Conus trencarti (Mollusca: Gastropoda: Conidae): a new cone from Senegal

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Key words: GASTROPODA, CONIDAE, Senegal, West Africa, new species.

Abstract: A new species from circalittoral depths off the Dakar region (Senegal, West Africa) is described. This species is compared with a number of other cones from Senegal and Angola.

Abbreviations:

FN: Private collection of Frank Nolf, Oostende, Belgium
JP: Jacques Pelorce, Le Grau du Roi, France
JV: Private collection of Johan Verstraeten, Oostende, Belgium
MNHN: Muséum national d'Histoire naturelle, Paris, France

Introduction: In March 2006 the junior author obtained three specimens of a cone from Senegal. They were said to be collected by a scuba diver at a depth of 30-40 m near Almadies (Dakar, Senegal) and were tentatively labelled as a new species. In April 2007, the electronic magazine '*The Cone Collector* 2', illustrated two specimens of this cone species, identified as *Conus* cf. *pineaui*. Later on, in March 2008, the junior author obtained a lot of interesting shells from Mr. Alex Trencart, who had been actively shell collecting as a scuba diver off Dakar for three years. Among these there were again three specimens of this particular cone. After careful comparison with other circalittoral and littoral cones, these shells proved to possess enough specific characteristics to deserve a description as a new species.

Material and methods: The new species is described and figured from material belonging to the authors' collections. Comparison with similar species is also based on specimens of both authors, the collection of Jacques Pelorce and further data from literature.

Type material: Plate I, Figs 4-9; Plate II, Figs 10-15.
Holotype: Almadies, Senegal. On rock. Collected at a depth of 20 m. 26.32 mm. MNHN. (Pl. I, Figs 8-9)

Paratypes:

1. 23.71 mm (FN). Off Dakar, Senegal. Collected by SCUBA diver (Alex Trencart). 2008. (Pl. I, Figs 4-5).
2. 26.09 mm (JV). Off Dakar, Senegal. Collected by SCUBA diver (Alex Trencart). 2008. (Pl. I, Figs 6-7).
3. 22.70 mm (JV). Almadies, Dakar, Senegal. On rocks. Dived at a depth of 30-40 m. (Pl. II, Figs 10-11).
4. 24.18 mm (JV). Almadies, Dakar, Senegal. On rocks. Dived at a depth of 30-40 m. (Pl. II, Figs 12-13).
5. 25.20 mm (JV). Almadies, Dakar, Senegal. On rocks. Dived at a depth of 30-40 m. (Pl. II, Figs 14-15).

Type locality: Dakar, Senegal, West Africa.

Measurements: From 23 to 27 mm.

Description: The shell is moderately small and solid. The last whorl is ventricosely conical to ovate, shoulder rounded. Outline convex at adapical half, straight or slightly concave below. Spire moderately high, slightly sigmoid. Sutural ramps convex with faint spiral ribs. Last whorl rather smooth but marked with some 10 spiral ribs at the base. Ground colour white with a pattern of light olive-brown markings forming irregular white flecks and triangulate spots throughout, mainly organised as three reticulated bands on the last whorl, one at the shoulder, a second one on the higher part and a third one at about mid body. In some specimens the tented markings coalesce forming wavy decurrent axial lines. These lighter zones are clearly visible in the brown to bluish grey coloured aperture.

Derivation of name: The name '*trencarti*' is attributed to honour the efforts of Alex Trencart (Paris, France), a French scuba diver. He not only collected most specimens of this cone, but made many interesting shell species from deeper water habitats, often inaccessible to trawling or littoral collecting available.

As a matter of fact, the efforts of several French scuba divers, such as Alex Trencart and Jacques Pelorce, have significantly increased the knowledge about many shell species and have resulted in the description of a fair amount of new species.

Habitat: *Conus trencarti* was collected on rocky bottoms from 20 to 40 m deep.

Geographic range: The species is at present only known to us from a restricted range around Dakar (Senegal).

Discussion:
A number of circalittoral and littoral cones from Senegal (*C. ambiguus* Reeve, 1844, *C. bruguieresi* Kiener, 1845, *C. echinophilus* Petuch, 1975, *C. genuanus* Linnaeus, 1758, *C. mercator* Linnaeus, 1758, *C. pulcher* Lightfoot, 1786, *C. tabidus* Reeve, 1844, *C. unifasciatus* Kiener, 1845) are quite different and need not be compared with the new species.
The other species from Senegal show more similar appearances and they are here mentioned in alphabetical order with their main characteristics:

- *Conus cacao* Ferrario, 1983 (Pl. III, Figs 16-26) has a larger shell (35 to 45 mm), and generally a greenish brown background with two tent-marked bands, sometimes coalescing, giving the whole shell a reticulated appearance.
- *Conus cloveri* Walls, 1978 (Pl. VIII, Figs 62-65): a larger species (up to 45 mm) with a pattern of axial brownish yellow lines against a white background.
- *Conus guinaicus* Hwass, 1792 (Pl. IV, Figs 27-33) a much larger shell (up to 60 mm), with a very blunt and pyriform profile; the ground colour is usually light bluish with a pattern of irregular wavy brown markings; smaller brownish shells with reduced ground colour may show a vague similarity with *C. trencarti*.
- *Conus hybridus* Kiener, 1845 (Pl. V, Figs 34-43) has a rounded shoulder and spire with a convex profile and a larger shell (30 to 47 mm); the outside is convex adapically; the ground colour is bluish grey with very fine brown markings forming a slightly reticulated pattern over the whole surface; smaller specimens with brown colour and reduced background have the same pattern as in *C. trencarti*.
- *Conus pineaui* Pin & Leung Tack, 1995 (Figs 1-2: holotype; Pl. VI, Figs 44-53) has an orange to brown coloured shell with axial zigzagging white flammulae; the shell is stouter with a more triangular shape.[1]
- *Conus taslei* Kiener, 1845 (Fig. 3: holotype; Pl. VII, Figs 54-59) can easily be distinguished by its triangular profile, relatively wide angulated shoulder and moderately high spire; the background colour of the shell is bluish, usually with a pattern of dark lines and blotches; some specimens can be completely bluish.
- *Conus* cf. *ventricosus* Gmelin, 1791 (Pl. VII, Figs 60-61) is a species with a more elongated shell; it has a greenish brown pattern on a bluish white background. Could be a separate species.

Conus trencarti can also be compared with a few *Conus*-species from Angola like:

- *Conus tenuilineatus* Rolán & Röckel, 2001 (Pl. VIII, Figs 70-71), which has a more elongated ventricosely conical last whorl. The base colour of the shell is white ornamented with numerous close-set brown lines, flowing together at shoulder and base.
- *Conus zebroides* Kiener, 1845 (Pl. VIII, Figs 66-69) with a lower spire and more convex sutural ramps. The ground colour is white with evenly spaced brown streaks, occasionally coalescing, even present on the spire. The aperture is shaded with bluish brown but it is completely white in larger specimens.

Conclusion: In spite of the superficial similarity with some other *Conus*-species living in West Africa, this species can immediately be differentiated by the following characteristics: the convex outline and the pattern of white flecks and triangular spots on an olive-brown background arranged as three reticulated bands on the last whorl.

Acknowledgements: We would like to thank Alex Trencart (Paris, France) for providing us with many interesting shells, among them specimens of the new cone. Particular thanks are due to Jacques Pelorce (Le Grau du Roi, France) who allowed us to study the cone species collected off Dakar (Senegal) by scuba diving, amongst which a large number of the *Conus pineaui* - *Conus taslei* group. David Monsecour was so kind as to revise our English text.

[1] After comparing a number of specimens of both *C. pineaui* and *C. taslei* we remain hesitant about the specific separation between both. In our opinion, further research on specimens of both species is needed before concluding if they are really separate species.

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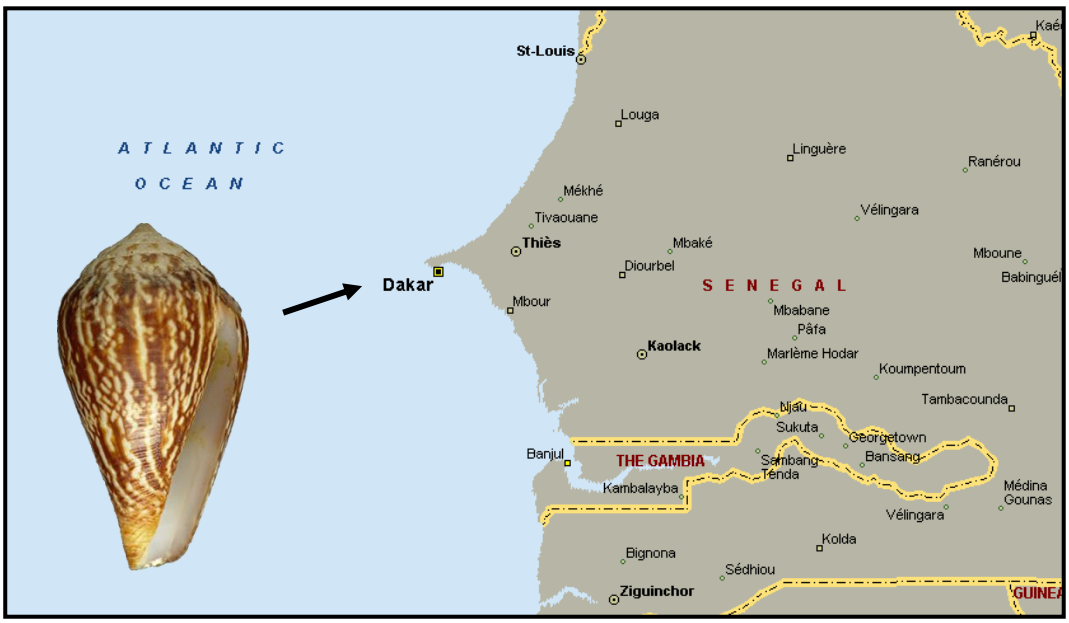

Type locality of *Conus trencarti*

Holotype of *Conus pineaui* Pin & Leung Tack, 1995 (MNHN) (from *La Conchiglia*, 276: 45, Figs 1-2)

Type of *Conus taslei* Kiener, 1845 (MNHN) – 31.5 x 19 mm

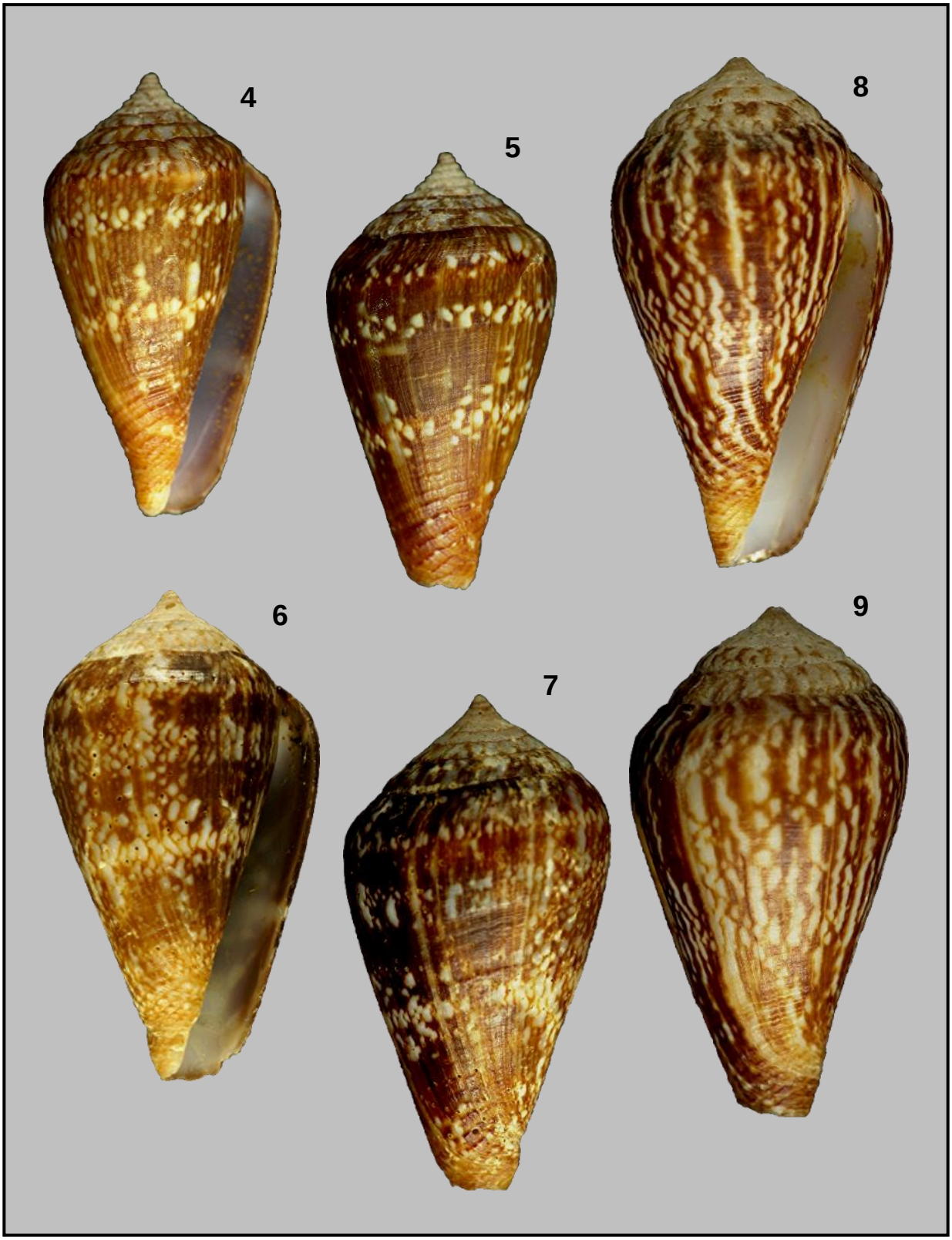

Plate I. Figs 4-9: *Conus trencarti*; 4-7: off Dakar, Senegal. Collected by SCUBA diver. 2008; 4-5: 23.71 mm. Paratype 1 (FN); 6-7: 26.09 mm. Paratype 2 (JV); 8-9: Almadies, Senegal. Dived at a depth of 20 m, on rocks. 26.32 mm. Holotype (MNHN).

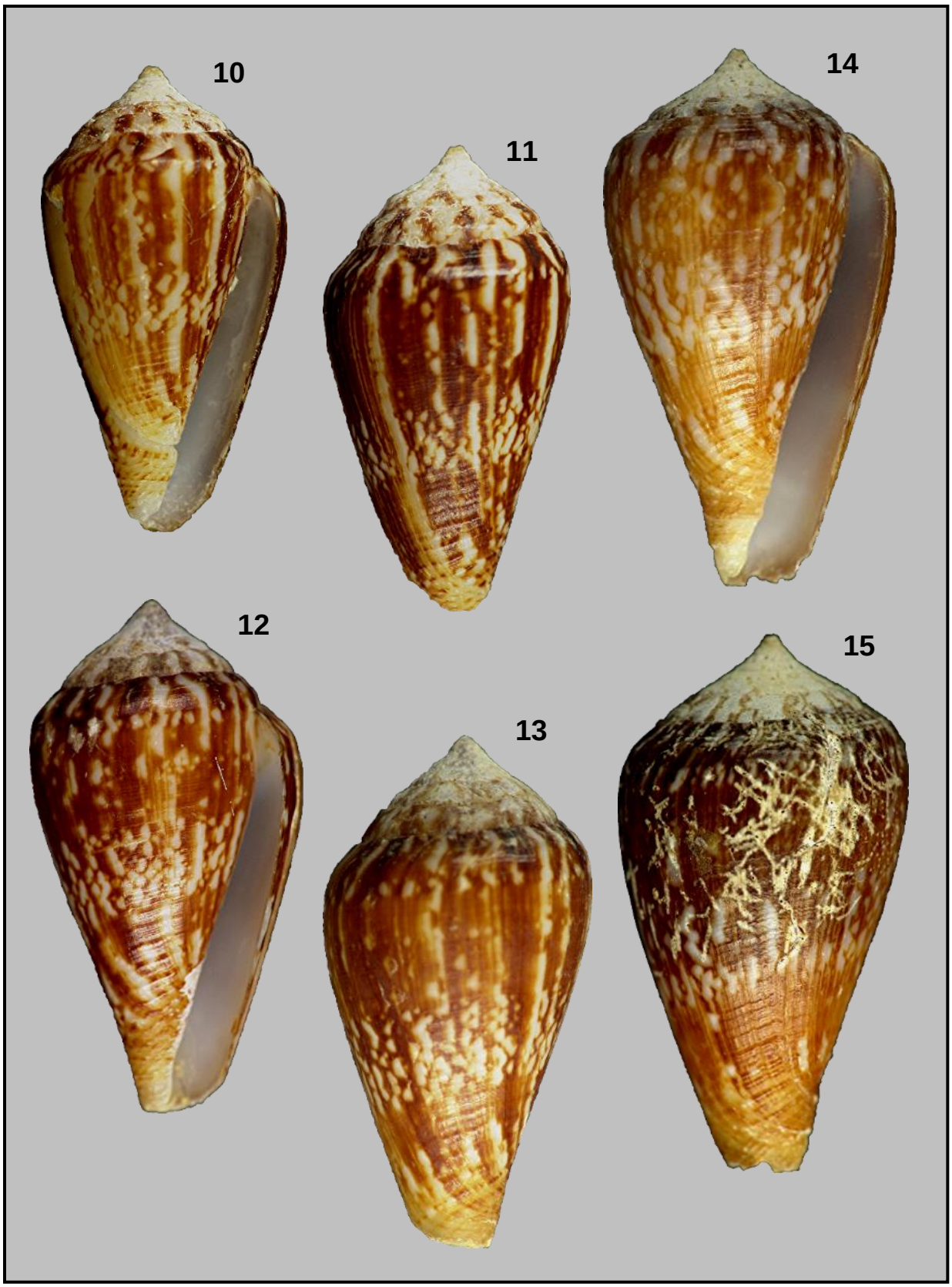

Plate II. Figs 10-15: *Conus trencarti*; Almadies, Dakar, Senegal. On rocks. Dived at a depth of 30-40 m; 10-11: 22.70 mm. Paratype 3 (JV); 12-13: 24.18 mm. Paratype 4 (JV); 14-15: 25.20 mm. Paratype 5 (JV).

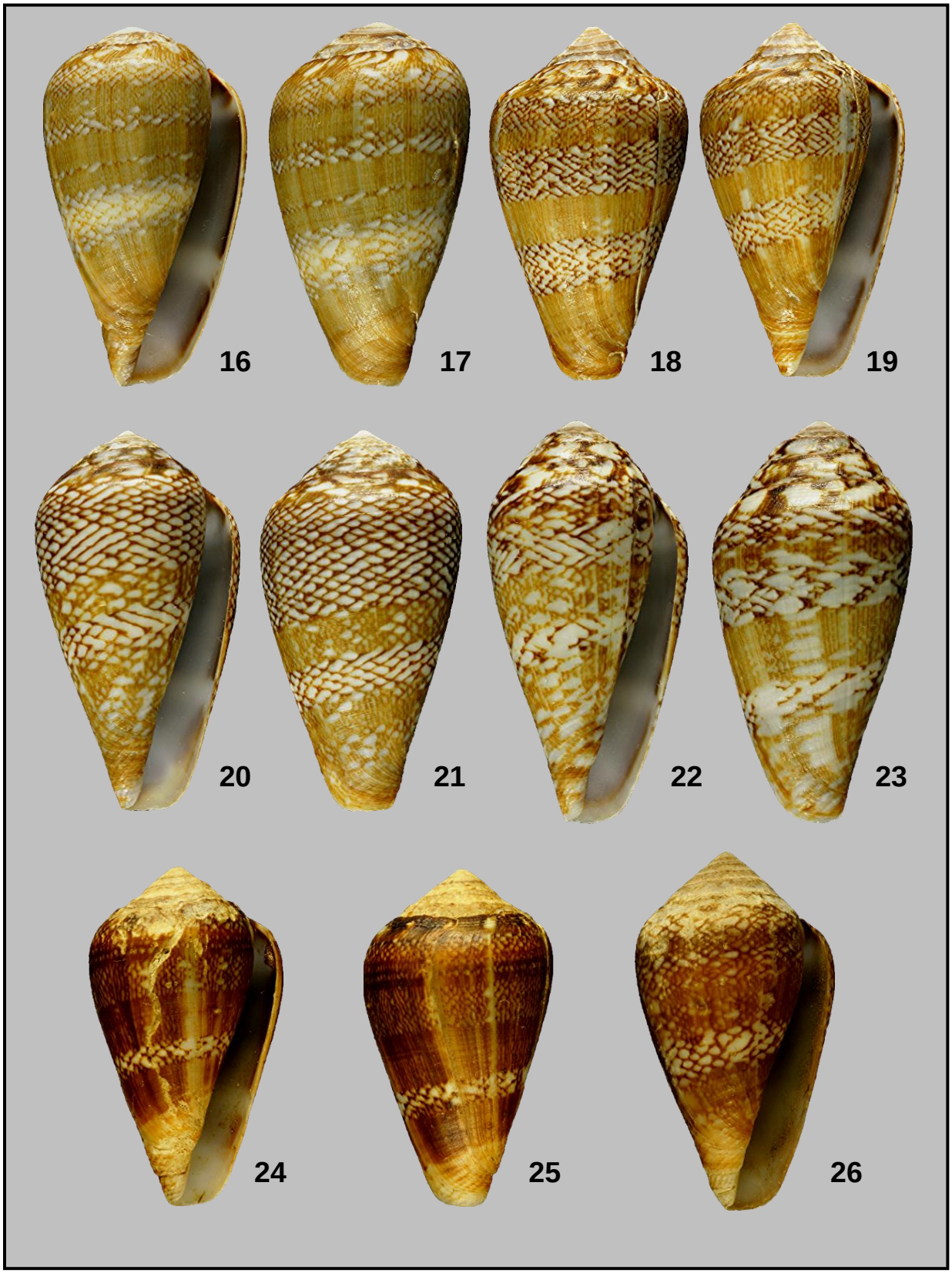

Plate III. Figs 16-26: *Conus cacao* Ferrario, 1983 (FN); 16-23: Popenguine, Senegal. Under rocks. Dived at a depth of 1 m. 1978; 16-17: 38.71 mm; 18-19: 38.67 mm; 20-21: 39.02 mm; 22-23: 40.16 mm; 24-26: Senegal. JV; 24-25: 28.27 mm; 26: 31.65 mm.

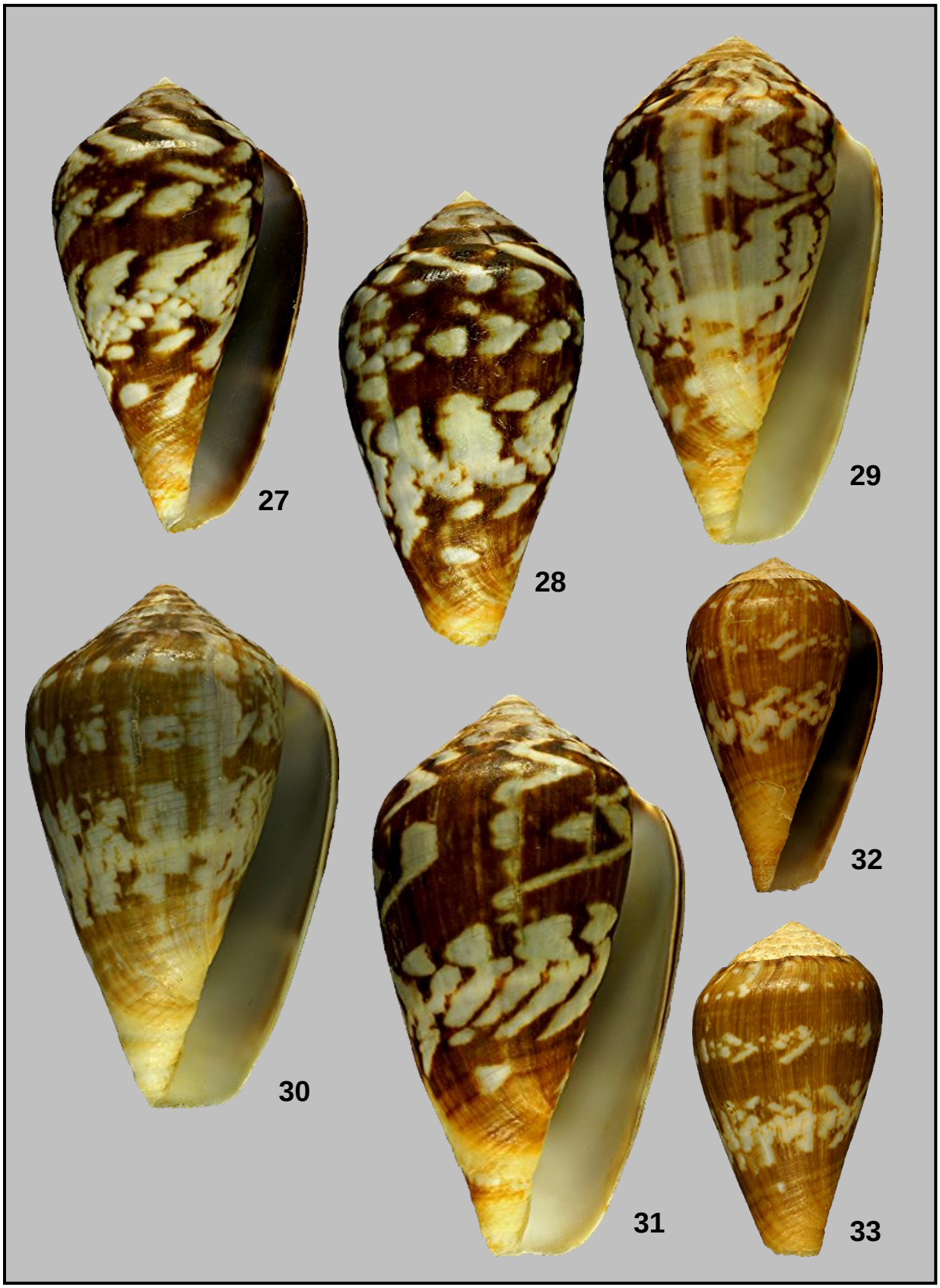

Plate IV. Figs 27-33: *Conus guinacus* Hwass, 1792; 27-31: Point of Hann, off Dakar, Senegal. In sand. Dived at a depth of 5 m. March 1978. FN; 27-28: 42.02 mm; 29: 53.73 mm; 30: 55.40 mm; 31: 59.38 mm; 32-33: Dakar, Senegal. Collected in shallow water. 32.11 mm. JV.

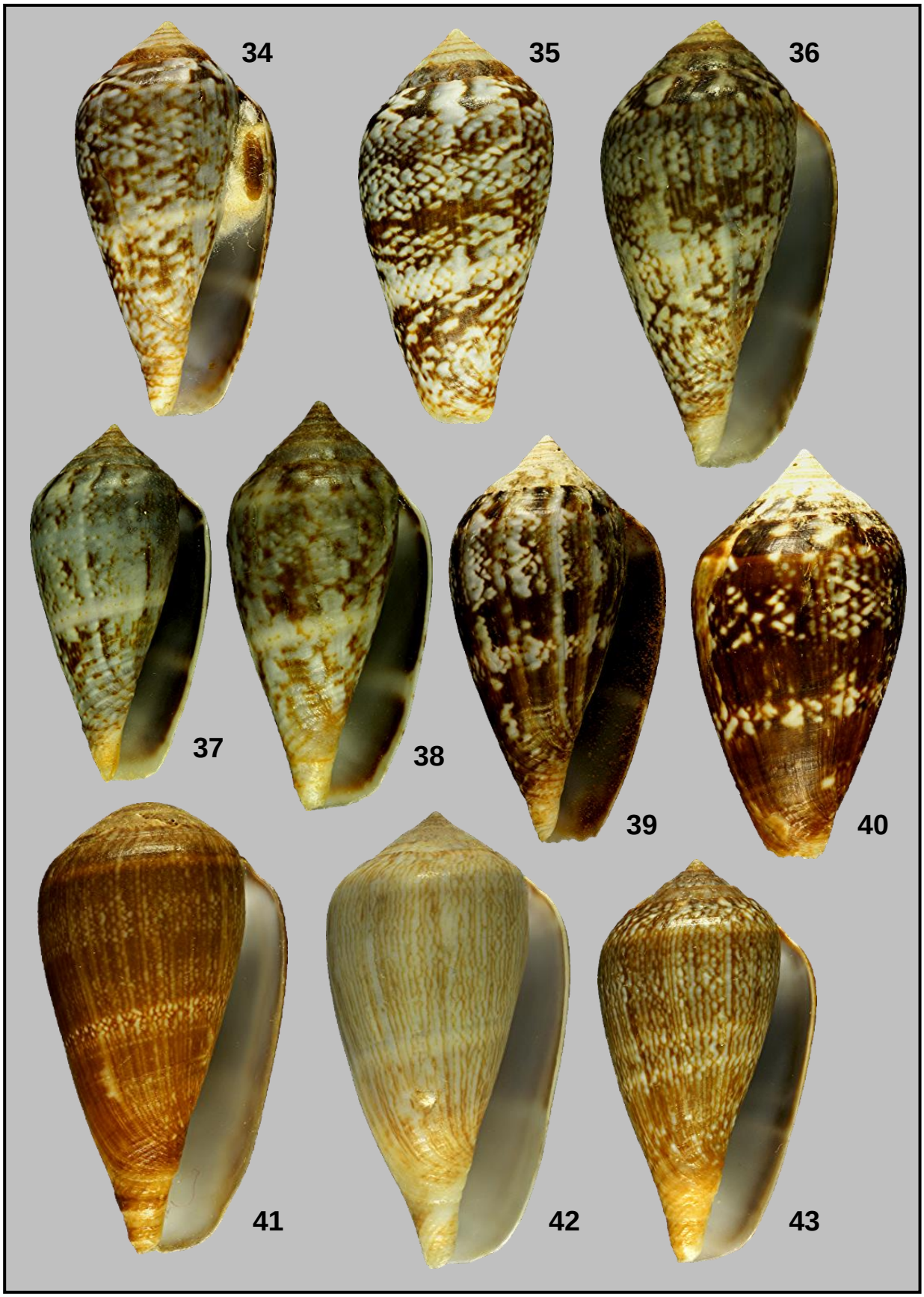

Plate V. Figs 34-43: *Conus hybridus* Kiener, 1845; 34-36: Point of Almadies, North Dakar, Senegal. On rocky bottom. Dived at a depth of 5 m. February 1976. FN; 34-35: 41.52 mm; 36: 46.63 mm; 37-38: Villa Cisneros, Western Sahara. At low tide. FN; 37: 32.79 mm; 38: 36.03 mm; 39-40: near Dakar, Senegal. On rocky bottom. From diver. 1990. 36.46 mm. JV; 41-43: Hann, off Dakar, Senegal. Under rock. Dived at a depth of 3 m. April 1978. FN; 41: 45.97 mm; 42: 46.07 mm; 43: 34.12 mm.

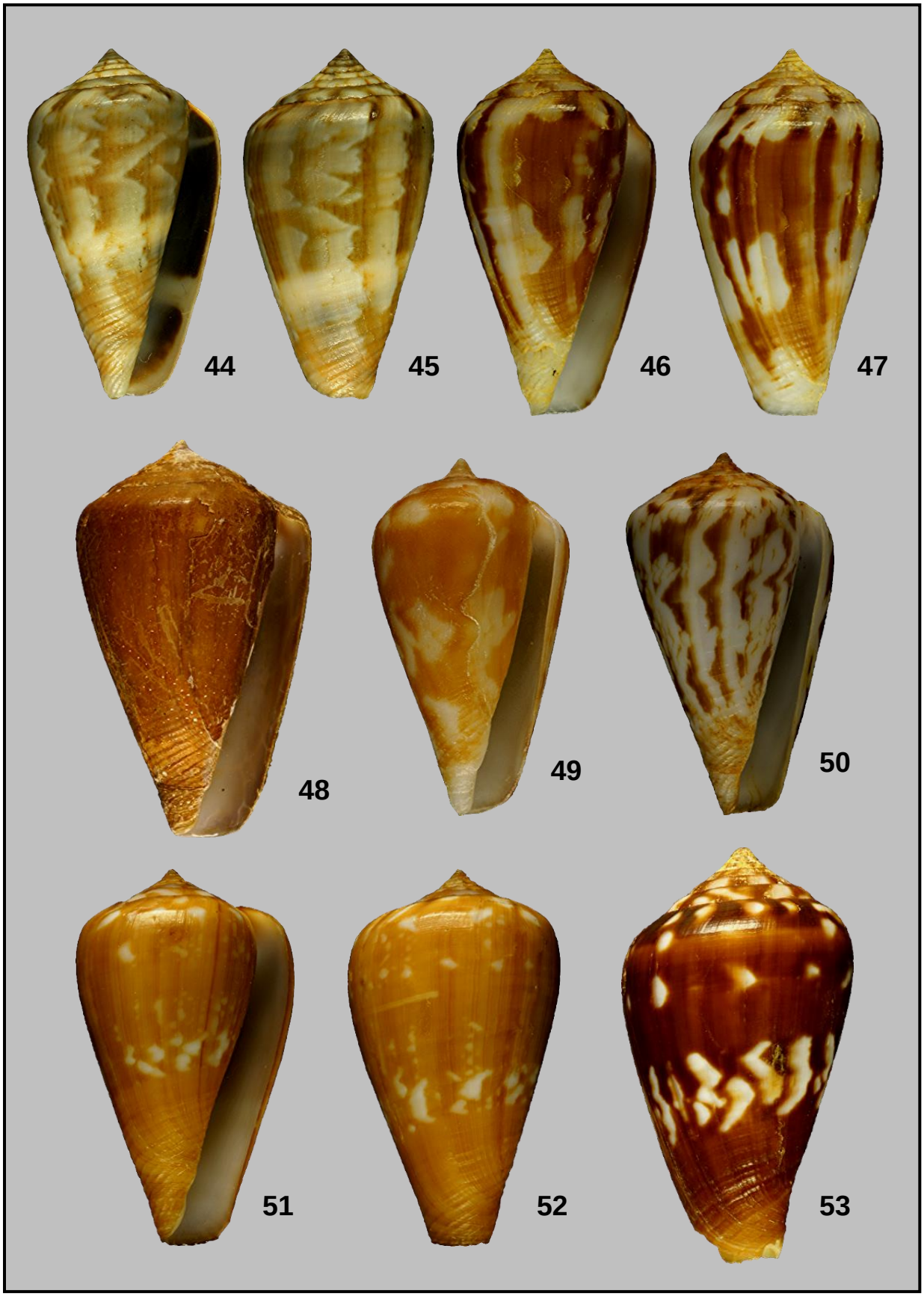

Plate VI. Figs 44-53: *Conus pineaui* Pin & Leung Tack, 1995; 44-48: off Faoud Islands, Senegal. Trawled by fishermen. November 1979. FN; 44-45: 25.61 mm; 46-47: 27.13 mm; 48: 29.86 mm; 49-50: M'Bao, Senegal. Dived at a depth of 25 m, on wrecked ship. JV; 49: 24.79 mm; 50: 27.45 mm; 51-53: Cap Vert, Senegal. Among stones. Dived at a depth of 15 m. September 1996. JV; 51-52: 28.49 mm; 53: 29.09 mm.

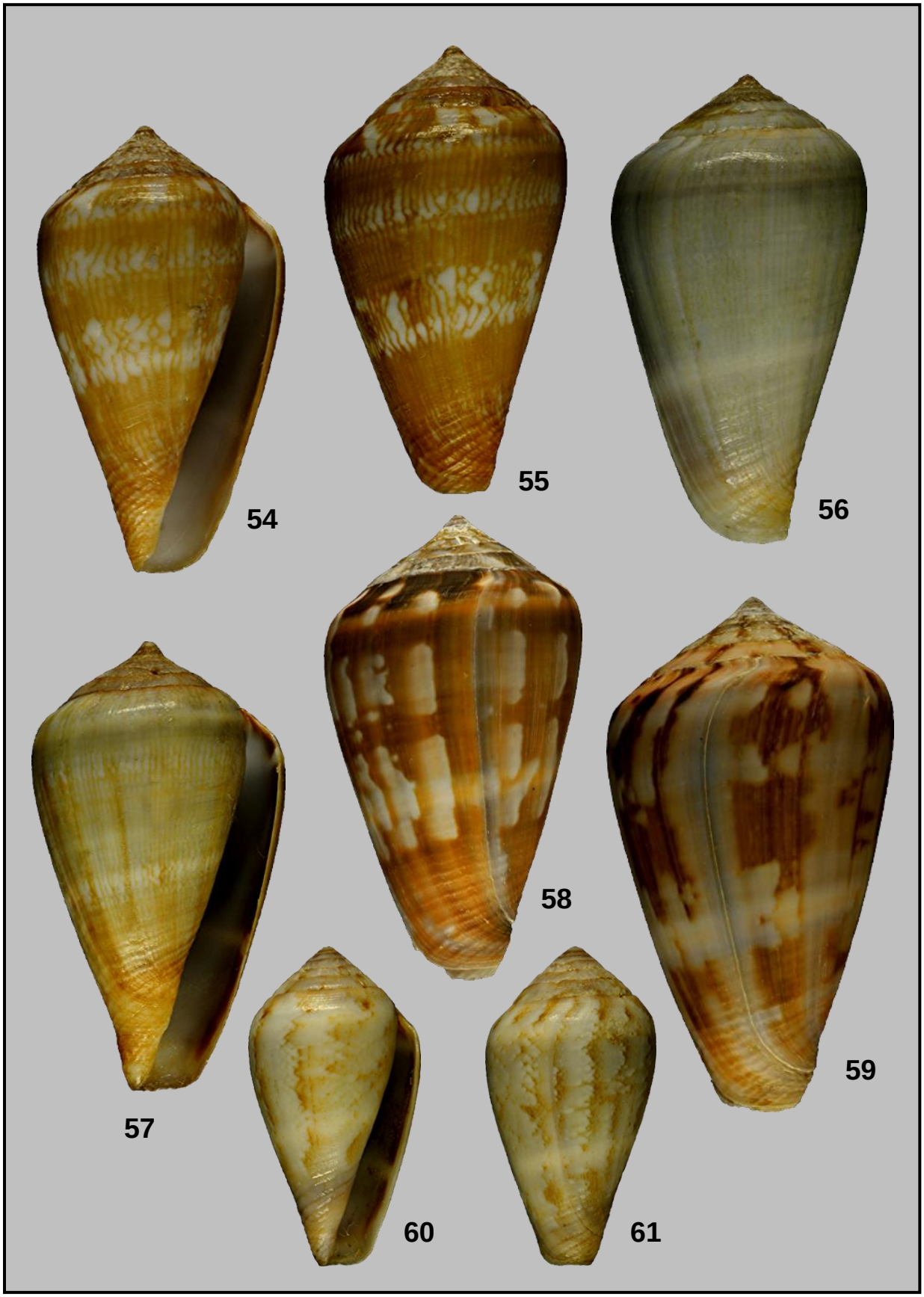

Plate VII. Figs 54-59: *Conus taslei* Kiener, 1845; 54-57: Dakar, Senegal. Dived. 1978. FN; 54-55: 32.80 mm; 56: 34.97 mm; 57: 33.96 mm; 58-59: near Faoud Islands, Senegal. In deep water, by local fishermen. JV; 58: 36.99 mm; 59: 39.63 mm; Figs 60-61: *Conus* cf. *ventricosus* Gmelin, 1791. Pointe Sarène, Senegal. On rocky bottom at low tide. April 1978. 22.24 mm. FN.

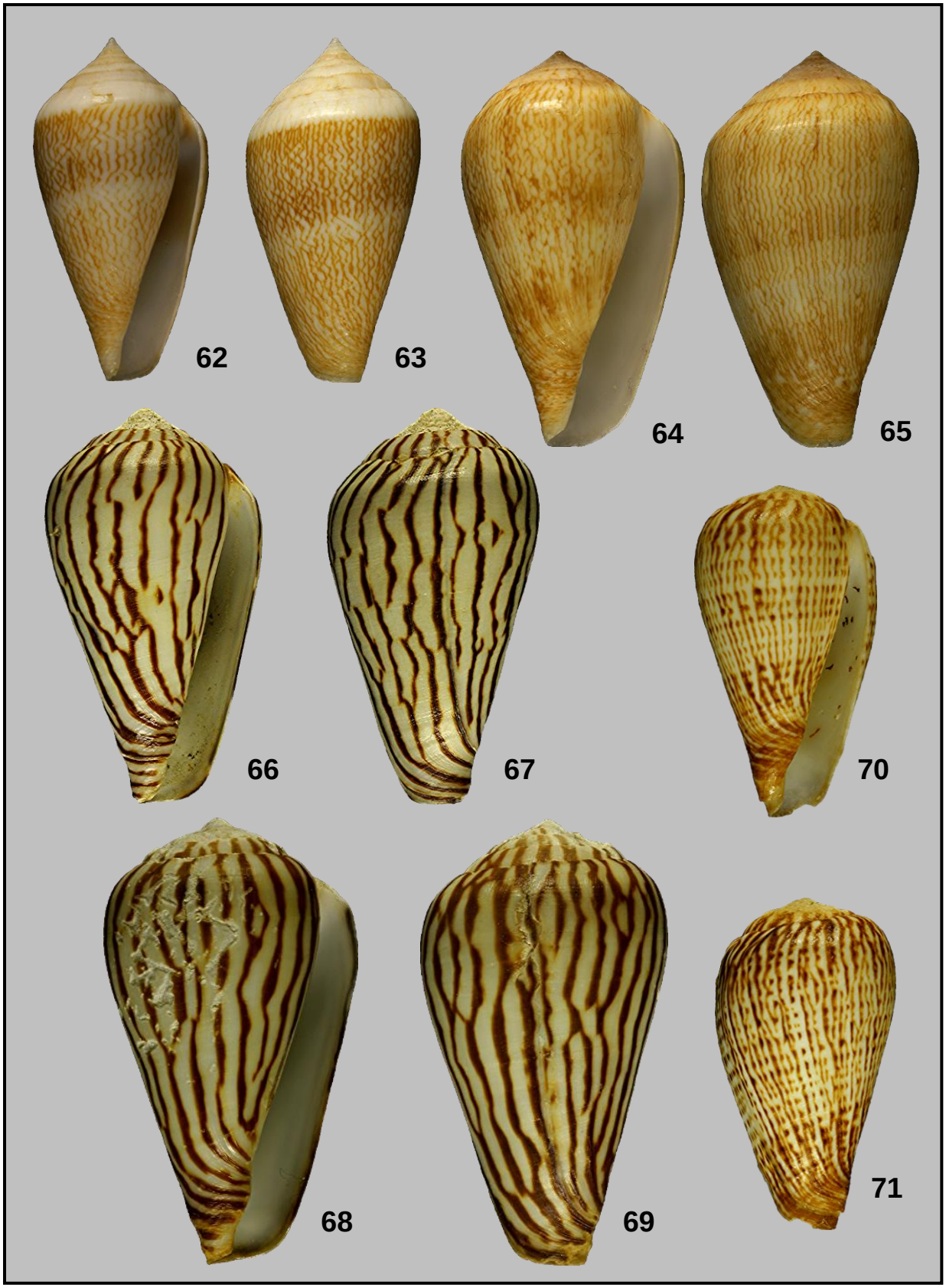

Plate VIII. Figs 62-65: *Conus cloveri* Walls, 1978. Anse Bernard, Dakar, Senegal. In sand, under rock. April 1975. FN; 62-63: 29.05 mm; 64-65: 36.60 mm; Figs 66-69: *Conus zebroides* Kiener, 1845. Luciras Bay, south of Angola. Under rocks. Collected by the CPAS-expedition. Dived at a depth of 10 m. FN; 66-67: 36.81 mm; 68-69: 41.16 mm; Figs 70-71: *Conus tenuilineatus* Rolán & Röckel, 2001. Porto Alexandre, Angola. 27.28 mm. FN.

***Conus cacao Ferrario,* 1983**

Conus trencarti

***Conus guinaicus* Hwass, 1792**

***Conus hybridus* Kiener, 1845**

***Conus taslei* Kiener, 1845**

***Conus pineaui* Pin & Leung Tack, 1995**

Plate IX: Comparison of *Conus trencarti* with similar cones from Senegal

A new turrid species from West Africa: *Drillia ghyooti* (Mollusca: Gastropoda: Drilliidae)

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Keywords: GASTROPODA, DRILLIIDAE, *Drillia ghyooti*, West Africa, new species.

Abstract: A new species from West Africa is described within the genus *Drillia*. The shell and its protoconch are illustrated.

Abbreviations:

FN: Private collection of Frank Nolf, Oostende, Belgium
JEG: Private collection of Jean-Etienne Ghyoot, Destelbergen, Belgium
JV: Private collection of Johan Verstraeten, Oostende, Belgium
MNHN: Muséum national d'Histoire naturelle, Paris, France

Introduction: Up to now the genus *Drillia* has been very extensively used in a conventional manner, to cover any turrid with a tall spire and a truncated body whorl, from most parts of the world but mainly from West Africa. As long as no definitive keys are set down to differentiate the large number of genera used in the families DRILLIIDAE, CLAVATULIDAE and TURRIDAE I regard the newly described species as belonging to the genus *Drillia*.

The new species in the genus *Drillia* has only recently been discovered off the coast of Ghana and the Gulf of Guinea, probably due to its habitat on rocky seafloors from 30 metres depth onwards. To my knowledge this species (a juvenile specimen) was first illustrated in Ardovini, R. & Cossignani, T. (2004). However, it was confused with *Drillia dakarensis* Knudsen, 1956, an uncommon, but very different species (Pl. IV, Figs 23-26).

During the past years a few specimens were dredged off the coast of Ghana, Ivory Coast and Equatorial Guinea, mostly in a rather poor condition. Only the last two years more specimens turned up off Lagoa Azul, (São Tomé) collected through scuba diving. The specific characteristics make it a separate species. Its distribution area is presently known to extend from Ivory Coast to the Gulf of Guinea.

Material and methods: The new species is described and figured from material belonging to different collections. Comparison with other similar species is based upon useful data from literature.

Type material: Plate I, Figs 1-8; Plate II, Figs 9-12; Plate III, Figs 13-16; Plate IV, Figs 17-22.

Holotype: 12.46 mm (MNHN).
Kia Reef, São Tomé. Under rock. Collected by diver at a depth of 12 m. September 2007. (Pl. I, Figs 5-6).

Paratypes:

1. 10.95 mm (FN). Kia Reef, NW Sao Tomé. Under rock. Collected by diver at a depth of 12 m. September 2008. (Pl. I, Figs 1-2).
2. 11.75 mm (FN). Kia Reef, NW Sao Tomé. Under rock. Collected by diver at a depth of 12 m. September 2008. (Pl. I, Figs 3-4).
3. 13.06 mm (FN). Kia Reef, NW Sao Tomé. Under rock. Collected by diver at a depth of 12 m. September 2008.
4. 15.71 mm (FN). Kia Reef, NW Sao Tomé. Under rock. Collected by diver at a depth of 12 m. September 2008. (Pl. I, Fig. 7-8).
5. 14.39 mm (FN). Off Lagoa Azul, NW São Tomé. Under rock. Collected by scuba diver at a depth of 15-20 m at night. September 2007. (Pl. II, Figs 9-10).
6. 16.31 mm (FN). Off Lagoa Azul, NW SãoTomé. Under rock. Collected by scuba diver at a depth of 15-20 m at night. September 2007. (Pl. II, Figs 11-12).
7. 11.84 mm (JEG). Off Lagoa Azul, NW São Tomé. Under rock. Collected by scuba diver at a depth of 30 m at night. 25 September 2008. (Pl. III, Figs 13-14).
8. 14.31 mm (JEG). Off Lagoa Azul, NW São Tomé. Under rock. Collected by scuba diver at a depth of 30 m at night. 25 September 2008. (Pl. III, Figs 15-16).
9. 15.21 mm (FN). Mudrachmi Bay, Ghana. In rocky area. Dredged at a depth of 17 m. October 2001. (Pl. IV, Fig. 17).
10. 13.79 mm (JV). Off San Pedro, Ivory Coast. Dredged at a depth of 40-50 m. In sand and rubble. January 2004. (Pl. IV, Figs 18-19).
11. 15.08 mm (FN). North of San Antonio, Annobón, Equatorial Guinea. (Pl. IV, Figs 20-21).

Locus typicus: NW São Tomé.

Description: Small, light, turreted shell with a high pointed spire. Protoconch consisting of about 3-3.5 whorls. Number of whorls 10. Last whorl taking nearly half of total length. Whorls provided with rather sharp, strong, relatively broad, transversal shouldered ribs, 8 on the last whorl and 8-9 on the penultimate whorl. These ribs run at right angle over the whole surface of all whorls, but on the body whorl they are particularly developed in its higher part. Ribs are crossed by faint threads, nearly obsolete on the ribs, about 20 on the last whorl and a total of 8 on the penultimate whorl.
There is a broad smooth subsutural zone. The columella is slightly reflected with a strong stromboid notch. The sinus is broad and deep. The surface of the shell is rather glossy. The aperture is broad, smooth and porcellaneous, clearly showing the colouration of the last whorl throughout.
Colouration: milky to creamy white over the whole surface with a broad band covering the lower part of each whorl. The latter is less apparent on the parallel ribs, and in the interstices present as brown flecks. On the body whorl this brown band runs over the middle of the surface, followed by a second very narrow pinkish brown ribbon on the siphonal canal of adult specimens.
Animal and radula are unknown.

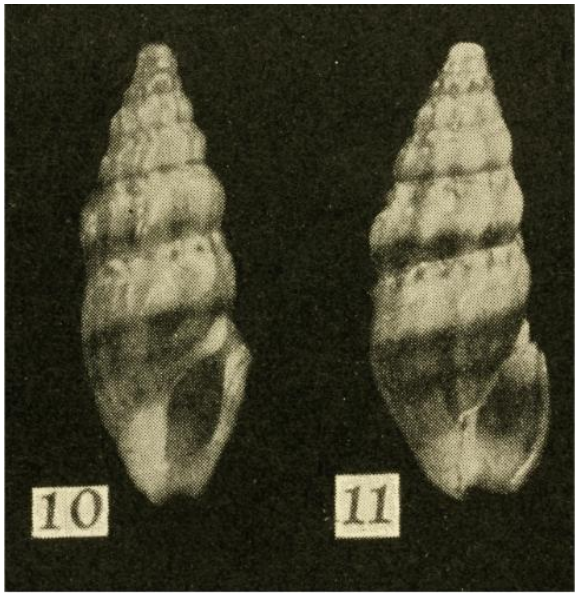
Etymology: The species' name is dedicated to Jean-Etienne Ghyoot (Destelbergen, Belgium), a good friend and excellent diver. This enthusiastic shell collector brought many shells from his expeditions in India in the past years and recently from São Tomé, where he collected good quality specimens of the new species through scuba diving at night.

Habitat: Under rocks in deeper water (from -12 m down to -50 m) among sand and seaweed.

Geographic range: From Ivory Coast to São Tomé & Principe.

Measurements: From 10 to 17 mm.

Discussion: This shell is rather unique in the Gulf of Guinea, but it was confused with *Drillia dakarensis* Knudsen, 1956 (Pl. IV, Figs 23-26). However, the latter is a very small species (5-9 mm) with a totally different appearance. It has a typical spiral row of rounded nodules just below the suture, more distinct and closely set on the last whorl. The siphonal canal is short and broad. There is no spiral sculpture. The colouration is whitish with darker brown spots at the suture. It seems to be an uncommon species, restricted to the coasts of Senegal. Specimens were found in the MNHN turrid collection.



From: Knudsen, J., 1956. Remarks on a Collection of Marine Prosobranchs from Senegal. *Bulletin de l'Institut d'Afrique Noire*. Tome XVIII, série A, n°2, pl. 2, figs 10-11: *Drillia dakarensis* n. sp. Type.

Conclusion: Through comparison with *Drillia dakarensis* Knudsen, 1956 from Senegal we can establish *D. ghyooti* as a different species with a very specific and consistent appearance, and living in the Gulf of Guinea.

Acknowledgements: I am very grateful to Jean-Etienne Ghyoot (Destelbergen, Belgium), Sandro Gori (Italy) and Johan Verstraeten (Oostende, Belgium) for providing samples of this shell. I thank the latter for a critical perusal of the text and David Monsecour (Aarschot, Belgium) for carefully controlling the English text. I am also thankful to Dr. Philippe Bouchet and Virginie Héros, both from the MNHN, for the loan of West African turrids.

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Geographic distribution of *Drillia ghyooti*

Drillia dakarensis **Knudsen, 1956**

Drillia ghyooti **Nolf, 2008**

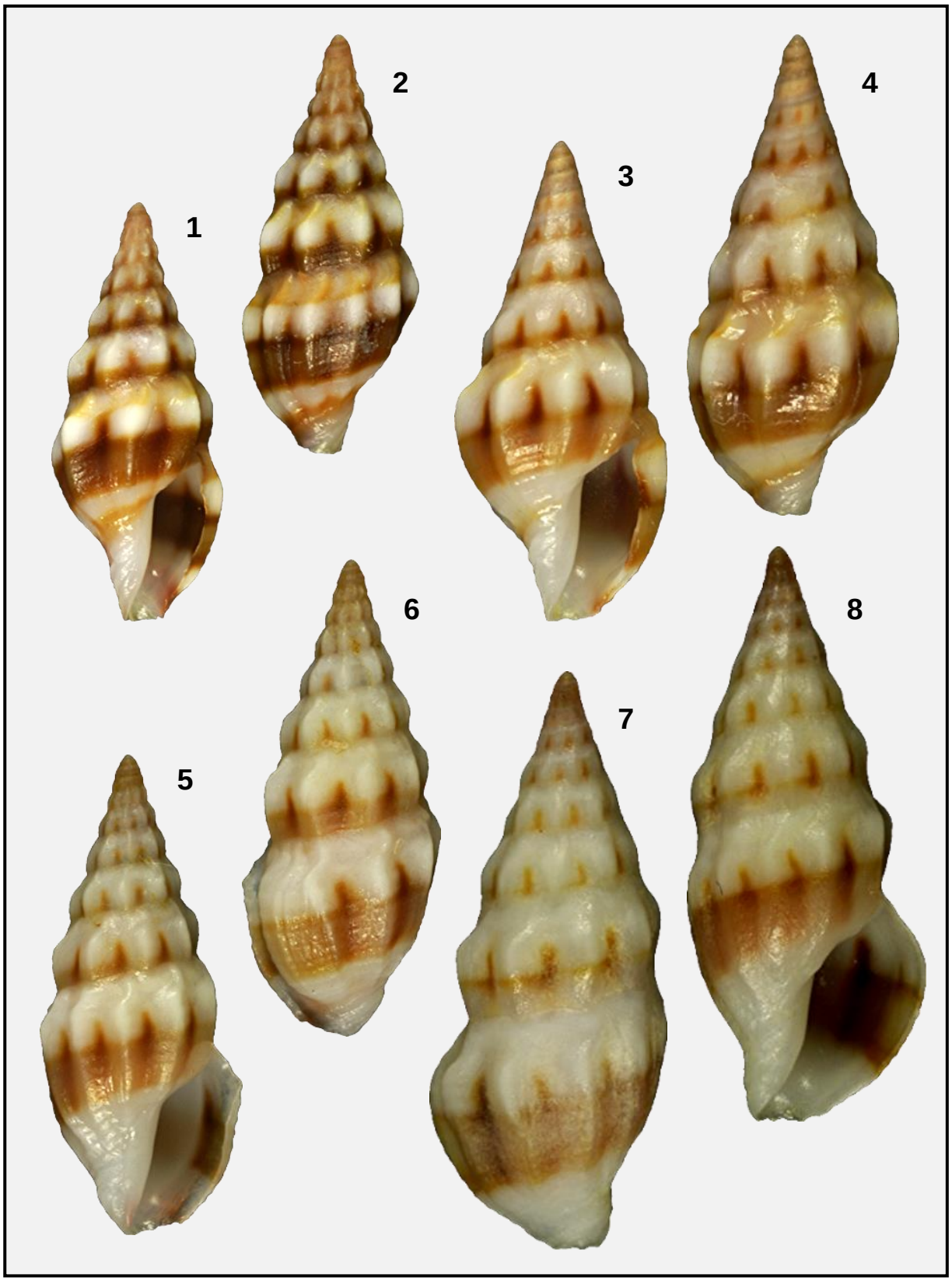

Plate I. Figs 1-8: *Drillia ghyooti*. Kia Reef, NW São Tomé. Under rock. Dived at a depth of 12 m. September 2008; 1-2: 10.95 mm. Paratype 1 (FN); 3-4: 11.75 mm. Paratype 2 (FN); 5-6: 12.46 mm. Holotype (MNHN); 7-8: 15.71 mm. Paratype 4 (FN).

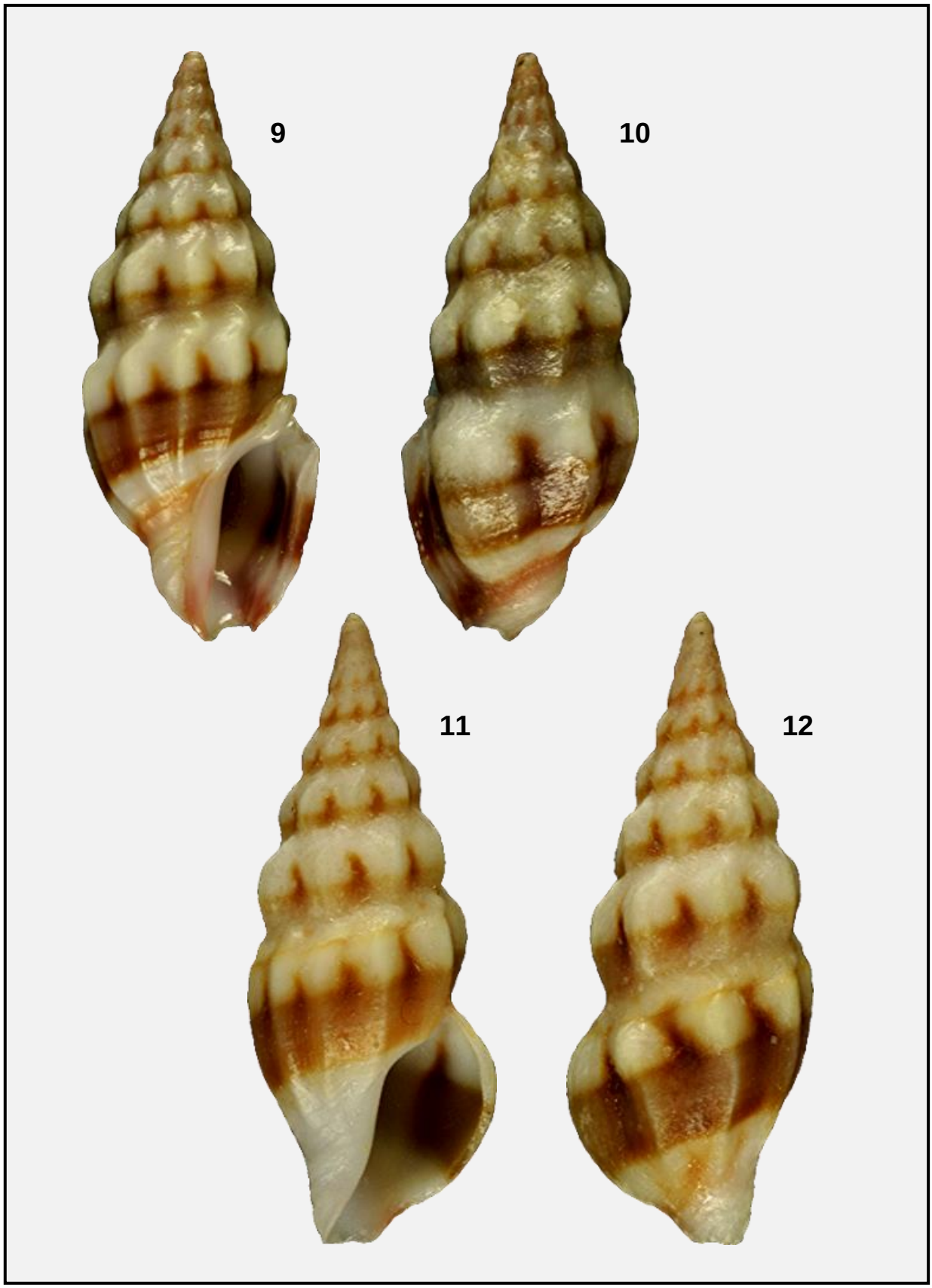

Plate II. Figs 9-12: *Drillia ghyooti.* Off Lagoa Azul, NW São Tomé. Collected by scuba diver, under rocks at a depth of 15-20 m at night. September 2007; 9-10: 14.39 mm. Paratype 5 (FN); 11-12: 16.31 mm. Paratype 6 (FN).

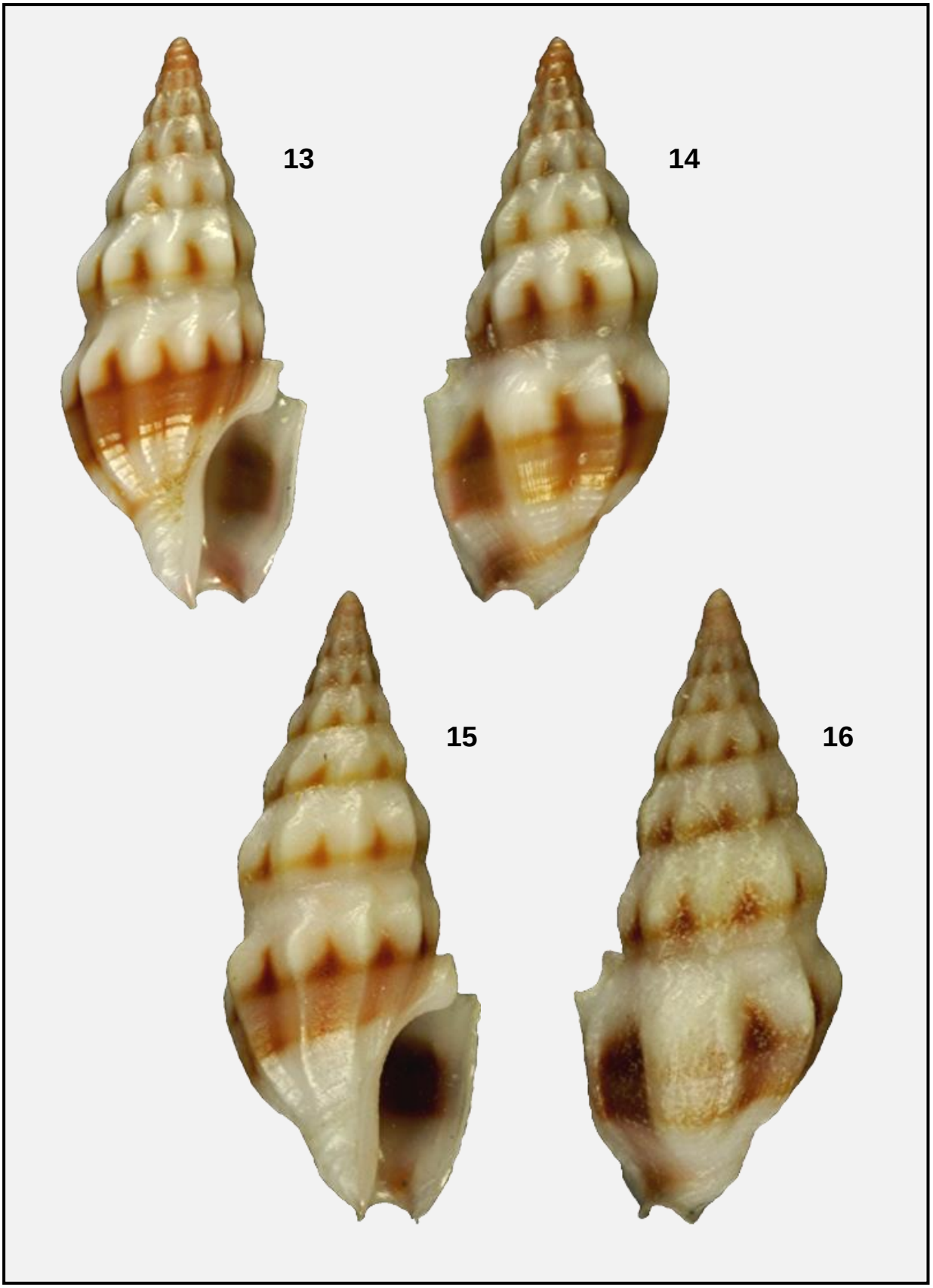

Plate III. Figs 13-16: *Drillia ghyooti.* Off Lagoa Azul, NW São Tomé. Collected by scuba diver, under rocks at a depth of 30 m at night. 25 September 2008; 13-14: 11.84 mm. Paratype 7 (JEG); 15-16: 14.31 mm. Paratype 8 (JEG).

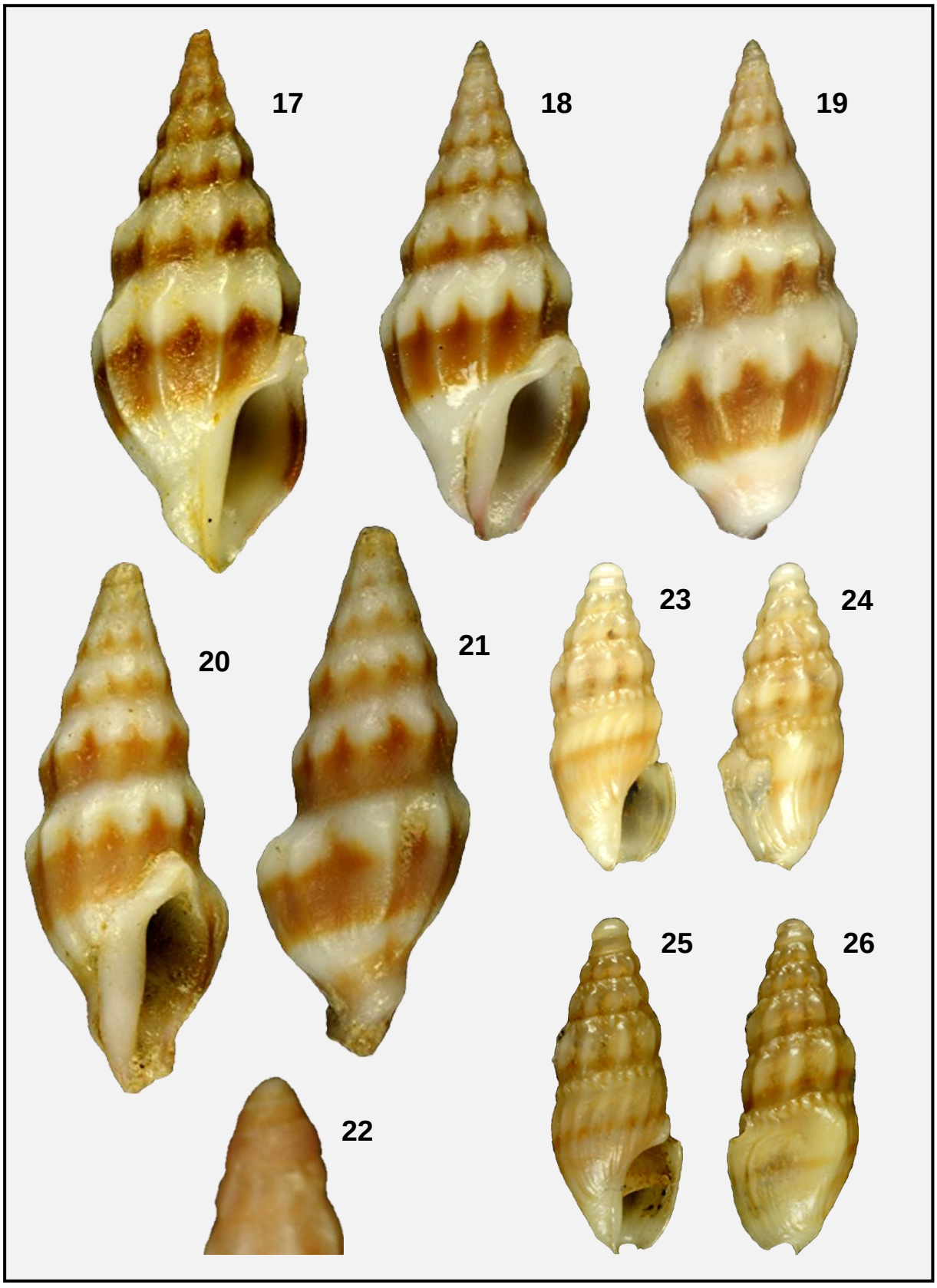

Plate IV. Figs 17-22: *Drillia ghyooti*; 17: Mudrachmi Bay, Ghana. In rocky area. Dredged at a depth of 17 m. October 2001. 15.21 mm. Paratype 9 (FN); 18-19: Off San Pedro, Ivory Coast. Dredged at a depth of 40-50 m. In sand and rubble. January 2004. 13.79 mm. Paratype 10 (JV); 20-21: North of San Antonio, Annobón, Equatorial Guinea. 15.08 mm. Paratype 11 (FN); 22: protoconch; Figs 23-26: *Drillia dakarensis* Knudsen, 1956. Off Dakar, Senegal. 14° 32' N./ 17° 25' W. Dredged at a depth of 43-45 m. Coll. Marche-Marchad (MNHN); 23-24: 6.69 mm; 25-26: 7.71 mm.

Contributions to the knowledge of the Triviidae: XIX. New species from the Indo-Pacific and eastern Atlantic (Mollusca: Gastropoda)

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Keywords: TRIVIIDAE, *Niveria*, *Trivirostra*, recent, new species, Indonesia, French Polynesia, Madeira.

Abstract: Recently discovered species in the genera *Trivirostra* Jousseaume, 1884 and *Niveria* Jousseaume, 1884 are described from French Polynesia and the Madeira Archipelago. The new species are briefly discussed and compared with similar species.

Abbreviations:
DFB: collection Dirk Fehse, Berlin, Germany
HNC: Haus der Natur Cismar, Germany
JGS: collection Jozef Grego, Banska Bystrica, Slovakia
JLT: collection Jean Letourneux, Tuamotu, French Polynesia
KGH: collection Klaus Groh, Hackenheim, Germany.
LACM: Los Angeles County Museum, USA
ZSM: Zoological State Collection, Munich, Germany

Schilder (e.g. 1931: 66; 1958: 81) used slightly different formulae to describe triviids: L:W(/H)[1]–LT:CT–LR:DR. That means L = length, W = width in % of the length, H = height in % of the length, LT = number of labral teeth, CT = number of columellar teeth, LR = number of ribs on the margins, DR = number of dorsal ribs.

Introduction: In the past few years many huge samples of TRIVIIDAE from the Pacific, Indo-Pacific, Mediterranean, Atlantic and Caribbean were studied. More than 30,000 specimens were sorted and identified by the senior author. Such a large number of specimens had never been studied before within the Triviidae and it became apparent that the Indo-Pacific genus *Trivirostra* Jousseaume, 1884 is more diverse as generally supposed although each species has its variability. We have observed a similar situation within the Mediterranean triviids. Our analysis of the results will be the topic of papers still in preparation. Two elusive species – *Cleotrivia culmen* Fehse, 2004 and *Trivirostra yangi* Fehse & Grego, 2006 – have already been described in the meantime. Recently, several dozens of specimens received from French Polynesia and the Madeira Archipelago caused a surprise. Among this material three new species were discovered which are described below as *Trivirostra letourneuxi* nov. sp., *Trivirostra pseudotrivellona* nov. sp. and *Niveria grohorum* nov. sp.

[1] The height in % of the length was only occasionally used by Schilder.

Trivirostra letourneuxi nov. sp.
(Pl. I, Figs 1-3)

Locus typicus: Atoll of Makemo, external reef of Pouheva, Tuamotu, French Polynesia; in small cracks under blocks of dead coral.

Type material:
Holotype: ZSM, No. 20080002.
Paratype 1: DFB, No. 9187-1
Paratype 2: DFB, No. 9187-2
Paratype 3: DFB, No. 9187-3
Paratype 4: DFB, No. 5527-1
Paratype 5: DFB, No. 5527-2
Paratype 6: DFB, No. 5527-3
Paratype 7: DFB, No. 8812-1
Paratype 8: DFB, No. 8812-2

Etymology: In honour of Jean Letourneux, Tuamotu, who provided us with sufficient material to describe this taxon.

Description: Shell small, elongated, elliptical and glossy. Terminals slightly produced with both tips blunt. Dorsum evenly elevated with a long, fairly wide, incised mid-dorsal sulcus which bisects and/ or depresses the transverse ribs that are slightly thickened on both sides of the sulcus. Margins rounded. Ventrum even with terminals strongly recurved. Aperture narrow, somewhat widened at fossular section, almost straight, strongly curved posteriorly. Canals indented and smooth. Columella slightly, convexly curved without a distinct inner adaxial carinal ridge. Fossula concave. Fossular edge

excavated. Columellar edge slightly indented towards fossula. Fossular and columellar edge clearly visible through the aperture. Labrum rounded, broadest at its mid-portion, slightly declivous anteriorly. Outer labral margin curved and rounded. Inner edge almost straight with the posterior end curved. Dorsal ribbing − 22 on average (varies between 20 and 26 in number) − numerous, irregular, close-set and fine. Ribs continuous from the dorsal elevation, becoming more numerous over sides, margins, ventrum and labrum and terminating as sharp, fine teeth on the labral edge − 22 on average (varies between 21 and 24 in number). Ribs continue on the columellar wall becoming much finer whereas they become stronger again towards the fossular edge. They are not thickened on the developed, edged parietal lip and their number is 21 on average (varies between 18 and 23). Parietal lip slightly sinuous anteriorly, posteriorly roundly thickened and ventrally protruded.
Shell colour uniformly white.

Living animal: Not recorded.

Radula: Not recorded.

Variations: The available specimens are astonishing uniform in shell morphology.

Geographic range: In addition to the type locality also known from Takaroa, Tuamotu and from Motu Taherahera, Tikehau Atoll.

Measurements:
Holotype: L = 5.2 mm, W = 3.5 mm, D = 2.7 mm, LT 23, CT 21, RR 26 (ZSM, No. 2008002)
Paratype 1: L = 4.6 mm, W = 3.0 mm, D = 2.6 mm, LT 21, CT 20, RR 24 (DFB, No. 9187-1)
Paratype 2: L = 5.0 mm, W = 3.4 mm, D = 2.7 mm, LT 22, CT 20, RR 20 (DFB, No. 9187-2)
Paratype 3: L = 4.5 mm, W = 3.1 mm, D = 2.5 mm, LT 22, CT 18, RR 20 (DFB, No. 9187-3)
Paratype 4: L = 5.5 mm, W = 3.7 mm, D = 3.1 mm, LT 24, CT 23, RR 22 (DFB, No. 5527-1)
Paratype 5: L = 5.4 mm, W = 3.6 mm, D = 2.9 mm, LT 21, CT 19, RR 22 (DFB, No. 5527-2)
Paratype 6: L = 5.6 mm, W = 3.7 mm, D = 3.2 mm, LT 24, CT 23, RR 22 (DFB, No. 5527-3)
Paratype 7: L = 5.3 mm, W = 3.5 mm, D = 2.8 mm, LT 23, CT 23, RR 20 (DFB, No. 8812-1)
Paratype 8: L = 5.1 mm, W = 3.5 mm, D = 2.7 mm, LT 21, CT 21, RR 22 (DFB, No. 8812-2)

Discussion: Only few other species with such a narrowly elongated shell shape are known. Species of the genus *Semitrivia* Cossmann, 1903 – *S. desirabilis* (Iredale, 1912), *S. hallucinata* (Liltved, 1984) and *S. tsuchidai* Fehse, 2002 – have a similar shape but their outer labral margin is edged and this characteristic is never observed in other species of the genus *Trivirostra* Jousseaume, 1884. Similarly shaped species in the genus *Trivirostra* are *T. hordacea* (Kiener, 1843), *T. thaanumi* Cate, 1979 [2] (Plate I, Figs 4a-d) and *T. boucancanotica* Fehse & Grego, 2002. All these species are usually smaller than *T. letourneuxi* nov. sp. but we have occasionally observed giants of *T. hordacea* and *T. thaanumi* that reach the shell length of the new species. The new species differs from *T. hordacea*, *T. thaanumi* and *T. boucancanotica* by the roundly thickened and protruded part of the parietal lip, the wider, more incised dorsal sulcus, the more elliptical shell, the slightly coarser shell ribs that are thickened on both sides of the dorsal sulcus and the lack of an edge at mid-ventrum. *Trivirostra hordacea*, *T. thaanumi* and *T. boucancanotica* possess a mid-ventral, rounded, semicircular edge with the left side of ventrum sloping into the aperture. *Trivirostra letourneuxi* nov. sp. also differs from *T. hordacea* and *T. boucancanotica* by the narrower columella and fossula. In *T. hordacea* and *T. boucancanotica* the inner columellar and fossular edge are covered by the labrum whereas they are clearly visible in *T. letourneuxi* nov. sp. The appearance of the new species, except for its outline, is more similar to *Trivirostra shawi* Schilder, 1933 than to the similarly shaped, aforementioned species. We have studied hundreds of specimens of *T. shawi* from French Polynesia where it is common and thousands from other regions in the Indo-Pacific, but we did not find such elliptical outlines in any of these shells. *Trivirostra shawi* is always more inflated. *Purpurcapsula polynesiae* (Cate, 1979) comb. nov. (Pl. IV, Figs 2a-b) also possesses an ovate outline but this species differs from *T. letourneuxi* nov. sp. by its coloured shell, the different shaped anal canal, the broader columella and fossula and its more stocky general appearance.

[2] *Trivirostra aussiorum* Cate, 1979 (Pl. IV, Figs 3a-b) is also assigned to the tiny and elongated species but the description was based on a single, beach worn shell. Almost all ribs are already decorticated and the terminals are eroded. A dorsal sulcus is not visible anymore. Yet, Cate (1979: 93) noted, "… in this case beach worn, decorticated, practically obliterating any evidence of a longitudinal furrow; however, the character of the remaining radiating dorsal ribbing would seem to indicate that in life a furrow did exist …". According to its worn preservation *T. aussiorum* can only be a *nomen dubium* because the shell lacks all distinguishing features that would allow a separation from other *Trivirostra* species. The remaining inner part of the shell and the form of the aperture are similar to *T. thaanumi* but this cannot be confirmed.

***Trivirostra pseudotrivellona* nov. sp.**
(Pl. II, Figs 1-4)

Locus typicus: Fringing reef of the east coast, Society Islands, Tahiti; in sea grass or in small cracks under blocks of dead coral.

Type material:
Holotype: ZSM, No. 20080003
Paratype 1: DFB, No. 9187-1
Paratype 2: DFB, No. 9187-2
Paratype 3: DFB, No. 8504
Paratype 4: DFB, No. 9179
Paratype 5: DFB, No. 8475
Paratype 6: JLT

Etymology: Name derived from the Latin, '*pseudo*', meaning false and the genus *Trivellona* Iredale, 1931 because of its appearance similar to species of that genus.

Description: Shell small, roundly inflated, opaque and glossy. Anterior terminals broad, slightly produced, somewhat recurved with an indented tip. Posterior terminal even broader, unusually elongated, recurved with a protruded tip. Dorsum abruptly elevated with a narrow, incised mid-dorsal sulcus which bisects and/or depresses the transverse ribs. Ribs slightly thickened along both sides of sulcus. Margins rounded. Ventrum convex. Aperture narrow, almost straight, posteriorly curved. Siphonal canal indented and smooth, anal canal almost blunt and completely ribbed. Columella slightly, convexly curved with slightly developed inner adaxial carinal ridge. Fossula concave. Fossular edge excavated with both the columellar and fossular edge not clearly delimited. Inner fossular and columellar edge usually covered by labrum. Labrum rounded, broadest at mid-portion, declivous anteriorly and posteriorly. Outer labral margin curved and rounded. Inner edge almost straight with posterior end curved. Dorsal ribbing − 16 on average (varies between 16 and 18 in number) − less numerous, fine, very irregular with broader interstices. Ribs continuous from the dorsal elevation, becoming more numerous over sides, margins, ventrum and labrum. They terminate as sharp, fine teeth on the labral edge − 20 on average (varies between 19 and 21 in number). Ribs continue on the columellar wall becoming much finer. They are not thickened on the developed, roundly edged and projected parietal lip, and their number is 17 on average (varies between 16 and 19). Parietal lip slightly curved.
Shell colour opaquely white.
Living animal: Not recorded.

Radula: Not recorded.

Variations: Specimens collected in Indonesia are somewhat more inflated especially on the left side of the aperture, their posterior terminal is somewhat shorter, the dorsum is more elevated and their columella and fossula are slightly narrower. The projection of the posterior terminal also varies in specimens from French Polynesia. In some specimens the dorsum is more evenly elevated.

Geographic range: In addition to the type locality also known from the atoll of Vahanga, S. Tuamotu, French Polynesia; Upohu, Samoa and from the Berau Isl. and Flores, Indonesia.

Measurements:
Holotype: L = 6.3 mm, W = 4.1 mm, D = 3.6 mm, LT 20, CT 17, RR 18 (ZSM, No. 20080003)
Paratype 1: L = 5.8 mm, W = 4.0 mm, D = 3.6 mm, LT 21, CT 17, RR 16 (DFB, No. 9180-1)
Paratype 2: L = 5.8 mm, W = 3.8 mm, D = 3.3 mm, LT 20, CT 17, RR 18 (DFB, No. 9180-2)
Paratype 3: L = 5.4 mm, W = 3.7 mm, D = 3.1 mm, LT 21, CT 17, RR 18 (DFB, No. 8504)
Paratype 4: L = 5.4 mm, W = 3.9 mm, D = 3.5 mm, LT 21, CT 18, RR 16 (DFB, No. 9179)
Paratype 5: L = 5.9 mm, W = 4.4 mm, D = 3.6 mm, LT 21, CT 19, RR 16 (DFB, No. 8475)
Paratype 6: L = 5.5 mm, W = 4.0 mm, D = 3.7 mm, LT 19, CT 16, RR 16 (JLT)

Discussion: *Trivirostra mactanica* Fehse & Grego, 2002 (Pl. IV, Figs 5a-d) is the only species similar to *T. pseudotrivellona* nov. sp. regarding the irregular ribs and the appearance of the dorsal sulcus. However, it differs from the new species by the position of the aperture situated at mid-ventrum in *T. mactanica*, by the narrower aperture, the incised anal canal, the narrower posterior terminal, the straight posterior part of the aperture (unlike to the left turned one in *T. pseudotrivellona* nov. sp.), the slightly coarser, more prominent ribs and the more evenly elevated dorsum. The general appearance of *T. mactanica* is more similar to species of the genus *Purpurcapsula* Fehse & Grego, (in press) whereas *T. pseudotrivellona* resembles small species of the genus *Trivellona* Iredale, 1931 like *T. dolini* Fehse & Grego, 2004.

***Niveria grohorum* nov. sp.**
(Pl. III, Figs 1-2)

Locus typicus: Porto dos Frades, Porto Santo, Madeira Archipelago, Portugal.

Type material:
Holotype: ZSM, No. 20080004.
Paratype 1: ZSM, No. 20080005.
Paratype 2: DFB, No. 9194-1
Paratype 3: DFB, No. 9194-2
Paratype 4: DFB, No. KGH
Paratype 5: DFB, No. KGH
Paratype 6: DFB, No. KGH
Paratype 7: DFB, No. 9194-3

Etymology: In honour of Klaus and Christina Groh, Hackenheim, Germany, who supplied the type material.

Description: Shell small, solid and ovate. Terminals broad, slightly produced, somewhat recurved with blunt tips. Dorsum slightly humped in the posterior third, completely ribbed without a sulcus. Dorsal summit has a polished appearance due to callus deposited over the ribs. Ventrum convex, ventral margin rounded. Aperture relatively narrow in the posterior portion and curved adapically, wider in the anterior part. Siphonal canal indented, anal canal slightly so. Columella slightly, convexly curved with slightly developed inner adaxial carinal ridge. Fossula shallowly concave. Fossular edge somewhat excavated with both the columellar and fossular edge not clearly delimited. Inner fossular and columellar edge visible through aperture. Labrum rounded, broadest at mid-portion. Outer labral margin curved and edged. Inner edge curved. Dorsal ribbing − 24 on average (varies between 20 and 28 in number) − less numerous, slightly coarse, somewhat irregular. Ribs continuous from the dorsal elevation, becoming more numerous over sides, margins, ventrum and labrum, terminating as sharp, fine teeth on the inner labral edge, 18 on average (varies between 16 and 20 in number). Ribs continue on the columellar wall becoming slightly finer. They are not thickened on the developed, roundly edged and projected parietal lip and their number is 17 on average (varies between 15 and 18). Parietal lip slightly curved.
Dorsal coloration reddish beige to brownish with mid-dorsum often darker, ventrum and labrum white.

Living animal: Not recorded.

Radula: Not recorded.

Variations: The development of the dorsal callus varies but it was present in all examined specimens. The number of dorsal ribs considerably varies in some shells, only a few have more numerous ribs.

Geographic range: Only known from the type locality.

Measurements:
Holotype: L = 6.8 mm, W = 4.9 mm, D = 4.0 mm, LT 19, CT 17, RR 26 (ZSM, No. 20080004)
Paratype 1: L = 6.3 mm, W = 4.6 mm, D = 3.7 mm, LT 18, CT 15, RR 20 (ZSM, No. 20080005)
Paratype 2: L = 7.7 mm, W = 5.7 mm, D = 4.6 mm, LT 17, CT 18, RR 28 (DFB, No. 9194-1)
Paratype 3: L = 5.9 mm, W = 4.3 mm, D = 3.6 mm, LT 16, CT 16, RR 22 (DFB, No. 9194-2)
Paratype 4: L = 8.2 mm, W = 5.9 mm, D = 4.9 mm, LT 20, CT 18, RR 28 (KGH)
Paratype 5: L = 6.9 mm, W = 4.9 mm, D = 4.1 mm, LT 17, CT 17, RR 24 (KGH)
Paratype 6: L = 6.3 mm, W = 4.5 mm, D = 3.6 mm, LT 17, CT 15, RR 20 (KGH)
Paratype 7: L = 7.6 mm, W = 5.5 mm, D = 4.4 mm, LT 20, CT 16, RR 22 (DFB, No. 9194-3)
Further 43 paratypes from type locality in coll. KGH and 15 paratypes in coll. DFB.

Discussion: The Mediterranean houses a *Niveria*-species-complex with taxa of similar appearance. It consists of *Niveria spongicola* (Monterosato, 1923)[3] (Pl. III, Figs 4a-d), *N. problematica* (Schilder, 1931)[4] (Pl. IV, Figs 1a-d) and *N. africana* (Schilder, 1931) (Pl. III, Figs 3a-d), which occur in different but overlapping parts of the Mediterranean Sea. *Niveria spongicola* is characterized by a usually dark brown shell with a non-ribbed, smooth mid-dorsum. It occurs in the NW Mediterranean Sea. *Niveria africana* has a light brownish shell with a ribbed shell and distinct sulcus at mid-dorsum. This species is found in the southern Mediterranean from Israel to Morocco and overlaps with *N. spongicola* at Sardinia.

[3] *Niveria spongicola* (Monterosato, 1923) is the only available name for the species that is commonly called "*Trivia*" *pulex* (Gray, 1828). Firstly *Cypraea pulex* Solander *in* Dillwyn, 1817 was not established in a valid way. The name "*Cypraea pulex*" was only used in a manuscript by Solander (Dillwyn, 1817: 467) and is also preoccupied by a primary homonym: *Cypraea pulex* Röding, 1798 [= *Pusula pediculus* (Linnaeus, 1758)]. Secondly Gray (1827: 368) did not introduce *Cypraea pulex* as a new species but referred to *Cypraea pulex* Dillwyn, 1817 in his paper. Thirdly it is not possible to locate any type for *C. pulex*. Fourthly the description was made without a picture and the description alone does not allow one to assign *C. pulex* to any of the brownish coloured species of the Mediterranean, Caribbean or eastern Pacific Triviidae. Therefore, *C. pulex* is a *nomen dubium*. As a conclusion it can be noted that "*Trivia*" *pulex* should not be used in any publication anymore.
[4] *Trivia levantina* Smriglio, Mariottini & Buzzuro, 1998 is a junior synonym of *N. problematica*.

The third species, *N. problematica*, possesses a light brownish shell with at least reddish tips. Its dorsum is completely ribbed and *N. problematica* possesses the most distinct dorsal sulcus of all three taxa. It occurs in the eastern Mediterranean but is also found along the North African coast from Egypt to Tunisia. The occurrence of the three species is confirmed by the rich samples deposited in the Hebrew University of Jerusalem that we have examined. None of the three Mediterranean taxa has a similarly ribbed shell that is overlaid by a callus at mid-dorsum like *Niveria grohorum*. None of the three species seems to occur in the adjacent Atlantic. The only similar species is the fossil *Niveria permixta* (Cristofori & Jan, 1832) (Pl. IV, Figs 4a-d) from the Zanclean to Piacenzian deposits of Italy, Morocco and Spain. The Pliocene species also has a completely ribbed shell with a callus deposit at mid-dorsum. However, the new species differs from the fossil species by the generally smaller shell, the finer ribs all over the shell, and the absence of a dorsal depression.

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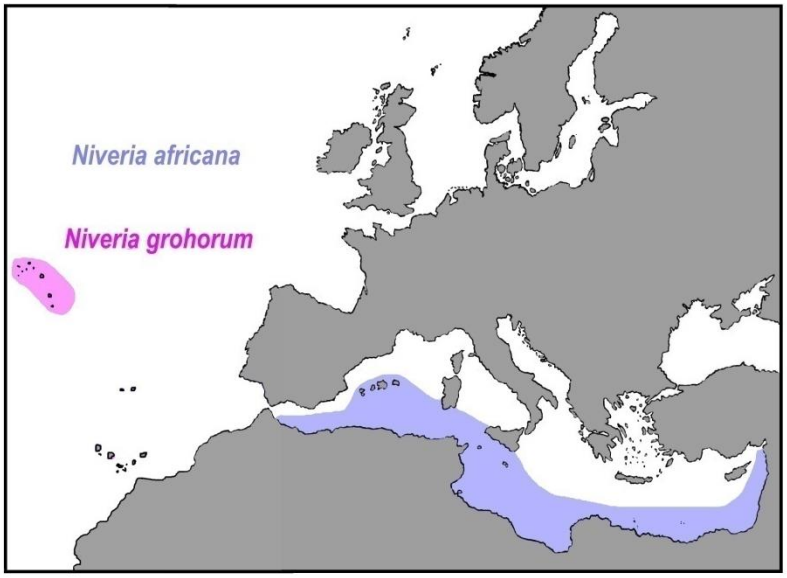
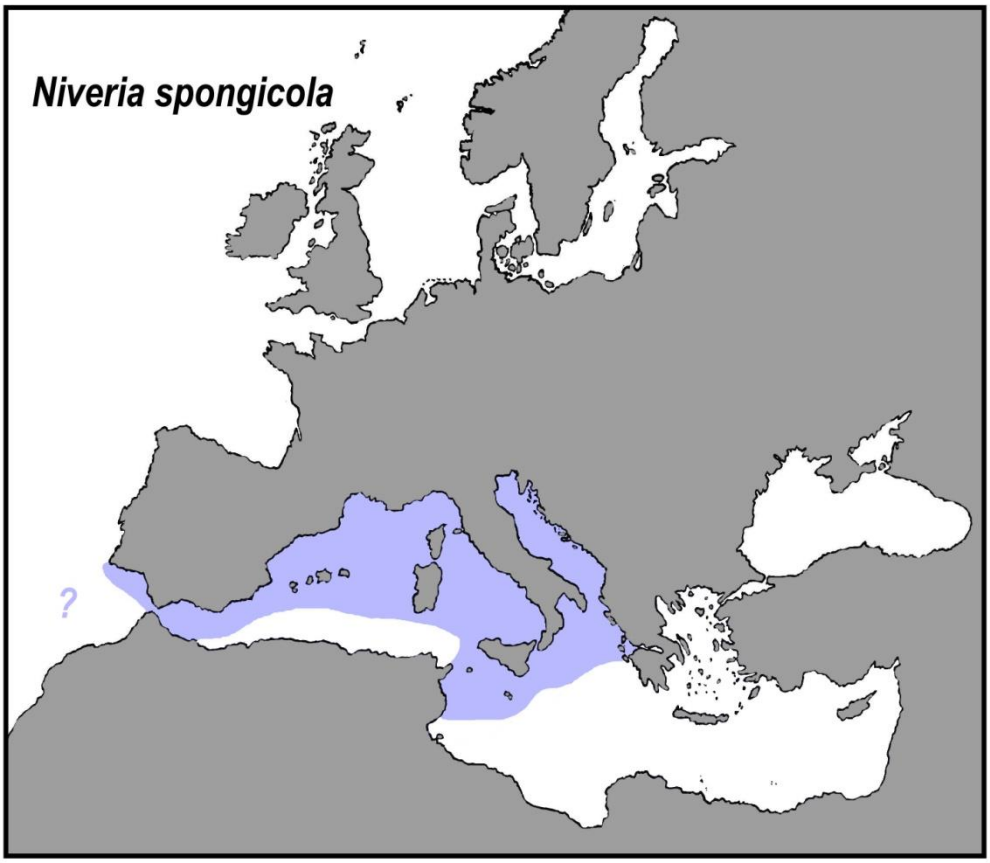
Distributional maps:

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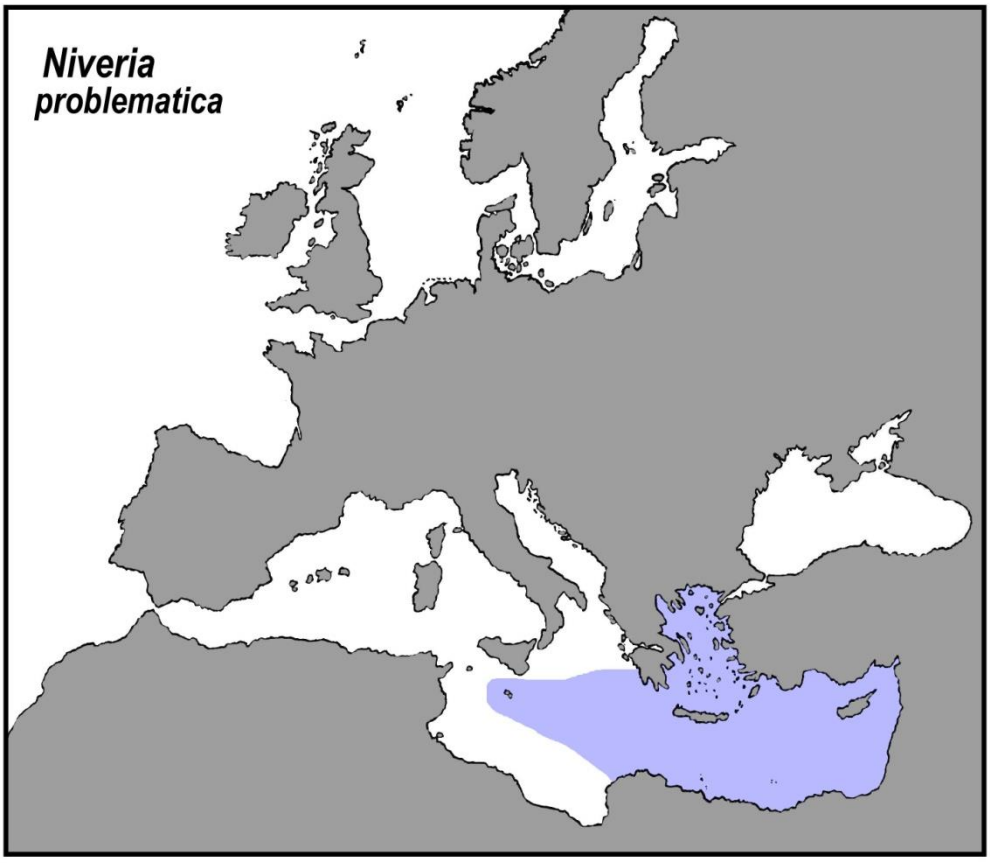
?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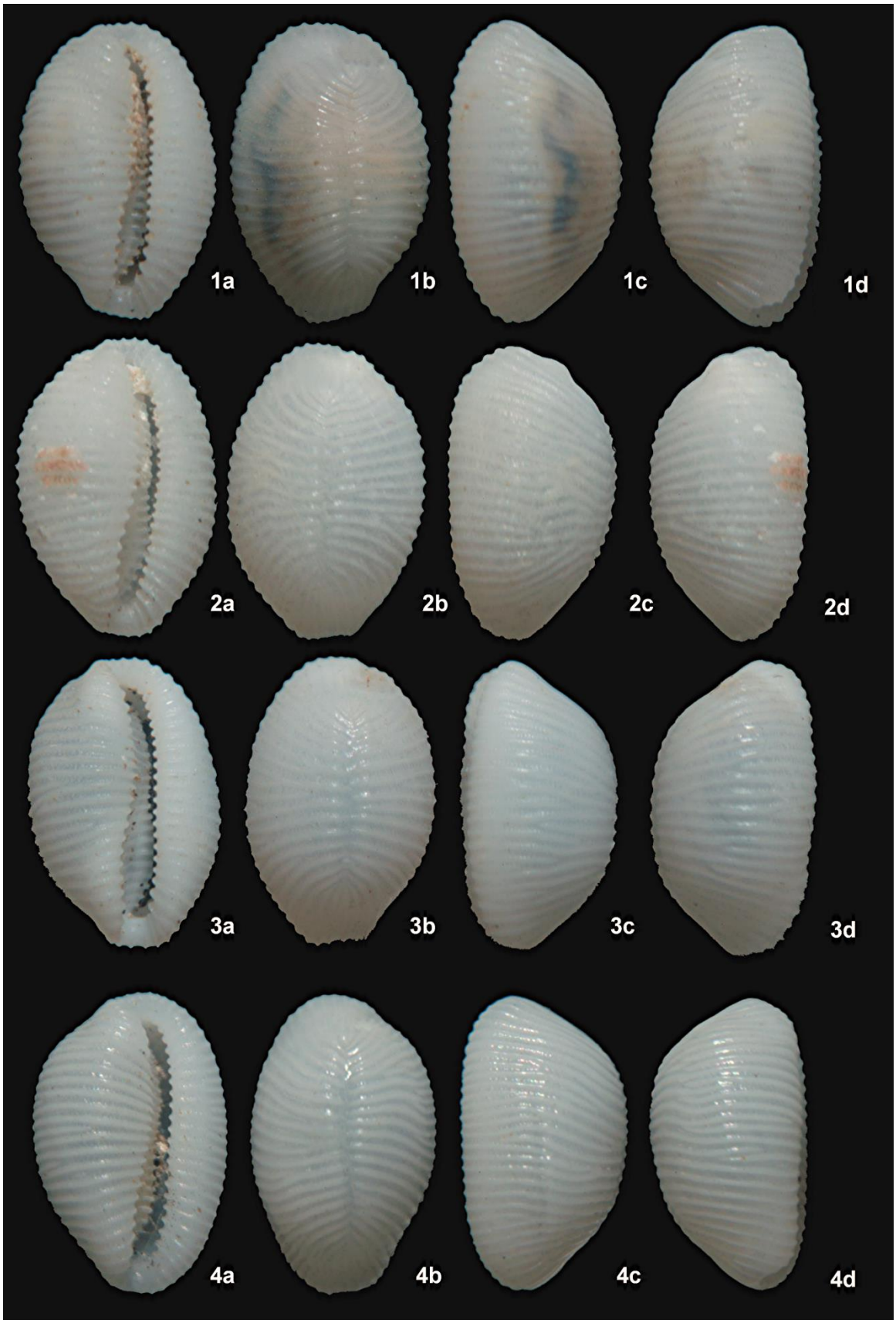

Plate I. Figs 1-3: *Trivirostra letourneuxi*. Atoll of Makemo, external reef of Pouheva, Tuamotu, French Polynesia; 1a-1d: 4.6 mm, paratype 1 (DFB, No. 9187-1); 2a-2d: 5.2 mm, Holotype (ZMS, No. 20080002); 3a-3d: 5.0 mm, paratype 2 (DFB, No. 9187-2); Figs 4a-d: *Trivirostra thaanumi* Cate, 1979. Atoll of Makemo, external reef of Pouheva, Tuamotu, French Polynesia; 5.0 mm (DFB, No. 9166).

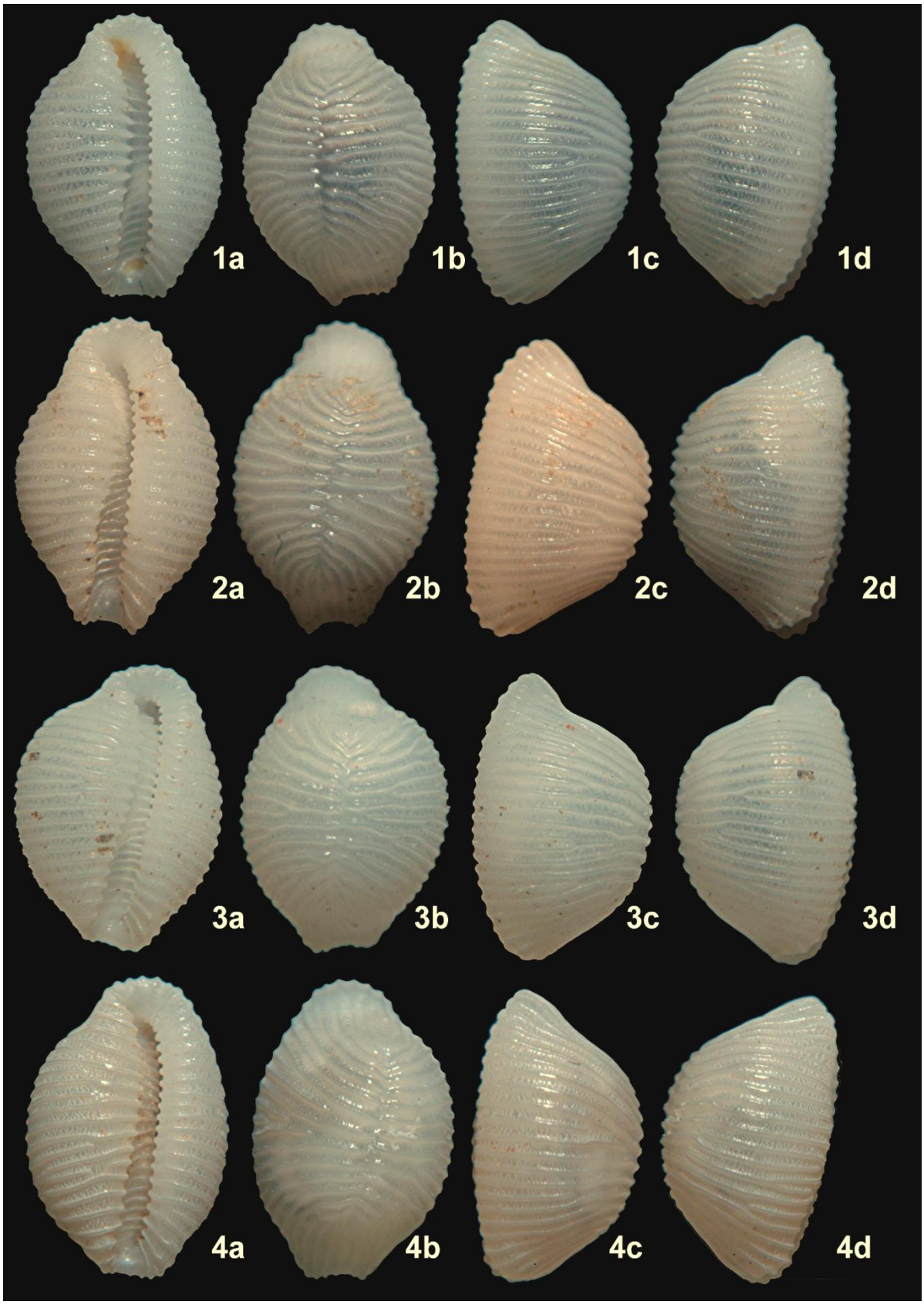

Plate II. Figs 1-4: *Trivirostra pseudotrivellona*. Fringing reef of the east coast, Society Islands, Tahiti; 1a-d: 5.8 mm, paratype 1 (DFB, No. 9180-1); 2a-d: 6.3 mm, holotype (ZMS, No. 20080003); 4a-d: 5.8 mm, paratype 2 (DFB, No. 9180-2); Figs 3a-d: *Trivirostra pseudotrivellona*. Off Upohu, Samoa; 5.4 mm, paratype 3 (DFB, No. 8504).

Plate III. Figs 1-2: *Niveria grohorum*. Porto dos Frades, Porto Santo, Madeira Archipelago, Portugal; 1a-1d: 6.8 mm, holotype (ZSM, No. 20080004); 2a-d: 6.3 mm, paratype 1 (ZSM, No. 20080005); Figs 3a-d: *Niveria africana* (Schilder, 1931). Shavey Zion, Israel; 6.6 mm (DFB, No. 8316); Figs 4a-d: *Niveria spongicola* (Monterosato, 1923). Porto Istana, NE Sardinia, Italy. Collected at 1-5 m on *Botrillum* sp.; 7.1 mm (DFB, No. 5222).

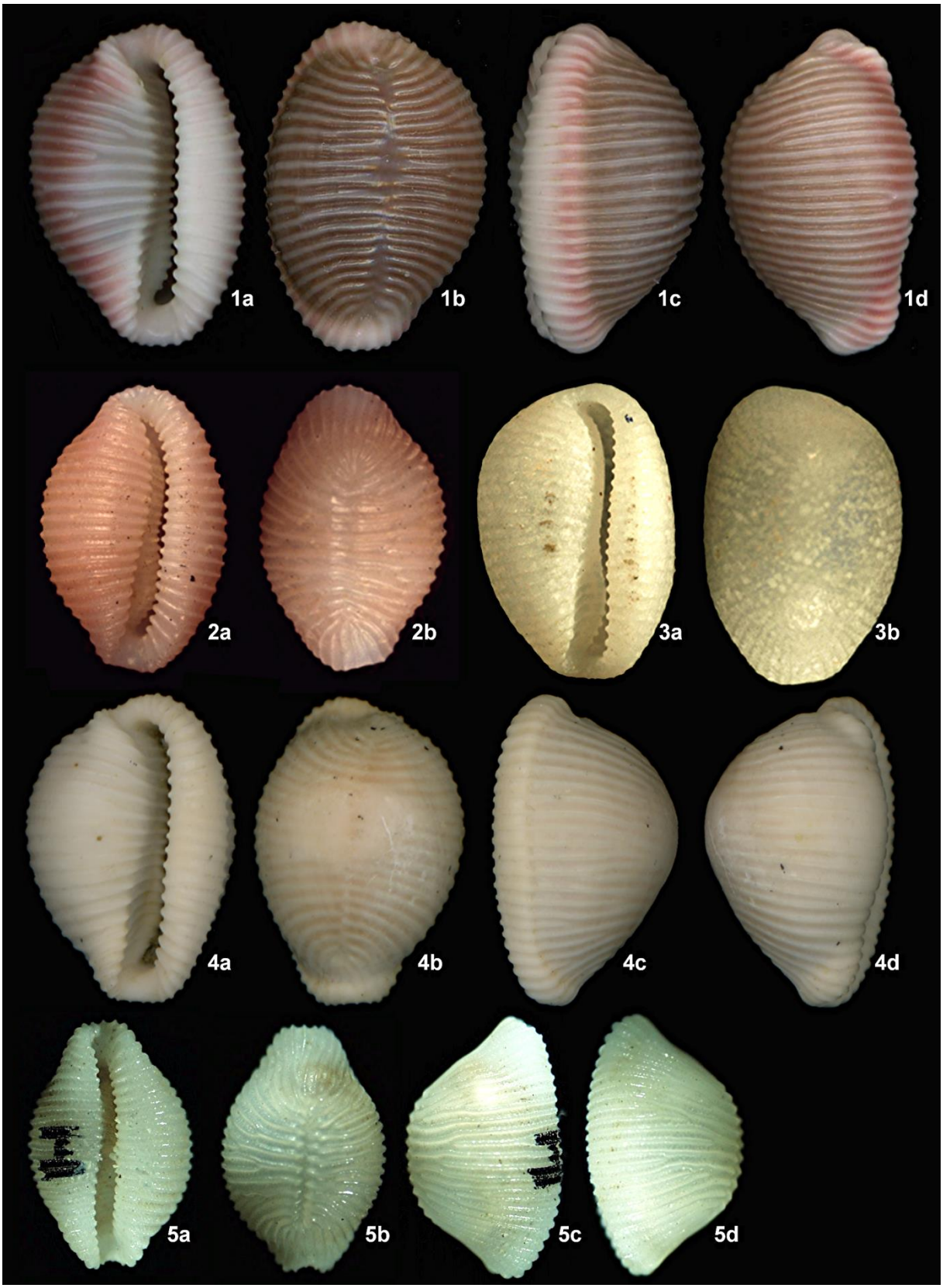

Plate IV. Figs 1a-d: *Niveria problematica* (Schilder, 1931). Nahariyya, Israel; 8.8 mm (DFB, No. 8321); Figs 2a-b: *Purpurcapsula polynesiae* (Cate, 1979) **comb. nov.** Club Mediterranean resort, West side Moorea, Society Islands, French Polynesia (17° 30' S, 149° 46' W); 4.8 mm, holotype (LACM, No. 1121); Figs 3a-b: *Trivirostra aussiorum* Cate, 1979. Lighthouse Beach, Vlaming Head, North West Cape, Western Australia (21° 50' S, 114° 10' E); 4.3 mm, holotype (LACM, No. 1799); Figs 4a-b: *Niveria permixta* (Cristofori & Jan, 1832). Zanclean, early Pliocene, Estepona near Malaga, Spain; 11.0 mm (DFB, No.6545); Figs 5a-d: *Trivirostra mactanica* Fehse & Grego, 2002. Punta Engaño, Mactan Island, Philippines; 5.7 mm, holotype (HNC, No. 57315).