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Authors: Albano, Paolo G., and Pizzini, Mauro

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Notes on Caecidae (Mollusca: Gastropoda) from southern Mozambique, with the description of a new species

Paolo G. Albano[1] and **Mauro Pizzini**[2]

[1]Department of Experimental Evolutionary Biology, University of Bologna, c/o Prof. Sabelli, via Selmi 3, Bologna, 40126 Italy; pgalbano@iperbole.bologna.it
[2]Largo della Caffarelletta, 6, Roma, 00197 Italy; pizzini.mauro@gmail.com

ABSTRACT

The Caecidae found in shallow water sediment samples in Inhaca Island and Maputo Bay are described and illustrated. Three species are recorded: *Caecum chinense*, which is the most common; *Caecum sepimentum*, which was represented by a couple of specimens only; and *Caecum inhacaense*, a new species here described. The operculum of *C. chinense* is described and illustrated by SEM for the first time. The type specimens of the Indo-Pacific species *Caecum amputatum* Hedley, 1899, *C. attenuatum* Folin, 1879, *C. berberense* Ladd, 1972, *C. chinense* Folin, 1868, *C. sepimentum* Folin, 1868, *C. maculatum* Habe, 1963 and *C. vertebrale* Hedley, 1899 are illustrated. *C. maculatum* and *C. berberense* are newly synonymised under *Caecum sepimentum*.

KEY WORDS: Gastropoda, Caecidae, Mozambique, Indo-Pacific, molluscs, systematics, new species, new synonymies.

INTRODUCTION

The Caecidae is a family of caenogastropods composed of minute species usually a few millimetres long. Two subfamilies are recognized: Caecinae and Ctiloceratinae (Beesley *et al*. 1998).

Species of the subfamily Caecinae, to which all the species treated here belong, have a typical tusk-shaped and tubular shell. The other subfamily, Ctiloceratinae, has a tubular to depressed trochiform to almost planispiral shells.

In the Caecinae, shells have deciduous smooth, flattened, spiral protoconch that is lost during the juvenile life and replaced by a septum. Shells are slender and curved.

Inhaca Island (latitude 26°S, longitude 33°E) lies in the Indian Ocean 32 km east of Maputo, the capital city of Mozambique which is located at its southernmost part (Fig. 1). Its area is 12.5 km^2 from its northern point to its south-eastern one, and it is about 7 km across at the widest part. Its natural history was described by Kalk (1995), to which we refer for more detailed information on the island and from which we quote a few descriptive sentences on the area. The most important issue to highlight is that, although the island lies outside the tropics, biogeographically the shores may be considered tropical since the majority of their species are known from the Indo-West Pacific Region. It is, in fact, at the south-western edge of the widest zoogeographical region of the world.

The Bay of Maputo has an area of 960 km^2 and is roughly horseshoe-shaped, opening to the Indian Ocean to the north. The bay is shallow, only one fifth of its area being deeper than 10 m. Five large rivers flow into the Bay of Maputo on its western boundary and reach the Indian Ocean northwards. The southern half of the bay is less than 5 m deep.

Inhaca Island forms the end of the eastern boundary of this large, complex, sheltered, estuarine bay. The island's sheltered shores are bathed by the Indian Ocean waters at every incoming tide. Ocean water surges through the strait between the southern end

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Fig. 1. Geographical position of Inhaca Island in Africa (black circle and arrow).

of the island and Machangulo Peninsula, and from the north around Portuguese Island. Thus the estuarine influence of the waters of the Bay of Maputo on the sheltered shores of the island is diminished.

The mollusc fauna of this area is poorly known. In the last decades research has been carried out mainly by South African (e.g. the Natal Museum) and Portuguese institutions and private collectors, but little is published, especially on micromolluscs. The work by Kalk (1995) illustrates only a few molluscs, generally those that most characterise the different habitats. Other works with an ecological perspective such as Macnae & Kalk (1962*a*, *b*) and Kalk (1958) list only a few large-sized species. There are few faunistic works dealing with the southern Mozambique fauna. Braga (1956) made an extensive list of molluscan species of the whole of Mozambique, with stations in the south too. However, this work is limited to medium to large species. More specific to Inhaca Island are the works of Paes da Franca (1960), which cites a few small sized species but not a single species of Caecidae, and Boshoff (1965), which deals with bivalves only (again, only medium to large species are treated). Therefore, it has not been possible to trace any work dealing with the Caecidae in southern Mozambique.

The South African fauna is slightly better known, but only a few works record Caecidae. In any case, they generally deal with more southerly places like Port Elizabeth (Barnard 1963), Port Alfred (Barnard 1963, Bartsch 1915; Turton 1932) or Still Bay, Cape Province (Barnard 1963). Barnard (1963) records species from the Natal coast, but from upper circalittoral dredgings.

MATERIAL AND METHODS

Material from Inhaca Island was collected by sampling sediments in intertidal flats and near shallow subtidal coral outcrops on the west coast of Inhaca Island (facing the Bay of Maputo). Material from the Bay of Maputo comes from dredgings carried out by a rectangular dredge pulled by a small motorboat.

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The list of stations is as follows:

Loc. 2035: Mozambique, Ilha de Inhaca, Barreira Vermelha; shellgrit from -1 m near dead coral slabs near patches of live coral, at low tide, 25.ii.2000, P.G. Albano leg.
Loc. 2036: Mozambique, Ilha de Inhaca, Ponta Torres, Bay of Maputo side; -2 m, shellgrit from sandy channel near live coral reef, at low tide, 19.ii.2000, P.G. Albano leg.
Loc. 2037: Mozambique, Ilha de Inhaca, south of the Estaçao de Biologia Marinha; shellgrit from intertidal mud flats, 23.ii.2000, P.G. Albano leg.
Loc. 2847: Mozambique, Baia de Maputo; rectangular dredge, -8–10 m, shellgrit from muddy bottom with dead shells, 1.iii.2000, P.G. Albano & J. Rosado leg.

Overall, 157 specimens of Caecidae were collected. Samples were washed in fresh water, dried and then sorted under a binocular microscope. Opercula were extracted from live collected specimens. Specimens were photographed by the scanning electron microscope JEOL JSM 5200 after ultrasonic cleaning and gold coating.

Abbreviations and institution codens used:

AMS	–	Australian Museum, Sydney, Australia;
BMNH	–	Natural History Museum, London, UK (currently NHMUK);
MNHN	–	Muséum National d'Histoire Naturelle, Paris, France;
MZB	–	Museo di Zoologia dell'Università di Bologna, Italy;
NMDP	–	Natal Museum Dredging Programme;
NMNS	–	National Museum of Nature and Science, Tsukuba City, Japan, formerly NSMT;
NMSA	–	KwaZulu-Natal Museum, Pietermaritzburg, South Africa;
USNM	–	National Museum of Natural History, Washington, USA;
coll.	–	collection;
juv.	–	juvenile(s);
sh.	–	shell(s);
spec. specs.	–	live-collected specimen(s).

TAXONOMY

Superfamily Rissooidea J.E. Gray, 1847
Family Caecidae J.E. Gray, 1850
Genus *Caecum* Fleming, 1813

Type species: *Dentalium imperforatum* Kanmacher, 1798 (= *trachea* Montagu, 1803) from Europe, Mediterranean Sea and nearby Atlantic to southern England.

Caecum chinense Folin, 1868

Figs 2A–H

Caecum chinense: Folin 1868: 80.

Original description:

"*Testa conica, parva, angustissima, sat elongata, subopaca, albida, levi, transversim aliquibus strigis minutissimis irregulariter cingulata, aperturam versus fere inflata; apertura levitissime contracta, vix declivi, haud marginata: septo magno, conico, apice subacuto, margine laterali et dorsali subrectis; operculo ?*
Long. : 0,0013 ; diam. : 0,0002 - 0,00025"

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Redescription:

Shell slender, subcylindrical, slightly arched, opaque white. Juvenile specimens have more slender shell, which looks sinusoidal when seen ventrally (Figs 2D, 2E). Tube seems smooth but has microsculpture of very fine growth lines (Fig. 2C). Aperture circular and slightly contracted. Septum profile pointed and sharp in fresh specimens but tends to become blunt in older or worn specimens. Its dorsal and ventral margins almost straight. Operculum (Figs 2F–H) 0.3 mm in diameter, corneous and light brown. Its outer surface crossed by 3–4 small, concentric, indistinct rings, going from edge toward round, slightly concave nucleus with 3–4 fine concentric rings. Its marginal areas have more marked concentric ridges and margin much thicker than rest of operculum. Its inner surface crossed by 3–4 small, concentric, rough and indistinct rings.

Soft parts unknown.

Mean dimensions: length 2.9 mm, min. diameter 0.3 mm, max. diameter 0.5 mm.

Type material (examined): 4 syntypes at MNHN (Kisch 1959).

Type locality: Near Deux Freres, South China Sea.

Material examined: Loc. 2035: 2 spec. and 59 sh. (8 juv.); Loc. 2036: 2 spec. and 43 sh. (4 juv.); Loc. 2037: 6 spec. and 1 sh.; Loc. 2847: 1 spec. + 33 sh. (2 juv.) (P.G. Albano coll.).

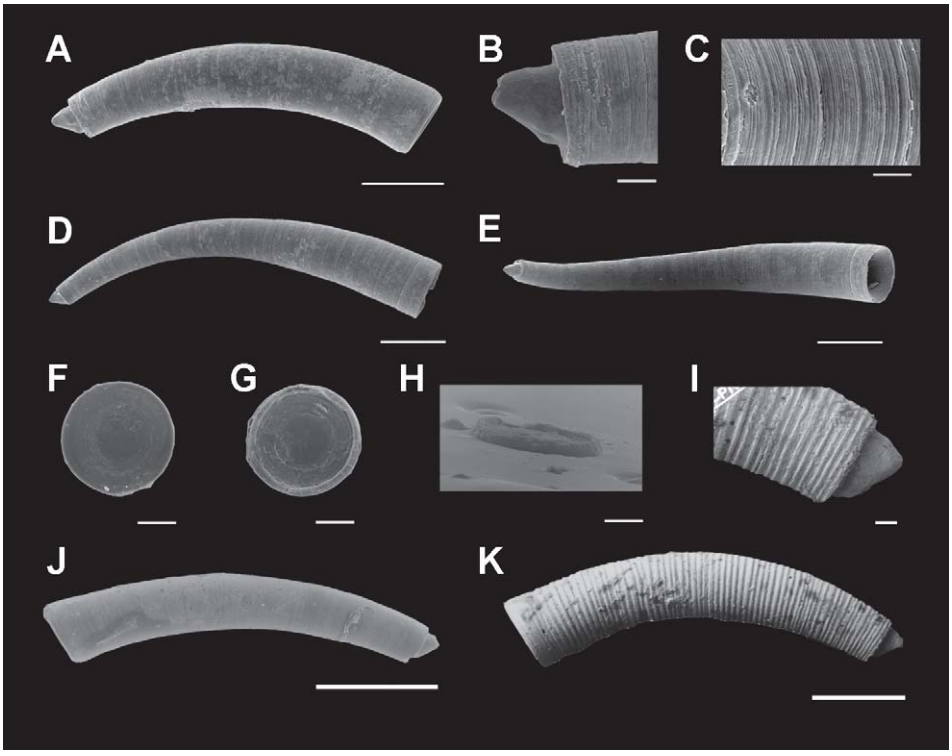


Fig. 2. *Caecum chinense* Folin, 1868: (A–C) adult, Inhaca I. (Loc. 2036): (A) shell, scale bar 500 μm; (B) septum, scale bar 100 μm; (C) microsculpture (ventral side, near the septum), scale bar 50 μm; (D, E) juvenile, Bay of Maputo (Loc. 2847), scale bar 500 μm: (D) lateral view; (E) ventral view; (F–H) operculum (Loc. 2036), scale bar 100 μm: (F) inside, (G) outside, (H) profile; (J) *Caecum chinense* Folin, 1868, syntype at MNHN, scale bar 500 μm; (I, K) *Caecum attenuatum* Folin, 1879, syntype at BMNH: (I) septum, scale bar 50 μm; (K) shell, scale bar 222 μm.

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Additional material examined: SOUTH AFRICA: *KwaZulu-Natal*: 1 sh., Stn SO4, off Cape St Lucia (28°31.8'S: 32°26.9'E), -76–80 m, dredged R.V. NMDP, 12.vi.1988 (NMSA E5196); 1 sh., Leadsman Shoal, Raggie Reef, -8–14 m, a mixed algal and coral reef, 1–2 km north of Leven Point, sorted from stone washings (NMSA E2726); 5 sh., Mapelane (NMSA E1662); 6 sh., Mission Rocks, N of St Lucia (J.P. Marais coll.); 13 sh., Mapelane, S of St Lucia (J.P. Marais coll. 2116); 86 sh., off St Lucia Lighthouse, -50 m, ex CSIR Water Research (NMSA A6212); 1 sh., Richards Bay, sand from harbour dredger (NMSA E1667); 1 sh., off Richards Bay, shallow dredgings (J.P. Marais coll. 2119); 7 sh., off Richards Bay, -50 m, fine quartzite, broken shell, ex CSIR Water Research (NMSA A6071); 1 spec. + 9 sh., Durban Bay, shallow dredgings (J.P. Marais coll. 2118); 84 sh., Durban Bay, shallow dredgings, sand (NMSA A5423); 79 sh. + 2 fragments, Durban Bay, shallow dredgings (NMSA E1019); 2 sh., Aliwal Shoal, off Scottburgh, -10 m, sand and reef debris (NMSA S8217); 1 sh., Aliwal Shoal, off Scottburgh, -16 m, hand dredged sand (NMSA S5922); 2 spec. + 1 sh., Aliwal Shoal (off Umkomaas), -27 m, silt from between rocks (NMSA E1669); 1 sh., Aliwal Shoal, -9–15 m (NMSA E6166); 2 sh. (worn), Aliwal Shoal, off Scottburgh, -10–20 m, sand (NMSA S6743); 2 spec., Aliwal Shoal, off Scottburgh, *c*. -20 m, hand-dredged sand (NMSA S7902); 1 spec., Aliwal Shoal, off Scottburgh, *c*. -14 m (NMSA S6160); 14 sh., Aliwal Shoal, off Umkomaas, -27 m, scuba, January 1988 (J.P. Marais coll.); 1 sh., South Coast, Landers Reef, off Scottburgh area, -45 m, scuba, April 1988 (J.P. Marais coll.); 4 sh., Landers Reef off Park Rynie, -30 m, slightly muddy sand (NMSA E1668); 2 sh., T.O. Strand, 2 km N of Port Edward (NMSA E1661); 5 sh. subadult, South Coast, Leisure Bay, Port Edward, beach (NMSA 2411). *Eastern Cape*: 1 sh., Mzamba, beachdrift (NMSA D3032); 5 sh., Mzamba (NMSA E1663); 23 sh., Mzamba, near KwaZulu-Natal border (J.P. Marais coll.). *Western Cape*: 1 sh., Hermanus (between False Bay and Cape Agulhas) (J.P. Marais coll.).

Comparative material examined: *C. attenuatum* Folin, 1879, five syntypes at BMNH nos 2315–2319. Type locality: Flinders Passage, Cape York, 7 fms, Australia (Fig. 2K).

Distribution: This species was described from the South China Sea. It was then recorded from North Australia (Folin 1879) and Borneo (Kisch 1959). It is here recorded from Mozambique but it is also present in South Africa.

Remarks: Specimens from South Africa do not show significant differences to our material. *C. chinense* resembles *C. attenuatum* Folin, 1879 (Fig. 2K) in its general subcylindrical shape, but differs by its smooth tube which is crossed only by fine growth lines, while *attenuatum* has a sculpture of small rings. The septum is similar in both species; in *chinense*, however, the mucro's cusp is almost always pointed and a slight hump is present on the posterior margin.

Caecum inhacaense sp. n.

Figs 3A–C, E

Etymology: From Ilha da Inhaca, southern Mozambique, the type locality.

Description:

Tube cylindrical, smooth, crossed only by fine growth striation. Septum mucronate, turned to right side by about 30° and protruding over the cutting plane. Mucro (Fig. 3C) has the form of a small flattened ball, almost obsolete in juvenile specimens. Dorsal margin of mucro strongly convex, while its ventral margin slightly S-shaped and inflated near the cutting plane. Aperture circular, weakly ringed and slightly contracted. Juveniles (Fig. 3E) have more slender shell, and aperture lip thin and fragile. Colour whitish.

Operculum and soft parts morphology unknown.

Holotype dimensions: length 1.4 mm, diameter 0.3 mm.

Holotype (Figs 3A–C): Loc. 2035; gold coated for SEM photography (MZB 15000).

Paratypes: A (juvenile) from the type locality (Fig. 3E), gold coated for SEM photography (MZB 15001). B from Loc. 2036 (MNHN 23121). C from Loc. 2036 (NMSA L8452/T2659). D from Loc. 2036 (BMNH 20100510).

Comparative material examined: *C. amputatum* Hedley, 1899 holotype AMS C68589 (Fig. 3D). Type locality: Cabbage Tree Bay, near Manly, in shell-sand, New South Wales (Australia).

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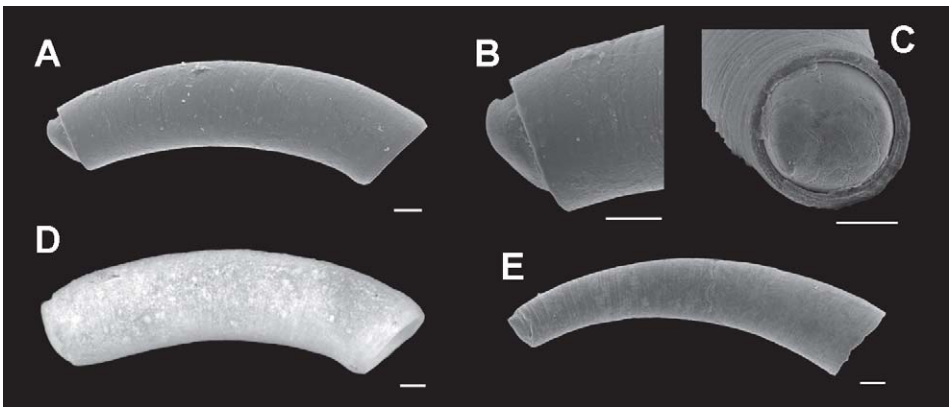


Fig. 3. (A–C) *Caecum inhacaense* sp. n., holotype, Inhaca I. (Loc. 2035), scale bar 100 µm: (A) shell; (B) septum; (C) detail of mucro; (D) *Caecum amputatum* Hedley, 1899, holotype AMS C68589, scale bar 100 µm; (E) *Caecum inhacaense* sp. n., paratype, juvenile, Inhaca I. (Loc. 2035), scale bar 100 µm.

Distribution: Inhaca Island, Mozambique.

Comparison: The new species is closely related to *C. amputatum* Hedley, 1899 (Fig. 3D), described from New South Wales, Australia. The greatest difference is in the septum, which in *C. amputatum* is "… well exerted, surrounded by a crown of the truncated tube, apex placed on the side of convex aperture" (Hedley 1899: 504). The position of the mucro (the "apex" in Hedley's description) is dorsal in *C. inhacaense* and ventral in *C. amputatum*. Moreover, there is a wide geographical distance between the two type localities since no similar species have been found by the second author while studying the huge collections of the MNHN in the Tropical Indo-Pacific.

The new species can be compared to the endemic Mediterranean species *C. auriculatum* Folin, 1868 due to the overall form of the tube. Neither has any sculpture but has a ringed aperture. However, the form of the septum is markedly different: it has the shape of a small, flattened ball in *inhacaense*, while it is hemispheric with ear-like right-oriented mucro in *auriculatum*. Moreover, the distribution is greatly disjunct.

Caecum sepimentum Folin, 1868

Figs 4A, 4B

Caecum sepimentum: Folin 1868: 84, pl. VI, fig. 7.
Caecum sepimentum var. *arcuata* [sic] Folin, 1879: 809 [no pls].
Caecum septimentum: Lightfoot 1992: 1, 4–5, figs 2, 3 [misspelling].
Caecum maculata Habe, 1963: 236, text-fig. 2 [correct spelling to be *Caecum maculatum*]. **Syn. n.**
Caecum berberense Ladd, 1972: 22–23, pl. 5, figs 11, 12. **Syn. n.**

Original description:

"*Testa valde elongata, angusta, sat solida, subcylindrica, interdum paulo conica, arcuata, alba, nitida; annulis XX-XXV validis, latis, rotundatis, interdum subacutis cincta, ultimo latiore sulcato; interstitiis subaequalibus concavis; aperturam versus parum tumescente; apertura valde contracta, paulo declivi; septo subplanato, haud extante, vix mamillato, marginibus nullis, operculo ?*
Long. : 0,0026; diam. : 0,0004."

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Redescription:

Tube subcylindrical, slightly curved, crossed by 20–25 pronounced rings having sub-rounded surface with interspaces as large as rings. In many specimens "halving" of the ring can be noticed, usually at base of central rings (Fig. 4B). Aperture surrounded by swelling crossed by 4–5 rings that become closer as diameter decreases. This swelling, which at first tightens, subsequently enlarges forming small and sharp edge that hems aperture, perfectly circular. Longitudinal microsculpture crossing entire tube can be seen on both rings and interspaces; in some specimens it is visible only near septum and aperture. Septum dome-shaped and generally quite flat under cutting plane; traces of temporary septum can often be noticed. Protoconch planispiral, smooth and vitreous, showing small suture that separates it from teleoconch. Operculum corneous, light brown; external surface crossed by 3–4 concentric small rings; internal surface, seen in profile, has stair-like shape (3 steps) and presents sunken nucleus. Shell colour white, fresh specimens have dark brown periostracum.

Soft parts unknown.

Mean dimensions: length 2.8 mm, min. diameter 0.4 mm; max. diameter 0.7 mm.

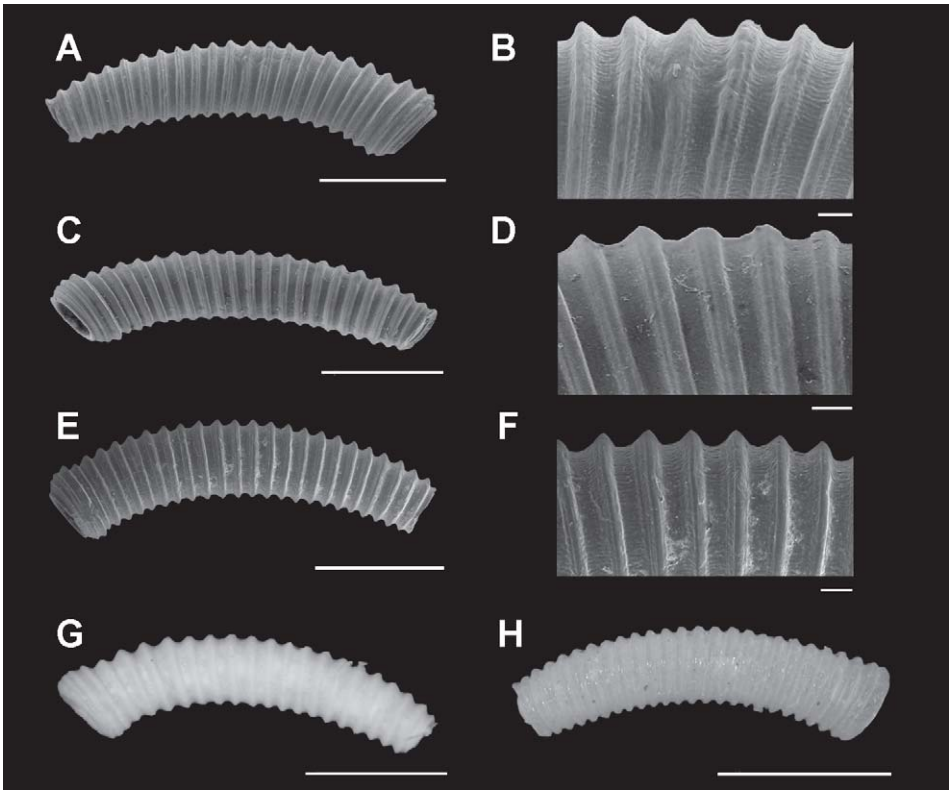


Fig. 4. (A, B) *Caecum sepimentum* Folin, 1868, adult, Inhaca I. (Loc. 2035): (A) shell, scale bar 1 mm; (B) rings sculpture, scale bar 100 μm; (C, D) syntype at MNHN: (C) shell, scale bar 1 mm; (D) rings sculpture, scale bar 100 μm; (E, F) *Caecum berberense* Ladd, 1972, holotype at USNM: (E) shell, scale bar 1 mm; (F) rings sculpture, scale bar 100 μm; (G) *Caecum maculata* Habe, 1963, holotype at NMNS; (H) *Caecum vertebrale* Hedley, 1899, holotype at AMS, scale bar 1 mm.

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Type material examined: *C. sepimentum*: 23 syntypes from Mauritius and Reunion Islands on the same glass slide at the MNHN (Kisch 1959) (Figs 4C, 4D). *Note*: Type material of *C. sepimentum* var. *arcuata* has not been found.

Type locality: *C. sepimentum*: Mauritius. *C. sepimentum* var. *arcuata*: Flinders Passage, Cape York (Australia).

Material examined: 2 sh. (Loc 2035) (P.G. Albano coll.).

Additional material examined: SOUTH AFRICA: *KwaZulu-Natal:* 1 sh., Mission Rocks, N of St Lucia (J.P. Marais coll.); 16 spec. + 47 sh., Leadsman Shoal, outer portion -24–26 m, sorted from stone washings (NMSA E2677); 2 spec., Leadsman Shoal, Raggie Reef, -8–14 m, a mixed algal and coral reef, 1–2 km N of Leven Point, sorted from stone washings (NMSA E2725); 3 spec. + 9 sh., Leadsman Shoal, outer portion, -25–28 m (NMSA E6929); 2 spec., Leadsman Shoal, -15 m, scrapings + broken down coral rubble (NMSA E2273); 1 spec. + 8 sh., Stn. Zb7, off Bokler Point (27°00.5'S:32°54.7'E), -50 m, coral rubble, dead *Lithothamnion*, R.V. Meiring Naudé, 6.vi.1987 (NMSA E1588); 1 sh., Sodwana Bay, Two-Mile Reef, outer edge, sorted from stone washings, -15–17 m (NMSA D5304); 5 sh., Stn. Za21, SE of Kosi R. Mouth (26°55.2'S:32°55.0'E), -50 m, fine sand, dredged R.V. NMDP, 8.vi.1987 (NMSA E1516); 1 spec. + 16 sh., between Bhanga Neck and Kosi Bay, Reef off Marker 13 N, *c*. -13 m, hand-dredged sand (NMSA S3118); 1 sh., Stn. Zm7, off Cape Vidal (29°07.1'S:32°36.6'E), -145 m, medium sand, dredged R.V. NMDP, 10.vi.1988 (NMSA E7550); 1 sh., Stn. Zf8, off Hully Point (27°0.4'S–32°46.4'S:32°46.4'E), -40 m, fine sand, dredged RV NMDP, 5.vi.1987 (NMSA E1658); 4 sh. (worn), Stn Zk2, off Gipsy Hill (27°48.8'S:32°38.4'E), -50 m, dredged RV NMDP, 8.vi.1988 (NMSA 4184); 1 sh. (worn), Stn Za19, off Kosi Estuary (26°56.7'S:32°54.7'E), -50 m, coarse sand, shells, dredged RV NMDP, 8.vi.1987 (NMSA E1630); 22 sh. (worn), Stn Zo4, off Cape St Lucia (28°31.8'S:2°26.9'E), -76–80 m, coarse sand, dredged RV NMDP, 12.vi.1988 (NMSA E5197); 1 spec. + 2 sh., Sodwana Bay, Two Mile Reef, sorted from stone washings, -10–15 m (NMSA E769); 3 spec., off Kosi Bay, main reef, 1–2 km S of Estuary, sorted from stone washings, -9–17 m (NMSA D9833); 1 sh., off Kosi Bay, main reef, 1–4 km S of Estuary, -9–17 m (NMSA D9267); 12 spec. + 19 sh., Kosi Bay, main reef, 1–4 km S of Estuary Mouth, *c*. -18 m, underwater pump (NMSA S4252); 2 spec. + 4 sh. (some in alcohol), Kosi Bay, main reef, 1–4 km S of Estuary Mouth, *c*. -20 m, underwater pump (NMSA S2526); 12 spec. + 11 sh., Kosi Bay, main reef, 1–4 km S of Estuary Mouth, -20–22 m, underwater pump (NMSA S2010); 8 spec. + 4 sh., Kosi Bay, main reef, 1–4 km S of Estuary Mouth, -23–24 m, underwater pump (NMSA S2918); 1 sh., Stn Zn7, SE of Mission Rocks (28°17.5'S:32°34.2'E), -100 m, medium sand, dredged RV NMDP 11.vi.1988 (NMSA E5191); 2 sh. (worn), Stn Zk4, NE of Gipsy Hill (27°45.2'S:32°39.8'E), -110 m, sponge, stones, dredged RV NMDP, 8.vi.1988 (NMSA E5204); 14 sh., Stn Zb5, off Boteler Point (27°00.0'S:32°55.2'E), -70 m, coral rubble, dredged RV NMDP, 6.vi.1987 (NMSA E1566); 2 spec. + 21 sh., Stn Zn1, SE of Mission Rocks (28°17.5'S:32°32.6'E), -50 m, old coral rubble, *Lithothamnion*, dredged RV NMDP, 10.vi.1988 (NMSA E6252); 2 sh., Stn Zk1, off Gipsy Hill (27°49.7'S:32°38.2'E), -47–50 m, fine sand, dredged RV NMDP, 8.vi.1988 (NMSA E5663); 2 spec. + 1 sh., between Bhanga Neck and Kosi Bay, reef off Marker 13 N, *c*. -8 m, underwater pump (NMSA S2738); 2 spec. + 1 sh., Leadsman Shoal, main portion of coral reef, -7–11 m (NMSA E6774); 14 sh., Stn. Ze2, off Rock Is. (27°17.2'S:32°48.0'E), -62 m, sandstone, coral, marine growths, dredged RV NMDP, 5.vi.1987 (NMSA E1542); 1 sh., Stn Zn1, SE of Mission Rocks (28°17.5'S:32°32.6'E), 50 m, old coral rubble, *Lithothamnion*, dredged RV NMDP, 10.vi.1988 (NMSA E7493); 46 sh., Stn Zk3, off Gipsy Hill (27°47.4'S:32°38.9'E), -65–70 m, broken shell, dredged RV NMDP, 8.vi.1988 (NMSA E5893); 2 sh., Stn. Zk6, off Gipsy Hill (27°48.9'S:32°38.4'E), -50 m, fine sand, dredged RV NMDP, 8.vi.1988 (NMSA E7497); 7 sh., Stn Zl5, NE of Leven Point (27°55.0'S:32°38.8'E), -250 m, coarse sand, dredged RV NMDP, 9.vi.1988 (NMSA E5883); 1 sh., Stn Zm9, off Cape Vidal (28°08.3'S:32°36.9'E), -200 m, sponge rubble, dredged RV NMDP, 11.vi.1988 (NMSA E5887); 1 sh., off Kosi Bay, main reef, 1–2 km S of Estuary, sorted from stone washings, -9–17 m (NMSA D9892); 1 spec., Leadsman Shoal, Raggie Reef, mixed algal and coral reef, 1–2 km N of Leven Point, -8–12 m (NMSA E6814); 4 sh., off Richards Bay, -50 m, fine quartzite, Broken Shell, ex CSIR Water Research (NMSA A6112); 1 sh., off Sodwana Bay, -50 m, shell grit, ex CSIR Water Research (NMSA A5087); 7 sh., off Kosi Bay, -50 m, shell grit, ex CSIR, 1975 Water Research (NMSA A4963); 26 sh., off Kosi Bay, -100 m, ex CSIR Water Research, 1977 (NMSA A5898); 20 sh., off Sodwana Bay, -100 m, ex CSIR, 1976, (G3) (NMSA A5553); 3 sh., off Kosi Bay, -50 m, shell grit, ex CSIR Water Research (NMSA A5964); 1 sh., off Durban Bluff, 10 km 130 SE of Cooper Lighthouse, -210 m, cone dredge, ex CSIR, 1974 (Ecor 5) (NMSA A2993) ; 7 spec. + 5 sh., Aliwal Shoal, -9–15 m (NMSA E6165); 5 spec. + 12 sh., Aliwal Shoal, -16 m, hand dredged sand (NMSA S5943); 1 larval shell cf. *sepimentum*, South Coast, Landers Reef, off Scottburg Area, -45 m, scuba, April 1988 (J.P. Marais coll.); 5 spec. + 39 sh., South Coast, Landers Reef, off Scottburg Area, -33 m, scuba (J.P. Marais coll.); 3 spec. + 135 sh., South Coast, Aliwal Shoal, off Umkomaas Area, -27 m, scuba (J.P. Marais coll.); 5 spec. + 19 sh., Aliwal Shoal, off Scottburgh, -25–27 m, sand and reef debris (NMSA S7186); 34 spec. + 55 sh., Aliwal Shoal, off Scottburgh, *c*. -14 m, underwater pump (NMSA S8627); 6 spec. + 1 sh., Aliwal Shoal, Cracker Reef, -23 m (NMSA E7168); 2 spec. + 9 sh., Aliwal Shoal, off Scottburgh, -10–20 m, sand (NMSA S6822); 7 sh., South Coast, Landers Reef, off Scottburg Area, -45 m, scuba (J.P. Marais coll.); 3 spec. +

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5 sh. (1 juv.), Landers Reef, off Park Rynie, -30 m, slightly muddy sand (NMSA E1671); 1 sh., Landers Reef, -20–30 m, sorted from stone washings (NMSA E2317); 7 spec. (1 juv.) + 5 sh., Aliwal Shoal, off Scottburgh, -10 m, sand and reef debris (NMSA S8247); 3 sh., Park Rynie, -50 m, coarse sand, 25.ii.1976, ex CSIR Water Research 1977 (NMSA B240); cf. *sepimentum* 2 sh. (worn), T.O. Strand, 2 km N of Port Edward (NMSA E1664). *Eastern Cape*: 1 sh., Mzamba, beach drift (NMSA A6285); cf. *sepimentum* 3 sh., Mzamba, beachdrift (NMSA D3021). KENYA: 3 sh., Kilifi, lagoon inshore of coral reef, sand from base of coral outcrops, *c*. -4 m (NMSA K7997). MAURITIUS: 3 sh., Pointe Radeau, S of Roches Noires, shell debris, near Reef Gap (NMSA K9511); 2 sh., Riambel Lagoon, beach drift (NMSA K9821); 8 sh., Gris Gris, debris on Surf Beach opposite Reef-Break (NMSA K9186). RÉUNION: 10 spec. + 3 sh., Cap La Houssaye, dived -8–17 m, varied bottom (NMSA K5444); 46 spec. + 25 sh., Cap La Houssaye, -6–12 m.

Comparative material examined:

C. vertebrale Hedley, 1899 holotype AMS C5917. Type locality: Funafuti Atoll, Ellice Group, in the sandy shore of the lagoon (Fig. 4H).
C. maculatum Habe, 1963 holotype NMNS. Type locality: Ankyaba, Kakeroma-jima, near Amami-Oshima Islands, Japan (Fig. 4G).
C. berberense Ladd, 1972 holotype, lot 650429 at USNM. Type locality: drill hole E-1, Eniwetok (Marshall Islands), depth 1,260–1,270 ft [384.1–387.1 m], Early Miocene (Figs 4E, 4F).

Distribution: This species is distributed throughout the Indo-Pacific province.

Remarks: The apparent lack of microsculpture visible in the SEM photo of the syntype of *C. sepimentum* deposited at MNHN (Fig. 4D) exemplifies the infraspecific variability of the species. Microsculpture can be observed between the rings near the aperture.

Caecum vertebrale (Fig. 4H) is the closest species to *C. sepimentum*. However, *C. vertebrale* has the septum elevated beyond the cutting plane and a single thick ring at the aperture.

In our opinion, *C. sepimentum* var. *arcuata* [sic] is a juvenile specimen of *C. sepimentum*, since it shows the same characteristics in terms of septum and ring-shaped sculptures, and microsculpture. The only difference that can be seen is the more curved shape of var. *arcuata* (hence its name) and the more accentuated subcylindrical shape, which are typical characteristics of the juvenile specimens. *C. maculatum* (Fig. 4G) and *C. berberense* (Figs 4E, 4F) also belong to this species, having the same general shape, septum, aperture and number of rings.

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