polynesian form to be conspecific with *F. rosamiae* or *F. sykesi*, it would mean an extension of the geographical range exceeding 8000 km.

***Favartia (Favartia) nivea* n. sp.**

Figs 66-67

Type material. BENTHAUS, French Polynesia, Austral Archipelago, President Thiers Bank, stn DW1937, 24°39.8' S, 145°56.4' W, 469-500 m, 1 dd, holotype MNHN 20171.

Type locality. French Polynesia, Austral Archipelago, President Thiers Bank, stn DW1937, 24°39.8' S, 145°56.4' W, 469-500 m.

Distribution. Austral Archipelago, President Thiers Bank, depth of living specimens unknown.

Description. Shell small for the genus, 11.35 x 6.26 mm at maturity, length/width ratio 1.80, broadly lanceolate, heavy, weakly squamous. Shoulder sloping, weakly concave. White with only small brown blotches near varices and dorsally on siphonal canal; aperture white.

Spire high with 1.5 protoconch whorls and 5 shouldered, weakly spinose whorls. Spire whorls narrow, last whorl broad with expanded apertural varix. Suture weakly adpressed. Protoconch large, whorls rounded; terminal lip eroded.

Axial sculpture of teleoconch whorls consisting of high, broad varices, each with short, broad, blunt spines: first teleoconch whorl with 8 varices, second with 7, third with 6; fourth and last whorl with 4, apertural varix webbed. Spiral sculpture of high,

strong, broad, squamous, primary cords grooved with 1 or 2 narrow spiral striae. Spiral sculpture of first whorl eroded, second and third with P1 and P2, fourth with P1-P3, last whorl with IP, P1-P6. Spiral cords of last whorl visible only on varices. IP flat, broad, probably split. P1-P5 approximately of same strength, strong, high, broad, with deep pits between each pair of cords, P6 small, narrow, low. Intervarical area smooth or with only weakly apparent cords. Cords extending on varix, forming broad, blunt, open spines. Aperture small, ovate; columellar lip broad, slightly flaring, smooth, completely erect with small notch abapically. Anal notch shallow, broad. Outer lip weakly erect, crenulate, with 7 strong elongate denticles within: ID split, D1-D5. Adapical denticles low, increasing in strength abapically, D4 and D5 strongest. Siphonal canal short, broad, slightly recurved dorsally, narrowly open, with 2 cords, ADP and MP extending as short, blunt, open spines, MP spine shorter.

Operculum and radula unknown.

Remarks. *Favartia nivea* n.sp. differs from other *Favartia* species with lecithotrophic larval development such as *F. ponderi* Myers & D'Attilio, 1989 known from scattered localities in the Pacific, *F. peasei* (Tryon, 1880) from the Indo-West Pacific, *F. morisakii* Kuroda & Habe, 1961 from Japan, *F. phantom* (Woolacott, 1957) from west Australia, and *F. voorwindei* Ponder, 1972 from Queensland, Australia, in having almost smooth intervarical areas, fewer axial varices on the last teleoconch whorl, a narrow, high, webbed apertural varix, narrower spire whorls, and a comparatively narrower aperture.

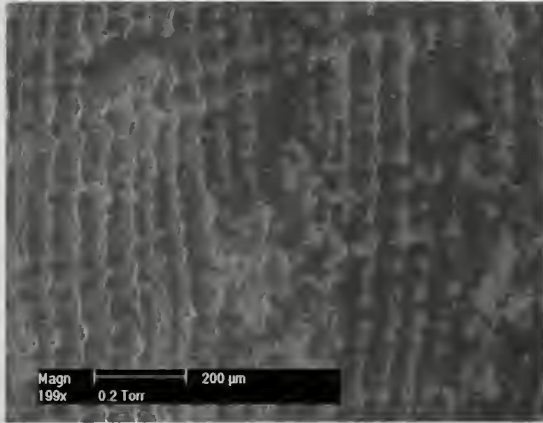
Favartia salvati n.sp. is sympatric with *F. nivea* n.sp. at station 1937, however *F. nivea* differs in many aspects of shell morphology: comparatively smaller, narrower spire, smoother spiral cords, decreasing in strength abapically, almost smooth intervarical areas, narrower aperture and shorter siphonal canal. The protoconch is also different, large, rounded, consisting of 1.5 whorls in *F. nivea* vs. small, conical, consisting of 2+ whorls in *F. salvati*.

Etymology. *Nivea* (L): white.

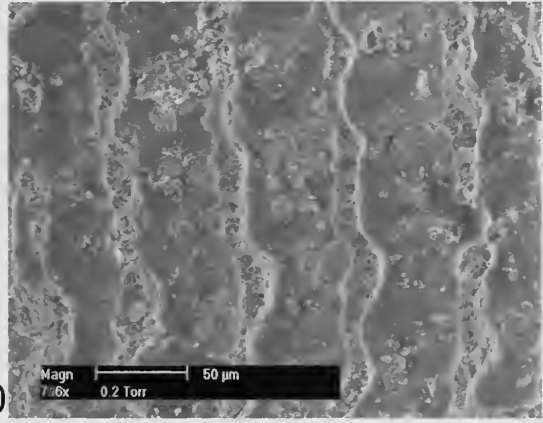
Figures 20-27. Details of shell microsculpture

20-21 & 27: uncoated SEM J. Cillis; 22-25: gold coated. SEM A. Warén

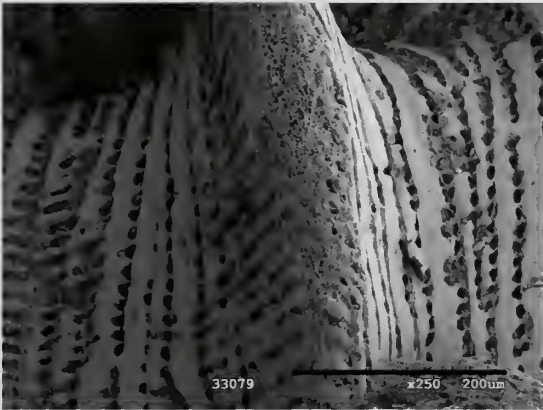
20-21. *Aspella hildrimae* n.sp. (inritacalx); 22-25. *Aspella lozoneti* n.sp. (22-23. inritacalx; 24-25. Protoconch); 26. *Aspella helenae* n.sp. (inritacalx); 27. *Aspella producata* (Pease, 1861) (inritacalx).



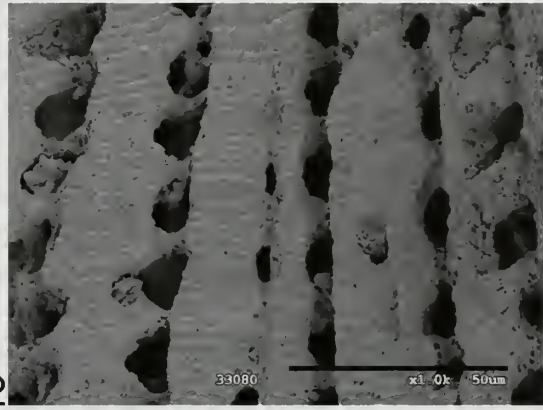
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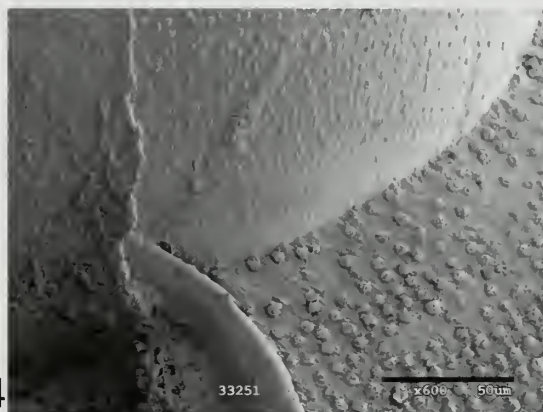
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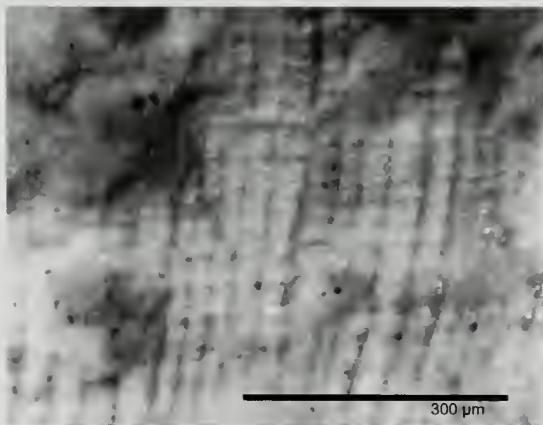
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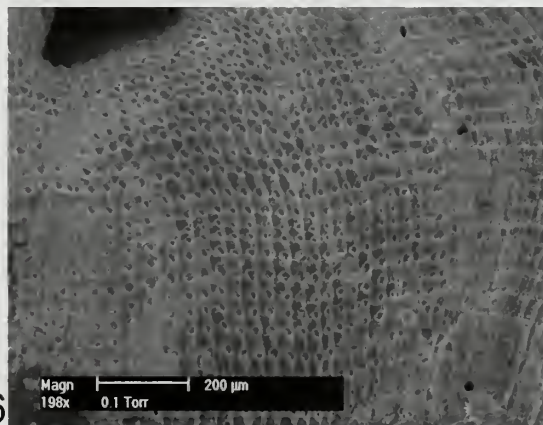
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(Favartia) salvati n. sp.
Figs 61-65

Type material. BENTHAUS, French Polynesia, Austral Archipelago, Tubuai Island, stn DW1959, 23°19.8' S, 149°30.4' W, 95-380 m, 2 lv., holotype MNHN 20167, and 1 paratype RII; President Thiers Bank, stn DW1937, 24°39.8' S, 145°56.4' W, 469-500 m., 1 dd, paratype MNHN 20169; stn DW1958, 23°19.6' S, 149°30.3' W, 80-150 m, 1 dd, paratype MNHN 20168; Rimatara, stn DW2013, 22°38.6' S, 152°49.7' W, 80-93 m, 1 lv, paratype MNHN 20170.

Other material examined. MUSORSTOM 9, Marquesas, Motu One, stn DW1281, 7°48' S, 140° 21' W, 450-455 m, 1 dd,

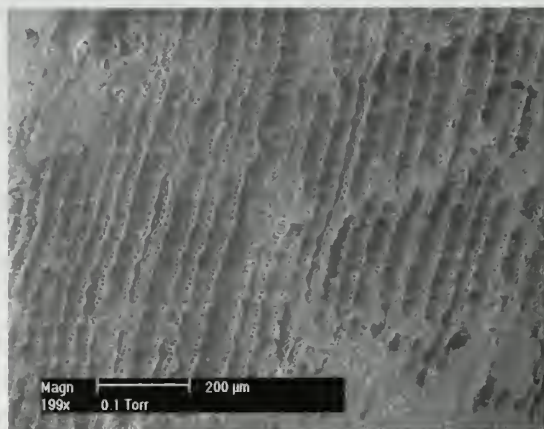
Type locality. French Polynesia, Austral Archipelago,

Tubuai Island, stn DW1959, 23°19.8' S, 149°30.4' W, 95-380 m.

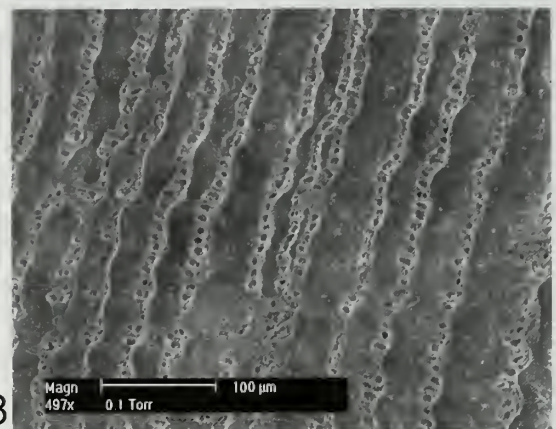
Distribution. French Polynesia, Marquesas and Tubuai Islands, living at 80-95 m.

Description. Shell medium sized for the genus, up to 20.9 mm in length at maturity, length/width ratio 1.47-1.80, broadly ovate, heavy, squamous. Shoulder weakly sloping, convex. Light cream with light brown band on shoulder, near suture and between P5 and ADP, occasionally extending on siphonal canal. Aperture white.

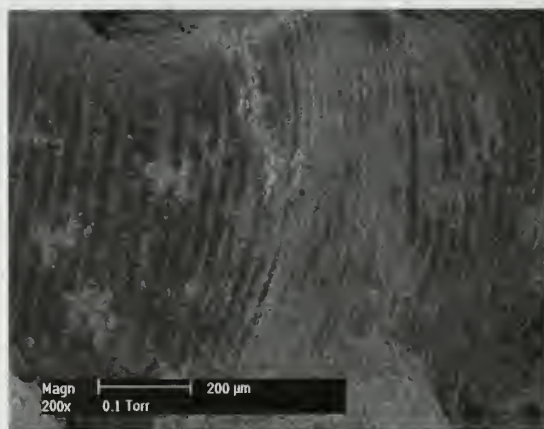
Spire high with 2+ protoconch whorls (partly broken) and teleoconch up to 5 or 6 broad, convex, shouldered, nodose whorls. Suture impressed, obscured by small lamellae of following whorl. Protoconch small, conical, whorls convex; terminal lip heavy, broad, of sinusigera type.



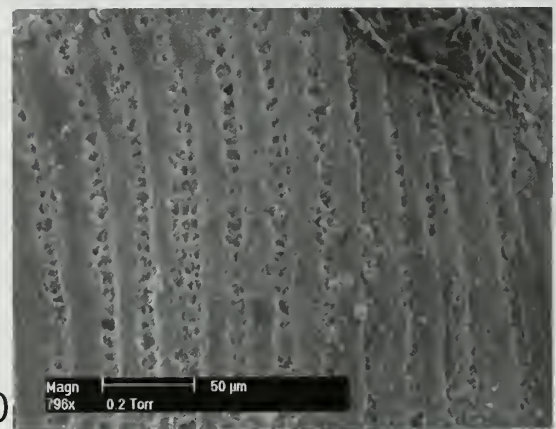
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Figures 28-31. Intritacalx (uncoated SEM J. Cillis)

28-29. *Aspella media* Houart, 1987; 30-31. *Aspella platylaevis* Radwin & D'Attilio, 1976

Axial sculpture of teleoconch whorls consisting of high, strong, broad, rounded, squamous varices: first and second teleoconch whorls with 5 or 6 varices, decreasing to 5 on third, 5 or 6 on fourth or fifth, last whorl with 3 or 4 varices. Distance between penultimate and apertural varix on last whorl twice as large as between other varices. Other axial sculpture of broad, squamous lamellae between each pair of varices, more apparent on shoulder, on abapical part of last whorl, and on siphonal canal. Small node near penultimate varix of last whorl, between penultimate and last varix. Spiral sculpture of high, broad, squamous, spirally grooved, primary cords, and squamous threads. Only P1 and P2 visible from first to penultimate whorls. Spiral threads occur from penultimate whorl on. Last whorl with IP, faintly apparent on apertural varix only, P1-P5; P6 reduced or absent. P2 broadest, high, forming strongly shouldered last whorl and with small knob near penultimate varix. P1 slightly narrower, P3-P5 weakly decreasing in strength abapically. Spiral cords between varices obvious from first to penultimate whorl, reduced or absent on last whorl, very obvious on axial varices, forming short, squamous, webbed spines with deep pits in interspaces.

Aperture large, roundly ovate; columellar lip broad, smooth; lip strongly erect, adherent at adapical extremity. Anal notch shallow but wide. Outer lip erect, crenulated, with weak, low denticles within: (ID), P1-P5 split. Siphonal canal long, 45-47 % of shell length, broad, straight, slightly bent abaxially and strongly recurved at tip, ventrally narrowly open. Ornamented with low ADP, MP and ABP, approximately similar in width, extending as short, webbed, squamous spines, decreasing in strength abapically.

Operculum and radula not examined.

Remarks. *Favartia salvati* n.sp. is part of a group of 16 or 17 *Favartia* species with more or less shouldered shell, squamous sculpture, high, webbed varices on the last whorl, expanded apertural varix and more or less long siphonal canal with webbed spines. Some of the species have been included in *Murexiella* (type species: *Murex hidalgoi* Crosse, 1869), mainly due to the webbed structure of the varices (Vokes, 1971, Ponder, 1972, Emerson & D'Attilio, 1979, D'Attilio & Myers, 1985, Houart, 1997 among others). *Favartia salvati* n.sp. differs from many species in that group, by having a conical protoconch with more than two whorls and a sinusigeral notch. It differs from *F. rosamiae* D'Attilio & Myers, 1985, a species with conical protoconch occurring throughout the Indo-West Pacific, by reaching a larger size relative to its number of teleoconch whorls, by having a more shouldered last whorl, a larger gap between P1 and P2, more webbed varices and a longer, straighter siphonal canal with three broad, low, webbed cords instead of two high cords extending as broad open spinelets in *F. rosamiae*.

It differs from *F. sykesi* (Preston, 1904) by the same morphological characters above and by having a large gap between penultimate and apertural varix, and 3 or 4 varices on the last whorl instead of 5, or occasionally 6 in *F. sykesi*.

Favartia salvati differs from *F. confusa*, a species with unknown protoconch morphology, by having more strongly shouldered whorls, with only very faint IP apparent on apertural varix only vs obvious adis. IP, abis on shoulder in *F. confusa*, by having a large gap between penultimate and last varix with a small node near penultimate varix, a narrower, higher spire, a relatively wider aperture, a longer siphonal canal, and more expanded varices.

Etymology. At the request of Philippe Bouchet, this new species is named for Bernard Salvat, who started his career as a malacologist and author of "Coquillages de Polynésie", and later became the indefatigable advocate of biodiversity research and marine conservation in French Polynesia.

Favartia (Pygmaepterys) avatea n. sp.

Figs 69-72

Type material. BENTHAUS, French Polynesia, Austral Archipelago, Rimatara, stn 2015, 22°38.16' S, 152°49.55' W, 250-280 m, 1 dd, holotype MNHN 20172; Tubuai, stn DW1958, 23°19.64' S, 149°30.3' W, 80-150 m, 1 dd, paratype MNHN 20173; Rimatara, stn DW2020, 22°36.96' S, 152°49.13' W, 920-930 m, 1 dd, paratype MNHN 20174.

Other material examined. BATHUS 2, New Caledonia, stn DW 749, 22°33' S, 168°26' E, 233-258 m, 1 dd.

Type locality. French Polynesia, Austral Archipelago, Rimatara, stn 2015, 22°38.16' S, 152°49.55' W, 250-280 m.

Distribution. Austral Archipelago, Tubuai and Rimatara, and New Caledonia. Depth of living specimens unknown.

Description. Shell large for the subgenus, up to 11.2 x 6.4 mm at maturity (holotype). Length/width ratio 1.75. Slender, lanceolate, broadly ovate, heavy. Shoulder weakly sloping, weakly concave. Light cream with brown tan above and on siphonal canal. Aperture white.

Spire high with 1.5 protoconch whorls and up to 5 broad, convex, weakly shouldered whorls. Suture impressed, obscured by axial lamellae of following whorls. Protoconch small, whorls rounded; terminal lip unknown (eroded).

Axial sculpture of teleoconch whorls consisting of relatively low, broad, rounded varices. Other axial sculpture of numerous, thin, scabrous lamellae on the whole surface: axial sculpture of first whorl eroded, second with 9 varices, third and fourth with 7 or 8, last whorl with 6. Apertural varix expanded, narrow,

webbed, aperturally densely fimbriate, webbing extending on siphonal canal. Spiral sculpture of high, narrow, nodose, primary cords and numerous squamous threads. First to antepenultimate whorl with visible P1 and P2, penultimate with P1, P2 and P3. Last whorl with P1-P6. P1 to P5 almost similar in strength and equidistant, P6 narrow, half the size of other primary cords, followed by ADP and MP. Other spiral sculpture of 3-5 narrow, squamous threads between each pair of primary cords.

Aperture narrow, ovate; columellar lip narrow with 3 or 4 strong knobs adapically, rim adherent. Anal notch deep, narrow. Outer lip with 5 strong denticles within: ID, D1-D2 fused, D3, D4, D5. D2 strongest, other denticles smaller, of similar size. Siphonal canal short, slightly recurved dorsally, open. Operculum and radula unknown.

Etymology. *Avatea* is the goddess of the moon in Polynesian mythology.

Remarks. *Favartia avatea* differs from *F. funafutiensis* by having a stronger spiral sculpture, a less shouldered shell, an aperture with stronger denticles and chiefly a different protoconch consisting of 1.5 whorls denoting non-planktotrophic larval development vs. a conical planktotrophic protoconch of 2+ whorls and a terminal lip of sinusigera type in *F. funafutiensis*.

F. avatea differs from *F. menoui* (Houart, 1990) and *F. cracentis* (Houart, 1996), in being broader and larger relative to the number of teleoconch whorls and in having 6 varices on the last whorl vs. 3 in *F. menoui* and *F. cracentis*. *Favartia avatea* differs considerably from the other Indo-West Pacific species, which do not need to be compared further here.

Favartia (Pygmaepterys) sp. 1

Fig. 68

Material examined. BENTHAUS, French Polynesia, Austral Archipelago, President Thiers Bank, stn DW1932, 24°40.76' S, 146°01.52' W, 500-800 m; Tubuai, stn DW1957, 23°18.8' S, 149°29.34' W, 558-1000 m, 1 dd; Tubuai, stn DW1959, 23°19.77' S, 149°30.44' W, 95-380 m, 1 dd; Tubuai, stn DW1961, 23°20.9' S, 149°33.5' W, 470-800 m, 1 dd.

Remarks. Compared with *F. avatea* n.sp., this species has a more angulate shell with fewer axial varices (5 vs. 6 on last whorl and 6 vs. 7 or 8 on the other whorls) fewer axial scabrous lamellae on the whole surface, a weakly broader aperture, a broader anal notch, and a slightly different spiral sculpture with the presence of IP on penultimate and last whorls. It could be a form of the previous species, although the differences seem to be constant. Until more material is available, we will consider it here as a different species but will not name it.

Favartia (Pygmaepterys) sp. 2

Figs 73-74

Material examined. BENTHAUS, French Polynesia, Austral Archipelago, Rimatara, stn DW2020, 22°36.96' S, 152°49.13' W, 920-930 m, 1 dd, MNHN.

Remarks. The species is sympatric with *F. (P.) avatea* n.sp., however, it differs in having more apparent, narrower axial varices, a roundly ovate aperture with a shallower anal notch, more conspicuous spiral primary cords and chiefly, a last teleoconch whorl with only 3 axial varices. Upon first

Figures 32-50

32-35. *Poirieria (Paziella) tanaoa* Houart & Tröndlé n.sp.

32-33. Holotype MNHN 20159, 8.2 mm; **34.** Paratype MNHN 20160, 5.4 mm; **35.** Detail of the aperture, paratype MNHN (scale bar: 1.5 mm).

36. *Pteryomarchia aparrii* (D'Attilio & Bertsch, 1980). BENTHAUS, Austral Archipelago, stn DW1914, 27°03.52' S, 146°04.01' W, 150 m, MNHN, 21.6 mm.

37-40. *Aspella lozoneti* Houart & Tröndlé n.sp.

37-39. Holotype MNHN 20161, 8.2 mm (scale bar: 1 mm). **40.** Paratype MNHN 20164, 8 mm.

41-43. *Aspella hildrunae* Houart & Tröndlé n.sp. Holotype MNHN 20165, 15.1 mm.

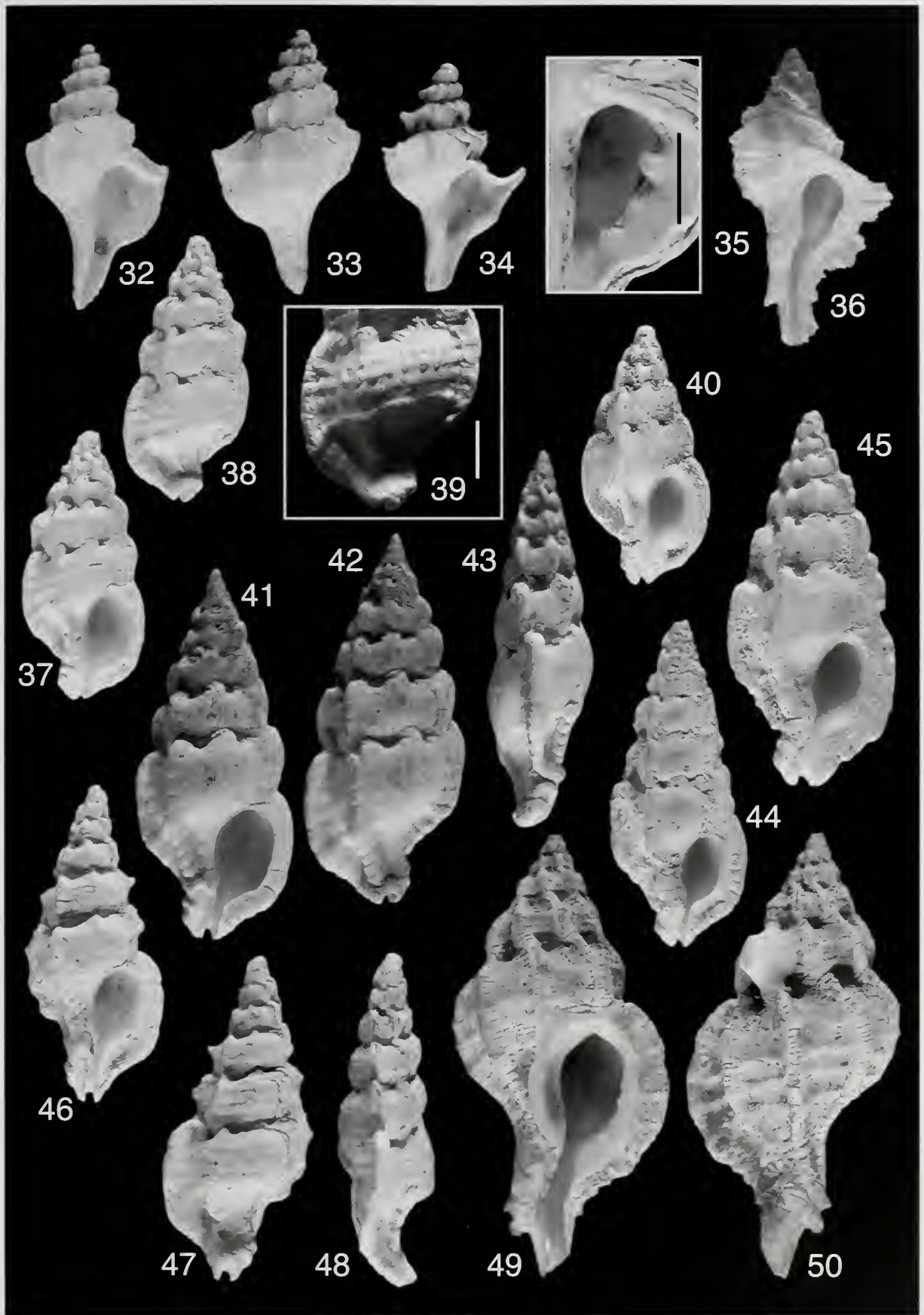
44-45. *Aspella platylaevis* Radwin & D'Attilio, 1976.

44. Holotype ANSP 285147, Woodman Pt, Cockburn Sound, West Australia, ca. 37.75 S, 114.40 E, 11.8 mm.

45. Paratype ANSP 201642, S.W. Rattakadokorn Id, Palau Ids, 7.30' N, 134.30' E, Western Carolines, 14.11 mm.

46-48. *Aspella helenae* Houart & Tröndlé n.sp. Holotype MNHN 20166, 8.8 mm.

49-50. *Dermomurex (Takia) infrons* Vokes, 1974. BENTHAUS, Austral Archipelago, stn CA 2008, 22°27.06' S, 151°18.88' W, 280-300 m, 23.1 mm.



inspection, it differs from the three other three-varical *Pygmaepterys* species, namely *F. (P.) dondani* (Kosuge, 1984), *F. (P.) menoui* Houart, 1990 and *F. (P.) cracentis* Houart, 1996, but the single specimen collected is damaged, which prevents a valid comparison with the other species.

***Murexsul tokubeii* Nakamigawa & Habe, 1964**

Figs 75-76

Murexsul tokubeii Nakamigawa & Habe, 1964: 28, pl. 2, fig. 4.

Material examined. BENTHAUS, Austral Archipelago, stn DW1881, 27°54.6' S, 143°28.5' W, 112-121 m, 1 dd; stn DW1884, 27°53.75' S, 143°32.9' W, 570-620 m, 1 dd; stn DW1937, 24°39.79' S, 145°56.43' W, 469-500 m, 1 dd; stn DW1952, 23°49.2' S, 147°53.37' W, 300-372 m, 2 lv.; stn DW1979, 23°21.74' S, 150°43.87' W, 176-340 m, 1 dd (all MNHN).

Distribution. Specimens of *M. tokubeii* have been recorded from southern Japan, Taiwan and the Philippines. The specimens reported from South Africa are conspecific with *M. marianae* (Houart, 2003) (see Remarks). The discovery of typical specimens in the Austral Archipelago means a geographical range extension of over 10,000 km in the Pacific.

Remarks. The shells illustrated by Houart (1991) as *Murexsul tokubeii* from South Africa are conspecific with *Murexsul marianae* (Houart, 2003), originally described as *Favartia*. It differs from the typical *M. tokubeii* in having a comparatively broader last teleoconch whorl, lower varices, a narrower siphonal canal, more uniformly sized and more crowded primary cords, and in having the median primary cord on the siphonal canal being closer to the aperture.

Subfamily Ergalataxinae Kuroda, Habe & Oyama, 1971

Remarks. The genus *Morula* considered in Thaidinae (= Rapaninae) by Tröndlé & Houart (1992) was moved to Ergalataxinae by Houart (2004). Several other genera included in Ergalataxinae by Tröndlé & Houart (1992) and Houart & Tröndlé (1997) are considered here as doubtful of belonging to any existing subfamily of Muricidae. Those genera are *Maculotrion*, *Phrygiomurex* and *Phyllocoma* and are listed separately until more is known about the species included in those genera. Fifteen species have been added in Ergalataxinae since Tröndlé & Houart (1992) and Houart & Tröndlé (1997), two of those are new species: *Orania maestratii* n.sp. from the Austral Islands and *O. atea* n.sp. from the Marquesas. Two species were recently described (Houart, 2000 and

2002a), ten are new records, and one species remains unidentified because of lack of material.

***Cytharomorula ambonensis* (Houart, 1996)**

Figs 83-84

Pascula ambonensis Houart, 1996: 383, figs 17-18.

Material examined. MUSORSTOM 9, Marquesas, stn DW 1281, 7°47.8 S, 140°20.8 W, 450-455 m, 1 dd, MNHN.

Distribution. *Cytharomorula ambonensis* was described from Ambon and subsequently been recorded from a few scattered localities: Guam (RH), New Caledonia (MNHN) and Mozambique (RH).

Remarks. *Cytharomorula ambonensis* is part of a group of small species, which also includes *C. lefevreiana* (Tapparone Canefri, 1880), *P. paucimaculata* (Sowerby, 1903) and *C. danigoi* Houart, 1995. The four species live in French Polynesia and their extensive geographical range is certainly due to their planktotrophic larval development. The four species have a conical protoconch of 3+ whorls with sinusigeral notch.

***Cytharomorula danigoi* Houart, 1995**

Fig. 82

Cytharomorula danigoi Houart, 1995: 253, figs 20, 27, 65-66.

Material examined. BENTHAUS, Austral Archipelago, stn DW 1885, 27°51.87' S, 143°32.59' W, 700-800 m, 1 dd, MNHN.

Distribution. The species was described from New Caledonia and has not been recorded again since.

Remarks. See comments under *C. ambonensis*.

***Cytharomorula grayi* (Dall, 1889)**

Cytharomorula sp. cf. *C. grayi* – Tröndlé & Houart, 1992: 88, fig. 88

Remarks. Since Tröndlé & Houart (1992), where we had doubts about the true identity of the Marquesas species, one of us (RH) has had the opportunity to examine more material from various Indo-West Pacific localities (Houart, 1995: 254). As a result, we still cannot separate it from the West and East Atlantic *Cytharomorula grayi*. One of us (RH) still has other material to examine and compare, but until any definitive conclusion is reached, we will consider the Marquesas species as conspecific with the Atlantic one, speculating that its wide distribution is probably due to a planktotrophic life of exceptional duration.

Cytharomorula lefevreiana
(Tapparone Canefri, 1880)

Remarks. The specimen illustrated as *Pascula benedicta* (Melvill & Standen, 1895), a synonym of *C. lefevreiana*, in Tröndle & Houart (1992: fig. 45) is most probably a juvenile of *Orania simonetae* Houart, 1995 (see under that species). However, *C. lefevreiana* was commented and illustrated from the Mururoa Atoll, Tuamotus by Cernohorsky (1982: 128, figs 14-15), so that its occurrence in French Polynesia remains confirmed.

Cytharomorula paucimaculata (Sowerby, 1903)
Fig. 81

Pentadactylus paucimaculatus Sowerby, 1903: 496.
Murex dollfusi Lamy, 1938: 54, fig. 1.

Material examined. MUSORSTOM 9, Marquesas, stn DW 1148, 9°18.9' S, 140°06.3' W, 300 m, 1 dd; stn DW 1154, 7°58.5' S, 140°43.7' W, 102 m, 2 dd; stn DW 1170, 8°45.1' S, 140°13.1' W, 104-109 m, 1 dd; stn DW 1177, 8°45.1' S, 140°14.1' W, 108-112 m; stn DW 1178, 8°46.1' S, 140°14.5' W, 74-75 m, 1 dd; stn DW 1182, 8°45.6' S, 140°03.9' W, 90-120 m; stn DR 1200, 9°49.9' S, 139°08.9' W, 96-100 m, 8 dd; stn DW 1204, 9°52.6' S, 139°03.2' W, 60m, 2 dd; stn DW 1209, 9°48.9' S, 139°09.5' W, 117 m, 1 dd; stn DW 1210, 9°50.4' S, 139°00.5' W, 98-100 m, 3 dd; stn DR 1223, 9°44.5' S, 138°51.3' W, 90-150 m, 2 dd; stn DR 1224, 9°44.6' S, 138°51.1' W, 115-120 m, 3 dd; stn CP 1228, 9°44.6' S, 138°51.5' W, 107-108 m, 1 dd; stn DW 1242, 10°28.1' S, 138°41.1' W, 119-122 m, 2 dd; stn DR 1254, 9°48.5' S, 139°38.1' W, 386-413 m, 3 dd; stn DR 1305, 8°54.1' S, 140°14.5' W, 90-155 m, 3 dd. BENTHAUS, stn DW 1869, 28°58.4' S, 140°15.4' W, 240-440 m, 1 lv; stn DW 1926, 24°38.16' S, 146°00.82' W, 50-90 m, 2 lv; stn 1952, 23°49.2' S, 147°53.37' W, 300-372 m, 1 dd; stn DW 1959, 23°19.77' S, 149°30.44' W, 95-380 m, 1 dd; stn DW 1996, 22°29.06' S, 151°21.93' W, 489-1050 m, 1 dd; stn DW 2013, 22°38.57' S, 152°49.73' W, 80-93 m, 1 llv., 1 dd (all MHN).

Distribution. *Cytharomorula paucimaculata* was described from Japan and is known throughout the Indo-West Pacific from scattered localities such as the Red Sea (MNHN), the Indian Ocean (MNHN), Japan (type locality), the Philippines (MNHN, RH), New Caledonia (MNHN), Fiji (Houart & Héros, in press) and the Tuamotu Archipelago (JT). It is very common in the Philippines.

Remarks. See comments under *C. anbonensis*.

Cytharomorula springsteeni Houart, 1995
Figs 14, 78-79

Cytharomorula springsteeni Houart, 1995: 256, figs 26, 69-71.

Material examined. MUSORSTOM 9, Marquesas, stn DR 1197, 8°57.4' S, 140°01.9' W, 277-372 m, 1 lv; stn DW 1208, 9°48.9' S, 139°09.5' W, 117 m, 2 lv., 2 dd; stn DR 1223, 9°44.5' S, 138°51.3' W, 90 m, 4 dd; stn DR 1247, 10°34.0' S, 138°41.6' W, 1150-1250 m, 1 lv.; stn DW 1287, 7°54.5' S, 140°40.2' W, 163-245 m, 1 dd; stn DW 1288, 8°53.9' S, 139°38.0' W, 200-220 m, 7 dd; stn DR 1298, 8°49.1' S, 140°17.1' W, 305 m, 1 lv., 2 dd.

BENTHAUS, Austral Archipelago, stn DW 1979, 23°21.74' S, 150°43.87' W, 176-340 m, 1 dd; stn DW 2018, 22°37.15' S, 152°49.06' W, 770-771 m, 1 dd (all MNHN).

Distribution. Japan, Philippines, Vanuatu, Marquesas and Austral Archipelago, living at 90-305 m.

Remarks. *Cytharomorula springsteeni* was described from Mactan Island in the Philippines. Two other specimens were recorded from Vanuatu (MNHN), living at 207-280 m. The shell illustrated by Tsuchiya (2000: 38, fig. 88) as *C. pinguis* from Ogasawara Islands in Japan (no depth mentioned) is another specimen of *C. springsteeni*. The multispiral protoconch indicates a planktotrophic development; it is thus not surprising to record this species from different localities in the Pacific Ocean. The depth for a single live-collected specimen at stn DR 1247 (1150-1250 m) seems to be extreme. We would welcome other specimens to confirm this depth, which we consider doubtful.

The radula (Fig. 14) was never illustrated before. It consists of a rachidian bearing a narrow, long, central cusp, and on each side a short, narrow, lateral denticle, a long, narrow, lateral cusp bent to the outside, and small marginal folds. Lateral teeth broad and sickle-shaped.

Genus *Morula* Schumacher, 1817

The intricate history of some French Polynesian species of *Morula* was reviewed by Houart (2002a). We consider it useful to illustrate again all those species, to repeat here the introduction from Houart (2002a) and to give a summary in Table 2:

"Problems began when Pease (1868) described three species in the buccinid genus *Engina* from the Tuamotu Archipelago (then known as Paumotus): *E. nodicostata*,

E. variabilis and *E. parva*, all of which actually belong to *Morula* (Muricidae). Problems were compounded by the fact that they have been subsequently misidentified many times.

In selecting a lectotype for *E. variabilis* from the three syntypes (MCZ), Cernohorsky (1987) noted that Tryon (1883) considers *Engina variabilis* to be a synonym of *E. nodicostata* described by Pease (1868) one page earlier. However, Dautzenberg & Bouge (1933) insist that *Morula variabilis* is a good species and they cite several Polynesian localities where the species has been collected". Cernohorsky did not make any decision regarding *E. nodicostata*.

Cernohorsky (1987) also illustrated one of the four syntypes of *Engina parva* in ANSP, adding that all four specimens are greatly worn. The name *Engina parva* Pease, 1868 is a secondary homonym of *Ricinuula parva* Reeve, 1846, both being included in *Morula*. Because all syntypes of *E. parva* are worn and faded, also because Pease's description is rather conflicting with his illustration and with the specimens, rather than to give a new name for *Engina parva* Pease (non Reeve, 1846), Cernohorsky decided to describe it as a new species with clearly recognizable holotype and paratypes. He described it as *Morula parvissima* Cernohorsky, 1987. Unfortunately, he wrongly identified *E. parva* and *E. nodicostata*, as a consequence of which *M. parvissima* becomes a synonym of *M. nodicostata*.

Tröndle & Houart (1992) concluded that *E. nodicostata* and *E. variabilis* were synonyms because I (RH) then personally examined a specimen received from ANSP labelled "type" with the note "matches the description but not the figure" (Houart & Tröndle, 1992: figs 85-86). I then examined both the "type" (ANSP 34543) and

six syntypes (then MCZ 178941). When returning the loan to MCZ I indicated that the 6 syntypes of *E. nodicostata* are in fact *E. parva* Pease, 1868 = *Morula parvissima* Cernohorsky, 1987, following the conclusion of Cernohorsky (1987). In fact, the specimen labelled *E. nodicostata* which I received in loan from ANSP labelled as "type", and illustrated as the holotype in Tröndle & Houart (1992), is identical to *E. variabilis* and is certainly not a type specimen of *E. nodicostata*. The material was probably mixed at some time.

Cernohorsky (1987) illustrated the holotype of *Morula angulata* (Sowerby, 1893), and a specimen from Mururoa Atoll, Tuamotu Archipelago, which he considered to be conspecific. Having observed differences between the holotype of *M. angulata* and the specimen from Tuamotu illustrated by Cernohorsky (1987), Houart & Tröndle (1997) described the latter as *Morula cernohorskyi*. In doing that they also wrongly identified *R. parva*, but without any negative consequence. In fact, *M. parva* (Pease, 1868) [not *M. parva* (Reeve, 1845)] is the species subsequently named *M. cernohorskyi*.

Johnson (1994) selected a lectotype for *E. nodicostata* (now MCZ 260614). He mentioned also a paralectotype (MCZ 260617) where it was noted "matches the description but not the figure". These specimens are part of the above material I received on loan from MCZ (then MCZ 178941).

Wishing to classify all these species once and for all correctly, I decided to examine the whole type material in ANSP and MCZ and to compare everything, together with recently collected material".

Figures 51-68

51-55. *Favartia (Favartia) conleyi* Houart, 1999.

51. Society Archipelago, Tahiti, La Faille d'Arue, 56 m, MB, 14 mm (photo MB); **52-53.** Holotype MNHN 1023, Guam, Piti lagoon, 15.2 mm (photo MNHN); **54-55.** *Favartia lillouxi* Myers & Hertz, 1999, holotype SBMNH 144184, Tahiti, off Pointe Taharaa, 12.5 mm (photo courtesy B. Myers & C. Hertz).

56. *Favartia (Favartia) maculata* (Reeve, 1845). BENTHAUS, stn DW1933, 24°40.72' S, 146°01.31' W, 500-850 m, MNHN, 11.8 mm.

57. *Favartia (Favartia) peregrina* Olivera, 1980. MUSORSTOM 9, Marquesas, stn DW1242, 10°28.1' S, 138°41.1' W, 119-122 m, MNHN, 6.2 mm.

58-59. *Favartia (Favartia) sp. cf. F. sykesi* (Preston, 1904).

58. Nuku Hiva, Taiohae, Marquesas, 40 m, RH, 14.8 mm; **59.** Nuku Hiva, Marquesas, 20-40 m, RH, 12.6 mm.

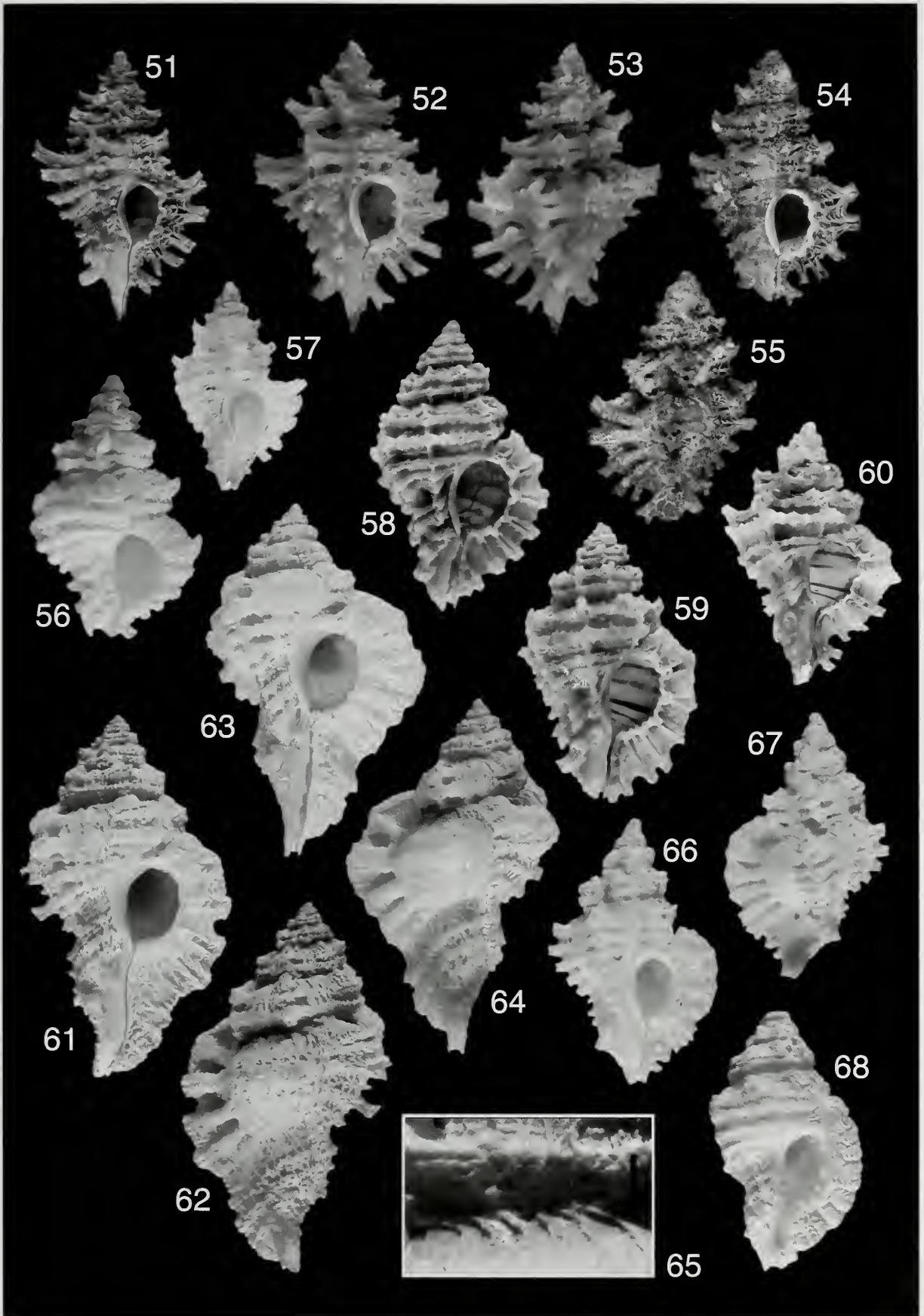
60. *Favartia (Favartia) rosaniae* D'Attilio & Myers, 1985. Nuku Hiva, Marquesas, 20-40 m, RH, 10.9 mm.

61-65. *Favartia (Favartia) salvati* Houart & Tröndlé n.sp.

61-62. Holotype MNHN 20167, 20.9 mm; **63-64.** Paratype MNHN 20170, 18.2 mm; **65.** Detail of paratype (scale bar 1 mm).

66-67. *Favartia (Favartia) nivea* Houart & Tröndlé n. sp. Holotype MNHN 20171, 11.4 mm.

68. *Favartia (Pygmaepterys) sp. l.* BENTHAUS, French Polynesia, Austral Archipelago, Tubuai, stn DW1959, 23°19.77' S, 149°30.44' W, 95-380 m, MNHN, 10.11 mm.



Reeve, 1846	Pease, 1868	Sowerby, 1893	Cernohorsky, 1987	Tröndlé & Houart, 1992	Houart & Tröndlé, 1997	Houart, 2002	Current paper
<i>Ricinula parva</i> n.sp.			<i>Mocula parva</i>			<i>M. parva</i>	Not present in French Polynesia
	<i>Engina parva</i> n.sp.		Misidentified as <i>M. parvissima</i> n.sp.	Misidentified as <i>M. parvissima</i>	<i>M. cernohorskyi</i> n.sp.	<i>M. cernohorskyi</i>	<i>M. cernohorskyi</i>
	<i>Engina nodicostata</i> n.sp.		Misidentified and described as <i>Morula parvissima</i> n.sp.	Misidentified as <i>M. parvissima</i>		<i>M. nodicostata</i>	<i>M. nodicostata</i>
	<i>Engina variabilis</i> n.sp.		<i>Morula variabilis</i>	Considered as a synonym of <i>M. nodicostata</i>		<i>M. variabilis</i>	<i>M. variabilis</i>
		<i>Sistrum angulatum</i> n.sp.	<i>M. angulata</i> (in part) <i>M. parva</i> (in part)	Misidentified with <i>M. parva</i>		<i>M. angulata</i>	<i>M. angulata</i>
				Illustrated as <i>M. nodicostata</i> (Fig. 23 only).		<i>M. peasei</i> n.sp.	<i>M. peasei</i>

TABLE 2. Nomenclatural history of some *Morula* species.***Morula (Morula) anaxares* (Kiener, 1835)**

Fig. 80

Morula (Morula) anaxares (Kiener, 1835): 26, pl. 7, figs 17-17a.

Material examined. Society Archipelago, Huahine Is., 1 dd, MB.

Distribution. *Morula anaxares* is known to live throughout the Indo-West Pacific, from southern Africa to the Red Sea, throughout the Indian Ocean and in several localities in the Pacific Ocean. It is thus not unexpected to find that species living in French Polynesia.

Remarks. The species was mentioned in Dautzenberg & Bouge (1933) but has not been recorded again since then.

***Morula (Morula) angulata* (Sowerby, 1893)**

Fig. 77

Sistrum angulatum Sowerby, 1893: 46, pl.4, fig. 3

Morula angulata – Kaicher, 1980: card 2446 (holotype); Cernohorsky, 1987: 100 (in part), fig. 19 (holotype); Houart & Tröndlé, 1997: figs 4-7.

NOT *Morula angulata* – Cernohorsky, 1987: 100 (in part), figs 16, 17-18, 20-21; Houart & Tröndlé, 1992: 99, fig. 76 [= *Morula cernohorskyi* Houart & Tröndlé, 1997]

Remarks (from Houart, 2002a). *Morula angulata* is a delicate, beautiful, but poorly known and probably rare species. It is unusual in having a strongly developed infrasutural cord (IP), starting on the penultimate whorl

and giving rise to the longest spine on last teleoconch whorl. PI is clearly visible on the early teleoconch whorls, but it is almost half the size of IP on the penultimate and last whorls.

Morula (Morula) cernohorskyi**Houart & Tröndlé, 1997**

Figs 96-97

Engina parva Pease, 1868: 276, pl.23, fig. 11 (not *Ricinula parva* Reeve, 1846)

Morula cernohorskyi Houart & Tröndlé, 1997: 4, fig. 3
Morula angulata – Cernohorsky, 1987: 100 (in part), figs 16, 17-18 (holotype of *Engina parva* Pease, 1868), 20-21; Tröndlé & Houart, 1992: 99, fig. 76 (not *Sistrum angulatum* Sowerby, 1903).

Remarks. *Morula angulata* was confused with *M. cernohorskyi* by Cernohorsky (1987), however, they differ greatly in axial and spiral ornamentation.

***Morula (Morula) nodicostata* (Pease, 1868)**

Figs 98-99

Engina nodicostata Pease, 1868: 274, pl. 23, fig. 8

Morula parvissima Cernohorsky, 1987: 99, figs 14-15 (n.n. for *parva* Pease, not Reeve)

Engina nodicostata –Johnson, 1994: 18, pl. 23, fig. 8 (lectotype).

Morula parva –Cernohorsky, 1978: 77, figs 24, 25; Springsteen & Leobrera, 1986: 140, pl. 38, fig. 7 (not *Engina parva* Reeve, 1846).

Morula parvissima –Tröndlé & Houart, 1992: 103, fig. 78; Tsuchiya, 2000: 391, pl. 194, fig. 138.

NOT *Morula nodicostata* – Cernohorsky, 1969: 399, pl. 49, fig. 20, text fig. 17; Cernohorsky, 1972: 127, pl. 36,

fig. 5; Wells et al, 1990: 44, pl. 21, fig. 144; Wilson, 1994: 44, text fig [= *Morula purpureocincta* (Preston, 1909)]; Tröndlé & Houart, 1992: 101 (in part), figs 84-86 [= *Morula variabilis* (Pease, 1868)]; Tröndlé & Houart, 1992: 101 (in part), fig. 83 (= *Morula peasei* n.sp.); Tsuchiya, 2000: 393, pl. 195, fig. 142 (= unknown species).

Remarks. This is the species described as *Morula parvissima* by Cernohorsky (1987: 99) due to a misidentification of *Morula nodicostata* (Pease, 1868). Houart (2002a: 103, figs 14-17) illustrated the lectotype of *M. nodicostata*.

***Morula (Morula) peasei* Houart, 2002**

Figs 93-95

Morula (Morula) nodicostata – Tröndlé & Houart, 1992: 101 (in part), fig. 83 (only).

Morula (Morula) peasei Houart, 2002a: 104, figs 32-34.

Original material examined. Society Archipelago, Tahiti, Arue, holotype MNHN 0295 and 8 paratypes (1 MNHN, 7 J. Tröndlé); Tahiti, Papara, 2 coll. R. Houart; Tahiti, Pueu, coll. R. Gourguet; Austral Is., Tubuai, 1 coll. R. Houart.

Additional material. Atelier RAPA, French Polynesia, Austral Archipelago, Rapa, SE of Tematapu Pt, stn 35, 27°34.8' S, 144°19.0' W, 2 m, 2 dd; North of Anatakuri Bay, stn 38, 27°37.4' S, 144°18.4' W, 2 m, 1 lv.; north of Rapa Iiti Id, stn 40, 27°37.2' S, 144°18.3' W, 2 m, 1 dd; Haurei Bay, Teakaurare Pt, stn 76, 27°36.9' S, 144°20.4' W, tide, 1 lv; Haurei Bay, stn 77, 27°37.2' S, 144°19.8' W, tide, 1 lv; Maomao Pt, stn 78, 27°36.6' S, 144°18.9' W, tide, 2 lv; Akatanui, stn 81, 27°35.9' S, 144°18.5' W, rocks, 2 lv., 2 dd; Anarua Bay, stn 87, 27°36.4' S, 144°22.6' W, 2 m, 4 lv.; Tekogoteemu Pt, stn 88, 27°36.4' S, 144°18.6' W, tide, 1 lv.; Tupuaki Bay, Kotuaie Pt, stn 93, 27°34.6' S, 144°20.6' W, tide, 5 lv. (all MNHN).

Distribution. Currently known as endemic in French Polynesia, in the Society Archipelago (Tahiti), in Tubuai, and now in Rapa.

Remarks. *Morula peasei* differs from *M. variabilis* (Pease, 1868) in being more weakly shouldered, in having a higher spire, more similar-sized spiral cords, a broader aperture with smaller (probably split) denticles within, and an abapically broader columellar lip. The shell also lacks orange colored nodes and has a lighter colored aperture. The shell attains a maximum length of 13.24 mm (MNHN, atelier Rapa, stn 78).

***Morula (Morula) rogersi* Houart, 2000**

Figs 89-92

Morula rogersi Houart, 2000: 101, figs 1-3.

Material examined. Tuamotu Archipelago, Takaroa Atoll, Secteur de Nake, 1 dd (MB).

Distribution. Western Guam, Agat Bay and Piti Lagoon, 6-9 m (type locality); Tuamotu Archipelago, Takaroa Atoll; South Mozambique, trapped alive in 70-120 m, near Macanza (coll. Manuel Amorim).

Remarks. The single specimen recorded in the Tuamotu Archipelago was dead-collected and worn but its conspecificity with *M. rogersi* is unquestionable.

***Morula (Morula) variabilis* (Pease, 1868)**

Figs 100-101

Engina variabilis Pease, 1868: 275, pl. 23, fig. 9

Morula variabilis – Cernohorsky, 1987: 99, figs 12-13 (lectotype).

Engina variabilis – Johnson, 1994: 27, pl. 7, fig. 5 (lectotype).

Morula nodicostata – Tröndlé & Houart, 1992: 101 (in part), figs 84-86 (not *Engina nodicostata* Pease, 1868).

Distribution. Tuamotu Archipelago and Tubuai.

***Morula (Morula) zebrina* Houart, 2004**

Figs 111-114

Sistrum striatum Pease, 1868: 276, pl. 23, fig. 2.

Morula striata (Pease, 1868) – Tröndlé & Houart, 1992: 103, fig. 79.

Morula (Morula) zebrina Houart, 2004: 114 (new name for *Sistrum striatum* Pease, 1868, not *Engina striata* Pease, 1868).

Remarks. Described from French Polynesia, *Sistrum striatum*, now included in *Morula*, is a secondary junior homonym of *Engina striata* (Pease, 1868), also a *Morula* species. It is interesting to note, and open to question, that *M. zebrina* has not been found outside of the French Polynesian geographical range, notwithstanding its multispiral protoconch with sinusigeral notch, which indicates a planktotrophic larval development.

See under *Morula (Habromorula) striata* for a comparison of those species.

***Morula (Habromorula) ambrosia* Houart, 1994**

Fig. 102

Habromorula ambrosia Houart, 1995: 24, figs 3, 17-19.
? *Morula (?Morula) pacifica* – Tröndlé & Houart, 1992: 102 (in part).

Material examined. Atelier RAPA 2002, stn 2, 27°34.4' S, 144°19.0' W, 29 m, 1 dd; stn 29 m; stn 8, 27°36.5' S, 144°17.7' W, 52-57 m, 1 lv; stn 8, 27°36.5' S, 144°17.7' W, 52-57 m, 1 lv; stn 22, 27°33.9' S, 144°21.7' W, 18-22 m, 1 lv, 1 dd; stn 30, 27°38.2' S,

144°18.2' W, 16-20 m, 1 lv; stn 50, off Baie Anarua, 19 m, 1 lv.

Tuamotu, Kaurura, on the beach, 1 dd, JT; Anaa, on the beach, 1 dd, JT; Mururoa, on the beach, 1 dd, JT. Society Archipelago, Tahiti, Punaauia, 30 m, 1 dd, JT.

Distribution. Central and South Pacific Ocean, Okinawa, the Philippines, Guam, New Caledonia, Marshall Islands and French Polynesia.

Remarks. This species was erroneously identified as ?*Morula* (?*Morula*) *pacifica* Nakayama, 1988 from the Tuamotu Archipelago in Tröndlé & Houart (1992). However, *Orania pacifica* is present in the Marquesas Archipelago.

Morula (Habromorula) dichrous
(Tapparone Canefri, 1880)

Fig. 103

Morula (Spinidrupa) bicatenata – Tröndlé & Houart, 1992: 105 (in part), fig. 88 (only).

Murex dichrous Tapparone Canefri, 1880: 21, pl. 2, fig. 5. 6.

Material examined. Society Archipelago, Tahiti, Toahotu, 1 lv., RH; Tahiti, Tautira, in coral holes, 1 lv., RH; Tahiti, Hitiaa, reef, under dead coral, 1 lv., 1 dd, JT.

Distribution. *Morula dichrous* is known from a few scattered localities in the Indo-West Pacific: Mauritius, Madagascar, the Coral Sea, the Philippines, Guam and French Polynesia. It is obvious that its full

range remains little known and that it will likely be found in other localities in the future.

Remarks. *Morula dichrous* was misidentified as *M. bicatenata* in Tröndlé & Houart (1992), however it was separated from that species by Houart (2004) because of the broader, weakly flattened, more serrate spiral cords, the broader siphonal canal, the more elongate, convex shell outline, and the broader axial ribs.

Morula (Habromorula) striata (Pease, 1868)

Figs 115-116, 130

Engina striata Pease, 1868: 275, pl. 23, fig. 18 (fig. 10 in error).

Remarks. *Morula striata* differs from *Morula zebrina* in having more numerous, narrower, more obvious spiral cords on all the whorls, including on the shoulder and on the siphonal canal, and in having comparatively narrower varices and a higher aperture.

The holotype of *Morula striata* described from Paumotu (Tuamotu) is not in ANSP (Johnson, 1994) nor in the BMNH, however the original illustration of Pease (Fig. 130) shows a shell of approximately 10 mm in length, with strongly carinate whorls, narrow varices and numerous fine spiral cords as observed in specimens of *M. striata* from many Indo-West Pacific localities (see Houart, 2004). To date, no specimens of *M. striata* have been recorded from French Polynesia notwithstanding the numerous lots examined. The record of *M. (H.) striata* from Rapa by Lozouet et al (2004: 29, figs 15-16) is based on two specimens of *M. zebrina*.

Figures 69-86

69-72. *Favartia (Pygmaepterys) avatea* Houart & Tröndlé n.sp.

69-70. Holotype MNHN 20172, 11.2 mm; 71. Paratype MNHN 20173, 9.6 mm; 72. Detail of holotype (scale bar 2 mm).

73-74. *Favartia (Pygmaepterys)* sp. 2. BENTHAUS, French Polynesia, Austral Archipelago, Rimatara, stn DW2020, 22°36.96' S, 152°49.13' W, 920-930 m, MNHN, 9.36 mm.

75-76. *Murexsul tokubeii* Nakamigawa & Habe, 1964. BENTHAUS, Austral Archipelago, stn DW1952, 23°49.2' S, 147°53.37' W, 300-372 m, MNHN, 14.5 mm.

77. *Morula (Morula) angulata* (Sowerby, 1893), Society Archipelago, Tahiti, west coast, coll. Wargnier, 6.7 mm (from Houart & Tröndlé, 1997).

78-79. *Cytharomorula springsteeni* Houart, 1995. BENTHAUS, Austral Archipelago, stn DW 2018, 22°37.15' S, 152°49.06' W, 770-771 m, MNHN, 12.4 mm.

80. *Morula (Morula)anaxares* (Kiener, 1835). Society Archipelago, Huahine, MB, 11.1 mm.

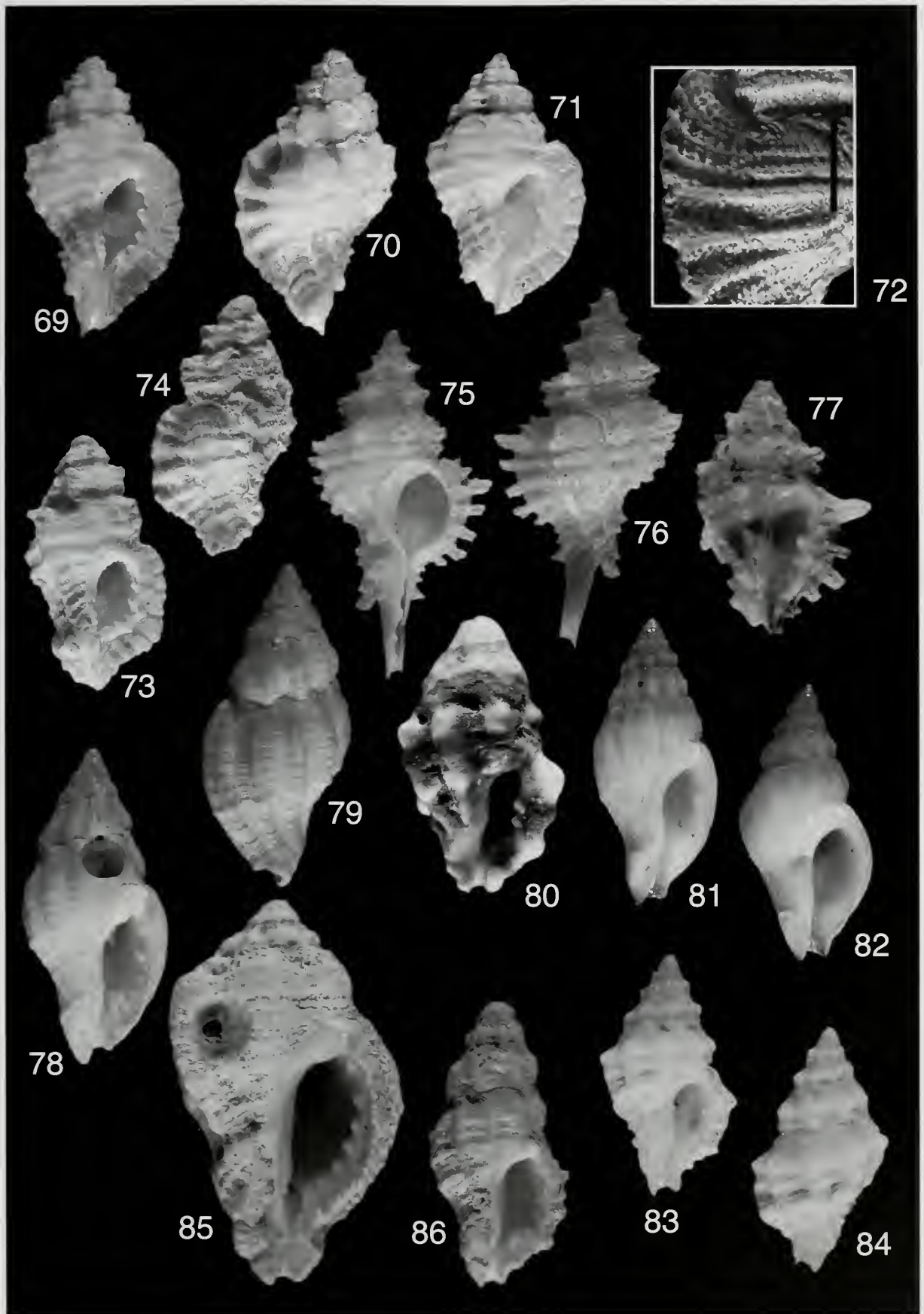
81. *Cytharomorula paucimaculata* (Sowerby, 1903). MUSORSTOM 9, Marquesas, stn DW 1869, 28°58.4' S, 140°15.4' W, 240-440 m, MNHN, 10.2 mm.

82. *Cytharomorula danigoi* Houart, 1995. BENTHAUS, Austral Archipelago, stn DW 1885, 27°51.87' S, 143°32.59' W, 700-800 m, MNHN, 9.7 mm.

83-84. *Cytharomorula ambonensis* (Houart, 1996). MUSORSTOM 9, Marquesas, stn DW 1281, 7°47.8' S, 140°20.8' W, 450-455 m, MNHN, 7.2 mm.

85. *Muricodrupa fiscella* (Gmelin, 1791). Marquesas, Tröndlé & Tardy, stn 34; Ua Huka, 8°56'80"S, 139°35'70"W, 10-15 m., MNHN, 16.3 mm.

86. *Orania archaea* Houart, 1995. Marquesas, stn 1281, 7°47'.8' S, 140°20.8' W, 450-455 m, MNHN, 11.8 mm.



All lots examined from French Polynesia turned out to be *M. zebrina* of which some forms are close to *M. striata* but all with broader, less numerous spiral cords, broader varices, and a shorter aperture, as in typical *M. zebrina*.

Pease (1868: 276) wrote that he found only a single, apparently not mature specimen of that species, associated with *Engina variabilis* (= *Morula variabilis*). As the species was never recorded again from French Polynesia since its description, it is thus questionable whether or not it lives there. The nearest locality where *M. striata* has been recorded to date (RH) is Pago Pago in Tutuila Is., American Samoa (Figs 115-116), some 3500 km from the Tuamotus.

***Muricodrupa fiscella* (Gmelin, 1791)**

Fig. 85

Murex fiscellum Gmelin, 1791 : 3552, ref. Chemnitz v.10, pl. 160, figs 1524, 1525.

Material examined. MUSORSTOM 9, Marquesas, stn DW 1204, 9°52.6' S, 139°03.2' W, 60-62 m, 1 lv.; coll. Von Cosel, Tröndlé & Tardy, Ua Huka, stn 34, 8°56'80"S, 139°35'70"W, 10-15 m., 2 dd..

Distribution. Throughout the Indo-West Pacific.

Remarks. The list of synonyms for this species is extensive (see Houart, 1995: 264) due to the great variability of shell characters. *M. fiscella* is a common species, so that enough material is available to compare it very carefully. However, as in *Maculotrion serriale* (see further), all attempts to separate the different varieties based on shell

characters failed because of the occurrence of intermediate forms.

***Orania archaea* Houart, 1995**

Fig. 86

Lataxiena (Orania) archaea Houart, 1995: 267, figs 22, 44, 127-132

Material examined. MUSORSTOM 9, Marquesas, stn 1281, 7°47'.8' S, 140°20.8' W, 450-455 m, 2 dd.

Distribution. *Orania archaea* was described from the Philippines with a range extending to Taiwan, Christmas Is. (Indian Ocean), and New Caledonia. Other specimens were collected alive in Hawaii. The discovery of specimens in the Marquesas was not unexpected, but live specimens will be welcome to confirm the presence of that species in French Polynesia.

***Orania simonetae* Houart, 1995**

Figs 117-121

Pascula benedicta – Tröndlé & Houart, 1992: 87, fig. 45 (not *Murex benedictus* Melville & Standen, 1895).

Orania simonetae Houart, 1995: 272, figs 140-141.

Material examined. BENTHAUS, Austral Archipelago, stn DW 1926, 24°38.16', 146°00.82' W, 50-90 m, 2 lv. Tuamotu, Anaa, on the beach, 1 dd, JT (as *P. benedicta* in Tröndlé & Houart, 1992); Mururoa, on the beach, 1 dd, JT (as *P. benedicta* in Tröndlé & Houart, 1992). Society Archipelago, Tahiti, Arue fault, 50-60 m, 1 dd, MB.

Figures 87-110

87-88. *Naquetia barclayi* (Reeve, 1858). MUSORSTOM 9, Marquesas, Ua Pou, stn CP1265, 9°20.4' S, 140°07.3' W, 90-92 m. MNHN, 102.5 mm, (photo P. Maestrati, MNHN).

89-92. *Morula (Morula) rodgersi* Houart, 2000

89-90. Tuamotu Archipelago, Takaroa atoll, Secteur de Nake, MB, 9.2 mm; **91-92.** Holotype MNHN 0911, Guam Piti lagoon, 10.9 mm (photo MNHN).

93-95. *Morula (Morula) peasei* Houart, 2002

93. Holotype MNHN 0295, Society Archipelago, Tahiti, Arue, 8.9 mm (photo MNHN); **94-95.** Atelier RAPA, French Polynesia, Austral Archipelago, Rapa, Haurei Bay, stn 77, 27°37.2' S, 144°19.8' W, tide, MNHN, 11 mm.

96-97. *Morula (Morula) cernohorskyi* Houart & Tröndlé, 1997. Holotype MNHN 0071, Tuamotu Archipelago, Mururoa Atoll, 22°00' S, 140°00' W, 6 mm (photo MNHN).

98-99. *Morula (Morula) nodicostata* (Pease, 1868). Society Archipelago, Tahiti, RH, 6.4 mm.

100-101. *Morula (Morula) variabilis* (Pease, 1868). Austral Archipelago, Tubuai, RH, 7.2 mm.

102. *Morula (Habromorula) ambrosia* Houart, 1994. Austral Archipelago, Rapa, SE of Tauna Id, 27°36.5' S, 144°17.7' W, 52-57 m, MNHN, 17.5 mm.

103. *Morula (Habromorula) dichrous* (Tapparone Canefri, 1880). Society Archipelago, Tahiti, Toahotu, RH, 13.3 mm.

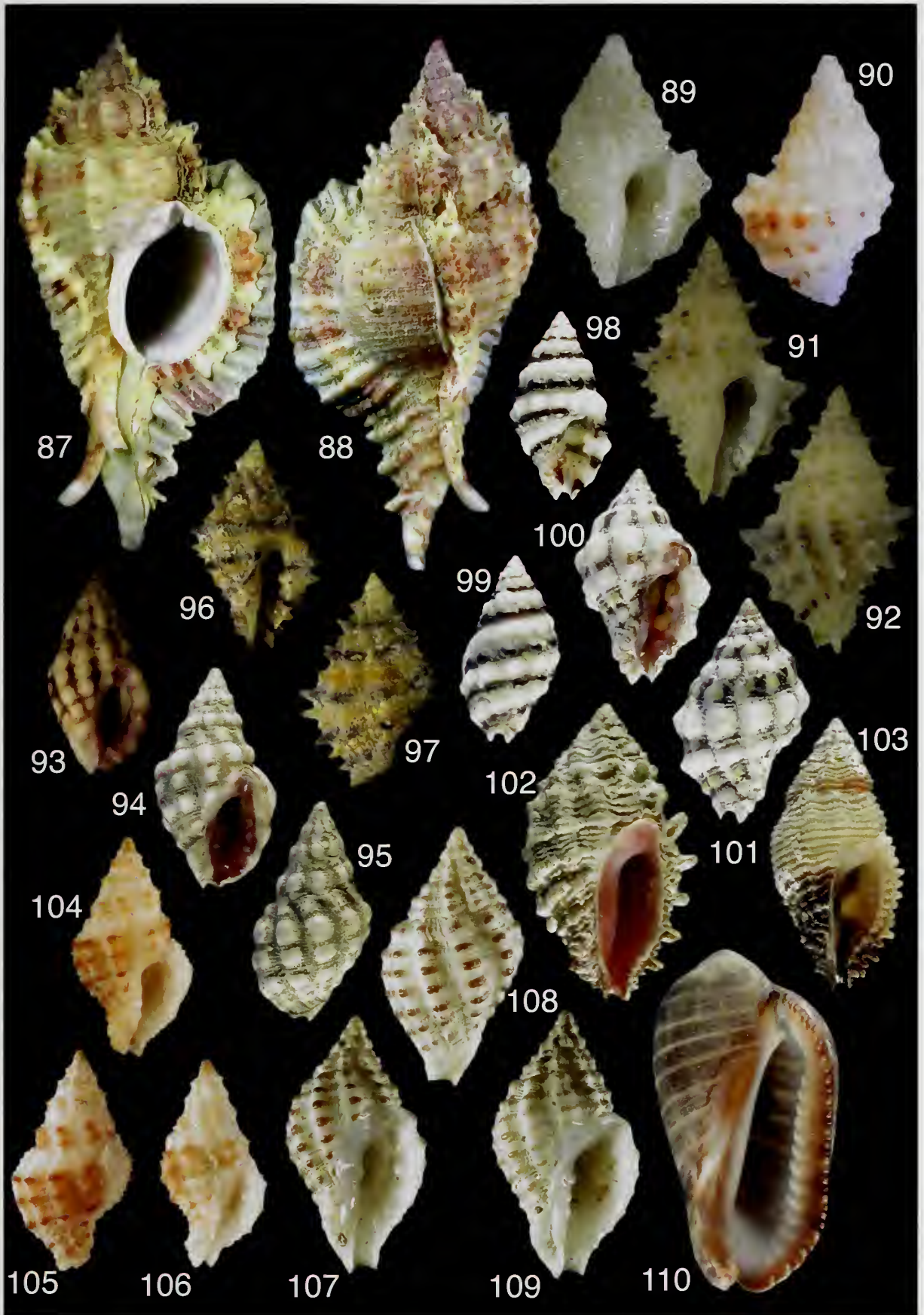
104-106. *Orania maestratii* Houart & Tröndlé n.sp.

104-105. Holotype MNHN 20175, 10.1 mm; **106.** Paratype MNHN 20176, 8.9 mm.

107-109. *Orania atea* Houart & Tröndlé n.sp.

107-108. Holotype MNHN 20178, 12.3 mm; **109.** Paratype MNHN 20179, 12.9 mm.

110. *Vexilla taeniata* (Powis, 1835). Tuamotu Archipelago, Rangiroa, RH, 24.7 mm.



Remarks. The new material collected in Rapa is most probably conspecific with *O. simonetae* and with the specimens wrongly identified as *Pascula benedicta* by Tröndle & Houart (1992: 87, fig. 45). The five additional specimens examined are subadult with 3 or 4 teleoconch whorls and a maximum length of 10.3 mm (MNHN). The holotype of *O. simonetae* (Figs 117-118) has 6 teleoconch whorls.

The spiral ornamentation of the last teleoconch whorl in *O. simonetae* looks as follows: adis, IP, abis, P1, s1, P2, s2, p3, s3, P4, s4, P5, (t), s5, t, P6, s6 (t), ADP, MP. One or two additional tertiary cords may be present between s6 and ADP.

P1-P3 similar in size, P4 smaller, P5 broadest and highest cord, s5 highly variable, occasionally as high and strong as P5, P6 and other abapical cords lower.

***Orania atea* n. sp.**

Figs 9, 15, 107-109

Type material. MUSORSTOM 9, Marquesas, Eiao Is., stn DW 1287, 7°54' S, 140°40' W, 163-245 m, holotype MNHN 20178.

Paratypes: Marquesas, Eiao Is., MUSORSTOM 9, stn DW 1287, 7°54' S, 140°40' W, 163-245 m, 10 MNHN 20179, 2 RH.

Other material examined. MUSORSTOM 9, stn DW 1146, 9°19' S, 140°06' W, 200 m, 18 lv. & dd; stn DW 1148, 9°19' S, 140°06' W, 300 m, 10 lv. & dd; stn DR 1197, 9°57' S, 140°02' W, 277-372 m, 1 lv., 1 dd; stn DR 1199, 9°49' S, 140°00' W, 210-258 m, 41 lv. & dd; stn DR 1200, 9°49.9 S, 139°08.9' W, 96-100 m, 1 dd; stn DW 1201, 9°51' S, 139°09' W, 275-300 m, 8 lv & dd; stn DW 1206, 9°51' S, 139°09' W, 352-358 m, 1 lv.; stn DW 1222, 9°44' S, 138°51' W, 340-352 m, 3 dd; stn DR 1231, 9°42' S, 139°05' W, 270-285 m, 1 lv., 2 dd; stn DW 1287, 7°54' S, 140°40' W, 163-245 m, 58 lv. & dd; stn DW 1288, 8°54' S, 139°38' W, 200-220 m, 24 dd.

Type locality. French Polynesia, Marquesas Archipelago, Eiao Is., 7°54' S, 140°40' W, 163-245 m.

Distribution. French Polynesia, Marquesas Archipelago, living at 163-352 m.

Description. Shell medium sized for the genus, average size between 11 and 13 mm in length at maturity, biconical, broadly ovate, heavy, nodose. Length/width ratio 1.73-1.88. Shoulder strongly sloping, weakly concave. Creamy white with knobs of spiral cords topped with light or dark brown. Aperture glossy white.

Spire high with 4 protoconch whorls and teleoconch up to 5 broad, convex, weakly shouldered, nodose whorls. Suture impressed. Protoconch large, conical, smooth, glossy, with a narrow keel abapically on 3 abapical whorls: first whorl small, last whorl broad, strongly convex. Terminal lip heavy, erect, of

sinusigera type, partially covered with first teleoconch whorl.

Axial sculpture of teleoconch whorls consisting of high, broad, nodose ribs. First and second whorls with 8 or 9 ribs, third with 8-10, fourth with 10 or 11, last whorl with 8 or 9 ribs. Intersection of axial ribs and spiral cords giving rise to low, elongate nodes. Spiral sculpture of narrow, moderately high primary cords and low, narrow, secondary and tertiary cords. First teleoconch whorl with visible P1 and P2, second whorl with P1 and P2, starting s1, third whorl starting SP, adis, IP, abis, P1, s1, (t), P2, fourth whorl with SP, adis, IP, abis, P1, t, s1, t, P2, t, s2, last teleoconch whorl with SP, adis, IP, abis, P1, t, s1, (t), P2, (t), s2, P3, (t), s3, P4, (t), sA, (t), P5, (t), s5), (t), P6, (t), s6, ADP, ads. P3 & P4 approximately of similar size. Subsutural cord (SP) occasionally broader and higher. P5 and P6 weakly narrower, ADP small. secondary and tertiary cords of similar strength.

Aperture large, broad, roundly ovate; columellar lip broad, with two strong knobs in center, extending into aperture, abapical knob weaker; strong parietal tooth at adapical extremity. Rim very weakly erect abapically, adherent adapically; occasionally completely adherent. Anal notch deep, broad. Outer lip broad, with strong denticles within: D1, D1-D2 fused, D3, D4, D5, decreasing in strength abapically. Siphonal canal short, broad, weakly dorsally recurved, broadly open.

Operculum light brown, with subapical nucleus (Fig. 9). Radula (Fig. 15) with a rachidian bearing a long, narrow, central cusp, a short, moderately broad lateral denticle, occasionally flanked by a small inner lateral denticle, a broad, long, lateral cusp, 2 or 3 marginal, low denticles, and a short, broad, marginal cusp. Lateral teeth sickle-shaped with broad base.

Remarks. There are a few Indo-West Pacific species of *Orania* with strong columellar denticles or folds, and with a multispiral, planktotrophic, conical protoconch. In general they differ strongly from *O. atea*.

Orania corallina (Melville & Standen, 1903) has a more globose last teleoconch whorl, fewer secondary cords, a broader aperture, smaller, more irregular columellar folds and a narrower protoconch with more rounded whorls.

Orania fischeriana (Tapparone Canefri, 1882) also has a broader last teleoconch whorl, together with 4 narrow, regularly shaped folds, extending into the aperture vs. 2 broad ones in *O. atea*, fewer secondary spiral cords, and narrower folds inside of the outer apertural lip.

Orania ficula (Reeve, 1848) has a smooth columellar lip, but it occasionally bears 1 or 2 shallow folds; however, *O. ficula* has different spiral cord morphology, a narrower, less deep anal notch, narrower folds into the outer apertural lip, and a smaller, narrower protoconch.

Orania pleurotomoides (Reeve, 1845) also has different spiral cord morphology, together with a more spiny shell with a broader last teleoconch whorl, a broader, more weakly sloping shoulder, and a longer, narrower siphonal canal.

Orania ornamentata Houart, 1995 is a much more elongate shell with most often a smooth columellar lip and very different spiral sculpture, consisting of numerous primary and secondary cords of approximately similar strength.

Etymology. In the mythology of the Marquesas Islands, Atea is the god of light.

***Orania maestratii* n. sp.**

Figs 104-106

Type material. BENTHAUS, French Polynesia, Austral Archipelago, Rapa Is., stn DW 1894, 27°40.13' S, 144°21.51' W, 100m, holotype MNHN 20175.

Paratypes: BENTHAUS, French Polynesia, Austral Archipelago, Rapa Is., stn DW 1894, 27°40.13' S, 144°21.51' W, 100m, 3 MNHN 20176; Neilson Reef, stn DW 1914, 27°03.52' S, 146°04.1' W, 150 m, 7 MNHN 20177, 1 RH.

Other material examined. BENTHAUS, stn DW 1868, 28°58.9 S, 140°14.07' W, 173-250 m, 1 dd; stn DW 1877, 28°59.012', 140°15.102' W, 59-150 m, 1 lv. & 1 dd, 1 dd; stn DW 1878, 27°51.59' S, 143°32.68' W, 750-1000 m, 1 dd; stn DW 1880, 27°55' S, 143°29.4 W, 90-94 m, 3 lv.; stn DW 1888, 27°51.38' S, 143°31.42' W, 100-120 m, 2 lv.; stn DW 1889, 27°36.87' S, 144°15.75' W, 600-620 m, 2 dd; stn DW 1894, 27°40.13' S, 144°21.51' W, 100m, 4 lv.; stn DW 1901, 17°24.8' S, 144°01.67' W, 115-120 m, 3 lv.; stn DW 1905, 27°25.36' S, 144°02.62' W, 120-140 m, 1 dd; stn CP 1906, 27°24.78' S, 144°01.75' W, 110-127 m, 1 dd; stn DW 1913, 27°01.5' S, 146°00.3' W, 120 m, 2 lv. (RH); stn DW 1914, 27°03.52' S, 146°04.1' W, 150 m, 8 lv. & dd; stn CP 1918, 27°03.45' S, 146°03.96' W, 130-140 m, 2 lv.; stn CP 1920, 27°03.58' S, 146°03.84' W, 120-203 m, 4 lv.; stn CP 1922, 27°03.67' S, 146°03.93' W, 150-163 m, 3 dd; stn DW 1926, 24°38.16' W, 146°00.82' W, 50-90 m, 1 lv.; stn DW 1927, 24°39.03' S, 146°01.58' W, 95-105 m, 1 lv.; stn DW 1936, 24°39.71', 145°57.09' W, 80-100m, 1 lv.; stn DW 1948, 23°48.7' S, 147°53.5' W, 120-280 m, 1 dd; stn DW 200122°26.6 S, 151°20.1' W, 200-550 m, 1 dd; stn no data, 5 dd.

Type locality. French Polynesia, Austral Archipelago, Rapa Is., 27°40.13' S, 144°21.51' W, 100m, lv.

Distribution. Austral Archipelago, living at 59-150 m.

Description. Shell small for the genus, up to 11.4 mm in length at maturity (MNHN), biconical, shouldered,

squamous. Length/width ratio 1.8-2.0. Shoulder strongly sloping, weakly concave. White with light orange to chestnut-brown colored spiral cords, lighter colored between spiral cords, darker on top of nodes. protoconch light brown, shoulder and aperture white, siphonal canal brown.

Spire high with 4.75 protoconch whorls and up to 6 broad, strongly shouldered whorls, suture adpressed. Protoconch high, narrow, conical, smooth, with a narrow keel abapically on 3 or 4 abapical whorls. Terminal lip raised, strongly curved, of sinusigera type.

Axial sculpture of teleoconch whorls of moderately high, broad, nodose ribs; 9 or 10 on first whorl, 9 on second, 8 or 9 on third and fourth, 6-8 on last whorl. Last whorl occasionally with a single, erratically placed broad varix. Other axial sculpture occasionally of low growth lamellae, more apparent on shoulder. Spiral sculpture of high, narrow, primary and small, narrow, secondary cords. First whorl with visible, high, narrow P1, second with P1 and P2, P2 partially covered by next whorl, third whorl with P1 and P2 or P1, s1, P2, fourth with P1, s1, P2, starting very low and squamous adis, IP, abis. Last whorl with low, squamous adis, IP, abis and P1, s1, P2, s2, P3, s3, P4, s4, P5, (s5). Intersection of axial ribs and spiral cords giving rise to broad nodes. P1-P3 almost similar in size and strength, P4 lower and narrower, P5 smallest.

Aperture small, narrow, ovate; columellar lip narrow, smooth or with 1 or 2 weak knobs abapically, rim weakly erect, adherent at abapical extremity, low parietal node at adapical extremity. Anal notch moderately deep, broad. Outer lip broad, squamous, with 5 denticles within: ID very low or moderately high, D1 high, broad, strongest denticle, D2-D5 lower, of approximately similar strength. Siphonal canal short, broad, weakly recurved dorsally, broadly open. Operculum and radula not examined.

Remarks. There are currently 29 Recent species included in *Orania* of which only the type species, *O. fusulus* (Brocchi, 1814), does not occur in the Indo-West Pacific.

Orania archaea Houart, 1995, described from the Philippines and with two specimens recorded here from the Marquesas, differs in being comparatively larger and more scaly, and in having more numerous secondary and tertiary spiral cords between P1-P5, a smooth columellar lip, and in having more elongate, lower, more numerous denticles within the aperture.

Orania fischeriana (Tapparone-Canefri, 1882) known from various Indo-West Pacific localities is a species with a broader, less scaly shell with a narrower spire and broader axial ribs. The aperture is also broader with a strongly folded columellar lip and narrow lirae within the outer lip.

Orania mixta Houart, 1995 from the Philippines is comparatively larger with broader axial ribs, broader secondary spiral cords and a narrower, longer siphonal canal. The aperture is comparatively broader with a

smooth columellar lip and weak, elongate denticles within the outer lip.

Orania pleurotomoides (Reeve, 1845) from the Philippines and Indonesia is also relatively larger with a much broader last teleoconch whorl and with obvious, more numerous primary spiral cords. The columellar lip has more obvious nodes and a strong parietal node. The anal notch is narrower and deeper and the outer apertural lip has strong, elongate denticles within.

Orania taeniata Houart, 1995 was described from Christmas Island, in the Indian Ocean and is also known from the Solomon Islands (AMS C.322354). It is a small shell of less than 9 mm in length like *O. maestratii*. However, it differs in having a less scaly, more ovate shell with more strongly developed and more equally sized spiral cords, a strong subsutural spiral cord, a more ovate aperture with a straighter columellar lip and a narrower anal sulcus. The protoconch of *O. taeniata* is also broader and the siphonal canal is narrower.

All other *Orania* species with a multispiral conical protoconch are very different and do not need to be compared here.

Etymology. Named after Philippe Maestrati from MNHN.

Pascula darrosensis (E.A. Smith, 1884)

Fig. 122

Murex (Ocinebra) darrosensis E.A. Smith, 1884 : 429, pl. 44, fig. f.

Material examined. MUSORSTOM 9, Marquesas, stn DR 1151, 9°19'.4' S, 140°03.7' W, 70 m, 1 dd; stn CP 1158, 7°58.7' S, 140°43.9' W, 109-110 m, 1 dd; stn DW 1161, 8°55.6' S, 140°06.1' W, 30-37 m, 8 dd; stn DW 1162, 8°56.2' S, 140°06.1' W, 45-64 m, 2 dd; stn DW 1170, 8°45.1' S, 140°13.1' W, 104-109 m, 2 dd; stn DR 1181, 8°45.5' S, 140°03.2' W, 102-130 m, 3

dd; stn DR 1197, 8°57.4' S, 140°01.9' W, 277-372 m, 1 dd; stn DR 1200, 9°49.9' S, 139°08.9' W, 96-100 m, 1 dd; stn DW 1203, 9°52.7' S, 139°02.2' W, 60-61 m, 14 dd; stn DW 1204, 9°52.6' S, 139°03.2' W, 60-62 m, 31 dd; stn DW 1208, 9°48.9' S, 139°09.5' W, 117 m, 1 dd; stn DW 1210, 9°50.4' S, 139°00.5' W, 98-100 m, 1 lv.; 2 dd, stn DR 1223, 9°44.5' S, 138°51.3' W, 90-150 m, 1 dd; stn DR 1247, 10°34.0' S, 138°41.6' W, 1150-1250 m, 4 dd; stn DR 1254, 9°48.5' S, 139°38.1' W, 386-413 m, 1 dd; stn DR 1293, 8°54.3' S, 139°37.5' W, 50 m, 13 dd; coll. Von Cosel, Tröndlé & Tardy, stn 30, Ua Huka, 8°56'10"S, 139°32'00"W, 20-30 m, 6 dd.

Distribution. *Pascula darrosensis* was described from Darros Island, in the Amirantes. Other records are currently known from Zululand, South Africa (NM D5365), the Coral Sea (AMS C170062), Papua New Guinea (RH), New Caledonia (MNHN) and the Philippines (MNHN, RH).

Remarks. None of the specimens recorded from French Polynesia reach a length over 8 mm, but all of them have only 3 to 3.5 teleoconch whorls while the holotype and other specimens from 10 mm up have 4 to 4.5 whorls.

?*Pascula ozenneana* (Crosse, 1861)

Figs 10, 18-19

Ricinula ozenneana Crosse, 1861: 285.

Remarks. Radwin & D'Attilio (1976: 146) tentatively assigned this species to the muricopsine genus *Favartia* as ?*Favartia crossei* (Lienard, 1873), a junior synonym of *R. ozenneana*. Later, the radula was illustrated in a drawing by Cernohorsky (1980: 174, fig. 11), as *Cronia gibba* (Pease, 1865), another junior synonym. Finally, Tröndlé & Houart (1992: 88) recorded it as *Pascula ozenneana*.

Figures 111-127

111-114. *Morula (Morula) zebrina* Houart, 2004.

111. Society Archipelago, Tahiti, RH, 14.6 mm; **112.** Mahina, RH, 9.7 mm; **113.** Papara, RH, 12.5 mm; **114.** Afaahiti, JT, 9.5 mm.

115-116. *Morula (Habromorula) striata* (Pease, 1868). American Samoa, Pago Pago, Tutuila Id, RH, 12.9 mm.

117-121. *Orania simonetae* Houart, 1995

117-118. Holotype MNHN 0283, Marquesas Islands, Nuku Hiva, 12.5 mm (photo MNHN); **119-121.** Austral Archipelago, stn DW 1926, 24°38.16', 146°00.82' W, 50-90 m, MNHN, 10.3 mm & 8.9 mm.

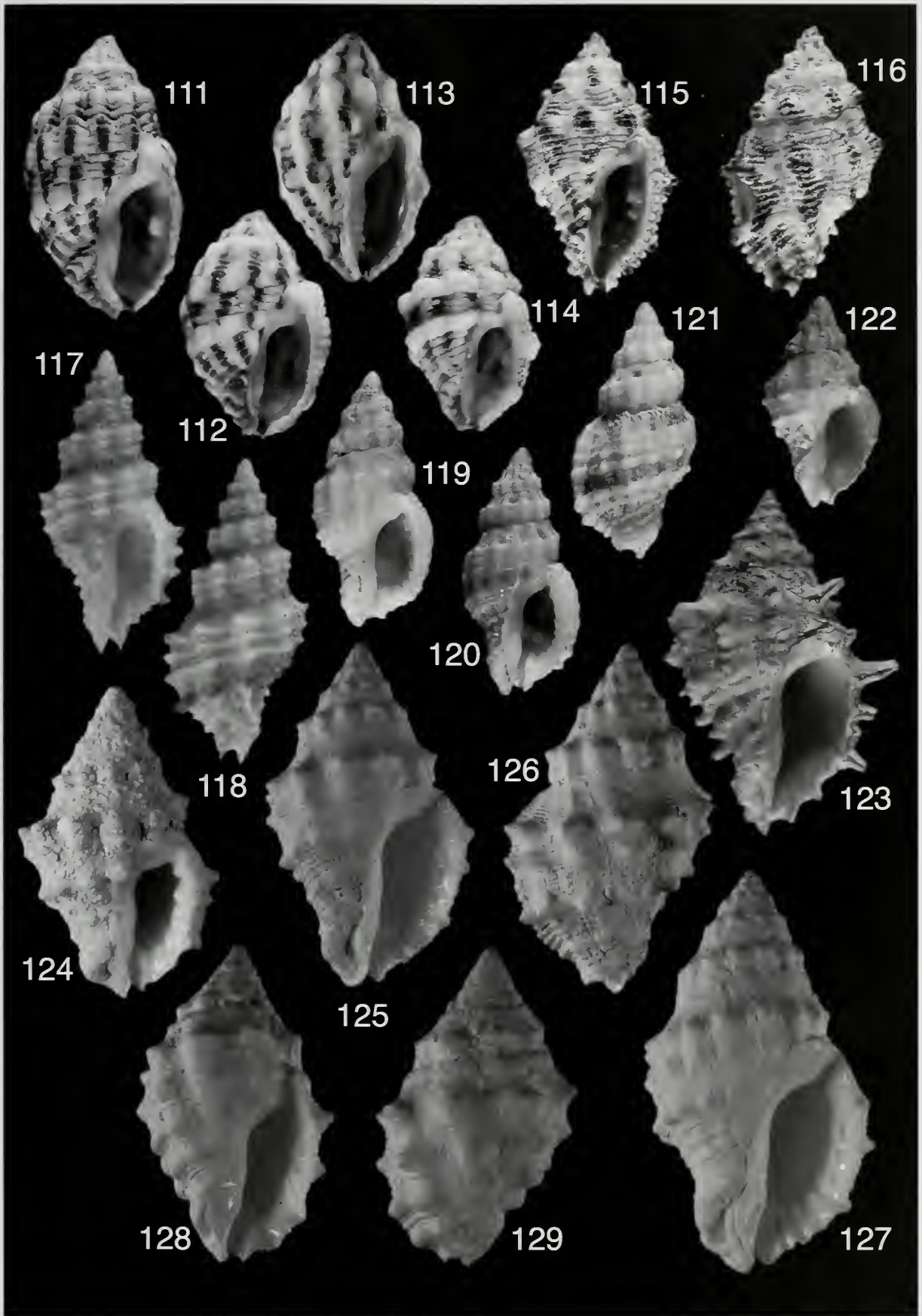
122. *Pascula darrosensis* (E.A. Smith, 1884). MUSORSTOM 9, Marquesas, stn DW 1203, 9°52.7' S, 139°02.2' W, 60-61 m. MNHN, 7.3 mm.

123. *Pascula* sp. BENTHAUS, Austral Archipelago, Rurutu Avera, stn DW 1995, 22°28.96' S, 151°21.85' W, 212-450 m, MNHN, 20.2 mm.

124-127. *Drupella eburnea* (Küster, 1862)

124. Society Islands, Moorea Id, NE of entrance to Opunohu Bay, off People's Beach, 17°49.15' S, 149°85.02' W, 1-3 m, FMNH 400709, 24.5 mm; **125-126.** Tahiti, lagoon, on coral, JT, 30.2 mm; **127.** Tahiti, Faone, Reef, on coral, JT, 39 mm.

128-129. *Drupella cornus* (Röding, 1798). French Polynesia, Tahiti, lagoon, on coral, JT, 27.7 mm.



We think it is useful to illustrate a SEM of the radula because in the Cernohorsky, 1980 drawing, there is no trace of any lateral denticle or of marginal folds, whereas they are clearly present in the radula illustrated here (Figs 18-19). The rachidian bears a moderately long, triangular central cusp with a broad base and on each side a short lateral denticle attached to a broad, short, lateral cusp, followed by 2 or 3 small marginal folds and a short marginal denticle. The lateral tooth is sickle-shaped and broad. The radula is atypical for *Pascula* [type species *Pascula citrica* (Dall, 1908)] from Easter Island, which has a radula with a long central cusp and on each side, a short, narrow lateral denticle, clearly separated from the long, broad, lateral cusp (Rehder, 1980: 135, figs 3-4). There is no trace of either marginal folds or of denticles.

The operculum of ?*P. ozenmeana* is typical ergalataxine with a narrow outline and a subterminal nucleus (Fig. 10) and the radula is more akin to *Orania* Pallary, 1900 [type species *Orania fusulus* (Brocchi, 1814) from the Mediterranean] (Houart, 2001: 23, fig. 16), however the lateral denticle is not attached to the lateral cusp and the shell of *P. ozenmeana* doesn't match the description of typical *Orania*. The species was transferred to *Pascula* by Tröndlé & Houart (1992) because it closely resembles other Indo-Pacific species such as *P. muricata* (Reeve, 1846) or *P. ochrostoma* (Blainville, 1832), however both of those have a typical *Pascula* radula. It is here tentatively retained in *Pascula* awaiting more information about radulae from related taxa.

Pascula sp.

Fig. 123

Material examined. BENTHAUS, Austral Archipelago, Rurutu Avera, stn DW 1985, 23°26.35' S, 150°44.22' W, 100-107 m, 1 dd, stn DW 1995, 22°28.96' S, 151°21.85' W, 212-450 m, 1 dd.

Remarks. There are only two specimens known of this species, one of which is badly damaged. Both were dead-collected and lack the protoconch. Although differing by having a more spinose and lighter shell with less spiral sculpture and straighter columella, the shell is reminiscent of *Pascula muricata* (Reeve, 1845), a common Indo-West Pacific species also found in French Polynesia. More fresh material is needed for a better comparison.

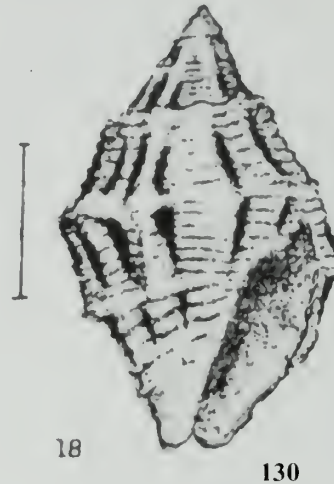
Usilla avenacea (Lesson, 1842)

Figs 11, 17

Purpura avenacea Lesson, 1842: 186.

Remarks. The radula was illustrated by Fujioka (1985: pl. 5, figs 45-46) but we think it is of interest to illustrate it again within the scope of this paper, since *Usilla avenacea* was described from Gambier, in French Polynesia.

The radula is clearly ergalataxine, very akin to *Cytharomornula* and *Pascula* (Houart, 1995), with a rachidian bearing a long, narrow central cusp, and on each side, a small lateral denticle, and a long lateral cusp slightly curved outwardly. There are no folds on the marginal area in the examined specimen.



130. *Engina striata* Pease, 1868.
From Pease (1868: pl. 23, fig. 18)

Subfamily Rapaninae Gray, 1853

Drupella eburnea (Küster, 1862)

Figs 124-127, 131

Ricimla eburnea Küster, 1862: 17, pl. 3, fig. 9.

Material examined. Society Islands, Moorea Is., NE of entrance to Opunohu Bay, off People's Beach,

17°49.15' S, 149°85.02' W, 1-3 m, 3 lv. FMNH 400709; Tahiti Is., lagoon, on coral, 10 lv & dd, JT; Tahiti Is., Faaone, reef, in coral, 2 dd, JT; Tahiti Is., Toahotu, reef flat, under coral, 1 lv, RH; Tahiti Is., Papara, reef flat Marae, under stones, 2 lv., JT; Tuamotus, Takapoto, 2 lv., 1 dd, JT; Kaukura, beach, 1 dd, JT.

Distribution. Maldives (RH), Vietnam (RH), Philippines (RH), Japan, Ryukyu Islands (Fujioka, 1982, 1984), New Caledonia (MNHN), Heron Island, Central Queensland, Australia (Fellegara, 1996) and Society Archipelago, French Polynesia.

Remarks. *Drupella eburnea* was illustrated by Fujioka (1982, 1984) and Fellegara (1996). It is distinguished from the related and much more common *D. cornus* (Röding, 1798) by having 2 or rarely 3 rows of strong spiral cords followed by 2 weaker ones apically [P1-P2, P3, P4, P5 or (P1-P2), P3, P4, P5] on the last teleoconch whorl instead of 4 strong cords (P1-P4) in *D. cornus*. Already in juveniles consisting of 5 or 6 teleoconch whorls, the

last whorl bears P1 and P2 very close to each other or even completely fused, followed by P3 and shallow P4 and P5. Adults also bear P1 and P2 fused or P1 immediately followed by a reduced P2, then P3 of the same strength as P1, followed by small, shallow P4 and P5. In adults of *Drupella cornus* (Figs 128-129) P1, P2 and P3 are of similar strength, followed by a weakly shallower P4. All 4 cords are equally separated in *D. cornus*.



131. *Ricimula eburnea* Küster, 1862.
From Küster (1862: pl. 3, fig. 9)

Subfamily Trophoninae Cossmann, 1903

Remarks. One new species is described: *Pagodula atanua* n.sp. from the Marquesas Islands. New material was also useful to definitively identify the species listed as *Trophon* sp. by Tröndle & Houart (1992: 114).

Pagodula pulchella (Schepman, 1911) Figs 132-133

Trophon pulchellus Schepman, 1911: 339, pl.21, fig. 2.
? *Trophon johannthielei* Barnard, 1959: 206, fig. 44b.
Trophon sp. – Tröndle & Houart, 1992: 114, fig. 102.

Material examined. MUSORSTOM 9, Marquesas, stn CP 1270, 7°56.00' S, 140°43.2' W, 497-508 m, 1 lv. BENTHAUS, Austral Archipelago, stn DW 1863, 27°39.14' S, 144°15.83' W, 650-684 m, 1 dd, stn DW 1889, 27°36.87' S, 144°15.75' W, 600-620 m, 7 lv & dd, stn DW 1890, 27°38.9' S, 144°15.64', 800-822 m, 1 dd, stn CP 1891, 27°37.09' S, 144°15.42' W, 800-850 m, 1 dd, stn CP 1909, 27°38.63' S, 144°14.61' W, 783-1000 m, 1 lv, stn 1923, 27°01.29' S, 146°05.29' W, 360-840 m, 1 lv.

Distribution. *Pagodula pulchella* was described from the Halmahera Sea, 0°59.1' S, 129°48' E, in 411 m. Its discovery in the Austral Islands results in a major range extension. However its full range is certainly wider, because very similar specimens collected recently off Mozambique, Závára/Bazaruto, trawled alive in 420-460 m (RH and Rosado coll.) reinforce the possibility that *Trophon johannthielei* Barnard, 1959, described from South Africa is most probably conspecific.

Pagodula atanua n. sp. Figs 16, 134-139

Type material. MUSORSTOM 9, French Polynesia, Marquesas, Nuku Hiva, stn CP 1307, 8°57.9' S, 140°15.8' W, 708-738 m, lv., holotype MNHN 20180.

Other material examined. MUSORSTOM 9, Marquesas, stn CP 1302, 8°56.7' S, 140°15.3' W, 478-502 m, 1 dd, stn DR 1255, 9°38.5' S, 139°48.4' W, 416-440 m, 1 dd, stn DW 1281, 7°47.8' S, 140°20.8' W, 450-455 m, 7 lv & dd.

Type locality. French Polynesia, Marquesas, Nuku Hiva, 8°57.9' S, 140°15.8' W, 708-738 m.

Distribution. French Polynesia, Marquesas, Dumont D'Urville, Motu One Hatutaa and Nuku Hiva, living at 455-708 m.

Description of the holotype. Shell medium sized for the genus, 26.6 mm in length, broadly ovate, heavy. Shoulder weakly sloping, weakly concave. Grayish-white, covered by light tan chalky layer (intrinsic?). Aperture flesh-colored.

Spire high. Protoconch and first 2 teleoconch whorls eroded. Remainder of teleoconch consisting of 4 broadly convex, weakly shouldered whorls. Suture weakly adpressed.

Axial sculpture of teleoconch whorls consisting of low, broad, lamellose ribs. Last whorl with 9 ribs, penultimate with 10. Axial and spiral sculpture of previous whorls strongly eroded. Spiral sculpture of very low, weak, broad, primary cords, of which only P1, P2 and P3 weakly discernible.

Aperture narrow, high, ovate; columellar lip narrow, elongate, smooth. Rim completely adherent. Anal notch shallow, broad. Outer lip smooth, thick with elongate, broad crest within, with 2 broad, very low denticles, probably D1-D2 fused and D3-D4 fused. Siphonal canal moderately long, broad, straight, broadly open.

Operculum light brown, narrowly ovate, with apical nucleus and numerous concentric ridges. Attachment surface with broad, callused rim. Radula (Fig. 16) with a rachidian bearing a broad, long, triangular central cusp, a small, narrow, lateral denticle and a broad, long, triangular lateral cusp.

Remarks. The additional material examined consists of a crabbed and damaged large adult specimen and 8 juveniles. The adult specimen (Figs 138-139) is slightly more strongly shouldered than the holotype, and has 4 very low, weak denticles within the aperture, barely visible on the photograph. The last whorl of the two largest juvenile specimens (Figs 136-137) fits perfectly with the antepenultimate whorl of the adult specimens, which bear 10-12 axial lamellae. However it is not certain whether these juvenile specimens are conspecific with *P. atania* or whether they belong to another related unnamed species. The juveniles have 1.5 small, rounded, teleoconch whorls, and 3 or 4 teleoconch whorls with 10-12 axial lamellae on the last whorl.

Pagodula obtuselirata (Schepman, 1911), described from the Flores Sea and known from a few scattered localities in the Indo-West Pacific to the Fiji Islands (MNHN), differs in having a thinner shell with more strongly shouldered penultimate and last teleoconch whorls, a higher, more acute spire, a more triangular-shaped last teleoconch whorl and aperture, a higher, more obvious P1, a narrower siphonal canal and more numerous axial lamellae on the last teleoconch whorl (10-13 vs. 9 in *P. atea* n.sp.).

Pagodula tenuirostrata (Smith, 1899) from the Andaman Islands also has a much more thinner shell with a higher spire, broader and more sloping shoulder, and a relatively longer, narrower, siphonal canal.

The presumed juveniles of *P. atania* n.sp. resemble somewhat the Japanese *Trophonopsis polycyma* Kuroda, 1953, or the related *T. kayae* Habe, 1981 from Hawaii. However, the juveniles have a thin fragile shell with a thin apertural lip, compared to the thick shell of both Japanese and Hawaiian species, which also have a broad apertural lip with obvious denticles within. Both species also have more numerous axial lamellae and more numerous, higher and more obvious spiral cords.

Etymology. In the mythology of the Marquesas Islands, Atania is the dawn goddess, wife of Atea.

Subfamily Typhinae Cossmann, 1903

Remarks. The subfamily Typhinae had not been found before in French Polynesia.

Monstrotyphis singularis Houart, 2002

Figs 140-145

Monstrotyphis singularis Houart, 2002b: 150, figs 3, 4-6, 10-13.

Material examined. Atelier RAPA 2002, stn 8, 27°36.5' S, 144°17.7' W, 52-57 m, 7 lv & dd; stn 44, 27°36.3' S, 144°18.2' W, 30 m, 8 lv & dd.

Distribution. Described from New Caledonia, this species was known to date only from the type material.

Remarks. We were not able to separate the new material from the species described from New Caledonia. Notwithstanding the protoconch consisting of 1.5 rounded whorls, which indicates lecithotrophic larval development, this species has jumped a gap of almost 5000 km to reach the Austral Archipelago. It would thus not be surprising to find *M. singularis* in other parts of the Pacific Ocean.

Questionable subfamily

Remarks. There are currently several genera that do not fit properly into any of the existing subfamilies because of their peculiar morphology of shell, radula and/or operculum. They are, in alphabetical order: *Daphnellopsis* Schepman, 1913, *Galfridus* Iredale, 1924, *Lindapterys* Petuch, 1987, *Maculotriron* Dall, 1904, *Phrygiomurex* Dall, 1904, *Phyllocoma* Tapparone Canefri, 1881, *Pradoxa* Fernandes & Rolán, 1990, *Uttleya* Marwick, 1934 and *Vexilla* Swainson, 1840. Four of those, *Maculotriron*, *Phrygiomurex*, *Phyllocoma* and *Vexilla* occur in French Polynesia.

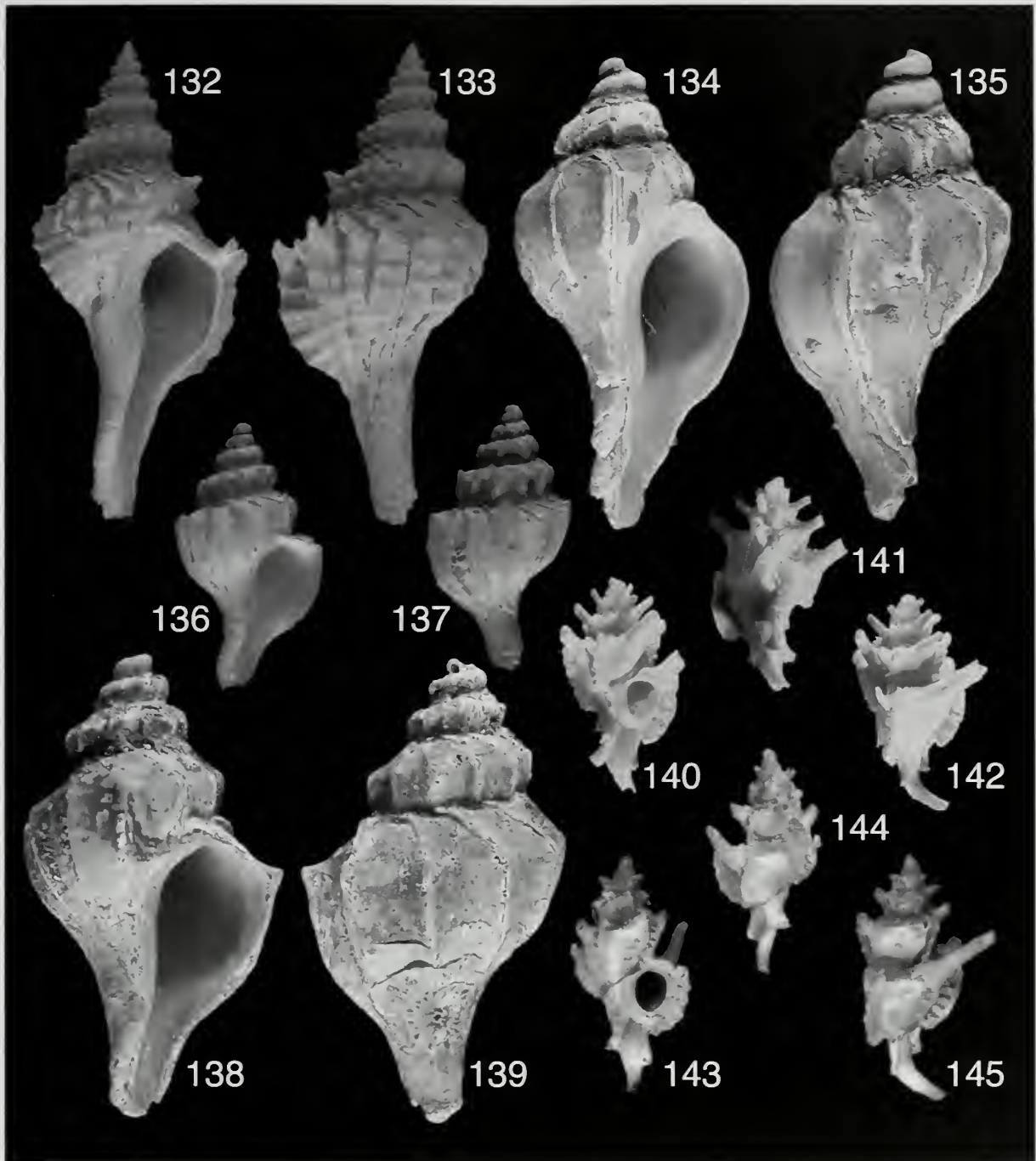
Maculotriron serriale (Deshayes, 1834)

Buccinum serriale Deshayes (1834) in Laborde, 1830-1834: 66, figs 32-34.

Maculotriron serriale (Deshayes, 1830) – Tröndle & Houart, 1992: 90.

Additional note. *Maculotriron serriale* was assigned to Deshayes (1830) by Sherborn. However, although the title page is dated 1830, the plates are all dated 1833 (B. Métivier, in litt.). However, Tomlin & Salisbury (1928) noted: "The plates and maps are bound at the end of the volume, none of these being numbered; but two of the latter bear dates 1833 and 1834, so that the book could not have been published prior to this last date, in spite of the date on the title page, which is given as 1830". On the other hand, that taxon was published in Laborde (1830-1834) and not in Laborde & Linant as listed in Cernohorsky (1982).

M. serriale has a very variable shell morphology. Some shells are white or with some brown nodes on the periphery, with a darker band around the nodes. Another band of darker nodes is situated just above the siphonal canal and on the shoulder, near the suture. Some also have narrower and weaker spiral cords. However these differences are not constant and there are many intermediate forms in sculpture morphology and/or color. Some have broader cords without or almost without secondary cords; the shell is occasionally broader, darker colored, or broad and white, but without consistency. All these varieties exist in French Polynesia. Attempts to separate them into



Figures 132-145

132-133. *Pagodula pulchella* (Schepman, 1911). BENTHAUS, Austral Archipelago, stn CP 1909, 27°38.63' S, 144°14.61' W, 783-1000 m, MNHN, 30.5 mm.

134-139. *Pagodula atania* Houart & Tröndle n. sp.

134-135. Holotype MNHN 20180, 26.7 mm; 136-137. MUSORSTOM 9, stn DW 1281, 7°47.8' S, 140°20.8' W, 450-455 m, MNHN, 7.9 mm; 138-139. MUSORSTOM 9, Marquesas, stn CP 1302, 8°56.7' S, 140°15.3' W, 478-502 m, 1 dd. stn DR 1255, 9°38.5' S, 139°48.4' W, 416-440 m, MNHN, 23.7 mm.

140-145. *Monstrotypis singularis* Houart, 2002

140-142. Austral Archipelago, Rapa, NW of Tauna Id. 27°36.3' S, 144°18.2' W. 30 m. MNHN, 5.7 mm; 143-145. Holotype MNHN 0293, New Caledonia, chenel de Touho, 6.3 mm (photo MNHN).

different groups always fail when more material from other parts of the world are examined and compared. We therefore consider all these forms to be probably conspecific.

***Vexilla taeniata* (Powis, 1835)**

Fig. 110

Purpura taeniata Powis, 1835: 96.

Vexilla vexillum – Salvat & Rives, 1975: 317, fig. 218; 1984: 98, fig. 4 [not *Vexilla vexillum* (Gmelin, 1791)].

Material examined. Tuamotus, Fakarava, on the beach, 1 dd, JT; Takapoto Nord, outer reef flat, under coral, 2 lv., JT; Rangiroa, 10-15 m, under coral, 1 lv, RH.

Distribution. Mauritius, Central Java, Tuamotus

Remarks. *Vexilla taeniata* was considered a synonym of *V. vexillum* (Gmelin, 1791) by Tröndlé & Houart (1992: 114), however, *V. taeniata* differs in having a more conical shell instead of weakly convex in *V. vexillum*, and in having a narrower aperture, a straighter columellar lip with a more obvious parietal tooth, a deeper anal sulcus, and more numerous denticles within the outer apertural lip.

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TABLES 3-10

bold : new record

+ : in Tröndlé & Houart (1992) or Houart & Tröndlé (1997)

◆ : new locality

● : endemic

Expeditions.

1. MUSORSTOM 9 -August 1997-

2. coll. Von Cosel, Tröndlé & Tandy -September 1997-

3. BENTHAUS -November 2002-

4. Rapa 2002

SPECIES	SCT	TMT	MRQ	GMB	AUS	RAP	EXP.	END.
<i>Chicoreus (C.) ramosus</i> (Linnaeus, 1758)	+	+	+	+	+		1	
<i>Chicoreus (Triplex) maurus</i> (Broderip, 1833)	+	+	+				1, 2	
<i>Chicoreus (Triplex) rubescens</i> (Broderip, 1833)	+	+	+					
<i>Chicoreus (Triplex) strigatus</i> (Reeve, 1849)	+	+						
<i>Chicoreus (Triplex) thomasi</i> (Crosse, 1872)			+				1	●
<i>Chicoreus (Triplex) torrefactus</i> (Sowerby, 1841)	◆							
<i>Chicoreus (Chicopimatus) laqueatus</i> (Sowerby, 1841a)	+	+						
<i>Chicoreus (Chicopimatus) orchidiflorus</i> (Shikama, 1973)					+			
<i>Naquetia barclayi</i> (Reeve, 1858)			◆				1	
<i>Naquetia cumingii</i> (A. Adams, 1853)	+	+		+				
<i>Naquetia triquetra</i> (Born, 1778)	+	+		+				
<i>Chicomurex laciniatus</i> (Sowerby, 1841)	+							
<i>Chicomurex venustus</i> (Rehder & Wilson, 1975)			+				1	
<i>Homalocantha anatomica</i> (Perry, 1811)	+		+				1	
<i>Poirieria (Paziella) tanaoa</i> n. sp.			◆				1	●
<i>Pteryonotus elongatus</i> (Lightfoot, 1786)	+	+						
<i>Pteryonotus loebbeckei</i> (Kobelt, 1879)				+	◆		3	
<i>Pteryomarchia aparrii</i> (D'Attilio & Bertsch, 1980)						◆	3	
<i>Pteryomarchia bouteti</i> (Houart, 1990)	+	+	+					●
<i>Pteryomarchia martiniana</i> (Röding, 1798)	+	+						
<i>Pteryomarchia triptera</i> (Born, 1778)	+		+					
<i>Aspella lozoneti</i> n. sp.						◆	4	●
<i>Aspella hildrunae</i> n. sp. as <i>Aspella platylaevis</i> Radwin & D'Attilio, 1976 in Tröndlé & Houart (1992)	+	+	◆	◆		+		●
<i>Aspella helenae</i> n. sp.	◆							●
<i>Aspella producta</i> (Pease, 1861)	+	◆	+				1, 2	
<i>Dermomurex (Triplatalia) trondleorum</i> Houart, 1990		+						●
<i>Dermomurex (Takia) infrous</i> Vokes, 1974					◆		1	
<i>Atiliosa caledonica</i> (Jousseaume, 1881)	+	+						

Table 3. Distribution of Muricidae in French Polynesia (Muricinae)

SPECIES	SCT	TMT	MRQ	GMB	AUS	RAP	EXP.	END.
<i>Favartia (Favartia) brevicula</i> (Sowerby, 1834)					+			
<i>Favartia (Favartia) conleyi</i> Houart, 1999 (March) [= <i>Favartia (Murexiella) lillouxi</i> Myers & Hertz, 1999] (April)	◆		◆					
<i>Favartia (Favartia) guamensis</i> Emerson & D'Attilio, 1979 as <i>Favartia (Favartia) crouchi</i> (Sowerby, 1894) in Tröndlé & Houart (1992)	+	+						
<i>Favartia (Favartia) unaculata</i> (Reeve, 1845)			◆		◆		1, 3	
<i>Favartia (Favartia) ponderi</i> Myers & D'Attilio, 1989	+	◆						
<i>Favaria rosamiae</i> D'Attilio & Myers, 1985			+					
<i>Favartia (Favartia) sp. cf. F. sykesi</i> (Preston, 1904)			◆				1, 2	●
<i>Favartia (Favartia) tetragona</i> (Broderip, 1833)	+							
<i>Favartia (Favartia) sp.</i>			◆				1	●
<i>Favartia (Favartia) salvati</i> n. sp.			◆		◆		3	●
<i>Favartia (Favartia) nivea</i> n. sp.					◆		3	●
<i>Favartia (Pygmaepterys) avatea</i> n.sp.					◆		3	●
<i>Favartia (Pygmaepterys) sp. 1</i>					◆		3	●
<i>Favartia (Pygmaepterys) sp. 2</i>					◆		3	●
<i>Murexsul tokubeii</i> Nakamigawa & Habe, 1964					◆	◆	3	

Table 4. Distribution of Muricidae in French Polynesia (Muricopsinae)

SPECIES	SCT	TMT	MRQ	GMB	AUS	RAP	EXP.	END.
<i>Ergalatax contracta</i> (Reeve, 1846)		+						
<i>Ergalatax margaricola</i> (Broderip, 1833)	+	+		+	+	◆		
<i>Cytharomorula ambonensis</i> (Houart, 1996)			◆				1	
<i>Cytharomorula danigoi</i> Houart, 1995						◆	3	
<i>Cytharomorula grayi</i> (Dall, 1889)			+				1	
<i>Cytharomorula lefevreiana</i> (Tapparone Canefri, 1880)	◆	+						
<i>Cytharomorula paucimaculata</i> (Sowerby, 1903)	◆	◆	◆		◆	◆	1, 3	
<i>Cytharomorula springsteeni</i> Houart, 1995					◆		3	
<i>Morula (Morula) anaxares</i> (Kiener, 1835)	◆							
<i>Morula (Morula) angulata</i> (Sowerby, 1893)	+	+						
<i>Morula (Morula) cernohorskyi</i> Houart & Tröndle, 1997		+			◆		3	●
<i>Morula (Morula) echinata</i> (Reeve, 1846)	+	+	◆	◆			1	
<i>Morula (Morula) granulata</i> (Duclos, 1832)	+	+	+	+	+	+	1, 2, 4	
<i>Morula (Morula) nodicostata</i> (Pease, 1868)	+	+		◆				●
<i>Morula parvissima</i> Cernohorsky, 1987								●
<i>Morula (Morula) oparensis</i> (Melvill, 1912)		+			◆	+	3, 4	●
<i>Morula (Morula) peasei</i> Houart, 2002 [as <i>Morula nodicostata</i> (in part) in Tröndle & Houart, 1992]	◆	◆		◆	◆	◆	4	●
<i>Morula (Morula) rodgersi</i> Houart, 2000	◆							
<i>Morula (Morula) uva</i> (Röding, 1798)	+	+	+	+	+	+	2, 4	
<i>Morula (Morula) variabilis</i> (Pease, 1868) [as <i>Morula nodicostata</i> (in part) in Tröndle & Houart, 1992]		+			+			●
<i>Morula (Morula) zebrina</i> Houart, 2004 (new name for <i>Sistrum striatum</i> Pease, 1868, not <i>Engina striata</i> Pease, 1868)	+	+			+	◆	4	●
<i>Morula (Habromorula) ambrosia</i> (Houart, 1995)	◆	◆				◆	3, 4	
<i>Morula (Habromorula) bicatenata</i> (Reeve, 1846)	+	◆						
<i>Morula (Habromorula) dichrous</i> (Tapparone Canefri, 1880)	◆							
<i>Morula (Habromorula) porphyrosioma</i> (Reeve, 1846)		+	+				1	
<i>Morula (Habromorula) spinosa</i> (H. & A. Adams, 1853)	+							
<i>Morula (Habromorula) striata</i> (Pease, 1868)		?						
<i>Muricodrupa fenestrata</i> (Blainville, 1832)	+	+		+	+			
<i>Muricodrupa fiscella</i> (Gmelin, 1791)			◆				1, 2	
<i>Orania archaea</i> Houart, 1995			◆				1	
<i>Orania maestrii</i> n. sp.					◆	◆	3	●
<i>Orania pacifica</i> (Nakayama, 1988)		non	+				1	
<i>Orania simonetae</i> Houart, 1995 (as <i>Pascula benedicta</i> in Tröndle & Houart, 1992)	+	◆	+		◆		3	●
<i>Orania atea</i> n. sp.			◆				1	●
<i>Pascula citrica</i> (Dall, 1908)	+	+			+	+	3	
<i>Pascula darrosensis</i> (E.A. Smith, 1884)			◆				1, 2	
<i>Pascula muricata</i> (Reeve, 1846) [as <i>Pascula</i> sp. in Tröndle & Houart, 1992]	+	+	+	+		+	1, 2	
<i>Pascula ozemana</i> (Crosse, 1861)	◆		+				1, 2	
<i>Pascula submissus</i> (E. A. Smith, 1903)			+				1, 2	
<i>Pascula</i> sp.					◆		3	
<i>Spindrupa euracantha</i> (A. Adams, 1853)	+	+	+					
<i>Usilla avenacea</i> (Lesson, 1842)		+	+	+			2	

Table 5. Distribution of Muricidae in French Polynesia (Ergalataxinae)

SPECIES	SCT	TMT	MRQ	GMB	AUS	RAP	EXP.	END.
<i>Pagodula pulchella</i> (Schepman, 1911) (= <i>Tropton</i> sp. in Tröndle & Houart, 1992)					◆	+	3	
<i>Pagodula atanna</i> n. sp.			◆				1	●

Table 6. Distribution of Muricidae in French Polynesia (Trophoninae)

SPECIES	SCT	TMT	MRQ	GMB	AUS	RAP	EXP.	END.
<i>Tripterotyphis lowei colemani</i> Ponder, 1972		+						

Table 7. Distribution of Muricidae in French Polynesia (Tripterotyphinae)

SPECIES	SCT	TMT	MRQ	GMB	AUS	RAP	EXP.	END.
<i>Monstrototyphis singularis</i> Houart, 2002						◆	3	

Table 8. Distribution of Muricidae in French Polynesia (Typhinae)

SPECIES	SCT	TMT	MRQ	GMB	AUS	RAP	EXP.	END.
<i>Drupa (Drupa) elegans</i> (Broderip & Sowerby, 1829)	+	+	+					●
<i>Drupa (Drupa) morum morum</i> Röding, 1798	+	+		+	+	+	4	
<i>Drupa (Drupa) morum iodostoma</i> (Lesson, 1840)			+				2	●
<i>Drupa (Drupa) ricinus</i> (Linnaeus, 1758)	+	+	+	+	+	+	2, 4	
<i>Drupa (Ricinella) clathrata</i> (Lamarck, 1816)	+	+	+	+	+		2	
<i>Drupa (Ricinella) rubusidaeus</i> Röding, 1798	+	+	+	+	+		3	
<i>Drupa (Ricinella) speciosa</i> (Dunker, 1867)	+	+	+	+			1	
<i>Drupa (Drupina) grossularia</i> Röding, 1798	+	+	+	+	+	◆	3, 4	
<i>Drupella cornus</i> Röding, 1798)	+	+	+	+	+	◆	3, 4	
<i>Drupella eburnea</i> (Küster, 1862)	◆	◆						
<i>Drupella fragum</i> (Blainville, 1832)	+	+	◆	+				
<i>Drupella rugosa</i> (Born, 1778)	+	+		+				
<i>Nassa sarta</i> (Bruguère, 1789) [as <i>Nassa francolina</i> (in part) in Tröndle & Houart, 1992]					+			
<i>Nassa tuamotuensis</i> Houart, 1996	+	+	◆	+		+	2	●
<i>Neothais nesiotis</i> (Dall, 1908)				+	◆	+	3, 4	
<i>Purpura persica</i> (Linnaeus, 1758)		+	+	+			2	
<i>Reishia armigera</i> (Link, 1807)	+	+	+	+	+		2	
<i>Semiricinula marginata</i> (Blainville, 1832)	+		+				2	
<i>Semiricinula muricoides</i> (Blainville, 1832) (as <i>Thais infumata</i> , a synonym, in Tröndle & Houart, 1992)	+							
<i>Semiricinula turbinoides</i> (Blainville, 1832) (as <i>Thais foliacea</i> , a synonym, in Tröndle & Houart, 1992)	+		+				1, 2	
<i>Thais (Thalessa) aculeata</i> (Deshayes & Milne Edwards, 1844)	+	+	+	+				
<i>Thais (Thalessa) intermedia</i> (Kiener, 1835)	+	+		+		+	4	
<i>Thais (Thalessa) tuberosa</i> (Röding, 1798)	+	+	+	+		+		

Table 9. Distribution of Muricidae in French Polynesia (Rapaninae)

SPECIES	SCT	TMT	MRQ	GMB	AUS	RAP	EXP.	END.
<i>Maculotriron serriale</i> (Deshayes, 1833)	+	+	+	+	+	◆	2, 4	
<i>Phrygiomurex sculptilis</i> (Reeve, 1844)	+	+	◆					
<i>Phyllocoma convoluta</i> (Broderip, 1833)	+	+	+				1, 2	
<i>Vexilla vexillum</i> (Gmelin, 1791)		+	+					
<i>Vexilla taeniata</i> (Powis, 1835)		◆						

Table 10. Distribution of Muricidae in French Polynesia (subfamily questionable)