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Two new species of *Scalptia* (Neogastropoda: Cancellarioidea: Cancellariidae) from the Indian Ocean

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Abstract: Two new *Scalptia* species (Mollusca, Gastropoda: **Cancellariidae**) from the Indian Ocean are described: *S. harmulensis* from Oman and *S. richardi* from the southern Gulf of Bengal. In addition, two shells of *S. articularoides* Verhecken, 1995, a species described from off southeastern India, are reported from the Gulf of Oman.

Introduction: The **Cancellariidae** living in the Indian Ocean and especially the species of the genus *Scalptia*, are still poorly known (Verhecken, 1986: 134). Therefore, new *Scalptia* samples from the Indian Ocean are needed to improve the current taxonomic and zoogeographic understanding of this genus.

Among material collected by KVL in Oman in 2007, 2012 and 2014, and in India in 2003 and 2005, there were several shells of two undescribed *Scalptia* species. Subsequently, it appeared that shells of these species were also present in three private collections (AV, HD, JFL). These two new species are described in this paper. Next to the two new species, the material of KVL also comprised a shell of *Scalptia articularoides* Verhecken, 1995, a species that has never been mentioned again in literature after its original description. Therefore, they are figured and discussed here, too.

Counting of the number of whorls in the protoconch is done as described by Verduin (1982: 129). The publication dates of species introduced by the Sowerby family and their attribution to the correct person within the same family, are after Petit (2009).

Abbreviations:

AV: collection of André Verhecken

HD: collection of Henk Dekker, Winkel, the Netherlands

JFL: collection of Jean-François Lesport, Sainte-Hélène, France

KVL: collection of Kirsten Van Laethem

MHNG: Muséum d'Histoire naturelle, Genève

RBINS: Royal Belgian Institute of Natural Sciences, Brussels.

Systematic part

Genus *Scalptia* Jousseume, 1887

Shell ovoid, umbilicus of variable strength; sutural area flattened or canaliculate; with axial and spiral sculpture; outer lip rounded, columella with three folds.

In their study on the molecular phylogeny of the **Cancellariidae**, Modica, Bouchet *et al.* (2011) found the studied *Scalptia* species to belong to a trigonostomatine clade that also groups the studied species of *Trigonostoma* and *Nipponaphera*. This suggests that the genus *Scalptia* is not monophyletic, and that its taxonomic status may have to be re-evaluated.

Scalptia harmulensis sp. nov.

Figs. 1-5

Trigonostoma costifera (Sowerby, 1833) - Bosch & Bosch, 1982: 118, unnumbered fig.

Scalptia scalarina (Lamarck, 1822) - Verhecken, 1986: 147

Scalptia cf. *scalarina* (Lamarck, 1822) – Verhecken & Wranik, 1991: 61-62

Scalptia cf. *scalarina* (Lamarck, 1822) - Bosch *et al.*, 1995: 157, fig. 686

Diagnosis: Shell rather small, pale to whitish, with paucispiral protoconch. Axial ribs low and narrow, overruled by the spirals. Columella parallel to shell axis, three columellar folds, abapical one the weakest. Umbilical slit covered by callus.

Type material: Holotype: RBINS I.G.32936 MT.3208, 16.1 x 10.3 mm, leg. KVL, 2007 (Fig. 1). **Paratypes:** (1) AV1585, Dubai, 15.7 x 9.9 mm (Fig. 2); (2) JFL 15L0001, Dubai, 14.9 x 9.5 mm (Fig. 3); (3) HD16203-1, United Arab Emirates, Sharjah, Khor Fakkan (25°20' 57"N 056°21'29"E, Tibia-III exp. Statn. 60), 19.8 x 12.5 mm, 15-ii-2004 (Fig. 4).

Other material studied: Oman, N. Harmul, 4 shells, 08-iv-2012; 1 sh., 03-ii-2014. Al Sawadi (23°46' 57"N, 57°47'28"E), 3 shells, iv-2007, incl. 1 SEM shell (Fig. 5) (all leg. & coll. KVL). Masirah Island, Sur Masirah, 2 shells HD31933, leg. Moolenbeek & Dek-ker, Oman trip 1991 statn. 102, 22-xi-1991; United Arab Emirates, Sharjah emirate, (leg. Dekker & De Ceuninck van Capellen, Tibia-III exp.): HD16041, Diba al Hisn (statn. 53, 25°37'23"N, 56°16'16"E, 13-ii-2004), 2 shells Khor Fakkan (statn. 60, 25°20'57"N, 56°21'29"E), HD16203, 62 shells, 15-ii-2004. Ras Hafun, Somalia, 100-200 m: 1 shell AV0595.

Type locality: Harmul (24°31'39"N, 56°35'49"E), Al Liwa, in the northern part of the Oman coastline, Gulf of Oman, sandy beach.

Distribution: This species is known from off Oman, the United Arab Emirates, Dubai and Ras Hafun, Somalia.

All shells collected by KVL and by H. Dekker are dead beach specimens.

Description: Shell slender, up to 19.8 x 12.5 mm (HD 16203-1), rather thin, especially in juveniles. Protoconch paucispiral, with 1-1 ¼ smooth whorls. Nucleus relatively large (d 0.3 mm), largest diameter 0.9-1.0 mm, exposed height 0.8-1.1 mm. In some shells the suture between protoconch and teleoconch is well marked, making the protoconch quite conspicuous (Figs 1-3). Transition to teleoconch poorly marked by a thin line or by the first axial rib of the teleoconch (see Figs 8-9). Teleoconch with up to 4 ¾ whorls. Height of last whorl 75 % of total shell height in the larger shells.

Axial ribs with triangular cross-section, rounded tops narrower than the spaces between them. Number of axial ribs: 8-10, 9-12, 9-12, and 10-12 on first to fourth whorl respectively. Spiral sculpture only consists of weak spiral lines between the axials and small rounded knobs on the intersections with the axial ribs. Number of spirals: 3-4, 3-4, 3-7, 5-7 on first to fourth teleoconch whorl, and 12-21 on the last whorl. The sutural shelf is distinct, but not very wide and sculptured with thin growth lines. Starting from the top of the axial ribs, a sharp lamella obliquely crosses the sutural plane: the lamellae are sharp on the top, and thicker at their base. Aperture elliptical, truncated posteriorly, with one tooth in the middle of the truncated part. Outer lip can have 8-10 lirae. Columella straight, parallel to shell axis, with three columellar folds: adapical one the strongest, middle one medium, and abapical fold medium to weak. Columellar callus thin, white, partly covering the umbilical slit.

Most of the shells are whitish, sometimes with traces of pale brown, with a vague broad white spiral band on the last whorl.

Etymology: this species is named after its type locality Harmul.

Remarks: The material from the type locality Harmul was collected on a beach protected by a sand bank emerging at low tide only. A few shells from off Ras Hafun, Somalia, are said to come from a depth of 100-200 m.

In the Indian Ocean, only few species of the genus *Scalptia* with a paucispiral protoconch are known: e. g. *S. androyensis* Verhecken & Bozzetti, 2006, and *S. contabulata* (Sowerby (I), 1832). *Scalptia androyensis* is easily distinguishable by its very fine spiral striae and its low, broadly rounded axial ribs. Some shells of *S. contabulata* from Madagascar-Mozambique have unusually strong and narrowly spaced axial ribs, e.g. AV1544-1 (Fig. 16). Such shells are easily differentiated from *S. harmulensis* by their lower spire, sloping-out sutural ramp, wider umbilicus, and only minor knobs on top of the axials ribs.

Scalptia harmulensis may also be confused with three other *Scalptia* species recorded from the Arabian Sea, viz. *S. scalariformis* (Lamarck, 1822), *S. costifera* (Sowerby, 1833) and *S. scalarina* (Lamarck, 1822). These names have been inconsistently used in literature; they are discussed below.

Scalptia scalariformis has a multispiral protoconch by which it is easily distinguished from the paucispiral protoconch of *S. harmulensis*. Moreover, *S. scalariformis* has fewer and smoother axial ribs than *S. harmu-*

lensis. These axial ribs are stronger, straighter and more parallel to the shell axis in *S. scalariformis*, and the spiral sculpture is much fainter than in *S. harmulensis*.

The name *S. costifera* is invalid as a junior subjective synonym of *S. scalariformis* (Kiener, 1841: 14; Garrard, 1975: 28, Verhecken, 1985:10; Wilson, 1994: 178). Shells figured under the name *C. costifera* by Bosch & Bosch (1982: 118) and Smythe (1982: pl. 4 fig. e), and as *C. scalarina* by Kirtisinghe (1978:79, pl. 44 fig. 4; a very small, almost unrecognizable figure) and by Bosch, Dance *et al.* (1995: 157), demonstrate the confusion in literature referred to above.

The lectotype of *Cancellaria scalarina* (MHNG 1097/85, designated by Verhecken 1986: 146) was figured by Kiener (1841: pl. 5 fig. 3), Chenu (1859: 276, fig. 1832, but not fig. 1836), copied by Webb (1959: pl. 57 fig. 18 left), and Hemmen (2007: 280, showing a photograph labelled as “syntype”). Whether the protoconch of the lectotype is pauci- or multispiral cannot be determined because the shell is superficially eroded.

Further confusion was created when quite different shells were figured under the name *C. scalarina* by Sowerby (II) (1849: 452, pl. 96 figs. 87-88) and by Reeve (1856: pl. 6 fig. 25), with the erroneous locality ‘West-Indies’. Many subsequent authors have referred to these figures; the Reeve figures were renamed *C. thomasiana* Crosse, 1861.

Problems associated with the identification of *Scalptia scalarina* (Lamarck, 1822) have been discussed before (Verhecken, 1986: 147). In studies of material from the Red Sea and the Gulf of Aden (Verhecken, 1986: 146; 1991: 61) a number of - sometimes rather different - shells were tentatively identified as a very variable *S. scalarina* and *S. cf. scalarina*, respectively. About material from the Gulf of Aden, then tentatively identified as *Scalptia cf. scalarina*, it was stated (Verhecken & Wranik, 1991: 62): “The possibility cannot be excluded that this material from the northwestern Indian Ocean (Aden Gulf, Oman, Arabian Gulf) belongs to an undescribed species, but a clear differentiation with closely related species is not possible at present”. Some of the shells then studied may belong to *S. harmulensis*.

Scalptia scalarina has fewer axial ribs, a much more solid shell, and a more open and deeper umbilicus than *S. harmulensis*. According to Lamarck (1822: 113), who was blind when he described the species, the shell surface is completely smooth (“*n’a rien de rude au toucher*”); but the lectotype does have fine close-set spiral lines on the last whorl (see also Kiener, 1841: 9). Compared to *S. harmulensis*, *S. scalarina* has a heavier shell with broad rounded axial ribs and a very fine spiral sculpture; its umbilicus is very deep (Kiener, 1841: 9).

Shells somewhat similar to *S. scalarina*, very solid but with a shallow umbilicus, are known from Kaoshiung, Taiwan (AV0319); Mikawa (AV0318, 2 shells) and Kii, Japan (AV0316, AV0317). This could indicate that the heavy-shelled *S. scalarina* occurs in the Far East, and not off Mauritius, the type locality given by Lamarck.

Shells similar to *S. harmulensis*, but with a multispiral protoconch are known from several localities in the Indian Ocean. Some resemble the lectotype of *S. scalarina*, but their shell is thinner and their sculpture is not as smooth (e.g. Figs. 6, 7 versus Fig. 10). Such shells are here reported from: Kuwait (AV0681, 2 shells, 8-10 m); Mogadishu, Somalia (AV0345); Conducia, Mozambique (AV0333); Bandos Isld., Maldives (AV0330, 2 shells); Matara, Sri Lanka (AV0332, 3 shells); Cudaloor, SE India (AV1567-2, Fig. 6); Madras, E India (AV0797, 12 m, xi-1985, Fig. 7), but also from outside the Indian Ocean: Kuala Terengganu, E. Malaysia (AV0724, 4 shells); Queensland, Australia: Clairview (AV0690, 2 shells) and Swain Reef (AV1574).

Scalptia richardi sp. nov.

Figs. 11-13

Diagnosis: A species of *Scalptia* with multispiral protoconch from the southern Gulf of Bengal, colour yellowish orange, aperture white. Axial ribs low and narrowly-spaced; spirals thin and low, crossing over the axials. Columella deviated abaxially, with three folds, abapical one forming a strong tooth. Umbilicus narrow, partly covered by callus.

Type material: Holotype: RBINS I.G.32937 MT.3209 (ex coll. AV1198), 23.6 x 15.8 mm, Vattakottai Beach Fort (08°07'32"N 77°33'57"E), near Kanyakumari, the southernmost point of Indian subcontinent, Tamil Nadu, 25-iii-2005, leg. KVL. (Fig. 11) **Paratypes: (1)** AV0698, 21.1 x 13.6 mm, Sri Lanka (Fig. 12). **(2)** AV0577, 21.2 x 14.0 mm, Andaman Islands, 45 m, xi-1977 (Fig. 13). **(3)** 23.3 x 14.9 mm, leg. & coll. KVL, same locality as holotype, 25-iii-2005.

Type locality: Vattakottai Beach Fort (08°07'32"N 77°33'57"E), near Kanyakumari, at the southernmost point of the Indian subcontinent, Tamil Nadu, muddy sand.

Material studied: Only the type material.

Distribution: All known shells originate from the southern Bay of Bengal: S. India, Sri Lanka, and Andaman Islands.

Description: (Based on the type series) Shell up to 23.6 x 15.8 mm (holotype). Protoconch multispiral with 2- 2 ¼ smooth shiny whorls, naticoid, slightly deviated from teleoconch shell axis. Nucleus diameter 0.13-0.2 mm, largest diameter 1.0 mm, exposed height 0.7-0.8 mm. Transition to teleoconch marked by start of teleoconch sculpture. Teleoconch with up to 5 whorls. Shell H/W: 1.47-1.54. Height of last whorl 75.7-77.3 % of total shell height. Axial ribs only slightly prosocline, narrowly-spaced, numbering 9-11, 11-14, 15-16, 18-20 on first to fourth teleoconch whorl, respectively, and 14-15 on the last whorl. Spiral sculpture consists of narrow bands, numbering 3, 3, 3-5, 5-7 on first to fourth teleoconch whorl, and 16-17 on last whorl, often with one secondary spiral between the primaries. The spirals overrun the axials, forming low, ridge-like knobs. Sutural shelf white, nearly perpendicular to shell axis; obliquely crossed by low ridges from the top of the axial ribs to the suture. Shoulder with soft rounded knobs on top of the axial ribs. Aperture elliptical, truncated posteriorly, one broad tooth on the truncated part, two merged in the holotype. Aperture height, including the shoulder crest: 60.5-65.1 % of total shell height. Outer lip rounded, with 14-16 lirae inside. A weak "stromboid notch" below the white spiral line, at the same height as the anterior columellar fold. Columella curved abaxially, with two rather strong folds and the anterior fold at the rim of the siphonal canal where it forms a conspicuous strong tooth. Columellar callus thin, transparent in the adapical part; abapically it is thicker, white, freestanding, half covering the very narrow umbilical slit. Siphonal fasciole weakly developed, siphonal canal rather short.

Colour yellowish brown with a white spiral band just below the periphery.

Etymology: The name honours the late Richard E. Petit who was one of the foremost students of the family Cancellariidae for nearly four decades. Five cancellariids have already received the specific name *petiti* (in *Africotriton*, *Brocchinia*, *Gergovia*, and two in *Cancellaria*, one of them renamed because of homonymy), and one *Cancellaria richardpetiti*. Therefore, the first given name of R. E. Petit is used here.

Remarks: The four shells of the type series of *S. richardi* sp. nov. are very much alike. The multispiral protoconch, narrowly-spaced axial ribs, the columella abaxially deviated and ending in the strong tooth at the anterior columellar fold of this new species distinguish it from *S. harmulensis* sp. nov.

Scalptia richardi is easily differentiated from unusual forms of *S. contabulata* with narrowly-spaced axial ribs,

e.g. AV1544 from Mozambique (Fig. 16), as the latter has a paucispiral protoconch.

Within the genus *Scalptia*, this new species must be distinguished from a few species with multispiral protoconch and narrowly-spaced axial ribs, such as *S. crispa* (Sowerby (I), 1832), *S. hystrix* (Reeve, 1856) from the NW Indian Ocean (Oman, Somalia) and *S. nassa* (Gmelin, 1791), formerly known as *S. lamellosa* (Hinds, 1843). The latter species has the axial ribs composed of narrow lamellae, and has a wider and deeper umbilicus than *S. richardi*.

Scalptia hystrix and *S. crispa* have been discussed before (Verhecken, 1986: 143, 148; 1989: 98-101). It was concluded that "the general form and colour of both species are identical. Study of more material, if possible from other localities, might indicate whether or not *S. hystrix* is to be considered a subspecies of *S. crispa*". Gravely (1942: 68), studying material from Madras, Coromandel Coast, Bay of Bengal, considered *C. costifera*, *C. lamellosa* and *C. "hystrix"* [sic] as varieties of *C. crispa* s. str. He only figured the latter (Gravely 1942: 66 fig. 12j), but this figure does not really agree with those by Sowerby (I) (1832: fig. 30), Sowerby (II) (1849: fig. 89) and Reeve (1856: pl. IX fig. 43). Differences between *S. crispa* and *S. hystrix* are: the number of axial ribs (about 11 for *crispa*; up to 19 for *hystrix* on the third teleoconch whorl, and the presence of fine points on the ribs in *hystrix*, absent in *crispa*).

C. crispa was well described in 1832; in the original figure it looks slightly more elongated with a longer siphonal canal (H/W 1.71) and is somewhat less neat than the figure given by Sowerby (II) (1849: fig. 89) (H/W 1.60) under the incorrect spelling *C. crispata*, but both figures are essentially the same. A photo of a *S. crispa* shell from the Philippines was given by Verhecken (1986: fig. 29; 1989; fig. 3). The number of axial ribs in *S. crispa* is: 9-10, 10-12, 9-12 and 12-13 on first to fourth teleoconch whorl, respectively; there are 11 lirae inside the outer lip, and there is only an umbilical chink (Verhecken, 1989: 100, fig. 3). The exact locality of *S. crispa* is not very clear: it was unknown in the original description; a sample in the Cuming collection is said to be taken in the Philippine 'Island of Negroes'.

The type locality of *S. hystrix* was given as Mauritius (Reeve, 1856), but this needs confirmation (Verhecken 1986: 143). Confirmed localities for *S. hystrix* are from the NW Indian Ocean only: Red Sea (RBINS I.G. 10591, 2 shells); Yemen (Robin, 2008: pl. 456 fig. 14), Aden (Verhecken & Wranik, 1991: 61), Socotra (Verhecken 1986: 144, fig. d.); Oman (KVL), Salalah (AV1541, AV1554); Somalia: Bosaso (AV1550), Ras Hafun, 150-200 m (AV0054; Bozzetti, 1997: 148); Mogadishu (Bozzetti 1990: 8); Persian Gulf (Melvill,

1928); Karachi, Pakistan (RBINS I.G. 10591). Based on the current data, and ignoring the doubtful type locality, *S. hystrix* only appears to occur in the NW Indian Ocean (the Arabian Sea), from Mogadishu all along the coastline to Karachi; *S. richardi* occurs in the southern Bay of Bengal.

In the Gulf of Aden, shells of both *S. crispa* and *S. hystrix* have been collected, most of them with hermit crabs and rather eroded; it is often not easy to distinguish them. Bosch *et al.* (1995: 156 fig. 683) figure a shell of each, under the name *S. hystrix*. A fine shell of *S. hystrix* from Yemen is figured by Robin (2008: 456 fig. 14).

Shells of *S. richardi* are rather similar to what is probably an extreme form of *S. hystrix*, RBINS I.G.10591 (Fig. 15) (obtained from Sowerby (III) & Fulton, 10-vi-1909), with locality label "Mauritius" possibly copied from Reeve (1856: species 67) or Tryon (1885: 81). But the *S. richardi* shells have fewer axial ribs that are less prosocline and less pointed; their siphonal fasciole is weaker and forms a narrower spiral around the narrow umbilicus.

It appears that *S. crispa*, *S. hystrix* and *S. richardi* are rather similar and their sculpture forms a continuum: the more coarsely sculptured *S. crispa*, the finely and densely sculptured *S. hystrix*, and *S. richardi* with a subdued sculpture similar to that of *S. hystrix*. However, *S. crispa* and *S. hystrix* are sympatric (at least geographically; their bathymetry still has to be established) in the Gulf of Aden. Based on the data now available and ignoring the doubtful data from Gravely (1942: 48), *S. hystrix* and *S. richardi* are not sympatric (Gulf of Aden versus southern Gulf of Bengal, resp.).

***Scalptia articularoides* Verhecken, 1995**
Figs. 17-18

Scalptia articularoides Verhecken, 1995: 100, figs. 1-5.

Type locality: (O. D.) Sri Lanka.

Material studied: One shell coll. KVL, 16.4 x 11.5 mm (Fig. 17), Harmul, Oman, iv-2012. A second shell, HD 16203-2, 13.9 x 9.5 mm, Tibia-III statn. 60 (see under *S. harmulensis*), Khor Fakkan, Sharjah emirate, 15-iv-2004.

A few shells, from the Andaman Islands and from Oman, had tentatively been identified in museums in Calcutta and in Amsterdam (now in Leiden) (Verhecken, 1995: 100).

Discussion: This species has a multispiral protoconch (Fig. 18); the teleoconch whorls are more rounded and the umbilicus is deeper and more open than in *S. harmulensis*. It differs from *S. richardi* in having the last whorl more inflated, the axial ribs more prosocline, and its straight columella is parallel to the shell axis, without a prominent anterior fold forming a strong tooth as it does in *S. richardi*.

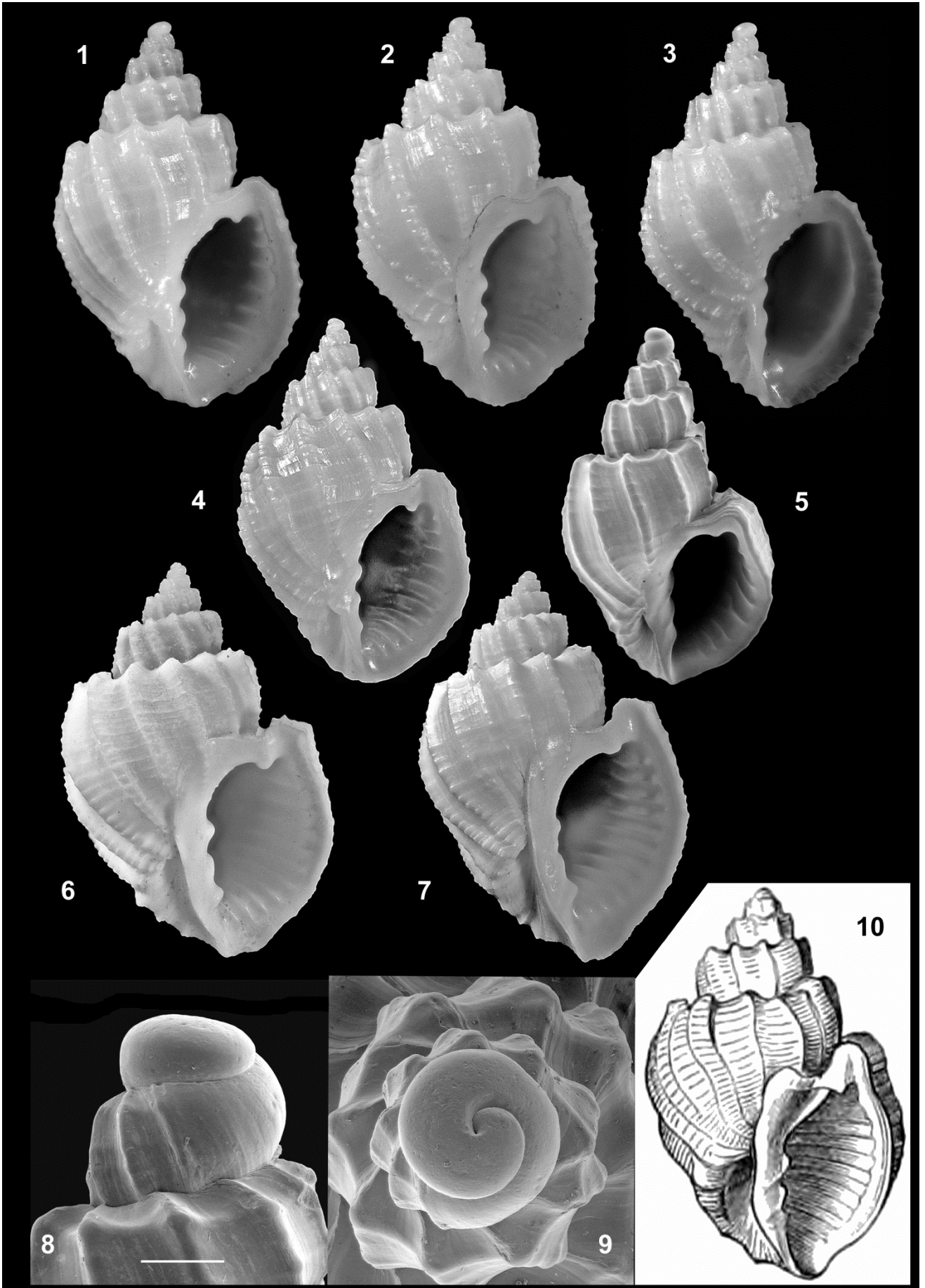
The name *Scalptia articularoides* was introduced for five shells formerly erroneously identified as *S. articularis* (Sowerby (I), 1832); the exact identity of the latter taxon still remains very doubtful (Verhecken, 1995: 99) since no type material has been found, and the original figure is not very clear. Shells figured as *C. articularis* by Sowerby (II) (1849: pl. xcvi figs. 90, 91) and by Reeve (1856: fig. 54) do not closely resemble the original figure given for that species (Sowerby (I) 1832: fig. 32).

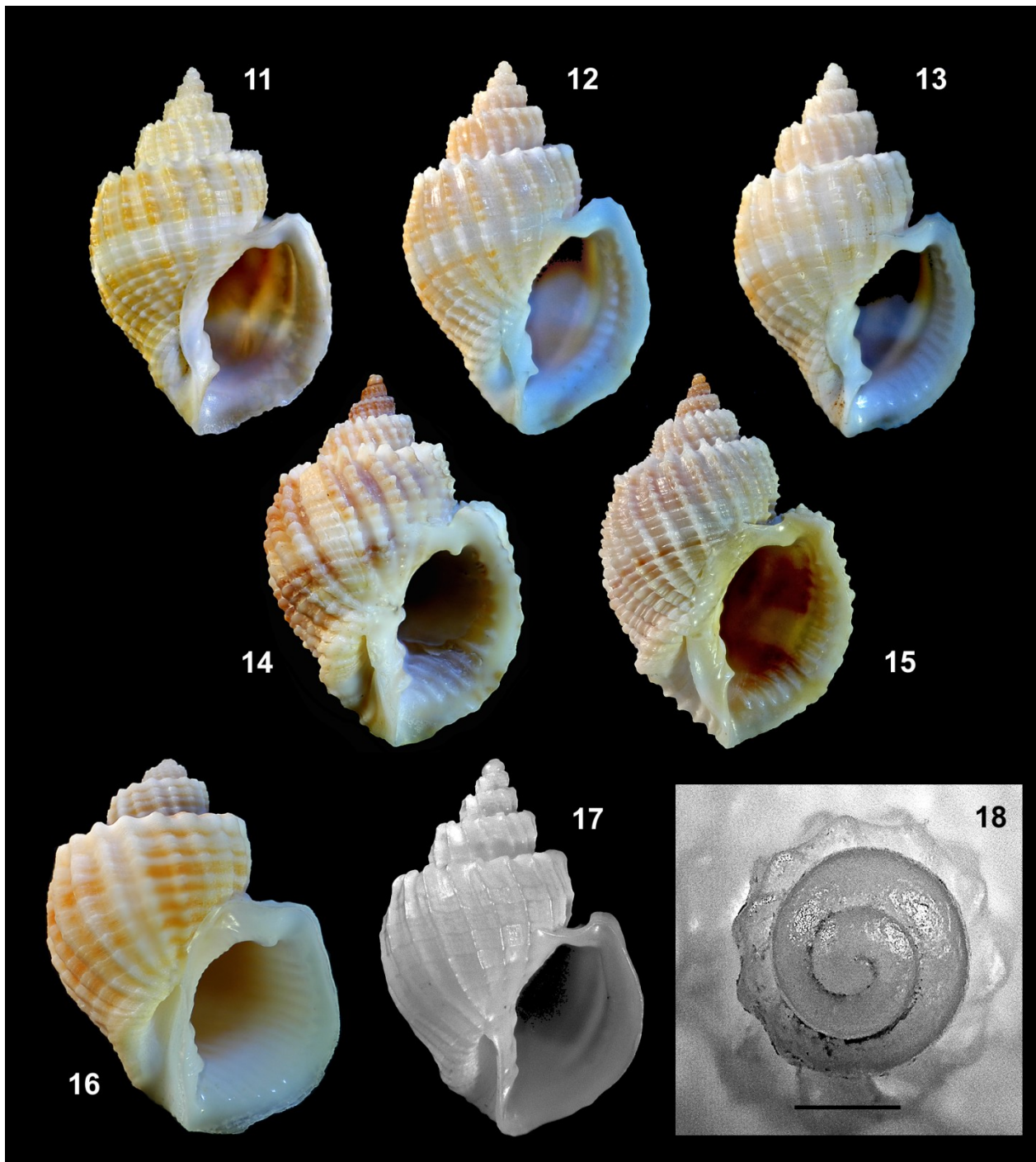
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- 1-5: *Scalptia harmulensis* sp. nov.**
1: Holotype, RBINS I.G.32936 MT.3208, 16.1 x 10.3 mm, Harmul, Oman.
2: Paratype 1, AV1585, 15.7 x 9.9 mm, United Arab Emirates, Dubai, East coast.
3: Paratype 2, JFL 15L0001, 14.9 x 9.5 mm, same locality as Fig. 2.
4: Paratype 3, HD16203-1, 19.8 x 12.5 mm, Sharjah Emirate, Khor Fakkan, Tibia-III statn. 60.
5: Al Sawadi, in shell grit, 11.6 x 7.1 mm (leg. & coll. KVL). The shell profile is modified by the presence of a drill hole in the penultimate whorl.
- 6-7: *Scalptia* sp. with multispiral protoconch.**
6: AV1567-2, 21.1 x 14.7 mm, Cudaloor, SE India.
7: AV0797, 20.9 x 15.6 mm, off Madras, E. India.
- 8-9: *Scalptia harmulensis* sp. nov.**
 Protoconch of shell of Fig. 5. Scale bar: 0.5 mm.
- 10: *Cancellaria scalarina* Lamarck, 1822**
 as figured by Chenu (1859: 276 fig. 1832).





11-13: *Scaltia richardi* sp. nov.

11: holotype, RBINS I.G.32937 MT.3209 (ex coll. AV1198), 23.6 x 15.8 mm, Vattakottai, S India (leg. & coll. KVL).

12: Paratype 1, AV0698, 21.1 x 13.6 mm, Sri Lanka.

13: Paratype 2, AV0577, 21.2 x 14.0 mm, Andaman Islands.

14-15: *Scaltia hystrix* (Reeve, 1856)

14: AV0054, 18.6 x 12.9 mm. Somalia, Ras Hafun.

15: RBINS I.G.10591 (Dautzenberg coll.), 28.1 x 18.8 mm, "Mauritius".

16: *Scaltia contabulata* (Sowerby (I), 1832).

Heavy, ribbed form, AV1544-1, 19.8 x 15.4 mm, Nacala Bay, Mozambique.

17-18: *Scaltia articularoides* Verhecken, 1995

17: Harmul, 16.4 x 11.5 mm (leg. & coll. KVL).

18: Protoconch of same shell. Image taken with USB Digital Microscope, scale bar: 0.5 mm.