

Nine new molluscs (Gastropoda: Truncatelloidea: Tornidae: Vitrinellidae) from the Tropical Indo-Pacific

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ABSTRACT. New species of the families Tornidae and Vitrinellidae are studied, and placed in several genera listed below; the samples were collected during the Research Campaigns of the IRD in cooperation with the MNHN. The described species are new to science and were placed in the following genera: *Tornus* (*T. propinquus*), *Uzumakiella* (*U. solomonensis*), *Ponderinella* (*P. difficilis*), *Neusas* (*N. juliae*, *N. inesae*, *N. distorta*) and *Anticlimax* (*A. senenbarroi*, *A. salustianomatoi*, *A. juanvianoi*). Comparison is made with the previously known related species currently placed in the same genera and, in one case, with a species from a different genus.

RESUMEN. Se estudian nuevas especies de las familias Tornidae y Vitrinellidae (Mollusca, Gastropoda, Truncatelloidea), pertenecientes a diferentes géneros, y procedentes de las campañas de Investigación del IRD en colaboración con el MNHN. Las especies descritas son nuevas para la ciencia y pertenecen a los siguientes géneros: *Tornus* (*T. propinquus*), *Uzumakiella* (*U. solomonensis*), *Ponderinella* (*P. difficilis*), *Neusas* (*N. juliae*, *N. inesae*, *N. distorta*) y *Anticlimax* (*A. senenbarroi*, *A. salustianomatoi*, *A. juanvianoi*). Se hace comparación con las especies similares previamente conocidas y actualmente situadas en estos mismos géneros y en un caso con una especie de un género diferente.

INTRODUCTION

A large quantity of material was collected during the numerous expeditions organized by IRD and MNHN in the Pacific. This material was used for numerous major revisions, such as in Tornidae, Circulinae (an ongoing work), and Pyramidellidae including the description of many species previously unknown to science.

A few species were awaiting the finding of additional material before being described. In some cases, however, no further material was found and we decided to describe the new species anyhow.

Takano & Kano (2014) separated the family Vitrinellidae from Tornidae. They found that it was polyphyletic while *Vitrinella* C.B. Adams, 1850 is a sister group of the family *Iravadia* Blanford, 1867 (family Iravadiidae Thiele, 1928).

In the present paper we describe some isolated species from different genera, one in the family Tornidae and several within Vitrinellidae.

These families have been studied by Rolán & Rubio (2002) in West Africa, followed by a few

shorter works covering the Atlantic (Oliver & Rolán, 2011; Rolán & Rubio, 2012; Rolán & Swinnen, 2013); (Rubio et al., 2011) and in the Pacific by several authors (Marshall, 1988; Ponder, 1994; Ponder & de Keizer, 1998; Rubio & Rolán, 2014, 2015, 2016, 2017a, 2017b).

Material and Methods

General information about the MNHN expeditions can be found in Bouchet *et al.* (2008).

The material used to prepare this paper was collected during a number of those expeditions:

- MUSORSTOM 4 (1985)** on board R/V Vauban deep-sea exploration around New Caledonia.
- MUSORSTOM 6 (1989)** on board R/V Alis on the Loyalty Ridge.
- LAGON (1984-1989)** on board R/V Vauban explored New Caledonia, to map the biological communities of the coral reef lagoon.
- SMIB 8 (1993)** on board R/V Alis explored New Caledonia collecting invertebrates on seamounts where biological activity has already been shown.

- BATHUS 1-4** (1993-94) on board R/V Alis around New Caledonia proper, and the Norfolk and Loyalty Ridges.
- SALOMON 1** (2001) on board R/V Alis surveyed the central part of the Solomon Islands, from Guadalcanal to Malaita and Makira.
- PANGLAO 2005** (Panglao Deep Sea Cruise) explored and researched the deep-sea fauna of the Bohol and Sulu Seas.
- ATIMO VATAE (2010)** (Principal Investigator: Philippe Bouchet) explored Madagascar "Deep South".
- KAVIENG (2014)** explored the Kavieng Lagoon and the surface and deep waters of this region in Papua New Guinea.

Abbreviations

AMS: Australian Museum, Sydney, Australia
 IRD: Institut de Recherche pour le Développement
 H/D: ratio height/diameter
 MNHN: Muséum national d'Histoire naturelle, Paris, France
 SEM: Scanning Electron Microscopy
 stn: station
 s: empty shell

SYSTEMATICS

Superfamily **TRUNCATELLOIDEA** Gray, 1840
 Family **TORNIDAE** Sacco, 1896

Criscione & Ponder (2013) placed the family Tornidae in Truncatelloidea; after a phylogenetic analysis of 43 species belonging to 14 of the 23 families previously included in Rissuoloidea, and of all the families of Cingulopsoidea, they concluded that the family Tornidae, represented by two genera (*Circulus*: *C. subtatei* and *Pseudoliotia*: *P. micans*), was monophyletic, with *Nozeba* being sister to the Tornidae.

Morphologically, the shells are minute, colourless and glassy, paucispiral and umbilicate, depressed and auriform, the operculum is corneous, paucispiral, with an eccentric nucleus, and the radula is taenioglossate.

Takano & Kano (2014) stated that Eulimidae are part of the superfamily Vanikoroidea, on the basis of sequenced data. This placement implies the synonymy of the superfamilies Eulimoidea and Vanikoroidea. On the basis of their results, they reached the conclusion that the monophyletic nature of the Tornidae (=Vitrinellidae; Bouchet and Rocroi, 2005) is clearly rejected by the sister relationship between *Vitrinella* and *Iravadia*, confirming the previous suspicion that this family comprises heterogeneous groups (Ponder and de Keyser, 1998). Actually these searches are not completed and we have used the genera in the way that seems correct to us.

Genus *Tornus* Turton & Kingston, 1830

Tornus Turton & Kingston, 1830: 438, pl. 7, fig. 9 [Type species by monotypy: *Helix subcarinata* Montagu, 1803].

Adeorbis Wood, 1842: 530 [Type species *Adeorbis subcarinatus* (Montagu, 1803)].

Remarks. The genus *Tornus* currently has mainly an Atlantic distribution: the African West Coast, which is the area that shows the highest concentration of species (14), and the Caribbean (2); other species have been described from New Zealand (2), the Eastern Mediterranean (1), the Pacific coast of Central America (1), and the Gulf of Oman (1).

The new species described from southern Madagascar expands the distribution area of *Tornus* to the Southern Indian Ocean.

Tornus propinquus spec. nov.

Fig. 1A-F

Type material. Holotype (Fig. 1A, D) in MNHN IM-2000-33599 and 7 paratypes in MNHN IM-2000-33600

Material examined. South Madagascar, ATIMO VATAE: 1 s, East of Cap Antsirabe, stn TP11, 25°02.8-03.0'S 47°01.3-02.0'E, 49-52 m, sand compacted; 8 s, Secteur Fort Dauphin, stn DW3567, 25°05.3'S-47°02.4'E, 65-67 m (type material).

Type locality. South Madagascar, Secteur Fort Dauphin, 25°05.3'S-47°02.4'E, 65-67 m [ATIMO VATAE: stn DW3567].

Description of the holotype. Shell slightly glossy, with the shape of a truncate cone, nearly circular in apical view, with a very depressed spire and a wide umbilicus. Protoconch with 1 ½ whorls, poorly differentiated from the teleoconch; it has a very small nucleus of about 40 µm, and a diameter of about 320 µm, ending in a slightly marked, sinuous varix. Teleoconch with 1 ¾ whorls, keeled at the periphery, very depressed; in apertural position 5 spiral cords like carinae can be seen (1 subsutural; 2 peripheral; 1 basal; 1 periumbilical); the upper one very close to the suture, the basal one narrower and prominent, forming a keel. All of them are separated evenly. The axial sculpture is formed by about 33 adapically very prosocline narrow ribs, which cross the spiral cords, and are slightly irregular. On the peripheral carina, new small ribs are formed between every two previous ones, but most of them do not reach the upper cord, except at the end of the spire. The base is flat with a wide infundibuliform umbilicus limited by a strong rib that depresses the peristome. The aperture is almost triangular, with a continuous and very narrow peristome, interrupted only by three angles: the lowest one formed by the end of the periumbilical cord; the

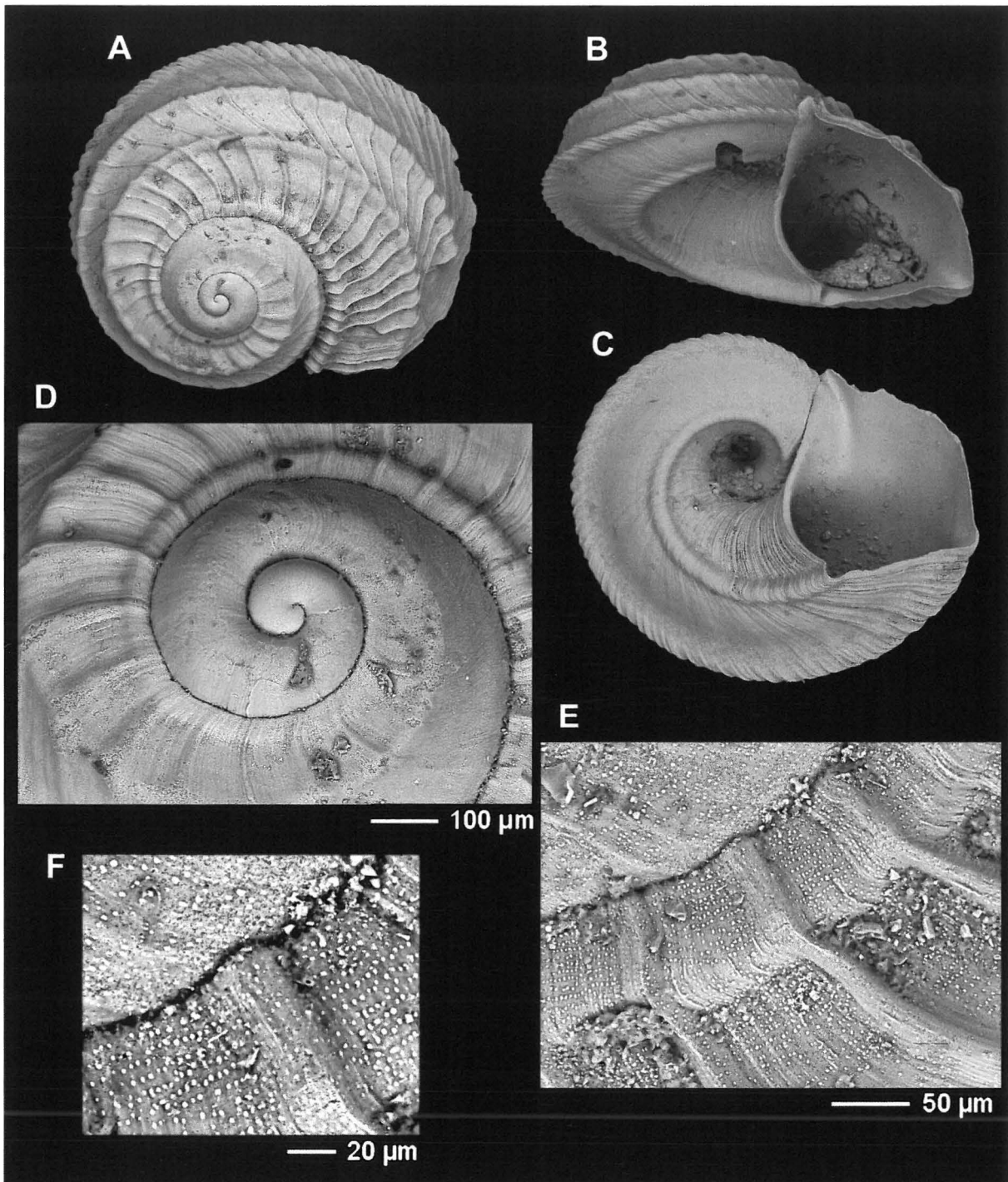


Figure 1

A-F. *Tornus propinquus* spec. nov. A. Holotype, 2.1 mm in diameter (MNHN IM-2000-33599); B-C. paratypes, 2.10, 1.80 mm (MNHN), South Madagascar, Secteur Fort Dauphin, stn DW3567, 25°5.3'S-47°2.4'E, 65-67 m, ATIMO VATAE; D. Protoconch of the holotype; E-F. Microsculpture and detail.

external one by the end of the carina; the upper one by the junction of the external lip with the prolongation of the columella. Microsculpture formed by numerous small tubercles spirally aligned, and numerous growth lines.

Dimensions: the holotype is 2.1 mm in diameter x 1.23 in height.

Habitat. Circumlittoral species, dredged at 49-52 m from compact sandy bottom.

Distribution. Only known from Madagascar.

Remarks. Montagu (1803) described a common European species as *Helix subcarinata*, which is the type species of the genus. Fretter & Graham (1978) give a complete description of the shell and its soft parts.

Tornus propinquus spec. nov. is rather similar to the European *Tornus subcarinatus* (Montagu, 1803) being characterized by the carinae which angulate the shell and the keel that forms the basal carina. The European species is more solid, the spiral sculpture stronger, more marked and with numerous axial riblets, the base more heavily sculptured and the peripheral carina is very close to another spiral cord.

Also rather similar are some West African species, described by Adam & Knudsen (1969), mainly *Tornus garrawayi* Adam & Knudsen, 1969 (figured by Rolán & Rubio, 2002), which has a similar profile, but can be distinguished by the presence on the base of a low spiral cord between the periumbilical one and the external carina; the axial sculpture in the dorsal part is less marked and the two upper spiral cords are in the same position, but the third one is closer to the peripheral carina and only appears at the end of the spire.

Tornus africanus Adam & Knudsen, 1969 is more rounded, less carinate peripherally and with more dorsal spiral cords.

Etymology. The specific name is from the Latin word *propinquus*, a, um which means "close, relative, neighbour", alluding to its clear similarity with the type species of the genus.

Family VITRINELLIDAE Bush, 1897
Genus *Uzumakiella* Habe, 1958

Uzumakiella Habe, 1958: 33 [Type species by monotypy: *Uzumakiella japonica* Habe, 1958].

Remarks. Only two species in the genus *Uzumakiella* are presently known: *U. japonica* Habe, 1958 and *U. natalensis* Kilburn, 1977 from Japan and South Africa

respectively. A third species is described below from deep water of Solomon Islands.

Uzumakiella solomonensis spec. nov.
Fig. 2A-F

Type material. Holotype (Figs. 2A-C) in MNHN IM-2000-33601.

Type locality. Solomon Islands, 09°23'S-159°59'E, 253-356 m [SALOMON 1: stn DW1745].

Description. Shell of small size (< 2.5 mm), solid, depressed, spire formed by about 4 whorls separated by a deep, ribbed suture.

The protoconch has 2 ½ whorls and measures about 580 µm in maximum diameter; its surface is slightly rough with scattered micro-granules and has two differentiated phases, the first has about 0.6 of a whorl and the second phase, much larger, has 1.9 whorls, ending in a sigmoidal varix. The teleoconch has about 1.6 rapidly enlarging whorls. Ornamentation formed by spiral cords and fine growth lines. Spiral cords are narrow and sharp; the interspaces are wider than the cords and very concave.

In apertural view, at the beginning of the last whorl, 13-14 cords are distributed between the suture and inside of the umbilicus; in the last 1/4 whorl, in proximity of the external lip, 10 intermediate cords appear, forming a total of 24-25 cords. The growth lines are very fine and numerous, and are concentrated in the last 1/4 whorl. Umbilicus narrow and deep with 5-6 spiral cords in its interior. Aperture oval, very prosocline, strongly sloped downward; parietal area covered by a thick callus; columella arched, very thick and reflected towards the umbilicus; outer lip very thick, with its margin modified by the spiral cords, forming a parietal angle in which there is a shallow groove.

Dimensions: holotype size 2.35 mm in diameter and 1.45 mm in height (H/D: 0.59).

Habitat. Bathyal species dredged at 253-356 m depth.

Distribution. Only known from type locality.

Remarks. *Uzumakiella solomonensis* spec. nov. has a very characteristic morphology and differs from its congeners by the greater number of whorls and the large size of its protoconch; by its sharp spiral cords and by their interspaces which are much wider than the cords. The following table shows its position between *U. japonica* and *U. natalensis* according to the number of cords.

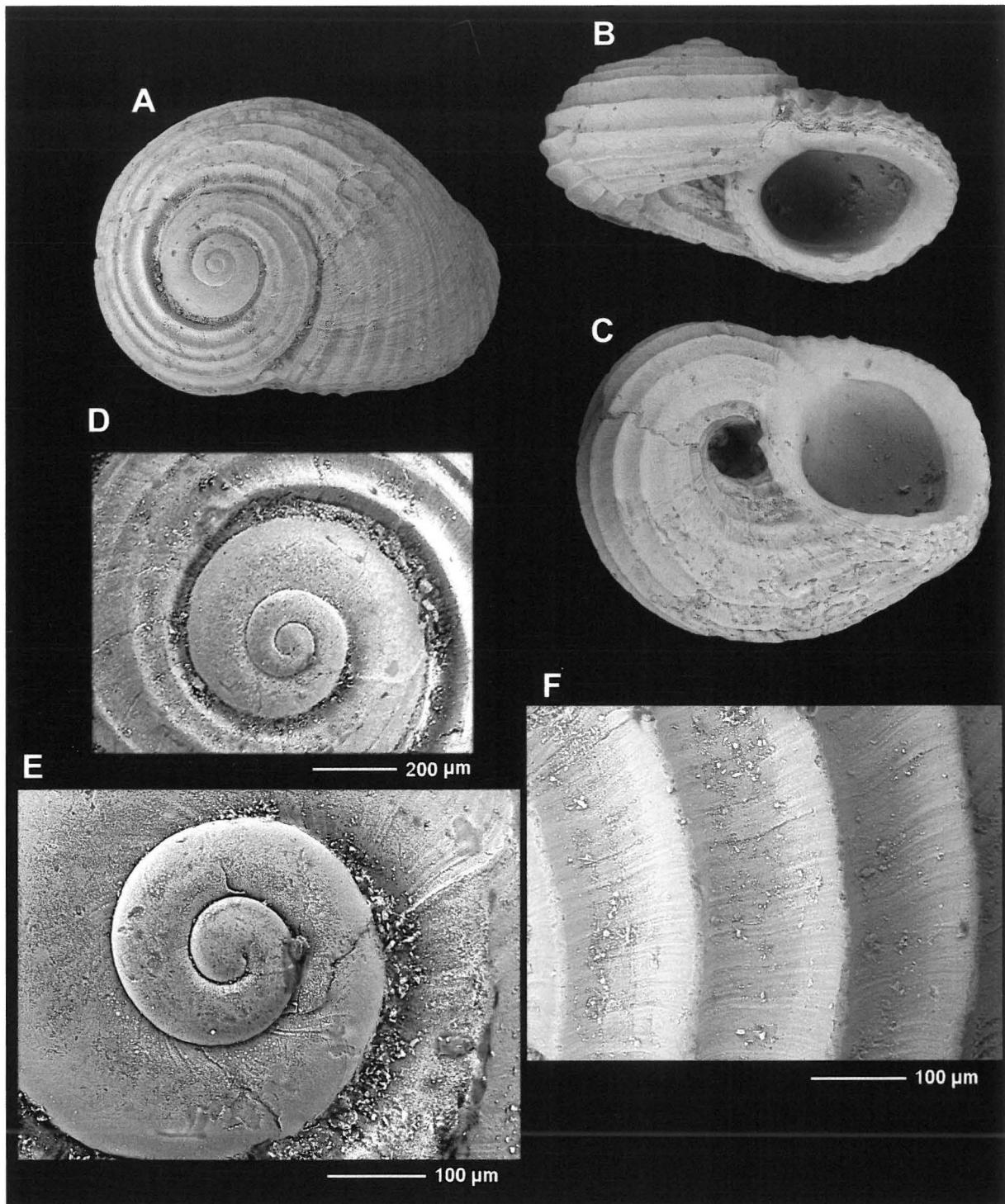


Figure 2

A-F. *Uzumakiella solomonensis* spec. nov. A-C. Holotype MNHN IM-2000-33601, 2.35 mm in diameter (MNHN), Solomon Islands, stn DW1745, 09°23'S-159°59'E, 253-356 m [SALOMON 1]; D-E. Protoconch of the holotype and detail; F. Microsculpture.

	<i>U. japonica</i>	<i>U. solomonensis</i>	<i>U. natalensis</i>
Number of cords penultimate whorl	5	4	3
Number of cords last whorl (aperture)	32-34	24-25	16-17

We do not agree with the opinion of Kilburn (1977) about *Teinostoma parvulum* Hedley, 1899 from Funafuti, that it could possibly belong in *Uzumakiella*. Upon examining the illustration of the holotype (Hedley, 1899: 553, fig. 64) and comparing it with the three existing species, we conclude that it does not belong in that genus, and should remain in *Teinostoma* until its correct generic placement can be determined.

Etymology. The specific name recognizes the islands where the species was collected.

Genus *Ponderinella* Marshall, 1988

Ponderinella Marshall, 1988: 986 [Type species by original designation: *Ponderinella lignicola* Marshall, 1988]. Recent, NSW.

Remarks. Marshall (1988: 986) stated: *Ponderinella lignicola* is the only vitrinellid known to live on wood, although additional material is needed to ascertain whether or not the association is fortuitous. Hasegawa (1997) described *Ponderinella major* from Suruga Bay, Japan, collected from bathyal depths associated with sunken wood. Most of the specimens studied (also from New Caledonia and the Philippines) were collected on sunken wood, confirming the association suggested by B. Marshall.

Ponderinella difficilis spec. nov.

Fig. 3A-E

Type material. Holotype (Fig. 3A-B) MNHN IM-2000-33602; 2 paratypes MNHN IM-2000-33603).

Type locality. New Caledonia, Grand Passage, 18°59'S-163°09'E, 580 m, on wood [MUSORSTOM 4: stn CC202].

Material examined. New Caledonia, MUSORSTOM 4: 1 s, Grand Passage, stn CC202, 18°58.0'S-163°59.3'E, 580 m, on wood; MUSORSTOM 6: 2 s, Loyalty Ridge, stn CP464, 21°01'S-167°32'E, 420-430 m.

Other material examined. Philippines, PANGLAO 2005: 4 s, Bohol/Sulu Seas sill, stn CP 2358, 8°52'N-123°37'E, 569-583 m; 7 s, Bohol/Sulu seas sill, Dipolog Bay, stn CP2380, 8°41'N-123°18'E, 150-163 m; 5 s, Bohol Sea, stn CP2388, 9°27'N-123°35'E, 762-786 m; 3 s, Bohol Sea, off Balicasag Island, stn CP2392, 9°29'N-123°41'E, 242-400 m;

2 s, Bohol Sea, off Balicasag Island, stn CP2398, 9°33'N-123°41'E, 713-731 m.

Description. Shell turbiniform, wider than high, small (<2 mm), thin, transparent, umbilicate. Periostracum very thin, smooth and colourless.

The protoconch has about 0.9-1.3 convex whorls, 420-430 µm of maximum diameter and is developed in two phases; the first phase has only one whorl, and is completely covered by a fine net sculpture and has 2-3 fine scarcely prominent spiral cords. The net-like sculpture is low on the nucleus and becomes more elevated distally, showing irregular more or less rounded depressions. The transition to the second phase is marked by a sharp and sinuous varix. The second phase has 0.3-0.4 whorl, is sculptured with very fine and dense ribs, placed near the suture, ending in a fine and sinuous varix.

The teleoconch consists of about 1.9-2.0 convex whorls, usually near perfectly smooth with only sinuous incremental lines. Base with two carinae, one basal and another periumbilical; space between carinae strongly concave. Umbilicus narrow and deep, delimited by a thick carina, only thin spiral threads and incremental lines inside.

Aperture oval, prosocline; parietal area covered by fine callus layer; columella arched, thin and reflected towards the umbilicus, with a small canal at its base, formed by periumbilical carina. Outer lip thin, with smooth margin modified only by the basal carina that angles, forming a wide channel.

Dimensions. The holotype measures 2.33 mm in maximum diameter and 1.9 mm in height (H/D: 0.81).

Habitat. Alive on wood between 150-786 m depth.

Distribution. Collected in New Caledonia and Philippines.

Remarks. The holotype of *P. lignicola* (in AMS, Australian Museum Sydney, C.152559) was examined by SEM photography

(http://seashellsofnewsw.org.au/Tornidae/Pages/Ponderinella_lignicola.htm) and compared with the specimens of *P. difficilis* spec. nov. So, we were able to ascertain that they are different species.

The new species may be separated from *P. lignicola* by its larger size, and the presence of 2-3 spiral cordlets on the first phase of the protoconch; also because the basal carina is extended on the entire last whorl and finally, by the concave space which is formed between both basal carinae.



Figure 3

A-E. *Ponderinella difficilis* spec. nov. A-B. Holotype, 2.33 mm in diameter (MNHN IM-2000-33602) New Caledonia, Grand Passage, MUSORSTOM 4, stn CC202, 580 m; C. Paratype, 1.20 mm (MNHN IM-2000-33603) Ride des Loyautés MUSORSTOM 6, stn CP464, 420-430 m; D-E. Protoconch of the holotype and of the paratype of fig. 3C.

F-G. *Ponderinella lignicola* Marshall, 1988. Holotype, 1 mm (AMS) (photographed by Sue Lindsay, Australian Museum).

From *Ponderinella major* Hasegawa 1997, the new species can be separated by the presence of 2-3 spiral cordlets in the first phase of the protoconch, by the lack of the two marked sinuses on its external lip. Furthermore, there is a large distance between their distribution areas.

Ponderinella difficilis spec. nov., as well as *P. lignicola* and *P. major* all live on sunken wood.

Etymology. The specific name is from the Latin word "*difficilis, e*" which means "difficult" making allusion to the problems of placing this species in a known genus.

Genus *Neusas* Warén & Bouchet, 2001

Neusas Warén & Bouchet, 2001: 183-186. Type species (by original designation): *Homalogyra marshalli* Sykes, 1925. Recent. Azores.

Diagnosis. Small neotaenioglossate gastropods with more or less planispiral, slightly irregular coiled teleoconch, strongly prosocline peristome, and a tall-spined, obliquely inserted protoconch. Operculum round, corneous, multispiral, with central nucleus. Radula 10 times as long as broad, taenioglossate, with very robust teeth. Central, lateral, and inner marginal teeth with strong irregularly shaped cusps often of alternating strength. Inner marginal tooth very broad, triangular, and low. Outer marginal tooth simple, claw-shaped with three major cusps. Jaw sturdy with hexagonal pattern. Soft parts with pigmented, brownish zone from rear, left corner of mantle cavity, diagonally to just above head. Snout large, distally bilobed; cephalic tentacles small and inconspicuous, situated far apart, with small basal eyes at outer sides.

Remarks. Warén & Bouchet (2001), studying specimens of an undescribed, less planispiral species, from the Tropical Pacific, verified that its radula is neotaenioglossate, most similar to the Littorinidae and Zeratulidae and the operculum is round, corneous, multispiral, with a central nucleus, and placed *Neusas* provisionally in Vitrinellidae. One of the characters that defined the new genus and morphologically the most obvious, is the tall-spined obliquely inserted protoconch. This character is repeated in all the species found and described below; however, the more or less planispiral, slightly irregularly coiled teleoconch and strongly prosocline peristome are more variable, causing us doubts about the placement of some of the new species described as *Neusas*, which were ratified by A. Warén (pers. com.).

Warén & Bouchet (2001) comment: The holotype is an empty, somewhat damaged shell, and our identification can be questioned. However, we have not seen any additional species from the Atlantic and members of the group are evidently very rare.

Beck et al. (2006) report *Neusas marshalli* from Lusitanian Seamounts (Sedio and Seine Seamount).

They suggest that those findings seem to exclude a close relationship with hydrothermal vents and therefore *N. marshalli* is considered an exclusively deep-water species endemic to the Mid-Atlantic Ridge.

Neusas juliae spec. nov.
Fig. 4A-E

Type material. Holotype (Fig. 4A-C) MNHN IM-2000-33604.

Type locality. New Caledonia, 23°40'S-167°59'E, 850-900 m [BATHUS 3: stn DW810].

Description. Shell of very small size (< 1 mm), almost planispiral, tubular spire formed by 5 whorls separated by a deep suture.

High spired protoconch, obliquely inserted, and with 3 ¾ whorls, rough surface covered by micro-granules, 50 µm is the diameter of the nucleus and 250 µm maximum diameter, ending in a thick sigmoidal varix. The teleoconch, irregularly coiled, has a little more than 1 ¼ whorls and is developed almost planispirally in a plane oblique to the protoconch, which allows this protoconch to be seen basally. Ornamentation formed by marked sinuous growth lines and micro-granules. Aperture oval, very prosocline, peristome continuous; inner and outer lip with simple, non-modified margin. Like the protoconch, the teleoconch is covered by micro-granules.

In the coiling of the teleoconch, the point of contact with the previous whorl is a narrow area located in the middle part of the periphery, close to the base.

Dimensions. The holotype is 0.98 mm in diameter and 0.44 mm in height

Habitat. Bathyal species dredged at 850-900 m depth.

Distribution. Only known from the type locality.

Remarks. *Neusas juliae* spec. nov. is very similar in its shape to *N. marshalli*, type species of the genus, but the latter may be separated from it by its less planispiral spire and higher number of teleoconch whorls.

From *Neusas inesae* spec. nov. and *N. distorta* spec. nov. this species can be separated by its almost planispiral development as opposed to turbiniform.

Etymology. The specific name honors Julia Gallego Landín, daughter of our friends, university teachers, Pedro Pablo Gallego and Mariana Landín.

Neusas inesae spec. nov.
Fig. 5A-F

Type material. Holotype (Fig. 5A-C) MNHN IM-2000-33605.

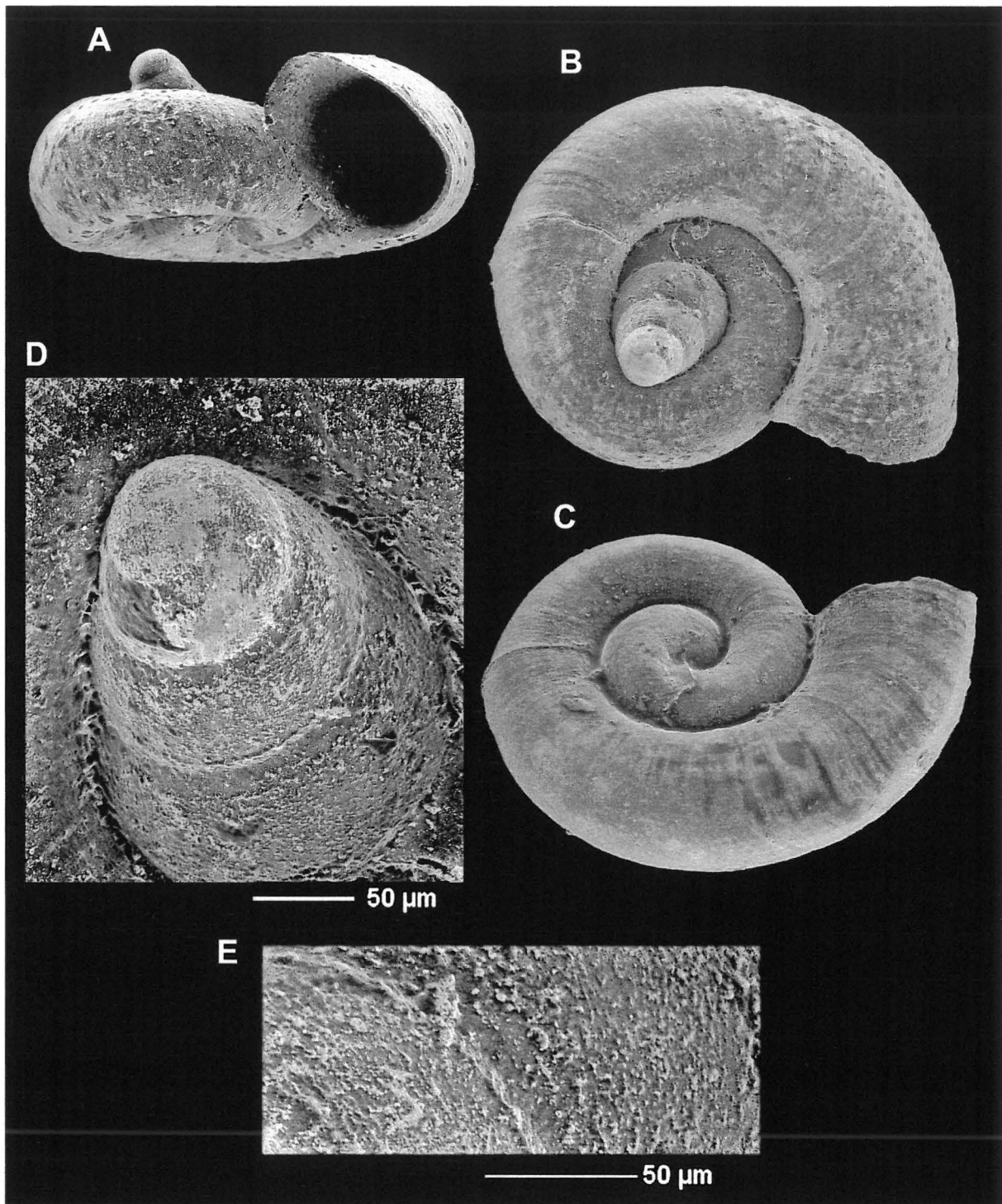


Figure 4

A-E. *Neusas juliae* spec. nov. A-C. Holotype, 0.98 mm (MNHN IM-2000-33604) New Caledonia, Campagne BATHUS 3, stn DW810, 850-900 m; D. Protoconch; E. Detail of the microsculpture of the protoconch.

Type locality. New Caledonia, Norfolk Ridge, 23°22'S-168°01'E, 381-469 m [BATHUS 3: stn DW827].

Description. Shell very small (<1.5 mm), broader than high, with spired protoconch and evenly rounded teleoconch whorls; spire formed by 3 $\frac{3}{4}$ whorls separate for a deep suture.

High spired protoconch, bulbous and obliquely inserted, with about 2 $\frac{1}{2}$ whorls, and about 250 μ m of maximum diameter; rough surface, covered by microgranules; ending in a thick sigmoidal varix, with two marked and elevated sinuses.

Teleoconch with a little more than 1 $\frac{3}{4}$ rounded whorls; ornamented with low indistinct spiral cords and axial growth lines. In apertural position, at the beginning of the last whorl, 8-10 spiral cords distributed between the suture and the umbilicus are visible. The growth lines are very marked and very close, giving the shell a rough appearance that can be seen with greater detail in the subsutural area.

At the beginning of the teleoconch and coinciding with the two sinuses that are formed in the terminal varix of the protoconch, there are two marked spiral cords that angle at the periphery and then fade until almost disappearing in the last whorl.

Umbilicus deep and broad, in its interior there are mainly growth lines and some fine spiral cordlets.

Aperture oval, prosocline; parietal area covered by a thick callused layer; columella arched and reflected towards the umbilicus; outer lip of simple margin, with a parietal angle.

Base and wall of the umbilicus very convex.

Dimensions. The holotype is 1.42 mm in diameter x 0.97 mm in height (H/D: 0.68).

Habitat. Bathyal species dredged at 381-469 m depth.

Distribution. Only known from the type locality.

Remarks. *Neusas inesae* spec. nov. can be separated from *Neusas juliae* spec. nov. because the development of its spire is turbiniform instead of planispiral.

On the other hand, *Neusas inesae* spec. nov. is similar to *Neusas distorta* spec. nov.; it can be separated from the latter by a more bulbous protoconch, with microgranules instead of little depressions, and oblique cordlets with a terminal varix with two elevated sinuses; also by having 2 cordlets at the beginning of the teleoconch, which are at an angle to the first whorl, and a lower number of cords distributed between the suture and the umbilicus.

Etymology. The specific name honors Inés Gallego Landín, daughter of our friends, university teachers, Pedro Pablo Gallego and Mariana Landín.

Neusas distorta spec. nov.

Fig. 6A-F

Type material. Holotype (Fig. 6A-C) MNHN IM-2000-33606.

Type locality. New Caledonia, Banc Antigonina, 23°18'S-168°05'E, 305-330 m [SMIB 8: stn DW182-184].

Description. Shell very small (<1.50 mm), slightly broader than high, with high spired protoconch and evenly rounded teleoconch whorls; spire formed by 4 $\frac{1}{4}$ whorls separated by a deep suture.

High spired protoconch, obliquely inserted, with 2 $\frac{1}{4}$ whorls, and 310 μ m of maximum diameter, the nucleus has 70 μ m; two phases can be distinguished, the first one with 1.1 whorls is covered with small depressions, while the second, with a little more than one whorl, has numerous oblique cordlets, which are fused or cross each other, ending in a thick sigmoidal varix.

Teleoconch with 1 $\frac{3}{4}$ rounded whorls; ornamented with low and indistinct spiral cords and axial growth lines. In apertural position, at the beginning of the last whorl, there are 14-15 spiral cords, distributed between the suture and the umbilicus.

The growth lines are marked and close together, giving the shell a rough look; in the last $\frac{1}{4}$ whorl there is a thick varix of growth interruption. Umbilicus deep and broad, fine spiral cordlets and marked growth lines can be observed on its interior. Aperture oval, prosocline; parietal area covered by a thick callused layer; columella arched and reflected towards the umbilicus; outer lip of simple margin with a parietal angle. Base and umbilical walls very convex.

Dimensions. The holotype is 1.23 mm in diameter and 1.00 mm in height (H/D: 0.81).

Habitat. Bathyal species dredged at 305-330 m depth.

Distribution. Only known from the type locality.

Remarks. In its general aspect, *Neusas distorta* spec. nov. is very similar to *Leptogyra inflata* Warén & Bouchet, 1993, but they can be separated mainly by the protoconch; whereas *Neusas distorta* spec. nov. has a high spired obliquely inserted protoconch, *Leptogyra inflata* has a regularly coiled protoconch.

Neusas distorta spec. nov. also differs from *Neusas juliae* spec. nov. because the development of its spire is turbiniform and not planispiral.

Also, *Neusas distorta* spec. nov. differs from *Neusas inesae* spec. nov., which also has turbiniform development, by the different ornamentation of its protoconch, covered with small depressions and numerous oblique cordlets that are fused or cross each other.

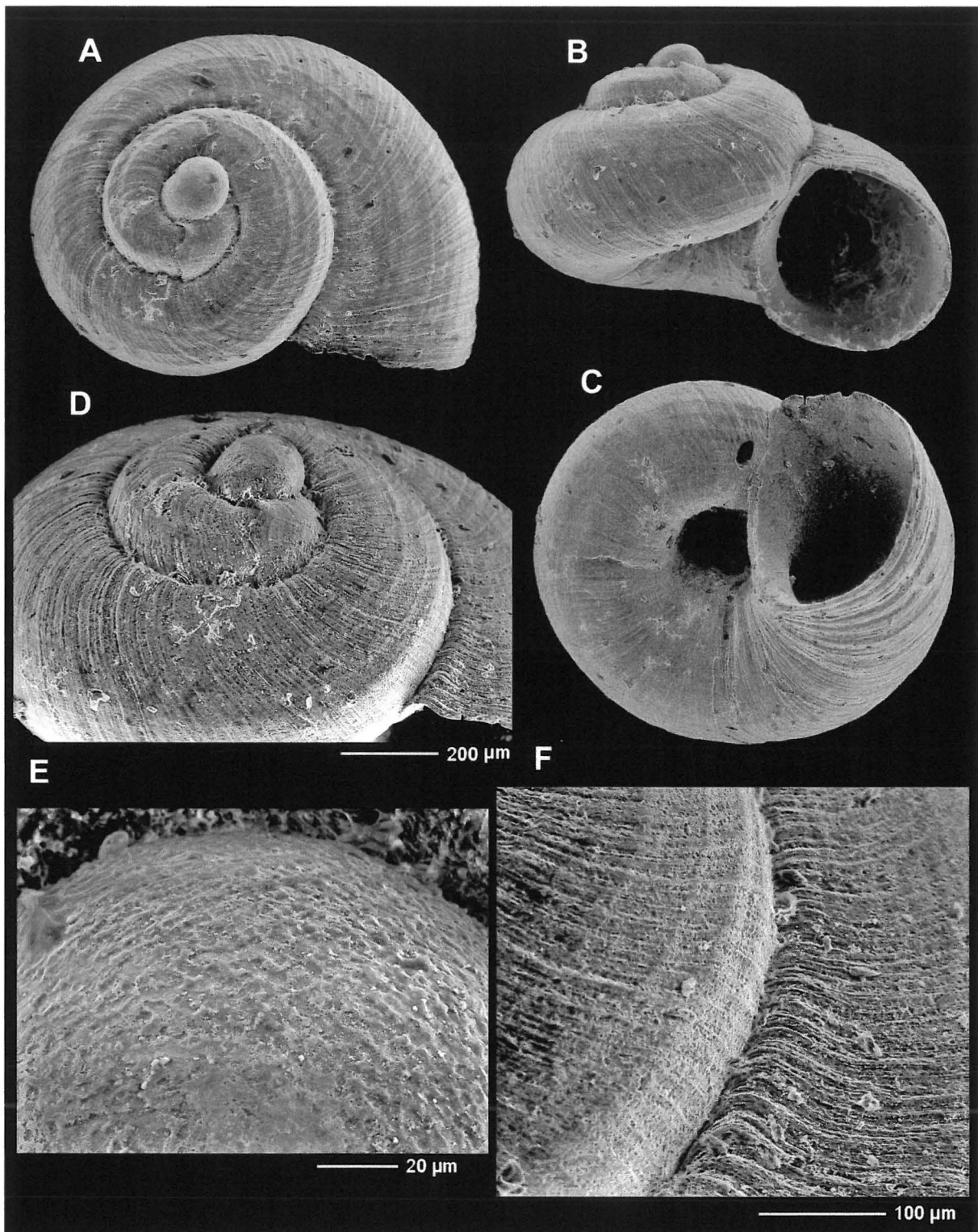


Figure 5

A-F. *Neusas inesae* spec. nov. A-C. Holotype, 1.42 mm (MNHN IM-2000-33605), New Caledonia, Norfolk Ridge, NO Alis campagne BATHUS 3, stn DW827, 381-469 m; D-E. Protoconch and detail of the microsculpture; F. Microsculpture of the teleoconch.

Etymology. The specific name alludes to the appreciable difference between the axis of the shell and protoconch.

Genus *Anticlimax* Pilsbry & McGinty, 1946

Climacia Dall, 1903: 1610 and 1633; pl. LX, figs. 1-3. (Preoccupied: junior homonym of *Climacia* M'Lachlan, 1869 [Neuroptera]; *Climacina* and *Anticlimax* are replacement names). Type species: *Teinostoma calliglyptum* Dall, 1903 (fossil) (Fig. 2).

Climacina Aguayo & Borro, 1946: 11 (Invalid: junior homonym of *Climacina* Gemmellaro, 1878 [Gastropoda]).

Anticlimax Pilsbry & McGinty, 1946: 12 (replacement name). (Comment: "Neither the group *Climacia* or its type species was described by Dall, both being defined only by figures, and the size, "diam. 3.0 mm").

Canimarina Aguayo & Borro, 1946: 46-47 (junior synonym [Rubio & Rolán, 2014: 5]). Type species: *Cyclostremiscus (Canimarina) crassilabris* Aguayo & Borro, 1946 (by original designation).

Lioprora Laseron, 1958: 169 (junior synonym). Type species: *Lioprora rostrata* (Hedley, 1900) (by monotypy).

Diagnosis. In Rubio & Rolán (2014): Shell wider than high; with a dome-shaped or low-conic spire; carinate periphery; the protoconch smooth or sculptured by tubercles, between 1 and 2 ½ whorls. Teleoconch with spiral zigzag grooves and cordlets. The microsculpture of the species of the genus *Anticlimax* is not capricious. There is an ontogenetic model which is repeated from one species to another. Even in a single shell it is possible to recognize several stages of this process. Aperture oblique, quadrangular or triangular; outer lip angular or often expanded at the termination of the keels.

Umbilicus bordered by a spirally emerging callous rib; terminating at the columella or filling the umbilicus. In some species, there may be areas on the adapical part on which the sculpture has almost disappeared. The operculum is rounded and multispiral with a central nucleus.

The radula is taenioglossate.

Animal. The head has a distally bilobed snout; long cephalic tentacles are finely ciliated in their distal half, with eyes on a slight basal bulge. No pallial tentacles on the right side. Foot expanded anteriorly with small lateral projections and rounded posteriorly. No metapodial tentacle. Opercular lobe simple without any associated tentacles.

Colour: the buccal mass and an area behind the eyes are pale red. Head, snout, foot and cephalic tentacles are translucent with opaque white flecks.

Remarks. Rubio & Rolán (2014) studied the genus *Anticlimax* in the SE Tropical Pacific and described 42

new species. In later expeditions sponsored by MNHN, additional new species were collected which are described below.

Anticlimax senenbarroi spec. nov.

Fig. 7A-F

Type material. Holotype (Fig. 7A-C) MNHN IM-2000-33607.

Type locality. New Ireland, Off Albatross Passage between Manne and N Ireland, 02°43.7'S-150°42.2'E, 2-4 m, sand and silt [KAVIENG: stn KD80].

Material examined. Papua New Guinea, KAVIENG: 1 s, Kavieng Lagoon, SW Port of Ungon Island, stn KS59, 02°39.5'S-150°39.7'E, 3 m, seagrass; 1 s, New Ireland, Off Albatross Passage between Manne and N Ireland, stn KD80 02°43.7'S-150°42.2'E, 2-4 m, sand and silt.

Description. Shell of small size for the genus (<3.5 mm), very solid, strongly convex, dome-shaped, with a marked basal keel; consisting of 4 whorls of rapid growth. Protoconch partially covered by the teleoconch, measuring about 270 µm, with a little more than one whorl and two phases; initially its surface being completely rough, at the distal end several wide varixes can be observed.

Teleoconch with 3 whorls; each whorl is partially covered by the previous whorl; two strong keels can be seen, the first delimits the base and the second delimits the umbilicus. The ornamentation is formed by spiral cords wider than their interspaces, which extend in zigzags and cover the whole shell. Aperture triangular; very thick parietal callus layer; columella arched, very thick and reflected towards the umbilicus occluding it partially; outer lip crenulated at its margin by the ending of the spiral cords and modified by the basal keel that widens and expands it laterally. Umbilicus totally covered by a columellar callus.

Dimensions. The holotype is 3.20 mm in diameter and 1.97 mm in height. (H/D: 0.61).

Habitat. Infralittoral species, collected at 2-4 m in sand and silt and at 3 m in sea grass bottom.

Distribution. Only known from New Ireland and Ungon Island, Papua New Guinea.

Remarks: *Anticlimax senenbarroi* spec. nov. is very similar in its general aspect to *Anticlimax juanae* Rubio & Rolán, 2014, due to its dome-shaped form, the presence of a hard basal keel and a prominent columellar callus, but differs from it by the lack of axial costae and because the columellar callus is totally smooth.

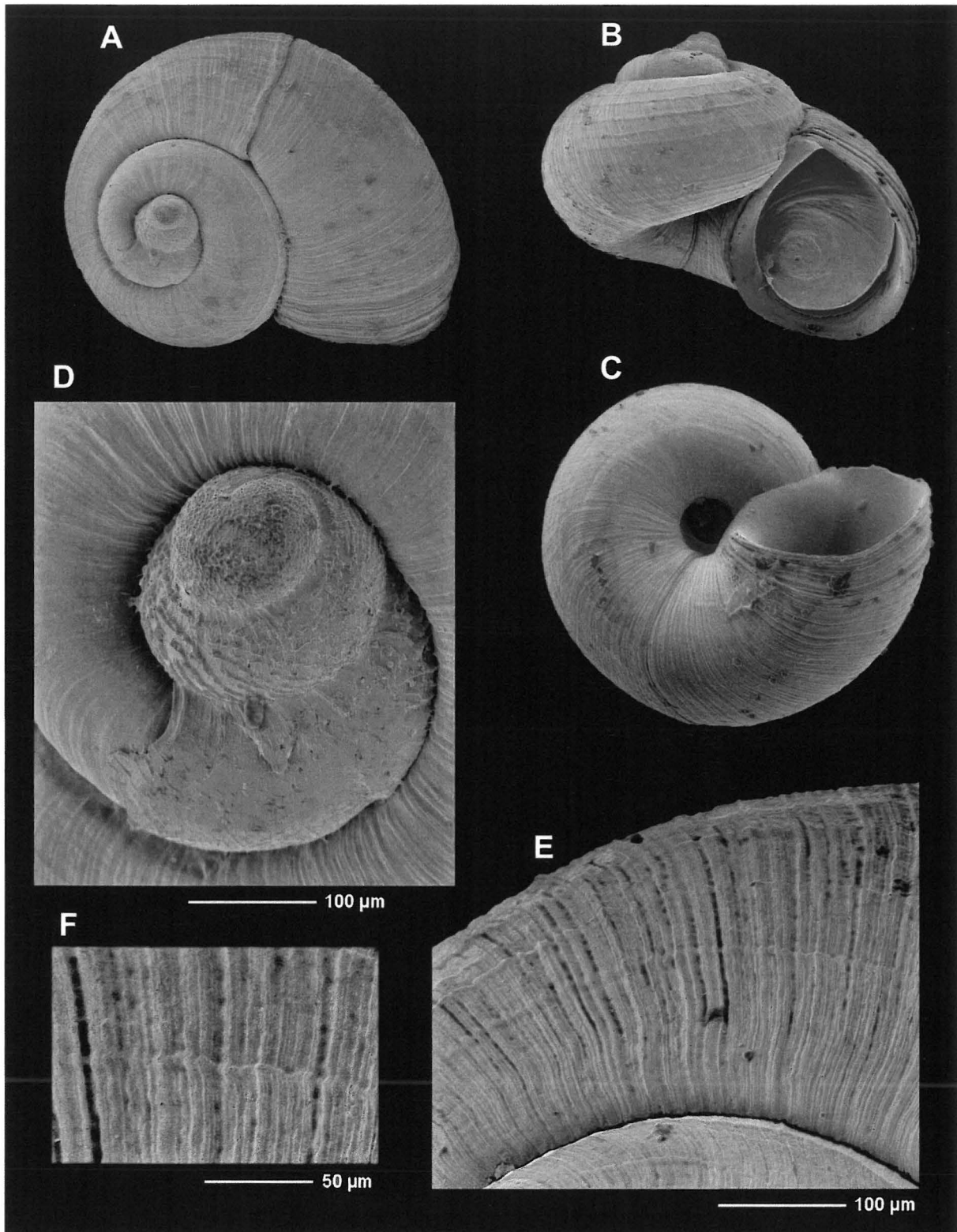


Figure 6

A-F. *Neusas distorta* spec. nov. A-C. Holotype, 1.23 mm (MNHN IM-2000-33606), S New Caledonia, Banc Antigonie, stn DW182-184, 305-330 m; D. Protoconch; E-F. Detail of the microsculpture.

Etymology. The specific name honors Prof. Senén Barro, ex-Rector of the University of Santiago de Compostela, Spain.

Anticlimax salustianomatoi spec. nov.

Fig. 8A-E

Type material. Holotype (Fig. 8A-C) MNHN IM-2000-33608.

Type locality. Papua New Guinea, Kavieng Lagoon, 02°44.6'S-150°43'E, 9-15 m, silty sand, dead coral rubble [KAVIENG: stn KB26].

Description. Shell solid in appearance, formed by 3 ½ rapidly expanding whorls, basally carinate; with a nearly flat spire and with a narrow umbilicus.

The protoconch has 2 ¼ whorls, measuring about 370 µm in diameter and two phases in its development; the first phase is seemingly smooth and the second phase is fully covered by fine tubercles; in its distal zone, thick oblique ribs appear, higher next to the suture.

The teleoconch has just 1 ¼ whorls and is entirely decorated with spiral cords of similar size, narrower than their interspaces and sigmoidal axial ribs between which there are rectangular cells; at the point of intersection small nodules are formed. The adapical part is convex and the base is flat. A double carina limits the base. Between the suture and the basal carina, there are 25 spiral cords; between the basal carina and the umbilicus there are 11-12. On the base, the space between the first and second carina is a broad concave groove, larger than the others, occupied by fine axial striae inside the cells.

Umbilicus large and deep, not limited by any carina or occluded by a callus. Aperture oval, prosocline; parietal area covered by a thick callus layer; columella arched, slightly reflected towards the umbilicus; outer lip with a smooth margin; the basal carina angulates it internally.

Dimensions. the holotype measures 1.30 mm in diameter and 0.67 mm in height. (H/D = 0.51)

Habitat. Infralittoral species, collected at 2-4 m, in silty sand and dead coral rubble.

Distribution. Only known from the type locality.

Remarks. *Anticlimax salustianomatoi* spec. nov. is very similar in shape to *A. philsmithi* Rubio & Rolán, 2014, but differs because the latter has a larger size, more minute sculpture and the protoconch lacks ornamentation. It also differs due to the axial sigmoidal costae of the teleoconch, different size of the umbilicus and a different ornamentation in the inner part of the cells.

Etymology. The specific name is in honor of Prof. Salustiano Mato de la Iglesia, Rector of the University of Vigo, Spain.

Anticlimax juanvianoi spec. nov.

Figure 9A-F

Type material. Holotype (Fig. 9A-B) MNHN-IM-2000-33609 and one paratype MNHN IM-2000-33610.

Type locality. New Caledonia, Secteur Nouméa, Canyon de la Dumbéa, 22°19.7'S-166°15.4'E, 20-23 m, compacted sand under blocks [LAGON: stn 1356].

Material examined. New Caledonia, LAGON: 2 s, Secteur Nouméa, Canyon de la Dumbéa, stn 1356, 22°19.7'S-166°15.4'E, 20-23 m.

Description. Shell of small size, dome-shaped, very solid, wider than high (HD: 0.52), fully decorated, including the umbilical callus.

Protoconch completely hidden by the development of the last whorl, only the apex being visible, impossible to examine any details. Teleoconch developed adapically, the last whorl covering all the previous ones. It is completely ornamented with spiral cords, not very high and in some areas almost flat, developed in zigzags, like the grooves or spaces between the cords that separate them. The grooves of the basal peripheral area are covered by numerous microgranules.

The shell is convex, both dorsally and peripherally. The base is concave and its spiral cords are more numerous and finer. A thick umbilical callus, also covered by cords and zigzagging grooves, extends from the columella, completely covering the umbilicus; above and coinciding with the parietal area, a thick callus extends, bright and completely smooth. The aperture is oval, prosocline; internal lip (columella and parietal area) widened and reflected outwards; outer lip thin, edge sharpening, not modified by the end of the cords.

Dimensions. the holotype is 2.3 mm in maximum diameter and 1.2 mm in height.

Habitat. Infralittoral species, collected at 20-23 m on compacted sand bottom under rocks.

Distribution. Only known from the type locality.

Remarks. *Anticlimax juanvianoi* spec. nov. could be related to species of the genus *Callodix* Laseron, 1954 because they have the umbilical callus completely covered with the same ornamentation as the rest of the shell; however, in our opinion, we are dealing with species of different genera included in the family Skeneidae.

The new species may be distinguished from *Callodix solida* Laseron, 1954 and *C. conica* by its less acute spire, protoconch covered almost completely by the last whorl, by the ornamentation formed by spiral zigzag cords and the concavity of the base.

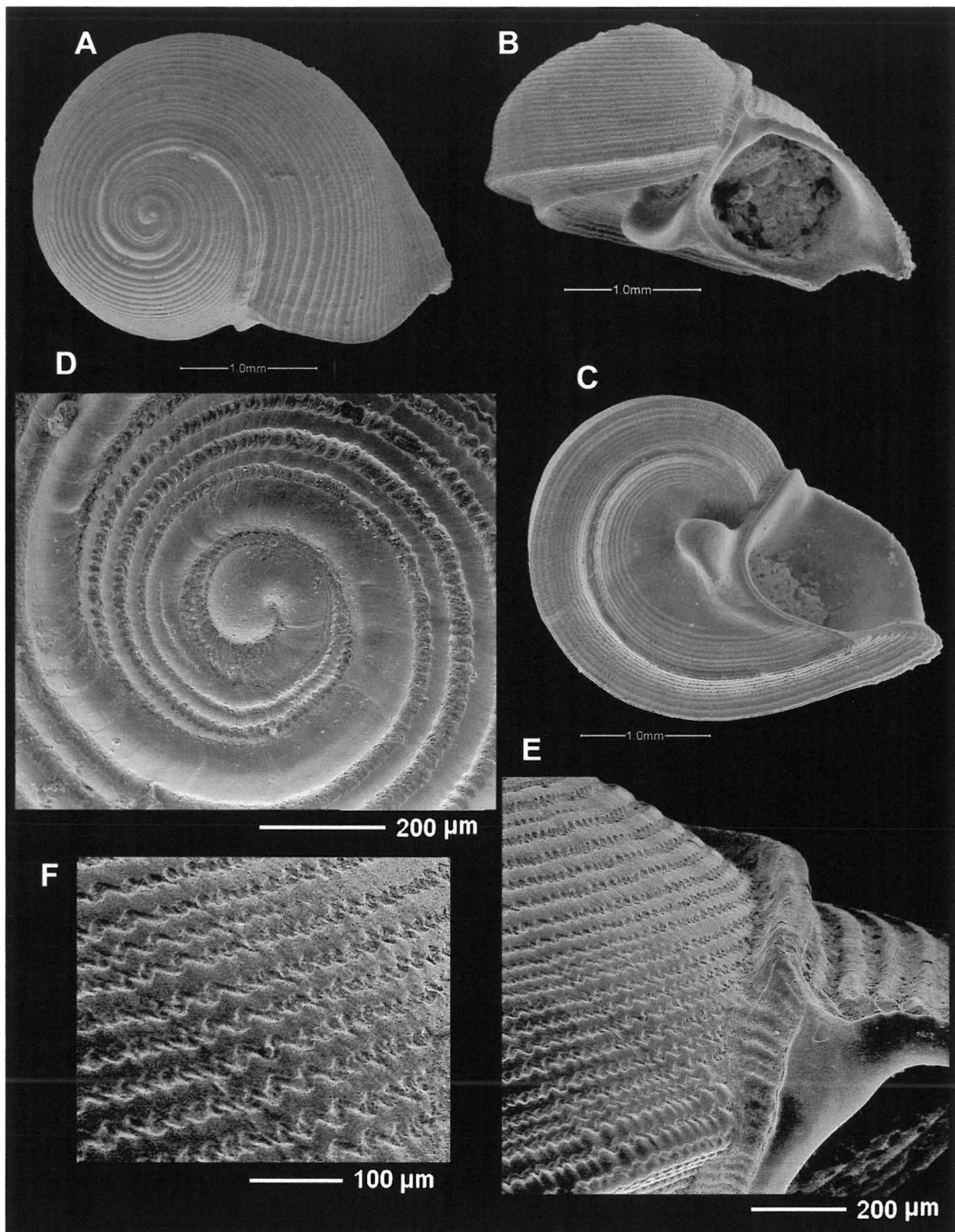


Figure 7

A-F. *Anticlimax senenbarroi* spec. nov. A-C. Holotype, 3.20 mm (MNHN IM-2000-33607), Papua New Guinea, New Ireland, off Albatros Passage between Manne and New Ireland, stn KD80 02°43.7'S-150°42.2'E, 2-4 m, sand and silt; D. Protoconch; E-F. Microsculpture and detail.

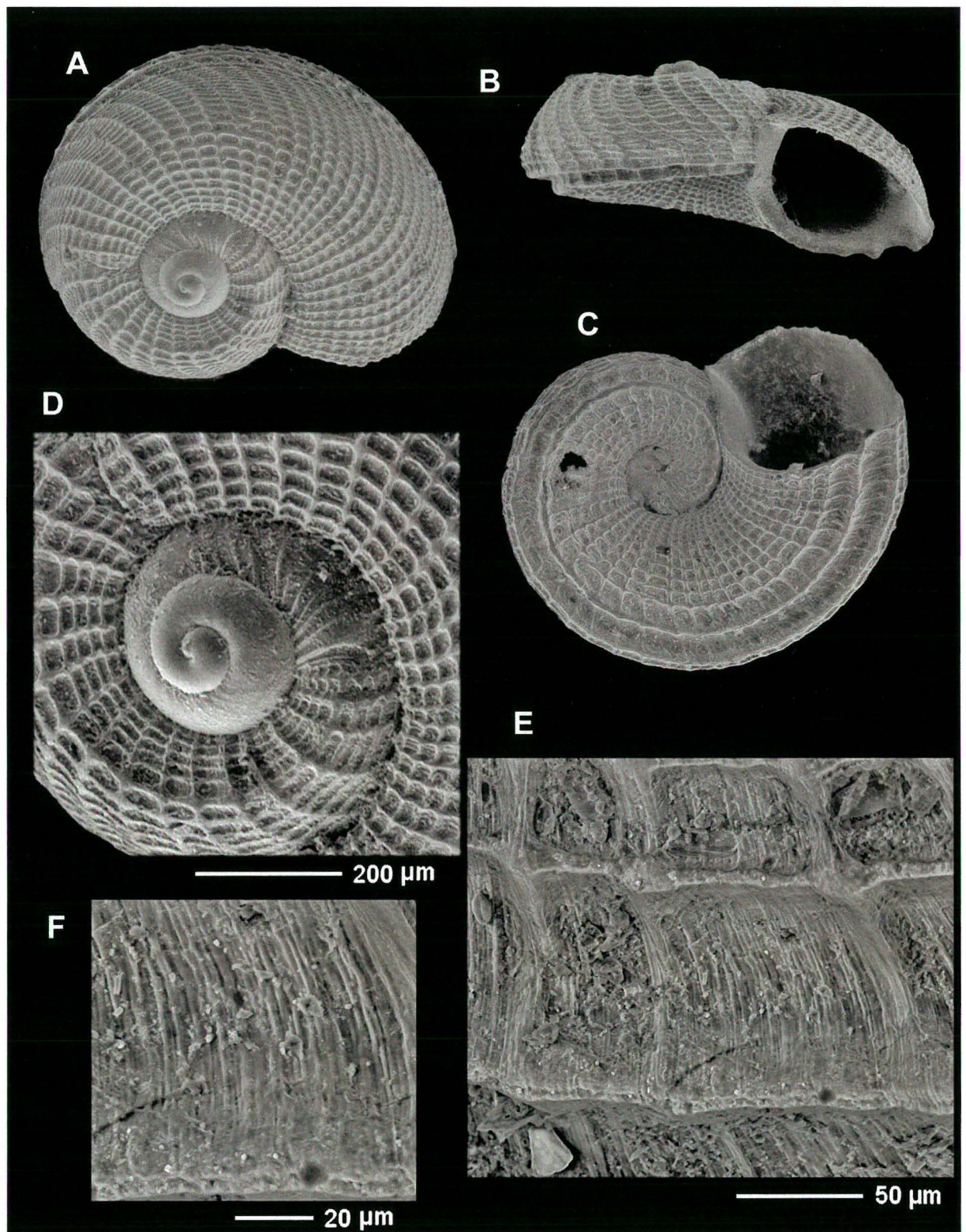


Figure 8

A-E. *Anticlimax salustianomatoi* spec. nov. A-C. Holotype, 1.30 mm (MNHN IM-2000-33608) Papua New Guinea, Kavieng Lagoon, stn KB26, 02°44.6'S-150°43'E, 9-15 m, silty sand, dead coral rubble; D. Protoconch; E: Detail of the sculpture.

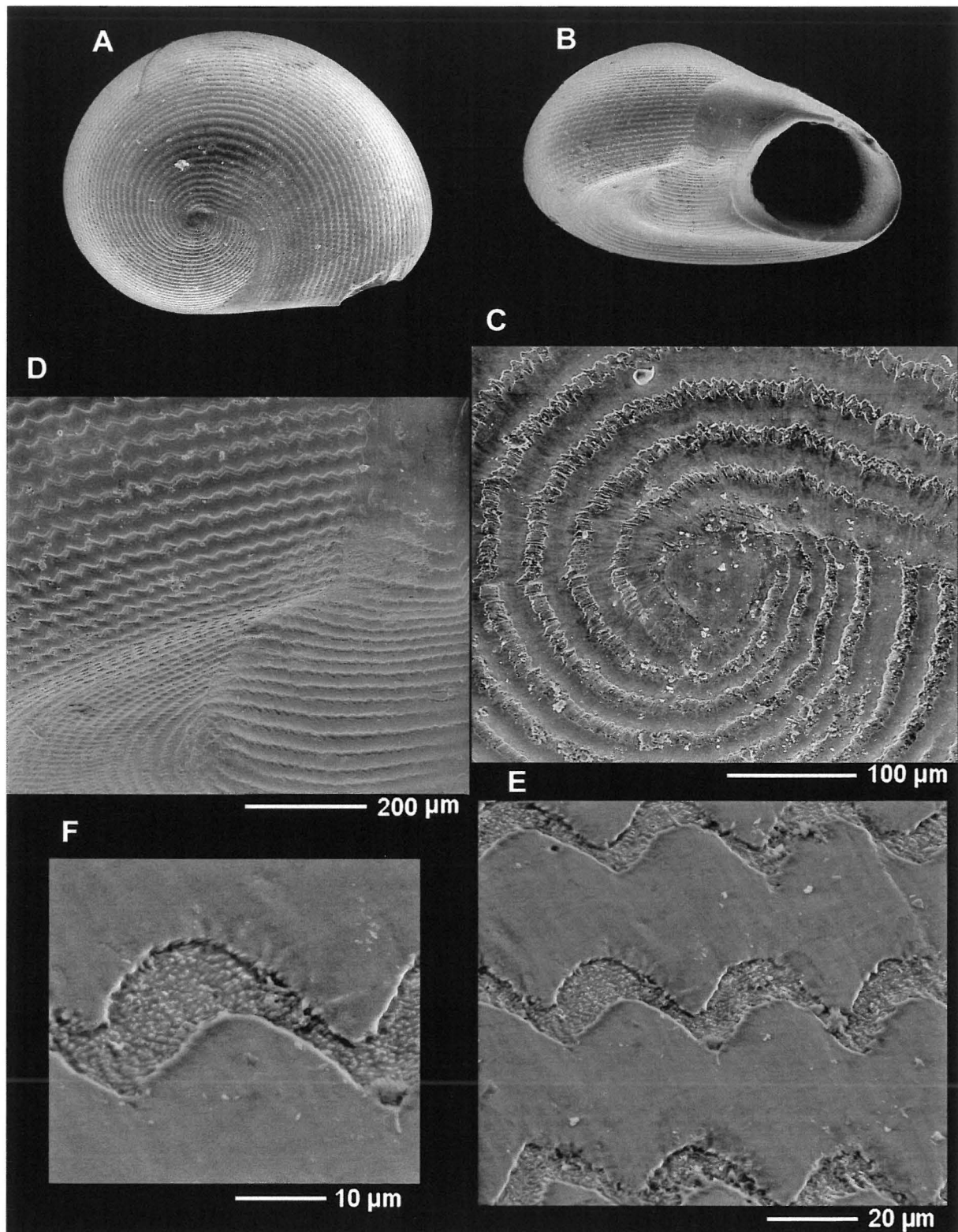


Figure 9

A-F. *Anticlimax juanvianoi* spec. nov. A-B. Holotype, 2.30 mm (MNHN IM-2000-33610) New Caledonia, Secteur Nouméa, Canyon de la Dumbéa, LAGON: stn 1356, 20-23 m; C. Protoconch; D. Sculpture of the base; E-F. Microsculpture.

Etymology. The specific name honors Prof. Juan Viaño, Rector of the University of Santiago de Compostela, Spain.

REMARKS

In the present work we have not tried to fully revise the genera presented, but only to describe some new species in the families Tornidae and Vitrinellidae

The genus *Tornus* Turton & Kingston, 1830 is very rare in the Indo-Pacific, but the morphological similarity of the only species described with the type species allows for no doubt about its determination.

Also the known species of the genus *Uzumakiella* Habe, 1958 are very rare and isolated, so far; only one was known from Japan and one other from South Africa.

The genus *Ponderinella* has mainly an Atlantic distribution; of the 11 currently known species, 8 are from the Atlantic Ocean and only 3 from the Pacific Ocean. The Atlantic species have a distribution from infra-circumlittoral to bathyal, while the Indo-Pacific species (*P. lignicola*, *P. major*, and the new species here described) live on bathyal bottom on sunken wood.

Some authors, such as Sasaki (2008: 171), consider it exceptional that tornids live in bathyal bottoms (for example *P. major*); nevertheless, some species like those of the genera *Neusas*, *Ponderinella* and *Uzumakiella* among others, have a distribution that is mainly bathyal.

The genus *Neusas* Warén & Bouchet, 2001 currently includes 4 species: the type species was found in Azores, and now three new species were collected in New Caledonia. The most important generic character is the tilted protoconch.

The genus *Anticlimax* Pilsbry & McGinty, 1946, however, presents a comparatively high number of species in the Caribbean, and recently Rubio & Rolán (2014) described 42 species from the Indo-Pacific. This number is now increased with these additions.

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