New species and new records of Seguenzioidea and Trochoidea (Gastropoda) from French Polynesia

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KEYWORDS. Gastropoda, Société, Australes, Tarava, Calliotropidae, Chilodontidae, Cantharidinae, Calliostomatidae, Margaritinae, *Calliotropis*, *Herpetopoma*, *Thalotia*, *Calliostoma*, *Gaza*, new species.

ABSTRACT. New records of eight known Seguenzioidea and Trochoidea species from French Polynesia area are listed, extending the distribution area of some of them. Seven new species are described and compared with similar species: *Calliotropis ammos* n. sp., *Herpetopoma poichilum* n. sp., *Thalotia tiaraeides* n. sp., *T. khlimax* n. sp., *T. polysarchosa* n. sp., *Calliostoma (Fautor) lepton* n. sp., *Gaza polychoronos* n. sp.

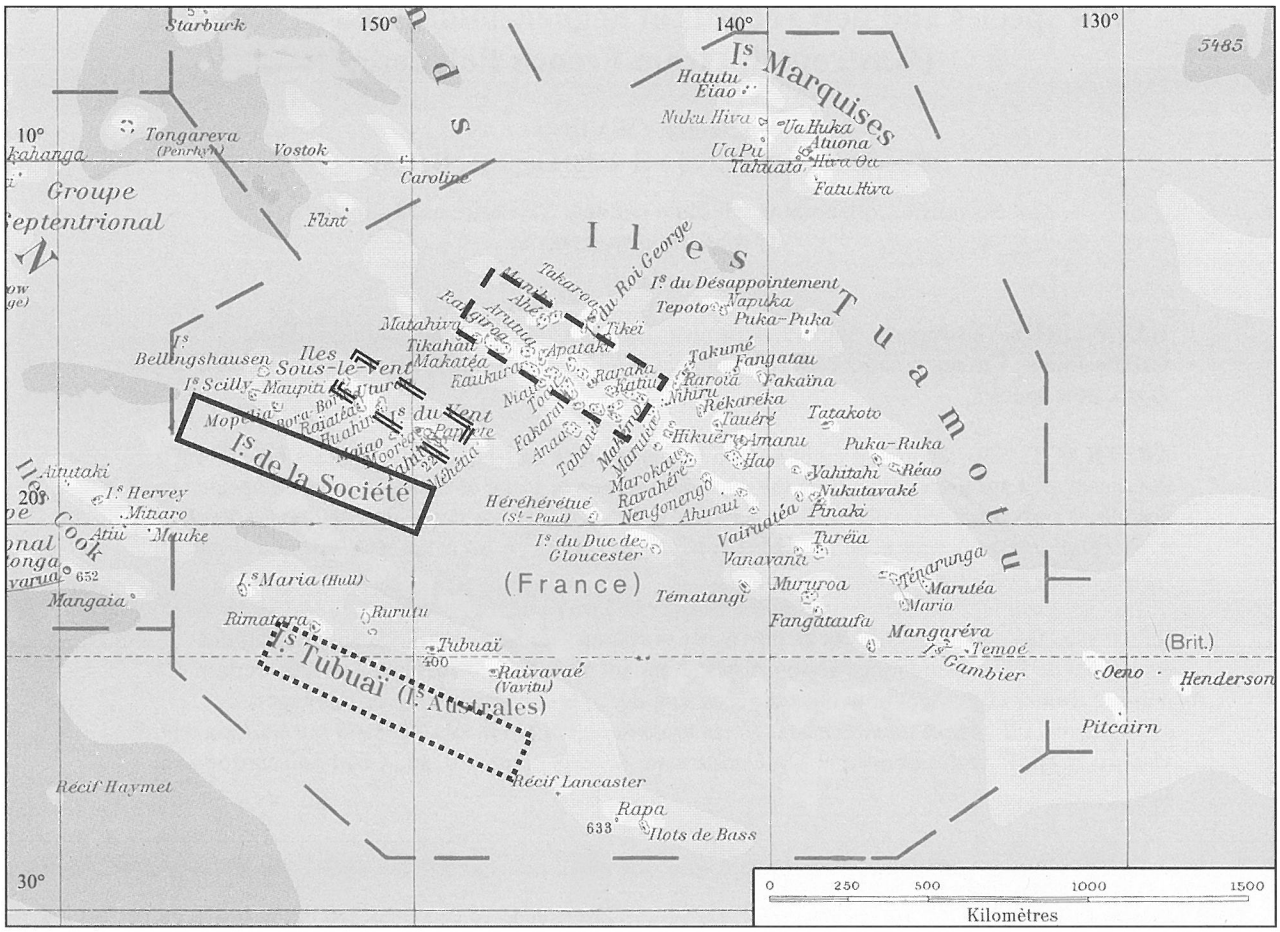
RESUME. De nouveaux relevés de huit espèces connues de Seguenzioidea and Trochoidea provenant de Polynésie Française sont listés, étendant ainsi l'aire de distribution d'un certain nombre d'entre elles. Sept nouvelles espèces sont décrites et comparées avec des espèces similaires : *Calliotropis ammos* n. sp., *Herpetopoma poichilum* n. sp., *Thalotia tiaraeides* n. sp., *T. khlimax* n. sp., *T. polysarchosa* n. sp., *Calliostoma (Fautor) lepton* n. sp., *Gaza polychoronos* n. sp.

INTRODUCTION

The deep-water fauna of the south-western Pacific is poorly known and not very documented. In the last decades occurred only a few books (Salvat & Rives, 1975; 1990) or papers (Cernohorsky, 1980; Tröndlé & Boutet, 2009; Vilvens, 2009b) about Polynesian shells; because some of these shells also occur in Hawaiian Islands, two recent books about Hawaiian malacofauna (Kay, 1979; Severn, 2011) can sometimes be useful. At the present time, one can mention that a team of malacologists (with J.Letourneux and R.Gourguet as contacts) is planning a compendium of the French Polynesian sea shells.
This explains the huge interest of deep-water material from French Polynesia brought recently in MNHN by the two campaigns BENTHAUS and TARASOC.
The BENTHAUS expedition was conducted in November 2002 aboard R.V. *Alis* by IRD (Institut de Recherche pour le Développement) with B. Richer de Forges as mission leader. It surveyed the Austral Islands from southwest to northeast (in an area covering 21°-29°S to 153°-140°W) from 60 to 1350 meters depth, with the aim to study the fauna living in these waters, especially zoo-benthos organisms like molluscs and crustaceans, and to perform seamounts cartography of this area. Dredging has been performed at 134 stations and trawling at 19 stations.

More recently, the TARASOC campaign was conducted in September and October 2009 aboard R.V. *Alis* by IRD and MNHN (Département Systématique & Evolution) with P. Bouchet as mission leader. The aim was to explore the fauna living on the benthos of Société Islands and the Tarava seamounts and to study the relations between isolation of these seamounts and their biodiversity, in partnership with MarBOL (Marine Barcode Of Life) project and CenSeam (Census of Marine Life on Seamounts) program. The Tarava Seamounts are 700 km long, are much older (about 35 to 50 million years) than Société seamounts and have some submarine summits reaching 600 to 900 m depth; they have been discovered in 1996 by the ZEPOLYF (Zone Economique de la Polynésie Française) program and no biological survey was ever undertaken in this area. During this campaign leaded in an area covering 15°-20°S to 155°-148°W, 213 dredging and trawling operations have been performed.

The present paper reports new records and new species of Seguenzioidea and Trochoidea species collected during these two campaigns.



Map 1 : French Polynesia : global location of MNHN campaigns -

..... : BENTHAUS campaign;

——— : TARASOC campaign / leg 1 (1) : Tarava Seamounts;

– – – – : TARASOC campaign / leg 1 (2) : Tuamotu Archipelago;

═══ : TARASOC campaign / leg 2 : Société Islands.

Material and methods

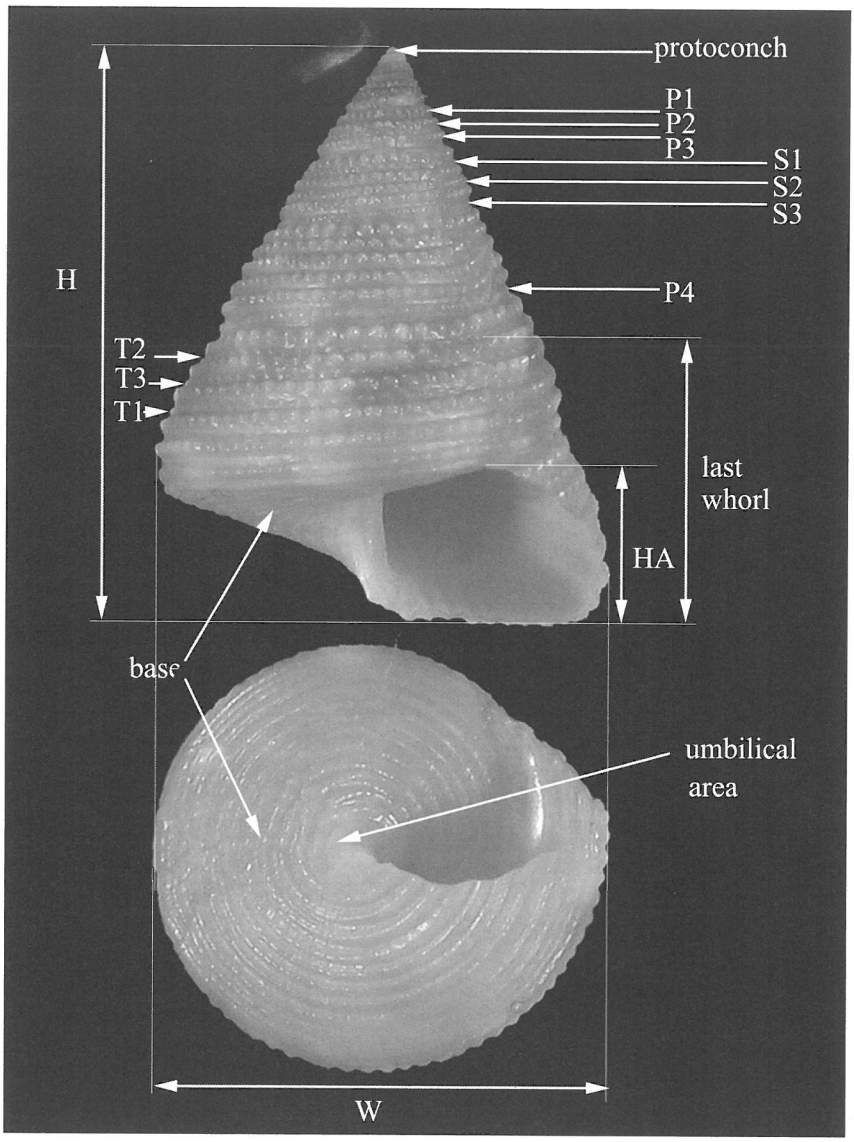
The material studied in the present paper was brought by the IRD-MNHN expeditions BENTHAUS (29/10/2002-28/11/2002) and TARASOC (20/09/2009–27/10/2009). Some information about intertidal and low subtidal species was brought by J.Letourneux and his team of French Polynesian malacologists.

Samples studied belong to superfamilies Trochoidea and Seguenziodea; the Solariellidae samples have been kept aside for another study using among other things DNA sequences (Vilvens and Williams, in preparation).

Regarding the distribution of the new species and the extension of the distribution of known species, the range is taken from the internal intervals of the two extremes values. This range of the known and new species is provided for all the available specimens and also for the only living specimens if they have been found; when these ranges are the same, the common range is cited once with the "(living)" annotation; if all the specimens are dead collected, the range is cited with the "(dead)" annotation.

Regarding the description methodology, the main conchological features used are (see Text Figure 1 below):

- general shape of the shell (depressed, high spired – conical, cyrtoconoidal, coeloconoidal);
- shape of the whorls (convex, concave, straight - with or without shoulder or keel);
- spiral cords of the whorls (ontogeny, number, beads, strength);
- spiral cords on the base (number, beads, distance between);
- shape of the aperture, the outer and the inner lip.



Text Figure 1 : Features of shells; H : height; W : width; HA : height of the aperture; P1, P2, P3, ... : primary cords; S1, S2, S3, ... : secondary cords; T1, T2, ... : tertiary cords (shell : *Calliostoma (Fautor) chlorum* Vilvens, 2005, Fiji, BORDAU 1, stn DW1454, 13.6 x 10.4 mm).

Abbreviations

Repositories

MNHN : Muséum national d'Histoire naturelle, Paris, France.
NHMUK : Natural History Museum of United Kingdom, London, England.
NMP : National Museum of the Philippines, Manila, Philippines.

Other abbreviations

H : height
W : width
HA : height of the aperture
TW : number of teleoconch whorls
P1, P2, P3, ... : primary cords (P1 is the most adapical)
Pi : group of the primary cords (i=1,2,...)
S1, S2, S3, ... : secondary cords (S1 is the most adapical)
Si : group of the secondary cords (i=1,2,...)
T1, T2, T3, ... : tertiary cords (numbered following appearing order)
Ti : set of the tertiary cords (i=1,2,...)
stn : station
lv : live-taken specimens present in sample
dd : no live-taken specimens present in sample
sub : subadult specimen
juv : juvenile specimen
o.d. : original designation
s.d. : subsequent designation
p.c. : personal communication

SYSTEMATICS

I follow here the classification of Williams et al. (2008, 2010) where, among other things :

- Calliotropidae and Chilodontidae are ranked as families of superfamily Seguenzioidea, not subfamilies of Chilodontidae *sensu* Bouchet & Rocroi (2005);
- Calliostomatidae are ranked as a family of superfamily Trochoidea (besides true Trochidae and other families as Solariellidae), as did the first Marshall (1995a) who erected the group to the family level.

Superfamily **SEGUENZIOIDEA** Verrill, 1884
Family **CALLIOTROPIDAE** Hickman & McLean, 1990
Genus ***Calliotropis*** Seguenza, 1903
Type species: *Trochus ottoi* Philippi, 1844 (by o.d.) - Pliocene-Pleistocene, Italy.

Calliotropis oros marquisensis Vilvens, 2007
Figs 1-6

Calliotropis oros marquisensis Vilvens, 2007: 52, 223, figs 124-129. Type locality: Marquesas Islands, Hiva Oa Island, 500-525 m.

Material examined. French Polynesia, Société Islands. TARASOC: stn DW3418, 16°33'S, 151°48'W, 580-618 m, 1 juv dd. – Stn CP3436, 16°43'S, 151°26'W, 430 m, 13 lv, 2 dd sub. – Stn CP3437, 16°41'S, 151°26'W, 440-560 m, 1 dd. – Stn CP3438, 16°41'S, 151°26'W, 638-700 m, 16 dd, 2 dd sub, 6 dd juv. – Stn CP3440, 16°40'S, 151°25'W, 650-800 m, 1 dd. – Stn DW3442, 16°41'S, 151°26'W, 515-550 m, 12 dd. – Stn DW3447, 16°42'S, 151°31'W, 620-700 m, 4 dd, 5 dd sub, 3 dd juv. – Stn DW3450, 16°40'S, 151°32'W, 705-755 m, 8 dd. – Stn DW3457, 16°45'S, 151°24'W, 520-572 m, 5 lv, 2 lv sub. – Stn DW3459, 17°28'S, 149°48'W, 485-560 m, 1 dd. – Stn DW3460, 17°28'S, 149°50'W, 660-680 m, 1 dd sub. – Stn DW3461, 17°27'S, 149°49'W, 844-877 m, 1 dd. – Stn DW3462, 17°27'S, 149°50'W, 1000-1145 m, 1 dd juv. – Stn DW3463, 17°34'S, 149°54'W, 460-505 m, 2 dd. – Stn DW3468, 17°34'S, 149°54'W, 800-870 m, 1 dd. – Stn DW3474, 17°28'S, 149°50'W, 720 m, 1 dd juv. – Stn DW3478, 17°31'S, 149°45'W, 678-810 m, 1 lv. – Stn DW3486, 17°48'S, 149°22'W, 660-920 m, 5 lv. – Stn DW3488, 17°48'S, 149°22'W, 390-790 m, 6 lv, 4 dd sub. – Stn DW3490, 17°48'S, 149°23'W, 720-1000 m, 2 lv. – Stn DW3494-3495, 17°27/28'S, 149°26/27'W, 556-859 m, 1 dd, 1 dd sub. – Stn DW3497, 17°43'S, 149°14'W, 365-850 m, 2 dd. – Stn DW3499, 17°41'S, 149°17'W, 550-700 m, 3 dd. – Stn DW3506, 17°36'S, 149°38'W, 380 m, 1 dd. – Stn without name, 300-900 m, 28 lv, 8 dd sub, 3 dd juv.

Distribution. French Polynesia, Marquesas Islands, alive in 500-660, shells in 408-1150 m (Vilvens, 2007); Société Islands, alive in 430-720, shells in 380-1000 m.

Calliotropis ammos n. sp.
Colour Figs A1-A2, Figs 7-13, Table 1

Type material. Holotype (22.4 x 22.7 mm) MNHN (24960). Paratypes: 5 MNHN (24961, 24962, 24963, 24964, 24965), 1 coll. C.Vilvens.

Type locality. Tuamotu Archipelago, Kaukura, TARASOC, stn DW3378, 15°38'S, 146°51'W, 887-890 m.

Material examined. French Polynesia, Tuamotu Archipelago. TARASOC: stn DW3349, 15°05'S, 148°03'W, 976-997 m, 1 dd sub. – Stn DW3362, 17°27'S, 149°50'W, 1000-1145 m, 1 dd sub. – Stn DW3374, 15°39'S, 146°54'W, 703-790 m, 1 lv (paratype), 1 dd juv. – Stn DW3377, 15°38'S, 146°53'W, 780-825 m, 2 dd (with paratype), 2 lv sub, 2 dd juv. – Stn DW3378, 15°38'S, 146°51'W, 887-890 m, 2 lv (holotype and paratype). – Stn DW3379, 15°38'S, 146°51'W, 800 m, 3 lv (with paratypes), 1 lv sub. – Stn DW3399, 15°51'S, 148°18'W, 1180-1308 m, 1 dd sub.
French Polynesia, Société Islands. TARASOC: stn DW3426, 16°41'S, 151°03'W, 801-874 m, 1 lv (paratype). – Stn DW3434, 16°42'S, 151°03'W, 700-785 m, 1 dd juv. – Stn DW3439, 16°43'S, 151°25'W, 800 m, 1 dd juv. – Stn DW3442, 16°41'S, 151°26'W, 515-550 m, 1 dd juv. – Stn DW3461, 17°27'S, 149°49'W, 844-877 m, 1 dd. – Stn DW3462, 17°27'S, 149°50'W, 1000-1145 m, 1 dd. – Stn DW3474, 17°28'S, 149°50'W, 720 m, 1 dd.

Distribution. French Polynesia, Tuamotu Archipelago, alive in 790-887 m, shells in 790-1180 m; Société Islands, alive in 801-874 m, shells in 550-1000 m.

Diagnosis. A rather big white *Calliotropis* species with a moderately elevated, more or less conical spire and a rounded periphery, 4 granular spiral cords on last whorls; size of beads of cords decreasing in size from adapical part to abapical part; convex base with 5 spiral cords; broad umbilicus covered by a deep-set septum.

Description. *Shell* of rather big size for the genus (height up to 24.5 mm, width up to 23.8 mm), more or less as high as wide, rather thin, conical; spire moderately elevated, height 0.9x to 1.1x width, 2.5x to 3.0x aperture height; broad umbilicus.
Protoconch of about 500-550 µm, of 1 whorl, dome shaped, without terminal varix.

Teleoconch up to 7.1 convex whorls, bearing 4 spiral granular cords different in size; nodules from cords produced on first whorls by intersections with axial ribs; axial sculpture on intermediate whorls consisting in prosocline threads in area between spiral cords; axial sculpture very weak on last whorls. Suture visible, not canaliculated.

First whorl convex, sculptured by 20-25 slightly prosocline smooth, rather strong ribs; interspace between ribs 2x broader than ribs; primary cord P2 and P3 appearing almost immediately; P2 weaker than P3. On second whorl, P2 and P3 stronger, beads of P3 sharp pointed. On third whorl, P1 appearing, weaker other cords; P2 closer to P1 than to P3; beads of P2 and P3 similar in size. On fourth whorl, P1 almost as strong as other cords; axial ribs enlarging, still strong; thin prosocline threads appearing between rib; P4 emerging partially from suture, beads smaller and more numerous than those of P2 and P3. On fifth whorl, axial ribs vanishing while axial threads still visible and even stronger; beads of P1, P2 and P3 bluntly pointed, similar in size, distance between about 1.5x size of bead; beads of P4 3x more numerous and much smaller than beads of other cords. On sixth whorl, number of beads of P3 increasing; axial threads weakening, but still visible. On last whorls, P4 peripheral; beads of spiral cords decreasing in strength and increasing in number (about 1.5x) from adapical to abapical cord; beads of P4 close together, about 2x more numerous and smaller than those of P1; prosocline threads almost obsolete.

Aperture subelliptic, vertically elongated; outer lip rather thin, flared at rim.

Columella more or less straight, strongly oblique, without tooth.

Base convex, with 5 spiral cords, outermost cords almost smooth, two innermost cords subgranular to granular; distance between outermost cords slightly greater than distance between the two innermost cords; axial ribs between spiral cords very weak, giving to interspaces a smooth appearance.

Umbilicus wide, diameter 27% to 33% of shell width, deep, funnel shaped, with gentle sloping walls, covered by a thin, deep-set thin septum; thin, weak axial threads inside; one thin, subgranular spiral cord possible under rim.

Colour of teleoconch yellowish sand; protoconch pinkish white.

	TW	H	W	HA	H/W	H/HA
holotype	6.9	22.4	22.7	8.5	0.99	2.64
paratype 1	7.0	22.7	22.3	8.7	1.02	2.61
paratype 2	7.1	24.5	23.8	9.9	1.03	2.47
paratype 3	6.7	22.7	21.6	7.5	1.05	3.03
paratype 4	7.1	24.1	23.7	8.6	1.02	2.80
paratype 5	6.7	22.4	23.7	8.8	0.95	2.55
paratype 6	6.9	22.4	21.4	8.8	1.05	2.55

Table 1. - *Calliotropis ammos* n. sp.: Shells measurements in mm for types.

Discussion. The new species is rather close to *C. derbiosa* Vilvens, 2004 (Figs 14-15) from Vanuatu and Fiji, but this similar in size species has a smaller protoconch (about 200 µm), a more depressed spire (height always 0.9x width), a subangulate periphery, a stronger, persistent fine scale-like axial sculpture on the last whorls and on the base, a horizontally (not vertically) elongated aperture, 6 (not 5) granular, spiral cords on the base and no septum covering the umbilicus.

Etymology. Sand (Greek : αμμος), used as a noun in apposition - with reference to ground colour.

Family : **CHILODONTIDAE** Wenz, 1938

Preliminary comments. Following Jansen (1994), we consider that chilodontid species having axial sculpture as strong as spiral cords belong to *Euchelus* Philippi, 1847 while species with spiral cords stronger than axial ribs belong respectively to *Herpetopoma* Pilsbry, 1889 and to *Vaceuchelus* Iredale, 1929 when having a strong or a weak (if present) columellar tooth.

Genus: ***Herpetopoma*** Pilsbry, 1889
Type species: *Euchelus scabriusculus* A.Adams & Angas, 1867 (by o. d.) - Recent, Australia.

Herpetopoma corrugatum (Pease, 1861)
Figs 22-23

Euchelus corrugatus Pease, 1861: 435. Type locality: Sandwich Island.
Euchelus corrugatus – Kay, 1979: 49, fig 14-A.
Herpetopoma corrugatum – Severn, 2011: 44, pl. 6, fig 3.

Material examined. French Polynesia, Société Islands. TARASOC: stn DW3416, 16°35'S, 151°44'W, 914 m, 2 dd. – Stn DW3420, 16°46'S, 151°04'W, 550 m, 1 dd. – Stn DW3429, 16°43'S,

150°38'W, 493-540 m, 2 dd. – Stn DW3434, 16°42'S, 151°03'W, 700-785 m, 1 dd sub. – Stn DW3481, 17°29'S, 149°45'W, 610 m, 1 dd, 2 dd juv.

Distribution. Hawaii, India, Marshall Islands, subtidal (Kay, 1979; Severn, 2011); French Polynesia, Société Islands, 540-914 m (dead); French Polynesia, Australes Archipelago, intertidal (living), 0-24 m (dead) (Letourneux et al., p.c.).

Herpetopoma poichilum n. sp.
Colour Figs G1-G2, Figs 16-19, Table 2

Type material. Holotype (3.1 x 2.5 mm) MNHN (24966). Paratypes: 4 MNHN (24967, 24968).

Type locality. Société Islands, Tahiti, TARASOC, stn DW3504, 17°37'S, 149°38'W, 455-650 m.

Material examined. French Polynesia, Société Islands. TARASOC: stn DW3425, 16°43'S, 151°03'W, 557 m, 1 dd juv. – Stn DW3434, 16°42'S, 151°03'W, 700-785 m, 1 dd. – Stn DW3457, 16°45'S, 151°24'W, 520-572 m, 1 dd (paratype). – Stn DW3460, 17°28'S, 149°50'W, 660-680 m, 1 dd, 1 dd sub, 4 dd juv. – Stn DW3476, 17°29'S, 149°45'W, 435-490 m, 1 dd sub. – Stn DW3481, 17°29'S, 149°45'W, 610 m, 4 dd (with 3 paratypes), 3 dd juv. – Stn DW3484, 17°47'S, 149°23'W, 300-650 m, 1 dd juv. – Stn DW3498, 17°43'S, 149°17'W, 347-460 m, 3 dd. – Stn DW3504, 17°37'S, 149°38'W, 455-650 m, 1 lv (holotype).

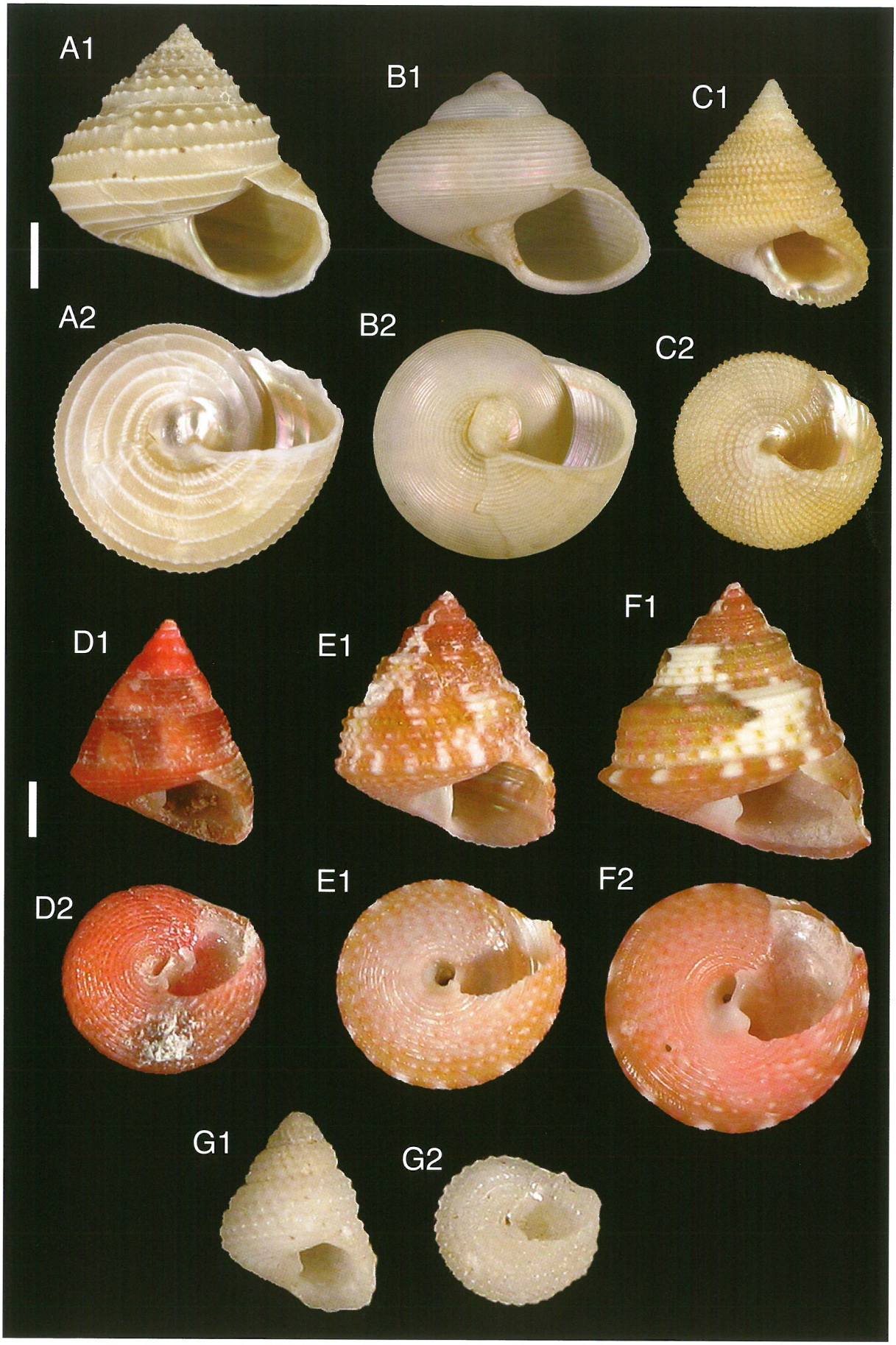
Distribution. French Polynesia, Société Islands, alive in 455-650 m, shells in 460-700 m.

Diagnosis. A small white *Herpetopoma* species with an elevated, more or less conical spire and a rounded periphery, 5 granular spiral cords on last whorl, peripheral cord smaller than the other cords, a convex base with 5 spiral cords and a closed or very narrow umbilicus.

Description. *Shell* of small size for the genus (height up to 4.8 mm, width up to 4.3 mm), higher than wide, rather thick, conical; spire elevated, height 1.1x to 1.2x width, 2.5x to 3.4x aperture height; umbilicus closed or reduced to a thin slit.
Protoconch more or less 200 µm, of about 1 whorl, with fine granules, with a thin terminal varix.
Teleoconch up to 5.1 convex whorls, bearing 5 spiral granular cords similar in size except peripheral smaller on last whorl; nodules from cords at intersections with strong axial prosocline ribs. Suture visible, weakly canaliculated.
First whorl convex, sculptured by about 20 slightly prosocline smooth, rather strong ribs; interspace between similar in size to ribs; primary cords P1, P2, P3 and P4 appearing at end of whorl, granular, closely packed, similar in size except P1 smaller. On second whorl, P3 slightly stronger than other cords, P1 still smaller; beads of all cords stronger, rounded, connected by axial ribs. On third whorl, all cords similar in size, except P1 smaller; distance between cords smaller than cords; strong axial ribs visible in interspaces, connecting beads of spiral cords. On fourth whorl, all cords more or less similar in size; axial ribs enlarging, still strong, more prosocline. On last whorl, P5 visible, slightly smaller than other cords; distance between cords still smaller than cords.
Aperture almost circular; outer lip thickened, with up to 9 inner lirae (eroded on dead specimens), lira the closest to columella stronger and producing a denticle. Columella straight, almost vertical, with a basal tooth. Base convex, with 5 subgranular to granular, similar in size spiral cords; distance between cords smaller than cords; axial ribs between spiral cords very visible.
Umbilicus close or reduced to a small chink.
Colour of teleoconch and protoconch white to yellowish white.

Colour plate 1. Holotypes MNHN of the new French Polynesian species described.

Scale bar: 5 mm.
A1-2. *Calliotropis ammos* n. sp., Tuamotu Archipelago, 887-890 m, 22.4 x 22.7 mm; **B1-2.** *Gaza polychoronos* n. sp., Société Islands, 580-618 m, 14.5 x 18.4 mm.
Scale bar: 1 mm.
C1-2. *Calliostoma (Fautor) lepton* n. sp., Tuamotu Archipelago, 315-340 m, 12.6 x 10.8 mm; **D1-2.** *Thalotia polysarchosa* n. sp., Australes Archipelago, 100 m, 4.5 x 4.0 mm; **E1-2.** *Thalotia khlimax* n. sp., Australes Archipelago, deep water, 6.2 x 5.1 mm, **F1-2.** *Thalotia tiaraeides* n. sp, Australes Archipelago, 500 800 m, 6.4 x 6.4 mm; **G1-2.** *Herpetopoma poichilum* n. sp, Société Islands, 455-650 m, 3.1 x 2.5 mm.


A1
B1
C1
A2
B2
C2
D1
E1
F1
D2
E1
F2
G1
G2

	TW	H	W	HA	H/W	H/HA
holotype	4.9	3.1	2.5	0.9	1.24	3.44
paratype 1	5.1	4.8	4.3	1.4	1.12	3.43
paratype 2	4.7	3.2	2.6	1.2	1.23	2.67
paratype 3	4.7	2.8	2.5	1.1	1.12	2.55
paratype 4	4.6	2.7	2.3	1.1	1.17	2.45

Table 2. - *Herpetopoma poichilum* n. sp.: Shells measurements in mm for types.

Discussion. The new species is rather close to *Herpetopoma eboreum* Vilvens & Héros, 2003 (Figs 20-21) from New Caledonia, but this slightly greater species lacks always an umbilicus, has a slightly cyrtoconoidal (not strictly conical) shape with only weakly convex to almost flat whorls, more close together spiral cords on the last whorls and up to 7 spiral cords on the base with interspace between cords as broad as cords.
Herpetopoma poichilum n. sp. is rather close to *H. elevata* Jansen, 1994 from Queensland, but this similar in size species has more convex whorls, four (not five), uneven in strength spiral cords on the last whorl with pointed (not rounded) nodules, four (not five) narrow spiral cords on the base.

Etymology. Embroidered (Greek :ποιχιλοζ) - with reference to the reticulate sculpture of the whorls.

Genus ***Vaceuchelus*** Iredale, 1929
Type species: *Euchelus angulatus* Pease, 1867 (by o.d.) – Recent, Indian Ocean.

Vaceuchelus foveolatus (A.Adams, 1853)
Figs 24-25

Monodonta foveolata A.Adams, 1853: 176. Type locality: Lord Hood's Island (=Marutea Atoll), 15-18 m.
Euchelus foveolatus – Pilsbry, 1889: 436.
Euchelus (Herpetopoma) foveolatus – Marshall, 1979: 524-525, figs 2A-E
"Euchelus" foveolatus – Kaicher, 1990: card#5790
Euchelus foveolatus – Herbert, 1996: 441, figs 72-73.
Vaceuchelus foveolatus – Poppe, Tagaro & Dekker, 2006: 48, pl. 16, fig 2.

Material examined. French Polynesia, Société Islands. TARASOC: stn DW3390, 14°59'S, 148°18'W, 380-758 m, 1 dd. – Stn DW3481, 17°29'S, 149°45'W, 610 m, 1 dd juv. – Stn DW3498, 17°43'S, 149°17'W, 347-460 m, 1 dd sub.

Distribution. Fiji (Pilsbry, 1889 – depth unknown); Philippines, 4-100 (using Poppe et al., 2006 data); New Zealand, Raoul Is., 9-37 m (Marshall, 1979); French Polynesia, Tuamotu, 15-18 m (A.Adams, 1853); French Polynesia, Société Islands, intertidal (living), 0-610 m (dead) (using data of Letourneux et al., p.c.); French Polynesia, Australes Archipelago, intertidal (dead) (Letourneux et al., p.c.); French Polynesia, Tuamotu Archipelago, 0-100 m (dead) (Letourneux et al., p.c.); French Polynesia, Gambier Islands, 0-38 m (dead) (Letourneux et al., p.c.).

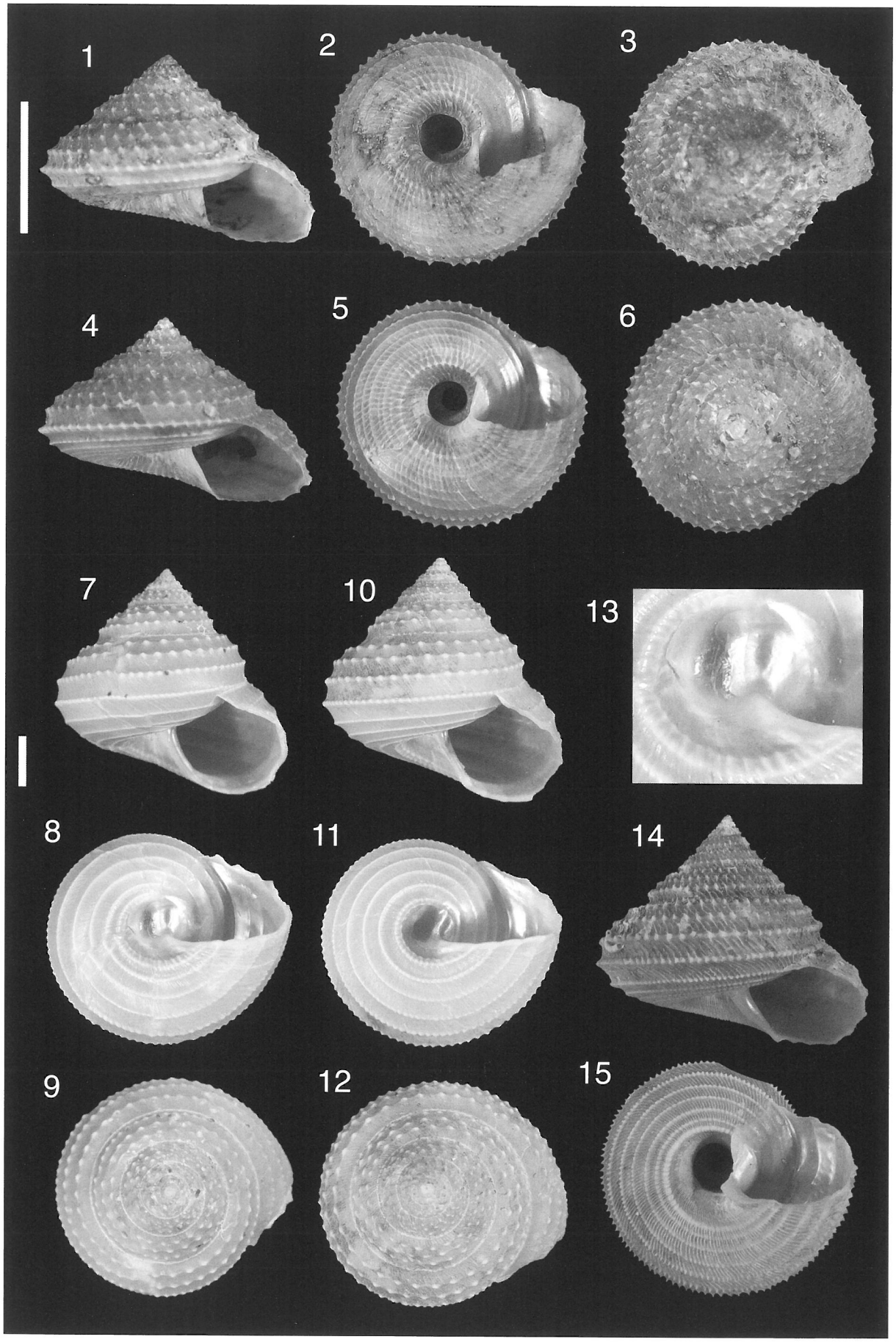
Vaceuchelus sp.
Figs 26-27

Material examined. French Polynesia, Tuamotu Archipelago. TARASOC: stn DW3349, 15°05'S, 148°03'W, 976-997 m, 1 dd.

Comments. This single specimen is too eroded seems different of every chilodontid known species, but its poor state could not lead to reliable description and comparison.

Genus: ***Agathodonta*** Cossman, 1918
Type species: *Trochus dentigerus* Orbigny, 1843 (by o. d.) – European Lower Cretaceous.

Figures 1-16. Scale bars = 5 mm
1-6. *Calliotropis oros marquisensis* Vilvens, 2007, Société Islands.; **1-3.** 300-900 m [TARASOC, stn DW3490], 8.4 x 11.9 mm; **4-6.** 720-1000 m [TARASOC, stn DW3490], 8.0 x 12.0 mm.
7-13. *Calliotropis ammos* n. sp., Tuamotu Archipelago.
7-9. Holotype MNHN (24960), 887-890 m [TARASOC, stn DW3378], 22.4 x 22.7 mm; **10-12.** Paratype MNHN (24964),800 m [TARASOC, stn DW3379], 24.1 x 23.7 mm; **13.** Details of septum on the umbilical area.
14-15. *Calliotropis derbiosa* Vilvens, 2004, holotype MNHN, Vanuatu, 748-775 m [MUSORSTOM 8, stn CP992], 22.3 x 25.4 mm.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Agathodonta sp.
Figs 28-30

Material examined. French Polynesia, Société Islands. TARASOC: stn DW3499, 17°41'S, 149°17'W, 550-700 m, 1 dd.

Comments. This single specimen is so broken and and the whorls are so eroded that it is very difficult to give reliable a possible description and comparison with known species.

Superfamily **TROCHOIDEA** Rafinesque, 1815
Family **TROCHIDAE** Rafinesque, 1815
Subfamily **TROCHINAE** Rafinesque, 1815
Genus :***Trochus*** Linnaeus, 1758
Type species: *Trochus maculatus* Linnaeus, 1758 (by o. d.) - Recent, Indo-Pacific.

***Trochus niloticus* Linnaeus, 1767**

Trochus niloticus Linnaeus, 1767: 1227, no. 579. Type locality : Indian Ocean.
Trochus niloticus – Cernohorsky, 1972: pp.38-39, pl.8, fig 1
Trochus niloticus – Salvat & Rives, 1975: 256,
Trochus niloticus – Kaicher, 1979: card#2175.
Trochus niloticus – Poppe, Tagaro & Dekker, 2006: 80-81, figs 70-71, pl. 33, figs 4-8.

Material examined. French Polynesia, Australes Archipelago. BENTHAUS: stn DW1913, 27°02'S, 146°00'W, 120 m, 1 dd juv. – Stn DW1917, 27°03'S, 146°04'W, 50-60 m, 4 dd juv. – Stn DW2015, 22°38'S, 152°50'W, 250-280 m, 2 dd juv.

Distribution. Indo-Pacific, low subtidal; French Polynesia, Australes Archipelago, 60-250 m (dead juv).

Subfamily **CANTHARIDINAE** Gray, 1857

Preliminary comment. The discrimination between the various genera belonging to Cantharidinae (*sensu* Hickman & Mc Lean, 1990) is not very clear, especially using only conchological features (e.g. shape of the whorls, round aperture or with a vertical columella, angle between inner and outer lip, tooth on the columella or not, base with a gentle or a steep slope, umbilicus present or absent). The new species described here are placed into one of the existing genera, although some features don't fit exactly with the features of the chosen genus, because it seems useless to add to confusion by creating new genera.

Genus ***Cantharidus*** Montfort, 1810
Type species: *Trochus iris* Gmelin, 1791 (by o.d.) = *Limax opalus* Martyn, 1784 (by s.d., 1847) - Recent, New Zealand.

Cantharidus marmoreus (Pease, 1868)
Figs 31-32

Trochus marmoreus Pease, 1868: 287, pl.24 fig. 9. Type locality: Tuamotu Archipelago, Paumotus.
Cantharidus marmoreus – Cernohorsky, 1980: 113, figs 1-3.
Calliostoma marmoreum – Kaicher, 1979: card#2102.

Material examined. French Polynesia, Australes Archipelago. BENTHAUS: stn DW1884, 27°54'S, 143°33'W, 570-620 m, 1 dd sub. – Stn DW1885, 27°52'S, 143°33'W, 700-800 m, 1 dd. – Stn DW1926, 24°38'S, 146°01'W, 50-90 m, 3 dd. – Stn DW1932, 24°41'S, 146°02'W, 500-800 m, 2 dd. – Stn DW1933, 24°41'S, 146°01'W, 500-850 m, 3 dd. – Stn DW1936, 24°40'S, 145°57'W, 80-100 m, 1 dd.

Distribution. French Polynesia, Tuamotu Archipelago, intertidal (dead) (Letourneux et al., p.c.); Australes Archipelago, 90-700 m (dead).

Cantharidus sp.
Figs 43-44

Material examined. Australes Archipelago. BENTHAUS: stn DW1939, 23°50'S, 147°42'W, 100 m, 1 dd.

Comments. This single specimen (7.3 x 5.6 mm) is highly eroded and has a broken protoconch : it is very difficult to describe accurately the spiral cords ontogeny.

Genus ***Jujubinus*** Monterosato, 1884
Type species: *Trochus matoni* Payraudeau, 1826 = *Trochus exasperatus* Pennant, 1777 (by s.d. Pilsbry, 1889)] - Recent, north-eastern Atlantic.

Jujubinus geographicus
Poppe, Tagaro & Dekker, 2006
Figs 39-42

Jujubinus geographicus Poppe, Tagaro & Dekker, 2006: 88-89, pl. 38, figs 2. Type locality : Philippines, Balicasag Is., 80-150 m.

Material examined. French Polynesia, Australes Archipelago. BENTHAUS: stn DW1880, 27°55'S, 143°30'W, 90-94 m, 3 dd, 1 dd sub. – Stn DW1927, 24°39'S, 146°02'W, 95-105 m, 1 dd. – Stn DW1932, 24°41'S, 146°02'W, 500-800 m, 1 dd. – Stn DW1958, 23°20'S, 149°30'W, 80-150 m, 1 dd sub. – Stn DW2013, 22°39'S, 152°50'W, 80-93 m, 1 dd.

Distribution. Philippines, 80-150 m (Poppe et al., 2006); French Polynesia, Australes Archipelago, 93-500 m (dead); French Polynesia, Tuamotu Archipelago, 0-100 m (dead) (Letourneux et al., p.c.); French Polynesia, Société Islands, 0-85 m (dead) (Letourneux et al., p.c.).

Comments. Regarding the huge gap between the type locality (Philippines) and French Polynesia, one can wonder to find this species in Australes Archipelago stations. But no clear conchological distinctions can be made between samples from the two areas, except that some Polynesian shells are less elevated, the subsutural spiral cord can be divided into two cords on the last whorls and the colour of the whorls is orange based rather then red wine.

Genus ***Thalotia*** Gray, 1847
Type species: *Monodonta conica* Gray, 1827 [=*Trochus pictus* Wood, 1828] (by o.d.) - Recent, Southern Australia.

Thalotia tiaraeides n. sp.
Colour Figs F1-F2, Figs 33-34, Table 3

Type material. Holotype (6.4 x 6.4 mm) MNHN (24969). Paratypes: 3 MNHN (24970, 24971).

Type locality. French Polynesia, Australes Archipelago, Président Thiers Bank, BENTHAUS, stn DW1932, 24°41'S, 146°02'W, 500 800 m.

Material examined. French Polynesia, Australes Archipelago. BENTHAUS: stn DW1923, 27°01'S, 146°05'W, 360-840 m, 1 dd. – Stn DW1932, 24°41'S, 146°02'W, 500-800 m, 1 dd (holotype). – Stn DW1955, 23°19'S, 149°26'W, 750-850 m, 1 dd sub. – Stn DW1958, 23°20'S, 149°30'W, 80-150 m, 1 dd sub. – Stn DW1999, 22°25'S, 151°22'W, 270-500 m, 1 dd. – Stn DW2003, 22°28'S, 151°19'W, 250-330 m, 1 dd (paratype). – Stn DW2018, 22°37'S, 152°49'W, 770-771 m, 1 dd. – Stn DW2020, 22°37'S, 151°49'W, 920-930 m, 2 dd (paratypes).

Distribution. French Polynesia, Australes Archipelago, 150-920 m (dead).

Diagnosis. A small white Cantharidinae species with a moderately elevated spire, a subsutural angulate keel making shoulder and a thick peripheral keel; 6 main granular spiral cords on last whorl with a thick peripheral keel; slightly convex base with up to 10 low, nearly smooth spiral cords; narrow and deep umbilicus, partly covered by a columellar expansion.

Description. *Shell* of small size for the genus (height up to 6.6 mm, width up to 6.4 mm), as high as wide or slightly higher than wide, rather thick, conical with a subsutural angulate keel making shoulder with gentle slope; spire moderately elevated, height 0.9x to 1.2x width, 3.3x to 3.6x aperture height; umbilicus narrow and deep, partly covered by a columellar expansion.
Protoconch approximately about 200 µm (eroded or damaged on all samples), without visible varix.
Teleoconch up to 6.1 convex whorls, bearing 6 main, similar in size spiral granular cords and peripheral keel produced by three close thin spiral cords. Suture visible, not canaliculated.
First whorl convex, sculptured by 4 smooth primary spiral cords and weak, low, wide axial folds; P1, P2 and P3 similar in size and evenly pinkish coloured, abapical cord P4 thinner with regular orange dashes; distance between P3 and P4 greater than distance between other cords. On second whorl, axial folds thinner and making P1, P2 and P3 subgranular. On third whorl, axial sculpture weakening; shoulder appearing with a round keel made by P1 at first adapical quarter; P1 stronger than other cords; S2 appearing rather quickly as strong as P2 and P3; strong suprasutural angulation above P4. On fourth whorl, keel much more angulate; S3 appearing above suprasutural angulation, quickly as strong as P3; T1 appearing at end of whorl on shoulder between suture and P1, quickly as strong as P2 but weaker than P1; T2 appearing between suprasutural angulation and P4, both cords thinner than other cords; all spiral cords granular. On fifth whorl, S3 stronger than P3, S2 and P2; T3 appearing between angulation and T2, similar in size to T2 and P4; beads of cords prosoclinely elongated. On last whorl, additional Ti appearing by intercalation; P4, T2 and T3 very close, hard to distinguish and forming a thick peripheral keel.
Aperture subquadrangular, slightly transversally elongated; outer lip thickened inside, meeting inner lip with obtuse angle.
Columella straight, almost vertical, with a strong tooth at abapical third.
Base weakly convex to almost flat, with 8-10 smooth to subgranular, similar in size spiral cords; distance between cords smaller than cords.
Umbilicus fairly narrow (diameter about 9% of shell width) and deep, funnel shaped with thin axial ridges inside, partly covered by columellar expansion.
Colour of protoconch and teleoconch first whorl deep pink; next whorls orange brown with wide, irregular axial white patches; spiral cords of three last whorls alternating pinkish white and orange dashes; umbilical area and inner part of base light pink, spiral cords of outer part alternating orange and pink.

	TW	H	W	HA	H/W	H/HA
holotype	6.1	6.4	6.4	1.8	1.00	3.56
paratype 1	5.8	5.9	6.4	1.8	0.92	3.28
paratype 2	6.1	6.2	5.8	1.8	1.07	3.44
paratype 3	5.7	6.6	5.5	1.9	1.20	3.47

Table 3. - *Thalotia tiaraeides* n. sp.: Shells measurements in mm for types.

Discussion. Regarding the straight, vertical columella, the rather sharp basal columellar tooth, the obtuse angle between inner and outer lip and the narrow umbilicus, and taking in account the shape of the new species similar to the one of *Thalotia* (*Odontotrochus*) *chlorostoma* (Menke, 1843) (despite a very different size), the genus *Thalotia* (as commented by Wilson, 1993) seems the more appropriate for this new species.
The new species is rather close to *Jujubinus hubrechti* Poppe, Tagaro & Dekker, 2006 (figs 35-36) from Philippines, but this similar in size species has a more elevated spire, a much stronger adapical spiral cord on the shoulder with elongate beads, a much stronger peripheral spiral cord with stronger, much rounded beads and different colours (green background colour instead orange brown).

Etymology. Tiara shaped (Greek : τιαρα and ειδηζ), adjective agreeing with a neutral noun - with reference to the general shape of the shell reminding an ancient tiara.

Thalotia khlimax n. sp.
Colour Figs E1-E2, Figs 37-38

Type material. Holotype (6.2 x 5.1 mm) MNHN (24972). Paratype (5.4 x 4.7 mm) MNHN (24973).

Type locality. French Polynesia, Australes Archipelago, BENTHAUS, stn without data.

Material examined. French Polynesia, Australes Archipelago. BENTHAUS: stn DW1885, 27°52'S, 143°33'W, 700-800 m, 1 dd. – Stn DW1903, 27°27'S, 144°04'W, 400-800 m, 1 dd sub. – Stn DW1923, 27°01'S, 146°05'W, 360-840 m, 1 dd (paratype). – Stn DW1961, 23°21'S, 149°34'W, 470-800 m, 1 dd. – Stn with no data, 1 lv (holotype), 1 dd sub.

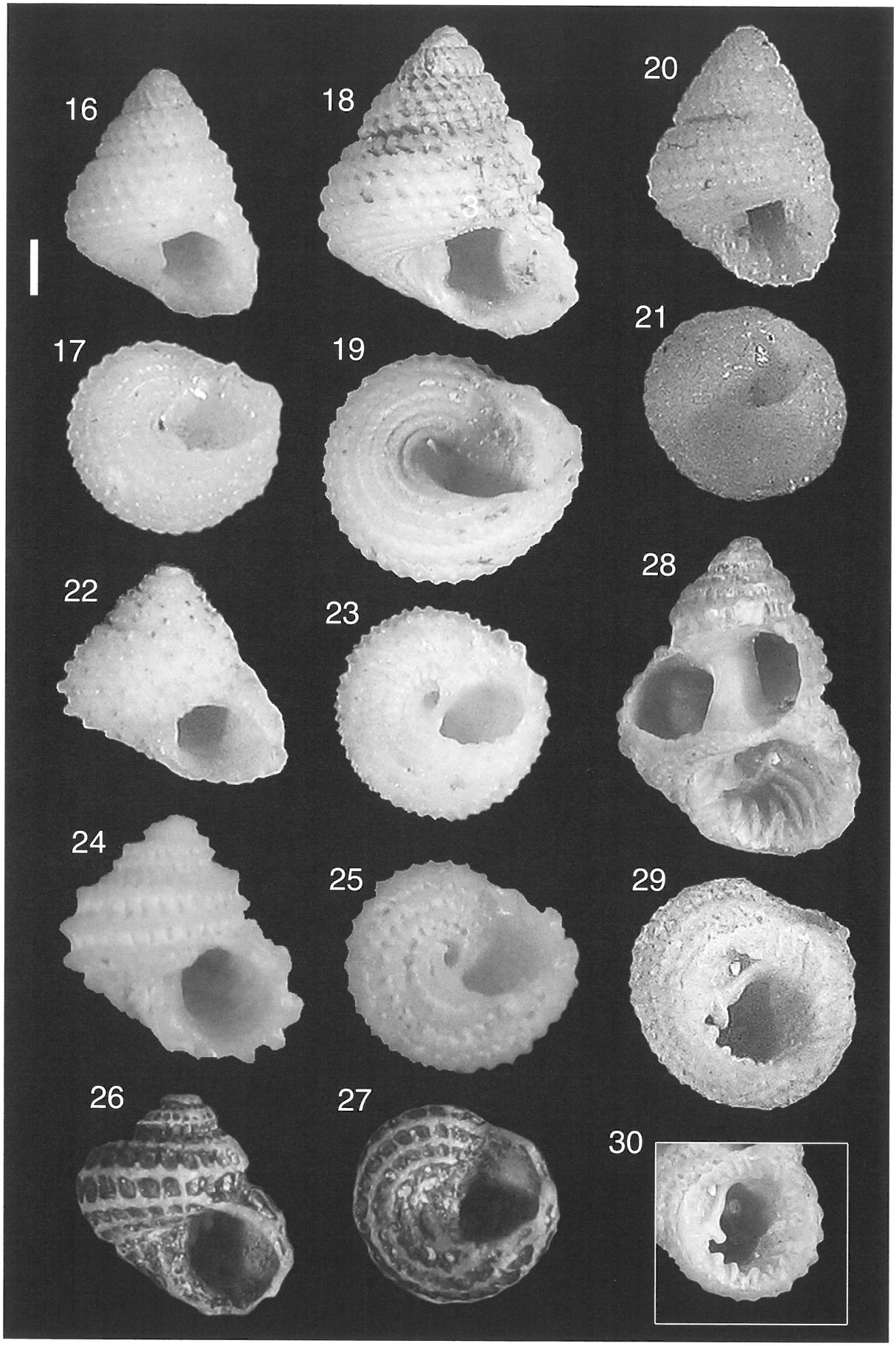
Distribution. French Polynesia, Australes Archipelago, 700-800 (dead).

Diagnosis. A small white Cantharidinae species with a moderately elevated spire and a small subsutural angulate keel making shoulder; **7** main granular spiral cords on last whorl, the two abapical cords slightly thinner, closer and separated from the other cords by a weakly concave area; slightly convex base with up to 10 low, smooth to subgranular spiral cords; moderately wide, deep umbilicus.

Description. *Shell* of small size for the genus (height up to 6.2 mm, width up to 5.1 mm), higher than wide, rather thin, conical with a small subsutural angulate keel making shoulder with gentle to almost horizontal slope; spire moderately elevated, height 1.1x to 1.2x width, 2.8x to 3.9x aperture height; umbilicus narrow and deep.
Protoconch about 100 µm, exserted, without visible varix.
Teleoconch up to 6.1 convex whorls, bearing 7 spiral granular cords; 5 adapical cords similar in size and 2 thinner, close peripheral cords with a concave area between two groups. Suture not canaliculated, poorly visible.
First whorl convex, sculptured by 3 primary spiral cords P2, P3 and P4 similar in size and evenly pinkish coloured; P1 appearing at mid whorl, similar to other cords. On second whorl, all cords subgranular; P1, P2 and P3 thicker, P4 thinner; shoulder appearing with a round keel made by P2 at first adapical quarter; distance between P3 and P4 greater than distance between other cords; S4 appearing at end of whorl, similar in size and shape to P4. On third whorl, S3 appearing, quickly as strong as P3; additional T1 appearing at mid whorl on shoulder between suture and P1. On fourth whorl, P1 thickening; keel more angulate and moving adapically to P1; T1 similar in size to P1; all spiral cords granular; distance between S3 and P4 still greater than distance between other cords, distance between P4 and S4 smaller than distance between other cords. On last whorls, T2 appearing between T1 and P1, similar in size to T1; beads of all cords rounded, without interspaces between; distance between P1, P2, P3 and S3 similar to cords; no interspace between P4 and S4; area between S3 and P4 concave, wider than cords, with prosocline, racher thick threads.

Figures 16-30. Scale bars = 1 mm except scale figs 18-19 = 100 µm.

16-19. *Herpetopoma poichilum* n. sp, Société Islands. **16-17.** Holotype MNHN (24966), 455-650 m [TARASOC, stn DW3504], 3.1 x 2.5 mm; **18-19.** Paratype MNHN (24967), 520-572 m m [TARASOC, stn DW3457], 4.8 x 4.3 mm.
20-21. *Herpetopoma eboreum* Vilvens & Héros, 2003, Caledonia, Touho area, 50–62 m [MONTROUZIER, stn 1275], 4.0 x 2.8 mm.
22-23. *Herpetopoma corrugatum* (Pease, 1861), Société Islands, 493-540 m [TARASOC, stn DW3429], 3.0 x 2.9 mm.
24-25. *Vaceuchelus foveolatus* (A.Adams, 1851), Société Islands, 380-758 m [TARASOC, stn DW3390], 3.6 x 3.5 mm.
26-27. *Vaceuchelus* sp., Tuamotu Archipelago, 976-997 m [TARASOC, stn DW3349], 3.2 x 3.3 mm.
28-30. *Agathodonta* sp., Société Islands, 550-700 m [TARASOC, stn DW3499], 5.0 x 4.0 mm.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Aperture subcircular; outer lip with a weak peripheral angulation and meeting inner lip with obtuse angle.
Columella straight, almost vertical, with weak swelling (holotype) or blunt tooth (paratype) at abapical third.
Base weakly convex to almost flat, with 10 smooth to subgranular, similar in size spiral cords; distance between cords smaller than cords.
Umbilicus moderately wide (diameter about 15% of shell width) and deep, funnel shaped with thin axial ridges inside.
Colour of protoconch pinkish white; teleoconch first whorl pinkish mauve; next whorls orange brown with irregular axial white and pink patches; periphery alternating orange dashes and narrower axial pinkish white flames; umbilical area and inner part of base nacreous pink, spiral cords of outer part alternating orange and pink.

Discussion. For the same reason as for *Thalotia tiaraeides* n. sp., the genus *Thalotia* seems the more appropriate for this new species.
Thalotia khlimax n.sp. may be compared to *T. tiaraeides* n. sp., but this similar in size species has a wider shoulder, a thick peripheral keel and an umbilicus partly covered by a columellar expansion.
The new species may be compared to *Kanekotrochus vietnamensis* Dekker, 2006 from Vietnam, but this species is much greater (height about 15 mm) for a same number of whorls, a more depressed spire and no umbilicus.

Etymology. Staircase (Greek : χλιμαξ) – with reference to the staggered shape of the shell.

Thalotia polysarchosa n. sp.
Colour Figs D1-D2, Figs 45-50, Table 4

Type material. Holotype (4.5 x 4.0 mm) MNHN (24974). Paratypes : 3 MNHN (24975).

Type locality. Australes Archipelago, BENTHAUS, stn DW1894, 27°40'S, 144°22'W, 100 m.

Material examined. French Polynesia, Australes Archipelago. BENTHAUS: stn DW1894, 27°40'S, 144°22'W, 100 m, 6 dd (holotype and paratypes), 1 dd sub. – Stn DW1939, 23°50'S, 147°42'W, 100 m, 1 dd, 2 dd sub. – Stn DW1946, 23°49'S, 147°41'W, 100-200 m, 1 dd. – Stn DW2018, 22°37'S, 152°49'W, 770-771 m, 4 dd.
French Polynesia, Société Islands. TARASOC: stn DW3420, 16°46'S, 151°04'W, 550 m, 1 dd juv. – Stn DW3429, 16°43'S, 150°38'W, 493-540 m, 2 dd juv. – Stn DW3434, 16°42'S, 151°03'W, 700-785 m, 1 dd juv. – Stn DW3435, 16°41'S, 151°02'W, 500-612 m, 5 dd juv. – Stn DW3451, 16°53'S, 151°21'W, 440-490 m, 1 dd juv. – Stn DW3458, 16°46'S, 151°23'W, 573-611 m, 1 dd. – Stn DW3459, 17°28'S, 149°48'W, 485-560 m, 1 dd sub, 3 dd juv. – Stn DW3460, 17°28'S, 149°50'W, 660-680 m, 4 dd juv. – Stn DW3476, 17°29'S, 149°45'W, 435-490 m, 7 dd sub. – Stn DW3481, 17°29'S, 149°45'W, 610 m, 7 dd juv. – Stn DW3482, 17°29'S, 149°45'W, 440 m, 2 dd.

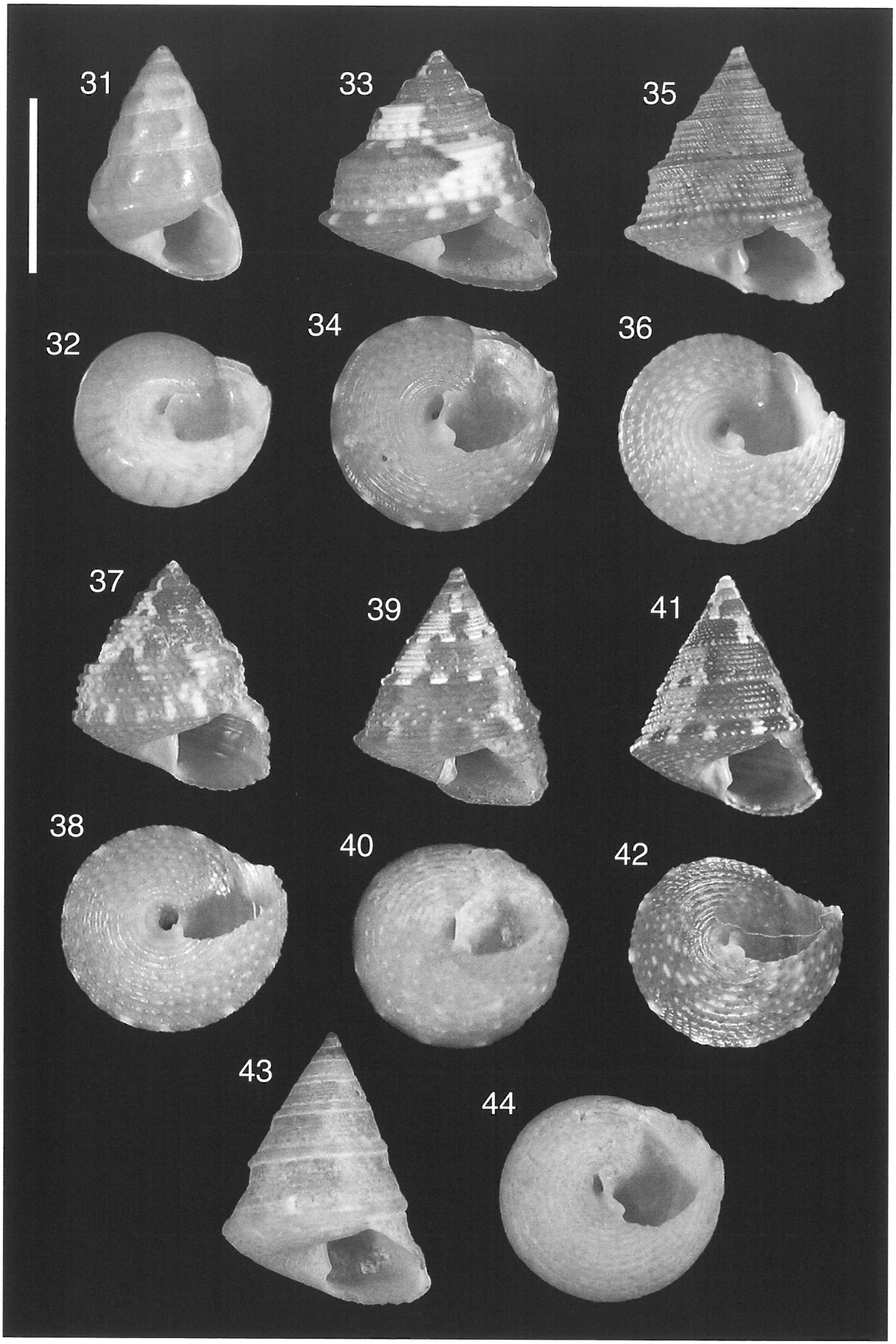
Distribution. French Polynesia, Australes Archipelago, 100-770 m (dead); Société Islands, 440-700 m (dead).

Diagnosis. A small reddish or orange brown Cantharidinae species with a moderately elevated spire with a weak suprasutural angulation; 8 main granular spiral cords on last whorl, the two abapical cords roundly granular, the median cords nearly smooth and the subsutural cords granular with axially elongated beads; base moderately convex with about 12 low, smooth cords; moderately wide, deep umbilicus partly covered by a columellar expansion.

Description. *Shell* of small size for the genus (height up to 4.6 mm, width up to 4.0 mm), higher than wide, rather thin, weakly cyrtoconoidal with an angular periphery; spire moderately elevated, height 1.1x to 1.2x width, 2.8x to 3.8x aperture height; umbilicus moderately wide and deep.
Protoconch about 100-120 µm, exserted, with a thin varix.

Figures 31-44. Scale bars = 5 mm.

31-32. *Cantharidus marmoreus* (Pease, 1868), Australes Archipelago, 700-800 m [BENTHAUS, DW1885], 6.5 x 4.1 mm;
33-34. *Thalotia tiaraeides* n. sp, holotype MNHN (24969), Australes Archipelago, 500-800 m [BENTHAUS, stn DW1932], 6.4 x 6.4 mm.
35-36. *Jujubinus hubrechti* Poppe, Tagaro & Dekker, 2006, holotype NMP, Philippines, Balicasag, 80-150 m, 7.0 x 6.2 mm – Photographs courtesy of Conchology, Inc.
37-38. *Thalotia khlimax* n. sp., holotype MNHN (24972), Australes Archipelago [BENTHAUS, stn with no data], 6.2 x 5.1 mm.
39-42. *Jujubinus geographicus* Poppe, Tagaro & Dekker, 2006. **39-40.** Australes Archipelago, 95-105 m [BENTHAUS: stn DW1927], 5.3 x 4.1 mm; **41-42.** Holotype NMP, Philippines, Mactan Island, 80-150 m, 4.9 x 3.8 mm - Photographs courtesy of Conchology, Inc.
43-44. *Cantharidus* sp., Australes Archipelago, 100 m [BENTHAUS: stn DW1939], 7.3 x 5.6 mm.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Teleoconch up to 6.2 convex whorls, bearing 8 spiral granular cords, in two areas of 6 and 2 cords, separated by a weak angulation; most adapical and two most adapical cords granular, other cords nearly smooth. Suture not canaliculated, poorly visible.
First whorl convex, sculptured by 4 primary spiral cords poorly marked, more or less similar in size. On second whorl, spiral cords wider, very low, distance between cords much smaller than cords; P4 slightly stronger, weakly subgranular; other cords smooth; S3 appearing at end of whorl. On third whorl, angulation appearing between S3 and P4; S3 quickly similar to P3.
On fourth whorl, all cords more elevated; S2 appearing at begin of whorl, quickly similar to P2; P4 dividing into two cords, subgranular at mid whorl, adapical cord slightly thinner; distance between S3 and two abapical cords greater than distance between other cords; S1 appearing at end of whorl by separation from P1. On fifth whorl, P1 and S1 weakly subgranular; two P4 clearly granular with round beads. On last whorls, four adapical cords granular with prosocline elongated beads; P3 and S3 still nearly smooth; two P4 roundly granular, similar in size, producing a week peripheral keel; T1 appearing under S3; T2 possibly appearing between two P4 on large specimens.
Aperture subelliptic, slightly prosoclinely elongated on large specimens; outer lip with a weak peripheral angulation and meeting inner lip with obtuse angle.
Columella straight, slightly opisthocline to vertical, with one blunt tooth at abapical third.
Base moderately convex, with 12 nearly smooth spiral cords; distance between cords smaller than cords; size of cords decreasing from outer part of base to inner part.
Umbilicus moderately wide (diameter about 15-16% of shell width) and deep, partly covered by expansion of columella, funnel shaped with thin axial ridges inside.
Colour of protoconch pinkish white to deep pink; teleoconch colour pattern rather variable : ground colour reddish brown to orange brown or pinkish brown, irregular axial white, light brown or pinkish patches; periphery alternating orange and pinkish white dashes; umbilical area and inner half of base nacreous pink or light red, spiral cords of outer half alternating pink and red or orange and pink, or almost uniformly pink.

	TW	H	W	HA	H/W	H/HA
holotype	6.2	4.5	4.0	1.3	1.13	3.46
paratype 1	6.0	3.7	3.2	1.3	1.16	2.85
paratype 2	6.0	4.6	3.8	1.2	1.21	3.83
paratype 3	5.9	3.9	3.3	1.1	1.18	3.55

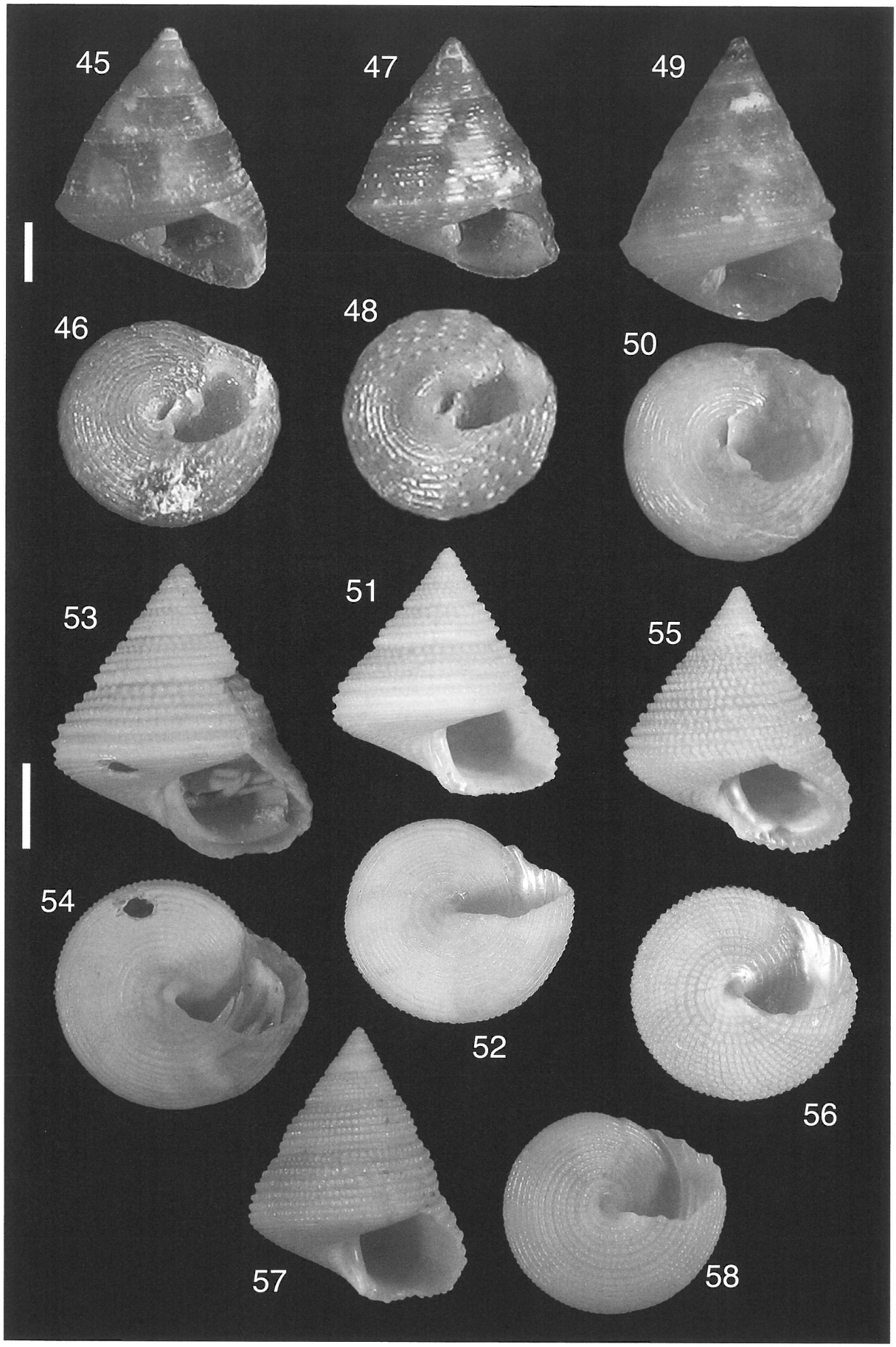
Table 4. - *Thalotia polysarchosa* n. sp. : Shells measurements in mm for types.

Discussion. Regarding its small size (the well formed columellar tooth implies that the studied specimens are, at least, shells of young adults) and the general shape of its shell, the new species can only be compared to similar in size known species from Philippines or French Polynesia. Among them, *Thalotia polysarchosa* n. sp. is rather close to *Jujubinus geographicus* Poppe, Tagaro & Dekker, 2006 (Figs 35-36) from Philippines and French Polynesia (new record in this paper), but this similar in size species is slightly more elevated, has a more conical shape, 7 (not 8) main granular spiral cords all with rounded beads, a more pronounced suprasutural keel and a subcircular aperture without transversal elongation.

Etymology. Obese (Greek : πολυσαρχοζ), with reference to the cyrtoconoidal shape of the moderately elevated shell.

Figures 45-58. 1st scale bar = 1 mm, 2nd scale bar = 5 mm.

45-50. *Thalotia polysarchosa* n. sp. **45-48.** Australes Archipelago, 100 m [BENTHAUS, stn DW1894]; **45-46.** Holotype MNHN (24974), 4.5 x 4.0 mm. **47-48.** Paratype MNHN (24975), 3.7 x 3.2 mm; **49-50.** Société Islands, 440 m [TARASOC, stn DW3482], 5.2 x 4.1 mm.
51-54. *Calliostoma (Fautor) paradigmatum* Marshall, 1995. **51-52.** Tarava Seamounts, 670-757 m [BENTHAUS, stn DW3300], 10.9 x 10.1 mm; **53-54.** Southern New Caledonia, 650-730 m [BATHUS 3, stn DW809], 17.6 x 15.2 mm.
55-56. *Calliostoma (Fautor) lepton* n. sp., holotype MNHN (24976), Tuamotu Archipelago, 315-340 m [TARASOC, stn DW3370], 12.6 x 10.8 mm.
57-58. *Calliostoma (Fautor) necopinatum* Marshall, 1995, paratype MNHN, New Caledonia, Atoll de Surprise, 255 m [MUSORSTOM 4, stn DW164], 12.7 x 9.8 mm.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Genus ***Calliotrochus*** Fischer, 1879
Type species: *Turbo phasianellus* Deshayes, 1863 (by monotypy) = *Margarita marmorea* Pease, 1861 - Recent, Indo-Pacific.

Calliotrochus marmoreus (Pease, 1861)

Margarita marmorea Pease, 1861: 435. Type locality: Sandwich Islands.
Turbo phasianellus – Deshayes, 1863: 74, n°216.
Gibbula marmorea – Kay, 1979: 51, fig 14-E.
Calliotrochus marmoreus – Severn, 2011: 48, pl. 8, fig 1.

Material examined. French Polynesia, Tarava Seamounts. TARASOC: stn DW3302, 19°15'S, 150°57'W, 600-660 m, 9 dd, 2 dd juv. – Stn DW3316, 19°14'S, 151°33'W, 519-520 m, 5 dd juv. – Stn DW3318, 19°15'S, 151°31'W, 557-569 m, 1 dd juv. – Stn DW3333, 18°45'S, 152°18'W, 795-975 m, 1 dd juv. – Stn DW3336, 18°23'S, 154°06'W, 573-619 m, 9 dd. – Stn DW3337, 18°23'S, 154°05'W, 571-614 m, 1 dd juv.
French Polynesia, Tuamotu Archipelago. TARASOC: stn DW3349, 15°05'S, 148°03'W, 976-997 m, 1 dd juv.
French Polynesia, Société Islands. TARASOC: stn DW3420, 16°46'S, 151°04'W, 550 m, 1 dd juv.

Distribution. Indo-Pacific (from northern Zululand to Hawaii and French Polynesia), shallow waters (Herbert, 1998); Hawaiian Islands, intertidal (Severn, 2011); French Polynesia, Tarava Seamounts, 520-795 m (dead); French Polynesia, Tuamotu Archipelago, 976-997 m (dead); French Polynesia, Société Islands, intertidal (living), 10-550 m (dead) (using data from Letourneux et al., p.c.).

Family **CALLIOSTOMATIDAE** Thiele, 1924
Subfamily **CALLIOSTOMATINAE** Thiele, 1924
Genus ***Calliostoma*** Swainson, 1840
Subgenus ***Fautor*** Iredale, 1924
Type species : *Ziziphinus comptus* A.Adams, 1855 (by o.d.) – Recent, southern Australia.

Calliostoma (Fautor) paradigmatum Marshall, 1995
Figs 51-54

Calliostoma (Fautor) paradigmatum Marshall, 1995b: 395-397, figs 13-15, 119, 155. Type locality: Southern New Caledonia, 505-550 m.
Calliostoma (Fautor) paradigmatum – Vilvens, 2005: 2.
Calliostoma (Fautor) paradigmatum – Vilvens, 2009a: 132, figs 25-26.

Material examined. Tarava Seamounts. BENTHAUS: stn DW3300, 19°19'S, 151°00'W, 670-757 m, 1 dd. – Stn DW3302, 19°15'S, 150°57'W, 600-660 m, 2 dd juv.

Distribution. Off Ile Surprise, northern New Caledonia, 585 m (living); South of Ile des Pins, southern New Caledonia, northern Norfolk Ridge, 470-795 m, living at 550-795 m (range computed using data of Marshall, 1995); Tonga, 342-500 m (dead); Tarava Seamounts, 660-670 m (dead).

Comments. Regarding the huge gap between the type locality (Southern New Caledonia) and French Polynesia, one can wonder to find this species on Tarava Seamounts stations, although some dead specimens were found in Tonga Archipelago (Vilvens, 2005). But the BENTHAUS adult shell shows all the characteristics of the New Caledonian species, especially the uniform white colour, the same ratio H/D (about 1.08), a spiral cord P1 commencing only at 2nd whorl, S2 appearing at 3rd whorl and S1 appearing at 4th whorl, a base with 14 spiral cords with the innermost stronger and granular. The only differences for the Polynesian samples are a spiral cord P4 emerging later (instead of present immediately but partly covered by next whorl), a spiral cord S3 absent (but this can happen, *fide* original description) and a smaller protoconch (only less than 300 µm for the Polynesian adult specimen).

Calliostoma (Fautor) lepton n. sp.
Colour Figs C1-C2, Figs 55-56

Type material. Holotype (12.6 x 10.8 mm) MNHN (24976).

Type locality. French Polynesia, Tuamotu Archipelago, TARASOC, stn DW3370, 15°39'S, 146°52'W, 315 340 m.

Material examined. Tuamotu Archipelago. TARASOC: stn DW3370, 15°39'S, 146°52'W, 315-340 m, 1 lv (holotype).

Distribution. French Polynesia, Tuamotu Archipelago, 315-340 m (dead).

Diagnosis. A rather small yellowish light brown *Calliostoma* species with a moderately elevated spire, coeloconoidal in shape in upper part and cyrtoconoidal in lower part, with a subangular periphery; aperture and columella highly nacreous; 6 main granular spiral cords on last whorls, axial threads visible between cords; base moderately convex base with about 12 granular cords; no umbilicus.

Description. *Shell* of rather small size for the genus (height 12.6 mm, width 10.8 mm), slightly higher than wide, rather thick, coeloconoidal in upper part, cyrtoconoidal in lower part, with a subangular periphery; spire moderately elevated, height 1.2x width, 3.1x aperture height; anomphalous.
Protoconch about 250-300 µm (apex eroded), with a thin varix.

Teleoconch up to 6.7 convex whorls, with 6 main, granular, similar in size spiral cords and an additional peripheral cord on last whorl; beads of all cords rounded conical, bluntly pointed. Suture not canaliculated, poorly visible.
First whorl convex, sculptured by thick axial folds and 3 primary spiral cords P1, P2 and P3 more or less similar in size, rather low, granular by intersection with folds; distance between folds 1.5x size of folds; distance between cords similar in size to cords. On second whorl, spiral cords stronger and wider, with well rounded beads; P3 slightly stronger than other cords, with rounded conical beads; axial folds more prosocline. On third whorl, beads of all cords bluntly pointed; P4 emerging from suture at end of whorl, beaded, weaker than other cords. On fourth whorl, P4 stronger, similar in size and shape to other cords; distance between P4 and P3 smaller than cords, distance between other cords similar in size to cords; S2 appearing at end whorl, thinner than other cords; axial folds weakening into axial threads. On fifth whorl, S1 appearing at mid whorl; S3 absent. On last whorls, all cords similar in size except P4 slightly stronger; all cords with conical, blunt pointed beads; axial threads weak but still visible; T1 appearing between P2 and S2; S4 visible on last whorl, peripheral, thinner than other cords; distance between all Pi and Si similar in size to cords, except S4 closer to P4; T2 appearing between S1 and P2.
Aperture subelliptic, slightly prosoclinely elongated; outer lip with nacreous thickened inside, with fine ridges at rim, without angle at meeting with thick inner.
Columella weakly arcuated, slightly oblique, thick and nacreous, flaring at lower part, without tooth.
Base moderately convex, with 12 granular spiral cords; subquadrate beads of cords made by thin axial threads across base; distance between cords smaller than cords; size of cords increasing in width from outer part of base to inner part.
No umbilicus (closed by columellar expansion).
Colour of protoconch and teleoconch yellowish light brown; base shiny white; aperture and columella nacreous.

Discussion. The new species is rather close to *Calliostoma (Fautor) necopinatum* Marshall, 1995 (Figs 57-58) from New Caledonia, but this similar in size species has a different, narrowly conical, weakly cyrtoconoidal shape, more convex last whorls, a spiral cord S3, a wider protoconch (400-420 µm) and a subquadrangular thin aperture without ridges inside.

Etymology. Hazelnut (Greek : λεπτον), used in apposition as a noun - with reference to light hazelnut colour of the shell, reminding of a cut hazelnut.

Genus ***Thysanodonta*** Marshall, 1988
Type species : *Thysanodonta aucklandica* Marshall, 1988 (by o.d.) – Recent, New Zealand.

Thysanodonta cf ***aucklandica*** Marshall, 1988
Figs 59-60

Thysanodonta aucklandica Marshall, 1988: 217-219, figs 3A-C. Type locality: off Auckland Islands, New Zealand, 549 m.

Material examined. Tuamotu Archipelago. TARASOC: stn DW3389, 14°55'S, 148°15'W, 889 m, 1 dd.

Comments. This single specimen (6.8 x 5.5 mm) has the spiral cords ontogeny of *T. aucklandica* (P1-P2-S2-P3-S4 with P4 peripheral on last whorl), but has only 7 spiral cords on the base (instead of 10 *fide* original description Marshall, 1988). This specimen, with first whorls rather eroded and an indistinct suture, could be subadult because its teleoconch has only 5.3 whorls. Additional material is clearly needed to decide if this is a different species or not.

Family **TURBINIDAE** Rafinesque, 1815
Subfamily **MARGARITINAE** Thiele, 1924
Genus ***Gaza*** Watson, 1879
Type species: *Gaza daedala* Watson, 1879 (by o. d.) - Recent, Fiji Islands.

Gaza polychoronos n. sp.
Colour Figs B1-B2, Figs 61-67, Table 5

Type material. Holotype (14.5 x 18.4 mm) MNHN (24977). Paratype (12.9 x 16.5 mm) MNHN (24978).

Type locality. French Polynesia, Société Islands, Bora Bora, TARASOC, stn DW3418, 16°33'S, 151°48'W, 580-618 m.

Material examined. French Polynesia, Société Islands. TARASOC: stn DW3418, 16°33'S, 151°48'W, 580-618 m, 1 lv (holotype). – Stn DW3497, 17°43'S, 149°14'W, 365-850 m, 1 lv (paratype).

Distribution. French Polynesia, Société Islands, living at 580-618 m.

Diagnosis. A rather small white *Gaza* species with a moderately elevated, more or less conical spire, a rounded periphery; first whorls smooth, last whorls with numerous spiral cords, granular on adapical half and almost smooth on abapical half; granular callus covering a fairly wide umbilicus.

Description. *Shell* of rather small size for the genus (height up to 14.5 mm, width up to 18.4 mm), wider than high, thin, conical, with a rounded periphery; spire moderately elevated, height 0.7x to 0.8x width, 1.8x to 2.2x aperture height; fairly broad umbilicus.
Protoconch of about 200-250 µm, of 1.25 whorl, low, smooth, glossy, without terminal varix.

Teleoconch up to 5.8 convex whorls, bearing numerous spiral, similar in size cords; adapical cords granular, abapical cords smooth; on last whorls, thin, prosocline axial threads between spiral cords. Suture visible, not canaliculated.
First whorl convex, almost smooth with growth lines poorly visible. On second whorl, low, poorly marked, axial folds appearing under suture. On third whorl, axial folds stronger, weakly prosocline, ending on adapical part with a rounded bead; 4 smooth, very thin, spiral cords appearing on abapical half. On fourth whorl, axial folds thinner, becoming thin threads, more numerous and more prosocline, covering all adapical half; subsutural beads resolving in a subsutural, roundly granular, spiral cord; at begin of whorl, 4 thin spiral cords appearing on adapical half, increasing in number by intercalation under suture, giving a reticulate pattern by intersection with axial threads; abapical cords nearly smooth to subgranular. On last whorls, number of spiral cords reaching 16 to 18; cords evenly spaced, distance between cords similar in size or slightly greater than cords, very different in shape on the two halves: cords of abapical half rather thin, almost smooth or slightly subgranular, elevated, with thin axial threads between them; cords of abapical half thicker, lower, granular,
Aperture well rounded, slightly deflected on adult shell, with small, inner denticles all around outer and inner lip; outer lip slightly flared at rim, inner lip meeting outer lip with a weak angle on subadult specimen.
Columella arched, without tooth, with a basal flaring on subadult sample.
Base convex, with up to 30 spiral cords; up to 50 axial threads around umbilicus; distance between spiral cords smaller than cords; cords of two outermost thirds smooth, thin; cords of innermost third wider, granular by intersection with axial threads.
Umbilicus fairly wide (diameter 9% to 10% of shell width), deep, funnel shaped, with steep sloping, slightly concave walls, covered by a moderately thin columellar callus (broken on paratype) covered by numerous, irregular in size and shape granules; thin, weak axial threads inside.
Colour of teleoconch nacreous white with pinkish sheen; protoconch pinkish brown (holotype).

	TW	H	W	HA	H/W	H/HA
holotype	5.8	14.5	18.4	6.7	0.79	2.16
paratype	5.6	12.9	19.5	7.1	0.66	1.82

Table 5. - *Gaza polychoronos* n. sp.: Shells measurements in mm for types.

Discussion. The new species is provisionally placed into the *Gaza* genus, regarding its spiral sculpture, its rounded, prosocline aperture and the umbilical callus, although it has an only weakly descending suture and a poorly reflected peristome (features used by Simone, 2006).
The new species is rather close to *Gaza daedala* Watson, 1879 (Figs 68-69) from Fiji, but this similar in size species has much thinner, more numerous spiral cords on the whorls (25 spiral lines in penultimate whorl), has a higher H/W ratio (1.24), a body whorl with a weak spiral carina between middle and lower thirds and a smooth, not granular callus.

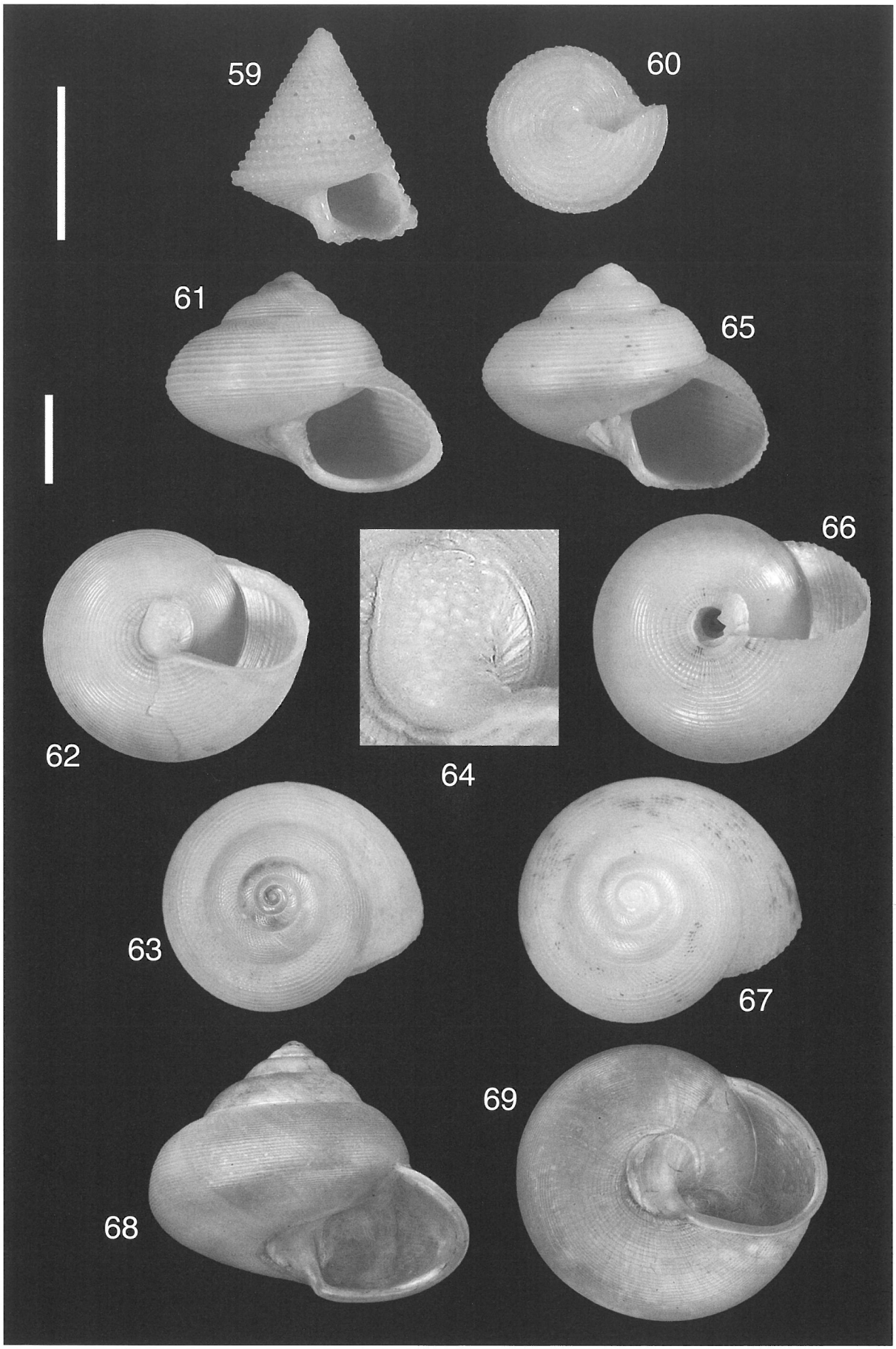
Etymology. Bead-shaped object (Greek : χορονοζ) and numerous (Greek : πολυζ, λη, λυ), used as a noun in apposition - with reference to the granular umbilical callus.

ACKNOWLEDGEMENTS

I would like to thank P. Bouchet (Muséum national d'Histoire naturelle, Paris) for reading the manuscript, constructive advice and access to the malacological resources of the MNHN, and V. Héros (MNHN) for her help in finding various scientific papers.
Also, I am very grateful to A. Salvador (Natural History Museum, London) for her help for her help to search material in the NHMUK collections and to get photographs of types and information about them.
I also would like to thank G. Poppe and J. Sarino (Conchology, Inc., Philippines) for the kind permission to use the types photographs they have sent.

Figures 59-69. Scale bars = 5 mm.

59-60. *Thysanodonta* cf *aucklandica* Marshall, 1988, Tuamotu Archipelago, 889 m [TARASOC, stn DW3389], 6.8 x 5.5 mm.
61-67. *Gaza polychoronos* n. sp., Société Islands. **61-64.** Holotype MNHN (24977), 580-618 m [TARASOC, stn DW3418]. **61-63.** 14.5 x 18.4 mm; **64.** Detail of the granular callus. **65-67.** Paratype MNHN (24978), 520-572 m [TARASOC, stn DW3497], 12.9 x 16.5 mm.
68-69. *Gaza daedala* Watson, 1879, holotype NHMUK (1887-2-9-346), Fiji, Kandavu, 1128 m, 20.6 x 17.0 mm – Photographs courtesy of Phil Crabb, NHMUK Photographic Unit.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