

Study of a Canary Island species of the genus *Diodora* Gray, 1821 (Mollusca: Gastropoda: Fissurelloidea: Fissurellidae) resulting in the description of a new species

Johan Verstraeten¹ & Frank Nolf²

¹ Warschaustraat, 48 – B-8400 Oostende

² Pr. Stefanieplein, 43/8 – B-8400 Oostende
frank.nolf@pandora.be

Keywords: GASTROPODA, FISSURELLIDAE, *Diodora canariensis*, new species, taxonomy, Canary Islands, Atlantic Ocean.

Abstract: A particular and distinctive species of the genus *Diodora*, confined to the Canary Islands (Macaronesia), is discussed and compared with *Diodora cayenensis* (Lamarck, 1822), a species with a large distribution along the east American coasts.

Abbreviations:

DEL Private collection of Jean-Louis Deleamarre (St. Nazaire, France)
FN Private collection of Frank Nolf.
H Height.
HL Private collection of Harry Lee (Jacksonville, Fla, USA)
JV Private collection of Johan Verstraeten.
L Length.
MLQ Private collection of Michel Le Quément (Ploubazlanec, France).
RBINS Royal Belgian Institute for Natural Sciences.
W Width.

Introduction: In September 2003 a group of dedicated French collectors, members of the Association Française de Conchyliologie (AFC), collected a number of specimens of a *Diodora* on the north-western coast of Tenerife, one of the Canary Islands. Together with the archipelago of Madeira, the Salvajes, the Azores and the Cape Verde, these islands form a large and specific territory called Macaronesia.

Specimens of this species were pictured in issue 105 of *Xenophora* (2004), a quarterly bulletin edited by the Association Française de Conchyliologie, as *Diodora* sp.

Jean-Louis Deleamarre (St. Nazaire) and Michel Le Quément (Ploubazlanec) kindly submitted specimens for study, while the authors were so fortunate to obtain a large number of specimens of *Diodora cayenensis* (Lamarck, 1822) for comparison from the collection of Mr. Harry G. Lee.

This species was mentioned by Nordsieck & Talavera (1979) as *Diodora cayenensis*

(Lamarck, 1822). The confusion between these two species was repeated in the study on amfiatlantic species by Talavera. Even though *D. cayenensis* and *D. canariensis* are very similar, a number of differences are clear enough to result in the description of a new species.

It is a fact that a lot of research remains to be done on the Fissurellidae from the Eastern Atlantic Ocean, especially in Macaronesia and West Africa. One can hope that the collecting efforts, which have been going on more recently in these parts of the world, will allow progress in this difficult puzzle.

Type material:

Holotype:

H. 8.8 mm W. 12.7 mm L. 19.7 mm (RBINS)

Paratypes:

1. H. 2.9 mm	W. 5.5 mm	L. 8.1 mm
2. H. 3.1 mm	W. 6.5 mm	L. 9.9 mm
3. H. 4.3 mm	W. 7.4 mm	L. 11.8 mm
4. H. 5.1 mm	W. 8.9 mm	L. 12.5 mm
5. H. 4.8 mm	W. 8.3 mm	L. 12.9 mm
6. H. 4.4 mm	W. 8.8 mm	L. 13.1 mm
7. H. 4.7 mm	W. 9.3 mm	L. 14.4 mm
8. H. 7.2 mm	W. 10.6 mm	L. 14.7 mm

All from Playa de la Caleta, Tenerife, Canary Islands. September 2003. JV-collection.

9. H. 3.1 mm	W. 6.0 mm	L. 8.9 mm
10. H. 5.1 mm	W. 7.9 mm	L. 11.0 mm
11. H. 3.7 mm	W. 7.2 mm	L. 11.1 mm
12. H. 5.0 mm	W. 8.0 mm	L. 12.1 mm
13. H. 3.5 mm	W. 8.3 mm	L. 13.4 mm
14. H. 11.1 mm	W. 14.8 mm	L. 21.7 mm

Tenerife, Canary Islands. MLQ-collection.

15. H. 9.9 mm	W. 9.0 mm	L. 12.9 mm
16. H. 5.3 mm	W. 8.9 mm	L. 13.4 mm
17. H. 4.9 mm	W. 9.1 mm	L. 13.6 mm
18. H. 8.6 mm	W. 12.8 mm	L. 19.3 mm

Tenerife, Canary Islands. DEL-collection.

Type locality: Playa de la Caleta, near Garachico, northwestern side of Tenerife (Canary Islands) under stones at low tide.

Measurements: The length varies from 8 mm up to 22 mm.

Description:

***Diodora canariensis* sp. nov.**

(Plate I, Figs 1-6; Plate II, Figs 7-12; Plate III, Figs 13-18)

Shell moderately heavy, from 8 to 20 mm in length, rather conical, elevated and slightly narrower anteriorly. Front slope straight or concave, the longer posterior slope convex. Base ovate or sub-oblong. Radial sculpture consists of 60-70 crowded ribs resulting in a denticulate margin. Each stronger rib alternates with a weaker secondary riblet, a major identifying feature. Weak concentric ridges forming small knobs where the ribs are intercepted cross the ribs. Apex anterior to shell centre, more or less curved forward, with the orifice placed immediately before it about $\frac{1}{4}$ of the frontal margin, with a diameter of 2.5 mm. In profile the shell has a slight secondary peak near the centre of the orifice. Colour from milky white, to cream or greenish cream, buff to light grey or brownish pink. With any of these colours as background there may be about 10-12 weak grey or light brown rays. Interior colour rarely white, mostly bluish grey, the colour of the outer surface showing through. The internal callus of the orifice is of the same colour as the rest of the inside, but darker. It is truncated with a small excavation behind it. Sometimes a dark purplish or black line internally encircles the orifice.

Derivation of name: The name '*canariensis*' refers to the endemic character of this species. As yet it is only known from La Palma and Tenerife in the Canaries.

Habitat: The species lives under large stones, lying on a rocky bottom, covered with other large stones, in a dark environment. This habitat is shared with specimens of *Diodora graeca* (Linnaeus, 1758), *Ocinebrina leukos* Houart, 2000, *Mitrella ocellata* (Gmelin, 1791) and *Lepidochitona stroemfelti* (Bergenhayn, 1931).

Geographic range: The species seems to be restricted to the western islands of the Canary Islands archipelago (La Palma and Tenerife).

Discussion: This species, which belongs to the genus *Diodora* J.E. Gray, 1821 was reported as *Diodora cayenensis* by Francisco García-

Talavera (1981), Fritz Nordsieck (1982) and both authors jointly (1979).

Talavera reports it as the first citation of *Diodora cayenensis* as an amfiatlantic species.

A description is presented by Nordsieck & Talavera (1979):

"Sólida, oval, alta. Orificio a $\frac{1}{4}$ desde el margen frontal, 2,5 mm. de diámetro, directamente debajo del punto más alto. Dorso convexo. Escultura de alrededor de 18-20 costillas, alternando con otras algo más estrechas, y unas muy finas, a modo de delicados rayos, entre ellas. Con respecto a esto, Abbott dice: <each fourth rib is more conspicuous>, pero el nombre dado por Say, **alternata**, es más apropiado. Alrededor de 35, mucho más estrechas pero conspicuas, espirales cubriendo tanto a las costillas como especialmente a los intervalos. Vista de frente, los lados son algo elevados. Color gris con pequeños sectores marrones, más conspicuos en el crenulado margen. Interior blanco, con un tinte azul claro. Callo alrededor del orificio, claramente bordeado, algo truncado por detrás."

English translation: 'Heavy, oval and high. Orifice at $\frac{1}{4}$ of the frontal margin, with a diameter of 2.5 mm, immediately under the highest point. The backside is convex.

The sculpture consists of 18-20 main ribs, alternating with a number of narrower ribs and some very narrow rays. Concerning the latter Abbott notes: <each fourth rib is more distinct>, but the name '*alternata*' (Say) seems more convenient. Some 35 narrow but striking ribs cover the whole surface. The front side is somewhat elevated. The colour of the shell is grey mottled with brown, but the crenulated margins are distinctly brown coloured. Inside white, with a pale bluish shade. The callus at the orifice is clearly bordered, somewhat truncated behind.'

A comparison between American and Canary Islands specimens is not discussed by Nordsieck & Talavera (1979).

The species is merely listed as "*Diodora cayensis* (Lamarck, 1818)" (sic!) by Nordsieck.

A photographic representation was first given by Talavera (1982) and a second time by Jaux (2004).

The present authors were able to compare 19 specimens of ***Diodora canariensis*** from Tenerife with numerous specimens of ***Diodora cayenensis*** from different American localities (Florida, Mexico, Puerto Rico, Bahamas, Gulf of Mexico) (Plate IV, Figs 19-24; Plate V, Figs 25-30; Plate VI, Figs 31-36; Plate VII, Figs 37-42).

This comparison resulted in the following observations:

- The American specimens have a larger size: in literature a maximum length of 34-40 mm is mentioned; for the specimens of the Canary Islands the maximum length reported is 22 mm;
- Juvenile specimens of similar length (8 mm) present a strongly different height-length ratio; the American specimens have an elevated conical appearance, whereas the Canary Islands specimens have low, flat and convex shells;
- American specimens present a radial sculpture with strong sharp ribs between which there are three weak intercalary riblets, the second of them being slightly stronger than its two neighbours; this feature is not present in any of the Canary Islands specimens, which have each strong rib alternating with a weaker riblet;
- *D. canariensis* has 65-70 radiating rays instead of 77-82 in *D. cayenensis*;
- The intersection between radial ribs and concentric growth laminae consists of tiny rounded or flattened knobs in the Canary species, whereas they are very distinct or even scaly in the West Atlantic species;
- In *D. cayenensis* the internal callus of the orifice is sharply truncated and the excavation is present as a deep pit behind it, a feature hardly visible in *D. canariensis*;

- The colour of the American specimens is a mixture of cream and brown-black dots or blotches; the Canary Islands specimens present a mottled grey-brown and cream colour, with dark coloured rays or concentric lines; none of the Canary Islands specimens show the minute black or brown spots, a distinguishing feature in American specimens. Generally speaking, colouration is much more variable in the latter.

Conclusion: The differences mentioned in the comparison between *D. canariensis* and *D. cayenensis* are convincing enough to conclude that the specimens found on Tenerife, belong to a new species until now wrongly known as atlantic *Diodora cayenensis*.

Acknowledgements: The authors are sincerely grateful to Jean-Louis Deleamarre (St. Nazaire, France) and Michel Le Quément (Ploubazlanec, France) for the loan and gift of specimens from their collection. We are greatly indebted to Harry G. Lee (Jacksonville, Florida, USA) for the loan of a large number of specimens of *Diodora cayenensis* from his extensive collection. David Monsecour (Rillaar, Belgium) carefully verified the English text and Catherine Lantsoght (Oostende, Belgium) made the translation of the Spanish text in Nordsieck & Talavera (1979).

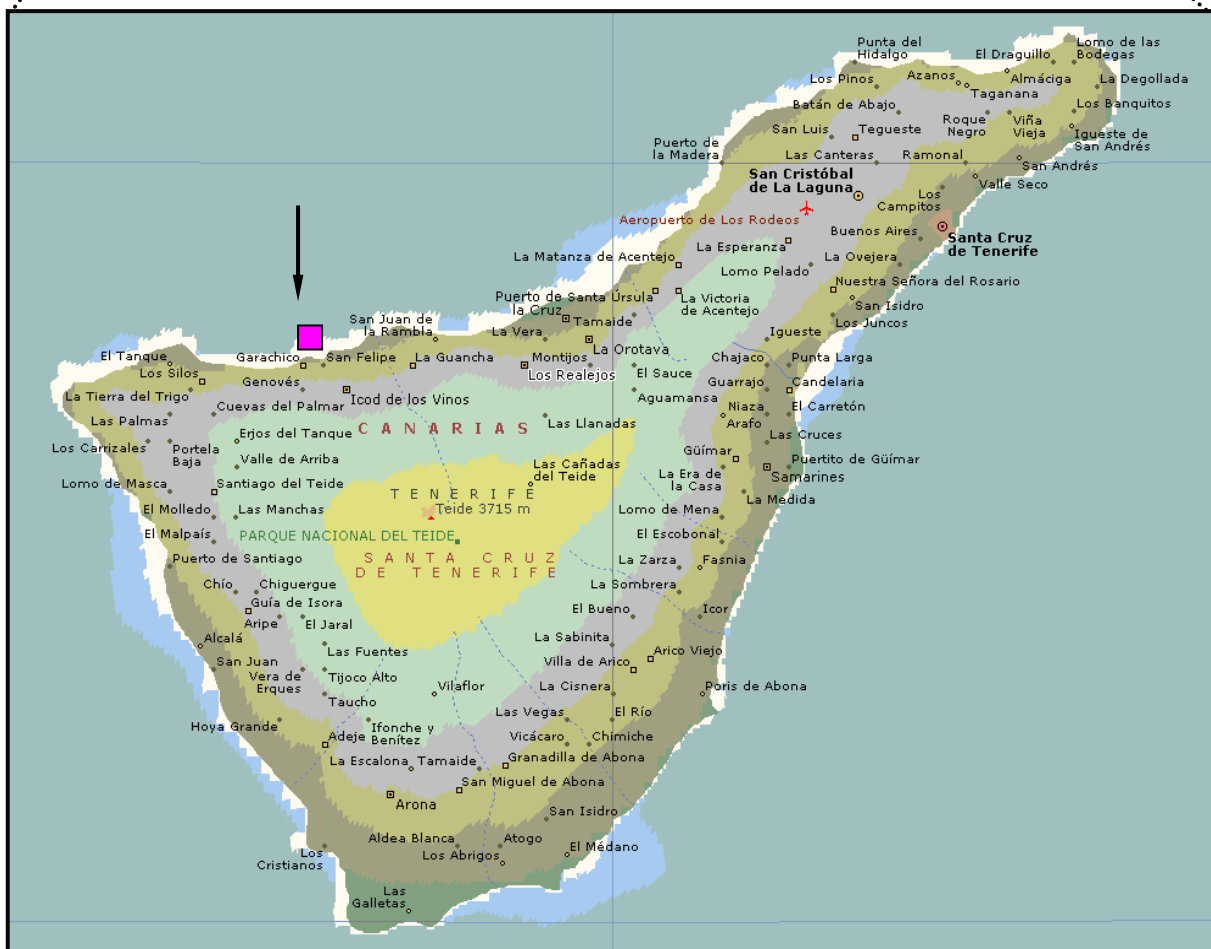
References:

- Abbott, R.T., 1974. *American Seashells*. Second edition. Van Nostrand Reinhold. New York. 663 pp.
- Buzzurro, G. & Russo, P., 2004. Notes and comments on the Mediterranean species of the genus *Diodora* Gray, 1821 (Archeogastropoda: Fissurellidae) with a description of a new species. *Triton*, **10**: 1.
- Christiaens, J., 1974. Les Fissurelles Européennes III. Le genre *Diodora* Gray, 1821 sensu Iredale, 1915. *Informations de la Soc. Belge de Malacologie*, Sér.3, n°4: 39-59.
- Christiaens, J., 1982. Révision des Fissurellidae (Mollusca: Prosobranchia) de l'archipel du Cap Vert, *Informations de la Soc. Belge de Malacologie*, Sér.10, n°1-4: 87-126.
- Farfante, I., P., 1943. The Genus *Diodora* in the western Atlantic. *Johnsonia*, **1**(11): 1-20.
- Jaux, G., 2004. Collectes au pied du "Teide", *Xenophora*, **105**: 12-17.
- Nordsieck, F. & Talavera, F.G., 1979. *Moluscos marinos de Canarias y Madeira (Gastropoda)*. Madrid. 208 pp., 46 pls.
- Nordsieck, F., 1982. *Die europäischen Meeres-Gehäuseschnecken (Prosobranchia)*, 2. Auflage Gustav Fischer Verlag, Stuttgart. New York. 539 pp.
- Redfern, C., 2001. *Bahamian Seashells. A Thousand Species from Abaco, Bahamas*. Bahamian-seashells.com, Inc. Boca Raton. 280 pp., 124 pls.
- Salvat, F., 1967. Campagne de la Calypso aux Iles du Cap Vert (1959), 8. Mollusques. Introduction. – I. Fissurellidae. *Ann. Inst. Océanogr. Monaco*, 45(2) : 19-31, 1 pl.
- Talavera, F.G., 1982. *Los moluscos gasteropodes anfiatlanticos (Estudio paleo y biogeográfico de las especies bentónicas litorales)*. Secretariado de publicaciones de la Universidad de La Laguna colección monografías, n°10. La Laguna. 352 pp., 7 pls.

Geographic distribution of *Diodora canariensis* Verstraeten & Nolf, 2007

■ In literature

■ French collectors (Delemarre, Le Quément et al.)



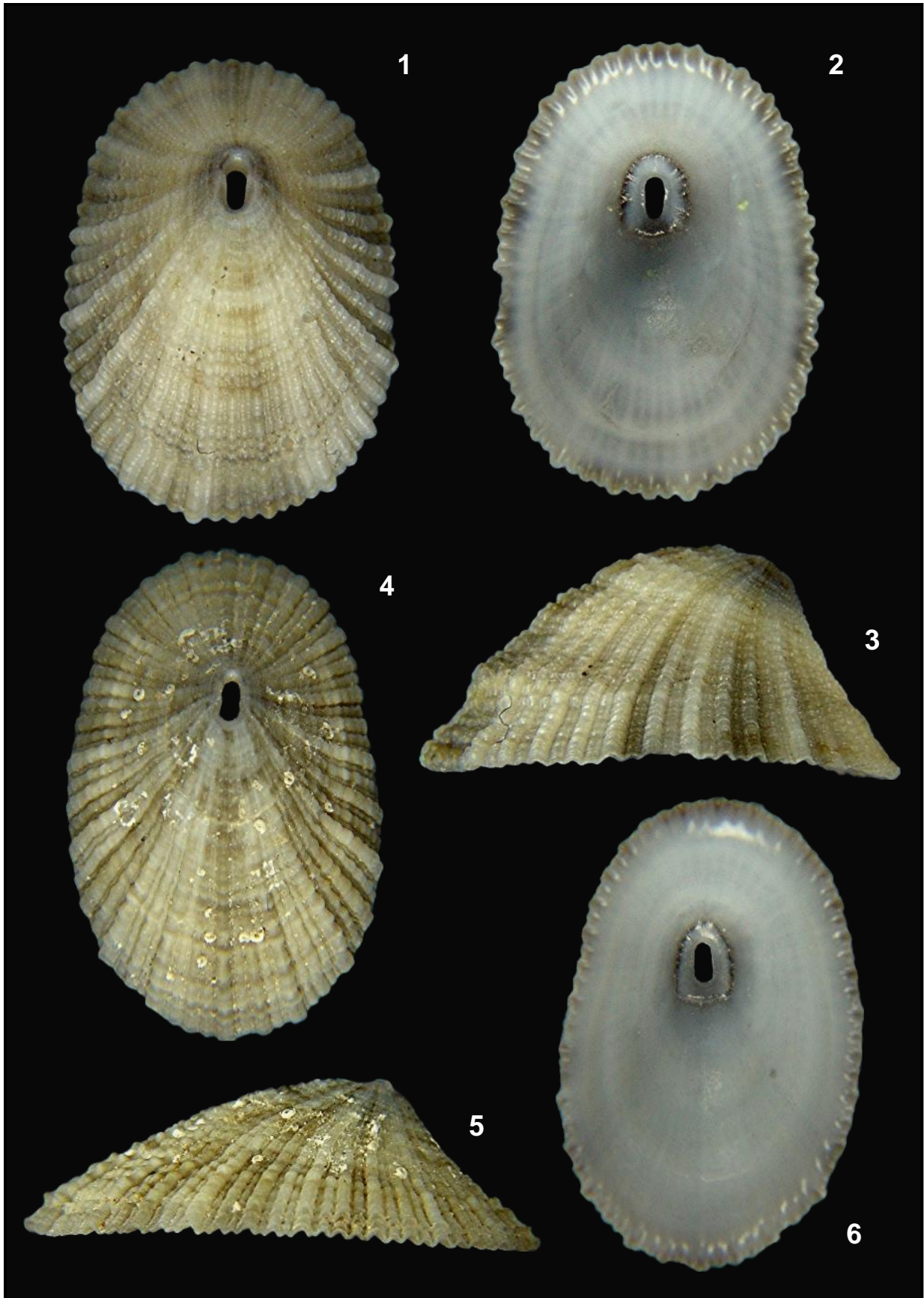


Plate I. Figs 1-3: *Diodora canariensis*. Playa de la Caleta, Tenerife, Canary Islands. September 2002. H. 7.2 W. 10.6 L. 14.7 mm. Paratype 8 (JV). Figs 4-6: *Diodora canariensis*. Playa de la Caleta, Tenerife, Canary Islands. September 2003. H. 8.8 W. 12.7 L. 19.7 mm. Holotype (RBINS).

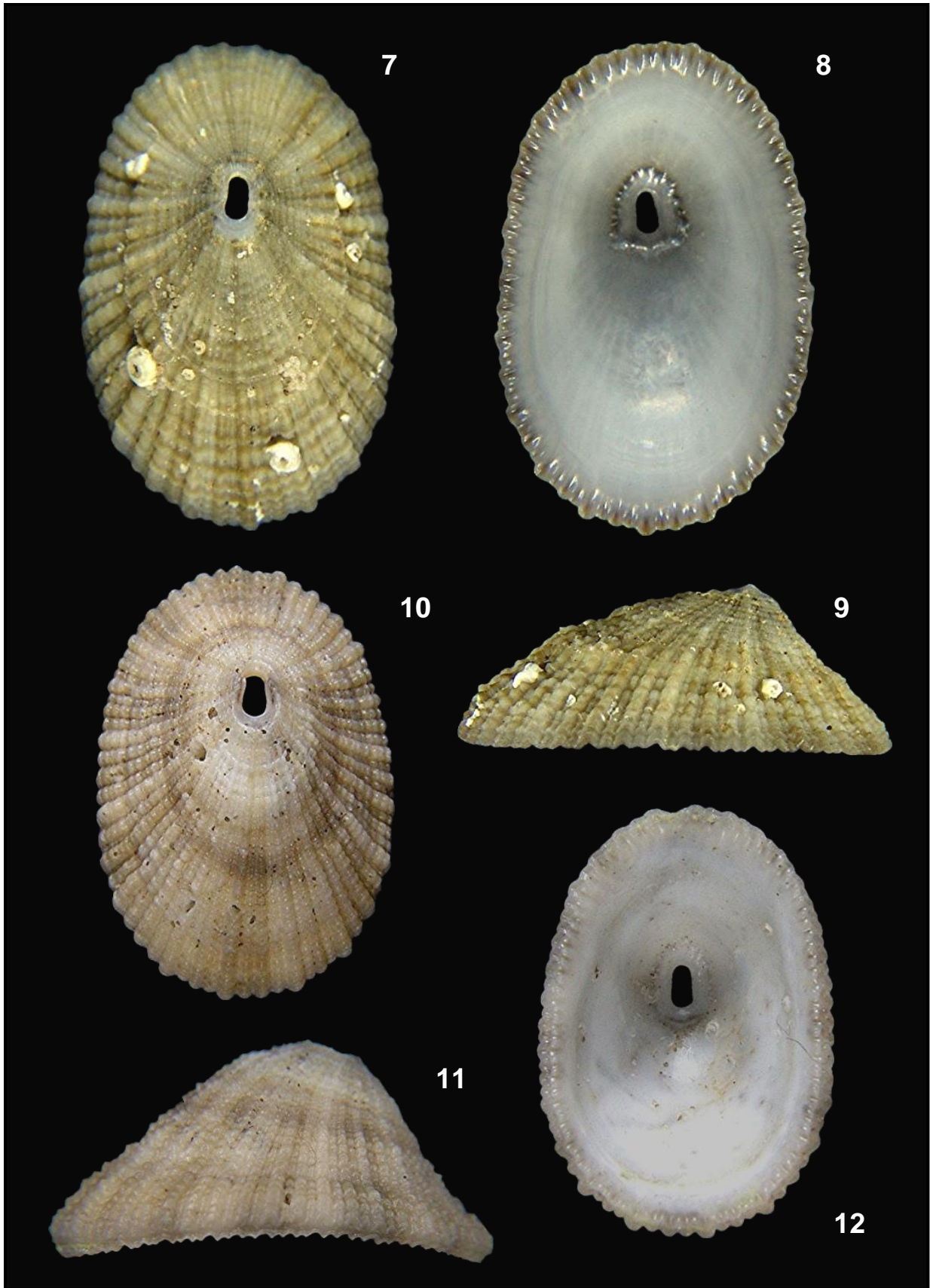


Plate II. Figs 7-9: *Diodora canariensis*. Playa de la Caleta, Tenerife, Canary Islands. September 2003. H. 4.8 W. 8.3 L. 12.9 mm. Paratype 6 (JV). Figs 10-12: *Diodora canariensis*. Tenerife, Canary Islands. September 2003. H. 11.1 W. 14.8 L. 21.7 mm. Paratype 14 (MLQ).

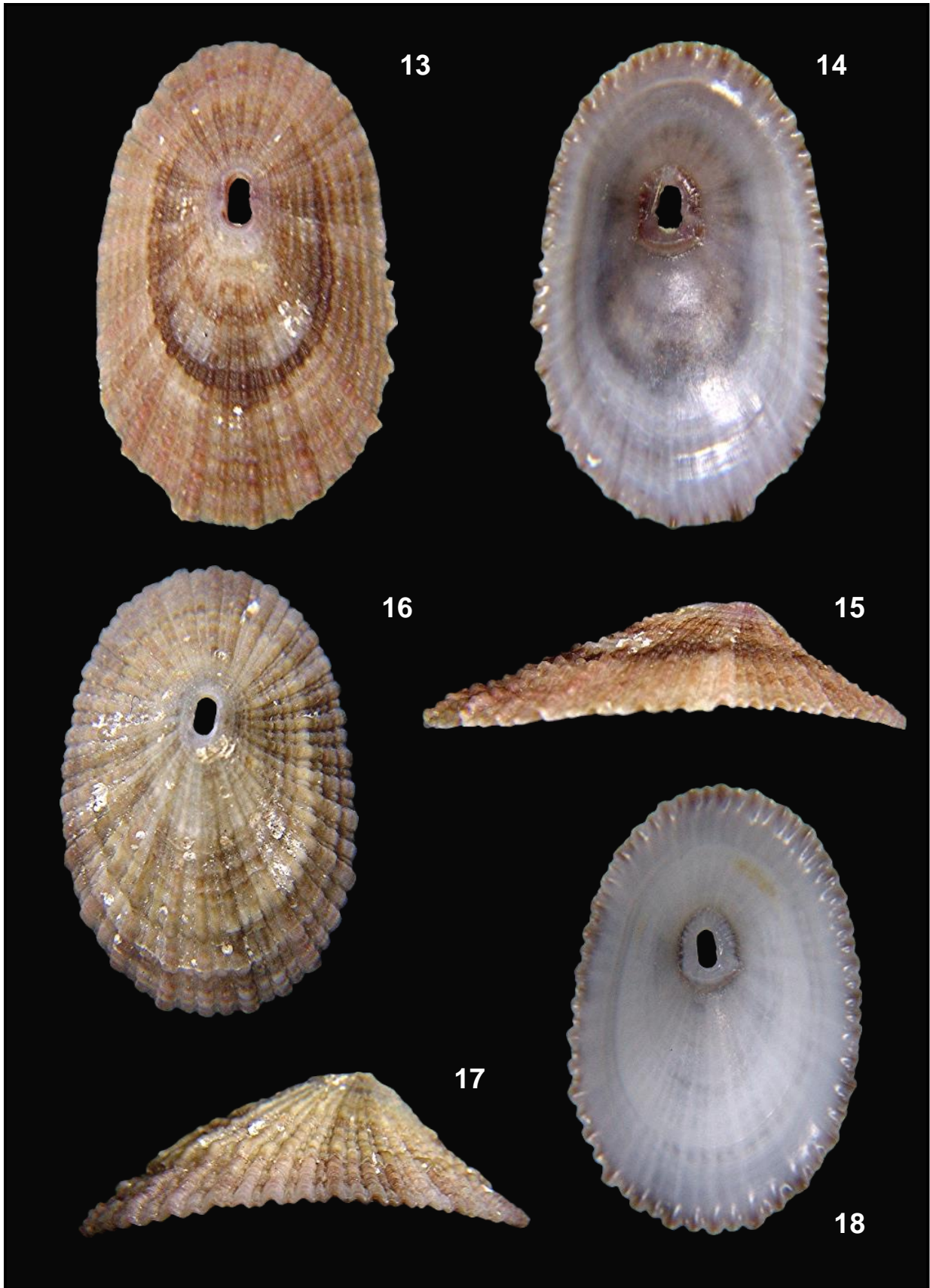


Plate III. Figs 13-15: *Diodora canariensis*. Tenerife, Canary Islands. September 2003. H. 3.5 W. 8.3 L. 13.4 mm. Paratype 13 (MLQ). Figs 16-18: *Diodora canariensis*. Tenerife, Canary Islands. September 2003. H. 4.9 W. 9.1 L. 13.6 mm. Paratype 17 (DEL).

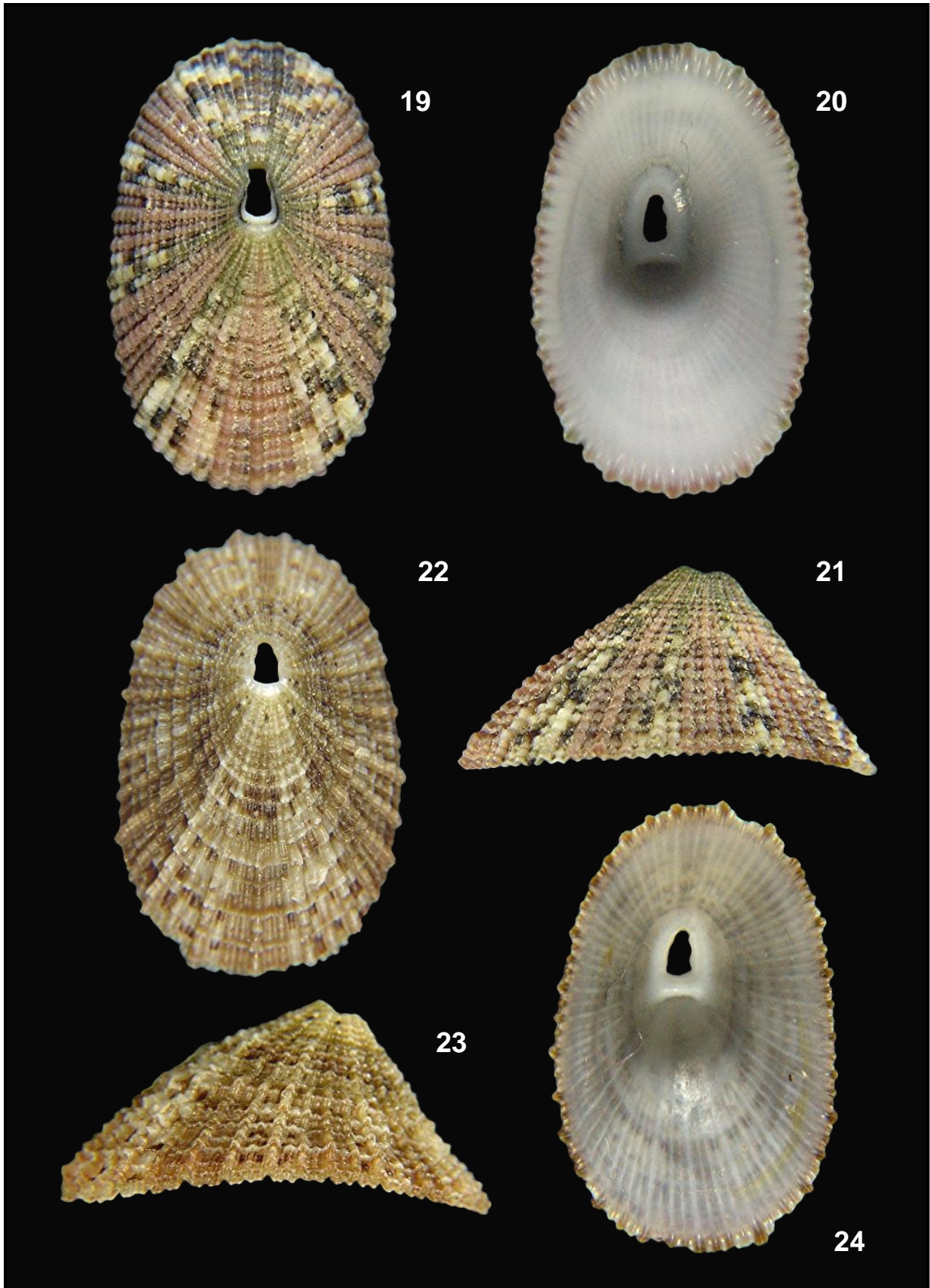


Plate IV. Figs 19-21: *Diodora cayenensis*. Off Newport, Florida, USA. Dredged at 30-35 m, on a sand bottom. H. 6.3 W. 8.0 L. 12.7 mm. (JV). Figs 22-24: *Diodora cayenensis*. Punta Mosquito, Isla Holbox, Q. Roo, Mexico. Under rock, at a depth of 4 m. H. 7.5 W. 10.1 L. 15.5 mm. (JV).

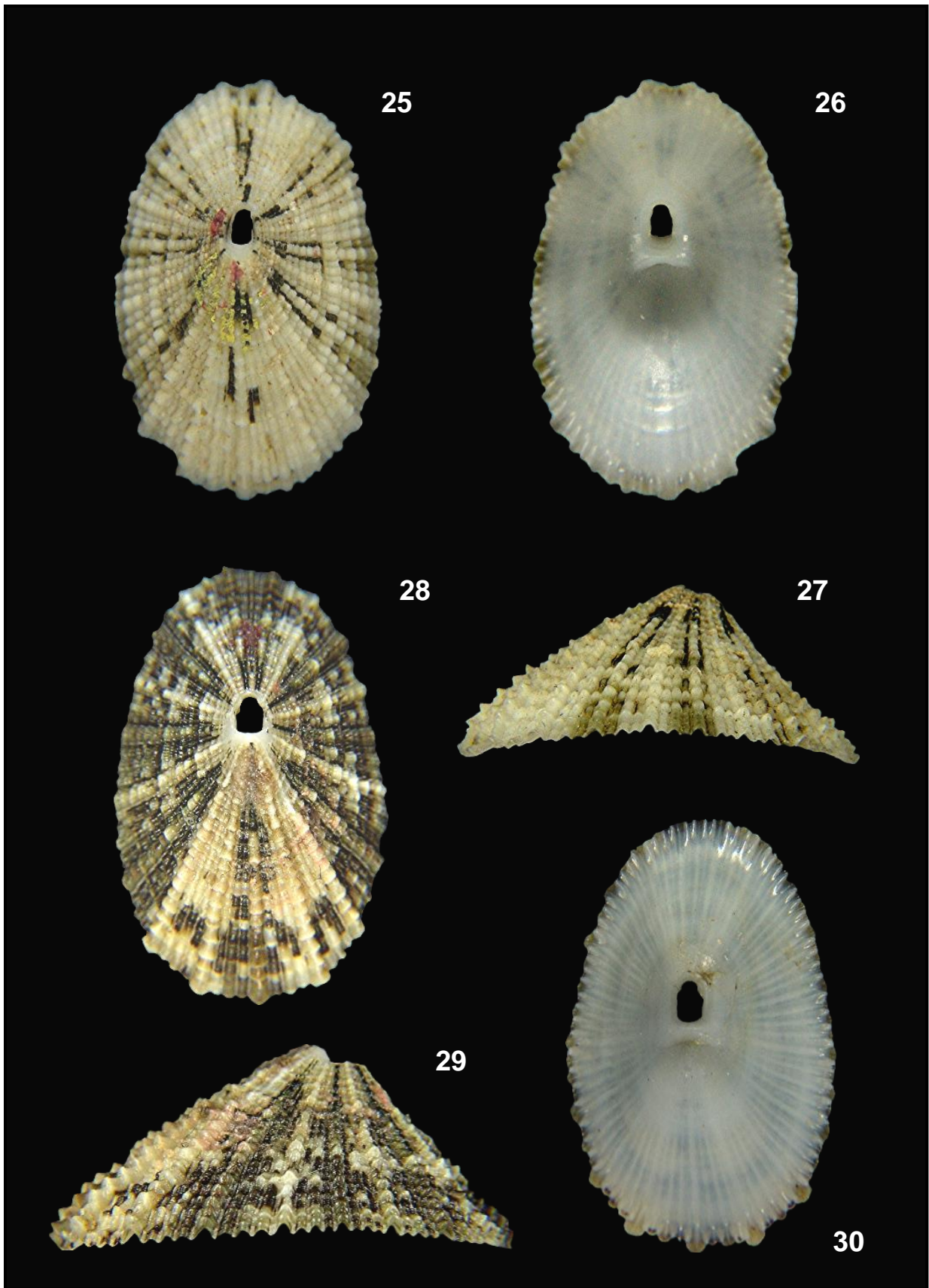


Plate V. Figs 25-27: *Diodora cayenensis*. Punta Mosquito, Isla Holbox, Q. Roo, Mexico. Under rock, at a depth of 4 m. H. 6.8 W. 9.8 L. 15.3 mm. (JV). Figs 28-30: *Diodora cayenensis*. Chunzubel reef, Playa del Carmen, Q. Roo, Yucatan, Mexico. H. 8.2 W. 11.8 L. 18.7 mm. (JV).

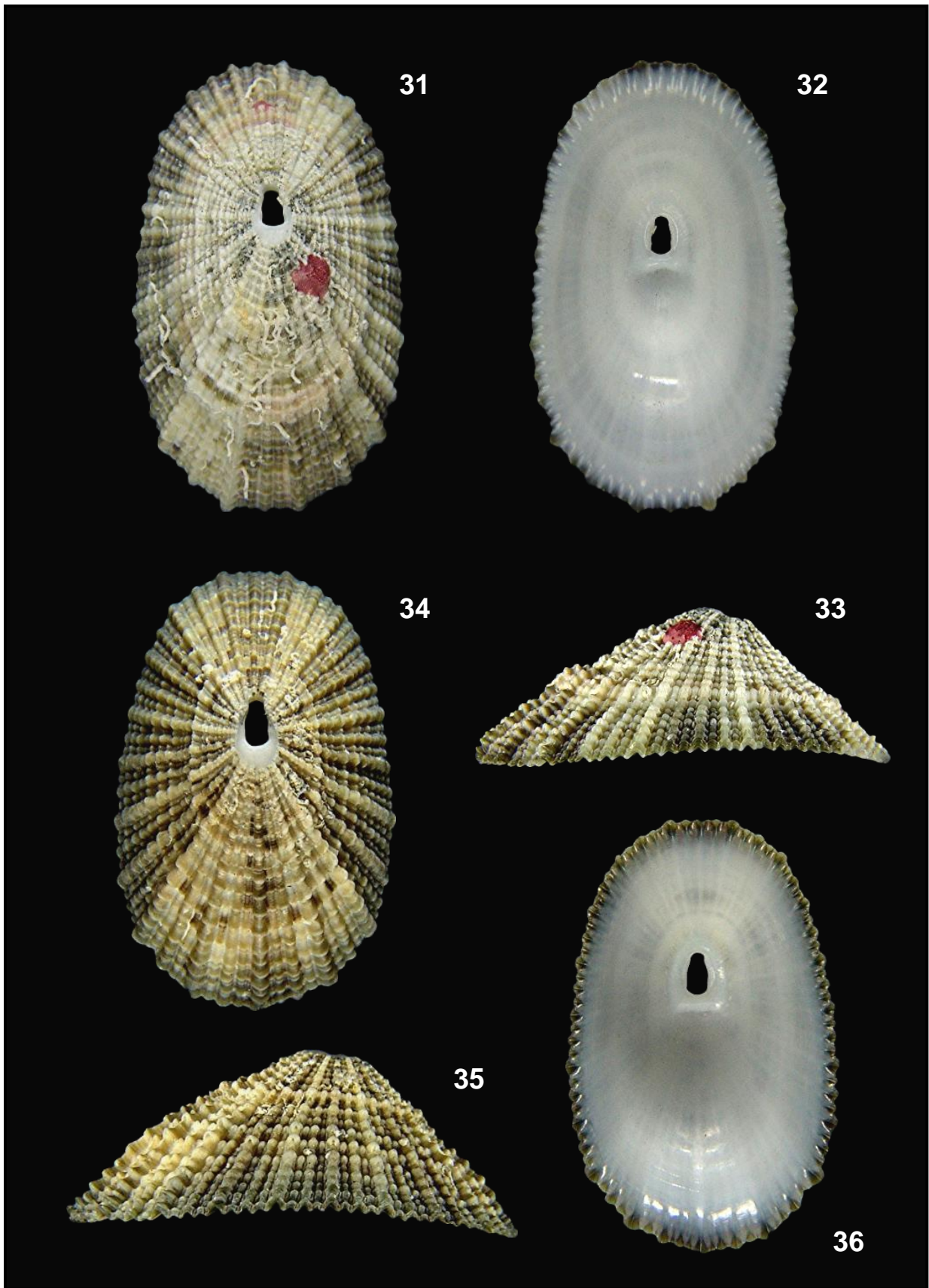


Plate VI. Figs 31-33: *Diodora cayenensis* Las Croabas, NE Puerto Rico. Undersides of rocks, at a depth of 1.5-7 m. July 1964. H. 10.0 W. 15.7 L. 26.1 mm. (HL). Figs 34-36: *Diodora cayenensis*. Las Croabas, NE Puerto Rico. Undersides of rocks, at a depth of 1.5-7 m. July 1974. H. 8.1 W. 12.3 L. 19.4 mm. (HL).

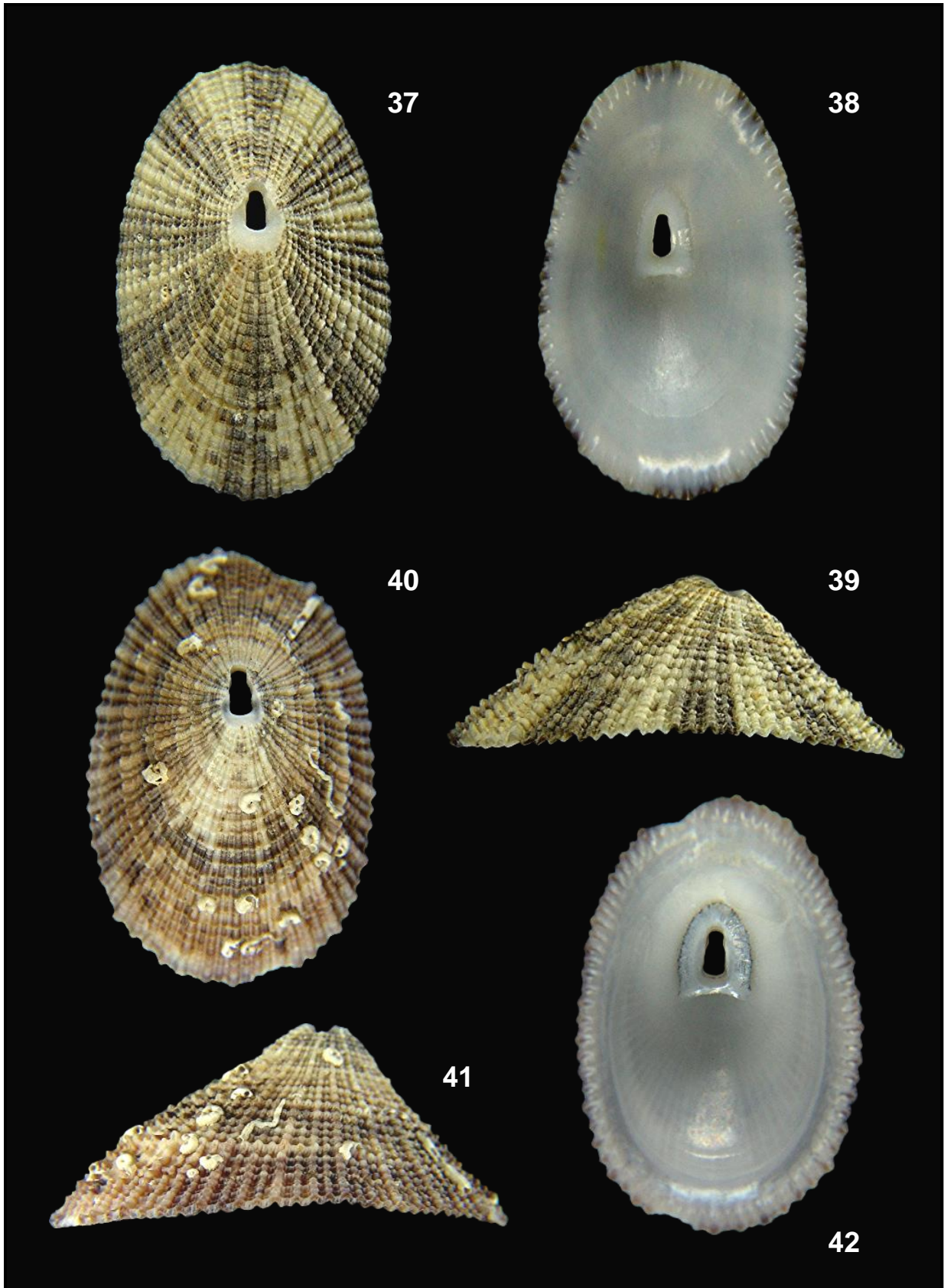
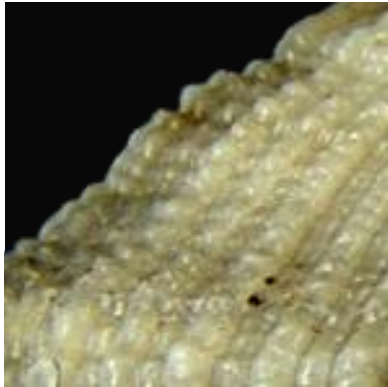


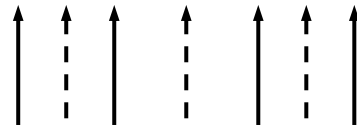
Plate VII. Figs 37-39: *Diodora cayenensis*. Cavalier, off Egmont Key, Florida, USA, Gulf of Mexico. Trawled at a depth of 275 m. 1963. H. 6.8 W. 10.9 L. 17.5 mm. (HL). Figs 40-42: *Diodora cayenensis*. Under ASA-bridge, Pt. George Inlet, Xalvis Island, Duval Co., Florida, USA. On intertidal concrete rubble. December 1990. H. 4.5 W. 8.0 L. 11.9 mm. (HL).

Comparison of the rib structure in *D. canariensis* and *D. cayenensis*

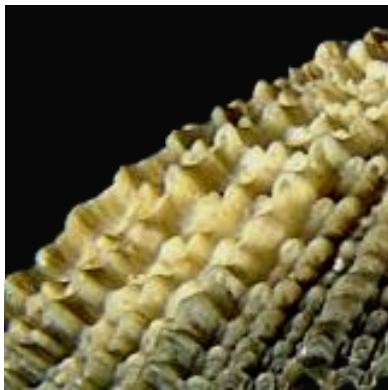
D. canariensis



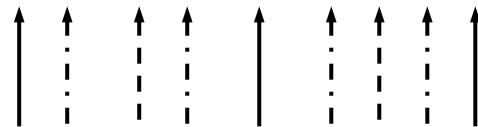
rounded or flattened knobs



D. cayenensis



scaled knobs




 = primary ribs
  = secondary riblets
  = tertiary threads

Plate VIII

Caribbean Triphoridae (Gastropoda: Triphoroidea): list and colour illustrations

Emilio Rolán¹ & Raúl Fernández-Garcés²

¹ Museo de Historia Natural, Campus Universitario Sur, 15782, Santiago de Compostela, Spain

² Centro de Estudios Ambientales (CEAC), Grupo de Recursos Naturales (GRN),
calle 17, esquina Ave. 46, Cienfuegos, Cuba

Keywords: TRIPHORIDAE, Caribbean, colour photographs.

Abstract: A critical list of Triphoridae described from the Caribbean is presented, giving their synonymies. Colour figures of some of these species are shown.

Introduction: The Triphoridae is a family with numerous species in the world, and in the Caribbean. Information on triphorids from this area appears dispersed in many different works such as those for Jamaica (C.B. Adams, 1850a, 1850b, most species represented in Clench & Turner, 1950), Virgin Islands (Nowell-Usticke, 1959 & 1971), Yucatan Peninsula, Mexico (Vokes & Vokes, 1983), Puerto Rico and other Caribbean areas (Warmke & Abbott, 1961), Curaçao, Aruba and Bonaire (De Jong & Coomans, 1988), Oceanic Islands off Brazil (Leal, 1991), Colombian Caribbean (Díaz Merlano & Puyana Hegedus, 1994). They also were the subject of some recent studies in which a number of new species were described, e.g., De Jong & Coomans (1988), Moolenbeek & Faber (1989), Faber & Moolenbeek (1991), and Rolán & Cruz-Ábrego (1996). During the revision of this group in Cuba (Rolán & Fernández-Garcés (1993a, 1993b, 1994 & 1995) and Rolán & Espinosa (1994), many of the Caribbean species with the exception of few endemic species from other areas, were collected; also, in Nicaragua, Rolán & Luque (1999). Deep-water species were described by Dall (1881, 1889, 1921). Fossil species in Olsson & Harbison (1953).

All works showing Triphoridae were published with drawings or black and white photographs. As of now, we have the opportunity to show these species in colour, and this is the main object of the actual work. At the same time, we will study more material and some species that have not been named at the present moment, mainly those from deep water, in a future paper.

Results: We believe that the simplest method of showing the species (most of them amply described and commented in the previously

mentioned studies) is to present them in colour plates, only with the indication of size and the original locality. An abstract of available information on the different species is presented in alphabetical order in Table I.

The shells figured without any indication are from the collection of E. Rolán.

Table I: Preliminary alphabetical checklist of triphorid species described from the Caribbean Sea. The genus in which each species was originally described (or reassigned) is indicated after the author and year, as well as data about colour pattern, depth, type of protoconch and geographical distribution, in this order. Species considered valid are shown in bold.

Abbreviations:

Column 2: Shell colour

- B:** shell more or less uniformly brown;
BB: shell with brown bands of different intensity;
BW: shell brown with isolated white dots;
BWB: shell brown and white, but without bands;
V: shell of variable colour;
W: shell white;
WBB: shell white with brown bands;

Column 3: Depth

- DW:** deep water (more than 100 m);
SW: shallow water;

Column 4: Protoconch whorls

- M:** protoconch multispiral (three whorls or more);
P: protoconch paucispiral (less than three whorls);

Column 5: Distribution range

- R:** reduced distribution (few records from small area);
U: poorly known because it is a deep-water species.
WI: wide distribution (several records).
-

Name of taxon	Colour	Depth	Protoconch	Range
<i>abrupta</i> (Watson, 1880), <i>Metaxia</i> (error, non Caribbean)				
<i>abrupta</i> (Dall, 1881), “<i>Triphora</i>”	W	DW	?	U
<i>affinis</i> (Hinds, 1843), “ <i>Triphora</i> ” (nomen dubium)				
<i>albida</i> (A. Adams, 1854), <i>Latitriphora</i>	BWB	SW	M	WI
<i>angasi</i> (Crosse & Fischer, 1865), “ <i>Triphora</i> ” (error)				
<i>apexcrassum</i> Rolán & Fernández-Garcés, 1994, <i>Cheirodonta</i>	B	SW	P	R
<i>arnoldoi</i> Faber & Moolenbeek, 1991, <i>Cosmotriphora</i>	BWB	SW	M	WI
<i>aspera</i> Jeffrey, 1885 in Dall, <i>Strobiligera</i> (= <i>brychia</i>)				
<i>ateralbus</i> Rolán & Fernández-Garcés, 1994, <i>Monophorus</i>	BW	SW	M	R
<i>barbadensis</i> Coomans & Faber, 1984, <i>Triforis</i>	B	DW	P	R
<i>bartschi</i> Olsson, 1916, “<i>Triphora</i>”	fossil	fossil	P	fossil
<i>bermudensis</i> (Bartsch, 1911), <i>Eutriphora</i>	WBB	SW	M	WI
<i>bermudensis</i> (Verrill & Bush, 1900), <i>Metaxia</i> (= <i>rugulosa</i> ?)				
<i>bigemma</i> (Watson, 1880), <i>Strobiligera</i>	W	DW	?	U
<i>bolax</i> Olsson & Harbison, 1953, “<i>Triphora</i>”	fossil	fossil	?	fossil
<i>brychia</i> (Bouchet & Guillemot), 1978, <i>Strobiligera</i>	W	DW	M	WI
<i>calva</i> Faber & Moolenbeek, 1991, “<i>Triphora</i>”	B	SW	P	WI?
aff. <i>calva</i>, “<i>Triphora</i>”	B	SW	P	R
<i>caracca</i> Dall, 1927, “<i>Triphora</i>”	W	DW	M	U
<i>caribbeana</i> Treece, 1980, “ <i>Triphora</i> ” (nomen nudum)				
<i>carmelae</i> Rolán & Fernández-Garcés, 1993, <i>Iniforis</i>	BWB	SW	P	R
<i>casta</i> (Hinds, 1843), <i>Iniforis</i>	WBB	SW	P	WI
<i>clenchi</i> Aguayo, 1935, “ <i>Triphora</i> ” (unnecessary new name)				

<i>colon</i> (Dall, 1881), " <i>Triphora</i> "	W	DW	M	U
<i>compsa</i> Dall, 1927, " <i>Triphora</i> "	W	DW	P?	U
<i>cylindrella</i> (Dall, 1881), " <i>Triphora</i> "	W	DW	?	U
<i>dealbata</i> (C. B. Adams, 1850), " <i>Triphora</i> " (= <i>melanura</i> ?)				
<i>decollata</i> Rolán & Fernández-Garcés, 1994, <i>Cheirodonta</i>	BW	SW	M	WI
<i>decorata</i> (C.B. Adams, 1850), <i>Nototriphora</i>	BWB	SW	M	WI
<i>dinea</i> Dall, 1927, " <i>Triphora</i> "	W	DW	?	U
<i>distincta</i> (Meyer, 1886), " <i>Triphora</i> "	fossil	fossil	?	fossil
<i>dupliniana</i> (Olsson, 1916), " <i>Triphora</i> "	fossil	fossil	M	fossil
<i>ellyae</i> De Jong & Coomans, 1988, " <i>Triphora</i> "	WBB	SW	M	WI
<i>elvirae</i> De Jong & Coomans, 1988, " <i>Triphora</i> "	WBB	SW	M	WI
<i>enopla</i> Dall, 1927, " <i>Triphora</i> "	W	DW	P	U
<i>espinosai</i> Rolán & Fernández-Garcés, 1993, <i>Metaxia</i>	W	SW	P	R
<i>excelsa</i> Faber & Moolenbeek, 1991, <i>Metaxia</i>	B	SW	M	WI
<i>exiguum</i> (C.B. Adams, 1850), <i>Triphora</i> ? (nomen dubium)				
<i>exile</i> C.B. Adams, 1850 non Escholtz, 1829 (= <i>excelsa</i>)				
<i>filata</i> (Dall, 1889), <i>Strobiligera</i> (= <i>inflata</i>)				
<i>gaesona</i> Dall, 1927, " <i>Triphora</i> "	W	DW	P	U
<i>georgiana</i> Dall, 1927, " <i>Triphora</i> "	W	DW	P	U
<i>guttata</i> (Guppy, 1874), " <i>Triphora</i> "	fossil	fossil	?	fossil
<i>hebes</i> Watson, 1881 in Pilsbry & Aguayo, 1933, <i>Triphora</i> ? (error, not Caribbean)				
<i>hemphilli</i> Bartsch, 1907, " <i>Triphora</i> " (error, not Caribbean)				
<i>hircus</i> (Dall, 1881), " <i>Triphora</i> "	W	DW	?	U
<i>ibex</i> (Dall, 1881), " <i>Triphora</i> "	W	DW	?	U

<i>immaculata</i> Rolán & Fernández-Garcés, 1993, <i>Iniforis</i>	W	SW	P	R
<i>indigena</i> Dall, 1927, " <i>Triphora</i> "	W	DW	M	U
<i>inflata</i> (Watson, 1880), <i>Strobiligera</i>	W	DW	P	U
<i>intermedia</i> (C.B. Adams, 1850), <i>Similiphora</i>	WBB	SW	M	WI
<i>intermedia</i> (Dall, 1881), " <i>Triphora</i> "	W	DW	?	U
<i>intermedia</i> Dall, 1889, " <i>Triphora</i> " (var. <i>triserialis</i>)				
<i>intermedius</i> Tryon, 1887 non Adams, <i>Triforis</i> (= <i>turristhomae</i>)				
<i>lilacina</i> Dall, 1889, " <i>Triphora</i> "	lilac	SW	?	?
<i>longissima</i> (Dall, 1881), " <i>Triphora</i> "	W	DW	?	U
<i>marmorata</i> (Hinds, 1843), " <i>Triphora</i> " nomen dubium				
<i>martii</i> Rolán & Fernández-Garcés, 1995, " <i>Triphora</i> "	WBB	SW	M	R
<i>medinae</i> Parodiz, 1955, " <i>Triphora</i> " (error)				
<i>melanura</i> (C.B. Adams, 1850), <i>Cosmotriphora</i>	W	SW	M	WI
<i>metaxa</i> (delle Chiaje, 1828), <i>Metaxia</i> (error; not Caribbean)				
<i>meteora</i> Dall, 1927, " <i>Triphora</i> "	W	DW	P	U
<i>mirabile</i> (C.B. Adams, 1850), <i>Iniforis</i> (= <i>turristhomae</i>)				
<i>mitella</i> Dall, 1892, " <i>Triphora</i> "	fossil	fossil	?	fossil
<i>miskitorum</i> Rolán & Luque, 1999, <i>Cheirodonta</i>	W	SW	P	R
<i>modesta</i> (C.B. Adams, 1850), <i>Marshallora</i>	B	SW	M	WI
<i>nana</i> (C.B. Adams, 1850), " <i>Triphora</i> " nomen dubium				
<i>nicaraguensis</i> Rolán & Luque, 1999, <i>Marshallora</i>	B	SW	P	R
<i>nichupte</i> Rolán & Cruz-Ábrego, 1996, <i>Marshallora</i>	V	SW	P	R
<i>nigrocincta</i> (C.B. Adams, 1839), <i>Marshallora</i>	B	SW	M	WI
<i>novem</i> (Nowell-Usticke, 1969), <i>Mesophora</i>	BB	SW	M	WI

<i>olivaceus</i> (Dall, 1889), <i>Monophorus</i>	BWB	SW	M	WI
<i>oreodoxa</i> Olsson & Harbison, 1953, "<i>Triphora</i>"	fossil	fossil	?	fossil
<i>ornatus</i> auct. non Deshayes, 1832, <i>Monophorus</i> (= <i>olivaceus</i>)				
<i>ortei</i> Espinosa, 2001, " <i>Triphora</i> " (= <i>ellyae</i>)				
<i>osclausum</i> Rolán & Fernández-Garcés, 1995, "<i>Triphora</i>"	B	SW	M	WI
<i>peetersae</i> (Moolenbeek & Faber, 1989), <i>Isotriphora</i>	BB	SW	P	WI
<i>perversa</i> Linné in Dall, 1889 (error, not Caribbean)				
<i>pfeifferi</i> (Crosse & Fischer, 1865), " <i>Triphora</i> " (error)				
<i>pompona</i> Dall, 1927, "<i>Triphora</i>"	W	DW	P	U
<i>pseudothomae</i> Rolán & Fernández-Garcés, 1993, <i>Iniforis</i>	WBB	SW	M	WI
<i>pulchellum</i> C.B. Adams, 1850, " <i>Triphora</i> " (= <i>intermedia</i>)				
<i>pusilla</i> (Pfeiffer, 1840), " <i>Triphora</i> " nomen dubium				
<i>pyrrha</i> (Henderson & Bartsch, 1914), "<i>Triphora</i>"	W	?	M	?
<i>rugulosa</i> (C.B. Adams, 1850), <i>Metaxia</i>	W	SW	M	WI
<i>rushii</i> Dall, 1881, "<i>Triphora</i>"	W	DW	?	U
<i>sagei</i> Rolán & Fernández-Garcés, 1995, <i>Aclophora</i>	BB	SW	M	WI
<i>samanae</i> (Dall, 1889), <i>Latitriphora</i> (= <i>albida</i>)				
<i>sarissa</i> Dall, 1889, "<i>Triphora</i>"	W	DW	?	U
<i>sentoma</i> Dall, 1927, "<i>Triphora</i>"	W	DW	?	U
<i>somersi</i> Peile, 1926, " <i>Triphora</i> " nomen dubium				
<i>somersi</i> Pilsbry & Aguayo, 1933, " <i>Triphora</i> " nomen nudum				
<i>taenialba</i> Rolán & Espinosa, 1994, <i>Isotriphora</i>	BB	SW	P	R
<i>taeniolata</i> (Dall, 1889), <i>Metaxia</i>	WBB	SW	M	WI
<i>terebrata</i> (Heilprin, 1889), "<i>Triphora</i>"	fossil	fossil	?	fossil

torticula (Dall, 1881), "Triphora"	W	DW	?	U
triserialis (Dall, 1881), "Triphora"	W	DW	P	U
<i>turrissimilis</i> (Nowell-Usticke, 1969), <i>Iniforis</i> (= <i>bermudensis</i>)				
turristhormae (Holten, 1802), <i>Iniforis</i>	WBB	SW	M	WI
<i>variegata</i> (A. Adams, 1854), "Triphora" (= <i>decorata</i>)				
<i>vestalis</i> (A. Adams, 1854), <i>Triphoris</i> (error: is a <i>Cerithiopsis</i>)				
verbernei (Moolenbeek & Faber, 1989), <i>Cheirodonta</i>	BW	SW	M	WI
<i>vicina</i> (C.B. Adams, 1850), <i>Metaxia</i> (= <i>rugulosa</i>)				

Remarks: We present 103 species names mentioned for Caribbean waters. From this total, 33 taxa are not valid; 11 are apparently synonyms of other taxa; 8 are *nomen nudum* or *nomen dubium*; 1 is an unnecessary replacement name; 1 is an invalid variety name and 8 are errors (species belonging to another area or from a different family). There are also 8 fossil species.

We therefore consider 64 species of Triphoridae present in the recent fauna of the Caribbean.

In the present work 118 colour figures of 33 species are presented. In recent works (Marshall, 1983; Bouchet, 1984), it was shown that, in order to attribute a species to a genus, it is necessary to examine not only the external morphology and protoconch, but in most cases also the radula. For this reason, we have employed the genus "Triphora" for most of the material studied due to the lack of sufficient information.

Bibliography:

- Adams, C.B., 1850a. Description of supposed new species of marine shells, which inhabit Jamaica. *Contributions to Conchology*, **1**(4): 56-68.
- Adams, C.B., 1850b. Description of supposed new species of marine shells, which inhabit Jamaica. *Contributions to Conchology*, **1**(7): 109-123.
- Bouchet, P., 1984. Les Triphoridae de Méditerranée et du proche Atlantique (Mollusca, Gastropoda). *Lavori della Società Italiana di Malacologia*, **21**: 5-58.
- Clench, W.J. & Turner, R.D., 1950. The western Atlantic marine mollusks described by C. B. Adams. *Occasional Papers on Mollusks*, **1**(15): 233-403.
- Dall, W.H., 1881. Reports on the results of dredging, under the supervision of Alexander Agassiz, in the Gulf of Mexico and in the Caribbean Sea, 1877-79, by the United States Coast Survey Steamer "Blake", Lieutenant-Commander C.D. Sigsbee, U.S.N., and Commander J.R. Bartlett, U.S.N., commanding. XV. Preliminary report on the Mollusca. *Bulletin of the Museum of Comparative Zoology*, **9**(2): 33-144.

Concerning the other genera used, some of the species have been shown with this name in previous works. Only in some cases, this generic name was supposed. The genera in which we have included the species studied and the number of species in these genera (between brackets) are the following: *Aclophora* (1), *Cheirodonta* (4), *Cosmotriphora* (2), *Euthriphora* (1), *Iniforis* (5), *Isotriphora* (2), *Latitriphora* (1), *Marshallora* (4), *Mesophora* (1), *Metaxia* (4), *Monophorus* (2), *Nototriphora* (1), *Similiphora* (1), *Triforis* (1), *Strobiligera* (3) and "Triphora" s. l. (31).

Acknowledgements:

Most photographs were made in the Department of Xenética (Prof. Armando Caballero and Emilio Rolán-Álvarez) and Ecología (Prof. Jesús S. Troncoso) of the University of Vigo, Spain. Some were made by the second author in CEAC, Cienfuegos, Cuba.

- Dall, W.H., 1889. Reports on the results of dredging, under the supervision of Alexander Agassiz, in the Gulf of Mexico (1877-78) and in the Caribbean Sea, (1879-80), by the United States Coast Survey Steamer "Blake", Lieutenant-Commander C.D. Sigsbee, U.S.N., and Commander J.R. Bartlett, U.S.N., commanding. XXIX. Report on the Mollusca. Part 2. Gastropoda and Scaphopoda. *Bulletin of the Museum of Comparative Zoology*, **18**: 1-492, pls 10-40.
- Dall, W.H., 1927. Small shells from dredgings off the southeast coast of the United States by the United States Fisheries Steamer "Albatross" in 1885 and 1886. *Proceedings of the United States National Museum*, **70**, art.18 (2667): 1-134.
- De Jong, K.M. & Coomans, H.E., 1988. *Marine gastropods from Curaçao, Aruba and Bonaire*. E.J. Brill, Leiden, 261 pp.
- Díaz Merlano, J.M. & Puyana Hegedus, M., 1994. *Moluscos del Caribe Colombiano, un catálogo ilustrado*. Fundación Natura/ Cociencias/ Invemar, Bogotá. 291 pp., 74 pls.
- Faber, M.J. & Moolenbeek, R.G. 1991. Two new shallow water triphorids and a new name in *Metaxia* from Florida and the West Indies. *Apex*, **6**(3-4): 81-85.
- Leal, J.H., 1991. *Marine Prosobranch Gastropods from Oceanic Islands off Brazil*. Universal Book Services. Oegstgeest, 418 pp.
- Marshall, B.A., 1983. A revision of the Recent Triphoridae of Southern Australia (Mollusca: Gastropoda). *Records of the Australian Museum*, Supplement 2: 1-119.
- Moolenbeek, R.G. & Faber, M.J., 1989. Two new *Triphora* species from the West Indies (Gastropoda; Triphoridae). *Basteria*, **53**(4-6): 77-80.
- Nowell-Usticke, G.W., 1959. *A Check List of the Marine Shells of St. Croix, U.S. Virgin Islands with Random Annotations*. Lane Press. Burlington. 90 pp.
- Nowell-Usticke, G.W., 1971. *A supplementary listing of new shells (illustrated)*. Nowell-Usticke. U.S.A. 31 pp.
- Olsson, A.A. & Harbison, A., 1953. Pliocene Mollusca of Southern Florida, with special reference to those from North Saint Petersburg. *Monographs of the Academy of Natural Sciences of Philadelphia*, **8**: 1-457, 65 pls.
- Rolán, E. & Cruz-Ábreo, F.M., 1996. A new triphorid species (Gastropoda, Triphoridae) from Nichupté lagoon, Yucatan peninsula, Mexico. *Iberus*, **13**(2): 87-92.
- Rolán, E. & Espinosa, J., 1994. The family Triphoridae (Mollusca, Gastropoda, Prosobranchia) in Cuba. 3. The genus *Isotriphora*, with description of a new species. *Basteria*, **58**(1-2): 63-68.
- Rolán, E. & Fernández-Garcés, R., 1993a. La familia Triphoridae en la isla de Cuba. 1. El género *Metaxia*. *Bollettino Malacologico*, **28**(9-12): 169-176.
- Rolán, E. & Fernández-Garcés, R., 1993b. The family Triphoridae (Mollusca, Gastropoda) in Cuba. 2. The genus *Iniforis* Jousseume, 1884. *Apex*, **8**(3): 95-106.
- Rolán, E. & Fernández-Garcés, R., 1994. The family Triphoridae (Mollusca, Gastropoda) in Cuba. 4. The genera *Monophorus*, *Nototriphora*, *Cosmotriphora* and *Cheirodonta*, with the description of three new species. *Apex*, **9**(1): 17-27.
- Rolán, E. & Fernández-Garcés, R., 1995. The family Triphoridae (Mollusca, Gastropoda) in Cuba. 5. The genera *Marshallora*, *Mesophora*, *Similiphora*, *Eutriphora*, *Latitriphora*, *Aclophora* and other species without generic assignment. *Apex*, **10**(1): 9-24.
- Rolán, E. & Luque, A.A., 1999. Two new species of triphorids (Gastropoda, Triphoridae) from the Miskitos Archipelago, Nicaragua. *Iberus*,
- Vokes, E.V. & Vokes, E.H., 1983. Distribution of shallow-water marine mollusca, Yucatan Peninsula, Mexico. *Mesoamerican Ecology Institute, Monograph 1. Middle American Research Institute*, publ. 54. 183 pp. (10-35 and plates 1-31).
- Warmke, G.L. & Abbott, R.T., 1961. *Caribbean seashells*. Livingston Publishing Co., Narberth, Pennsylvania. 348 pp, 43 plates.

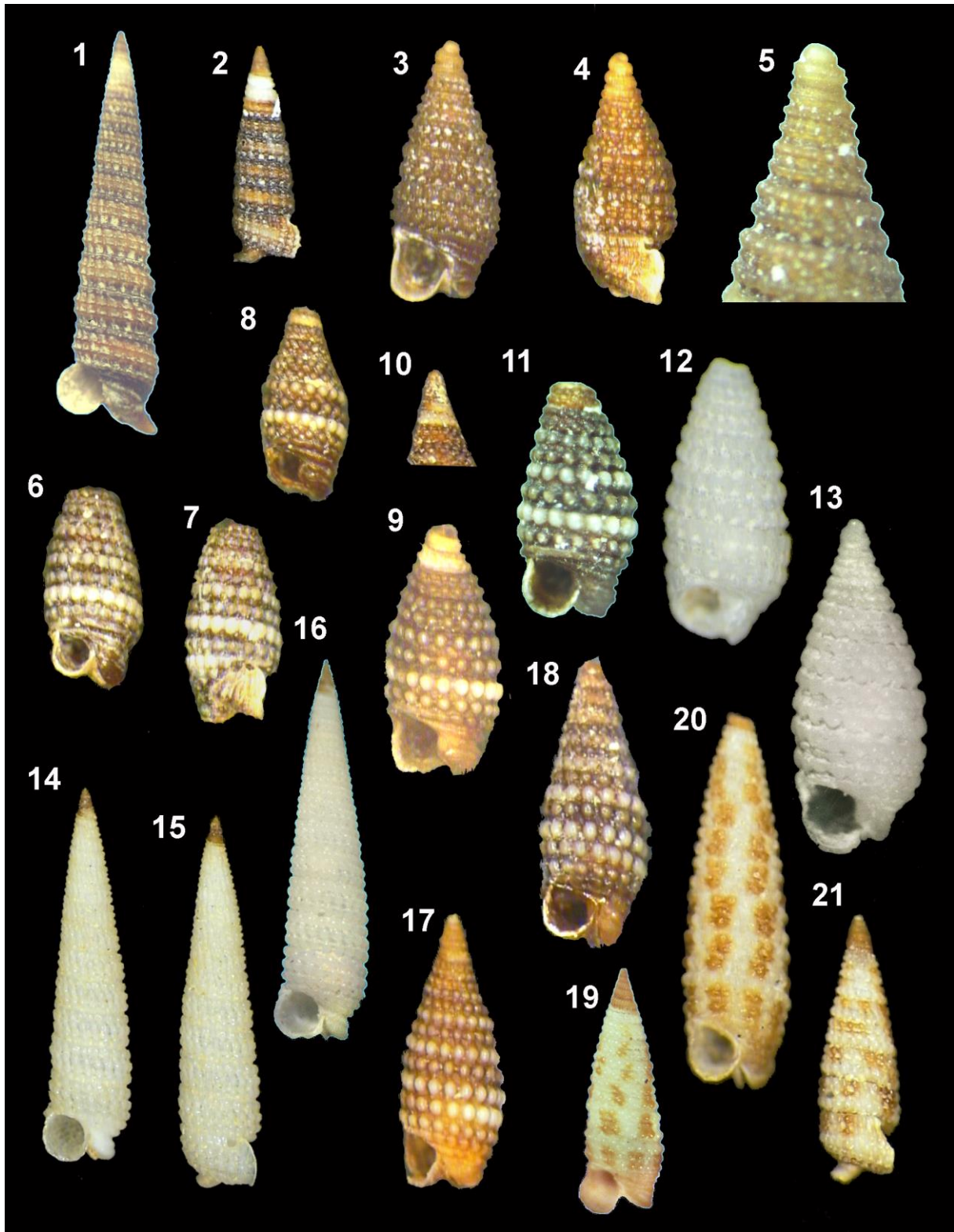


Plate I

Figs 1, 2. *Aclophora sagei*; 1: shell, 11.1 mm (CFG); 2: paratype, 6.5 mm, Cienfuegos, Cuba. Figs 3-5. *Cheirodonta apexcrassum*; 3, 4: paratype, 2.3 mm; 5: juvenile, 1.6 mm, Jibacoa Beach, north of Cuba. Figs 6-11. *Cheirodonta decollata*; 6-9: paratypes, 2.2, 2.2, 2.3, 2.4 mm; 10: protoconch; 11: shell, 2.5 mm, Cienfuegos, Cuba. Figs 12, 13. *Cheirodonta miskitorum*; 12: paratype, 2.8 mm; 13: holotype, 3.1 mm (MNCN), Miskitos Archipelago, Nicaragua. Figs 14-16. *Cosmotriphora melanura*, 9.2, 9.2, 9.8 mm (CFG), Cienfuegos, Cuba. Figs 17, 18. *Cosmotriphora verbernei*, 3.3, 3.5 mm, Cienfuegos, Cuba. Figs 19-21. *Cosmotriphora arnoldoi*, 3.2 mm (CFG), 5.0, 3.8 mm, Cienfuegos, Cuba.

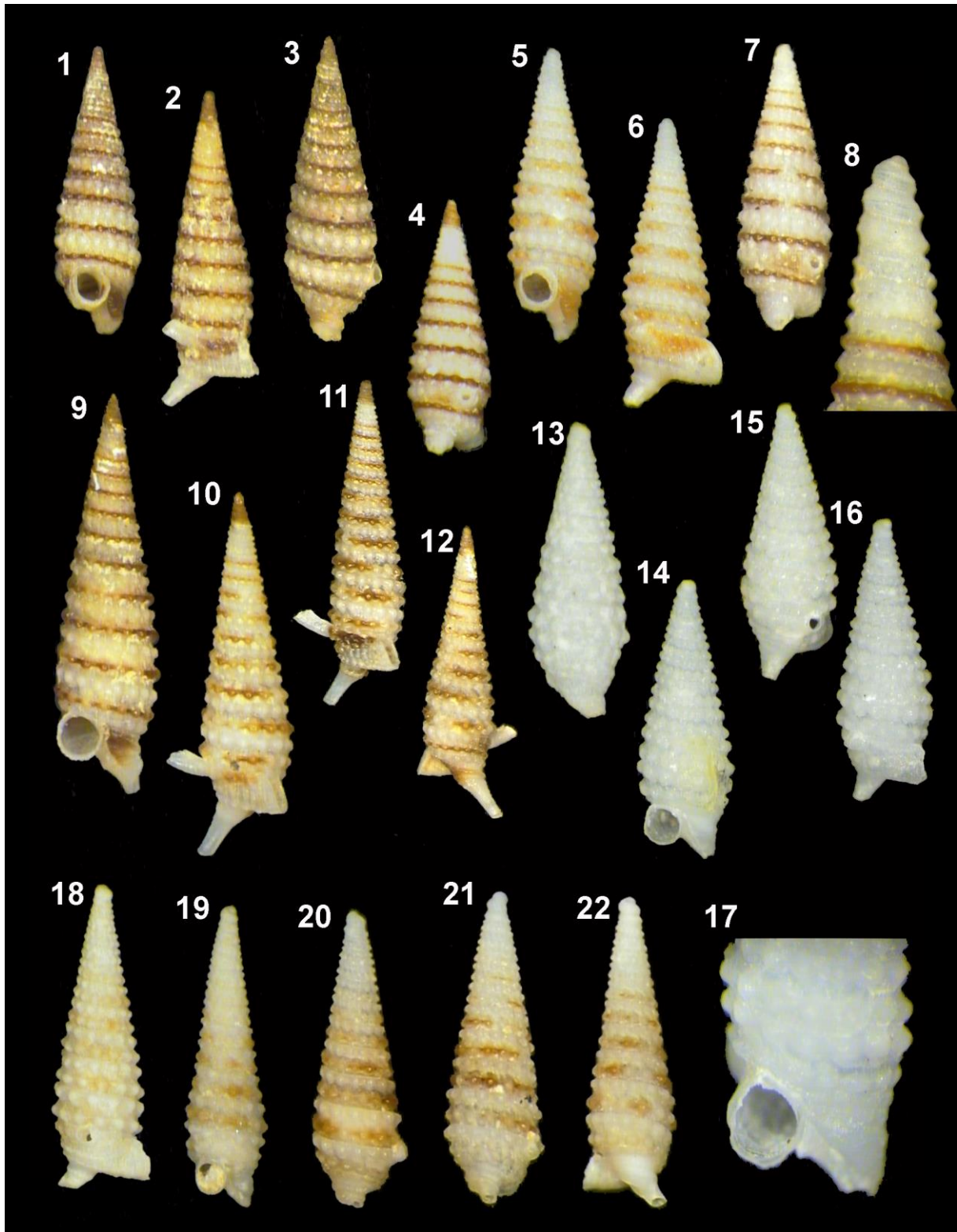


Plate II

Figs 1-4. *Iniforis turrithomae*, 5.9, 5.9, 6.5, 5.1 mm, Cienfuegos, Cuba. Figs 5-7. *Iniforis casta*, shells, 4.5, 4.5, 4.6 mm; 8: protoconch, Cienfuegos, Cuba. Figs 9-12. *Iniforis pseudothomae*; 9, 10; shells, 12.4, 11.2 mm (CFG); 11, 12: paratypes, 9.0, 7.1 mm, Cienfuegos, Cuba. Figs 13-17. *Iniforis immaculata*; 13: shell, 4.6 mm (CFG); 14-16: paratype, 4.1 mm; 17: aperture, Cienfuegos, Cuba. Figs 18-22. *Iniforis carmelae*; 18-19: shells, 5.1, 4.6 mm; 20-22: paratypes, 4.5, 4.9, 5.0 mm, Cienfuegos, Cuba.

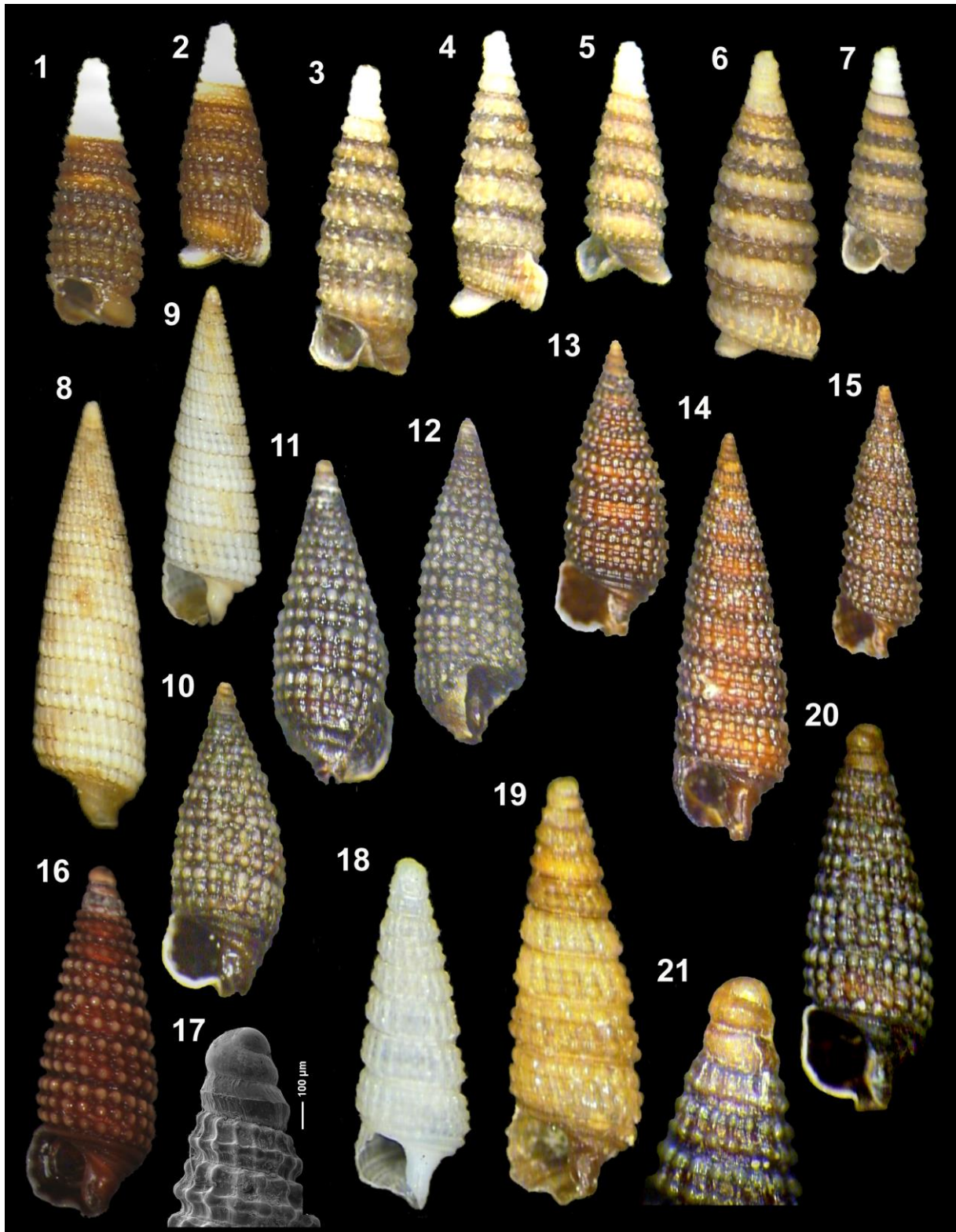


Plate III

Figs 1, 2. *Isotriphora peetersae*, 3.8, 3.3 mm, Cienfuegos, Cuba. Figs 3-7. *Isotriphora taenialba*; 3,4: shells, 5.8, 4.4 mm, Cienfuegos, Cuba; 5-7: paratypes, 4.8, 5.2, 4.2 mm, Rancho Luna, Cuba. Figs 8, 9. *Latitriphora albida*, 7.0, 6.3 mm, Cienfuegos, Cuba. Figs 10-12. *Marshallora modesta*, 3.2, 3.2, 3.3 mm, Penaut Isl., Riviera Beach, Fla. USA. Figs 13-15. *Marshallora nigrocincta*, 3.1, 5.8, 3.0 mm, Cienfuegos, Cuba. Figs 16, 17. "*Triphora*" *calva*; 16: shell, 3.7 mm, Cayo Matias, Cuba; 17: protoconch, Cienfuegos, Cuba. Figs 18-21. *Marshallora nichupte*; 18-20: paratypes, 3.4, 4.1, 3.5 mm; Nichupte Lagoon, Yucatan, Mexico; 21: protoconch.

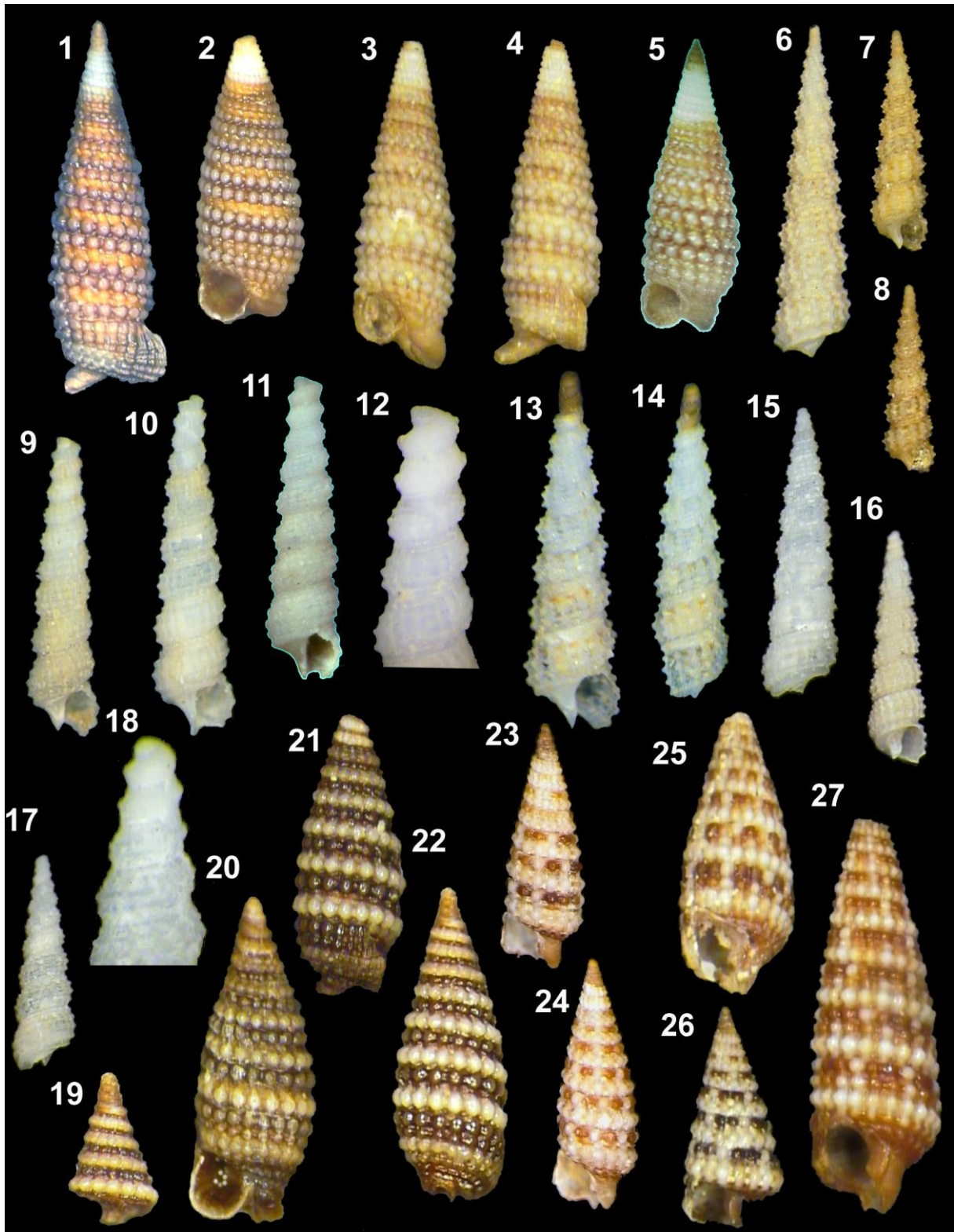


Plate IV

Figs 1-5. *Mesophora novem*; 1, 2: shells, 7.8, 4.6 mm, Punta Tamarindo, Cienfuegos, Cuba; 3-5: shells, 6.6, 6.6, 5.4 mm, Cienfuegos, Cuba (CFG). Figs 6-8. *Metaxia excelsa*; shells, 6.9, 4.9, 4.3 mm, Cienfuegos, Cuba. Figs 9-12. *Metaxia espinosai*; 9, 10: paratypes, 3.4, 3.7 mm, Faro de los Colorados; 11: shell, 3.1 mm, Cienfuegos, Cuba (CFG); 12: protoconch. Figs 13, 14. *Metaxia taeniolata*; shells, 3.6, 3.4 mm, Cienfuegos, Cuba. Figs 15-18. *Metaxia rugulosa*; 15-17: shells, 5.7, 5.0, 5.0 mm, Cienfuegos, Cuba; 18: protoconch. Figs 19-22. *Monophorus ateralbus*; 19: juvenile, 2.1 mm, Cienfuegos; 20: shell, 5.1 mm, Fla, USA; 21: paratype, 3.6 mm; 22: shell, 3.7 mm, Cienfuegos, Cuba. Figs 23-27. *Monophorus olivaceus*; 23, 24: small adults, 3.1, 3.3 mm, Cienfuegos, Cuba; 26: juvenile, 2 mm, Cienfuegos; 25, 27: shells, 6.5, 9.0 mm, Cienfuegos, Cuba.

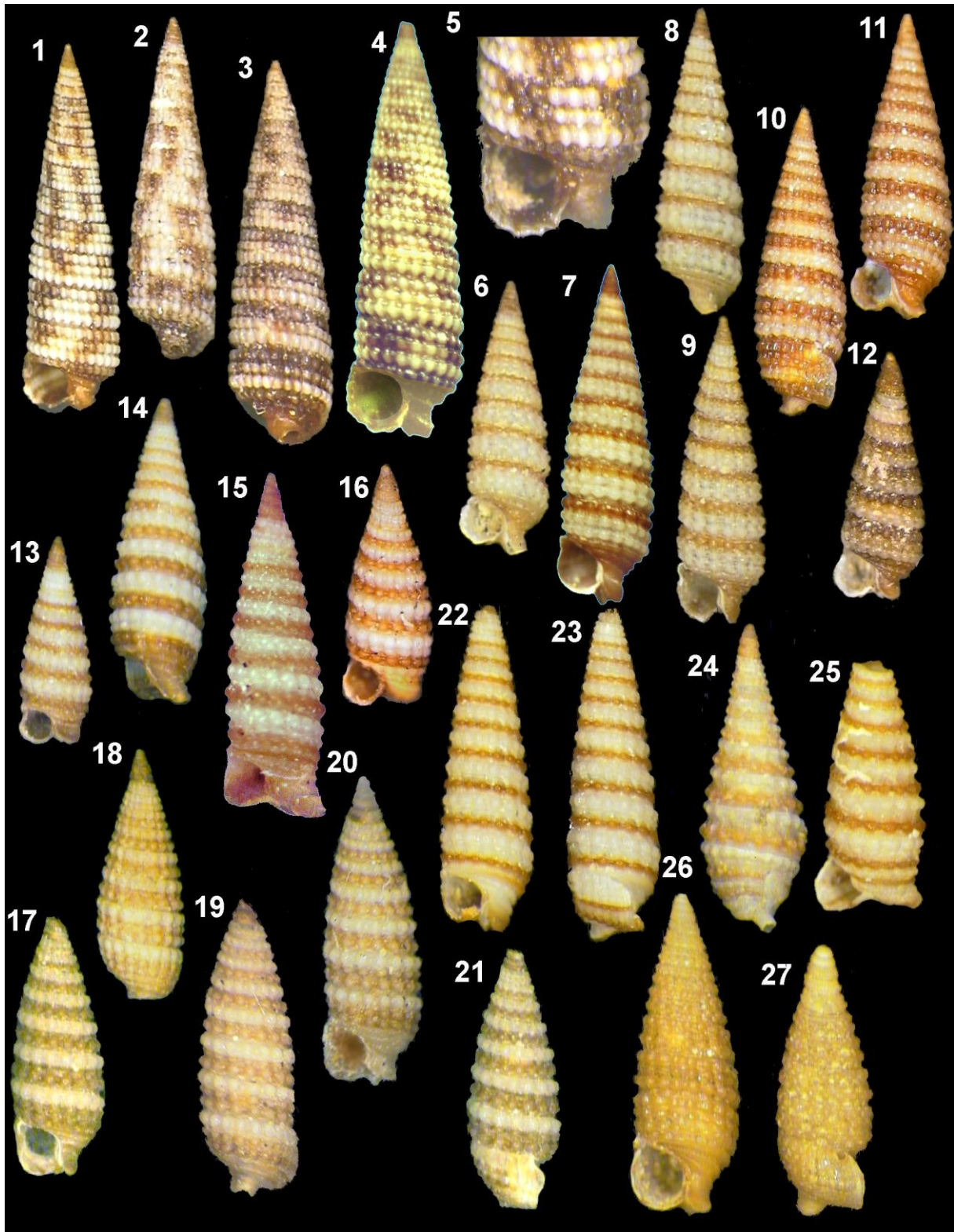


Plate V

Figs 1-5. *Nototriphora decorata*; 1-4: shells, 6.2, 6.2, 8.6, 9.2 mm, Cienfuegos, Cuba; 5: detail of the aperture. Figs 6-12. *Similiphora intermedia*; 4.2, 6.8, 5.5, 5.5, 5.6, 5.6, 3.5 mm, Cienfuegos, Cuba. Figs 13-16. *Eutriphora bermudensis*; 3.5, 5.9, 6.2, 4.1 mm, Cienfuegos, Cuba. Figs 17-21. *Triphora ellyae*; 3.7, 2.8, 4.2, 4.2, 3.7 mm, Cienfuegos, Cuba. Figs 22-23. *Triphora elvirae*; 6.7, 6.7 mm, Cienfuegos, Cuba. Figs 24-25. *Triphora martii*; 4.2, 4.0 mm, Cienfuegos, Cuba. Figs 26-27. *Triphora osclausum*; 4.0, 2.3 mm, paratypes, Cienfuegos, Cuba.

Two new species of the genera *Crassispira* and *Agladrillia* (Gastropoda, Conoidea) from Angola

Emilio Rolán ¹, Peter Ryall ² & Juan Horro ³

¹ Museo de Historia Natural, Campus Universitario Sur, E 15782 Santiago de Compostela, Spain; emiliorolan@inicia.es

² St. Ulrich 16, A-9161 Maria Rain, Austria; peterryall1@hotmail.com

³ Montero Ríos, 30-3º 36202 Vigo, Spain; JUANHORRO@telefonica.net

Key words: CONOIDEA, CRASSISPIRIDAE, DRILLIIDAE, *Crassispira*, *Agladrillia*, West Africa, new species.

Abstract: Two new species from Angola are described in the genera *Crassispira* and *Agladrillia*. The shells and protoconchs of both species are illustrated as well as the radula and operculum of one of them. They are compared with other species of a similar appearance from the study area.

Introduction: The Conoidea (Turrids in the classic old sense) from West Africa are not yet entirely known. Some species have been described in old works such as Gray (1838), Reeve (1845), Récluz (1851), von Maltzan (1883), etc. A revision was made by Tryon (1884). Further West African species were described in the previous century by Odhner (1923), Knudsen (1952, 1956), Fernandes, Rolán & Otero-Schmitt (1996), etc., or shown in general works such as Nicklès (1950), Bernard (1984), and others. Powell (1966) made a general revision and Tucker (2004) a complete taxonomy of the superfamily on all the genus and specific taxa.

In the material collected in Angola by the late Francisco Fernandes ("Xico") some small species of Conoidea were found, and the description of two of them is the result of the present work.

Material: The material was collected by Francisco Fernandes over several years, complemented by additional material collected by the senior author and partially stored in the collection of the second author. The collecting methods were snorkelling and dredging.

Abbreviations:

AMNH American Museum of Natural History, New York
ANSP Academy of Natural Sciences, Philadelphia
BMNH The Natural History Museum, London
MCZ Museum of Comparative Zoology, Harvard University

MHNS Museo de Historia Natural "Luis Iglesias Universidad, Santiago de Compostela
MNCN Museo Nacional de Ciencias Naturales, Madrid
MNHN Muséum national d'Histoire naturelle, Paris
USNM United States National Museum, Washington
ZSM Zoologische Staatssammlung München
CJH collection of Juan Horro, Vigo
CPR collection of Peter Ryall, Maria Rain
sp specimen with soft parts
s empty shell
j juvenile

Family Crassispiridae Morrison, 1966
Genus *Crassispira* Swainson, 1840

Type species (s. d.) *Pleurotoma bottae* Kiener, 1840.

Crassispira fuscobrevis spec. nov.
(Plate I, Figs 1-11)

Type material: Holotype (Fig. 1), in MNCN (15.05/47046). Paratypes in the following collections: MNHN (1 sp, Fig. 2); BMNH (1 sp, Fig. 3); AMNH (1 sp, Fig. 4); USNM (1 sp, Fig. 5); ZSM (1 sp, Fig. 6); ANSP (1 sp); MCZ (1 sp); CPR (17 sp and s, 3 j); CJH (10 sp and s); MHNS (36 sp and s, 15 j, Figs 7-10).

Type locality: Praia Amelia, Angola; 2-5 m, on sand/mud bottom with large flat rocks.

Etymology: The specific name is composed of the Latin words *fuscus* "brown" and *brevis* "small" which refer to the basic characteristics of the shells.

Description: Shell (Figs 1-10) moderately large, solid, elongate-conical, with a medium spire. Protoconch (Fig. 11) pupoid, smooth, with about 1 and ¼ whorls after the nucleus, and a diameter between 600 and 700 µm. The onset of the teleoconch has some spiral cords but no axial ribs, which only appear a little later; so, this could be considered as part of the protoconch and not as a real component of the teleoconch.

The teleoconch has 5-6 whorls, rapidly increasing in width, transversed by spiral cords and axial ribs.

In the subsutural area, there is a strong cord, which is a little undulating due to the influence of the axial ribs. However, the ribs are separated from the cord by a narrow depression. The spiral cords are finer below the strong subsutural cord and wider in the lower part of the whorls. Their number ranges from 4-5 in first whorls, up to 8-9 on the penultimate whorl, and 20-24 on the last whorl. There are 10 to 12 axial ribs which are orthocline, wide and strong and which are crossed by the spiral cords. Aperture elongate, continued below by a short and opened canal; on the upper part there is a deep sinus, internally bordered by a prominent callus. The external lip is sharp and there is a strong internal callus on the columella, which is straight in the lower part. No umbilicus. Colour variable: with periostracum, the appearance is always dark brown. When removed, the shell may be uniformly dark brown; sometimes a little lighter on the upper part of the ribs and, in a few cases, the colour is light brown with cream or almost white on the axial ribs. On the last whorl of the lighter shells, a band may be visible at the sutural level.

Dimensions: The holotype measures 12.6 mm; the largest shell: 15.8 mm.

Animal (Fig. 15): Studied from a retracted, alcohol-preserved specimen: whitish with an elongate penis, which is almost black. The operculum (Fig. 12) is ovate-lunate with a thicker internal border and the nucleus is at the lowest extreme. The radula is very small within the alimentary tract (Fig. 14) and is formed by two lines of more than 70 elongate and simple marginal teeth, which are about 60 µm long (Fig. 13).

Distribution: Only known from the type locality.

Remarks: The present species has a *Crassispira*-like appearance, but because of its shell, it could also be included in the genus *Drillia* Gray, 1838 according to the interpretation of this genus (Rolán & Ryall, 1999; Nolf & Verstraeten, 2006). Anyway, we have studied radula and operculum, which made us decide to include it in the genus *Crassispira*. *Drillia* have central, lateral and marginal teeth, which are not present in this species.

The species can easily be distinguished from most of the western African *Crassispira* species as they are larger, decollate, with thickened lip, though some are dark in colour. We comment on some of the smaller species it could be confused with:

Crassispira consociata (E.A. Smith, 1877) is larger and decollate, but juvenile specimens possess a multispiral protoconch.

Crassispira laevisulcata (von Maltzan, 1883) is more elongate, narrower, lighter in colour, lacking strong spiral cords and it is probably endemic to Senegal.

Crassispira pini Fernandes, Rolán & Otero-Schmitt, 1996 is darker, almost black, and narrower; furthermore this species is probably endemic to Senegal.

Crassispira sacerdotalis Rolán & Fernandes, 1992 is narrower and darker, with an angular protoconch and it is probably endemic to São Tomé Island.

Drillia tripter (von Maltzan, 1883), probably better placed in the genus *Crassispira*, is more elongate, lighter in colour, and the axial ribs are less developed and more numerous.

Family Drillidae Morrison, 1966
Genus *Agladrillia* Woodring, 1928

Type species (o. d.) *Agladrillia callothyra* Woodring, 1928

Agladrillia anadelgado spec. nov.
(Plate 2, Figs. 16-25)

Type material: Holotype (Figs 16-18), in MNCN (15.05/47047). Paratypes in the following collections: MNHN (1, Figs 19, 20); MHNS (1 s, 1 j) from type locality; CPR (1, Figs 21-23), Farol das Lagostas, 25 m.

Type locality: Off Luanda, Angola. 40-60 m.

Etymology: The specific name is derived from the apposition of Ana Delgado, malacologist and wife of the junior author.

Description: Shell (Figs 16-23) moderately large, solid, elongate conical, with a tall spire. Number of whorls 8. Protoconch (Fig. 24) pupoid, probably almost two whorls, but difficult to determine because the separation of the teleoconch is not clear. The first whorl after the nucleus is light brown, shiny and apparently smooth but some irregular spiral threads can be seen under magnification; the subsequent whorl is of the same colour and has 6 very fine but evident spiral threads; near the end of this second whorl the colour is lighter and at the same time axial ribs appear.

The diameter of the first whorl is 800 µm and that of the second almost 1 mm. The onset of the teleoconch has about 7 spiral threads, which increases to 11 in the following whorl.

In the subsequent ones the spiral sculpture is divided into about 7 very fine threads, in the subsutural depression, and another 7-8 threads below. The latter are slightly larger with wider interspaces; they transverse the very wide and strong opisthocline axial ribs, 7-8 per whorl, which reach up to the subsutural depression. There are about 24 spiral threads on the last whorl, below the subsutural area down to the base and 8 axial ribs. The suture is almost straight when crossing the ribs of the previous whorl and there is no evidence of a subsutural cord. Aperture (Fig. 25) almost rectangular, with a very short and open siphonal canal and a deep sinus on the upper part. The external lip is sharp, internally thickened on the columella, mainly on the upper part. There is a short fissure in the lowest part of the umbilical area. The columella is strongly curved on its upper part and almost straight on its lower part where it is a little opisthocline.

The colour of the shell is uniformly light creamish brown; the protoconch is a little darker.

Dimensions: The holotype measures 14.2 mm; the four paratypes are a little smaller.

Distribution: Only known from the Luanda area.

Remarks: Due to the scarcity of material we could not study the radula and operculum of this species.

Bibliographic references:

- Bernard, P.A., 1984. *Coquillages du Gabon*. Pierre A. Bernard, Libreville, Gabon. 140 pp.
- Fernandes, F., Rolán, E. & Otero-Schmitt, J., 1996. The genus *Crassispira* (Gastropoda, Turridae) in West Africa. *Journal of Conchology*, **35**(4): 283-301.
- Gray, J.E., 1838. On some new species of quadrupeds and shells. *Annals and Magazine of Natural History*, series 1, **1**:27-30.
- Kilburn, R.N., 1988. Turridae (Mollusca: Gastropoda) of southern Africa and Mozambique. Part 4. Subfamilies Drilliinae, Crassispirina and Strictispirinae. *Annals of the Natal Museum*, **29**(1): 167-320.
- Knudsen, J., 1952. Marine Prosobranchs of Tropical West Africa collected by the "Atlantide" Expedition 1945-46. *Videnskabelige Meddelelser fra Dansk naturhistorisk Forening i Kobenhavn*, **114**: 129-185, pls 1-3.
- Knudsen, J., 1956. Remarks on a collection of marine prosobranchs from Senegal. *Bulletin de l'Institut Française d'Afrique Noire*, sér. A, **18**: 514-529, pls 1-2.
- Maltzan, H.F. von, 1883. Beiträge zur Kenntnis der senegambischen Pleurotomiden. *Jahrbücher der Deutschen Malakozoologischen Gesellschaft*, **10**:115-135, pl. 3.
- Nicklès, M., 1950. *Mollusques testacés marins de la Côte occidentale d'Afrique. Manuels Ouest-Africains. Vol. II*. Paris: Lechevalier. 269 pp., 459 figs.
- Nolf, F. & Verstraeten, J., 2006. Upgrading of *Drillia consociata* Smith, var. *recordata* Sykes, 1905 (Mollusca: Gastropoda: Conoidea: Drilliidae) to the rank of species. *Neptunea*, **5**(4): 11-28.
- Odhner, N.H.J., 1923. Contribution to the marine molluscan faunas of South and West Africa. *Meddelanden fran Göteborgs Musei Zoologiska Avdelning*, **23**:1-39, pl. 1.

For this reason we could not reliably assign it to a genus. However, the shell is evidently very similar to the species *Agladrillia macella* (Melvill, 1923), *A. ukuminxa* Kilburn, 1988, *A. piscorum* Kilburn, 1988 and *A. benjamini* (Bartsch, 1915) as represented in Kilburn (1988, figs 57, 58, 157-162). It is different from those of *Crassispira* because this shell is clavate-fusiform, with the base strongly constricted. A spiral sculpture is present, even on the subsutural depression.

A. anadelgado spec. nov. is different from the South African species mentioned as it is narrower, more elongate and the spiral sculpture is noticeably finer in the subsutural area.

The shape of the shell is so unique that it cannot be confused with any other West African species of other genera.

Crassispira consociata (E.A. Smith, 1877) may have a fairly similar aspect. However, this species has a multispiral protoconch, usually decollate, the shell being larger, wider and more robust.

Acknowledgements:

To Jesús Méndez of the Centro de Apoyo Científico y Tecnológico a la Investigación (CACTI) of the University of Vigo for the SEM photographs. To Jesús S. Troncoso for allowing us to use the photographic set of the Department of Ecology at the University of Vigo and finally to David Monsecour, Frank Nolf and Johan Verstraeten (Belgium) for perusing the English text.

- Powell, A.W.B., 1966. The molluscan families Speightiidae and Turridae. An evaluation of the valid taxa, both Recent and fossil, with lists of characteristic species. *Bulletin of the Auckland Institute and Museum*, **5**: 1-184.
- Récluz, C., 1851. Description de quelques coquilles nouvelles. *Journal de Conchyliologie*, **2**(2): 194-216, pls 5-6.
- Reeve, L.A., 1845. Monograph of the Genus *Pleurotoma*. *Conchologia Iconica, or Illustrations of the shells of molluscous animals*. London: Reeve Brothers. Vol. 1: pls 20-33, species 166-305.
- Rolán, E. & Ryall, P., 1999. Checklist of the Angolan marine molluscs. *Reseñas Malacológicas*, **10**: 1-132.
- Tryon, G.W., 1884. Conidae, Pleurotomidae. *Manual of Conchology*, vol. VI. Tryon, Philadelphia. 413 pp., 34 pls.
- Tucker, J.K., 2004. Catalog of Recent and fossil turrids (Mollusca: Gastropoda). *Zootaxa*, 682. Auckland. 1295 pp.

Geographic distribution

- *Crassispira fuscobrevis* ● *Agladrillia anadelgado*



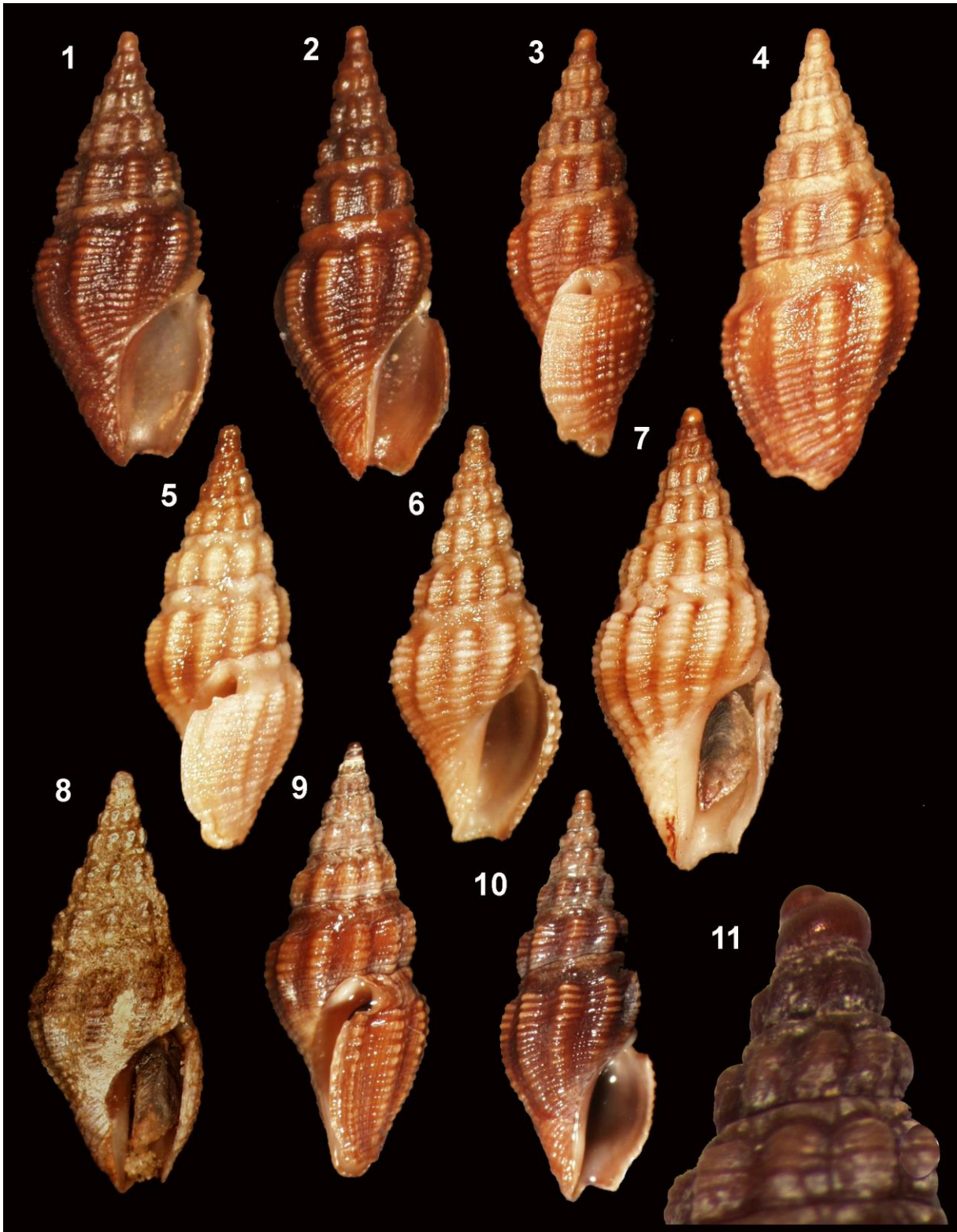


Plate I

Figs 1-11. *Crassispira fuscobrevis* spec. nov. 1: Holotype, 12.6 mm (MNCN); 2: paratype, 13.2 mm (MNH); 3: paratype, 13.5 mm (BMNH); 4: paratype, 12.4 mm (AMNH); 5: paratype 12.4 mm (USNM); 6: paratype, 12.3 mm (MCZ); 7: paratype, 13.4 mm (MHNS); 8: paratype, 12.3 mm (ZSM); 9, 10: paratypes (MHNS); 11: protoconch.

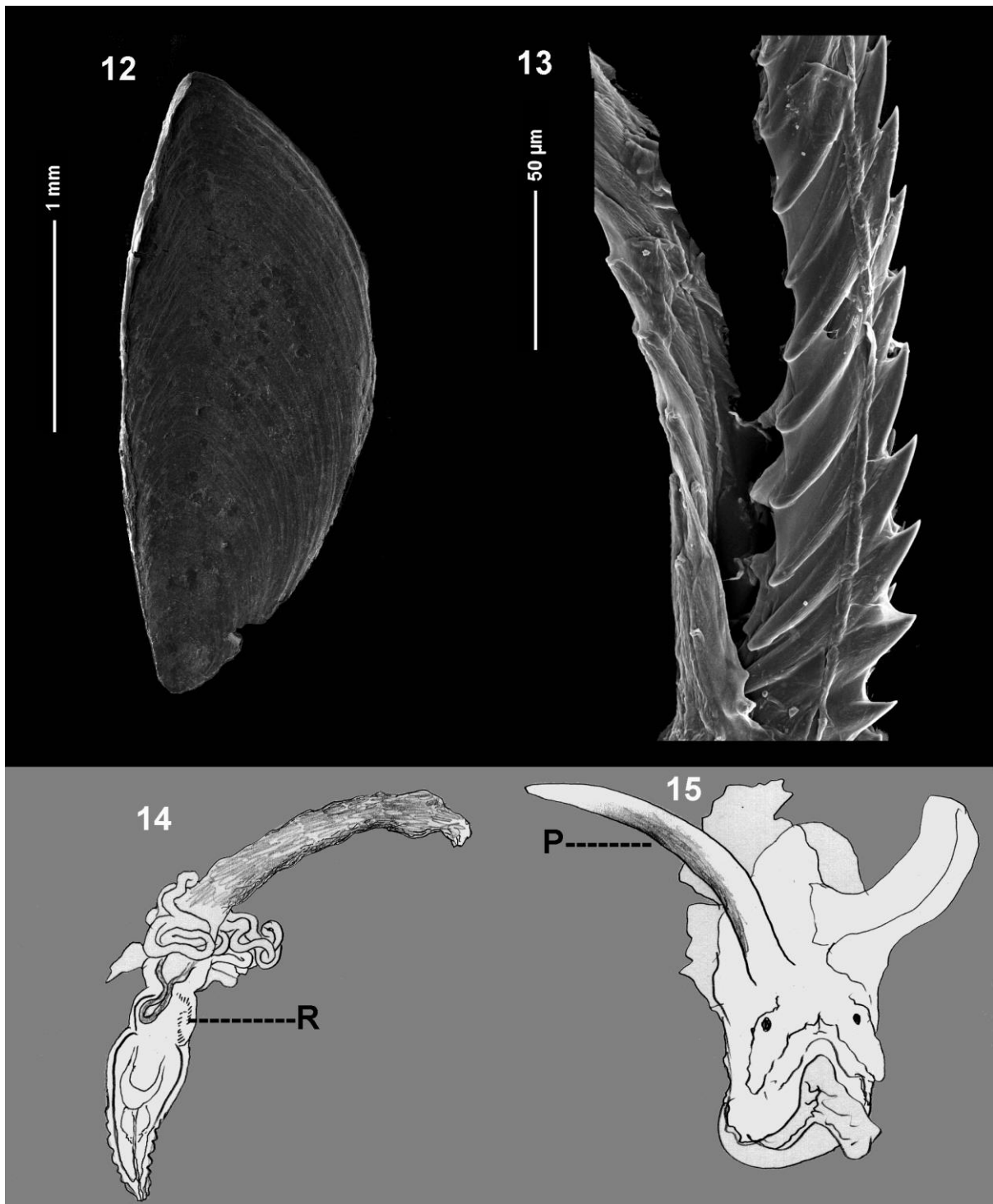


Plate II

Figs 12-15. *Drillia fuscobrevis*. 12: operculum; 13: radula; 14: detail of the radular apparatus (R = radula); 15: soft parts from an alcohol preserved animal (P = penis).

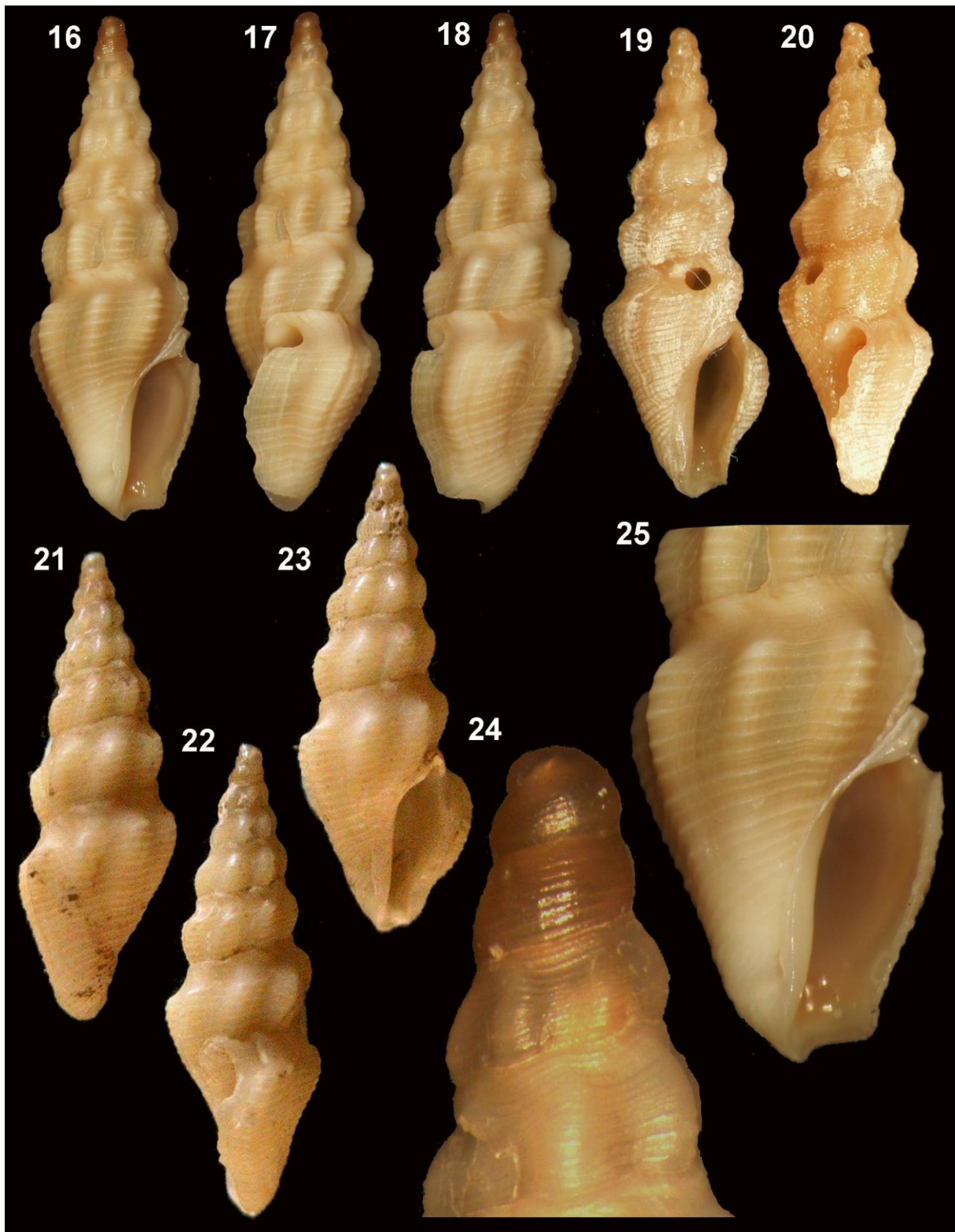


Plate III

Figs 16-25. *Agladrillia anadelgado* spec. nov. 16-18: holotype, 14.2 mm, off Luanda, 40-60 m (MNCN); 19, 20: paratype, 13.0 mm, type locality (MNHN); 21-23: paratype, 13.2 mm, Farol das Lagostas, Angola, 25 m (CPR); 24: protoconch, of the holotype; 25: detail of the aperture, holotype.