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Content:

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- Front cover: *Duplicaria franknolfi* Terryn, 2021
*** on the left: trawled by fishermen off Cuddalore, SE India – 1999**
*** on the right: dredged off Jaffna, Palk Strait, Sri Lanka at a depth of 15 m, from sandy bottom**
- Back cover: Sowerby, G.B. II, in Darwin, Ch., 1844. *Description of Fossil Shells. Geological Observation on the Volcanic Islands, visited during the voyage of H.M.S. Beagle*, appendix. London. Pl. CLX

Layout: Frank Nolf & Delphine Clement

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The presence of *Euspira lemaitrei* (Mollusca: Gastropoda: Naticidae) along the West African coasts and the status of *Euspira massieri* Petuch & Berschauer, 2018 as junior synonym

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Keywords: Mollusca, Gastropoda, NATICIDAE, *Euspira lemaitrei*, *Euspira massieri*, W Africa, range extension.

Abstract: *Euspira lemaitrei* (Knudsen, 1976) was originally described from the Northern Cape, South Africa). Specimens offered material in the past decades reveal its presence along West African coasts even as northernly as Mauritania. This species is also known under the junior synonym *Euspira massieri* Petuch & Berschauer, 2018. It has often been confused with *Euspira fusca* (Blainville, 1825), which is a more common sand dweller living from the British Isles in the north to Angola in the south.

Abbreviations:

CFN: Private collection of Frank Nolf (Oostende, Belgium)
CFS: Private collection of Frank Swinnen (Lommel, Belgium)
CJV: Private collection of Johan Verstraeten (Oostende, Belgium)
H.: Height
L.: Length
PEMARCO: Pêche maritime du Congo

Introduction: Kilburn (1976) described *Polinices* (*Euspira*) *lemaitrei* from the Cape Columbine area, Northern Cape, South Africa. At that moment it was only known from the type locality. In the last decades more material has become available from 275-400 m depths in Namibia (Petuch & Berschauer, 2018), Angola, Senegal (ca 200 m) and Mauritania (deep water). Since this species was not well known to dealers and shell collectors, specimens were generally treated as *Euspira fusca* (Blainville, 1825).

Class Gastropoda cuvier, 1795
Superfamily Naticoidea Guilding, 1834
Family NATICIDAE Guilding, 1834
Subfamily Polinicinae Gary, 1837
Genus *Euspira* Agassiz, 1837

The genus *Euspira* Agassiz in J. Sowerby, 1838, is based on the fossil European species *Natica glaucinoides* Sowerby, 1812 from the Middle Eocene, by subsequent designation (Bucquoy, Dollfus and Dautzenberg, 1883).
It is characterized by a globose to an elongate-globose shell with an umbilicus, partly-to-fully open, provided with a slender umbilicus callus, convex whorls separated by an impressed suture and a turreted spire (Bandel, 1999; Huelsken et al., 2012). However, species assigned to *Euspira* show many shell characters (e.g. umbilical morphology, shell shape and outline) identical to other naticid genera (e.g. *Natica*, *Tectonatica*). Therefore, Bandel (1999) criticized the application of these shell characters in the establishment of a separate genus, *Euspira*, especially since neither operculum nor protoconch of the type species of *Euspira* s.s. is known. Huelsken et al. (2012) suggest that a conchological analysis of *N. glaucinoides* and other related taxa assigned to *Euspira* would be advisable to revise the taxonomic validity of *Euspira* s.s.

According the Huelsken et al. (2012) – but in contrast to Kilburn - *Euspira* is not a subgenus of *Polinices* (Marincovich, 1977) but it represents a valid genus closely related to *Conuber* and *Neverita*.

***Euspira lemaitrei* (Kilburn, 1976)**
Pl. I, Figs 1-5; Pl. II, Figs 6-11; Pl. III, Figs 12-17; Pl. IV, Figs 18-23

Orginal description by Kilburn (1976): '*Globose, with fairly elevated, obtuse spire, whorls strongly convex, slightly impressed just below the suture on last whorl, sutures moderately deep; aperture oblong-ovate, greatest width just anterior to middle, labium very slightly and evenly concave, paries with a thick callus, columella lip erect, not reflected over umbilicus. Umbilicus fairly wide, its columellar wall slightly concave, with a trace of a median funicular ridge; anterior margin of umbilicus with two weak and feebly angular ridges, the outer one forming the umbilical*

border. Sculptured by coarse growth lines, becoming rather pliculate below suture, and minute spiral striae. Colour reddish-brown, becoming paler towards the base, and with a few pale axial bands on back of body whorl, becoming white and chalky in adult shells towards back of lip; subsutural region with a white band, blotched irregularly with buff and bordered below by a narrow reddish-brown band, more or less darker than the reddish-brown area which follows it; base white. Aperture white, the brown external colouration showing through posteriorly; parietal callus and interior of columellar lip, pure white, edge of columellar lip and interior of umbilicus chestnut. Protoconch worn; shell with a total of about 6 whorls. Periostracum olive-brown, lamellar, only developed within umbilicus save for vestiges of suture on last half whorl.
***Dimensions:** 36.2 x 34.9 mm (holotype); 42.3 x 39.2 mm (paratype 1); 42 x 39.5 mm (paratype 2).*
Operculum corneous, filling aperture, brownish-amber in colour, with a silky surface, iridescent when fresh.'

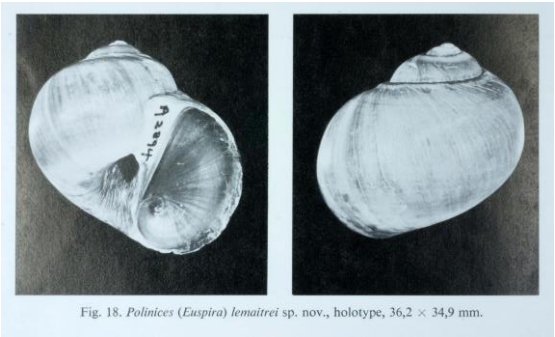
Fig. 18. *Polinices* (*Euspira*) *lemaitrei* sp. nov., holotype, 36,2 × 34,9 mm.

Fig. 1: Holotype of *Euspira lemaitrei*

Distribution: off Columbine area (appr. 33° S/ 17° E), Namaqualand coast, Northern Cape, South Africa in 360 m depth.

Euspira massieri
Petuch & Berschauer, 2018

Euspira lemaitrei (Kilburn, 1976) was redescribed as ***Euspira massieri*** by Petuch & Berschauer (2018).
The original description shows that it concerns the same species and has to be degraded to the rank of junior synonym:
'*Shell of average size for genus, thin, globose and inflated, with rounded shoulder and sides; spire slightly elevated, with rounded whorls; subsutural area slightly flattened; umbilicus present, narrow, deeply perforate; anterior end of umbilicus with single large, prominent raised cord; columellar area with large, prominent, roughly-rectangular parietal shield along posterior one-third of aperture; white parietal shield adherent, extending onto body whorl; anterior two-thirds of parietal shield thin, bladelike, not adherent, with large indented area that exposes entire umbilical opening; edge of indented area with large black brown stain; aperture wide, flaring, roughly semicircular; shell colour dark tan or brown, with pure white anterior end of body whorl and base of shell; interior of umbilicus white or pale tan, with anterior umbilical cord being darker tan; interior of aperture dark tan or brown on posterior area, turning white on anterior area*.'

Measurements: from 20 mm to 38 mm.

Type locality: South of Walvis Bay, Namibia in 275-300 m

Fig. 2: Type of *Euspira massieri* Petuch & Berschauer, 2018

Diagnosis: From the above two descriptions we learn that the following characteristics are predominant:
- a medium-sized shell: 23 mm – 47 mm;
- a relatively wide umbilicus, completely free of callus;
- an umbilicus which contains only a faint funicular ridge and two weak basal ridges;
- the reddish-brown colour with a paler subsutural zone, a cream-white base starting from mid parietal wall;
- a pure white parietal and columellar callus, the latter edged with a chestnut rim.

Distribution area of *Euspira lemaitrei*: Specimens are known from Mauritania in the

north, Senegal to Angola, Namibia and South Africa in the south. No important differences could be remarked between the several populations examined.

Discussion: Contact was made with E. Petuch to notify his mistake, which could be attributed to a lack of knowledge concerning the fauna of the West African molluscan fauna. He remains convinced that '***E. lemaitrei*** *is rather a species from South Africa and the Mozambique Channel (*sic!*), in contrast with* E. massieri *which is a typical inhabitant of the Namibian waters'* (personal communication, October 2018). In fact, there are no reports of the presence of *E. lemaitrei* in SE Africa. As demonstrated in this paper *E. lemaitrei* lives from Mauritania to South Africa.
E. Petuch states in his letter that 'E. massieri *has consistently a smaller shell than* E. lemaitrei'. This is partly true: South African specimens could be the extreme end of a cline. He continues: 'E. lemaitrei *should have a more stepped spire, with slightly flatter spire whorls, the parietal callus is proportionally smaller and is distinctly rectangular, and not tapering into the umbilical area.* E. massieri *also has a pure white anterior end of the body whorl and base of the shell, giving it a distinct two-toned look'*. Indeed, these characteristics are better reflected in smaller juvenile specimens but are not decisive to create a new species.
Finally, E. Petuch states that 'E. massieri *is a component of a highly endemic fauna that is restricted to the deep-water areas of northern and central Namibia'.* This is a very disputable point of view. Among other examples he mentions *Callumbonella namibiensis*, a junior synonym of *C. suturalis*, known from the Bay of Biscay (!) to Namibia. A critical analysis of the identity and the distribution of this species is described in detail by Nolf & Verstraeten (2013).

The descriptions of *E. lemaitrei* and *E. massieri* refer without doubt to the same species resulting in degrading the latter to the status of junior synonym.

The relationship between *E. lemaitrei* and *E. fusca*

Mainly as a result of the great similarity between *E. lemaitrei* and *Euspira fusca* (de Blainville, 1825) the former species has never been mentioned from other West African areas and it has remained in hiding from any report in literature and shell collections.
According to Kilburn, *E. fusca* is a Mediterranean species. Apparently, he was unaware of the occurrence of that widespread East Atlantic species, which ranges from the North Sea (Faroe Islands) to Angola. Petuch & Berschauer (2018) provided a detailed comparison between the two species.

Euspira massieri is characterized by:
- a narrower and more laterally compressed shell outline;
- a smaller and narrower umbilicus;
- a prominent anterior funicular ridge;
- the completely white base (in contrast with *E. fusca* which shows a dark brown zone);
- the parietal shield along the columellar side of the aperture which is small and covers only one-third of the parietal area extending in a large white rectangular callus-like structure at the posterior end of the aperture (absent in *E. fusca*).

E. fusca (Pl. V, Figs 24-29; Pl. VI, Figs 30-36) is different by:
- the better developed parietal shield, extending over two-thirds of the length of the aperture, partially closing off the umbilicus;
- the colour of the shell: the whorls are completely brown and both the parietal and columellar parts are stained dark brown.

Remarks concerning the distribution of *E. fusca*: Shells from the Celtic Sea (SE England, UK), the Bay of Biscay (Pl. VII, Figs 37-40) and the Mediterranean Sea are relatively larger (30-40 mm, max. 50 mm) than specimens from West Africa (Pl. V, Figs 24-29). A population of very small representatives (ca 20 mm) lives in Angolan waters (Fernandes & Rolán, 1993) (Pl. VI, Figs 34-36). Large quantities of this special form were trawled by Belgian fishermen (PEMARCO-fishery) off Cape Morro in the 60s and 70s of the last century.

Conclusion: *Euspira lemaitrei* has a wider distribution range than originally expected, largely overlapping in the East Atlantic with the geographic area of *Euspira fusca* from which it can easily be distinguished. *E. massieri* is a junior synonym of *E. lemaitrei*.

Acknowledgments: I am very thankful to Johan Verstraeten (Oostende, Belgium) and Frank Swinnen who kindly loaned specimens for the present study. As usual David Monsecour was of useful assistance in accurately correcting the English text.

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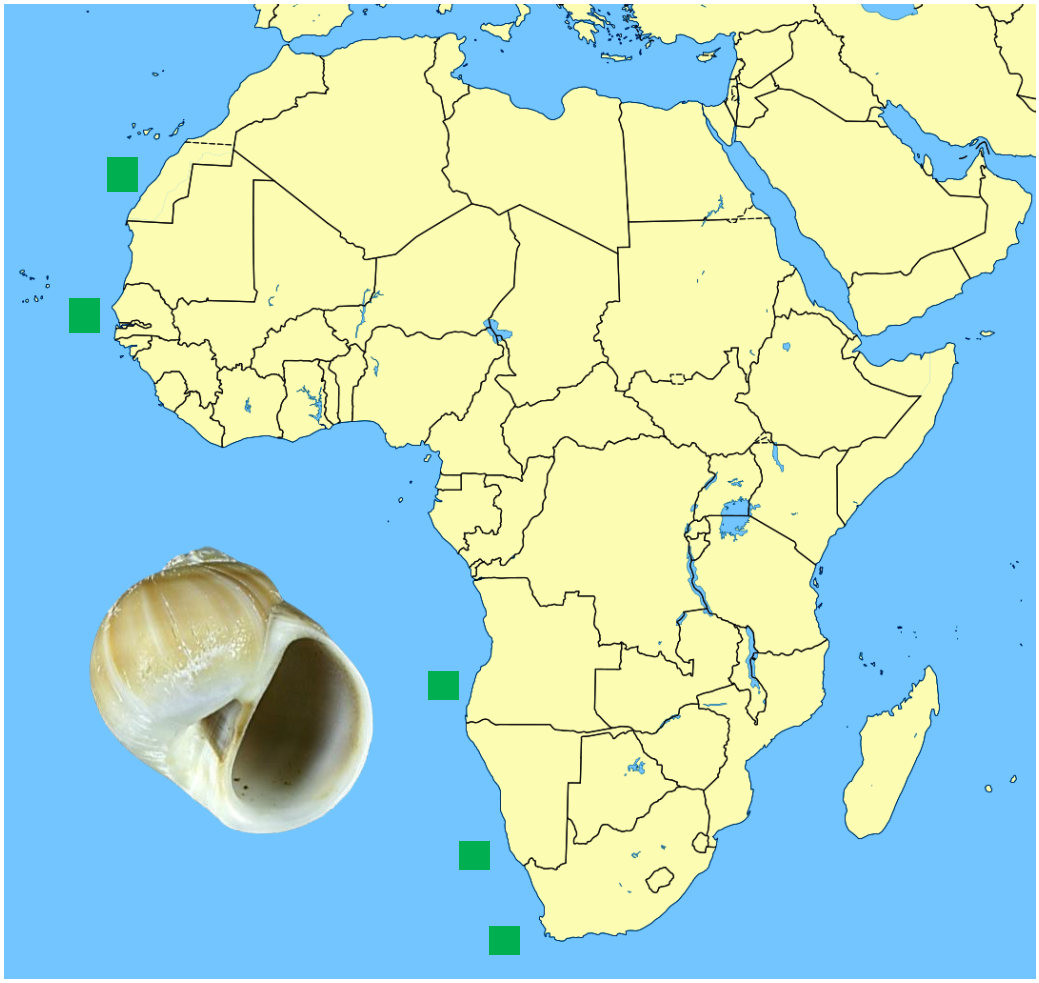
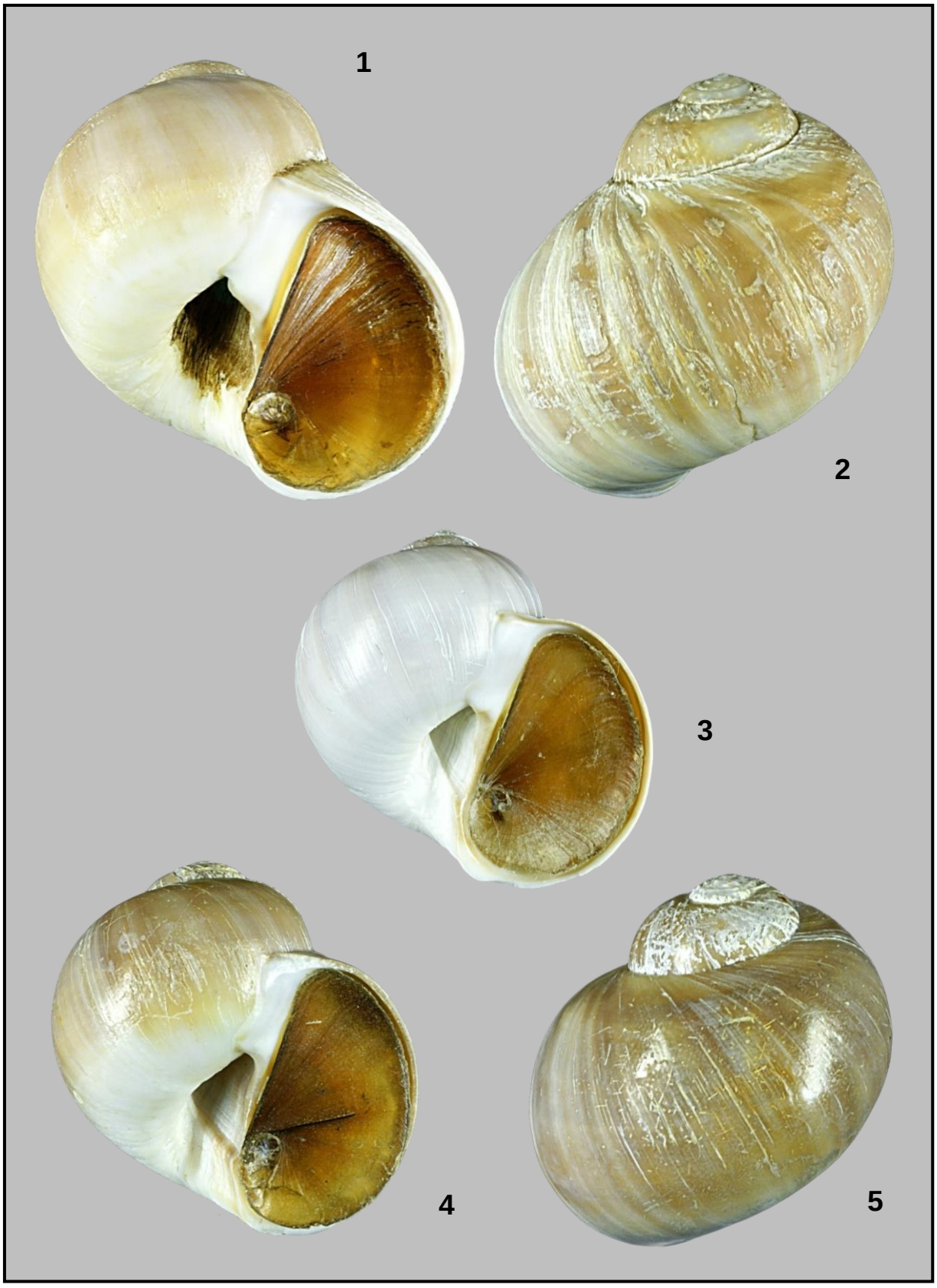
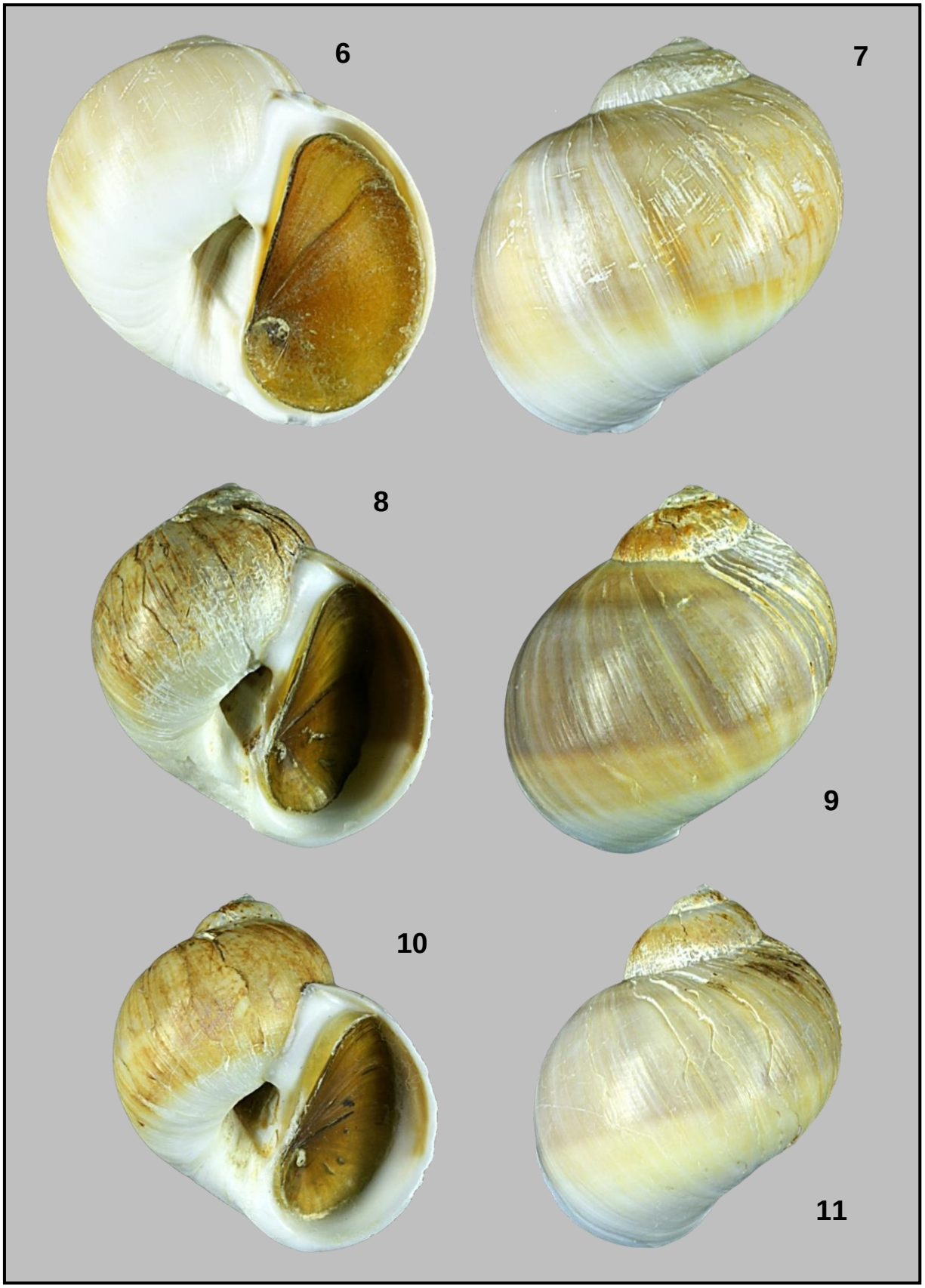


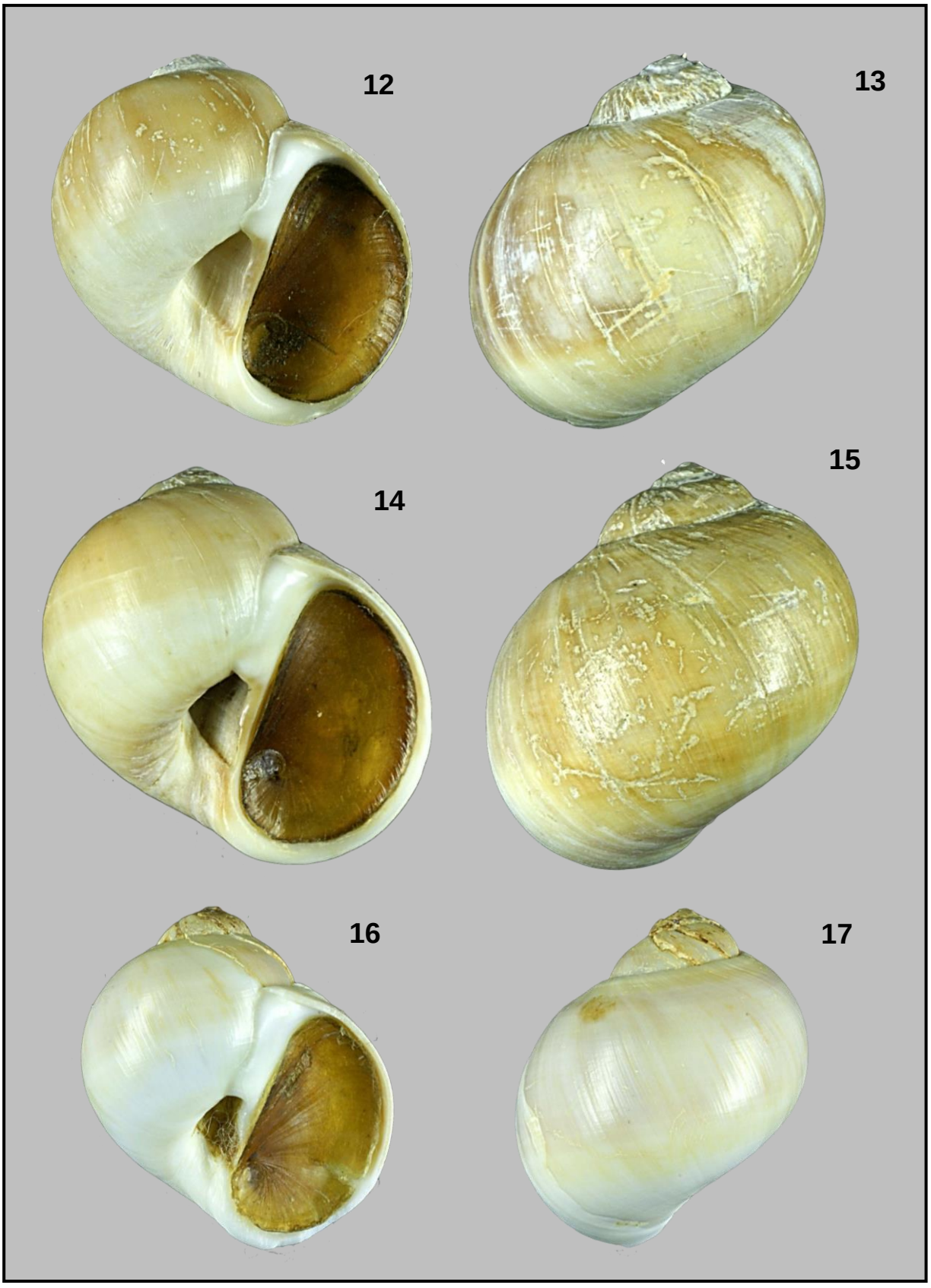
Geographic range of *Euspira lemaitrei* (Kilburn, 1976)



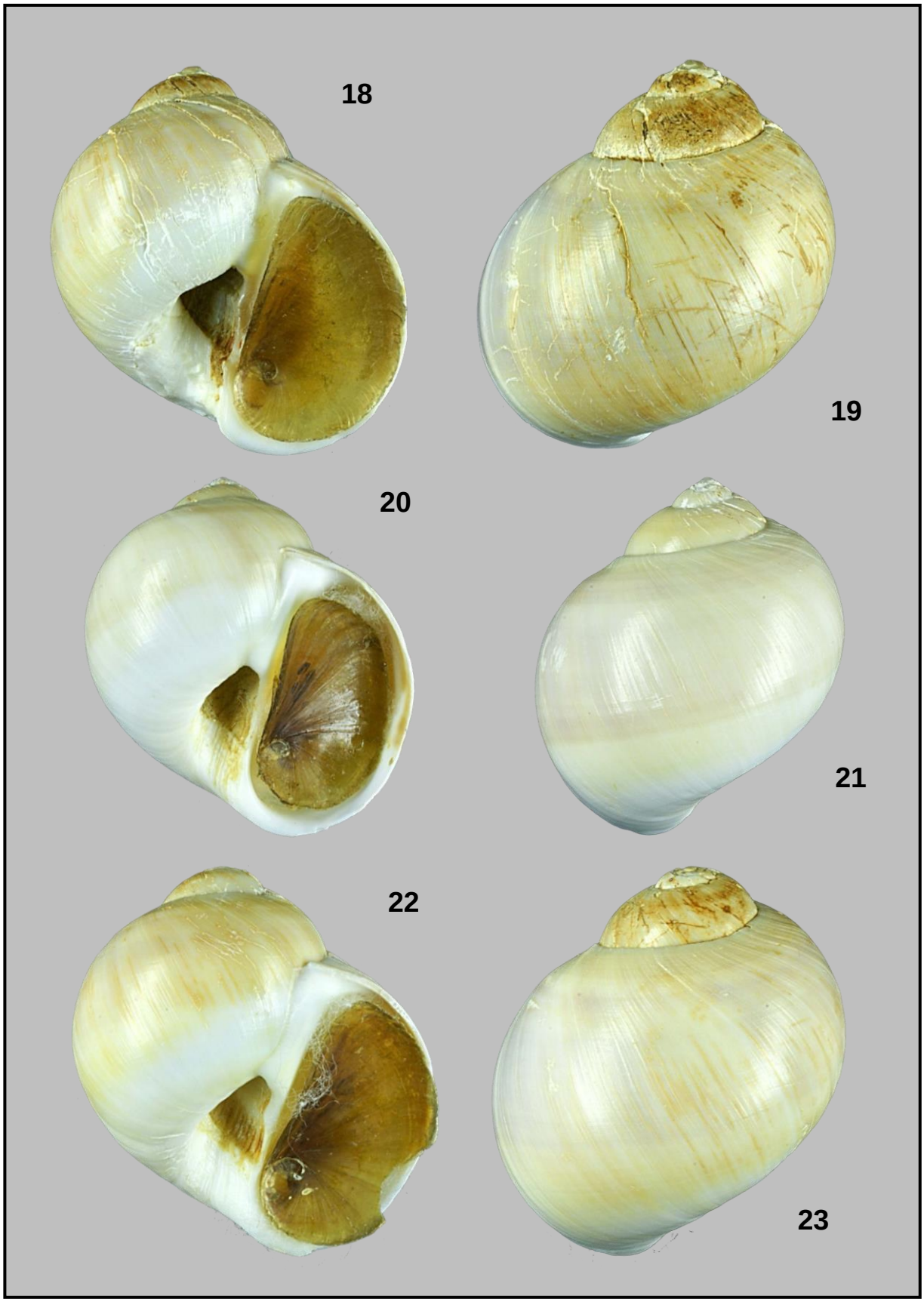
Pl. I. Figs 1-5: *Euspira lemaitrei* (Kilburn, 1976); 1-2: Hout Bay, off Constantia, South Africa. Trawled by fishermen. H. 46.84 mm L. 44.57 mm. CFN; 3-5: off Lüderitz, South of Walvis Bay, Namibia. 25° S/ 12° E. Trawled by fishermen at a depth of 400 m; 3: H. 34.11 mm L. 33.53 mm. JVC; 4-5: 34.49 mm L. 34.30 mm. CFN.



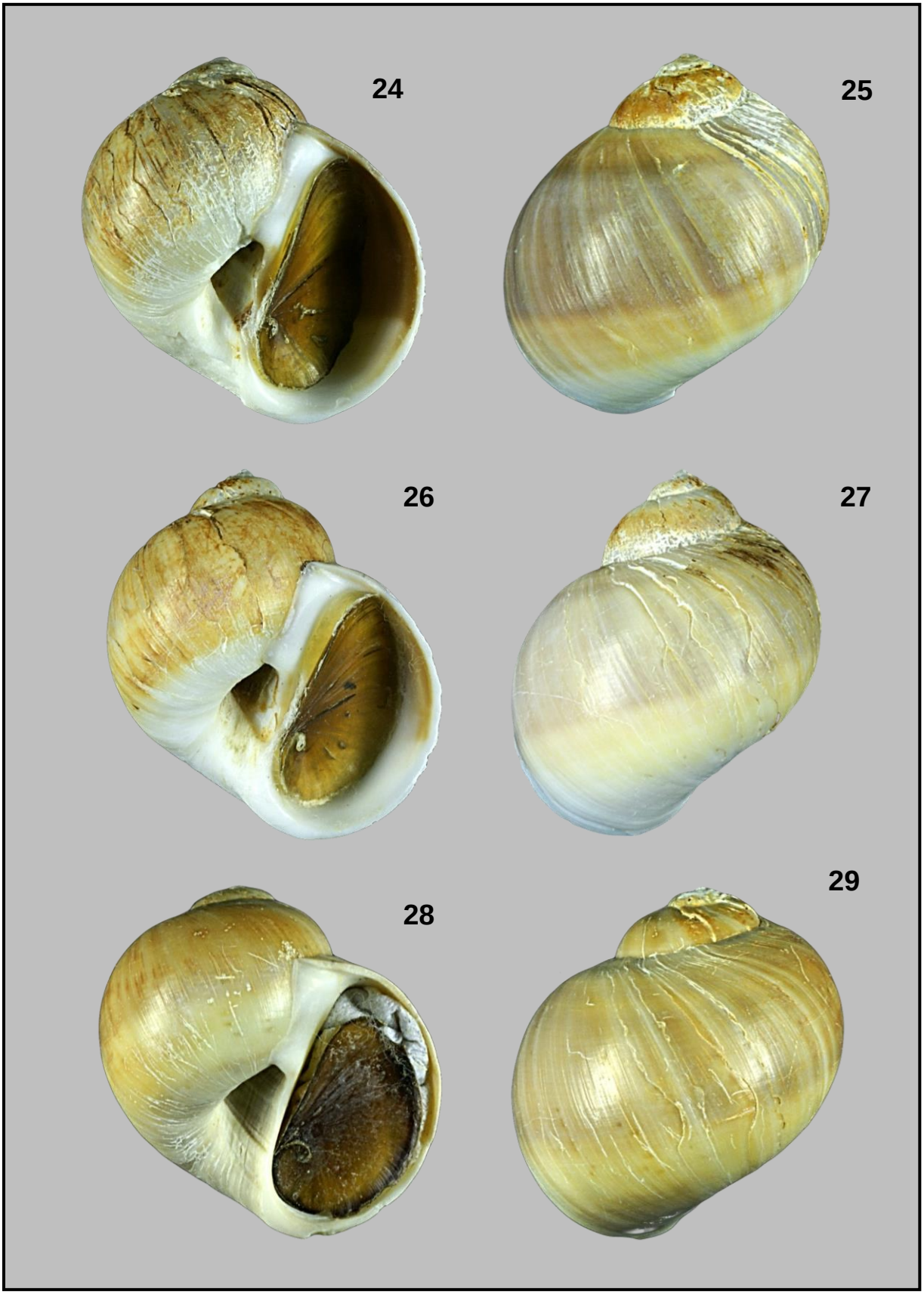
Pl. II. Figs 6-11: *Euspira lemaitrei* (Kilburn, 1976); 6-7: off Lüderitz, South of Walvis Bay, Namibia. 25° S/ 12° E. Trawled by fishermen at a depth of 400 m. H. 32.34 mm L. 32.80 mm. CFN; 8-11: off Soyo, N Angola. Trawled by fishermen at 120-150 m. Spring 2014. CJV; 8-9: H. 25.84 mm L. 23.90 mm; 10-11: H. 25.90 mm L. 23.43 mm.



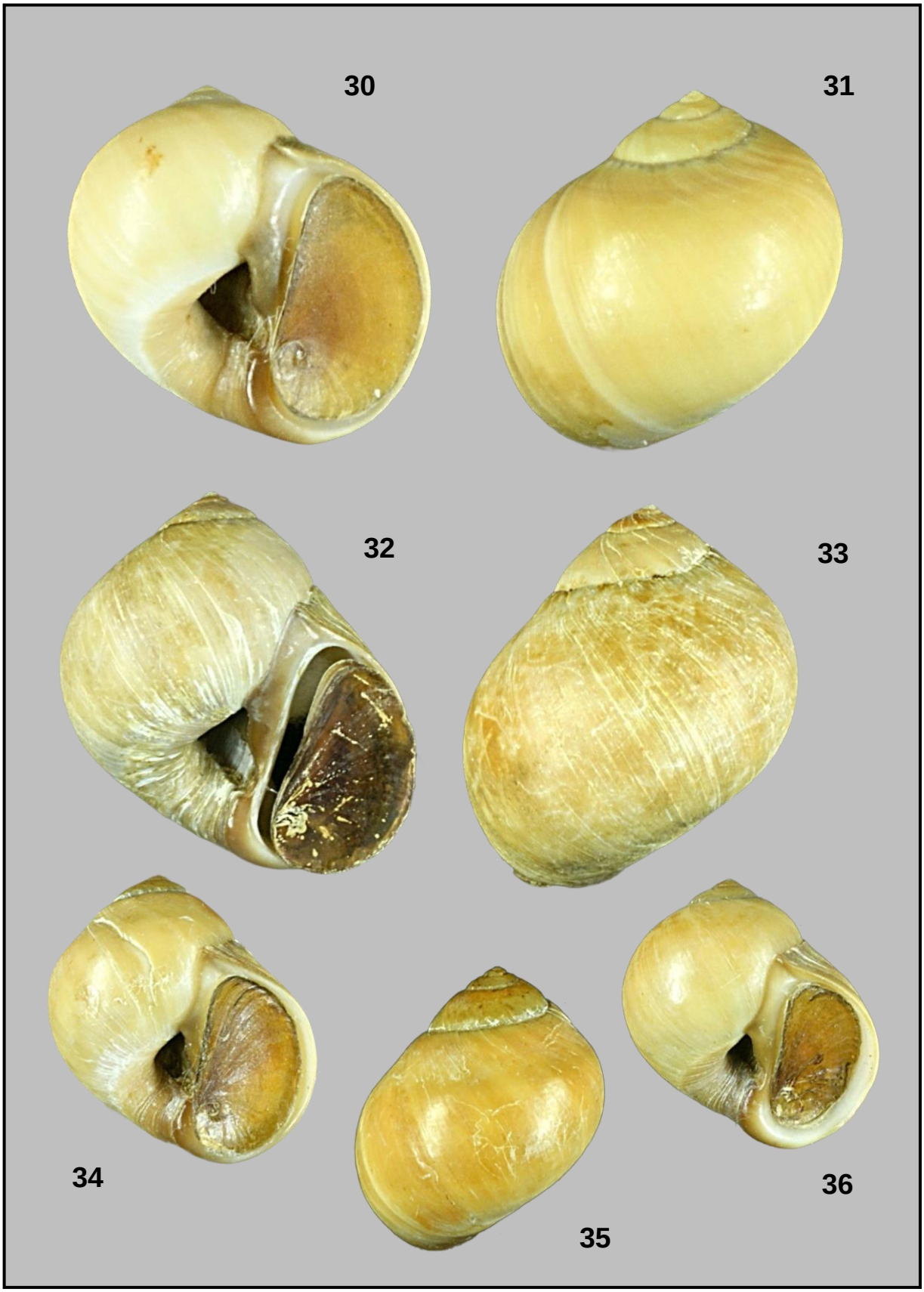
Pl. III. Figs 12-17: *Euspira lemaitrei* (Kilburn, 1976); 12-15: off Dakar, Senegal. Trawled by fishermen at a depth of 100 m. 1979. CFN; 12-13: 26.75 mm L. 25.36 mm; 14-15: H. 29.05 mm L. 27.58 mm; 16-17: off Nouakchott, Mauritania. Trawled by fishermen in deep water. 1979. H. 28.50 mm L. 25.63 mm. CFS.



Pl. IV. Figs 18-23: *Euspira lemaitrei* (Kilburn, 1976); off Nouakchott, Mauritania. Trawled by fishermen in deep water. 1979. CFS; 18-19: H. 29.11 mm L. 25.90 mm; 20-21: H. 28.50 mm L. 25.63 mm; 22-23: H. 28.89 mm L. 26.69 mm.



Pl. V. Figs 24-29: ***Euspira fusca* (de Blainville, 1825)**. JVC; 24-27: off Soyo, northern Angola. Trawled by fishermen at a depth of 120-150 m. April 2014; 24-25: H. 25.84 mm L. 23.90 mm; 26-27: H. 25.90 mm L. 23.43 mm; 28-29: off Cayar, northern Senegal. Trawled by fishermen at a depth of 80 m. H. 26.45 mm L. 25.94 mm.



Pl. VI. Figs 30-36: ***Euspira fusca* (de Blainville, 1825)**. CFN; 30-33: off Mauritania. 17°17' N/ 16°28' W. Trawled by fishermen at a depth of 95 m. 1979; 30-31: H. 19.39 mm L. 19.16 mm; 32-33: H. 21.21 mm L. 21.18 mm; 34-36: Cape Morro, Angola. Trawled by Belgian fishermen (PEMARCO) at a depth of 100 m. In mud. 1972; 34-35: H. 19.88 mm L. 18.19 mm; 36: H. 19.75 mm L. 19.17 mm.

Pl. VII. Figs 37-40: ***Euspira fusca* (de Blainville, 1825)**. CFN; Rochebonne Bank, off La Rochelle, Bay of Biscay, W France. Trawled by Belgian fishermen at a depth of 140 m. June 2005; 37-38: H. 38.77 mm L. 35.90 mm; 39-40: H. 37.74 mm L. 38.75 mm.
Figs 41-42: ***Euspira catena* (da Costa, 1778)**. Isla Canela, Ayamonte, southern Spain, Atlantic Ocean. Buried in clean sand at low tide. March 2009. H. 34.37 mm L. 31.87 mm. CFN.

About the enigmatic *Venus simulans* G.B. Sowerby I, 1844: a comparative study of the morphological variations in *Venus verrucosa* Linnaeus, 1758 (Mollusca: Bivalvia: Veneridae) in the Mediterranean and East Atlantic waters

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Keywords: Mollusca, Bivalvia, VENERIDAE, *Venus verrucosa*, *Venus simulans*, *Venus damasoi*, Cape Verde Islands, East Atlantic.

Abstract: *Venus verrucosa* Linnaeus, 1758 is a habitant of the East Atlantic waters from W Scotland to South Africa. A population of smaller, shorter and more globose specimens seems to be endemic to the Cape Verde Islands but similar shells have been recorded from other areas (Gabon, Angola). They are called *Venus simulans* G.B. Sowerby I, 1844. Recently the same shells have been described once again under the junior synonym *Venus damasoi* T. Cossignani, 2015. The present paper provides an overview of the variability of *Venus verrucosa* in the East Atlantic and Mediterranean waters, resulting in the conclusion that *Venus simulans* is neither is a separate species nor a subspecies of *V. verrucosa.* It should better be regarded as a form of *Venus verrucosa*, since similar forms are found in Gabon and Angola.

Abbreviations:

CFN: Private collection of Frank Nolf (Oostende, Belgium)
CJV: Private collection of Johan Verstraeten (Oostende, Belgium)
CSH: Private collection of Steve Hubrecht (Koksijde, Belgium)
CVI: Cape Verde Islands
H.: Height
L.: Length

Introduction:

Class Bivalvia Linnaeus, 1758
Superfamily Veneroidea Rafinesque, 1815
Family Veneridae Rafinesque, 1825
Genus Venus Linnaeus, 1758

***Venus verrucosa* Linnaeus, 1758**

Pl. III, Figs 14-15; Pl. IV, Figs 16-20; Pl. V, Figs 21-25; Pl. VI, Figs 26-30; Pl. VII, Figs 31-35

Venus verrucosa Linnaeus, 1758 is a shallow burrower in sand, fine or mixed gravel in the intertidal zone from 3 to about 100 m occurring in the East Atlantic and the Mediterranean.

Most important characteristics: Shell solid, equivalve, short, inflated; inequilateral, nearly subcircular, slightly longer than high; rarely measuring more than 70 mm. Ligament extending just over one-third of the way to the posterior margin. Beaks in front of the vertical midline. Lunule well-defined, broad, heart-shaped, brown, marked with very fine radiating ridges. Escutcheon extensive in the left valve, semi-elliptical with radiating lines and transverse brown stripes; in the right valve not so well developed. Sculpture of prominent commarginal lamellae bearing wart-like spines rising on the anterior and posterior margins; fine radiating lines between the commarginal ridges make the surface cancellate. Three cardinal teeth in each valve. In front of the lower end of the anterior cardinal tooth of the left valve is a small tubercle: the anterior lateral tooth. Inside of the valves white, but the posterior adductor muscle scar may carry a pale purple or brown blotch. Pallial sinus small, triangular. Inner margins of the valves finely crenulate. Outside dirty white to pale yellow, blotched with brown blotches or diverging rays or completely light brown in colour.

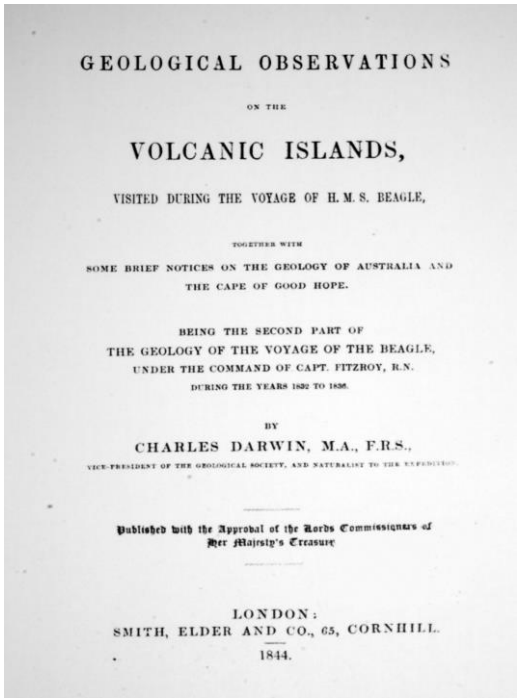
Geographic distribution: *Venus verrucosa* occurs along the west coast of Scotland, the south-west of Ireland, the Irish Sea, the English Channel, Brittany (France), the Bay of Biscay south to the Iberian Peninsula, into the Mediterranean, to Madeira, the Canary Islands, the Cape Verde Islands, and down the west coast of Africa to Senegal, rarer in the south and again more common southward from Angola to Namibia, South Africa and even to KwaZulu-Natal. Not recorded from Sierra Leone to Cameroon.

***Venus simulans* / *Venus verrucosa simulans* / *Venus verrucosa* forma *simulans* G.B. Sowerby I in Darwin, 1844**
Pl. I, Figs 1-6; Pl. II, Figs 7-10;
Pl. III, Figs 11-13

Synonyms: *Venus tuberosa* Deshayes, 1853 and *Venus nodosa* Dunker, 1853.

G.B. Sowerby II (1844) described a fossil shell from a tertiary deposit, beneath a great basaltic stream, at Santiago, Cape Verde Islands. The shell was not figured.

Original description: '*Testa rotundata, ventricosa, laeviuscula, crassa; costis obtusis, latiusculis, concentricis, anticè posticeque tuberculatim solutis; area cardinali postica alterae valvae latiuscula; impressione subumbonali postica circulari*.'
G.B. Sowerby II (1844) states that this shell '*is intermediate in its characters, taking its place between the* Venus verrucosa *of the British Channel and the* V. rosalina *of Rang of the western coast of Africa, but sufficiently distinguished from both by its broad, obtuse, concentric ribs, which are dived into tubercles both before and behind. It is also of a more circular form than either of those species*.'



GEOLOGICAL OBSERVATIONS

ON THE

VOLCANIC ISLANDS,

VISITED DURING THE VOYAGE OF H. M. S. BEAGLE,

TOGETHER WITH

SOME BRIEF NOTICES ON THE GEOLOGY OF AUSTRALIA AND THE CAPE OF GOOD HOPE.

BEING THE SECOND PART OF
THE GEOLOGY OF THE VOYAGE OF THE BEAGLE,
UNDER THE COMMAND OF CAPT. FITZROY, R.N.
DURING THE YEARS 1832 TO 1836.

BY

CHARLES DARWIN, M.A., F.R.S.,

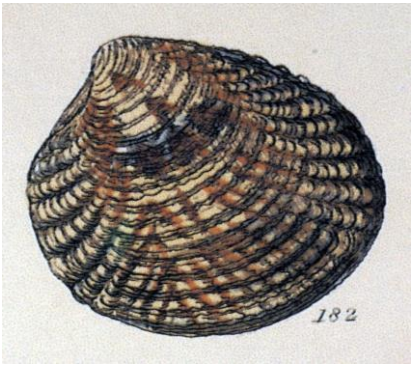
VICE-PRESIDENT OF THE GEOLOGICAL SOCIETY, AND NATURALIST TO THE EXPEDITION.

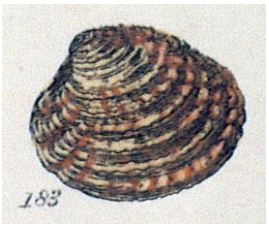
Published with the Approbation of the Lords Commissioners of Her Majesty's Treasury

LONDON:
SMITH, ELDER AND CO., 65, CORNHILL.
1844.

Fig. 1: Sowerby, G.B. II, in Darwin, Ch., 1844. *Description of Fossil Shells. Geological Observation on the Volcanic Islands, visited during the voyage of H.M.S. Beagle*, appendix. London. p. 154.

It is remarkable that G.B. Sowerby II (1853) did not refer to this description in his revision of the family Veneridae in the '*Thesaurus Conchyliorum*', although he illustrated a smaller specimen on Pl. CLX, fig. 183 without further comments, and which could possibly be forma *simulans*. Most probably, he considered the latter merely as a fossil shell.





Main differences from *V. verrucosa*:
- shell smaller and shorter, max. 40 mm;
- thicker and more solid, very globose;
- posterior margin sometimes truncated;
- surface with stronger and bulbus commarginal ribs with thicker warts compared to the sharper lamellae in *V. verrucosa.*
- geographic range apparently restricted to the Cape Verde Islands.

***Venus damasoi* T. Cossignani, 2015**

Short version of the Italian description: '… shell rounded and globular, slightly elongated … very robust … rough surface caused by the presence of warts - colour: ivory-white with rare light-brown specks – internal white marble … heterodont hinge with three cardinal teeth in the right valve and two elongated lateral teeth in the left valve … pale sinus line typical for the genus'.
'*This species has a great affinity with* V. verrucosa *from which it is distinguished by the shape, the smaller size and above all by the ornamentation of the radiating striae, and particularly from Venus verrucosa* forma *simulans by the much more evident tubercles and very rounded shape*' (Cossignani, 2015).

Type locality: Farol das Lagosta, Luanda, Angola. Trawled at a depth of 25-30 m.
Measurements: holotype: 36.51 x 33.32 mm; paratype 1: 31.42 mm x 28.35mm

Fig. 3: Holotype of *Venus damasoi* Cossignani, 2015

Fig. 4: Paratype 1 of *Venus damasoi* Cossignani, 2015

Discussion: *Venus damasoi* Cossignani, 2015 was described as a separate species from Angola, but only two specimens are known. They possesses the particular characteristics of *simulans* even to a greater extent than in the Cape Verde Islands specimens. If they were actually trawled off Farol das Lagosta, this find would rule out the opinion of *V. simulans* as a subspecies since the *simulans* form would be no more endemic to the CVI archipelago. After comparing the two descriptions of both *V. simulans* and *V. damasoi*, it is clear that this concerns the same species and therefore *Venus damasoi* Cossignani, 2015 must be treated as a junior synonym of *Venus simulans.*

We have always thought *V. simulans* was endemic from the Cape Verde Islands, where a locally common population is living. Until recently similar specimens were unknown from other areas, neither in the Mediterranean and nor from other East Atlantic waters. In this paper a gallery of related forms are illustrated: one from Gabon (with detailed coordinates) and one from Senegal (Pl. III, Fig. 14-15). Even in the Mediterranean Sea specimens can be found which similar characteristics, e.g. in Greece (Pl. VI, Figs 29-30).
A dozen of specimens from the CVI were examined and compared with a hundred of representatives of *V. verrucosa* in Western Europa, the Mediterranean Sea, W Africa and even form South Africa. The appearance of CVI specimens is very constant on the archipelago but exceptionally specimens with less extreme characteristics are present and even in that isolated area variability appears among some specimens.

Conclusion: *Venus verrucosa* is a wide spread species from the British Islands in the north to South Africa in the south of the East Atlantic waters and into the Mediterranean Sea. It can be expected that a lot of different forms are found and described as such. *Venus simulans* obtained the rank of a fossil species from the Cape Verde archipelago by G.B. Sowerby II (1844), but it has been proven to be also a recent venus clam later on. The typical characters of *V. simulans* are probably due to the special circumstances of the habitat. For instance, the truncated form can be explained by the kind of bottom consisting of gravel, stones and small boulders which may interrupt the growth in length. As a result this may lead to an extra development of ridges and thickened pustules.
In the past decades more material became available from adjacent countries such as Senegal, Gabon and Angola. Some of these shells are real lookalikes of the CVI representatives and we must abandon our line of thought assuming that *Venus verrucosa simulans* is a subspecies of *V. verrucosa*. It is not restricted to an isolated area, namely the CVI Islands.
Neither can we assume that *V. verrucosa* and *V. simulans* are eventually two different species as Cosel, von & Gofas (2020) let suggest in their comments. The similarity between both is very obvious and they are continuously interconnected through a large series of intermediate forms.
Therefore it seems more logical to consider *Venus simulans* as an ecological form of *V. verrucosa*, whereby Huber's (2010) way of thinking can be followed. It is typical for the Cape Verde Islands with representatives in neighbouring areas. We have to wait for further DNA-research to solve these problem.

Acknowledgements: I sincerely thank Steve Hubrecht (Koksijde, Belgium) and Johan Verstraeten (Oostende, Belgium) for loaning material of *Venus verrucosa* for this study and especially for their critical comments. Faithful as usual, David Monsecour was helpful in editing the English text.

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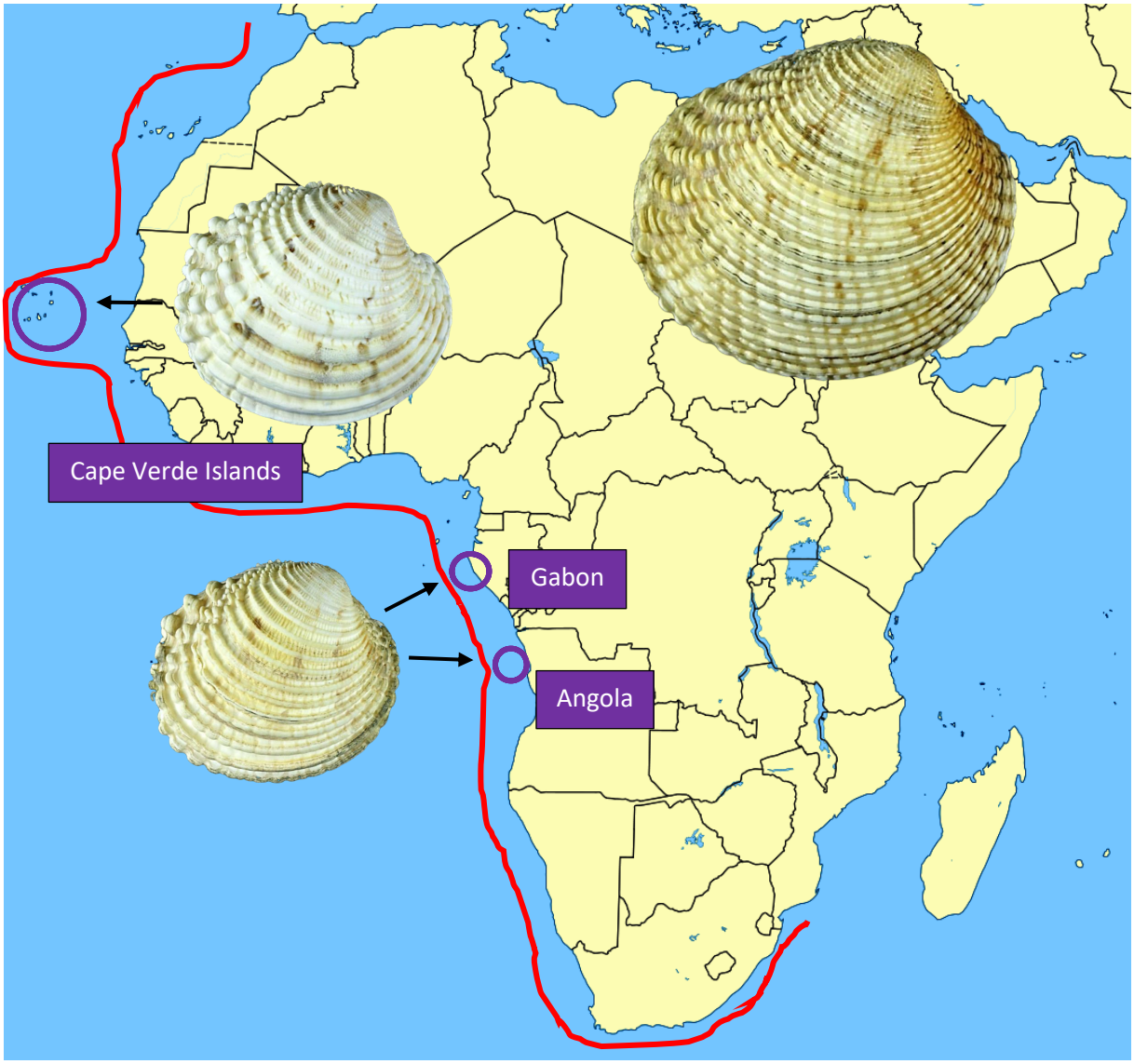

Geographic distribution of *Venus verrucosa* Linnaeus, 1758 in the East Atlantic waters of W Africa (red line) and localization of populations of '*Venus simulans'* G.B. Sowerby I, 1844 (purplish circle)

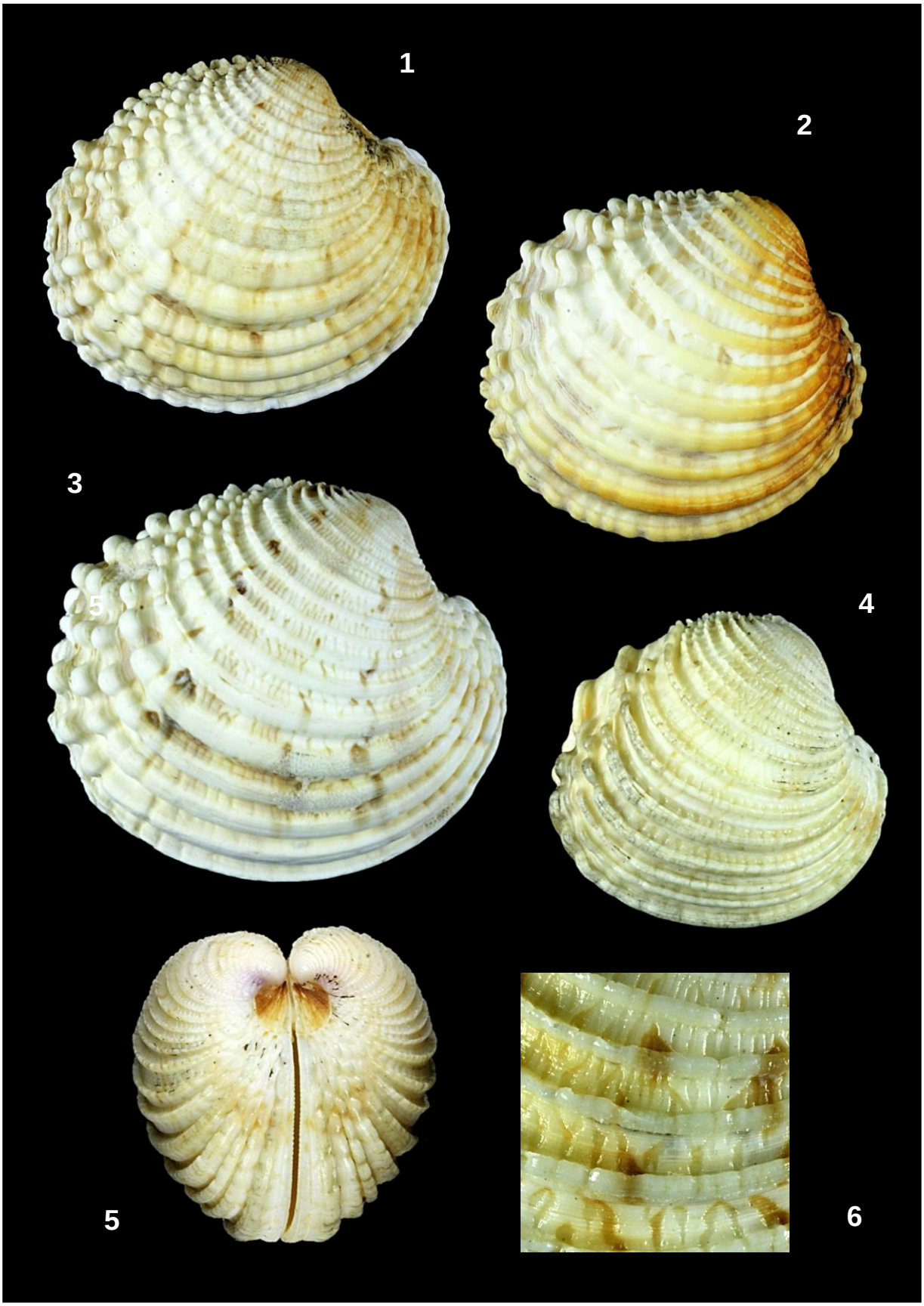

Plate I. Figs 1-6. *Venus simulans* G.B. Sowerby II in Darwin, 1844; 1-4: São Vicente, Cape Verde Islands. From SCUBA diver, at a depth of 10-28 m. May 2015. CJV; 1: H. 27.71 mm L. 31.94 mm; 2: 27.54 mm L. 31.02 mm; 3: 31.48 mm L. 33.24 mm; 4-6: Praia Gamboa, São Tiago, Cape Verde Islands. Dived. In sand. 1990. H. 25.09 mm L. 26.26 mm. CFN**.**

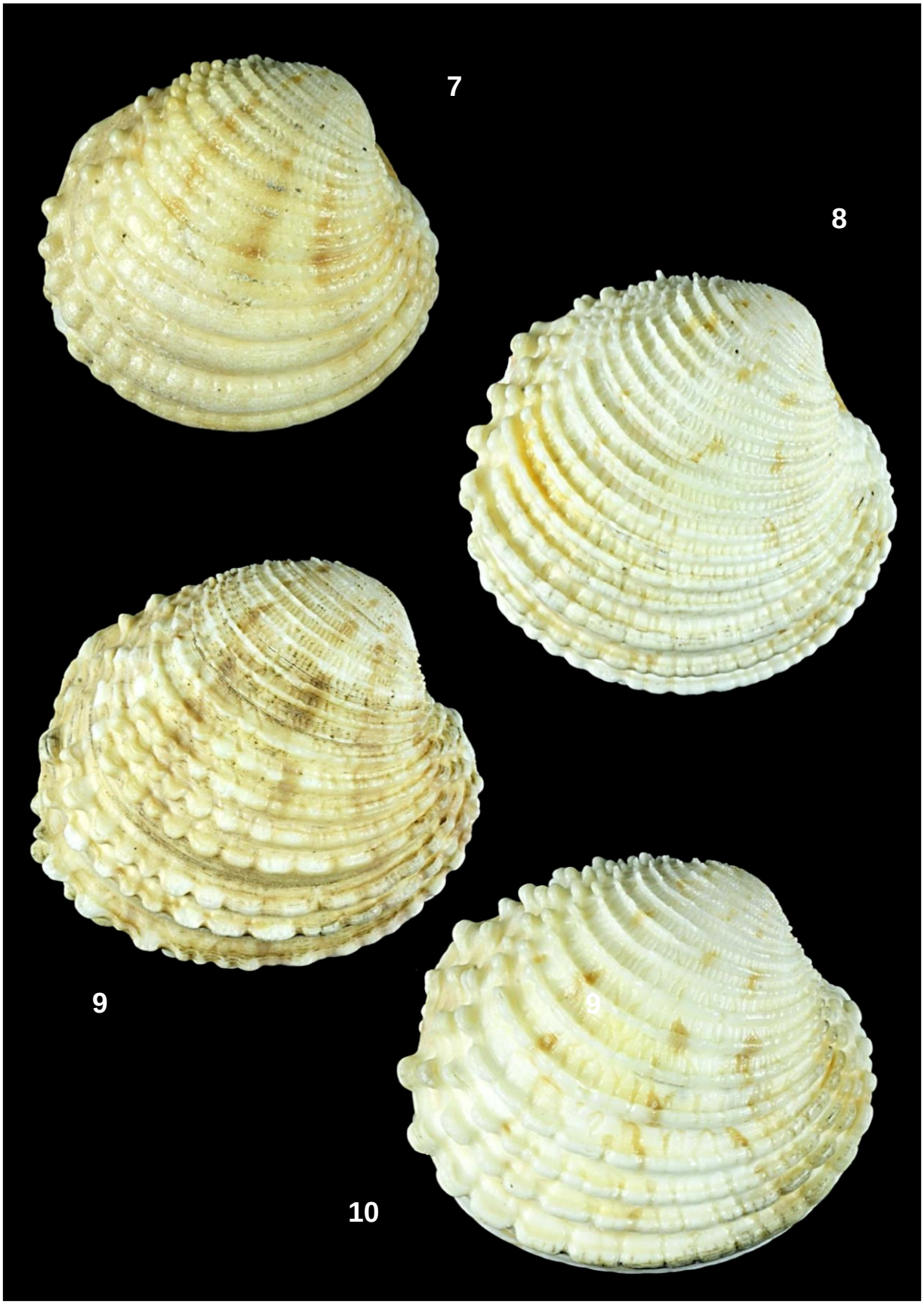

Plate II. Figs 7-10. *Venus simulans* G.B. Sowerby II in Darwin, 1844. Praia Gamboa, São Tiago, Cape Verde Islands. Dived. In sand. 1990. CFN; 7: H. 30.32 mm L. 32.47 mm; 8: 32.97 mm L. 33.92 mm; 9: H. 32.53 mm L. 35.51 mm; 10: H. 32.58 mm L. 36.96 mm.

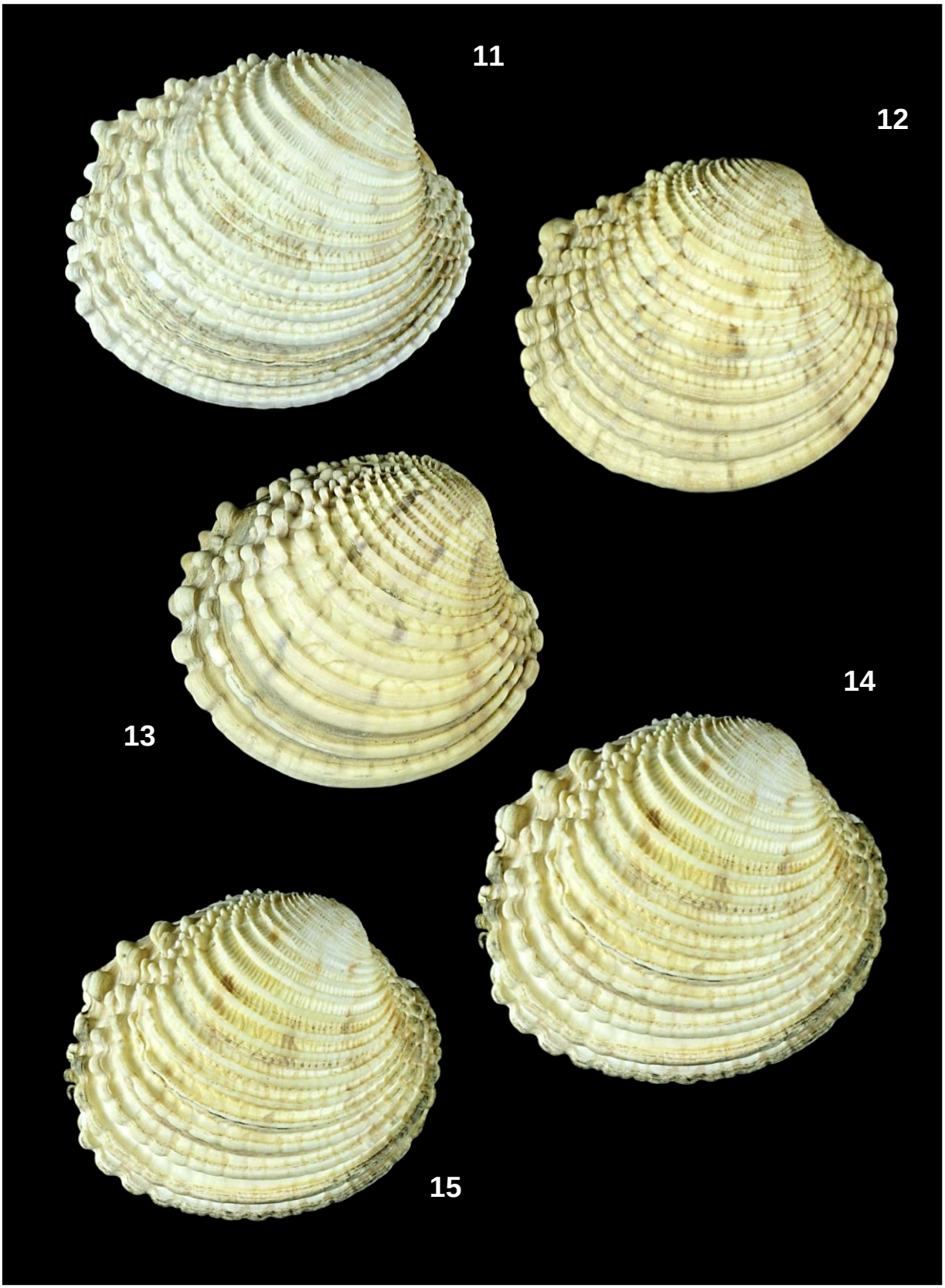

Plate III. Figs 11-13. ***Venus simulans* G.B. Sowerby II in Darwin, 1844**; 11: Praia Gamboa, São Tiago, Cape Verde Islands. Dived. In sand. 1990. H. 38.02 mm L. 41.81 mm. CFN; 12: Sal, Cape Verde Islands. H. 32.30 mm L. 37.34 mm. CSH; 13: Mindelo, São Vicente, Cape Verde Islands. Alive in sand in cartyre near Fish Market Pier. 28 September 2019. H. 32.41 mm L. 36.35 mm. CSH; Fig. 14-15: ***Venus verrucosa* Linnaeus, 1758.** CFN**;** 14: Santa Clara, Gabon. 00°30.5' N/ 09°19.5' E. Among rocks on sandy beach. 1985. H. 35.66 mm L. 39.84 mm; 15: Bay of Hann, off Dakar, Senegal. Dived at a depth of 10-15 m. 1985. H. 43.04 mm L. 50.36 mm. CFN.

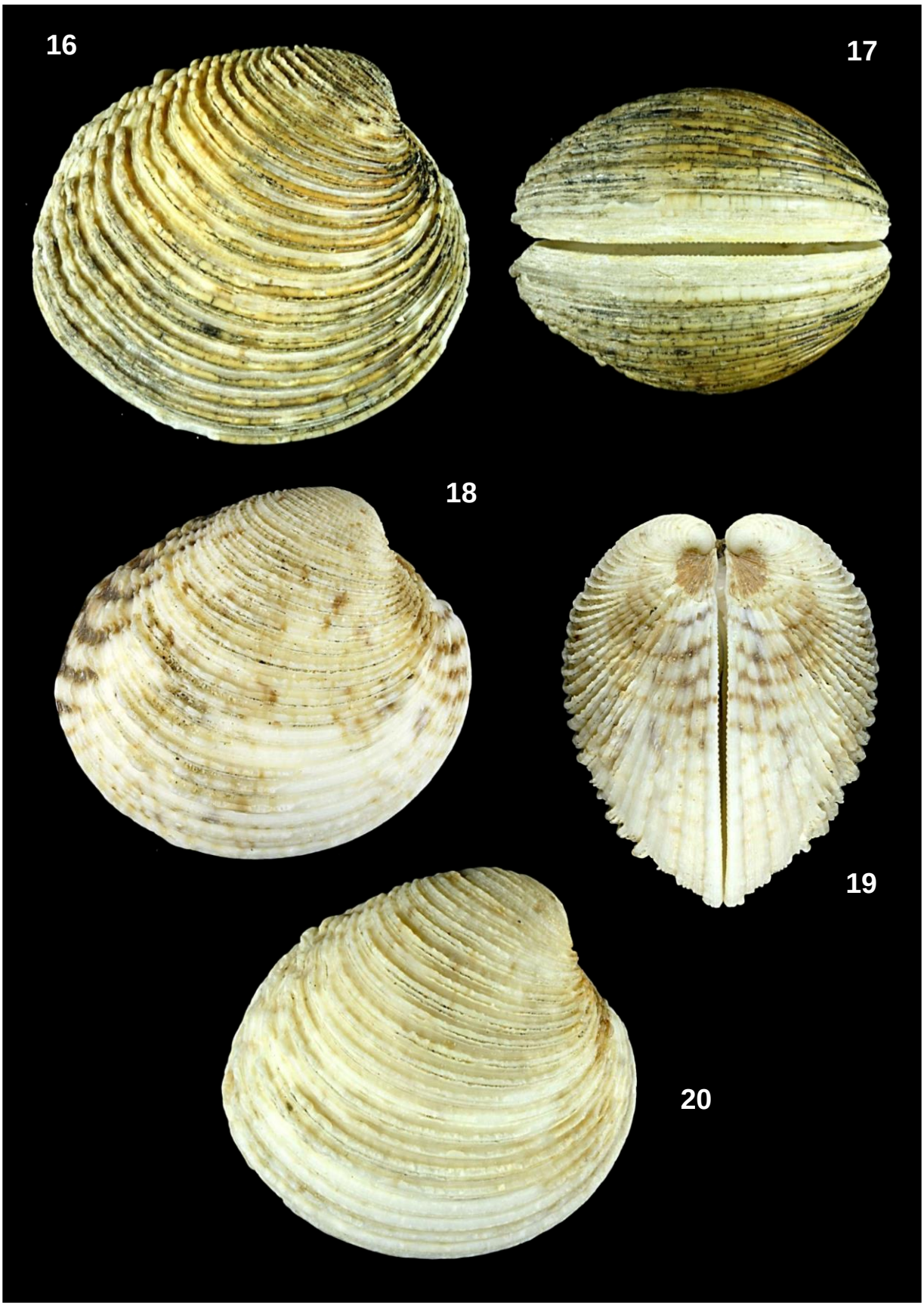

Plate IV. Figs 15-20: *Venus verrucosa* var. *tumida* B.D.D., 1893. CFN; 15-16: off Waterford, Ireland, UK. Trawled by Belgian fishermen. H. 41.77 mm L. 45.59 mm. CFN; 17-20: Le Verdelet, Le Val-André, Brittany, France. In sand at extreme low tide. 6 April 2012. CFN; 17-18: H. 37.36 mm L. 42.97 mm; 19: H. 39.52 mm L. 42.51 mm.

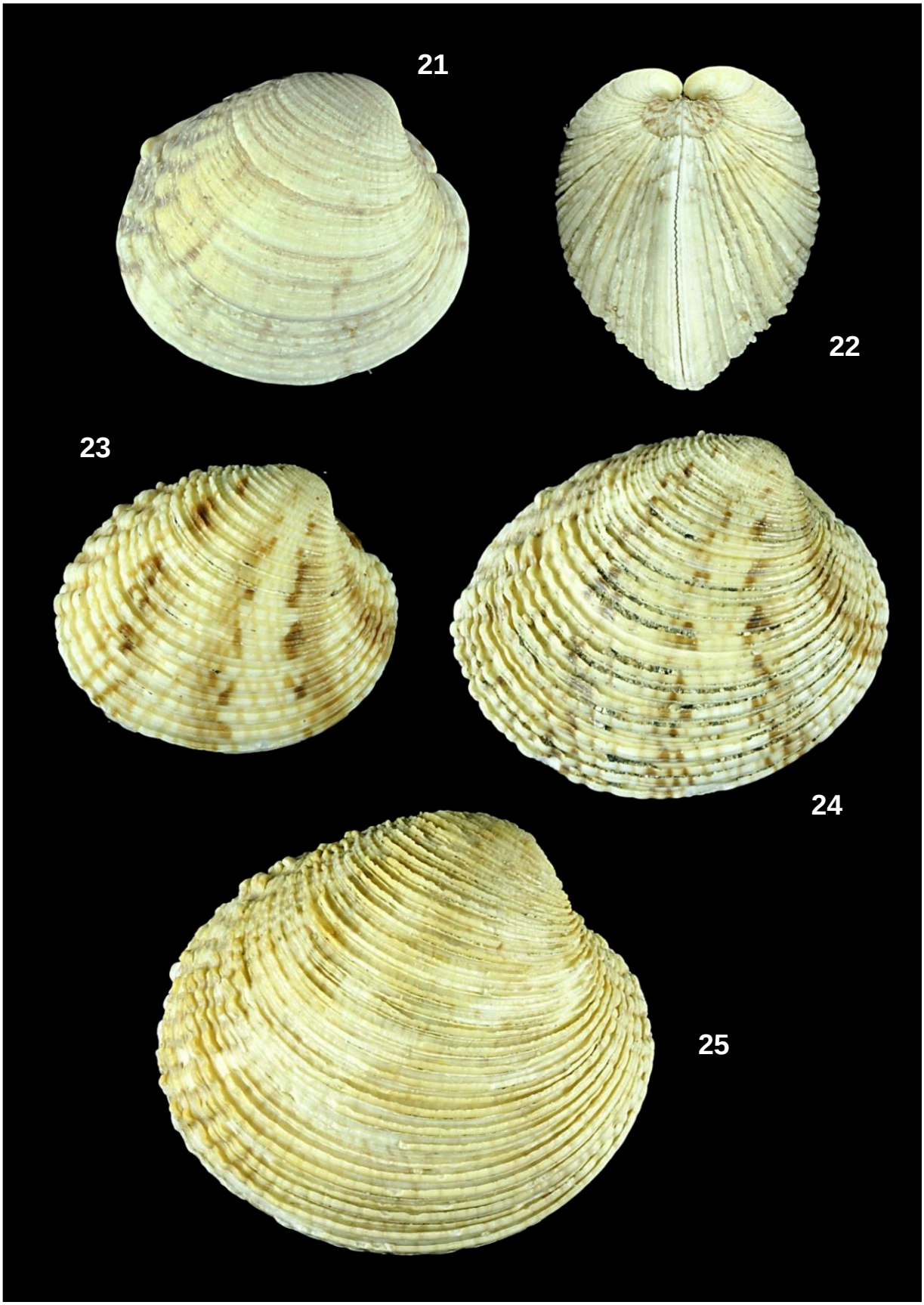

Plate V. Figs 21-22: ***Venus verrucosa* var. *tumida* B.D.D., 1893**. St. Germain-en-Ay-Plage, Normandy, France. In sand at low tide. 18 April 2003. H. 29.05 mm L. 32.54 mm. CFN.
Figs 23-25: ***Venus verrucosa*** Linnaeus, 1758. CFN; 23-24: Le Verdelet, Le Val-André, Brittany, France. In sand at extreme low tide. 6 April 2012; 23: H. 28.13 mm L. 33.49 mm; 24: 37.41 mm L. 44.71 mm; 25: Ile Tudy, Finistère, Brittany, France. In sand at extreme low tide. 29 March 2002. H. 54.80 m L. 61.90 mm.

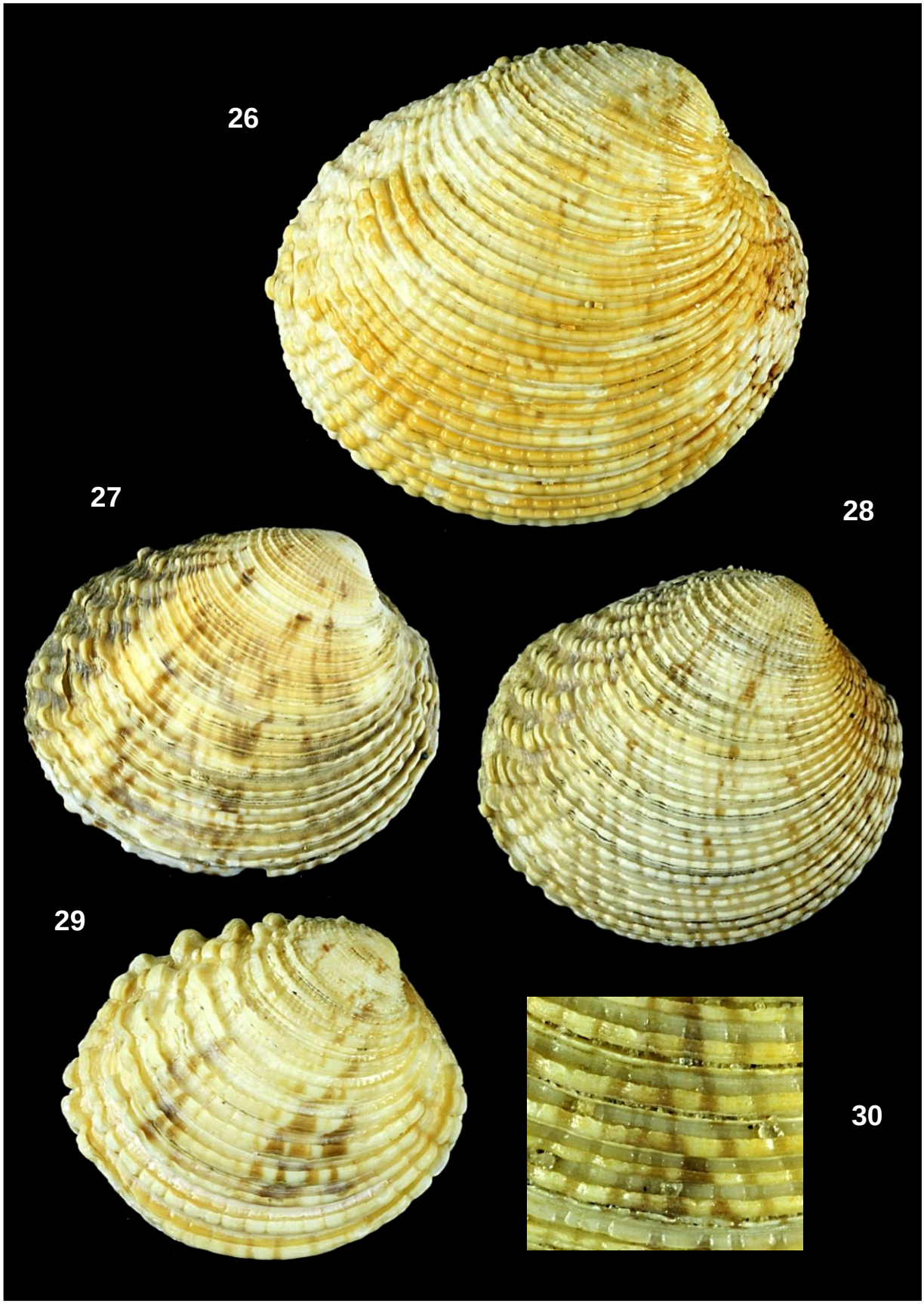

Plate VI. Figs 26-30: *Venus verrucosa* Linnaeus, 1758. CFN; 26: Peñiscola, Spain. Trawled by fishermen. April 1971. H. 61.31 mm L. 69.04 mm; 27-28: Hiliomili, Gulf of Maliakos, Greece. In sand. Dived at a depth of 3 m. July 2006; 27: H. 31.50 mm L. 36.98 mm; 28: 33.84 mm L. 38.99 mm; 29-30: Lagonisi, Sithonia, Greece. In mud of lagoon. Dived at a depth of 10 m. H. 29.27 mm L. 33.63 mm

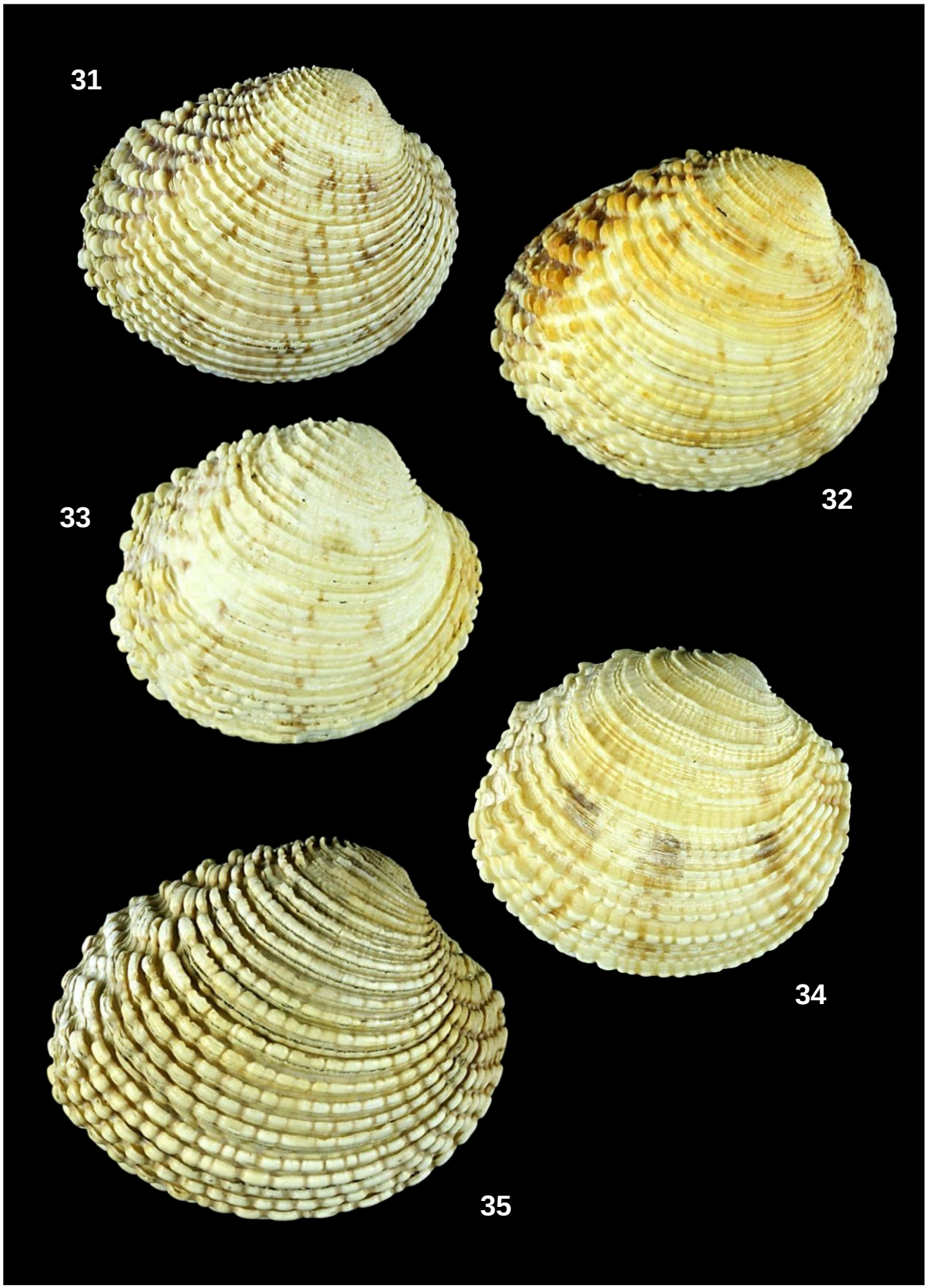

Plate VII. Figs 31-35: *Venus verrucosa* Linnaeus, 1758. CFN; 31: Lagonisi, Sithonia, Greece. In mud of lagoon. Dived at a depth of 10 m. H. 40.19 mm L. 48.08 mm; 32: Attiki, Euvoic Gulf, Ag. Apostoli, Greece. In sand. September 1969. H. 34.29 mm L. 39.44 mm; 33: Playa del Reducto, Arrecife, Lanzarote, Canary Islands. On sand at low tide. May 1971. H. 30.06 mm L. 35.07 mm; 34: Rio de Oro, Western Sahara, Morocco. In sand. Snorkeled at a depth of 2 m. 2000. H. 30.03 mm L. 34.21 mm; 35: Point of Hann, off Dakar, Senegal. In sand. Dived at a depth of 10 m. H. 41.58 mm L. 49.50 mm.

Duplicaria franknolfi sp. nov., a new species of *Duplicaria* (Gastropoda: Terebridae) from SE India

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Keywords: Terebridae, *Duplicaria*, *Duplicaria remanalva, Duplicaria spectabilis*, *Duplicaria edgarii, Duplicaria geminata*, *Duplicaria franknolfi* sp. nov., shell morphology, SE India, Sri Lanka.

Abstract: *Duplicaria franknolfi* sp. nov. is described as new and compared with its morphological kindred species.

Introduction: Saedul et al. (2021) illustrated and discussed the morpho-species surrounding *Duplicaria spectabilis* (Hinds, 1844), highlighting the validity of the hitherto synonyms *D*. *remanalva* (Melvill, 1910) and *D*. *edgarii* (Melvill, 1898). Based on shell-morphology alone, no conclusion could be drawn on the taxon *Terebra geminata* Deshayes, 1859 (from Mozambique and S Africa) and was preliminarily retained in the synonymy of *D*. *spectabilis*. The conchological differences are often discrete, and the presence of a protoconch is often vital in identifying different closely aligned morpho-species. As with many duplicariid species, also within this complex, a strong geographic factor is noted: *D*. *spectabilis* appears to be limited to the S and E China Seas (+ Mozambique and S Africa if *T*. *geminata* is considered synonymous); *D*. *edgarii* to the N Indian Ocean (Arabian Sea) and *D*. *remanalva* to the Persian Gulf and adjacent areas of the Arabian Sea. Their bathymetry remains unknown but is presumed to be rather shallow (0-20 m). Furthermore, a similar morpho-species from off the SE of the Indian subcontinent was highlighted and is presently described based on conchological features adding an additional species to the morphological group surrounding *D*. *spectabilis*.

Abbreviations:

DM: Private collection David Monsecour, Belgium
FN: Private collection Frank Nolf, Belgium
GP: Private collection Gianluigi Pellifroni(†) (Italy)
MNHN: Muséum national d'Histoire naturelle, Paris, France
NHMUK: Natural History Museum, London, UK
SG: Private collection Sandro Gori, Italy
SH: Private collection Steve Hubrecht, Belgium
TK: Private collection Terrence Kutolowski, USA
YT: Private collection Yves Terryn, Belgium

Systematics: The systematics for the species described and discussed in the present paper follows the systematics as proposed in Fedosov et al. (2020). For information on the types held in the NHMUK, we refer to Salvador & Pickering (2017). Of all here newly described taxa, the morphology of the soft part is unknown, the description is based solely on shell morphology.

Class **GASTROPODA** Cuvier, 1797
Order **NEOGASTROPODA** Wenz, 1938
Superfamily **CONOIDEA** Fleming, 1822
Family **TEREBRIDAE** Mörch, 1852
Subfamily **PERVICACIINAE** Rudman, 1969
Genus ***Duplicaria*** Dall, 1908

Duplicaria franknolfi sp. nov.
Pl. 1 Figs 10-19

Terryn, 2007: pl. 18 fig. 14 (as *D*. *spectabilis*)
Saedul et al., 2021: pl. 4 fig. 11 (as *Duplicaria* cf. *remanalva*)

Holotype: MNHN-IM-2007-36523, leg. FN, 24.8 mm.

Paratypes:
– *From the type locality* – **Paratype 1:** FN09857/1, 22.1 mm; **Paratype 2:** FN09857/2, 26.5 mm; **Paratype 3:** FN09857/3, 27.0 mm; **Paratype 4:** FN09857/4, 27.7 mm; **Paratype 5:** FN09857/5, 30.6 mm; **Paratype 6:** FN09857/6, 31.4 mm; **Paratypes 7-15:** YT, 23.3-29.9 mm; **Paratype 16:** DM, 24.1 mm; **Paratype 17:** TK, 25.4 mm.
– *From N Sri Lanka, Palk Strait, off Jaffna, dived at 15-25 m* – **Paratype 18:** SG, 25.7 mm; **Paratype 19:** GP, 25.8 mm (figured in Terryn, 2007: pl. 18 fig. 14 as *D*. *spectabilis*); **Paratype 20:** SH, 21.9 mm; **Paratype 21:** SH, 22.5 mm; **Paratype 22:** SH, 24.5 mm.

Type locality: SE India, off Cuddalore, 20 m.

Description *(holotype)*: Protoconch unknown. Shell colour on the apical 2/3rd of the whorls brown, remainder of the whorl white, except for a narrow band suprasuturally on the body whorl due to a sustained damaged displacing the last whorl. Outline of whorls convex. Spiral sculpture absent. Axial sculpture consists of slightly raised, widely spaced ribs constricted at the subsutural demarcation and often reduced to elongated nodes on the apical side of the subsutural band. Aperture elongate, columella straight.

Distribution: Only known from the SW Bay of Bengal between Cuddalore (India) and N Sri Lanka at depths of around 20 m.

Remarks: All specimens from the type locality were retrieved from local fishermen in January 1999, trawling the shallow muddy coastal bottom at about 20 m. An additional specimen (Paratype 16) was retrieved from northern Sri Lanka, diving at a depth between 15 and 25 m. The trawled specimens were covered/ encrusted with a black deposit and/or eroded but with an often smooth and shiny appearance. The single hand-dived specimen from N Sri Lanka shows no evidence of muddy deposits or encrustations, but has a shiny, yet eroded impression.
Virtually all specimens show some degree of damage probably due to particular predation, a feature also noted on the W coast of India in for example *Terebra connelli* Bratcher & Cernohorsky, 1985. Unfortunately, none of the specimens have an intact protoconch, the majority even lacking the protoconch and first teleoconch whorls but appears to be similar to that of *D*. *remanalva*.
The type series shows little variation in general appearance of colour and sculpture, with the apical angle minorly variable, often induced by the regrowth after having sustained damaged and the colour ranging from intense dark brown to light brown (heavily eroded specimens).

Discussion and comparison: The protoconch of *D*. *franknolfi* sp. nov. is unknown but judging from the study of specimens with damaged protoconchs it is presumably similar in size and shape as those of *D*. *remanalva* and *D*. *spectabilis*. Specimens with the most intact apex often show smoothened first teleoconch whorls, misleadingly appearing as a protoconch.

D. *franknolfi* sp. nov. differs from *D*. *spectabilis* by the more convex outline of the whorls, less protruding nodes on the apical side of the axial ribs on the remainder of the whorl, a narrower apical angle with wider whorls and the much narrower subsutural band ornamented with smaller nodes. While the number of axial ribs in *D*. *spectabilis*-specimens is rather constant and they are regularly spaced; they are variable in number and spacing in *D*. *franknolfi* sp. nov. While on most specimens of D. spectabilis a spiralling sculpture of fine incisions can be noticed, this feature is absent in *D*. *franknolfi* sp. nov.

D. *franknolfi* sp. nov. differs from *D*. *edgarii* by its slenderer apical angle and much broader whorls, with a narrower subsutural band with node-like axial sculpture in contrast to the slender and widely spaced axials on the subsutural band of *D*. *edgarii*. Although complete protoconchs of *D*. *franknolfi* sp. nov. could not be studied, judging from the damaged ones, it is conical in shape in contrast to the short somewhat mammilate protoconch of *D*. *edgarii*. The encircling white band above the suture is narrower in *D*. *edgarii* than in *D*. *franknolfi* sp. nov.

D. *franknolfi* sp. nov. differs from *D*. *remanalva* by having more axial ribs and the lack of any spiral sculpture intercostally, which is quite obvious in *D*. *remanalva*. Moreover, the white spiral band above the suture is present below the periphery in *D*. *remanalva*, while this is always on the suture, and above the periphery at the aperture in *D*. *franknolfi* sp. nov. The axial sculpture on the subsutural band of *D*. *remanalva* consists of broad ribs covering the whole subsutural band, while this feature is often reduced to nodes which sit at the apical side of the subsutural band in *D*. *franknolfi* sp. nov.

Derivatio nominis: The species honours lifelong friend and conchologist dr. sc. Frank Nolf, chairman of the Royal Belgian Society for Conchology Section Coast, editor of its magazine '*Neptunea*' and a celebrated collector and connoisseur of European and West African molluscs.

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CAPTIONS

Plate 1

Figs 1-2: ***Duplicaria edgarii*** (Melvill, 1898)
Fig. 1: Lectotype, NHMUK 1898.7.5.32, 'Karachi', 22.0 mm. (©The Trustees of the Natural History Museum, London)
Fig. 2: YT, Pakistan, Ormara, 11.7 mm.

Figs 3-5: ***Duplicaria remanalva*** (Melvill, 1910)
Fig. 3: Pakistan, Ormara, 18.1 mm.
Fig. 4: Paralectotype, NHMUK 1911.6.21.12, 'Persian Gulf, Bundo Abbas, and Bushire', 21.4 mm. (©The Trustees of the Natural History Museum, London)
Fig. 5: Lectotype, NHMUK 1911.6.21.11, 'Persian Gulf, Bundo Abbas, and Bushire', 33.8 mm. (©The Trustees of the Natural History Museum, London)

Figs 6-9: ***Duplicaria spectabilis*** (Hinds, 1844)
Fig. 6: *Terebra geminata* Deshayes, 1859, lectotype, NHMUK 197995/1, 'Cap Natal', 30.3 mm. (©The Trustees of the Natural History Museum, London)
Fig. 7: *Terebra geminata* Deshayes, 1859, paralectotype, NHMUK 197995/2, 'Cap Natal', 26.5 mm. (©The Trustees of the Natural History Museum, London)
Fig. 8: Paralectotype, NHMUK 1968174/2, 'Guinea, on sands (Humphrey); Sumatra, on sands (Ellis)', 39.2 mm. (©The Trustees of the Natural History Museum, London)
Fig. 9: Lectotype, NHMUK 1968174/1, 'Guinea, on sands (Humphrey); Sumatra, on sands (Ellis)', 49.7 mm. (©The Trustees of the Natural History Museum, London)

Figs 10-19: ***Duplicaria franknolfi*** sp. nov., all from the type locality, except where mentioned otherwise
Fig. 10: Holotype, MNHN-IM-2000-36523, 24.8 mm.
Fig. 11: Paratype 2, FN 09857/2, 26.5 mm.
Fig. 12: Paratype 18, SG, N Sri Lanka, Palk Strait, off Jaffna, dived at 15-25 m, 25.7 mm.
Fig. 13: Paratype 3, FN 09857/3, 27.0 mm.
Fig. 14: Paratype 10, YT, 24.0 mm.
Fig. 15: Paratype 4, FN 09857/4, 27.7 mm.
Fig. 16: Paratype 13, YT, 27.0 mm.
Fig. 17: Paratype 5, FN 09857/5, 30.6 mm.
Fig. 18: Paratype 15, YT, 29.9 mm.
Fig. 19: Paratype 6, FN 09857/6, 31.4 mm.


Plate 1
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Hastula matheroniana (Gastropoda: Conoidea: Terebridae) revisited, with the description of a new species and the rediscovery of a neglected taxon

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Abstract: The taxon *Hastula matheroniana* Deshayes, 1859 is re-evaluated together with its historical synonyms of which at least one taxon can be validated, and an additional novel species can be described. A historical W Atlantic taxon *T. crassula* is reinstated in its correct status as a separable tropical SW Indian Ocean *Hastula*-species.

Introduction: Chino & Terryn (2019) revealed the need to look in depth to morpho-species of *Hastula strigilata* to establish the conchological boundaries of different taxa within the morpho-species-complex. One taxon, *Terebra strigilata sumatrana* Thiele, 1925, was originally described as a subspecies of *H. strigilata*, but was generally, and correctly, considered within the *Hastula matheroniana* (Deshayes, 1859)-complex, and generally regarded synonymous. Moreover, *H. matheroniana* itself was considered synonymous to *H. strigilata* for long by numerous authors (e.g. Reeve, 1860) but lateron (correctly) rectified by e.g. Pease (1869), an opinion that remains to date. Nonetheless, the identities of *H. matheroniana - lauta (+sumatrana* and *modesta) - venus* have been confusing in literature. Such conflicting ideas induced the more in-depth study of the *H. matheroniana*-complex alongside the *H. strigilata*-complex.
Within the Indo-Pacific, axially sculpted *Hastula* which are (generally) ornamented with brown flecks on the subsutural band, three major morphological groups can be distinguished, based on mature specimens:

- *strigilata*: rounded close-set axial ribs
- *rufopunctata*: widely spaced, hardly elevated ribs which fade at midwhorl
- *matheroniana*: elevated ribs, often triangular in cross-section, with an interspace roughly as wide as the rib itself of postioned adjacent.

The *strigilata*-complex is an ongoing project, with a first result already published in 2019 (Chino & Terryn); the *rufopunctata*-complex was evaluated shortly after (Terryn, Rosado & Gori, 2020), and here the *matheroniana*-complex is treated for the first time, with an additional novel species added to the group and a forgotten tropical SW Indian Ocean taxon raised out of synonymy of a W Atlantic species.

Abbreviations:

ANSP: The Academy of Natural Sciences of Drexel University, Philadelphia, PA, USA
GP: Private collection Gianluigi Pellifroni(†), Italy
KDM: Private collection Kevin & David Monsecour, Belgium
MMM: Mostra Mondiale Malacologia, Cupra Marittima, Italy
MNHN: Muséum national d'Histoire naturelle, Paris, France
NHMUK: Natural History Museum, London, UK
SG: Private collection Sandro Gori, Italy
TK: Private collection of Terrence Kutolowski, USA
YT: Private collection Yves Terryn, Belgium

Historical overview: A morphological and a geographical distinction can be made between two groups of taxa: on one hand the Indo-Pacific with a broad white subsutural band, often fulvous coloration and relatively coarse sculpture, and on the other hand small tropical SW Indian Ocean taxa with predominantly olive coloration, a narrow subsutural white or paler band with more discrete sculpture.

- Indo-Pacific:

Terebra matheroniana Deshayes, 1859 (Proc. Zool. Soc. London, 27: 287): The 17 mm long lectotype (Pl. 1 Fig. 1) is curated at the MNHN (MNHN-IM-2000-2375) with type locality 'Taïté' (Tahiti, French Polynesia). The protoconch is eroded and damaged, and important to highlight is the complete lack of

subsutural incisions. Specimens (Pl. 1 Figs 3-4) from for example Mahina, Tahiti (Pointe Vénus is in very close proximity of the type locality of *H*. *venus*, see below), which comply completely in shell morphology with the lectotype reveal a conical protoconch of about 2.5 whorls yet can vary in apical angle of which the apical angle of the lectotype sits at the broadest end of the cline.
Bratcher & Cernohorsky (1987) list a protoconch of 2.5-3.0 conical whorls and erroneously indicate for the species punctations between the ribs as demarcation of the subsutural band; a feature taken from taxa regarded therein as synonymous: *Terebra lauta* and *Terebra strigilata sumatrana* (see below).
The taxon is historically and presently **regarded valid in the genus *Hastula* as *Hastula matheroniana***. For further information on the range and morphology, see below.

Hastula venus Aubry, 2008 (Malacologia, 59: 19): The 13 mm long holotype (Pl. 1 Fig. 2) is curated at the MMM with type locality Pointe Vénus (Mahina area, Tahiti). The holotype could not be studied first-hand, the description reveals the following noteworthy features: spiral sculpture completely absent, no demarcation of a subsutural band, widely spaced ribs. Although described as being dark grey, all available photographs reveal a light yellowish grey shell with dark grey sediment logged in the aperture. The specimen has a noteworthy narrow apical angle and in contrast to the original description a spiral white band below the periphery can be noticed together with remnants of subsutural flecks on a paler background. Local conchologist confirm that such specimens can be regularly found beached at Pointe Vénus which have the appearance of having been washed out of sedimentation (French: remanier). *H*. *venus* complies completely with slender specimens of *H*. *matheroniana*. This narrower apical angle is sometimes the result from a damage at the early stage of the teleoconch-shell.
Considering the above, ***Hastula venus* Aubry, 2008 should be regarded a junior synonym of *Hastula matheroniana***, already considered as such in Boutet et al. (2020: 460).

Terebra lauta Pease, 1869 (Am. J. Conch., 5 (1): 66): The 'type' is presumed lost. The taxon was originally not figured; the type locality is given as 'Insl. Oahu' (Oahu, Hawaiian Islands), with a size of 26 mm. Tryon (1885) considered the possibility that it may be a 'strong variety of *T*. *strigilata* (*Hastula strigilata*)' but correctly notes that the sharp plications and the punctures which would set it apart from *T*. *strigilata*. Furthermore, a size is indicated as 'an inch' (about 25 mm) and a (damaged) specimen is figured on pl. 10 fig. 91 (Pl. 1 Fig. 14), which lacks a large part of the apex. An identical looking 'syntype' (Pl. 1 Fig. 13) is curated in the malacology collection of the ANSP (ANSP 33589) which measures about 19 mm. If this specimen were complete, a size of about 25 mm would be attained, as mentioned in the original description which also notes that '*if in good condition, this species is a perfect gem*', indicating that the studied specimen was perhaps damaged. The specimen in the ANSP complies completely with the description in terms of sculpture and coloration. The possibility that this specimen could be the actual type, remains debatable but enough evidence is there to consider it highly probable.
Specimens from the Hawaiian Islands complying with the description were studied and revealed that they possess a quite variable, yet broader apical angle, larger mature size and a conical protoconch of about 3 whorls appearing about 15-20% more voluminous (or wider) than of *H*. *matheroniana*.
The taxon has at least since Bratcher & Cernohorsky (1987) erroneously been synonymized with *H*. *matheroniana* but should be regarded **a valid and separate taxon *Hastula lauta* (Pease, 1869)**.
For further information on the range and morphology, see below.

Terebra strigilata sumatrana Thiele, 1925 (Wiss. Ergeb. Deut. Tiefsee. Exped. '*Valdivia*', 17: 344, pl. 29, fig. 20): A syntype (Pl. 1 Fig. 5) is curated at the ZMB (Moll 111.667), with type locality 'Padang' (W Sumatra, Indonesia), described as a subspecies of *T*. *strigilata*. Three further syntypes are curated at the NHMUK (1948.12.10.5-7, ex ZMB, exchange arranged by Jaeckel in 1948). Thiele lists a size of 25 mm for the described specimen, while the syntype at the ZMB measures about 32 mm, and 2 syntypes at the NHMUK measure 18.7 and 12.8 mm (Pl. 1 Figs 6-7). In general appearance, the ZMB-syntype matches the partial figure by Thiele (fig. 20), yet subsutural incisions are drawn which are not as clearly visibly) present on the syntype. Small and shallow incisions, mere punctations can be noticed on the larger NHMUK-syntype, not present on the smaller, juvenile syntype. Moreover, the sculpture of the latter doesn't comply with the other syntypes; and the yellowish colouration of the NHMUK-syntypes leads to believe that it may concern specimens washed out of sediment (similar condition of the holotype of *H*. *venus*).
Bratcher & Cernohorsky (1987: 174) never formally designated a lectotype for this taxon yet mention for the NHMUK-types that they are

regarded as 'paratypes'. Because of the poor figuration, questionable curation of the type at the ZMB and inconsistencies within the types held at the NHMUK, all these specimens should at present be regarded syntypes pending further investigation, as compared to the opinion as formulated by Salvador & Pickering (2017: 107). Important conchological features are widely spaced, shallow, narrow and sharp ribs, mere shallow subsutural punctations between some axial ribs and a protoconch of about 3.0 whorls. The variability of the characteristics of the axial ribs, incisions and apical angle throughout the range and even within population don't justify at this stage separation from *H*. *lauta*. ***T. strigilata sumatrana* should preliminarily be regarded a synonym of *H. lauta* pending further (molecular) results.**
For further information on the range and morphology, see with *H*. *lauta* below.

- Indian Ocean
Terebra modesta Deshayes, 1859 (Proc. Zool. Soc. London, 27: 288): The 21.6 mm lectotype (Pl. 3 Fig. 14) (together with a 20.6 mm paralectotype) is curated at the NHMUK (1979104 and 1979104/2 resp.), with type locality 'the mouth of the Indus' (S of Karachi, Pakistan). Both Reeve (1860) and Tryon (1885) considered the taxon synonymous with *H*. *strigilata*, while the specific sculpture stands in large contrast with the round-topped axial ribs of morpho-species of *H*. *strigilata* and is hence more similar to morpho-species of *H*. *matheroniana* (and to a lesser extent *H*. *rufopunctata*). At least since Bracther & Cernohorsky (1987), the taxon has more appropriately been considered synonymous to *H*. *matheroniana*. Only here and there, very shallow subsutural incisions can be discerned below a paler subsutural band. Pease 1868) notes for the type that it is transversely striate. The specimens apparently lack any subsutural brown spotting otherwise always present in the above-mentioned taxa, but this could be faded. During recent coastal surveys of the area S of Karachi (Saedul et al., 2021, in press), the species was not encountered. Due to the complete lack of any additional similar specimens, the species is presently not further discussed.

Hastula tenuicolorata Bozzetti, 2008 (Malacologia, 60: 11): The 11.7 mm long subadult holotype (Pl. 3 Fig. 18) is curated at the MNHN (MNHN-IM-2000-21474). The species (e.g. Pl. 3 Figs 15-17) shows remarkable similarities to the type of *T*. *modesta* with similar axial sculpture, colour and pattern. In contrast to *T*. *modesta*, no subsutural incisions can be discerned. *Hastula tenuicolorata* can be mistaken for the off S Madagascar (often sympatrical) species *H*. *diversa* (E. A. Smith, 1901) but their different protoconch and axial rib morphology easily sets them apart.
Together with this well-separable taxon from S Madagascar, *Hastula modesta* should be treated as a separate taxon because of its type locality and particular conchological features, pending further information or its confirmation of the species from the Arabian Sea.
As both taxa are beyond the core scope of the present study, they are documented but not further elaborated.

A number of specimens from the N Marquesas Islands very closely resemble *H*. *matheroniana* in general appearance but close examination revealed a different protoconch and the presence of spiral incisions between the axial ribs, unlike the sculpture of *H*. *matheroniana*. **The species is presently described below as *H. konihoides* sp. nov.**

A relatively large and broad species from the tropical SW Indian Ocean shares many general sculptural features with the above. Terryn (2020) discussed most of the W Atlantic *Hastula* species, excluding *Hastula hastata* (Gmelin, 1791) because of the obvious morphological differences with the other Caribbean species (*Hastula cinerea* (Born, 1778), *Hastula salleana* (Deshayes, 1859), *Hastula maryleeae* (Burch, 1965), *Hastula tobagoensis* (Usticke, 1969) and *Hastula willemfaberi* Terryn, 2020).
One of the hitherto synonyms of *H*. *hastata* is *T*. *crassula* Deshayes, 1859 (p. 282). The basic description lists a type of 27 mm, without indication of a type locality. The MNHN curates a (possible) lectotype (Pl. 3 Fig. 11) (MNHN-IM-2000-2360) of 23.3 mm in length which complies with the original description yet is much smaller than the described size. The type has all morphological features of belonging to the genus *Hastula*, and with its sharp, fine and widely spaced ribs resembles somewhat the sculpture of for example *Hastula lauta.* Bratcher (1977) considered the lectotype as a 'paratype'. The discrepancy in size of the type of *T*. *crassula* with its descriptive size can be considered a typographic error, or incorrect measurement (or notation thereof) or it concerns a replaced specimen; sufficient features are present to facilitate the identification of specimens in collections and in the field.
Since Reeve (1860), subsequently retaken by Tryon (1885), *T*. *crassula* was generally (yet erroneously) accepted as a synonym of the Caribbean species *Hastula hastata* (Gmelin,

1791), an opinion that persisted to date (Bratcher & Cernohorsky, 1987). A number of specimens from the southern Indian Ocean (Seychelles, Madagascar and N Mozambique) comply completely with the type of *T*. *crassula* which should be **regarded as a valid separable species *Hastula crassula* (Deshayes, 1859)**, here treated together with *H*. *lauta* for sculptural similarities.

Systematic notes: The systematics for the species described and discussed in the present paper follows the systematics as proposed in Fedosov et al. (2020). For information on the types held in the NHMUK, we refer to Salvador & Pickering (2017). The here newly described taxon, the morphology of the soft parts is unknown, the description is based solely on shell morphology.

Class **GASTROPODA** Cuvier, 1797
Order **NEOGASTROPODA** Wenz, 1938
Superfamily **CONOIDEA** Fleming, 1822
Family **TEREBRIDAE** Mörch, 1852
Subfamily **Terebrinae** Mörch, 1852
Genus ***Hastula*** H. & A. Adams, 1853

Hastula lauta Pease, 1869 (s.l.)
Pl. 1 Figs 5-16 & Pl. 2
Terebra strigilata sumatrana Thiele, 1925: 344, pl. 29, fig. 20.

Descriptive notes: In general, shells are characterized by their relatively broader apical angle and much larger adult size than in *H*. *matheroniana*, wider spaced and often coarser ribs, a light brown (golden) conical protoconch of about 3.0-3.5 whorls. As mentioned above, *T*. *strigilata sumatrana* is here regarded synonymous as within the variability of the taxon *H*. *lauta*, no fundamental distinction can be made between the two, although typical *H*. *lauta* from the type locality differ tremendously with the type material of *T*. *strigilata sumatrana* but intergrade populations and/or variability within a population are abundant. Whether the taxon *H*. *lauta* is a single species or a complex of species will only be corroborated by means of molecular data. But even at the conchological level, a number of phenotypical groups, with some geographic vector can be noted:

Hawaiian *lauta*-group (Pl. 1 Figs 15-16 & Pl. 2 Figs 1-3): Together with the non-Hawaiian *lauta* and the Fijian-group, possess the broadest apical angle, but *lauta* from the Hawaiian Islands has the slenderest apical angle of the three and the densest set axial ribs which even in (sub-)adult stage retain a coarseness and triangular cross-section. The outline of the whorls is straight; the subsutural spiral ornamentation is deeply punctate, impressing on the axial ribs.

Non-Hawaiian *lauta*-group (Pl. 1 Fig. 8 Pl. 2 Figs 4-8, 21): Specimens resembling *lauta* best, but not originating from the Hawaiian Islands tend to have a broader spaced axial sculpture, hence less axials per whorl. These are moreover less coarse. the subsutural spiral ornamentation is punctate with a spiral-oriented impression, not crossing the crests of the ribs. A slight indentation of the axial ribs can be noticed on early whorls at the position of the spiral incisions.

Fiji *lauta*-group (Pl. 1 Figs 11-12): Specimens resembling Hawaiian and non-Hawaiian *lauta*, originating from Fiji tend to have the broadest apical angle. A noticeable indentation of the axial ribs can be noticed on early whorls at the position of the spiral incisions, which fades gradually in maturity. The coarseness and the spacing of the axial ribs in maturity is comparable to *lauta* from the Hawaiian Islands, yet the ribs are set at an angle while they are relatively straight positioned in *lauta* from the Hawaiian Islands. The juvenile sculpture of the Fijian specimens is much less coarse than in Hawaiian specimens, comparable to non-Hawaiian *lauta*.

***sumatrana*-group** (Pl. 1 Fig. 10 & Pl. 2 Figs 15-20): These shells portray the characteristic of the lectotype and largest paralectotype of *sumatrana* the best. The majority of studied material originated from the Visayas and Palawan (Philippines), not the Pacific coast. They appear ticker-shelled, generally of smaller adult size compared to the three previous forms and have almost inconspicuous, shallow and small subsutural spiral incisions between the axial ribs, usually not punctate. The white spiralling band below the periphery is relatively broad and well-delineated.

Solomon Islands-group (Pl. 1 Fig. 9 & Pl. 2 Figs 9-10): Specimens with a black base colour with clear and deep subsutural punctations between widely spaced, shallow axial ribs, denser than in specimens from the *sumatrana*-group, with a wide intercostal space. The white spiral band below the periphery is narrower than in *sumatrana*-specimens, comparable to *H*. *matheroniana*. This form is only known from a single find, and the *sumatrana* form can also be found in the Solomon Islands.

Whether these five groups constitute one, two, five or even more different species is at this stage only confirmable by analysis of molecular data.

Hastula matheroniana Deshayes, 1859
Pl. 1 Fig. 1-4 & Pl. 3 Fig. 9

Terebra matheroniana Deshayes, 1859: 287.
Hastula venus Aubry, 2008: 19.

Descriptive notes: *H. matheroniana* is characterized by a relatively small adult maximum size of about 20 mm, a purplish-brown conical protoconch of about 2.5-3.0 whorls, widely spaced, sharp and pale-crested axial rib, a diffuse white subsutural band beset with irregularly spaced and sized dark brown flecks; devoid of any spiral subsutural incisions. The narrow white spiralling band below the periphery becomes diffuse apically upon which the axially sculpture is completely faded.

Remarks and comparison: Although listed in literature (e.g. Bratcher & Cernohorsky, 1987; Terryn, 2007) as having a wide Indo-Pacific range, the species appears endemic to the Society Islands (French Polynesia). References to the taxon beyond the Society Islands refers in fact most probably to a separate taxon (or taxa – see below). *Hastula venus* is presently added to the synonymy. A similar looking species with different protoconch and subsutural incisions from the Marquesas Islands is here described:

Hastula konihoides sp. nov.
Pl. 1 Figs 17-20 & Pl. 3 Figs 1-8

Holotype: MNHN-IM-2000-36522, leg. YT, 11.8 mm.
Paratypes: – All from the type locality – **paratypes 1-7:** YT, 9.1-15.1 mm; **paratype 8:** SG, 11.9 mm; **paratype 9:** TK, 11.9 mm; **paratype 10:** DM, 11.8 mm.

Additional material: MNHN, various localities in the Marquesas (Ua Huka, Nuku Hiva, Ua Pou) – see examples Pl. 3.

Type locality: Marquesas Islands, Nuku Hiva, off Taiohae Bay, dived at 45 m.

Description *(holotype)*: Brown protoconch of about 3.5-4.0 whorls. Shell base colour pinkish to reddish brown with a white subsutural band beset with irregularly spaced and shaped reddish-brown flecks; a spiral well-delimited white band below the periphery, whitish columella, brown-tinged inside the aperture; crests of axial ribs whitish. Outline of whorls straight to minorly convex, occasionally a slight indentation at the height of the spiral incisions. Spiral sculpture consists of subsutural deep incisions, confined between the axial ribs not crossing over the white crests. Axial sculpture consists of slightly raised ribs with wide interspace, from suture to suture, fading towards the adapical suture, somewhat swollen apically; ribs as wide as interspaces. Aperture elongate, columella straight.

Distribution: Only known from the Marquesas Islands. Majority of live specimens were collected at depths between 20 and 60 m.
Remarks: Largest specimen investigated 18.8 mm (MNHN). The species has a rather deep bathymetry for the group of species it belongs to; the majority is usually collected intertidally or at shallow depths. The studied material shows virtually no variability and is in most respects macroscopically comparable to *H. matheroniana* in features. Dead collected specimen often have faded or light brown colours, sedimented specimens have a predominantly yellowish or white base colour (see remarks *H. venus* above).

Discussion and comparison: The Marquesan *H. konihoides* sp. nov. differs from Society Island *H. matheroniana* by the presence of subsutural (punctate) incisions confined to the interspace of the axial ribs and a similar sized/shaped, yet wider-based conical protoconch of about 3.5-4.0 whorls.
For a discussion the morpho-species of *H. lauta*, see above. *H. konihoides* sp. nov. differs from the *H. lauta* morpho-types by its smaller adult size, narrower apical angle, punctate spiral incisions below the suture and a somewhat larger protoconch. They are closest in general appearance to both the *sumatrana* and Fiji-Island-type of *lauta* but the axial ribs on the first teleoconch whorls are much weaker than in the *sumatrana*-type, and the spiral sculpture consists of (punctate) incisions compared to deep punctations in the Solomon Island-form and a narrower apical angle.

Derivatio nominis: The species is named for the resemblance of its axial sculpture, crossing uninterrupted from the subsutural band over spiral subsutural incisions to the remainder of whorl (appearing as a stitch), which is reminiscent of the typical N Marquesas Islands mouth tattoos named '*koniho*'.

The taxon *Terebra crassula* Deshayes, 1859 was historically regarded synonymous to the W Atlantic *H*. *hastata* (Gmelin, 1791). The recent rediscovery of the species in the tropical SW Indian Ocean creates the need to elaborate on some conchological features to facilitate its recognition and comparison in general:

Hastula crassula (Deshayes, 1859)
Pl. 3 Figs 10-13

Descriptive notes: Yellowish white conical protoconch of about 2.5 whorls. Shell colour shiny white with a pinkish or light orangish hue shining through. Outline of whorls straight. Spiral sculpture absent, except for subsutural intercostal deep punctations. Axial sculpture consists of angularly set, widely spaced, straight to slightly wavy ribs. Aperture elongate, columella straight, in maturity with a thick shiny white callus.

Remarks and comparison: The sharp widely spaced axial ribs stand in high contrast to the closely set round-crested axials of *H*. *hastata* with which it was regarded synonymous. The lack of a type locality and the basic description (in latin) and the lack of any figuration probably facilitated this erroneous synonymy that persisted to date. Recent findings of these species in the tropical SW Indian Ocean confirm its identity and range (known from the Seychelles Islands, N Mozambique and N Madagascar. Its bathymetry is presumed shallow (0-20 m). Because of its axial rib morphology, it is here regarded together with *H*. *matheroniana*, *H*. *lauta* etc… but further shares very little similarities in pattern and coloration. Because of its particular general shape and white glossy colour, it is incomparable to any known Indo-Pacific species. *H*. *crassula* specimens were unfortunately often erroneously catalogued in many collections together with *Punctoterebra nitida* (Hinds, 1844) (s.l) from the SW Indian Ocean, with which it shares only a few very general features.

Conclusion: The present study revealed the true identity of *H*. *matheroniana* and its limited range, affirmed the validity of *Hastula lauta*. The latter is either a complex of species or a single variable one, an issue that could not be resolved yet based on conchological features alone. The status of *H*. *venus* was re-assessed and joined to the synonymy of *H*. *matheroniana*. A novel species was described from the Marquesas Islands and compared to *H*. *matheroniana* and the various forms of *H*. *lauta*. Also, the status of *T*. *modesta* remains in fact unresolved, but when compared to the well-documented *H*. *tenuicolorata*, it should be regarded a valid and separable species with a range probably restricted to the N Indian Ocean. The likelihood that both would be synonymous is small as a strong geographical vector is presumed in all of these species.
Furthermore, *H*. *crassula* was found to be a valid and separable species from the tropical SW Indian Ocean, lifted out of the synonymy of the W Atlantic taxon *H*. *hastata*. *H*. *crassula* is well recognisable by its characteristically swollen outline, white shell colour and particular sculpture.
To conclude, the present study lifted at least 2 taxa out of the synonymy of *H*. *matheroniana*, add a novel species to the complex, discusses the allied group in the Indian Ocean, and revealed the validity of a synonym of a W Atlantic species to be present in the tropical SW Indian Ocean.

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CAPTIONS

Plate 1

Figs 1-4: ***Hastula matheroniana*** (Deshayes, 1859)
Fig. 1: Lectotype, MNHN-IM-20002375, 'Taïti' (Tahiti, French Polynesia), 17.0 mm.
Fig. 2: *Hastula venus* Aubry, 2008, holotype, MMM, Pointe Vénus (Mahina, Tahiti, French Polynesia, 13.1 mm.
Fig. 3: YT, French Polynesia, Tahiti, Mahina, 17.8 mm.
Fig. 4: YT, French Polynesia, Tahiti, Mahina, 17.8 mm.

Figs 5-16: ***Hastula lauta*** Pease, 1869 (s.l.)
Fig. 5: *Terebra strigilata sumatrana* Thiele, 1925, syntype, ZMB Moll_11667, '*Valdivia*', Padang, Sumatra, Indonesia, 31.7 mm.
Fig. 6: *Terebra strigilata sumatrana* Thiele, 1925, syntype (ex ZMB), NHMUK 1948.12.10.5 '*Valdivia*', Padang, Sumatra, Indonesia, 18.7 mm.
Fig. 7: *Terebra strigilata sumatrana* Thiele, 1925, syntype (ex ZMB), NHMUK 1948.12.10.6 '*Valdivia*', Padang, Sumatra, Indonesia, 12.8 mm.
Fig. 8: YT, Papua New Guinea, Madang Province, Hansa Bay, off Awar, 31.6 mm.
Fig. 9: YT, Solomon Islands, Guadalcanal, *Hirokawa-Maru* wreck, dived at 10-12 m, 24.3 mm.
Fig. 10: YT, Philippines, S Siquijor, Ibo, 22.5 mm.
Fig. 11: YT, Fiji, Yasawa Island, dived in shallow water, 37.8 mm.
Fig. 12: YT, Fiji, Viti Levu, 39.7 mm.
Fig. 13: *Hastula lauta* Pease, 1869, possible syntype, ANSP 33589, Hawaiian Islands, approx. 19 mm.
Fig. 14: *Hastula lauta* Pease, 1869, figure taken from Tryon, 1885: pl. 10 fig. 91.
Fig. 15: YT, USA, Hawaiian Islands, Oahu, Kahe Point, dived at 18-20 m, 21.0 mm.
Fig. 16: YT, USA, Hawaiian Islands, W Oahu, dived at 10-15 m, 22.3 mm.

Figs 17-20: ***Hastula konihoides*** sp. nov., all from the Marquesas Islands, Nuku Hiva, off Taiohae Bay, dived at 45 m.
Fig. 17: Paratype 3, YT, 11.8 mm.
Fig. 18: Holotype, MNHN-IM-2000-36522, 11.8 mm.
Fig. 19: Paratype 6, YT, 13.4 mm.
Fig. 20: Paratype 5, YT, 12.3 mm.

Plate 2

Figs 1-21: ***Hastula lauta*** Pease, 1869 (s.l.), all coll. YT
Fig. 1: USA, Hawaiian Islands, Hawaii, 28.5 mm.
Fig. 2: USA, Hawaiian Islands, Maui, Kihei, 34.0 mm.
Fig. 3: USA, Hawaiian Islands, Oahu, Punaluu, at low tide, 36.9 mm.
Fig. 4: Papua New Guinea, Madang Province, Hansa Bay, off Awar, 31.6 mm.
Fig. 5: Philippines, E Talikud, Santa Cruz, at low tide, 28.9 mm.
Fig. 6: Papua New Guinea, Madang Province, Hansa Bay, off Awar, 33.7 mm.
Fig. 7: Philippines, Luzon, Subic Bay, 30.5 mm.
Fig. 8: Philippines, 26.3 mm.
Fig. 9: Solomon Islands, Guadalcanal, *Hirokawa-Maru* wreck, dived at 10-12 m, 22.6 mm.
Fig. 10: Solomon Islands, Guadalcanal, *Hirokawa-Maru* wreck, dived at 10-12 m, 24.3 mm.
Fig. 11: USA, Hawaiian Islands, W Oahu, dived at 10-15 m, 21.0 mm.
Fig. 12: USA, Hawaiian Islands, W Oahu, dived at 10-15 m, 21.3 mm.
Fig. 13: USA, Hawaiian Islands, W Oahu, dived at 10-15 m, 22.3 mm.
Fig. 14: USA, Hawaiian Islands, Oahu, Kahe Point, dived at 18-20 m, 22.3 mm.
Fig. 15: Philippines, S Palawan, Roxas, dived at 30-40 m, 18.9 mm.
Fig. 16: Philippines, S Palawan, Roxas, dived at 30-40 m, 16.6 mm.
Fig. 17: Philippines, S Palawan, Roxas, dived at 30-40 m, 19.3 mm.
Fig. 18: Philippines, S Palawan, Roxas, dived at 30-40 m, 20.7 mm.
Fig. 19: Philippines, S Palawan, Roxas, dived at 30-40 m, 21.1 mm.
Fig. 20: Philippines, S Palawan, Roxas, dived at 30-40 m, 23.5 mm.
Fig. 16: Philippines, Cebu, dived at 10 m, 33.6 mm.

Plate 3

Figs 1-8: ***Hastula konihoides*** sp. nov., all from MNHN, various localities in the Marquesas Islands
Fig. 1: Oua Pou, 18.8 mm.
Fig. 2: Ua Huka, 19.0 mm.
Fig. 3: Nuku Hiva, 16.1 mm.
Fig. 4: Ua Huka, 16.0 mm.
Fig. 5: Ua Huka, 17.2 mm.
Fig. 6: Ua Huka, 17.1 mm.
Fig. 7: Nuku Hiva, 15.0 mm.
Fig. 8: Ua Huka, 12.2 mm.

Fig. 9: ***Hastula matheroniana*** (Deshayes, 1859), lectotype, MNHN-IM-20002375, 'Taïti' (Tahiti, French Polynesia), 17.0 mm.

Figs 10-13: ***Hastula crassula*** (Deshayes, 1859)
Fig. 10: YT, N Mozambique, off Pemba, dived at 10 m, 31.1 mm.
Fig. 11: Lectotype, MNHN-IM-2000-2360, no type locality given, 23.3 mm.
Fig. 12: YT, N Mozambique, off Pemba, dived at 10 m, 31.3 mm.
Fig. 13: YT, NW Madagascar, 27.5 mm.

Fig. 14: ***Hastula modesta*** (Deshayes, 1859), lectotype, NHMUK 1979104, Indus River delta, Pakistan, 21.6 mm.

Figs 15-18: ***Hastula tenuicolorata*** Bozzetti, 2008
Fig. 15: YT, S Madagascar, Lavanono area, dredged at 30 m, 14.8 mm.
Fig. 16: YT, S Madagascar, Lavanono area, dredged at 30 m, 13.8 mm.
Fig. 17: YT, S Madagascar, Lavanono area, dredged at 30 m, 14.1 mm.
Fig. 18: Holotype, MNHN-IM-2000-21474, S Madagascar, Lavanono, 11.7 mm.


Plate 1
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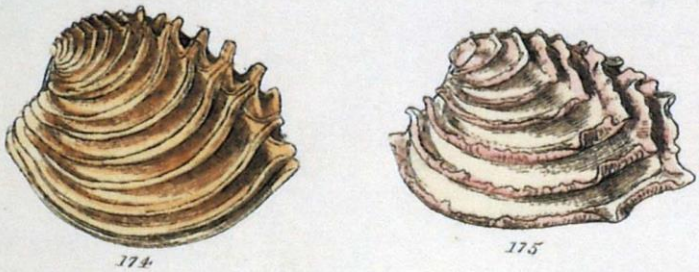

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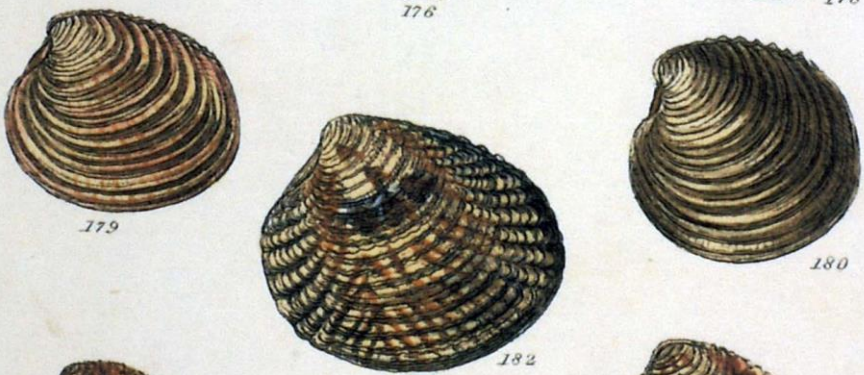

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