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# New and poorly known species of Cancellariidae (Neogastropoda: Cancellarioidea) from the Indian Ocean and the western Pacific

André VERHECKEN

Operational Directorate Taxonomy and Phylogeny, Royal Belgian Institute of Natural Sciences, Vautierstraat, 29, B-1000 Brussels, Belgium
andre.verhecken@telenet.be

**Key words:** Indian Ocean, *Admetula afra, Admetula epula, Brocchinia tanimbarensis, Cancellaria okutanii, Scalptia contabulata, Scalptia dekkeri, Scalptia delsaerdti, Scalptia gorii, Scalptia hasegawai, Scalptia larissaensis, Scalptia rashafunensis, Scalptia scalata, Merica melanostoma, Merica semperiana, Mericella rosadoi, Nipponaphera kilburni, Nipponaphera quasilla, Nipponaphera wallacei, Zeadmete verheckeni, Africotriton crebriliratus, Africotriton fictilis, Africotriton petiti, Tritonoharpa antiquata, Tritonoharpa beui, Tritonoharpa pseudangasi, Fusimorio rosadoi, Plesiotriton vivus.*

**Abstract:** Six new taxa are described: *Mericella rosadoi* n. sp., southern Tanzania; *Scalptia gorii* n. sp., south Oman; *S. delsaerdti* n. sp., Mozambique and *S. delsaerdti hasegawai* n. ssp., a geographic subspecies from Japan, *S. larissaensis* n. sp. from Kuwait and *S. rashafunensis* n. sp., Cape Ras Hafun, Somalia. *Admetula afra* Petit & Harasewych, 2000, southern Mozambique, was already known from eastern South Africa. A disputed shell from Mozambique Channel is identified as *Brocchinia tanimbarensis* Verhecken, 1997. A unique shell and 8 (possibly juvenile) shells are presented as two *species inquirenda*. Two shells are recognised as *Zeadmete verheckeni* Petit & Harasewych, 2000, South Africa, and shells of *Merica semperiana* (Crosse, 1863) (new comb.), New Caledonia, are illustrated. A lectotype is designated for *Cancellaria bicolor* Hinds, 1843. Eight species of the subfamily Plesiotritoninae from off SE Africa are presented and figured: *Africotriton crebriliratus* (Sowerby, 1903), *Africotriton fictilis* (Hinds, 1844), *Africotriton petiti* Beu & Maxwell, 1987, *Tritonoharpa antiquata* (Hinds in Reeve, 1844), *Tritonoharpa beui* Verhecken, 1997, *Tritonoharpa pseudangasi* Beu & Maxwell, 1987, *Fusimorio rosadoi* (Beu & Verhecken, 2000) is a new combination; *Plesiotriton vivus* Habe & Okutani, 1981, occurs both in the Philippines and off eastern Africa.

**Introduction:** Cancellariidae from the Indo-west Pacific, and especially from the Indian Ocean, continue to confront us with species that are undescribed, or the identification of which presents problems because of the present insufficient knowledge of species and their geographic distribution. In an attempt to clear the path for a forthcoming study of the Cancellariidae collected by MNHN expeditions around Madagascar, the present paper studies material from other sources and tries to solve a few old pending problems.

Some ninety cancellariid species are known from the Indian Ocean and about as many of these, plus scores of others, occur in the western Pacific, but many of them are still poorly known. Six species-level taxa are here described as new to science, including one new geographic subspecies. In one case, only one shell of an unknown species could be studied and in another case only eight apparently juvenile shells are known. These are here preliminarily introduced as species inquirendum.

It is remarkable that several Indo-pacific species of Cancellariidae have a very large distribution and present only little variation, even between wide-spread localities.

**Materials and methods:** The collections of Mr. José Rosado (Maputo, Mozambique) and Mr. Sandro Gori (Livorno, Italy) contain cancellariid material they collected during the past years, mainly from localities in the western Indian Ocean, but also from Sri Lanka and Honiara, Solomon Islands. These collectors kindly made their specimens available for the present study and donated holotypes. Material in the present author's collection is also used in this study: these shells are here referred to under their collection number (format: AVxxxx).

Whenever possible, several shells per species are figured in order to illustrate infraspecific variation. The number

of shells examined is only mentioned when more than one is present.

The measuring and nomenclature of protoconch whorls follow Verduin (1982). Parameters given are: n (count of protoconch whorls), d (diameter of nucleus), D (diameter of complete protoconch), and the exposed height (e. h.) of the protoconch measured along the shell axis (all expressed in mm). The exact measurement of d can be rather difficult when the first section of the suture does not really agree with a half circle, as was postulated by Verduin (1982: 129).

In cancellariid literature, the umbilicus depth (UD) has not yet been considered of much importance. However, in many cases carefully introducing a thin insect needle (diameter 0.3 mm) into the umbilicus easily allows at least an evaluation of its depth. The inner lip partly covering the needle may slightly complicate that measurement, but extreme precision is not needed. The umbilicus depth thus found can be expressed as a percentage of some other shell dimension. Shell height is not ideal, as it would implicate the shape of the shell anterior to the umbilicus, to which it may have no direct relationship. It must be noted that even in the extreme case of e.g. a *Trigonostoma* species with an umbilicus open up to the protoconch, the value found will never be 100%, as the height of the complete protoconch (differing from its "exposed height") is also taken into account. This measuring method is here referred to as the "needle method". Evidently, in cases of a very narrow umbilicus or when its axis is somewhat distorted, this will not work well.

References to names used only once in this paper are not listed here; most of them can be found in Petit & Harasewych (2005). Text parts cited from other authors are rendered between double brackets (" "); if translated from the original language, they are put between single brackets (' '). In a cited text, remarks by the present author are between square brackets ([ ]).

References to publications by the different persons of the G. B. Sowerby dynasty are here stated as G. B. Sowerby I, II of III, indicating the first to the third of the name.

**Abbreviations:**

**ALMD:** Aquazoo Löbbecke Museum, Düsseldorf, Germany.
**ANSP:** Academy of Natural Sciences, Philadelphia.
**ApH:** aperture height.
**AV:** author's collection.
**HD:** Henk Dekker collection, Winkel, the Netherlands.
**ISAM:** Iziko South African national Museum, Cape Town, RSA.
**MNHN:** Muséum national d'Histoire naturelle, Paris.
**MZUSP:** Museu de Zoologia da Universidade de São Paulo, Brazil.
**NHMUK:** Natural History Museum (UK), London.
**NM:** Natal Museum, Pietermaritzburg, RSA.
**NMNS:** National Museum of Nature and Science, Tokyo, Japan.
**RBINS:** Royal Belgian Institute of natural Science, Brussels, Belgium.
**RGM:** Museum Naturalis, Leyden, the Netherlands.
**SNZ:** Stazione Zoologica Anton Dohrn, Naples, Italy.
**ZSIC:** Zoological Survey of India, Calcutta, India.
**colln.:** collection.
**H/W:** height to width ratio.
**LW:** last whorl.
**M:** mathematical mean value.
**N:** number of shells.
**n:** number of protoconch whorls.
**O.D.:** original designation.
**O.m.:** own measurements (by AV).
**rApH:** relative aperture height (= ApH/ShH).
**RSA:** Republic of South Africa.
**rSpH:** relative spire height (= spH/ShH).
**S.D.:** subsequent designation.
**ShH:** shell height.
**SpH:** spire height.
**UD:** umbilicus depth.

**List of species treated:**

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| *Scalptia* | *rashafunensis* | **n. sp.** | 72 | 12 |
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| *Africotriton* | *fictilis* | (Hinds, 1844) | 78 | 13 |
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| *Fusimorio* | *rosadoi* | (Beu & Verhecken, 2000) | 80 | 13 |
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| *Tritonoharpa* | *antiquata* | (Hinds in Reeve, 1844) | 82 | 13 |
| *Tritonoharpa* | *beui* | Verhecken, 1997 | 82 | 13 |
| *Tritonoharpa* | *pseudangasi* | Beu & Maxwell, 1987 | 85 | 13 |

**Systematic study:**

Order Neogastropoda Wenz, 1938
Superfamily Cancellarioidae Forbes & Hanley, 1851
Family Cancellariidae Forbes & Hanley, 1851
Subfamily Admetinae Troschel, 1856

The date given for this subfamily (Verhecken, 1986: 248) is here corrected since Troschel's part 1 of the *Gebiss der Schnecken* was published in 1856, not 1866 (Robertson, 1957: 137).

Genus ***Admetula*** Cossmann, 1889

The history of confusion in the use of the generic names *Bonellitia* Jousseaume, 1887 and *Admetula* Cossmann, 1889 was discussed by Cossmann himself, including the rejection of *Admetula* (Verhecken, 2007: 286). Consequently, *Bonellitia* was considered a senior synonym of *Admetula* (by a. o. Davoli, 1982) because the distinguishing characteristics (presence or absence of varices, sculpture sharp vs. rounded) are not a sufficient basis for such subdivision. Other authors (1927-1980) used one of these names as a subgenus of the other or used these two names for separate genera: *Bonellitia* for shells with a sharp sculpture like *Bonellitia bonellii* (Bellardi, 1841) and *Admetula* for shells with a smoother sculpture, like *Admetula evulsa* (Solander, 1766) and *Admetula serrata* (Reeve, 1856).

Landau, Petit & Marquet (2006: 85) figured and described both *Bonellitia bonellii* and *Admetula serrata* from the early Pliocene of Estepona, southern Spain and stated that they consider the differences to be of generic importance (not specific as understood by some other workers). Evidently, that is a subjective evaluation and the fact that the protoconch of both taxa is very similar is no proof of congenericity, since different types of protoconch can be found within a same cancellariid genus (see also note under *Scalptia gorii* n. sp.).

Schnetler & Petit (2006: 98), apparently referring to Cossmann & Pisarro (1910-13) and Pacaud & Le Renard (1995), stated "they list 11 species in the genus *Bonellitia* Jousseaume, 1887 which they consider a synonym of *Admetula*, a synonymy not accepted herein"; but their reasons for not accepting it are not mentioned.

In retrospect, the reasoning behind these different (subjective) opinions can be: If, at genus level, *Admetula* is considered a synonym of *Bonellitia*, then the senior name *Bonellitia* is valid (Davoli, 1982: 62; Pacaud & Le Renard, 1995; Brunetti *et al.* 2009: 55; Lozouet 2019: 31). If they are not synonyms, *Admetul*a and *Bonellitia* are considered different valid genera: Wilson (1994), Vera Pelaez *et al.* (1995), Petit & Harasewych (1991; 2000), Schnettler (2001), Landau, Petit & Marquet (2006: 85), Bouchet & Petit 2008: 4), Schnetler & Petit (2006; 2010), Harzhauser & Landau (2012: 9). These can still be split up in their nominotypical subgenus *Bonellitia* (*Bonellitia*) and *Admetula* (*Admetula*) and other subgenera such as *Bonellitia* (*Admetula*) and *Admetula* (*Bonellitia*), although the latter has not been seen. Yet, all decisions in these reasonings are essentially subjective. The prevailing usage (ICZN, Glossary) is followed herein.

***Admetula afra*** Petit & Harasewych, 2000
Pl. I, Figs A-D

*Admetula afra* Petit & Harasewych, 2000: 146, figs 3-4. *Admetula afra* - Lussi *et al*., 2004: 6, text figure. Hemmen, 2007: 24.

**Type material:** Holotype: NM E3189/T1382, 8.0 mm and 3 paratypes, 7.8, 6.9 and 9.0 mm.

**Type locality:** SE of Port Durnford (29°01.5'S, 32°11.8'E), South Africa, 310-320 m, glutinous sandy mud, R/V MEIRING NAUDÉ stn. ZQ9, 1985.

**Distribution:** Type locality; off Cape Vidal (28°08.4'S, 32°36.4'E), 165 m, R/V MEIRING NAUDÉ st. ZM8, 1988.

**Material studied:** Two small brown shells, height 6.6 and 6.2 mm, from south Bilene, southern Mozambique, 190-220 m (Pl. 1, Figs A-D).

**Remarks:** Compared to the *A. afra* holotype, the two shells studied here have a similar size and quadratic sculpture, but the axials are more predominant and slightly less prosocline, and the nodes at the intersections of axial and spiral sculpture are relatively larger. The present shells have some larger axials and their nodules are paler, so that they look like varices. The absence of

lirations inside the outer lip can be explained by the fact that in many cancellariids these lirations are only formed intermittently, sometimes together with a maximum strength of the columellar folds (see Harasewych & Petit, 1982: 106).

*A. afra* is very similar to *Admetula epula* Petit & Harasewych, 1991, from Cape St. Blaise to off the mouth of the Mbashe River (32°22.8'S, 29°00.8'E), the former Transkei, to 450 m; published shells measure 7.4-10.5 mm (Petit & Harasewych, 1991; 2000. Hemmen, 2007: 132). Shells AV1245, off Cape St. Francis, 17.2 mm (Pl. 1, Fig. H), and AV1303, Western Cape Province, off Agulhas Bank, 16.4 mm (Pl. 1, Fig. E), have a more swollen last whorl, a mean spire angle of 59° and 64°, resp., versus 54° and 60° for smaller shells of *A. epula* (Pl. 1, Figs F, G), and 62° and 56° for the two small brown shells from Bilene. *A. afra* differs from *A. epula* "in having uniformly rectangular sculpture formed by equal-sized axial ribs and spiral cords, and a posteriorly reflected outer lip with weak denticles beneath the spiral cords" (Petit & Harasewych 2000: 147). *A. epula* has a spiral sculpture with a single secondary spiral between the primaries; in *A. afra* "single, weak, secondary cords may be present between primary cords on posterior half of body whorl" (Petit & Harasewych, 2000: 146).

Protoconch size: *A. epula* shells: n = 1.5-2, d = 0.33-0.46 mm, D = 1.0-1.5 mm, e.h. = 1.5-1.6 mm. *A. afra* (after Petit & Harasewych; 2000: figs 3, 4): n = 1¼, d = 0.34 mm, D = 1.2 mm (incl. varix), e. h. = 0.82 mm. The spire angle does not discriminate: all *A. epula* shells seen: 54°-64°; *A. afra*: 56° (Petit & Harasewych, 2000: fig. 3).

The most striking difference between *A. afra* and *A. epula* is the presence of a strong varix at the termination of the protoconch in *A. afra*. In contrast, "the transition from protoconch to teleoconch is indistinct and gradual in *Admetula epula*" (Petit & Harasewych, 2000: 147-148). The smaller shell of *A. afra* studied here (Pl. 1, Figs C-D) indeed has a varix. Yet, it is difficult to establish if the protoconch of the larger shell here identified as *A. afra* (Pl. 1, Figs A-B) also has it: there is a varix-like structure then followed by the axials of the early teleoconch. It is difficult to make the distinction between the "varix" and the early teleoconch axials of about the same strength. At any rate, the transition is not "indistinct and gradual" as in *A. epula*.

The description of *A. epula* mentions a white shell with a light greenish-yellow periostracum with fine hairs at intersections of spiral cords and axial ribs. This agrees with Pl. 1, Fig. E. The shell colour described for *A. afra* is also white. The two Mozambican shells studied here have no periostracum and are brown. This also applies to the single shell from off Kwazulu-Natal figured by Lussi *et al*. (2004: 6). The majority of collected *A. epula* shells were taken from fish guts, hence their original condition, including the periostracum, may have been altered. Shell AV1303 (Pl. I, Fig. E), 16.4 mm high, from off Agulhas Bank, still has such a hairy periostracum.

Only few images have been published of the *Admetula* species here discussed. *A. afra*: original description, and Lussi *et al.* (2004: 6). Figures of *A. epula*: original description, and three shells: (Petit & Harasewych, 2000: fig. 1); 14 mm, off E. Cape (Lussi et al., 2004: 6); 10.5 mm, from off Cape Agulhas, Western Cape province (Hemmen (2007: 132). It should be remembered that the latter province has about half of its coastline east of Cape Agulhas, and therefore must not necessarily refer to an Atlantic locality.

It must be concluded that the two small brown shells from Mozambique studied here do not belong to *A. epula* (shell not white, no secondary spirals, protoconch varix present). Until further data become available, the differences between the original description of *A. afra* and the two brown Mozambican shells in the Rosado collection are herein interpreted as infraspecific variation within *A. afra*.

*Genus* ***Brocchinia*** Jousseaume, 1887.

*Brocchinia* Jousseaume, 1887: 221.

Lussi *et al.* (2004: 7) figured a shell without locality data under the name " '*Cancellaria' okutanii* Petit, 1974" (non *Neadmete okutanii* Petit, 1974), a taxon only known from Japan. Yet, since an identity as *Brocchinia* species was suspected, the genus *Neadmete* needs a closer study. *Brocchinia* is known to occur in the Indo-Pacific and Atlantic Ocean; it was discussed before (Verhecken, 1997: 300-307; 2011: 10).

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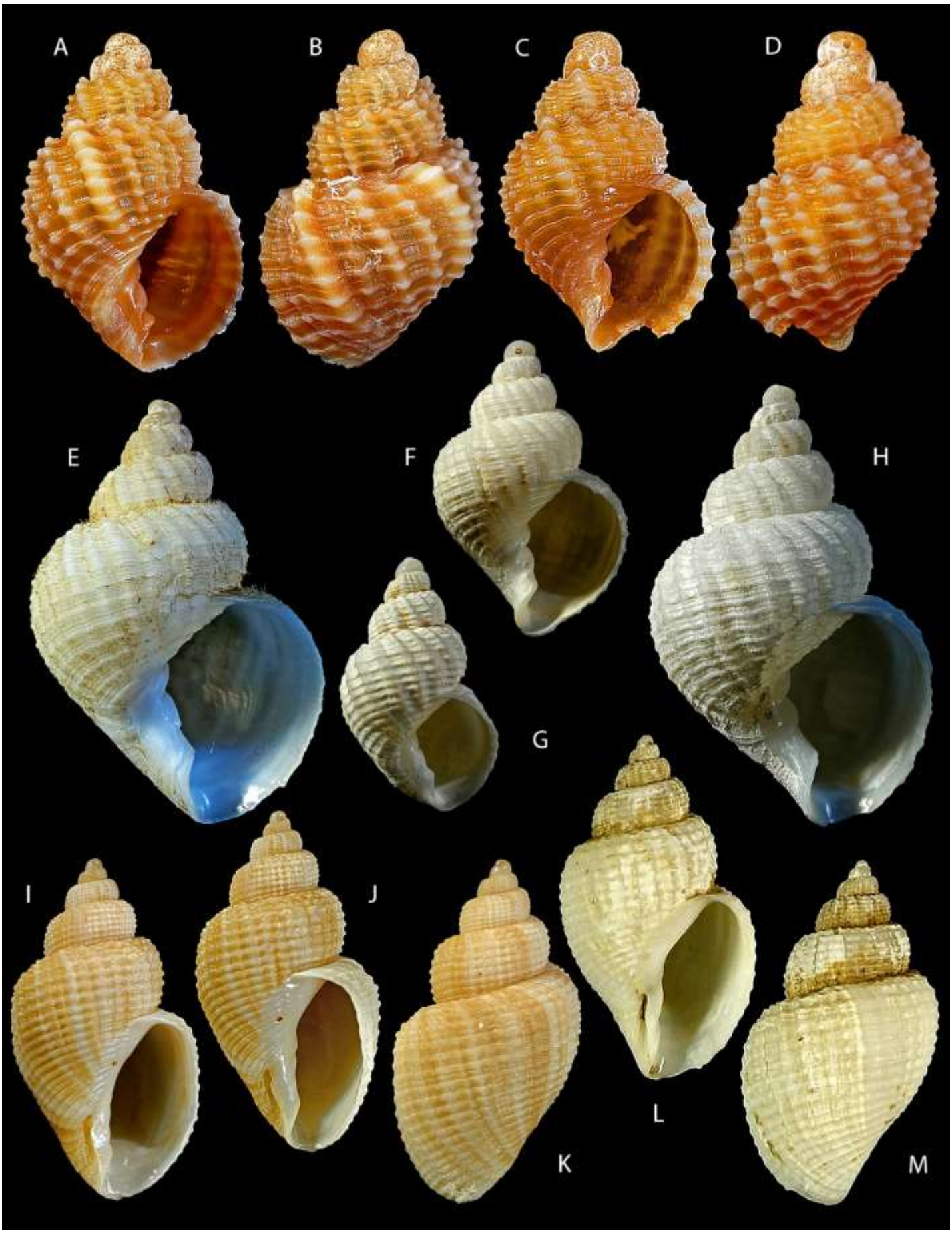
**Plate 1: Admetinae**

**A-D:** ***Admetula afra*** Petit & Harasewych, 2000
S Bilene, southern Mozambique, 190-220 m (Rosado colln.) (x 10)

**E-H:** ***Admetula* cf. *epula*** Petit & Harasewych, 1991
South Africa (x 5)
**E-H:** off Agulhas bank
**E:** AV1303
**F-G.** juveniles, *ex pisces*
**F:** AV0929-1
**G:** AV0929-2
**H:** AV1245. Cape St. Francis, near Jeffreys Bay

**I-M:** ***Zeadmete verheckeni*** Petit & Harasewych, 2000
Agulhas Bank, RSA (x 5)
**I-K:** AV0498
**L-M:** N°148562,Agulhas Bank, *ex pisces*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**Type species of *Neadmete*:** *Neadmete* was proposed by Habe (1961a: 73; Appendix 28, pl. 36 fig. 2) with "*Cancellaria japonica* Smith, 1879" as the type species (O.D.). Yet, this was a misidentification: not *C. japonica* Smith with holotype by monotypy: NHMUK 1878.11.7.50 (Pl. 2, Figs A-B), 11.7 x 5.8 mm, from Goto Islands in the Korean Channel, 90 m was meant. That holotype is "not in very good condition" (Smith, 1879: 216, pl. 20, fig. 54) and was considered "badly broken, probably juvenile and … not a *Neadmete*" (Petit, 1974: 110). The original drawing of *C. japonica* Smith (Pl. 2, Fig C) was embellished, but better photographs of the type are available now: Hemmen (2007: text fig. p. 173), and Pl. 2, Figs A-B. Kuroda *et al*. (1971: pl. 109, fig. 23) figured a shell as *Neadmeta japonica* (Smith), 6.0 x 3.0 mm, but with the columellar folds not clearly visible; these authors referred to the Habe (1961a) figure of the incorrectly identified *N. japonica* Habe. No correct use of the name has been found in Japanese publications and *N. japonica* has not been used later than 1974, except in a few listings and ICZN-related papers. Higo *et al.* (1999: n° G3433) list the species as only recorded from the type locality, hence they refer to the species described by Smith (1879). The holotype of *C. japonica* Smith does not enter the discussion about *Neadmete* here: it is in fact a species of *Brocchinia*, based on the two broad columellar folds in the original figure (Smith, 1879: pl. 20, fig. 54); these are also visible in the apertural view of the NHMUK holotype (see Petit, 1974: fig. 3; Hemmen, 2007: 173, and Pl. 2, Figs A-B herein).

Habe (1964: pl. 36, fig. 2) described and figured a shell with a velvety, light-yellowish periostracum and 3 weak columellar folds as "*N. japonica* (Smith)", but the figure is the same as in Habe (1961a).

**Columellar folds:** Petit (1974: 110-111) proposed *Neadmete okutanii* as *nomen novum* for "*Neadmete japonica* (Smith)" (non *Cancellaria japonica* Smith), and designated the shell figured by Habe (1961a, pl. 36, fig. 2; = 1961b, pl. 24, fig. 3) as "the type". The original figure of the holotype of "*Neadmete japonica* Habe" (= *Neadmete okutanii* Petit) is small, and details of the columellar folds can hardly be seen in the cited Habe figures.

The original diagnosis of *Neadmete* is in Japanese, but an English translation was given by Kanakoff & McLean (1966: 2). It mentions "spiral sculpture fine and distinct; axial sculpture forming cancellations"; this does not apply to the shell figured by Lussi (2004: 7) and does not mention columellar folds, an important characteristic in most cancellariids. Tubbs (1986), following a proposal by Petit (1983), published Opinion 1370, in which ICZN under plenary powers set aside all existing designations of type species for the genus *Neadmete*, and designated *N. okutanii* Petit, 1974, as its type species. The type series of the species *N. okutanii* Petit, 1974 is not affected by ICZN Opinion 1370.

**The Habe line drawing:** The only good information on the columellar folds of *C. japonica* Smith (sensu Habe) is Habe's line drawing (1961b: pl. 23, fig. 11; Pl. 2, Fig. D herein) of a topotypic shell. That drawing clearly shows two minor close-set columellar folds near the adapical end of the columella; this is quite different from the *C. japonica* Smith holotype.

Petit (1974) did not include the cited line drawing in "the type" of *N. okutanii*, but used it (1974: 110, text fig. 2), without precise figure reference, to illustrate the species *N. okutanii*. Yet, he did not exclude it from the type series, either, thus it belongs to the type series (ICZN 72.4.1.). Comparing the cited line drawing to the photo of *N. okutanii* in Hasegawa *in* Okutani (2000: 585, pl. 291, fig. 28; 2017: 1055, pl. 345, fig. 8) shows that the same shell is represented; the cited books states 14 mm as shell height of *N. okutanii*, the holotype of which (NMNS-Mo 13289) measures 16.2 x 8.25 mm (Higo *et al*., 2001: G3432).

The cited Habe line drawing, height 44 mm, copied by Petit (1974: fig. 2) and by Hemmen (2007: 173) as *N. japonica* (see Pl. 2, Fig. D), figures a shell of *N. okutanii*. A relatively good illustration of *N. okutanii* is given by Hemmen (2007: 236), copying the Hasegawa (2000) figure cited above. That Habe line drawing, the Hasegawa (2000, 2017) photos, and the description of *N. okutanii* by Hasegawa (2000; 2017) (Petit gave no description) allow a good identification of the species and hence comparison with the Mozambique (see under *Brocchinia tanimbarensis*) shell figured by Lussi *et al.* (2004: 7). Hasegawa (2000: 585) described *N. okutanii* as: axial ribs thick but indistinct; spiral ribs conspicuous; deeply impressed suture, rounded shoulder; narrowly umbilicated. This distinguishes *Neadmete* from *Brocchinia*, which the Mozambican shell belongs to: the latter has nodules and two strong columellar folds. Hence the shell figured by Lussi *et al.* (2004: 7) is not a *Neadmete*, but belongs to the genus *Brocchinia.*

Based on DNA sequences, Harasewych & Petit (2014: 163, fig. 21) classify *Brocchinia tanimbarensis* Verhecken, 1997 in the broad-shelled group of recent *Brocchinia* species. Modica *et al.* (2011: 95) published results for *B. tanimbarensis* from Mozambique and placed *Brocchinia* species in the Admetinae.

***Brocchinia tanimbarensis*** Verhecken, 1997
Pl. 2, Figs E-I

*'Cancellaria okutanii'* Petit, 1974 - Lussi *et al*., 2004: 7, text fig. (not *Neadmete okutanii* Petit, 1974).

*Brocchinia tanimbarensis* Verhecken, 1997: 305, figs 33-35.
*Brocchinia tanimbarensis* - Hemmen, 2007: 311. Harasewych & Petit, 2014: 163.

**Holotype:** MNHN IM-2000-2137, 6.5 x 5.5 mm.

**Type locality:** Arafura Sea, off Tanimbar Islands, KARUBAR Stn. CP77, 08°57'S, 131°27'E, 346-352 m.

**Material examined:** 13.4 x 7.9 mm, southern Mozambique, 480-520 m, (colln. Rosado) (Pl. 2, Figs E-F); AV0701-1 and -2, SW off Diego Garcia, abyssal (one collected alive) (Pl. 2, Figs G-H, I).

**Distribution:** The type locality, southern Mozambique, 480-520 m (Rosado colln.) and also trawled SW off Diego Garcia, about 9°S, 67°E, 6060-6120 m (AV0701), 2 specs, 5.9 x 4.3; 7.3 x 5.1 mm).

**Plate 2**

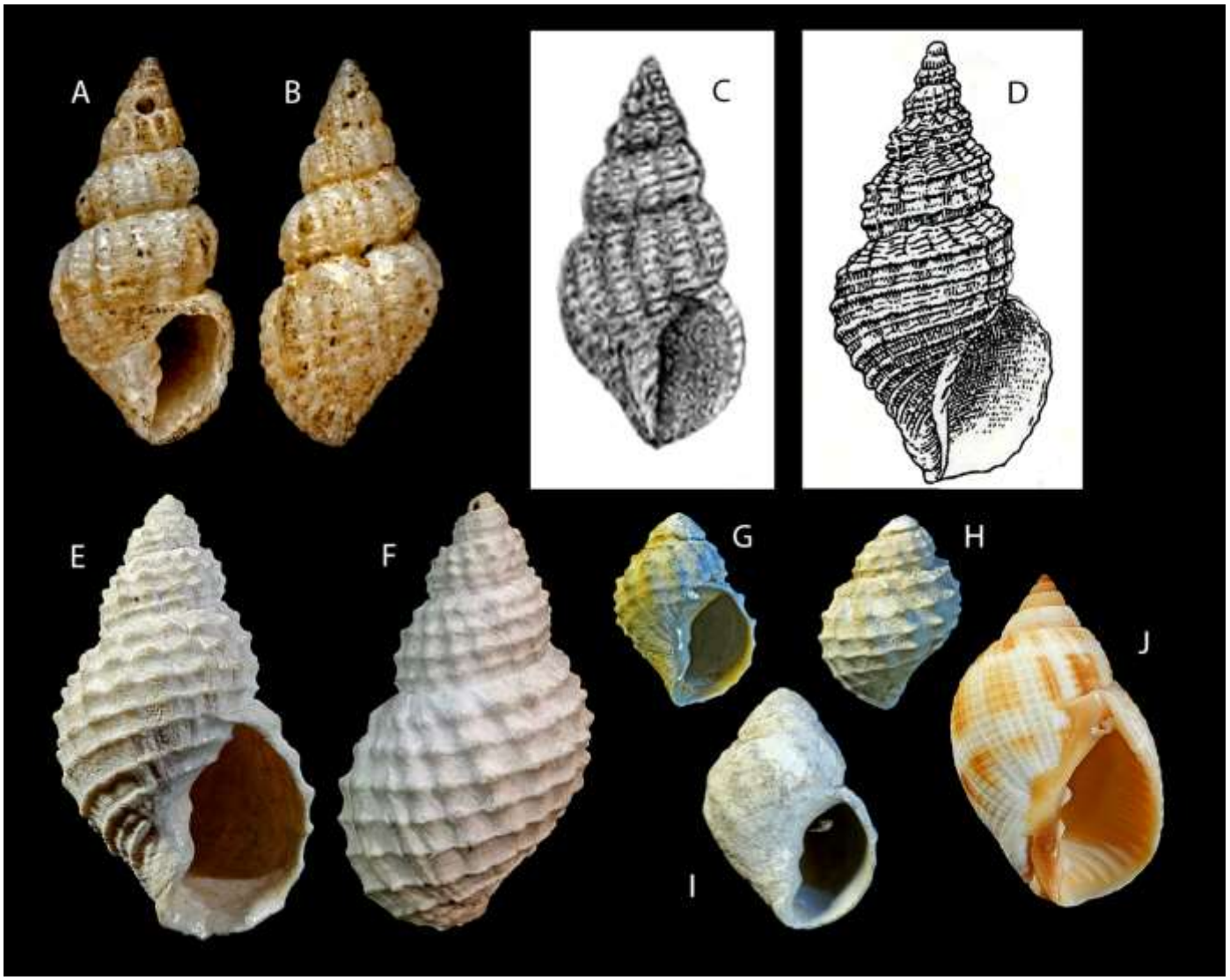
**A-B:** ***Cancellaria japonica*** E. A. Smith, 1879
Holotype by monotypy (x 5). NHMUK 1878.11.7.50. Photo: © Natural History Museum of London; K.Webb, NHMUK Photographic Unit

**C:** Copy of original figure (Smith, 1879: fig. 54)

**D:** drawing published by Habe (1961b: pl. 23, fig. 11) under the name *Neadmete japonica* (Smith), real size of figure 44.5 mm

**E-I:** ***Brocchinia tanimbarensis*** Verhecken, 1997 (x 5).
**E-F:** Shell figured by Lussi *et al*. (2004: text fig. p. 7) under the name '*Cancellaria' okutanii* Petit, 1974, southern Mozambique, 480-520 m (Rosado colln.)
**G-I:** juvenile shells from near Diego Garcia, depth 6120-6160 m
**G-H:** AV0701-2
**I:** AV0701-1

**J:** ***Merica melanostoma*** G. B. Sowerby II, 1849a
25.1 x 15.9 mm (x 2), Lavanono, southern Madagascar (Gori colln.)



**Description:** Based upon the largest shell (Pl. 2, Figs E-F): Shell small, elongate, high-spired, ApH 55.5% of SH. The protoconch is superficially quite eroded, paucispiral: n = 1 ⅓, d = 0.3 mm, D = 1.3 mm, e.h. = 1.3 mm. Teleoconch of 3.5 whorls; suture impressed. The teleoconch sculpture consists of 4 spiral rows of spirally elongated nodules on the spire whorls and 6 on the last whorl; the last whorl has 16 prosocline axial ribs formed by the nodules on the adapical part of the whorl; towards the base the nodules become weaker and continue as 5 continuous spiral ribs. Aperture grossly hemicircular. Outer lip smooth inside. Columella axial, with 2 broad columellar folds, the anterior one at the start of the wide siphonal canal. Narrow umbilical area closed by callus.

**Remarks:** This is the shell figured by Lussi *et al*. (2004: 7) in the context of South African and Mozambican Cancellariidae, yet without locality data, under the name '*Cancellaria' okutanii* Petit, 1974. In correspondence with the late R. E. Petit, it was learned that this shell originates from Mozambique. It has recently been discovered that this shell is in the collection of José Rosado (Maputo, Mozambique), who provided a good photograph, the shell data, and kindly sent the shell on loan for study. Its identity as the shell figured by Lussi *et al*, is proven by the small bore-hole in the protoconch (Pl. 2, Fig. F). Although quite larger (13.4 x 7.9 mm), it agrees well with the Arafura Sea type material (up to 7.4 mm).

Two small shells (AV0701-1 and -2) identified as *B. tanimbarensis*, 5.9 x 4.3 and 7.3 x 5.1 mm, from the abyssal Indian Ocean, near Diego Garcia, 6160-6120 m, are very much alike, but both have a corroded or eroded protoconch (Pl. 2, Figs G-H, I). This might explain their difference in top angle (66°, 68°) with the Rosado shell spire angle (52°).

Comparing the Habe line drawing (1961b: pl. 23, fig. 11) of "*Neadmete japonica"* (Pl. 2, Fig. D), the Hasegawa data, and the Rosado shell, in this order, shows that: Spire angle: 41°, 46°, 50°. Whorl form: shouldered, rounded, rounded. H/W: 2.42, 1.89, 1.70. RLWH: 0.61, 0.65, 0.74. Axial ribs visible in frontal view: 9, 9, 9. Spirals on LW: not visible, 4, 11 - including minors. Umbilicus: very narrow, very narrow, closed.

The shell shape and columellar folds of *B. tanimbarensis* are typical of *Brocchinia*: the adapical fold is broad, and the lower fold is placed at the border of the siphonal canal.

The shell figured by Lussi *et al*. (2004: text fig. 7) under the name '*Cancellaria' okutanii* Petit, 1974 (Pl. 2, Figs E-F) and studied here, is not this taxon, but is the largest known specimen of *B. tanimbarensis*. The identification as the Japanese species cannot be maintained: a good drawing of *Neadmete okutanii* (but not the holotype) is figured by Petit (1974: text fig. 2) and is clearly different, but see ICZN Opinion 1370 discussed above, under genus *Brocchinia*. Shells of *B. tanimbarensis* from Indonesia (Verhecken, 1997: 305) have a weaker axial sculpture than the present shell.

Genus ***Zeadmete*** Finlay, 1926

See discussion in Verhecken (2011a: 37).

***Zeadmete verheckeni*** Petit & Harasewych, 2000
Pl. 1, Figs I-M

*Zeadmete verheckeni* Petit & Harasewych, 2000: 151-154, figs 14-17. (published 6 April 2000).
*Zeadmete verheckeni* - Poppe, Encyclopedia (Conchology Inc.), shell 148562.

**Type material:** Holotype by monotypy: NM C6800/T1755, 5.1 mm.

**Type locality:** off Stony Point, Transkei, South Africa (32°37.5'S, 28°45.8'E), dredged on muddy sand with small stones at 390-400 m; R/V Meiring Naudée sta. VII, 12-vii-1984.

**Material studied:** one shell, AV0498, 13.3 x 7.3 mm, taken in "deep" water by a Cape Town trawler (pre-1994).

**Description:** Shell and soft parts of the holotype were described well by Petit & Harasewych (2000). No radula was found in the holotype, which had large black eyes (Petit & Harasewych, 2000: 151-152); their tentative generic placement is followed here.

Protoconch: paucispiral, n = 1¼, d = 0.23 mm, D = 0.9 mm, e.h. = 0.9 mm. Transition to teleoconch sculpture marked by onset of spiral sculpture. Spire angle: 65°

**Remarks:** Only the holotype had been known until now. Its dimensions were checked by I. Muratov (NM): the holotype height of 7.9 mm (Petit & Harasewych, 2000: 151) must be a printing error. Hence the holotype, height 5.2 mm, is a juvenile shell. A single shell of 13.5 mm, *ex pisce*, ex Meyer colln. (RSA), figured in Poppe's Encyclopedia n°148562 (Pl. 1, Figs L-M) from "Agulhas Bank, Cape", completely agrees with *Zeadmete verheckeni*. The two shells figured here have labels relating them to "Cape" and Agulhas Bank; Cape Town

trawlers work in an area from Cape Town to Agulhas Bank (Sink *et al*., 2012). Hence, the shells' labels are not sufficiently detailed to indicate the exact locality, but do indicate the relationship between Cape fishery and Agulhas bank location.

The weak columellar folds (only well visible when the shell is rotated axially: Pl. 1, Fig. J) resemble those of the holotype of *Cancellaria euetrios* Barnard, 1959 (SAM n°A8747), 4.5 x 2.5 mm, from 213 m off Cape Recife, RSA. Differences are the tabulate shoulder and lower spire of *Z. verheckeni* (Petit & Harasewych (2000: 154). In general shape, the thin-shelled *Merica lussii* Petit & Harasewych, 2000, known from Kwazulu Natal, 150 m, reaching a shell height of 35 mm, with a spire angle of 53-55°, looks like a large form of the present species. Its protoconch data, as derived from the published images, are: multispiral, n = 2.0, d = 0.3 mm, D =2.15 mm, e. h.= 1.56 mm. The description mentions a conspicuous sutural canal, which looks very narrow in the macrophotos.

Subfamily **Cancellariinae**

Genus ***Merica*** H. & A. Adams, 1853

Type species: S.D. (Cossmann, 1899: 13): "*C. melanostoma*, Sow. (= *asperella* Lk)". It appears that Cossmann considered *Cancellaria asperella* Lamarck, 1822 as "equal" to *Cancellaria melanostoma* Sowerby, 1849; if so, he should have used the senior name. Today these taxa are considered different, with *C. melanostoma* the type species of *Merica* and *Cancellaria renovata* Iredale, 1929 type species (O.D.) of *Sydaphera* Iredale, 1929.

For the relation between *Merica* and *Sydaphera*, see Verhecken (2011: 13, 17).

***Merica* (*Merica*) *melanostoma*** (G. B. Sowerby II, 1849)
Pl. 2, Fig. J

*Cancellaria melanostoma* G. B. Sowerby II, 1849a: 447, pl 95, fig 78. 1849b: 137 (distributed 1 June 1849; gives the text presented at the Zoological Society Meeting of 28 November 1848).
*Cancellaria melanostoma* Sowerby, "1833" - Bosch & Bosch, 1982: 118 unnumbered text fig.

**Type material:** Holotype by monotypy: NHMUK 1968271, 29.6 x 18.7 mm, from the Cuming collection; figured by Garrard (1975: fig. 4 (15)) and Hemmen (2007: 208).

**Type locality:** Unknown to Sowerby. The species is mentioned from the Red Sea, Aden and Persian Gulf by Smith (1891: 410), Shopland (1903), Sturany (1903) and Melvill (1928: 112).

**Distribution:** Red Sea (Dekker & Orlin, 2000: 30), Arabian Sea, Persian Gulf, India: Bay of Bengal (AV0414), Tamil Nadu (AV1975), Phuket, Thailand (AV0418), eastern Malaysia (AV0475), now also southern Madagascar. "One, very perfect, rare form" from China, Japan, Philippines (one shell from 3 localities?) cited by Mellvill & Standen (1898: 38) may well refer to a similar, yet different species. Hitherto, the southernmost locality off eastern Africa for this species was off Mogadishu, Somalia (AV0423), but it now becomes southern Madagascar.

**Material studied:** Southern Madagascar, Lavanono, beach-collected by natives, 25.1 x 15.9 mm (Pl. 2, Fig. J). This is a range extension for the well-known distribution given above. A shell trawled (60-80 m) off Ras Hafun, Somalia (leg. L. Briano, colln. Gori), 25.0 x 15.9 mm; protoconch: n = $2^3/_8$, d = 0.2 mm, D = 1.2 mm, e.h. = 0.8 mm.

**Remarks:** The Sowerby II publication (1849b) refers to pl. 95, fig. 78 in *Thesaurus Conchyliorum*, but the latter text (1849a) refers to "Sowerby, *junr* Pro. Zool. Soc., 1848" without a page number, whereas in that *Thesaurus* volume other references to PZS publications are given with the page number. Hence it must be accepted that the paper in PZS (distributed 1 June 1849) was published later than the relevant *Thesaurus* part. There are minor differences between both texts. The sentence "serve to distinguish this species from the preceding" is identical in both, but "the preceding" in the *Thesaurus* refers to *Cancellaria asperella* (now placed in *Merica*), and to *Cancellaria taeniata* in PZS (now placed in *Tribia*, see Verhecken 1985: 7; 2007: 335).

This species appears to be quite rare off SE Africa: it is not included in Kensley (1973), Petit & Harasewych (2000), Lussi *et al*. (2004) and Steyn & Lussi (2005).

*Merica melanostoma westralis* Garrard, 1975, holotype WAM 697-74, was described as a subspecies from Western Australia and cited as such by Wells (1977: 47), Kaicher (1978), Taylor & Glover (2004), but in literature it has also been treated as a full species (Abbott & Dance, 1982; Wilson, 1994: 174; Petit & Harasewych, 2000: 147; Wye, 2003: 176).

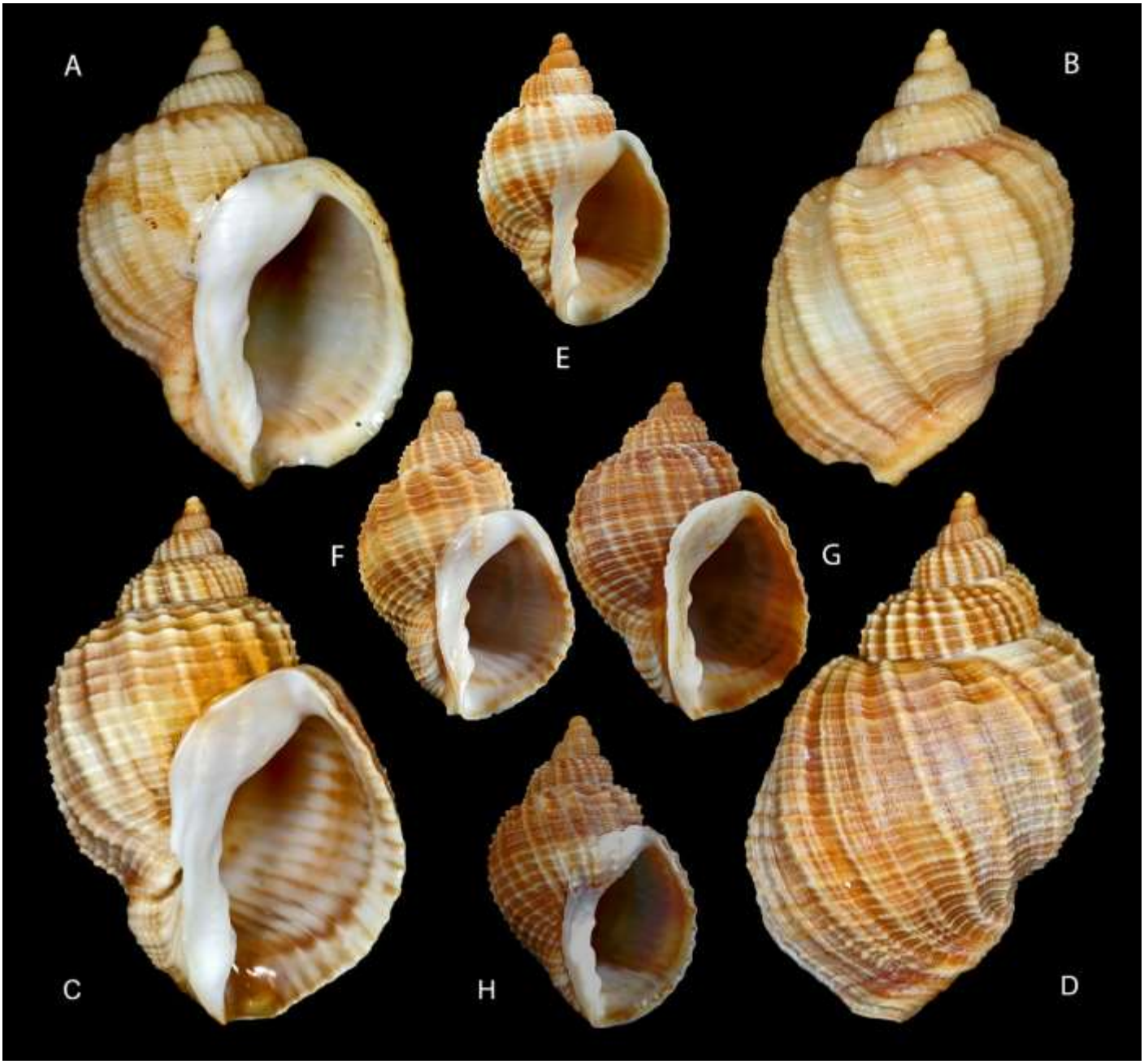



**Plate 3**

**A-H:** ***Merica* (*Sydaphera*) *semperiana*** (Crosse, 1863)
New Caledonia (x 2)
**A-B, C-D:** Locality not further specified.
Photos: L. Charles, MHNBx
**A-B:** MHNBx 2009.22517.1
**C-D:** MHNBx 2009.22517.2
**E-F:** Off Bourail, West N. Caledonia, 70-120 m
**E:** AV1501
**F:** AV1486
**G-H:** Grand Récif, interior of lagoon, 8 m, sand
**G:** AV0813-1
**H:** AV0813-2, with paucispiral protoconch

***Merica* (*Sydaphera*) *semperiana*** Crosse, 1863
Pl. 3, Figs A-H

*Cancellaria semperiana* Crosse 1863: 65, pl. II, Fig. 7
*Cancellaria semperiana* Crosse – Marcy & Bot, 1969: 220, pl. 69, fig. E (ID dubious).

**Holotype:** NHMUK 1896.12.1.12, ex colln. Thomas; 37 x 25 mm (Crosse), but 35.8 x 23.8 mm (o.m.).

**Type locality:** New Caledonia, 'according to all appearances' (Crosse, 1863: 66).

**Material studied:** New Caledonia: W, off Bourail, 70-120 m: AV1486, 22.5 x 14.7 mm; AV1501, 23.8 x 15.4 mm (Pl. 3, Figs E-F). Grand Récif, interior of lagoon, 8 m, sand: AV0813, 4 shs, dimensions from 23.0 x 15.4 to 27.5 x 19.6 mm.

**Distribution:** This species has only been reported from New Caledonia.

**Diagnosis:** A medium to large-sized shell with relatively large multispiral protoconch, short spire and large, swollen last whorl. The main sculpture on the last whorl is axial, crossed by many spiral riblets.

**Description:** Crosse (1863) made a good description and mentioned a multispiral protoconch of 2 whorls. The sculpture consists of many axial riblets on the early teleoconch whorls, but on the younger whorls the axials are broader and more widely spaced. The white inductura on the parietal side of the aperture extends broadly to about the line through shell top and umbilicus. The basal part of the callus stands off from the shell surface. *M. semperiana* has a multispiral, more or less cylindrical protoconch of 2 smooth whorls. Shells AV1486 and AV1501 (Pl. 3, Figs F and E), from deeper water, agree with Crosse's description in having a relatively large multispiral protoconch (n = $2^1/_8$-2¼, d = 0.3-0.4 mm, D = 1.6-1.7 mm, e. h. = 1.5-1.7 mm) and are hereby considered juveniles of *M. semperiana.*

The smaller-sized shells AV1486 and AV1501, the larger shells in MHNBx (Pl. 3, Figs A-B, C-D), and the holotype figure all have the rSpH between 0.17-0.20.

**Remarks:** *M. semperiana* has been very poorly known, probably by lack of material, and only the type shell was figured by Crosse (1863), who stated that the monographs by Reeve and Sowerby only contain one species with some relation to this one: *Cancellaria undulata* G. B. Sowerby II, 1849, from Tasmania. The latter species is now placed in *Sydaphera* and can be distinguished well, based on the general shell shape, the protoconch and the columellar folds (3 in *M. semperiana*; in *M. undulata*, the posterior fold is the strongest and the anterior one, on the rim of the siphonal canal, is weak to very weak). In shell shape, *M. semperiana* tends to the subgenus *Sydaphera*, as discussed before (Verhecken, 2011a: 13, 17).

Tryon (1885: 68) did not agree with Crosse's suggested relation with *C. undulata*, he thought that these species *"*appear to be sufficiently different*"*. Löbbecke (1886: 60) only copied Crosse's text and figures. Garrard (1975: 9) supposed *C. semperiana* to be a junior synonym of *M.* (*Sydaphera*) *undulata*, based on two shells labelled "New Caledonia" in Australian collections, on condition that their identification and locality is correct. Marcy & Bot (1969: 220, pl. 69, fig. E) figured a white shell from Australia under the name *C. semperiana*, "finely reticulated by transversal and spiral cords of the same size; deep suture; 26-36 [mm]", but that shell might as well be a white form of *Merica westralis* Garrard, 1975.

The British Museum obtained the types of 14 species of shells from the collection of B. Thomas in Brest from G. B. Sowerby III (1897: 137-138); Smith (1897: 229-230) compared them to the B. M. collection, and *C. semperiana* from New Caledonia was found to be "quite distinct from all other forms".

Bouchet & Petit (2008: 1) mentioned "the rediscovered endemic *Merica semperiana*, which we intend to deal with separately", but after the decease of R. E. Petit (2013) no further work on that subject has been published.

MHNBx holds two non-type shells from Ile des Pins: MHNBx 2009.22517.1, 41.4 x 27.7 mm, and MHNBx 2009.22517.2, 39.9 x 25.9 mm (Pl. 3, Figs A-B and C-D, resp). They agree very well with the type description and their protoconch is multispiral, as visible in photos supplied by Laurent Charles (MHNBx). For AV0813-3 and -4, these protoconches are also multispiral, their values are: n = 2¼, d = 0.33-0.4 mm, D = 1.7-1.5 mm, e.h. = 1.8-1.5). The shells AV0813 from the interior lagoon of Grand Récif have a thin, sharp outer lip, suggesting they were in a growth stage when collected. In contrast to the other shells from that locality, shells AV0813-1 and -2 (Pl. 3, Figs G and H, resp.) have a paucipiral protoconch with n = 1¾, d = 0.6 mm, D = 1.8 mm, e.h. = 2.7 mm and n = 1¼, d = 0.4 mm, D = 2.4 mm, e.h = 1.2 mm, resp.

*Merica marisca* Bouchet & Petit, 2002, from New Caledonia and Vanuatu, shell size 25.7 x 18.0 mm, also has a paucispiral protoconch (n = 1.0), but a straight axial columella with 3 folds, the suture less impressed and the crossings of axial and spiral sculpture much more rounded than in the cited paucispiral AV0813 shells.

## Genus ***Mericella*** Thiele, 1929

Thiele, 1929: 352.

**Type species:** (monotypy) *Cancellaria* (*Merica*) *jucunda* Thiele, 1925. VALDIVIA stn. 242, 6°34.8'S, 39°35.5'E, between Dar es Salaam and southern Zanzibar, depth not mentioned by Thiele, but given as 404 m by Albano & Bakker (2019).

*Mericella* was introduced by Thiele as a section of the subgenus *Narona* H. & A. Adams, 1854, but that placement cannot be maintained because *Narona* is a Panamic-Pacific genus (Petit, 1975: 388).

From the Western Indian Ocean are known: *Mericella paschalis* (Thiele, 1925) from Zanzibar Channel and Bazaruto, Mozambique; *Mericella jucunda* (Thiele, 1925), from Dar es Salaam, Tanzania and *Mericella bozzetti* Petit & Harasewych, 1993 from off Somalia.

Olsson & Bayer (1972) introduced the genus *Gerdiella*, type species (O. D.) *Gerdiella gerda* Olsson and Bayer, 1972, for three Caribbean species (*Gerdiella cingulata* Olsson and Bayer, 1972; *G. gerda*; *G. santa*) with the remark: "most similar of these is *Mericella* Thiele, 1929, from east African waters… It seems unwise to refer our species to *Mericella* in view of our incomplete knowledge of its type species" (Olsson & Bayer, 1972: 875). And also: " *Mericella* is perhaps the more likely possibility with which *Gerdiella* may be congeneric. However, definite reference of our Caribbean shells to *Mericella*, as first considered, would be premature since it would imply a direct relationship between our Caribbean species and an imperfectly known species from the Indian Ocean, an expression of a degree of knowledge on our part that we do not possess " (Olsson & Bayer, 1972: 876). Lima *et al*. (2007: 100) stated that "the geographical grouping of *Mericella*, with all known species being from off eastern Africa, and *Gerdiella*, with all known species being from the western and southern Atlantic, is obvious".

There is no consensus yet as to *Mericella* and *Gerdiella* being synonyms (Petit & Harasewych, 1993; Verhecken & Bozzetti, 2006; Lima *et al*., 2007). According to Kaicher (1978, card 1953) *Cancellaria corbicula* Dall, 1908, from off California, "is usually placed in the genus *Mericella* but seems to resemble more closely the Caribbean *Gerdiella*". Yet, Lima *et al.* (2007: 100) do not consider *C. corbicula* to belong to *Gerdiella* and prefer to keep its generic placement in doubt. That discussion is now revived by the description of *Mericella rosadoi* n. sp., which has almost all characteristics of the Atlantic *Gerdiella alvesi* Lima, Barros & Petit, 2007 (see further). Phylogenetic analysis may bring the answer one day. *Mericella zhangsupingae* S. Zhang & Wei, 2018, from the Dongsha Islands, South China Sea, has now extended the distribution area of *Mericella* to the northwestern Pacific. The genus *Gerdiella* is as yet unknown in the Tertiary of Caribbean and Panamic areas (Petit, 1983: 250).

***Mericella rosadoi* n. sp.**
Pl. 4, Figs A-H

**Type material: Holotype:** MNHN-IM-2000-35482, 26.2 x 10.4 mm (Pl. 4, Figs A-C). **Paratype:** 28.9 x 11.1 mm (Pl. 4, Figs G-H), Rosado collection, Maputo, Mozambique. The shells were collected alive, but the animals had not been preserved.

**Type locality:** Southern Tanzania, between Dar es Salam and Rovuma River, trawled by Portuguese trawler for deepwater crayfish on muddy bottom at 330-360 m, the area where *Galeodea keyteri* (Kilburn, 1975) is captured, in November 2005.

**Distribution:** Only known from the type locality.

**Etymology:** This species' name honours Mr José Rosado (Maputo, Mozambique), who made the material available for study and donated the holotype. He already did the same for *Loxotaphrus rosadoi* Beu & Verhecken, 2000.

**Diagnosis:** Shell yellowish, slender, fusiform, surface nodulous; aperture elongated, height equals half shell height; a few white varices present on last whorls.

**Description:** Shell elongate, high-spired, rApH = 0.47, with narrow, elongate aperture. Sculpture of many fine small rounded knobs; a few varices. Two columellar folds, colour pale tan, varices and outer lip white. Protoconch paucispiral, dome-shaped, smooth, glossy; n = 1¾, d = 0.3 mm, D = 1.4 mm, e. h. = 1.3 mm; transition to teleoconch not clearly marked. Teleoconch has 5.5 whorls, suture impressed, with a very narrow, round shoulder. Axial ribs are formed by the rows of whitish nodules, diameter about 0.3 mm; there are 30, 30, 31 axial ribs on the 3rd to last teleoconch whorl. Very fine growth lines (Pl. 4, Fig. F), about 18/mm, occur all over the shell surface; they are slightly opisthocline. Spiral sculpture on 1st - 5th teleoconch whorl: 5, 6, 7, 8, 9 rows of nodules; on LW 20 spiral rows of nodules on the crossings with the axial ribs. Yet, neither the axials nor the spirals are clearly indicated as such by an axial rib or a spiral line; they are only formed by the ordered succession of the nodules. The peristome is thick and white, except the columellar inductura, which is thin and transparent. Starting at $1^3/_4$ teleoconch whorls, temporary growth stops are marked on the spire by the presence of the exposed rim of a thin outer lip; on later occasions a varix is formed, at first only distinguishable by a slightly higher axial rib, then by a paler colour of the shell, later a real varix and then a strong varix at the sigmoid outer

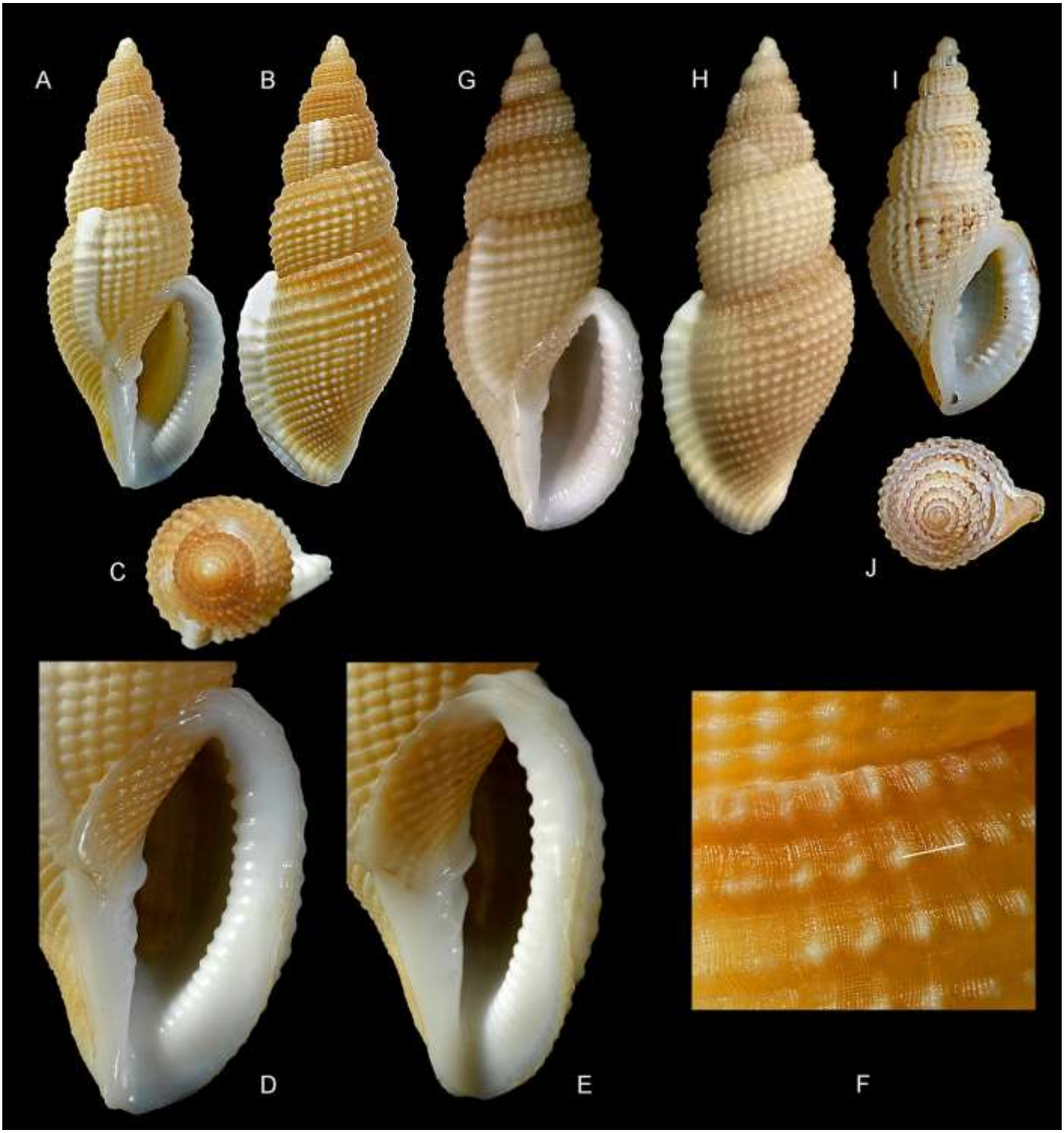



**Plate 4:** ***Mericella*** species

**A-F:** ***Mericella rosadoi*** **n. sp.**
**A-C:** holotype MNHN-IM-2000-35482 (x 3)
**D-E:** Columella of holotype (x 6)
**D:** In normal apertural position
**E:** shell axially rotated 45° clockwise
**F:** Growth lines on holotype
Scale bar: 1.25 mm
**G-H:** paratype, (x 3) **(**Rosado colln.)
(Photos J. Rosado)

**I-J:** ***Mericella alvesi*** (Lima, Barros & Petit, 2007).
Holotype, MZUSP 78932 (x 3), off N.E. Brasil, 690 m. Photos: Daniel Abate and prof. dr. L. R. Simone, MZUSP

lip. There is a total of five growth stops, not counting the apertural varix. Outer lip white, with about 17 lirae on the everted part of the outer lip, starting strong near the adapical angle, and gradually diminishing in strength in the anterior part of the aperture. The lirae are short and do not continue inside the aperture. Inner lip covered by thin transparent colourless callus. A strong columellar fold is formed at the height of the end of the last varix. A weaker fold follows anteriorly; further on, the columella is straight to the siphonal canal (best visible when the shell is slightly rotated axially (Pl. 4, Figs D-E). In apertural view, two or three small nodules on the anterior part of the columella give the impression of very small columellar folds (Pl. 4, Figs A, D, E), which they are not. The anteriormost part of the columella is solid, white, covering the umbilical region; it looks as if several layers of callus have been deposited there. No umbilicus.

**Remarks:** *Mericella rosadoi* n. sp. has the general shell shape of the genus *Mericella*, and especially of *M. jucunda* (height up to 15 mm) and *M. paschalis* (up to 17 mm), shells of which were figured by Verhecken & Bozzetti (2006: pl. 1, figs 1-6 and 7-9), but *M. rosadoi* grows larger (up to 28.9 mm).

*Mericella bozzettii* Petit & Harasewych, 1993, from off Somalia, 200-205 m, shells up to 37 mm, is similar in sculpture to *M. rosadoi*, but the sculpture of the former is somewhat coarser. *M. bozzettii* has a much larger protoconch (AV0019: n = 2, d = 0.6 mm, D = 2.1 mm, e.h. = 2.5 mm) than *M. rosadoi*, the two columellar folds are stronger and it has 2-3 small nodules near the anterior end of the columella. *M. bozzettii* has a sculpture of nodules like that of *M. rosadoi*, but the other *Mericella* species differ markedly from these two in having a sculpture of fine axial and spiral lines.

Remarkably, *M. rosadoi* n. sp. has a strong similarity to *Gerdiella alvesi* (Lima *et al*., 2007) (Pl. 4, Figs I-J), known from off NE Brazil, 08°46.5'S, 34°44.5'W, 690 m, and SE Brasil 22°06.5'S, 40°33.2'W (Petuch, 2013: 189). Both species are very much alike in general shell and protoconch shape, but *G. alvesi* has numerous microscopic spiral threads on the protoconch, visible in SEM photos but not in an optical photo of the holotype (Lima et al., 2007: figs 4 and 6-9, resp.). The callus of the peristome, the sigmoid outer lip and its lirations are similar in both species. The outer lip has its largest distance from the shell axis in the adapical half of the aperture in *M. rosadoi*, but at half aperture height in *G. alvesi*. The two columellar folds are weaker in *M. rosadoi* than those in *G. alvesi*. In apertural view, *G. alvesi* also presents a slight thickening of the columella abapically from the smallest fold, probably comparable to that in *M. rosadoi* (Pl. 4, Figs A, D). In contrast to *M. rosadoi*, *G. alvesi* has no varices on the spire (Lima *et al*., 2007: 102) (see Pl. 4, Figs A, C, and I-J), the colour of the shell is white for *G. alvesi* and yellowish tan for *M. rosadoi*. The narrow axial and spiral lines, on the crossings of which the nodules are formed, are clearly visible in a SEM photo of *G. alvesi* (Lima *et al*., 2007, fig. 14); similar lines are absent in *M. rosadoi* (see description above, no SEM image). The slenderness (H/W) of *M. rosadoi* is 2.52 (holotype) and 2.60 (paratype); the holotype of *G. alvesi* has 2.65, based on the dimensions given, but its figure (Lima *et al.*, 2007: fig. 1, reconstructed from two SEM photos) has 2.24; Pl. 4, Fig. I gives 2.20. The rApH for *M. rosadoi* is 0.48 (holotype), 0.56 (paratype); it is 0.51 for *G. alvesi* (Pl. 4, Fig. I). In *G. alvesi*, the number of axial ribs on the 1st-5th teleoconch whorl (as given by Lima *et al*., 2007: 100) is 20-22; 20; 22; 26; 32-33; and 32 on the LW. For the *M. rosadoi* holotype these figures are: 27; 26; 30; 30; 31; 25. The number of spiral rows of nodules on said teleoconch whorls of *G. alvesi* is: 6-7; 7; 7; 7; 4; 4, respectively; and 15 on the base. For the *M. rosadoi* holotype they number 5; 6; 7; 8; 9; 20. In the rectangles between axials and spirals, *G. alvesi* has finer microscopic growth lines (Lima *et al.*, 2007: fig. 14) than in *M. rosadoi* (Pl. 4, Fig. F). All these differences are rather small. Hence, there is no reason to maintain the separation between Atlantic *Gerdiella* and Indian Ocean - northwestern Pacific *Mericella*, mentioned above in the discussion of these genera. Therefore, the Brazilian species *G. alvesi* is hereby transferred to the genus *Mericella.*

Genus ***Nipponaphera*** Habe, 1961a: 72, Appendix, p. 27.

Type species: (ICZN Opinion 1052): *Nipponaphera habei* Petit, 1972. Recent, Japan.

The original description of *Nipponaphera* was published in Japanese; dr. K. Hasegawa (NMNS) kindly translated it into English (see Verhecken 2011a: 25). It states: "Outer lip with numerous lirations on inner side; columellar lip covering umbilical part, aperture rounded triangular, with wide siphonal canal; columellar lip with 3 folds, and umbilicus imperforate".

It has become clear that the presence or absence of lirations inside the outer lip depends on the growth stage of the animal, it is not a specific or generic character in Cancellariidae (see note under *Admetula afra*).

The arrangement of the columellar folds is rather typical for this genus: they are quite strong, with a gap between the middle fold and the posterior one; the anterior fold forms a strong tooth, and the middle fold has its direction different from both others.

Petit & Harasewych (2000) established new combinations in this genus: *Nipponaphera semipellucida*

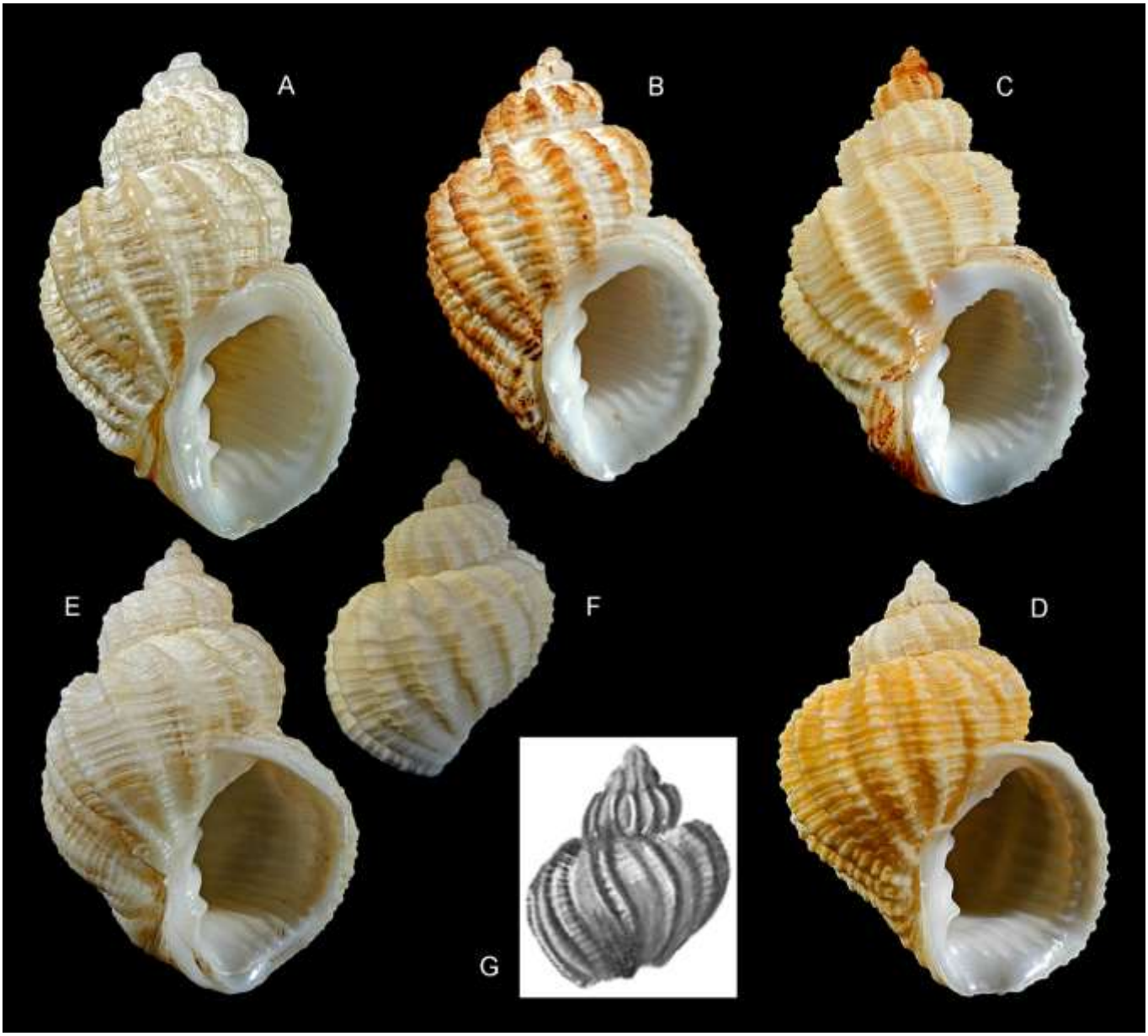



**Plate 5:** ***Nipponaphera quasilla*** (Petit, 1987)

**A-B:** Off southern India (x 3)
**A:** AV1924-1, off Kerala
**B:** AV1658, Chennai (= Madras), 40-50 m

**C-D:** Off Somalia (x 3)
**C:** AV1498-2
**D:** AV1498-3

**E-F:** Off Cape Ras Hafun (x 3)
**E:** AV0013, 100-200 m
**F:** AV0012, 150 m

**G:** Shell figured by Knorr (1769, 4: 42, t. 26. f. 6) as the *Blätterkinkhorn* from India, with some resemblance to *N. quasilla*

(A. Adams & Reeve, 1850), *Nipponaphera teramachii* (Habe, 1961), *Nipponaphera nodosivaricosa* (Petuch, 1979), *Nipponaphera quasilla* (Petit, 1987), *Nipponaphera kastoroae* (Verhecken, 1997) and *Nipponaphera suduirauti* (Verhecken, 1999).

***Nipponaphera quasilla*** (Petit, 1987)
Pl. 5, Figs A-G

*Cancellaria cretacea* Smith, 1899: 245 (non *C. cretacea* Nyst, 1882)
*Cancellaria cretacea* Smith – Alcock & McArdle, 1901: pl. XI Figs 5, 5a
*Cancellaria quasilla* Petit, 1987: 154 fig. 1 (*nomen novum* for *C. cretacea* Smith non Nyst)
*Cancellaria quasilla* Petit, 1987 - Bozzetti, 1996: 49, text-fig.
*Scalptia* sp. - Lussi *et al*., 2004: 9, text fig.
*Nipponaphera quasilla* (Petit, 1987) - Bouchet & Petit, 2008: 10.

**Type material: "**Holotype", M920/1, 23.9 x 16.9 mm (measured by the present author in Calcutta), Zoological Survey of India, 659 m, off Travancore Coast, S India. The shell was figured by Alcock & McArdle (1901: pl. XI, figs 5, 5a), who worked at the Indian Museum. Smith's (1899) description does not mention the number of shells, hence it must be considered a single syntype (ICZN 73.1.1). The plate in Alcock & Mc Ardle shows two shell views (5 and 5a); but since all shells on that plate have two views it seems probable that only one shell was figured, in both dorsal and apertural view. Both views have the early whorls superficially eroded and without any sculpture. Petit (1987: fig 1) figured two views of the "holotype" (in Calcutta), these figures agree with Alcock & McArdle's figures, in spite of some small differences between the drawings (1901) and the photos (Petit, 1987); dimensions: 25 x 19 mm (Smith, 1899: 245).

**Type locality:** Laccadive Sea, Travancore Coast, S India, INVESTIGATOR sta. 229, (9°29'34"N, 75°38'E), 659 m.

**Distribution: Bay of Bengal:** type locality, S Burma, Andaman Sea (ANSP 291936), Chennai (formerly known as Madras) (AV1612, AV1658, AV1827), Tamil Nadu: Cuddalore (AV1565). **Arabian Sea:** Off Kerala (AV1924-1), off Cape Ras Hafun, Somalia (AV0012, AV0013, AV1498). **Mozambique:** off Quissico (Lussi *et al*. 2004: 9).

**Material studied:** the AV shells listed above.

**Description:** Shell solid, whitish to pale brownish. Aperture with 11 relatively strong lirae; sometimes there are 2-3 narrow ridges on the parietal lip, spirally running into the aperture, and showing as small narrow teeth (Pl. 5, Figs C, D). Protoconch (eroded in most shells) multispiral with deep suture, n = 2, d = 0.2-0.3 mm, D = 1.3 mm, e.h = 1.3 mm. (Pl. 5, Fig. D). Transition to teleoconch difficult to locate because of erosion. Aperture rounded triangular in shape; shoulder angled, and the sutural ramp convex Columellar folds strong. Umbilicus very narrow in young shells; wide in larger shells, but even then not very deep.

**Remarks:** The figure (Lussi *et al*, 2004: 9), 31 x 24 mm (H/W= 1.29), of a shell *ex pisce*, 75-90 m from Quissico, Mozambique, may well represent a shell of *Cancellaria quasilla* Petit, but seems to miss the secondary spiral lines. The slenderness of shells of that species is about the same for material from off southern India (H/W = 1.31-1.53, n = 10) and from near East Africa (H/W = 1.33-1.48, n = 5). Shells from around India seem to have a more regular build than those from off the East African coast.

*Cancellaria cretacea* Nyst, 1882 is a *nomen novum* for *Cancellaria obtusa* Binkhorst van den Binkhorst, 1861 (non Deshayes, 1830) from the Cretaceous of Maastricht, The Netherlands. Yet, Nyst's name for the fossil preoccupies the name introduced for the recent species from the Kerala coast, SW India, by Smith, who gave a Latin description, but no figure and stated that it is "remarkable on account of the absence of an anterior canal and of colour". Fresh shells of this species are now known to have a pale brownish tint. The "absence of an anterior canal" remains unexplained.

For his *Cancellaria scalarina*, Lamarck (1822: 113) referred to Knorr (a.o.) (1769, 4: 42, t. 26. f. 6.), who stated (translation): 'belongs to *Mignatur* [Latin for miniature], they name it the *Blätterkinkhorn* [Leaves conch] because it attaches itself to the leaves of trees that grow on the beach in India; it is thin-shelled and has on the whorls soft ribs that are somewhat incised. The colour is yellowish brown'. The text part on the Indian beach trees (mangroves?) was copied by Chemnitz (1780: 45). The cited Knorr figure (Pl. 5, Fig. G herein) shows the dorsal view of a shell that has some resemblance to *N. quasilla* (see Pl. 5, Fig. F), but that species has never been mentioned as found on the leaves of beach trees, and 'thin-shelled' does not really apply to *N. quasilla*. Therefore and because a lectotype of *C. scalarina* exists, this reference must be disregarded in the context of *C. scalarina*. The Dutch version of Knorr (1773, pt. 4: 27, pl. 26, fig. 6) cites this figure in the context of the *Koffer hoorentjes* (*Arcularia*) (now *Nassarius*) of Rumphius (1705: 91-92, pl. 27, fig. M, N) to which it has very little resemblance. It must be remarked that the Dutch version is 'provided with a completely new Dutch description' (see title page of part 4).

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**Plate 6:** ***Nipponaphera*** species

**A-C, E-I:** ***Nipponaphera wallacei*** Petit & Harasewych, 2000. Natal, RSA (x 5).

**A:** AV2047, Richards Bay, *ex pisce*
**B:** AV1685, south coast, dredged crabbed
**C:** AV1845, 100 m, dredged crabbed
**E-F:** AV2053, Richards Bay, *ex pisce*
**G-H:** AV1611, Richards Bay, RSA, *ex pisce*, showing fish tooth hole, ShH= 21 mm
**I:** AV1611, columellar folds seen through the fish bite hole in shell (x 12)

**D, J-K:** ***Trigonostoma kilburni*** Petit & Harasewych, 2000. East London, RSA, dredged at 120 m

**D:** AV1686 (x 5), for dimensional comparison to *N. wallacei* shells
**J, K:** Same shell (x 8) as D, showing details of surface sculpture


***Nipponaphera wallacei*** Petit & Harasewych, 2000
Pl. 6, Figs A-I; Pl. 15, Figs C, D

*Nipponaphera wallacei* Petit & Harasewych, 2000: 149, Figs 11-13.
*Nipponaphera wallacei* Petit & Harasewych, 2000 – Lussi *et al*: 2004: 8; Steyn & Lussi, 2005: 198 n° 545.

**Type material:** Holotype: NM V4689, H 6.9 mm. 2 paratypes in NM (one of 12.4 mm), taken alive at 35 m and 53 m.

**Type locality:** off Phumula, Natal, South Africa, on reef, 45 m.

**Material studied:** 11 shells from colln. AV, up to 18.8 x 14.4 mm, from Richards Bay, Natal (4 of them *ex pisce*; the others taken dead).

**Description:** Protoconch paucispiral, n = 1.5, d = 0.3 mm; D = 1.2 mm; e.h. = 0.9 mm. (AV1253). The SEM photos (Pl. 15, Figs C-D) yield: n =1 ¼; d = 0.25; D = 1.0 mm; e.h. = 0.9 mm (AV 1263). Two columellar folds, thin and rather high, with sides parallel to each other, a deep wide groove between them and a very small fold at the rim of the siphonal canal. Spire angle of 64-75°.

The species was well described by Petit & Harasewych (2000), but the figures of the holotype clearly represent a juvenile shell.

**Remarks:** These shells have a well-developed siphonal fasciole, clearly distinguished from the surface of the last whorl around the narrow and shallow umbilicus (Pl. 6, Figs A-C, G-H), but this is not visible in apertural view of a juvenile shell, e.g. the holotype.

The two paratypes were taken by SCUBA, living on a shell of *Bolma Andersoni* (Smith, 1902): these are again examples of the epizoic association of some Cancellariidae with other molluscs (cfr. Verhecken 2011b, and here also under *Scalptia contabulata / scalata*).

The original description mentions "umbilicus narrow, inconspicuous, bordered by a well-developed, cord-like siphonal fasciole"; it must be remarked that the holotype is a juvenile (height 6.6 mm) without umbilicus. It is further stated "The Japanese *N. teramachii* (Habe,1961) has a sharp keel, is umbilicate; with a cord-like siphonal fasciole, but lacks the squarish, finely imbricated spiral sculpture of this new species". Hence, the condition "umbilicus imperforate" is not fulfilled for *Nipponaphera teramachii.* Bouchet & Petit (2008: 10), when redefining the genus *Nipponaphera*, corrected this to "only a small umbilicus if one is present".

Lussi *et al.* (2004: 8) mention the idea, ascribed to Petit, that differences in size and number of axial ribs may be due to differences in bathymetry and possibly even food sources. Steyn & Lussi (2005: 198, text fig.) mention two forms for *N. wallacei*: a smaller, thicker form with few axial ribs from shallower waters and a larger, thinner deep-water form with more ribs. Yet, these differences were not further specified and therefore the existence of the said two forms cannot be verified. Differences seen in the material studied may relate to this, although their documented data do not point to important differences in bathymetry. The shells studied differ in colour (brown or white), number and thickness of axials, strength of the siphonal fasciole and umbilicus.

Based on the material studied, it appears that *Trigonostoma kilburni* Petit & Harasewych, 2000 can sometimes be very similar to shells of *N. wallacei.* AV2053: apical view (Pl. 6, Fig. E-F); compare with AV1686 *T. kilburni* (Pl. 6, Figs D, J-K). See below under *T. kilburni.*

Several shells studied here were taken from fish guts and some of them have small puncture holes, probably from fish teeth (e.g. Pl. 6, Figs A, G, H). In one such shell (AV1611, Pl. 6, Figs G, H) this allows observation of the columellar folds half a whorl inside the last whorl: these are thin, relatively high and with a sharp crest (Pl. 6, Fig. I, shown columellar axis vertical, top side up). The disposition of the columellar folds in the aperture is typical of *Nipponaphera*: the posterior fold is separated from the middle fold by a gap deeper than that between middle and anterior folds.

Lussi *et al.* (2004: 5, text-fig.) figured a shell, 16 mm high, *ex pisce*, 65-90 m, from off Quissico, Mozambique under the name "*N. teremachii* (Habe, 1961a)" (error for *N. teramachii*). The real *N. teramachii* from Japan, lectotype (S.D. Verhecken 2011: 29) NMNS Mo 13302, 16.8 x 11.9 mm (not 22.0 x 14.6 mm as stated by Habe, 1961a) also occurs in the Philippines (Verhecken, 2011a: 29-30). The differences between *N. wallacei* and *N. teramachii* were discussed by Petit & Harasewych (2000: 150): the latter "has a sharp keel, is umbilicate, with a cord-like siphonal fasciole, but lacks the squarish, finely imbricated spiral sculpture" of *N. wallacei*. The presence of *N. teramachii* off the East-African coast has not yet been confirmed. Smaller shells from off eastern Africa have an almost vertical columella, a narrow umbilicus and poorly developed siphonal fasciole (Pl. 6, Fig. G), but in larger shells this changes into the form of Pl. 6, Fig. C, where the umbilicus rather suddenly changes from narrow to a funnel-shape with wide siphonal fasciole.

Two *Nipponaphera* species with the whorls angular at the periphery, similar to *N. teramachii*, were described (Bouchet & Petit, 2002) from the south of New Caledonia. *Nipponaphera pardalis* Bouchet & Petit, 2002 is less distinctly angled at the shoulder and has a finer sculpture and *Nipponaphera goniata* Bouchet & Petit, 2002 has a proportionally higher spire, narrower umbilicus, and brown maculations; it differs from *N. pardalis* in its thicker ribs, not imbricate, a narrow umbilicus and smaller adult size.

The spire angle of *N. wallacei* varies from 64° (AV1685) to 75° (AV1845), the latter (Pl. 6, Fig. C) has a rather wide umbilicus bordered by a siphonal fasciole, but in spite of this the umbilicus depth is only 23% of SH. This seems to be caused by the irregular shape of the umbilicus higher up to the top, not allowing the needle to enter further. Shell AV1685 (Pl. 6, Fig. B) has an umbilicus depth 15% of SH, and AV1611 (Pl. 6, Fig. G) 13 %.

## Genus ***Scalptia*** **Jousseaume, 1887b**

**Type species:** *Cancellaria obliquata* Lamarck, 1822.

The genera *Trigonostoma* Blainville, 1827 and *Scalptia* Jousseaume are clearly distinguished: *Trigonostoma* has a triangular aperture, two columellar folds, the spire strongly to extremely scalate, and a wide, open, very deep umbilicus generally reaching the protoconch. *Scalptia* has been used to group a rather wide variety of shell forms more or less similar to *Trigonostoma*.

*Trigonostoma* has long been considered the type genus of a cancellariid subfamily Trigonostomatinae (Cossmann, 1899), but Bouchet, Rocroi *et al*. (2017: 349) synonimised that subfamily with Cancellariinae.

*Trigonaphera* Iredale, 1936 has generally been considered a synonym of *Scalptia*, but it can also be considered the subgeneric name for a number of species within *Scalptia.*

According to preliminary results obtained by Modica *et al.* (2011: 96), *Trigonostoma* s.s. (*Trigonostoma thysthlon* Petit & Harasewych, 1987 and *Trigonostoma scalare* (Gmelin, 1791)) and *Scalptia* (including *Scalptia bicolor* (Hinds, 1843) from Vanuatu, New Caledonia) form sister groups.

### ***Scalptia bicolor*** (Hinds, 1843)
Pl. 7, Figs A-H, J-M

*Cancellaria bicolor* Hinds, 1843: 48 (published October 1843 (Sclater, 1893: 438)); 1844: 43 (published July 1844).
*Cancellaria bicolor* Hinds, 1843 - Sowerby II, 1849: 59, Figs 49, 50, 69.
*Scalptia bicolor* (Hinds, 1843) - Petit, 1980: 214, fig. 4. Robin, 2008 pl. 459 fig. 12 (Mauritius). Verhecken *in* Poppe, 2008 pl. 705 Figs 6-8.

**Type material:** The original description (Hinds, 1843: 47) is titled: "Descriptions of ten new species of *Cancellaria*, from the collection of Sir Edward Belcher, …". Many of Belcher's shells ended up in NHMUK after donation or sale, but the syntypes of *C. bicolor* from the SULPHUR expedition are not there. They might have been dispersed after the auction of (part of ?) Belcher's shell collection at "Stephen's" in 1851 (Keen, 1966: 266), or at "Steven's" on 8 May 1877 (Chalmers-Hunt, 1976: 111), when 3 drawers containing unspecified *Cancellaria* were sold (Stevens, 1877:11-12).

NHMUK has four "probable syntypes 1968413" from the Cuming collection; their syntype status is here demonstrated under "Type locality". Two of these possible syntypes (Pl. 7, Figs J, K) have a pencilled number on the parietal lip: 60 and 61, resp. These numbers might refer to the figures by Sowerby II (1849a: 456, pl. xcv figs. 60, 61) for *Cancellaria costata "*Gray?", for which he noted: "This species resembles *C. bicolor*, but is rugose in every part", and also: "I do not think *C. rigida* of Sowerby is distinct. From the sands of the river Gambia". For the latter names, see Verhecken (2007: 336-344). Hence, this pencil numbering on the shells is not relevant as to their identity.

Hemmen (2007: 58) figured a "probable syntype" 1968413 (in fact "syntype", see below) without further specimen numbering; he stated (2007: text fig. p. 59): "Higo *et al*. (2001: fig. G3421) figure as lectotype: BM(NH) 1968413/1", but no lectotype was designated by cited authors. They used "UT", standing for "undetermined type" (Callomon, *in litt*. 20190904), probably replacing the "possible syntype" on the NHMUK label. In order to avoid confusion about the exact type status of these NHMUK specimens, the largest shell of lot NHMUK 1968413 (here Pl. 7, Fig. J) is here designated lectotype; the three remaining shells in that lot thereby become paralectotypes 1-3 (Pl. 7, Figs K-M).

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**Plate 7:** ***Scalptia bicolor*** (Hinds, 1843) (x 4, except indicated otherwise)

**A-E:** Off Eastern Africa
- **A:** AV1623-1, Dar es Salaam, Tanzania Leg. Annie Langleit, 1968
- **B-D:** Mozambique, Nacala Bay, by diver
  - **B:** AV2002-2, 15 m (x 3)
  - **C:** AV1925-2**,** 5-8 m
  - **D:** AV2046. 5-18 m
- **E:** AV1343. Mozambique, with large pauci-spiral protoconch

**F-M:** Philippines
- **F:** AV1649 (x 4). Cebu, Lilo-an
- **G:** AV1552, Nocnocan Island
- **H:** AV1264-2, Bohol
- **I:** AV0128, Mactan, Cebu
- **J-M:** *Cancellaria bicolor*, type lot NHMUK 1968413-52469, from Corregidor (ex Cuming collection (x 3). Photo © Natural History Museum of London, Kevin Webb, NHMUK Photographic Unit.
  - **J:** Lectotype, a-b.
  - **K-M:** paralectotypes.

**N:** ***Scalptia*** **spec. inquirendum**
juvenile,with multispiral protoconch, Mirissa, Sri Lanka (x 6) (leg. & colln. Gori).


**Type locality:** The original description (Hinds, 1843: 48) indicates the straits of Macassar as locality for the *C. bicolor* material from the SULPHUR expedition. Yet, a note with the type series in NHMUK states: "further syntypes from the Straits of Macassar not found in 1983". Hinds (1843: 49) also mentioned that "Mr Cuming obtained specimens at the Island of Corregidor, Bay of Manila", and "a banded variety was obtained in the same locality". Hinds (1844: 5) stated: "I was under the necessity of availing myself of the collection of Mr. Hugh

Cuming for comparison". Hence the four Cuming shells from Corregidor Island (14°23'N, 120°34'E.) are indeed syntypes (ICZN 72.4.1).

Sowerby II (1849a: 456 n° 59, pl 94 Figs 49, 50) figured two shells, "from Catbalonga and the island of Samoa", obviously from the same type lot since the figures are exactly the same, under the name *C. bicolor* (Pl. 7, Figs J, K, reps.), but without referring to Cuming material. These figures are exactly the same as two shells in the type lot from Corregidor. The Mollusca literature has several other references to "Catbalonga, island of Samar" (e. g. *Arca disparilis* Reeve, 1844: species 52); nowadays that locality on the west coast of Samar Island is named Catbalogan City (11°47'N, 124°53'E.). Samar is an island near the Mindanao Trench, in the East of the Philippines. Samoa (13°36'S, 172°30'W) is at very considerable distance from Catbalonga; to all probability Sowerby's "Samoa" is a mere writing or printing error for "Samar".

The *C. bicolor* type lot NHMUK 1968413 also has a label "Samar Island (from Reeve)". Reeve (1856: species 29, fig 29 a, b) stated "Island of Samar, Philippines; Cuming". It would appear that he referred to a different lot of *C. bicolor* shells from the Cuming collection, but his fig. 29a looks exactly the same as Sowerby's (1849) fig. 50, including shell height. Clearly something is wrong: the same figured shell is said to originate from Manilla Bay and from Samar Island. The incidents with the labelling of Cuming's shells were discussed by Dance (1966: 167-170) and might explain this problem. Anyway, the Samar locality has no impact on the type locality of *C. bicolor*; the Isle of Corregidor, place of origin of the lectotype, becomes the type locality of *C. bicolor*, despite any previously published statement on the type locality (ICZN 76.2).

**Distribution:** The literature mentions shells of *S. bicolor* from various localities: Japan, Philippines, Indonesia (Verhecken, 1986a), Persian Gulf (Melvill & Standen, 1898), Kenya (AV0143, leg. Annie Langleit, 1974); Mozambique (Petit, 1980; Lussi et *al.*, 2004); Australia (Wilson, 1994; Garrard (1975: 22); but the exact shape of the protoconch was never clearly mentioned. Moreover, the protoconch of this species is very often eroded or covered by a calcareous layer, thus making the distinction of the protoconch type difficult or impossible. Such shells have not been taken into account in the following study.

**Description:** Shell whorls with triangular section, shell with triangular aperture and medium-sized umbilicus. Several shells are whitish, but have a dark brown band on the last whorl; it can be assumed that this has led to the species name *bicolor*.

Protoconch smooth, paucispiral; n = 1 ¼; d = 0.2 mm; D = 0.9 mm; e.h. = 0.8 mm (AV1990, Pl. 15, Figs G, H). Transition to teleoconch only marked by start of spiral sculpture. Axial ribs rather narrow, axial to slightly prosocline, numbering 10 on spire whorls, and 9 on last whorl; passing over the shoulder and crossing the sutural shelf as a broad, rather high ridge, but thin near the shelf; apparently this easily breaks, leaving only a low, thin ridge. Spiral sculpture overriding the axials; between the axials the spiral sculpture almost disappears, or it remains in strength, apparently independent of the locality (E. Africa or Philippines). Sutural shelf strongly marked, almost perpendicular to shell axis. Inside the sutural shelf, there is a broad tooth, often with a tendency to split in two (AV1264-2) to four (AV1264-1) half-fused teeth. Aperture triangular; larger shells have a wide siphonal canal bordered by a siphonal fold near the anterior part of the outer lip. Outer lip smooth, or with 10 sharp lirations inside. Columella almost parallel to shell axis, but in larger shells it deviates abaxially. Three columellar folds, the adapical one the strongest, the anterior one often forming a strong tooth at the start of the siphonal canal. Umbilicus narrow in smaller shells, well formed in larger ones. Mean umbilicus depth: Philippines: 44% of SH (N = 5); off E. Africa: 51.7% of SH (N = 7). The white shells often have a stronger spiral sculpture, especially when crossing the axials (AV1264-2, Pl. 7, Fig. H).

**Remarks:** *S. bicolor* is considered one of the most widely distributed species of the family (Wilson, 1994: 183), quite variable in colour and colour pattern (Petit, 1980: 214). The possibility of sexual dimorphy has not yet been suggested, nor verified.

The protoconch shape of *S. bicolor* has never been well described, probably also because specimens often have the shell top eroded or covered by a calcareous layer. Several lots of *S. bicolor* in colln. AV have the protoconch irrecognisable as to its type because of erosion or other damage. A single shell AV1343 (Pl. 7, Fig. E), 15.1 x 9.4 mm, from Nacala Bay area, Mozambique, 5-10 m, collected in 2008, has an exceptionally large paucispiral protoconch (n = 1.5, d = 0.4 mm, D = 1.3 mm, e. h. = 1.4 mm). The protoconch is smooth, the transition to the teleoconch's axial sculpture is rather sudden. Some of these shells are rather elongate (e. g. Pl. 7, Figs E, G), with H/W 1.69 and 1.88, respectively. A few small shells collected by Gori at Mirissa, Sri Lanka suggest a strong relation with juveniles of *S. bicolor*, but their protoconch is naticoid multispiral (n = $^{1.5}/_{8}$; d = 0.2 mm; D = 1.4 mm, e.h. = 1.1 mm), in contrast to *S. bicolor*'s (see Pl. 7, fig. N). See below under *Scalptia* spec. inquirendum A.

***Scalptia contabulata*** (Sowerby I, 1832)
Pl. 8, Figs A-K, L; Pl. 15, Figs I, J

*Cancellaria contabulata* Sowerby I, 1832: n° 29 fig. 2008; Sowerby II,1849a: 455, n° 56, pl. xciii Figs 19, 23; Reeve, 1856: species 42, pl. ix fig. 42a-b.
*Scalptia forestieri* Montrouzier *in* Souverbie & Montrouzier, 1863: 161, pl. 5 fig. 7.
*Cancellaria rougeyroni* Souverbie *in* Souverbie & Montrouzier, 1870: 427, pl. XIV fig. 1.

**Type material:** lectotype (S.D. Verhecken, 1986a: 48): NHMUK 1968402-1 (Pl. 8, Fig. A), 29.2 x 21.2 mm. H/W = 1.38 (Sowerby wrote 1.2 x 0.8 inch = 30.5 x 20.3 mm, H/W= 1.50); 3 paralectotypes NHMUK 1968402-2 to -4. *Cancellaria rougeyroni*: 3 syntypes, MHNBx 2004.TY.53.

**Type locality:** Ceylon (Sowerby, 1832: n° 29)

**Distribution:** Japan, up north to Kii island (Hasegawa in Okutani, 2017), Philippines, South China Sea, Natuna island, Indonesia, New Caledonia, Andaman Islands: Snake Island, Red Sea, Mozambique (Verhecken, 1986a: 48; 1986b: 139).

**Material studied** (all leg. & colln. Gori): **Tanzania:** 2 shs, 26.7 x 17.9 mm, and 24.0 x 15.2 mm. Mbwangawa, east Ras Nungwi, 05°43'47"S, 39°19'40"E, Unguja Island, Zanzibar, night dive, 12 m, 28-02-2019. **Madagascar:** Tulear, native divers, 28.7 x 19.8 mm; between Faux Cap and Cap St. Marie, 2 shs, 30.8 x 21.7 and 30.3 x 20.5 mm; Lavanono, local collectors, 3 shs, 20.8 x 14.4, 20.4 x 15.2 and 24.3 x 18.0 mm. **Oman:** Mirbat, Dhofar, Hamdy's Block, 22.2 x 16.0 mm, 11-11-14, 15 m. **Sri Lanka:** Mirissa, Deep Rocks area, 32 m; thin layer of sand and seagrass on rocks, rock brushing, MS 62 St. 5 (1 juv., 13.8 x 9.5 mm). Material in colln. AV: 15 shs from NW Pacific; 9 shs from Indian Ocean and off E. Africa.

**Remarks:** Some shells of this species have a series of 4-5 small dentiform structures on the parietal side of the aperture, obviously resulting from the surface sculpture of the penultimate whorl (Pl. 8, Figs C, E), but this is also present in the lectotype of *S. scalata* (Pl. 9, Fig. A). The protoconchs of the lectotypes of *S. contabulata* and *S. scalata* are both strongly eroded, but all non-type shells seen have a paucispiral protoconch. This does not explain the apparent difference in geographical distribution. SEM-photos of the paucispiral protoconch of a *S. contabulata* are shown in Pl. 15, Figs I, J; the latter showing one spiral line near the protoconch suture. At larger magnification (Pl. 16, Fig E), (the remainders of ?) a sculpture of small nodules like that on the nucleus of *Bivetiella cancellata* (Linnaeus, 1767) (Verhecken 2007: fig. 16) can be seen.

*Scalptia. contabulata* and *S. scalata* have very often been confused subsequent to their simultaneous publication by Sowerby I. "Position precedence" has not explicitly been invoked, even in the period when this concept did not apply only to the fixation of type species as it is now (ICZN 2000: Recommendation 69A.10). This was not so in the second (1964: Rec. 24A; Rec. 69B (12) and third [1985: Rec. 24 A; Rec. 69B (11)] editions of ICZN; moreover, its use was never mandatory. Evidently, all depends on the subjective conclusion of workers on this subject: do these names stand for two different species or document variation within a single species?

In order to satisfactorily clarify the *contabulata-scalata* complex, two main questions must be resolved. Both names were simultaneously introduced, hence the question of synonymy arises, and if so, which one is the valid name, based on the literature, ICZN and prevailing usage. If they are not synonyms, then the differences between the two taxa have to be specified. A third possibility could be that the synonymy cannot be decided based on the data at hand now, so that more and better differenciating criteria (DNA ?) should be found in the (near?) future.

The differences between both original descriptions are:

| | *S. contabulata* | *S. scalata* |
|---|---|---|
| Shell shape | ventricose | oblong |
| spire | rather short | acuminate |
| sutual area | upper part flat | broad groove<br>margin crenulate |
| aperture | large oval | oval |
| umbilicus | small | small, narrow |
| H/W | 1.29-160 M = 1.42 | 1.42-1.58 M = 1.49 |

Unfortunately, most of these criteria are only qualitative and the differences between them are not clearly indicated. The only rather clear difference given concerns the shape of the sutural area. H/W (not in original descriptions) indicates no difference. Oddly, in spite of the strong resemblance between both species, both Reeve (1856; *C. contabulata*: sp. 42, pl. ix; *C. scalata*: sp. 19, pl v) and Löbbecke (1881-86, *C. contabulata*: p. 8, pl. 1, fig 9-10*; C. scalata*, p. 72-74, pl. 19, figs 1-6, 7-8) treat these species in different parts of their work (because of alphabetical order?), and do not even mention one species when discussing the other.

Because of the extreme mixup in literature between the cited taxon names, both of them are here studied consecutively, leaving the normal alphabetical arrangement.

**Columellar folds:** Sowerby I (1832; 1841) described a columella with four small plaits for both *C. scalata* and

*C. contabulata*, but for *C. contabulata* he added: "of which the upper one is very small", as in his fig. 28, which looks as if the figure is damaged exactly at that spot. Sowerby's (1832; 1841) figure 27 of *C. scalata* shows the adapical 4th columellar fold rather clearly. Later on, Sowerby II, (1849a: 455) mentioned "columella triplicata" for both species. His figure of *C. scalata* (1849a: pl. xciii, fig. 26) has three columellar folds, but that of *C. contabulata* (pl. xciii, fig. 23) has four. This inconsistency between the Sowerby I (1832) and Sowerby II (1849) descriptions must probably be considered as one of "some errors and imperfections [that] must have occurred" because "a younger and less experienced conchologist" (Sowerby II?) was involved (Sowerby II, 1841: Notice).

Kiener (1841: 11, pl. 7, fig. 3) only found *S. scalata* in the collections at his disposal. He described and figured it with a triplicate columella, and compared it to *Scalptia textilis* (Kiener, 1841); this is not a first reviser action (ICZN 24.2.1).

Deshayes (1843: 411-412), referring to the cited Sowerby and Kiener texts on *S. scalata*, stated "*columella quadriplicata*" in his description and added (transl.): 'the columella has four unequal folds, oblique, not very sharp; sometimes the fourth, that is the smallest, and at the same time the last, is hardly apparent'. Deshayes stated that this species was (transl.) 'until now very rare in the collections'.

Löbbecke (1881: 8, pl 1, figs 9-10) mentioned 3 clear columellar folds of almost equal strength for *S. contabulata*. His description (1886: 72-73, pl.19, figs 1-6) of *S. scalata* reads "*columella ... triplicato, rarius quadriplicato*". He described the weak 4$^{th}$ adapical columellar fold as (transl.) 'callus with three clear and often still another less explicit uppermost fold'. This was based on the four shells in his collection: a poor statistical basis for his (contradictory) statements 'often' and "*rarius*".

It must be concluded that the number of columellar folds is not a good criterium in this case, and indeed, subsequent to 1886, it has no longer been used as such. Only Cernohorsky (1972: 181) mentions "usually with 3 folds or an occasional small fourth".

Löbbecke (1886: 74, pl. 19, figs 7-8) also introduced a "*Cancellaria scalata* Sowerby var.?", ex Taylor collection, dark purple brown, H = 20.4 mm, H/W = 1.71, (Pl. 9, Fig. D) from unknown locality, also with four columellar folds. Löbbecke remarked that Reeve's figure of *C. scalata* is quite different from Sowerby's (1832: fig. 27 and 1849: pl. 93, fig. 26; the only Sowerby figures he referred to) and his own; and that it is hardly possible to include it [the Reeve figure?] in the same species as the variety he [Löbbecke?] described. The Löbbecke collection also contains another *C. scalata* var. (pl. 19, figs 3-4; Pl. 8, Fig. H), ex Scheepmaker collection (G. Scheepmaker, 1811-1854): it is a white, rather plump shell, H = 22.4 mm; H/W = 1.29, that was not mentioned as a variety of *S. scalata* by Löbbecke, and is interpreted here as a shell of *S. contabulata*.

Tryon (1885: 81) considered *C. contabulata* (his pl. 6, fig. 5) a synonym of *C. scalata* (his pl. 6, fig. 2, not mentioned in his text), but he also included *C. pusilla* Sowerby I, 1832, *textilis*, *articularis* Sowerby I, 1832, *forestieri* Montrouzier, 1863, *rougeyroni* Souverbie *in* Souverbie & Montrouzier, 1870, *montrouzieri* Souverbie *in* Souverbie & Montrouzier, 1863, and *tenuis* A. Adams, 1855 in this synonymy*;* some of these are difficult to accept. He even stated that *S. obliquata*, the type species of *Scalptia,* "probably passes into *C. scalata* Sow, a form with a more exserted spire*".* This could be interpreted as a First Reviser action (ICZN 24.2.1), but it is well known that Tryon was a "lumper" (a terminology already used by Darwin in 1857: Enderby, 2009), and this is a good example of it; hence he is not followed here. Moreover, accepting this extensive synonymy would be against the prevailing usage (ICZN, Glossary); therefore *S. contabulata* is accepted as the valid name for the taxon studied here. Tryon's (1885: 81) opinion that *C. textilis* from Japan, the Philippines and Indonesia is a synonym of *C. scalata* (and hence of *C. contabulata*) is not followed here.

Salvat *et al.* (1988: pl. 19, fig. 8) figure a shell from New Caledonia that is probably a *S. contabulata* (H/W = 1.4) under the name *S. scalarina*. Lussi *et al.* (2004: 5) figured two *S. contabulata* shells from N. Mozambique.

Shells of *S. contabulata* from localities as far apart as Red Sea, Madagascar, Japan, New Caledonia and Fiji Islands, have very much the same typical form (see Pl. 8, Figs A-K) if one takes into account the number of teleoconch whorls; the main difference can be the slope of the sutural shelf. As an example, shells from New Caledonia often have the sutural plane flat, but inclined abapically (Pl. 8, Figs E, J, I, and also *S. rougeyroni* Souverbie). Shells with that characteristic have been described as separate species (*Cancellaria forestieri*, *Cancellaria montrouzieri*) when the intraspecific variation was still less documented than today.

A few shells are rather different from the typical *S. contabulata* form and have been assembled on Pl. 9: they are here considered to be the real *S. scalata*, versus the shells figured on Pl. 8. The slenderness (H/W) of these shells is: *S. contabulata* (N = 11; 1.29-1.60; M = 1.42); *S. scalata* (N = 9; 1.42-1.58; M = 1.49). These two areas overlap, and the difference in spread between these two species would then only be 4.7%. The conclusion is that the slenderness is not a good distinctive characteristic for the cited species.

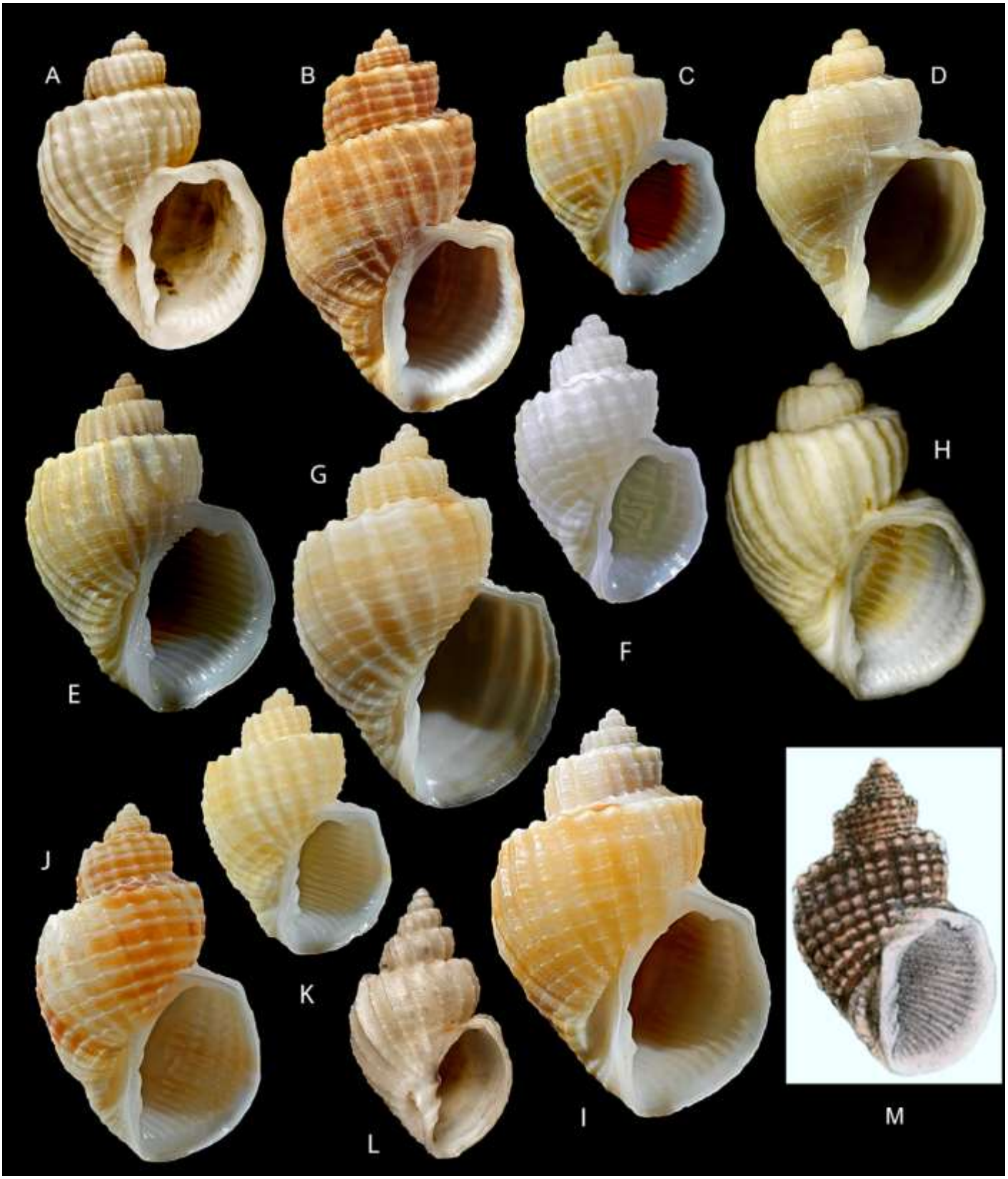


**Plate 8:** ***Scalptia contabulata*** Sowerby I, 1832

**A:** Lectotype (S. D. Verhecken, 1986), NHMUK 1968402-1, (x 2)
**B:** AV1655, S Madagascar, Lavanono
**C:** S. Madagscar, Lavanono, beach (leg. L. Briano; Gori colln.)
**D:** South Andaman, Snake Island, beach. AV0161, juvenile (x 5) (leg. E. Van der Vloet)
**E-G:** New Caledonia, S.W., Grand Coude, 25-35 m
**E:** AV1505-1, dived alive at night, detrital sand (x 3)
**F:** AV1505-2, juvenile, (x 5)
**G:** AV0156-1. New Caledonia (x 4)
**H:** Löbbecke colln. (ALMD) (Löbbecke, 1881: 8, text: H 21 mm), Ceylon, on sand; monstrosity? (does not really agree with Löbbecke 1881: 9 pl. 1 figs. 3-4). ex Scheepmaker colln. Photo Dr Stefan Curth (ALMD)
**I-J:** Philippines (x 3) **I:** AV1553
**J:** AV0671. Bohol, Balicasag Island
**K:** Fiji, Suva Island, 2 m. AV0155 (x 3) **(**Leg. Max Marrow, vii-1974; ex colln. I. Marrow)
**L:** *Cancellaria tenuis* A. Adams, 1855, single syntype NHMUK 1961139, China Seas (x 3)
**M:** *Cancellaria rougeyroni* Souverbie *in* Souverbie & Montrouzier, 1870, figure of a syntype (shell 2004.TY.53 in MHNBx) (x 2)

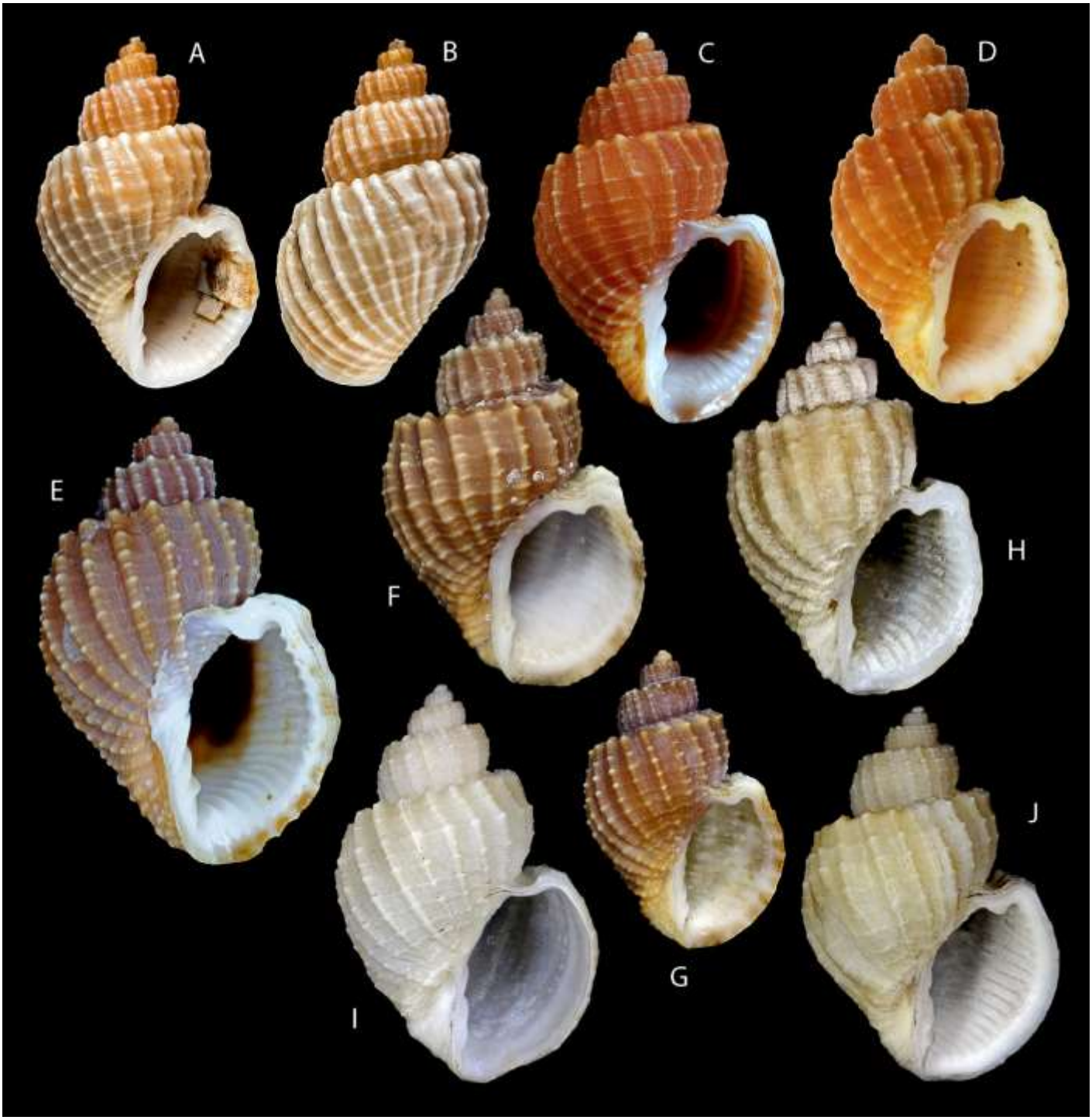


**Plate 9:** ***Scalptia scalata*** (Sowerby I, 1832)
(x 3 if not indicated otherwise)

**A-B:** lectotype (S.D. Verhecken, 1986), NHMUK 1968270-1 (x 2). East-Indies.

**C:** Mauritius, AV0162.

**D:** ***Cancellaria scalata*** var., from the nearer Indian Ocean, (presumably) Ceylon. Löbbecke collection, ALMD (ex Taylor colln.) (shell figured by Löbbecke 1886, pl. 19 figs 7-8). Photo Dr Stefan Curth (ALMD).

**E-G:** RBINS, Dautzenberg colln
**E:** Ceylon
**F-G:** Mauritius
**F:** 23 mm
**G:** (ex Vimont, 10.iii.83)

**H-J:** RBINS, General colln., I.G. 9154, n° 150, Mauritius

***Scalptia scalata*** (Sowerby I, 1832)
Pl. 9, Figs A-J

*Cancellaria scalata* Sowerby I, 1832: n° 28 fig. 27; Sowerby II, 1849a: 455, n° 55 pl. xciii fig. 26; Reeve, 1856: species 19, pl. v fig. 19a-b.

**Type material**: Lectotype (S. D. Verhecken 1986a: 48): NHMUK 1968270-1, 29.2 x 21.2 mm, East Indies.

**Type locality:** "East Indies" (Sowerby I, 1832: nr 28).

The difference between *S. contabulata* and *S. scalata* mainly consists of a different development of the sutural area and of the umbilicus (see above, and Pl. 8 *versus* 9). It must be taken into account that the outline of the aperture peristome depends on the growth stage of the shell. If the last axial rib is not fully formed at the animal's death, the outer lip is thin (Pl. 8, Figs D-G, J; Pl. 9, Fig. I) and clearly shows the shape of the sutural area: flat, or excavated. When the last axial rib is fully formed, the peristome is thickened, and a solid tooth (sometimes bifid) is formed between the suture and the posterior notch at the shoulder. In apertural view, this structure can hide the exact shape of the sutural canal: an excavated sutural canal can be covered by a big tooth (Pl. 9, Fig. E). The shells here identified as *S. scalata* have a tendency to have a double or triple spiral row of close-set nodules on the shoulder of the axial ribs (Pl. 9, Figs F, G, J), forming a linear, abaxially descending row per axial rib. Löbbecke (1886: 74) remarked this on the shells he figured (pl. 19, figs 5-6 and 7-8), although this feature is hardly recognisable in his figures.

**Locality:** The species *S. scalata* and *S. contabulata* were described from "East Indies" and "Ceylon", respectively (Sowerby I, 1832). The shells discussed by Sowerby II (1849) and by Reeve (1856), and also *C. articularis* Sowerby I, 1832, were collected by dr Sibbald (Reeve writes "Dr. Siebold"), the head of the medical staff at Trincomalee in 1829 (Holman 1840: 293), in Ceylon; hence a reliable source for that locality).

Petit (1980: 213, fig. 4) figured *S. contabulata* and stated that it is readily separable from *S. scalata* by the latter's U-shaped sutural area, which is flat and sloping in *S. contabulata*. He stated that the two are "evidently closely related, but readily separable", and that *S. scalata* "appears to be restricted to Mauritius", but he gave no reference for that statement; while *S. contabulata* is "widely distributed". Baker (1891: 23) was the only one to report *Cancellaria* (*Trigonostoma*) *scalata* as "very common" in an unspecified large collection of fresh shells from Mauritius. Hemmen (2007: 280) stated: "Indeed *S. scalata* is a species - close to *S. contabulata* - occurring around Mauritius and in the Seychelles only". He added that he and two others had been snorkelling for 3 weeks in March-April 1976 all around Mauritius, and had not found a single shell of *S. scalata*. Perhaps these apparently contradictory statements might be related to a seasonal occurrence of the species in the shallow waters there.

**Distribution:** The shell of *Cancellaria contabulata* in the Löbbecke collection (ALMD) is from Ceylon; and his three shells of *C. scalata* are supposed to originate from Ceylon ("*von wo die drei abgebildeten Exemplare meiner Sammlung stammen sollen"* (Löbbecke, 1886: 73). Hence not Mauritius.

Shell AV0162 (Pl. 9, Fig. C), said to come from Mauritius, has about the general shape of *S. scalata*, but its sutural area is flat and it lacks the U-shaped canal said to be typical of that species.

Drivas & Jay (1988, pl. 24, fig. 13) figure a *S. scalata*, (H/W = 1.67) from Reunion and Jay (1988) figured a shell, probably *S. scalata*, 'very rare, dead on sand, 20-25 m', height 21.8 mm.

Shells incorrectly figured as *S. scalata*: Webb (1959: pl. 57, left-hand fig. 18) Mauritius, is *scalarina*; Abbott & Dance (1982: text fig. p. 225; 2000: text fig. p. 226): *S. scalata* from Indian Ocean, and under the erroneous name *S. obliquata* p. 228 (but in 2000 edn. p 225 *S. scalata*; and p. 228 that name was changed into *S. contabulata* from Indo-west Pacific; but cited figures can hardly be distinguished from each other.

Shells of *S. contabulata* figured under the name *S. scalata*: Olsson (1970: pl. 4 fig. 6) figures a shell without locality data, probably *S. contabulata*. Oliver's un-numbered figure (1975: 263) is not *S. scalata*, although his description can apply to that taxon. Sharabati (1984: pl. 24, fig. 2) figured a *S. contabulata* under the name *S. scalata.* Hemmen (2007: 281) figures as *S. scalata* a shell from Mauritius that completely agrees with *S. contabulata.*

The distribution of "*T. scalata*" given by Cernohorsky (1972: 181) as "westward from the Fiji islands" is not very helpful, since hardly any cancellariid is known to occur east of that area. His figure (1972: 181, pl. 50, fig.5) clearly represents a *S. contabulata*. Since he states "synonyms are *contabulata* and *pusilla* Sowerby, and *rougeyroni* Souverbie, 1870", this can be interpreted as first reviser action, if both names are considered synonyms. See also Tryon (1885), and Petit (1974).

Petit (1980: 213) listed as synonyms of *S. contabulata* the neocaledonian species *C. forestieri* Montrouzier, 1863,

*C. montrouzieri* Souverbie, 1863, and *C. rougeyroni* Souverbie, 1870; this was already the idea of Tryon. The main difference given by Petit (1980: 214), apparently based on Sowerby I (1832: n° 28-29), is that the sutural zone in *S. scalata* is excavate, whereas in *S. contabulata* it is flat and horizontal to sloping down outwards. It is very probable that the shape of the aperture is merely the result of several (independent?) factors: the shell's growth stage at death (last axial rib fully formed?), the strength of the adapical notch at the shoulder of the whorl and the presence and size of the tooth inside the sutural area.

Five shells from Mauritius, conforming *S. scalata* by the canaliculate sutural area, are in RBINS. One of them (Pl. 9, Fig. I) is rather thin-shelled and has a thin outer lip, indicating that the solid peristome of a temporary growth-stop had not yet been formed. General collection lot n°150, labelled Mauritius, I.G. 9154, has three shells with dimensions 23.3 x 15.2; 23.3 x 15.8; 20.1 x 13.8 mm) (Pl. 9, Figs H-J). The Dautzenberg collection in RBINS has two lots (3 shells) (Pl. 9, Figs E-G) very similar to AV0162 (Pl. 9, Fig. C) with well-formed peristome.

The material now studied suggests that *S. scalata* is quite rare in collections, but is found more in collections made in the 19th century. Only very few recently collected *S. scalata* shell seem to be known. That rareness of *S. scalata* in collections and publications hinders its interpretation as a full species or a (local ?) form. *S. contabulata* is very widely spread, in largely the same form, from eastern Africa to the central Pacific (AV0155, Suva, Fiji Islds (Pl. 8, Fig. K). More and fresh material for DNA research might be necessary to solve this old problem of possible synonymy *contabulata / scalata*. Yet, based on the material studied and illustrated here (Pls 8-9), *S. scalata* is considered a species different from *S. contabulata* for the time being.

**Other related names:** *Cancellaria articularis* Sowerby I, 1832, from Ceylon has always been poorly understood. Sowerby I's figures (1832: n° 34, fig. 32 and Sowerby II 1849: n° 51, figs 90-91) are quite different from each other. No type material has been found in NHMUK. Literature has always referred to the Sowerby II (1849) figures, therefore Verhecken (1995: 98-103, figs 1-5) introduced the new species *Scalptia articularoides* for shells conforming the latter figures. A better understanding of the name *S. articularis* itself has not yet been proposed.

Melvill & Standen (1898: 32) use *C. scalata* as a synonym of *C.* (*Trigonostoma*) *articularis* Sowerby, 1832, said to occur in the Red Sea, Ceylon, Mauritius, Moluccas, New Caledonia; Andamans (Subba Rao & Dey, 2000: 158); Gulf of Mannar (Hylleberg & Kilburn: 2002).

Ever since Sowerby II (1849a: 455), *Scalptia pusilla* (Sowerby I,, 1832: n°36, fig. 34) has generally been accepted as a juvenile shell of *S. contabulata.* Its single syntype was found in the umbilicus of a *Cassis rufa* from New South Wales. *S. contabulata* as well as *S. scalata* have been cited as found attached to the dorsum or aperture of large sand dwelling molluscs (Cernohorsky 1972: 181, pl. 50, fig. 5; Hemmen, 2007: 280; Verhecken, 2011b: 101-106).

*Cancellaria tenuis* A. Adams, 1855, (Pl. 8, Fig. L), based on a Cuming shell from the "China Seas" (date of publication: 1 December 1855 (Sclater, 1893)) has also been synonymised with *C. contabulata*, but the *C. tenuis* shell is rather thin and the axial ribs are thinly plicate. Several authors (Tryon 1885: 81; Hemmen 2007: 280-282) mix up *S. contabulata* / *scalata* with *S. tenuis.* Reeve's pl. xvi, fig. 75 (Dec. 1856) does not agree with the single syntype of *C. tenuis* and at least Hemmen's right-hand text figure on p. 282 is not *S. scalata* nor *S. tenuis.* The latter's single syntype (not holotype) NHMUK 1961139 (Pl. 8, Fig. L), 17.8 x 10.3 mm, has a thin shell with narrow, rather sharp axial ribs, slightly lamellose, not rounded in section; they have thin, triangular, scaly protrusions bent spirally backwards on the shoulder. *S. tenuis* somewhat resembles *S. vangoethemi* Verhecken, 1995: both species have a multispiral protoconch, in contrast to the *contabulata / scalata* shells.

A few species have been described from Art Island, Belep archipelago, New Caledonia: *C. forestieri* Montrouzier *in* Souverbie & Montrouzier, 1863, was described as 'common', 17.5 x 11 mm. MHNBx has a lot of 3 shells in the Montrouzier colln., MHNBx 2009.22523.0, under an unpublished variety name that therefore is not repeated here. Three shells under that name from the Solomon Islands (Honiara; Kakambone and Guadalcanal, leg. A. Delsaerdt), are pale, thin-shelled specimens of S. *contabulata*.

*C. montrouzieri* Souverbie *in* Souverbie & Montrouzier, 1863, is based on a unique shell (holotype MHNBx 2004.TY.51, 15 x10 mm), that was first considered as a variety or monstrosity of *S. forestieri* by its author.

*C. rougeyroni* Souverbie *in* Souverbie & Montrouzier, 1870 (p.427: pl. XIV, fig. 1), H 28 mm, is based on 3 syntypes (MHNBx 2004.TY.53). The published figure (28 x 18.5 mm; Pl. 8, Fig. M) has three columellar folds, umbilicus very narrow and deep. This name is clearly a junior syonym of *S. contabulata.*

Some smaller shells, e. g. Pl. 8, Fig. J, have about the shape of *S. scalata*, but lack the excavated sutural area typical of that species. This might possibly be due to younger specimens, that did not yet develop that characteristic. Indeed, e. g. AV0162, *S. scalata* from

Mauritius (Pl. 9, Fig. C), has the earlier whorls with a flat, slightly descending sutural plain, which gradually changes into the excavated area of *S. scalata.*

***Scalptia delsaerdti* n. sp.**
Pl. 10, Figs A-G, Pl. 15, Figs K-L

**Type material: Holotype:** RBINS I.G. 34168 MT.3881 (ex AV1829-1), 14.7 x 10.2 mm (Pl. 10, Figs B-D), Nacala Bay**,** northern Mozambique (14°24'S, 40°45'E), 5-18 m, by diver (2015. Figured **paratypes**: AV1211-2 (Pl. 10, Fig. A), Bazaruto Island area (21°36'S, 35°20'E); AV1939 (Pl. 10, Fig. E), 15-25 m; AV1992 (Pl. 10, Fig. F); AV2004-1 (Pl. 10 Fig. G). Unfigured paratypes: from near type locality: AV1829-2; AV1829-3; AV1939 (15-25 m); AV1990 (dive 5-8 m); AV2004-2 (dive 15-25 m). From Bazaruto: AV1211-1; AV1989.

**Type locality:** Nacala Bay**,** northern Mozambique (14°24'S, 40°45'E).

**Material studied:** Holotype plus 11 paratypes.

**Distribution:** Only known from the above cited Mozambique localities Nacala Bay and Bazaruto Island.

**Etymology:** This name honours the memory of my friend André Delsaerdt (1944-2019), who was very active in conchology. Together with many other publications on Turbinellidae, Chamidae, Conidae, he will be remembered for his extensive study of the land snails on the Solomon islands.

**Description:** Shell small, white to pale brownish, but the axial ribs white. Shell rather globose, thin-shelled, height up to 15.7 mm (AV1211-2: Pl. 10, Fig. A). Protoconch white, smooth, paucispiral (SEM photos Pl. 15, Figs K, L), n = 1-1$^{3}/_{8}$, d = 0.3-0.5 mm, D = 0.9-1.1 mm, e.h. = 0.7-0.8 mm. Transition to teleoconch not well marked. Up to 4¾ teleoconch whorls. Axial sculpture consists of 8-10 narrow, slighty prosocline ribs of triangular cross-section and narrow crest. Spiral sculpture very weak between the axial ribs, it forms small rounded nodules when crossing the axials. Shell surface between the axial ribs almost smooth, apart from very fine spiral lines. Spire whorls with 9-10 axials and 4-5 primary spirals and one secondary in between. The last whorl has 7-9 axials and 9-11 primary spirals. The axials are raised above the shoulder and form broad rounded points there, sometimes ending in a sharp triangular scale, placed in an axially oriented plane. The axial ribs cross over the deep sutural depression as narrow plates, between them there is hardly any sculpture on the sutural area. Aperture oval, outer lip roundly expanded, usually with 11 lirae inside, but the holotype has 15. One broad, round tooth inside the sutural shelf. Columella with 3 well-defined folds. Umbilicus rather wide, deep, needle test: holotype: 54% of SH; AV1829-2, -3: 66% and 61%, resp.; in apertural view it is about half covered by a thin columellar inductura. The mean slenderness of the shells is 1.46 (N = 12).

**Remarks:** Most of the shells studied seem to be fully grown: they have the white outer lip thicker than the normal axials ribs. The shell of Pl. 10, Fig. A had not yet formed the peristome when captured; it has no lirae in the aperture, and only two columellar folds are shown in that stage. This cyclic development of lirae, folds and peristome is known in other cancellariids, too (see note under *Admetula afra*).

This new species differs from *Trigonostoma vinnulum* Iredale, 1925, figured in Verhecken (2018a: pl. 2, figs 20-21), type species of *Trigonaphera* Iredale, 1936, in its thinner shell, the wider umbilicus, narrower axial ribs, and being slightly less slender (H/W 1.46 versus 1.57).

*Scalptia delsaerdti* n. sp. differs from the single shell of *Cancellaria tjibaliungensis* Martin (1895: pl. vii, figs 116, 116b), holotype RGM 7963, from the Pliocene of Java, in having fewer, but stronger broader axials ribs, a weaker sculpture of fewer spiral lines and a much wider sutural channel. The columellar callus partly covers the umbilicus; this is not the case in the fossil species. The fossil shell figured (Martin, 1895 pl. vii, figs 117-117a) as *Cancellaria* (*Trigonostoma*) *crispata* Sowerby, (error for *C. crispa* Sowerby I, 1832) from the same Java locality, has the whorl surface between the axial ribs almost without spiral sculpture. Martin (1895: 52) stated he could 'in no point' distinguish the cited Java fossil from recent shells of *S. crispata* [sic] from the Philippines. Yet, the figures given for *S. crispa* by Sowerby I (1832: fig. 30) and by Reeve (1856: fig. 43) have the aperture and the half-closed umbilicus wider. The strong siphonal fasciole of typical *S. crispa* is absent in both *S. delsaerdti* and the fossil from Java, hence Martin's comparison is not really relevant.

*Cancellaria lamberti* Souverbie *in* Souverbie & Montrouzier, 1870, was described based on two shells from Ouvea Island (Loyalty islds), Caledonian Archipelago. These shells 'probably do not present all the desired freshness and, consequently, probably also not the real colour' (Souverbie, 1870: 429), but the two syntypes (MHNBx 2004.TY.5.1, figured by Souverbie; MHNBx 2004.TY.5.2, unfigured) are more eroded than suggested by that sentence: they also have a damaged protoconch.


**Plate 10**

**A-G:** ***Scalptia delsaerdti*** n. sp.

**A:** AV1211-2, largest shell known; not fully grown (x 5)
**B-D:** holotype, RBINS I.G. 34168 MT.3884, (ex AV1829-1)
**E:** AV1989, Mozambique, Bazaruta island
**F:** AV1939, Nacala Bay
**G:** AV2004-1, juvenile (x 4), dived 15-25 m, Nacala Bay, N Mozambique (see SEM photo Pl. 15, Figs K, L).

**H-I:** ***Scalptia souverbiei*** Crosse, 1868. Holotype NHMUK 4986-12-1-10, 17.2 x 10.9 mm (o.m.). Photo © Natural History Museum of London, Kevin Webb, NHMUK Photographic Unit

**J-M:** ***Scalptia delsaerdti hasegawai*** n. ssp.
Mikawa, Honshu, Sea of Japan, (x 4)
**J-K**: holotype, RBINS I.G. 34168 MT.3885 (ex AV0570-1).
**L-M:** paratype, AV0570-2

*Trigonostoma lamberti* (Souverbie) as figured by Kaicher, 1978: card 1879 (not *C. lamberti* as intended by Souverbie, 1870), is a damaged shell from Nossi Bé (Madagascar ), that shell (ANSP 264859) resembles *S. delsaerdti*. Kaicher also mentions the type locality New Caledonia.

*Cancellaria souverbiei* Crosse (1868: 272, pl. ix, fig. 8), 17 x 10 mm, has a shape more or less similar to *S. delsaerdti*, but is more conical: spire angle 63° in holotype, versus 73° in *S. delsaerdti*; and *S. souverbiei* has a stronger spiral sculpture. Its single syntype (NHMUK 1896.1.12.10; here Pl. 10, Figs H-I) is illustrated as" holotype" by Hemmen (2007: 299), but the description only allows a syntype. Crosse (1868: 274) stated (transl.): 'we ignore the actual habitat of this species, that must probably originate from some point of the Pacific Ocean'. He also stated (transl.): 'it has been communicated to us by mr B. Thomas from Brest, and is part of his collection'. For more information on that collection, see under *M. semperiana*. The type of *C. souverbiei* was compared to *Cancellaria crenifera* by Smith (1897: 231), who disagreed with Crosse's idea that the latter species are different.

Hylleberg & Kilburn (2003: 101) consider *C. souverbiei* a synonym of *Scalptia scalariformis* (Lamarck, 1822). This is difficult to accept, based on the respective type material, especially when taking into account that the Lamarck types are mutilated shells that have lost most columellar folds (Verhecken, 1986: 54). Compare *C. souverbiei*: single syntype (Pl. 10, Figs H, I), versus the *S. scalariformis* lectotype (S. D. Verhecken, 1986: 53) and two type shells figured as "syntype 1, 2" by Hemmen (2007: 278).

The shell figured by Cernohorsky (1972: pl. 50 fig. 2a) and identified as forma *costifera* Sowerby I of *Trigonostoma scalariformis* Lamarck, has some resemblance to *S. delsaerdti* but is easily distinguished from it by the shape of shell and sutural area, and the width of the umbilicus.

***Scalptia delsaerdti hasegawai* n. ssp.**
Pl. 10, Figs J-M

**Type material: Holotype:** RBINS I.G. 34168 MT.3385, 14.2 x 10.2 mm (ex AV570-1) (ex colln. Kruyniers, Antwerp). **Paratype:** AV0570-2, 13.2 x 9.8 mm, same locality as holotype.

**Type locality:** off Mikawa, Honshu, Japan Sea.

**Distribution:** Only known from the type locality.

**Etymology:** The name honours dr Kazunori Hasegawa (NMNS) for his repeated help to the present author regarding Cancellariidae in Japanese museum collections.

**Diagnosis:** Shell small, resembling *S. delsaerdti* n. sp., but with a stronger axial sculpture and the spirals forming small nodules when crossing the axials.

**Description:** Shell yellowish white, with pale yellow spiral lines. General shell shape very much like that of *S. delsaerdti* n. sp., but the strength of the sculpture is different, The H/W: holotype: 1.39; paratype: 1.35. Protoconch white, paucispiral: n = $1^5/_8$ - $1^3/_4$, d = 0.36-0.4 mm, D = 1.0-1.1 mm, e.h. = 1.0-1.1 mm. Transition to teleoconch not clearly indicated: only a few axial ribs of increasing strength. The spire angle is 80° for the type shells. Teleoconch has 4 whorls with 11, 11, 10 axials; and 8 on the LW. The axials pass over the shoulder as blunt, rounded coronations, then loose height before transgressing the sutural area, which they pass as narrow, rather low "spokes" that are slightly convex towards the aperture. Spiral sculpture stronger than in the nominal species, especially when crossing the axials. Umbilicus wide, depth 59% and 69 % of SH. Sutural area very much like in *S. delsaerdti.*

**Remarks:** The types, from commercial source, are very much like the Mozambique shells of *S. delsaerdti*, but the former have a stronger spiral sculpture and the axials number 10, 11, 12, 11 on $1^{st}$-$4^{th}$ holotype teleoconch whorls and are considerably wider and higher than in the nominal species.

These Japanese shells are similar to *Scalptia obliquata* Lamarck, 1822, type species of *Scalptia*, which occurs all over the Indo-Western Pacific, but has a naticoid multispiral protoconch. Compared to *S. delsaerdti hasegawai*, *S. obliquata* has weaker axials, a more rounded shoulder, flatter sutural area hardly crossed by the axials; the umbilicus is narrower and less deep (only 19% of SH for a similar-sized shell from Réunion (AV0033).

The slenderness (H/W) of the shells is: *S. delsaerdti*: 1.37-1.60, M = 1.46 and *S. delsaerdti hasegawai*: 1.35, 1.39. *S. obliquata* has: from the Philippines: 1.30-1.40; from Vietnam: 1.28-1.37; from Mozambique: 1.35-1.37; hence *S. obliquata* and *S. delsaerdti hasegawai* cannot be distinguished by that parameter.

The umbilicus depth of *S. delaerdti hasegawai* is 59-69%, the nominal species has 65%.

Dr Hasegawa (NMST, Tokyo) kindly looked into the collection of Japanese cancellarids and stated that he could not find any specimens that exactly match the photos of Pl. 10, Figs J-K and L-M. Because of its great similarity to *S. delsaerdti* n. sp., but the huge distance between their distributional areas, these western Pacific shells are here interpreted as belonging to a geographic subspecies of *S. delsaerdti* n. sp.

### *Scalptia gorii* n. sp.

Pl. 11, Figs A-H; Pl. 15, Figs A-B

**Type material: Holotype:** MNHN-IM-2000-35483, 11.7 x 8.1 mm. (Pl. 11, Figs A-C), Mirbat, Dhofar, NE Oman, 18-24 m, 2016-xi (leg. Rosado). **Paratypes:** 9.7-13.7 mm. Ibid. (leg. & colln. Rosado): 9.7 mm (Pl. 11, Fig. D). Mirbat, Dhofar, Oman, (leg. & colln. Gori): Deep Platou, stn. 23-Oman 4-MS 5, 16°56'494"N, 54°43'367"E, 20 m: 13.7 mm (Pl. 11, Fig. F). Bird Island offshore, st 24-Oman 4-MS 56, 16°56'466"N, 57°44'479"E, brushing rocks at 25 m; 10.1 mm (Pl. 11, Fig. E). NE Masirah Island, Ras Al Ya, 21 m, on coarse sand, 20°29'42"N, 58°57'29"E: 2 shs., 10.7-12.8 mm (Pl. 11, Figs G-H, and Pl. 14, Fig. B).

**Type locality:** south Oman, northeast of Mirbat, dived at 18-24 m, 2016-xi.

**Material studied:** the type material.

**Distribution:** Only known from Oman: the type locality, and Ras al Ya, Masirah island.

**Etymology:** The name honours Mr. Sandro Gori (Livorno, Italy), who made the material he collected in the Indian Ocean available for study.

**Diagnosis:** Shell small, protoconch multispiral and naticoid. Teleoconch sculpture of relatively broad axial ribs; a great number of fine spiral lines visible only when crossing the axials. Three columellar folds. Umbilicus narrow and shallow.

**Description:** Shell rather small, up to 13.7 mm; the H/W is 1.44-1.58. Protoconch multispiral and naticoid, suture well impressed; n = $2^1/_8$, d = 0.17 (holo) - 0.20 mm, D = 0.8-1.0 mm, e.h. = 0.8 mm; transition to teleoconch not clearly marked: a few softly indicated axial ribs. Teleoconch has $4^1/_8$ whorls with a sculpture of well-indicated axial ribs; spiral sculpture almost negligible. Aperture rounded triangular; outer lip expanded, with 10 weak lirae inside. A broad, but not very strong tooth at the inside of the sutural ramp. Inner lip with whitish inductura, half covering the narrow umbilicus. Columella almost axial, to slightly deviated abaxially, with three relatively strong folds: adapical one the strongest, placed rather high; anterior one at rim of wide siphonal canal. In apertural view, the middle fold has the greatest length because it is more inclined abapically. This is not the case in the related species *Scalptia androyensis* Verhecken & Bozzetti, 2006, and *Scalptia foveolata* Sowerby II, 1849; the latter species has the three folds much weaker than the new species. The sculpture of the paratype figured Pl. 11, Fig. D consists of 12, 11, 12 and 11 axials on the 1st-3rd teleoconch whorl and the last whorl respectively, and similarly 4, 5, 10 and about 12 spiral lines, sometimes with hardly visible secondary spirals. The aperture has 9-10 lirae inside the outer lip. The umbilicus is very narrow in the holotype (diameter about 0.4 mm), its depth is 68% of SH. Other shells, even the one figured Pl. 11, Fig. F, do not allow substantial penetration of the needle.

**Remarks:** There is some damage on the freestanding inductura of the holotype, leaving a trace without taxonomic value.

One shell from Bird Island, offshore: 10.4 x 6.8 mm, st 24-Oman 4-MS, 56.16°56'466"N, 54°44'479"E, 25 m (Pl. 11, Fig. E) is distinguished by its more rounded outline.

This new species is somewhat similar to *S. foveolata* from eastern South Africa, and still more to *S. androyensis* Verhecken & Bozzetti, 2006, only known from Madagascar. The paucispiral protoconch of both cited species have been figured (Verhecken & Prelle, 2014: 95, figs 9-12). *S. gorii* n. sp. and *Scalptia dekkeri* already differ from both cited species in their naticoid multispiral protoconch.

*S. gorii* and *S. androyensis* form another example of a pair of very similar species that mainly differ in the type of protoconch: paucispiral for *S. androyensis* and multi-spiral for *S. gorii*. Other such examples are known in Cancellariidae (Verhecken 1984: 13; 1999: figs 7-12). *S. androyensis* occurs in two colour varieties: pink and fawn, not geographically separated (Verhecken & Prelle, 2014); the colour of *S. gorii* shells is a pale pink to fawn. *S. foveolata* shells reach a height of 24.5 mm (Verhecken & Prelle, 2014: fig. 6); *S. androyensis* grows up to a height of 17 mm (Verhecken & Bozzetti, 2006: 19), and the largest shell now known of *S. gorii* has a height of

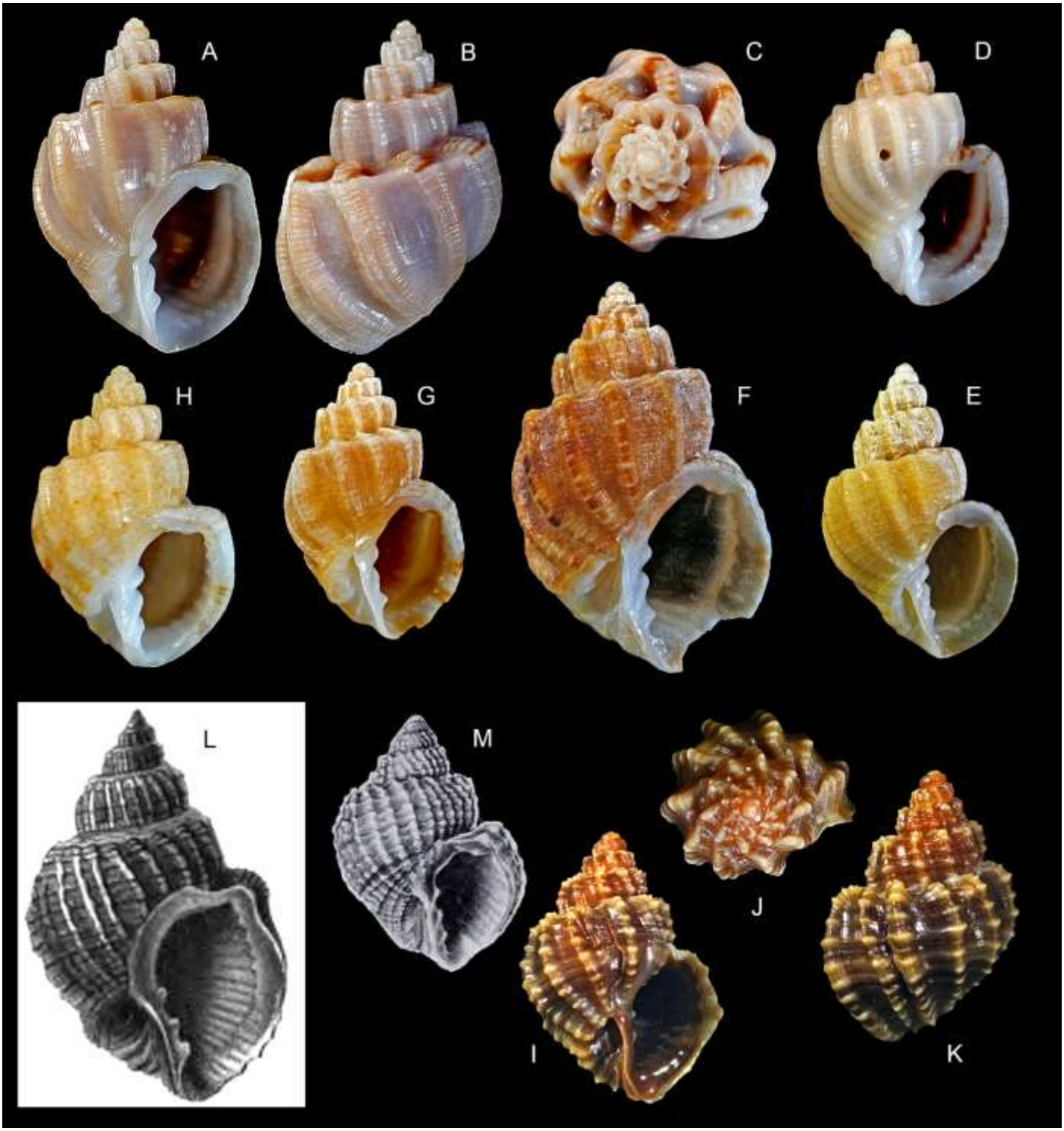


**Plate 11: *Scalptia* species**

**A-H: *Scalptia gorii* n. sp.** from Oman, Dhofar, Mirbat (x 5)

**A-C:** Holotype, MNHN-IM-2000-35483, Mirbat, Dhofar, N.E. Oman, 18-24 m, 2016-xi, (leg. Rosado)

**D-H:** Paratypes

**D:** from type locality, 9.7 mm

**E:** Bird Island, 10.1 mm (leg. & colln. Gori)

**F:** Deep Platou, 13.7 mm

**G-H:** Masirah Island, Ras Al Ya, 9.7 mm and 10.6 mm, resp.

**I-K: *Scalptia* spec. inquirendum B** (x 5). Honiara, Solomon Islands (Rosado leg. & colln.)

**L: *Cancellaria verreauxii*** Kiener, 1841 (x 3). Original figure of single syntype, locality unknown

**M: *Cancellaphera amasia*** Iredale, 1930 (x 3). Original figure of syntype AM C. 57740, Port Curtis, Queensland, Australia.

13.7 mm. The surface of *S. androyensis* shells has a sculpture of very fine spiral grooves, about 9 per mm (see Verhecken & Bozzetti, 2006: 20, fig. 14), also on the sutural ramp. Such fine sculpture is absent in the holotype of *S. gorii*, which has only very weak superficial spiral threads, about 5 per mm, not neatly indicated; and sometimes also a few microscopic growth lines between the axial rib. Other differences between cited species: *S. gorii* has broader axial ribs and when crossing over the sutural ramp they are brown, continuous or striped (Pl. 11, Figs B-C). Between these radial 'spokes', the depressions of the sutural ramp lack the fine spiral grooves present in *S. androyensis*.

*Trigonaphera dekkeri* (Verhecken, 2018b) (see below) from Somalia and Yemen, with a naticoid multispiral protoconch, has a more prominent spiral sculpture and the sutural shelf on the last whorls is strongly inclined abapically.

The H/W ratio of *S. gorii* is 1.44-1.58 (n = 5), *S. androyensis* has H/W 1.49-1.59 (n = 6); *S. foveolata* has 1.57-1.85 (n = 8); and *T. dekkeri* has 1.52-1.64 (n = 5), hence that ratio does not distinguish these species.

The largest paratype of *S. gorii* (Pl. 11, Fig. D) has a superficially corroded protoconch (SEM photos Pl. 16, Figs A-B), rather similar to that of *T. dekkeri* (Pl. 15, Figs E-F).

### ***Scalptia larissaensis* n. sp.**

Pl. 12, Figs D-F

*Trigonostoma costifera* (Sowerby I, 1832) - Bosch D. & E., 1982: 118, textfig. (non *costifera* Sowerby, 1832)
*Cancellaria costifera* - Smythe, 1982: 68, pl. 4e (non *C. costifera* Sowerby, 1832)

**Type material: Holotype:** RBINS I.G. 34168 MT3887, (ex AV0681-1), 24.3 x 15.2 mm (Pl. 12, Figs D-E). **Paratype:** AV0681-2, same locality, 21.8 x 13.7 mm (Pl. 12, Fig. F).

**Type locality:** Kuwait, taken in rubble at base of reef at a depth of 8-10 m.

**Etymology:** *Larissa* was the name used by the Ancient Greeks (Alexander the Great) for what is now Kuwait (https://www.triposo.com/loc/Kuwait/history/background).

**Material studied:** Type series only.

**Distribution:** Shells most probably belonging to this species are also known from a few places in the Persian Gulf and the Aden Gulf as *Scalptia* cf. *scalarina* (Bosch *et al*., 1995: 157, text fig. 686); and as *Trigonostoma costifera* (Bosch & Bosch 1982: 118; Smythe 1982: 68, pl.4 fig.e).

**Diagnosis:** A medium-sized, solid shell, spire high, with rough surface, narrow pale brown spiral bands on the last whorl.

**Description:** medium-size solid shell. Protoconch present, but details eroded in both type shells. Teleoconch of about $5^1/_2$ whorls, LWH 73 % of SH. Axial ribs rather strong, narrow, with sloping sides and rounded crest, 10-11 on the spire whorls, 9 on last whorl. On the shoulder, the last two axial ribs form a thin, rounded triangular scale slightly reflected away from the aperture (see Pl. 12, Fig. E), on older axials this appears to be eroded. There are 5 primary spirals, with one smaller secondary spiral. Spirals on penultimate whorl: 9; when passing over the axials, they form rounded horizontal lamellae, and a broad rounded knob on the shoulder. Spaces between the axial ribs are wider than the ribs; the spirals have almost disappeared there. This results in a coarse, pearled surface appearance that is rough to the touch. Aperture: Columella straight, slightly deviating abaxially, with two folds and one at the rim of the siphonal canal. The umbilicus is not very wide, depth (needle test): holotype: 33 %; paratype 26% of SH. One tooth and 10-11 lirations inside the outer lip and sutural plane.

### ***Scalptia rashafunensis* n. sp.**

Pl. 12, Figs A-C

**Type material**: Holotype: RBINS I.G. 34168 MT3886 (ex AV0344), 18.9 x 11.6 mm (protoconch partly missing), Somalia, Ras Hafun, 150 m (Pl. 12, Figs A-B). **Paratype:** AV1894, 18.3 x 11.8 mm (protoconch missing), (Pl. 12, Fig. C), Somalia, Ras Hafun, trawled 150-250 m, shrimp nets.

**Type locality:** off Cape Ras Hafun, 150 m.

**Material studied:** Only the type series is known.

**Etymology:** Named after Cape Ras Hafun, Somalia.

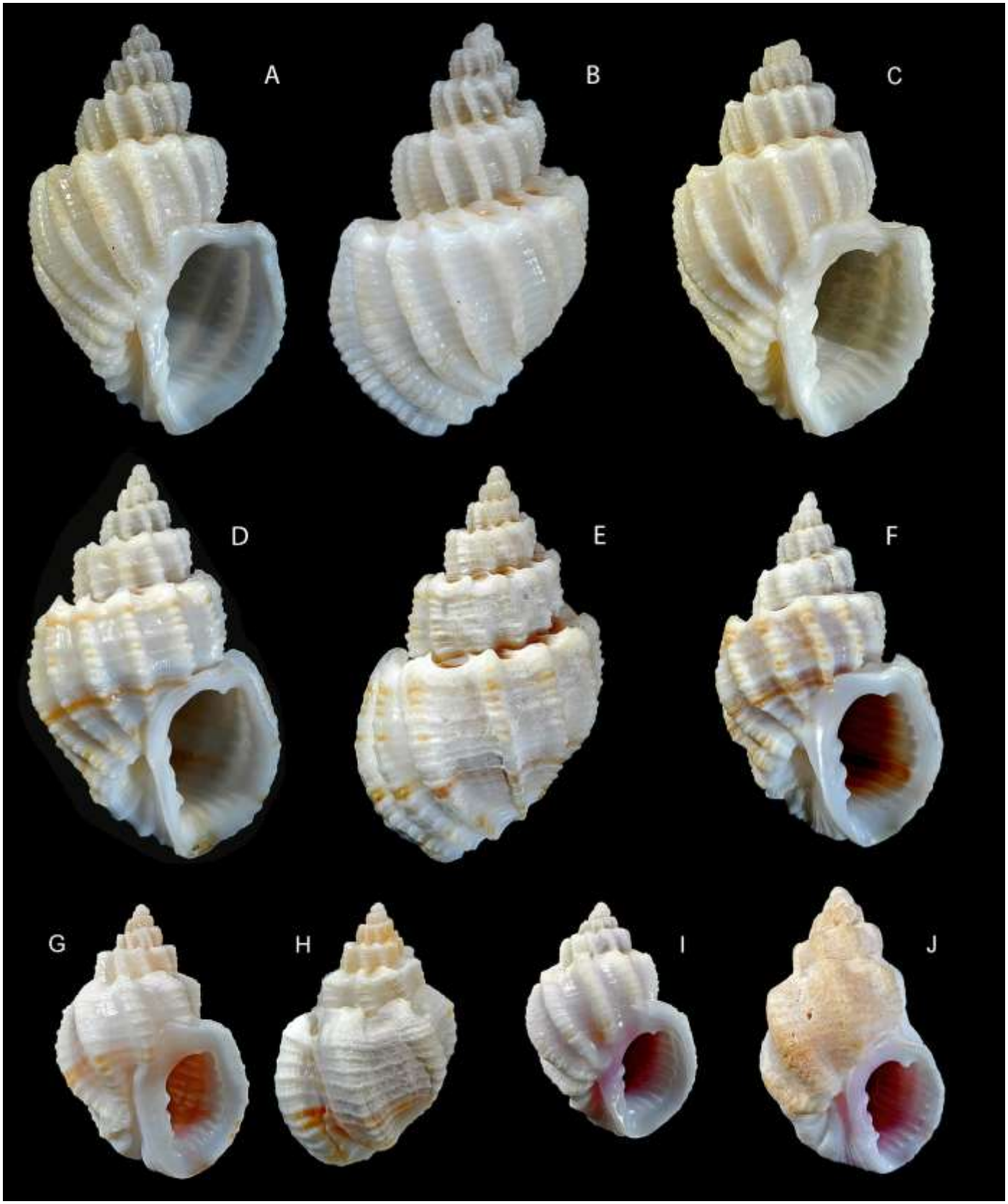


**Plate 12: *Scalptia* species.**

**A-C:** ***Scalptia rashafunensis*** n. sp. (x 4)
Cape Ras Hafun, Somalia
**A-B:** holotype RBINS I.G. 34168 MT.3886, (ex AV0344) (protoconch partly missing), 150 m
**C:** Paratype, AV1894, 150-250 m

**D-F:** ***Scalptia larissaensis*** n. sp. (x 3), Kuweit, 8-10 m, in rubble at base of reef
**D-E:** holotype, RBINS I.G. 34168 MT.3887, (ex AV0681-1)
**F:** paratype, AV0681-2

**G-J:** ***Trigonaphera dekkeri*** Verhecken, 2018, (x 3), Oman (leg. & colln. Gori)
**G-I:** Dhofar, Mirbat, Marriott wreck, 12 m
**I:** 15.0 mm
**J:** Ras al Ya, Masirah Island, 20091118, coarse sand, 21 m

**Diagnosis:** white shell, less than 2 cm high, umbilicus rather narrow and very shallow. Close-set axial ribs; spiral sculpture on last whorl consists of some 20 rounded bands.

**Description:** These shells are rather solid, although the holotype is partially translucent. Axial ribs: 11, 11, and 11 on LW, they cross over the sutural area as a straight line with triangular section. Holotype: The ridge crest of the axial ribs is almost flat, about 0.7 mm wide. The number of axial ribs is: from 2nd to LW: 11, 11, 10. Their raising sides are almost parallel, their crest is flattish with the angles rounded. Spiral cords about 9 on the whorls; their width is about 0.6 mm, with a rounded cross-section; between the axial ribs they form only a fine spiral line on the otherwise smooth and shiny shell surface; when passing over the axials they form rounded spiral lamellae. About 19 spirals on last whorl. Sutural area slightly sloping down abapically; the axials continue over it; between them the slightly concave sutural area is shiny, with only very thin growth lines. Aperture rounded triangular, with 11 lirae in outer lip; one weak tooth inside the sutural area. Columella straight, practically parallel to shell axis. Columellar folds: 3, continuing on the inductura of the inner lip in a very weak spiral ridge on which a few nodules are formed; in frontal view the nodule on the middle ridge looks as it were a fourth fold. The umbilicus is narrow and very shallow (UD 5 % of SH).

**Remarks:** These shells resemble the whitish forms of *S. bicolor* (Pl. 7, Figs B, C, H), but have more axial ribs and spirals; the umbilicus is narrower and very shallow.

The holotype has remains of the smooth last quarter protoconch whorl: there the transition between proto- and teleoconch is only marked by the start of the teleoconch sculpture. The paratype has lost the complete protoconch.

### *Scalptia* species inquirendum A

Pl. 7, Fig. N; Pl. 14, Figs D-F; Pl. 16, Figs C-D

**Material studied:** from Mirissa, southern Sri Lanka, thin layer of sand and seagrass on rocks, rock brushing (leg. & colln. Gori). Mid Rocks, 3 juveniles, 05°55'341"N, 80°27'536"E, 16 m, 20190218, MS N.62 St. 1. Deep Rocks Area, 5 juveniles, 05°55'124"N, 80°27'476" E, 20190225, 29 m, MS 62 St. 7.

**Description:** All 8 shells are small (up to 8.2 x 5.8 mm, Pl. 7, Fig. N); they may well be juveniles. Dimensions: Deep rocks: 7.5 x 8.1 mm, protoconch n = $2^3/_8$, d = 0.6 mm, D = 1.3 mm, e. h. = 1.1 mm. Protoconch smooth, multi-spiral, relatively large with rounded swollen whorls (n = $1^5/_8$ to $2^1/_4$, d = 0.2-0.3 mm, D = 0.9-1.1 mm, e.h = 0.9-1.0 mm). Transition to teleoconch indicated by start of teleoconch sculpture. Teleoconch shell has up to 3.5 whorls. Axial ribs very slightly prosocline, of constant width, numbering 8-10, 9-10, 9-11 on first three teleo-conch whorls, 8-10 on last whorl. Sutural ramp almost perpendicular to shell axis. The axials continue as a low ridge over the sutural plane. Areas between them are rounded depressed, with almost no sculpture except very weak growth lines. Spiral sculpture weak, about 4-6 on the whorl sides, continuing over the axial ribs. Aperture rounded triangular; no tooth inside the sutural plane, no lirations inside the aperture. Columella parallel to shell axis; three columellar folds; anteriormost the weakest, forming the rim of the axial siphonal canal. Umbilicus deep, but narrow, partly covered by a thin almost transparent inductura. Siphonal fasciole weak to very weak.

**Remarks:** The 8 shells studied here were collected by S. Gori on two occasions, 7 days apart at two nearby localities: they may well be juveniles from a same hatching period: this may explain their size similarity.

These small shells with a multispiral protoconch (see Pl. 16, Figs C-D) are not juveniles of the slender, thin-shelled form of *S. bicolor*, since the latter has a pauci-spiral protoconch (see Pl. 15, Figs G-H).

The possibility cannot be excluded that these specimens are juveniles of a species like *S. scalarifomis* (Lamarck, 1822) (synonym: *S. costifera* (Sowerby), which also has a multispiral protoconch. Yet, the present juveniles have a somewhat rough surface because of the small points on the crossings of the axial and spiral sculpture, whereas the surface of *S. scalariformis* is smooth (Garrard, 1975: 27).

The small shells studied here (Pl. 14, Figs D-F) look like juveniles of *S. gorii* n. sp. and have a similar type of protoconch (Pl. 16, Figs A-B (*S. gorii*) versus Figs C-D (sp. inquir. A), but can be distinguished rather well by the general shell shape (Pl. 14, Figs A-C versus D-E). In both taxa the protoconch size and the number of teleoconch whorls are about the same; yet *S. gorii*'s shell size is about 1.5 time that of the spec. inq. A shells, which may very well be only juveniles. The latter shells are clearly thinner than the solid *S. gorii* shells that have stronger columellar folds, a more rounded outer lip and about 10 nodules-like short lirae inside the outer lip (Pl. 14, Figs A-C). The axial ribs of the spec. inquirendum A are relatively strong and better defined than those of *S. gorii*, which have a more rounded section.

Hence, these spec. inquir. A shells from Mirissa (Pl. 14, Figs D-F) probably do not belong to *S. gorii* n sp. here described from Oman (Pl. 14, Figs A-C), but it is difficult to compare fresh juvenile shells to larger shells that have the early whorls more or less eroded. Therefore no name is given, awaiting finds of more and larger specimens.

### ***Scalptia* species inquirendum** B
Pl. 11, Figs I-K

**Material studied:** One shell (Pl. 11, Figs I-K), 9.5 x 7.1 mm, Honiara, Guadalcanal, Solomon Islands, trap 17-18 m, sand & mud, 11-12/04/2018 (leg. & colln. Rosado).

**Description:** The single dark brown shell here studied, probably a juvenile, has a multispiral protoconch (n = $2^1/_8$, d = 0.4mm, D = 1.1 mm, e.h = 0.8 mm). Four teleoconch whorls; top angle 70°. The axial ribs are broad, but relatively high and rounded: 9, 9, 10 on 1st-third teleoconch whorl; 10 on last whorl; at the shoulder they turn in full strength on the shoulder area, but then their width diminishes while crossing over the sutural area. Between the axials, the sutural area is concave and glossy, not very wide, without any spiral sculpture. Spirals: 3 on first two teleoconch whorls; 10 primaries on last whorl, with one secondary in between. The sculpture is not sharp, nor lamellous. Columella straight, with two whitish columellar folds of triangular section, and a very weak one anteriorly. Umbilicus rather narrow, depth (needle test): 31 % of shell height. When crossing the axials ribs, the tops of the spirals are yellowish white; in this aspect it looks somewhat like *S. crispa* (Sowerby I, 1832), sometimes erroneously cited as *S. crispata* (Sowerby II, 1849a, fig. 89).

**Remarks:** *Scalptia verreauxii* (Kiener, 1841) (Pl. 11, Fig. L) was described from unknown locality, based on a shell in the Verreaux collection; that single (?) syntype has not yet been found (Verhecken, 2011: 34). The description mentions a uniformly russet shell, 23.3 mm high, the many axial ribs are sharp and more or less lamellous, crossed by many fine spirals: this makes the shell rough to the touch. Columella curved, with three folds, the largest next to the siphonal canal. Umbilicus wide and deep. Spire angle 62°. Shells of *S. verreauxii* from the Philippines (Verhecken, 2011a: 34, pl. 8, figs 6-7) are not really different from the present shell in the protoconch characteristics; but, like shells from the Moluccas (Verhecken, 1986: 56, fig. 18), they have a much weaker axial sculpture than on the spec. inquirendum B.

Shells of *Scalptia amasia* (Iredale, 1930) from Nha Trang, Vietnam (AV1124) and off Turkey Beach, Queensland, Australia (AV0909), have the protoconch, sculpture and shell colour much like the *S. spec. inquirendum* B shell, which more pronounced axial ribs, and a spire angle of 76°.

The figured syntype (AM Sydney, C. 57740) of *S. amasia* (Pl. 11, Fig. M), originating from Port Curtis, Queensland, 16-20 m, has a purplish brown shell with paler reddish nodules. The adult whorls have a deeply channelled shoulder. Umbilicus small, columella straight, with three folds; 11 lirae inside outer lip. Shell height 15 mm. Spire angle 75°. Smooth glassy protoconch of two whorls, somewhat globose (Iredale 1930: 80). Yet, Garrard (1975: 19) and Wilson (1994: 177) mention sharp oblique axial ribs, a protoconch of 1.5 whorl, and unicoloured shells from white to brown and purple. The difference in protoconch whorl counts may be due to a different counting system used by the different authors.

The differences between *S. verreauxii* and *S. amasia* (shell and umbilicus size, inclination of the columella) can probably be explained by the higher number of teleoconch whorls of the *S. verreauxii* shell figured by Kiener (Pl. 11, Fig. L). If so, then the valid name for them is evidently *S. verreauxii*. Still, the single small shell from Honiara discussed here significantly differs from *S. verreauxii.*

In colour shade and pattern this shell from Honiara looks like that of the brown to blackish *S. textilis* Kiener, 1841, which grows much larger, has already been discussed (Verhecken, 1986a: 58) and is widely spread over the Indo-west Pacific, including Guadalcanal, Solomon islands (Garrard, 1975: 32). Yet, the *S. textilis* protoconch is paucispiral (n = 1.5-$1^3/_4$, d = 0.3 mm, D = 1.3 mm, e.h. = 0.9 mm). Typical *S. textilis* shells have a tall spire with a top angle of 54-60° (Verhecken *in* Poppe, 2008: pl. 703, figs 2, 3), and grow up to a height of 48.9 mm (Verhecken, 1986a: 56). The suture is deeply impressed, the sutural shelf is slightly descending outward. At the shoulder the axials are raised, crossed by 3-4 (very often white) spirals, from there a soft line connects to the suture. Well-developed shells have about 16 lirae inside the outer lip, and one tooth inside the sutural ramp. The three columellar folds are well developed. Umbilicus rather narrow and not very deep (17% of SH). The whorls of *S. textilis* have 6 main spiral lines, with sometimes a secondary spiral in between; the number of axials on the 1st-4th teleoconch whorls is 12, 13, 13, 14.

A juvenile cancellariid shell in colln. G. Hoarau (5.5 mm high), taken at 53 m, Réunion island, has been figured (http://vieoceane.free.fr/mollusques/cancellariidae.htm). The shell colour is described as pale brownish; it has pale points on the crossings of axials and spirals; the

(apparently paucispiral) protoconch is white. This might be a juvenile *S. contabulata*.

The present small shell here described is as yet unique: it might be a juvenile of some larger species with a multispiral protoconch.

Genus ***Trigonaphera*** Iredale, 1936

Type species: *Cancellaria vinnulum* Iredale, 1925, from New South Wales, has the umbilicus "small and deep" (Garrard, 1975: 32).

The use of the genus *Trigonaphera* has recently been discussed (Verhecken, 2018a: 83-84; 2018b: 3). The exact criteria for the genera *Trigonaphera*, *Scalptia* and possibly *Cancellaphera* are still to be elaborated.

***Trigonaphera dekkeri*** Verhecken, 2018
Pl. 12, Figs G-J; Pl. 15, Figs E-F

*Trigonaphera dekkeri* Verhecken, 2018: 3, pl. 1, figs 3-12.

**Type material:** Holotype: RBINS, I.G. 28671/MT.3250, 13.1 x 8.4 mm, Mogadishu, Somalia. Five paratypes: 4 from Somalia (1 in RBINS; AV0324-1, -2 and AV0592), 1 from Yemen (HD39149).

**Type locality:** Off Mogadishu, Somalia.

**Material studied:** the type material, and 4 samples from Oman: Dhofar, Mirbat: 3 shs., 15.2 x 10.6 mm, 15.1 x 11.1 mm, 8.8 x 6.6 mm (Rosado colln.). Leg. & colln. Gori: Marriott wreck, 4 shs, 17.1 x 12.0 to 13.5 x 8.9 mm, 16°56'954"N, 54°43'650"E, 08-11-2015, 12 m. Hamdy's Block, coral reef, 3 shs, up to 14.6 mm (smallest: SEM, Pl. 15, Figs E-F), 15 m, 13-11-14. NE Masirah Island, Ras Al Ya. 2 shs, 15.0 x10.1; 15.0 x 10.5, 12 m, 10-11-2008. 6 shs., 17.8 x 11.0 to 12.9 x 8.9 mm, on coarse sand, 20°29'42"N, 58°57'029"E, 21 m, 18-11-2009. Total: 12 shs.

**Distribution:** Somalia (off Mogadishu; Cape Ras Hafun); Yemen, al-Mahrah, Khaysayt (Verhecken, 2018b: 3); and Oman, here reported.

**Description:** The description of this species, recently published in the present journal, needs not be repeated here. Protoconch multispiral: n = 2, d = 0.3-0.5 mm, D = 0.9-1.2 mm, e.h .= 0.7-1.2 mm (Verhecken, 2018b: 4; SEM photos Pl. 15, Figs E-F).

**Remarks:** Several shells in these new samples also show an apparent small fourth columellar fold, between the middle fold and the anterior one, as was already mentioned for the holotype and paratypes 2 and 3 (Verhecken, 2018b)

Most of these shells from Oman are whitish, some with only a narrow, pale brown spiral band beneath the periphery. Some shells have the apertural area tinted pale pink or purplish (Pl. 12, Figs I-J); it is not certain whether or not this colour shade is embedded in the shell material, or is only a superficial layer of a pigment like 6, 6'-dibromoindigotin, the "mollusk purple", which has not yet been reported for Cancellariidae. The spire is often covered by a very thin white calcareous layer.

Genus ***Trigonostoma*** Blainville, 1827

Type species: **(**by monotypy) *Delphinula trigonostoma* Lamarck, 1822 (= *Buccinum scalare* Gmelin, 1791) (cfr. Verhecken, 2015: 77-90).

***Trigonostoma kilburni*** Petit & Harasewych, 2000.
Pl. 6, Figs D, J-K

*Trigonostoma kilburni* Petit & Harasewych, 2000: 148, figs 5-8. - Lussi *et al*, 2004: 9, text fig.

**Type material:** Holotype, NM D679, 12.9 mm; 1 paratype, NM D680, 14.4 mm.

**Type locality:** off East London, South Africa, 90 m.

**Distribution:** Type locality; off Kidd's Beach (paratype: 33°11.8'S, 28°3.2'E), 90 m.

**Material studied:** Only shell seen: AV1686, 8.2 mm, most probably a juvenile, from off East London, dredged at 120 m, Jan. 2002. Yet, a shell from Madagascar (MNHN, IM-2009-14488) will be treated in a forthcoming paper. It is doubtlessly a *T. kilburni* with n = 1.5; d = 0.33 mm, D = 1.1 mm; e.h. = 0.9 mm for the

protoconch, and has 10 broad axial ribs on the second teleoconch whorl. Its umbilicus depth is 82% of SH.

**Description:** The nucleus of the protoconch of AV1686 is rather damaged; it looks as if the upper part of this whorl has been removed or abraded, and the nucleus is no longer present. Hence, the exact parameters of the protoconch whorls cannot be counted, only D = 1.1 mm can be established with certainty.

The holotype of *T. kilburni* has the protoconch parameters: n = 1.5, D = 1.94 mm; shell AV1686 has about 26 fine narrow axial "ribs" on the last whorl, formed by the successive imbricately arranged outer lips.

**Remarks:** This species has a narrow, yet deep umbilicus, an almost perfectly axial columella with two columellar folds and a very small siphonal fold; hence it agrees with *Trigonostoma*, although at its introduction Petit & Harasewych pointed out that "it differs from all other *Trigonostoma* in its distinctive outline". AV1686 is probably a juvenile shell; it has the scaly lamellous surface sculpture clearly described and figured by Petit & Harasewych (2000: 148, figs 5-8). Because of the strong resemblance of its shell profile to that of *Nipponaphera wallacei* (see above), there can be some doubts as to the generic classification of these taxa. Therefore figures of both taxa are hereby presented together on the same plate (Pl. 6, Figs E-F versus D, J-K) for comparison.

The figures of *T. kilburni* given by Lussi *et al*. (2004: 9, text fig.) are very similar to AV1686; the former has one teleoconch whorl more, the umbilicus slightly wider, the siphonal fasciole almost the same, the columella vertical and straight. The surface sculpture cannot clearly be seen on the Lussi *et al*. print, but seems to be like that of the holotype.

The spire angle of *T. kilburni* is: holotype fig: 60°; figure in Lussi *et al* (2004): 60°; and AV1686: 56°. *N. wallacei* has the spire angle: AV1685: 64°; AV1845: 75°; AV2047: 69°; AV2053: 64°. Shells AV2047, 15.5 x 11.8 mm, pale brown (Pl. 6, Fig. A) and AV2053, 12.5 x 9.4 mm, white (Pl. 6, Figs E-F), both *ex pisce* from Richards Bay, Natal, have the same general shell shape including the convex, rather than tabulate, sutural area, but lack the scabrous sculpture. AV2053 has 15 rather wide axial ribs, angled at the periphery, similar to those of *N. goniata* from New Caledonia, which has 13-14 axials on the last whorls.

*N. kilburni* has 16-18 prosocline scaly "varices" on the early teleoconch whorls, increasing in number on subsequent whorls.

Yet, the possibility cannot be excluded that in the *ex pisce* shells the scaly surface sculpture was removed in the fish gut, leaving only the sculpture of some 16 axial ribs (Pl. 6, Fig. F) and fine spiral bands of different strengths. Still, AV1686 (Pl. 6, Figs J-K), here preliminarily identified as *T. kilburni*, has 31 axial ribs per whorl, like those figured in that species' holotype. The siphonal fasciole of *N. wallacei* is well marked in larger shells (Pl. 6, Fig. H) and its umbilicus and columellar folds are both getting stronger with increasing shell size. Shell AV1686 (Pl. 6, Figs D, J-K) agrees very well with the original description of *T. kilburni*. It is rather close to shell AV2053 (Pl. 6, Figs E-F) in general shape, but they differ in sculpture and colour. This difference could be interpreted as being of specific, subspecific or variety level, but the material now available for study does not allow a firm conclusion.

Another possibility might be that *T. kilburni* is only a juvenile form of *N. wallacei*, but this is contradicted by the shell height of their types (given above in this paper). It appears that more and larger shells of both taxa here discussed will be necessary for allowing a good distinction between *T. kilburni* and *N. wallacei*, if any exists.

## Subfamily **Plesiotritoninae** Beu & Maxwell, 1987

In their seminal study on this subfamily, Beu & Maxwell (1987) worked out the worldwide recent and fossil species. Their system is followed here. Some species had been known for a long time, but were classified in several (even non-cancellariid) genera.

Species of this subfamily often have a non-collabral axial sculpture. Identification to the species level is not always easy.

### Genus ***Africotriton*** Beu & Maxwell, 1987

Distinction between the two species here mentioned is not absolutely certain, but follows Beu & Maxwell (1987: 30-31) who use the terms "we assume" and "it is conceivable".

Closely spaced, low spiral cords, paucispiral protoconch of about 2 whorls, 1 or 2 weak columellar folds.

***Africotriton crebriliratus*** (Sowerby III, 1903)
Pl. 13, Figs A-B

*Epidromus crebriliratus* Sowerby III, 1903: 220, pl. 4 fig. 4.
*Colubraria crebrilirata* (Sowerby III, 1893) – as listed by Barnard, 1963: 36. Kensley, 1973: 134 fig. 449.
*Africotriton crebriliratus* (Sowerby III, 1893) – as listed by Lussi *et al*., 2004: 10, text fig.

**Type material:** holotype SAM A4974, off Port Alfred, South Africa, 13.2 x 5.2 mm.

**Distribution:** South Africa; Natal coast; Transkei coast; now also Red Sea.

**Material studied:** AV1956 (Pl. 13, Fig. A) is dark brown, 16.2 x 6.7 mm, Algoa Bay, 100 m dredged. AV2048 (Pl. 13, Fig. B) is yellowish olive, 14.2 x 5.6 mm, Port Alfred, dredged alive at 100 m.

**Description:** AV1956: This brown shell has a pauci-spiral protoconch: n = 1.5, d = 0.4 mm, D = 1.6 mm, e.h = 1.9 mm. The protoconch to teleoconch transition is clearly delimited by the sudden appearance of the many fine spiral grooves. Axial sculpture of weak, rounded, almost orthocline axial ribs, 5-6 between successive varices, which disappear near the anterior suture and on the last whorl. The typical sculpture consists of very fine spiral grooves, about 30 on the penultimate whorl, separating 0.1 mm wide close-set spiral ribbons. Varices low and narrow, spaced about half a whorl apart. Aperture elongate; outer lip with 10 small knobs on the inner rim. Columellar folds: strongest at half height, a weaker posterior to it, sometimes a third at the rim of the siphonal canal. Umbilicus closed.

**Remarks:** a drawing of the animal and SEM photos of the radular teeth were published by Beu & Maxwell (1987: 8 fig. 1.A; pl. 13, a-d).

***Africotriton fictilis*** (Hinds, 1844)
Pl. 13, Figs D-E

*Triton fictilis* Hinds, 1844a: 21; 1844b: 12, pl. 4, figs 11-12.
*Colubraria fictilis* (Hinds, 1844) – Barnard, 1963: 35; Kensley, 1973: 134, fig. 450.
*Africotriton fictilis* (Hinds, 1844) – Lussi et al., 2004: 10, figd.; p. 11, figd. as *Tritonoharpa* sp. Steyn & Lussi, 2005: 196, fig. 540.

**Type material:** Holotype: NHMUK 1879.2.26.108, 16.5 x 7.7 mm, ex Lombe-Taylor colln., figured by Beu & Maxwell (1987: pl. 5, figs j-o).

**Type locality:** Agulhas Bank, South Africa, 90-110 m.

**Material studied:** AV0009-1, 25.9 mm, Algoa Bay, South Africa, 100 m, live in crayfish trap. Shell AV0784, 16.0 x 7.0 mm, same locality and depth, is smaller and less colourful. AV2062, 20.2 mm; AV2063, 16.1 mm, from Cape St. Francis, South Africa, trawled at 150 m.

**Distribution:** From Agulhas Bank to Transkei and Natal (Beu & Maxwell, 1987: 31).

**Description:** Paucispiral protoconch: n = 1¾, d = 0.4 mm, D = 1.4 mm, e.h. = 1.5 mm. Shell brownish, larger and more solid than *A. crebriliratus*, whorls more rounded, varices stronger and paler.

**Remarks:** The holotype is said to be an aberrant specimen with an evenly corroded surface (Beu & Maxwell, 1987: 31). Shell AV0009-1 (Pl. 13, Fig. E) still has the original colours. Shell AV0784 (Pl. 13, Fig. D) is very similar, also in the protoconch (n = $1^{7}/_{8}$, d = 0.4 mm, D = 1.5 mm, e.h = 1.7 mm); it may be bleached. Slenderness of the shell: holotype: 2.14; AV0009-1: 2.43; AV1091: 2.56.

***Africotriton petiti*** Beu & Maxwell, 1987
Pl. 13, Fig. C

*Africotriton petiti* Beu & Maxwell, 1987: 33, pl. 8, figs a-h.
*Africotriton petiti* - Lussi *et al*., 2004: 10 (unfigured).

**Type material:** Holotype C8829, 13.4 x 5.2 mm, and paratype (C9771), in Natal Museum, South Africa.

**Type locality:** Off Mgazi River, Transkei coast, 370 m, R.V. MEIRING NAUDÉ sta. J8 (31°44 .8'S, 29° 33.0'E).

**Material studied:** A white shell, AV1955 (Pl. 13, Fig. C), 16.1 x 6.6 mm, Algoa Bay, crayfisch trap, 100 m.

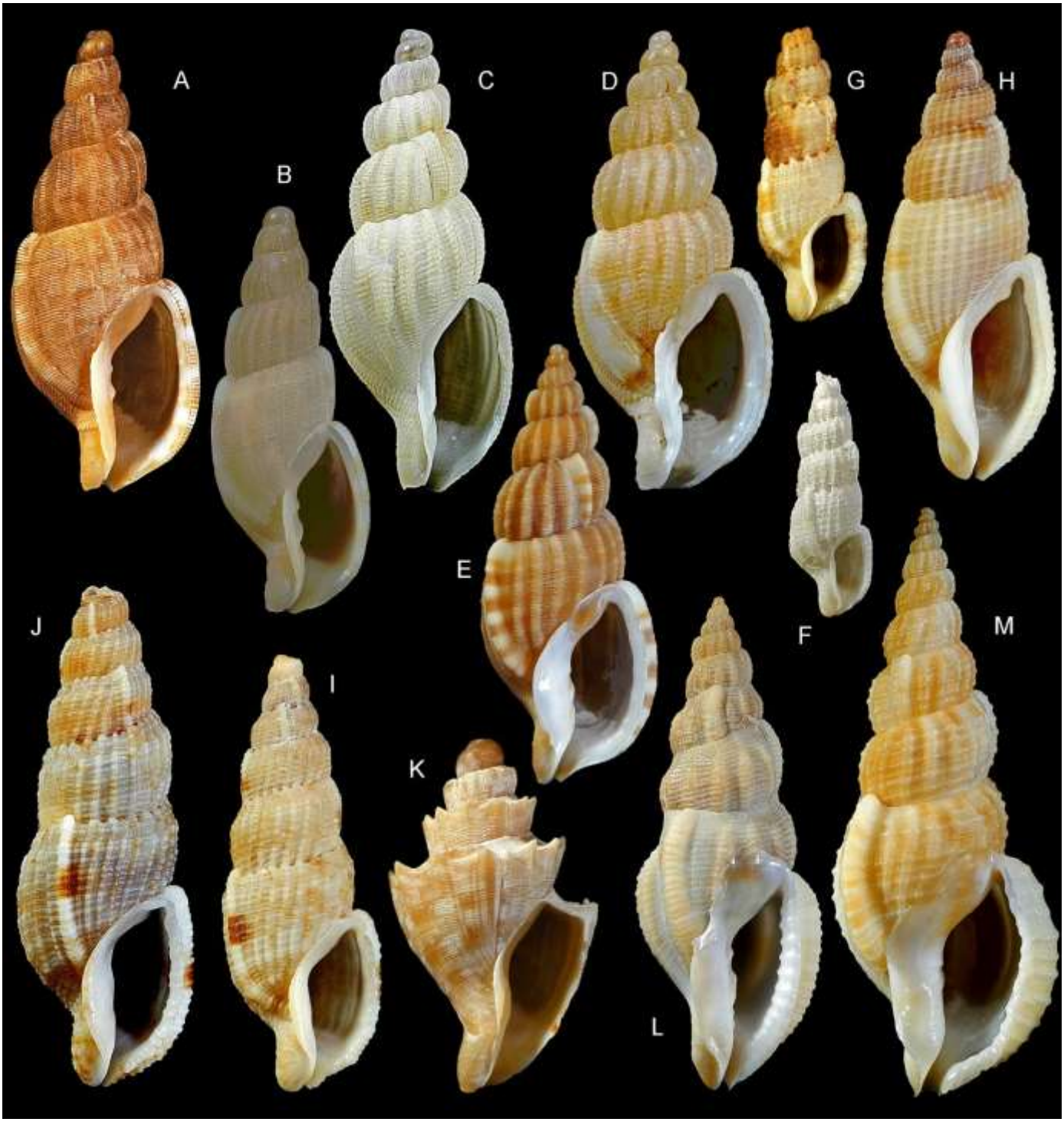


**Plate 13: Plesotritoninae** species

**A-E:** ***Africotriton*** species. Algoa Bay, 100 m
**A-B:** ***Africotriton crebriliratus*** (Sowerby III: 1903) (x 5)
**A:** AV1956
**B:** AV2048

**C:** ***Africotriton petiti*** Beu & Maxwell, 1987. AV1955 (x 5), Algoa bay, 100 m

**D-E:** ***Africotriton fictilis*** (Hinds, 1844). Algoa Bay, 100 m (x 5)
**D:** AV0784 (x 5)
**E:** AV0009-1 (x 3)

**F-J. Tritonoharpa species**
**F-G:** ***Tritonoharpa antiquata*** (Hinds *in* Reeve, 1844), (x 4)
**F:** Mulaku Kandu, S. side of Mulaku Atoll, Maldives (S. Gori)
**G:** AV1951, Red Sea, Gulf of Aqaba, shallow water dive, under coral slab

**H:** ***Tritonoharpa beui*** Verhecken, 1997. AV1959-2 (x 4), Red Sea, Sinai, dived

**I-J:** ***Tritonoharpa pseudangasi*** Beu & Maxwell, 1987 (x 4)
**I:** AV1237, S. Mozambique, 30-50 m
**J:** AV0593, Somalia, Ras Hafun

**K:** ***Fusimorio rosadoi*** (Beu & Verhecken, 2000), AV0866, juvenile (x 6), *ex pisce*, Banco de Sofala, Mozambique

**L-M:** ***Plesiotriton vivus*** Habe & Okutani, 1981, (x 2)
**L:** AV0780-1, Balut Island, Mindanao, Philippines, tangle net
**M:** AV1213, trawled at 320-350 m, mud-sand, Zanzibar Channel

**Distribution:** Only known from the Transkei coast (31°44.8'S, 29°33'E and 31°18.6'S, 30°08.6'E).

**Description:** White, translucent paucispiral protoconch (n = 1.5, d = 0.3 mm, D = 1.5 mm, e. h. = 1.5 mm) and a teleoconch with about 21 spiral lines on the penultimate whorl. Suture impressed; no sutural coronation, only the low rounded profile of the axial ribs is indicated. The axials are wider than their interspaces; the spirals override the axials and remain more or less of the same strength. Five varices present, spaced at about $^{5}/_{8}$ whorl, but not clearly marked. The aperture lacks a strong posterior notch. The columellar folds are rather special; in normal apertural view only a shallow notch is seen. When viewed obliquely from the anterior side, the columella has a broad and deep incision below half-height, well visible only when the shell is rotated axially so as to view deep inside the aperture; on its adapical side is a low, narrow ridge that can be interpreted as a columellar fold, it diminishes in strength towards the apertural plane. At the abapical side there is a strong, rounded ridge between the incision and the siphonal canal. Adapical to the columellar fold is a rather wide but very weak fold. Length of the total columella till the start of the siphonal canal is 15 mm; hence the single columellar fold is placed at one third of that distance. In this species the separation between the columella and the siphonal canal is fairly well marked, much better than in the case of *A. crebriliratus* and *A. fictilis.*

Genus ***Fusimorio*** Sacco, 1896

*Fusimorio* Sacco, 1896: 90
*Loxotaphrus* Harris, 1897: 165.

**Type species:** (O. D.) *Fusus carcarensis* Michelotti, 1847, Miocene (Tongrian) (but placed in the lower to middle Oligocene by Lozouet (2019: 44)), Carcare, Italy. On 14 December 1896, Sacco (1896: 90) validly introduced the genus *Fusimorio* with type species *Fusus carcarensis* Michelotti, 1847, without bibliographic reference (ICZN 12.2.2.5, and its Example) in an additional note to subclass Prosobranchiata, order Pectibranchiata, which was placed between Patellidae and Oocorythidae amidst a variety of gastropod families from Pleurotomariidae to Umbrellidae, and the Pulmonata in his part XXII. Sacco (1897: 25) stated that this genus 'has a mixture of characters from the 'Buccinide, Fuside, Turbinellide and Casside, that made me until now uncertain of the determination of the species'. He kept its systematic position vague and mentioned (transl. M. V. Modica): 'eventually I took the decision of making a new genus of it, on the systematic position of which it will be possible to conclude better when one will have better specimens than those now examined by me'. This statement cannot be interpreted as conditional (ICZN, Glossary) since it contains no "stated reservations"; hence it is valid.

The use of the name *Loxotaphrus* Harris, 1897, type species (O. D.): *Phos variciferus* Tate, 1888, Middle Miocene, Australia) was revived by Beu & Maxwell (1987: 48), and has been used by consecutive workers, who, however, also overlooked the priority of *Fusimorio*. The genus name *Fusimorio* was revived by Lozouet (2019: 44). Only three living species are known: *Fusimorio deshayesii* (Duval, 1841), NW Africa; *Fusimorio rosadoi* (Beu & Verhecken, 2000), off eastern Africa; and *Fusimorio limpusi* (Beu & Verhecken, 2000), off Queensland, Australia. They have a paucispiral protoconch with a bulbous apex, and no columellar folds.

***Fusimorio rosadoi*** (Beu & Verhecken, 2000)
**new combination**
Pl. 13, Fig. K; Pl. 15, Figs A, B

*Loxotaphrus rosadoi* Beu & Verhecken, 2000: 6, fig. 2.
*Loxotaphrus rosadoi* Beu & Verhecken, 2000 - Lussi *et al*., 2004: textfig. p. 10 (30 mm). Steyn & Lussi, 2005: 196, fig. 543 (23 mm). Modica *et al*., 2011: 11 figs 1 I-J.

**Type material**: Holotype L4843 T1719, 30.9 mm, Natal Museum.

**Type locality**: off Southern Mozambique; in lobster trap, 150 m (leg. Rosado, 1998).

**Material studied**: A juvenile *ex pisce* shell AV0866, 10.7 x 6.4 mm, from Banco de Sofala, Mozambique; AV0704, 17.5 mm, missing ¾ of the last whorl, off Quissico, 100-130 m, lobster trap.

**Distribution:** Off southern Mozambique, 150 m; off Quissico, Mozambique Channel, 277 m.

**Description:** Protoconch dark brown, smooth, bulbous; n = 1¼, d = 0.6-0.9 mm, D = 1.8-1.9 mm, e.h. = 1.8 mm. In the last $^{3}/_{8}$ protoconch whorl, the shape of the surface is adapted from almost spherical to the flat suture of the teleoconch. The protoconch ends with a well-marked sigmoid line; then starts the teleoconch sculpture of about 14 thin, incised spiral lines. The sharp coronations of the axial sculpture start (or remain) only $^{3}/_{4}$ whorl further. The protoconch (Pl. 15, Figs A-B) is very much like, but a little larger than that of the recent Australian *F. limpusi*,

which was already described and figured (Beu & Verhecken, 2000: 4, fig. 1 E).

**Remarks:** Larger shells have a more elongated outline than the juvenile figured here, but the shell remains easily recognisable. Taken in lobster trap, *ex pisce*.

Apart from the material mentioned in the original publication, a few more shells are now known: a juvenile AV0866 (Pl. 13, Fig. K); AV0704, off Quissico, S Mozambique, 100-130 m, in lobster trap (was probably crabbed, since last whorl is missing) (ex coll. Hemmen); one specimen MNHN IM-2009-5625, Mozambique Channel, 277 m; the shells figured by Lussi *et al.* (30 mm) and by Steyn & Lussi (2005) (23 mm). Two shells attached to a *Xenophora pallidula* Reeve, 1842, are known: one in colln. Dawn Brink, Westville, South Africa, and one in Meeresmuseum Öhringen-Cappel, Germany, figured by Hemmen (2007: 269 text fig.), but this is independent of the cases of epizoic association of living cancellariids with living mollusca, cited above (Verhecken 2011b).

Anatomy and radula of *F. rosadoi* were described by Modica *et al.* (2011: 120).

Genus ***Plesiotriton*** Fischer, 1884.

Type species (O .D.) *Cancellaria volutella* Lamarck, 1803, Eocene, Paris Basin.

Apart from 8 fossil species, only three living species are known: *Plesiotriton vivus* Habe & Okutani, 1981 (Philippines, Indonesia, E Africa), *Plesiotriton mirabilis* Beu & Maxwell, 1987 (New Britain, Solomon Islands and Marshall island) and *Plesiotriton silinoensis* Verhecken, 2011 (Philippines).

***Plesiotriton vivus*** Habe & Okutani, 1981
Pl. 13, Figs L-M

*Plesiotriton vivus* Habe & Okutani, 1981, 144, figs 2, 3.
*Plesiotriton vivus* Habe & Okutani, 1981 - Beu & Maxwell, 1987: 28, pl. 4, figs f, i, m.

**Type material:** Holotype, 39.0 x 15.2 mm, NMNS-Mo 58602; 2 paratypes NMNS-Mo 58603-4.

**Type locality**: Off Panglao, Bohol island, Philippines,"deep water".

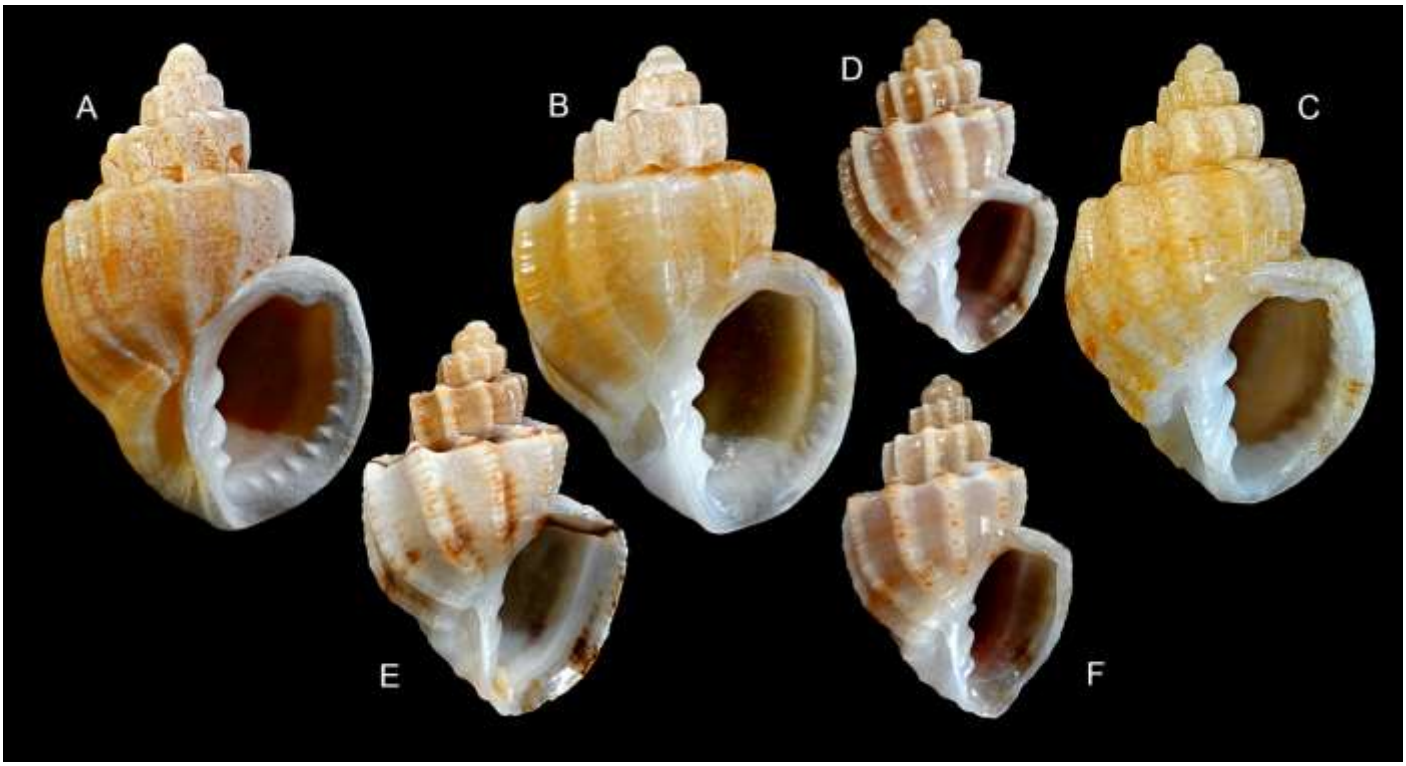


**Plate 14**

**A-C:** ***Scalptia gorii*** n. sp., Ras al Ya, Masirah island, Oman
**A:** 10.9 mm
**B:** 12.7 mm
**C:** (= Pl. 11, Fig. H) 10.6 mm

**D-F:** ***Scalptia* spec. inquirendum A**, Sri Lanka, Mirissa.
**D:** Deep Rocks, 7.5 mm
**E:** 8.2 mm (= Pl. 7 Fig. N)
**F:** 7.6 mm

**Distribution:** Philippines (types; and 39 shs (Verhecken, 2011: 43)), Indonesia, Tanimbar Island, 291-295 m (Verhecken, 1997: 318, fig. 53), Tanzania, Zanzibar Channel, 350 m, 320-360 m (AV1213, AV1333, AV1404). Southern Tanzania, north Rovuma river: (AV1341, AV1495).

**Material studied:** Philippines: AV0780-1, Balut Island, Mindanao. East Africa: AV1213, Zanzibar Channel, 320-350 m, mud-sand.

**Remarks:** This is the largest species in the subfamily Plesiotritoninae. Kantor & Fedosov (2009: 77) found that the valve of Leiblein of this species diverges strongly from that known in other neogastropods.

Shells from the eastern African localities here cited generally have the aperture wider and the outer lip more rounded than those from the Philippines and Indonesia (Verhecken, 1997: 318, fig. 53. Verhecken, 2011a: pl. 10, figs 1-3 versus 4). See Pl. 13, Figs L versus M. The paucipiral protoconch of shells from off E Africa (n = 1.5, d = 0.4 mm, D = 1.6 mm, e.h. = 1.5 mm) is slightly larger than those from the Pacific (n = 1-1.25, D = 1.0-1.2 mm, e.h. = 1.3 mm). The value of d is difficult to establish since the nucleus axis differs from that of the rest of the protoconch.

## Genus ***Tritonoharpa*** Dall, 1908

Type species (O.D.): *Tritonoharpa vexillata* Dall, 1908, Panamic western America.

Columellar folds: None, or at most one single, very low. Most shells higher than about 14 mm are decollate.

### ***Tritonoharpa antiquata*** (Hinds *in* Reeve, 1844)
Pl. 13, Figs F-G

*Triton antiquatus "*Hinds" in Reeve, 1844 (June): pl. 18 fig. 80.
*Triton antiquatus* Hinds, 1844 (July): 21
*Tritonoharpa antiquata* "Hinds"- Beu & Maxwell, 1987: 35, pl. 11 a-l; Lussi et al, 2004: 11; Hemmen, 2007: 38, figd.; Verhecken, 2011: 46, pl. 10, figs 11-12.

**Type material:** Lectotype (Beu & Maxwell, 1987: 36): NHMUK 1969344, 16.3 x 6.0 mm, figured by Hemmen (2007: 38). Type material of *Triton antiquatus* Hinds, 1844 apparently lost (Beu & Maxwell, 1987: 36).

**Type locality:** New Ireland (Cuming collection).

**Material studied:** 10.9 x 3.8 mm, Mulaku Kandu, S side of Mulaku Atoll, Maldives, Gori colln. (Pl. 13, Fig. F); AV1951, Red Sea, Gulf of Aqaba, off East Sinai Peninsula, 12.9 x 4.9 mm (Pl. 13, Fig. G).

**Distribution:** This species is widely distributed, but has been reported under different genus names. Western Pacific Ocean: Japan to Australia, east to the Kwajalein atoll (AV2064, 167°E), Fiji (178°E), Samoa (172°W), Tahiti (149°W). Indian Ocean: a few mentions from the Red Sea, but not under cancellariid genera: Sharabati, 1984: pl. 22 (Dekker & van Gemert, 2008: pl. 22): Dekker & Orlin (2000: 31). Mentioned from Aden as *Triton antiquatus* (Shopland, 1902: 172), from Oman as *Colubraria antiquata* (Bosch *et al*, 1995: 140); from Réunion and Mauritius (Drivas & Jay, 1988: 78, pl. 24, fig. 11) as *Pisanella antiquata* (Hinds, 1844); Now also from the Maldives (Gori colln., Pl. 13, Fig. F) and Red Sea, Gulf of Aqaba (AV1951, Pl. 13, Fig. G). Anon., n.d.: figd. (n° 275) in Colubrariidae; *Colubraria antiquata* Hinds, 1844, rare (2 shells figured). As Cancellariidae: *Tritonoharpa antiquata* Reeve, 1844. Indian Ocean, Red Sea, Aqaba; from Kwazulu-Natal and Mozambique (Steyn & Lussi, 2005: 199).

**Remarks:** The somewhat complicated history of the name *Triton antiquatus* was explained by Beu & Maxwell (1987: 36).

The protoconch, missing by decollation on practically all shells published, is figured by Beu & Maxwell (1987: pl. 11, figs c, e) for a shell from Vanua Levu, Fiji: it is rather flat-topped. The spire angle is 20-21° (Pl. 13, Figs F-G). This species is rather easily recognisable: small size, decollate shell, small spire angle, combined with the coronate suture.

### ***Tritonoharpa beui*** Verhecken, 1997
Pl. 13, Fig. H

*Tritonoharpa* sp. ?C, aff. *T. angasi* (Brazier) - Beu & Maxwell, 1987: 35, pl. 12, figs i-j, l-p.
*Tritonoharpa beui* Verhecken, 1997: 319, fig. 54. 2011a: 47, pl. 10, figs 16-17.

**Type material:** Holotype: MNHN2119, 16.5 x 6.0 mm

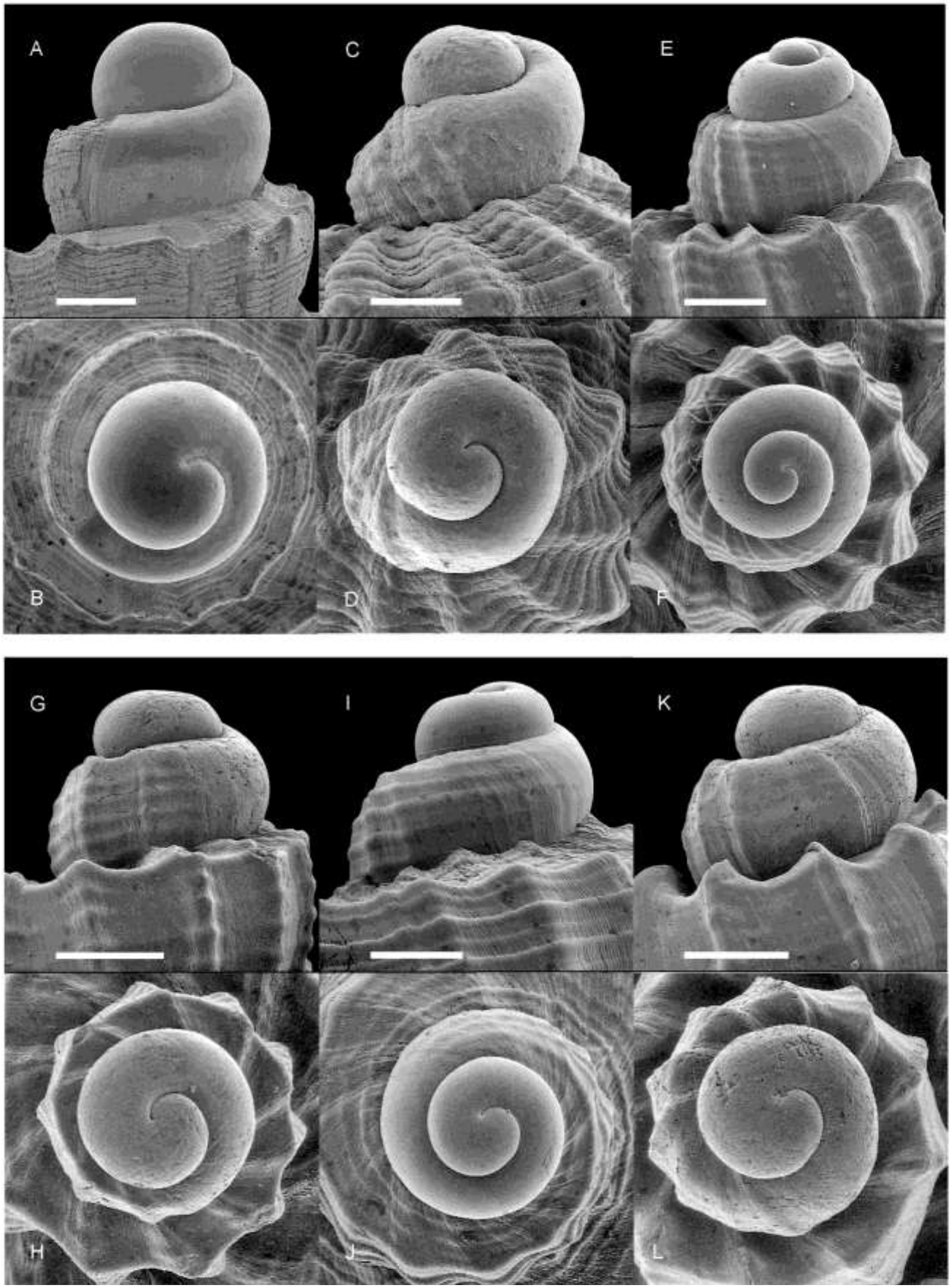


**Plate 15: SEM photos of protoconchs** of some species studied in this paper. Scale bar = 500 µ
**A-B:** ***Fusimorio rosadoi***, AV0866, Mozambique, Banco de Sofala
**C-D:** ***Nipponaphera wallacei***, AV1263-2, South Africa, Richards Bay
**E-F:** ***Trigonaphera dekkeri***, Oman, Hamdy's Block
**G-H:** ***Scalptia bicolor***, AV1990, Mozambique, Nacala Bay
**I-J:** ***Scalptia contabulata***, AV0735A, Philippines
**K-L:** ***Scalptia delsaerdti*** n. sp., AV2004, Mozambique, Nacala Bay

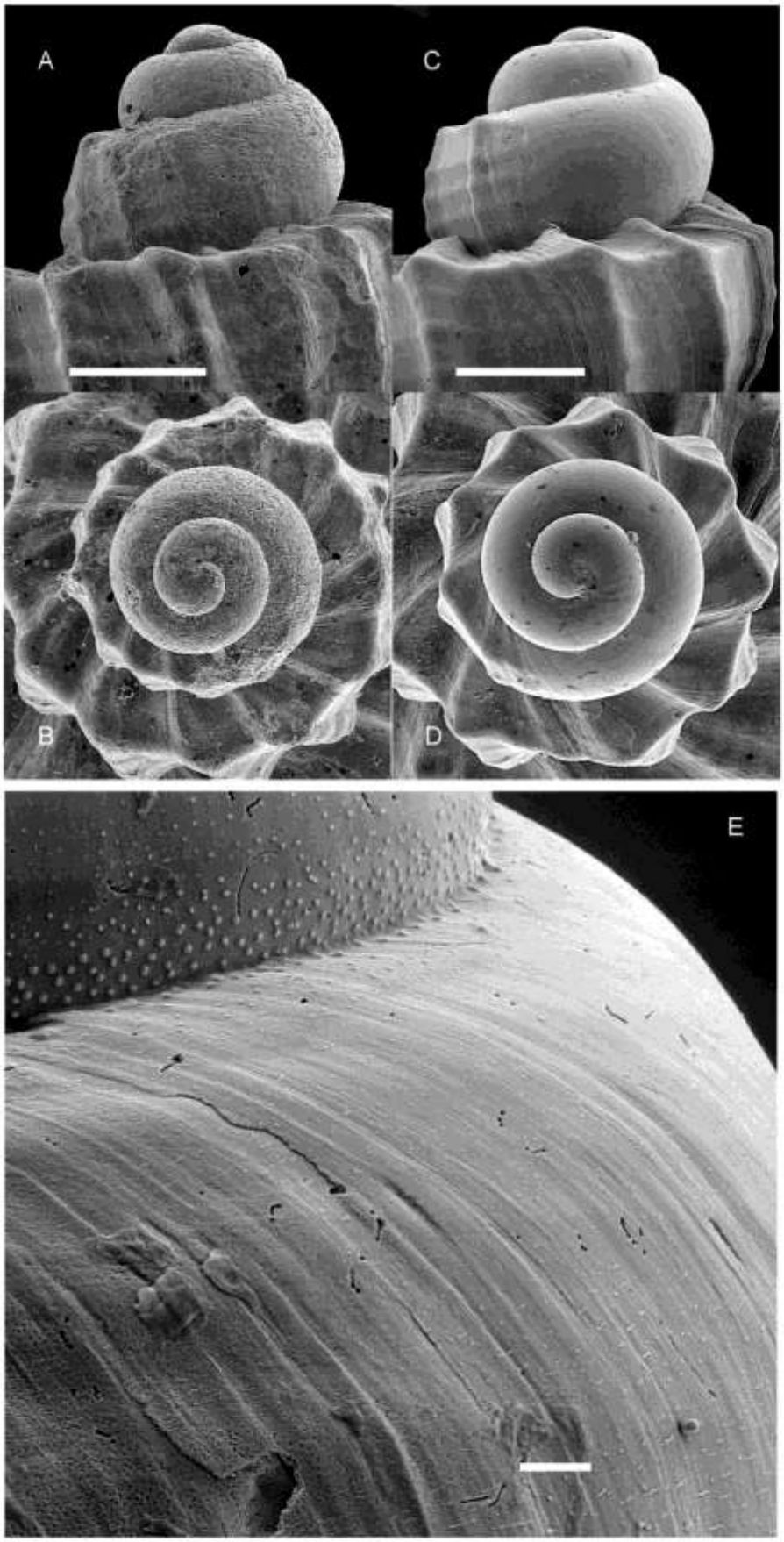


**Plate 16. SEM Photos of protoconchs.** Scale bar = 500 µ.
**A-B:** ***Scalptia gorii*** n. sp., NE Oman, Mirbat, Dhofar.
**C-D:** ***Scalptia*** **sp. inquirendum** A, Sri Lanka, Mirissa.
**E: Sculpture details of protoconch** of shell AV0735A (= *Scalptia contabulata* Pl. 15, Figs I, J). Upper part: (remaining?) nodules on the protoconch sutural area. Lower right: different sculpture on the last part of the protoconch. Lower left: very early part of the teleoconch, with a porous structure. Scale bar = 50 µ.

**Type locality:** Off Kai Island, Karubar stn. DW30, 111-118 m.

**Material studied:** 2 shs, AV1959-1, 19.8 x 7.6 (Pl. 13, Fig. H) and AV1959-2, 20.9 x 7.7 mm. Sinai, Red Sea, dive 10-20 m.

**Distribution:** Southern Moluccas, Indonesia; Bohol, Philippines; now also Red Sea.

**Remarks:** The spire angle varies according to the locality, from: 20°-21° (Sinai, material studied), 28° (Arafura Sea, 1997), and 29° (Philippines, 2011). See Verhecken (1997; 2011a) for a detailed description.

Shell AV1959 protoconch has: n = $2^3/_8$, d = 0.2 mm, D = 1.1 mm, e.h = 0.9 mm. Shell AV1959-2 has the nucleus slightly damaged, but the protoconch is clearly multi-spiral.

***Tritonoharpa pseudangasi*** Beu & Maxwell, 1987**.**
Pl. 13, Figs I, J

*Tritonoharpa pseudangasi* Beu & Maxwell, 1987: 44, pls. 16, 19, 22.
*Tritonoharpa pseudangasi* Beu & Maxwell, 1987 - Verhecken, 2011a: 48, pl. 10, fig. 13; pl. 11, fig. 4. Panglao, Philippines

**Type material:** Holotype USNM 747058, 19.7 x 7.3 mm. Paratypes in USNM, ANSP, NHMUK.

**Type locality:** Indonesia, Mariel King Memorial Expedition sta. KRVII/1-8; Kai Islands Moluccas, 5°32'S, 132°46'E, 33-37 m.
**Material studied:** AV1237, 19.2 x 7.0 mm (Pl. 13 Fig. I), off South Mozambique, 30-50 m; AV0593, 21.7 x 7.8 mm (Pl. 13 Fig. J), Ras Hafun, N.E. Somalia, 150 m.

**Distribution:** Indonesia (type locality), Philippines, Thailand, New Ireland, Fiji, Tahiti, Society Islands, now also Somalia and S Mozambique. It is one of the Cancellariidae with the furthest eastward distribution, in spite of its apparently paucispiral protoconch figured by Beu & Mawell (1987: pl. 22, figs l, o), suggesting the absence of veliger larvae.

**Remarks:** Protoconch generally decollate on shells of about 20 mm.

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