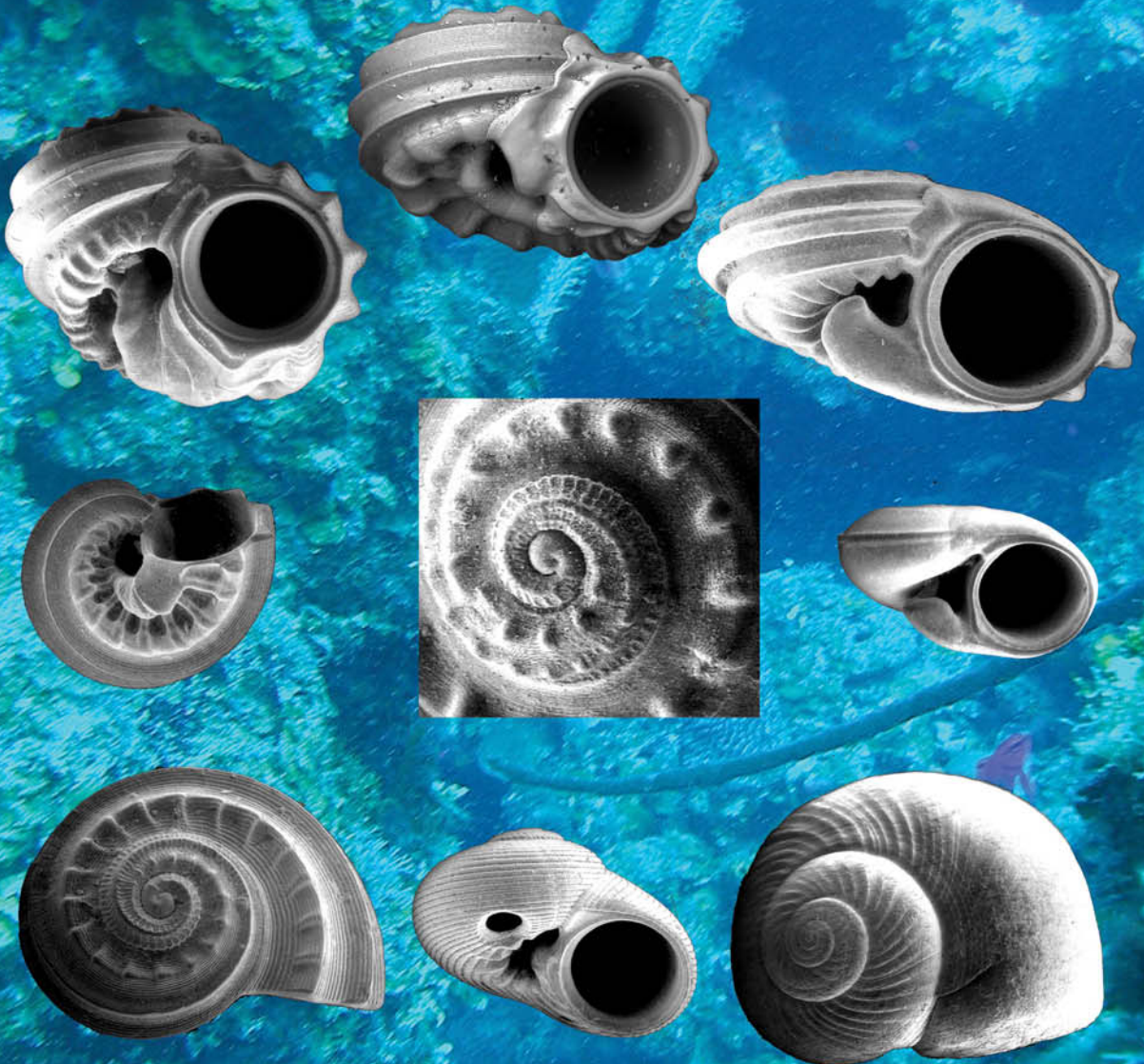


The genus LEUCORHYNCHIA
Crosse, 1867 (Gastropoda, Skeneidae)
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F. Rubio

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mhn



**MUSEO DE HISTORIA NATURAL
UNIVERSIDADE DE SANTIAGO DE COMPOSTELA**

**The genus LEUCORHYNCHIA Crosse, 1867
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Federico Rubio & Emilio Rolán

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Abbreviations:

Fi: Fiji; **Fu:** Funafuti; **I:** Indonesia; **J:** Japan; **Ma:** Maldivas Is.; **Mad:** Madagascar; **MI:** Mayotte Is.; **Mi:** Micronesia; **Mo:** Moçambique; **NC:** New Caledonia; **NCL:** New Caledonia, Lifou; **O:** Oman; **Ph:** Philippines; **PNG:** Papua New Guinea; **R:** Reunion; **RS:** Red Sea; **S:** Singapore; **SI:** Society Islands; **So:** Solomon Is.; **Th:** Thailand; **V:** Vanuatu.

The genus *Leucorhynchia* Crosse, 1867 (Gastropoda, Skeneidae) in the Tropical Indo-Pacific

El género *Leucorhynchia* Crosse, 1867 (Gastropoda, Skeneidae) en el Indopacífico tropical

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ABSTRACT

The species of the genus *Leucorhynchia* Crosse, 1867 from the tropical Indo-Pacific, collected during the Tropical Deep-Sea Benthos expeditions, directed by IRD and MNHN, in Madagascar, Reunion Island, Mayotte Island, Mozambique, New Caledonia, Vanuatu, Fiji, Solomon Islands, Philippines Islands, Society Islands, and Papua New Guinea are studied. For their correct identification, we have studied all the type material of the previously known species, available in different museums where they were deposited, verifying the possible existing synonymies and describing the new species found. From *Leucorhynchia caledonica* and *L. tricarinata*, in addition to the type material, we have used topotypes for a more detailed study. In total, we have studied 87 species, from both shallow and deep water, resulting in 77 new to science. When possible, each species was illustrated using micrographs from scanning electron microscope (SEM), discussing their specific variability and providing information about the habitat, geographical distribution and bathymetric range. All known species from the western coast of Africa are shown for comparison.

Radular and opercular data related to the species *Leucorhynchia perpolita* n. sp. and *Leucorhynchia robusta* n. sp. were shown.

Typespecimens of species examined for comparative purposes are illustrated: *Leucorhynchia caledonica* Crosse, 1867; *Teinostoma* (*Leucorhynchia*) *crossei* Tryon, 1888; *Teinostoma* (*Leucorhynchia*) *tryoni* Pilsbry, 1891; *Leucorhynchia tricarinata* Melvill & Standen, 1896; *Ethalia candida* A. Adams, 1862; *Teinostoma rotatum* Hedley, 1899; *Vitrinella* (*Leucorhynchia*) *omanensis* Thiele, 1925; *Vitrinella* (*Leucorhynchia*) *amoena* Thiele, 1925; *Vitrinella* (*Leucorhynchia*) *plicifera* Thiele, 1925 and *Vitrinella* (*Leucorhynchia*) *ornatissima* Thiele, 1925.

New synonyms: *Teinostoma* (*Leucorhynchia*) = *Leucorhynchia* Crosse, 1867 and *Vitrinella* (*Leucorhynchia*) = *Leucorhynchia* Crosse, 1867

New combinations: *Teinostoma* (*Leucorhynchia*) *tryoni* Pilsbry, 1891; *Teinostoma* *rotatum* Hedley 1899; *Vitrinella* (*Leucorhynchia*) *omanensis* Thiele, 1925; *Vitrinella* (*Leucorhynchia*) *amoena* Thiele, 1925; *Vitrinella* (*Leucorhynchia*) *plicifera* Thiele, 1925 and *Vitrinella* (*Leucorhynchia*) *ornatissima* Thiele, 1925 are transferred to *Leucorhynchia* Crosse, 1867.

New species (77): *L. multistriata* n. sp.; *L. impolita* n. sp.; *L. perpolita* n. sp.; *L. seminiiformis* n. sp.; *L. sulinitel* n. sp.; *L. philippinensis* n. sp.; *L. redita* n. sp.; *L. valida* n. sp.; *L. barreiroi* n. sp.; *L. basiscostae* n. sp.; *L. carbegtel* n. sp.; *L. plurilicium* n. sp.; *L. sandrogorii* n. sp.; *L. fecitae* n. sp.; *L. robusta* n. sp.; *L. ryalli* n. sp.; *L. salisburyi* n. sp.; *L. australis* n. sp.; *L. confortinii* n. sp.; *L. fereglabra* n. sp.; *L. carinampla* n. sp.; *L. crinita* n. sp.; *L. carigracilis* n. sp.; *L. globosa* n. sp.; *L. iterata* n. sp.; *L. perinde* n. sp.; *L. papuaensis* n. sp.; *L. baesitans* n. sp.; *L. magnucleus* n. sp.; *L. levis* n. sp.; *L. glabra* n. sp.; *L. funiculata* n. sp.; *L. celata* n. sp.; *L. peculiaris* n. sp.; *L. sulciobliqui* n. sp.; *L. radiata* n. sp.; *L. raquelae* n. sp.; *L. operta* n. sp.; *L. reunionensis* n. sp.; *L. stellata* n. sp.; *L. sculpturata* n. sp.; *L. persculpturata* n. sp.; *L. arctusulcus* n. sp.; *L. torta* n. sp.; *L. marcosi* n. sp.; *L. lluviae* n. sp.; *L. thailandensis* n. sp.; *L. letourneuxi* n. sp.; *L. distorta* n. sp.; *L. colorible* n. sp.; *L. assesa* n. sp.; *L. parvicostae* n. sp.; *L. levinicum* n. sp.; *L. osmagnum* n. sp.; *L. microtuberculata* n. sp.; *L. lingula* n. sp.; *L. microstriata* n. sp.; *L. depressa* n. sp.; *L. umbilifuni* n. sp.; *L. catenata* n. sp.; *L. undulans* n. sp.; *L. umbilicord* n. sp.; *L. bilinguae* n. sp.; *L. poteli* n. sp.; *L. paucistiata* n. sp.; *L. garciarodejai* n. sp.; *L. rosinae* n. sp.; *L. striatissima* n. sp.; *L. monteiroi* n. sp.; *L. densilabri* n. sp.; *L. linguaeformis* n. sp.; *L. plena* n. sp.; *L. prominens* n. sp.; *L. osaculeatum* n. sp.; *L. condei* n. sp.; *L. iniqua* n. sp.; *L. kosraensis* n. sp.

Other species related or close to this genus are discussed.

RESUMEN

Se estudian las especies del género *Leucorhynchia* Crosse, 1867 del Indo-Pacífico tropical, recolectadas durante las expediciones Tropical Deep-Sea Benthos, dirigidas por IRD y MNHN, en Madagascar, Reunión Island, Mayotte, Mozambique, Nueva Caledonia, Vanuatu, Fiji, Islas Salomón, Islas Filipinas, Islas de la Sociedad y Papua Nueva Guinea. Para su correcta identificación, hemos estudiado todo el material tipo de las especies previamente conocidas,

disponible en los distintos museos donde fueron depositados, verificando las posibles sinonímias existentes y describiendo las especies nuevas encontradas. De *Leucorhynchia caledonica* y *L. tricarinata*, además del material tipo, hemos utilizado topotipos para un estudio mas detallado.

En total se han estudiado 87 especies, tanto de aguas superficiales como profundas, resultando 77 nuevas para la ciencia. Cuando fue posible, cada una de las especies se ilustró mediante fotografías al microscopio electrónico de barrido (MEB), discutiendo su variabilidad específica y aportando datos sobre el hábitat, distribución geográfica y rango batimétrico. Para comparación se ilustran todas las especies conocidas de la costa oeste de África.

Se han mostrado datos de rádula y opérculo obtenidos de las especies *Leucorhynchia perpolita* n. sp. y *Leucorhynchia robusta* n. sp.

Ejemplares tipo de las especies examinadas con propósito comparativo, se han representado: *Leucorhynchia caledonica* Crosse, 1867; *Teinostoma* (*Leucorhynchia*) *crossei* Tryon, 1888; *Teinostoma* (*Leucorhynchia*) *tryoni* Pilsbry, 1891; *Leucorhynchia tricarinata* Melvill & Standen, 1896; *Ethalia candida* A. Adams, 1862; *Teinostoma rotatum* Hedley, 1899; *Vitrinella* (*Leucorhynchia*) *omanensis* Thiele, 1925; *Vitrinella* (*Leucorhynchia*) *amoena* Thiele, 1925; *Vitrinella* (*Leucorhynchia*) *plicifera* Thiele, 1925 y *Vitrinella* (*Leucorhynchia*) *ornatissima* Thiele, 1925.

Nuevas sinonímias: *Teinostoma* (*Leucorhynchia*) = *Leucorhynchia* Crosse, 1867 y *Vitrinella* (*Leucorhynchia*) = *Leucorhynchia* Crosse, 1867

Nuevas combinaciones: *Teinostoma* (*Leucorhynchia*) *tryoni* Pilsbry, 1891; *Teinostoma rotatum* Hedley, 1899; *Vitrinella* (*Leucorhynchia*) *omanensis* Thiele, 1925; *Vitrinella* (*Leucorhynchia*) *amoena* Thiele, 1925; *Vitrinella* (*Leucorhynchia*) *plicifera* Thiele, 1925 y *Vitrinella* (*Leucorhynchia*) *ornatissima* Thiele, 1925 son transferidas al género *Leucorhynchia* Crosse, 1867.

Nuevas especies (77): *L. multistriata* n. sp.; *L. impolita* n. sp.; *L. perpolita* n. sp.; *L. seminiiformis* n. sp.; *L. sulinitel* n. sp.; *L. philippinensis* n. sp.; *L. redita* n. sp.; *L. valida* n. sp.; *L. barreiroi* n. sp.; *L. basiscostae* n. sp.; *L. carbegtel* n. sp.; *L. plurilicium* n. sp.; *L. sandrogorii* n. sp.; *L. fecitae* n. sp.; *L. robusta* n. sp.; *L. ryalli* n. sp.; *L. salisburyi* n. sp.; *L. australis* n. sp.; *L. confortinii* n. sp.; *L. fereglabra* n. sp.; *L. carinampla* n. sp.; *L. crinita* n. sp.; *L. carigracilis* n. sp.; *L. globosa* n. sp.; *L. iterata* n. sp.; *L. perinde* n. sp.; *L. papuaensis* n. sp.; *L. haesitans* n. sp.; *L. magnucleus* n. sp.; *L. levis* n. sp.; *L. glabra* n. sp.; *L. funiculata* n. sp.; *L. celata* n. sp.; *L. peculiaris* n. sp.; *L. sulciobliqui* n. sp.; *L. radiata* n. sp.; *L. raquelae* n.

sp.; *L. operta* n. sp.; *L. reunionensis* n. sp.; *L. stellata* n. sp.; *L. sculpturata* n. sp.; *L. persculpturata* n. sp.; *L. arctusulcus* n. sp.; *L. torta* n. sp.; *L. marcosi* n. sp.; *L. lluviae* n. sp.; *L. thailandensis* n. sp.; *L. letourneuxi* n. sp.; *L. distorta* n. sp.; *L. colurible* n. sp.; *L. assesa* n. sp.; *L. parvicostae* n. sp.; *L. levinicum* n. sp.; *L. osmagnum* n. sp.; *L. microtuberculata* n. sp.; *L. lingula* n. sp.; *L. microstriata* n. sp.; *L. depressa* n. sp.; *L. umbilifuni* n. sp.; *L. catenata* n. sp.; *L. undulans* n. sp.; *L. umbilicord* n. sp.; *L. bilinguae* n. sp.; *L. poteli* n. sp.; *L. paucistiata* n. sp.; *L. garciarodejai* n. sp.; *L. rosinae* n. sp.; *L. striatissima* n. sp.; *L. monteiroi* n. sp.; *L. densilabri* n. sp.; *L. linguaeformis* n. sp.; *L. plena* n. sp.; *L. prominens* n. sp.; *L. osaculeatum* n. sp.; *L. condei* n. sp.; *L. iniqua* n. sp.; *L. kosraensis* n. sp.

Otras especies relacionadas o próximas a este género son discutidas.

INTRODUCTION

CROSSE (1867) created the genus *Leucorhynchia* to describe a new species, *L. caledonica* Crosse, 1867, from Nouméa, New Caledonia, whose main characteristic, besides having a continuous peristome, coarser in its upper attachment point, is the formation of a large lump below the umbilicus, at the base of the columella, which in basal view seems to have closed this umbilicus, although in apertural view the umbilicus can be clearly seen to be open.

There are currently sixteen species of *Leucorhynchia* known: 10 are distributed in the Indo-Pacific and the remaining 6 along the western coast of Africa.

The Indo-Pacific species are: *L. candida* (A. Adams, 1862), from Japan; *L. caledonica* Crosse, 1867 from New Caledonia; *L. crossei* (Tryon, 1888), from Singapore; *Leucorhynchia tryoni* (Pilsbry, 1891), from Singapore; *L. tricarinata* Melvill & Standen, 1896, from Lifou (Loyalty Islands, New Caledonia); *L. rotata* (Hedley, 1899), from Funafuti; *L. variegata* (Preston, 1914), from India; *L. amoena* (Thiele, 1925) and *L. plicifera* (Thiele, 1925) from Indian Ocean; *L. omanensis* (Thiele, 1925) and *L. ornatissima* (Thiele, 1925), from the Gulf of Oman.

As for the species of *Leucorhynchia* living on the western coast of Africa, ADAM & KNUDSEN (1969) placed in *Leucorhynchia* two species described by E. A. SMITH (1872) for the genus *Ethalia* H. & A. Adams, 1854 (*L. lirata* and *L. plicata*), and in the same paper they described a new species, *L. bicarinata*.

RUBIO & ROLÁN (1991) photographed at SEM the species studied by ADAM & KNUDSEN (1969), including in this genus the species *Tinostoma punctatum* Jousseaume, 1872, and also described and figured for first time the soft parts and the radula of *L. lirata* E. A. Smith, 1872. Later, ROLÁN & RUBIO

(2012) described *L. gorii* and ROLÁN & GORI (2013) described *L. minor* for the Guinean Gulf.

For the present work, specimens of *L. plicata* from Miamia, Ghana have been photographed for the first time at SEM.

The fossil records of *Leucorhynchia* are very broad, distributed from the Paleocene to the Holocene. The oldest species was described by BRIART & CORNET (1887) (*Leucorhynchia nitida*) and comes from the Paleocene, Danien. Nevertheless, most fossil species have been described from the Eocene of Paris, Lutetian, which is perhaps the best studied geological stage (DESHAYES, 1832; GRATELOUP, 1828; COSSMANN (1913, 1918) and GOUGEROT (1973). Also from the Miocene.

MATERIAL AND METHODS

In the present work, the skeneiform species of the genus *Leucorhynchia* Crosse, 1867, from different oceanographic campaigns realized by MNHN in the Indo-Pacific, were studied. These are detailed as follows:

BENTHEDI (1977) on board the Research Vessel R/V Suroît, in Mayotte region.

VAUBAN (1978-1979) around New Caledonia.

MD32 (1982) Reunion Islands.

LAGON (1984-1989) on board R/V Bauban explored New Caledonia, to map the biological communities of the coral reef lagoon.

MONTROUZIER (1993) land based expedition in Touho and Koumac areas, New Caledonia.

BATHUS 1-4 (1993-94) on board R/V *Alis* around New Caledonia proper, and the Norfolk and Loyalty Ridges.

MUSORSTOM 8 (1994) on board R/V *Alis*, explored the Vanuatu Archipelago.

MUSORSTOM 10 cruise (1998) on board R/V *Alis* explored the Fijian Archipelago.

ATELIER LIFOU (2000) (Biodiversity Workshop), a land-based research campaign at Lifou, Loyalty Islands Province, New Caledonia.

SALOMON 1 (2001) on board R/V *Alis* surveyed the central part of the Solomon Islands, from Guadalcanal to Malaita and Makira.

PANGLAO 2004 (Panglao Marine Biodiversity Project) explored the Central Philippines: Panglao, Dauis, Cortes, Tagbilaran and Bacayon.

EBISCO (2005) (Exploration de la Biodiversité et Isolement en mer du Corail) on board R/V *Alis* sponsored research expedition in the Coral Sea.

SANTO 2006 (Global Biodiversity Survey) explored the waters of Spiritu Santo Island in Vanuatu.

TARASOC (2009) on board R/V *Alis*, explored the Iles de la Societe and Tarava seamounts.

MIRIKI (2009) off northwestern Madagascar.

BIOPAPUA (2010) on board R/V *Alis* to take an inventory of the deep benthic biodiversity, in the Papua New Guinea area.

EXBODI (2011) on board R/V *Alis* around New Caledonia.

INHACA (2011) an expedition to Inhaca Island and South Mozambique.

ATIMO VATAE (2012) Expedition to Madagascar “Deep South” marine fauna & flora.

PAPUA NIUGINI (2012) expedition to Papua New Guinea.

KAVIENG (2014) workshop and oceanographic campaign to explore the lagoon, surface and deep waters of this region of Papua New Guinea.

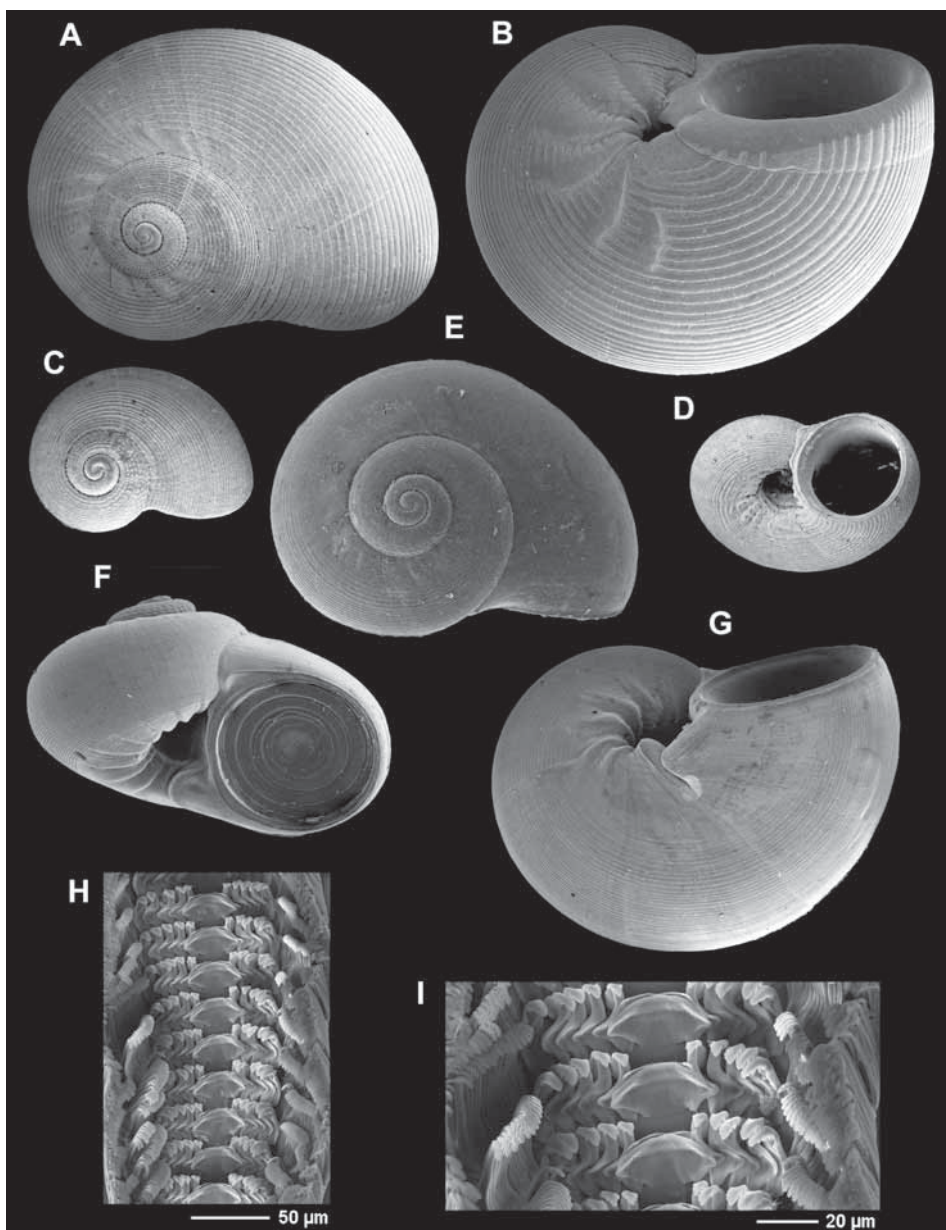
MADEEP (2014) on board R/V *Alis*, dedicated to the study of the diversity of deep sea bottoms in Bismarck Sea and the Solomon Islands.

Figure 1

A-B. *Leucorhynchia lirata* (E.A. Smith, 1872), 3,3, 3,0 mm, Minerio, São Tomé, W Africa, 35-41 m (MHNS) (with authorization of Novapex); C-D: *Leucorhynchia gorii* Rolán & Rubio, 2012, holotype, 1,5 mm (MNHN IM-2000-24633) and paratype, 1,6 mm (MHNS), Tinhosa Pequena, Principe Is., W Africa (with authorization of Gloria Maris); E-G: *Leucorhynchia minor* Rolán & Gori, 2013, holotype, 2,55 mm (MNHN-IM-2000-25744); paratypes, 2,44 and 2,9 mm (MNCN & CSG); H-I: radulae of *L. lirata* (with authorization of Gloria Maris)(images from ROLÁN & RUBIO, 2012 and ROLÁN & GORI, 2013).

Figura 1

A-B. *Leucorhynchia lirata* (E.A. Smith, 1872), 3,3, 3,0 mm, Minerio, Santo Tomé, Africa Occidental, 35-41 m (MHNS) (con la autorización de Novapex); C-D: *Leucorhynchia gorii* Rolán & Rubio, 2012, holotipo, 1,5 mm (MNHN IM-2000-24633) y paratipo, 1,6 mm (MNHN-IM-2000-), Tiñosa Pequena, Isla de Príncipe, Africa Occidental (con la autorización de Gloria Maris); E-G: *Leucorhynchia minor* Rolán & Gori, 2013, holotipo, 2,55 mm (MNHN-IM-2000-25744); paratipos, 2,44 y 2,9 mm (MNCN & CSG); H-I: rádula de *L. minor* (con la autorización de Gloria Maris)(imágenes de ROLÁN & RUBIO, 2012 y ROLÁN & GORI, 2013).



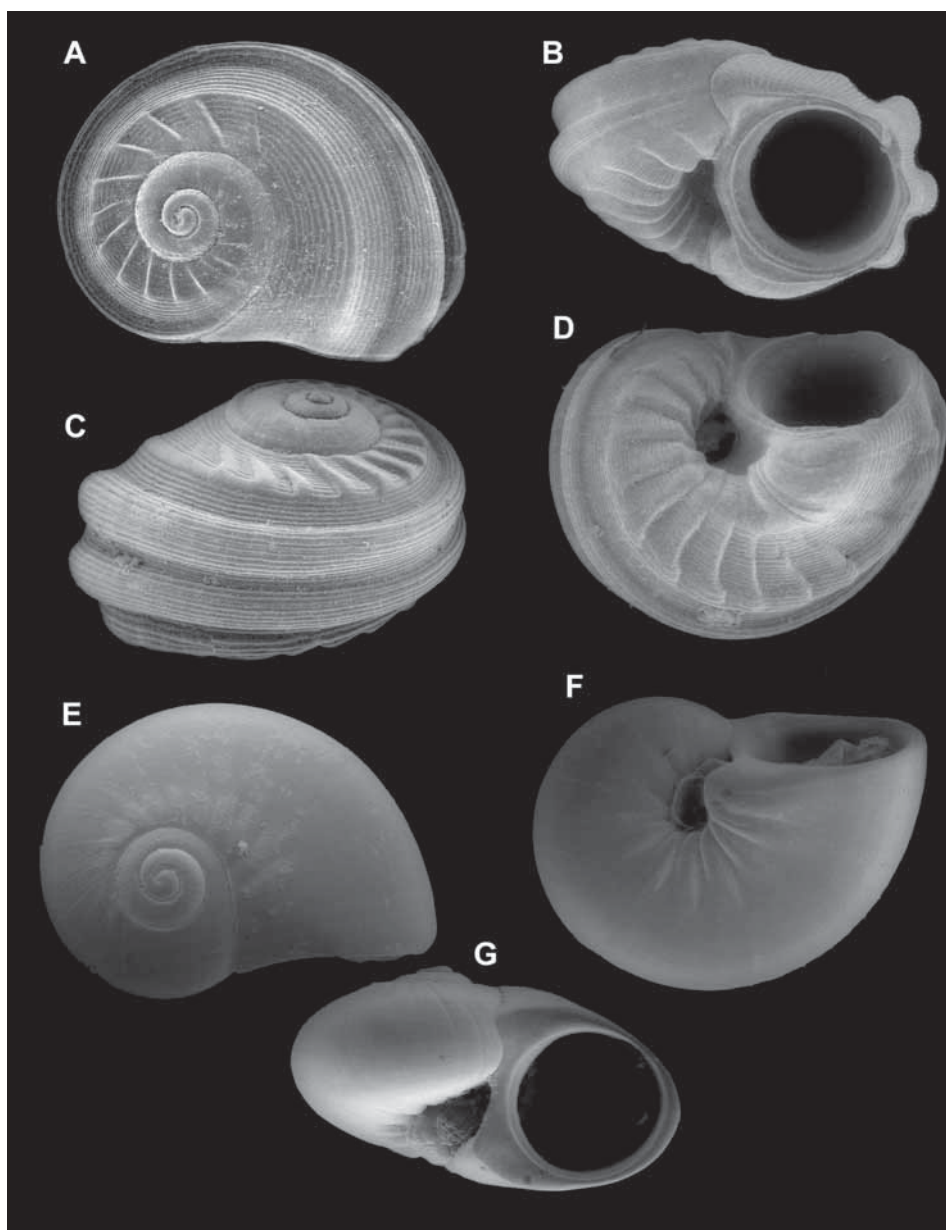
All the materials used in this study were obtained in sediments collected by the above mentioned oceanographic expeditions in shallow and deep waters of Reunion Islands, New Caledonia, Vanuatu, Fiji, the Solomon and the Philippines Islands, Madagascar and Papua New Guinea.

Also material from a few private collections, namely: **Menou Collection**, of Jean-Louis Menou, professional diver (IRD, Nouméa), the reef collections obtained by diving with SCUBA gear; **Arbasto Collection**, of Jo Arbasto, fisherman, Panglao Island, Bohol, Philippines; **Sandro Gori Collection**, of Sandro Gori, Italian diver and malacologist, who made numerous trips to many different parts of the world, collecting shells mainly by scuba diving and later separated under binocular microscope and who made his collection available for our study, and donated the holotypes to the MNHN.

ABBREVIATIONS

AMS	Australian Museum, Sidney.
ANSP	Academy of Natural Sciences of Philadelphia
CACTI	Centro de Apoyo Científico y Tecnológico a la Investigación, University of Vigo
CACTUS	Centro de Apoyo Científico y Tecnológico a la Investigación, University of Santiago de Compostela
CJL	Collection of Jean Letourneux
CSG	Collection of Sandro Gori
MHNS	Museo de Historia Natural, Universidad de Santiago
MMUM	Manchester Museum, University of Manchester
MNHN	IM-2000- numbers of Muséum national d'Histoire naturelle, Paris
NMV	National Museum of Victoria, Australia
NMW	National Museum of Wales, Cardiff

Figure 2
A-D: *Leucorhynchia bicarinata* Adam & Knudsen, 1969, 2.5, 2.37, 2.32, 2.48 mm (MHNS). E-G: *Leucorhynchia plicata* (E.A. Smith, 1782), 1.84, 2.0, 1.9 mm, Miamia, Ghana, West Africa (MHNS).
Figura 2
A-D: *Leucorhynchia bicarinata* Adam & Knudsen, 1969, 2,5, 2,37, 2,32, 2,48 mm (MHNS). E-G: *Leucorhynchia plicata* (E.A. Smith, 1782), 1,84, 2,0, 1,9 mm, Miamia, Ghana, Africa Occidental (MHNS).



NHMK	Natural History Museum United Kingdom, London
SEM	Scanning electron microscopy
USNM	National Museum of Natural History, Smithsonian Institution, Washington
ZMB	Museum für Naturkunde Zoologisches, Berlin
D	maximum diameter of the shell, measured perpendicular to the axis of coiling
Stn	station
s	shell
spm(s)	alive collected specimen (s)
juv	juvenile
fragm	fragment
H	total height of the shell

List of known species:

Genus *Leucorhynchia* Crosse, 1867

West Africa species:

Leucorhynchia lirata (E. A. Smith, 1872)
Leucorhynchia plicata (E. A. Smith, 1872)
Leucorhynchia punctata (Jousseaume, 1872)
Leucorhynchia bicarinata Adam & Knudsen, 1969
Leucorhynchia gorii Rolán & Rubio, 2012
Leucorhynchia minor Rolán & Gori, 2013

Previously known Indo-Pacific species:

Leucorhynchia candida (A. Adams, 1862)
Leucorhynchia caledonica Crosse, 1867
Leucorhynchia crossei (Tryon, 1888)
Leucorhynchia tryoni Pilsbry, 1891
Leucorhynchia tricarinata Melvill & Standen, 1896
Leucorhynchia rotata (Hedley, 1899)
Leucorhynchia variegata (Preston, 1914)
Leucorhynchia amoena (Thiele, 1925)
Leucorhynchia omanensis (Thiele, 1925)
Leucorhynchia ornatissima (Thiele, 1925)
Leucorhynchia plicifera (Thiele, 1925)

SYSTEMATIC PART

Subclass VETIGASTROPODA Salvini-Plawen, 1980

Superfamily TROCHOIDEA Rafinesque, 1815

Family SKENEIDAE Clark, 1851

Genus *Leucorbynchia* Crosse, 1867

Leucorbynchia Crosse, 1867. *Journal de Conchyliologie*, 15: 312-321. [Type species by original designation: *Leucorbynchia caledonica* Crosse, 1867]. Recorded in other works in different genus:

Teinostoma (*Leucorbynchia*) Crosse, 1867: P. FISCHER (1885: 834).

Vitrinella (*Leucorbynchia*) Crosse, 1867: THIELE (1925: 260).

Definition: Original diagnosis in CROSSE (1867): “*T. perforata, polita; anfr. pauci; apert. rotundata, baud margaritacea; margo basalis una cum columellari rostrum validum, callosum, supra perforationem emittens. Operculum rotundatum, corneum, multispinum, nucleo centrali*”.

After BRIART & CORNET (1887): *Coquille orbiculaire, polie, non nacrée, à spire courte et tours peu nombreux, ombiliquée; ouverture arrondie à peristome simple et continu; bord basal et bord columellaire donnant naissance à une forte protubérance calleuse se prolongeant audessus de la région ombilicale sans la toucher.*

New diagnosis (from original diagnosis and new data):

When a new genus is described, one species is designate as type-species, representing the characters of this genus. Sometimes, all the species in a genus present very similar characters which are different from close ones and, in these case, the genus may be characterized by just a few differences. In other occasions, the differential characters may be numerous and also have great differences in the expressivity of each one of these characters. In such cases, a detailed examination is necessary in order to distinguish all of these characters, which are sometimes expressed very scarcely. This is the case of the genus *Leucorbynchia*.

Description of the genus:

Shell of small size, robust, discoidal to turbiniform. Some characters are rather typical but can be more or less conspicuous:

- 1- Protoconch usually small; in most cases with $\frac{3}{4}$ nuclear whorl after the typical point of the beginning in Skeneidae; smooth or with 2 spiral cordlets. The end is clearly distinguished.
- 2- Teleoconch, first part (1 to $1\frac{1}{2}$ whorls), very variable in sculpture (smooth or with a cord, or a groove, or forming rectangles on its external surface. Different from the next section.
- 3- Teleoconch, second part changes its sculpture and this new one is very variable: it may be smooth, or covered with fine spiral cords separated by narrow sulci (sometimes the sulci may be reduced to just a few in the base), grooves, etc.
- 4- Peripherally keeled or spherically rounded; sometimes, there are several apically and adapically prominent keels.
- 5- Axial folds, wide or narrow, which can be located adapically and around the umbilicus; very numerous or reduced and shorter. When they exist at all, they are not present in the last quarter of the last whorl.
- 6- Aperture regularly circular, with an entire fine peristome. Inside the inner lip, a circular fold may be present, supposedly acting as an opercular stop.
- 7- A thick callous layer covers the parietal area and part of the previous whorl; a thick callus formed between the base of the columella and the base of the outer lip extends towards the umbilicus, covering it completely or forming a strong callous protuberance, which is extended towards the umbilical region like a face, but without touching it.
- 8- Operculum circular, thin, corneous and multispiral, outer side with a small central depression, inner side with a triangular area for insertion of the foot.
- 9- The soft parts of the animal of *Leucorhynchia caledonica* shows papillate conditions, but a bipectinate ctenidium, a true hermaphroditic gland with a common gonoduct and a propodial penis on the left side (HAZPRUNAR ET AL.,(2016)).

Remarks: BRIART & CORNET (1887) commented on the creation of the genus *Leucorhynchia* by CROSSE (1867), from a very curious shell living in New Caledonia. At the same time, it was surprising that Crosse, generally considered to be a skilled palaeontologist, had not located in his new genus the species described by Deshayes with the name *Delphinula callifera*. In their opinion, this species, from the coarse limestone of Mons, reliably belongs to *Leucorhynchia*, therefore being the oldest species in the genus.

P. FISCHER (1885: 834) considered *Leucorhynchia* a subgenus of *Teinostoma* H & A. Adams, 1853. Later, other authors followed his opinion, like TRYON (1888: 106), who described a second species, *Teinostoma (Leucorhynchia) crossei*, which was dedicated to the author of the genus; also PILSBRY (1891: 91) described *Teinostoma (Leucorhynchia) tryoni*.

THIELE (1925: 260-262) described four new species from the Indian Ocean, considering *Leucorhynchia* as a subgenus of *Vitrinella* C. B. Adams, 1850. In view of the lack of information about the soft parts, he considered it scarcely worthwhile to speak about this group and its relationship with *Vitrinella* or *Teinostoma*; but in his opinion the operculum with a central nucleus and numerous whorls described by Crosse made it similar to *Vitrinella*.

HAZPRUNAR ET AL., (2016): A monopectinate gill is also found in other minute vetigastropod species (KANO, 2008; GEIGER ET AL., 2008), and this condition might reflect paedomorphosis, since a monopectinate condition occur during early ontogeny of bipectinate species (e.g. CROFTS, 1937; STRASOLDI, 1991). However, there are small species with bipectinate ctenidia, like *Leucorhynchia caledonica* (2 mm) and several scissurellids, and relatively large species like *D. voightae* (5.8 mm) with a monopectinate ctenidium; so this is not a strict rule. In addition, the ctenidia of many small gastropods do not show distinct respiratory areas but probably use their lateral cilia as ventilators of the mantle cavity: in such cases, respiration is mainly provided by the thin mantle roof and (in limpets) the subpallial epithelia.

The type species of *Leucorhynchia* Crosse, 1867, *L. caledonica* Crosse, 1867, also shows papillate conditions, but a bipectinate ctenidium, a true hermaphroditic gland with a common gonoduct and a propodial penis on the left side (pers. obs. TK). Accordingly, we also exclude *Leucorhynchia* Crosse, 1867 from Skeneidae.

We cannot exclude the possibility that in the present diagnosis Skeneidae is only a subclade within a broader clade of trochoid vetigastropods, which may also include taxa without a propodial penis (or with a left one as in *L. caledonica* Crosse, 1867: Anders Warén pers. comm.).

Given the still existing confusion over the inclusion/exclusion of some genera in the family Skeneidae, as *Leucorhynchia*, we prefer to keep it in that family until new anatomical and molecular studies definitively determine otherwise.

As for the larval dispersal of the different species of the genus, its just 0.75 paucispiral protoconch whorls, very common among skeneiform gastropods, apparently indicate reduced dispersal ability; however, we have seen the wide dispersion of some species studied.

Grouping:

Bearing all the generic differential characters in mind, we can separate the studied species into several well defined and differentiated groups. Due to the lack of information on soft parts, radula and DNA, we choose not to introduce different generic or subgeneric names, which would only be justified after a more detailed knowledge of the group.

The description order of the species will be made presenting them within the mentioned groups.

Indo Pacific Group 1 Caledonica

The species in this group are characterized by the fact that the first whorl of the teleoconch presents an ornamentation of cords/furrows, which disappears in the later whorl, and also because of the thick callus formed between the base of the columella and the base of the outer lip, which extends towards the umbilicus, forming a strong callus, usually with a hook-shaped protuberance.

It is formed by the following species:

- Leucorhynchia caledonica* Crosse, 1867NC and others Fig 3,4,5
- Leucorhynchia crossei* (Tryon, 1888)..... S Fig 6
- Leucorhynchia tricarinata* Melvill & Standen, 1896...SeveralFigs 7,8,9,10
- Leucorhynchia tryoni* Pilsbry, 1891..... S Fig 11
- Leucorhynchia omanensis* (Thiele, 1925) O..... Fig 12
- Leucorhynchia amoena* (Thiele, 1925)..... I..... Fig 13
- Leucorhynchia plicifera* (Thiele, 1925) I..... Fig 14
- Leucorhynchia multistriata* n. sp..... NC Fig 15
- Leucorhynchia impolita* n. sp PNG Fig 16
- Leucorhynchia perpolita* n. sp Ph Fig 17,18
- Leucorhynchia seminiiformis* n. sp..... SI..... Fig 19
- Leucorhynchia sulinitel* n. sp V Fig 20

- <i>Leucorhynchia philippinensis</i> n. sp.....	Ph	Fig 21
- <i>Leucorhynchia redita</i> n. sp.....	Ph	Fig 22,23
- <i>Leucorhynchia valida</i> n. sp.....	So	Fig 24
- <i>Leucorhynchia barreiroi</i> n. sp	NC	Fig 25
- <i>Leucorhynchia basiscostae</i> n. sp.....	So,Ph.....	Fig 26
- <i>Leucorhynchia carbegteli</i> n. sp.....	Ph	Fig 27
- <i>Leucorhynchia plurilicium</i> n. sp	Ph	Fig 28
- <i>Leucorhynchia sandrogorii</i> n. sp.....	So	Fig 29
- <i>Leucorhynchia fecitae</i> n. sp	PNG	Fig 30
- <i>Leucorhynchia robusta</i> n. sp.....	So	Fig 31
- <i>Leucorhynchia ryalli</i> n. sp.....	Th.....	Fig 32
- <i>Leucorhynchia salisburyi</i> n. sp.....	PNG	Fig 33
- <i>Leucorhynchia australis</i> n. sp.....	Ma.....	Fig 34,35
- <i>Leucorhynchia confortinii</i> n. sp.....	Ma.....	Fig 36,37
- <i>Leucorhynchia fereglabra</i> n. sp	Ph,Th	Fig 38,39
- <i>Leucorhynchia carinampla</i> n. sp	PNG	Fig 40
- <i>Leucorhynchia crinita</i> n. sp.....	Mi	Fig 41,42
- <i>Leucorhynchia carigracilis</i> n. sp.....	So	Fig 43

***Leucorhynchia caledonica* Crosse, 1867**

Figures 3A-D, 4A-F, 5A-G

Leucorhynchia caledonica Crosse, 1867. *Journal de Conchyliologie*, 15: 312-321 [Type locality: Nouméa, New Caledonia].

Teinostoma (Leucorhynchia) caledonicum (Crosse, 1867): in TRYON (1888). *Manual of Conchology*, Ser. 1, Vol. X, pp. 106, pl. 45, figs, 85-86.

Leucorhynchia caledonica Crosse, 1867: HIGO, CALOMON & GOTO (1999). *Elle Scientific Publications*, pp. 69 [G502].

Type material: Holotype, registration number NHMUK 1958.1.10.20. Locality: Nouméa, New Caledonia. Examined by photography.

Material examined: **19 spms, 25 s:** New Caledonia, LAGON: 3 s, Secteur de Canala, Stn DW729, 21°19'S-165°54'E, 42-45 m; 2 spms, Secteur de Nouméa, Récif Senez, Stn 1343, 22°17.8'S-166°19.9'E, 7 m, pente interne (topotypes); 10 spms, Secteur de Nouméa, Pointe Magnin, Stn 1355, 22°28.9'S-166°26.6'E, 7-10 m, bord du canyon, blocks, sediment (topotypes).

Loyalty Islands, Lifou, ATELIER LIFOU 2000: 3 spms, Lifou, Baie de Santal, north of the Cap Aime Martin, Stn 1450, 20°45.8'S-167°01.65'E, 27-31 m, brossages. Vanuatu, SANTO 2006: 4 spms, Vanuatu, SE corner of Santo. Philippines, PANGLAO 2004: 2 s, Balicasag Island, Stn B41, 9°30.9'N-123°40.8'E, 17-19 m, floor large cave; 13 s, Panglao Island, Biking, Stn S1, 9°35.3'N-123°50.5'E, 5 m, reef slope with overhangs; 1 s, Bohol Island, Ubajan, Stn S27, 9°41.5'N-123°51.0'E, 12 m, mud. Solomon Islands: 1 s, Charapoana Pt, Uepi Island, Morovo Lagoon, 20 m (CSG)(115B).

Description (from the original description and new data based on topotypes): Shell very small (<3.0 mm), robust, discoidal to turbiniform, formed by 3 ½ whorls, keeled and narrowly umbilicated.

Protoconch with a little over ¾ whorls, about 220 µm in diameter and apparently smooth.

Teleoconch of 2 ¾ whorls separated by an impressed suture which after the first whorl is covered by a callous extension of the following whorl. A prominent cord is placed in a central position at the beginning of the teleoconch, as a keel; it disappears in the last quarter of the whorl, being covered by a thin callous layer. The entire surface of the teleoconch is smooth, except for its first half whorl, on which a wide spiral cord (which provides an angular profile) and two grooves of similar size are observed, disappearing subsequently, covered by the next whorl; this cord is observed adapically by “transparency” (Fig. 3B) in the last whorl, disappearing in the last quarter.

The umbilicus is narrow and deep, but it is scarcely visible, since the columellar callus is in front of it.

Aperture circular, peristome entire. Inside the apertural border there is a fold serving as opercular stop. A thick callus is located in the parietal area and by extension covers the keel and part of the previous whorl; a thick callus formed between the base of the columella and the base of the outer lip is extended towards the umbilicus, forming a strong callous protuberance, which has the shape of the lower part of a bird's beak and is extended over the umbilical region but without touching it.

Operculum thin, corneous and multispiral, outer side with a small central depression, inner side with a triangular area for insertion of the foot.

Dimensions: Topotype size 2.90 mm in diameter and 1.76 mm in height (H/D: 0.60) (Fig. 4A-D).

Habitat: Under stones (sublapidibus) (CROSSE, 1867); intertidal, sandy mud (HIGO ET AL., 1999); in beach drift on rocky shore (OKUTANI, 2000).

Infralittoral species collected between 5-45 m deep. The topotypes from Nouméa were found in an edge of the canyon, blocks and sediment at 7-10 m depth. Specimens from Philippines were found at 17-19 m, on a large cave floor; at 5 m in reef slope with overhangs and at 12 m in mud bottom.

Distribution: Nouméa, New Caledonia (CROSSE, 1867); New Caledonia (TRYON, 1888); Kii peninsula and southwards, New Caledonia, Indo-Pacific

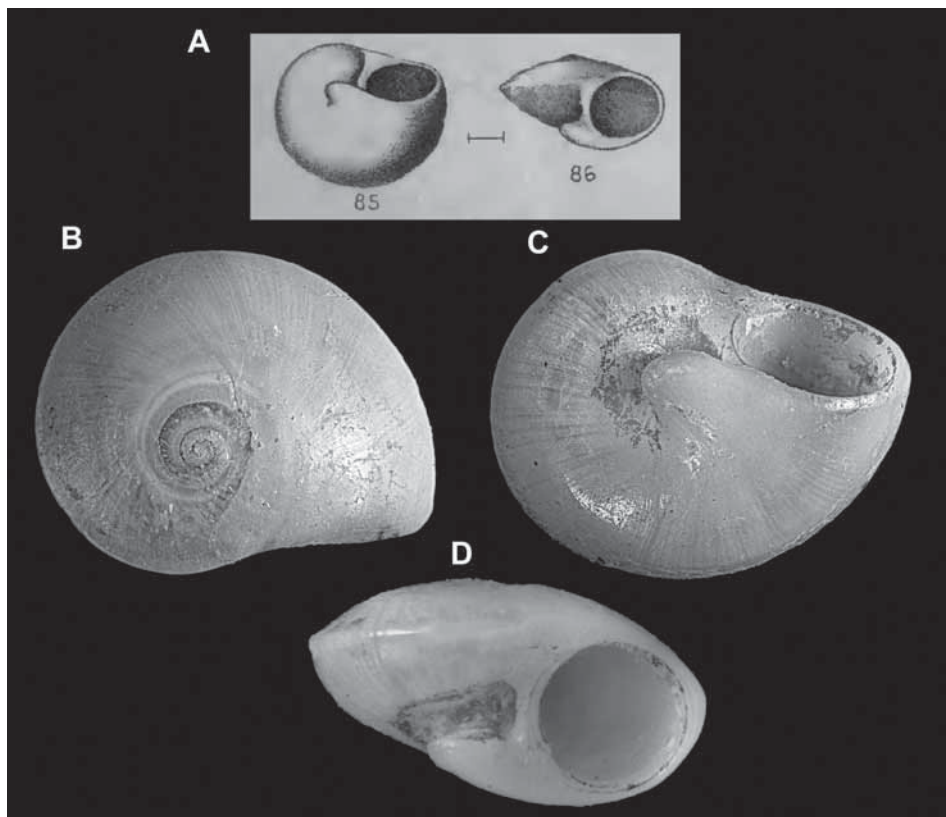


Figure 3

A-D. *Leucorhynchia caledonica* Crosse, 1867. A: figuration of the holotype in TRYON (1888); B-D: holotype, 3.0 mm, NHMUK 1958.1.10.20. Locality: Nouméa, New Caledonia.

Figura 3

A-D. *Leucorhynchia caledonica* Crosse, 1867. A: representación del holotipo en TRYON (1888); B-D: holotipo, 3,0 mm, NHMUK 1958.1.10.20. Localidad: Nouméa, Nueva Caledonia.

(HIGO ET AL., 1999); Kii Peninsula, southward to tropical West Pacific (OKUTANI, 2000). Vanuatu and the Philippines in the present work.

Remarks: The shell was first collected by M. Marie at Nouméa, New Caledonia, and forwarded to H. Crosse, who, given its small number of whorls, initially thought that it was a young shell, poorly characterized. Unable to relate it satisfactorily to any of the known genera up to that time (*Skenea*, *Spira*, *Cyclostrema*, *Adeorbis*, *Pseudorotella*, *Teinostoma* and *Calceolina*), and finding within these genera nothing comparable with the singular “beak” present, that kind of spur in which the columellar and basal edges end, Crosse decided to describe the new genus *Leucorhynchia*.

LADD (1966) commented that all fossil specimens of *L. caledonica* from Enewitak Atoll, Marshall Islands (age, Recent), are smaller than the recent shells from New Caledonia, and that it is not found living in the area today.

Leucorhynchia caledonica is characterized by the protoconch being located in the same plane as the first whorl of the teleoconch; by the peripheral keel that angles the last whorl of the teleoconch; and by the beak or spur shape of the columellar callus.

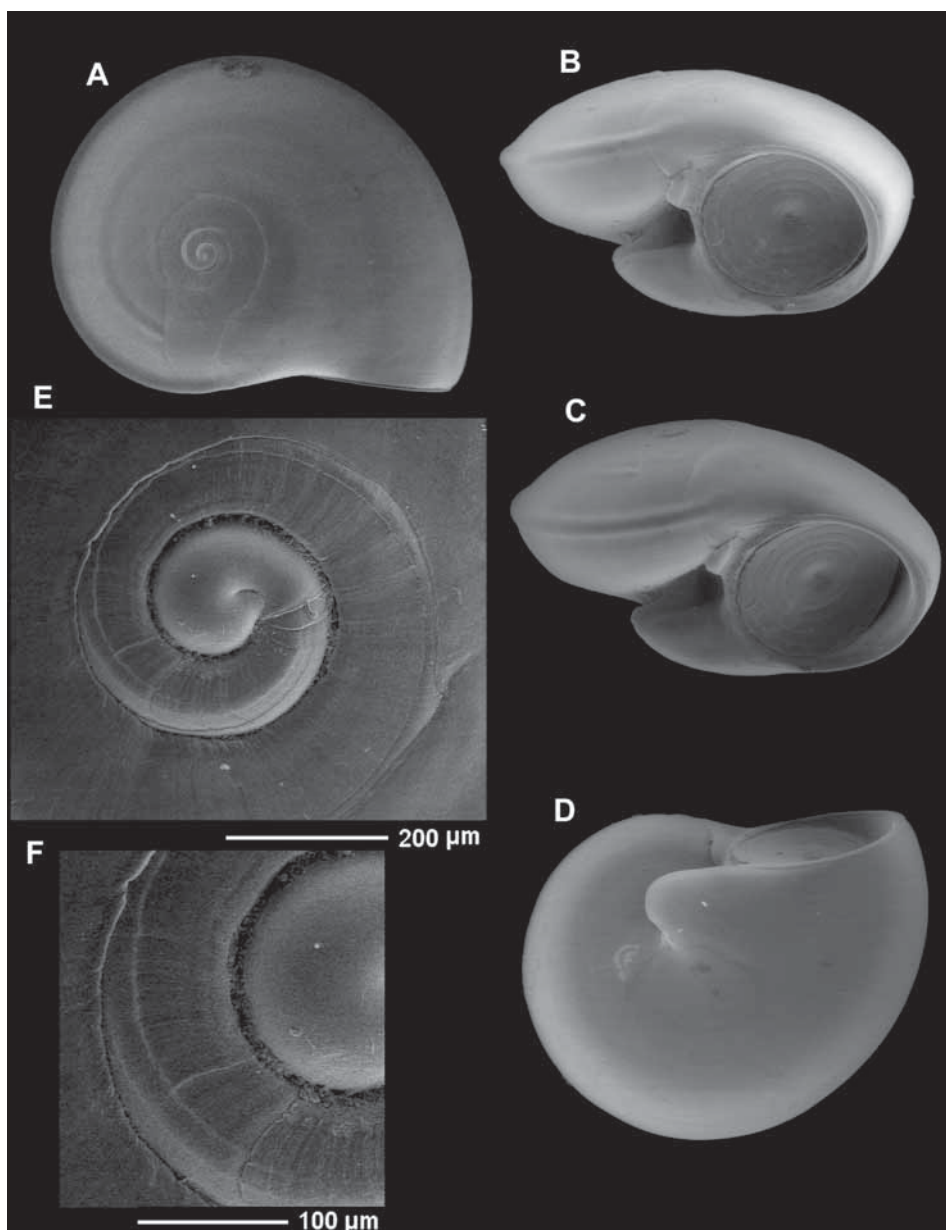
It differs from *L. crossei* by the peripheral keel, which angles the last whorl of the teleoconch; from *L. tricarinata* by having a peripheral keel; and from *L. tryoni* by the shape of the columellar callus and the lacking of the periumbilical thick cord.

Figure 4

A-F. *Leucorhynchia caledonica* Crosse, 1867. A-D: shell, topotype, 2.90 mm, New Caledonia, Secteur de Nouméa, Pointe Magnin, Stn 1355, 7-10 m. E-F: protoconch and first teleoconch whorl, and detail.

Figura 4

A-F. *Leucorhynchia caledonica* Crosse, 1867. A-D: *concha*, *topotipo*, 2,90 mm, Nueva Caledonia, Sector de Nouméa, Punta Magnin, Stn 1355, 7-10 m. E-F: *protoconcha* y *primera vuelta de teleoconcha*, y *detalle*.



Leucorhynchia crossei (Tryon, 1888)

Figure 6A-H

Teinostoma (Leucorhynchia) crossei Tryon, 1888. *Manual of Conchology*, Ser. 1, Vol. X, pp. 106, pl. 45, figs. 86a-b [Type locality: Singapore].

Leucorhynchia crossei (Tryon, 1888): HIGO, CALLOMON & GOTO, 1999. *Elle Scientific Publications*, pp. 69 [G503].

Type material: Syntype of *Teinostoma (Leucorhynchia) crossei* Tryon, 1888: 7 spms in ANSP-20634. Singapore (Coll. Archer).
12 spms, NHMUK 1908.10.26.16-27. Singapore (J.R. Le B. Tomlin Coll.).
Examined by photographs.

Other material examined: 30 spms: Singapore: 28 spms, National Museum of Wales, Coll. Melvill-Tomlin: NMW.1955.158:26802.
Gulf of Oman: 2 spms, NHMUK 1952.12.1.50-51. R. Winckworth Collection. Examined by photographs.

Description: From the original description and new data based on syntype and material examined:

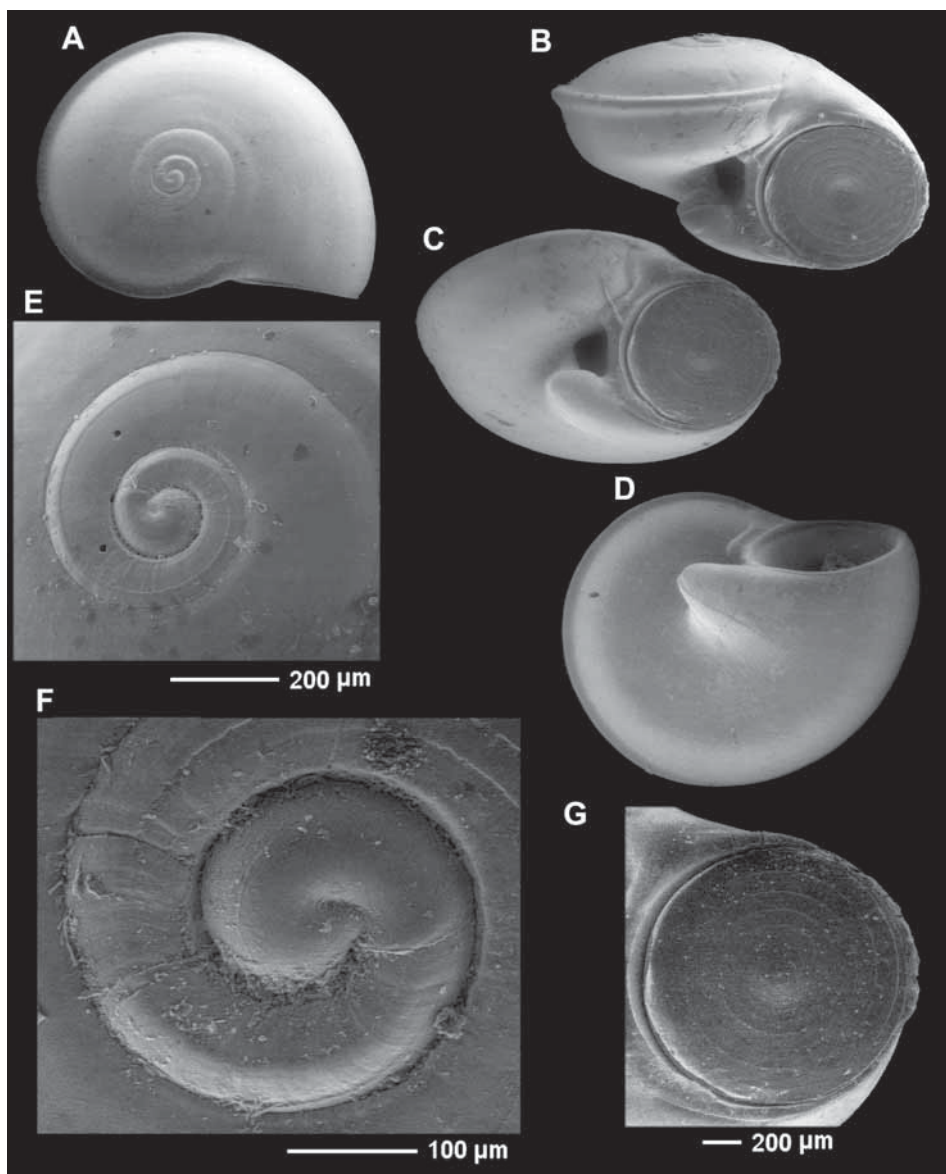
Shell small (<3.0 mm), robust, discoidal, depressed-turbiniiform, spire formed by 3.8 whorls, not keeled and narrowly umbilicate. Protoconch with a little more than of 0.75 whorls, size 215 µm approximately.

Figure 5

A-G. *Leucorhynchia caledonica* Crosse, 1867. A-D: shell, 2.30 mm, Vanuatu, SE corner of Santo, shallow water. E-F: protoconch; G: operculum.

Figura 5

A-G. *Leucorhynchia caledonica* Crosse, 1867. A-D: *concha*, 2,30 mm, Vanuatu, esquina al SE de Santo, aguas superficiales. E-F: *protoconcha*; G: *opérculo*.



Teleoconch of 3 whorls separated by a moderately impressed suture, visible in the first whorl and completely covered in the remaining ones by the adapical extension of parietal callus; the periphery is rounded, not keeled. The entire surface of the teleoconch is smooth. A thick cord formed by very thick triangular denticles delimits the umbilicus.

Aperture circular, peristome entire. Inside of the inner lip there is a fold in which the operculum abuts. Parietal area covered by a very thick callus layer that extends adapically covering the suture of the previous whorl; arched, slightly reflected columella. A narrow and elongated concave area is formed in both the parietal area and the columella.

Between the base of the columella and the base of the outer lip appears a thick callous protuberance that has the shape of the lower part of a bird's beak, and which extends over the umbilical region but without occluding it.

Narrow, deep umbilicus, not occluded by the columellar callus; in dorsal view the umbilicus is hidden by the columellar callus and it can be seen only in apertural view.

Dimensions: the syntype is 2.56 mm in diameter x 1.65 mm in height. The shell in NMW measures 2.92 mm in diameter x 1.82 mm in height.

Habitat: In the Gulf of Oman dredged at 156 fms (MELVILL, 1906); intertidal to 20 m, sandy mud (HIGO ET AL., 1999); in beach drift on rocky shore (OKUTANI, 2000).

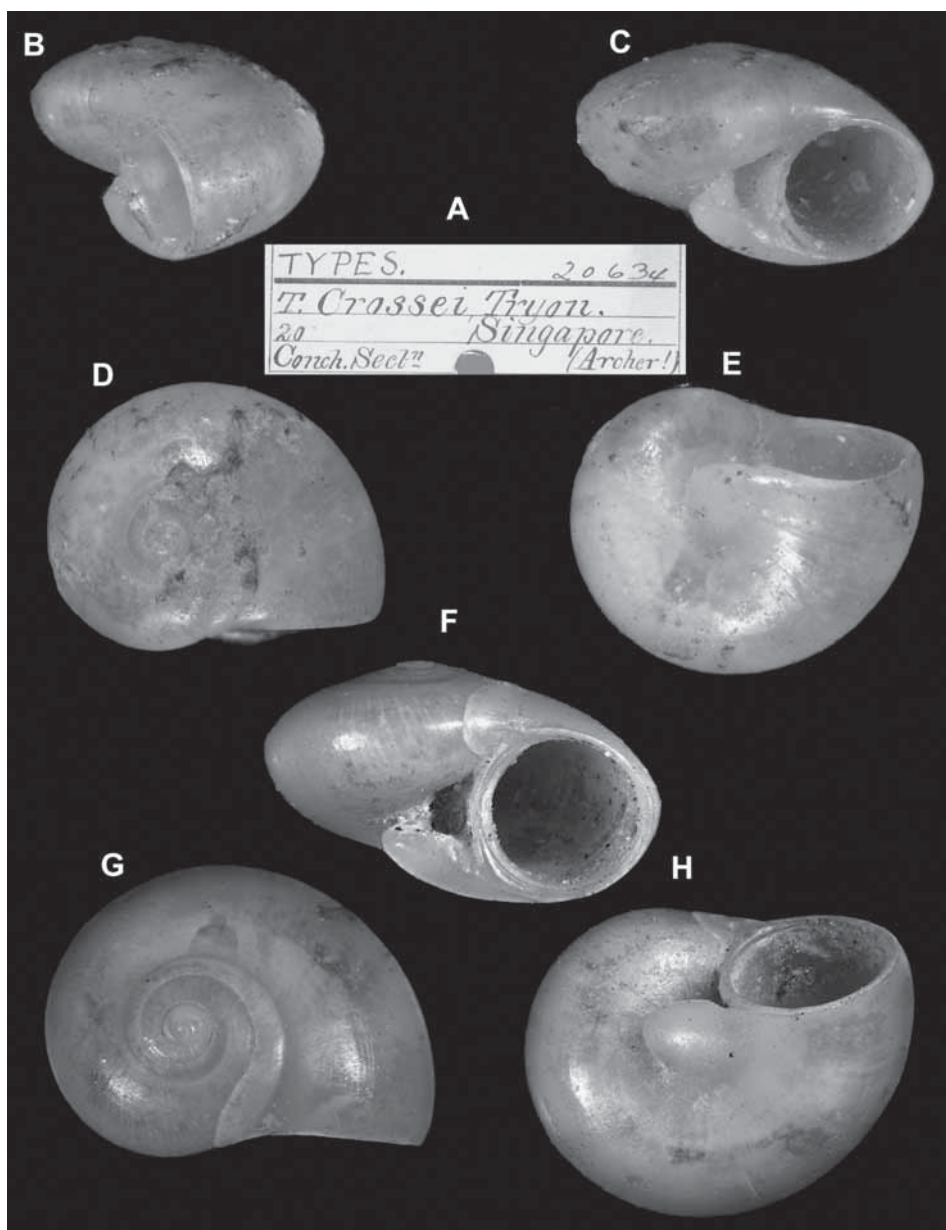
Distribution: Singapore (TRYON, 1888); Gulf of Oman (MELVILL, 1906); southern Kyüsü and southwards, southeast Asia (HIGO ET AL., 1999); Ogasawara Islands, southward to tropical West Pacific (OKUTANI, 2000).

Figure 6

A-H. *Teinostoma (Leucorhynchia) crossei* Tryon, 1888. A-E: Syntype from Singapore (Archer) (ANSP 20634). A: original label, B-E: shell, 2.56 mm in diameter. F-H: shell, 2.71 mm, Singapore (Archer), Coll. Melvill-Tomlin NMW.1955.158.26802.

Figura 6

A-H. 186 *Teinostoma (Leucorhynchia) crossei* Tryon, 1888. A-E: Sintipo procedente de Singapur (Archer) (ANSP 20634). A: etiqueta original, B-E: concha, 2,56 mm de diámetro. F-H: concha, 2,71 mm, Singapur (Archer), Coll. Melvill-Tomlin NMW.1955.158.26802.



Remarks: Following FISCHER (1880: 834), TRYON (1888) considered *Leucorhynchia* a sub-genus of *Teinostoma* H. et A. Adams, 1853 and described *Teinostoma (Leucorhynchia) crossei* as new species from Singapore (Archer), whose description merely indicates that it differs from *L. caledonica* in having a rounded periphery, surface polished, without a trace of striae.

MELVILL (1906) identifies several specimens from the Gulf of Oman as *L. crossei*, indicating that he could not separate these specimens from the Singapore species as collected by Mr. Archer and described by G.B. TRYON (1888); at the same time, he comments that the only difference, between *L. crossei* and the typical *L. caledonica* Crosse, is the absence of a peripheral angle around the body-whorl in the latter.

It is obvious that a description as brief as that provided by TRYON (1888), only aimed at differentiating the new species *L. crossei* from *L. caledonica*, the only species then known for the genus *Leucorhynchia*. However, and in order to be able to differentiate it from the new species that are going to be described, we have expanded it from an examination of the type material.

LADD (1966: 76, pl. 14, figs 32-33) records *L. crossei* as Recent shell from Enewitak Atoll, Marshall Islands but, in our opinion it is *L. redita* and not *L. crossei*.

OKUTANI (2000) remarks that *L. crossei* has a rounded periphery and weak spiral ribs on the upper whorls. Since the lack of striae is one of the differential features of the species provided by Tryon and verified by us, we consider that the species referred to by Okutani may not be *L. crossei* and it could be a different new species.

Really, *L. crossei* and *L. caledonica* are so similar, that if not for the peripheral keel of the type species, it would be very difficult to differentiate between them in an eye examination. Other differential characters between the two species are that *L. crossei* has the spire a little higher, and that the parietal callus covers only a part of the previous whorl. Even the columellar callus in the shape of a peak (lower half of a bird's beak) or spur, as called by Crosse in the description of the type species, is very similar in both species.

L. crossei differs from *L. caledonica* mainly because it lacks a peripheral keel. *L. bicolor* is different because it lacks the thick periumbilical cord; *L. perpolita* n. sp. and *L. redita* n. sp. by the form of the columellar callus and *L. sulinitel* n. sp. for lacking of spiral cords in the first 1 ½ teleoconch whorls.

Leucorhynchia tricarinata Melvill & Standen, 1896

Figures 7A-C, 8A-F, 9A-H, 10A-F

Leucorhynchia tricarinata Melvill & Standen, 1896. *Journal of Conchology*, 8(9): 311-312, pls 9-11, figs. 75a-b [Type locality: Lifou, Loyalty Islands].

Type material: Holotype in MMUM (EE.3793) from Lifou, Loyalty Islands. Examined by photography.

Material examined: 1 spm, NMW-National Museum Wales,. Coll. Melvill-Tomlin: NMW.1955.158.26803. Lifou, Loyalty Islands, Central Pacific. Examined by photography.

Other material examined: 4 spms, 91 s: New Caledonia, ATELIER LIFOU: 2 spms, Loyalty Islands, Lifou, Baie du Santal, au nord du Cap Aimé Martin, Stn 1450, 20°45.8'S-167°01.65'E, 27-31 m, brushings (topotypes). Vanuatu, SANTO 2006: 2 spms, SE corner of Santo, shallow water. Philippines, PANGLAO 2004: 1 s, Balicasag Island, Stn B41, 9°30.9'N-123°40.8'E, 17-19 m, floor of large cave; 5 s, Black Rock, Tuburan, Panay Island, 11°48.505'N-121°52.507'E, 32 m (CSG). Solomon Islands: 5 s, Charapoana Point, Uepi Island, Morovo Lagoon, 20 m (CSG). Papua New Guinea, KAVIENG 2014: 2 s, Lemus Island, Stn KPS11, 02°38.3'S-150°37.4'E, 8-19 m, sediment in ledges, reef slope. Micronesia: 7 s, Pehleng Pass, South oceanside dropoff, Pohnpei Island, 06°51.29'N-158°06.24'E, 40 m, sand in cave (CSG); 2 s, Split Rock, Kosrae Island, 17 m; 62 s, Sanctuari, Kosrae Island, 39 m (CSG); 2 s, Fanif Wall, Yap Island, 09°35.3'N-138°06.31'E, 61 m (CSG); 4 s, Millenium dropoff, Yap Island, 09°27.00'N-138°05.13'E, 40 m (CSG).

Description (from the original description and new data based on topotypes): Shell very small (<3.0 mm), robust, discoidal to turbiniform, formed by 3 ¼ whorls, carinated and widely umbilicate.

Protoconch with a little more than ¾ whorl, about 240 µm in diameter and a rough surface, with two short little strong spiral cordlets.

Teleoconch of 2 ½ whorls, completely smooth, separated by a moderately impressed suture, with adapical and basal folds.

Three keels are located on the periphery; one is very prominent, in a central position, forming a keel, and the other two are placed at each side of it. The central keel is very thick, triangular in shape and has a spiral cord at the

base; the two remaining carinae are very marked and angled the periphery above and below of the main keel. The spaces between the carinae are very concave. Adapically, on the last whorl, there are 15 fine axial folds within the subsutural zone; abapically there are 10 very thick axial folds that are located around the umbilicus.

Umbilicus wide and deep, not occluded by the parietal and columellar callus. Aperture circular, peristome entire. Inside the inner lip there is a fold for opercular stop. A thick callus is located in the parietal area and covers the carinae; other thick callus is formed between the base of the columella and the base of the outer lip extending towards the umbilicus, and forming a strong callous tongue-shaped protuberance which extends over the umbilical region but without touching it.

Operculum thin, corneous and multispiral, outer side with a small central depression, while the inner side has a triangular area for insertion of the foot.

Topotypes size:

2.98 mm in diameter

2.88 mm in diameter and 1.58 mm in height (H/D: 0.55).

Shells from Vanuatu, size:

5.20 mm in diameter

4.72 mm in diameter and 2.64 mm in height (H/D: 0.56).

Habitat: From intertidal to 20 m, sandy mud (HIGO ET AL., 1999); in beach drift on rocky shore (OKUTANI, 2000). The specimens (topotypes) studied from Lifou, were collected alive by brushing at 27-31 m. The specimens from Vanuatu were collected in shallow water and the Philippines shell at 17-19 m in floor of a large cave.

Distribution: Lifou, Loyalty Islands (MELVILL & STANDEN, 1896); Amami Islands and southwards, Ogasawara islands (Chichijima, Hahajima), Philippines, New Caledonia (HIGO ET AL., 1999); Amami Islands, Ogasawara Islands, southward to tropical West Pacific (OKUTANI, 2000). Vanuatu, **Solomon**, Papua New Guinea and states of Micronesia (Yap, Pohnpei and Kosrae) in the present work.

Remarks: MELVILL & STANDEN (1896) indicated that *L. tricarinata* differed from *L. caledonica*, the type species of the genus, by its tricarinate periphery, the middle keel being strong, squarely built, and bold, and projecting further

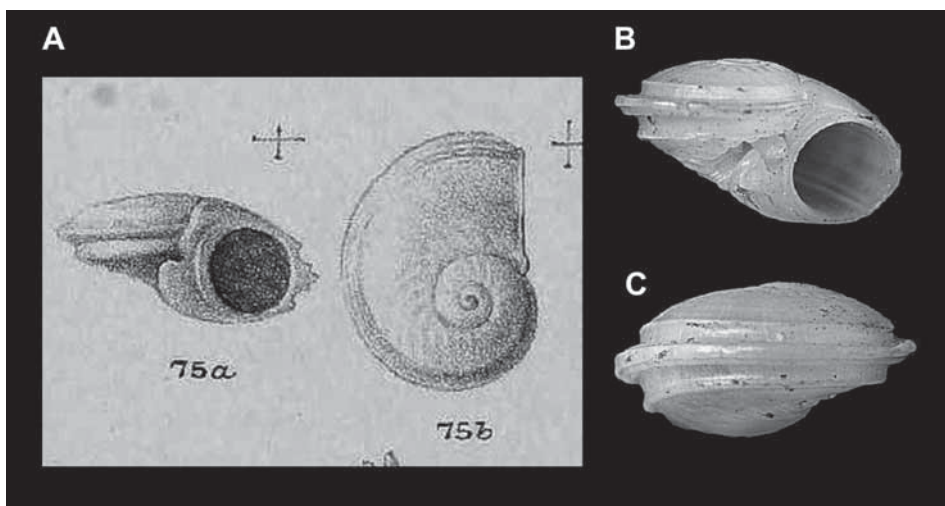


Figure 7

A-C. *Leucorhynchia tricarinata* Melvill & Standem, 1896. A: holotype, 3.0 mm, original figuration. B-C: holotype, MMUM (EE.3793) from Lifou, Loyalty Islands.

Figura 7

A-C. *Leucorhynchia tricarinata* Melvill & Standem, 1896. A: *holotipo*, 3,0 mm, *representación original*; B-C: *holotipo*, MMUM (EE.3793) *de Lifou*, *Islas Loyalty*.

from the whorl than the two other keels. The shell is more depressed with a papillary apex, sunk in the spire; the spiral carina runs around the sutures and around the peristomial callosity, this being tongue shaped and almost concealing the umbilicus.

OKUTANI (2000) remarks that *L. tricarinata* has a similar shell shape to *L. caledonica* differing in its periphery keel and winkled umbilical area.

SASAKI (2008: 158, figs. 5A-B) photographed for the first time at SEM a specimen of *L. tricarinata* from Kushibaru, Aka Island, Okinawa, Japan, at 7 m deep.

Leucorhynchia tricarinata is unmistakable: the three peripheral carinae from which the central one is the more prominent and act as a keel, make it different

from other known species. Only *L. bicarinata* on the West coast of Africa, bears some resemblance, although it lacks the prominent peripheral central keel. Among the shells from Lifou, Loyalty Islands (type locality) (Figs. 7-8), Vanuatu (Fig. 9), Papua New Guinea (Fig. 10) and Philippines there are some morphological differences, mainly in the ornamentation of the protoconch, as well as in the number and size of the axial folds and size and the shape of the callous protuberances from the base of the columella, that initially suggested to us that it could be a different species.

However, taking into account the morphology of the shell as a whole, we consider that it is the same species which, across its geographical range, shows some morphological differentiation between the studied populations.

We would therefore consider geographical morphotypes and not different species. Only a more thorough study of living individuals of the different populations, taking into account DNA data, would make possible a correct species delimitation.

The specimens studied from Vanuatu, present some morphological differences in relation to the topotypes from Lifou:

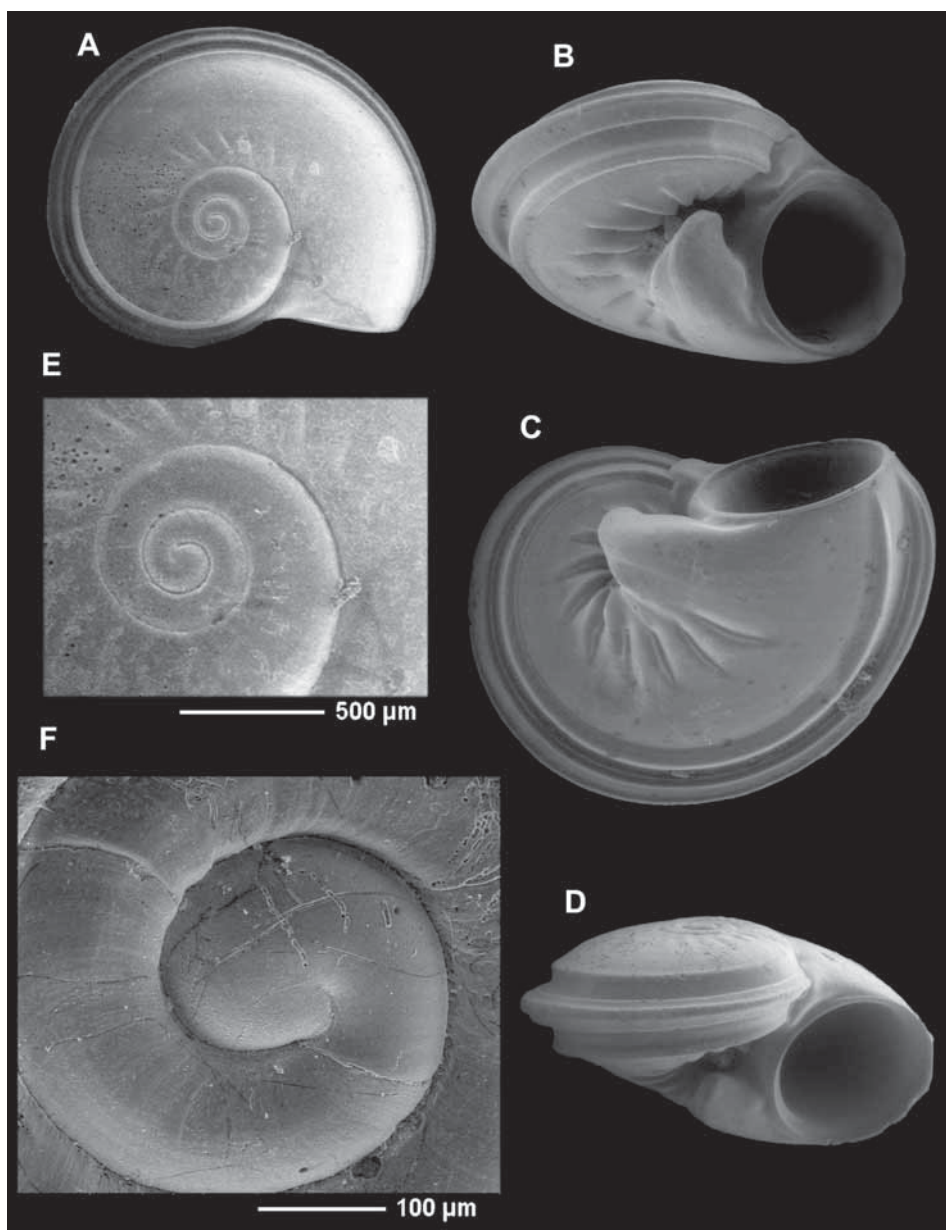
1. the shell is more depressed adapically and the H/D ratio is identical.
2. the spiral cordlets of the protoconch, are more marked and long.
3. the first whorl of the teleoconch has a keel that disappears with the presence of the axial folds.
4. the last whorl has 18 subsutural axial folds longer and 11 basal ones.
5. the central keel has 2 spiral cords on its base on each side.

Figure 8

A-F. *Leucorhynchia tricarinata* Melvill & Standen, 1896. A-D: topotypes, 2.83, 2.94, 3.34, 2.60 mm, Loyalty Islands, Lifou, Baie du Santal, au nord du Cap Aimé Martin, Stn 1450, 27-31 m, brassages; E: protoconch and first teleoconch whorl; F: detail.

Figura 8

A-F. *Leucorhynchia tricarinata* Melvill & Standen, 1896. A-D: topotipos, 2,83, 2,94, 3,34, 2,60 mm, Islas Loyalty, Lifou, Bahía de Santal, al norte del Cabo Aime Martin, Stn 1450, 27-31 m, cepillados; E: protoconcha y primera vuelta de la teleoconcha; F: detalle.



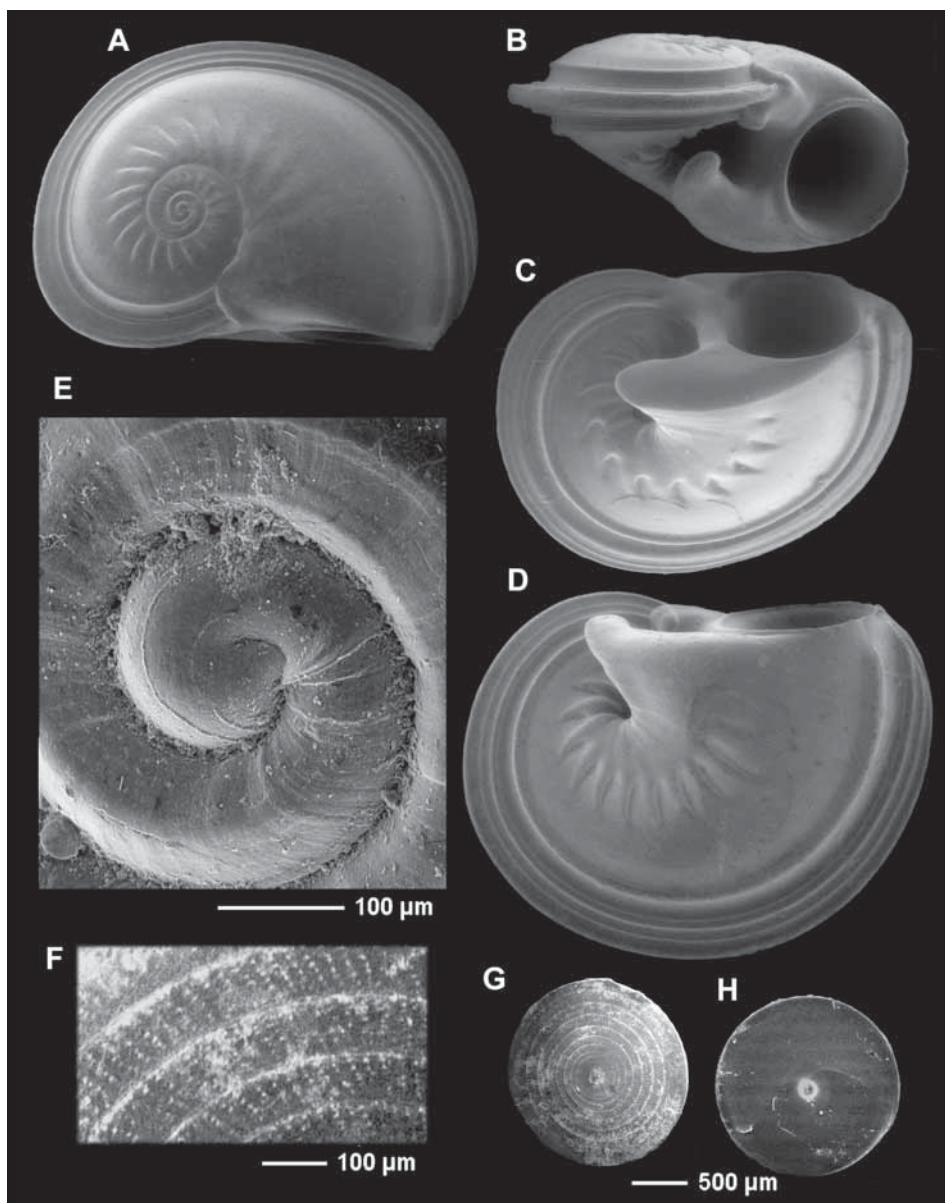


Figura 9

A-H. *Leucorhynchia tricarinata* Melvill & Standen, 1896. A-D: shells, 5.17, 4.60, 4.77, 5.54 mm, Vanuatu, SE corner of Santo, shallow water; E: protoconch; F-G: operculum; H: detail.

Figura 9

A-H. *Leucorhynchia tricarinata* Melvill & Standen, 1896. A-D: conchas, 5.17, 4.60, 4.77, 5.54 mm, Vanuatu, esquina al SE de Santo, agua superficial; E: protoconcha; F-G: opérculo; H: detalle.

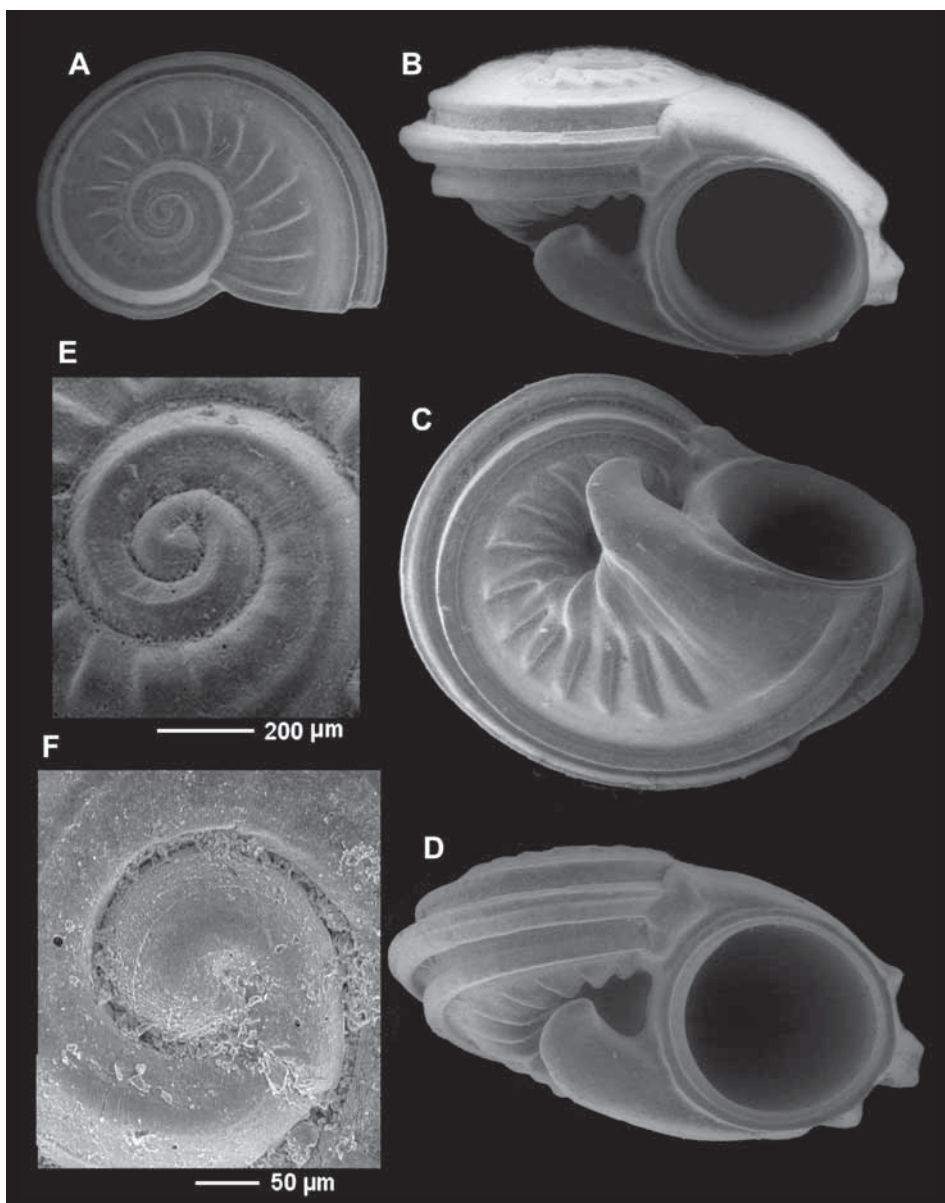


Figure 10

A-F. *Leucorhynchia tricarinata* Melvill & Standen, 1896. A-D: shells, 2.11, 3.14, 3.28, 3.34 mm, Papua New Guinea, Lemus Island, Stn KPS11, 02°38.3'S-150°37.4'E, 8-19 m; E-F: protoconch and detail.

Figura 10

A-F. *Leucorhynchia tricarinata* Melvill & Standen, 1896. A-D: conchas, 2,11, 3,14, 3,28, 3,34 mm, Papua Nueva Guinea, Isla de Lemus, Stn KPS11, 02°38,3'S-150°37,4'E, 8-19 m; E-F: protoconcha y detalle.

***Leucorhynchia tryoni* (Pilsbry, 1891) n. comb.**

Figure 11A-H

Teinostoma (*Leucorhynchia*) *tryoni* Pilsbry, 1891. *The Nautilus*, 5(8): 91 [Type locality: Singapore].

Type material: Syntype of *Teinostoma tryoni* Pilsbry, 1891. ANSP 20635. Singapore (Coll. Archer). Examined by photography.

Other material examined: 16 spms, National Museum Wales, Coll. Melvill-Tomlin: NMW.1955.158.26804. Singapore (Coll. Archer). Examined by photography.

Description: New description (from the original description and new data based on syntype and shells in NMW):

Shell small (<3.5 mm), robust, discoidal, depressed-turbiniiform, spire formed by 3.75 whorls, not keeled and narrowly umbilicate.

Protoconch with a little more than of 0.75 whorls.

Teleoconch of 3 whorls separated by a moderately impressed suture; periphery rounded. The entire surface of the teleoconch is smooth, except for the early teleoconch, which shows two carinae of small nodules, one central and another in the periphery. The latter one disappears from the whorl 1.5 and the first half of the base which shows about 8-10 radiating basal folds. A thick cord formed by very thick triangular denticles delimits the umbilicus.

Aperture circular, peristome entire. Inside the apertural border there is a fold for opercular stop. Between the base of the columella and the base of the outer lip, a thick callous hook-shaped protuberance is formed, which extends over the umbilical region but without touching it.

Umbilicus narrow and deep, not occluded by the parietal and the columellar callus, with several strong teeth on its outer margin.

Dimensions: the syntype is 3.08 mm in diameter x 2.75 mm in height. The shell in NMW is 3.87 mm in diameter x 2.48 mm in height.

Habitat: Unknown.

Distribution: Only known from Singapore, its type locality.

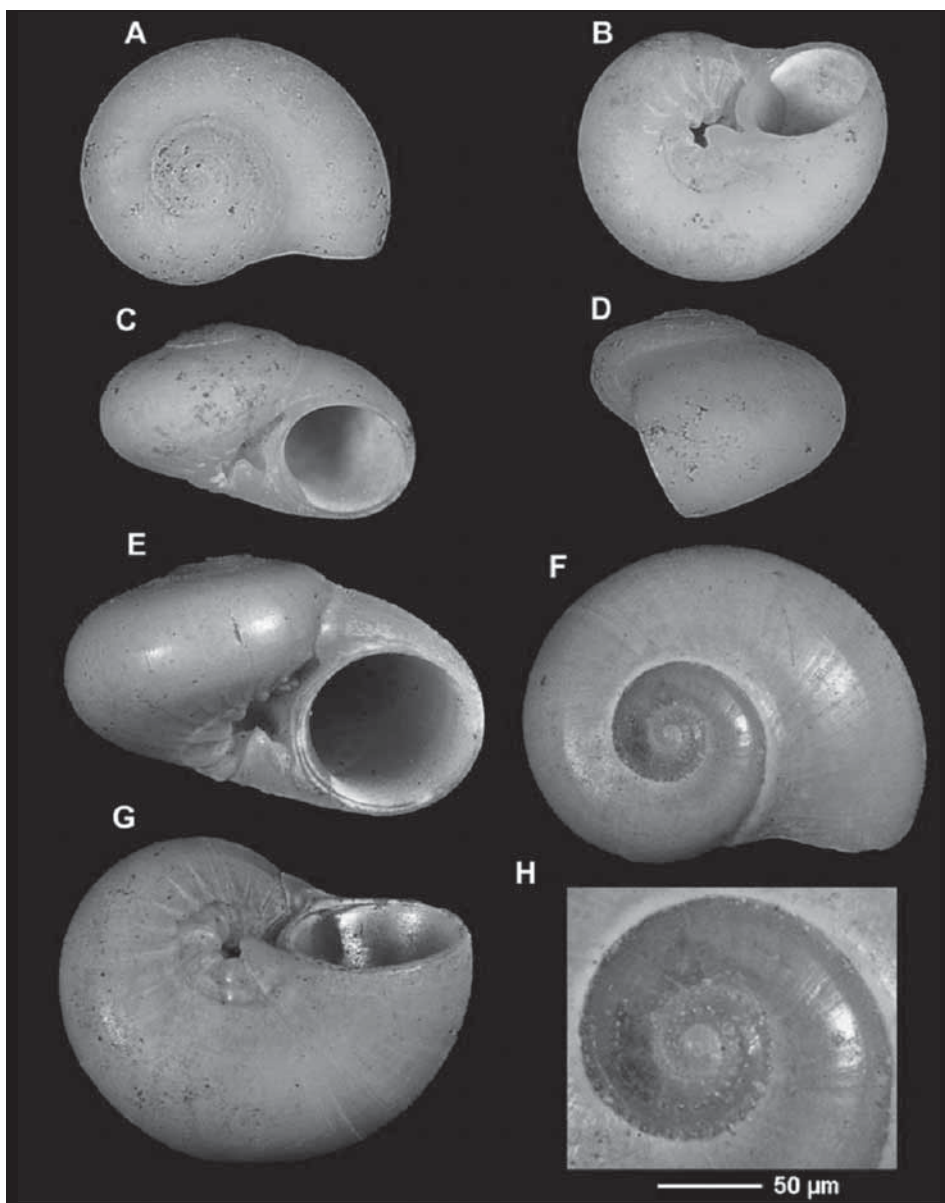


Figure 11

A-H. *Leucorhynchia tryoni* (Pilsbry, 1891). A-D: syntype, 3.08 mm in diameter (ANSP 20635), Singapore (Coll. Archer); E-G: shell, 3.87 mm in diameter (NMW.1955.158.26804), Singapore (Coll. Archer); H: apical view.

Figura 11

A-H. *Leucorhynchia tryoni* (Pilsbry, 1891). A-D: sintipo, 3,08 mm de diámetro (ANSP 20635), Singapur (Coll. Archer); E-G: concha, 3,87 mm de diámetro (NMW.1955.158.26804), Singapur (Coll. Archer); H: vista apical.

Remarks: After describing *L. tryoni*, PILSBRY (1891) remarks that there were four specimens collected by Archer in Singapore (type material).

Although his work is titled “A new specie of *Leucorhynchia*”, he really considered *Leucorhynchia* as a subgenus of *Teinostoma*, and after the mention that TRYON (1888) in his monography on *Teinostoma* described a second species as *T. {Leucorhynchia} crossei*, he wrote the following: “The subgenus now consists of three species which may be distinguished as follows:

Umbilical lobe of callus large; surface smooth:

- Periphery carinated, *L. caledonica* Crosse.
- Periphery rounded, *L. crossei* Tryon.

Umbilical lobe small; base radiately grooved:

- Periphery rounded, *L. tryoni* Pilsbry.

The species is characterized by its teleoconch with a totally smooth surface, except for the two carinae of small nodules that develop in the first 1.5 whorls of the teleoconch and the radiating basal folds on the first half of the base; by the thick cord that delimits the umbilicus, formed during the development of columellar callus and by the strong tooth on the base of the columella.

***Leucorhynchia omanensis* (Thiele, 1925)**

Figure 12A-E

Vitrinella (Leucorhynchia) omanensis Thiele, 1925. *Wissenschaftliche Ergebnisse der deutschen Tiefsee-Expedition auf dem Dampfer “Valdivia” 1898-1899*, 17(2): 295, pl. 5, fig. 6 [Type locality: Gulf of Oman, Indian Ocean].

Type material: Holotype in Museum für Naturkunde, Berlin-Malakologie (ZMB/Moll-55013). Examined.

Description: From the original description in THIELE (1925) and the examination of the holotype:

Shell small (<4.0 mm), wider than height, robust, turbiniform, spire formed by 3.8 whorls, very convex and narrowly umbilicated.

Protoconch with a little more than 0.75 whorl, 240 µm in diameter, sculptured by numerous small granules, regularly distributed. Teleoconch of 3 whorls

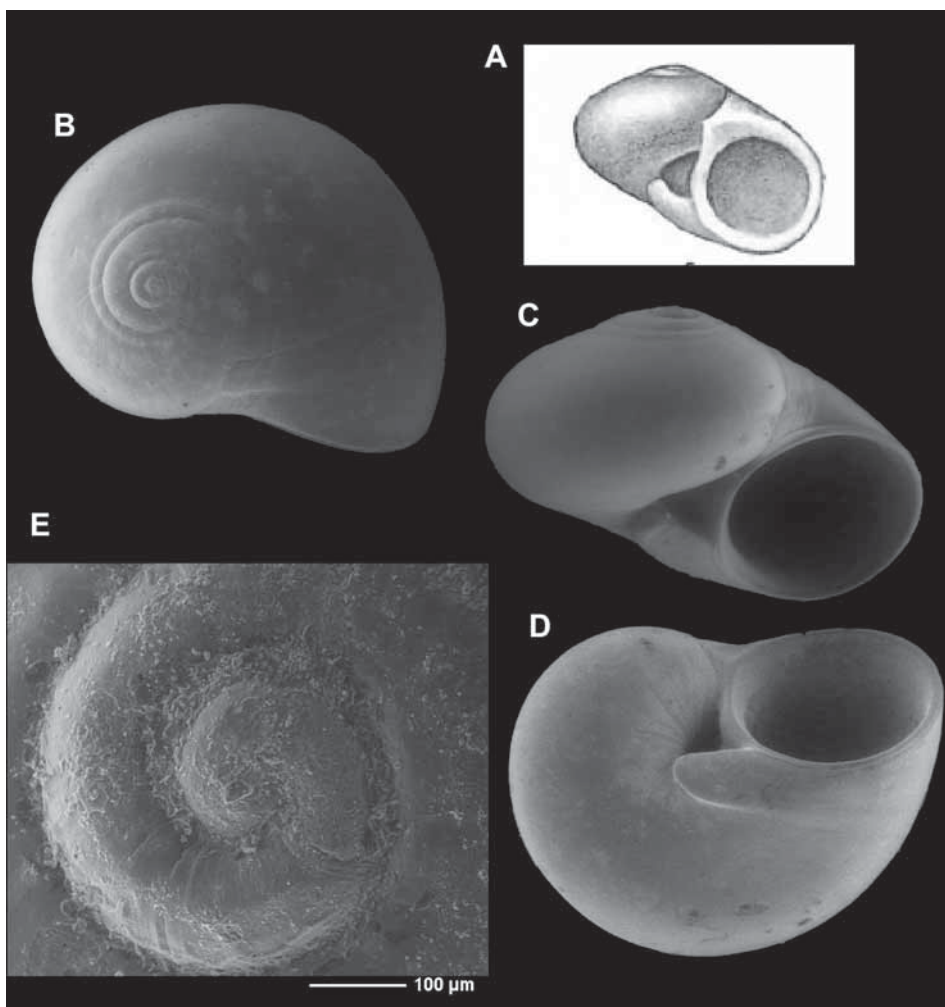


Figure 12

A-E. *Leucorhynchia omanensis* (Thiele, 1925). A: original figuration, Golfo de Omán. B-D: holotipo, 4,1 mm de diámetro, Golfo de Omán (ZMB 55013); E: protoconcha.

Figure 12

A-E. *Leucorhynchia omanensis* (Thiele, 1925). A: representación original, Golfo de Omán. B-D: holotipo, 4,1 mm de diámetro, Golfo de Omán (ZMB 55013); E: protoconcha.

separated by a wide, deep suture; a very thick subsutural cord delimits it and is bifurcated in the last quarter whorl. Periphery very convex. The first $\frac{1}{2}$ whorl of the teleoconch is weakly carinate, but slightly it change to be convex.

Teleoconch surface totally smooth, except for a subsutural cord and strong growth lines.

There are no adapical or abapical axial folds.

Aperture circular, entire peristome. Inside the apertural border there is a fold for opercular stop. Parietal area covered by a strong callous coating extending up to the suture; columella wide, arched, with a prominent callous protuberance hook-shaped placed at the base and extended towards the umbilicus, but not occluding it. External lip strong but with smooth margin not modified. The surface of the parietal and columellar callus is totally smooth.

Umbilicus relatively wide and deep, partially covered by the callous protuberance of the base of the columella.

Dimensions: The holotype size: 4.1 mm in diameter and 2.8 mm in height (H/D: 0.68).

Habitat: Unknown.

Distribution: Only known from the type locality.

Remarks: MELVILL (1906) mentioned *L. crossei* from the Gulf of Oman. THIELE (1925: 295, Pl. 5, fig. 6) figured a shell obtained by Sowerby also from the same locality but he considers that it was not the same species, being distinguished by its higher spire, smaller umbilicus and by its dimensions (2.5 mm in height, and 3.5 mm in diameter), which was called *L. omanensis*.

L. omanensis is characterized by its higher spire; its thick subsutural cord; the weakly carinated early teleoconch; and the prominent hook-shaped callous protuberance placed at the base of the columella.

L. omanensis is similar to *L. crossei*, which is differentiated by its higher spire; the thick subsutural cord, which bifurcates close to the aperture; and the shape of the columellar callus (hook-shaped).

Leucorhynchia amoena (Thiele, 1925)

Figure 13A-G

Vitrinella (Leucorhynchia) amoena Thiele, 1925. *Wissenschaftliche Ergebnisse der deutschen Tiefsee-Expedition auf dem Dampfer "Valdivia" 1898-1899*, 17(2): 261, pl. 5, figs. 9-10 [Type locality: Sunda Sea, 0°30'S, 107°5' W, Indian Ocean] (Pulau-pulau Badas, Riau Islands, Sumatra, Indonesia).

Type material: Two syntypes in Museum für Naturkunde, Berlin-Malakologie (ZMB/Moll-108499). Examined.

Description: From the original description in THIELE (1925) and the examination of the syntypes:

Shell small (<4.0 mm), almost as high as it is wide, robust, discoidal, depressed-turbiniform, spire formed by 3.75 whorls, not keeled and narrowly umbilicate.

Protoconch with a little more than of 0.75 whorls and with 226 µm in diameter.

Teloconch of 3 whorls separated by an impressed suture; periphery rounded. The entire surface of the teloconch is smooth except the early teloconch which shows two carinae of thick nodules, one central and another in the periphery, which disappear from the whorl 1.5, and the first half of the base which shows about 8-10 radiating basal folds. A thick cord formed by very thick rounded denticles delimits the umbilicus.

Aperture circular, peristome entire. Inside the apertural border there is a fold for opercular stop. Between the base of the columella and the base of the outer lip a thick and hook-shaped callous protuberance is formed, which extends over the umbilical region but without touching it.

Umbilicus narrow and deep, not occluded by the parietal and the columellar callus, with several strong rounded teeth on its outer margin.

Dimensions: the syntypes measure 3.7 and 3.25 mm in diameter.

Habitat: Unknown.

Distribution: Only known from the type locality, Pulau-pulau Badas, Riau Islands, Sumatra, Indonesia.

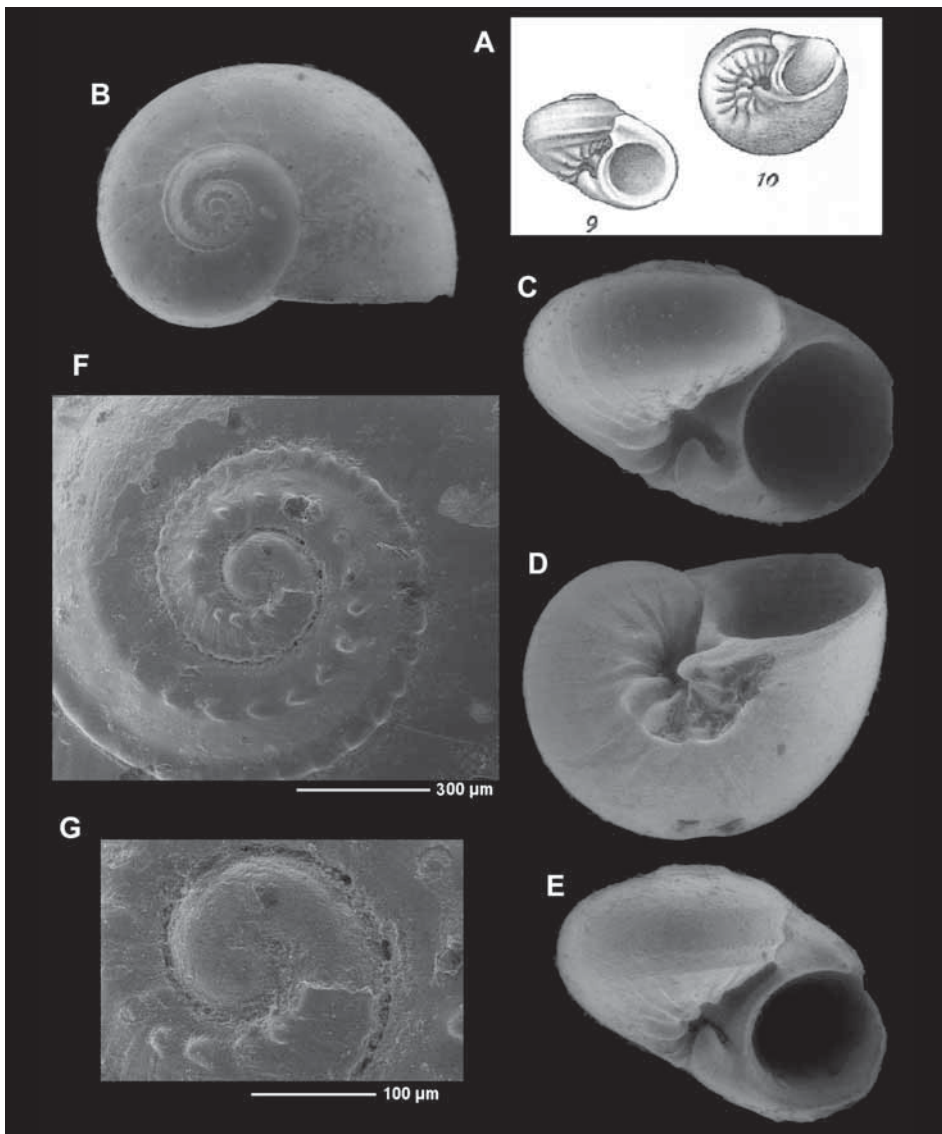


Figure 13

A-G. *Leucorhynchia amoena* (Thiele, 1925). A: original figuration; B-D: syntype, 3.7 mm in diameter; E: syntype, 3.25 mm in diameter, both from Sunda Sea, 0°30'S, 107°5'W, Indian Ocean (ZMB/Moll-108499); F: protoconch and first teleoconch whorl; G: protoconch, detail.

Figura 13

A-G. *Leucorhynchia amoena* (Thiele, 1925). A: representación original; B-D: sintipo, 3,7 mm de diámetro; E: sintipo, 3,25 mm de diámetro, ambos del Mar de Sunda, 0°30'S, 107°5'W, Océano Índico (ZMB/Moll-108499); F: protoconcha y primera vuelta de teleoconcha; G: protoconcha, detalle.

Remarks: *Leucorhynchia amoena* is characterized by its depressed-turbiniiform spire; by the fact that its protoconch is at the same level as the first whorl of the teleoconch; by its adapical carinae of strong nodules; by its basal folds and wide rounded teeth which delimit the umbilicus; and by the strong hook-shaped columellar callus.

In its general aspect it is very similar to *L. tryoni*, with which it shares some singular characters, but differs otherwise in the nodules of the carinae, which are wider; the rounded form and large size of the teeth bordering the umbilicus; and the hook shape of the columellar callus. Geographically, the two species are close, *L. tryoni* from Singapore and *L. amoena* from Badas Islands, Indonesia.

Leucorhynchia plicifera (Thiele, 1925)

Figure 14A-E

Vitrinella (Leucorhynchia) plicifera Thiele, 1925. *Wissenschaftliche Ergebnisse der deutschen Tiefsee-Expedition auf dem Dampfer "Valdivia" 1898-1899*, 17(2): 261, pl. 5, figs. 7-8 [Type locality: Sunda Sea, Indian Ocean (0°5'N-107°E)] (Pulau Penjantan, Riau Islands, Sumatra, Indonesia)].

Type material: Holotype in Museum für Naturkunde, Berlin-Malakologie (ZMB/Moll-108498). Examined.

Description: From the original description THIELE (1925: 295) and new data based on the holotype):

Shell very small (<3.0 mm), robust, discoidal, depressed to turbiniiform, spire formed by 3 ½ whorls, keeled and narrowly umbilicate.

Protoconch with about ¾ of whorl and 220 µm in diameter; the erosion and dirt present have not allowed us to observe its real ornamentation.

Teleoconch of 2 ¾ whorls separated by an impressed suture that in the last quarter of whorl is covered by the extension of the parietal callus. The entire teleoconch surface is apparently smooth. Adapically and abapically convex. A marked keel is located in the middle of the periphery of the last whorl.

The umbilicus is narrow and deep; the thick columellar callus does not allow it to be seen from the base, however, in an apertural view it is perfectly visible. Aperture oval, peristome entire. Inside the apertural lip has a fold on which the operculum abuts. Parietal area covered by a very thick callus layer that extends adapically covering the suture of the previous whorl; arched columella, not reflected.

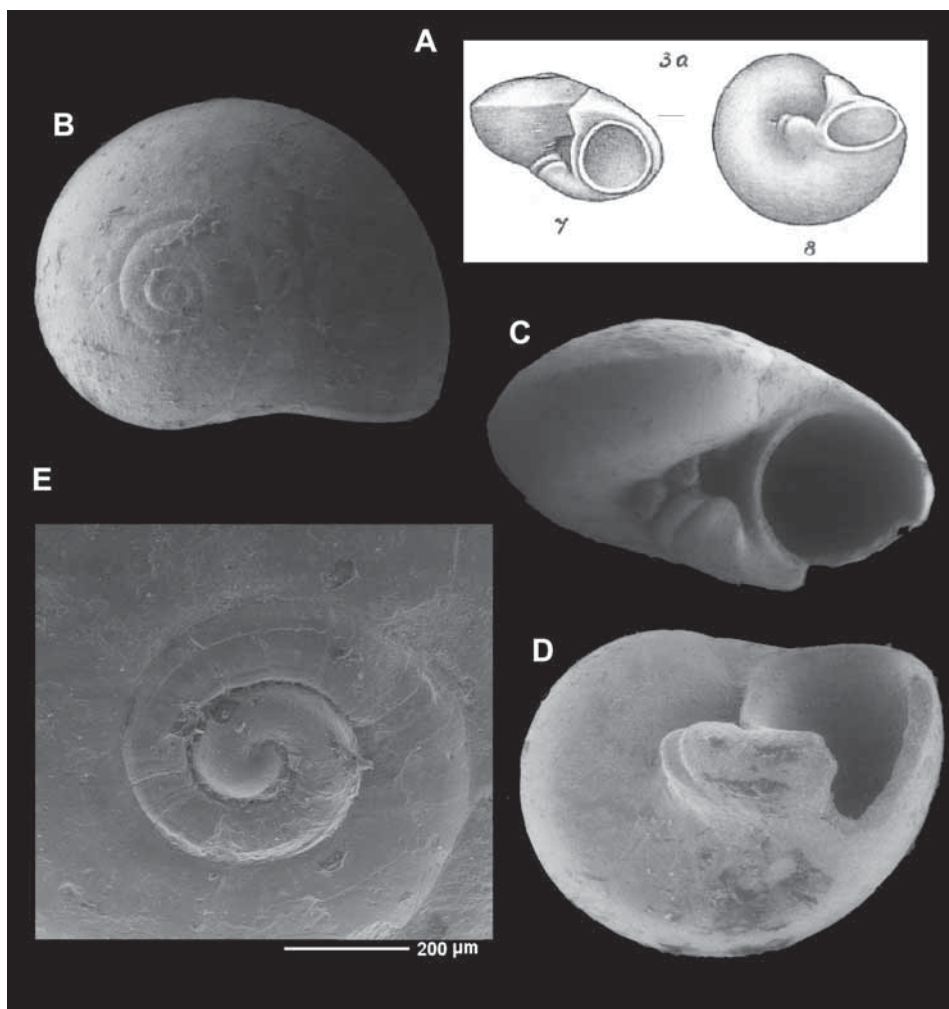


Figure 14

A-E. *Leucorhynchia plicifera* (Thiele, 1925). A: original figuration; B-D: holotype, 2.74 mm in diameter, Indian Ocean, 0°5'N-107°E, Pulau Penjantan, Riau Islands, Sumatra, Indonesia (ZMB/Moll-108498).

Figura 14

A-E. *Leucorhynchia plicifera* (Thiele, 1925). A: representación original; B-D: holotipo, 2,74 mm de diámetro, Océano Indico, 0°5'N-107°E, Pulau Penjantan, Islas de Riau, Sumatra, Indonesia (ZMB/Moll-108498).

Between the base of the columella and the base of the outer lip a thick callous protuberance appears, with the shape of two triangular teeth, joined laterally, extending over the umbilical region but without occluding it.

Dimensions: holotype is 2.74 mm in diameter and 1.7 mm in height (H/D: 0.62).

Habitat: Unknown.

Distribution: Only known from the type locality, Pulau Penjantan, Riau Islands, Sumatra, Indonesia.

Remarks: *Leucorbynchia plicifera* is characterized by its keel-like outline; for being convex adapical and abapically; by its totally smooth surface; and by the two large and thick rounded teeth that form the columellar callus.

Because of its keel-like outline, it is very similar to *L. caledonica*, from which it differs because it is more convex adapically and due to the different shape and size of the columellar callus.

***Leucorbynchia multistriata* n. sp.**

Figure 15A-H

Type material: Holotype (Figs. 15A-C) MNHN-IM-2000-34689 and 2 paratypes (Figs. 15D-E) MNHN-IM-2000-34690.

Material examined: **6 s:** New Caledonia, BATHUS 2: 3 s, S Ile des Pins, Stn DW714, 22°38'S-167°10'E, 124 m (type material). VAUBAN 1978-1979: 1 s, S New Caledonia, Stn DR40, 22°30'S-166°24'E, 250-350 m. EBISCO: 2 s, S Lansdowne, Stn DW2629, 21°06'S-160°46'E, 569-583 m.

Type locality: New Caledonia, South Ile des Pins, Stn DW714, 22°38'S-167°10'E, 124 m.

Etymology: The specific name derives from the Latin words *multis* which means “a lot” and *striata* alluding to the great quantity of small striae on its surface.

Description: Shell very small (<2.5 mm), robust, discoidal, depressed-turbiniiform, formed by 3.5 whorls, keeled and moderately umbilicate. Protoconch with a little more than of $\frac{3}{4}$ whorls, about 230 μ m in diameter, rough surface but no spiral cordlets.

Teloconch of 2 $\frac{3}{4}$ whorls, separated by a moderately impressed suture; periphery rounded, keeled.

Early teloconch smooth, convex, separated by a wide and deep suture; in the subsutural area there are fine axial threads. From the $\frac{3}{4}$ of the first whorl, the coil becomes flatter, appearing the first spiral grooves. From the first whorl, the entire surface of the teloconch is covered by fine spiral grooves.

In addition to the spiral grooves, there are adapically 12 axial slightly prominent subsutural folds and 10-12 very thick axial folds, which circumscribe the umbilicus and are coincident with the columellar/basal callus. A thick peripheral keel is observed in the last whorl.

Aperture circular with an entire peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a thick callous layer that extends adapically to cover the peripheral keel; columella with a callous nodule located at this beginning and a strong callous protuberance located between the base of the outer lip and the base of the columella, which extends in front of the umbilicus, without occluding it. Outer lip thick, smooth, with a non-modified margin.

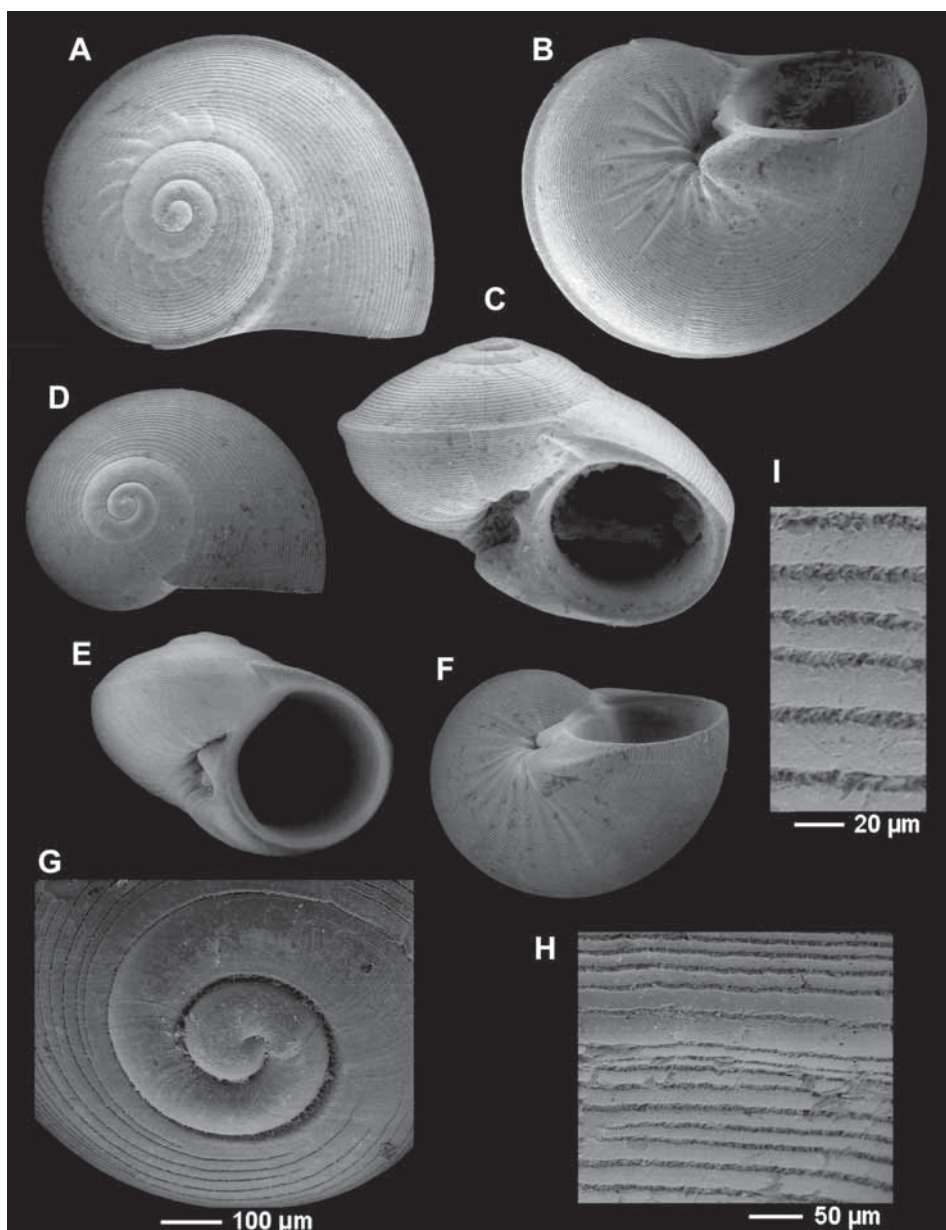
Umbilicus relatively wide and deep, surrounded by numerous axial thick folds.

Figure 15

A-H. *Leucorhynchia multistriata* n. sp. 1. A-C: holotype, 2.32 mm in diameter, New Caledonia, South Ile des Pins, Stn DW714, 22°38.0'S-167°10'E, 124 m (MNHN); D-F: paratype, 1.73 mm in diameter, same locality (MNHN); G: protoconch; H-I: microsculpture and detail.

Figura 15.

A-H. *Leucorhynchia multistriata* n. sp. 1. A-C: *holotipo*, 2,32 mm de diámetro, Nueva Caledonia, S de Isla de Pins, Stn DW714, 22°38,0'S-167°10'E, 124 m (MNHN); D-F: *paratipo*, 1,73 mm de diámetro, la misma localidad (MNHN); G: *protoconcha*; H-I: *microscultura y detalle*.



Dimensions: Holotype: 2.32 mm in diameter and 1.64 mm in height (H/D: 0.71). Paratype: 1.73 mm in diameter and 1.27 mm in height (H/D: 0.73).

Habitat: Bathial species dredged at 124–583 m depth.

Distribution: Only known from New Caledonia.

Remarks: *Leucorhynchia multistriata* n. sp. is characterized by its more elevate spire; by the position of the peripheral keel; by the teleoconch being totally covered with spiral grooves; by the presence of subsutural and periumbilical axial folds; and by the two columellar calluses, one with the form of a nodule at the beginning of the columella and a strong callous protuberance in the base of the columella and the base of the external lip.

By the peripheral keel, *L. multistriata* n. sp. has a slight similarity with *L. caledonica*, but it can be separated from it because it has the teleoconch totally covered with spiral grooves, and also by the higher spire.

***Leucorhynchia impolita* n. sp.**

Figure 16A–F

Type material: Holotype (Fig. 16A–C) MNHN-IM-2000-34691.

Material examined: 1 s: Papua New Guinea, BIOPAPUA: 1 s, Vitiaz Strait, Stn DW3719, 06°03'S–147°36'E, 410 m.

Type locality: Papua New Guinea, Vitiaz Strait, 06°03'S–147°36'E, 410 m [BIOPAPUA: Stn DW3719].

Etymology: The specific name is derivated of the Latin word *impolitus*, *a, um* which means “which is not polished” alluding to the presence of microsculpture on the shell.

Description: Shell very small (<2.5 mm), robust, discoidal, depressed-turbiniform, formed by 3.3 whorls, keeled and narrowly umbilicate. Protoconch with a little more than of $\frac{3}{4}$ whorls, about 270 µm in diameter, smooth surface.

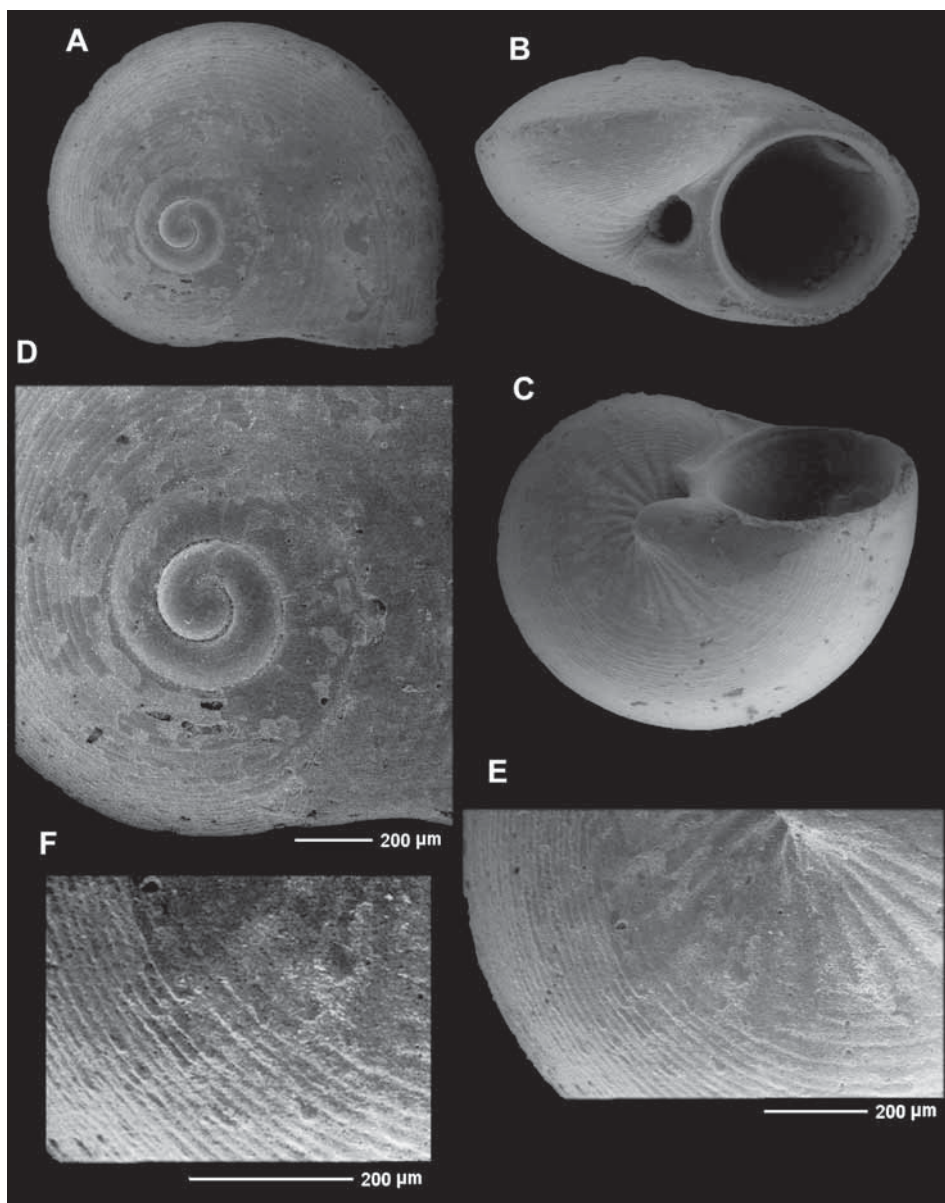


Figure 16

A-F. *Leucorhynchia impolita* n. sp. A-C: holotype, 2.30 mm in diameter, Papua New Guinea, Vitiaz Strait, 06°03'S-147°36'E, 410 m [BIOPAPUA: Stn DW3719] (MNHN); D: protoconch; E-F: sculpture and detail.

Figura 16

A-F. *Leucorhynchia impolita* n. sp. A-C: holotipo, 2,30 mm de diámetro, Papua Nueva Guinea, Estrecho Vitiaz, 06°03'S-147°36'E, 410 m {BIOPAPUA: Stn DW3719} (MNHN); D: protoconcha; E-F: escultura y detalle.

Teleoconch of 2.5 whorls separated by a moderately impressed suture; periphery keeled. Early teleoconch smooth, convex, separated by a wide and deep suture. In the subsutural area there are fine axial threads. From the first whorl, the spire becomes flatter, appearing the first spiral grooves. From the first 1.25 whorls, the entire surface of the teleoconch is covered by fine spiral grooves. In addition to the spiral grooves, basally are observed 15-16 axial folds not very thick, which circumscribe the umbilicus. A thick peripheral keel is observed in the last whorl.

Aperture circular with an entire peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a thick callous layer that extends adapically until to cover the peripheral keel and basally to cover partially the umbilicus; columella with a strong callous protuberance located between the base of the outer lip and the base of the columella, which extends in front the umbilicus, occluding it partially. Outer lip thick, smooth, with a non-modified margin.

Umbilicus relatively narrow and deep, surrounded by axial folds not very thick. Dimensions: holotype is 2.30 mm in diameter and 1.43 mm in height (H/D: 0.62).

Habitat: Bathyal specie dredged at 410 m depth.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia impolita* n. sp. is characterized by the peripheral keel; by the spiral cordlets which cover the entire surface of the teleoconch; and by the shape and placement of the callus.

By its general aspect it resembles *Leucorhynchia seminiformis* n. sp., but can be separated because the spiral cordlets or grooves cover all the teleoconch including the area of the axial folds which circumscribe the umbilicus, and by the higher number of these folds.

From *Leucorhynchia multistriata* n. sp. it can be separated by having a more depressed spire and by the different shape of the columellar callus.

***Leucorhynchia perpolita* n. sp.**

Figure 17A-D, 18A-E

Type material: Holotype (Figs. 17A-B) MNHN-IM-2000-34692 and 38 paratypes MNHN-IM-2000-34693.

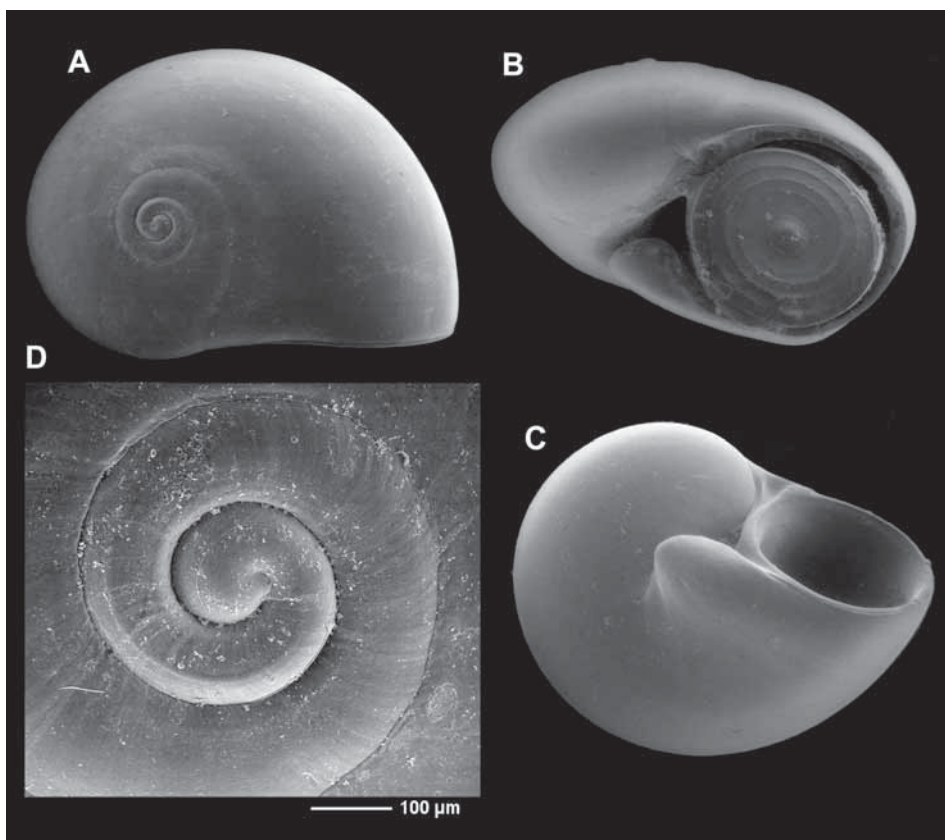


Figure 17

A-D: *Leucorhynchia perpolita* n. sp. A-B: holotype, 2.63 mm in diameter; C: paratype, 2.58 mm in diameter, Philippines, Balicasag Island, Stn B41, 17-19 m, floor of large cave (MNHN); D: protoconch.

Figura 17

A-D: *Leucorhynchia perpolita* n. sp. A-B: *holotipo*, 2,63 mm de diámetro; C: *paratipo*, 2,58 mm de diámetro, Filipinas, Isla de Balicasag, Stn B41, 17-19 m, en el suelo de una cueva grande (MNHN); D: *protoconcha*.

Material examined: (6 spms, 107 s): Philippines, PANGLAO 2004: 3 spms, 36 s, Balicasag Island, Stn B41, 9°30.9'N-123°40.8'E, 17-19 m, floor of large cave (type material); 3 spms, 5 s, Panglao Island, Napaling, Stn B9, 9°33.1'N-123°44.0'E, 8-10 m, caves in reef wall; 62 s, Panglao Island, Biking, Stn S1, 9°35.3'N-123°50.5'E, 5 m, reef slope with overhangs; 2 s, Bohol Island, Ubajan, Stn S25, 9°41.5'N-123°51.0'E, 21 m, mud; 2 s, Bohol

Island, Ubajan, Stn B20, 9°41.5'N-123°51.0'E, 2-8 m, rocks and corals with sand and mud.

Type locality: Philippines, Balicasag Island, 9°30.9'N-123°40.8'E, 17-19 m [PANGLAO 2004: Stn B 41].

Etymology: The specific name derived from the Latin verb *perpolio* which means “entirely polished”, alluding to its smooth surface.

Description: Shell small (<3.0 mm), robust, discoidal elevate, turbiniform, with about 3 whorls, rounded and umbilicate.

Protoconch with about $\frac{3}{4}$ of whorl, with about 210 μ m in diameter, and a smooth surface with 2 very fine spiral cordlets.

Teloconch of 2.6 whorls separated by a moderately impressed suture; periphery slightly curved. The almost entire surface of the teloconch is smooth, except adapically where almost the first $\frac{3}{4}$ whorls are smooth but with a couple of spiral cordlets; beyond these whorls, about $\frac{3}{4}$ of whorl more, the spire becomes narrower, with only slight prolongation of the two spiral cordlets. After these almost 1 $\frac{1}{2}$ whorls the whorls are wider and its surface is totally smooth.

Aperture circular, peristome entire. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a thick callous layer that extends adapically until it covers the peripheral keel and basally to partially cover the umbilicus; columella with a strong callous protuberance located between the base of the outer lip and the base of the columella, which is extended in front the umbilicus, covering it but not occluding it totally. Outer lip thick, smooth, with a non-modified margin.

Umbilicus relatively narrow and deep; in basal view it is covered by the columellar callus.

Dimensions: holotype is 2.63 mm in diameter x 1.78 mm in height.

The operculum is rounded, multispiral with a central nucleus. It is formed by a small and depressed central nucleus and nine whorls, ending in a long growing edge. The spiral is ornamented with short axial ribs that start at the outer margin and extend to the middle of each whorl.

Radula: Rhipidoglossate, formula $N+5+1+5+N$.

The radula is bilaterally symmetrical with regularly arcuate rows.

The rachidian tooth has a broad base that lacks a shaft and its cusp is very

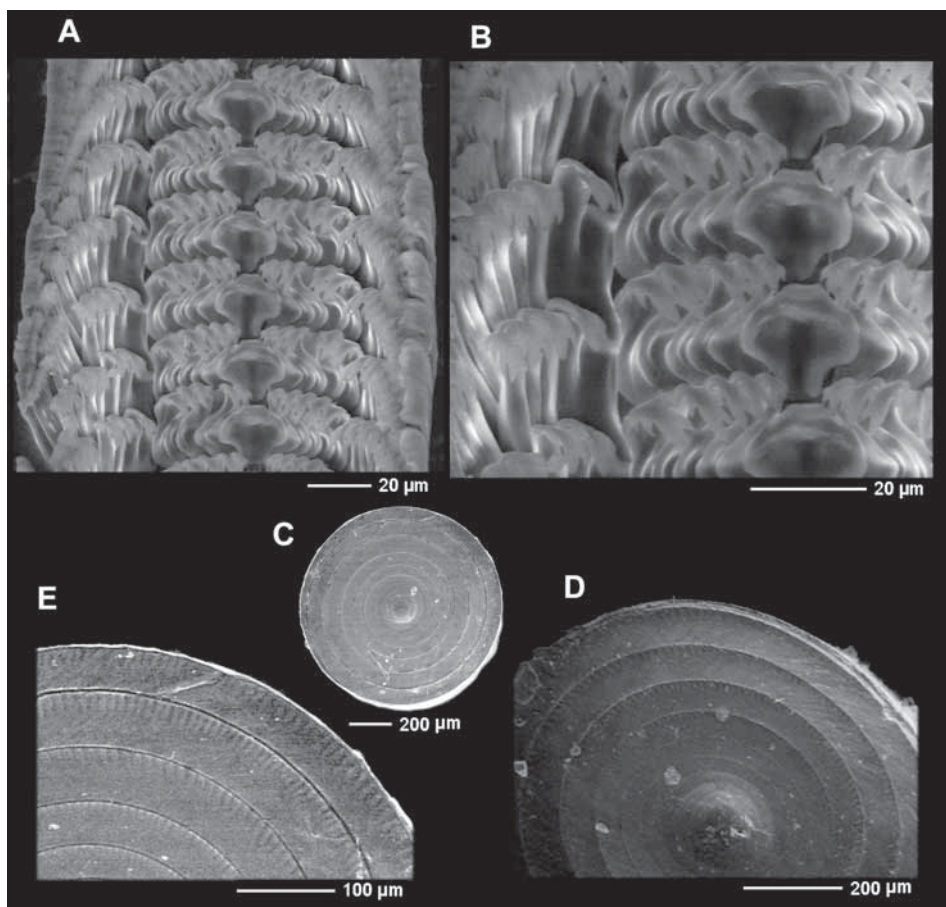


Figure 18

A-E: *Leucorhynchia perpolita* n. sp. Philippines, Balicasag Island, Stn B41, 17-19 m, in the floor of a large cave. A-B: radula; C-E: operculum and detail.

Figura 18

A-E: *Leucorhynchia perpolita* n. sp. Filipinas, Isla de Balicasag, Stn B41, 17-19 m, en el suelo de una cueva grande. A-B: rádula; C-E: opérculo y detalle.

small and scarcely denticulate; it is slightly thickened along its broad anterior margin but is thin and poorly developed posteriorly; its base interlocks shallowly with the innermost laterals and occupies the front position in each row.

There are five pairs of laterals teeth that are of similar size and shape. The primary cusps on the lateral teeth are strong and pointed, and there are secondary serrations along the outer and inner margin (3 on each side) near the beginning of the shafts. The bases of the innermost marginal and outermost lateral are heavy; a latero-marginal plate is placed between the inner marginal and the outer lateral teeth.

The marginal teeth have laterally flattened shafts of similar form and the cusp show a pronounced gradation in form and decrease in size outward along the row; the inner marginal teeth have the strongest cusps.

The radula of *Leucorhynchia perpolita* n. sp. is very similar to that of the turbinids, and shows a great similarity with that of some trochids of the genus *Tegula*, subgenus *Chlorostoma*. The most important difference is that the rachidean tooth lacks of the characteristic “rolled”, showing a very small cusp scarcely denticulate.

Habitat: Infralittoral species collected by brushing on the floor of a large cave, at 17-19 m deep; in caves in reef wall at 8-10 m; at 2-8 m, on rocks and corals with sand and mud bottom and by suction in reef slope with overhangs at 5 m and in mud at 21 m.

Distribution: Only known from the Philippines: Balicasag, Panglao and Bohol Islands.

Remarks: *Leucorhynchia perpolita* n. sp. is characterized by its depressed-turbiniform spire; the ornamentation of the protoconch (rough surface with 2 spiral cordlets); the carina at the beginning of the teleoconch; the spatula form of the columellar callus; and the slightly angled shape of the aperture.

Its general shape is similar to that of *L. redita* n. sp., from which it can be separated because it lacks the spiral grooves at the beginning of the teleoconch. There is also some similarity with *L. sulinitel* n. sp., from which it differs in lacking the spiral cords in the first teleoconch whorls.

***Leucorhynchia seminiformis* n. sp.**

Figure 19A-F

Type material: Holotype (Fig. 19A) MNHN-IM-2000-34694 and 5 paratypes MNHN-IM-2000-34695.

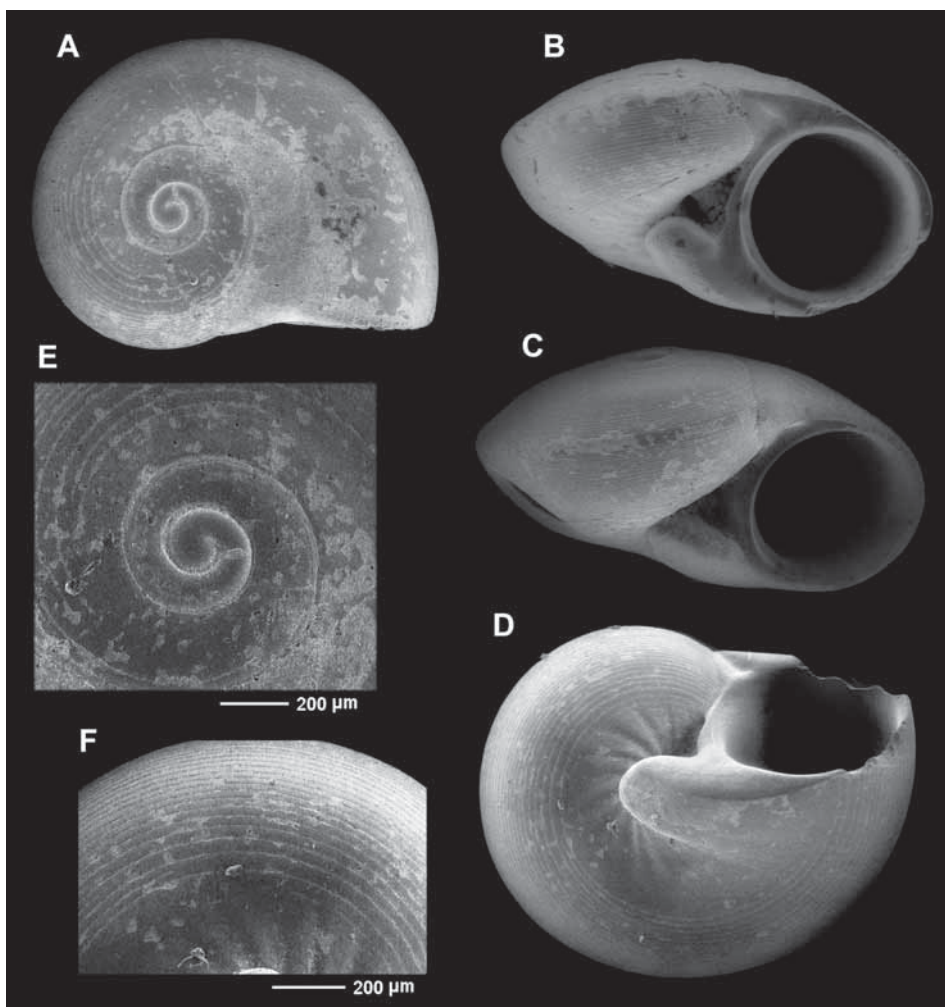


Figure 19

A-F: *Leucorhynchia seminiiformis* n. sp. A: holotype, 2.22 mm in diameter, Society Islands, Huahine, Stn DW3435, 500-610 m (MNHN); B-D: paratypes, 1.98, 2.12, 2.18 mm, from the same locality (MNHN); E: protoconch; F: detail of the microsculpture.

Figure 19

A-F: *Leucorhynchia seminiiformis* n. sp. A: *holotipo*, 2,22 mm de diámetro, Islas de la Sociedad, Huahine, Stn DW3435, 500-610 m (MNHN); B-D: *paratipos*, 1,98, 2,12, 2,18 mm, de la misma localidad (MNHN); E: *protoconcha*; F: *detalle de la microescultura*.

Material examined: 6 s: Society Islands, TARASOC: 6 s, Huahine, Stn DW3435, 16°41'S-151°02'W, 500-612 m.

Type locality: Society Islands, Huahine, 16°41'S-151°02'W, 500-612 m [TARASOC: Stn DW3435].

Etymology: The specific name derived from the Latin words *semen*, *inis* which means “seed” and *formis*, which is “with the form of”.

Description: Shell very small (<2.5 mm), robust, discoidal, depressed-turbiniiform, formed by 3.3 whorls, keeled and narrowly umbilicate. Protoconch with a little more than 3/4 whorl, about 240 µm in diameter, smooth surface.

Teloconch of 2.5 whorls separated by a moderately impressed suture; periphery keeled. The entire surface of the teloconch is covered with spiral grooves, except adapically, the first 1 ½ whorls and basally the area of axial folds. Apically, the early teloconch is smooth, convex, separated by a marked suture; from the first whorl, the spire becomes flatter, appearing the first spiral grooves in the subsutural area. From the first 1.25 whorls, the complete surface of the teloconch is covered with fine spiral grooves.

In addition to these grooves, basally 9-10 thick axial folds can be seen, circumscribing the umbilicus. A thick peripheral keel is observed in the last whorl.

Aperture circular with an complete peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a thick callous layer that extends adapically until it covers the peripheral keel and basally partially covering the umbilicus; columella with a strong callous protuberance located between the base of the outer lip and the base of the columella, which extends in front the umbilicus, occluding it partially. Outer lip thick, smooth, with a non-modified margin.

Umbilicus relatively narrow and deep, surrounded by axial folds not very thick.

Dimensions: holotype: 2.22 mm in diameter and 1.28 mm in height (H/D: 0.57).

Habitat: Bathyal species dredged at 500-612 depth.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia seminiiformis* n. sp. is characterized by being keeled in the middle part of the teleoconch; by having the teleoconch totally striated except adapically, and a wide subsutural area basally, occupied by the basal folds, about 9 in number, surrounding the umbilicus.

By its shape, it is similar to *Leucorhynchia impolita* n. sp., from which it can be differentiated by the lesser number of basal folds; the smaller extension towards the base of the parietal callus; and by presenting adapically a wide subsutural area and basally, the area of the basal folds, without spiral sulcus.

***Leucorhynchia sulinitel* n. sp.**

Figure 20A-E

Type material: Holotype (Figs. 20A-C) MNHN-IM-2000-34696.

Material examined: 1 s: Vanuatu, MUSORSTOM 8: 1 s, W Malekula, Stn DW1065, 16°16'S-167°21'E, 360-419 m..

Type locality: Vanuatu, W Malekula, 16°16'S-167°21'E, 360-419 m {MUSORSTOM 8: DW1065}.

Etymology: The specific name is formed employing the three first letters of three words: sulcus, initium, and teleoconch (sul-ini-tel), alluding to the fact that numerous sulci appear at the beginning of the teleoconch.

Description: Shell very small (<2.0 mm), robust, discoidal, depressed-turbiniiform, with almost 3 whorls, rounded and umbilicated. Protoconch with about $\frac{3}{4}$ of whorl and with 240 μ m in diameter, with a smooth surface.

Teleoconch of 2.7 whorls separated by a moderately impressed suture; periphery slightly curved. Initially, the teleoconch is convex and has spiral grooves that cover it completely until the first 1 $\frac{1}{2}$ whorls; the rest of the whorls of the teleoconch are totally smooth.

Aperture circular, with a complete peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a thick callous layer that extends adapically until it partially covers the previous whorl; columella thin and curved with a strong callous protuberance, hook-shaped, located between the base of the outer lip and the base of the columella, which

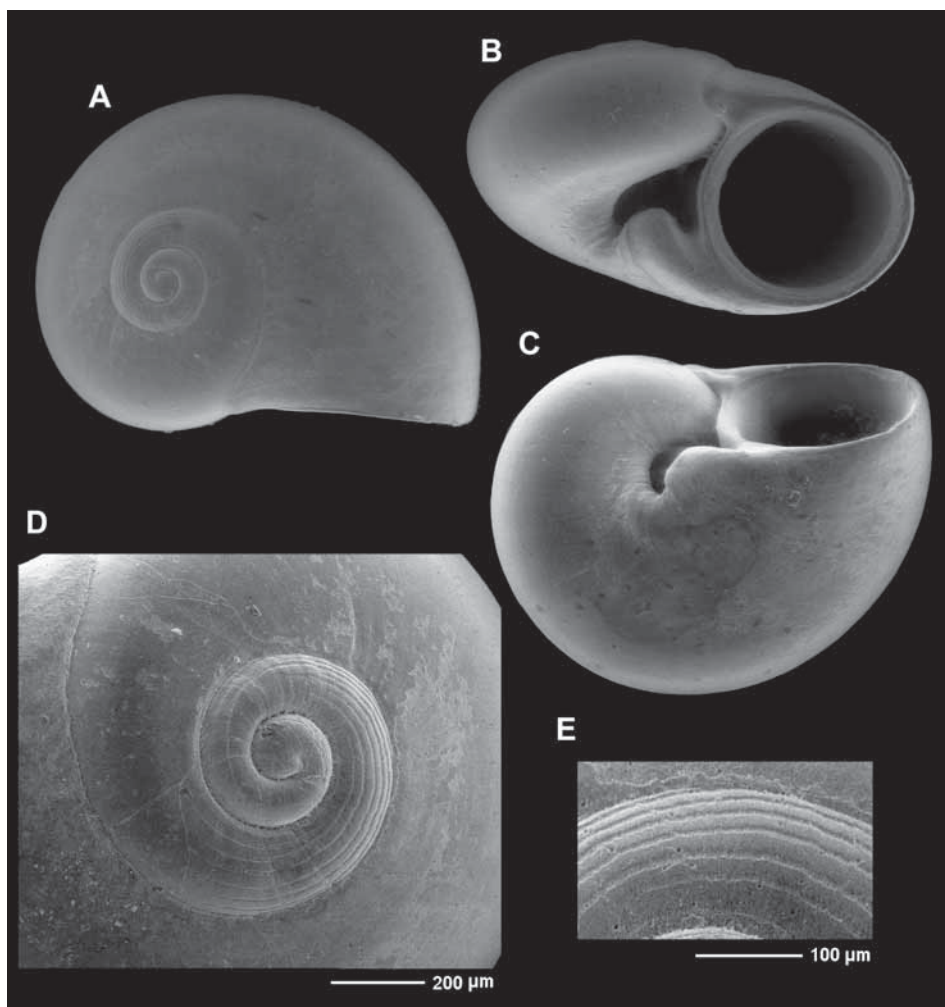


Figure 20

A-E: *Leucorhynchia sulinitel* n. sp. A-C: holotype, 1.96 mm in diameter, Vanuatu, W Malekula, Stn DW1065, 360-419 m (MNHN); D: protoconch; E: detail of the sculpture.

Figura 20

A-E: *Leucorhynchia sulinitel* n. sp. A-C: holotipo, 1,96 mm de diámetro, Vanuatu, W Malekula, Stn DW1065, 360-419 m (MNHN); D: protoconcha; E: detalle de la escultura.

extends into the umbilicus but not occluding it; outer lip thick, smooth, with a non-modified margin.

Umbilicus relatively narrow and deep.

Dimensions: holotype is 1.96 mm in diameter x 1.15 mm in height (H/D = 0.58).

Habitat: Bathyal specie dredged at 360-419 m deep.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia sulinitel* n. sp. is very similar by its shape to *L. redita* n. sp., but differs from it by the spiral grooves that cover the first 1 ½ whorls of the teleoconch and because the thick columellar callus is curved towards the centre of the umbilicus.

***Leucorhynchia philippinensis* n. sp.**

Figure 21A-F

Type material: Holotype (Figs. 21A-C) MNHN-IM-2000-34697.

Material examined: 2 s: Philippines: 1 s, Olango Island, Tapon Sta. Rosa, 200 m (holotype); 1 s, Mactan Island, Punta Engaño, 30-60 m.

Type locality: Olango Island, Tapon Sta. Rosa, 200 m.

Etymology: The specific name alludes the archipelago where the species was collected.

Description: Shell small (<3.5 mm), robust, discoidal to turbiniform, formed by 3 ½ whorls, keeled and narrowly umbilicated.

Protoconch with a little more than of ¾ whorls, about 220 µm in diameter and a rough surface with two spiral, slightly strong cordlets.

Teleoconch of almost 2 ¾ whorls separated by an impressed suture which after the first whorl is covered by a callous extension of the following whorl. A prominent keel placed in the middle of the periphery angles the beginning of the teleoconch, disappearing in the last ¼ whorl to be covered by a fine callous layer. The entire surface of the teleoconch is smooth, except for the first whorl and quarter of the teleoconch, in which a wide spiral cord, which

provides an angular profile, extending along the first $\frac{1}{2}$ whorl, disappearing in the beginning of the second $\frac{1}{2}$ whorl covered for the following one. This cord is observed adapically by “transparency” in the last whorl disappearing in the last quarter and forming in the last whorl the peripheral keel. From the first $\frac{1}{2}$ teleoconch whorl there is a wide spiral sulcus and after $\frac{3}{4}$ of this whorl a second sulcus appears, both disappearing after $1\frac{1}{4}$ of teleoconch whorl. The umbilicus is narrow and deep, but it is scarcely visible, since it is hidden by the columellar callus.

Aperture circular with a complete peristome. Inside the inner lip there is a fold on which the operculum abuts. A thick callus is located in the parietal area and extends to cover the keel and part of the previous whorl; a thick callus formed between the base of the columella and the base of the outer lip extends towards the umbilicus, forming a strong callous protuberance knife-shaped, which is in the direction of the umbilicus, but only occluding it partially.

Operculum thin, corneous and multispiral; outer side with a small central depression and eight whorls; inner side with a triangular area for insertion of the foot.

Dimensions: holotype size is 2.71 mm in diameter and 1.49 mm in height (H/D: 0.55). Shell: size 3.07 mm in diameter and 1.73 mm in height (H/D: 0.56)

Habitat: Infralittoral to bathyal specie collected to 30-200 m deep.

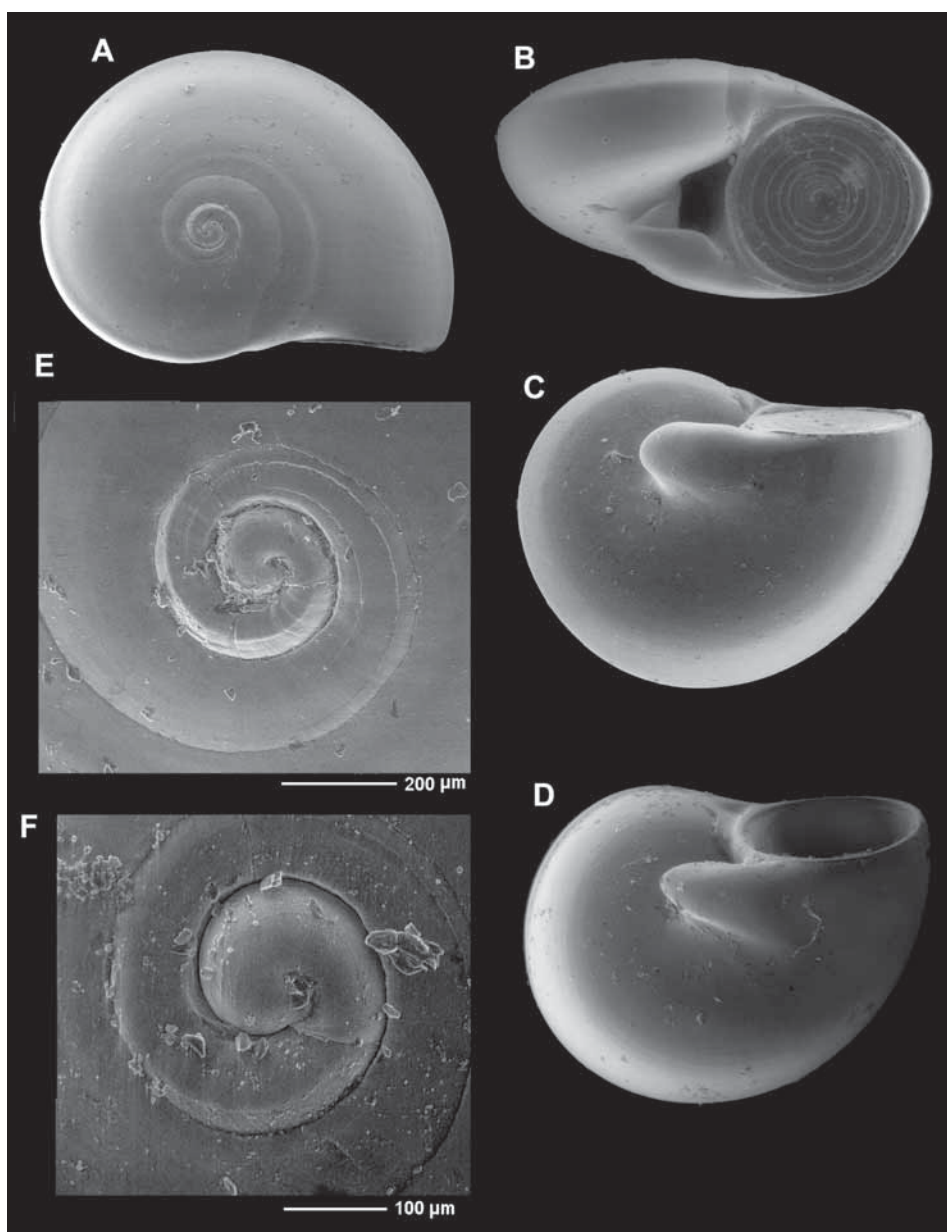
Distribution: Philippines: Olango Island and Mactan Island.

Figure 21

A-F: *Leucorhynchia philippinensis* n. sp. A-C: holotype, 2.71 mm in diameter, Philippines, Olango Island, Tapon, Sta. Rosa, 200 m (MNHN); D: shell, 3.07 mm, Mactan Island, Punta Engaño, 30-60 m (MNHN); E-F: protoconchs from holotype and from the shell of fig. D.

Figura 21

A-F: *Leucorhynchia philippinensis* n. sp. A-C: *holotipo*, 2,71 mm de diámetro, Filipinas, Isla de Olango, Tapon, Sta. Rosa, 200 m (MNHN); D: *concha*, 3,07 mm, Isla Mactan, Punta Engaño, 30-60 m (MNHN); E-F: *protoconchas* del *holotipo* y de la *concha* de la fig. D.



Remarks: *Leucorhynchia philippinensis* n. sp. is characterized by having spiral cordlets in its protoconch; by its prominent keel; by the adapical carina at the beginning of its teleoconch; by the thick subsutural cord and by the form of its columellar callus. It is very similar to *L. caledonica*, differing from the latter by having spiral cordlets on the protoconch and by the shape of the columellar callus.

***Leucorhynchia redita* n. sp.**

Figures 22A-G, 23A-G

Type material: Holotype (Fig. 22A) MNHN-IM-2000-34698 and 7 paratypes (Figs. 22E-D) MNHN-IM-2000-34699.

Material examined: 16 spms, 25 s: Philippines, PANGLAO 2004: 8 s, Siquijor Islands, Sandugan, Stn L91, 09°18'N-123°36'E, 40 m (type material); 11 s, Siquijor Island, Camogao, Stn L89, 09°15'N-123°39'E, 50 m; 3 spms, 4 s, Mactan Island, Punta Engaño, 60-100 m, lumun lumun nets (Poppe); 2 s, Balicasag Island, Stn B41, 9°30.9'N-123°40.8'E, 17-19 m, floor large cave; 13 spms, Mactan I., 200 m (CSG).

Type locality: Philippines: Siquijor Islands, Sandugan, 09°18'N-123°36'E, 40 m [PANGLAO 2004, Stn L91].

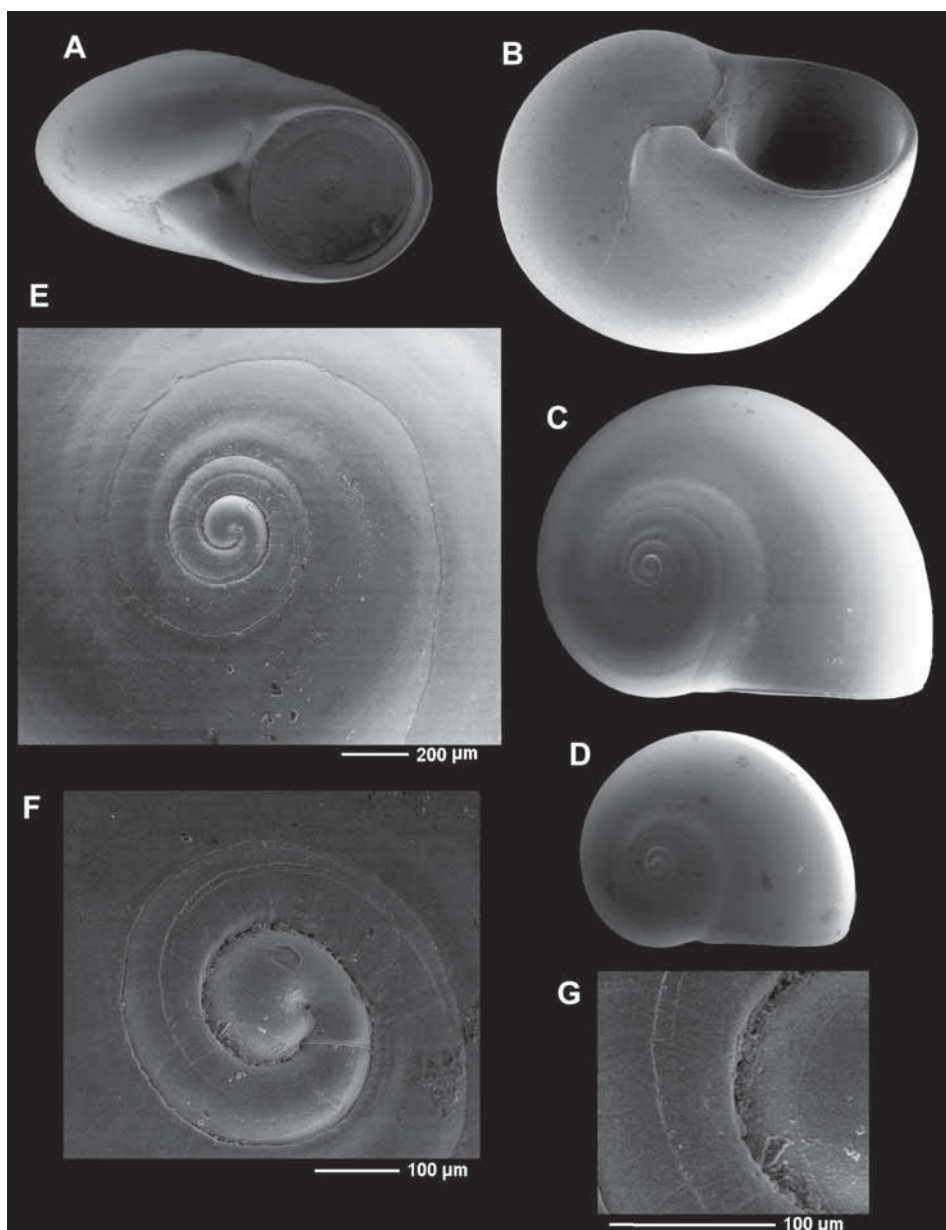
Etymology: The specific name alludes to the great similarity of the present species with others of the group A (from the Latin verb *redeo, is, ere, ivi, itum* which means “turn, again” referred to the morphology.

Figure 22

A-G: *Leucorhynchia redita* n. sp. A: holotype, 3.31 mm, Siquijor Islands, Sandugan, Stn L91, 40 m, Philippines (MNHN); B-D: paratypes, 3.57, 3.49, 2.37 mm, from the type locality; E-G: protoconchs and details.

Figura 22

A-G: *Leucorhynchia redita* n. sp. A: *holotipo*, 3,31 mm, *Islas Siquijor, Sandugan, Stn L91, 40 m, Filipinas* (MNHN); B-D: *paratipos*, 3,57, 3,49, 2,37 mm, *de la localidad tipo*; E-G: *protoconchas y detalle*.



Description: Shell small (<3.5 mm), robust, discoidal, depressed-turbiniiform, spire with almost 3.8 convex whorls, rounded periphery and narrowly umbilicate.

Protoconch with about $\frac{3}{4}$ whorls, measures 240 μ m in diameter and with a smooth surface.

Teleoconch of 3 whorls separated initially by an impressed suture; later, the suture is covered by the extension of the parietal callus; periphery convex. The teleoconch initially is smooth and convex, and it has a wide spiral groove in the centre that disappears after the end of the first whorl, covered by the parietal callus; the rest of whorls of the teleoconch are totally smooth.

Aperture circular with a complete peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a thick callous layer that extends adapically until it partially covers the previous whorl; columella thin and curved with a strong callous protuberance hook-shaped located between the base of the outer lip and the base of the columella, which extends into the umbilicus, occluding it basally but not aperturally; outer lip thick, smooth, with a non-modified margin.

Umbilicus narrow and deep, only visible in apertural view.

Dimensions: holotype is 3.31 mm in diameter x 2.23 mm in height (H/D = 0.67).

Habitat: Circalittoral species dredged between 40-50 m and collected at 60-100 m in lumun lumun nets.

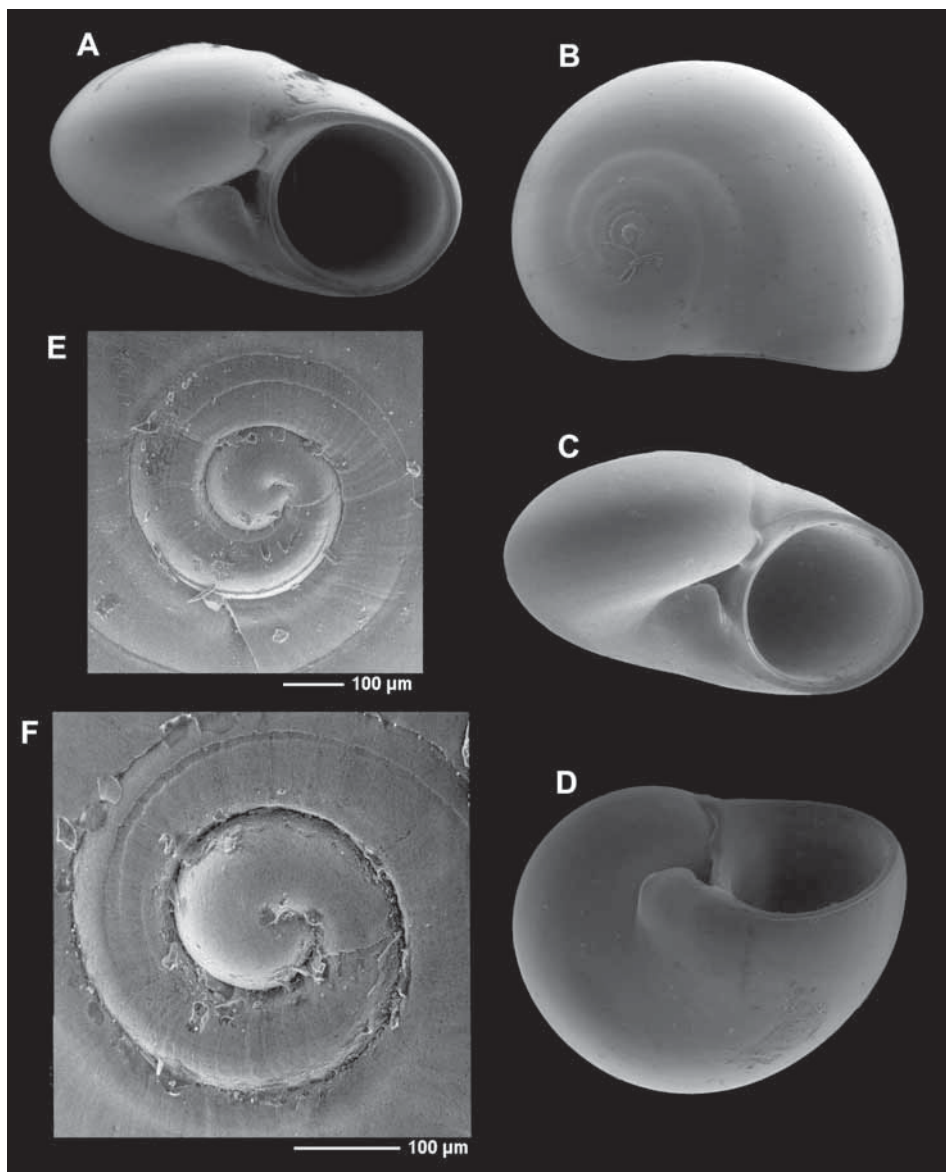
Distribution: Only known from the Siquijor and Mactan islands, in the Philippines.

Figure 23

A-G: *Leucorhynchia redita* n. sp. A-D: shells, 3.20, 3.31, 3.28, 3.16 mm in diameter, Mactan Island, Punta Engaño, 60-100 m, lumun lumun nets, Philippines (MNHN); E: protoconch of the shell of the fig. C; F-G: protoconch of other paratype.

Figura 23

A-G: *Leucorhynchia redita* n. sp. A-D: conchas, 3,20, 3,31, 3,28, 3,16 mm, Isla Mactan, Punta Engaño, 60-100 m, "lumun lumun nets", Filipinas (MNHN); E: protoconcha de la concha de la fig. C; F-G: protoconcha de otra concha.



Remarks: *Leucorhynchia redita* n. sp. is characterized by its convex shape, both apical and basal; by the ornamentation of the first whorl of the teleoconch, the form of the columellar callus and also by how this callus covers partially the umbilicus.

In its general appearance is very similar to *L. sulinitel* n. sp. from which differs in lacking spiral cords in the first 1 ½ whorl of the teleoconch.

From *L. perpolita* n. sp. it differs in the general outline, the form of the callus and the size of the umbilicus.

L. crossei differs in the shape of the columellar callus.

***Leucorhynchia valida* n. sp.**

Figure 24A-F

Type material: Holotype (Fig. 24A-C) MNHN-IM-2000-34700.

Material examined: 1 s: Solomon Sea: 1 s, Siga Island, SE Engeneer Group Islands. MADEEP: Stn DW4305, 10°46'S-151°10'E, 666-680 m.

Type locality: 1 s, Solomon Sea, Siga Island, SE Engeneer Group Islands, 10°46'S-151°10'E, 666-680 m [MADEEP, Stn DW4305].

Etymology: The specific name if from the Latin word *validus*, *a*, *um* which means “robust”.

Description: Shell very small (<2.0 mm), as height as wide, robust, discoid shaped, depressed-turbiniiform, formed by 3.2 whorls, carinate and narrowly umbilicate.

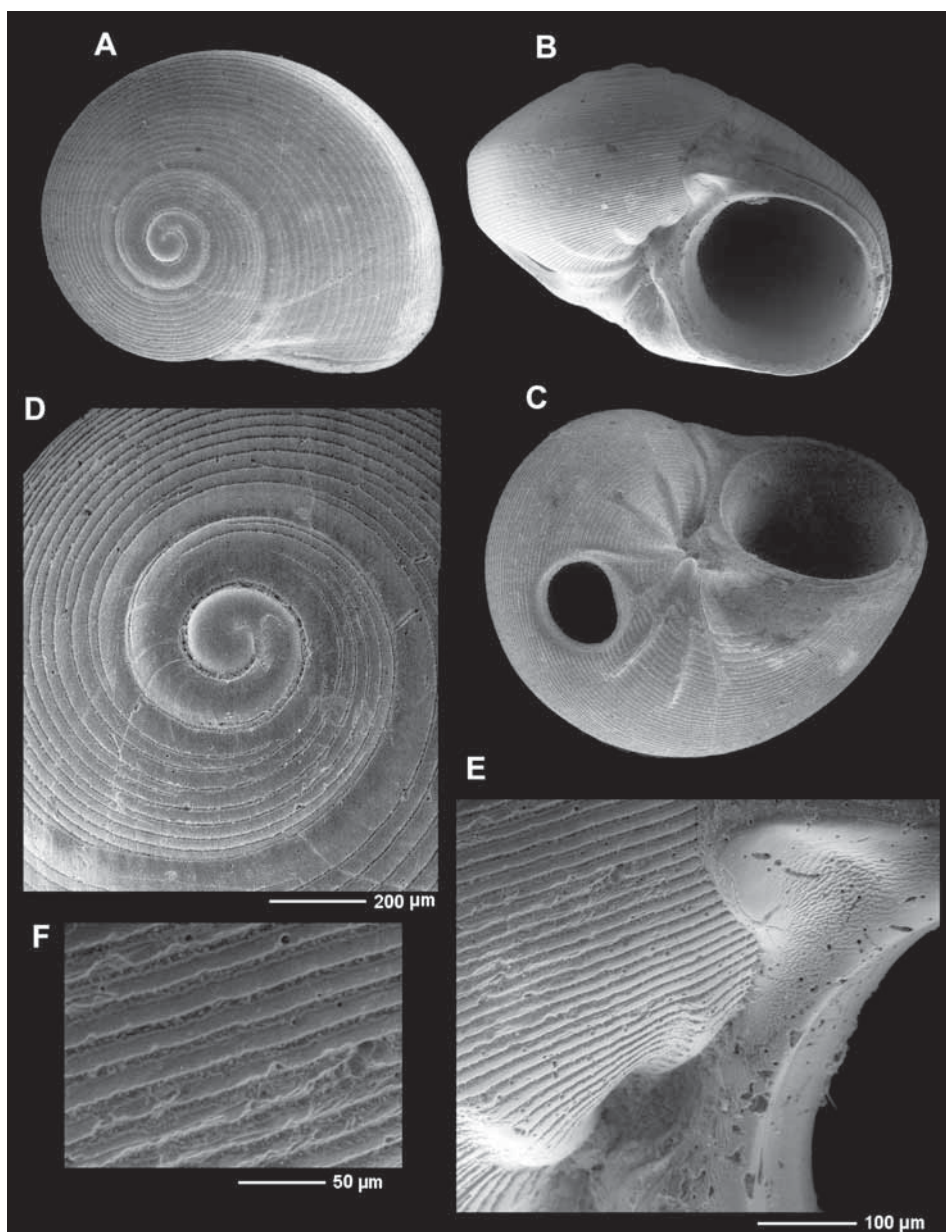
Protoconch with a little more than of ¾ whorl, about 250 µm in diameter, with a smooth surface.

Figure 24

A-F. *Leucorhynchia valida* n. sp. A-C: holotype, 1.93 mm in diameter, Solomon Sea, Siga Island, SE Engeneer Group Islands, Stn DW4305, 666-680 m (MNHN); D: protoconch; E-F: sculpture and detail.

Figura 24

A-F. *Leucorhynchia valida* n. sp. A-C: *holotipo*, 1,93 mm de diámetro, Mar de Salomón, Isla Siga, SE de las Islas del Grupo Engeneer, Stn DW4305, 666-680 m (MNHN); D: *protoconcha*; E-F: *escultura y detalle*.



Teloconch of 2.4 whorls separated by a moderately impressed suture; a slight carina angles the periphery, making smaller up to the last quarter of whorl where it disappears.

Early teloconch smooth, convex, separated by a wide and deep suture. From the $\frac{3}{4}$ of the first whorl, appearing the first spiral grooves; from the 1 $\frac{1}{4}$ whorls, the entire surface of the teloconch is covered by fine spiral grooves, except for a narrow smooth subsutural fringe.

In the base 8 strong axial folds can be observed, which penetrate inside the umbilicus at the level of the callous protuberance of the basal callus.

Aperture circular with a continuous peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a strong callous layer which extends adapically up to cover the peripheral keel; columella strong, slightly arched, with a callous nodule placed at its beginning and an increasing placed on the base, reflected towards the umbilicus, without occluding it. External lip strong, with smooth margin, not modified. The surface of the parietal and columellar callus is rough.

Umbilicus narrow and deep, surrounded by very thick axial folds.

Dimensions: holotype is 1.93 mm in diameter and 1.38 mm in height (H/D: 0.72).

Habitat: Bathyal species dredged at 666-680 m deep.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia valida* n. sp. is characterized by its robustness; by the carina which angles the periphery; by having its surface totally covered by spiral grooves; by the number and strength of the axial folds on the base and by the form of the columellar callus.

In its general appearance it resembles *L. barreiroi* n. sp., but differs from the latter by having the basal folds much thicker and completely covered the teloconch surface by spiral grooves.

***Leucorhynchia barreiroi* n. sp.**

Figure 25A-H

Type material: Holotype MNHN-IM-2000-34701 (Fig. 25A) and 3 paratypes MNHN-IM-2000-34702 (Figs. 25B-F).

Material examined: 5 s: New Caledonia, EBISCO: 4 s, Lansdowne, Stn DW2629, 21°06'S-160°46'E, 569-583 m (type material). 1 s, Secteur de Koumac, Passe de Koumac, tombant expedition MONTROUZIER: Stn 1311, 20°40.4'-164°14.9'E, 26-40 m.

Type locality: New Caledonia, Lansdowne, 21°06'S-160°46'E, 569-583 m [EBISCO: Stn DW2629].

Etymology: The specific name is after Ramiro Barreiro, chief of the Centro de Apoyo Científico y Tecnológico, University of Santiago de Compostela (CACTUS), where many micrographs were made.

Description: Shell small (<3.0 mm), wider than high, robust, depressed-turbiniform, formed by 3.5 whorls, carinate and not umbilicate. Protoconch with a little more than of $\frac{3}{4}$ whorls, about 330 μ m in diameter, with smooth surface.

Teloconch of 2.75 whorls separated by a moderately impressed suture; a light carina angles the periphery, later being less marked, disappearing in the last quarter of whorl.

Surface of the teloconch totally smooth except 3-4 fine spiral sulcus placed on its base surrounding the umbilical callus.

Adapically, 15-18 fine axial oblique folds can be seen in the subsutural area.

Abapically, there are 6-8 axial folds which penetrate inside the umbilicus.

As can be observed in the juvenile individuals (Figs. 25E-F) the umbilicus is narrow and deep and the fine axial folds of the base go inside it; a strong callus is formed in the base of the columella and the external lip is extended towards the umbilicus occluding it slowly while the individual get the adult state, when all have the umbilicus totally covered by this columellar callus.

Aperture circular with a complete peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a strong callous layer which is extended adapically up to cover the peripheral carina; columella wide, arched, with a strong callus placed at its base, reflected towards the umbilicus, occluding it completely. External lip of smooth margin, not modified. The surface of the parietal and columellar callus is totally smooth. Between the callus and the internal lip there is a fine canal.

Dimensions: holotype is 2.89 mm in diameter and 1.95 mm in height (H/D: 0.65).

Habitat: Bathyal species dredged at 569-583 m deep.

Distribution: Only known from the type locality.

Remarks: *L. barreiroi* n. sp. is characterized by the angled periphery of the last whorl; the surface of the teleoconch totally smooth except 3-4 fine spiral grooves placed on its base and by having the umbilicus fully covered by the columellar callus.

By its shape, *L. barreiroi* n. sp. is somewhat similar to *L. valida* n. sp., which differs in having the surface of the teleoconch completely smooth and much smaller basal folds.

Leucorhynchia basiscostae n. sp. Rubio, Rolán & Gori
Figure 26A-D

Type material: The holotype (Figs. 26A-C) MNHN-IM-2000-34703.

Material examined: **2 s:** Solomon Islands: 1 s, Charapoana Pt, Uepi Island, Morovo Lagoon, 20 m (exCSG). Philippines: 1 s, Sulu Island, 10-15 m.

Type locality: Solomon Islands, Charapoana Pt, Uepi Island, Morovo Lagoon, 20 m.

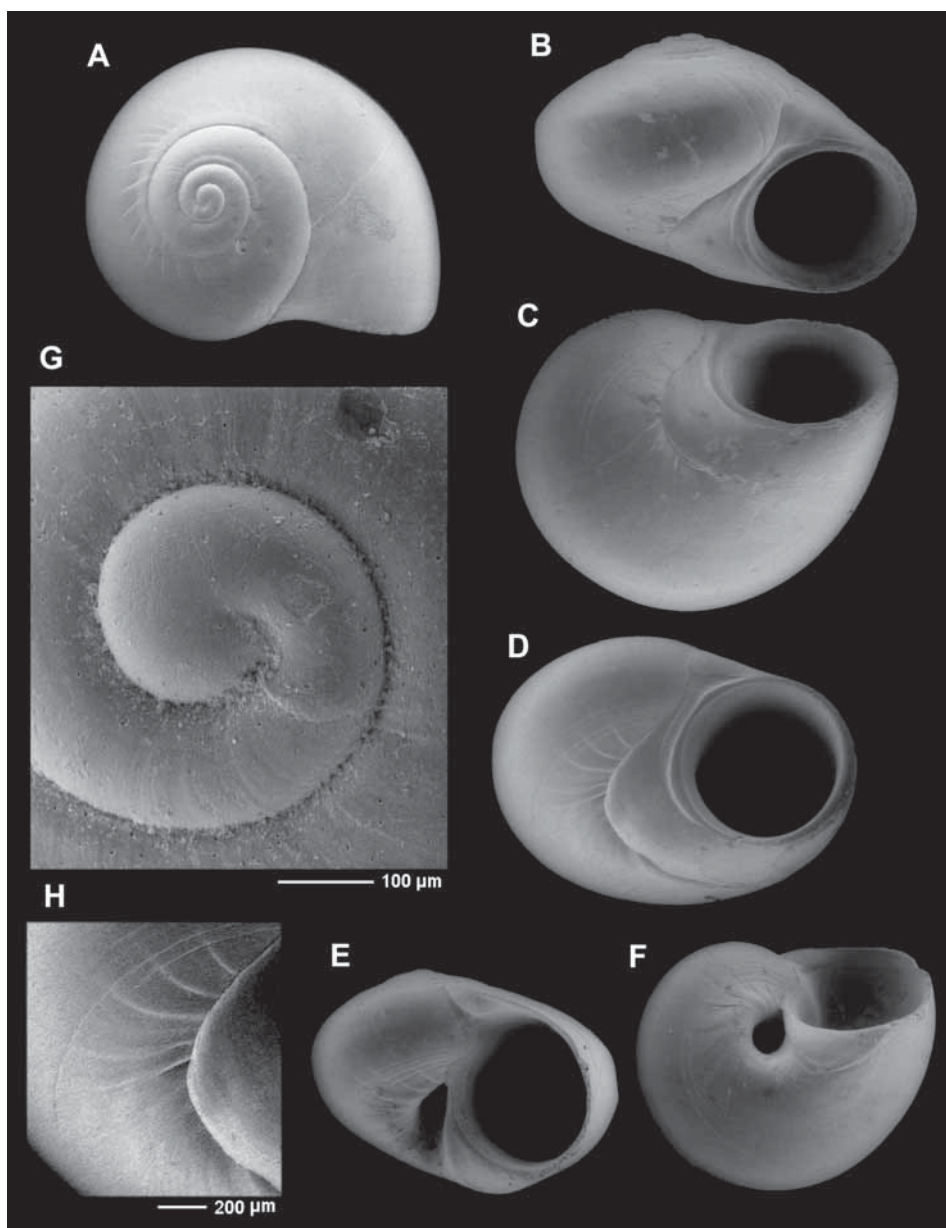
Etymology: The specific name alludes the presence of costs in the base of the shell.

Figure 25

A-H: *Leucorhynchia barreiroi* n. sp. A: holotype, 2.89 mm in diameter, New Caledonia, S Lansdowne, Stn DW 2629, 569-583 m (MNHN); B-F: paratypes; B-C: 2.95 mm in diameter; D: 2.87 mm in diameter (MNHN); E-F: juvenile, 2.39 mm, all from the type locality; G: protoconch of the holotype; H: detail of the sculpture.

Figura 25

A-H: *Leucorhynchia barreiroi* n. sp. A: *holotipo*, 2,89 mm de diámetro, Nueva Caledonia, S Lansdowne, Stn DW 2629, 569-583 m (MNHN); B-F: *paratipos*; B-C: 2,95 mm de diámetro (MNHN); D: 2,87 mm de diámetro; E-F: *juvenil*, 2,39 mm, todas de la localidad tipo; G: *protoconcha* del holotipo; H: *detalle de la escultura*.



Description: Shell small (<4.5 mm), wider than height, robust, turbiniform, spire formed by 4 whorls, very convex and narrowly umbilicate.

The protoconch has about 3/4 whorl, measures about 212 µm in diameter and has a smooth surface.

Teleoconch of 3.2 whorls separated by a marked suture; a subsutural cord delimits it. Periphery very convex. The first ½ whorl of the teleoconch is strongly carinate; two strong carinae (subsutural and peripheral) which angulate its surface can be seen, but soon disappear and the surface is transformed in convex.

Teleoconch surface totally smooth, except for a subsutural cord and basal axial folds.

Abapically, in the last whorl, there are 10-12 axial folds around the umbilicus, disappearing in the last quarter of a whorl, covered by the columellar callus.

Aperture circular with a complete peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a strong callous coating extending up to the suture; columella arched, wide at the beginning and reflected, with a prominent callous protuberance placed at the base and extended towards the umbilicus, but not occluding it. Outer lip with a smooth, sharp margin not modified. The surface of the parietal and columellar callus is totally smooth.

Umbilicus relatively narrow and deep, partially covered by the callous protuberance of the base of the columella.

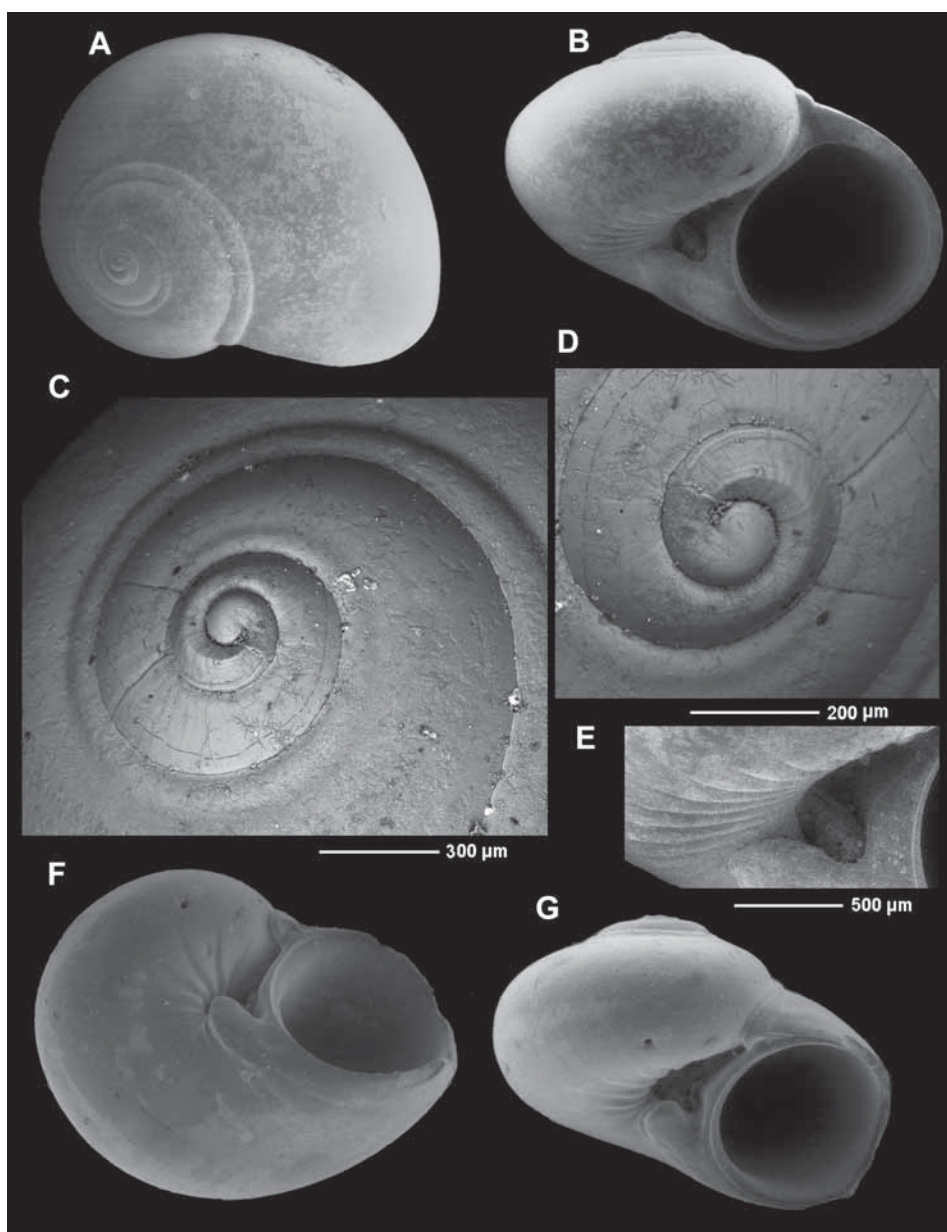
Dimensions: the holotype size is 4.07 mm in diameter and 2.96 mm in height (H/D: 0.72).

Figure 26

A-E. *Leucorhynchia basiscostae* n. sp. A-B: holotype, 4.07 mm, Solomon Islands, Charapoana Pt, Uepi Island, Morovo Lagoon, 20 m (MNHN); C-D: protoconch and detail; E: detail of the basal folds; F-G: shell, 3.82 mm, Philippines, Sulu Island, 35 m (MNHN).

Figura 26

A-E. *Leucorhynchia basiscostae* n. sp. A-B: holotipo, 4,07 mm, Islas Salomón, Charapoana Pt, Isla de Uepi, Laguna Morovo, 20 m (MNHN); C-D: protoconcha y detalle; E: detalle de los pliegues basales; F-G: concha, 3,82 mm, Filipinas, Isla de Sulu, 35 m (MNHN).



Habitat: Infralittoral species collected at 20 meters deep by diving in the Solomon Islands and dredged at 10-15 m deep in the Philippines.

Distribution: The Philippines and Solomon Islands.

Remarks: *Leucorhynchia basiscostae* n. sp. is characterized by its more elevated spire; by its wide suture and evident subsutural cord; by the presence of axial folds on the base; and by the strong callous protuberance on the base of the columella which is extended towards the umbilicus.

By its elevated spire and strong subsutural cord, *L. basiscostae* n. sp. may seem similar to *L. omanensis*, from which may be separated by the different shape of the columellar callus and by having periumbilical axial folds.

Leucorhynchia carbegteli n. sp. Rubio, Rolán & Gori
Figure 27A-D

Type material: The holotype (Figs. 27A-B) MNHN-IM-2000-34704.

Material examined: **1 s:** Philippines: 1 s, Black Rock, Tuburan, Panay, 11°48.505'N-121°52.507'E, 32 m (exCSG).

Type locality: Philippines, Black Rock, Tuburan, Panay, 11°48.505'N-121°52.507'E, 32 m.

Etymology: The specific name is formed by the three first letters of the following words: carina, beginning, teleoconch (car-, beg-, tel-) alluding to the carinae at the beginning of the teleoconch).

Description: Shell small (<3.5 mm), robust, discoidal, is depressed-turbiniform, with almost 3.8 convex whorls, rounded periphery, not keeled and narrowly umbilicate. The protoconch has about 3/4 whorl and is located in the same plane that the first two teleoconch whorls; it measures about 250 µm in diameter and has a smooth surface with 4 spiral cordlets.

Teleoconch of 3 whorls separated initially by an impressed suture; later, in the last whorl, the suture is covered by the extension of the parietal callus; periphery very convex. The teleoconch has a thick carina initially, which angulates the whorl adapically, but it disappears from the first half whorl; the rest of teleoconch is totally smooth.

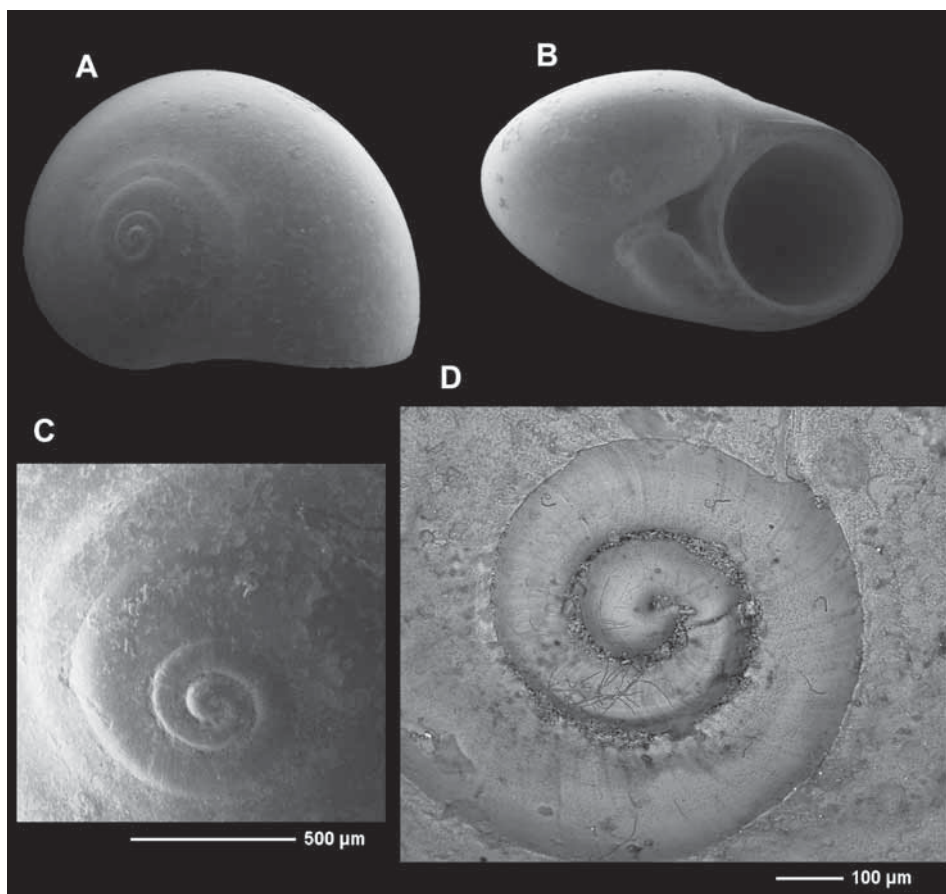


Figure 27

A-D. *Leucorhynchia carbegtel* n. sp. A-B: holotype, 3.0 mm, Philippines, Black Rock, Tuburan, Panay, 11°48.505'N-121°52.507'E, 32 m (MNHN); C-D: protoconch and detail.

Figura 27

A-D. *Leucorhynchia carbegtel* n. sp. A-B: *holotipo*, 3,0 mm, Filipinas, Black Rock, Tuburan, Panay, 11°48,505'N-121°52,507'E, 32 m (MNHN); C-D: *protoconcha* y *detalle*.

Aperture circular with entire peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a thick callous layer that is extended adapically until it partially covers the previous whorl; columella thin and curved with a strong callous protuberance located between the base of

the outer lip and the base of the columella, which extends into the umbilicus and whose external margin forms a deep fold occluding it basally; outer lip thick, smooth, with a non-modified margin.

Umbilicus narrow and deep, only visible in apertural view.

Dimensions: holotype is 3.00 mm in diameter x 1.90 mm in height (H/D = 0.63).

Habitat: Infralittoral species collected in scuba at 32 m depth.

Distribution: Only known from the type locality.

Remarks: *Lecucorbynchia carbegtel* n. sp. is characterized by the number of cordlets in the protoconch (4); by the carina which adapically angles the first half whorl of the teleoconch; and by the callous protuberance in the base of the columella, whose external margin forms a deep fold.

The species with which it has the greatest similarity is *L. redita* n. sp., from which it can be distinguished by the lack of the carina which angles adapically the beginning of the teleoconch and by the shape of the columellar callus.

It has some slight similarity with *L. perpolita* n. sp., but differs in the larger number of the protoconch cordlets, and also in the convexity of the shell and the different columellar callus.

Leucorbynchia plurilicium n. sp. Rubio, Rolán & Gori

Figure 28A-D

Type material: The holotype (Figs. 28A-B) MNHN-IM-2000-34705 and 2 paratypes MNHN-IM-2000-34706; 2 paratypes in CSG.

Material examined: 5 s: Philippines: 5 s, Black Rock, Tuburan, Panay Island, 11°48.505'N-121°52.507'E, 32 m (exCSG).

Type locality: Philippines, Black Rock, Tuburan, Panay Island, 11°48.505'N-121°52.507'E, 32 m.

Etymology: The specific name alludes to the high number of cordlets on the protoconch; from the Latin prefix whorl *pluri-* “much” and *licium* “thread”.

Description: Shell small (<3.5 mm), robust, discoidal, wider than high (H/D: 0.57), depressed-turbiniiform, formed by 3 ½ whorls, keeled and narrowly umbilicated. Adapically slightly convex; abapically very convex.

The protoconch has about ¾ whorls and measures about 190 µm in diameter; its surface is rough with 5 spiral cordlets.

Teleoconch of almost 2 ¾ whorls separated by an impressed suture which after the first whorl is covered by the parietal callous extension of the next whorl. A prominent keel placed in the middle of the periphery angles the last whorl. The entire surface of the teleoconch is smooth, except for the first whorl and quarter on which there is a wide spiral groove that narrows and finally it disappears.

The umbilicus is narrow and deep, but it is scarcely visible, being hidden by the columellar callus.

Aperture circular with a complete peristome. Inside the inner lip there is a fold on which the operculum abuts. A thick callus is located in the parietal area and by extension covers the keel and part of the previous whorl; a thick callus is formed between the base of the columella and the base of the outer lip extending towards the umbilicus, forming a strong callous knife-shaped protuberance, which partially occludes it.

Dimensions: holotype size is 3.17 mm in diameter and 1.73 mm in height (H/D: 0.57)

Habitat: Infralittoral species collected in scuba at 32 m depth.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia plurilicium* n. sp. is characterized by the larger number of spiral cordlets on its protoconch; and by having from the beginning of the teleoconch a wide spiral groove that narrows until disappearing from the first whorl and lacking a subsutural cord.

From *L. caledonica* n. sp., it is separated by the larger number of spiral cordlets of the protoconch and by having a wide groove at the beginning of the teleoconch that narrows until disappearing from the first whorl.

The species that mostly resembles it is *L. philippinensis* n. sp., which is different because it has fewer spiral cordlets in the protoconch and a thick carina that angles adapically the first whorl of the teleoconch.

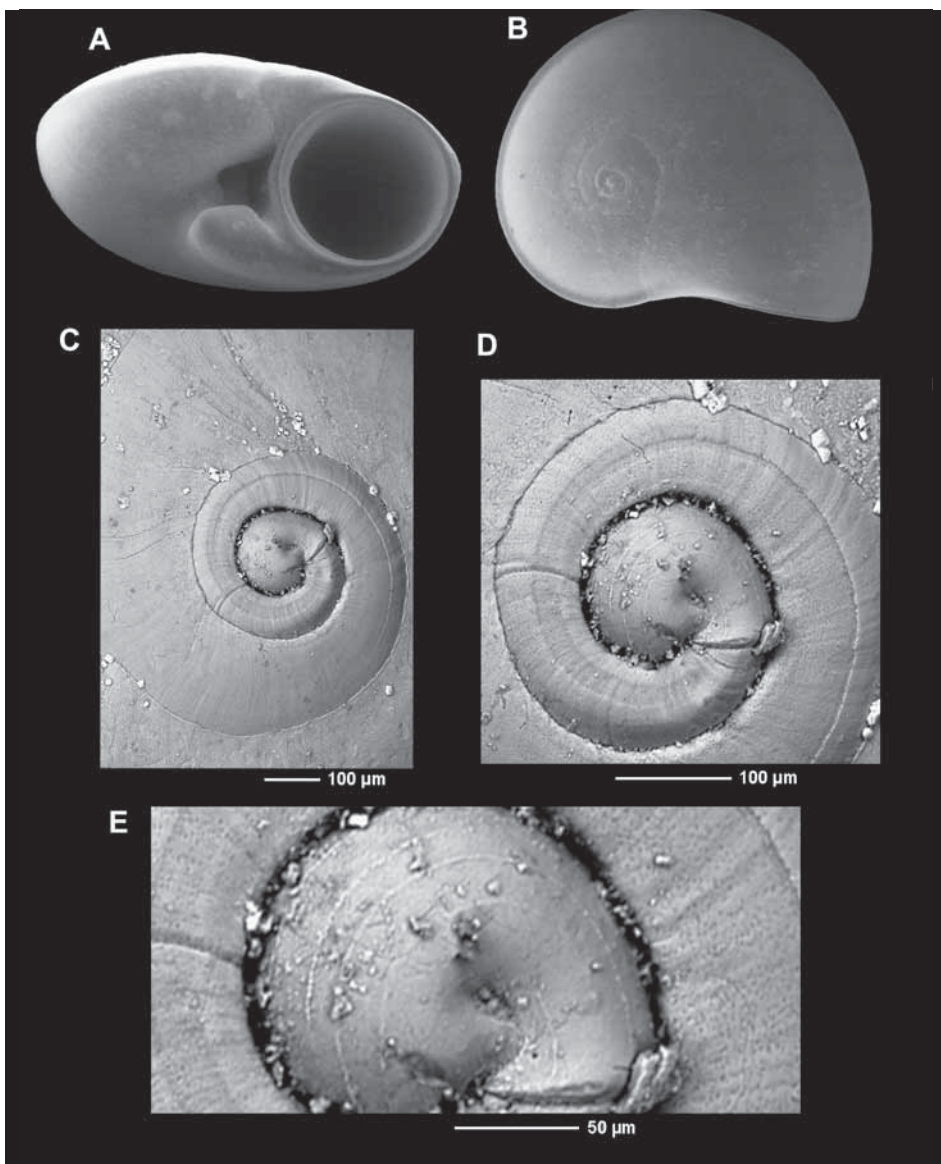


Figure 28

A-D. *Leucorhynchia plurilicium* n. sp. A-B: holotype, 3.17 mm in diameter, Philippines, Black Rock, Tuburan, Panay, 11°48.505'N-121°52.507'E, 32 m (MNHN); C-D: protoconch and detail; E: detail of the spiral cordlets

Figura 28

A-D. *Leucorhynchia plurilicium* n. sp. A-B: holotipo, 3,17 mm de diámetro, Filipinas, Black Rock, Tuburan, Panay, 11°48,505'N-121°52,507'E, 32 m (MNHN); C-D: protoconcha y detalle; E: detalle de los cordoncillos espirales.

***Leucorhynchia sandrogorii* n. sp.**

Figure 29A-G

Type material: Holotype (Figs. 29A-C) MNHN-IM-2000-34707; paratypes, 6 MNHN-IM-2000-34708 and 11 in CSG.

Material examined: 18 s: Solomon Islands: 18 s, Bapita Caves, Hele Islands, Morovo Lagoon, 30 m (exCSG).

Type locality: Solomon Islands, Bapita Caves, Hele Islands, Morovo Lagoon, 30 m.

Etymology: The specific name is after the Italian malacologist Sandro Gori who collected the material studied.

Description: Shell small (<3.0 mm), very robust, discoidal, wider than high (H/D: 0.71), depressed-turbiniform, formed by 3.3 whorls, weakly keeled and narrowly umbilicated. Adapically and abapically convex.

The protoconch has about 3/4 whorls and measures about 210 µm in diameter; its surface is rough with 6-7 spiral cordlets. The protoconch and the first whorl of the teleoconch are located in an upper level to the remaining whorls. Teleoconch of 2 ½ whorls separated by an impressed suture which, in the last whorl, is progressively covered by the extension of the parietal callus.

A weak keel placed in the middle of the periphery angles the last whorl; another weak angulation is also observed in the profile of the last whorl, next to the suture.

The entire surface of the teleoconch is smooth, except for the first three quarters of a whorl in which there is an adapical carina that angulates it until it disappears.

Under strong magnification, it can be seen that the entire surface of the teleoconch appears covered by micro-perforations. At first we thought that this was due to an erosion process, but we changed our opinion when observing the micro-perforations in very fresh specimens.

The umbilicus is narrow and deep, but it is scarcely visible, since it is hidden by the columellar callus.

Aperture circular with entire peristome. Inside the inner lip there is a fold on which the operculum abuts. A thick callus is located in the parietal area and by extension covers the keel and part of the previous whorl; a thick callus

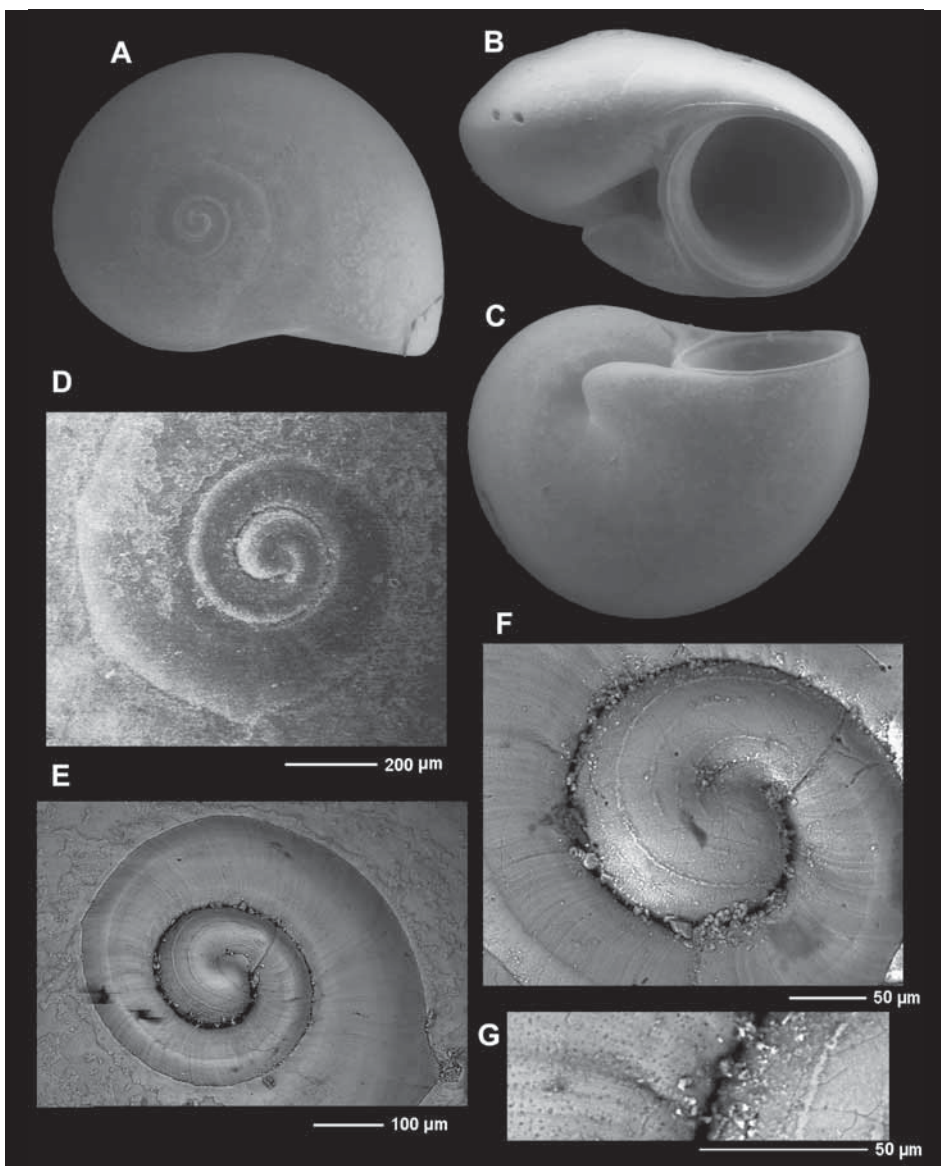


Figure 29

A-G. *Leucorhynchia sandrogorii* n. sp. A-C: holotype, 2.53 mm in diameter, Solomon Islands, Bapita Caves, Hele Islands, Morovo Lagoon, 30 m (MNHN); D-F: apex, protoconch and detail; G: detail of the microsculpture.

Figura 29

A-G. *Leucorhynchia sandrogorii* n. sp. A-C: *holotipo*, 2,53 mm de diámetro, Islas Salomón, Bapita Caves, Islas de Hele, Laguna Morovo, 30 m (MNHN); D-F: ápice, protoconcha y detalle; G: detalle de la microescultura.

formed between the base of the columella and the base of the outer lip extends towards the umbilicus, forming a strong callous V-shaped protuberance, which partially occludes it.

Dimensions: holotype size is 2.53 mm in diameter and 1.80 mm in height (H/D: 0.71).

Habitat: Infralittoral species collected in scuba at 30 m depth.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia sandrogorii* n. sp. is characterized by the high number of spiral cordlets of the protoconch; by the adapical carina of the first whorl of the teleoconch; by the double-keeled profile, characteristic of the last whorl and by the thickness and shape of the callous protuberance of the base of the columella.

From *L. plurilicium* n. sp. and *L. philippinensis* n. sp. it is separated by the double-keeled profile and by the shape and thickness of the columellar callus.

Leucorhynchia fecitae n. sp. Rubio, Rolán & Gori

Figure 30A-F

Type material: The holotype (Figs. 30A-B) MNHN-IM-2000-34709.

Material examined: **1 s:** Papua New Guinea: 1 s, Bermuda Drop, Binnegem Island, New Ireland, 02°45.0'S-150°41.0'E, 27 m.

Type locality: Papua New Guinea, Bermuda Drop, Binnegem Island, New Ireland, 02°45.0'S-150°41.0'E, 27 m.

Etymology: The specific name is after María Fe Rodriguez “Fecita”, good friend in the group of friends of the second author.

Description: Shell small (<4.5 mm), wider than height, robust, turbiniform, spire formed by 3.8 whorls, very convex and narrowly umbilicate.

The protoconch has $\frac{3}{4}$ whorls, measures about 260 µm in diameter and has a smooth surface.

Teleoconch of 3 whorls separated by a marked suture; two subsutural cords

delimit it. Periphery very convex. The first whorl of the teleoconch is strongly carinated; two strong carinae (subsutural and peripheral) that angulate the surface can be seen, but soon disappear and the surface becomes convex.

Teleoconch surface totally smooth, except for subsutural cords, basal axial folds and the rough surface of the columellar callus.

Abapically, in the last whorl, there are 11 axial folds around the umbilicus, disappearing in the last quarter of a whorl, covered by the rough columellar callus.

Aperture circular, entire peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a strong callous coating extended up to the suture; columella arched and reflected, with a prominent nail-shaped callous protuberance, placed at the base and extended towards the umbilicus, but not occluding it; its surface is completely covered by 8-9 cords. Outer lip thick with smooth margin, not modified. The surface of the parietal callus is totally smooth.

Umbilicus narrow and deep, partially covered by the callous protuberance of the base of the columella.

Dimensions: the holotype size is 4.04 mm in diameter and 3.0 mm in height (H/D: 0.74).

Habitat: Infralittoral species collected by diving at 27 m depth.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia fecitae* n. sp is mainly characterized by the double carinae in the beginning of the teleoconch; by the double subsutural cord; by the shape of the columellar callus; and by having its surface covered with folds.

The most similar species is *L. basiscostae* n. sp., from which it differs because the diameter of the protoconch is larger; by having two subsutural cords; and by the shape and ornamentation of columellar callus

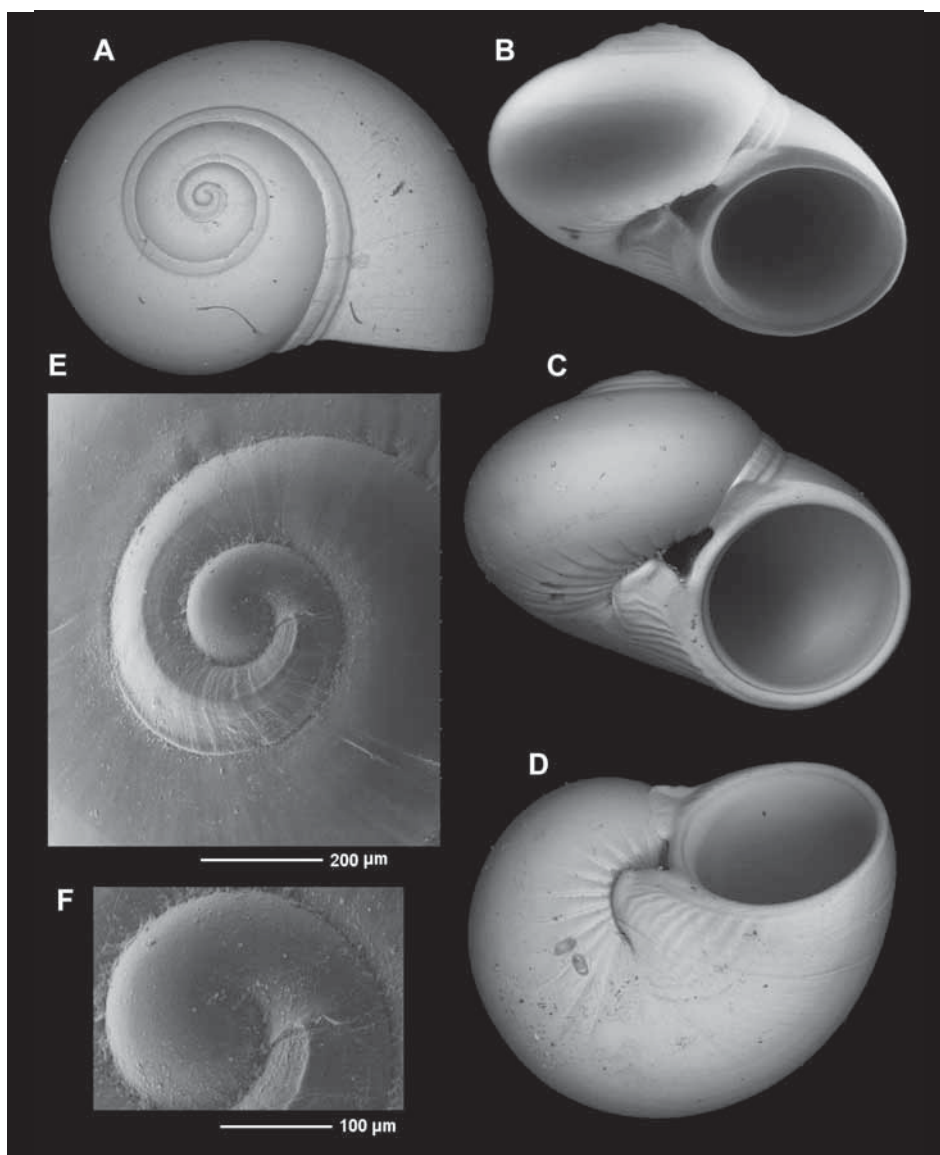


Figure 30

A-E. *Leucorhynchia fecitae* n. sp. A-D: holotype, 4.04 mm in diameter, Papua New Guinea, Bermuda Drop, Binnegem Island, New Ireland, 02°45.0'S-150°41.0'E, 27 m (MNHN); E-F: protoconch and detail.

Figura 30

A-E. *Leucorhynchia fecitae* n. sp. A-D: holotipo, 4,04 mm de diámetro, Papua New Guinea, Bermuda Drop, Isla de Binnegem, Nueva Irlanda, 02°45,0'S-150°41,0'E, 27 m (MNHN); E-F: protoconcha y detalle.

Leucorhynchia robusta n. sp. Rubio, Rolán & Gori

Figure 31A-F

Type material: The holotype (Figs. 31A-C) MNHN-IM-2000-34710.

Material examined: 1 spm: Solomon Islands: 1 spm, Charapoana Pt, Uepi Island, Morovo Lagoon, 20 m (exCSG).

Type locality: Solomon Islands, Charapoana Pt, Uepi Island, Morovo Lagoon, 20 m.

Etymology: The specific name alludes to the main shell characters, which are: strong, spherical, wide, and robust. From the Latin *robustus*, *a*, *um*.

Description: Shell small (<4.5 mm), wider than height, robust, turbiniform, spire formed by 5.1 whorls, very convex and narrowly umbilicate.

The protoconch has $\frac{3}{4}$ whorl, measures about 170 μ m in diameter and apparently has a smooth surface.

Teleoconch of 4.3 whorls separated by a marked suture. Periphery very convex. Ornamentation formed by a wide adapical groove, axial ribs and spiral cords. From the first whorl of the teleoconch, adapically, a wide spiral groove appears, disappearing in the last whorl and a half. Adapically, there is sinuous axial ribs, extend from the suture to the spiral groove. Last $1\frac{1}{2}$ whorl, in the periphery and base there are numerous fine spiral cordlets; adapically, in the last whorl and a half, the spiral cords also cover the subsutural zone. Thick and sinuous growth lines are also observed, appearing randomly during the development of the spire. Abapically, irregular folds penetrate the umbilicus folds.

Aperture circular with an entire peristome. Parietal area covered by a strong callous coating; columella arched and strongly reflected, with a large callous protuberance, placed at the base and extended towards the umbilicus, which is completely occluded. Thick outer lip with smooth margin, not modified. The surface of the columellar callus has irregular tubercles.

Umbilicus totally covered by the successive developments of the callous protuberance of the base of the columella.

The soft parts were very retracted and worn.

Dimensions: the holotype size is 5.43 mm in diameter and 4.11 mm in height (H/D: 0.76).

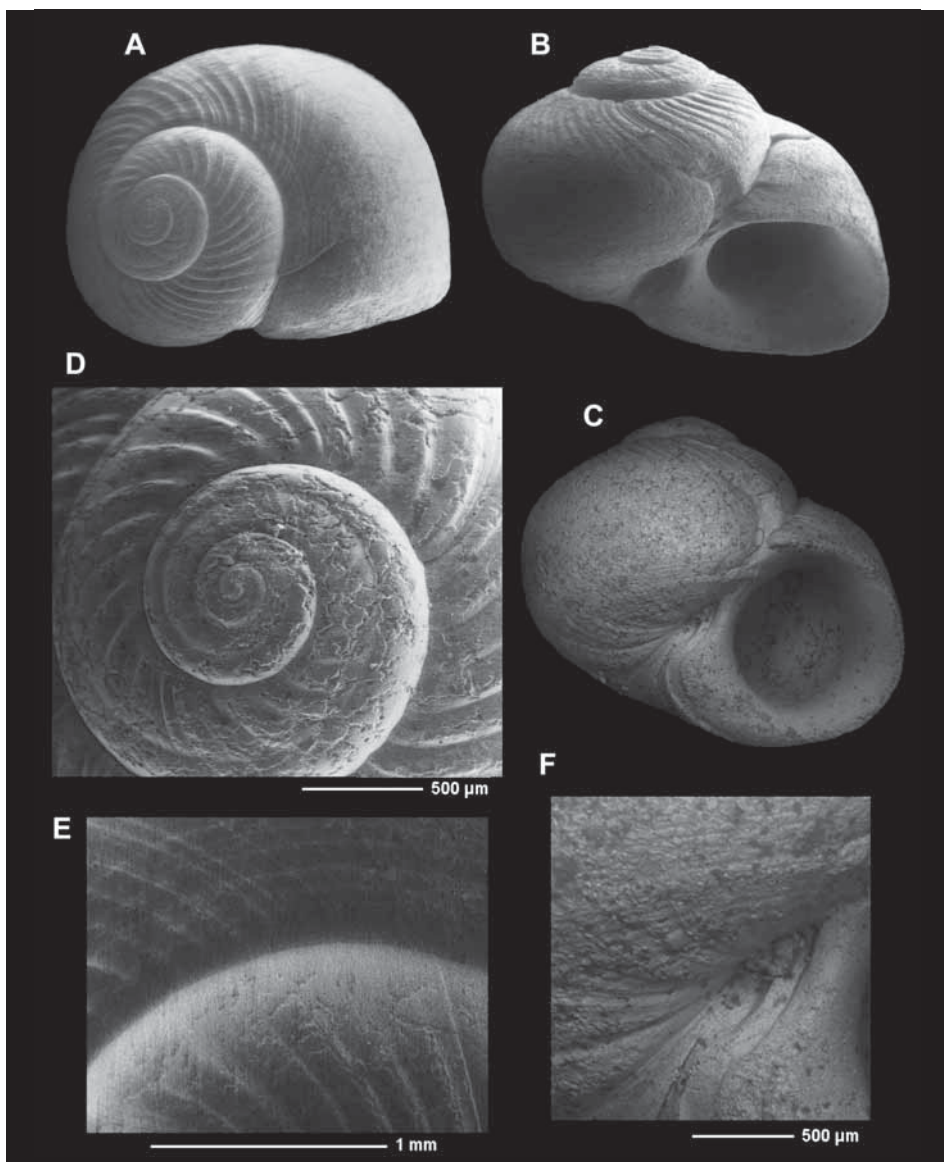


Figure 31

A-F. *Leucorhynchia robusta* n. sp. A-C: holotype, 5.43 mm in diameter, Solomon Islands, Charapoana Pt, Uepi Island, Morovo Lagoon, 20 m (MNHN); D-E: protoconch and detail; F: detail of the umbilicus.

Figura 31

A-F. *Leucorhynchia robusta* n. sp. A-C: holotipo, 5,43 mm de diámetro, Islas Salomón, Punta Charapoana, Isla de Uepi, Laguna Morovo, 20 m (MNHN); D-E: protoconcha y detalle; F: detalle del ombligo.

Habitat: Infralittoral species collected by diving at 30 m depth.

Distribution: Only known from the type locality.

Remarks: The shell is very characteristic, strong, almost spherical in shape, with the umbilicus occluded, with numerous axial oblique, elongated folds, also in the base. There are no other species with similar characters.

Leucorhynchia ryalli n. sp. Rubio, Rolán & Gori
Figure 32A-E

Type material: The holotype (Figs. 32A-B) MNHN-IM-2000-34711. Other paratypes: 3 in MNCN (15.05/200070) and 2 in CSG.

Material examined: 6 s: Thailand: 6 s, Similan Island, Koh Tachai, 32 m (exCSG).

Type locality: Thailand, Similan Island, Koh Tachai, 32 m.

Etymology: The specific name is after Peter Ryall, Austrian malacologist, who always helped our works in multiple ways.

Description: Shell very small (<2.0 mm), robust, discoidal, depressed-turbiniform, with almost 3.3 whorls, rounded and narrowly umbilicate. Protoconch with about $\frac{3}{4}$ whorl, with about 230 μ m in diameter and smooth surface.

Teleoconch of 2.5 whorls separated by a moderately impressed suture; rounded periphery. Initially, the first half whorl of the teleoconch is totally smooth and convex; subsequently, numerous spiral grooves cover it completely until the first 1 $\frac{1}{2}$ whorls, the rest of the whorls of the teleoconch are totally smooth.

Aperture circular, entire peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a callous layer that extends adapically until it partially covers the previous whorl; columella thin and arched with a strong callous protuberance u-shaped located between the base of the outer lip and the base of the columella, which extends into the umbilicus but not occluding it; outer lip thick, smooth, with a non-modified margin.

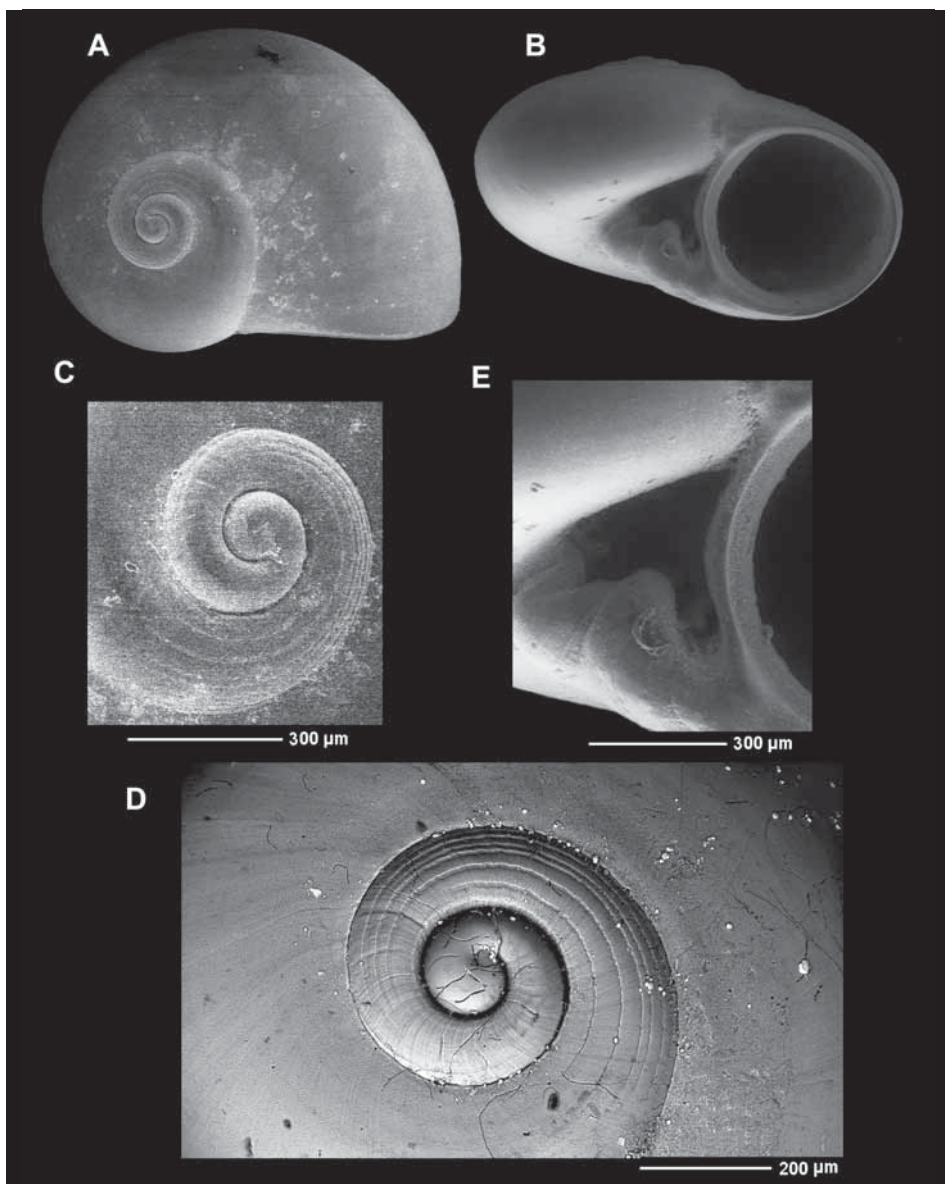


Figure 32

A-E. *Leucorhynchia ryalli* n. sp. A-B: holotype, 1.91 mm, Thailand, Similan Island, Koh Tachai, 32 m (MNHN); C-D: protoconch and detail; E: detail of the umbilicus.

Figura 32

A-E. *Leucorhynchia ryalli* n. sp. A-B: *holotipo*, 1,91 mm, *Tailandia*, *Isla de Similan*, *Koh Tachai*, 32 m (MNHN); C-D: *protoconcha* y *detalle*; E: *detalle del ombligo*.

Umbilicus relatively narrow and deep.

Dimensions: holotype is 1.91 mm in diameter x 1.20 mm in height (H/D: 0.63).

Habitat: Infralittoral species collected by diving at 32 m depth.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia ryalli* n. sp. is characterized by having the first 1 ½ whorls covered with spiral furrows and by the U form of the columellar callus. The most similar species is *L. sulinitel* n. sp., from which it differs because the latter has a hook-shaped columellar callus.

***Leucorhynchia salisburyi* n. sp.** Rubio, Rolán & Gori

Figure 33A-G

Type material: Holotype (Figs. 33A-B) MNHN-IM-2000-34712 and 6 paratypes (Fig. 33C) MNHN-IM-2000-34713; 6 paratypes more in CSG.

Material examined: **15 s:** Papua New Guinea: 13 s, Baudisson Bay, Baudisson Island, E New Ireland, 02°44.4'S-150°39.6'E, 29 m (type material) (exCSG); 2 s, Kavin Village dropoff, E New Ireland, 02°45.2'S-150°44.2'E, 32 m (CSG).

Type locality: Papua New Guinea, Baudisson Bay, Baudisson Island, E New Ireland, 02°44.4'S-150°39.6'E, 29 m.

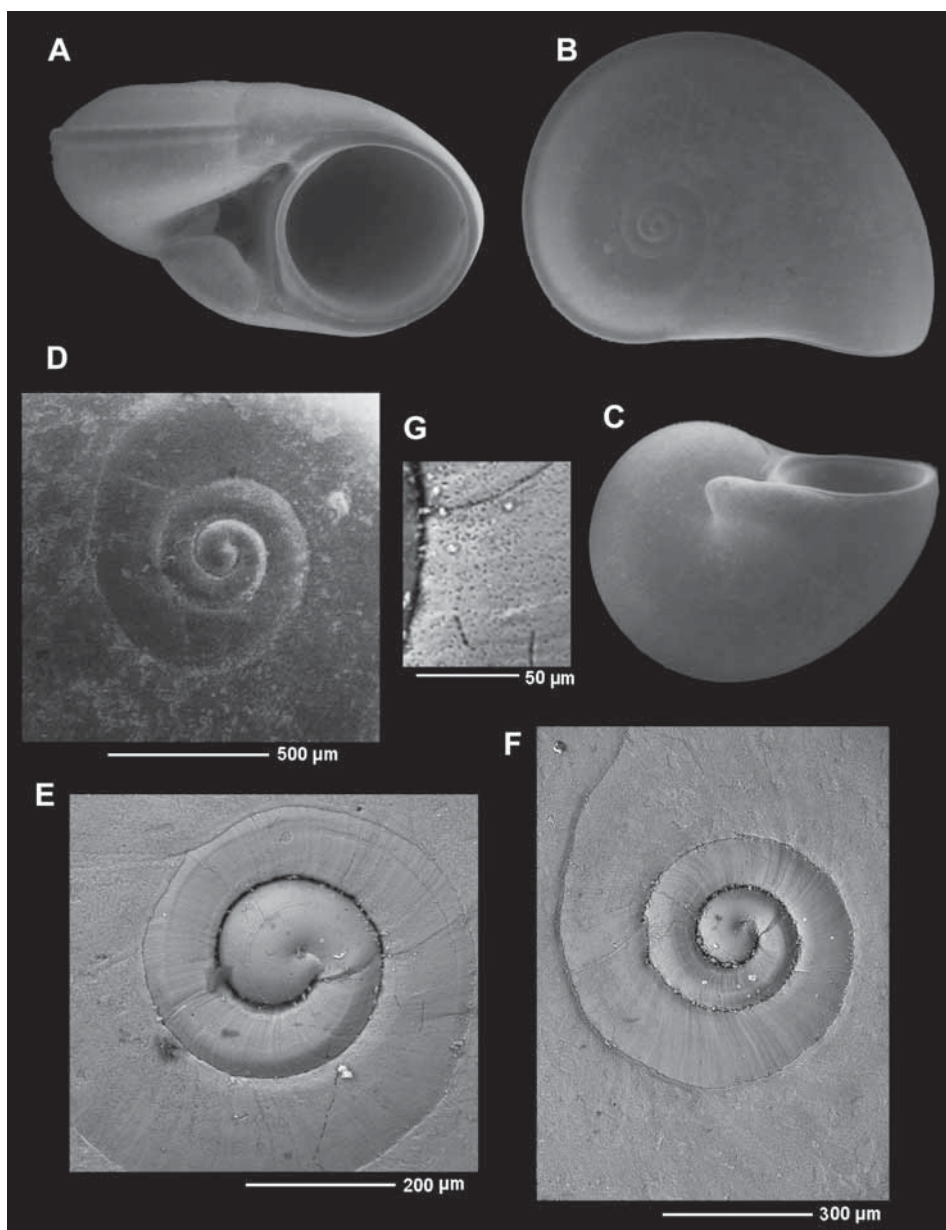
Etymology: The specific name is after Richard Salisbury, American malacologist, for his contribution to Malacology.

Figure 33

A-G. *Leucorhynchia salisburyi* n. sp. A-B: holotype, 3.42 mm, Papua New Guinea, Baudisson Bay, Baudisson Island, E New Ireland (MNHN); C: paratype, 2.7 mm, same locality (MNHN); D-F: protoconch and detail; G: microsculpture.

Figura 33

A-G. *Leucorhynchia salisburyi* n. sp. A-B: holotipo, 3,42 mm, Papua Nueva Guinea, Bahía Baudisson, Isla Baudisson, E Nueva Irlanda (MNHN); C: paratipo, 2,7 mm, la misma localidad (MNHN); D-F: protoconcha y detalle; G: microsculpture.



Description: Shell small (<3.5 mm), robust, discoidal, wider than high (H/D: 0.58), depressed-turbiniform, formed by 3.8 whorls, keeled and narrowly umbilicated. Adapically it is slightly convex and abapically very convex. The protoconch has $\frac{3}{4}$ of a whorl and measures about 240 µm in diameter; its surface is rough with 2–4 spiral cordlets; ending in a thick varix.

Teleoconch of almost 3 whorls separated by an impressed suture which after the first half whorl is covered by the parietal callous extension of the next whorl.

A prominent keel placed in the middle of the periphery angles the last whorl. The entire surface of the teleoconch is smooth, except for the first whorl and quarter, in which there is an adapical carina that slightly angles the shell and a wide spiral groove that narrows until disappearing. Under strong magnification a microsculpture of small pits can be seen.

The umbilicus is narrow and deep, but it is scarcely visible, since it is hidden by the columellar callus.

Aperture circular, entire peristome. Inside the inner lip there is a fold on which the operculum abuts. A thick parietal callus covers by extension the keel and a part of the previous whorl. Columella thick, arched, reflected at the base; a thick callus formed between the base of the columella and the base of the outer lip extending towards the umbilicus, forming a strong callous bird's beak-shaped protuberance, which partially occludes it.

Dimensions: holotype size is 3.42 mm in diameter and 2.00 mm in height (H/D: 0.58).

Habitat: Infralittoral species collected in scuba at 29–32 m depth.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia salisburyi* n. sp. is characterized by its pronounced keel; by the adapical, almost planispiral development of its spire; by the bird's beak-shape of columellar callus; and by the ornamentation of the first whorl of the protoconch.

In its general aspect it is very similar to *L. caledonica*, from which it differs by its almost planispiral adapical development and by the largest number of cordlets of its protoconch.

From *L. philippinensis* n. sp. differs by lacking the flat adapical almost planispiral shape; by the small number of cordlets of its protoconch; by the thickness of parietal callus which almost occluded the umbilicus; and by the lack of the peripheral adapical carina on the first whorl of the teleoconch.

Leucorhynchia australis n. sp. Rubio, Rolán & Gori

Figure 34A-F, 35A-D

Type material: Holotype (Figs. 34A-B) MNHN-IM-2000-34714 and 1 paratype (Fig. 34C) MNHN-IM-2000-34715; 1 paratype in CSG.

Type locality: Maldivas, Vattaruh Kiandu W oceanside dropoff, Vattarurah Atoll, 36 m.

Material examined: **19 s:** Maldivas: 3 s, Vattaruh Kiandu W oceanside dropoff, Vattarurah Atoll, 36 m (type material) (exCSG); 11 s, Hurahu Kandu, west corner entrance, Felidhee Atoll, 03°29.14'N-73°45.45'E, 20 m, sand bank (CSG); 1 s, Guraidhoo Kandu, s. oc. dropoff South Male Atoll, 03°54'N-73°28'E, 20 m, sand in amall cave (CSG); 1 s, Guraidhoo Kandu, s. oc. dropoff South Male Atoll, 03°53.18'N-73°28.12'E, 35 m (CSG); 1 s, Mulaku Kandu, Mulaku Atoll, 37 m (CSG).

Etymology: The specific name alludes to the southern area where the species was collected: *australis* “from the south”.

Description: Shell small (<3.5 mm), wider than high, lenticular, depressed-turbiniiform, formed by 3.5 whorls, keeled and narrowly umbilicate.

The protoconch has $\frac{3}{4}$ of a whorl, and measures about 180 µm in diameter, its surface is rough with at least 2 spiral cordlets scarcely developed, only observable under strong magnification, and ending in a thick labial varix.

The teleoconch has almost 2.8 whorls, is peripherally keeled and apically convex. Its surface is completely smooth, except for one non prominent adapical carina that develops in the first half whorl, then disappears, covered by the subsequent whorl; no spiral grooves are observed.

The umbilicus is narrow and deep.

Aperture circular with a complete peristome. Inside the inner lip there is a fold on which the operculum abuts. A thick parietal callus covers by extension the keel and much of the previous whorl. Columella thick, arched and not reflected; a thick callus formed between the base of the columella and the base of the outer lip extends towards the umbilicus, forming a very strong callous protuberance with the external margin in V, and with a wide notch next to the columella. Exterior of the outer lip angulated in the periphery by the effect of the keel.

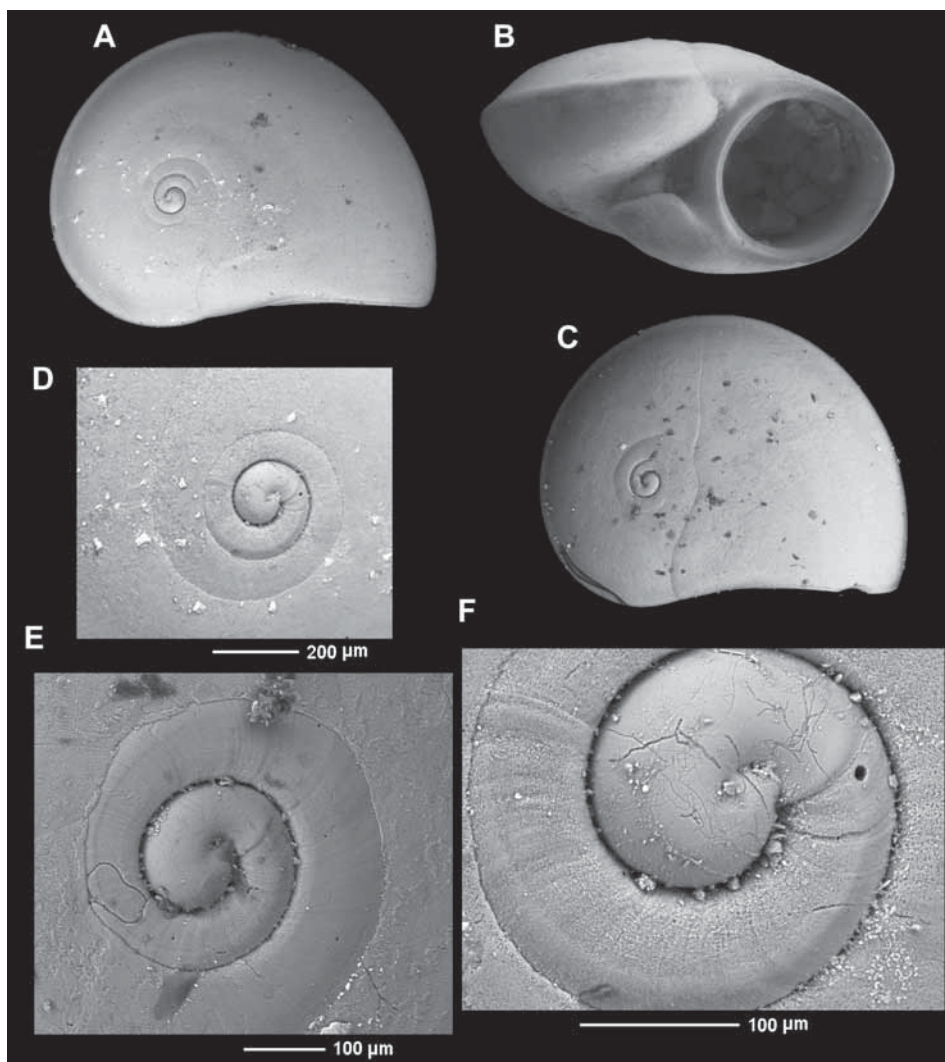


Figure 34

A-F. *Leucorhynchia australis* n. sp. A-B: holotype, 2,34 mm, Maldivas Islands, Vattaruh Kandu W Oceanside dropoff, Vattarurah Atoll, 36 m (MNHN); C: paratype, 2,05 mm, same locality (MNHN); D and F: protoconch of the holotype; E: protoconch of the paratype.

Figura 34

A-F. *Leucorhynchia australis* n. sp. A-B: holotipo, 2,34 mm, Islas Maldivas, Vattaruh Kandu W sedimentos oceánicos, Vattarurah Atoll, 36 m (MNHN); C: paratipo, 2,05 mm, la misma localidad (MNHN); D y F: protoconcha del holotipo; E: protoconcha del paratipo.

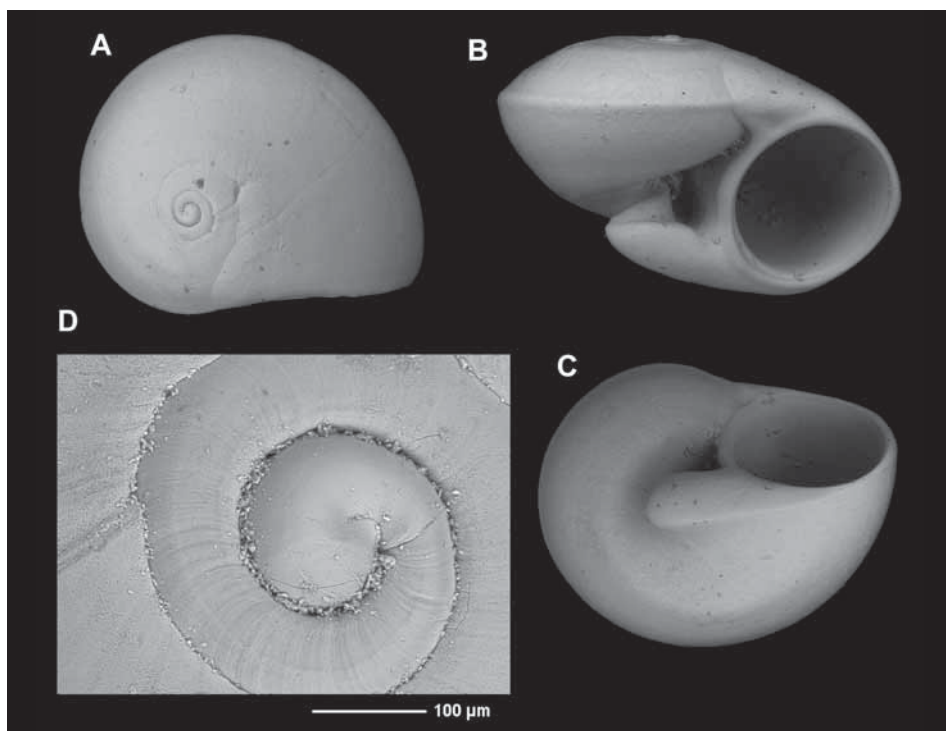


Figure 35

A-D. *Leucorhynchia australis* n. sp. A-C: shells, 2.32, 2.74, 2.6 mm, Hurahu Kandu East, oceanside dropoff, Felidhee Atoll, 26 m (CSG); protoconch.

Figura 35

A-D. *Leucorhynchia australis* n. sp. A-C: conchas, 2,32, 2,74, 2,6 mm, Hurahu Kandu East, sedimentos oceánicos, Felidhee Atoll, 26 m (CSG); protoconcha.

Dimensions: the holotype size 3.00 mm in diameter and 1.67 mm in height (H/D: 0.56).

Habitat: Infralittoral species collected by diving at 36 m deep.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia australis* n. sp. is characterized by its convexity, both adapical and abapical and by the very strong callous protuberance with a wide notch next to the columella.

It can be separated from *L. crinita* n. sp. by having lesser number of spiral cordlets in the protoconch.

Leucorhynchia confortinii n. sp. Rubio, Rolán & Gori

Figures 36A-F, 37A-F

Type material: The holotype (Figs. 36A-C) MNHN-IM-2000-34716 and 3 paratypes MNHN-IM-2000-34717; 3 paratypes in CSG.

Material examined: 7 s: Maldivas Islands, Vattaruh Kandu W oceanside dropoff, Vattarurah Atoll, 36 m (exCSG).

Type locality: Maldivas, Vattaruh Kandu W oceanside dropoff, Vattarurah Atoll, 36 m.

Etymology: The specific name is after the Italian Malacologist Giovanni Confortini.

Description: Shell very small (<2.5 mm), as height as wide, robust, discoid, depressed-turbiniform, formed by 3.6 whorls, keeled and narrowly umbilicate. In some shells it is possible to see a poorly defined light brown area on the adapical or abapical periphery.

Protoconch with $\frac{3}{4}$ of a whorl, about 180 μ m in diameter, with a smooth surface, ending in a little marked varix.

Teleoconch of 2.8 whorls separated initially by an impressed suture; a keel angles the periphery, diminishing up to the last quarter of whorl where it disappears.

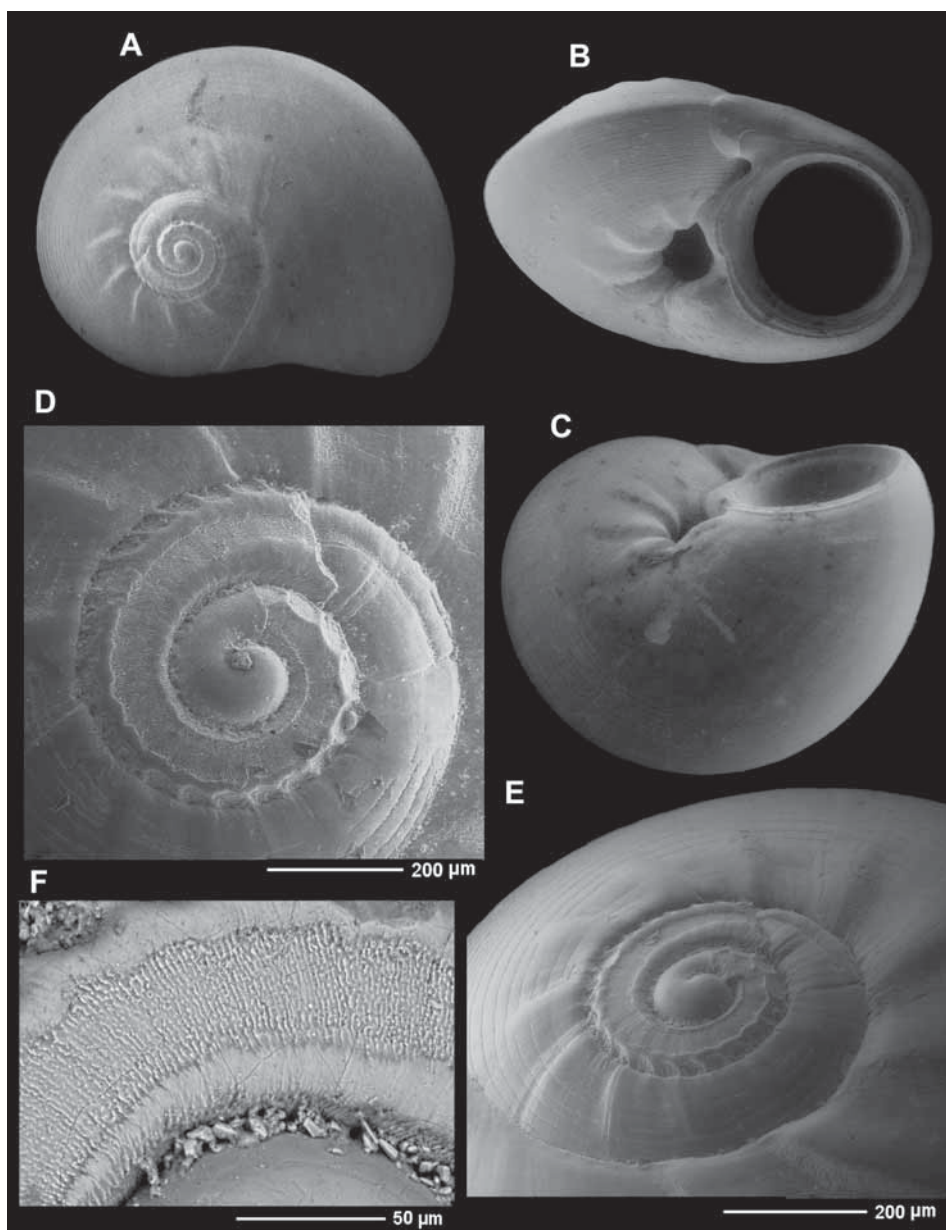
Early teleoconch ornamented with two peripheral cords which are developed in zigzag forming a reticle of pentagonal spaces and a subsutural cord; the spaces between cords are totally covered by very fine axial threads. From the first whorl the quadrangular reticle is covered by the subsequent whorl until it

Figure 36

A-F. *Leucorhynchia confortinii* n. sp. A-C: holotype, 1.93 mm, Maldivas, Vattaruh Kandu W oceanside dropoff, Vattarurah Atoll (MNHN); D-F: apex, protoconch and detail.

Figura 36

A-F. *Leucorhynchia confortinii* n. sp. A-C: *holotipo*, 1,93 mm, Maldivas, Vattaruh Kandu W, *sedimentos oceánicos*, Vattarurah Atoll (MNHN); D-F: *ápice*, *protoconcha* y *detalle*.



disappears; the subsutural cord progressively widens until the space between cords, from the first whorl, is reduced to a narrow groove. From 1 ¼ whorls the axial folds and the spiral grooves appear, which end up covering the entire surface of the teleoconch. In the last whorl there are 9-10 thick axial folds.

In the base 4-5 very strong axial folds can be observed, which penetrate inside the umbilicus at the level of the callous protuberance of the basal callus.

Aperture circular with an complete peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a strong callous layer which extends adapically up to cover the peripheral keel; columella strong, arched, reflected towards the umbilicus, with a thick callous on the base which coincides with the basal periumbilical fold. Outer lip strong, with smooth margin, not modified.

Umbilicus narrow and deep, rounded by very thick axial folds.

Dimensions: holotype is 1.93 mm in diameter and 1.38 mm in height (H/D: 0.72).

Habitat: Infralittoral species collected by diving at 36 m depth.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia confortinii* n. sp. is characterized by the number of subsutural axial folds and the number and thickness of folds periumbilical; by the ornamentation of the first and half whorl of teleoconch; and by the form of the columellar callus.

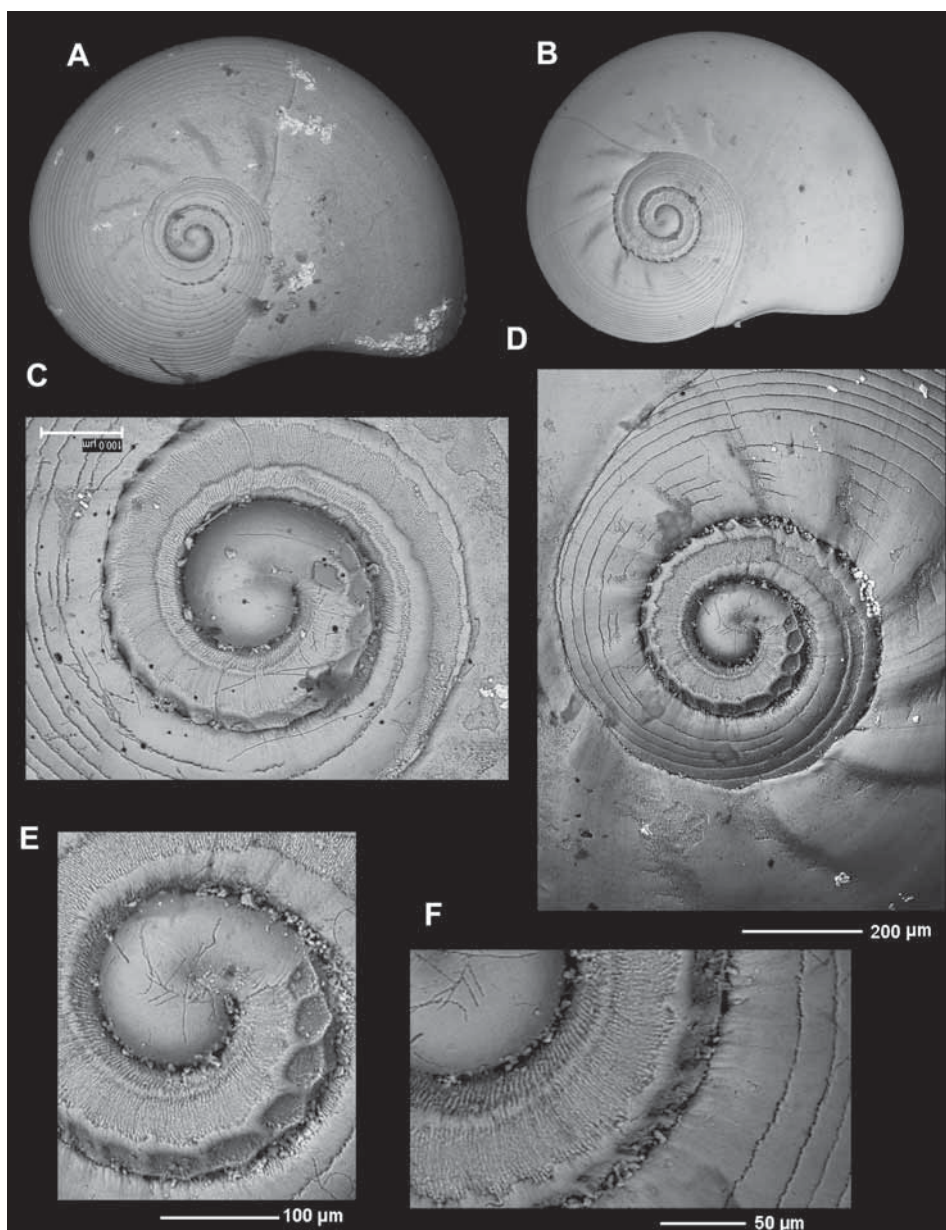
By its shape it is very similar to *L. valida* n. sp., from which it may be separated by the ornamentation of the first 1 ½ whorls of the teleoconch and by the smaller number of basal folds.

Figure 37

A-F. *Leucorhynchia confortinii* n. sp. A-B: paratype, 2.4 mm, Maldivas, Vattaruh Kandu W, oceanside dropoff, Vattarurah Atoll (MNHN); C: protoconch; D: detail of the umbilicus; E-F: apex, protoconch and detail from other paratype.

Figura 37

A-F. *Leucorhynchia confortinii* n. sp. A-B: holotipo, 2,4 mm, Maldivas, Vattaruh Kandu W, sedimentos oceánicos, Vattarurah Atoll (MNHN); C: protoconcha; D: detalle del ombligo E-F: ápice, protoconcha y detalle de otro paratipo.



Leucorhynchia fereglabra n. sp. Rubio, Rolán & Gori

Figure 38A-D, 39A-F

Type material: Holotype (Fig. 38A) MNHN-IM-2000-34718 and 3 paratypes (Figs. 38B-C) MNHN-IM-2000-34719, 3 paratypes in CSG.

Material examined: 7 spms, 3 s: Philippines: 7 spms, Mactan, 200 m (type material) (exCSG). Thailand: 3 s, Hin Daeng, S. Phuket, 20 m (CSG).

Type locality: Philippines, Mactan Island, 200 m.

Etymology: The specific name is from the fusion of two Latin words, the adverb *fere*, which means “almost” and the adjective *glabrus*, *bra*, *brum* which means “smooth” alluding to the smooth surface of most of the shell.

Description: Shell small (<3.5 mm), wider than high, discoidal, depressed-turbiniiform, formed by 3.8 whorls, depressed adapically and narrowly umbilicate.

The protoconch has $\frac{3}{4}$ of a whorl, and measure about 220 μ m in diameter, its surface is rough, with 2-3 spiral cordlets, ending in a varix.

The teleoconch has 3 whorls and is peripherally keeled. Its surface is completely smooth, except for one prominent adapical carina that develops in the first whorl, then disappears, covered by the subsequent whorl; and two wide spiral grooves that disappear from whorl 1 $\frac{1}{4}$.

The umbilicus is narrow and deep.

Aperture circular with a complete peristome. Inside the inner lip there is a fold on which the operculum abuts. A thick parietal callus extends to cover the keel and a part of the previous whorl. Columella not very thick, arched; a thick callus formed between the base of the columella and the base of the outer lip extends towards the umbilicus, forming a strong callous protuberance shaped like a small bird's beak, with a marked notch next to the columella. Outer lip angled at the periphery because of the keel.

The operculum is rounded, multispiral, with a central nucleus. It is formed by a small and depressed central nucleus and nine whorls, ending in a long growing edge. The spiral is ornamented with short axial ribs that start at the outer margin and extend to the middle of each whorl.

Dimensions: the holotype size is 2.8 mm in diameter and 1.71 mm in height (H/D: 0.52).

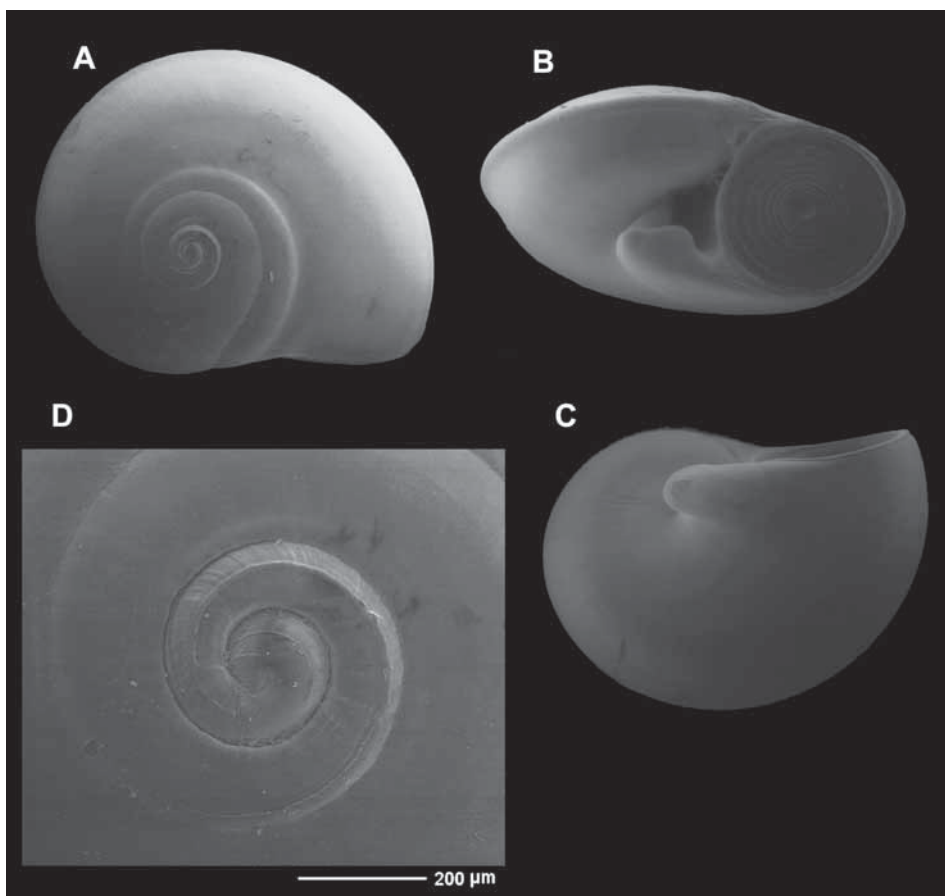


Figure 38

A-D: *Leucorhynchia fereglabra* n. sp. A: holotype, 2.8 mm, Philippines, Mactan Island, 200 m (MNHN); B-C: paratypes, 3.32, 2.78 mm, same locality (MNHN)

Figura 38

A-D: *Leucorhynchia fereglabra* n. sp. A: *holotipo*, 2,8 mm, Filipinas, Isla Mactan, 200 m (MNHN); B-C: *paratipos*, 3,32, 2,78 mm, la misma localidad (MNHN)

Habitat: Bathyal species dredged at 200 m deep in Mactan Island, Philippines and by diving at 20 m, in Hin Daeng, S. Phuket, Thailand.

Distribution: Only known from Mactan Island, Philippines and from Hin Daeng, S. Phuket, Thailand.

Remarks: *Leucorhynchia glabra* n. sp. is characterized by its prominent keel;

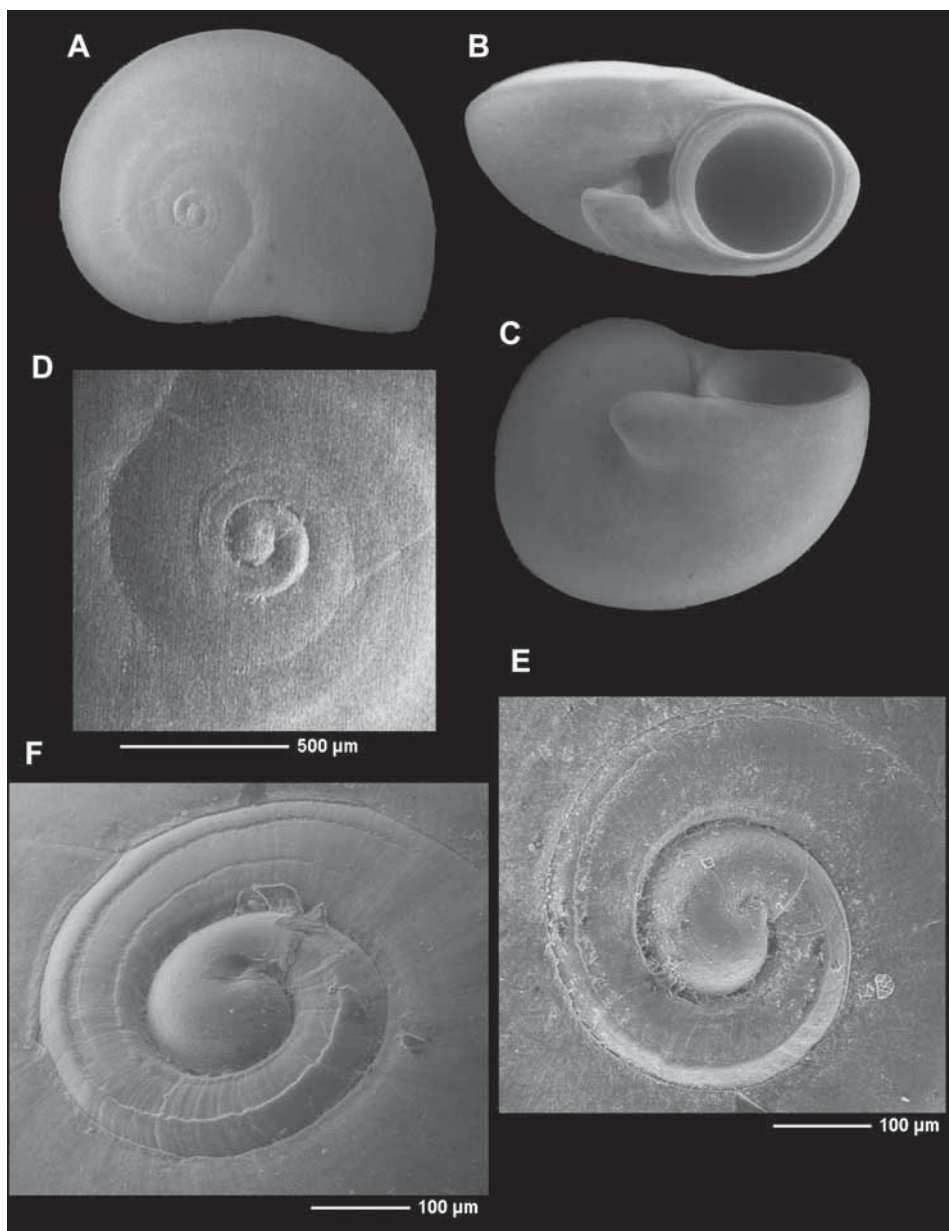


Figure 39

A-F. *Leucorhynchia fereglabra* n. sp. A-C: shells, 2.32, 2.74, 2.6 mm, Thailand, Hin Daeng, S. Phuket, 20 m (CSG).

Figure 39

A-F. *Leucorhynchia fereglabra* n. sp. A-C: *conchas*, 2,32, 2,74, 2,6 mm, *Tailandia*, *Hin Daeng*, *S. Phuket*, 20 m (CSG).

by the ornamentation of the first whorl of the teleoconch; and by the shape of the columellar callus.

The species with which it has the greatest similarity are *L. caledonica* and *L. philippinensis*, but it can be separated from both because they have a larger number of spiral cordlets in the protoconch and by the different shape of its columellar callus, with a marked notch in its base, next to the columella.

Leucorhynchia fereglabra n. sp. is also very similar to *L. plurilicium* n. sp., which is different because it has a greater number of spiral cordlets on the protoconch and because it lacks an adapical carina on the first whorl of the teleoconch.

Some morphological differences have been observed between individuals from the populations of the Philippines and those of Thailand. Among them, the subsutural cord, scarcely perceptible in the population of Thailand and very wide and prominent in that of the Philippines; or, the presence of two wide spiral grooves present in the first whorl of the teleoconch of the individuals of Thailand and practically absent in the individuals of the Philippines. However, these morphological differences are considered to be mere intraspecific variations between individuals from different populations, to our insufficient knowledge. So, we have avoided describing two different new species.

Leucorhynchia carinampla n. sp. Rubio, Rolán & Gori

Figure 40A-E

Type material: Holotype (Figs. 40A-B) MNHN-IM-2000-34720.

Material examined: 1 s: Papua New Guinea: 1 s, Bermuda Drop, Binneses Island, New Ireland, 02°45.0'S-150°41.0'E, 27 m (exCSG).

Type locality: Papua New Guinea, Bermuda Drop, Binneses Island, New Ireland, 02°45.0'S-150°41.0'E, 27 m.

Etymology: The specific name is the fusion of two Latin words: *carina*, *ae* which means “keel” and *amplus*, *a*, *um* which means “wide” alluding to the keel at the beginning of the teleoconch.

Description: Shell small (<3.5 mm), wider than high, discoidal, depressed-turbiniiform, formed by 3.8 whorls, keeled and narrowly umbilicate. The protoconch has $\frac{3}{4}$ of a whorl; size 200 µm in diameter, its surface is rough with at least 2 spiral cordlets, ending in a thick varix.

The teleoconch has almost 3 whorls and is peripherally keeled. Its surface is completely smooth, except for one prominent adapical carina that develops in the first whorl, then disappears covered by the subsequent whorl; and two wide spiral grooves that disappear from whorl 1 $\frac{1}{4}$.

The umbilicus is narrow and deep.

Aperture circular with a complete peristome. Inside the inner lip there is a fold on which the operculum abuts. A thick parietal callus extends to cover the keel and much of the previous whorl. Columella thick, arched and reflected at the base; a thick callus formed between the base of the columella and the base of the outer lip extends towards the umbilicus, forming a strong callous protuberance with the external margin in V. Outer lip angled lightly the periphery by the effect of the keel.

Dimensions: the holotype size is 3.17 mm in diameter and 1.79 mm in height (H/D: 0.56).

Habitat: Infralittoral species collected by diving at 27 m deep.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia carinampla* n. sp. is characterized by the thick parietal callous layer that covers the keel and much of the previous whorl, the wide prominent keel at the beginning of the teleoconch and by the strong callous protuberance with the external margin in V.

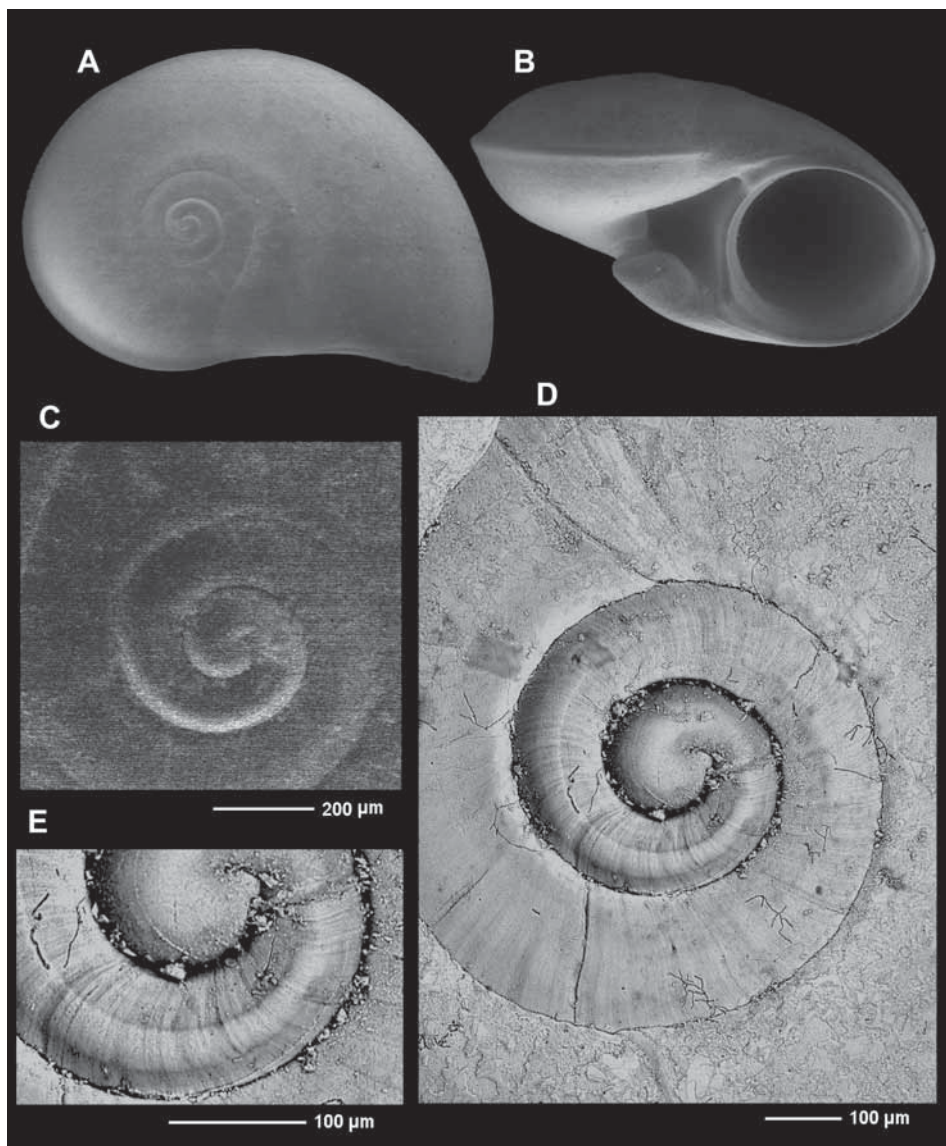
Due to its shape it is very similar to *L. caledonica*, *L. philippinensis* and *L. fereglabra*, but can be separated from these, by the size and outer margin in V of the columellar callus protuberance, as well as by the lack of any notch next to the columella.

Figure 40

A-E. *Leucorhynchia carinampla* n. sp. A-B: holotype, 3.17 mm, Papua New Guinea, Bermuda Drop, Binneses Island, New Ireland, 27 m (MNHN); C-D: apex and protoconch; E: detail of the beginning of the teleoconch.

Figura 40

A-E. *Leucorhynchia carinampla* n. sp. A-B: holotipo, 3,17 mm, Papua Nueva Guinea, Bermuda Drop, Isla de Binneses, Nueva Irlanda, 27 m (MNHN); C-D: ápice y protoconcha; E: detalle del comienzo de la teleoconcha.



Leucorhynchia crinita n. sp. Rubio, Rolán & Gori

Figures 41A-F, 42A-D

Type material: Holotype (Fig. 41A) MNHN-IM-2000-34721 and 5 paratypes (Figs. 41B-C) MNHN-IM-2000-34722); 5 paratypes in CGS.

Material examined: **1 spm, 166 s:** Micronesia States, Yap Islands: 1 spm and 10 s, Fanif Wall, 09°35.03'N-138°06.31'E, 61 m (type material); 2 s, Yap Cavern, 09°25.13'N-138°02.19'E, 30 m; 9 s, Millenium dropoff, 09°17.0'N-138°05,13'E, 40 m. Kosrae Island: 144 s, Sanctuari, 39 m. Palau Islands: 1 s, New Dropoff Ngemelis Island, 07°06.09'N-134°14.17'E, 40 m.

Type locality: Yap Islands, Fanif Wall, 09°35.03'N-138°06.31'E, 61 m.

Etymology: The specific name is from the Latin worl *crinitus*, *a*, *um*, which means “who has a large hair”, alluding to the fine cordlets in the protoconch.

Description: Shell small (<3.0 mm), wider than high, lenticular, depressed-turbiniiform, formed by 3.1 whorls, keeled and narrowly umbilicate.

The protoconch has $\frac{3}{4}$ whorls and a size of about 215 μ m in diameter; its surface is rough with 4 spiral cordlets strongly developed, ending in a thick labial varix.

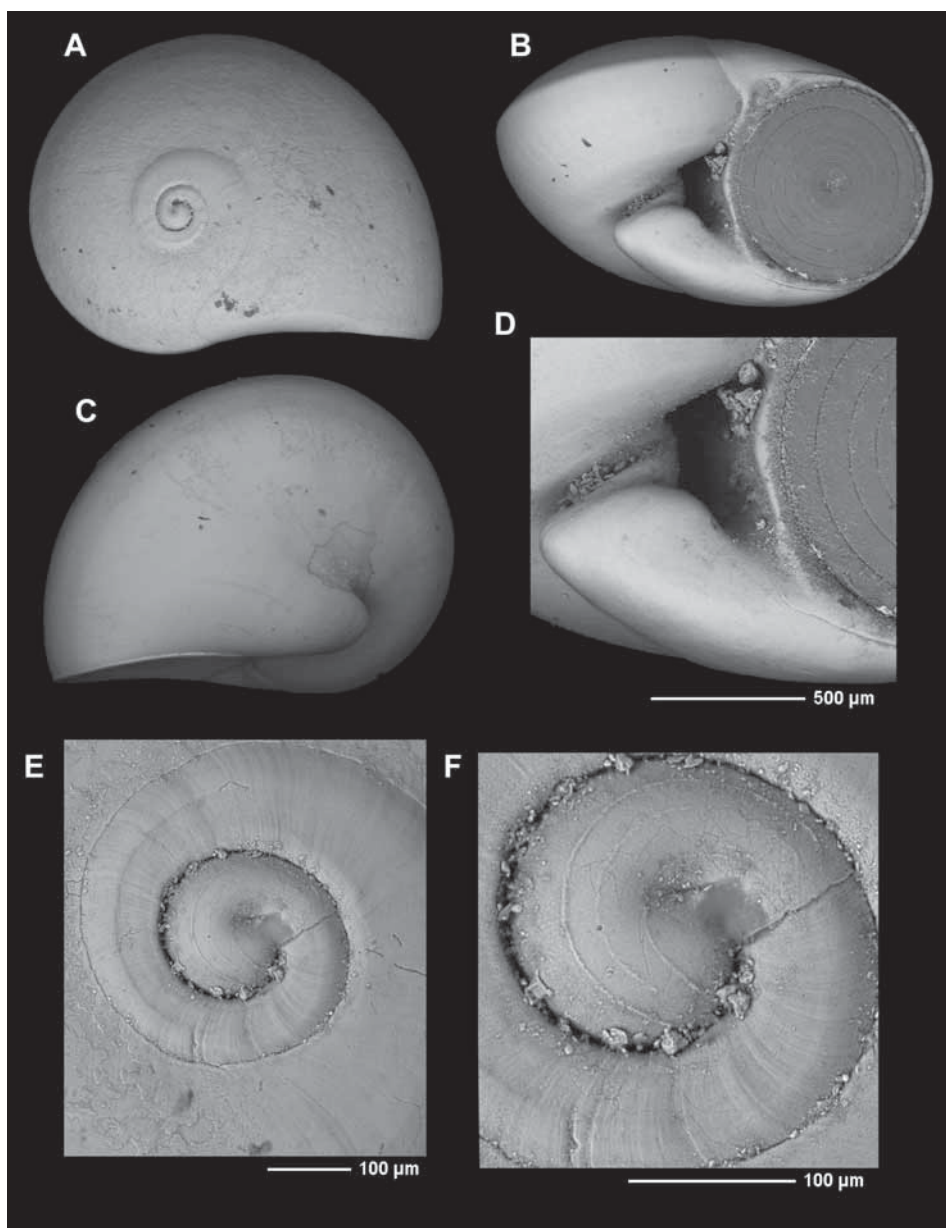
The teleoconch has almost 2.5 whorls, is peripherally keeled and adapically very convex. The keel is less marked until it almost disappears in the last quarter of the last whorl. Its surface is completely smooth, except for one non prominent adapical carina that develops in the first half whorl, followed by a more marked carina that develops in the second half of the first whorl, to disappear later.

Figure 41

A-F. *Leucorhynchia crinita* n. sp. A: holotype, 2.71 mm, Yap Islands, Fanif Wall, 09°35.03'N-138°06.31'E, 61 m (MNHN); B-C: paratypes, 2.79, 2.8 mm, same locality (MNHN); D: detail of the umbilical area; E-F: protoconch and detail.

Figura 41

A-F. *Leucorhynchia crinita* n. sp. A: *holotipo*, 2,71 mm, Isla de Yap, Fanif Wall, 09°35,03'N-138°06,31'E, 61 m (MNHN); B-C: *paratipos*, 2,79, 2,8 mm, la misma localidad (MNHN); D: *detalle del área umbilical*; E-F: *protoconcha y detalle*.



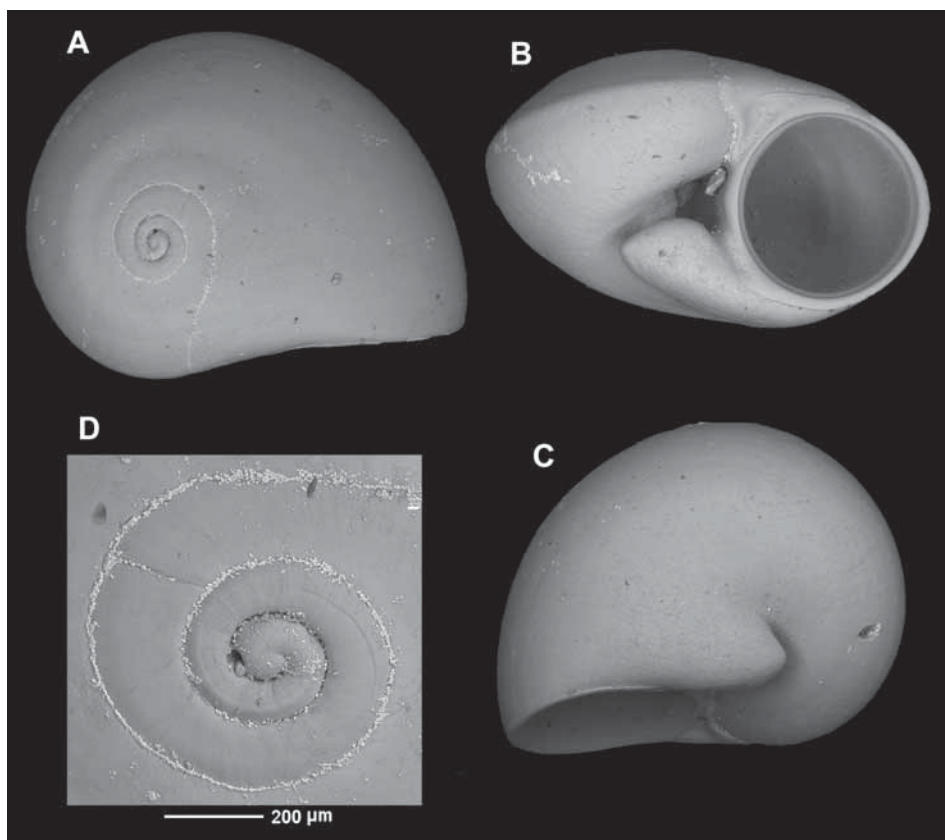


Figure 42

A-D. *Leucorhynchia crinita* n. sp. A-C: shells, 2.39, 2.7, 2.67 mm, Kosrae Island, Sanctuari, 39 m (CSG); D: protoconch.

Figura 42

A-D. *Leucorhynchia crinita* n. sp. A-C: conchas, 2,39, 2,7, 2,67 mm, Isla de Kosrae, Sanctuari, 39 m (CSG); D: protoconcha.

The umbilicus is narrow and deep.

Aperture circular with a complete peristome. Inside the inner lip there is a fold on which the operculum abuts. A thick parietal callus extends to cover the keel and much of the previous whorl. Columella not very thick, arched and not reflected; a thick callus formed between the base of the columella and the base of the outer lip extends towards the umbilicus, forming a very strong callous protuberance with the external V-shaped margin, and with a wide and

elongated notch next to the columella. Exterior of the outer lip not angulated in the periphery by the effect of the keel.

The operculum is rounded, multispiral with a central nucleus. It is formed by a small and depressed central nucleus and seven whorls, ending in a long growing edge. The spiral is ornamented with short oblique axial ribs that start at the outer margin and they extend in the upper third of each whorl.

Dimensions: the holotype size is 2.71 mm in diameter and 1.71 mm in height (H/D: 0.63).

Habitat: Circalittoral species collected by diving at 30-61 m depth.

Distribution: Only known from Micronesian States, Yap, Palau and Kosrae Islands.

Remarks: *Leucorhynchia crinita* n. sp. is characterized by the number of spiral cordlets on its protoconch; by the ornamentation of the first whorl of the teleoconch; and by the shape and size of the columellar callus.

Due to its general appearance, this species is very similar to *L. caledonica*, *L. philippinensis* n. sp., *L. fereglabra* n. sp. and *L. carinampla* n. sp. but differs from them all by the larger number of spiral cordlets of its protoconch.

It differs from *L. plurilicium* n. sp. in having one spiral cordlet less in its protoconch.

It differs from *L. sandrogorii* n. sp. and *L. salisburyi* n. sp., because although it has the same number of spiral cordlets on the protoconch, its general shape is different.

From *L. australis* n. sp. it differs in having more spiral cordlets on the protoconch.

Leucorhynchia carigracilis n. sp. Rubio, Rolán & Gori

Figure 43A-D

Type material: Holotype (Fig. 43A-B) MNHN IM-2000-34723 and one paratype MNHN IM-2000-34724.

Material examined: **2 s:** Solomon Islands: 2 s, Charapoana Pt, Uepi Island, Morovo Lagoon, 20 m (exCSG).

Type locality: Solomon Islands, Charapoana Pt, Uepi Island, Morovo Lagoon, 20 m.

Etymology: The specific name is the beginning of the Latin words *carina* “keel” and *gracilis*, *e* which means “fine, narrow” alluding to the fine keel at the beginning of the teleoconch.

Description: Shell small (<3.0 mm), robust, depressed-turbiniform, with almost 3.5 convex whorls, rounded periphery, not keeled and narrowly umbilicate. The protoconch has about $\frac{3}{4}$ of a whorl and is located on the same plane as the first and a half whorl of the teleoconch; it measures about 185 μ m in diameter and has a smooth surface; it ends in a thick labial varix.

Teleoconch of 2.7 whorls separated initially by an impressed suture; later, in the last whorl, the suture is covered by the extension of the parietal callus; periphery very convex. Its surface is completely smooth, except for one adapical carina that develops in the first whorl, to disappear later.

Aperture circular with an entire peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a thick callous layer that extends adapically until partially covering the previous whorl; columella thin and curved, with a strong callous spatula-shaped protuberance, located between the base of the outer lip and the base of the columella, which extends into the umbilicus but without occluding it; outer lip not very thick, smooth, with a non-modified margin.

Umbilicus narrow and deep, only visible in apertural view.

Dimensions: holotype size is 2.67 mm in diameter and 1.67 mm in height (H/D = 0.63).

Habitat: Infralittoral species collected in diving at 20 m deep.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia carigracilis* n. sp. is characterized by having the protoconch completely smooth and in the same plane as the first one and a half whorls of the teleoconch; by the adapical carina of the first whorl of the teleoconch; and by the spatula-shaped columellar callus.

In its general appearance, it is very similar to *L. redita* n. sp., from which it differs by lacking a spiral groove in the first whorl of the teleoconch.

From *L. crossei* and *L. carbegtel* n. sp. it differs by a different shape of the columellar callus.

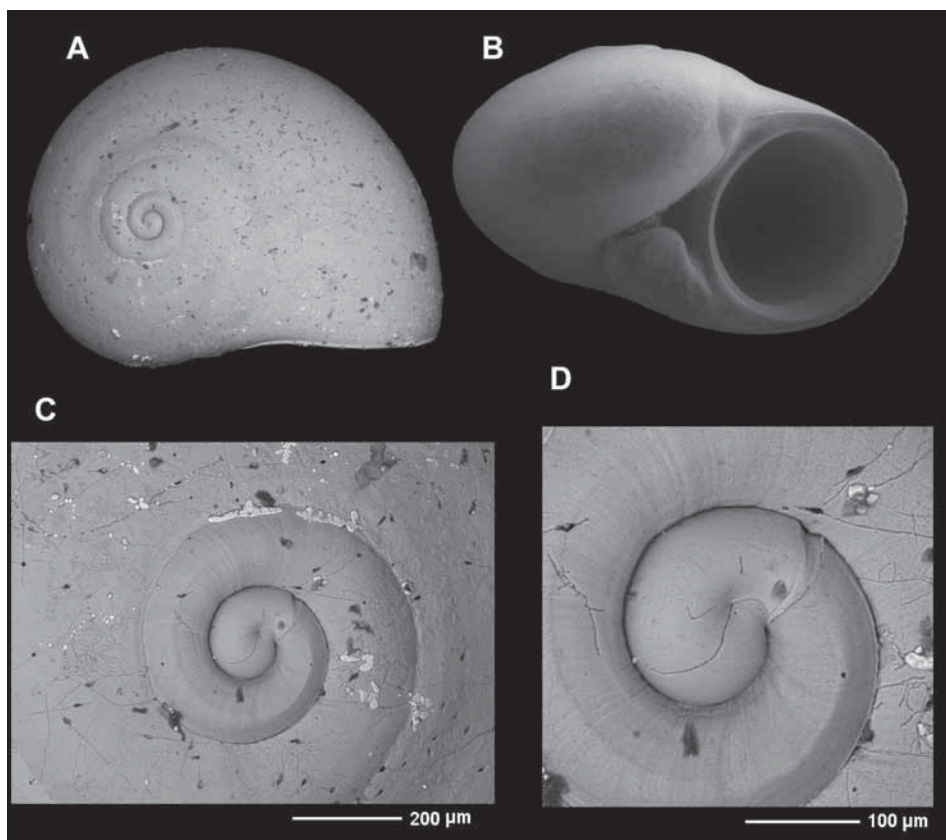


Figure 43

A-D. *Leucorhynchia carigracilis* n. sp. A-B: holotype, 2.67 mm in diameter, Solomon Islands, Charapoana Pt, Uepi Island, Morovo Lagoon, 20 m (MNHN); C-D: protoconch and detail.

Figure 43

A-D. *Leucorhynchia carigracilis* n. sp. A-B: *holotipo*, 2,67 mm de diámetro, Islas Salomón, Charapoana Pt, Isla de Uepi, Morovo Lagoon, 20 m (MNHN); C-D: *protoconcha* y *detalle*.

From *L. perpolita* n. sp it differs by a different shape of the teleoconch.

From *L. sulinitel* n. sp. and *L. ryalli* n. sp. may be distinguished by lacking of spiral grooves in the first whorl of the teleoconch.

Indo Pacific Group 2

The species of this group are characterized by their higher spire, globose shape, smooth surface of the teleoconch (except for the subsutural and periumbilical axial folds) and by the thick callus formed between the base of the columella and the base of the outer lip extending towards the umbilicus, forming a strong callous layer.

The group includes the following species:

Indo Pacific group 2

- <i>Leucorhynchia globosa</i> n. sp	NC	Fig 44
- <i>Leucorhynchia iterata</i> n. sp.....	Ph	Fig 45
- <i>Leucorhynchia perinde</i> n. sp.....	Ph	Fig 46
- <i>Leucorhynchia papuaensis</i> n. sp.....	PNG	Fig 47
- <i>Leucorhynchia baesitans</i> n. sp.....	PNG	Fig 48
- <i>Leucorhynchia magnucleus</i> n. sp.....	NC	Fig 49
- <i>Leucorhynchia levis</i> n. sp.....	V.....	Fig 50
- <i>Leucorhynchia glabra</i> n. sp	Ph	Fig 51
- <i>Leucorhynchia funiculata</i> n. sp.....	RS	Fig 52
- <i>Leucorhynchia celata</i> n. sp	SI.....	Fig 53
- <i>Leucorhynchia peculiaris</i> n. sp	So	Fig 54
- <i>Leucorhynchia sulciobliqui</i> n. sp.....	So	Fig 55

Leucorhynchia globosa n. sp.

Figure 44A-D

Type material: Holotype (Figs. 44A-C) in MNHN-IM-2000-34725.

Material examined: 1 s: New Caledonia: 1 s, St Vincent Bay, Tenia Islet, 50 m, external border, diving (Coll. Menou).

Type locality: New Caledonia, St. Vincent Bay, Tenia Islet, 50 m.

Etymology: The specific name (from the Latin *globosus*, *a, um* “globose, spherical”) alludes to its shape.

Description: Shell small (<5.0 mm), wider than high, robust, turbiniform, spire formed by 4 whorls, very convex and barely umbilicate. Protoconch with 0.75 whorls, about 260 µm in diameter and smooth surface.

Teleoconch of 3.25 whorls separated initially by a pronounced suture which is less marked on the last whorl. The first ½ whorl of the teleoconch has a central elevation like a keel, but it rapidly changes to a convex shape and a gradual outline. A wide sutural cord delimits the suture from 1.25 whorls. Periphery very convex.

Teleoconch surface totally smooth, except for the sutural cord and a few axial basal folds.

Abapically, there are 5 medium thick axial folds that penetrate inside the umbilicus, disappearing after ¼ whorl; they are partially covered by the columellar callus.

Aperture circular with a complete peristome. Inside the apertural border there is a fold on which the operculum abuts. Parietal area covered by a callous layer which is extended adapically, partially covering the previous whorl; columella thick, arched, slightly reflected, with a thick callous coat on its base and extended towards the umbilicus, occluding it almost totally except for a small lateral hole. External lip thick, with smooth unmodified margin. The surface of the parietal and columellar callus is totally smooth.

Umbilicus almost completely covered by the callous coat of the base of the columella; the axial folds of the base penetrate into the interior.

Dimensions: holotype size is 4.61 mm in diameter and 3.26 mm in height (H/D: 0.71).

Habitat: Circalittoral species, collected by diving on the outer slope of the reef, at 50 m deep.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia globosa* n. sp. is characterized by its turbiniform spire and globose shape; by having a rounded periphery on the last whorl; by having the teleoconch keeled in its first half whorl; by the strong sutural cord; by the number of axial folds on the base; and by the columellar callus, like a strong callous layer which covers the umbilicus almost entirely.

Leucorhynchia globosa n. sp. is very similar in its form to *L. iterata* n. sp., but the latter can be separated by its higher spire and shape of the columellar callus, having also a light brown color.

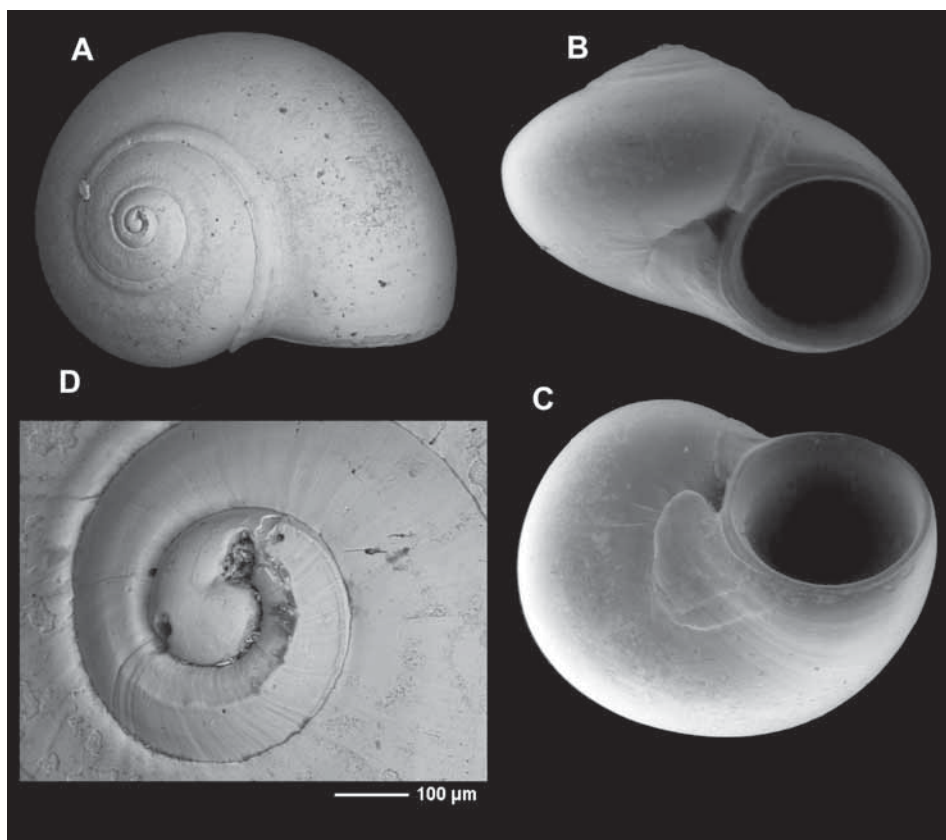


Figure 44

A-D. *Leucorhynchia globosa* n. sp. A-C: holotype, 4.61 mm in diameter, New Caledonia, St Vincent Bay, Tenia Islet, 50 m (MNHN); D: protoconch of the holotype.

Figura 44

A-D. *Leucorhynchia globosa* n. sp. A-C: holotipo, 4,61 mm de diámetro, Nueva Caledonia, Bahía de San Vincent, Islote Tenia, 50 m (MNHN) D: protoconcha del holotipo.

It is different from *L. papuaensis* n. sp. by the light color of the shell and smaller number of axial folds.

From *L. perinde* n. sp. it may be distinguished because the carina at the beginning of the teleoconch is more prominent.

***Leucorhynchia iterata* n. sp.**

Figure 45A-E

Type material: Holotype (Fig. 45A) MNHN-IM-2000-34726 and 1 paratype (Fig. 45B) MNHN-IM-2000-34727.

Material examined: **2 s, 1 juv:** Philippines: 2 s, 1 juv, Siquijor Island, Camogao, Stn L89, 09°15'N-123°39'E, 50 m (Philippines, leg. Arbasto).

Type locality: Philippines, Siquijor Island, Camogao, 09°15'N-123°39'E, 50 m.

Etymology: The specific name is from the past participle of the Latin verb *itero, as, are, avi, atum*, which means “to repeat”, alluding to the similarity with the previous species.

Description: Shell small (<5.0 mm), wider than high, robust, turbiniform, with a spire formed by 4 whorls, very convex and barely umbilicate. The shells have a light brown coloration mainly on the periphery, less so on the sutural and umbilical areas.

Protoconch of a little more than 0.75 whorl, about 230 µm in diameter, 100 µm of which corresponds to the nucleus and with a smooth surface.

Teleoconch of 3.25 whorls, initially separated by a well marked suture which, below, widens and changes, becoming deeper on the last whorl. The first $\frac{3}{4}$ whorl of the teleoconch is keeled, with a strong cord on the middle which is progressively attenuated, disappearing after 0.75 whorls; later, the surface changes to convex and is softened gradually; a strong, wide cord delimits the suture after 1.25 whorls. Periphery very convex.

Teleoconch surface totally smooth, except for the sutural cord and the basal axial folds.

Abapically, there are 5 not very thick axial folds that penetrate inside the umbilicus, disappearing after the first $\frac{1}{4}$ whorl, and which are partially covered by the columellar callus.

Aperture circular with a complete peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a thick layer of callous coat, extended adapically, partially covering the previous whorl; columella thick, arched, not reflected. A thick callus with a triangular tooth shape extends towards the umbilicus, partially occluding it. Outer lip thick, smooth, with a non-modified margin. Parietal callus and columellar surface completely smooth.

Umbilicus narrow and deep, almost covered by the columellar callus; inside, axial folds of the base that penetrate inside.

Dimensions: holotype size 4.86 mm in diameter and 3.63 mm in height (H/D: 0.75).

Habitat: Circalittoral species dredged at 50 m deep.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia iterata* n. sp. is characterized by its turbiniform spire and globose shape; by having a keeled teleoconch for the first $\frac{3}{4}$ whorl, with a thick cord on the keel; the width and thickness of the sutural cord; by the number of axial folds on the base and the columellar callus with a triangular tooth-shaped form, partially covering the umbilicus; and, finally, by its light brown coloration.

Leucorhynchia iterata n. sp. is very similar in shape to *L. globosa* n. sp. but differs from it by the thick cord around the suture of the teleoconch, the reduced number of basal folds and the columellar triangular tooth-shaped callus.

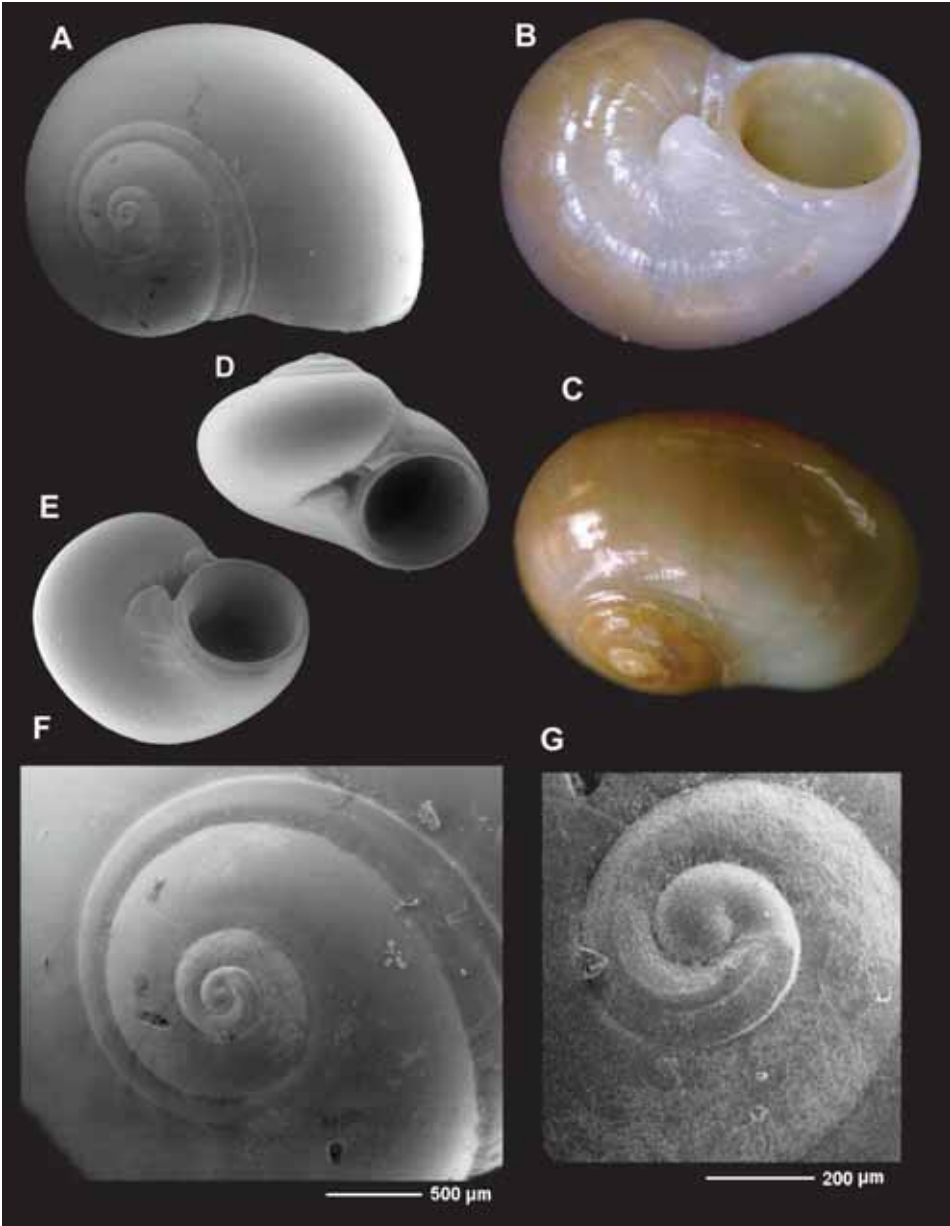
From *L. papuaensis* n. sp. it differs by its thick carina on the first $\frac{3}{4}$ whorl and by its colour.

Figure 45

A-G: *Leucorhynchia iterata* n. sp.; A: holotype, 4.86 mm in diameter, Siquijor Island, Camogao, Stn L89, 09°15'N - 123°39'E, 50 m (MNHN); B-C: paratype, 4.5 mm, same locality (MNHN); D-E: juvenile, 3.1 mm, same locality (lost); F-G: protoconch and detail.

Figura 45

A-G: *Leucorhynchia iterata* n. sp.; A: *holotipo*, 4,86 mm de diámetro, Isla Siquijor, Camogao, Stn L89, 09°15'N - 123°39'E, 50 m (MNHN); B-C: *paratipo*, 4,5 mm, la misma localidad (MNHN); D-E: *juvenil*, 3,1 mm, la misma localidad (perdido); F-G: *protoconcha y detalle*.



***Leucorhynchia perinde* n. sp.**

Figure 46A-F

Type material: Holotype (Figs. 46A-C) MNHN-IM-2000-34728.

Material examined: **3 s:** Philippines: 1 s, Aliquay Island, off NE Mindanao, 50-150 m; 2 s, from same locality examined in photograph only (collected by Poppe).

Type locality: Philippines, Aliquay Island, off NE Mindanao, 50-150 m.

Etymology: The specific name is the Latin adverb *perinde* which means “besides” alluding to its morphological similarity to other species of the group.

Description: Shell small (<5.5 mm), wider than high, robust, turbiniform, spire formed by 4 whorls, very convex and barely umbilicate. Colour brown except for the last quarter of the last whorl which is ivory (Figs. 65D-E). Protoconch measuring a little more than 0.75 whorl, about 270 µm in diameter and smooth surface.

Teloconch of 3.25 whorls, initially separated by an evident suture which widens when the cord develops after 1.25 whorls. The first $\frac{3}{4}$ whorl of this teloconch is slightly keeled and flattens gradually until it disappears from about 0.75 whorls, when it becomes convex. Periphery very convex. Teloconch surface totally smooth, except for the sutural cord and the basal axial folds.

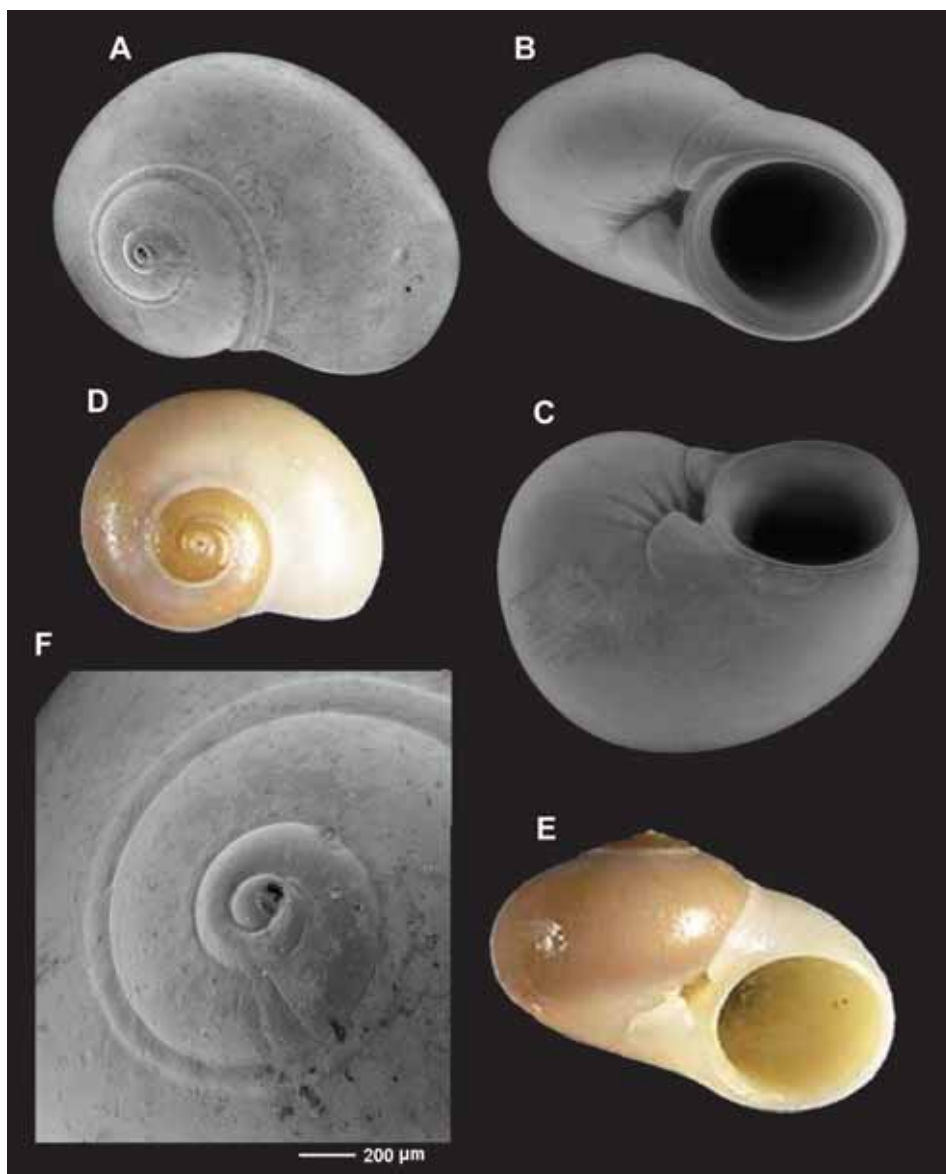
Abapically, there are 5-6 very thick axial folds that penetrate inside the umbilicus, disappearing after the first $\frac{1}{4}$ of the last whorl when the columellar callus is developed.

Figure 46

A-F. *Leucorhynchia perinde* n. sp. A-C: holotype, 5.2 mm in diameter, Philippines, Aliquay Island, offshore NE Mindanao, 50-150 m (MNHN) (collected by Poppe) D-E: shells with natural colour, 2.5, 3.6 mm, same locality; F: protoconch.

Figura 46

A-F. *Leucorhynchia perinde* n. sp. A-C: *holotipo*, 5,2 mm de diámetro, Filipinas, Isla Aliquay, frente a NE Mindanao, 50-150 m (MNHN) (recolectada por Poppe); D-E: *conchas con su color natural*, 2,5, 3,6 mm, de la misma localidad; F: *protoconcha*.



Aperture circular with a complete peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a thick callous layer that extends adapically covering partially the previous whorl; columella thick, arched, not reflected, a thick callus shape like a triangular tooth extends towards the umbilicus, occluding it partially. Outer lip thick, smooth, with a non-modified margin. Parietal callus and the columellar surface are completely smooth.

Umbilicus narrow and deep, covered almost entirely by the columellar callus; inside, the axial folds of the base penetrate into it.

Dimensions: holotype size is 5.2 mm in diameter and 3.46 mm in height (H/D: 0.67).

Habitat: Circalittoral to bathyal species collected at 50-150 m.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia perinde* n. sp. is characterized by the thick axial folds at the beginning of the base and by the columellar callus, resembling a strong triangular tooth.

It differs from *L. iterata* n. sp. by its lighter colour and because the carina on the first $\frac{3}{4}$ of the initial whorl is poorly marked.

From *L. papuaensis* n. sp. it is separated by its dark brown colour and by having less axial folds around the umbilicus.

***Leucorhynchia papuaensis* n. sp.**

Figure 47A-D

Type material: Holotype (Figs. 47A-C) MNHN-IM-2000-34729.

Material examined: **1 s:** Papua New Guinea, KAVIENG 2014: 1 s, Manne Island, Stn KPR07, 02°45.4'S-150°41.3'E, 22-27 m, sediment on ledges, reef wall.

Type locality: Papua New Guinea, Manne Island, 02°45.4'S-150°41.3'E, 22-27 m, sediment in ledges, reef wall. [KAVIENG 2014: Stn KPR07].

Etymology: The specific name is derived from the island where the species was collected.

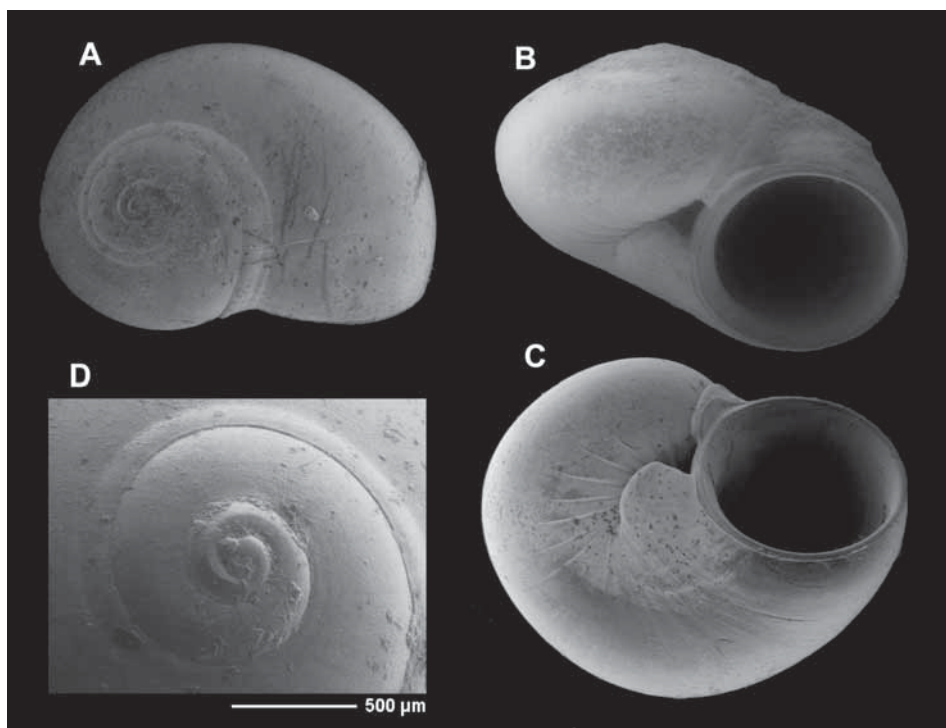


Figure 47

A-D: *Leucorhynchia papuaensis* n. sp. A-C: holotype, 4.1 mm in diameter, Papua New Guinea, Manne Island, Stn KPR07, 02°45.4'S-150°41.3'E, 22-27 m, sediment on ledges, reef wall (MNHN); D: protoconch.

Figura 47

A-D: *Leucorhynchia papuaensis* n. sp. A-C: *holotipo*, 4,1 mm de diámetro, Papua Nueva Guinea, Isla de Manne, Stn KPR07, 02°45,4'S-150°41,3'E, 22-27 m, sedimento recolectado en el borde de la pared arrecifal (MNHN); D: *protoconcha*.

Description: Shell small (<4.5 mm), wider than high, robust, turbiniform, spire formed by 4 whorls, very convex and barely umbilicate; white in colour. Protoconch with a little more than 0.75 whorl, about 220 µm in diameter and a smooth surface.

Teleoconch of 3.25 whorls, initially separated by a scarcely marked suture which widens on the last whorl when the subsutural cord is developed. The first $\frac{3}{4}$ whorl of the teleoconch is lightly keeled flattening progressively until the keel disappears from the first whorl, at the same time that a strong sutural cord appears and is developed.

Teleoconch surface totally smooth, except for the sutural cord and the basal axial folds. Periphery convex.

Abapically, there are 10-11 not very thick axial folds that penetrate inside the umbilicus, only visible when the columellar callus appears.

Aperture circular with a complete peristome. Inside the apertural border there is a fold on which the operculum abuts.

Parietal area covered by a thick callous layer that extends adapically partially covering the previous whorl; columella not very thick, arched, scarcely reflected, having a thick callus with a square tooth shape that extends from its base towards the umbilicus, which is occluded partially, except for a large hole in the parietal area. Outer lip thick, smooth, with a non-modified margin. The surface of both the parietal and the columellar calluses is completely smooth. Umbilicus is limited to a hole more or less large in the parietal area.

Dimensions: holotype size is 4.1 mm in diameter and 3.18 mm in height (H/D: 0.77).

Habitat: Infralittoral species collected on sediment in ledges, reef walls at 22-27 m deep.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia papuaensis* n. sp. is characterized by its depressed spire, by the shape of the columellar callus and by the higher number of axial folds around the umbilicus.

L. globosa n. sp., *L. iterata* n. sp. and *L. perinde* n. sp. may be separated because they do not have a large number of axial folds around the umbilicus. Furthermore the last two have brown colour.

***Leucorhynchia haesitans* n. sp.**

Figure 48A-D

Type material: Holotype (Figs. 48A-C) MNHN-IM-2000-34730.

Material examined: 1 s: Papua New Guinea, BIOPAPUA: 1 s, Vitiaz Strait, Stn DW3719, 06°03'S-147°36'E, 410 m.

Type locality: Papua New Guinea, Vitiaz Strait, 06°03'S-147°36'E, 410 m [BIOPAPUA: Stn DW3719].

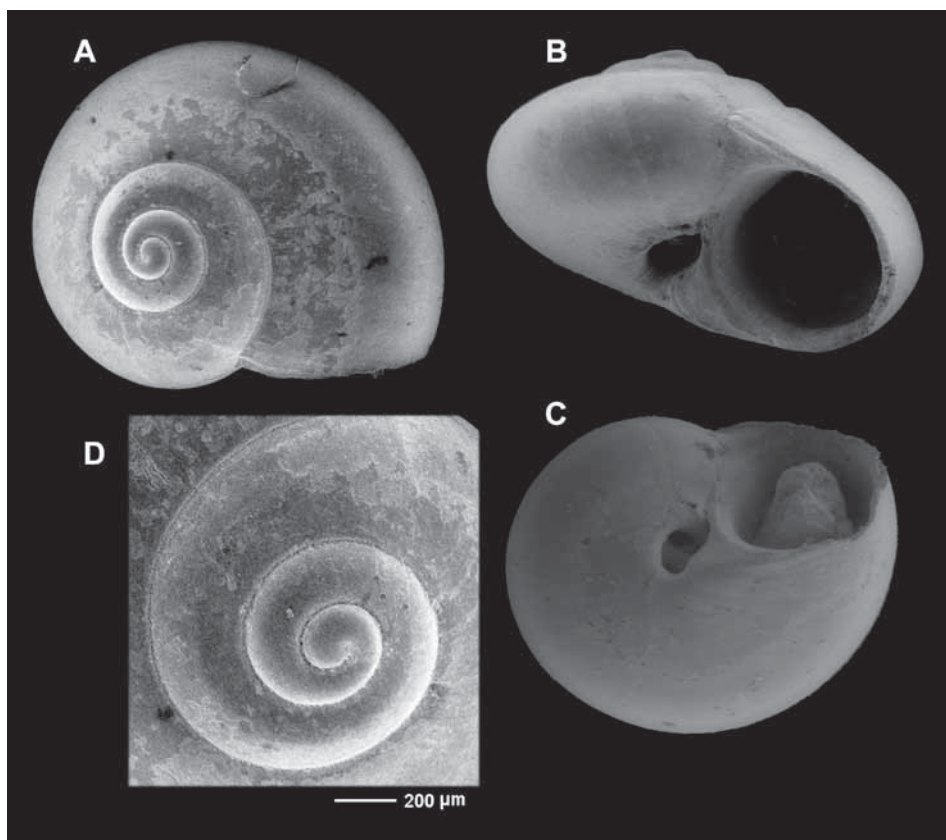


Figure 48

A-D. *Leucorhynchia haesitans* n. sp. A-C: holotype, 2.4 mm in diameter, Papua New Guinea, Vitiaz Strait, 06°03'S-147°36'E, 410 m (MNHN); D: protoconch and first teleoconch whorl.

Figure 48

A-D. *Leucorhynchia haesitans* n. sp. A-C: *holotipo*, 2,4 mm de diámetro, Papua Nueva Guinea, Estrecho de Vitiaz, 06°03'S-147°36'E, 410 m (MNHN); D: *protoconcha* y *primera vuelta de teleoconcha*.

Etymology: The specific name derives from the past participle of the verb *haesito*, *as*, *are*, *avi*, *atum* which means “to have doubts”, referring to the problems in the comparison of this species with others.

Description: Shell very small (<3.0 mm), wider than high, robust, turritiform, spire laterally viewed, formed by 3.5 whorls, very convex and closely umbilicated.

Protoconch with a little more than 0.75 whorl, about 260 μm in diameter and with a smooth surface.

Teloconch of 2.75 whorls separated by a scarcely marked suture. Periphery convex. Teloconch surface totally smooth, with only fine growth lines to be seen. There are no subsutural or basal axial folds.

Aperture circular with a complete peristome. Inside the apertural border there is a fold on which the operculum abuts. Parietal area covered by a more or less callous layer which is extended adapically covering partially the previous whorl; columella strong and arched, not reflected, a wide triangular callus is extended from the base occluding a little of the umbilicus. Outer lip thick, with a smooth unmodified margin. The surface of the parietal callus and the columella are totally smooth.

Umbilicus narrow and deep, delimited by the increase of the columellar callus. Dimensions: holotype is 2.40 mm in diameter and 1.65 mm in height (H/D: 0.69).

Habitat: Bathyal species dredged at 410 m deep.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia baesitans* n. sp. is characterized by its totally smooth teloconch and by the columellar callus with a triangular shape, which is originated during the development of the shell; also by the strong cord which delimits the umbilicus.

This species is similar to *L. magnucleus* n. sp., from which it differs by the shape of the columellar callus and the smaller size of the protoconch and its nucleus.

***Leucorhynchia magnucleus* n. sp.**

Figure 49A-F

Type material: Holotype (Figs. 49A-D) MNHN-IM-2000-34731.

Material examined: 1 s: New Caledonia, BATHUS 4: 1 s, Stn DW923, 18°52'S-163°24'E, 470-502 m

Type locality: New Caledonia, 18°52'S-163°24'E, 470-502 m [BATHUS 4: Stn DW923].

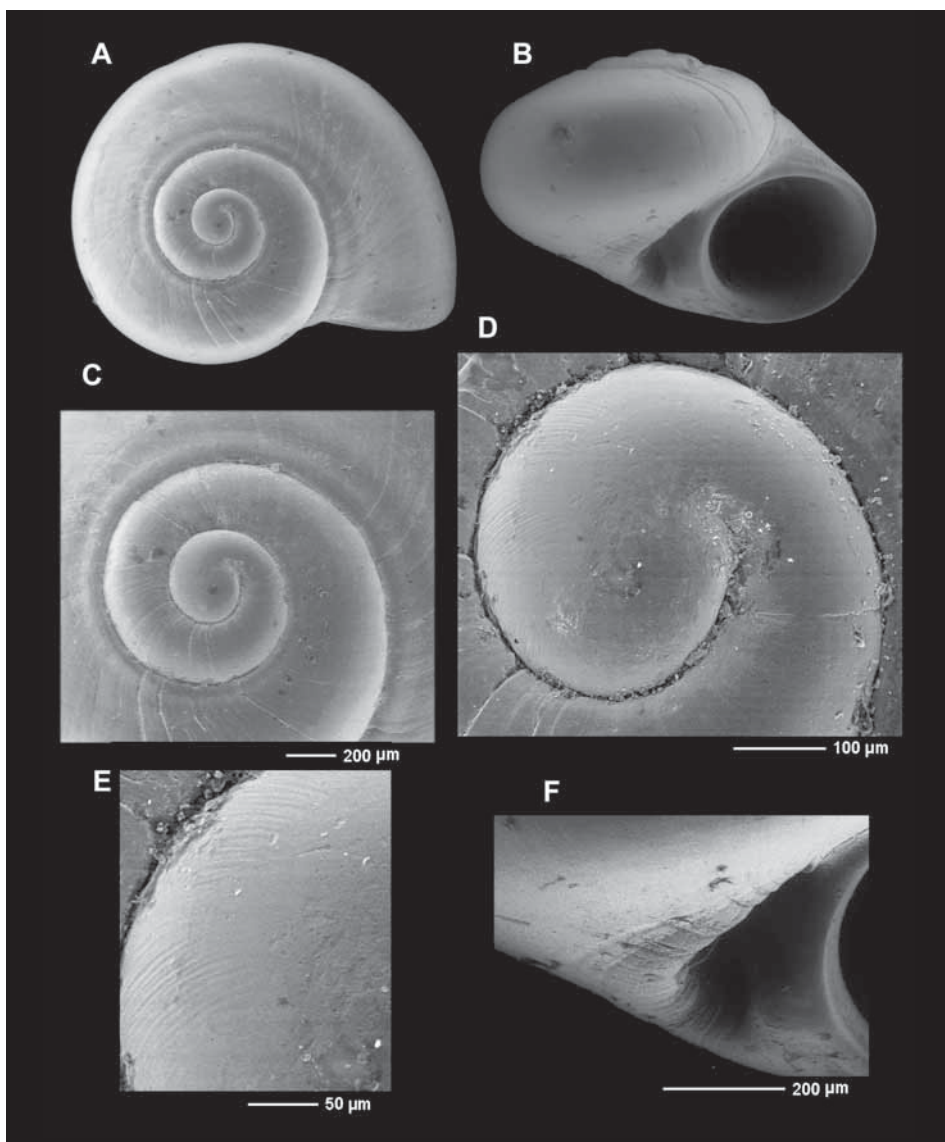


Figure 49

A-F. *Leucorhynchia magnucleus* n. sp.; A-B: holotype, 2.66 mm in diameter, New Caledonia, Stn DW923, 18°52'S-163°24'E, 470-502 m (MNHN); C-E: apex and protoconch from the holotype in detail; F: detail of the holotype.

Figura 49

A-F. *Leucorhynchia magnucleus* n. sp.; A-B: holotipo, 2,66 mm, Nueva Caledonia, Stn DW923, 18°52'S-163°24'E, 470-502 m (MNHN); C-E: ápice y protoconcha del holotipo en detalle; F: detalle del ombligo.

Etymology: The specific name is formed by the Latin words *magnus* “large” and *nucleus* alluding to the large size of the protoconch nucleus.

Description: Shell very small (<3.0 mm), wider than high, robust, turbiniform depressed, spire visible viewed laterally, formed by 3 convex whorls and closely umbilicate. Protoconch with a little more than 0.75 whorl, about 450 µm in diameter with a nucleus of about 270 µm and a smooth surface, except for fine axial wrinkles next to the suture.

Teloconch of 2.25 whorls separated by a marked suture. At the beginning of the teloconch, the suture widens and becomes deeper; it is delimited by a thick sutural cord. Periphery convex. Teloconch surface totally smooth, with only fine growth lines to be seen. There are no subsutural or basal axial folds. Aperture circular with a complete peristome. Inside the apertural border there is a fold on which the operculum abuts. Parietal area covered by a wide callous layer which is extended adapically covering a great part of the previous whorl. Columella thick and arched, not reflected. A wide callus with nodular form is present at the base, increasing the umbilical margin. The surface of the parietal and columellar callus is totally smooth.

Umbilicus narrow and deep, delimited by the thickening of the columellar callus.

Dimensions: holotype size: 2.66 mm in diameter and 1.77 mm in height (H/D: 0.67).

Habitat: Bathyal species dredged at 470-502 m deep.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia magnucleus* n. sp. is characterized by the size of its protoconch; by the marked growth lines; by lacking the axial adapical and basal folds; and by the nodular shape of the columellar callus.

This species is similar in shape to *L. haesitans* n. sp. and *L. levis* n. sp. From the first, it may be distinguished by its larger protoconch and also by the nodular shape of the parietal callus. From *L. levis* n. sp. it may be separated by the size of the protoconch and nucleus and by the parietal callus which do not cover the umbilicus.

***Leucorhynchia levis* n. sp.**

Figure 50A-D

Type material: Holotype (Fig. 50A-C) MNHN-IM-2000-34732.

Material examined: **1 s:** Vanuatu, SANTO 2006: 1 s, NE coast of Malo Island, Stn EP30, 15°38'S-167°05'/05.4'E, 103-120 m.

Type locality: Vanuatu, NE coast of Malo Island, 15°38'S-167°05'E, 103-120 m [SANTO 2006: Stn EP30].

Etymology: The specific name is from the Latin word *levis*, *e*, which means “light, scarcely heavy” alluding to the lightness and the lacking of protuberances on the shell, which is smooth.

Description: Shell very small (<2.5 mm), wider than high, robust, depressed, turbiniform, spire formed by 4.0 whorls, very convex and not umbilicated. Protoconch with a little more than 0.75 whorl, about 210 µm in diameter and a smooth surface.

Teleoconch of 3.25 whorls separated by a scarcely marked suture. Convex periphery. Teleoconch surface totally smooth. There are no subsutural or basal axial folds.

Aperture circular with a complete peristome. Inside the apertural border there is a fold on which the operculum abuts. Parietal area covered by a fine callous layer which is extended adapically covering partially the previous whorl; columella thick, arched and reflected. At the base of the external lip, a thick callous layer is extended towards the umbilicus occluding it totally, except for a parietal hole. Outer lip thick, with smooth margin, not modified. The surface of the parietal and columellar calluses is totally smooth.

Umbilicus totally covered by an extension of the columellar callus.

Dimensions: holotype is 2.47 mm in diameter and 1.53 mm in height (H/D: 0.62).

Habitat: Bathyal species dredged at 103-120 m deep.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia levis* n. sp. is characterized by having the protoconch at the same level than the first whorls of the teleoconch; by lacking axial

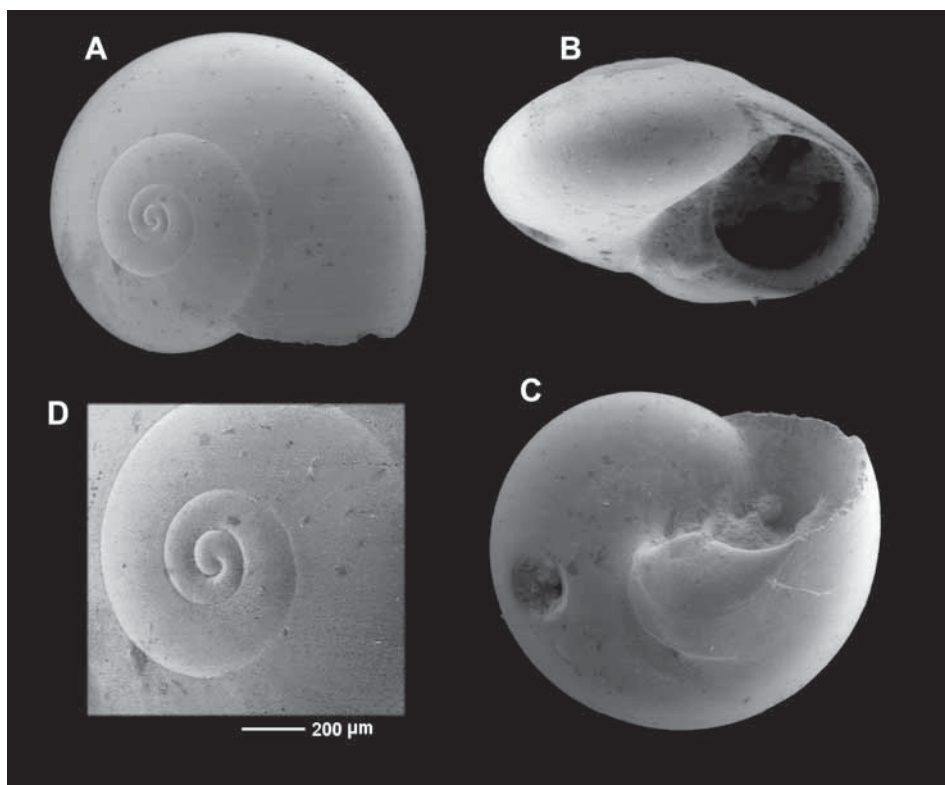


Figure 50

A-D. *Leucorhynchia levis* n. sp. A-C: holotype, 2.47 mm in diameter, Vanuatu, NE coast of Malo Island, 15°38'S-167°05'/05.4'E, 103-120 m (MNHN); D: protoconch.

Figura 50

A-D. *Leucorhynchia levis* n. sp. A-C: holotipo, 2,47 mm de diámetro, Vanuatu, NE costa de la isla de Malo, 15°38'S-167°05'/05,4'E, 103-120 m (MNHN); D: protoconcha.

and basal subsutural folds; and by the small thick denticle at the base of the columella.

From *L. haesitans* n. sp. and *L. magnucleus* n. sp. can be distinguished because in *L. levis* the columellar callus almost covers the entire umbilicus; and also by the lack of a periumbilical cord.

***Leucorhynchia glabra* n. sp.**

Figure 51A-D

Type material: Holotype (Figs. 51A-C) MNHN-IM-2000-34733.

Material examined: **1 s:** Philippines: 1 s, Olango Island, Santa Rosa, 90 m. (collected by Poppe).

Type locality: Philippines, Olango Island, Santa Rosa, 90 m.

Etymology: The specific name is from the Latin name *glaber*, *bra*, *brum* which means “smooth, polished”, alluding to the smooth surface of the shell.

Description: Shell small (<3.0 mm), wider than high, robust, depressed, turbiniform, spire formed by 4.15 whorls, very convex and closely umbilicated. Protoconch with a little more than 0.75 whorl, 220 µm in diameter and a smooth surface.

Teleoconch of 2.75 whorls separated by a shallow suture. Teleoconch surface totally smooth, with only very fine growth lines to be seen. There are no subsutural or basal axial folds.

Aperture circular with a complete peristome. Inside the apertural border there is a fold on which the operculum abuts. Periphery convex. Parietal area covered by a more or less thick callous layer which is extended adapically covering partially the previous whorl; columella thick and arched, not reflected; at the base and also the base of the external lip, a wide callous layer is formed, being extends towards the umbilicus, occluding it almost totally except for a parietal hole; between the callus and the margin of the base of the columella and the external lip a wide and deep sulcus is formed. External lip thick, with a smooth margin, not modified. The surface of the parietal and columellar calluses is totally smooth.

Umbilicus totally covered by the extension of the columellar callus.

Dimensions: holotype is 2.40 mm in diameter and 1.65 mm in height (H/D: 0.69).

Habitat: Infra-circalittoral species dredged at 30-60 m deep.

Distribution: Only known from the type locality.

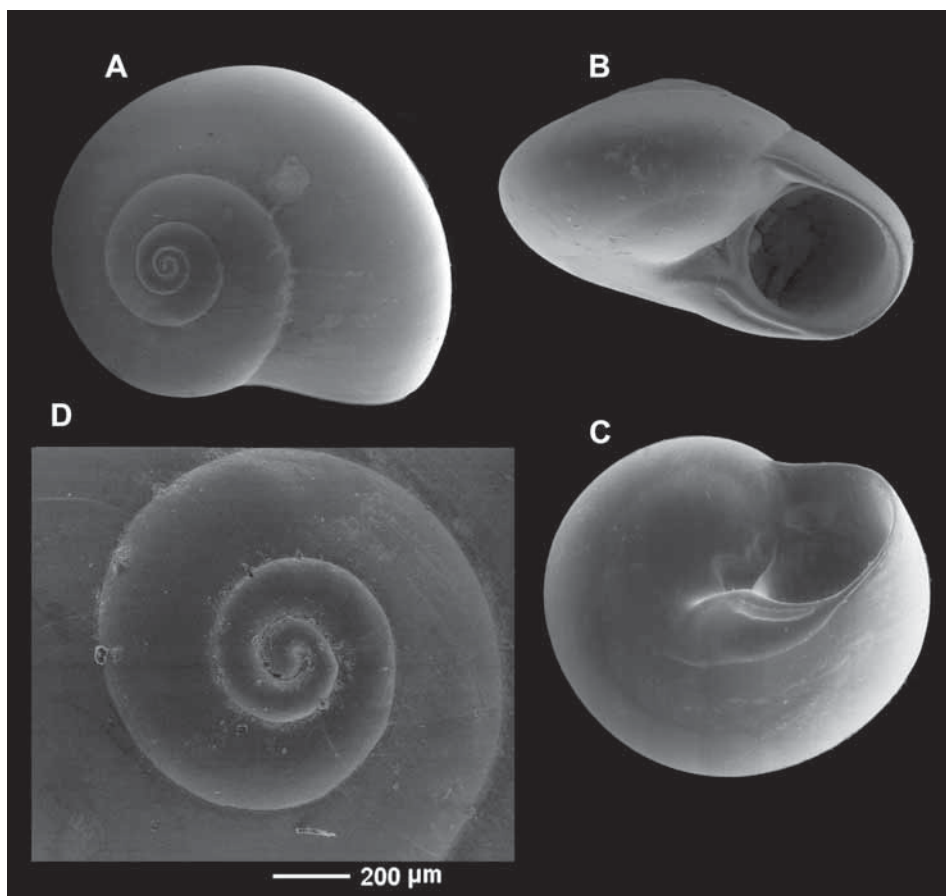


Figure 51

A-D. *Leucorhynchia glabra* n. sp. A-C: holotype, 2.4 mm in diameter, Philippines, Olango Island, Santa Rosa, 90 m (MNHN); D: protoconch and first teleoconch whorls.

Figura 51

A-D. *Leucorhynchia glabra* n. sp. A-C: *holotipo*, 2,4 mm de diámetro, Filipinas, Isla Olango, Santa Rosa, 90 m (MNHN); D: *protoconcha y primera vuelta de teleoconcha*.

Remarks: *Leucorhynchia glabra* n. sp. is characterized by lacking subsutural and basal axial folds, or any sutural groove; also because the basal callus with a thick callous layer totally covers the umbilicus, except for a parietal hole, and by the elongate and deep groove formed between the callus and the columella.

***Leucorhynchia funiculata* n. sp.**

Figure 52A-F

Type material: Holotype (Fig. 52A-B) MNHN-IM-2000-34734 and one paratype MNHN-IM-2000-34735.

Material examined: 2 s: Egypt, Red Sea: 2 s, Hurghada, 50 m; from sediments collected diving in 50 m by the Spanish submarine photographer José Luis Gonzalez.

Type locality: Egypt, Hurghada: from sediments.

Etymology: The specific name alludes to the presence of several cordlets on the first part of the teleoconch.

Description: Shell very small (<2.0 mm), almost as high as it is wide, robust, turbiniform, spire formed by 3.8 whorls, very convex and closely umbilicated. Protoconch with a little more than 0.75 whorl, about 170 µm in diameter and smooth surface.

Teleoconch of 3.0 whorls separated by a marked suture. Very convex periphery. Teleoconch surface totally smooth, except for the 1 ½ first whorls that are covered by spiral cordlets, with fine axial rows very close between them in the interspaces; below 1 ½ whorls the cords disappear and the surface becomes totally smooth.

There are no subsutural or basal axial folds.

Aperture circular with a complete peristome. Inside the apertural border there is a fold on which the operculum abuts. Parietal area covered by a thick callous layer which is extended adapically covering a small part of the previous whorl. Columella not very strong, arched, with a callous extension of the columellar callus in the shape of a half moon, extending from the base of the columella towards the umbilicus, but without occluding it. External lip thick, with smooth margin, not modified. The surface of the parietal and columellar calluses is totally smooth.

Umbilicus narrow and deep, without spiral cordlets around it; the extension of the columellar callus occurs before the umbilicus but without occluding it. Dimensions: holotype is 1.64 mm in diameter and 1.22 mm in height (H/D: 0.90).

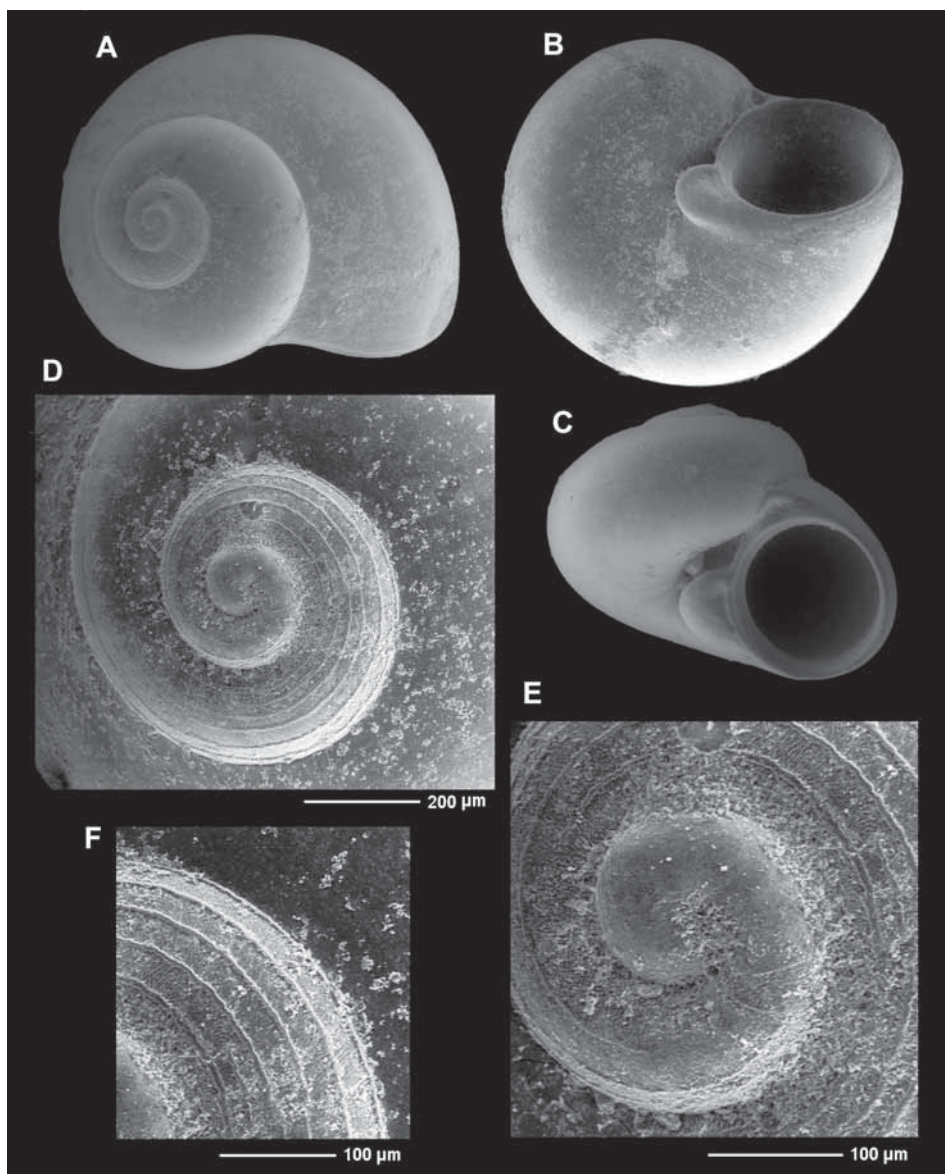


Figure 52

A-F. *Leucorhynchia funiculata* n. sp. A-B: holotype, 1.64 mm in diameter, Egypt, Hurgada, 50 m (MNHN); C: paratype, 1.38 mm, same locality, (MNHN); D-F: first teleoconch whorl, protoconch and detail from the holotype.

Figura 52

A-F. *Leucorhynchia funiculata* n. sp. A-B: *holotipo*, 1,64 mm de diámetro, Egipto, Hurgada, 50 m (MNHN); C: *paratipo*, 1,38 mm de la misma localidad, (MNHN); D-F: *primeras vueltas de teleoconcha, protoconcha y detalle, del holotipo*.

Habitat: The material of the present species was collected in sediments on sand bottom.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia funiculata* n. sp. is characterized by its globose spire, by the sculpture of the first 1 ½ whorls of the teleoconch, which is composed of spiral cordlets and fine axial fillets in the interspaces; and by the half-moon shape of the columellar callus.

The other species of the group like *L. globosa* n. sp., *L. perinde* n. sp., *L. iterata* n. sp., *L. papuaensis* n. sp., *L. haesitans* n. sp., *L. magnucleus* n. sp. and *L. levis* n. sp. may be easily differentiated because in all of them the 1 ½ first whorls of the teleoconch lack evident spiral cordlets.

***Leucorhynchia celata* n. sp.**

Figure 53A-D

Type material: Holotype (Figs. 53A-C) MNHN-IM-2000-34736.

Material examined: 1 s: Society Islands, TARASOC: 1 s, Huahine, Stn DW3435, 16°41'S-151°02'W, 500-612 m.

Type locality: Society Islands, Huahine, 16°41'S-151°02'W, 500-612 m [TARASOC: Stn DW3435].

Etymology: The specific name derives from the past participle of the Latin verb *cello*, *as*, *are*, *avi*, *atum*, which means “to hide”, referring to the fact that the umbilicus is not visible in adults of this species.

Description: Shell very small (<2.5 mm), almost as high as it is wide, robust, turbiniform, spire formed by 3.30 whorls, very convex and not umbilicate. Protoconch with a little more than 0.75 whorl, about 300 µm in diameter, with a nucleus of 150 µm and a smooth surface.

Teleoconch of 2.5 whorls, very convex, separated, with a totally smooth surface. There are no subsutural axial folds. The first whorl is uniformly narrow, and then immediately widens. A subsutural cord begins after 1 ½ teleoconch whorls.

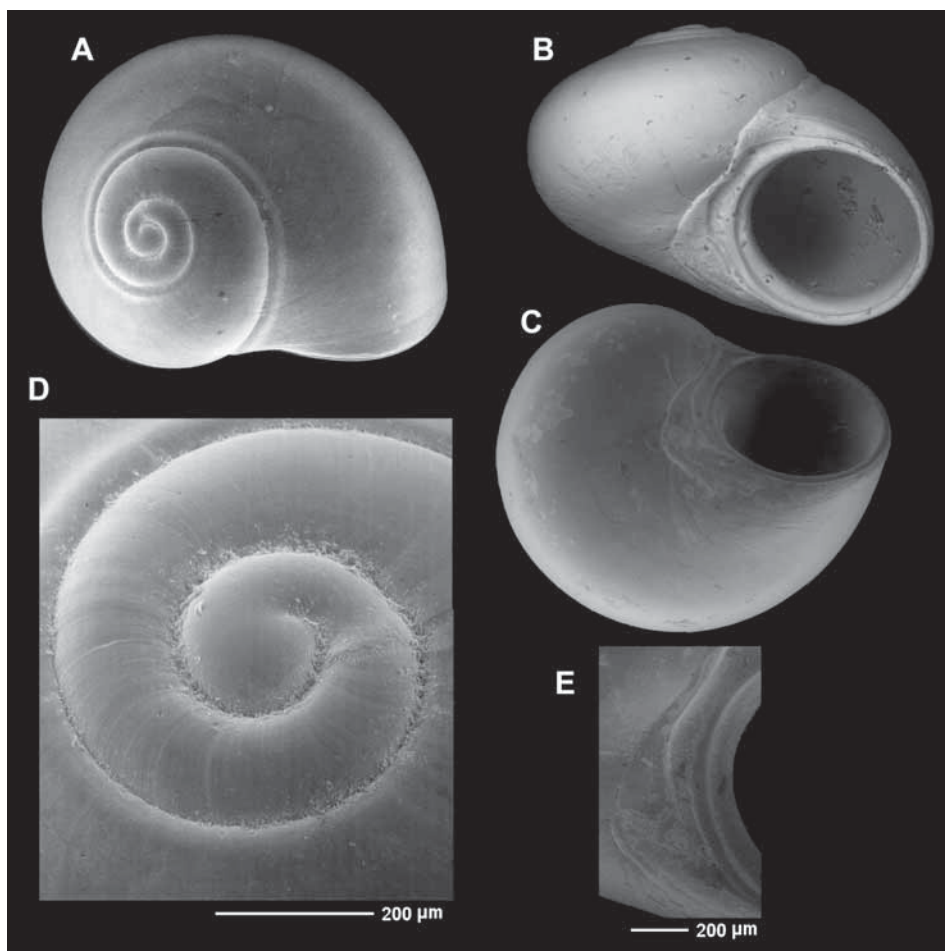


Figure 53

A-E. *Leucorhynchia celata* n. sp. A-C: holotype, 2.18 mm in diameter, Society Islands, Huahine, Stn DW3435, 16°41'S-151°02'W, 500-612 m (MNHN); D: protoconch; E: detail of the umbilical area.

Figura 53

A-E. *Leucorhynchia celata* n. sp. A-C: *holotipo*, 2,18 mm de diámetro, Islas de la Sociedad, Huahine, Stn DW3435, 16°41'S-151°02'W, 500-612 m (MNHN); D: *protoconcha*; E: *detalle del área umbilical*.

Aperture circular with a complete peristome. Inside the apertural border there is a fold on which the operculum abuts. Parietal area covered by a thick callous layer which is extended adapically covering a small part of the previous

whorl; columella strong, arched, while an extension of the columellar callus occludes completely the umbilicus. External lip thick, with smooth margin, not modified. The surface of the parietal and columellar calluses is totally smooth.

Umbilicus covered by the extension of the columellar callus; around it 2-3 fine axial folds can be observed; there are no spiral cordlets.

Dimensions: holotype is 2.18 mm in diameter and 1.53 mm in height (H/D: 0.7).

Habitat: Bathyal species dredged at 500-612 m deep.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia celata* n. sp. is characterized by the large size of the protoconch and its nucleus; by lacking axial folds abapically and presenting 2-3 fine folds on its base; and by the columellar callus layer that completely covers the umbilicus.

L. magnucleus n. sp. has a wider protoconch and also a larger nucleus.

***Leucorhynchia peculiaris* n. sp.**

Figure 54A-D

Type material: Holotype (Figs. 54A-C) MNHN-IM-2000-34737.

Material examined: 1 s: Solomon Islands, SALOMON 1: 1 s, Stn DW1762, 8°40'S-160°04'E, 396-411 m.

Type locality: Solomon Islands, 8°40'S-160°04'E, 396-411 m [SALOMON 1: Stn DW1762].

Etymology: The specific name is from the Latin adjective *peculiaris*, *e* that means “special”, alluding to some characters not usually found in the species of this genus.

Description: Shell small (<3.5 mm), wider than high, robust, depressed-turbiniiform, formed by 4.3 whorls, very convex and closely umbilicated. The protoconch has $\frac{3}{4}$ of a whorl, measures 220 µm in diameter and has a smooth surface.

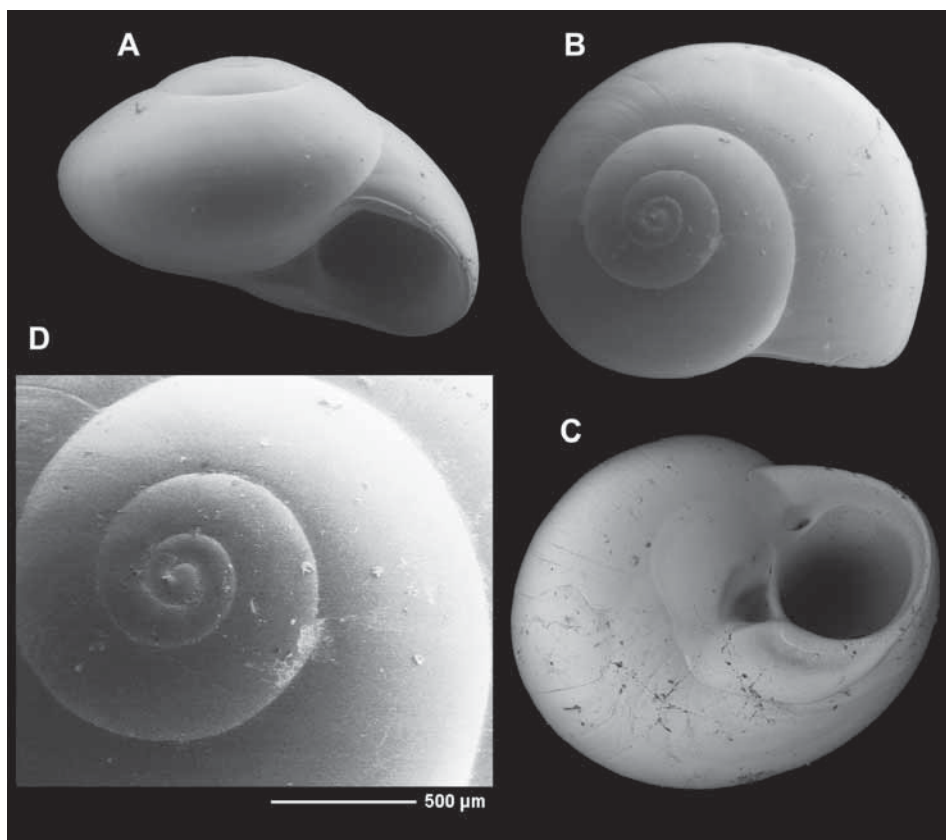


Figure 54

A-D. *Leucorhynchia peculiaris* n. sp. A-C: holotype, 3.25 mm, Solomon Islands, Stn DW1762, 8°40'S-160°04'E, 396-411 m (MNHN); D: protoconch and beginning of the teleoconch.

Figura 54

A-D. *Leucorhynchia peculiaris* n. sp. A-C: holotipo, 3,25 mm, Islas Salomón, Stn DW1762, 8°40'S-160°04'E, 396-411 m (MNHN); D: protoconcha y comienzo de la teleoconcha.

Teleoconch of 3.5 whorls separated by a marked suture. Teleoconch surface totally smooth, with only isolated growth lines to be seen. There are no subsutural or basal axial folds.

Aperture circular with a complete peristome. Inside the apertural border there is a thin fold on which the operculum abuts. Periphery convex. Parietal area

covered by a callous layer of variable thickness which is extended adapically covering partially the previous whorl; columella thick, arched, reflected at base, with a strong callus located between the base of the outer lip and the base of the columella, which extends into the umbilicus, surrounding it, but without occluding it totally; the surface of the callus between the base of the columella and the base of the external lip forms an elongated depression. Besides the umbilicus, narrow and deep, a parietal hole can be seen.

The surface of the parietal and columellar calluses is totally smooth. Outer lip thick, with smooth margin, not modified.

Dimensions: holotype is 3.25 mm in diameter and 2.20 mm in height (H/D: 0.68).

Habitat: Bathyal species dredged at 396-411 m deep.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia peculiaris* n. sp. is characterized by the clear presence of an umbilicus, narrow and deep, in addition to a parietal hole.

Leucorhynchia peculiaris n. sp. differs from *L. glabra* n. sp., by having a narrow and deep umbilicus in addition to the parietal hole.

***Leucorhynchia sulciobliqui* n. sp.**

Figure 55A-F

Type material: Holotype (Figs. 55A-B) MNHN-IM-2000-34738 and 2 paratypes MNHN-IM-2000-34739.

Material examined: **3 s:** Solomon Islands, SALOMON 1: 3 s, Stn DW1767, 8°19'S-160°40'E, 98-200 m.

Type locality: Solomon Islands, 8°19'S-160°40'E, 98-200 m [SALOMON 1: Stn DW1767].

Etymology: The specific name is the fusion of the two Latin words: *sulcus*, *i*, which means “groove” and *obliquus*, *a*, *um* which means “oblique” alluding to the sculpture of the shell.

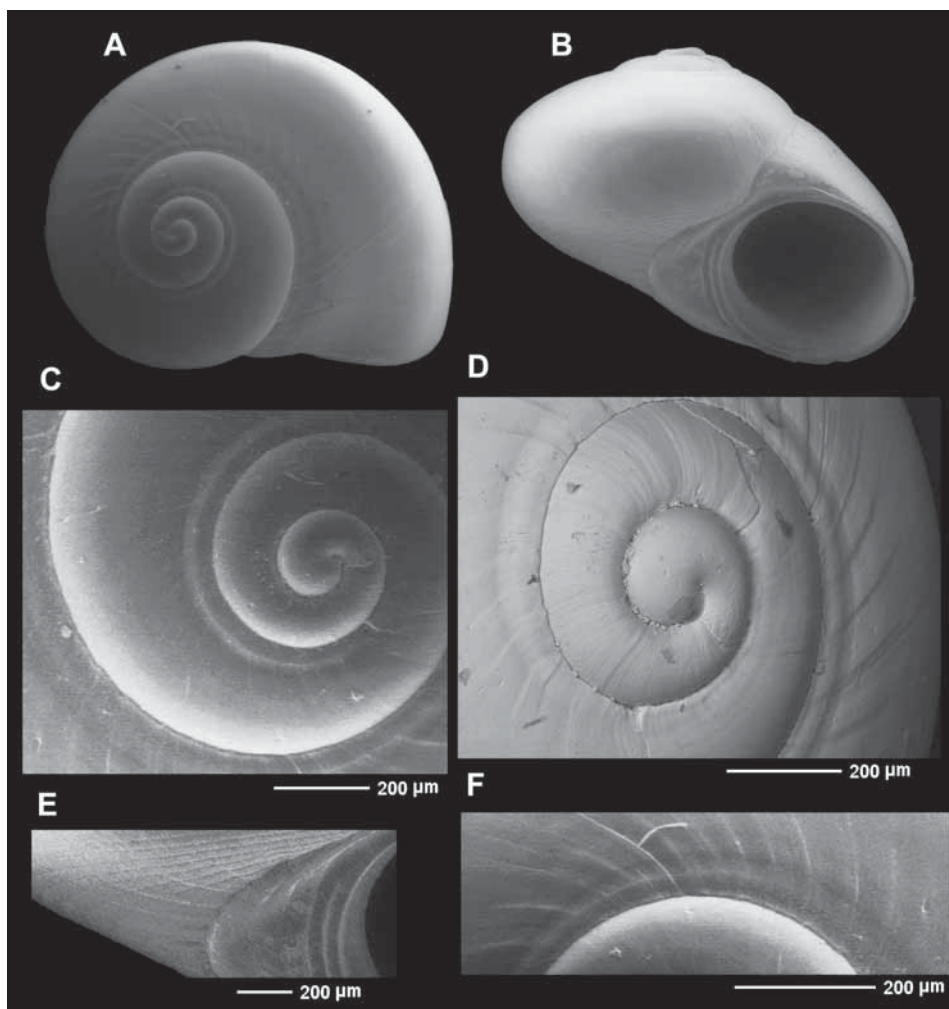


Figure 55

A-F. *Leucorhynchia sulciobliqui* n. sp. A-B: holotype, 2.7 mm, Solomon Islands, 8°19'S-160°40'E, 98-200 m (MNHN); C-D: protoconch; E: detail of the microsculpture of the base; F: sculpture of the adapical part.

Figura 55

A-F. *Leucorhynchia sulciobliqui* n. sp. A-B: holotipo, 2,7 mm, Islas Salomón, 8°19'S-160°40'E, 98-200 m (MNHN); C-D: protoconcha; E: detalle de la microescultura de la base; F: escultura de la parte adapical.

Description: Shell small (<3.0 mm), wider than high, robust, turbiniform, formed by 3.4 whorls, very convex and not umbilicate.

Protoconch with a little more than 0.75 whorl, with 225 µm in diameter and a smooth surface.

Teleoconch of 2.6 whorls separated by a lightly marked suture. Teleoconch surface totally smooth, except for fine periumbilical cords and strong prosocline oblique sulcus like growth lines, more evident subsuturally and periumbilically.

There are no subsutural or basal axial folds.

Aperture circular with a complete peristome. Inside the inner lip there is a fold on which the operculum abuts. Periphery convex. Parietal area covered by a thick callous layer which is extended adapically covering partially the previous whorl; columella thick and arched, not reflected; surface of both callused layers, depressed, forming a wide and deep groove parallel to the inner lip; a thick callused layer extends from the columella, completely covering the umbilicus. Outer lip thick, with a smooth margin, not modified.

Umbilicus totally covered by the extension of the columellar callus.

Dimensions: holotype is 2.70 mm in diameter and 2.03 mm in height (H/D: 0.75).

Habitat: Bathyal species dredged at 98-200 m deep.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia sulciobliqui* n. sp. is characterized by its turbiniform shape; thick subsutural cord; periumbilical spiral cords; thick axial prosocline sulcus and growth lines, more evident next to the suture and around the umbilicus and the columellar callus that extends, completely covering the umbilicus.

Indo Pacifico Group 3 Candida

The species of this group are characterized by the fact that the first whorl of the teleoconch is ornamented with grooves or small cells, which are then transformed into fine grooves that cover the entire surface of the teleoconch. The callus is moderately sized, covers the umbilicus totally or partially, and occasionally shows cords.

The group includes 21 species:

Indo Pacific group 3

- <i>Leucorhynchia candida</i> (A. Adams, 1862).....	J	Fig 56
- <i>Leucorhynchia rotata</i> Hedley, 1899.....	Fu	Fig 57
- <i>Leucorhynchia radiata</i> n. sp.....	Fi.....	Fig 58
- <i>Leucorhynchia raquelae</i> n. sp.....	NCL	Fig 59
- <i>Leucorhynchia operta</i> n. sp.....	PNG	Fig 60
- <i>Leucorhynchia reunionensis</i> n. sp	R.....	Fig 61
- <i>Leucorhynchia stellata</i> n. sp	Ph	Fig 62
- <i>Leucorhynchia sculpturata</i> n. sp	R.....	Fig 63
- <i>Leucorhynchia persculpturata</i> n. sp	MI.....	Fig 64
- <i>Leucorhynchia arctusulcus</i> n. sp.....	Mo.....	Fig 65
- <i>Leucorhynchia torta</i> n. sp	PNG	Fig 66
- <i>Leucorhynchia marcosi</i> n. sp.....	PNG,Ph,Th.....	Fig 67,68,69
- <i>Leucorhynchia lluviae</i> n. sp.....	V,NC,SI.....	Fig 70,71
- <i>Leucorhynchia thailandensis</i> n. sp	Th	Fig 72
- <i>Leucorhynchia letourneuxi</i> n. sp	SI.....	Fig 73,74
- <i>Leucorhynchia distorta</i> n. sp	So	Fig 75
- <i>Leucorhynchia colurible</i> n. sp	Th	Fig 76
- <i>Leucorhynchia assessa</i> n. sp	Mi	Fig 77
- <i>Leucorhynchia parvicostae</i> n. sp	Mi	Fig 78,79
- <i>Leucorhynchia levinicium</i> n. sp	Th	Fig 80
- <i>Leucorhynchia osmagnum</i> n. sp	PNG	Fig 81

***Leucorhynchia candida* (A. Adams, 1862)**

Figure 56A-E

Ethalia candida A. Adams, 1862. *Annals and Magazine of Natural History* (3) 9: 295-298 [Type locality: Gotto islands].

Leucorhynchia candida (A. Adams, 1862): HIGO ET AL., (1999). *Elle Scientific Publication*, pp. 69 [G505].

Type material: *Ethalia candida* A. Adams, 1862. Type. Victoria Museum, Australia (registration number F31517). Gotto Island, Japan. Purchased from Geale. Only photographs examined.

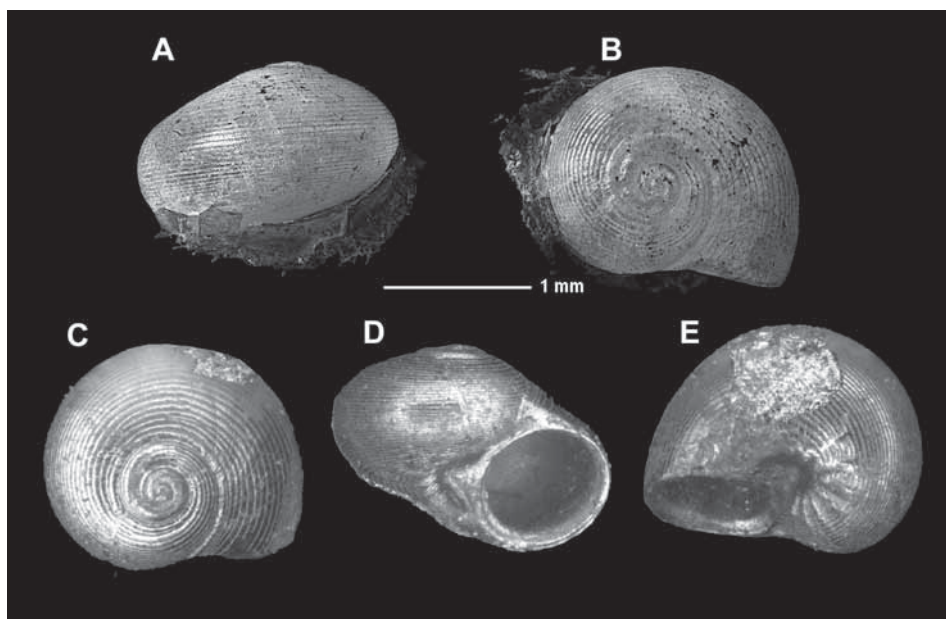


Figure 56

A-E. *Ethalia candida* A. Adams, 1862. A-B: syntype, 1.76 mm in diameter, NHMUK 1878.1.28.145. Japan. C-E: syntype, 1.86 mm, Gotto Island, Japan. Victoria Museum (F31517).

Figura 56

A-E. *Ethalia candida* A. Adams, 1862. A-B: sintipo, 1,76 mm de diámetro, NHMUK 1878.1.28.145. Japón. C-E: sintipo, 1,86 mm, Isla de Gotto, Japón. Victoria Museum (F31517).

Ethalia candida A. Adams, 1862, syntype? registration number NHMUK 1878.1.28.145. Locality: Japan. Ex. H. Adams collection. Purchased from Geale (no original labels). Only photographs examined.

Material examined: 1 spm, labelled as *Ethalia candida*. NMW-National Museum Wales. Coll. Melvill-Tomlin. NMW.1955.158. PR56570. China Seas. Original collection: E.A. Marie.

Description based on the type in the Museum of Victoria (F31517): Shell very small (<2.00 mm), robust, depressed-turbiniform, formed by 3.5 whorls, not keeled and narrowly umbilicate.

Protoconch with about 3/4 of a whorl and about 240 µm in diameter; it is higher than the other whorls of the shell.

Teloconch with a little more than 3 whorls separated by a moderately impressed suture; periphery rounded, keeled.

The entire surface of the teloconch is covered by fine spiral grooves (or smooth), with adapical and or basal folds.

Aperture circular with an entire peristome. Parietal callus very thick, columellar callus curved and reflected towards the umbilicus which is occluded.

Dimensions: the type measures 1.86 mm in diameter and 1.40 mm in height (H/D: 0.75).

Habitat: Dredged at 71 fms (A. Adams, 1862).

Distribution: Gotto Islands (A. Adams, 1862); Pacific side 34°N, Japan Sea side 35°N (Kuroda & Habe, 1952).

Remarks: *Leucorhynchia candida* is characterized by a sculpture of spiral cordlets, an umbilical channel curved by a prominence which begins at the columella; axial ribs very well marked over the abapical part and not appreciable on its adapical part.

***Leucorhynchia rotata* (Hedley, 1899) n. comb**

Figure 57A-F

Teinostoma rotatum Hedley, 1899. *Australian Museum Memoir*, 3(9): 553, fig. 65 [Type locality: off Tutaga Islet, Funafuti Atoll, Tuvalu].

Argalista rotata (Hedley, 1899): Atlas of Living Australia.

Type material: Holotype in Australian Museum (C.5646). Tuvalu, Funafuti Atoll, off Tutaga (Tutaga) Is. (8°37'00"S-179°05'00"E). Examined by photographs.

Description based on the holotype in AMS (C.5646): Shell very small (<2.5 mm), white in colour, wider than high, depressed-turbiniform, formed by 3.3 whorls, slightly bicarinate and umbilicate.

The protoconch has about $\frac{3}{4}$ of a whorl, size around 200 µm and apparently smooth.

Teleoconch of 2.5 whorls separated by a scarcely marked suture; in the last whorl it appears slightly carinated around the periphery. Surface totally covered by spiral cordlets/grooves; the first whorl is smooth, with only some peripheral grooves; subsequently the surface is completely covered with spiral grooves.

At the base there are about eight periumbilical axial folds; there is no subsutural axial sculpture.

Aperture oval, with a continuous peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a thick callous layer which is extended apically covering partially the previous whorl. Columella arched, slightly reflected; at the beginning a small callus is formed with thick cords on its surface, which barely occludes the umbilicus. Outer lip not very thick, with an unmodified smooth margin.

Umbilicus small with crenulated margin.

Dimensions: the holotype is 1.76 mm in diameter.

Habitat: One specimen dredged in 200 fathoms off Tutaga Islet.

Distribution: Only known from the type locality.

Remarks: HEDLEY (1899): "By its small size and peculiarly sculptured base, this species is sufficiently distinguished from the remainder of the genus".

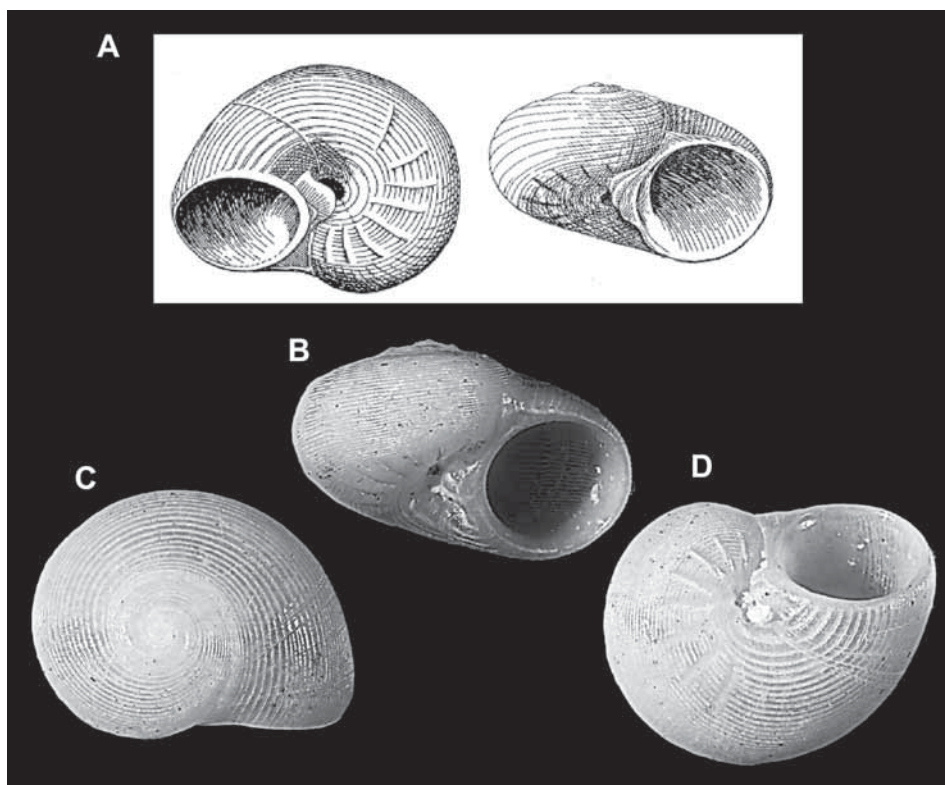


Figure 57

A-C. *Leucorhynchia rotata* (Hedley, 1899). A: holotype, original illustration in Hedley, 1899. B-D: holotype, 1.76 mm (AM-C.5646), Tutaga Islet, Funafuti Atoll, Tuvalu.

Figura 57

A-C. *Leucorhynchia rotata* (Hedley, 1899). A: *holotipo, ilustración original en Hedley, 1899.* B-D: *holotipo, 1,76 mm (AM-C.5646), Islote Tutaga, Funafuti Atoll, Tuvalu.*

Leucorhynchia rotata (Hedley, 1899) is characterized by the 8 periumbilical axial folds that surround the umbilicus and disappear in the last half whorl; by their peripheral spiral cords, narrower and more numerous than in the apical and basal areas; by the columellar callus, which originates at the beginning of the columella, and is rather thick; and, finally, by the spiral cords that penetrate into the umbilicus.

In the Atlas of Living Australia

(<https://biocache.ala.org.au/occurrences/c4de09c3-b1bd-4d4c-9d15-65636ee01073>) this species appears in the genus *Argalista*, but after examination of the holotype we consider that it should be included in the genus *Leucorhynchia*.

***Leucorhynchia radiata* n. sp.**

Figure 58A-F

Type material: Holotype (Figs. 58A-C) MNHN-IM-2000-34771.

Material examined: 1 s: Fiji, MUSORSTOM 10: 1 s, S Viti Levu, Stn CP1366, 18°12.4'S-178°33'E, 149-168 m.

Type locality: Fiji, S Viti Levu, 18°12'S-178°33'E, 149-168 m [MUSORSTOM 10: Stn CP1366].

Etymology: The specific name refers to the distribution of the basal radiating folds.

Description: Shell small (<2.50 mm), wider than high, robust, turbiniform depressed, spire formed by 3.25 whorls separated initially by a marked suture, very convex periphery and not clearly umbilicated.

The protoconch has a little more than of 0.75 whorls, measures about 180 µm in diameter and has a smooth surface.

Teleoconch of 2.5 whorls, ornamented with spiral cords, spiral grooves and micro-granules inside the spiral grooves. The teleoconch surface is totally covered by spiral cords and grooves; initial ornamentation formed by 2-3 spiral grooves located at the periphery; from 0.75 whorl, the spiral grooves totally cover the teleoconch surface; in apertural view 52-54 spiral cords can be observed, distributed between the suture and the umbilical margin. Other 4-5 wider spiral cords are located at the base of the outer lip and penetrate inside the umbilicus. There are 8-9 thick periumbilical axial folds.

Aperture oval, with a continuous peristome. Inside the apertural border there is a fold on which the operculum abuts. Parietal area covered by a very thick callous layer that extends adapically covering partially the previous whorl; columella arched and reflected towards the umbilicus, covered also by a very thick callous layer; a thick callus located at the beginning of the columella



Figure 58

A-F. *Leucorhynchia radiata* n. sp. A-C: holotype, 2.0 mm, Fiji, South of Viti Levu, Stn CP1366, 18°12'S-178°33'E, 149-168 m; D: protoconch; E-F: detail of the sculpture.

Figura 58

A-F. *Leucorhynchia radiata* n. sp. A-C: holotipo, 2,0 mm, Fidji, Sur de Viti Levu, Stn CP1366, 18°12'S-178°33'E, 149-168 m; D: protoconcha; E-F: detalle de la escultura.

almost totally covers the umbilicus. Outer lip not very thick, with smooth margin, not modified by spiral cords. The external surface of the parietal and columellar callus is rough.

Umbilicus almost totally covered by the extension of the columellar callus, there are 4-5 wider spiral cords which penetrate inside and 10 thicker axial folds around.

Dimensions: holotype size is 2.0 mm in diameter and 1.32 mm in height (H/D: 0.66).

Habitat: Bathyal species dredged at 149-168 m depth.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia radiata* n. sp. is characterized by the ornamentation of the beginning of the teleoconch, consisting of 1-2 spiral grooves located at the periphery of the whorl; by the number and shape of the periumbilical radiating folds; and by the location and shape of the columellar callus, which almost totally occludes the umbilicus.

From *L. rotata* (Hedley, 1899) it may be distinguished by the less prominent basal folds and also by the almost closed completely umbilicus.

From *L. torta* n. sp. it is separated by having axial folds around the umbilicus and also because the columellar callus covers it totally.

***Leucorhynchia raquelae* n. sp.**

Figure 59A-G

Type material: Holotype (Fig. 59A-B) MNHN-IM-2000-34772.

Material examined: 1 s: New Caledonia, ATELIER LIFOU 2000: 1 s, Lifou, Santal Bay, Cap Aime Martin, Stn 1441, 20°46.4'S-167°02'E, 20 m, from sediments.

Type locality: Lifou, Santal Bay, 20°46.4'S-167°02'E, 20 m [ATELIER LIFOU 2000: Stn 1441].

Etymology: The specific name is after Raquel Antón Segurado, who made an important part of the SEM micrographs of the present work in the Centro de

Apoyo Científico y Tecnológico of the University of Santiago de Compostela (CACTUS).

Description: Shell small (<5.5 mm), wider than high, robust, depressed turbiniform, spire formed by about 4 whorls, very convex and not umbilicate. The protoconch is located on the same plane as the first two whorls of the teleoconch; it measures a little less than 0.75 whorls, about 250 µm in diameter and has a rough surface with 2 thin spiral threads.

Teleoconch of 3.25 whorls separated by a scarcely marked suture; the first ½ whorl is keeled, but later the keel is reduced until it disappears. Periphery rounded. Teleoconch surface totally covered with spiral grooves; initially the ornamentation is formed by spirally aligned ovoid cells and progressively these become smaller and elongated until they change into fine spiral grooves. There are no subsutural or basal axial folds.

Aperture oval, peristome entire. Inside the aperture there is a fold on which the operculum abuts. Parietal area covered by a thick callous layer which is extended adapically covering partially the previous whorl. Columella arched, lightly reflected. Both in the parietal area in the columella a thick callous layer is formed being extending towards the umbilicus and occluding it totally. Outer lip not very thick, with unmodified smooth margin. The surface of the parietal callus is rough and that of the columellar callus is smooth.

Umbilicus totally covered by the extension of the columellar callus.

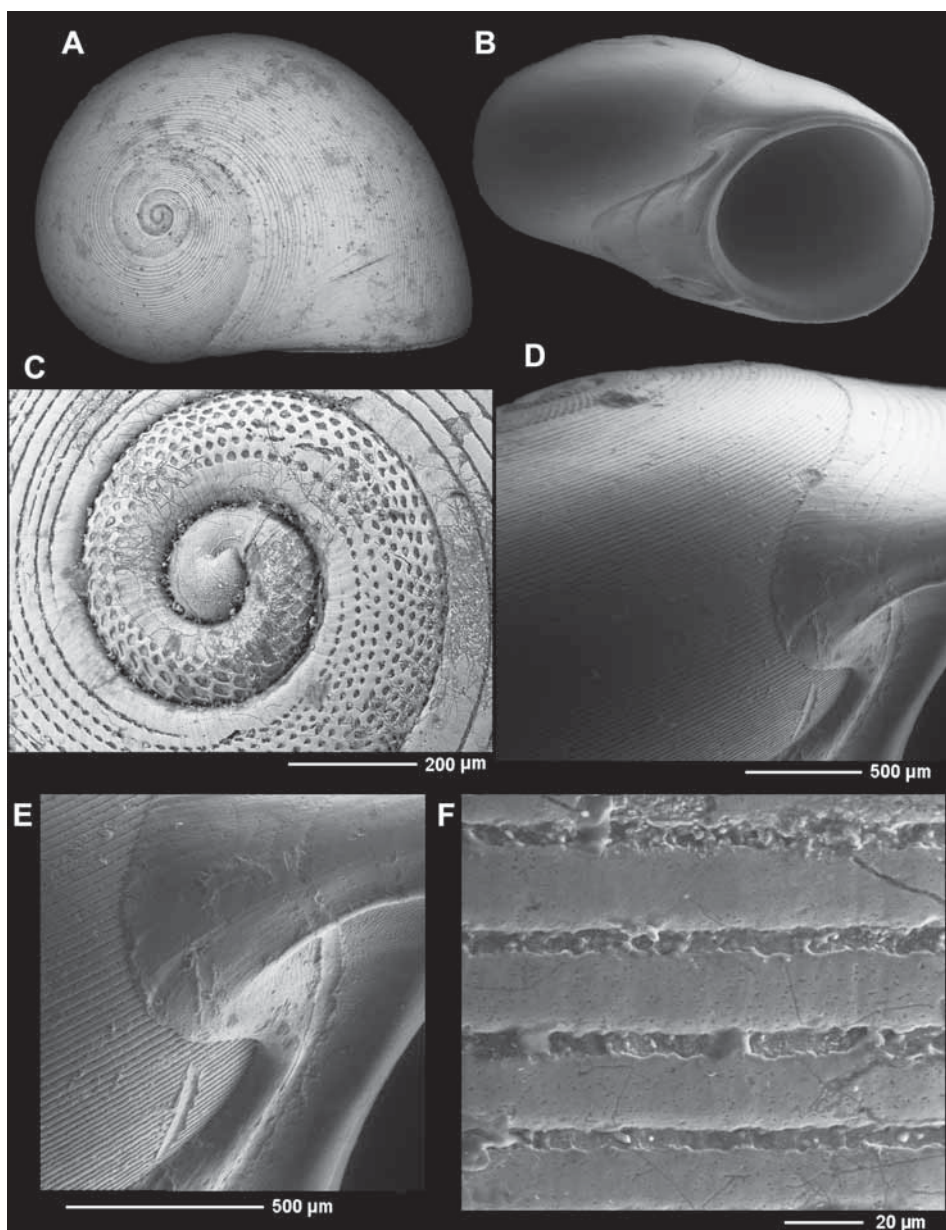
Dimensions: the holotype is 6.1 mm in diameter and 3.8 mm in height (H/D: 0.58).

Figure 59

A-G. *Leucorhynchia raquelae* n. sp. A-B: holotype, 6.1 mm in diameter, Lifou, Santal Bay, 20°46.4'S-167°02'E, 20 m, from sediments (MNHN); C: protoconch; D-E: detail of the upper part of the columella; F: microsculpture.

Figura 59

A-G. *Leucorhynchia raquelae* n. sp. A-B: holotipo, 6,1 mm de diámetro, Lifou, Bahía Santal, 20°46,4'S-167°02'E, 20 m, de sedimentos (MNHN); C: protoconcha; D-E: detalle de la parte superior de la columela; F: microescultura.



Habitat: Infralittoral specie collected by scuba at 20 m in “surplomb sciaphile”.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia raquelae* n. sp. is characterized by its ovoid rounded periphery; by the ornamentation of the early teleoconch; by the lack of subsutural and basal axial folds and because the columellar callus covers completely in sucesive layers the umbilicus.

In general shape, the most similar species is *L. operta* n. sp., from which this can be distinguished by the dense sculpture on the first whorl of the teleoconch, and the larger interspaces at the end of the teleoconch.

***Leucorhynchia operta* n. sp.**

Figure 60A-F

Type material: Holotype (Figs. 60A-C) MNHN-IM-2000-34781 and 3 paratypes MNHN-IM-2000-34782.

Material examined: 4 s: Papua New Guinea, KAVIENG 2014: 4 s, Baudisson Island, Stn KPS09, 02°41.6'S-150°37.2'E, 18-27 m, sediment in ledges, reef wall.

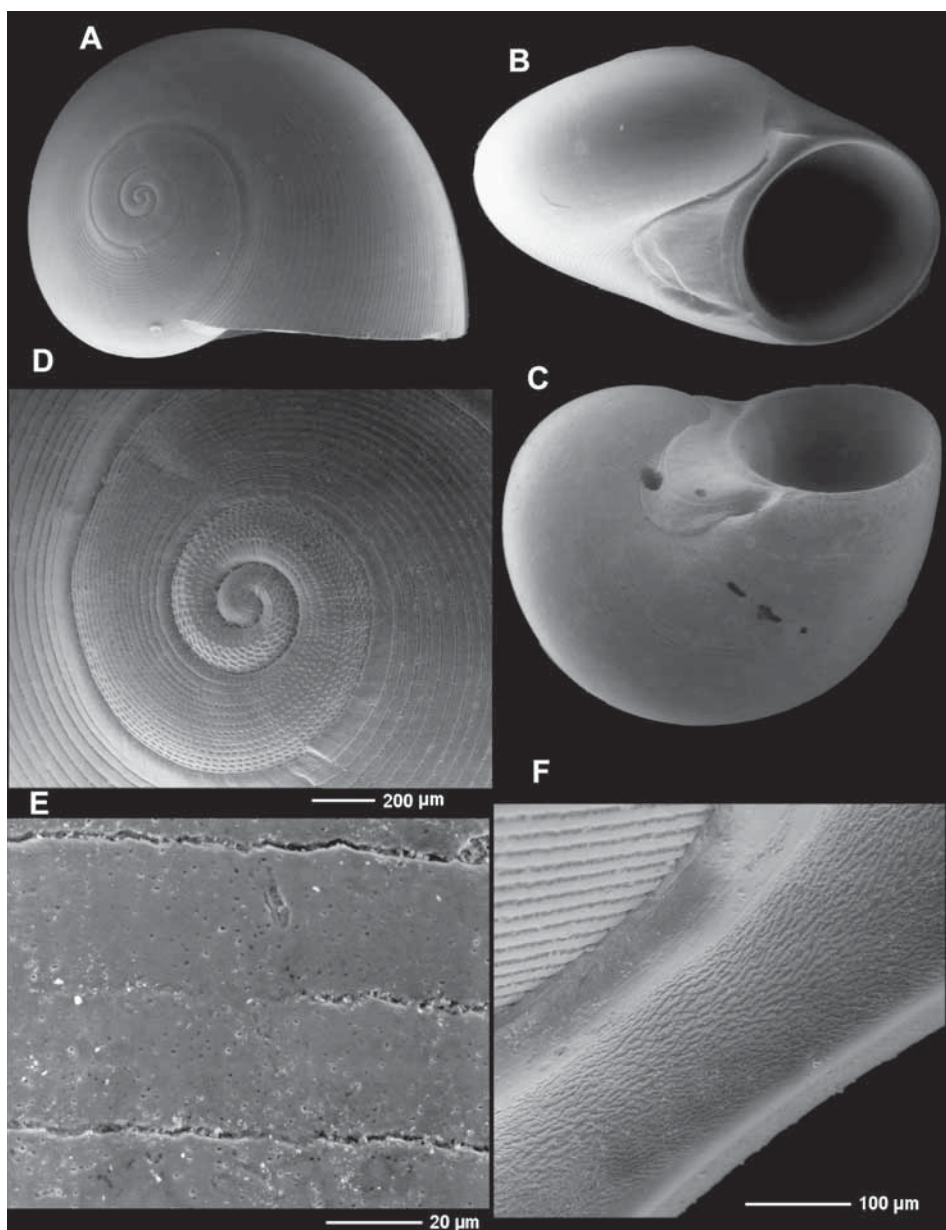
Type locality: Papua New Guinea, Baudisson Island, 02°41.6'S-150°37.2'E, 18-27 m, sediment in ledges, reef wall [KAVIENG 2014: Stn KPS09].

Figure 60

A-F. *Leucorhynchia operta* n. sp. A: holotype, 4.6 mm in diameter, Papua New Guinea, Baudisson Island, Stn KPS09, 18-27 m (MNHN); B-C: paratypes, 5.3, 4.8 mm in diameter; D: protoconch and first teleoconch whorl from the holotype; E: sculpture of the teleoconch; F: microsculpture of the columella.

Figura 60

A-F. *Leucorhynchia operta* n. sp. A-C: *holotipo*, 4,6 mm de diámetro, Papua Nueva Guinea, Isla Baudisson, Stn KPS09, 18-27 m (MNHN); B-C: *paratipos*, 5,3, 4,8 mm de diámetro; D: *protoconcha y primera vuelta de teleoconcha del holotipo*; E: *escultura de la teleoconcha*; F: *microescultura de la columela*.



Etymology: The specific name is the past participle of the Latin verb *operio*, *is, ire, perui, pertum*, which means “cover, conceal” referring to the callus that occludes the umbilicus.

Description: Shell small (<5.5 mm), wider than high, robust, turbiniform, depressed, spire formed by about 4 whorls, very convex and not umbilicated. The protoconch is located on the same plane as the first two whorls of the teleoconch; it measures a little more than 0.75 whorls, about 250 µm in diameter, and has a rough surface with 2 thin spiral threads, ending in a thick labial varix.

Teleoconch of 3.25 whorls separated by a lightly marked suture; the first ½ whorl is keeled, then the keel becomes smooth until it disappears. Periphery ovoid. Teleoconch surface totally covered by fine spiral grooves, except in the small periumbilical area around the callus that covers the umbilicus; more than one hundred spiral grooves are observed in the last quarter whorl. Initial ornamentation formed by oval/rounded cells, aligned spirally, that gradually become smaller and lengthen, turning into fine spiral grooves.

There are no subsutural or basal axial folds.

Oval aperture, peristome entire. Inside the apertural border there is a fold on which the operculum abuts.

Parietal area covered by a very thick callous layer that extends adapically partially covering the previous whorl; columella arched and slightly reflected. Next to the parietal and columellar area, along the inner lip, there is a concave space, with a rough surface (Fig. 60F); from this space, successive callous layers extend, finally covering the umbilicus completely.

Outer lip not very thick, with a non-modified smooth margin. The surface of the parietal callus is rough, but that of the columella is completely smooth.

Umbilicus completely covered by the extension of the columellar callus.

Dimensions: the holotype is 4.6 mm in diameter and 2.7 mm in height (H/D: 0.58).

Habitat: Infralittoral species collected at 27-28 m in sediment in ledges, reef wall.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia aperta* n. sp. is characterized by its ovoid profile; by the initial ornamentation which is formed by oval/rounded cells, spirally

aligned; and by the high number of visible spiral grooves in the last teleoconch whorl.

The most similar species is *L. raquelae* n. sp., from which it can be differentiated by having a more ovoid profile and a higher number of spiral grooves in the last quarter whorl.

***Leucorhynchia reunionensis* n. sp.**

Figure 61A-F

Type material: Holotype (Figs. 61A-B) MNHN-IM-2000-34779 and 13 paratypes (Figs. 61C-D) MNHN-IM-2000-34780.

Material examined: 14 s: Reunion Island, MD32 (REUNION): 14 s, Stn DC56, 21°05'S-55°12'E, 170-225 m.

Type locality: Reunion Island, 21°05'S-55°12'E, 170-225 m MD32 (REUNION): Stn DC56.

Etymology: The specific name is after the island where the species was collected.

Description: Shell small (<4.5 mm), wider than high, robust, turbiniform and depressed, spire formed by 4 whorls, very convex and narrowly umbilicated. The protoconch is located in the same plane as the first two whorls of the teleoconch; it has a about 0.75 whorl, with about 240 µm in diameter, a rough surface with at less one thin spiral thread, ending in a thick labial varix.

Teleoconch of 3.25 whorls separated by a suture lightly marked; the first ½ whorl is keeled, then the keel is softened till disappear. Periphery rounded. Teleoconch surface totally covered by numerous fine spiral grooves.

Initial ornamentation is formed by diamond cells, spirally aligned and that gradually become smaller and lengthen, turning into fine spiral grooves. There are 23-24 basal axial folds which are situated around the umbilicus; there are no axial subsutural folds.

Aperture circular with an entire peristome. Inside the outer lip there is a fold on which the operculum abuts.

Parietal area covered by a very thick callous layer that extends adapically covering partially the previous whorl; columella arched, slightly reflected.

Next to the parietal area a concave space is formed, extending to the beginning of the columella, whose surface is rough.

Both in the parietal as in the columella is formed a thick callous layer that extends towards the umbilicus but not occluding it. Outer lip not very thick, of smooth margin, non-modified. The surface of the parietal callus is rough and the columellar one is completely smooth.

Between the base of the columella and the base of the outer lip, a thick callus is formed with a triangular shape, forming a thick cord that delimits the umbilicus.

Dimensions: holotype is 4.37 in diameter x 2.56 mm in height (H/D: 0.58).

Habitat: Bathyal species dredged at 170-225 m depth.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia reunionensis* n. sp. is characterized by the beginning of the ornamentation of the teleoconch, formed by rhomboidal cells; by the high number of axial folds placed around the umbilicus; and by the shape and size of the columellar callus.

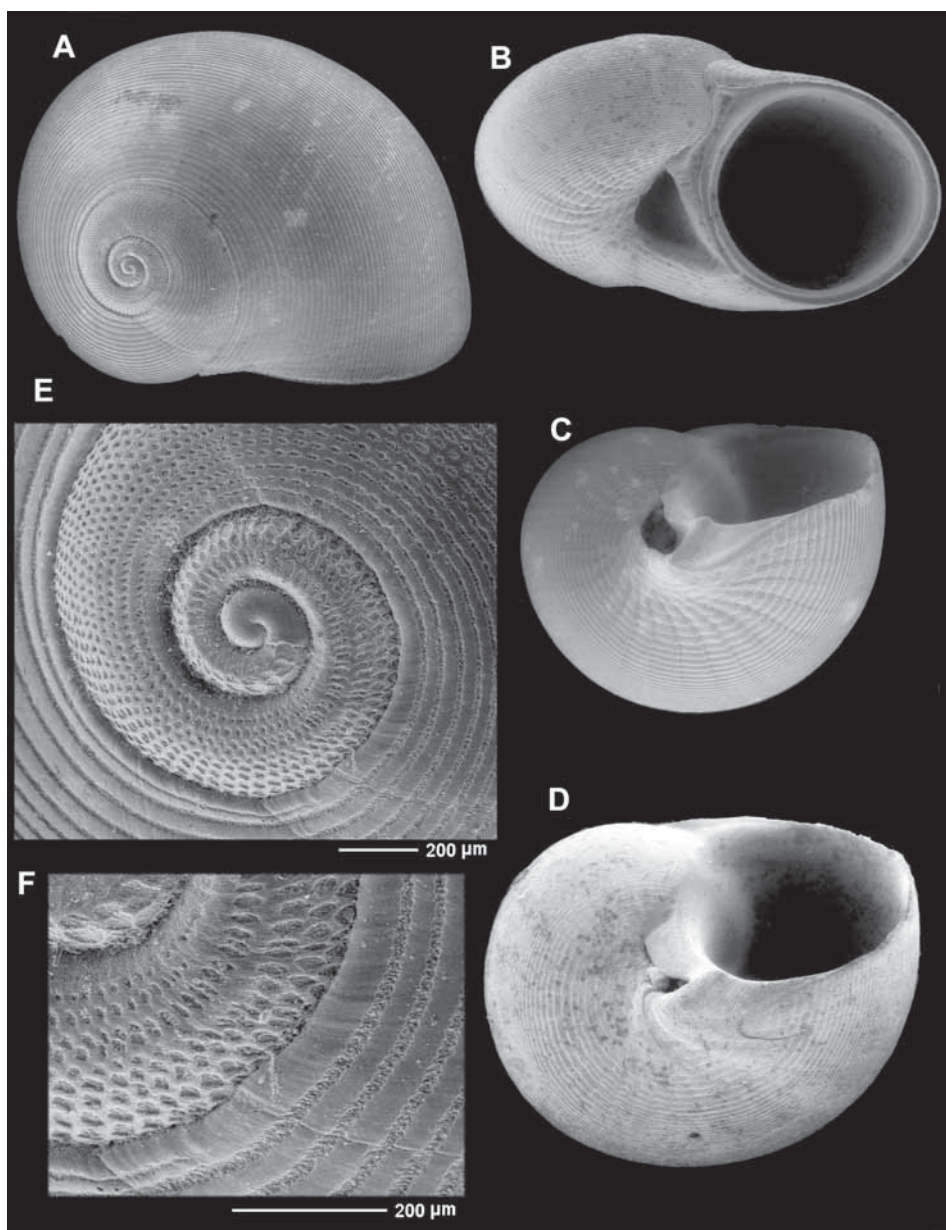
L. raquelae n. sp. and *L. operta* n. sp. are species with a similar ornamentation, from which it can be differentiated by its rounded profile; by having periumbilical axial folds; by the shape of the columellar callus; and because the callus does not cover the umbilicus completely.

Figure 61

A-F. *Leucorhynchia reunionensis* n. sp. A: holotype, 4.37 mm in diameter, Reunion, Stn DC56, 170-225 m (MNHN); B-D: paratypes, 4.4, 3.46, 4.43 mm in diameter, same locality (MNHN); E: protoconch and first teleoconch whorls; F: detail of the microsculpture.

Figura 61

A-F. *Leucorhynchia reunionensis* n. sp. A: holotipo, 4,37 mm de diámetro, Reunión, Stn DC56, 170-225 m (MNHN); B-D: paratipos, 4,4, 3,46, 4,43 mm de diámetro, la misma localidad (MNHN); E: protoconcha y primera vuelta de teleoconcha; F: detalle de la microescultura.



Leucorhynchia stellata n. sp. Rubio, Rolán & Gori

Figure 62A-F

Type material: Holotype (Figs. 62A-C) MNHN-IM-2000-34776.

Material examined: **2 s:** Philippines: 1 s, Olango Island, Tapon, Santa Rosa, 200 m (holotype excoll. Poppe); 1 s, Black Rock, Tuburan I., Panay Island, 11°48.505'N-121°52.507'E, 32 m (CSG).

Type locality: Philippines, Olango Island, Tapon, Santa Rosa, 200 m.

Etymology: The specific name is from the Latin word *stellatus*, *a, um* which means “related to the stars”, alluding to the basal radiating folds that resemble a star.

Description: Shell small (<5.5 mm), wider than high, robust, depressed turbiniform, spire formed by 4 whorls, very convex and not umbilicated. The protoconch measures little more than 0.75 whorls, about 260 µm in diameter, with a rough surface with two thin spiral threads, ending in a thick labial varix.

Teleoconch of 3.25 whorls separated by a shallow suture; the first ½ whorl is keeled, then the keel is attenuated until it disappears. Teleoconch surface totally covered with fine spiral grooves. The initial ornamentation is formed by diamond shaped, spirally aligned cells that gradually become smaller and lengthen to become fine spiral grooves.

There are 23-24 basal axial folds which are situated around the umbilicus; there are no axial adapical folds. Periphery rounded.

Aperture circular, peristome entire. Inside the apertural border there is a fold on which the operculum abuts.

Parietal area covered by a very thick callous layer that extends adapically covering the previous whorl partially; columella arched, not reflected. Next to the parietal area there is a concave space, which disappears when the columellar/parietal calluses are extended towards the umbilicus, covering it entirely except for a small hole at the base of the columella. Outer lip not very thick, smooth, with a non-modified margin. Parietal callus and columellar surface are completely smooth.

Dimensions: holotype is 5.00 mm in diameter and 3.32 mm in height (H/D: 0.66).

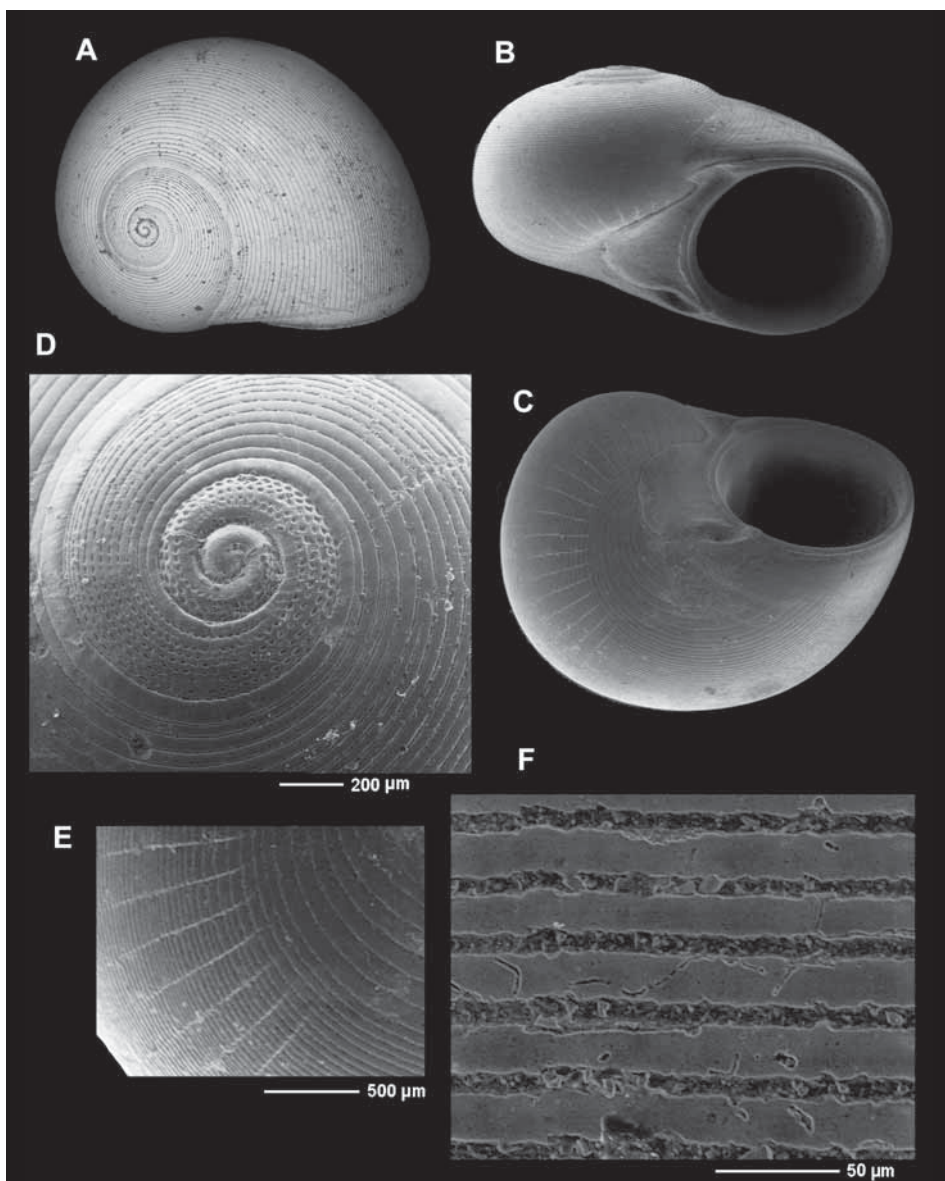


Figure 62

A-F. *Leucorhynchia stellata* n. sp. A-C: holotype, 5.0 mm in diameter, Philippines, Olango Island, Tapon, Santa Rosa, 200 m (MNHN); D: protoconch and first teleoconch whorl; E-F: sculpture and detail.

Figura 62

A-F. *Leucorhynchia stellata* n. sp. A-C: holotipo, 5,0 mm de diámetro, Filipinas. Isla Olango, Tapon, Santa Rosa, 200 m (MNHN); D: protoconcha y primera vuelta de teleoconcha; E-F: escultura y detalle.

Habitat: Bathyal species collected in tangle nets at 200 m depth.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia stellata* n. sp. is characterized by its rounded profile; also by the columellar/parietal calluses occluding totally the umbilicus and finally by having fine axial grooves like folds, around the umbilicus.

L. raquelae n. sp. and *L. operta* n. sp. are distinguished by the rounded profile and by having axial grooves on the base.

L. reunionensis n. sp. is distinguished because the columellar/parietal calluses do not cover the umbilicus completely.

***Leucorhynchia sculpturata* n. sp.**

Figure 63A-C

Type material: Holotype (Figs. 63A-C) MNHN IM-2000-34787.

Material examined: 2 s: Reunion Island, MD32 (REUNION): 1 s, Stn DC56, 21°05'S-55°12'E, 170-225 m (holotype); 1 s, Stn DR90, 19°44.9'S-54°08.6'E, 65 m.

Type locality: Reunion Island, 21°05'S-55°12'E, 170-225 m MD32 (REUNION): Stn DC56.

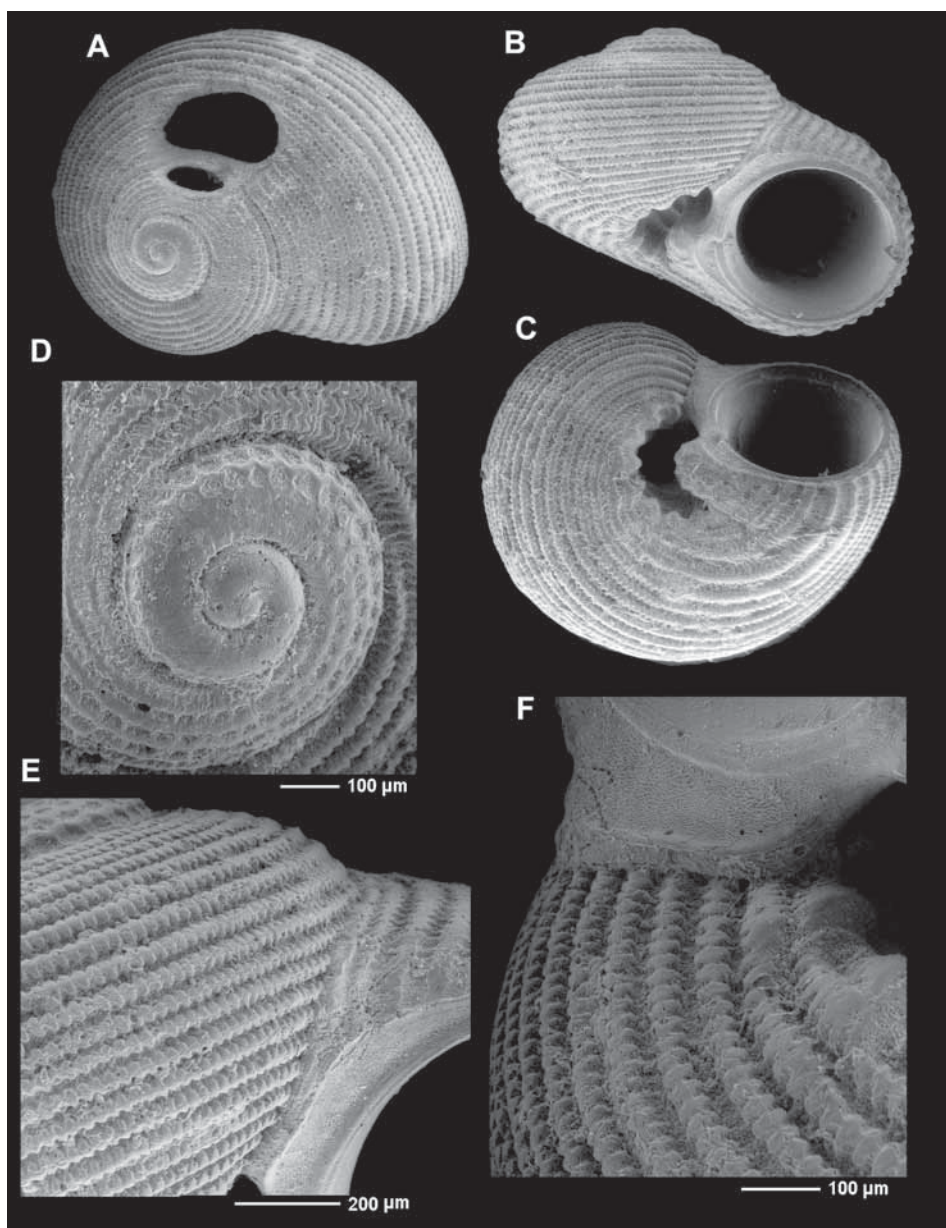
Etymology: The specific name alludes to the prominent sculpture of the shell.

Figure 63

A-F. *Leucorhynchia sculpturata* n. sp. A-C: holotype, 2.19 mm in diameter, Reunion Island, Stn DC56, 170-225 m (MNHN); D: protoconch and first teleoconch whorl; E-F: sculpture and detail.

Figura 63

A-F. *Leucorhynchia sculpturata* n. sp. A-C: *holotipo*, 2,19 mm de diámetro, Isla de Reunión, Stn DC56, 170-225 m (MNHN); D: *protoconcha y primera vuelta de teleoconcha*; E-F: *escultura y detalle*.



Description: Shell small (<2.5 mm), wider than high, robust, turbiniform, spire formed by 3.75 whorls, very convex and narrowly umbilicated.

Protoconch with a little more than 0.75 whorls, about 190 µm in diameter and a smooth surface apparently.

Teloconch of 3 whorls separated by a wide and deep suture. Periphery very convex. Ornamentation consisting of spiral cords and axial ribs with microgranules in the interspaces. In apertural view 4 spiral cords are visible on the penultimate whorl and 20-21 on the last one; they have a zigzag shape and are crossed by axial ribs, forming an irregular reticulate pattern composed initially of rounded spaces on the first whorl which subsequently lengthen to become deep grooves from the first 1 ½ whorls to the aperture. The spiral cords are totally nodulous. Basally, 7-8 strong periumbilical axial folds with a triangular tooth shape delimit the umbilicus.

Aperture circular, peristome entire. Inside the apertural border there is a fold on which the operculum abuts. Parietal area covered by a strong callous layer extending to the suture; columella wide, arched, with a strong callous layer and a prominent callous protuberance at the base which penetrate into the umbilicus, but do not occlude it; outer surface with the same ornamentation as the rest of the teloconch. External lip strong with external margin modified by the cords. The surface of both the parietal and columellar calluses is totally rough.

Umbilicus narrow and deep, partially covered by the callous protuberance at the base of the columella; two spiral cords and fine axial ribs are observed inside.

Dimensions: holotype size is 2.19 mm in diameter and 1.57 mm in height (H/D: 0.73).

Habitat: Circalittoral to bathyal species dredged to 65-225 m depth.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia sculpturata* n. sp. is characterized by its ornamentation, formed by tubercle-shaped zigzag spiral cords; by the presence of axial folds that border the umbilicus and are very thick and triangular; and by the columellar callus that presents the same spiral ornamentation as the rest of the teloconch.

The species that is most similar to it is *L. persculpturata* n. sp., from which it is differentiated by having granular spiral cords on the teloconch.

Leucorhynchia persculpturata n. sp.

Figure 64A-F

Type material: Holotype (Figs. 64A-C) MNHN-IM-2000-34785.

Material examined: 1 s: Mayotte Island, Moçambique Channel, BENTHEDI: 1 s, S Recif Sud, Stn DS42, 13°05'S-45°08'E, 400-520 m.

Type locality: Mayotte I., S Recif Sud, 13°05'S-45°08'E, 400-520 m [BENTHEDI: Stn DS42].

Etymology: The specific name alludes to the sculpture similar to the previous species but in this case formed by more numerous spiral cordlets.

Description: Shell small (<2.5 mm), wider than high, robust, turbiniform, spire formed by 3.60 whorls, separated by a wide and deep suture, very convex and narrowly umbilicated.

Protoconch with $\frac{3}{4}$ of a whorl, about 200 μ m in diameter and an apparently smooth surface.

Teleoconch of 2.8 whorls; periphery very convex. Ornamentation formed by spiral cordlets, and axial ribs and micro-granules in the interspaces. The spiral cords are smooth, narrower than the intermediate spaces and are not crossed by the axial ribs. In apertural view 2 spiral cords (carinae) are visible on the penultimate whorl and 22 on the last one. In the first teleoconch whorls the cords are very prominent like keels, while in the following whorls their number increases and their size are smaller. The axial ribs are short, of similar size and are regularly distributed; in the first spiral whorl are they are less in number and form wide quadrangular spaces; in later whorls the number increase and the rectangular spaces are reduced, forming a regular reticulate pattern. The inner part of the reticle is occupied by axially aligned micro-granules. There are no periumbilical axial folds.

Aperture circular, peristome entire. Inside the aperture there is a fold on which the operculum abuts. Parietal area covered by a thick callous layer that extends towards the suture; columella thick, wide and arched, with a prominent callous protuberance placed at the base which penetrates into the umbilicus, but without occluding it; its outer surface has the same ornamentation as the rest of the teleoconch. External lip strong with external margin modified by

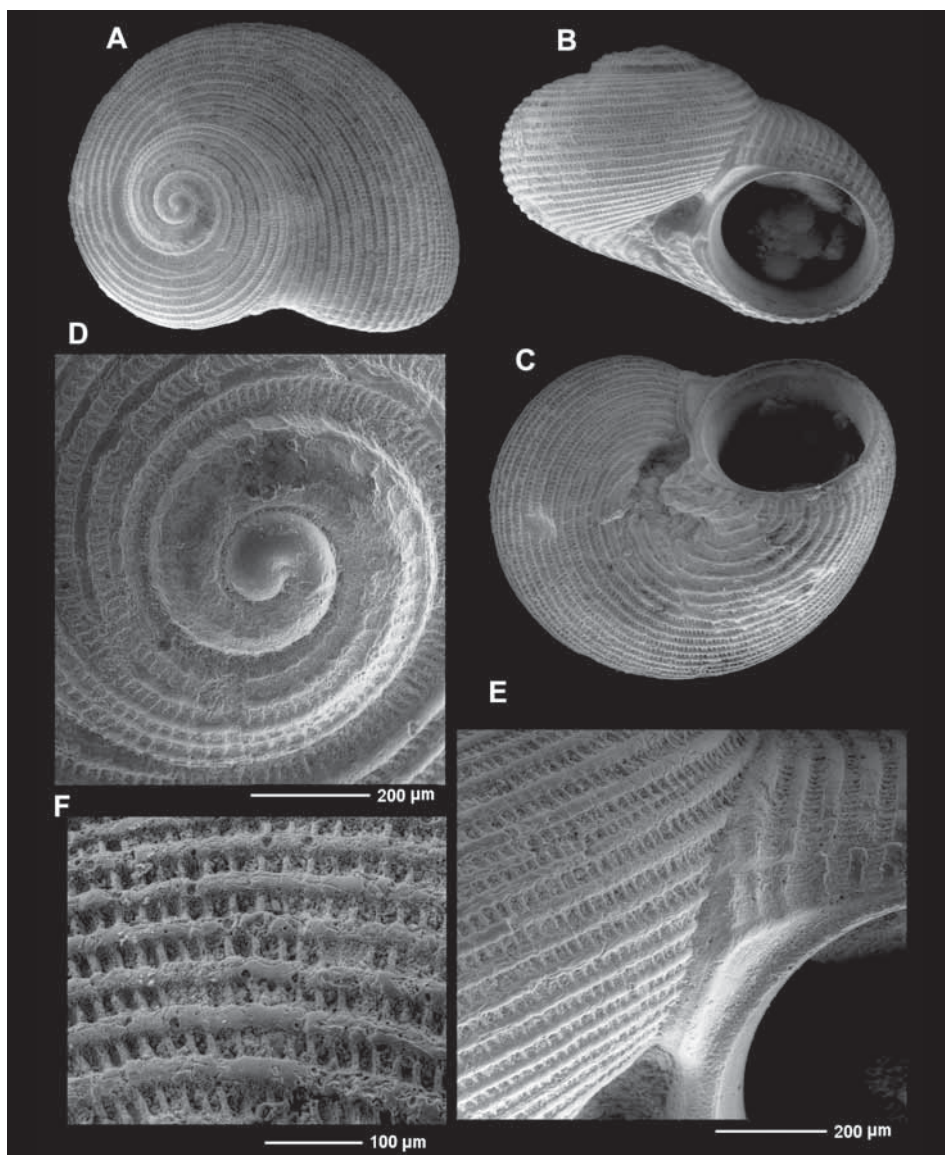


Figure 64

A-F: *Leucorhynchia persculpturata* n. sp. A-C: holotype, 2.23 mm in diameter, Mayotte, S Recif Sud, Stn DS42, 400-520 m (MNHN); D: protoconch and first teleoconch whorl; E-F: sculpture and detail.

Figura 64

A-F: *Leucorhynchia persculpturata* n. sp. A-C: *holotipo*, 2,23 mm de diámetro, Mayotte, S Recif Sud, Stn DS42, 400-520 m (MNHN); D: *protoconcha y primera vuelta de teleoconcha*; E-F: *escultura y detalle*.

cords. The surface of the parietal and columellar callous layer is rough overall. Umbilicus narrow and deep, partially covered by the callous protuberance of the base of the columella; spiral cords can be seen inside.

Dimensions: the holotype size is 2.23 mm in diameter and 1.55 mm in height (H/D: 0.70).

Habitat: Bathyal species dredged at 400-520 m depth.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia persculpturata* n. sp. is characterized by its ornamentation, consisting in smooth spiral cords, of similar size, narrower than their interspaces, not crossed by the axial ribs, which are short, very numerous and forming a regular lattice of rectangular spaces.

L. sculpturata n. sp. is the most similar species; it can be differentiated by having smooth cords on the teleoconch, which are not crossed by the axial ribs.

***Leucorhynchia arctusulcus* n. sp.**

Figure 65A-F

Type material: Holotype (Figs. 65A-C) MNHN-IM-2000-34786.

Material examined: 1 s: Mozambique, INHACA 2011: 1 s, Inhaca Island, N de la Passe, Stn MD13-MD14, 26°03.1'S-33°01.0'E, 50-53 m.

Type locality: Mozambique, Inhaca Island, N de la Passe, 26°03.1'S-33°01.0'E, 50-53 m [INHACA 2011: Stn MD13-MD14].

Etymology: The specific name is formed by two Latin words: *arctus*, *a*, *um* which means “narrow” and *sulcus*, *i*, alluding to the narrow sulci that separate the spiral cords.

Description: Shell small (<2.00 mm), wider than high, robust, turbiniform, spire formed by 3.30 whorls, very convex and narrowly umbilicated. Protoconch with $\frac{3}{4}$ of a whorl, about 200 μ m in diameter and a smooth surface.

Teleoconch of 2.5 whorls separated by a marked suture. Very convex periphery. Ornamentation formed of spiral cords, axial ribs and micro-granules in the interspaces. In apertural view 1-2 spiral cords are visible on the penultimate whorl and 20-21 on the last one. The first teleoconch whorl is smooth adapically and has 2-3 spiral cords at the periphery which are crossed by axial ribs, forming a regular reticulate pattern composed initially of rounded spaces on the first whorl, which subsequently lengthen to become deep grooves from the first 1 ½ whorls to the aperture. The spiral cords are totally smooth, and wider than the intermediate spaces. Basally, 6 strong periumbilical axial folds delimit the umbilicus; they have a triangular tooth shape.

Aperture circular, with a continuous peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a strong callous layer extended up to the suture; columella wide, arched, with a strong callous layer and a prominent callous protuberance where it starts, which penetrates into the umbilicus, but does not occlude it; its outer surface has the same ornamentation as the rest of the teleoconch. External lip strong with external margin not modified by the cords. The external surface of the callous parietal and columellar layer is rough overall.

Umbilicus narrow and deep, partially covered by the columellar callous protuberance; the axial folds penetrate inside.

Dimensions: the holotype size is 1.98 mm in diameter and 1.37 mm in height (H/D: 0.69).

Habitat: Circalittoral species dredged at 50-53 m depth.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia arctusulcus* n. sp. is characterized by its ornamentation, formed by smooth spiral cords, rounded, of similar size, wider than their interspaces; by its deep spiral grooves; by the situation and shape of the columellar callous protuberance; and by the number, shape and size of the periumbilical basal folds.

In general shape *L. arctusulcus* n. sp. is very similar to *L. sculpturata* n. sp. and *L. persculpturata* n. sp., from which it is differentiated by having the spiral cords wider than their interspaces, occupied by deep grooves.

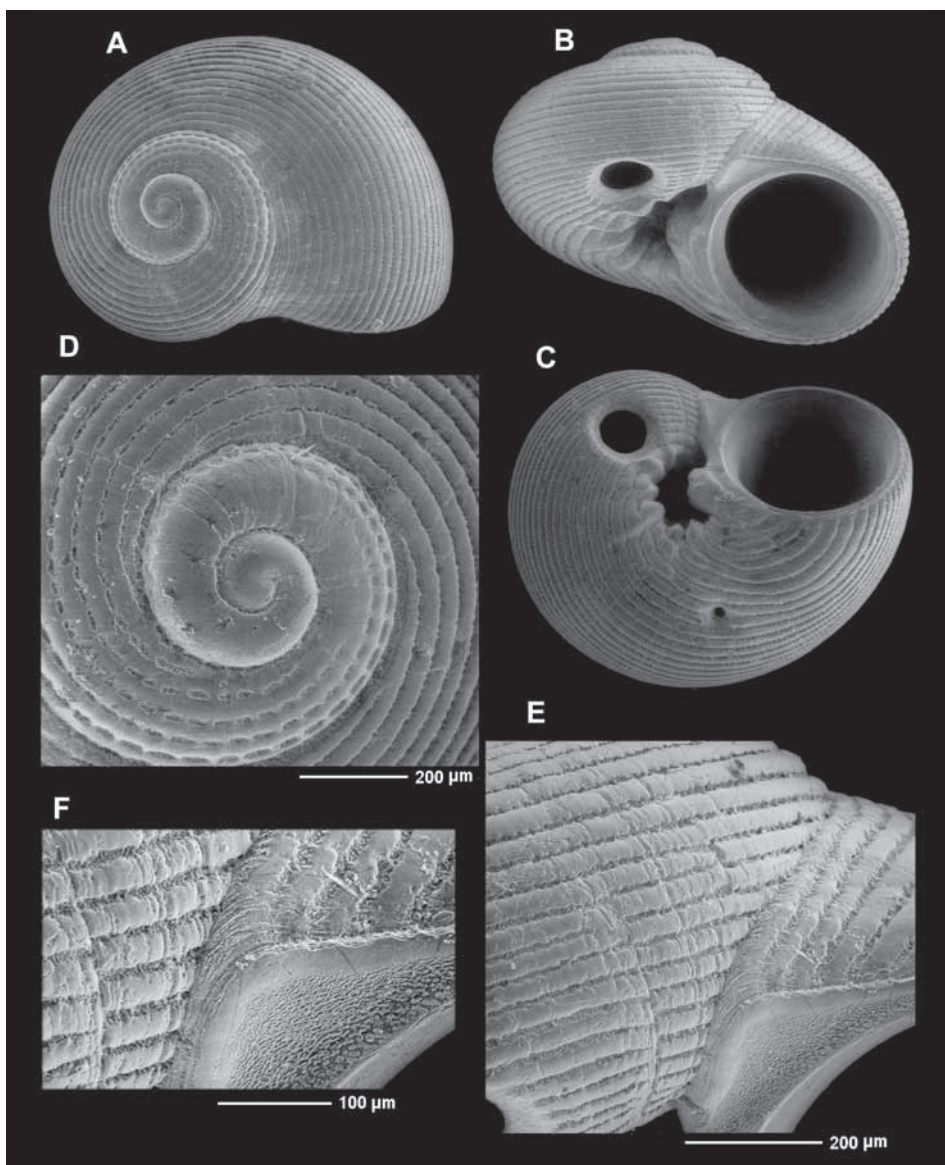


Figure 65

A-F. *Leucorhynchia arctusulcus* n. sp. A-C: holotype, 1.98 mm in diameter, Mozambique, Inhaca Island, Stn MD13-MD14, 50-53 m (MNHN); D: protoconch and first teleoconch whorl; E-F: detail of the sculpture.

Figura 65

A-F. *Leucorhynchia arctusulcus* n. sp. A-C: holotipo, 1,98 mm de diámetro, Mozambique, Isla de Inhaca, Stn MD13-MD14, 50-53 m (MNHN); D: protoconcha y primera vuelta de teleoconcha; E-F: detalle de la escultura.

***Leucorhynchia torta* n. sp.**

Figure 66A-F

Type material: Holotype (Figs. 66A-C) MNHN-IM-2000-34788.

Material examined: 1 s: Papua New Guinea, PAPUA NIUGINI: 1 s, S Urembo Island, Stn PB37, 05°15.9'S-145°47.1'E, 10 m, outer slope.

Type locality: Papua New Guinea, S Urembo Island, 05°15.9'S-145°47.1'E, 10 m, outer slope [PAPUA NIUGINI: Stn PB37].

Etymology: The specific name is from the past participle of the verb *torque*, *is, ere, torsi, tortum*, alluding to the umbilicus, which is twisted.

Description: Shell small (<2.00 mm), wider than high, robust, depressed turbiniform, spire formed by 3 whorls initially separated by a marked suture, very convex periphery and narrowly umbilicated.

The protoconch has a little more than 0.75 of a whorl, about 250 µm in diameter and a rough surface with 2 spiral cordlets.

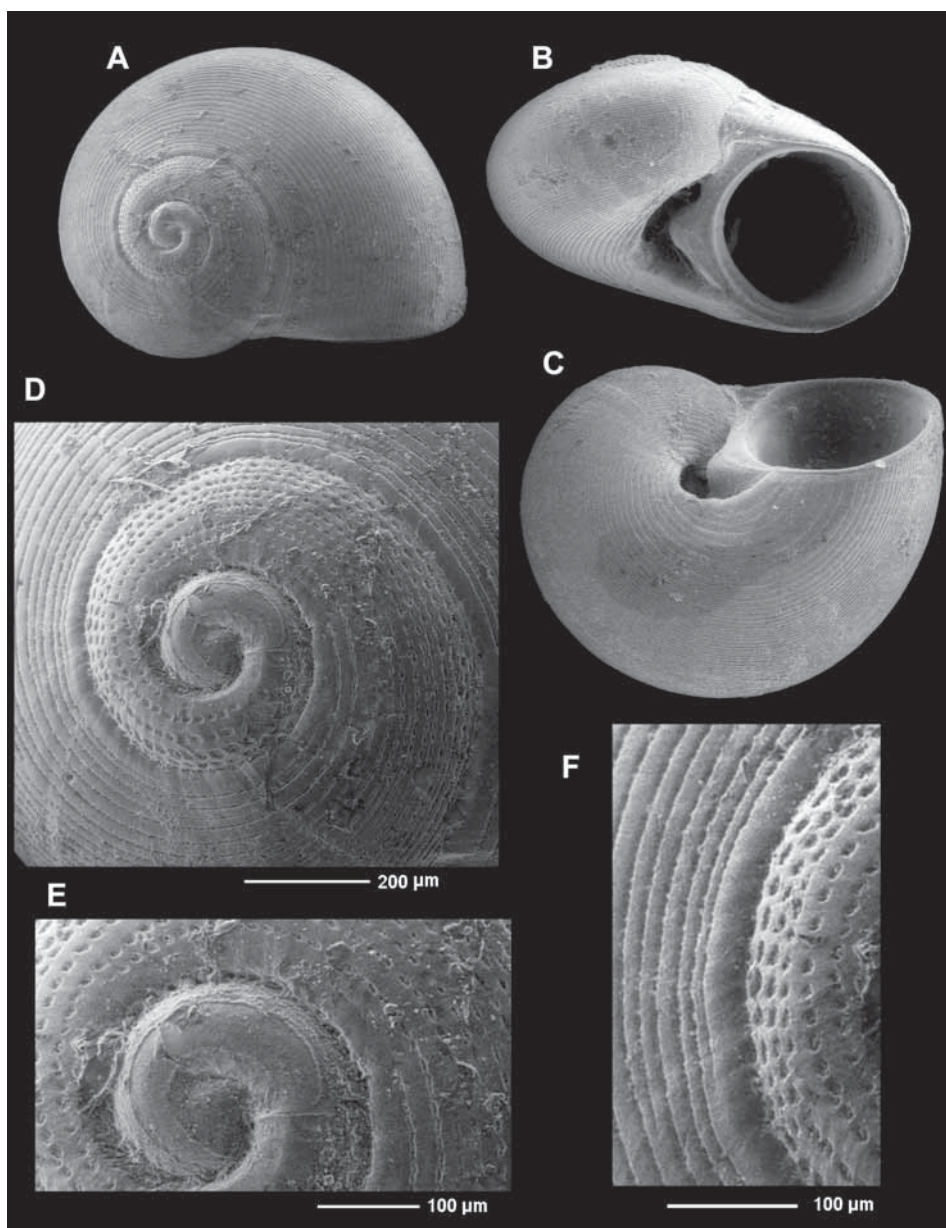
Teloconch of 2.20 whorls, ornamented with spiral cordlets; small axial ribs and micro-granules only in the interspaces. The beginning of the teloconch whorls is smooth and slightly keeled; immediately, then the keel disappears and the teloconch surface is totally covered with spiral cords and grooves; the initial ornamentation is formed by spiral cords and axial ribs that form rounded/oval cells in the interspaces, progressively becoming smaller and stretch into narrow spiral grooves. There are no subsutural or basal axial folds.

Figure 66

A-E. *Leucorhynchia torta* n. sp. A-C: holotype, 1.71 mm in diameter, Papua New Guinea, S Urembo Island, Stn PB37, 10 m, outer slope (MNHN); D-E: protoconch and first teloconch whorl, and detail; F: detail of the microsculpture.

Figure 66

A-E. *Leucorhynchia torta* n. sp. A-C: *holotipo*, 1,71 mm de diámetro, Papua Nueva Guinea, S Isla de Urembo, Stn PB37, 10 m, ladera exterior (MNHN); D-E: *protoconcha y primera vuelta de teloconcha*, y *detalle*; F: *detalle de la microescultura*.



Aperture oval, with a continuous peristome. Inside the border there is a fold on which the operculum abuts. Parietal area covered by a very thick callous layer that extends adapically, partially covering the previous whorl; columella arched and slightly reflected towards the umbilicus, also covered by a very thick callous layer; a thick callus at the beginning of the columella partially covers the umbilicus making it twisted.

Outer lip not very thick, with smooth margin, not modified by spiral cords. The external surface of the parietal and columellar callus is rough.

Umbilicus narrow and deep; partially covered by an extension of the columellar callus, there are no cords or ribs inside.

Dimensions: holotype is 1.71 mm in diameter and 1.1 mm in height (H/D: 0.64).

Habitat: Infralittoral species collected at 10 m on the outer slope.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia torta* n. sp. is characterized by the ornamentation of its protoconch (rough surface and 2 cordlets); by the high number of spiral cords on its teleoconch; by the shape and location of the columellar callus, at the beginning of the columella; by the lack of axial folds; and by ribs inside the umbilicus.

It is separated from *L. sculpturata* n. sp., *L. persculpturata* n. sp. and *L. arctusulcus* n. sp. by having a rough protoconch with two spiral cordlets.

From *L. radiata* n. sp. it is distinguished by the lack of axial folds around the umbilicus.

***Leucorhynchia marcosi* n. sp.**

Figures 67A-F, 68A-E, 69A-F

Type material: Holotype (Fig. 67A-C) MNHN-IM-2000-34791 and one paratype MNHN-IM-2000-34792.

Material examined: **6 s:** Papua New Guinea, PAPUA NIUGINI: 2 s, Madang, in front of Maritime College, Stn PD03, 05°13.2'S-145°47.7'E, 2-3 m (type material); KAVIENG 2014: 2 s, Kavieng Lagoon, N coast of Manne Island, Stn KB18, 02°40.8'S-150°42.7'E, 4-7 m. Philippines: 1 s, Northern

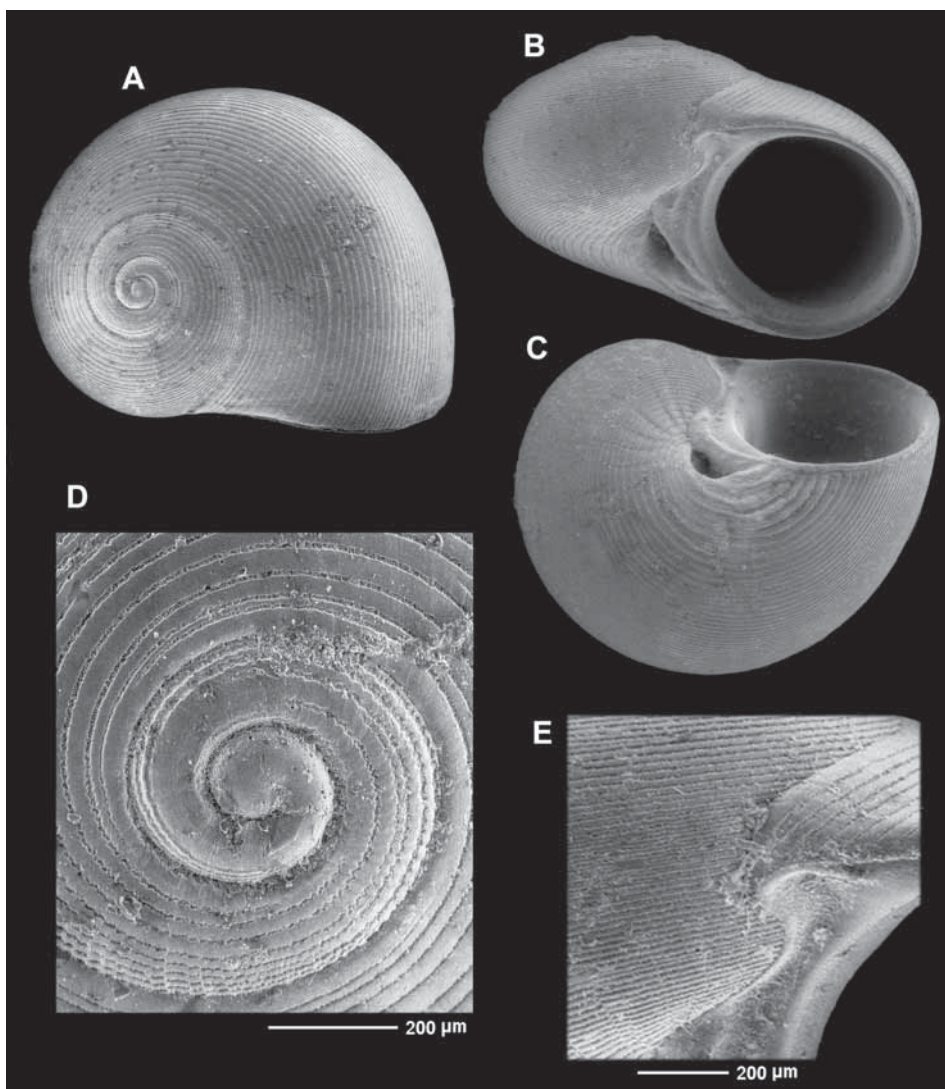


Figure 67

A-E. *Leucorhynchia marcosi* n. sp. A-C: holotype, 2.33 mm in diameter, Papua New Guinea, Madang, in front the Maritime College, Stn PD03, 3 m (MNHN); D: protoconch and first teleoconch whorl; E: detail of the columellar area.

Figura 67

A-E. *Leucorhynchia marcosi* n. sp. A-C: *holotipo*, 2,33 mm de diámetro, Papua Nueva Guinea, Madang, frente al Maritime College, Stn PD03, 3 m (MNHN); D: *protoconcha* y *primera vuelta de teleoconcha*; E: *detalle del área columelar*.

Bohol, Pandanon Island, Pipe Point, 6 m, vacuum (exPoppe). Thailand: 1 s, Hin Daeng, S Phuket, 22 m (CSG).

Type locality: Papua New Guinea, Madang, in front of Maritime College, 05°13.2'S-145°47.7'E, 2-3 m [PAPUA NIUGINI: Stn PD03].

Etymology: The specific name is after Dr. Marcos Andrés González, present Director of the Museo de Historia Natural of the University of Santiago de Compostela, Spain, for his help to our works.

Description: Shell small (<2.50 mm), wider than high, robust, turbiniform-depressed, spire formed by about 3.5 whorls separated by a marked suture; periphery very convex and narrowly umbilicated, or not umbilicated in mature shells. The protoconch measures little more than 0.75 of a whorl, having between 220-240 µm in diameter and a smooth surface.

Teleoconch of 2.75 whorls, ornamented with spiral cords, spiral grooves and micro-granules inside the spiral grooves. The teleoconch surface is totally covered by the spiral cords and grooves; initially the spiral cords develop in zigzag and they are located at the periphery; from 0.75 whorl, the spiral cords and grooves are still developing in zigzag and practically cover the entire teleoconch surface; it is after 1.5 whorls of the teleoconch, that the cords develop in a straight line up to the apertural margin.

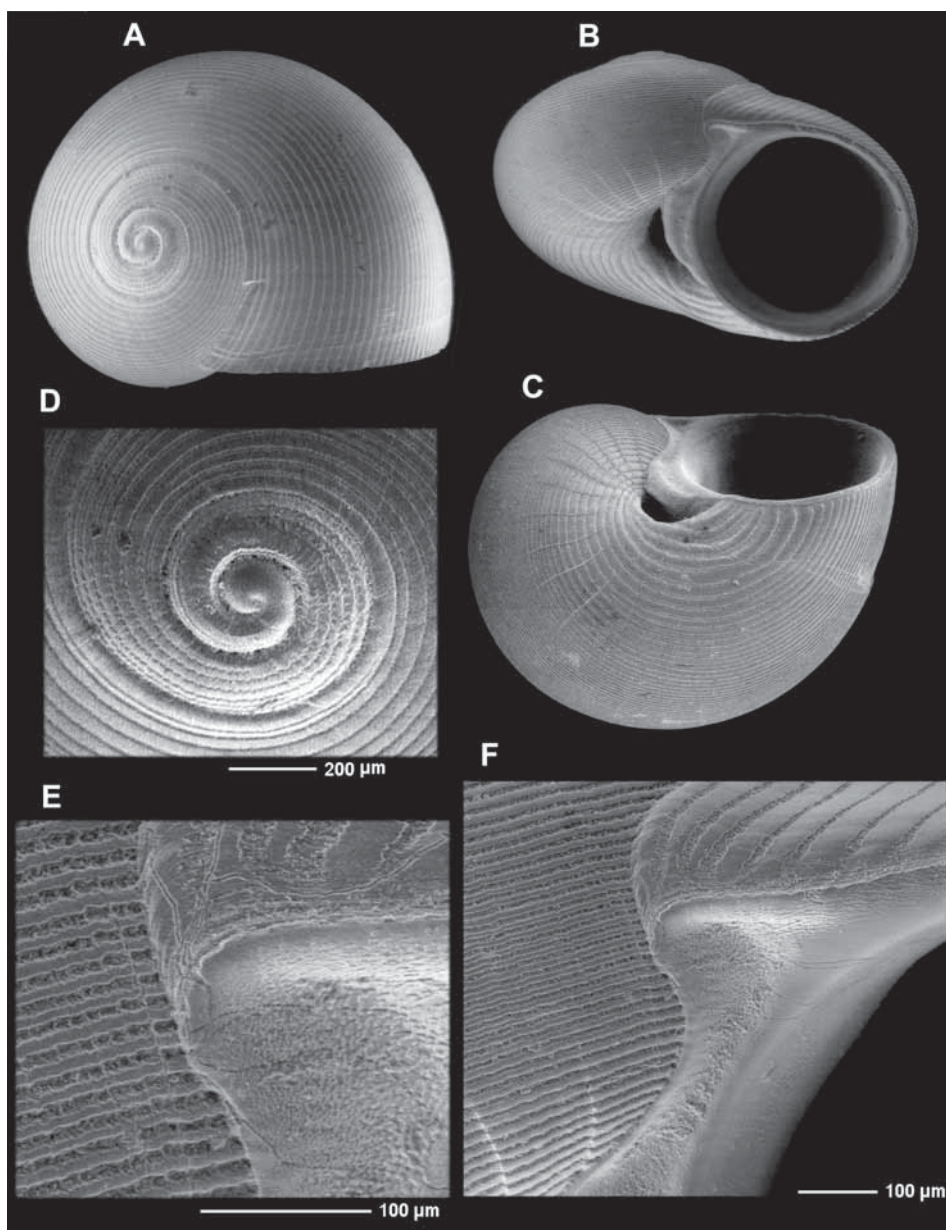
In apertural view 3-4 spiral cords on the penultimate whorl and 60-61 on the last can be observed, distributed between the suture and the umbilical margin.

Figure 68

A-F: *Leucorhynchia marcosi* n. sp. A-C: shell, 2.28 mm in diameter, Papua New Guinea, Kavieng Lagoon, Stn KB18, 4-7 m (MNHN); D: protoconch and first whorl of the teleoconch; E-F: sculpture of the columellar area and detail.

Figura 68

A-F: *Leucorhynchia marcosi* n. sp. A-C: concha, 2,28 mm de diámetro, Papua Nueva Guinea, Kavieng Lagoon, Stn KB18, 4-7 m (MNHN); D: protoconcha y primera vuelta de la teleoconcha; E-F: escultura del área columelar y detalle.



Aperture oval, with a continuous peristome. Inside the apertural border there is a fold on which the operculum abuts. Parietal area covered by a very thick callous layer that extends adapically, partially covering the previous whorl, while it is extended towards the umbilicus in successive layers until it is partially or entirely occluded; columella arched and reflected towards the umbilicus, also covered by a very thick callous layer. Outer lip not very thick, with a smooth and sharp margin, not modified by the spiral cords. The external surface of the parietal and columellar callus is rough.

Umbilicus narrow and deep, delimited by a thick cord and partially covered by the extension of the parietal callus. There are 7-8 not very thick axial folds around it.

Dimensions: holotype size is 2.33 mm in diameter and 1.63 mm in height (H/D: 0.70).

Habitat: Infralittoral species collected at 2-7 m depth.

Distribution: Known from Papua New Guinea, the Philippines and Thailand.

Remarks: *Leucorhynchia marcosi* n. sp. is mainly characterized by the ornamentation of the first 1.5 teleoconch whorls, formed by spiral cords and grooves which are developed in zigzag; by a thick cord that delimits the umbilicus; and by the fact that the callous extension that partially covers the umbilicus is parietal and not columellar, as happens normally, and has 7-10 fine periumbilical grooves.

It differs from *L. lluviae* n. sp., because in the latter the spiral cords and grooves do not initially develop in zigzag, and because it lacks axial folds around the umbilicus.

L. letourneuxi n. sp. is different because on the protoconch it shows three spiral cords on a rough surface; it also differs by the axial threads that develop between the spiral cords at the beginning of the teleoconch and because of the lack of periumbilical axial folds.

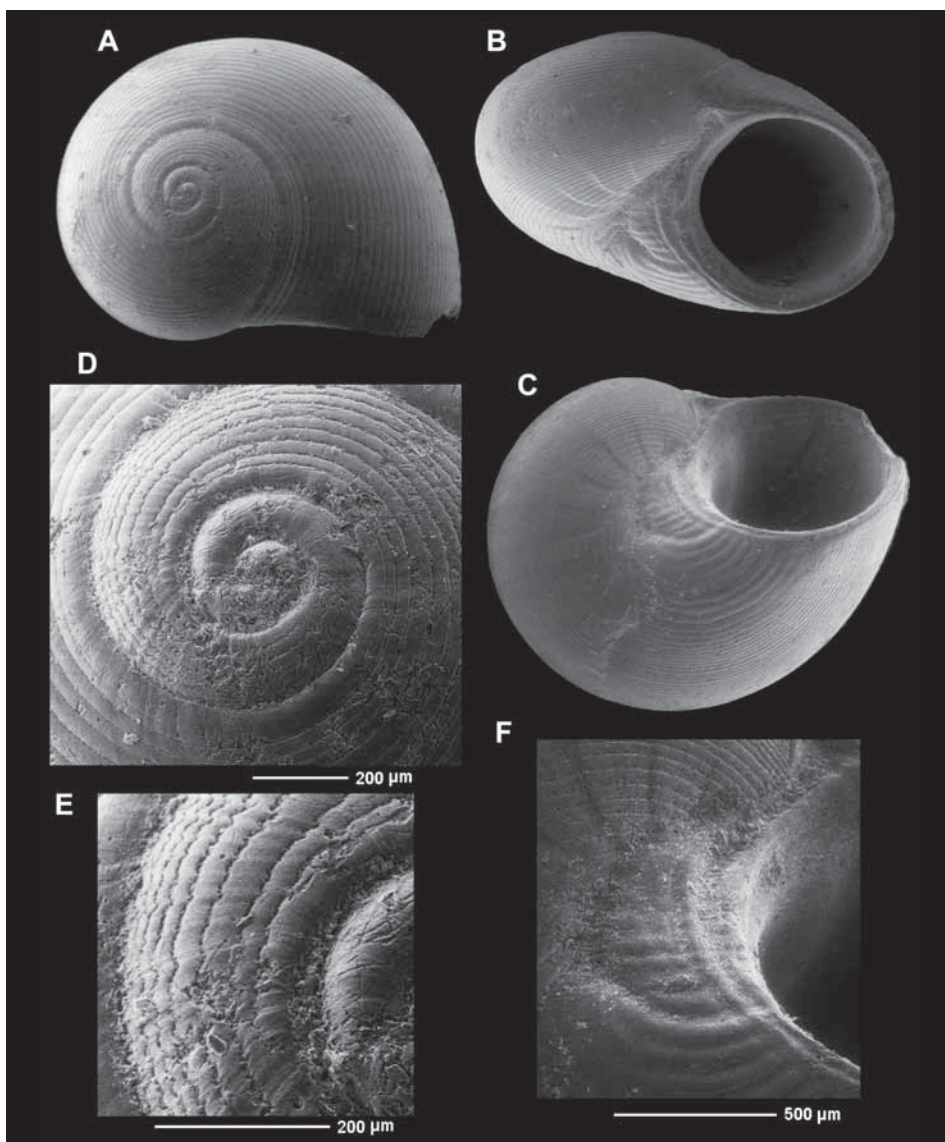


Figure 69

A-E: *Leucorhynchia marcosi* n. sp. A-C: shell, 3.22 mm in diameter, Philippines, Northern Bohol, Pandanon Island, Pipe Point, 6 m, vacuum (MNHN); D-E: protoconch and detail; F: columellar area.

Figura 69

A-E: *Leucorhynchia marcosi* n. sp. A-C: concha, 3,22 mm de diámetro, Filipinas, Norte de Bohol, Isla Pandanon, Punta Pipe, 6 m, vacuum (MNHN); D-E: protoconcha y detalle; área columelar.

***Leucorhynchia lluviae* n. sp.**

Figures 70A-G, 71A-F,

Type material: Holotype (Figs. 70A-B) MNHN-IM-2000-34773 and one paratype (Fig. 70C) MNHN-IM-2000-34774.

Material examined: 4 s: Vanuatu, SANTO 2006: 2 s, Segond Channel, SW Aoré Island, Les Flamboyants, Stn ZS25, 15°35.1'S-167°07.6'E, 36 m, coarse sand rubble (type material). Society Islands, TARASOC: 1 s, Between Raitaea and Tahaa, Stn CP3439, 16°44'S-151°25'W, 800 m. New Caledonia, LAGON: 1 s, Sector Koumac, Passe de Koumac, tombant Nord, Stn 1310, 20°39.7'S-164°14.9'E, 15 m, hard bottom.

Type locality: Vanuatu, Segond Channel, SW coast of Aoré Island, Les Flamboyants Stn ZS25, 15°35.1'S-167°07.6'E, 36 m.

Etymology: The specific name is after Lluvia Monzó, granddaughter of the first author.

Description: Shell small (<4.00 mm), wider than high, robust, turbiniform, depressed, spire formed by 3.6 whorls initially separated by a marked suture, very convex periphery and not umbilicated.

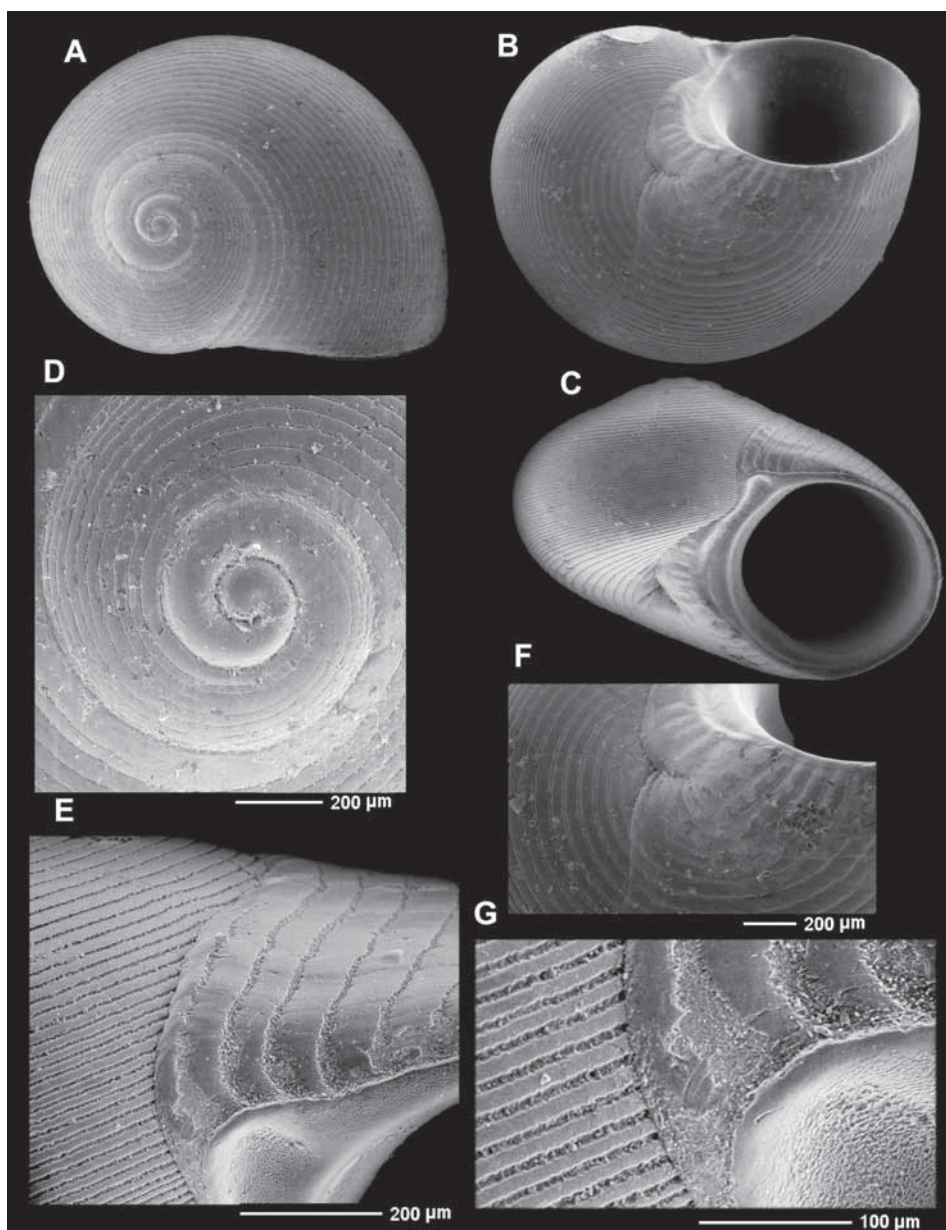
The protoconch measures nearly 3/4 of a whorl, and about 200 µm in diameter, and has a smooth surface apparently.

Figure 70

A-G. *Leucorhynchia lluviae* n. sp. A-B: holotype, 2.74 mm in diameter, Vanuatu, Segon Channel, W coast Aore Is., Stn ZS25, 36 m (MNHN); C: paratype, 2.44 mm, same locality (MNHN); D: protoconch and first teleoconch whorl; E-F: detail of the microsculpture.

Figura 70

A-G. *Leucorhynchia lluviae* n. sp. A-B: *holotipo*, 2,74 mm de diámetro, Vanuatu, Segon Channel, costa Oeste de Isla Aore, Stn ZS25, 36 m (MNHN); C: *paratipo*, 2,44 mm, la misma localidad (MNHN); D: *protoconcha y primera vuelta de teleoconcha*; E-F: *detalle de la microescultura*.



Teleoconch of 2.80 whorls, ornamented with spiral cords, spiral grooves, axial folds and micro-granules inside the spiral grooves. The teleoconch surface is totally covered by spiral cords and grooves; the first half whorl of the surface is totally smooth and very convex; between the initial 0.5 to 1 whorl, there are 1-3 peripheral cords; from the first whorl of the onwards, the cords totally cover the teleoconch surface; they are flat, smooth and do not develop in zigzag pattern; a wide and thick subsutural cord appears. In apertural view, 5-7 spiral cords on the penultimate whorl and 50-51 on the last one can be observed, distributed between the suture and the umbilical margin. Another 4-5 spiral cords, wider, are located at the base of the outer lip and penetrate inside the umbilicus, but are covered by the layer extension. There are 2-3 thin periumbilical axial grooves, located abapically at the beginning of the whorl.

Aperture oval with a continuous peristome. Inside the apertural border there is a fold on which the operculum abuts. Parietal area covered by a very thick callous layer that extends adapically covering partially the previous whorl; columella arched and reflected towards the umbilicus, which is covered also by a very thick callous layer; a thick callus is formed by the extension of the columellar callus which covers totally the umbilicus; its outer surface is ornamented with 5-6 thick cords. Outer lip no very thick, with smooth margin, not modified by the spiral cords. The external surface of the parietal and columellar callous layer is concave and rough, forming a broad canal prior to the columellar callus.

Umbilicus totally covered by the extension of the columellar callus, where 6-7 wider spiral cords and 7-8 thicker axial folds around it ,can be seen.

Dimensions: holotype size 2.74 mm in diameter and 1.73 mm in height (H/D: 0.63).

Habitat: Infralittoral species collected at 36 m in coarse sand rubble and also at 800 m.

Distribution: Known from Vanuatu, Society Islands and New Caledonia.

Remarks: *Leucorhynchia lluviae* n. sp. is characterized: 1) by having almost the first teleoconch half-whorl very smooth, convex, without ornamentation; 2) because the spiral cords in the first 1.5 whorl do not develop in zigzag; 3) by having micro-granules inside the spiral grooves and having few or no weak axial folds around the umbilicus.

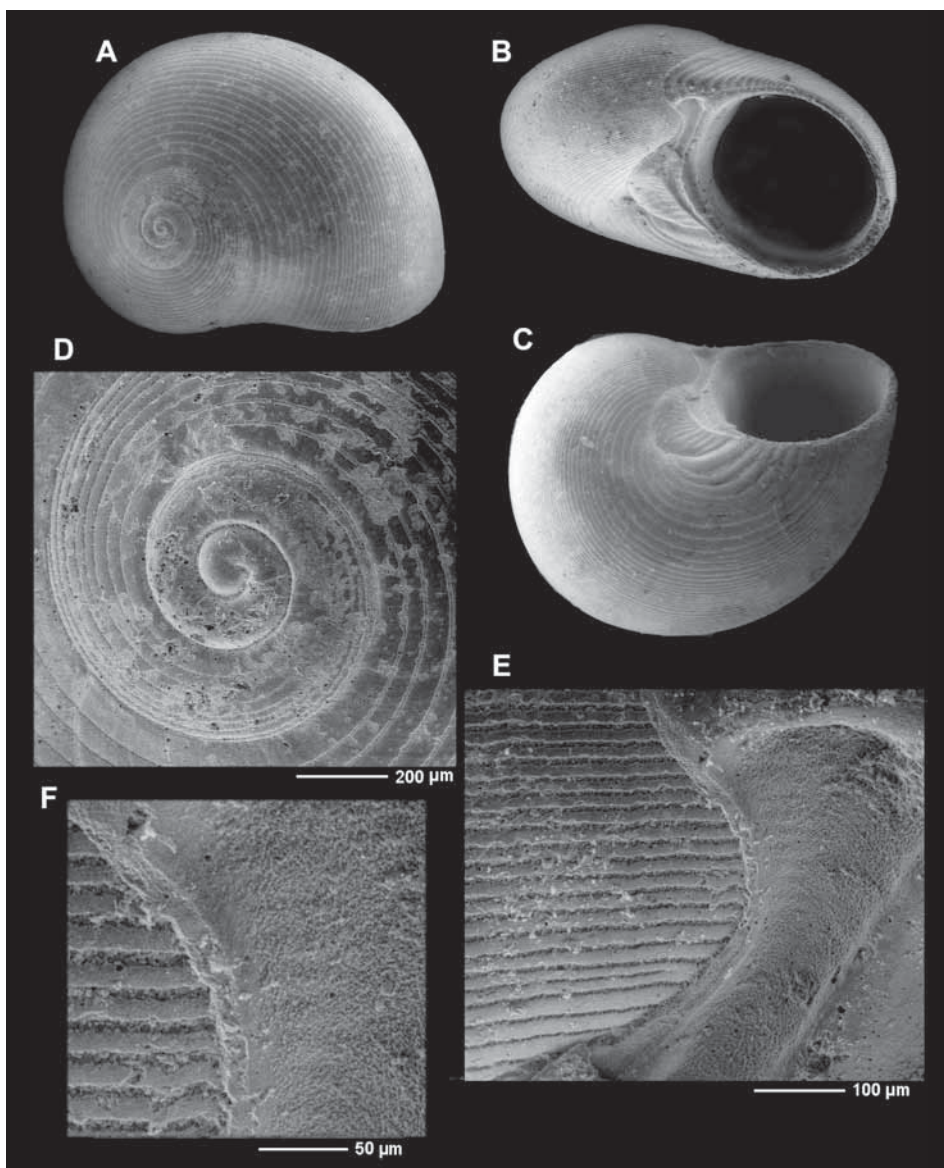


Figure 71

A-F. *Leucorhynchia lluviae* n. sp. A-C: shell, 3.75 mm in diameter, Society Islands, between Raitaea and Tahaa, Stn CP3439, 800 m (MNHN); D: protoconch and first teleoconch whorl; E-F: microsculpture and detail.

Figura 71

A-F. *Leucorhynchia lluviae* n. sp. A-C: concha, 3,75 mm de diámetro, Islas de la Sociedad, entre Raitaea y Tahaa, Stn CP3439, 800 m (MNHN); D: protoconcha y primera vuelta de teleoconcha; E-F: microescultura y detalle.

This species may be separated from *L. marcosi* n. sp. by having a rough protoconch, the complete first whorl of the teleoconch being smooth (instead of only half the whorl in *L. marcosi*), and the striae between the cords at the beginning of the teleoconch being very fine and not zigzagging; also by the lack of axial folds on the base.

From *L. letourneauxi* n. sp. it is distinguished by lacking spiral cordlets on the protoconch.

The geographical distribution of *L. lluviae* is more septentrional: in Vanuatu, Society Islands and New Caledonia *vs* Papua New Guinea for *L. marcosi* n. sp. The geographical distribution of *L. lluviae* in the Pacific is more southern (Vanuatu, Society Islands and New Caledonia) while the distribution of *L. marcosi* (Papua New Guinea, Philippines and Thailand) is more northern.

Leucorhynchia thailandensis n. sp. Rubio, Rolán and Gori

Figure 72A-F

Type material: Holotype (Figs. 70A-C) MNHN-IM-2000-34949 and 1 paratype MNHN-IM-2000-34950.

Material examined: 2 s: Thailand: Similien Is., 10-20 m (exCSG).

Type locality: Thailand, Similien Is., 10-20 m.

Etymology: The specific name is after the country where the species was found.

Description: Shell very small (<2.50 mm), wider than high, robust, turbiniform, formed by 3.7 whorls separated by a marked suture, very convex periphery and weakly umbilicated.

The protoconch has 3/4 of a whorl and measures about 214 µm in diameter with a finely rough surface.

Teleoconch of 2.9 whorls, ornamented with spiral cords, spiral grooves and micro-granules inside the spiral grooves. The teleoconch surface is totally covered with spiral cords and grooves; they are flat, smooth, initially develop in zigzag and afterwards in a straight line; a wide and thick subsutural cord appears and extends to the aperture. In apertural view 6 spiral cords on the penultimate whorl and 65-67 on the last one can be observed, distributed

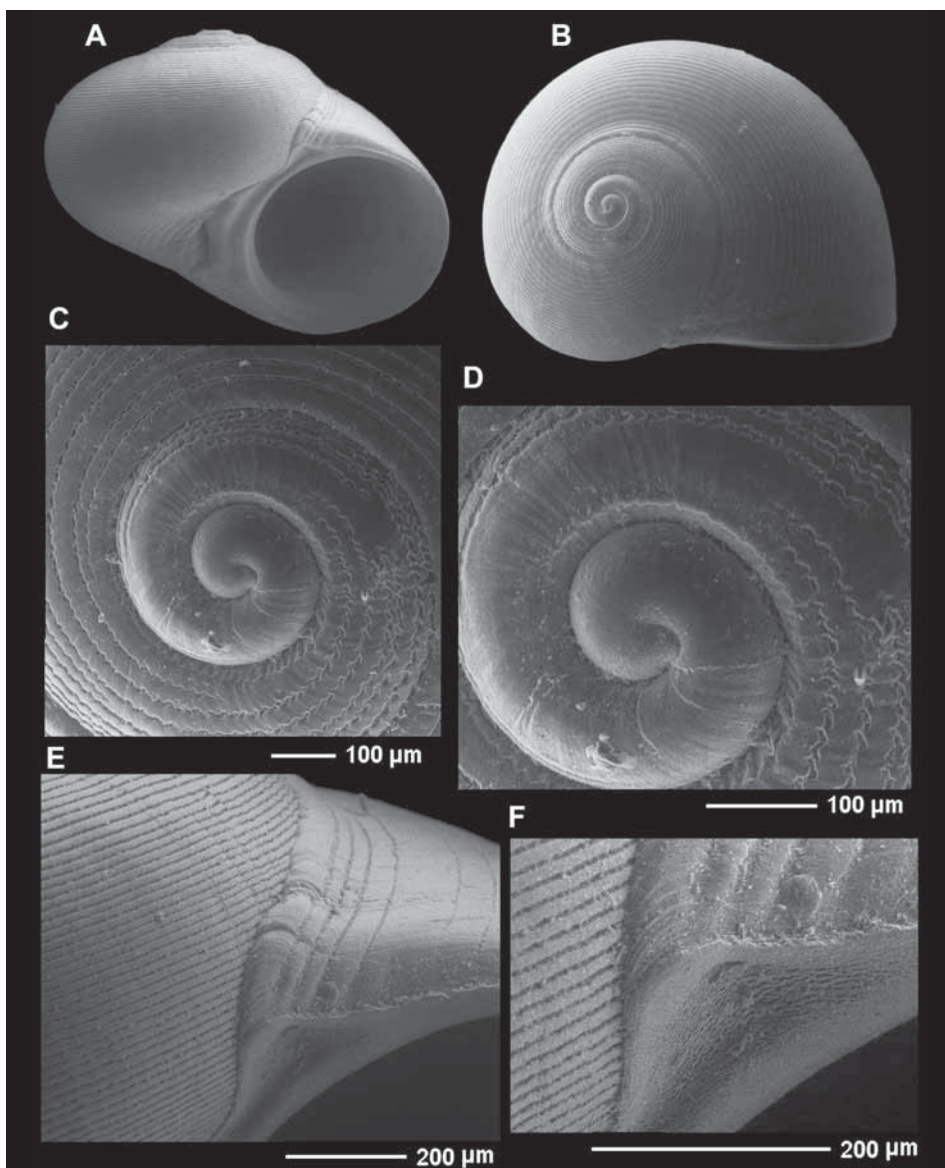


Figure 72

A-F. *Leucorhynchia thailandensis* n. sp. A: holotype, 2.44 mm in diameter, Thailand, 36 m (MNHN); B: paratype, 2.64 in diameter, same locality (MNHN); C-D: protoconch and first teleoconch whorl; E-F: microsculpture and detail.

Figura 72

A-F. *Leucorhynchia thailandensis* n. sp. A: *holotipo*, 2,44 mm de diámetro, Tailandia, 36 m (MNHN); B: *paratipo*, 2,64 de diámetro, la misma localidad (MNHN); C-D: *protoconcha* y *primera vuelta de teleoconcha*; E-F: *microescultura* y *detalle*.

between the suture and the umbilical margin. The surface of the first half whorl is totally smooth and very convex; from 0.5 to 1 whorl, there are 1-3 peripheral cords; from 1 whorl the cords totally cover the teleoconch surface. Another 3-4 spiral cords, wider, are located at the base of the outer lip and penetrate inside the umbilicus, but are covered by the layer extension.

Aperture rounded with a continuous peristome. Inside the apertural border there is a fold on which the operculum abuts. Parietal area covered by a very thick callous layer that extends adapically covering partially the previous whorl and abapically covering the umbilicus; columella arched and reflected towards the umbilicus; a thick callous layer formed mainly in the parietal zone and in the columella, extends towards the umbilicus but without covering it completely, its outer surface is not ornamented with cords. Outer lip no very thick, with smooth margin, not modified by the spiral cords. The external surface of the parietal and columellar calluses is concave and rough, forming a broad canal prior to the columellar callus.

Umbilicus reduced to a narrow fissure, almost completely covered by the extension of the parietal and columellar calluses.

Dimensions: holotype size 2.44 mm in diameter and 1.85 mm in height (H/D: 0.76).

Habitat: Infralittoral species collected at 20 m in scuba diving.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia thailandensis* n. sp. is characterized by its relatively high spire; because the spiral cords in the first 1.5 whorls develop in zigzag; by the lack of axial folds around the umbilicus; because the callus does not completely cover the umbilicus and its surface is not covered by cords.

This species may be distinguished from *L. marcosi* n. sp. because the latter has a more depressed spire and axial folds around the umbilicus; it also has the surface of the callus smooth, without cords.

L. lluviae n. sp. is separated by its closed umbilicus because the spiral cords are not developed in zigzag in the first whorl of the teleoconch.

L. letourneuxi n. sp. is separated by having axial threads between the cords in the beginning of the teleoconch, and having three spiral cordlets in the protoconch.

***Leucorhynchia letourneuxi* n. sp.**

Figures 73A-G, 74A-G

Type material: Holotype (Figs. 73A) MNHN-IM-2000-34793 and 3 paratypes (Fig. 73B-C) MNHN-IM-2000-34794, and 5 in CJL.

Material examined: 42 s, 12 j: Society Islands: 9 s, Tahiti, Matavai Bay, 50 m (type material); 5 s, Tuamotu Archipelago, 71-100 m (CJL); 2 s, Tuamotu, Makemo, Nake coral reef, 1-2 m (CJL); 2 s, Gambier archipelago, Gatawake I., 23°11'26.5"-134°9'89.46"W, 1-3 m (CJL); 24 s, 12 j, Australes, Rapa, Ahurei Bay, 1-5 (CJL).

Type locality: Society Islands, Tahiti, Matavi Bay, 50 m.

Etymology: The specific name is after the malacologist and collector Jean Letourneux, from French Polynesia, Tahiti.

Description: Shell very small (<2.50 mm), wider than high, robust, turbiniform, spire formed by 3.6 whorls separated by a marked suture, very convex periphery and narrowly umbilicated.

The protoconch has nearly $\frac{3}{4}$ of a whorl, measures about 250 μ m in diameter with a rough surface and three thin spiral cordlets.

Teloconch of 2.8 whorls, ornamented with spiral cords, spiral grooves and axial threads. The teloconch surface is totally covered by spiral cords and grooves; at the first $\frac{3}{4}$ of whorl there are 5 spiral cords (1 subsutural, 1 like a carina and 3 peripheral), all are narrower than their interspaces, which are concave and in which very fine and numerous axial threads can be observed; from $\frac{3}{4}$ of a whorl the cords progressively widen and the interspaces become narrower, until the cords become wide and flat and the grooves still keep the axial threads.

In apertural view, 5-6 spiral cords on the penultimate whorl and 85-87 on the last one can be observed, distributed between the suture and the umbilical margin. There are no periumbilical axial folds or spiral cords at the base of the outer lip that penetrate inside the umbilicus.

Aperture rounded, with a continuous peristome. Inside the inner lip there is a fold in which the operculum abuts.

Parietal area is covered by a very thick callous layer that extends adapically covering partially the previous whorl and extending abapically towards the

umbilicus; columella arched and reflected towards the umbilicus. A thick callus, shaped like a half moon, formed by the extension of the columellar and parietal calluses, covers almost completely the umbilicus, reducing it to a narrow fissure.

Outer lip not very thick, with smooth margin, not modified by spiral cords. The external surface of the parietal and columellar calluses is concave and rough, forming a broad canal prior to it.

Umbilicus reduced to a narrow fissure, no cords that penetrate inside or axial folds around it.

Dimensions: the holotype size is 2.05 mm in diameter x 1.26 in height; (H/D = 0.61).

Habitat: Infralittoral to circalittoral species collected at 20-70 m depth.

Distribution: Society, Tuamotu, Gambier and Australes.

Remarks: *Leucorhynchia letourneuxi* n. sp. is a very small species, characterized by the ornamentation of the protoconch, which consists of a rough surface with 3 spiral cordlets, and the ornamentation of the beginning of the teleoconch, formed by thin spiral cords with fine axial threads between them.

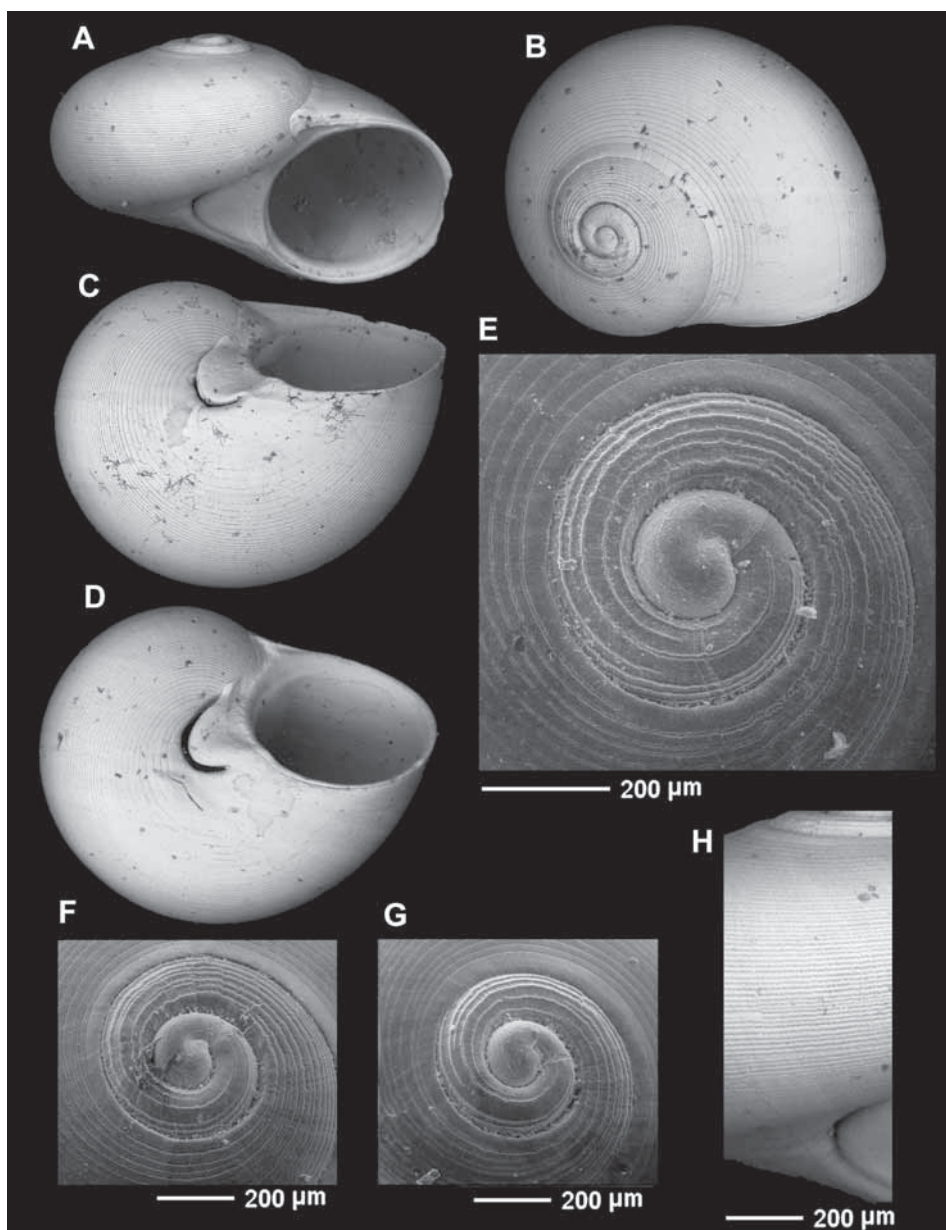
Leucorhynchia letourneuxi n. sp. may be separated from *L. lluviae* n. sp. and *L. marcosi* n. sp., by the different ornamentation of the protoconch (smooth *vs* rough with three spiral cordlets) and by having fine axial threads between the cords at the beginning of the teleoconch.

Figure 73

A-H. *Leucorhynchia letourneuxi* n. sp. A: holotype, 2.05 mm in diameter, Society Is., Tahiti, Matavai Bay, 50 m (MNHN). B-D: paratypes, 2.19, 2.26, 2.15 mm, in diameter, same locality (MNHN). E: protoconch and first teleoconch whorl of the holotype; F-G: the same from paratypes; H: detail of the sculpture from the holotype.

Figura 73

A-H. *Leucorhynchia letourneuxi* n. sp. A: *holotipo*, 2,05 mm de diámetro, Islas de la Sociedad, Tahití, Bahía de Matavai, 50 m (MNHN). B-D: *paratipos*, 2,19, 2,26, 2,15 mm de diámetro, la misma localidad (MNHN); E: *protoconcha y primera vuelta de teleoconcha del holotipo*; F-G: *lo mismo de paratipos*; H: *detalle de la escultura del holotipo*.



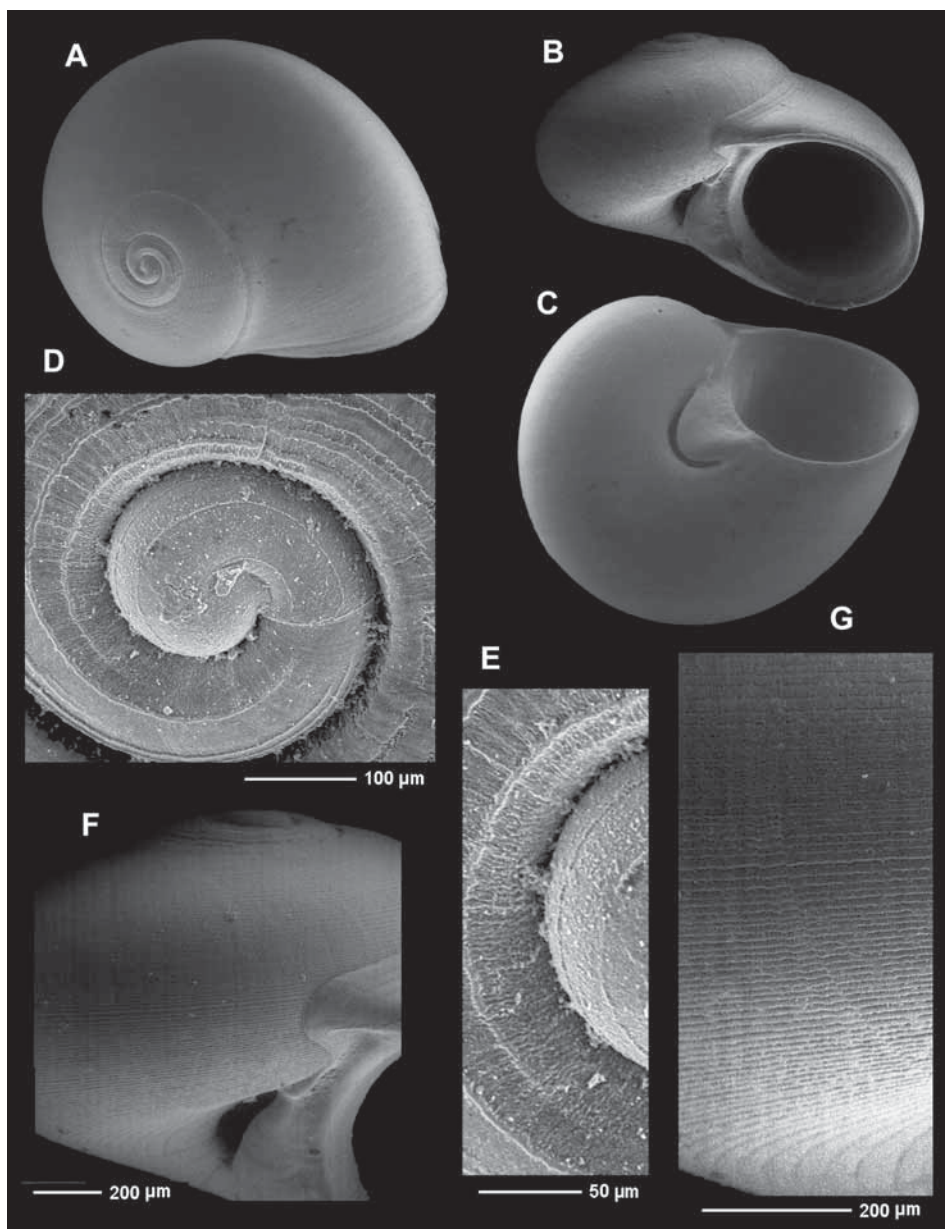


Figure 74

A-G. *Leucorhynchia letourneuxi* n. sp. A-C: shells, 2.6, 1.96, 2.5 mm, Tuamotu Archipelago, 71-100 m (CJL); D-E: protoconch and detail; F-G: microsculpture.

Figura 74

A-G. *Leucorhynchia letourneuxi* n. sp. A-C: conchas, 2,6, 1,96, 2,5 mm, Archipiélago Tuamotu, 71-100 m (CJL); D-E: protoconcha y detalle; F-G: microescultura.

Leucorhynchia distorta n. sp. Rubio, Rolán & Gori

Figure 75A-E

Type material: The holotype (Figs. 75A-B) MNHN-IM-2000-34777.

Material examined: **1 s:** Solomon Islands: 1 s, Charapoana Pt, Vepi Island, Morovo Lagoon, 20 m (exCSG).

Type locality: Solomon Islands, Charapoana Pt, Vepi Island, Morovo Lagoon, 20 m.

Etymology: The specific name alludes to the deformation of the umbilicus in this species.

Description: Shell small (<4.5 mm), wider than high, robust, depressed-turbiniiform, formed by 4 whorls, very convex and narrowly umbilicated. The protoconch is located on the same plane as the first two whorls of the teleoconch; it measures about $\frac{3}{4}$ of a whorl, with about 200 μm in diameter and a rough surface with 3-4 thin spiral threads, ending in a thick labial varix. Teleoconch of 3.2 whorls separated by a slightly marked suture; the first $\frac{1}{2}$ whorl is slightly keeled, then the keel disappears and the surface changes, becoming convex. Periphery rounded. Teleoconch surface totally covered by numerous fine spiral grooves. The initial ornamentation is formed by strong growth lines and rhomboidal hollows which are placed between the adapical keel and the suture; below $\frac{3}{4}$ whorl all the surface has rhomboidal hollows spirally aligned which progressively change to be smaller and more elongated until they become fine spiral grooves. Subsuturally, in the last quarter whorl, there is an area that is entirely smooth, without spiral grooves.

Between 20-24 basal axial folds placed around the umbilicus; there are no subsutural axial folds.

Aperture circular, with an entire peristome. Inside the outer lip there is a fold on which the operculum abuts. Parietal area covered by a wide callous layer that extends adapically partially covering the previous whorl. Columella strong, arched, not reflected, with a prominent nodule on its base.

Between the base of the columella and the base of the external lip there is a strong callus which forms a wide cord delimiting the umbilicus; this cord seems to be a little curved and reflected in its initial part. External lip not very wide with smooth margin, narrow, fine and not modified.

Umbilicus wide, and deep, delimited by the periumbilical cord.
Dimensions: the holotype is 4.2 mm in diameter x 2.1 mm in height (H/D: 0.5).

Habitat: Infralittoral species collected by scuba diving at 20 m depth.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia distorta* n. sp. is characterized by the spiral cordlets of its protoconch; by the periumbilical cordlets (5-6) and because the first part of the periumbilical callus is reflected outwards.

The most similar is *L. colorible* n. sp. from which it can be separated because the latter has a more deformed basal callus, and the periumbilical cordlets are more numerous.

***Leucorhynchia colorible* n. sp.** Rubio, Rolán & Gori

Figure 76A-E

Type material: The holotype (Figs. 76A-B) MNHN-IM-2000-34775.

Material examined: 1 s: Thailand: 1 s, Hin Daeng, S. Phuket, 22 m, diving collected (exCSG).

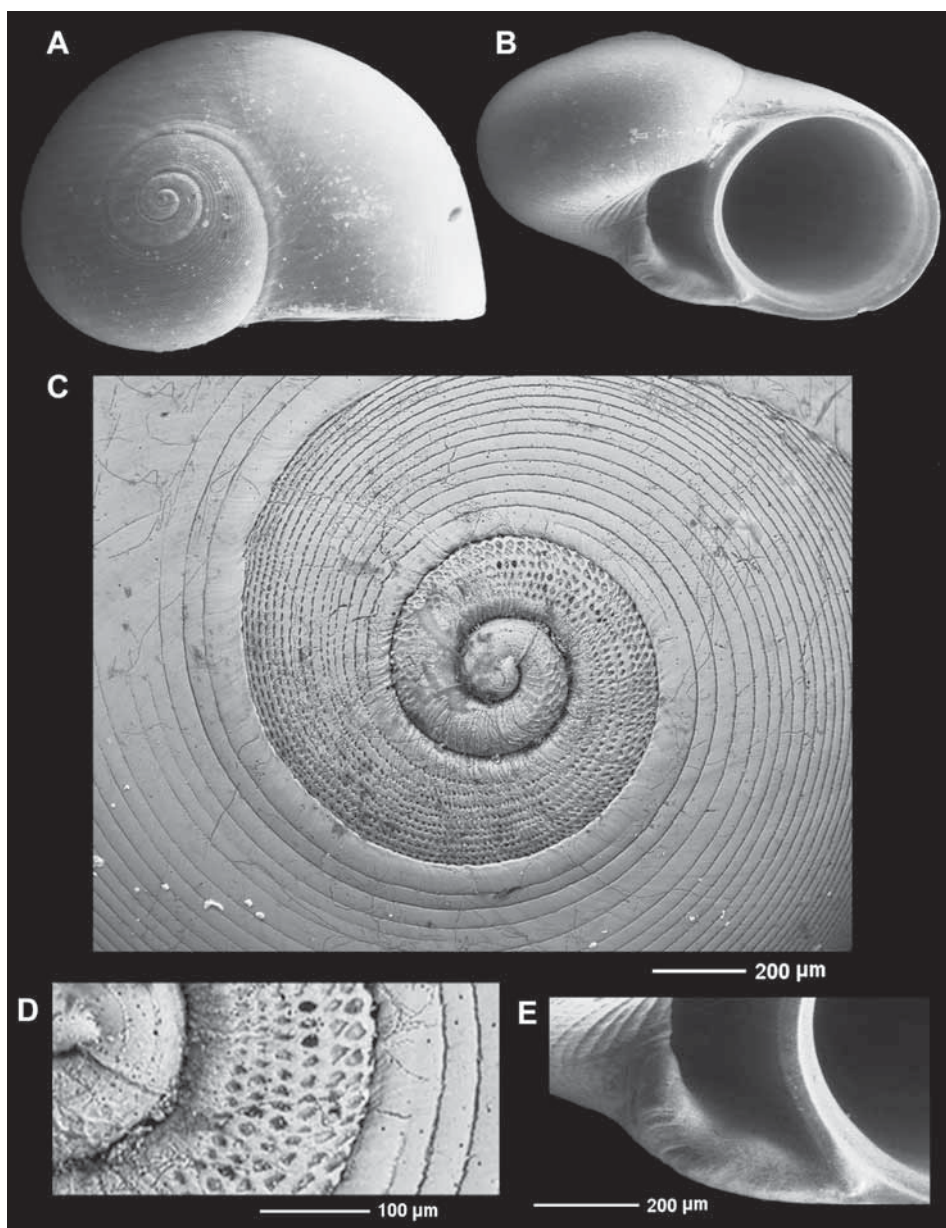
Type locality: Thailand, Hin Daeng, S. Pucket, 22 m.

Figure 75

A-E. *Leucorhynchia distorta* n. sp. A-B: holotype, 4.2 mm in diameter, Solomon Islands, Charapoana Pt, Vepi Island, Morovo Lagoon, 20 m (MNHN); C: apex with the protoconch; D-E: details of protoconch and umbilicus.

Figura 75

A-E *Leucorhynchia distorta* n. sp. A-B: *holotipo*, 4,2 mm de diámetro, Islas Salomón, Charapoana Pt, Isla de Vepi, Morovo Lagoon, 20 m (MNHN); C: *ápice con la protoconcha*; D-E: *detalles de la protoconcha y ombligo*.



Etymology: The specific name alludes to the high number of periumbilical cordlets with the fusion of the first part of two words: columella (colu-) and riblets (ribble-).

Description: Shell small (<5.0 mm), wider than high, robust, depressed-turbiniform, formed by 3.9 whorls, very convex and narrowly umbilicated. The protoconch is located on the same plane as the first whorl of the teleoconch; it has $\frac{3}{4}$ of a whorl, about 220 μ m in diameter and a rough surface with about 2 thin spiral threads.

Teleoconch of 3.1 whorls separated by a scarcely marked suture; the first $\frac{1}{2}$ whorl is adapically keeled, afterwards the keel disappears. Periphery rounded. Teleoconch surface totally covered with spiral grooves; initially the ornamentation is formed by spirally aligned rounded cells; they become progressively smaller and more elongated, until they turn into fine spiral grooves.

Subsuturally, in the adapical last quarter of whorl there is an area that is completely smooth, without spiral grooves.

Around the umbilicus there are between 20-24 axial basal grooves; no subsutural axial folds.

Aperture rounded, with an entire peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a thick callous layer which is extended abapically. Columella thick, arched, not reflected, with a small nodule on its base and a narrow low neck nearby. Between the base of the columella and the base of the external lip there is a coarse callus which forms part of the strong callus which delimits the umbilicus; this cord, in its initial part is covered by 10-12 strong spiral cordlets. Outer lip not very thick, with smooth unmodified margin. The surface of the parietal callus is rough and that of the columellar callus is smooth.

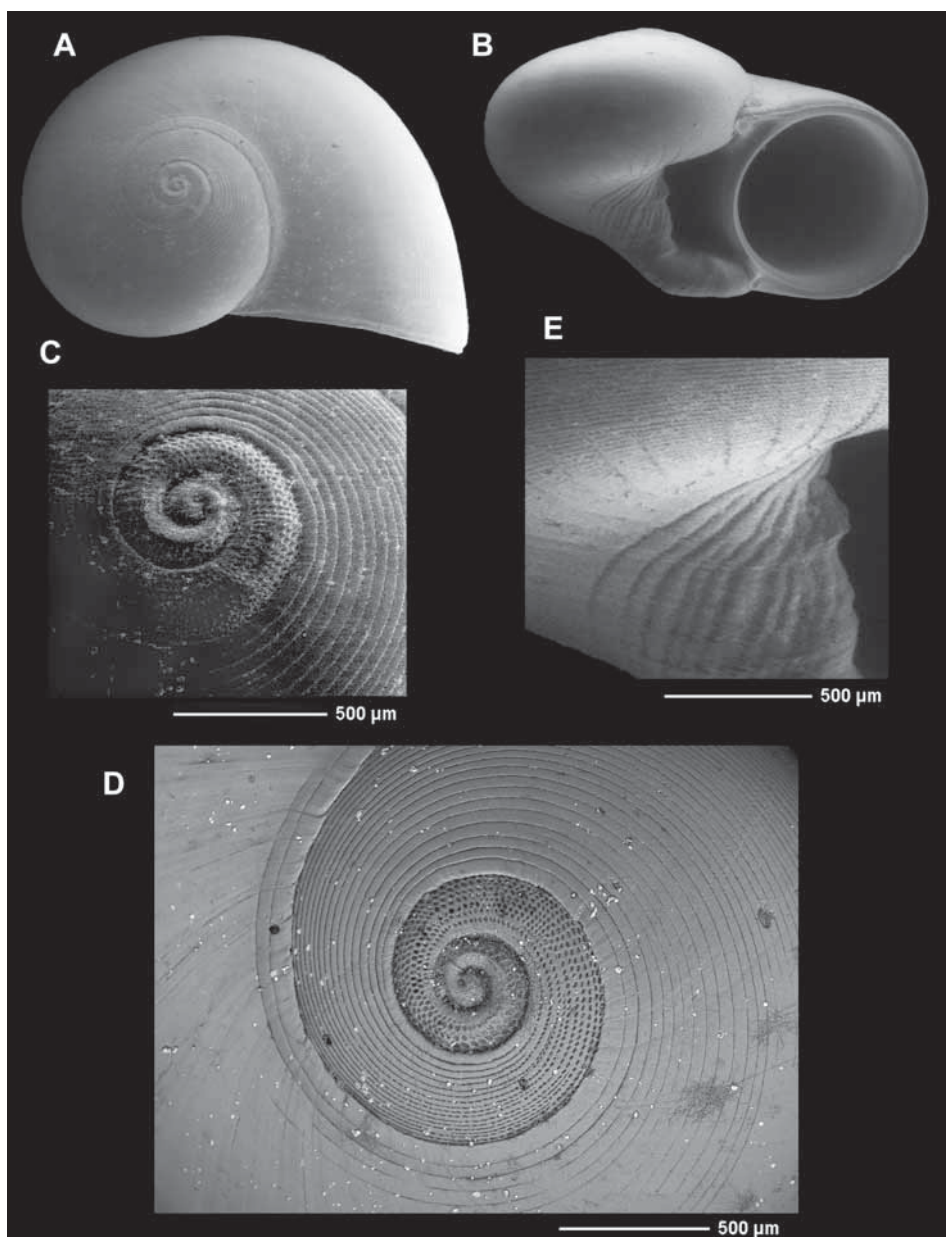
Umbilicus wide and deep.

Figure 76

A-E. *Leucorhynchia colurible* n. sp. A-B: holotype, 4.88 mm in diameter, Thailand, Hin Daeng, S. Pucket, 22 m (MNHN); C-D: protoconch and details; E: detail of the columella.

Figura 76

A-E. *Leucorhynchia colurible* n. sp. A-B: holotipo, 4,88 mm de diámetro, Tailandia, Hin Daeng, S. Pucket, 22 m (MNHN); C-D: protoconcha y detalles; E: detalle de la columela.



Dimensions: the holotype is 4.88 mm in diameter and 2.88 mm in height (H/D: 0.59).

Habitat: Infralittoral species collected by scuba diving at 22 m depth.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia colurible* n. sp. is characterized by the small number of spiral cordlets in the protoconch; by lacking clear growth lines in the first whorl of the teleoconch; by the shape of the columellar callus; and by the number of cords which cover initially the periumbilical cord.

The species that is most similar is *L. distorta* n. sp., from which it can be separated by the smaller number of spiral cordlets in its protoconch and by the larger number of cords which cover the umbilical callus.

***Leucorhynchia asessa* n. sp.** Rubio, Rolán & Gori

Figure 77A-E

Type material: Holotype (Fig. 77A-B) MNHN-IM-2000-34778.

Material examined: 1 s: Micronesia States, Pohnpei Island: 1 s, Pehleng Pass, South Oceanside dropoff, 06°51.29'N-158°06.24'E, 40 m, sand in cave (exCSG).

Type locality: Micronesia States, Pohnpei Island, Pehleng Pass, South Oceanside dropoff, 06°51.29'N-158°06.24'E, 40 m, sand in cave.

Etymology: The specific name is from the past participle of the Latin verb *assideo*, *es*, *ere*, *sedi*, *sessum* which means “to be placed close” alluding to the position of this species within its group.

Description: Shell small (<3.0 mm), wider than high, robust, depressed-turbiniiform, formed by 3.6 whorls, very convex and narrowly umbilicated. The protoconch has $\frac{3}{4}$ of a whorl, about 220 μ m in diameter and a very rough surface with 2 spiral cordlets and micro-granules aligned forming small threads.

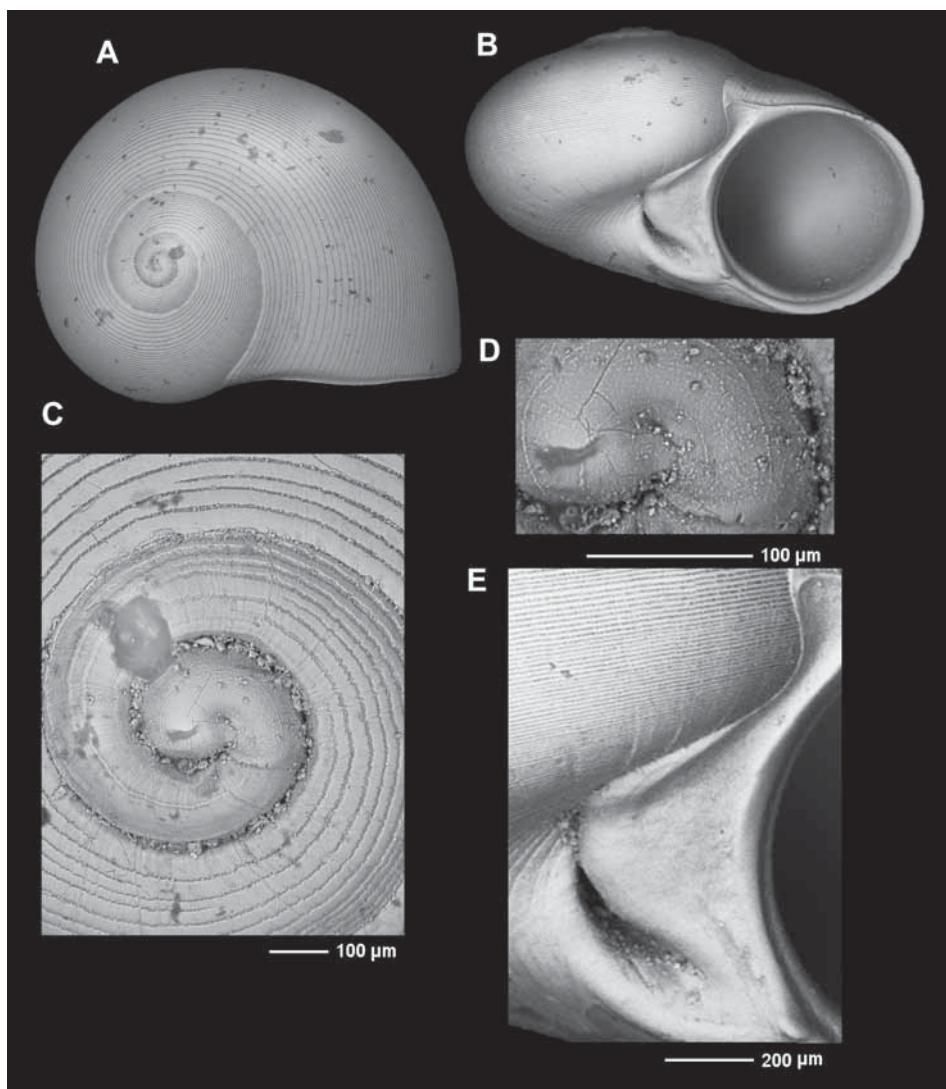


Figure 77

A-D. *Leucorhynchia assesa* n. sp. A-B: holotype, 2.82 mm, Micronesia, Pohnpei Island, Pehleng Pass, 40 m (MNHN); C: protoconch; D: detail of the umbilicus.

Figura 77

A-D. *Leucorhynchia assesa* n. sp. A-B: *holotipo*, 2,82 mm, Micronesia, Isla Pohnpei, Pebleng Pass, 40 m (MNHN); C: *protoconcha*; D: *detalle del ombligo*.

Teleoconch of 2.8 whorls separated by a suture initially marked; periphery rounded. Surface totally covered by spiral cords/grooves; the first ½ whorl is convex with one spiral cord and axial lines of micro-granules on each side; later, the number of cords increases until it covers the entire surface. The spiral cords are broader subsuturally and periumbilically, and narrower at the periphery.

Abapically, around the umbilicus there are numerous axial grooves; adapically, there are no subsutural axial folds.

A thick smooth cord delimits the umbilicus.

Around the umbilicus there are between 19-21 axial basal grooves; no subsutural axial folds.

Aperture rounded, with a continuous peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a thick callous layer which is extended adapically partially covering the previous whorl. Columella thick, arched, slightly reflected. The parietal/columellar calluses forms a depressed area next to the inner lip, and its extension almost completely covers the umbilicus. Outer lip not very thick, with a smooth margin, unmodified and reflected.

Umbilicus narrow and deep bordered by a thick spiral cord.

Dimensions: the holotype is 2.80 mm in diameter and 1.89 mm in height (H/D: 0.68).

Habitat: Infra-circalittoral species collected by diving at 40 m deep, on sand in cave.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia assessa* n. sp. is characterized by having a very rough protoconch surface with two fine cordlets; the entire teleoconch surface is covered with spiral cords/grooves, the beginning of the first half whorl of the teleoconch with only a very fine cord; umbilicus bordered by a thick cord and reduced to a fissure by the columellar callous layer.

From *L. colurible* n. sp. it differs by the smooth periumbilical cord and by the parietal/columellar callous layer.

Leucorhynchia parvicostae n. sp. Rubio, Rolán & Gori

Figures 78A-F, 79A-E,

Type material: Holotype (Fig. 78A) MNHN-IM-2000-34789 and 11 paratypes (Figs 78B-C) MNHN-IM-2000-34790; 8 paratypes in CSG.

Material examined: 21 s: Micronesia States, Pohnpei Island: 1 s, Pehleeng Pass, South Oceanside dropoff, 06°51.29'N-158°06.24'E, 40 m, sand in a cave (CSG). Kosrae Island: 20 s, Sanctuari, 39 m (type material) (exCSG).

Type locality: Micronesia States, Kosrae Island, Sanctuari, 39 m.

Etymology: The new species is the fusion of the Latin whorls *parvus*, *a*, *um* which means “small”, and *costae* “ribs” alluding to the small size of those present in the adapical part.

Description: Shell small (<3.5 mm), wider than high, robust, depressed adapically, turbiniform, formed by 3.6 whorls, keeled at the periphery and not umbilicated.

The protoconch is located on the same plane as the first whorl of the teleoconch; it has $\frac{3}{4}$ of a whorl, about 300 μ m in diameter and a rough surface with 1-2 thin spiral threads.

Teleoconch of 2.8 whorls separated by a scarcely marked suture; periphery keeled. The first $\frac{3}{4}$ whorl is adapically keeled; afterwards the keel disappears and two peripheral, narrow and shallow grooves arise, progressively growing in number until they cover the entire surface. The entire teleoconch is covered by spiral grooves except for a broad, smooth subsutural zone, which is formed in the last whorl in which numerous oblique axial folds are developed and a basal, periumbilical zone, also smooth, but without folds.

On the last whorl, in the smooth subsutural zone there are 14-15 little prominent oblique axial folds, which are not present in the periumbilical area. Aperture rounded, with a continuous peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a thick callous layer which is extended abapically and covers most of the previous whorl. Columella thick, arched, not reflected; between the base of the columella and the base of the external lip a wide, thick callous layer is formed that completely covers the umbilicus.

Outer lip not very thick, with a smooth unmodified margin. The surface of the parietal and columellar callus is smooth.

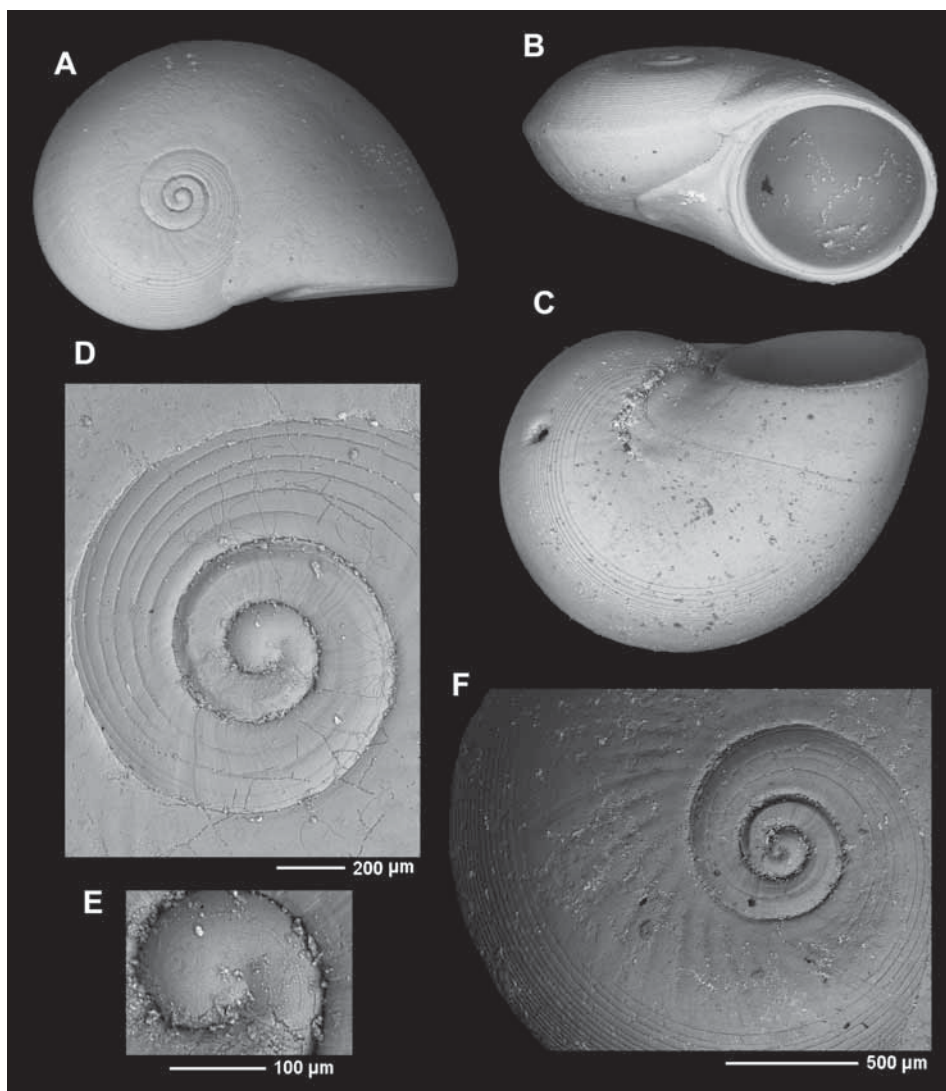


Figure 78

A-F. *Leucorhynchia parvicostae* n. sp. A: holotype, 3.3 mm, Micronesia States, Kosrae Island, Sanctuari, 39 m (MNHN); B-C: paratypes, 3.08, 3.07 mm, same locality (MNHN); D-E: protoconch of the holotype and detail; F: detail of the sculpture of the adapical part.

Figura 78

A-F. *Leucorhynchia parvicostae* n. sp. A: *holotipo*, 3,3 mm, *Estados de la Micronesia, Isla Kosrae, Sanctuari*, 39 m (MNHN); B-C: *paratipos*, 3,08, 3,07 mm, *la misma localidad* (MNHN); D-E: *protoconcha del holotipo y detalle*; F: *detalle de la escultura de la parte adapical*.

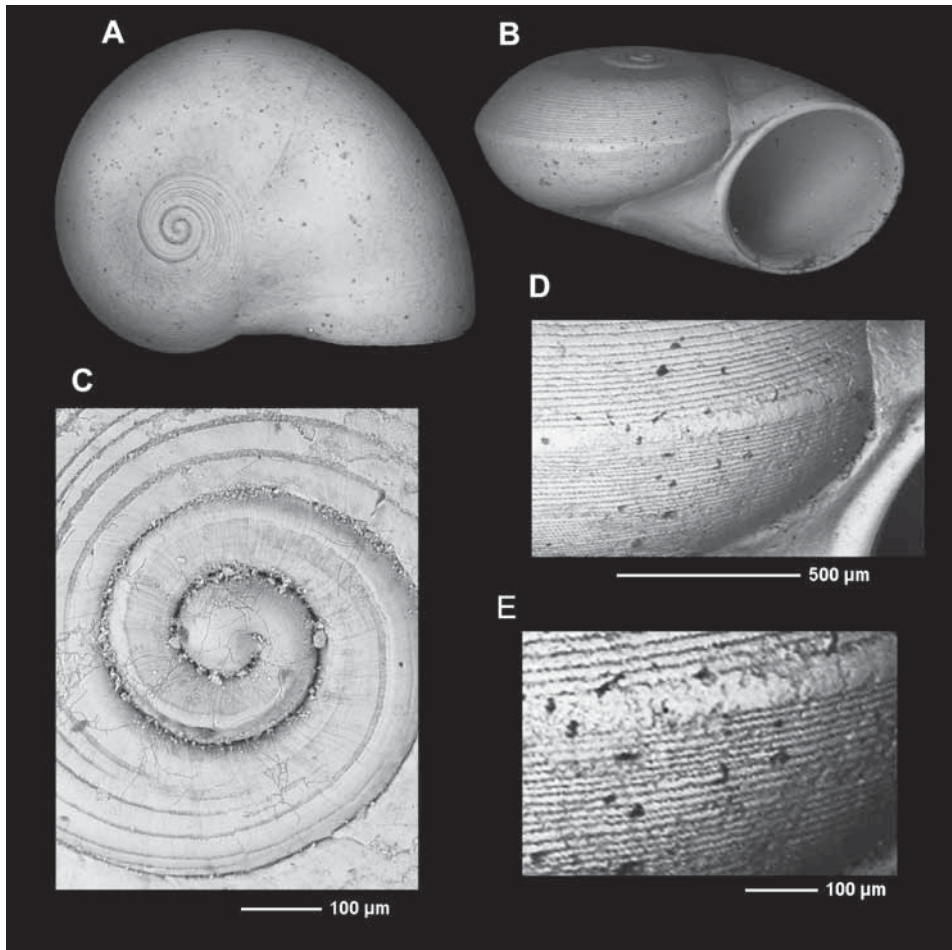


Figure 79

A-E. *Leucorhynchia parvicostae* n. sp. A-B: shell, 3.39 mm, Micronesia States, Pohnpei Island, Pehleng Pass, South Oceanside dropoff, 06°51.29'N-158°06.24'E, 40 m (CSG); C: apex and protoconch; D-E: detail of the periphery.

Figura 79

A-E. *Leucorhynchia parvicostae* n. sp. A-B: concha, 3,39 mm, Estados de la Micronesia, Isla Pohnpei, Pehleng Pass, depósitos oceánicos del sur, 06°51.29'N-158°06.24'E, 40 m (CSG); C: ápice y protoconcha; D-E: detalle de la perifería.

Umbilicus wide and deep.

Dimensions: The holotype is 3.3 mm in diameter and 1.7 mm in height (H/D: 0.56).

Habitat: Infralittoral-circalittoral species collected by diving between 39-40 m deep, on sand in cave.

Distribution: Micronesian States, Pohnpei and Kosrae Islands.

Remarks: *Leucorhynchia parvicostae* n. sp. is characterized by having the shell adapically depressed and peripherally keeled; by having the surface of the teleoconch covered by spiral grooves, except for a subsutural zone and another periumbilical area; by having oblique axial folds and a columellar callus that completely covers the umbilicus.

Leucorhynchia levinicum n. sp. Rubio, Rolán & Gori

Figure 80A-F

Type material: Holotype (Figs. 80A-B) MNHN-IM-2000-34783.

Material examined: 1 s: Thailand: 1 s, Similan Islands, Koh Bangu, 20 m (exCSG).

Type locality: Koh Bangu, Similan Islands, Thailandia, 20 m.

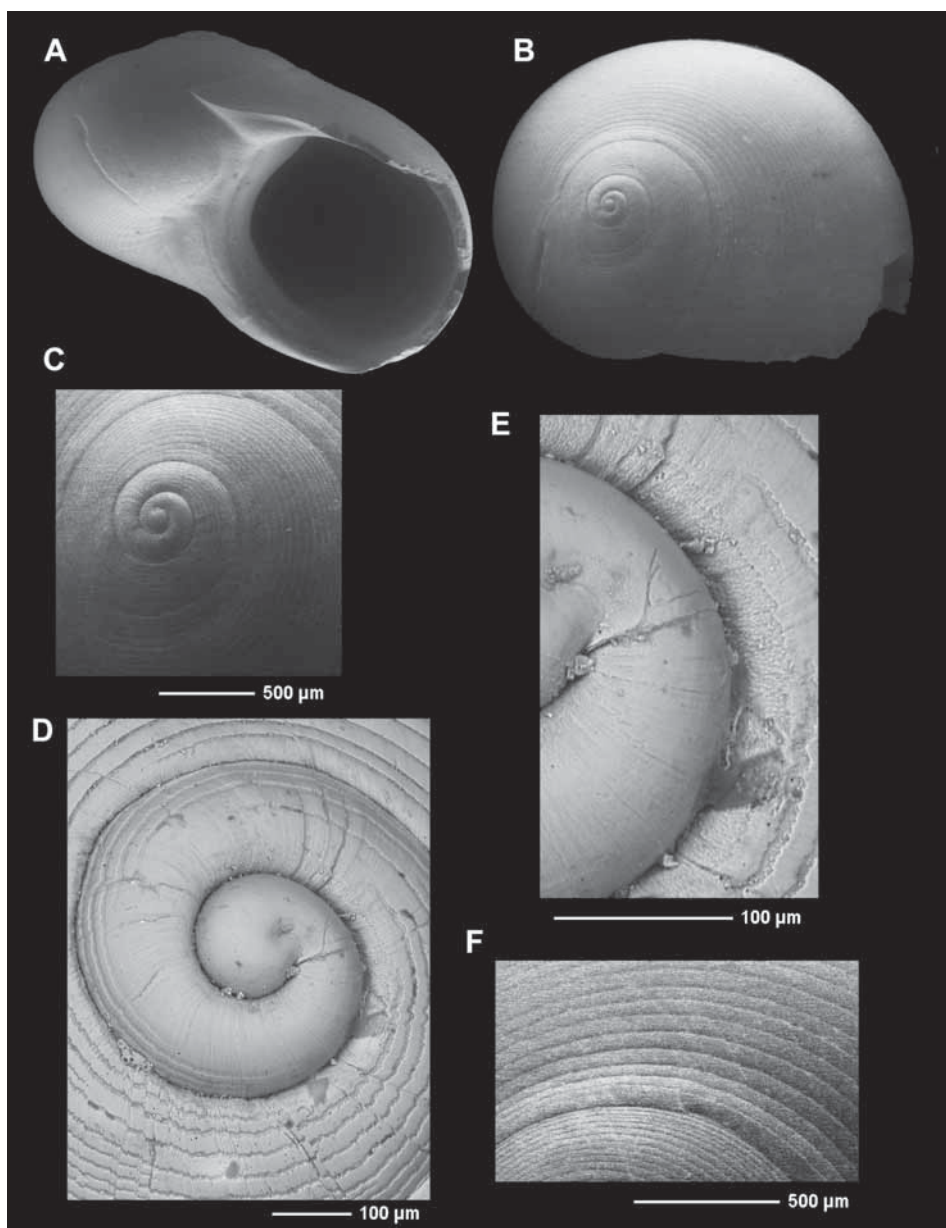
Etymology: The specific name is the fusion of two Latin words: *initium* which means “beginning” and *levis*, *e* which means “smooth”, alluding to the

Figure 80

A-F. *Leucorhynchia levinicum* n. sp. A-B: holotype, 4.23 mm in diameter, Koh Bangu, Similan Islands, Thailand, 20 m (MNHN); C-E: protoconch and detail; F: detail of the sculpture of the teleoconch.

Figura 80

A-F. *Leucorhynchia levinicum* n. sp. A-B: *holotipo*, 4,23 mm de diámetro, Koh Bangu, Isla de Similan, Tailandia, 20 m (MNHN); C-E: *protoconcha y detalle*; F: *detalle de la escultura de la teleoconcha*.



beginning of the teleoconch that has no sculpture on its convex part, which is unusual in this genus.

Description: Shell small (<4.50 mm), wider than high, robust, depressed-turbiniform, formed by 4.4 whorls initially separated by a marked suture, very convex periphery and not umbilicated.

The protoconch is nearly $\frac{3}{4}$ of a whorl, measures about 200 μm in diameter and has a smooth surface, ending in a thick varix.

Teleoconch of 3.6 whorls, ornamented with spiral cords, spiral grooves and micro-granules. The teleoconch surface is totally covered with spiral cords and grooves in the interspaces; the cords are flat, smooth and do not develop in zigzag pattern. The surface of the first whorl is very convex with 3-4 peripheral cords; from the first whorl the surface is covered totally by spiral cords/grooves; a wide and thick subsutural cord appears. There are no periumbilical or basal axial folds.

Inside the spiral grooves there are micro-granules.

Aperture circular with an entire peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a very thick callous layer that extends apically partially covering the previous whorl and forming abapically, together with the columella, which is arched and reflected, a callous extension that completely covers the umbilicus; its outer surface is smooth. Outer lip not very thick, with smooth margin, not modified by the spiral cords.

Umbilicus totally covered by the extension of the columellar and parietal callus.

Dimensions: holotype size is 4.23 mm in diameter and 3.13 mm in height (H/D: 0.74).

Habitat: Infralittoral species collected by diving at 20 m deep.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia levinicum* n. sp. is characterized by its smooth protoconch; by the lack of ornamentation of the first whorl of the teleoconch, which is convex and smooth; and by having a smooth surface on the columellar callus.

Leucorhynchia osmagnum n. sp. Rubio, Rolán & Gori

Figure 81A-F

Type material: Holotype (Figs. 81A-B) MNHN-IM-2000-34784.

Material examined: 1 s: Papua New Guinea: 1 s, Baudisson Bay, Baudisson Island, E New Ireland, 02°44.4'S-150°39.6'E, 29 m (exCSG).

Type locality: Baudisson Bay, Baudisson Island, E New Ireland, Papua New Guinea, 02°44.4'S-150°39.6'E, 29 m.

Etymology: The specific name alludes to the large size of the aperture: from the Latin *os, oris* “mouth” and *magnus, a, um* “large”.

Description: Shell small (<4.50 mm), wider than high, robust, turbiniform, depressed, formed by 3.9 whorls initially separated by a marked suture, very convex periphery and not umbilicated.

The protoconch has nearly $\frac{3}{4}$ of a whorl, measures about 260 μ m in diameter and has apparently a smooth surface.

Teleoconch of 3.1 whorls, ornamented with spiral cords, spiral grooves, and micro-granules inside the spiral grooves. The whorls are separated by a shallow suture; the first $\frac{1}{2}$ whorl is adapically keeled, afterwards the keel disappears. Periphery rounded. Teleoconch surface totally covered by spiral grooves; initially the ornamentation is formed by rounded cells spirally aligned; progressively they become smaller and elongated until converted into fine spiral grooves. From the first whorl a wide and thick subsutural cord appears. The subsutural and periumbilical cords are wider than the peripheral ones. There are no subsutural or periumbilical axial folds.

Aperture oval, with a continuous peristome; its size represents 75% of the total height of the shell. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a very thick callous layer that is extended adapically covering partially the previous whorl and abapically covering a large part of the umbilicus next to the columella; columella arched and not reflected; between the base of the columella and the base of the external lip there is a coarse callus formed by the cord that delimits the umbilicus. Outer surface of parietal/columellar callus is smooth. Outer lip not very thick, with smooth margin, not modified by the spiral cords.

The umbilicus is limited to the part not covered by the parietal/ columellar callus.

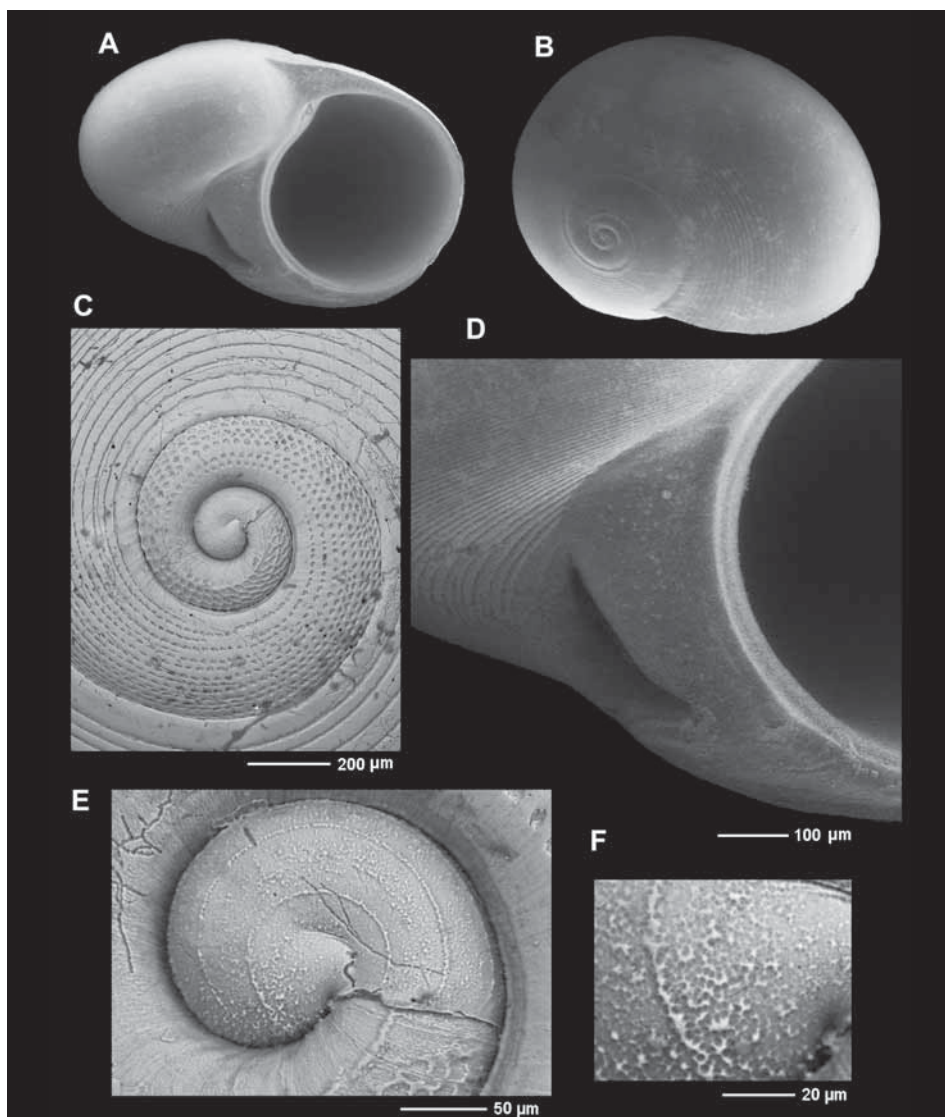


Figure 81

A-F. *Leucorhynchia osmagnum* n. sp. A-B: holotype, 4.43 mm in diameter, Papua New Guinea, Baudisson Bay, Baudisson Island, E New Ireland, 29 m (MNHN); C: protoconch and first teleoconch whorl; D: detail of the umbilicus area; E-F: microsculpture of the protoconch and detail.

Figura 81

A-F. *Leucorhynchia osmagnum* n. sp. A-B: holotipo, 4,43 mm de diámetro, Papua Nueva Guinea, Bahía de Baudisson, Isla de Baudisson, E Nueva Irlanda, 29 m (MNHN); C: protoconcha y primera vuelta de la teleoconcha; D: detalle del área umbilical; E-F: microescultura de la protoconcha y detalle.

Dimensions: holotype size is 4.33 mm in diameter and 3.1 mm in height (H/D: 0.72).

Habitat: Infralittoral species collected by diving at 29 m depth.

Distribution: Only known from the type locality.

Remarks: *Leucorbhynchia osmagnum* n. sp. is characterized by its wide aperture and the ornamentation of the first teleoconch whorl; also by the shape of the columellar callus and the parietal/columellar callous layer that covers a large part of the umbilicus.

Indo Pacific Group 4 Ornatissima

The species of this group are very heterogeneous in their general appearance and are characterized by the fact that the callus that rises from the base of the outer lip forms the thick spiral cord that delimits the umbilicus.

Indo Pacific group 4

- <i>Leucorbhynchia ornatissima</i> (Thiele, 1925).....O	Fig 82
- <i>Leucorbhynchia microtuberculata</i> n. sp NC	Fig 83
- <i>Leucorbhynchia lingula</i> n. sp V.....	Fig 84
- <i>Leucorbhynchia microstriata</i> n. sp V.....	Fig 85
- <i>Leucorbhynchia depressa</i> n. sp V.....	Fig 86
- <i>Leucorbhynchia umbilifuni</i> n. sp.....Mad	Fig 87
- <i>Leucorbhynchia catenata</i> n. sp.....Mad	Fig 88
- <i>Leucorbhynchia undulans</i> n. sp PNG.....	Fig 89,90
- <i>Leucorbhynchia umbilicord</i> n. sp PNG.....	Fig 91
- <i>Leucorbhynchia bilinguae</i> n. sp Ph.....	Fig 92
- <i>Leucorbhynchia poteli</i> n. sp Ph.....	Fig 93
- <i>Leucorbhynchia paucistriata</i> n. sp NC	Fig 94
- <i>Leucorbhynchia garciarodejai</i> n. sp PNG.....	Fig 95
- <i>Leucorbhynchia rosinae</i> n. sp So	Fig 96
- <i>Leucorbhynchia striatissima</i> n. sp Ph.....	Fig 97
- <i>Leucorbhynchia monteiroi</i> n. sp So	Fig 98
- <i>Leucorbhynchia densilabris</i> n. sp So	Fig 99
- <i>Leucorbhynchia linguaeformis</i> n. sp PNG.....	Fig 100

Leucorhynchia ornatissima (Thiele, 1925)

Figure 82A-F

Vitrinella (Leucorhynchia) ornatissima Thiele, 1925. *Wissenschaftliche Ergebnisse der deutschen Tiefsee-Expedition auf dem Dampfer "Valdivia" 1898-1899*, 17(2): 262, pl. 5, figs. 11-12 [Type locality: Gulf of Oman, Indian Ocean].

Type material: Holotype in Museum für Naturkunde, Berlin-Malakologie (ZMB/Moll-108500). Examined.

Description: From the original description and examination of the holotype: shell small (<4.50 mm), wider than height, robust, depressed turbiniform, spire formed by 3.6 whorls, tetra carinate and deeply umbilicate.

The protoconch has $\frac{3}{4}$ of whorl, measuring about 270 μ m in diameter and its surface is completely eroded.

Teloconch of 2.8 whorls initially separated by a marked suture; there are four carinae that angle the shell; one is below the suture; two in the periphery and one delimiting the base. In early teloconch, two nodulous carinae can be observed: one adapical and one in the periphery; after the first whorl the nodules soften and disappear.

The teloconch surface is totally smooth. Adapically there are 14-15 fine and short subsutural axial folds on the last whorl.

Abapically, there are 10-12 thick periumbilical axial folds that penetrate inside the umbilicus, formed by the columellar callus, during the growth of the shell.

Aperture oval with a complete peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a thin callous layer, that extended towards the suture; columella arched and not reflected towards the umbilicus; a prominent callus, placed between the base of the columella and the base of the outer lip is extended towards the umbilicus, but not occluding it. Outer lip thin, with smooth margin.

Umbilicus wide and deep, with 10-12 very thick axial folds delimiting it. Each fold coincides with different growth periods of the columellar callus. Umbilical wall with a thick cord that penetrates from the base of the columella inside of the umbilicus.

Dimensions: the holotype measures 3.75 mm in diameter and 2.59 mm in height (H/D: 0.69).

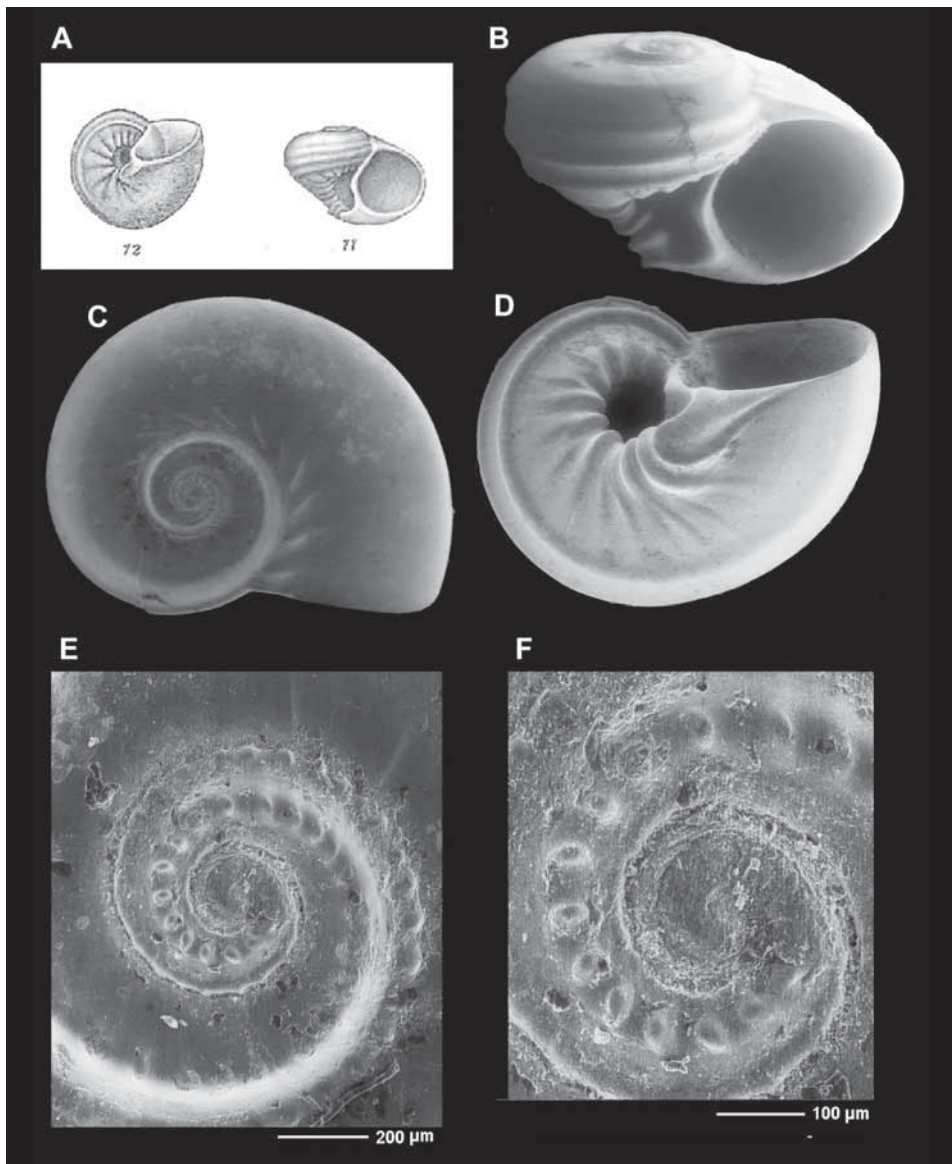


Figure 82

A-F. *Leucorhynchia ornatissima* (Thiele, 1925). A: original representation. B-D: holotype, 3.75 mm, Gulf of Oman, Indian Ocean (ZMB/Moll-108500); E-F: protoconch and detail.

Figura 82

A-F. *Leucorhynchia ornatissima* (Thiele, 1925). A: original representación. B-D: holotipo, 3,75 mm, Golfo de Omán, Océano Índico (ZMB/Moll-108500); E-F: protoconcha y detalle.

Habitat: Unknown.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia ornatissima* is similar in general appearance to *L. umbilifuni* n. sp., but can be distinguished from it by having the surface of the teleoconch completely smooth; by its four carinae; by the two nodular carinae of the beginning of the teleoconch; and by the number and size of the axial folds.

***Leucorhynchia microtuberculata* n. sp.**

Figure 83A-F

Type material: Holotype (Figs. 83A-B) MNHN-IM-2000-34903.

Material examined: 2 s: New Caledonia, Atelier LIFOU 2000: 1 s, Lifou, Santal Bay, before of the islet Huca Hutighé, Stn 1434, 20°52.5'S-167°08.1'E, 5-20 m, hard bottoms (holotype). LAGON: 1 s, Secteur de Poindimiée, Stn DW830, 20°49'S-165°19'E, 105-110 m.

Type locality: New Caledonia, Lifou, Santal Bay, before of the islet Huca Hutighé, 20°52.5'S-167°08.1'E, 5-20 m, hard bottoms [Atelier LIFOU 2000: Stn 1434].

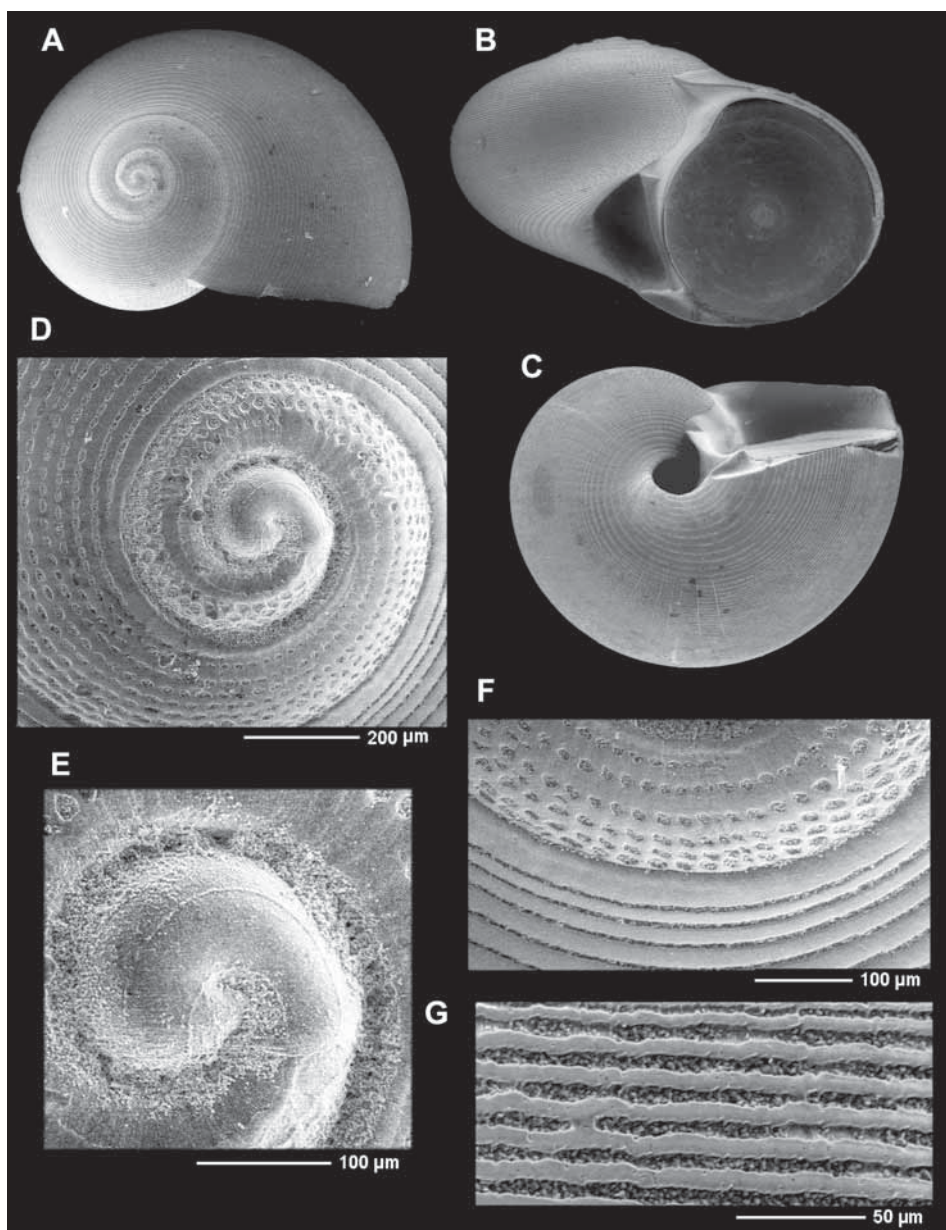
Etymology: The specific name alludes to the very small tubercles present in the spaces between the spiral cordlets.

Figure 83

A-G. *Leucorhynchia microtuberculata* n. sp. A-C: holotype, 2.53 mm in diameter, New Caledonia, Lifou, Santal Bay, before the islet Huca Hutighé, Stn 1434, 20°52.5'S-167°08.1'E, 5-20 m, hard bottoms (MNHN); D-E: protoconch and first whorl of teleoconch, and detail; F-G: microsculpture and detail.

Figura 83

A-G. *Leucorhynchia microtuberculata* n. sp. A-C: *holotipo*, 2,53 mm in diameter, Nueva Caledonia, Lifou, Bahía de Santal, antes del islote Huca Hutighé, Stn 1434, 20°52,5'S-167°08,1'E, 5-20 m, fondos duros (MNHN); D-E: *protoconcha y primera vuelta de la teleoconch, y detalle*; F-G: *microescultura y detalle*.



Description: Shell small (<2.6 mm), wider than high, robust, depressed turbiniform, spire formed by 3.4 whorls, very convex and narrowly umbilicated. The protoconch has $\frac{3}{4}$ of a whorl, about 240 μm in diameter, with a rough surface and three thin spiral threads, ending in a thick lip varix.

Teleoconch of 2.6 whorls separated by a suture initially marked and a rounded periphery. The first $\frac{1}{2}$ whorl has a central keel, with fine axial threads between the keel and the suture, and 3 peripheral cords that are developed in zigzag forming a reticulum of large rounded spaces; from $\frac{1}{2}$ whorls the keel becomes less marked until it disappears and the rounded spaces become progressively smaller and lengthen to form fine spiral grooves.

Teleoconch surface totally covered by spiral cords and fine spiral grooves. Inside the spiral grooves can be seen micro-granules. On the penultimate whorl there are about 6 spiral cords at the beginning and 20 at its end; on the last whorl 68-70 fine cordlets are visible, their number going down to 10 in the infundibula umbilicus. There are not subsutural or periumbilical axial folds. Under high magnification can be seen in the base about 30 axial lines. Aperture circular with a complete peristome. Inside the aperture there is a fold on which the operculum abuts. Parietal area covered by a not very thick callous layer that extends adapically covering partially the previous whorl; columella slightly arched, not very thick and reflected towards the umbilicus. Between the base of the columella and the base of the outer lip, a callus is formed with a triangular shape, which during the growth of the shell will result in a thick cord that delimits the umbilicus. Outer lip thin, with smooth margin, not modified by spiral cords. The surface of the parietal and columellar callus are completely smooth.

Umbilicus narrow and deep, delimited by a strong cord and in its interior there are no folds or spiral cords. Operculum rounded, multispiral and with a central nucleus.

Dimensions: the holotype measures 2.53 mm in diameter and 1.67 mm in height (H/D: 0.66).

Operculum multispiral with a central nucleus, formed by a nucleus of small size and about 8 whorls.

Habitat: Infralittoral to bathyal species collected at 5-20 m on hard bottom, and dredged at 105-110 m depth.

Distribution: Only known from New Caledonia.

Remarks: *Leucorhynchia microtuberculata* n. sp. is characterized by the small cordlets on its protoconch; by the reticle of rounded spaces at the beginning of the teleoconch; and by the shape and size of the columellar callus.

It is very similar to *L. microstriata* n. sp., and *L. undulans* n. sp., but *L. microtuberculata* n. sp. may be distinguished by having a rough protoconch surface, with two spiral cordlets, and also by the axial lines near the base.

***Leucorhynchia lingula* n. sp.**

Figure 84A-F

Type material: Holotype (Figs. 84A-C) MNHN-IM-2000-34904.

Material examined: 1 s: New Caledonia, Expédition MONTRouZIER: 1 s, Secteur de Koumac, Chenal de la Passe de Koumac, Stn 1314, 20°39.8'S-164°15.3'E, 30-63 m, sable coquillier vaseux.

Type locality: New Caledonia, Secteur de Koumac, Chenal de la Passe de Koumac, 20°39.8'S-164°15.3'E, 30-63 m, sable coquillier vaseux [Expédition MONTRouZIER: Stn 1314].

Etymology: The specific name alludes to the protuberance in the base with the form of a *lingula* “tongue”. Name by apposition.

Description: Shell small (<2.50 mm), wider than high, robust, turbiniform, spire formed by 3.3 whorls, very convex and umbilicate.

Protoconch with $\frac{3}{4}$ of whorl, about 280 μ m in diameter and apparently with a smooth surface.

Teleoconch of 2.5 whorls separated initially by a wide suture, and after $\frac{3}{4}$ whorl, a subsutural cord appears delimiting it. Very convex periphery. Teleoconch surface totally smooth, except keels in early teleoconch, subsutural cord and basal axial folds.

The first half whorl of the teleoconch is bicarinate: two carinae are observed, one central and one peripheral; from the first half whorl these carinae disappear and the surface becomes convex and totally smooth. On the base, in the first half whorl there are 5 spiral sulci placed close to the umbilical margin.

Abapically, there are about 14 periumbilical axial folds that do not penetrate the umbilicus.

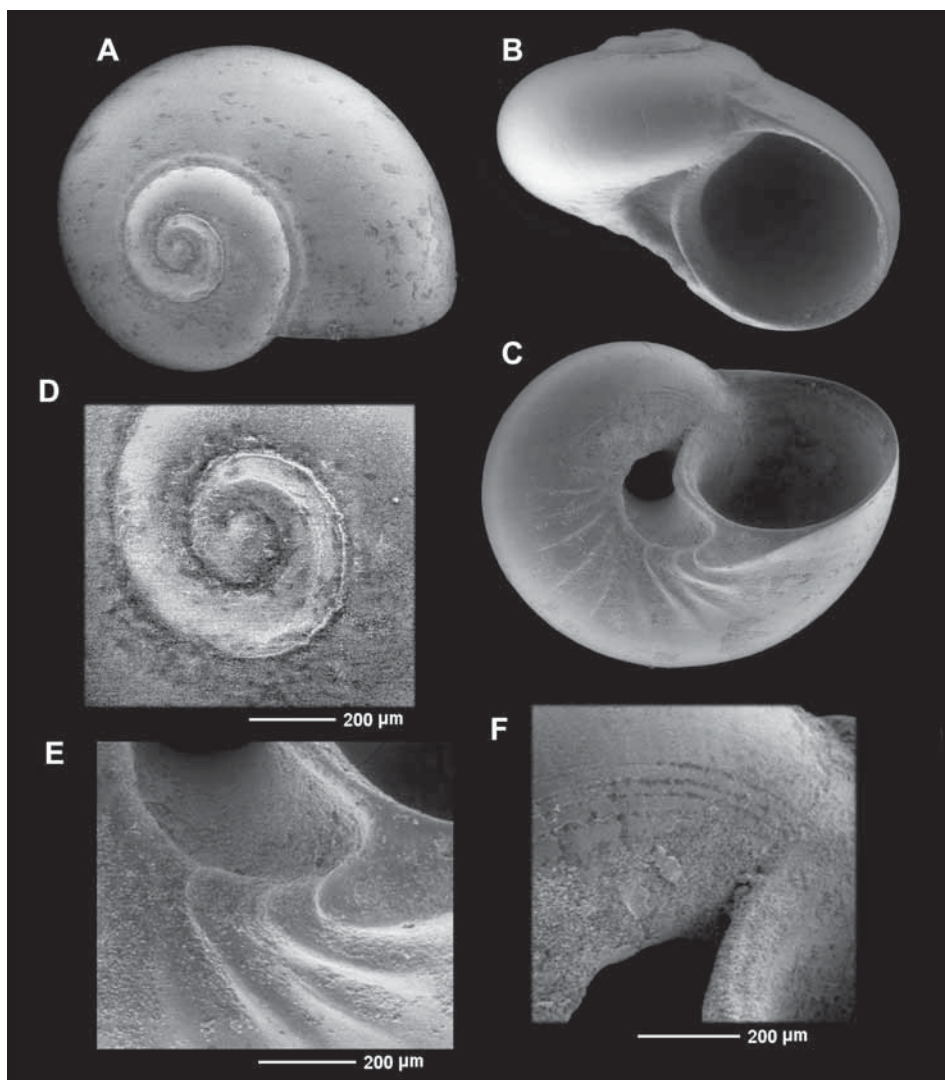


Figure 84

A-F. *Leucorhynchia lingula* n. sp. A-C: holotype, 2.21 mm in diameter, New Caledonia, Secteur de Koumac, Chenal de la Passe de Koumac, 20°39.8'S-164°15.3'E, 30-63 m, shell gritt bottom (MNHN); D: protoconch and first teleoconch whorl; E-F: details of the sculpture of the umbilicus and the spiral sculpture of the base.

Figura 84

A-F. *Leucorhynchia lingula* n. sp. A-C: *holotipo*, 2,21 mm de diámetro, Nueva Caledonia, Sector de Koumac, Chenal de la Passe de Koumac, 20°39,8'S-164°15,3'E, 30-63 m, fondo con arena conchífera; D: protoconcha y primera vuelta de teleoconcha; E-F: detalle de la escultura del ombligo y de la escultura espiral de la base.

Aperture circular with a complete peristome. Inside the apertural border there is a fold on which the operculum abuts. Parietal area covered by a thin callous coating extended up to the suture; columella not very wide, slightly arched, with a prominent callous protuberance hook-shaped, placed at the base and extended towards the umbilicus, but not occluding it. External lip thin with smooth margin not modified. The surface of the parietal and columellar callus is totally smooth.

Umbilicus relatively wide and deep, delimited by a strong cord formed by the successive enlargements of the columellar callus; the umbilical wall is initially concave and later convex, without folds or cords.

Dimensions: the holotype size is 2.21 mm in diameter and 1.60 mm in height (H/D: 0.72).

Habitat: Infra to circalittoral species dredged at 30-63 m in shelling muddy and sand bottoms.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia lingula* n. sp. is characterized by the careening at the beginning of the teleoconch; by the 4 spiral grooves at the start of the base; and by the shape and the thickness of the columellar callus.

This species may be distinguished from *L. microtuberculata* n. sp. by having a smooth surface, without micro-tubercles; by having axial folds on the base and by its tongue-shaped columellar callus.

From *L. catenata* n. sp. it differs in having the protoconch smooth and lacking of adapical axial folds.

***Leucorhynchia microstriata* n. sp.**

Figure 85A-F

Type material: Holotype (Figs. 85A-C) MNHN-IM-2000-34905 and 1 paratype MNHN-IM-2000-34906.

Material examined: 2 s: Vanuatu, SANTO 2006: 2 s, W. Aoré Island, Les Flamboyants, Stn FB90, 15°35'S-167°07.7'E, 36-39 m, coarse sand.

Type locality: Vanuatu, W. Aoré Island, les Flamboyants, 15°35'S-167°07.7'E, 36-39 m [SANTO 2006: Stn FB90].

Etymology: The specific name alludes to the very fine spiral striation in the last part of the teleoconch.

Description: Shell small (<2.5 mm), wider than high, robust, depressed turbiniform, spire formed by 3.4 whorls, very convex and moderately umbilicated. The protoconch has about $\frac{3}{4}$ of whorl, measuring about 200 μm in diameter; the surface is slightly rough, ending in a thick labial varix. Teleoconch of 2.6 whorls separated by an initially very marked suture, with a rounded periphery.

The first $\frac{1}{2}$ whorl is almost completely smooth (except for some sulci near the lower suture) and very convex. After the first $\frac{1}{2}$ whorl, spiral grooves gradually appear, first on the periphery, and then they extend throughout the entire surface of the teleoconch; a thick subsutural cord starts to develop. After the first whorl, the teleoconch surface is totally covered by spiral cords and fine spiral grooves. Inside the spiral grooves, micro-granules can be seen. In apertural view, about 30-33 spiral cordlets are visible on the penultimate whorl and more than 85 on the last one.

There are no basal or subsutural axial folds.

Aperture circular, with complete peristome. Inside the inner lip there is a fold on which the operculum abuts.

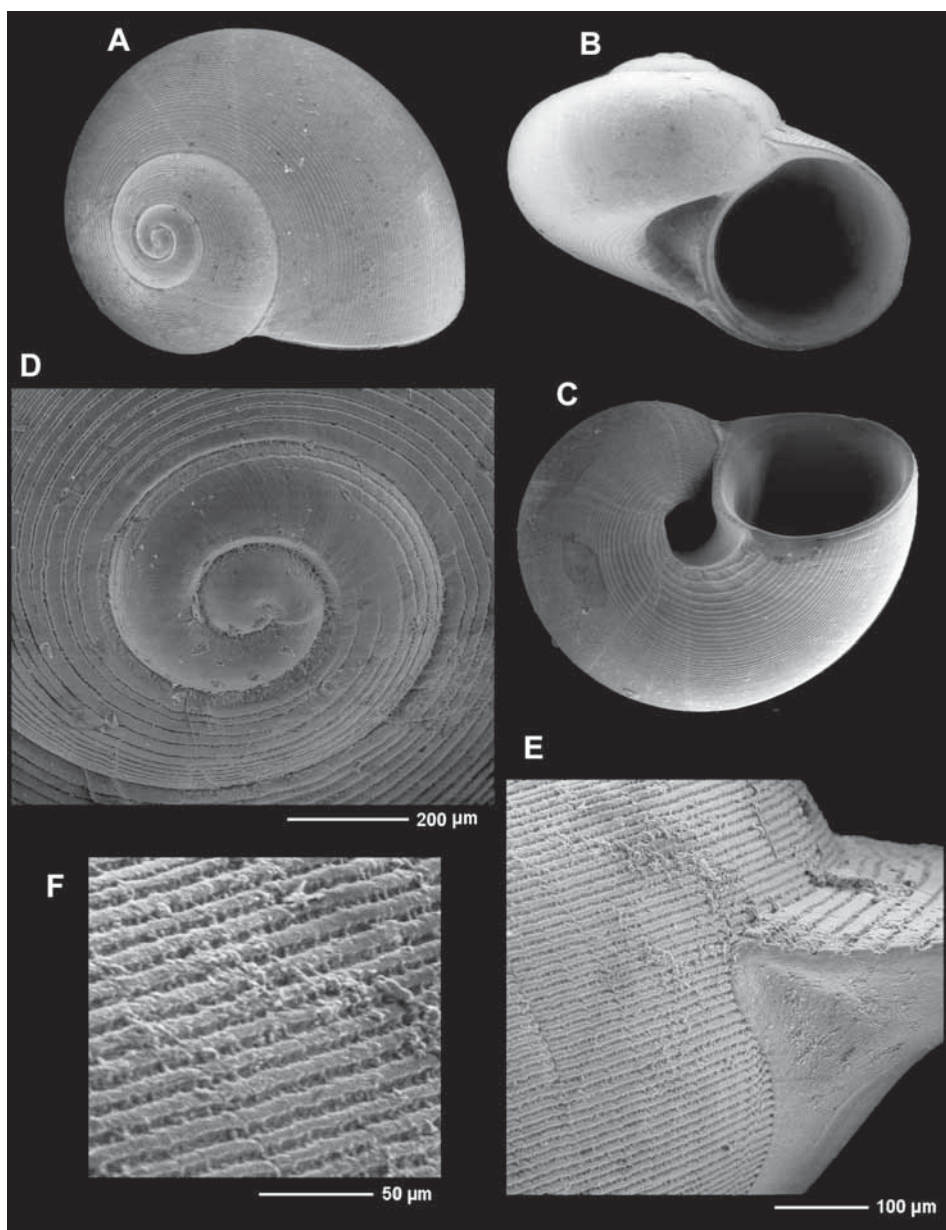
Parietal area covered by a not very thick callous layer that extends adapically covering partially the previous whorl; columella slightly arched and reflected towards the umbilicus; on its base a callous thickening is formed with a triangular shape and from which a thick cord appears delimiting the umbilicus. Outer lip thin, finely crenulated in the margin by the spiral cordlets. Umbilicus very narrow and deep, delimited by a thick cord; inside, no folds or spiral cords can be observed; umbilical wall concave.

Figure 85

A-F. *Leucorhynchia microstriata* n. sp. A-C: holotype, 2.17 mm in diameter, Vanuatu, W Aoré Island, Stn FB90, 36-39 m (MNHN); D: first teleoconch whorl and protoconch; E-F: microsculpture and detail.

Figura 85

A-F. *Leucorhynchia microstriata* n. sp. A-C: holotipo, 2.17 mm de diámetro, Vanuatu, Oeste de la Isla de Aoré, Stn FB90, 36-39 m (MNHN); D: primera vuelta de teleoconcha y protoconcha; E-F: microescultura y detalle.



Dimensions: the holotype measures 2.17 mm in diameter and 1.83 mm in height (H/D: 0.84).

Habitat: Infralittoral species, collected at 33-36 m in coarse sand.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia microstriata* n. sp. is characterized by its rough protoconch without spiral cordlets; by the high number of spiral cords on the last whorl of the teleoconch; and by the shape of the columellar callus.

L. microtuberculata n. sp. may be distinguished by having spiral cordlets on its protoconch, by having a protoconch of smaller diameter, a labial varix at its end, and two keels at the beginning of the teleoconch.

This species may show an overall similarity with *L. umbilifuni* n. sp., but the latter species is smaller and has some undulations in the umbilical infundibulum, due some axial folds at the end on the spire. Also the spiral striation is not so marked.

***Leucorhynchia depressa* n. sp.**

Figure 86A-F

Type material: Holotype (Figs. 86A-C) MNHN-IM-2000-34907.

Material examined: 1 s: Vanuatu, SANTO 2006: 1 s, N Tutuba Island, Stn DS99, 15°32'S-167°17'E, 100-105 m, cave sand holes with sand pockets.

Type locality: Vanuatu, N Tutuba Island, 15°32'S-167°17'E, 100-105 m, cave sand holes with sand pockets [SANTO 2006: Stn DS99].

Etymology: The specific name is the past participle of the Latin verb *deprimo*, *is, ire, pressi, pressum* which means “depressed” alluding to the very low spire of this species.

Description: Shell very small (<2.0 mm), wider than high, robust, depressed, almost planispiral, spire formed by 2.7 whorls, very convex and widely umbilicated; the last whorl represents 95% of the total height of the shell.

The protoconch has $\frac{3}{4}$ of whorl and is placed almost in the same plane as the teleoconch whorls; it measures about 260 μm in diameter; the surface is rough with 3 spiral cordlets, and ends in a thick varix.

Teleoconch of 1.9 whorls initially separated by a very marked suture; the periphery is rounded. At the beginning of the teleoconch there is an adapical carina that angles the shell until it disappears approximately at $\frac{3}{4}$ of a whorl; between the carina and the periphery, in the first half whorl, there are 2-3 spiral cords; their number then increases until covering the entire surface; the cords progressively widen while the spaces between the cords become narrower and transform into more or less deep grooves. All spaces between cords are covered with axially aligned micro-granules.

Teleoconch surface totally covered with spiral cords and fine spiral grooves. In apertural view 3-4 fine spiral cords are visible on the penultimate whorl and 54-56 on the last one. There are no basal or subsutural axial folds.

A wide spiral cord, formed by the developing of the columellar callus, delimits and angles the umbilicus.

Aperture circular with an entire peristome. Inside the apertural border there is a fold on which the operculum abuts.

Parietal area covered by a thin callous layer extending adapically and covering a great part of the previous whorl; columella arched, not very thick and reflected towards the umbilicus. Between the base of the columella and the base of the outer lip, a triangularly shape callus is formed, which during the growth of the shell will result in a thick cord that delimits the umbilicus and angling the umbilical margin. Outer lip thin, finely crenulated at its margin. Umbilicus wider and deeper, bounded by a thick cord that angles its outer margin; inside there are 10-12 fine spiral cords and micro-granules axially aligned in the interspaces.

Dimensions: the holotype measures 1.45 mm in diameter and 0.98 mm in height (H/D: 0.67).

Habitat: Bathyal species collected at 100-105 m in cave sand holes with sand pockets.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia depressa* n. sp. is characterized by its depressed spire, ornamentation of the protoconch (rough with 3 spiral cordlets), adapical carina in the first half whorl of the teleoconch, the shape of the umbilicus and the columellar callus.

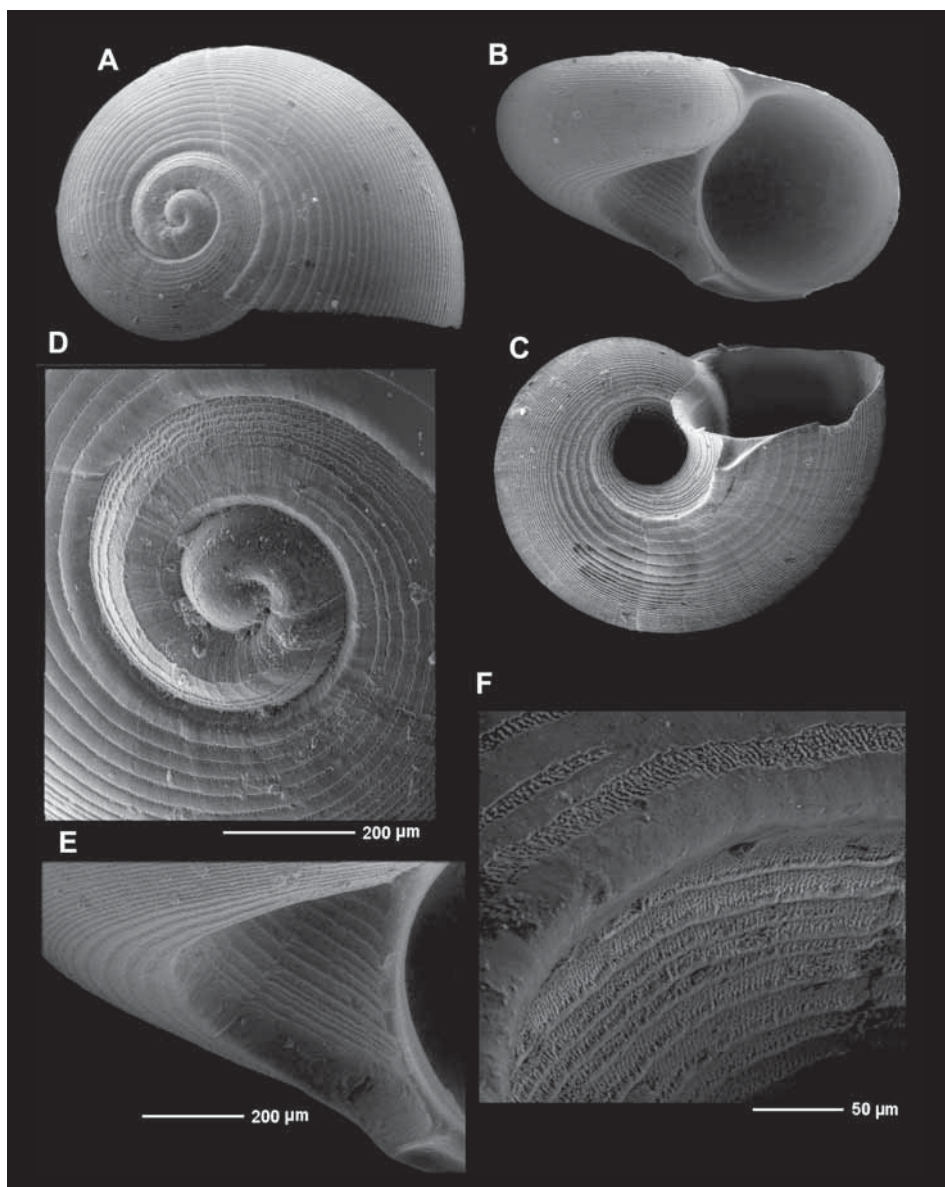


Figure 86

A-F. *Leucorhynchia depressa* n. sp. A-C: holotype, 1.45 mm in diameter, Vanuatu, N Tutuba Island, Stn DS99, 100-105 m (MNHN); D: protoconch and first teleoconch whorl; E-F: sculpture of the umbilicus and detail.

Figura 86

A-F. *Leucorhynchia depressa* n. sp. A-C: *holotipo*, 1,45 mm de diámetro, Vanuatu, N Isla Tutuba, Stn DS99, 100-105 m (MNHN); D: *protoconcha* y primera vuelta de *teleoconcha*; E-F: *escultura del ombligo* y *detalle*.

The differences between *L. umbilicord* n. sp. and the present species are indicated in the remarks for the former.

***Leucorhynchia umbilifuni* n. sp.**

Figure 87A-F

Type material: Holotype (Figs. 87A-C) MNHN-IM-2000-34908.

Material examined: 1 s: S Madagascar, ATIMO VATAE: 1 s, S Cap Sainte Marie, Stn CP3613, 26°13'S-45°08'E, 225-282 m.

Type locality: S Madagascar, South Cap Sainte Marie, 26°13'S-45°08'E, 225-282 m [ATIMO VATAE: Stn CP3613].

Etymology: The specific name makes reference to the cord present inside the umbilicus, through the fusion of the beginnings of the two whorls: *umbilicus* and *funiculus*, “cord”.

Description: Shell small (<2.00 mm), wider than high, robust, turbiniform; spire formed by 3.3 whorls, very convex and umbilicate. The protoconch has about $\frac{3}{4}$ of whorl, measuring about 230 μ m in diameter and having apparently a smooth surface.

Teloconch of 2.5 whorls initially separated by a wide suture; after the first 1 $\frac{1}{2}$ whorls, a wide, elevated subsutural cord, extends to the aperture. Very convex periphery.

The teloconch surface is totally covered by spiral cords and spiral grooves in the interspaces, except, adapically, the first 1 $\frac{3}{4}$ whorls that are totally smooth.

From the beginning of the teloconch a carina is formed next to the suture that progressively softens and transforms into a thin cord.

Abapically, there are 4-5 thick periumbilical axial folds that do not penetrate inside the umbilicus.

Aperture circular, peristome entire. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a thin callous layer, that extended towards the suture; columella wide, arched and reflected to the umbilicus; a prominent callous protuberance-shaped, placed between the base of the columella and the base of the outer lip, extends towards the

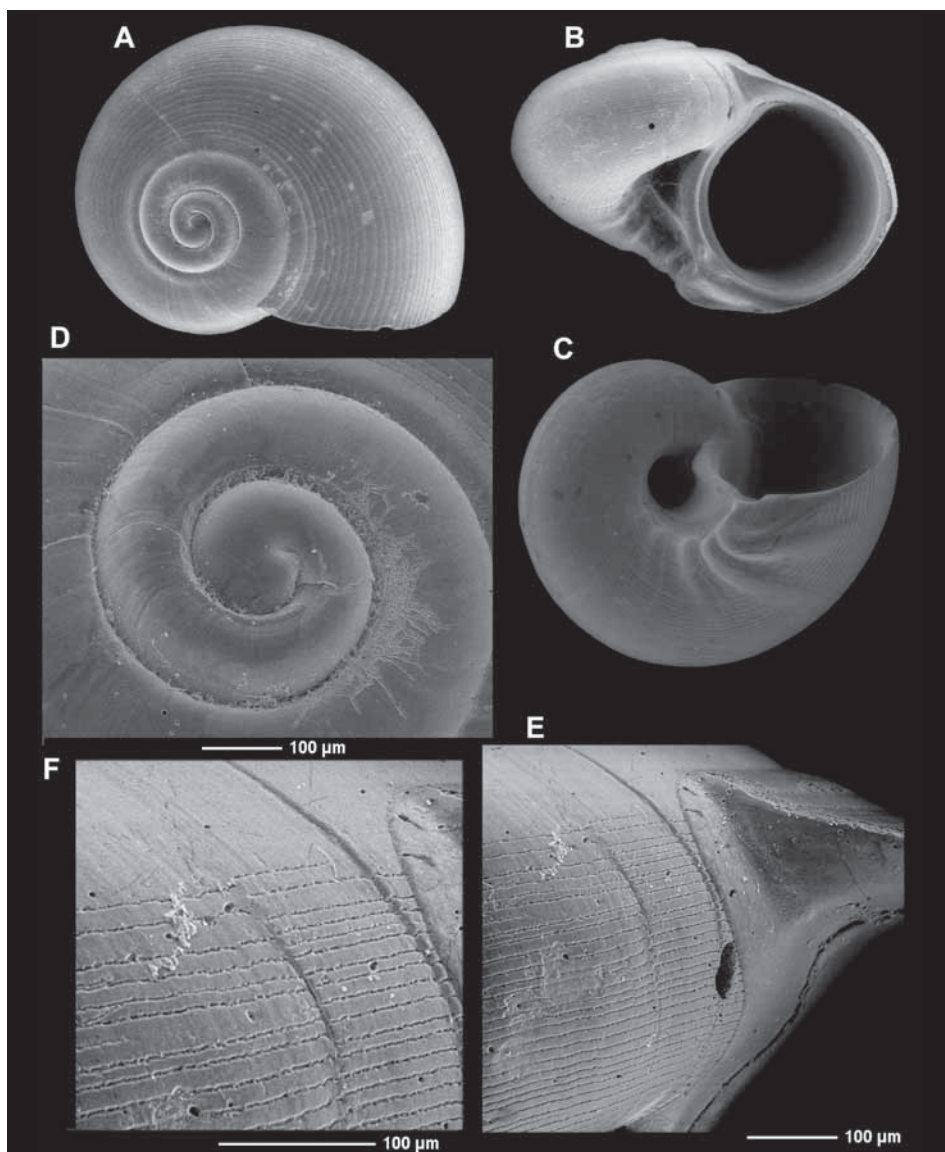


Figure 87

A-F. *Leucorhynchia umbilifuni* n. sp. A-C: holotype, 1.47 mm in diameter, Madagascar, South Cap Sainte Marie, Stn CP3613, 225-282 m MNHN); D: protoconch and first teleoconch whorl; E-F: microsculpture.

Figura 87

A-F. *Leucorhynchia umbilifuni* n. sp. A-C: *holotipo*, 1,47 mm de diámetro, Madagascar, Sur del Cabo Santa María, Stn CP3613, 225-282 m (MNHN); D: *protoconcha* y *primera vuelta de la teleoconcha*; E-F: *microescultura*.

umbilicus, but does not occlude it. Outer lip thin, with a margin slightly crenulated. The surface of the parietal and columellar callus is totally smooth. Umbilicus wide and deep, with 4-5 thick axial folds delimiting it in its last half whorl. Each fold coincides with different growth periods of the columellar callus. Umbilical wall with a thick cord that penetrates from the base of the columella towards the inside of the umbilicus

Dimensions: the holotype size is 1.47 mm in diameter and 1.02 mm in height (H/D: 0.69).

Habitat: Bathyal species dredged at 225-282 mm depth.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia umbilifuni* n. sp. is characterized by the subsutural carina at the beginning of the teleoconch; by the totally smooth adapical zone; by the axial thick folds located around the umbilicus in the last half whorl; and by the spiral cord that is placed inside the umbilicus.

It has a slight similarity with *L. lingula* n. sp. from which can be distinguished mainly by having the surface of the teleoconch covered by spiral cords and the more strong nodules of the periumbilical cord.

See remarks under *L. microstriata* n. sp.

***Leucorhynchia catenata* n. sp.**

Figure 88 A-F

Type material: Holotype (Figs. 88A-C) MNHN-IM-2000-34909.

Material examined: 1 s: NW Madagascar, MIRIKY: 1 s, W Nosy-Bée, Stn DW3230, 13°25'S-47°57'E, 71-158 m.

Type locality: NW Madagascar, W Nosy-Bée, 13°25'S-47°57'E, 71-158 m [MIRIKY: Stn DW3230].

Etymology: The specific name derives from the Latin word *catenatus*, *a, um* which means “chained”, alluding to the fact that the umbilicus border resembles a chain.

Description: Shell small (<5.00 mm), wider than height, robust, turbiniform, spire formed by 4.3 whorls, very convex and narrowly umbilicate. Protoconch with about $\frac{3}{4}$ of whorl, 240 μm in diameter, and with a smooth surface with two spiral cordlets.

Teleoconch of 3.5 whorls separated by a marked suture and a very convex periphery. Teleoconch surface totally smooth, except in the first whorl where there are some prominent nodulous keels, a periumbilical cord and subsutural and basal axial folds.

The first half whorl of the teleoconch presents two keels, one central and the other peripheral, with wide nodules and a concave interspace between them, where some axial small lines can be seen under magnification; after the first half whorl the keels lose the nodules and after the first whorl they disappear and the surface become convex and totally smooth.

Adapically there are 14 thin subsutural axial folds, and abapically, there are 16 periumbilical axial folds.

A prominent, rounded axial cord formed by successive thickening of the columellar callus borders and delimits the umbilicus like a carina.

Aperture circular, with an entire peristome. Inside the apertural border there is a fold on which the operculum abuts. Parietal area covered by a thin coating callus extended up to the suture; columella not very thick, arched, reflected towards the umbilicus, with a prominent callous protuberance-shape, placed at the base and extended towards the umbilicus, but without occluding it, forming a limit of strong nodules. External lip thin with smooth margin.

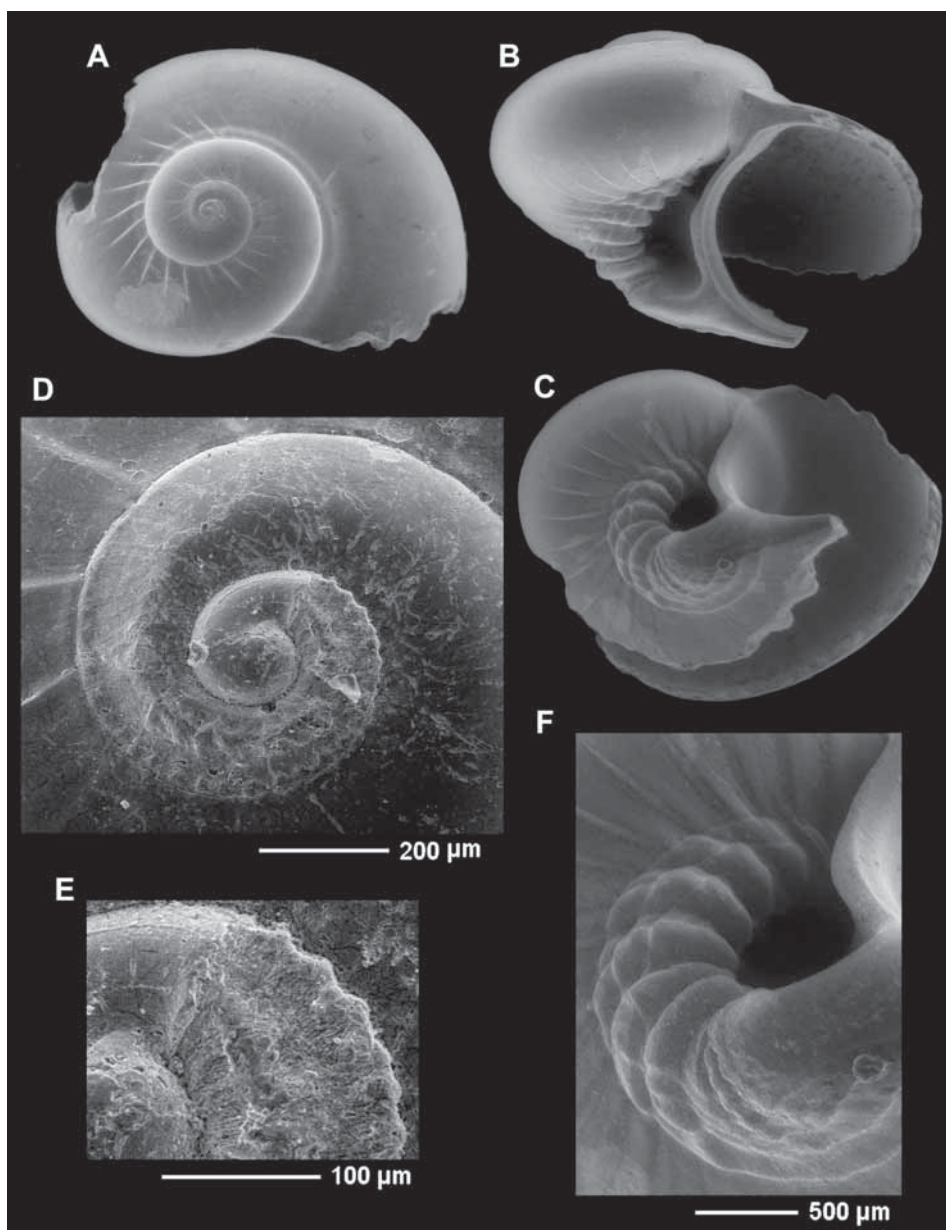
Umbilicus narrow and deep, delimited by a strong cord formed by several thickenings of the columellar callus; in the inner part a thick spiral cord can be seen.

Figure 88

A-F. *Leucorhynchia catenata* n. sp. A-C: holotype, 5.7 mm in diameter, NW Madagascar, W Nosy-Bée, Stn DW3230, 13°25'S-47°57'E, 71-158 m (MNHN); D: protoconch and first teleoconch whorl; E: detail of the transition point of protoconch-teleoconch; F: umbilicus.

Figura 88

A-F. *Leucorhynchia catenata* n. sp. A-C: *holotipo*, 5,7 mm de diámetro, NW Madagascar, O de Nosy-Bée, Stn DW3230, 13°25'S-47°57'E, 71-158 m (MNHN); D: *protoconcha y primera vuelta de teleoconcha*; E: *detalle del punto de transición protoconcha-teleoconcha*; F: *ombiligo*.



Dimensions: The holotype size: 5.7 mm in diameter and 3.6 mm in height (H/D: 0.63).

Habitat: Bathyal species dredged at 71-158 m depth.

Distribution: Only known from the type locality.

Remarks: We have only one shell of the present species, and it is partially broken. Perhaps in other circumstances we would not decide to describe it and give it a name. But its characters are so different from any other species examined from the area of study that we decided to go ahead in spite of the bad conditions of the holotype.

Leucorhynchia catenata n. sp. is characterized by the cordlets that decorate the protoconch; by the carinae in the early teleoconch; by the surface of the teleoconch without spiral cords; by the subsutural and periumbilical axial folds; and by the thick cord that borders and delimits the umbilicus.

This species has a slight similarity with *L. lingula* n. sp., from which it differs in having 2 cordlets on the protoconch and adapical axial folds.

***Leucorhynchia undulans* n. sp.**

Figures 89A-F, 90A-B

Type material: Holotype (Figs. 89A-C) MNHN IM-2000-34910 and one paratype (lost after the photography: Figs. 90A-B).

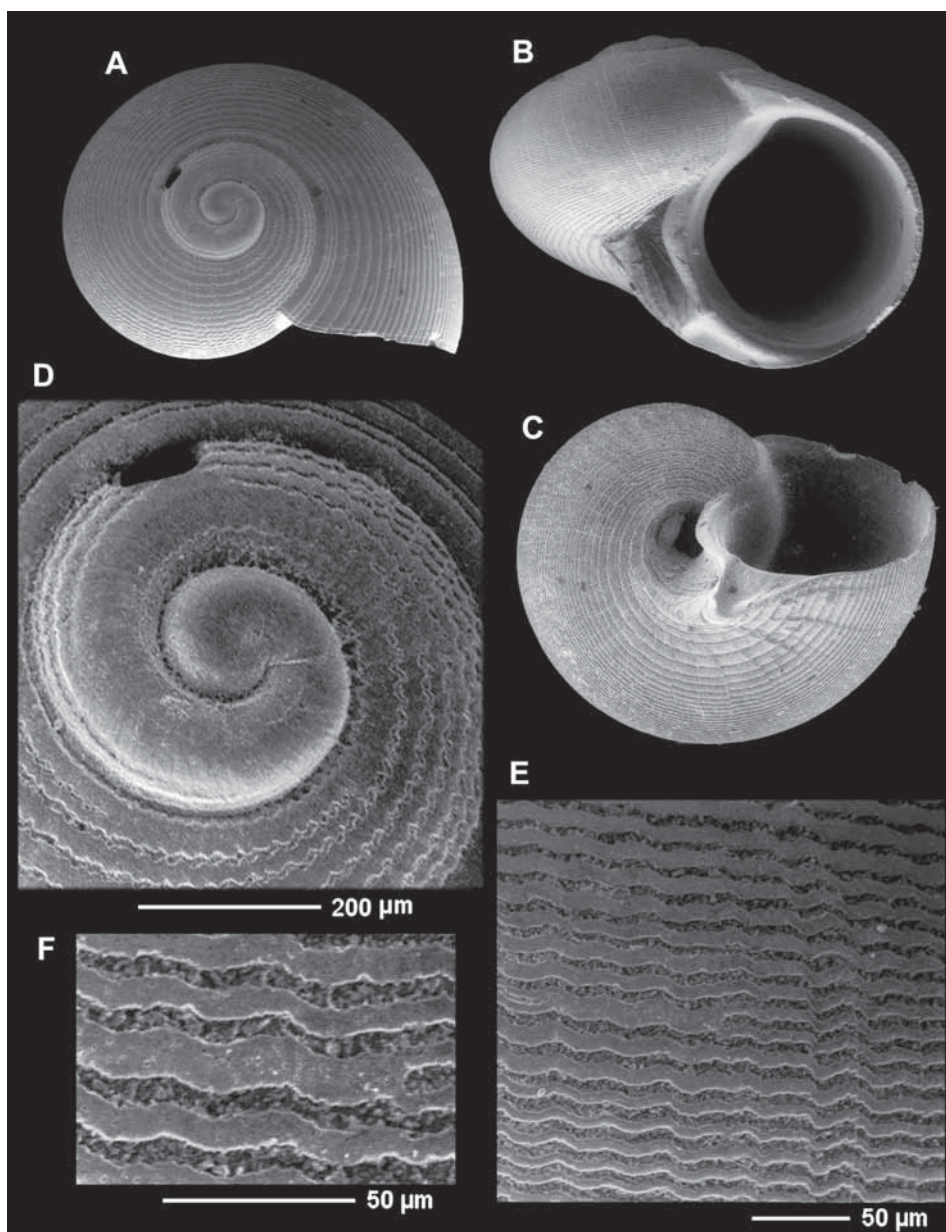
Material examined: 2 s: Papua New Guinea: KAVIENG 2014: 2 s, Lissenung Island, Stn KPR06, 02°40'S-150°44,1'E, 2-7 m, sandy area in front of small reef.

Figure 89

A-F. *Leucorhynchia undulans* n. sp. A-C: holotype, 1.53 mm in diameter, Papua New Guinea, Lissenung Island, 02°40'S-150°44.1'E, 2-7 m, sandy area in front of small reef (MNHN); D: protoconch and beginning of the teleoconch; E-F: microsculpture and detail.

Figura 89

A-F. *Leucorhynchia undulans* n. sp. A-C: holotipo, 1,53 mm de diámetro, Papua Nueva Guinea, Isla de Lissenung, 02°40'S-150°44,1'E, 2-7 m, área arenosa en frente del pequeño arrecife (MNHN); E-F: microescultura y detalle.



Type locality: Papua New Guinea, Lissenung Island, 02°40'S-150°44.1'E, 2-7 m, sandy area in front of the small reef [KAVIENG 2014: Stn KPR06].

Etymology: The specific name refers to the spiral cordlets which in most of the shells are undulated.

Description: Shell small (<2.0 mm), wider than high, robust, depressed turbiniform, spire formed by about 3 whorls, last whorl representing 95% of the total height of the shell, whose periphery is very convex and is narrowly umbilicated.

The protoconch has $\frac{3}{4}$ of whorl, measures about 200 μ m in diameter, has a smooth surface and ends in a thick labial varix.

Teloconch of 2.3 whorls separated by an initially more strongly marked suture, with a rounded periphery. The first half whorl is adapically smooth and convex, with a fine subsutural cord and 2-3 peripheral cords.

After the first half whorl the spiral cords progressively cover the entire surface of the teloconch; they are much wider than the intermediate groove and in the first two whorls are in zigzag.

Teloconch surface totally covered by spiral cords and fine spiral grooves. Inside the spiral grooves can be seen micro-granules. In apertural view, 4-5 spiral cords are visible on the penultimate whorl and 54-56 on the last one. There are 20-22 thin basal axial folds which are placed around the umbilicus. There are no axial subsutural folds.

Aperture circular, peristome entire. Inside the apertural border there is a fold on which the operculum abuts. Parietal area covered by a thin callous layer which is extending adapically covering much of the previous whorl; columella arched, not very thick and reflected towards the umbilicus. Between the base of the columella and the base of the outer lip, a callus is formed with a triangular shape and concave surface, which during the growth of the shell will lead to the thick cord that delimits the umbilicus. Outer lip thin, of margin slightly crenulated. The surface of the parietal callus is smooth and rough that of the columellar callus.

Umbilicus narrow and deep, delimited by a thickness cord, inside there are 10-12 fine spiral cords.

Dimensions: the holotype is 1.53 mm in diameter and 1.31 mm in height (H/D: 0.85).

Habitat: Infralittoral species collected at 2-7 m, on sandy area in front of small reef.

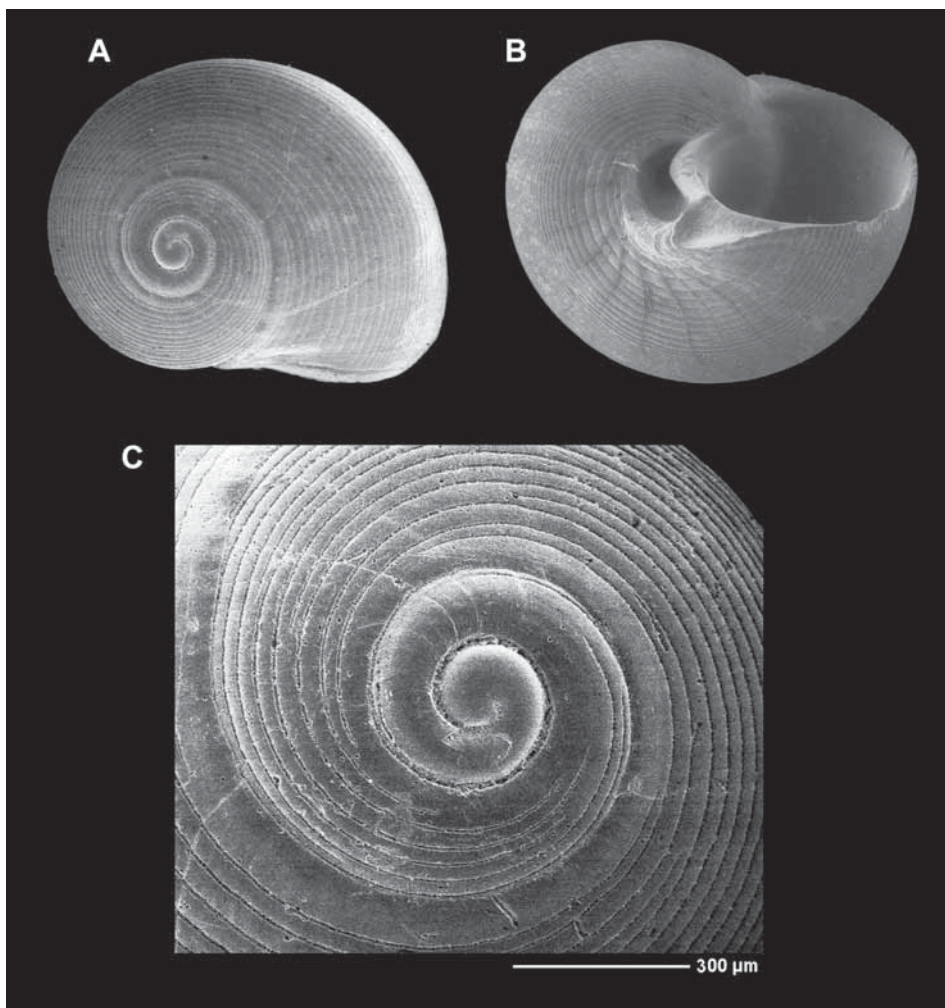


Figure 90

A-C. *Leucorhynchia undulans* n. sp. A-B: paratype, 1.96 mm in diameter, Papua New Guinea, Lissenung Island, 02°40'S-150°44.1'E, 2-7 m, sandy area in front of small reef (lost); D: protoconch and first whorl of the teleoconch.

Figura 90

A-C. *Leucorhynchia undulans* n. sp. A-B: paratipo, 1,96 mm de diámetro, Papua Nueva Guinea, Isla de Lissenung, 02°40'S-150°44,1'E, 2-7 m, zona arenosa frente al pequeño arrecife (perdido); D: protoconcha y primera vuelta de la teleoconcha.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia undulans* n. sp. is characterized by the presence of cords and spiral grooves developed in zigzag in the two first whorls of the teleoconch, by the form of the columellar callus and by the presence of spiral cordlets in the inner wall of the umbilicus.

This species is similar to *L. microtuberculata* n. sp., *L. microstriata* n. sp., from which can be distinguished because the spiral cords and grooves which cover the teleoconch are developed in zigzag in the two first whorls.

***Leucorhynchia umbilicord* n. sp**

Figure 91A-F

Type material: Holotype (Figs. 91A-C) MNHN IM-2000-34911.

Material examined: 1 s: Papua New Guinea, KAVIENG 2014: 1 s, Kavieng Lagoon, entrance of Albatross Passage, Stn KB26, 02°44.6'S-150°43'E, 9-15 m, silty sand, dead coral rubble.

Type locality: Papua New Guinea, Kavieng Lagoon, entrance of Albatross Passage, 02°44.6'S-150°43'E, 9-15 m, silty sand, dead coral rubble [KAVIENG 2014: Stn KB26].

Etymology: The specific name is the fusion of two words: *umbilicus* and *cordlets*, alluding to the presence of numerous cordlets inside the umbilicus.

Description: Shell very small (<1.5 mm), wider than high, robust, depressed almost planispiral, spire formed by 2.6 whorls, very convex and widely umbilicated; the last whorl represents 95% of the total height of the shell.

The protoconch has $\frac{3}{4}$ of whorl and is placed almost in the same plane as the teleoconch whorls; it measures about 200 μ m in diameter, the surface is smooth and ends in a thick varix.

Teleoconch of 1.8 whorls separated by a marked suture; the periphery is rounded. Teleoconch surface totally covered by spiral cords and fine spiral grooves that extend in zigzag; all spaces between cords (spiral grooves) are covered by micro-granules. In apertural view 3-4 fine spiral cords are visible

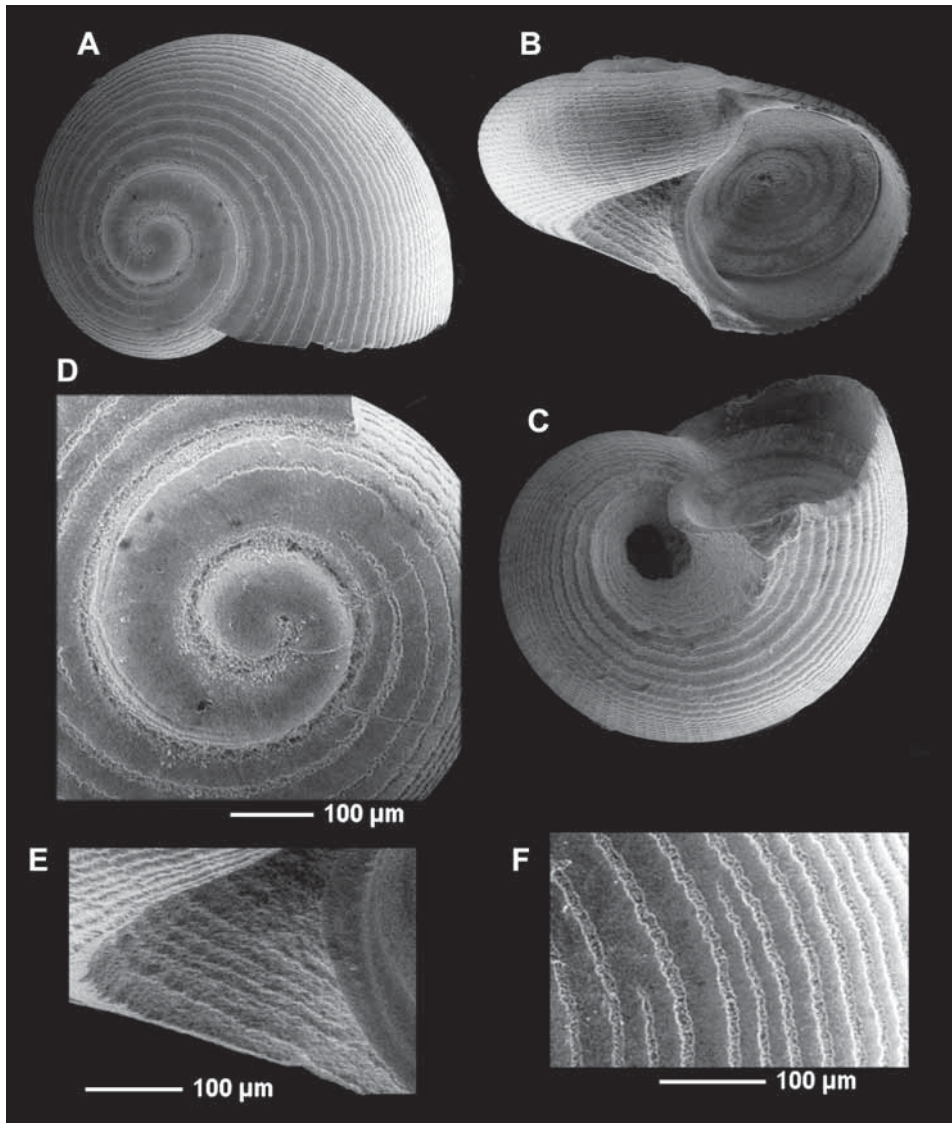


Figure 91

A-F. *Leucorhynchia umbilicord* n. sp. A-C: holotype, 1.38 mm, Papua New Guinea, Kavieng Lagoon, entrance of Albatross Passage, 02°44.6'S-150°43'E, 9-15 m; D: protoconch and first teleoconch whorl; E: detail of the umbilicus; F: detail of the microsculpture.

Figura 91

A-F. *Leucorhynchia umbilicord* n. sp. A-C: *holotipo*, 1,38 mm, Papua Nueva Guinea, Kavieng Lagoon, entrada de Albatross Passage, 02°44,6'S-150°43'E, 9-15 m; D: *protoconcha* y *primera vuelta de teleoconcha*; E: *detalle del ombligo*; F: *detalle de la microescultura*.

on the penultimate whorl and 24-26 on the last one. There are neither basal nor subsutural axial folds. A strong spiral cord, formed by the growth of the columellar callus, delimits and angles the umbilicus.

Aperture circular, with an entire peristome. Inside the apertural border there is a fold for the opercular stop. Parietal area covered by a thin callous layer that extends adapically covering part of the previous whorl; columella thin, arched and reflected towards the umbilicus. Between the base of the columella and the base of the outer lip, a callus is formed; it is triangular and concave and has a rough surface, which during the growth of the shell will form a thick cord that delimits the umbilicus and angles the umbilical margin. Outer lip thin, with a finely crenulated margin.

Umbilicus wide, infundibuliform, bounded by a thick cord that angles its outer margin; in its interior there are 6-7 fine spiral cords.

Operculum circular, multispiral with a central nucleus (six whorls around a wide nucleus).

Dimensions: the holotype measures 1.38 mm in diameter and 0.85 mm in height (H/D: 0.62).

Habitat: Infralittoral species collected at 9-15 m, in silty sand bottom with dead coral rubble.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia umbilicord* n. sp. is characterized by its almost planispiral spire; by the fact that their cords/grooves are developed in zigzag; by its infundibuliform umbilicus with fine cords inside and by the shape and small size of the columellar callus.

The most similar species is *L. depressa* n. sp., which may be distinguished by having a rough protoconch with three spiral cordlets, a smaller infundibuliform umbilicus and a different microsculpture in the interspaces of the cords.

***Leucorhynchia bilinguae* n. sp.**

Figure 92A-F

Type material: Holotype (Figs. 91A-C) MNHN-IM-2000-34912.

Material examined: **1 s:** Philippines: 1 s, Olango Island, Tapon, Sta. Rosa, 200 m (exPoppe).

Type locality: Philippines, Olango Island, Tapon, Sta. Rosa, 200 m.

Etymology: The specific name alludes to the two expansions in the columella and the base resembling two tongues (in Latin *lingua*, *ae*).

Description: Shell small (<2.0 mm), wider than high, robust, depressed, turbiniform, spire formed by 3.3 convex whorls separated by a suture not very marked, slightly keeled and narrowly umbilicated. The protoconch has $\frac{3}{4}$ of whorl, measures about 250 μ m in diameter; the surface is smooth and ending in a faint labial varix.

The teleoconch has 2.5 whorls and its surface is totally smooth except for a thick subsutural cord that develops from the first 1 $\frac{1}{2}$ whorls and 5-6 spiral grooves located at the first part of the base. Rounded periphery with a weak keel that develops in the middle of the last whorl.

There are no subsutural axial folds; on the base, in the last quarter of the whorl there are several axial thickening, originated by the development of the callus of the base of the columella.

Aperture circular, with an entire peristome. Inside the apertural border there is a fold on which the operculum abuts.

Parietal area covered by a thin callous layer extending adapically and covering much of the previous whorl. Columella thin, arched and not reflected towards the umbilicus; in its beginning area it forms a thick callus in the shape of a half-moon that partially covers the umbilicus; likewise, at its base a callous thickening is formed, and it has a rounded shape and a surface slightly concave which will originate the thick cord that delimits the umbilicus. Outer lip thin, smooth margin, not modified by the spiral cordlets. Umbilicus narrow and deep, bounded by a thick cord, almost entirely occluded by the columellar callus.

Dimensions: the holotype measures 2.1 mm in diameter and 1.43 mm in height (H/D: 0.68).

Habitat: Bathyal species collected at 200 m in tangle nets.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia bilinguae* n. sp. is characterized by its completely smooth teleoconch except for 5 spiral grooves that appear only at the base, in the first quarter of whorl; by the soft peripheral keel; by the thick cord that runs along the umbilicus; and by the presence of two calluses, one between the parietal area and the beginning of the columella, and the other at the base of the outer lip.

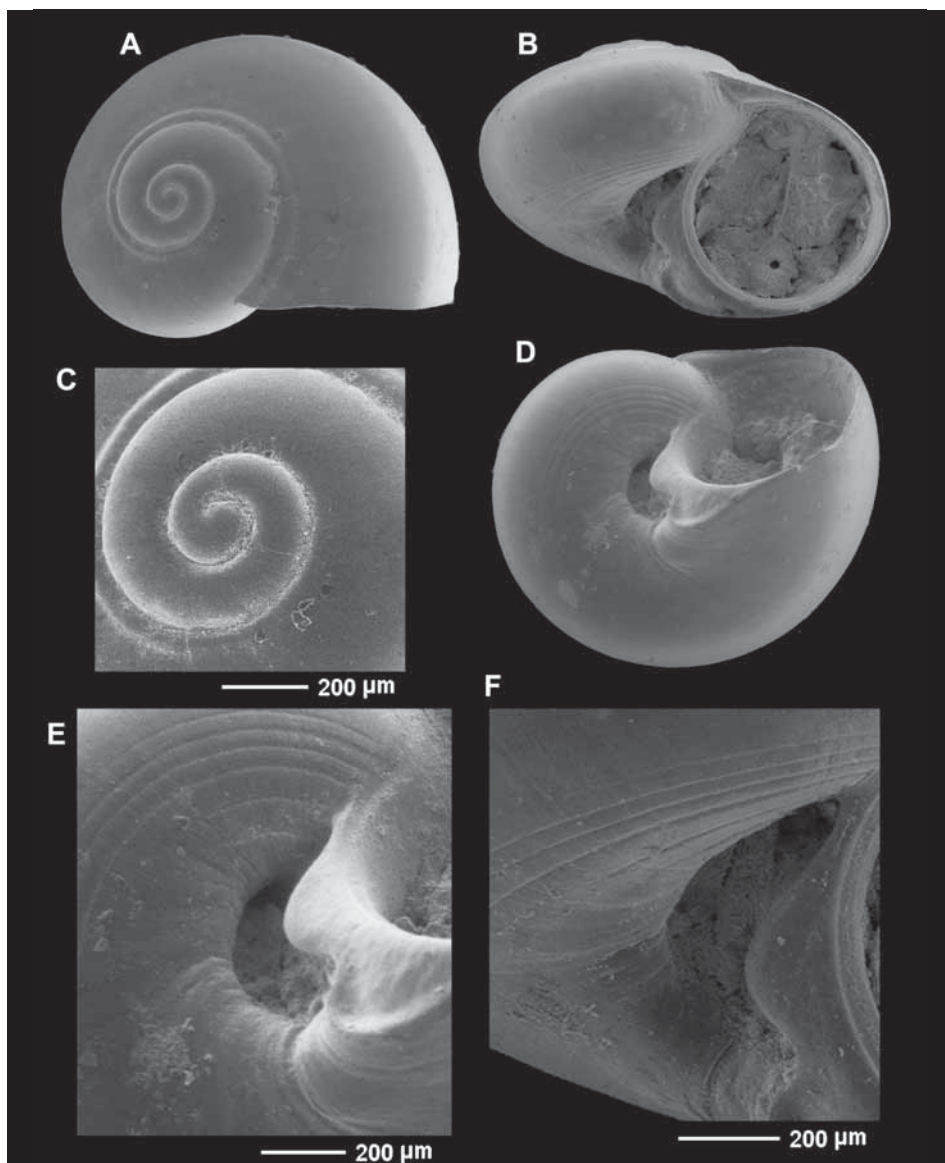


Figure 92

A-F. *Leucorhynchia bilinguae* n. sp. A-C: holotype, 2.1 mm in diameter, Philippines, Olango Island, Tapon, Sta. Rosa, 200 m (MNHN); D: protoconch and first teleoconch whorl; E-F: detail of the microsculpture.

Figura 92

A-F. *Leucorhynchia bilinguae* n. sp. A-C: holotipo, 2,1 mm de diámetro, Filipinas, Isla de Olango, Tapon, Sta. Rosa, 200 m (MNHN); D: protoconcha y primera vuelta de teleoconch; E-F: detalle de la microescultura.

One might think that it could be a species of the genus *Cirsonella* Angas, 1877 due to its similarity in general appearance with species of this genus, but in our opinion, after a detailed examination, we do not think so, for the following reasons:

In the genus *Cirsonella* Angas, 1877 the callus is formed in the inner lip, between the columella and the parietal area, and it develops towards the umbilicus occluding it partially; only in some species, such as *Cirsonella romettensis* (Granata, 1877), does the callus completely cover the umbilicus. However, the *Cirsonella* species lack the callus that in *Leucorhynchia* species is formed between the base of the columella and the base of the outer lip, and from which results a thick periumbilical cord in adult individuals.

According to WARÉN (1992: 160) the young individuals of *Cirsonella*, lack the thickening inner lip; they have a deep suture and a strong spiral ribs in the umbilicus.

***Leucorhynchia poteli* n. sp.**

Figure 93A-F

Type material: Holotype (Fig. 93A-B) MNHN-IM-2000-34913 and 2 paratypes (Fig. 93C-E) MNHN-IM-2000-34914.

Material examined: 3 s: Philippines: 3 s, Balicasag Island, 10 m, scuba in cave (exPoppe).

Type locality: Philippines, Balicasag Island, 10 m, scuba in a cave.

Etymology: The specific name is after Prof. Joaquín Potel Lesquereux, a good friend of the second author, Professor and Doyen of the Facultad de Medicina of the University of Santiago de Compostela.

Description: Shell very small (<2.0 mm), almost as high as wide, robust, depressed turbiniform, spire formed by 3.3 whorls, very convex and narrowly umbilicated.

The protoconch has $\frac{3}{4}$ of whorl, about 210 μ m in diameter and smooth surface, only one fine spiral cordlet was observed.

Teleoconch of 2.5 whorls separated by a marked suture and with a rounded periphery. The first $\frac{1}{2}$ whorl has a soft central carina and 3 peripheral cords that are developed in zigzag; from $\frac{1}{2}$ whorl the carina gradually softens until

it disappears, and the cords completely cover the teleoconch, but abapically in zigzag.

Teleoconch surface totally covered by spiral cords and fine spiral grooves that develop in zigzag. Inside the spiral grooves can be seen micro-granules. In apertural view, 4-5 spiral cords are visible on the penultimate whorl and more of 60 on the last one. There are no subsutural axial folds in adapical part; abapically there are axial short fine grooves.

Aperture circular, with an entire peristome. Inside the aperture there is a fold on which the operculum abuts. Parietal area covered by a not very thick callous layer that extends adapically covering partially the previous whorl; columella arched, not very thick and reflected towards the umbilicus. Between the base of the columella and the base of the outer lip, a callus is formed with a triangular shape, which during the shell growth is changed in a thick cord that delimits the umbilicus. Outer lip thin, with fine crenulated margin. The surfaces of the parietal and columellar calluses are completely smooth.

Umbilicus narrow and deep, delimited by a strong cord and inside there are about 60-12 spiral cords.

Dimensions: the holotype measures 1.68 mm in diameter and 1.32 mm in height (H/D: 0.79).

Habitat: Infralittoral species collected at 10 m, diving in a cave.

Distribution: Only known from the type locality.

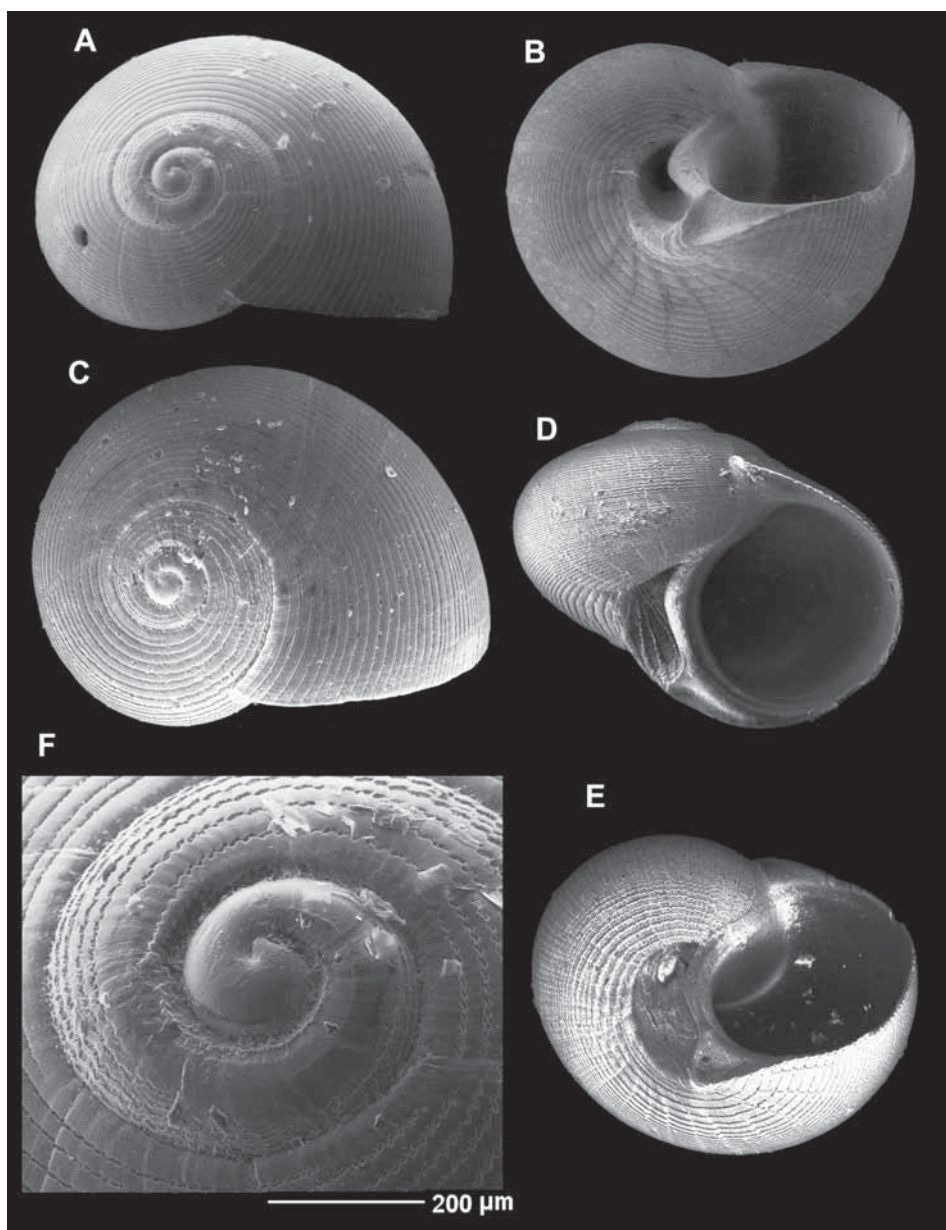
Remarks: *Leucorhynchia poteli* n. sp. is characterized by its smooth protoconch, but with at least one spiral cordlet; by the surface of the teleoconch completely covered by spiral zigzag cords and grooves; by the triangular columellar callus; and by the numerous cords inside the umbilicus.

Figure 93

A-F. *Leucorhynchia poteli* n. sp. A-B: holotype, 1.68 mm in diameter, Philippines, Balicasag Island, 10 m, scuba in caves (MNHN); C: paratype, 1.95 mm, same locality (MNHN); D-E: paratype, 1.61 mm, same locality (MNHN); F: protoconch of the holotype.

Figura 93

A-F. *Leucorhynchia poteli* n. sp. A-B: *holotipo*, 1,68 mm de diámetro, Filipinas, Isla de Balicasag, 10 m, buceando en cuevas (MNHN); C: *paratipo*, 1,95 mm, la misma localidad (MNHN); D-E: *paratipo*, 1,61 mm, la misma localidad (MNHN); F: *protoconcha del holotipo*.



The species with which it has greater similarity is *L. microtuberculata* n. sp., distinguished by having a reticulum in the first whorl of the teleoconch; by the spiral cordlets on the protoconch, by a narrower umbilicus without spiral cordlets.

***Leucorhynchia paucistriata* n. sp.**

Figure 94A-F

Type material: Holotype (Figs. 94A-C) MNHN-IM-2000-34195.

Material examined: 1 s: New Caledonia, BATHUS 2: 1 s, South Ile des Pins, Stn DW714, 22°38'S-167°10'E, 124 m.

Type locality: New Caledonia, South Ile des Pins, 22°38'S-167°10'E, 124 m [BATHUS 2: Stn DW714].

Etymology: The specific name alludes to the presence of some striae in some parts of the shell (first teleoconch, base, umbilicus) but in small quantity: from Latin *pauci, orum* “in small number” and *striatus, a, um* “with striae”.

Description: Shell very small (<2.0 mm), wider than high, robust, depressed-turbiniform, spire formed by 3.1 whorls, very convex and widely umbilicate.

Protoconch with $\frac{3}{4}$ of whorl, about 220 μ m in diameter and apparently smooth surface. Teleoconch of 2.3 whorls separated initially by a wide suture. Very convex periphery.

Teleoconch surface almost smooth, except for some spiral striae and spiral cords. The first half whorl of the teleoconch is convex and totally smooth; adapically, from the first half whorl there are 2-5 spiral grooves that extend until whorl 1.5 in which they disappear, while the surface of the shell becomes progressively less convex and completely smooth; abapically, on the base, in the first half whorl there are 4-6 spiral grooves placed next to the umbilical margin.

Aperture circular with an entire peristome. Inside the apertural border there is a fold on which the operculum abuts. Parietal area covered by a thin callous coating extended up to the suture; columella not very wide and arched, with a prominent callus hook-shaped at the base, that extend towards the umbilicus, but not occluding it; that callus, during the development of the

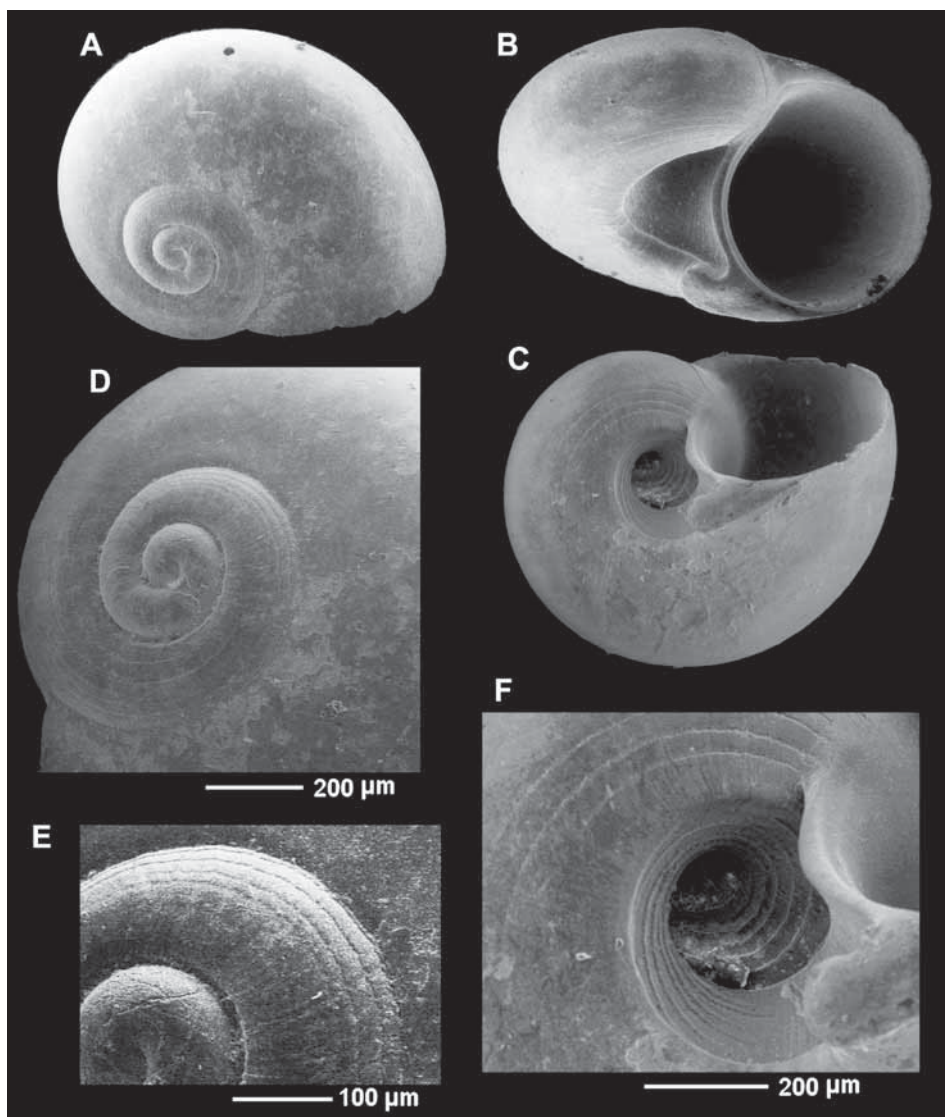


Figure 94

A-F. *Leucorhynchia paucistriata* n. sp. A-C: holotype, 1.52 mm in diameter, New Caledonia, South Ile des Pins, 22°38'S-167°10'E, 124 m (MNHN); D-E: protoconch and first teleoconch whorl and detail of the protoconch; F: detail of the umbilicus.

Figura 94

A-F. *Leucorhynchia paucistriata* n. sp. A-C: holotipo, 1,52 mm de diámetro, Nueva Caledonia, Sur de la Isla de Pins, 22°38'S-167°10'E, 124 m (MNHN); D-E: protoconcha y primera vuelta de la teleoconcha y detalle; F: detalle del ombligo.

shell, will shape the thick spiral cord that delimits the umbilicus. Surface of the callus smooth and concave. Outer lip thin with a smooth margin. Umbilicus relatively wide and deep, delimited by a thick cord formed by the successive thickenings of the columellar callus; the umbilical wall is initially concave and then convex, with 5-7 cordlets and axial growth lines inside. Dimensions: the holotype size is 1.52 mm in diameter and 1.06 mm in height (H/D: 0.7).

Habitat: Bathyal species dredged at 124 m depth.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia paucistriata* n. sp. is characterized by the spiral grooves of the base and the early teleoconch; by the shape of the columellar callus; by the shape of the umbilicus; and also by the cordlets present inside. The most similar species is *L. lingula* n. sp., which is distinguished by having two prominent carinae at the beginning of the teleoconch; also by the shape of the columellar callus, the shape of the umbilicus without spiral cordlets and the spiral axial folds in the base.

***Leucorhynchia garciarodejai* n. sp.**

Figure 95A-D

Type material: Holotype (Figs. 95A-C) MNHN-IM-2000-34916.

Material examined: 1 s: Papua New Guinea, PAPUA NIUGINI: 1 s, Sek Island, Stn PD25, 05°05'S-145°49.1'E, 3-54 m.

Type locality: **1 s:** Papua New Guinea, Sek Island, 05°05'S-145°49.1'E, 3-54 m [PAPUA NIUGINI: Stn PD25].

Etymology: The specific name is after Eduardo García-Rodeja Gayoso recently Vice-rector of the University of Santiago de Compostela, Spain.

Description: Shell small (<2.50 mm), wider than high, very robust, depressed, turbiniform, spire formed by 3.2 whorls, convex periphery, carinate and narrowly umbilicate.

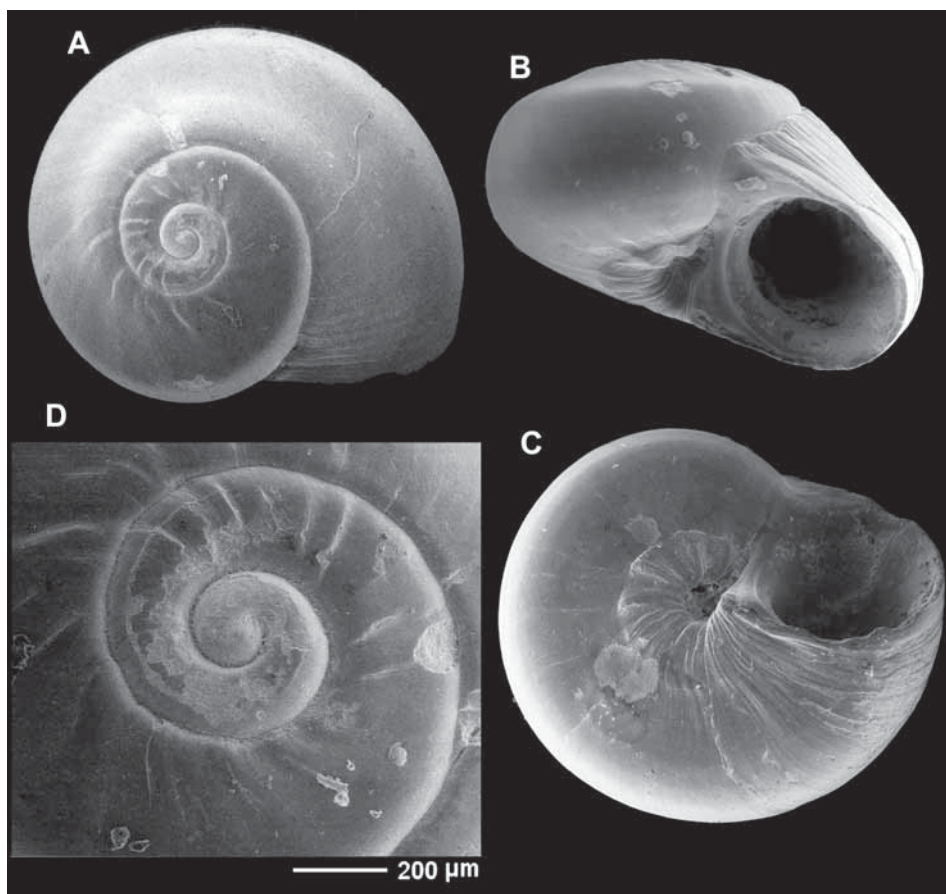


Figure 95

A-D. *Leucorhynchia garciarodejai* n. sp. A-C: holotype, 2.5 mm in diameter, Papua New Guinea, Sek Island, 05°05'S-145°49.1'E, 3-54 m; D: protoconch and first teleoconch whorl.

Figura 95

A-D. *Leucorhynchia garciarodejai* n. sp. A-C: holotipo, 2,5 mm de diámetro, Papua Nueva Guinea, Isla de Sek, 05°05'S-145°49,1'E, 3-54 m; D: protoconcha y primera vuelta de teleoconcha.

The protoconch has $\frac{3}{4}$ of whorl, measures about 290 µm in diameter and has a smooth surface, apparently due to its poor condition; it is placed at the same level that the first teleoconch whorl.

Teleoconch of 2.3 whorls, which are initially separated by a wide and deep suture.

Teleoconch surface totally smooth, except the marked growth lines; adapically there are axial folds and basally a thick periumbilical cord. The adapical axial folds are developed between the first half whorl until the last half whorl of the teleoconch.

Adapically an elevated subsutural area can be observed, as well as a carina placed at the beginning of the periphery. In the base, there is a strong spiral cord formed by the development of the columellar callus, and which delimits and almost gets to occlude the umbilicus.

Aperture circular with a complete peristome. Inside the border there is a fold on which the operculum abuts. Parietal area covered by a thick callous coating extended up to the suture; columella thick and arched, with a prominent callus of triangular-shape at the base; during the development of the shell, that callus will increase like a thick spiral cord that delimits the umbilicus. Surface of the callus smooth and concave. Outer lip thick with a smooth margin.

Umbilicus very narrow and deep, delimited by a thick cord formed by the successive thickenings of the columellar callus; inside there are 2 spiral cordlets.

Dimensions: the holotype is 2.5 mm in diameter and 1.68 mm in height; (ratio H/D = 0.67).

Habitat: Infralittoral species collected at 3-4 m depth.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia garciarodejai* n. sp. is characterized and distinguished from the other species by its great robustness; by the adapical strong axial folds; by the shape and the thickening of the periumbilical cord; and by the shape of the columellar callus.

The previously mentioned characters make *L. garciarodejai* n. sp. totally different from most of the studied species.

***Leucorhynchia rosinae* n. sp.**

Figure 96A-F

Type material: Holotype (Figs. 96A-C) MNHN-IM-2000-34917 and 2 paratypes (Fig. 96D) MNHN-IM-2000-34918.

Material examined: 3 s: Solomon Islands, SALOMON 1: 3 s, N. Buena Vista Island, Stn DW1762, 8°40'S-160°04'E, 396-411 m.

Type locality: Solomon Islands, N. Buena Vista Island, 8°40'S-160°04'E, 396-411 m [SALOMON 1: DW1762].

Etymology: The specific name is after Rosa Dios, wife of Luis Álvarez, the nephew of the second author.

Description: Shell very small (<3.0 mm), wider than high, robust, depressed-turbiniform, formed by 3.2 whorls, not keeled and narrowly umbilicate. Protoconch with a little more than of 0.75 whorls, apparently smooth and with about 280 µm in diameter.

Teleoconch of 2.4 whorls separated by an impressed suture; periphery rounded. Ornamentation formed by spiral cords and growth lines. The entire surface of the teleoconch is smooth except for a subsutural cord that starts in the early teleoconch and disappears in the last quarter of a whorl, and three thick and rounded periumbilical cords.

Umbilicus narrow and deep, not occluded by the columellar callus; delimited by three thick periumbilical cords and with a sharp cord inside.

Aperture rounded, peristome entire. Inside the apertural border there is a thick fold to stop the operculum. Between the base of the columella and the base of the outer lip a thick callous is formed, which has triangular shape and extended over the umbilical region but without occluding it. Outer lip not very thick, with a smooth margin.

Dimensions: the holotype measures 2.63 in diameter and 1.91 mm in height (H/D = 1.38). The smaller paratype is 1.73 mm in diameter.

Habitat: Bathyal species dredged at 396-411 m deep.

Distribution: Only known from the type locality.

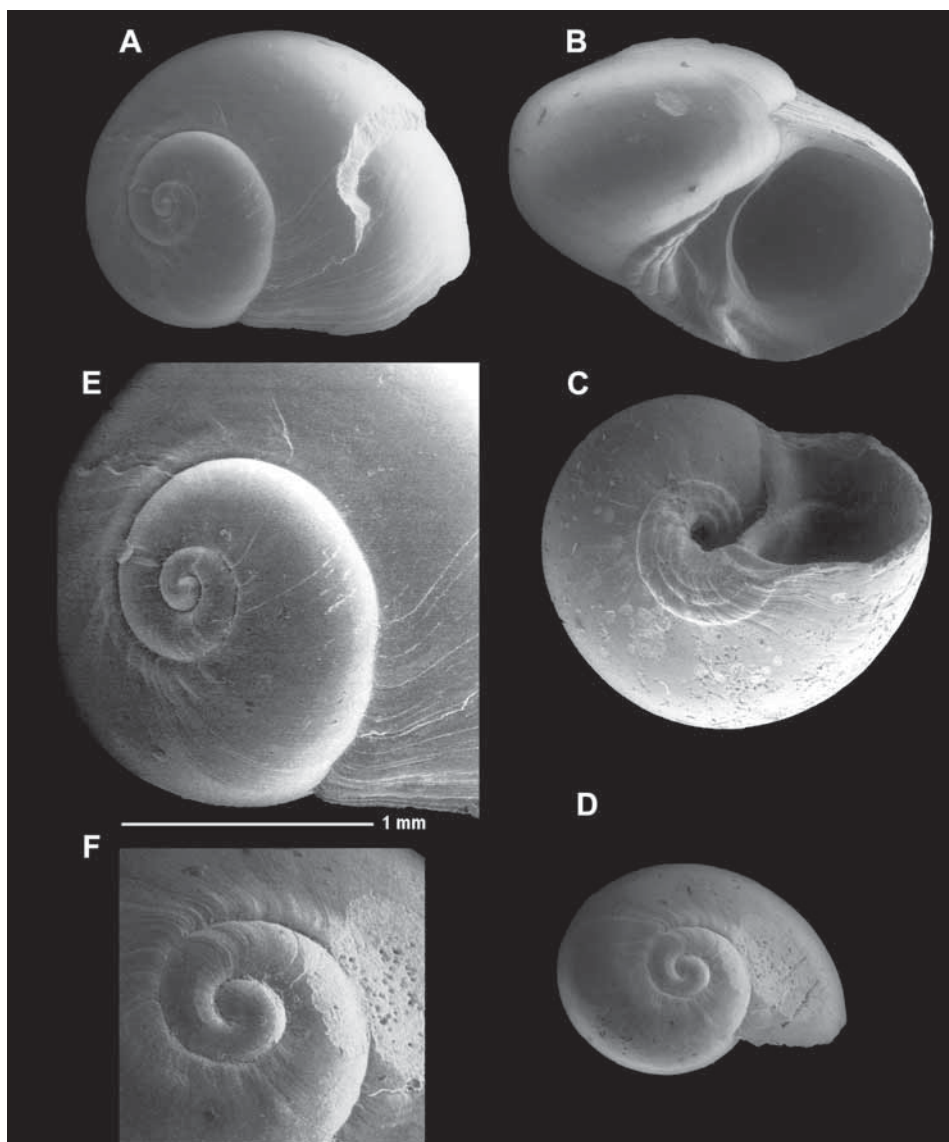


Figure 96

A-F. *Leucorhynchia rosinae* n. sp. A-C: holotype, 2.6 mm in diameter, Solomon I., 396-411 m (MNHN); D: paratype, 1.73 mm, same locality (MNHN); E: apex from the holotype; F: protoconch from the paratype.

Figura 96

A-F. *Leucorhynchia rosinae* n. sp. A-C: *holotipo*, 2,6 mm de diámetro, Islas Salomón, 396-411 m (MNHN); D: *paratipo*, 1,73 mm, la misma localidad (MNHN); E: *ápice del holotipo*; F: *protoconcha del paratipo*.

Remarks: *Leucorhynchia rosinae* n. sp. is characterized by its depressed-turbiniiform spire; by its periumbilical rounded cords; by its subsutural cord and by the triangular callus at the base of the columella.

In its general aspect it is very similar to *L. garciarodejai* n. sp., but differs from this by having a larger aperture, three periumbilical narrow and rounded cords instead one wider; the umbilicus is wider and the columellar callus is different.

Leucorhynchia striatissima n. sp. Rubio, Rolán & Gori

Figure 97A-D

Type material: Holotype (Figs 97A-B) MNHN-IM-2000-34919.

Material examined: 1 s: Philippines: 1 s, Black Rock, Tuburan, Panay, 11°48.505'N-121°52.507'E, 32 m (exCSG).

Type locality: Philippines, Black Rock, Tuburan, Panay, 11°48.505'N-121°52.507'E, 32 m.

Etymology: The specific name alludes to the spiral sculpture of the species with very numerous cords.

Description: Shell small (<3.0 mm), wider than high, robust, depressed-turbiniiform, formed by 3.6 whorls, very convex and narrowly umbilicated. The protoconch has $\frac{3}{4}$ of whorl, about 250 μ m in diameter, rough surface with two thin spiral threads, ending in a thick labial varix.

Teleoconch of 2.8 whorls separated by a suture initially marked and with a rounded periphery. The first $\frac{1}{2}$ whorl has an adapical keel, and 3 peripheral cords that are developed in zigzag forming a reticulum of large rounded spaces; from the first $\frac{1}{2}$ whorl the keel is softened to disappear and the rounded spaces become progressively smaller and lengthen to become fine spiral grooves.

Teleoconch surface totally covered by spiral cords and fine spiral grooves; subsutural and periumbilical cords are wider. Inside the spiral grooves can be seen micro-granules. In apertural view 6 spiral cords are visible on the penultimate whorl and +90 on the last one. There are no basal or subsutural axial folds.

Aperture circular with an entire peristome. Inside the aperture there is a fold on which the operculum abuts. Parietal area covered by a thick callous layer that extends adapically covering partially the previous whorl and abapically covering slightly the umbilicus; columella arched, not very thick and not reflected towards the umbilicus. Between the base of the columella and the base of the outer lip, a fine triangular shaped callous layer is formed, which during the growth of the shell will result in a thick cord that delimits the umbilicus. Outer lip thin, with smooth margin, not modified by spiral cords. The surface of the parietal callus is rough.

Umbilicus narrow and deep, with three spiral cords inside; there are not folds inside. Dimensions: the holotype measures 2.9 mm in diameter and 1.78 mm in height (H/D: 0.62).

Habitat: Infralittoral species collected by diving at 32 m depth.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia striatissima* n. sp. is characterized by having very numerous spiral cords; by lacking of fine axial lines at first half whorl of the protoconch; and by having spiral cords inside the umbilicus and the shape of the columellar callus.

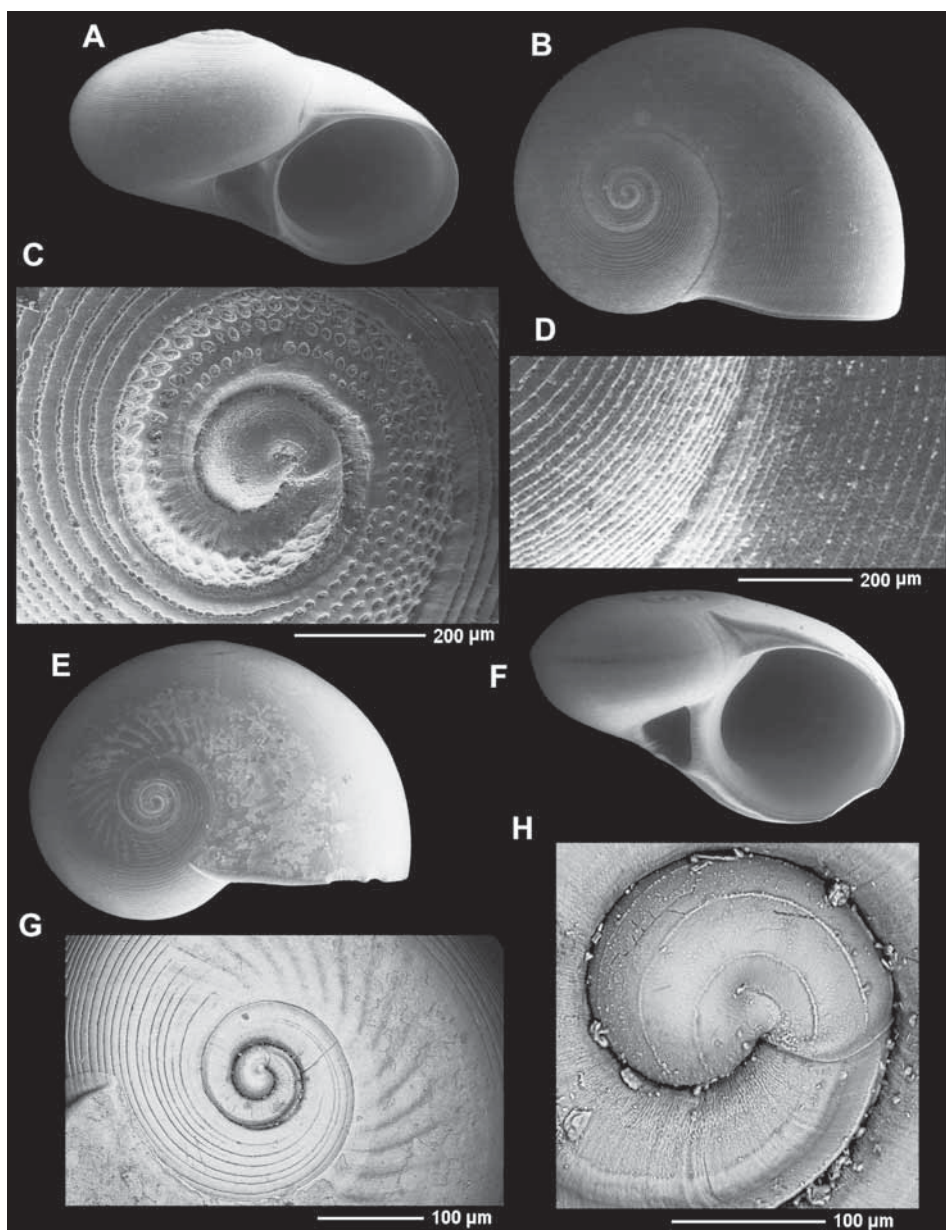
L. microtuberculata n. sp. is the most similar species, but it is distinguished by having a more elevate shell, the aperture more vertical, wider spiral interspaces of the spiral cords on the teleoconch; and by the different shape of the columellar callus.

Figure 97

A-D. *Leucorhynchia striatissima* n. sp. A-B: holotype, 2.9 mm in diameter, Philippines, Black Rock, Tuburan, Panay, 32 m (MNHN); C: protoconch and first whorl of the teleoconch; D: microsculpture. E-H: *Leucorhynchia monteiroi* n. sp. E-F: holotype, 3.24 mm in diameter, Solomon Islands, Bapita caves, Marovo Lagoon, Hele Islands, 30 m (MNHN); G-H: protoconch and detail of the microsculpture.

Figura 97

A-D. *Leucorhynchia striatissima* n. sp. A-B: holotipo, 2,9 mm de diámetro, Filipinas, Black Rock, Tuburan, Panay, 32 m (MNHN); C: protoconcha y primera vuelta de teleoconcha; D: microescultura. E-H. *Leucorhynchia monteiroi* n. sp. E-F: holotipo, 3,24 mm de diámetro, Islas Salomón, Cuevas Bapita, Laguna Marovo, Islas Hele, 30 m (MNHN); G-H: protoconcha y detalle de la microescultura.



Leucorhynchia monteiroi n. sp. Rubio, Rolán & Gori

Figure 97E-H

Type material: Holotype (Figs. 98A-B) MNHN-IM-2000-34920.

Material examined: 1 s: Solomon Islands: 1 s, Bapita caves, Marovo Lagoon, Hele Islands, 30 m (exCSG).

Type locality: Solomon Islands, Hele Islands, Marovo Lagoon, Bapita caves, 30 m.

Etymology: The specific name is after António Antunes Monteiro, from Lisbon (Portugal), malacologist and an old friend, who is usually the reviser of the English text for our works and editor of the present one.

Description: Shell small (<3.50 mm), wider than high, robust, depressed turbiniform, with a spire formed by 3.6 whorls, adapically almost planispiral, keeled and deeply umbilicate. The protoconch has $\frac{3}{4}$ of whorl, measuring about 240 μ m in diameter and its surface is rough with two spiral cordlets.

Teloconch of 2.8 whorls initially separated by a marked suture; there is a peripheral keel that angles the shell. In the early teloconch, a peripheral carina can be observed; this carina soften and disappear from 1 $\frac{1}{4}$ whorls. From $\frac{3}{4}$ whorl a wide groove is developed; from 1 $\frac{1}{4}$ whorls the teloconch surface is totally covered by spiral cords and grooves.

On the last whorl, adapically, there are 19-20 fine and short, subsutural oblique axial folds. But there are not periumbilical axial ones.

Adapically the subsutural area where usually are the axial folds is smooth, lacks of cords and spiral grooves.

Abapically, there are 10-12 thick periumbilical axial folds that penetrate inside the umbilicus, where is formed a columellar callus, during the growth of the shell.

Aperture rounded, with an entire peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a thick callous layer, that extended towards the suture and covered an important part of the previous whorl; columella thick, arched and reflected to the umbilicus; a callus not very prominent, placed between the base of the columella and the base of the outer lip, is extended towards the umbilicus, but not occluding it, forming during the development of the shell a strong cord which delimits the umbilicus. Outer lip thin, with smooth margin.

Umbilicus wide and deep; there are no axial folds. Umbilical wall smooth. Dimensions: the holotype size is 3.24 mm in diameter and 2.00 mm in height (H/D: 0.62).

Habitat: Infralittoral species collected diving at 30 m depth.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia monteiroi* n. sp. is characterized by its adapical, almost planispiral spire; by the number of axial subsutural folds; by the peripheral keel of the last whorl and by the shape of the columellar callus and periumbilical cord.

By its shape it may be quite similar to *L. ornatissima*, but it can be distinguished from the latter by having a peripheral keel instead of three carinae; by having a higher number of axial subsutural oblique folds; by having spiral striae, lacking of basal axial folds; and by the cord which delimits the umbilicus.

Leucorhynchia densilabris n. sp. Rubio, Rolán & Gori

Figure 98A-F

Type material: Holotype (Figs. 99A-C) MNHN-IM-2000-34921 and 1 paratype MNHN-IM-2000-34922; 2 paratypes in CSG.

Material examined: 4 s: Solomon Islands: 4 s, Charapoana Pt., Morovo Lagoon, Uepi Island, 20 m (exCSG).

Type locality: Solomon Islands, Charapoana Pt., Horovo Lagoon, Uepi Island, 20 m.

Etymology: The specific name alludes to the width of the apertural border: from *densus*, *a, um* “thick” and *labrum*, *i* “border”.

Description: Shell small (<3.0 mm), wider than high, globose, robust, depressed-turbiniform, formed by 3.8 whorls, very convex and not umbilicate, of $\frac{3}{4}$ whorl, about 240 μ m in diameter, rough surface with two thin spiral threads, ending in a thick labial varix.

Teleoconch with 3.0 whorls separated by an initially marked suture and with very rounded periphery.

The first teleoconch whorl is ornamented with an adapical keel and spiral cords that are developed in zigzag forming a reticulum of rounded spaces; after the first whorl the keel gradually softens until it disappears, and the rounded spaces become progressively smaller and lengthen to become fine spiral grooves. Teleoconch surface totally covered by spiral cords separated by fine spiral grooves.

In apertural view about 33-35 spiral cords are visible on the end of the penultimate whorl and more than 80 on the last one. There is a strong subsutural cord.

There are no basal or subsutural axial folds.

Aperture circular, prosocline with an entire peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered with a thick callous layer that is extended adapically covering partially the previous whorl; columella arched, thick and not reflected towards the umbilicus.

Several growths of the parietal/columellar callus cover the umbilicus completely.

Outer lip thin, with smooth margin, not modified by spiral cords; its external border is increased by the extension of the parietal callus.

Dimensions: the holotype measures 5.20 mm in diameter and 3.80 mm in height (H/D: 0.73).

Habitat: Infralittoral species collected by diving at 20 m depth.

Distribution: Only known from the type locality.

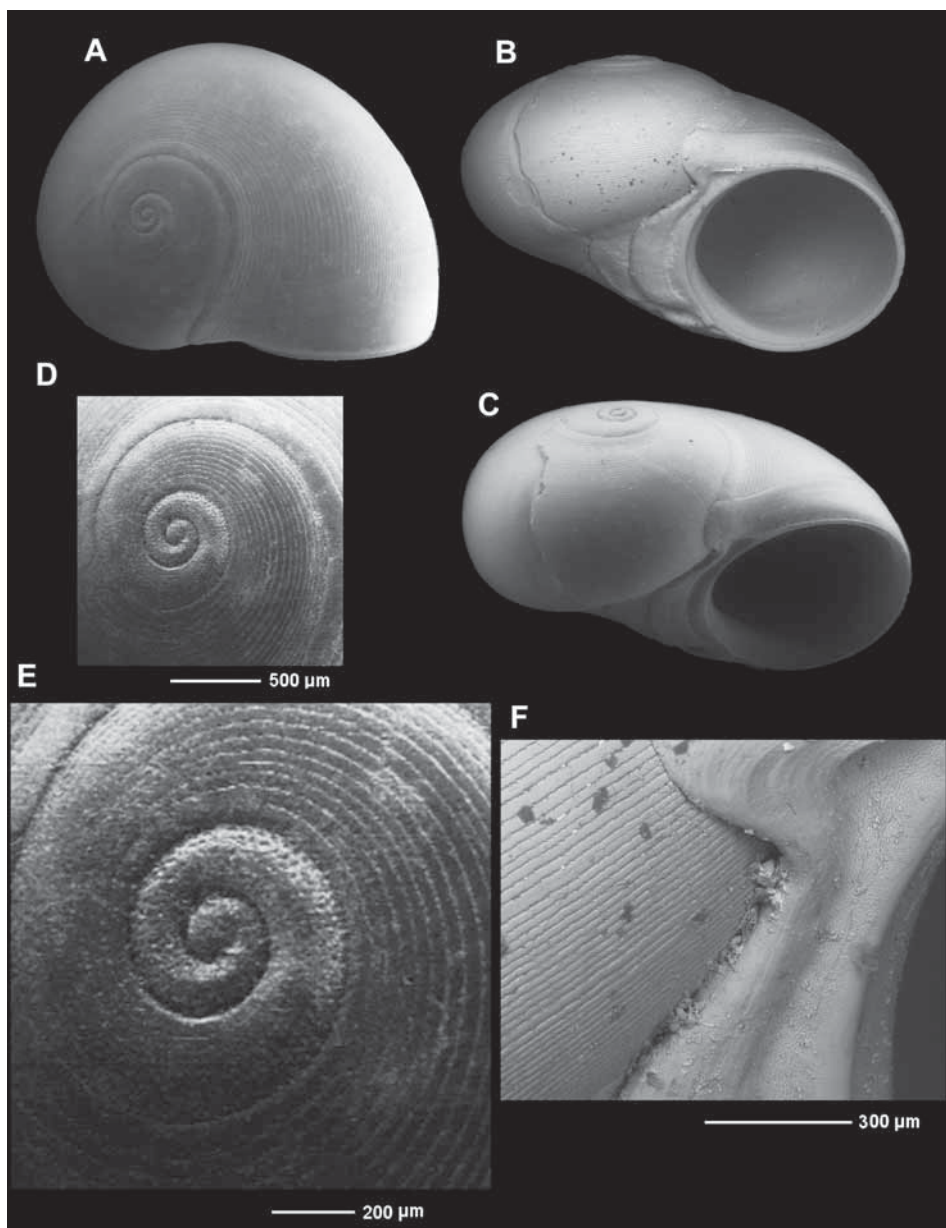
Remarks: *Leucorhynchia densilabris* n. sp. is characterized by its globose form; by the strong subsutural cord; by the shape of the parietal/columellar callus; and by the widening of the external border of the outer lip.

Figure 98

A-C. *Leucorhynchia densilabris* n. sp. A: holotype, 5.2 mm, Solomon Islands, Charapoana Pt., Morovo Lagoon, Vepi Island, 20 m (MNHN). B-C: paratype, 4.7 mm, same locality (MNHN); D-E: protoconch and detail; F: microsculpture.

Figura 98

A-F. *Leucorhynchia densilabris* n. sp. A: holotipo, 5,2 mm, Islas Salomón, Charapoana Pt., Laguna Morovo, Isla de Vepi, 20 m (MNHN). B-C: paratipo, 4,7 mm, la misma localidad (MNHN); D-E: protoconcha y detalle; F: microescultura.



Leucorhynchia linguaeformis n. sp. Rubio, Rolán & Gori

Figure 99A-F

Type material: Holotype (Figs. 100A-B) MNHN-IM-2000-34923.

Material examined: 1 s: Papua New Guinea: 1 s, Bermuda Drop, Binneses Island, New Ireland, 02°45.0'S-150°41.0'E, 27 m.

Type locality: Papua New Guinea, Bermuda Drop, Binneses Island, New Ireland, 02°45.0'S-150°41.0'E, 27 m.

Etymology: The specific name alludes to the shape of the columellar callus which is similar to a “tongue”, in Latin *lingua*, *ae*.

Description: Shell small (<5.0 mm), wider than high, robust, depressed-turbiniiform, formed by 3.8 whorls, very convex and not umbilicated. The protoconch has $\frac{3}{4}$ of whorl, about 240 μ m in diameter, with a rough surface with two thin spiral threads, ending in a thick labial varix.

Teloconch with 3.0 whorls separated by a wide, marked suture and with rounded periphery. The first $\frac{1}{2}$ whorl has adapical keel, and peripheral cords that are developed in zigzag forming a reticulum of large rounded spaces; after the first $\frac{1}{2}$ whorl the keel is softened to disappear and the rounded spaces become progressively smaller and lengthen to become fine spiral grooves. Teloconch surface totally covered by spiral cords and fine spiral grooves.

In apical view from 11 spiral cords up to 16 are visible in the penultimate whorl, being more than 100 on the last one. There are not basal and subsutural axial folds.

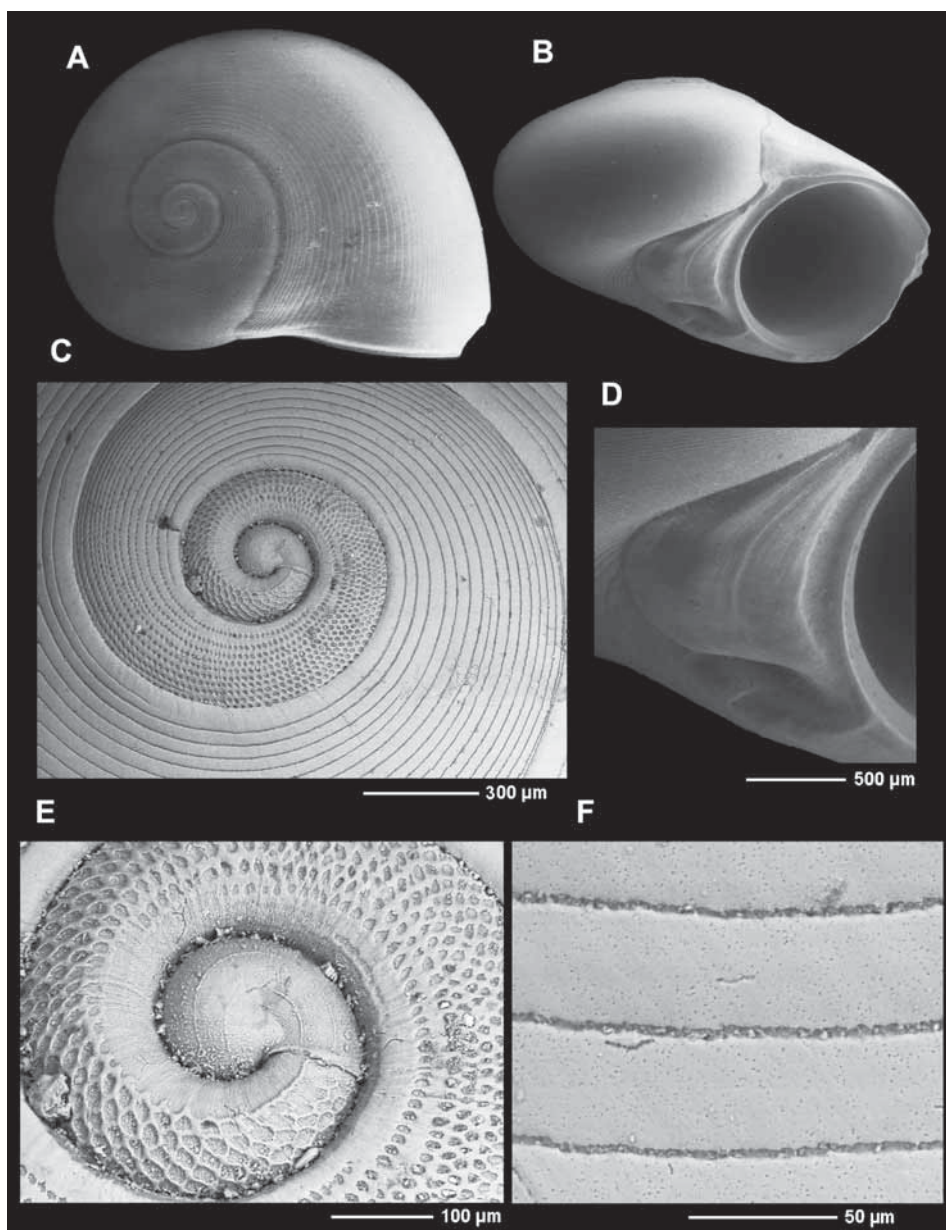
Aperture circular, with an entire peristome. Inside the apertural border there is a fold on which the operculum abuts. Parietal area covered by a very thick

Figure 99

A-D. *Leucorhynchia linguaeformis* n. sp. A-B: holotype, 4.9 mm in diameter, Papua New Guinea, Bermuda Drop, Binneses Island, New Ireland, 27 m (MNHN); C: protoconch; D: detail of the base; E-F: detail of the microsculpture.

Figura 99

A-D. *Leucorhynchia linguaeformis* n. sp. A-B: *holotipo*, 4,9 mm de diámetro, Papua Nueva Guinea, Bermuda Drop, Isla Binneses, Nueva Irlanda, 27 m (MNHN); C: *protoconcha*; D: *detalle de la base*; E-F: *microescultura*.



callous layer that extends adapically covering partially the previous whorl; columella thick, arched and reflected towards the umbilicus; the external surface of the parietal and columellar callous layer is concave and rough, forming a broad canal which is extended parallelly to the inner lip. Further extensions of the parietal/columellar callus form a tongue-shaped callous layer that completely covers the umbilicus; its surface is entirely smooth.

Between the base of the columella and the base of the outer lip, a fine triangular callous layer appears which during the growth of the shell forms the cord that delimits the umbilicus.

Outer lip no very thick, with smooth margin, not modified by the spiral cords. Umbilicus completely covered by extensions of parietal/columellar callus.

Dimensions: the holotype is 4.9 mm in diameter and 3.12 mm in height ($H/D = 0.63$).

Habitat: Infralittoral species collected by diving at 20 m depth.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia linguaeformis* n. sp. is characterized by the ornamentation of the first teleoconch whorl; by the wide and marked suture; by the tongue-shaped parietal/columellar callus that covers the umbilicus; and by the shape of the callus at the base of the columella that forms the periumbilical cord.

L. lluviae n. sp. is very similar in its general appearance but this species may be distinguished by having the surface of the callus which numerous undulations and its first part of the teleoconch lacking of rounded figures in its microsculpture.

Indo Pacific Group 5 Bicarinata

The species of this group are characterized by its robustness; by the presence of 3 strong peripheral carinae and two nodulous cords, one adapical and other abapical; and also by the shape and size of the columellar callus.

It comprises 6 species:

Indo Pacific grupo 5

- <i>Leucorbhynchia plena</i> n. sp.....	So.....	Fig 100
- <i>Leucorbhynchia prominens</i> n. sp.....	NC.....	Fig 101
- <i>Leucorbhynchia osaculeatum</i> n. sp.....	PNG.....	Figs 102-103
- <i>Leucorbhynchia condei</i> n. sp.....	Ph.....	Fig 104
- <i>Leucorbhynchia iniqua</i> n. sp.....	Th.....	Fig 105
- <i>Leucorbhynchia kosraensis</i> n. sp.....	Mi.....	Fig 106

Leucorbhynchia plena n. sp.

Figure 100A-F

Type material: Holotype (Fig. 100A) MNHN-IM-2000-34928 and 18 paratypes (Figs. 100B-C) MNHN-IM-2000-34929.

Material examined: **19 s:** Solomon Islands, SALOMON 1: 19 s, Stn DW1762, 8°40'S-160°04'E, 396-411 m.

Type locality: Solomon Islands, 8°40'S-160°04'E, 396-411 m [SALOMON 1: Stn DW1762].

Etymology: The specific name is from the Latin *plenus, a, um* “plenty” and alludes to the sculpture of the shell which is very abundant all over.

Description: Shell small (<3 mm), wider than high, very robust, not depressed, turbiniform, spire formed by about 3 whorls, with three spiral carinae and narrowly umbilicated.

Protoconch with $\frac{3}{4}$ of a whorl, about 220 μ m in diameter, rough surface mainly in the entire sutural area, ending in a labial varix.

Teleoconch of 2.3 whorls initially separated by a very marked suture; it is characterized by the presence in the last whorl of a strong smooth subsutural cord, another one adapical with large nodules, three strong peripheral carinae, a basal cord of large nodules and another thick periumbilical one. The ornamentation consists in spiral cords, axial ribs and micro-granules.

At the beginning of the teleoconch there are 2 carinae, one in a central position, and the other at the periphery; between both carinae there are axial ribs that form a reticle of rectangular spaces, which disappears after the first whorl. Between the central carina and the suture, in the narrow space of the first whorl, a strong cord is formed, which increases quickly and develops strong nodules since the second teleoconch whorl. At same time the rectangular spaces disappear and all the surface of the teleoconch will become covered with spiral flat cords and spiral sulcus in the interspaces. Both the rectangular spaces and the spiral grooves have axially aligned micro-granules inside. Abapically, between the nodules and the periumbilical cord there are also axial ribs.

At the last whorl the adapical cord has 19 nodules and the basal (abapical) cord 12-13.

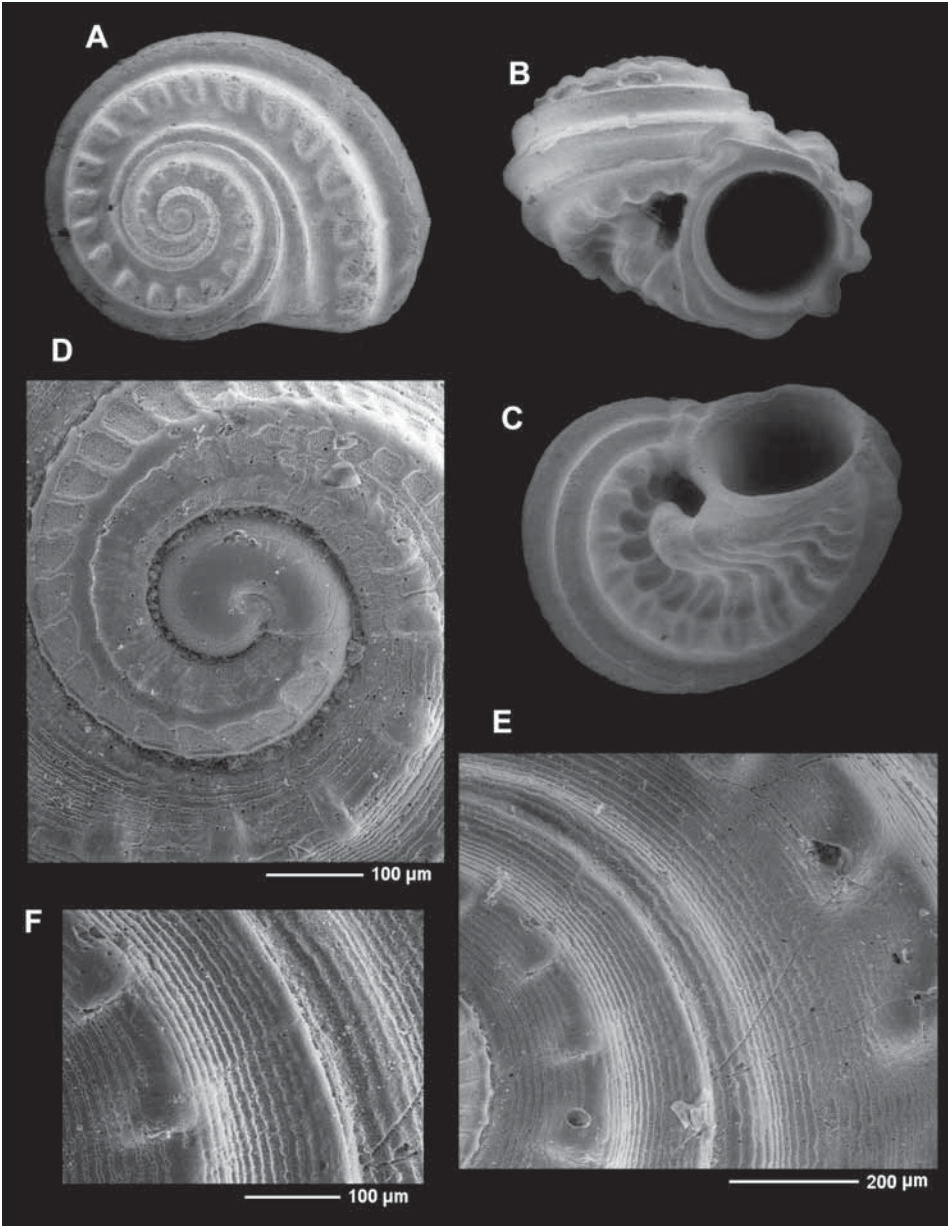
Aperture circular with a complete peristome. Inside the aperture, near the border, there is a fold on which the operculum abuts. Parietal and columellar areas are covered by a strong callous layer; between the base of the columella and the base of the external lip, a triangular callus appears; during the development of the shell this callus will originate a strong cord that delimits the umbilicus. External lip with a smooth margin, not modified by the spiral cords.

Figure 100

A-F. *Leucorhynchia plena* n. sp. A: holotype, 2.45 mm in diameter, Solomon Islands, Stn DW1762, 396-411 m (MNHN); B-C: paratypes, 2.4, 2.39 mm, same locality (MNHN); D: protoconch and beginning of the teleoconch; E-F: sculpture and microsculpture.

Figure 100

A-F. *Leucorhynchia plena* n. sp. A: *holotipo*, 2,45 mm de diámetro, Islas Salomón, Stn DW1762, 396-411 m (MNHN); B-C: *paratipos*, 2,4, 2,39 mm, same locality (MNHN); D: *protoconcha y comienzo de la teleoconcha*; E-F: *escultura y microescultura*.



Umbilicus narrow and deep, delimited by a strong cord formed by the growth of the columellar callus; in its interior neither folds nor spiral cords have been observed.

Dimensions: the holotype measures 2.45 mm in diameter and 1.71 mm in height (H/D: 0.70).

Multispiral operculum with a small central nucleus and 8 spiral whorls.

Habitat: Bathyal species dredged at 396–411 m depth.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia plena* n. sp. is characterized by having the periphery with three carinae and nodules on the adapical part.

See remarks in the next species of *Leucorhynchia* in this group for comparison.

***Leucorhynchia prominens* n. sp.**

Figure 101A–D

Type material: Holotype (Figs. 101A–C) MNHN-IM-2000-34930.

Material examined: **1 s:** New Caledonia, EXBODI: 1 s, Récifs de l’Astrolabe-NW, Stn DW3906, 19°50’S–165°33’E, 490–580 m.

Type locality: New Caledonia, Récif de l’Astrolabe-NW, 19°50’S–165°33’E, 490–580 m [EXBODI: Stn DW3906].

Etymology: The specific name is from the Latin word *prominens*, *entis*, alluding to the prominent sculpture of the shell.

Description: Shell small (<3.5 mm), wider than high, very robust, turbiniform, spire consisting of 3.8 whorls, tri-carinated and narrowly umbilicated.

The protoconch has 0.80 whorls, measuring about 229–250 µm in diameter and has an apparently smooth surface.

Teleoconch of 3 whorls separated by a marked suture; it is characterized by presenting in the last whorl an adapical cord with strong nodules, three thick peripheral carinae, a basal cord (abapical) of strong nodules and a thick

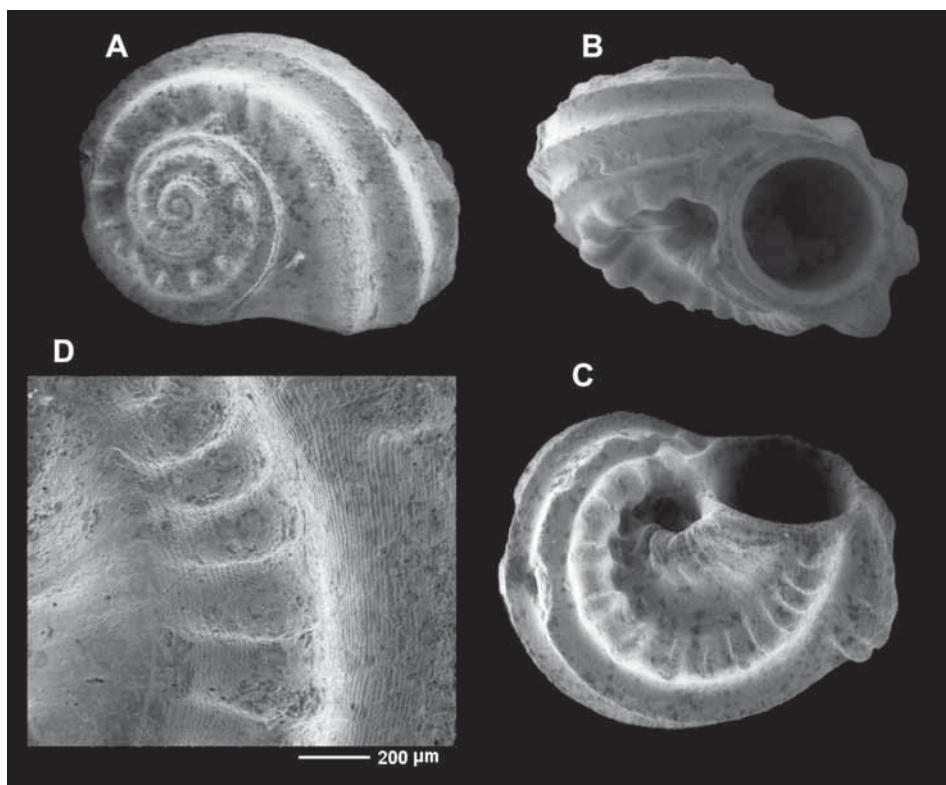


Figure 101

A-D. *Leucorhynchia prominens* n. sp. A-C: holotype, 3.38 mm in diameter, New Caledonia, Reef of l'Astrolabe-NW, Stn DW3906, 490-580 m (MNHN); D: detail of the sculpture.

Figura 101

A-D. *Leucorhynchia prominens* n. sp. A-C: holotipo, 3,38 mm de diámetro, Nueva Caledonia, Arrecife de l'Astrolabe-NO, Stn DW3906, 490-580 m (MNHN); D: detalle de la escultura.

periumbilical cord. The whole surface of the teleoconch appears to be covered by very fine spiral filets. On the adapical cord as well as on the abapical one, at the beginning of the last whorl, strong rounded nodules are present, which progressively become narrower and are elongate to be nearer to the external lip; the adapical nodules disappear in the last quarter of the last whorl and the abapical nodules are transformed into strong axial ribs on a concave space.

On the last whorl, the adapical cord has about 15 nodules and the basal one (abapical) has 15, the last ones being as cords. Among the peripheral carinae, the one placed in a central position is more prominent than the other two.

A strong spiral cord is formed by the progressive development of the columellar callus delimits the umbilicus.

Aperture circular with a complete peristome. Inside the apertural lip there is a fold on which the operculum abuts. The parietal and columellar areas are covered with a strong callous layer; between the base of the columella and the base of the external lip, a triangular callus is formed, which during the growth of the shell will form a strong cord that delimits the umbilicus. External lip strong, with a smooth internal margin, and with an external margin very thick due to the carinae and nodules of spiral cords.

Umbilicus narrow and deep, delimited by a strong cord formed by the growth of the columellar callus; in its inner part, neither folds nor spiral cords are observed.

Dimensions: the holotype measures 3.38 mm in diameter and 2.42 mm in height (H/D: 0.71).

Habitat: Bathyal species dredged at 490-580 m depth.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia prominens* n. sp. is characterized by its central carina, which is more prominent and seems like a keel; also because the adapical nodules disappear in the last quarter of the whorl and the basal ones are changed into strong ribs; by the shape of the periumbilical cord which has no prominence towards the umbilicus.

L. prominens n. sp. may be differentiated from *L. plena* n. sp. in several characters: the shell is larger, and the basal periumbilical cord is smaller in opposition with the lower nodular cord which has larger nodules mainly on the outer lip. The space between these two cords does not have clear ribs as in *L. plena*. Dorsally, the nodules on the main spiral cord disappeared in the last quarter of whorl, whereas they are larger at the middle.

***Leucorhynchia osaculeatum* n. sp.**

Figures 102A-F, 103A-D

Type material: Holotype (Figs. 102A-B) MNHN-IM-2000-34931 and 1 paratype MNHN-IM-2000-34932.

Material examined: **5 s:** Papua New Guinea, KAVIENG 2014: 2 s, Kavieng Lagoon, Albatross Passage, Stn KD81, 02°44.2'S-150°42.3'E, 8-12 m, sand and coral rubble (type material); 3 s, Kavieng Lagoon, E Albatross Passage, Stn KR57, 02°45.7'S-150°44.5'E, 3-41 m, wall with caves and ledges.

Type locality: Papua New Guinea, Kavieng Lagoon, Albatross Passage, 02°44.2'S-150°42.3'E, 8-12 m, sand and coral rubble [KAVIENG 2014: Stn KD81].

Etymology: The specific name derives from the fusion of two Latin words: *os, oris*, which means “mouth” and *aculeatus, a, um*, “pointed”, alluding to the end of the spiral cords which are acute.

Description: Shell small (<3.0 mm), wider than high, very robust, turbiniform, spire formed by 3.3 whorls, tri-carinated and narrowly umbilicated. The protoconch has $\frac{3}{4}$ of a whorl and is in the same plane as the first whorl of the teleoconch, measures about 210 µm in diameter, has the rough surface with two spiral cordlets and finish in a thick labial varix.

Teleoconch of 2.5 whorls separated by a not very marked suture; it is characterized by presenting in the last whorl an adapical carina with elongated nodules; three thick peripheral carinae, the central one is the most prominent as a keel; an abapical cord (basal) with thick nodules and a thick periumbilical cord. Ornamentation composed of spiral cords, axial ribs and micro-granules. Early teleoconch with two thick carinae; one is adapical, in central position, which angles the shell and the other, little more fine, is near the suture in the periphery; between the central carina and the suture, after the first $\frac{1}{2}$ whorl, a third carina appears. Among the three carinae there are axial ribs that initially form a reticle of quadrangular spaces, which slowly get narrower and more elongated till they disappear in the 1.25 whorl. The third carina, subsutural, after the first whorl, develops elongate nodules which are placed towards the suture forming a strong axial rib.

Then, in the following whorls the quadrangular/rectangular spaces disappear and all the surface of the teleoconch appears covered with spiral cordlets. The rectangular spaces as the spiral sulcus have interiorly micro-granules axially aligned. Abapically, between the nodules and the periumbilical cord also there are strong axial ribs.

At the last whorl the adapical carina has 18 thick axial ribs and the abapical cord 15 thick nodules.

Aperture circular with a complete peristome. Inside the apertural border there is a fold on which the operculum abuts. Parietal area covered by a not very strong callous layer; columella fine, arched, between the base of the columella and the base of the external lip, a callus with trapezoidal form very strong and prominent is formed, which during the shell growth originates a thick cord which delimits the umbilicus. Outer lip thick, with a smooth internal margin and the external margin modified by the carina and the spiral cords.

Umbilicus narrow and deep, delimited by a strong cord formed by the development of the columellar callus.

Dimensions: the holotype measures 2.78 mm in diameter and 2.2 mm in height (H/D: 0.79).

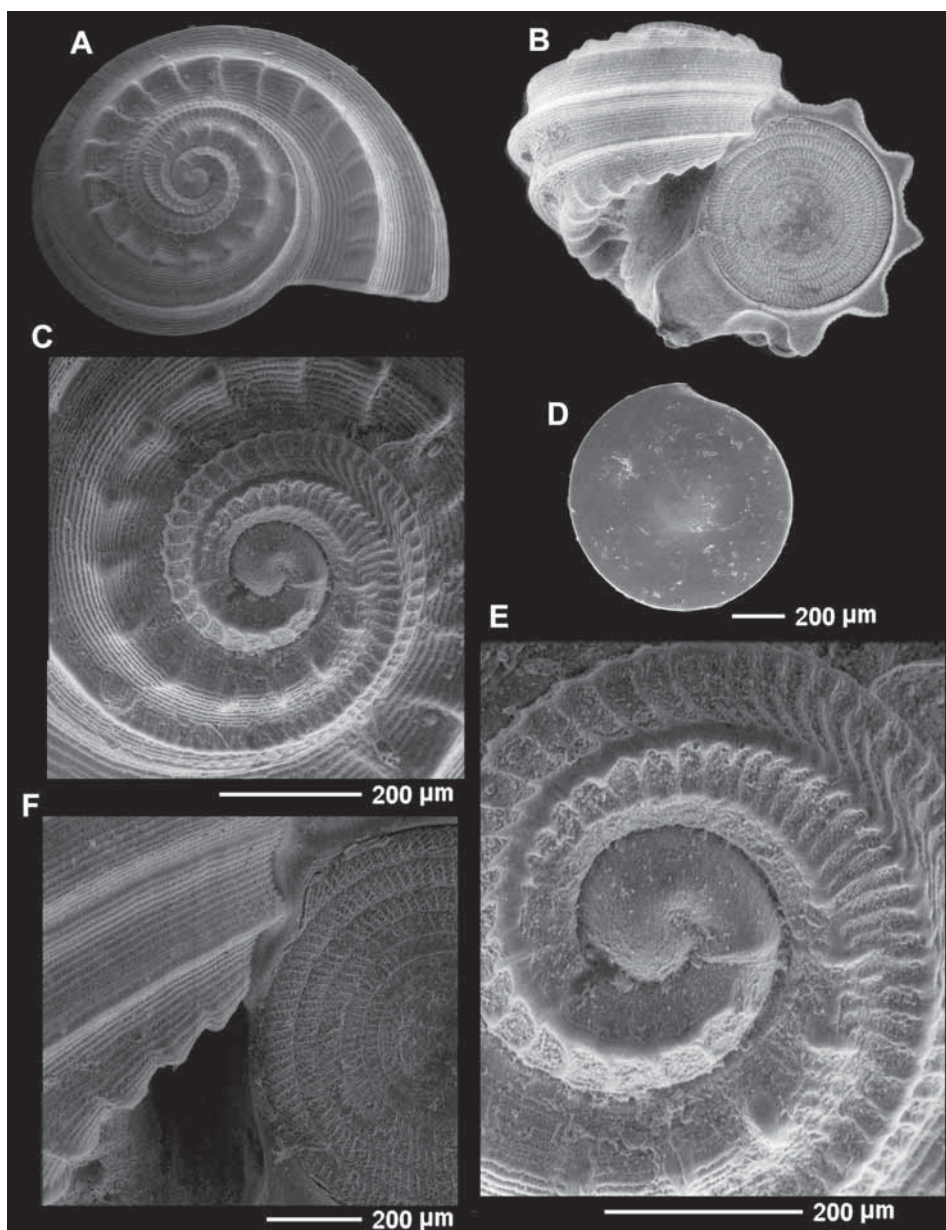
The operculum is rounded, multispiral, with a wide central nucleus which lies in a slightly depressed area. Following the nucleus there are seven whorls around, which finish in a short growing edge. The spiral is ornamented with axial threads and other thinner and oblique in the interspaces.

Figure 102

A-F. *Leucorhynchia osaculeatum* n. sp. A: holotype, 2.78 mm, Papua New Guinea, Kavieng Lagoon, Albatross Passage, Stn KD81, 8-12 m (MNHN); B: shell, 1.82 mm, Kavieng Lagoon, E Albatross Passage, Stn KR57, 02°45.7'S-150°44.5'E, 3-41 m (MNHN); C-D: first teleoconch whorls and protoconch, with detail; F: detail of the microsculpture of shell and operculum.

Figura 102

A-F. *Leucorhynchia osaculeatum* n. sp. A: holotipo, 2,78 mm, Papua Nueva Guinea, Kavieng Lagoon, Albatross Passage, Stn KD81, 8-12 m (MNHN); B: concha, 1,82 mm, Kavieng Lagoon, E Albatross Passage, Stn KR57, 02°45,7'S-150°44,5'E, 3-41 m (MNHN); C-D: primera vuelta de teleoconcha y protoconcha, y detalle; F: detalle de la microescultura de la concha y del opérculo.



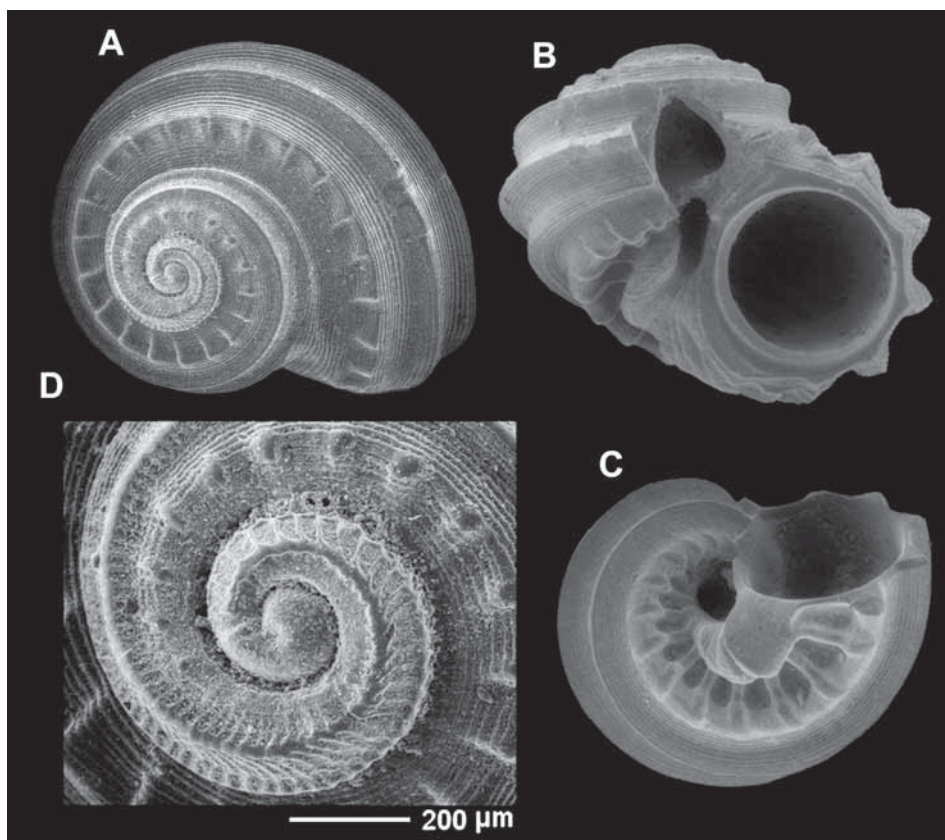


Figure 103

A-D. *Leucorhynchia osaculeatum* n. sp. A-C: shells, 2.17, 2.30, 1.96 mm in diameter, Papua New Guinea, Kavieng Lagoon, E Albatross Passage, Stn KR57, 02°45.7'S-150°44.5'E, 3-41 m, wall with caves and ledges (MNHN); D: protoconch and first teleoconch whorl.

Figura 103

A-D. *Leucorhynchia osaculeatum* n. sp. A-C: conchas, 2.17, 2.30, 1.96 mm de diámetro, Papua Nueva Guinea, Kavieng Lagoon, E Albatross Passage, Stn KR57, 02°45.7'S-150°44.5'E, 3-41 m, pared con cuevas y repisas (MNHN); D: protoconcha y primera vuelta de teleoconcha.

Radula: Formula N+5+R+5+N. The rachidian tooth has a broad base and its cusp is “rolled”; they are slightly thickened along its broad anterior margin but thinly and poorly developed posteriorly; its base occupies the most

anterior position in each row. There are five pairs of laterals that are of similar size and shape; the primary cusps on the lateral teeth are thin and pointed with secondary serrations along the outer and inner margin (3 on each side). The marginal teeth have long shafts of similar shapes and the cusp shows a pronounced gradation in shape and decrease in size outwardly along the row.

Habitat: Infralittoral species collected at 8-12 m in sand and coral rubble bottom and at 3-41 m in walls with caves and ledges.

Distribution: Only known from Albatross Passage, Kavieng Lagoon, Papua New Guinea.

Remarks: *Leucorhynchia osaculeatum* n. sp. is characterized by the reticle of quadrangular/rectangular spaces from the beginning of the teleoconch; by the adapical cord with nodules, which is elongated, forming strong axial ribs, and by the shape and size of the columellar callus.

The radula of *Leucorhynchia osaculeatum* n. sp. is very similar in structure to that of *L. perpolita*, but differs from it mainly because the rachidian tooth has its cusp “rolled” and the lateral teeth have a primary sharp and pointed cusp.

Leucorhynchia condei n. sp. Rubio, Rolán & Gori

Figure 104A-E

Type material: Holotype (Figs. 103A, 103C) MNHN-IM-2000-34933 and one paratype (Fig. 103B) MNHN-IM-2000-34934; two paratypes in CSG.

Material examined: 4: Philippines: 4 s, Black Rock, Tuburan, Panay Island, 11°48.505'N-121°52.507'E, 32 m (exCSG).

Type locality: Black Rock, Tuburan, Panay Island, Philippines, 11°48.505'N-121°52.507'E, 32 m.

Etymology: The species name is after Javier Conde, Spanish malacologist who made a great work revising the English language of part of the present work and some others.

Description: Shell small (<3.0 mm), wider than high, very robust, turbiniform, formed by 3.5 whorls, tricarinate and narrowly umbilicated.

The protoconch has 0.80 whorls and it is in the same plane as the first whorl of the teleoconch, measures about 200 µm in diameter, has a smooth surface without spiral cordlets, ending in a marked labial varix.

Teleoconch of 2.8 whorls, initially separated by a wide and marked suture; it has two nodulous spiral cords (adapical and abapical), three peripheral carinae and one periumbilical cord. Ornamentation formed by nodulous spiral cords, axial ribs, carinae, spiral grooves and micro-granules. The entire teleoconch surface is covered with narrow spiral grooves; the micro-granules are axially aligned and cover the spaces of the reticle and the interior of the grooves.

Early teleoconch with two carinae; one adapical, more pronounced, which angles the shell and one peripheral something thinner; between the central carina and the suture, after the first ½ whorl, a third carina appears. Among the three carinae there are axial ribs which form a reticle of rectangular/quadrangular spaces, which slowly get narrower and more elongated till they disappear from the first whorl.

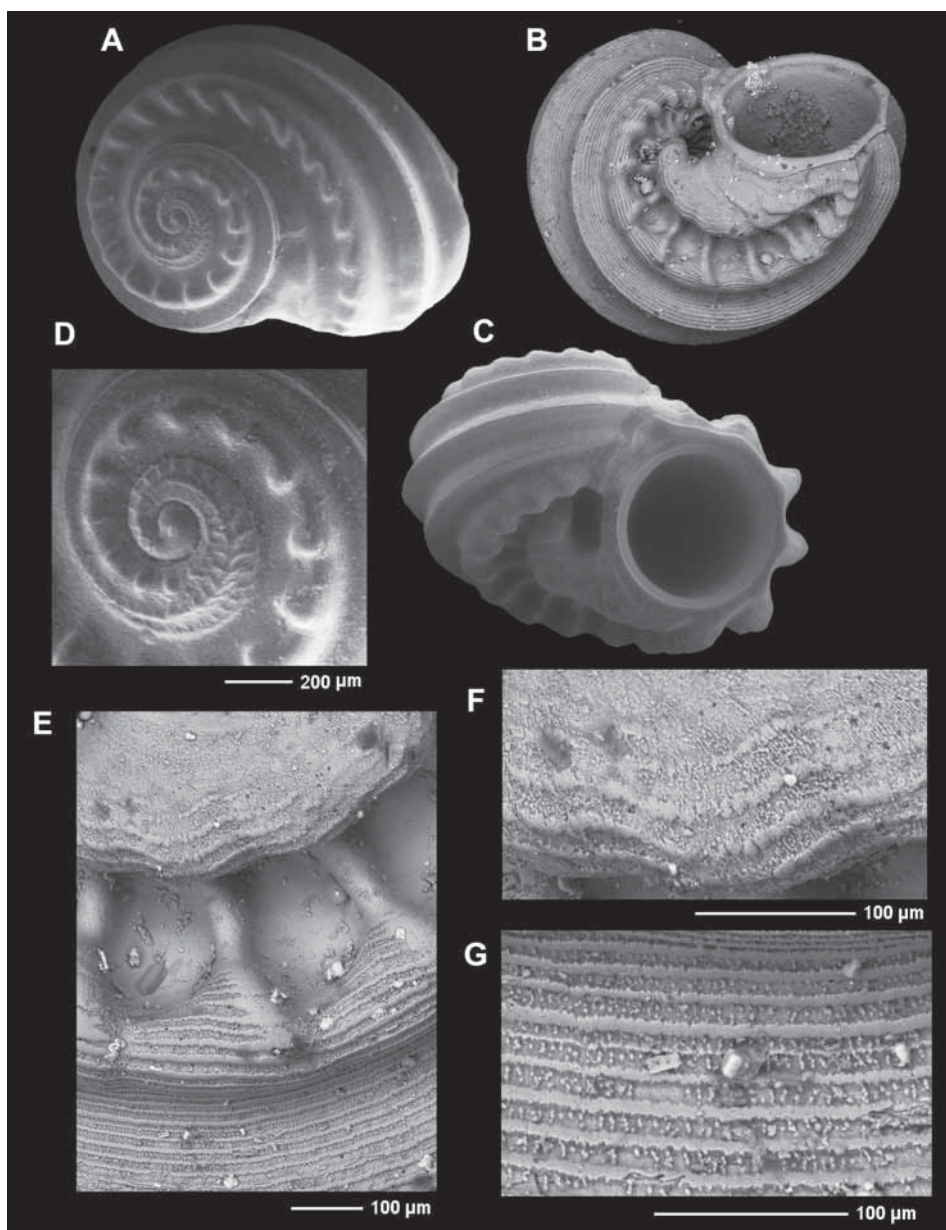
The third carina, subsutural, after the first whorl, develops thick rounded nodules which are oblique and elongated in the last half whorl. In the last whorl, the adapical cord has about 20 thick nodules and the abapical cord 15. The nodules of the abapical cord are big and rounded and they extend to the periumbilical cord forming thick axial ribs. The periumbilical cord delimits the umbilicus, is very thick, has the convex surface and is formed by the successive growth of the columellar callus.

Figura 104

A-F. *Leucorhynchia condei* n. sp. A-B: holotype, 2.72 mm, Black Rock, Tuburan, Panay Island, Philippines, 32 m (MNHN); C: paratype, 2.7 mm in diameter, same locality (MNHN); D: protoconch and first teleoconch whorl; F-G: detail of the microsculpture.

Figura 104

A-F. *Leucorhynchia condei* n. sp. A-B: holotipo, 2,72 mm, Black Rock, Tuburan, Isla Panay, Filipinas, 32 m (MNHN); C: paratipo, 2,7 mm de diámetro, la misma localidad (MNHN); D: protoconcha y primera vuelta de teleoconcha; E-G: detalle de la microescultura.



Aperture circular with a complete peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a strong callous layer which extends adapically covering up to the central; columella thick, arched and reflected; at the base of the columella and the base of the outer lip, a prominent callous layer triangle-shaped is formed, which during the shell growth originates a thick cord which delimits the umbilicus. Outer lip thick, with an internal margin smooth and external margin modified by the carinae and the spiral cords.

Umbilicus narrow and deep, delimited by a thick convex cord formed by the development of the columellar callus.

Dimensions: the holotype measures 2.72 mm in diameter x 1.5 mm in height.

Habitat: Infralittoral species collected by diving at 32 m deep (H/D: 0.55).

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia condei* n. sp. is characterized by the elongated and oblique nodules of its adapical cord; by the lower number and greater thickness of the abapical cord nodules; and by the shape of the columellar callus.

Leucorhynchia plena n. sp. is different because the adapical nodules are larger; the basal nodules are larger and closer, the ribs in the interspaces on the spiral cords are fines; also the microsculpture of the cordlets and its interspaces is different.

L. prominens n. sp. has no nodules at the end of the adapical spiral cord and the abapical interspace between the spiral cords has no ribs, the microsculpture is less marked.

L. osaculeatum n. sp. has more microsculpture, the nodules on the spiral cords are smaller and the umbilical infundibulum is more elongate.

L. iniqua n. sp. and *L. kosraensis* n. sp. have the sculpture of the base totally different.

Leucorhynchia iniqua n. sp. Rubio, Rolán & Gori

Figure 105A-F

Type material: Holotype (Fig. 105A-B) MNHN-IM-2000-34935 and one paratype (Fig. 105C) MNHN-IM-2000-34936.

Material examined: **2 s:** Thailand: 2 s, Hin Muang, S Phuket, 28 m (exCSG).

Type locality: Hin Muang, S Phuket, Thailandia, 28 m.

Etymology: The specific name is from the Latin word *iniquus*, *a, um* which means “disproportionate” alluding to the prominent base of the shell.

Description: Shell small (<3.5 mm), almost as high as wide, very robust, turbiniform, formed by 3.9 whorls, tri-carinate and narrowly umbilicated. The protoconch has $\frac{3}{4}$ of a whorl and is in the same plane as the first whorl of the teleoconch; it measures about 210 μ m in diameter, ending in a thick labial varix.

Teleoconch of 3.1 whorls separated by a marked suture; it has two nodulous spiral cords (adapical and abapical), three peripheral carinae and one periumbilical cord. Ornamentation formed by nodulous spiral cords, axial ribs, carinae and spiral grooves. The entire surface of the teleoconch is covered by narrow spiral grooves.

Early teleoconch with two carinae; one adapical, thicker, which angles the shell and one peripheral something thinner; between the central carina and the suture, after the first $\frac{1}{2}$ whorl, a third carina appears. Among the three carinae there are axial ribs which form a reticle of quadrangular spaces, which slowly get narrower and more elongated till they from 1.25 whorls.

The third carina, subsutural, after the first whorl, develops thick rounded nodules which are elongated at last whorl. The adapical carina has 20 thick rounded nodules on the last whorl. The abapical part of the last whorl is very prominent with a supra-umbilical spiral cord, nodulous and fused by 6 wide ribs with the periumbilical cord which is very wide. The abapical cord has about 26 inflate nodules. The periumbilical cord delimits the umbilicus, is very thick and is formed by the successive growth of the columellar callus.

Aperture circular, with a complete peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a strong callous

layer which extends adapically covering up to the central keel; columella thick, arched, between the base of the columella and the base of the external lip, a prominent callus is formed, which during the shell growth originates a thick cord which delimits the umbilicus. Outer lip thick, with a smooth internal margin and external margin modified by the carina and the spiral cords. Umbilicus narrow and deep, delimited by a strong cord formed by the development of the columellar callus. Dimensions: the holotype measures 3.12 mm in diameter and 2.72 mm in height (H/D: 0.87).

Habitat: Infralittoral species collected by diving at 28 m deep.

Distribution: Only known from the type locality.

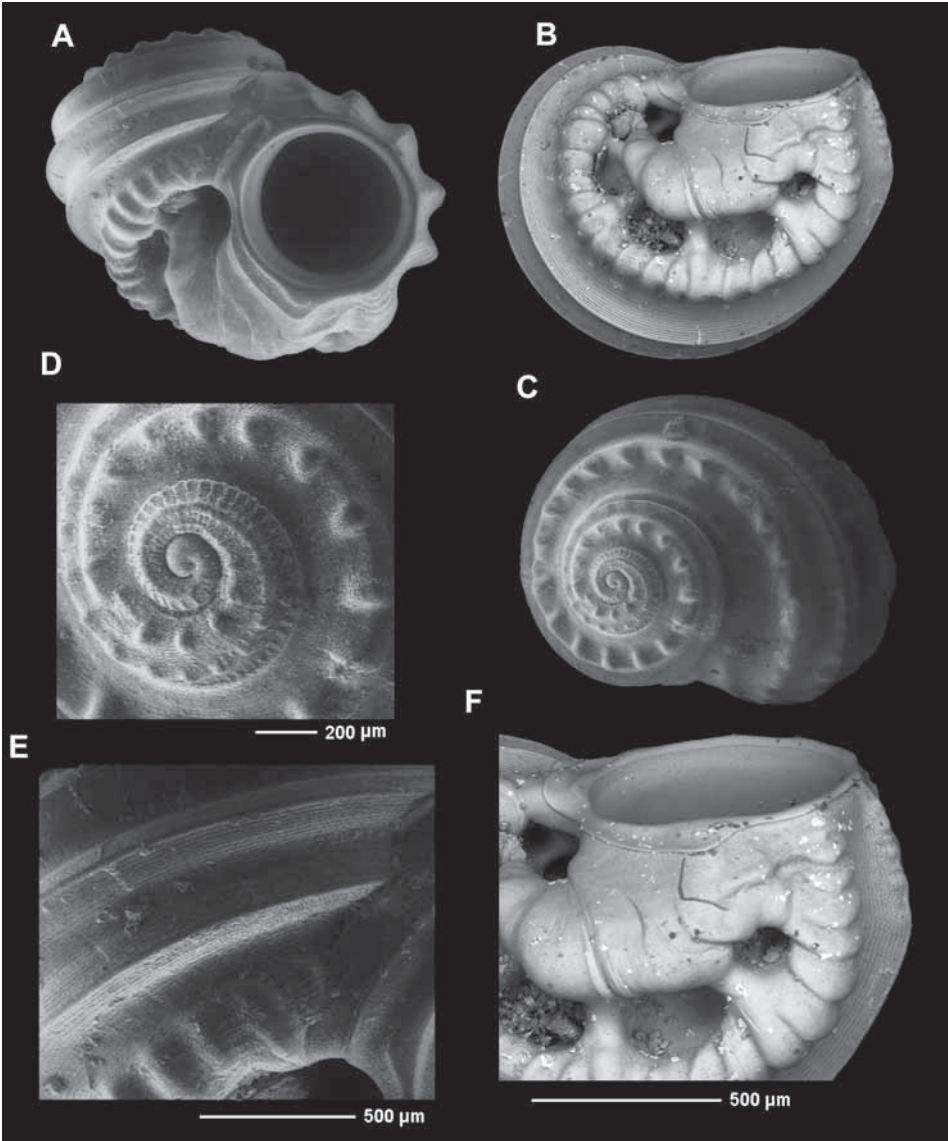
Remarks: *Leucorhynchia iniqua* n. sp. is characterized by the shape and number of nodules mainly in the abapical cord; and by the shape and size of the columellar callus. By its base, it is easily differentiated from *L. plena* n. sp., *L. prominens* n. sp., *L. osaculeatum* n. sp. and *L. condei* n. sp. *Leucorhynchia iniqua* n. sp. differs from *L. kosraensis* n. sp. by lacking nodules in the cords and carinae near the outer lip; also by the larger size of its protoconch and different shape of the periumbilical cord.

Figure 105

A-D. *Leucorhynchia iniqua* n. sp. A-B: holotype, 3.12 mm in diameter, Hin Muang, S Phuket, Thailand, 28 m (MNHN); C: paratype, 2.96 mm in diameter, same locality (MNHN); D: protoconch and first teleoconch whorl, from the paratype; E-F: details of the base.

Figura 105

A-D. *Leucorhynchia iniqua* n. sp. A-B: holotipo, 3,12 mm de diámetro, Hin Muang, S Phuket, Tailandia, 28 m (MNHN); C: paratipo, 2,96 mm de diámetro, la misma localidad (MNHN); D: protoconcha y primera vuelta de teleoconcha, del paratipo; E-F: detalles de la base.



Leucorhynchia kosraensis n. sp. Rubio, Rolán & Gori

Figure 106A-F

Type material: Holotype (Fig. 106A) MNHN-IM-2000-34937 and 2 paratypes (Figs. 106B-D) MNHN-IM-2000-34938; 2 paratypes in the CSG.

Material examined: 5 s: Micronesian States, Kosrae Island: 5 s, Sanctuari, 39 m (exCSG).

Type locality: Micronesian States, Sanctuari, Kosrae Island, 39 m.

Etymology: The specific name is from the islands where the species was collected.

Description: Shell small (<3.0 mm), wider than high, very robust, a little depressed, turbiniform, formed by 3.8 whorls, tri-carinated and narrowly umbilicated. The protoconch has $\frac{3}{4}$ of a whorl and it is in the same plane as the first whorl of the teleoconch, measuring about 160 μ m in diameter, has a rough surface but without spiral cordlets, ending in a marked labial varix. Teleoconch of 3.0 whorls, separated initially by a wide and marked suture; it has two nodulous spiral cords (adapical and abapical), three peripheral carinae and one periumbilical cord. Ornamentation formed by nodulous spiral cords, axial ribs, carinae, spiral grooves and micro-granules. The entire surface of the teleoconch is covered with narrow spiral grooves; the micro-granules are axially aligned and cover the spaces of the reticle and the interior of the grooves.

Early teleoconch with two carinae; one adapical, more pronounced, which angles the shell and one peripheral something thinner; between the central carina and the suture, after the first $\frac{1}{2}$ whorl, a third carina appears. Among the three carinae there are axial ribs which form a reticle of rectangular/quadrangular spaces, and which progressively get narrower and more elongated until they disappear after 1.25 whorls.

The third carina, subsutural, after the first whorl, develops thick rounded nodules which are elongated at the beginning of the last whorl and they become thinner until their almost disappearing in the last quarter of the last whorl. In this one the adapical cord has about 11 thick nodules and the abapical cord 12. The nodules of the abapical cord extended to the periumbilical cord forming thick axial elongate ribs. The periumbilical cord delimits the umbilicus, is

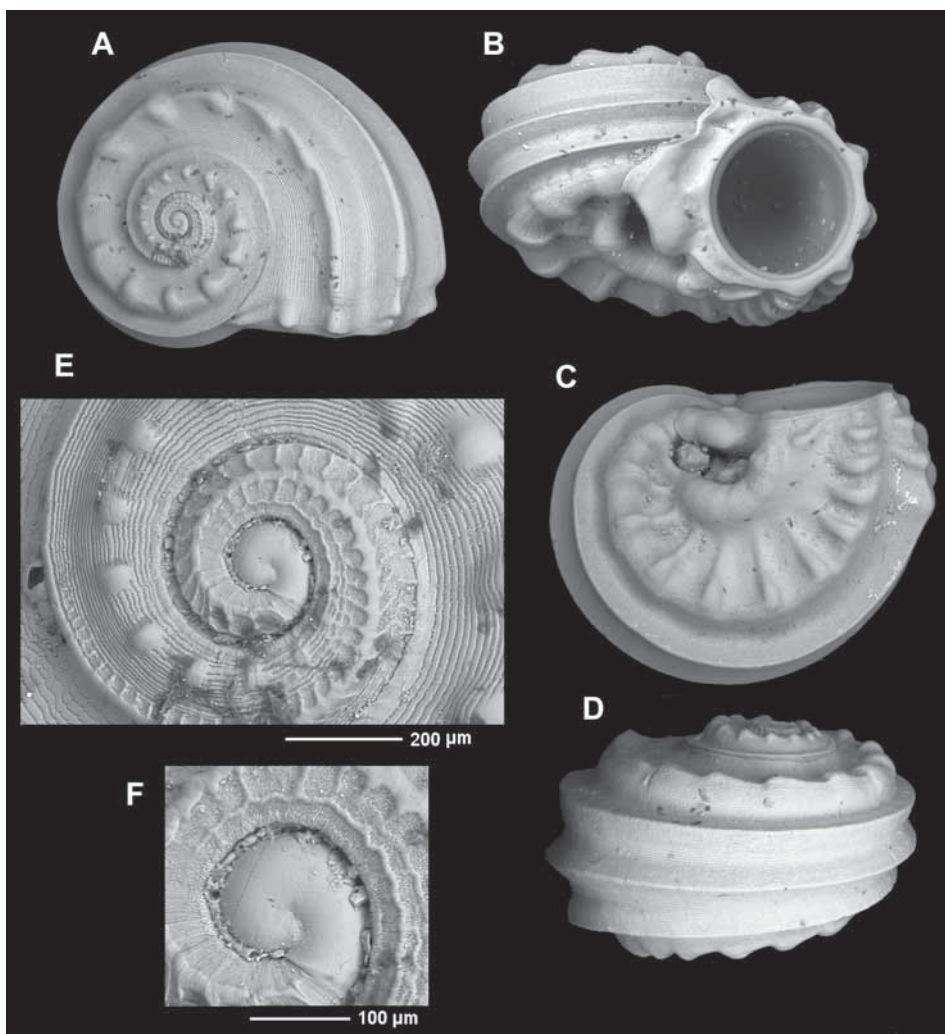


Figure 106

A-F. *Leucorhynchia kosraensis* n. sp. A: holotype, 2.7 mm in diameter, Micronesian States, Kosrae Island, Sanctuari (MNHN); B-C: paratypes, 2.96, 2.8 mm, same locality (MNHN); D: paratype, 2.25 mm, same locality (CSG); E-F: protoconch and detail, from the holotype.

Figura 106

A-F. *Leucorhynchia kosraensis* n. sp. A: holotipo, 2,7 mm de diámetro, Estados de la Micronesia, Isla de Kosrae, Sanctuari (MNHN); B-C: paratipos, 2,96, 2,8 mm, la misma localidad (MNHN); D: paratipo, 2,25 mm, la misma localidad (CSG); E-F: protoconcha y detalle del holotipo.

very thick, has the convex surface and is formed by the successive growth of the columellar callus.

Aperture circular with a complete peristome. Inside the inner lip there is a fold on which the operculum abuts. Parietal area covered by a strong callous layer which extends adapically covering up to the central keel and abapically partially covering the umbilicus; columella thick, arched and reflected, at the base of the columella a prominent callous layer is formed, which during the shell growth originates a thick cord which delimits the umbilicus. Outer lip thick, with an internal margin smooth and external margin modified by the carina and the spiral cords; all the cords and carinae develop more or less thick nodules next to the aperture.

Umbilicus narrow and deep, delimited by a thick convex cord formed by the development of the columellar callus.

Dimensions: the holotype measures 2.70 mm in diameter and 1.80 mm in height (H/D: 0.67).

Habitat: Circalittoral species collected by diving at 39 m deep.

Distribution: Only known from the type locality.

Remarks: *Leucorhynchia kosraensis* n. sp. is characterized by the small size of its protoconch; for its less prominent periumbilical cord; also by the larger size of its parietal callus and because all the cords and carinae have nodules next to the outer lip. On the other hand, the nodules of the adapical cord are elongated near the end, being confused with the carina, and the basal ones are very elongated. These characters clearly separate it from all other known species.

FOSSIL RECORD

The fossil records of *Leucorhynchia* are very vast, extending from the Paleocene to the Holocene. The oldest species was described by BRIART & CORNET (1887) (*Leucorhynchia nitida*) and comes from the Danian age, in the Paleocene. But the largest number of species was described from the Lutetian age, Paris Eocene, perhaps the best studied geological stage (DESHAYES, 1832; GRATELOUP, 1828; COSSMANN (1913, 1918) and GOUGEROT, 1973), as well as from the Miocene.

List of species in order of stratigraphic occurrence:

Paleocene of Belgium, Danian *Leucorhynchia nitida* Briart & Cornet, 1887
 Paleocene of Denmark, Danian *Leucorhynchia marginata* Ravn, 1933
 Paleocene of France, Danian *Leucorhynchia* sp.

Eocene of France, Lutetian *L. callifera callifera* Deshayes, 1832

Eocene of the U. K., Lutetian *L. callifera* Deshayes, 1832
 Eocene of Australia, *L. ventricosa* Darragh & Kendrick, 2000
 Eocene of Australia, *L. rotulina* Darragh & Kendrick, 2000

Miocene of France, Burdigalian ... *L. rotellaeformis* (Grateloup, 1828)
 Miocene of Poland, Badenian *L. rotellaeformis* (Grateloup, 1828)

Miocene of Marshall Islands, *L.?* *stephensoni* Ladd, 1966
 Miocene of Italia *L.?* *zboroviensis* Friedberg, 1928

Pliocene of Japan *Leucorhynchia* sp.

Pleistocene to Recent *Leucorhynchia?* *lilli* Ladd, 1966

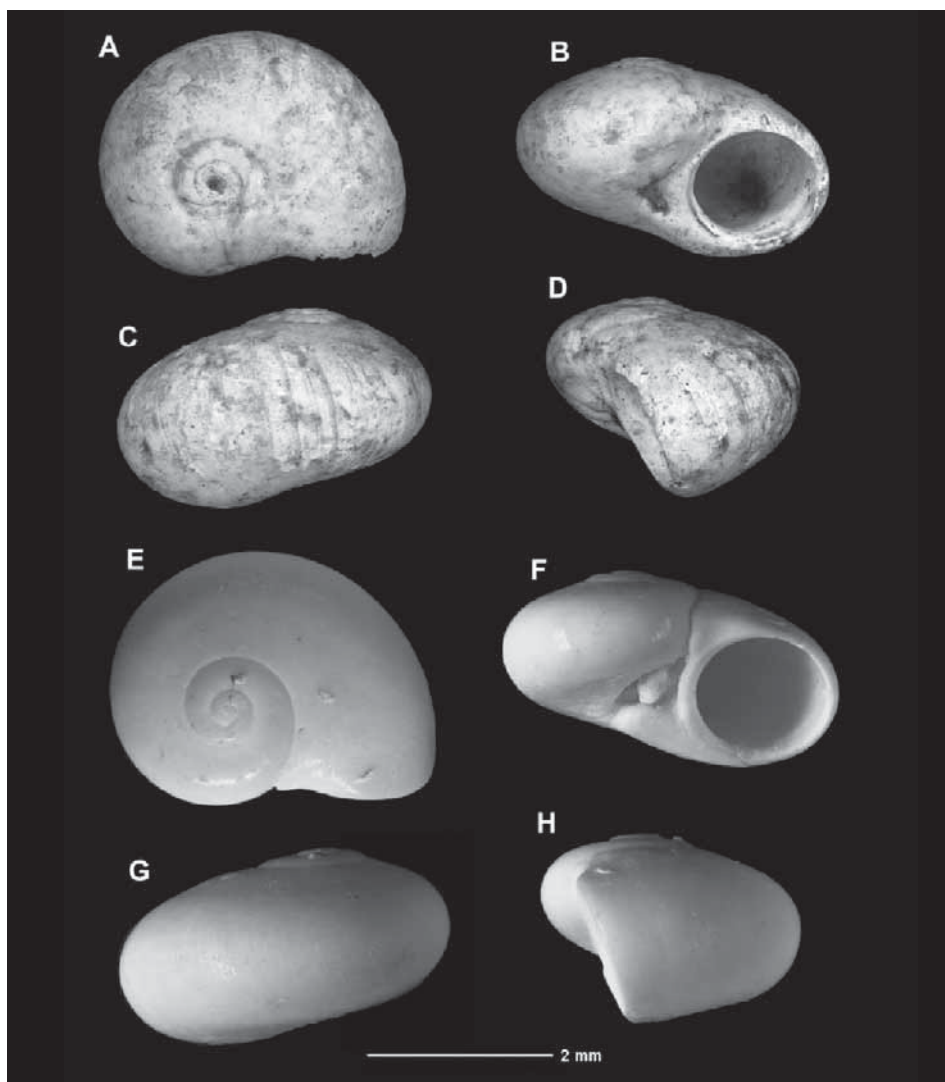


Figure 107

A-D. *Leucorhynchia rotellaeformis* (Gretaloup, 1828). Largileyre, Gironde; Miocene, Serravallien. Collection Cossmann (MNHN.F.J05550). E-H. *Leucorhynchia callifera* (Deshayes, 1832). Oise, Eocene, Lutetian. Collection Cossmann (MNHN.F.J03733).

Figura 107

A-D. *Leucorhynchia rotellaeformis* (Gretaloup, 1828). Largileyre, Gironde; Mioceno, Serravallien. Colección Cossmann (MNHN.F.J05550). E-H. *Leucorhynchia callifera* (Deshayes, 1832). Oise, Eoceno, Lutetien. Colección Cossmann (MNHN.F.J03733).

SPECIES POSSIBLY BELONGING TO OTHER FAMILIES

Ethalia variegata (Preston, 1914)

Tinostoma variegata Preston, 1914: 302. figs.6, 6a-b [Type locality: Manikpatna, Chilka Lake, at depth of 1.2 m). 1916.

Tinostoma variegatum (Preston, 1914): ANNANDALE & KEMP (1916: 348

Tinostoma variegata Preston, 1914: ANNANDALE (1924: 858).

Leucorhynchia variegata (Preston, 1914): SUBBA RAO, SURYA RAO & MAITRA (1991: 16).

Type material: The holotype is from of Manikpatna, Chilka lake in the collection of the Indian Museum.

Description: Original description in PRESTON (1914): “Shell depressedly turbinate, polished, shining, pale greyish white shading to pale yellowish brown and painted with irregular, zigzag, radiate, transverse bands of dark ashen-grey which are more pronounced in the subsutural region; whorls 4, the first three regularly increasing, the last large, the earlier whorls smooth, the last two bearing radiate growth plications; suture impressed, narrowly margined below with white; base of shell very moderately convex, conspicuously painted with rather closely-set, radiate, whitish bands and presenting a slightly microscopic, granular appearance; umbilical region overlaid by a coarse, convex, greyish callus which becomes again overlaid and thickened by a broadly outwardly extending, nacreous callus round the base of the columella; columella margin callously thickened, vertically descending then angled and very obliquely descending below, spreading above into an interiorly situate, thick, nacreous, parietal callus; labrum simple; aperture roundly subovate”.

Alt. 0.75, max. diam. 2, min. diam. 1.5 mm.

Habitat: Species collected at a depth of 4 feet (PRESTON, 1914).

Distribution: India: Odisha (as above), known only from type locality.

Remarks: In PRESTON (1914), the name of the genus was inadvertently printed as *Tinostoma*, and the same was repeated by ANNANDALE & KEMP

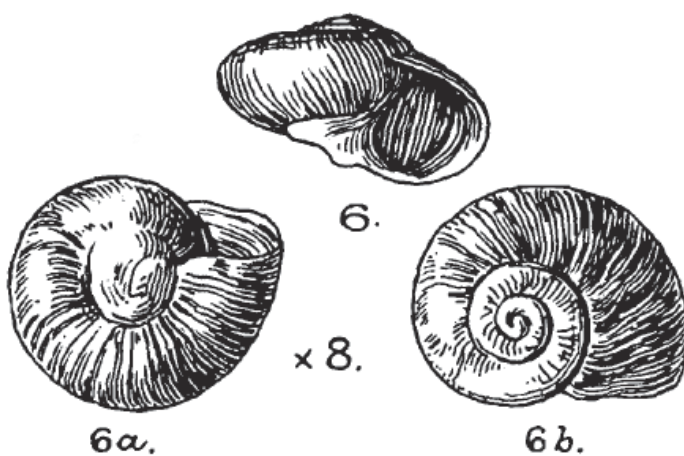
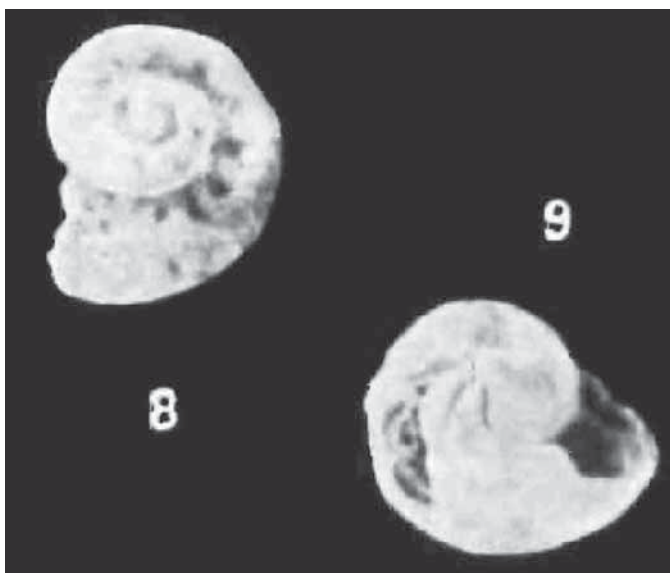


Figure 108. *Tinostoma variegata* Preston, 1914. Holotype. Figured in SUBBA RAO, N. V., SURYA RAO, K. V. & MAITRA, S. 1991.

(1916). According to BROOKES KNIGHT ET AL. (1960) *Teinostoma* H. & A. Adams (= *Tinostoma* Preston) is included in the family Vitrinellidae and the species *T. variegata* is transferred to the genus *Leucorhynchia* Crosse.

NOTE: It could be useful to add that according to WoRMS, the genus *Teinostoma* H. & A. Adams, 1853 is included in the family Tornidae Sacco 1896 (1884)

In our opinion it is not a *Leucorhynchia* and in all likelihood it may be a species of the genus *Ethalia* H. & A. Adams, judging by the shape and the general profile of the species; also by its polychromy and by the shape of the callus covering the umbilicus.

CONCLUSIONS AND COMMENTS

Leucorhynchia is a genus of small vetigastropods, characterized by having a turbiniform shell with a more or less depressed spire; the teleoconch surface smooth or completely covered with spiral cords and grooves; presence or absence of adapical and/or abapical axial folds; and by having a thick columellar callus that may or may not cover the umbilicus.

The species vary in shape and size, from 1 to 6 mm, or even more.

Operculum: Opercular data from W. Africa species such as *L. minor* and *L. lirata* and Indo-Pacific species such as *L. caledonica*, *L. crossei*, *L. tricarinata*, *L. perpolita*, *L. philippinensis*, *L. redita*, *L. microtuberculata*, *L. umbilicord* and *L. rudis*, confirmed that they have a circular, multispiral operculum, with a wide central nucleus; external surface depressed centrally; interior surface with a central point and triangular area for attachment of the foot. The growing edge is usually long, although some species have a short growing edge. The opercular ornamentation is variable, from radial lines of points, to radial incisions that cover only half of the whorl or even to thin oblique lines or thin radial threads and oblique threads in the interspaces.

Radula: The radular data from the species *Leucorhynchia minor* Rolán & Gori, 2013, *Leucorhynchia perpolita* n. sp. and *Leucorhynchia rudis* n. sp., show a rhipidoglossate radula, formula $N+5+1+5+N$. The radula is bilaterally symmetrical, with regularly arcuate rows. The rachidian tooth has a broad base, with its cusp “rolled”, and occupies the most anterior position in each

row. Five pairs of lateral teeth of similar shape with strong and pointed primary cusp and secondary serrations on each side. A latero-marginal plate is placed between the inner marginal and the outer lateral teeth. Marginal teeth cusps show a pronounced gradation in form and decrease in size outward along the row; the inner marginals are the teeth with the strongest cusps.

The radula of *Leucorhynchia robusta* n. sp. is identical in structure to that of *L. minor* and very similar to that of *L. perpolita*, but differing from this, mainly because the rachidian tooth has its cusp “rolled” and the lateral teeth have a primary sharp and pointed cusp.

The radula of *Leucorhynchia perpolita* n. sp. is very similar to that of the turbinids, and shows a great similarity with that of some trochids of the genus *Tegula*, subgenus *Chlorostoma*. The most important difference is that the rachidean tooth lacks of the characteristic “rolled”, showing a very small cusp scarcely denticulate.

Soft parts: The soft parts of the animal of *Leucorhynchia caledonica* shows cephalic tentacles with sensory papillae; 4 pairs of epipodial tentacles with sensory papillae and knobbed epipodial sense organs (ESO) located on the base of the first and second epipodial tentacle, per each side; a bipectinate ctenidium; a true hermaphroditic gland with a common gonoduct; and a propodial penis on the left side.

Habitat: Until now, nothing was known about the habitat of *Leucorhynchia* species, due to their small size and the different types of sampling. The species studied are distributed between the infralittoral, circalittoral and bathyal floors, with a bathymetric range between 0 and 680 m.

Infralittoral species have been found both on the walls and on the external and internal slopes of the reef, and also in caves. They were on hard bottoms, such as: sediment in ledges; blocks and sediment at canyon edge; in reef slope with overhangs; overhead sciaphile; wall with caves and ledges; caves in reef wall; floor of large cave or sand in cave. (The word “cave” appears in the following species: *L. caledonica*, *L. tricarinata*, *L. perpolita*, *L. redita*, *L. sandrogorii*, *L. australis*, *L. crinite*, *L. assesa*, *L. parvicostae*, *L. depressa*, *L. poteli* and *L. monteiroi*). The fact that living individuals were collected inside caves, as well as the occurrence of numerous shells in the same sampling stations, make us suppose a preference of some species of *Leucorhynchia* for scarcely illuminated (sciaphilic) environments and hard bottoms.

Also mentioned: Soft bottoms, such as mud; coral slope with mud; rocks and corals with sand and mud; sand and coral rubble; silty sand, dead coral rubble and in sandy area in front of small reef.

Circalittoral species have been found in coarse sand, coarse sand rubble, muddy shell sand, sand on Echinoderms beds, muddy bottoms with many large sponges or sand in cave.

The bathyal species come from fine sand and mud bottom with echinoderms or mud bottom with shells and cave sand holes with sand pockets.

As for the habitat of live collected species, ten were collected alive: *L. caledonica* found in the edge of a canyon, on sediment between blocks and in floor of large cave; *L. tricarinata* found in shallow water; *L. perpolita* in caves in the reef wall and in floor of a large cave; *L. redita*, *L. philippinensis* and *L. fereglabra*, in tangle nets at bathyal depths; *L. umbilicord* in silty sand, dead coral rubble; *L. crinita* in reef wall and in cave; *L. microtuberculata* in hard bottoms and *L. osaculeatum* in sand and coral rubble.

Number of species: *Leucorhynchia* is a genus of West African and Indo-Pacific distribution.

Among the 17 previously known species, six were from the West African Coast and eleven were from Indo-Pacific. In the present work this number is greatly increased: 87 species are studied, of which 77 are new.

The lack of information about this group is probably due to the small size of most of their species and because the area has traditionally been scarcely sampled, within a still poorly known Pacific Ocean.

Because the genus has species with short protoconch (usually $\frac{3}{4}$ of whorl) a short distribution area for most of them is conjectured, and for this reason in the area where a lot of islands are present, the endemism of many species is very probable.

Although this study encompasses the area with a higher density of species of the genus, the samplings have not been very extensive, and for this reason it is possible that for some species no material has been collected. Among the previously known species, *Leucorhynchia caledonica* and *L. tricarinata* have their type localities in New Caledonia; *L. crossei* and *L. tryoni* have their type localities in Singapore; *L. candida* in Japan; *L. amoena*, *L. omanensis*, *L.*

ornatissima and *L. plicifera* in the Indian Ocean; *L. rotata* in Funafuti Atoll and *L. variegata* in India.

Collection: The large quantity of sediments collected by the Expeditions of IRD and MNHN was a very important basis for the present work. In addition, the cooperation of a few people did increase the number of species found. In respect to this cooperation, we must point out the name of Sandro Gori, a malacologist who dived everywhere, and helped us through the loan of a large quantity of micro-molluscs collected, found between the intertidal and 50 m depth; frequently these are the deep bottoms which were more scarcely sampled in the large expeditions. So, in 26 of the new described species, his name accompanies those of the two authors of the study.

The cooperation of numerous museums was also very important, since it has allowed us to remedy the sampling shortcomings and to obtain photographs of the type material of species which had not been collected.

Number of specimens and shells: Probably due to the depth in which some species were found, as well as their habitats on hard bottoms and caves, the most part of the shells were collected from sediments and in scarce quantity. There are some exceptions:

- For *L. crinita* 167 s were examined.
- For *L. perpolita* 113 s were examined.
- For *L. tricarinata* 95 s were examined.

For the rest, the numbers were very low:

- Between 21-50 shells were examined in 4 species.
- Between 11-20 shells were examined in 6 species.
- Between 6-10 shells were examined in 5 species.
- Between 3-5 shells were examined in 12 species.
- The rest of the species studied only had 1-2 shells each.

Type material photographed in museums:

For comparative purposes, the type material from the previously known species has been photographed in several museums:

Leucorhynchia caledonica Crosse, 1867 in NHMUK.

Leucorhynchia tricarinata Melvill & Standen, 1896 in MMUM.

Teinostoma rotatum Hedley, 1899 in AMS.

Ethalia candida A. Adams, 1862 in AMV.

Vitrinella (*Leucorhynchia*) *amoena* Thiele, 1925; *Vitrinella* (*Leucorhynchia*) *omanensis* Thiele, 1925; *Vitrinella* (*Leucorhynchia*) *ornatissima* Thiele, 1925 and *Vitrinella* (*Leucorhynchia*) *plicifera* Thiele, 1925 in ZMB.

Teinostoma (*Leucorhynchia*) *crossei* Tryon, 1888 and *Teinostoma* (*Leucorhynchia*) *tryoni* Pilsbry, 1891 in ANSP.

Taxonomic changes:

New synonyms: *Teinostoma* (*Leucorhynchia*) = *Leucorhynchia* Crosse, 1867 and *Vitrinella* (*Leucorhynchia*) = *Leucorhynchia* Crosse, 1867

New combinations: *Teinostoma* (*Leucorhynchia*) *tryoni* Pilsbry, 1891; *Vitrinella* (*Leucorhynchia*) *omanensis* Thiele, 1925; *Vitrinella* (*Leucorhynchia*) *amoena* Thiele, 1925; *Vitrinella* (*Leucorhynchia*) *plicifera* Thiele, 1925 and *Vitrinella* (*Leucorhynchia*) *ornatissima* Thiele, 1925 are transferred to *Leucorhynchia* Crosse, 1867.

Origen: The origin of the *Leucorhynchia* species know up to now is as follows:

Previously known ones: 2 from Indonesia, 2 from Singapore, 2 from Oman, 1 from Japan, 1 from Funafuti, 2 species from several localities (*L. caledonica* and *L. tricarinata*).

New species: 77 new species were described in the present paper. Their names were mentioned in the INDEX at the beginning of the work and those of each group at the beginning of each section. 8 species were collected from New Caledonia; 1 from Lifou; 2 from Maldivas; 1 from Mayotte; 4 from Micronesia; 15 from Papua New Guinea; 16 from Philippines; 1 from the Red Sea; 2 from Reunion; 4 from Society Islands; 11 from Solomon Is.; 6 from Thailand; 6 from Vanuatu.

But some of these species were collected in several countries: *L. basiscostae* in Solomon Is. and Philippines; *L. fereglabra* in Philippines and Thailand; *L. marcosi* in Papua New Guinea, Philippines and Thailand; *L. lluviae* in Vanuatu, New Caledonia and Society Islands.

The countries with greatest diversity of species were: Papua New Guinea and the Philippines.

Collecting depth: The depths from which the new species were collected were very variable. In a simple distribution we have:

Depth range (m)	Number of species
0 – 5	1
6 – 10	3
11 – 20	9
21 – 50	25
51 – 100	2
101 – 200	5
201 – 300	2
301 – 400	3
401 – 500	5
501 – 600	3
601 – 700	1

But in some cases it is more difficult due the large differences of the limits. In these approximate depths:

Between 1-50 m: *L. letourneuxi*, *L. marcosi*, *L. osaculeatum*.

Between 20-40 and 200: *L. philippinensis*, *L. stellata*, *L. redita*, *L. fereglabra*, *L. microtuberculata*, *L. sulciobliqui*.

Between 30 and 60 m: *L. crinita*, *L. lingula*.

Between 50 and 150 m: *L. perinde*, *L. sculpturata*, *L. catenata*.

Between 124 and 569 m: *L. multistriata*.

Between 36 and 800 m: *L. lluviae*.

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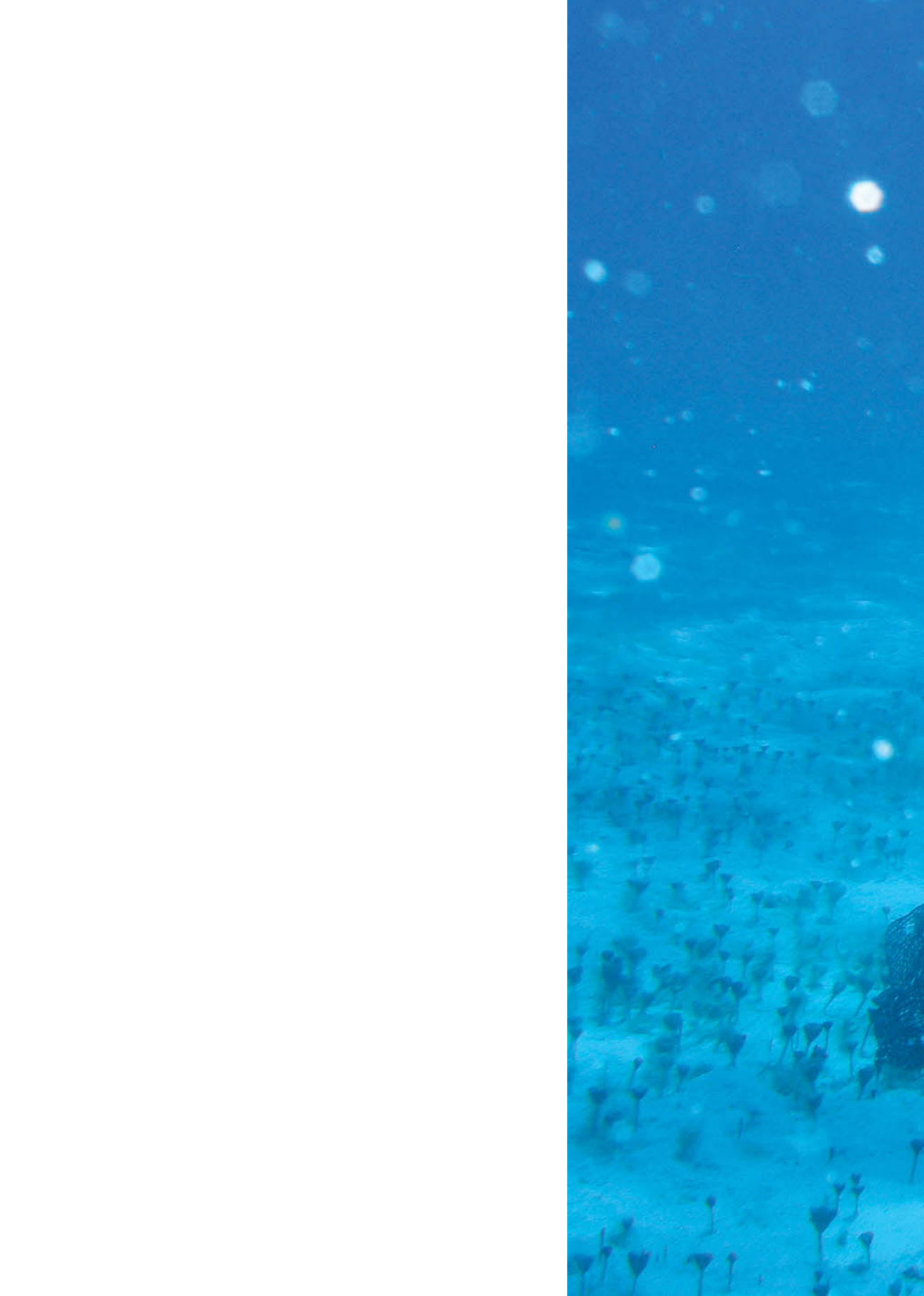
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Federico Rubio and Emilio Rolán are well-known malacologists, who started working together already many years ago, their first joint paper dating 1991. From then on, they continued a fruitful collaboration, first studying the African malaco-fauna, and afterwards with a number of revisions or different families, namely Skeneidae and Tornidae, based on samples collected worldwide by the Paris MNHN; in all, they have published papers on the genus *Clanculus* in West Africa, followed by numerous others on Cornirostridae, *Haplocochlias*, *Moerchia*, *Anticlimax*, *Parviturbo*, *Lophocochlias*, in which new genera were described, among them *Circuitus*, *Tuberes*, *Collatus*, and also on Conradiidae. The authors have numerous projects they plan to pursue in the near future.