

**Two new mathildids from the south-eastern coast of Africa  
(Gastropoda, Heterobranchia, Mathildidae)**

Paolo MARIOTTINI

Dipartimento di Biologia, Università "Roma Tre", Viale Marconi 446, I 00146 Roma, Italy;  
mariotpa@uniroma3.it [corresponding author]

Carlo SMRIGLIO

Via di Valle Aurelia 134, I 00167 Rome, Italy; csmriglio@alice.it

& Andrea DI GIULIO

Dipartimento di Biologia, Università "Roma Tre", Viale Marconi 446, I 00146 Roma, Italy;  
digiulio@uniroma3.it

Based on shell characters, two new species of the family Mathildidae Dall, 1889, are herein described from the south-eastern coast of Africa. The new species are clearly distinguishable from all the members of the family occurring in the Indian Ocean and Mozambique Channel on the base of their teleoconch shape and sculpture, and protoconch morphology.

Key words: Gastropoda, Heterobranchia, Mathildidae, *Mathilda*, taxonomy, Indian Ocean, corals.

INTRODUCTION

The family Mathildidae Dall, 1889, includes a small group of marine gastropods generally inhabiting deep-water biocoenoses that harbour cnidarians. In fact, these molluscs are associated to cnidarians for feeding habits, whereas their larval shell morphology suggests a long pelagic phase, usually associated with wide geographic distributions. The typical mathildid shell is high-spined, generally with a hyperstrophic protoconch and a sculpture consisting of intersecting axial and spiral ribs. This group of gastropods is considered a "lower heterobranch" branching (Haszprunar, 1988; Bieler, 1992; 1995), and up to now it has been rather poorly studied with most nominal species known from their type series only (Bieler, 1995). Along the south-eastern coast of Africa the genus *Mathilda* Semper, 1865, is actually represented by three species (Bieler, 1995), namely: *Mathilda amanda* Thiele, 1925, *Mathilda salve* Barnard, 1963, and *Mathilda sansibarica* Thiele, 1925. We had the opportunity to examine three shells of a mathildid that we were unable to classify among South African and Indopacific species of this family. These shells, collected along the Mozambique Channel, show very peculiar sculpture features that clearly separate them from the rest of the mathildids described so far. During comparative studies with some *Mathilda* material kept at the Natal Museum, kindly provided by Dr Herbert, we suspected that four other shells collected in South Africa represent an undescribed species. These specimens also show very unique morphological shell characters. So, two species new to science are herein described: *Mathilda mozambicensis* n. sp. from the Mozambique Channel and *Mathilda herberti* n. sp. from South Africa. Furthermore the distribution of *M. amanda* is extended with the records of shells from South Africa.

Abbreviations, for collections: CS-PM, Carlo Smriglio and Paolo Mariottini (Rome, Italy); MNHN, Muséum National d'Histoire Naturelle (Paris, France); NMSA, Natal Museum (Pietermaritzburg, South Africa). For shell characters: D, diameter; H, height; PD, protoconch diameter (in  $\mu\text{m}$ ); TW, teleoconch whorls (number).

## SYSTEMATICS

Family Mathildidae Dall, 1889

*Mathilda* Semper, 1865

Type species (by subsequent designation of De Boury, 1883: 112): *Turbo quadricarinatus* Brocchi, 1814; Pliocene, Italy.

*Mathilda mozambicensis* spec. nov. Mariottini & Smriglio (figs 1-9, 29)

Type series . – Mozambique, Zavora, off Xai-Xay, at 350-450 m depth (MNHN 21399/holotype; CS-PM/paratypes A, B).

Description. – Shell of medium size for the family, high-spired, cone-shaped, moderately slender; spire about 0.4 of total height.

Protoconch smooth, globular, transparent whitish, hyperstrophic, approximately diverging 30-35° (fig. 2a) from teleoconch axis; embryonic whorl exposed (the first whorl visible, only partially covered), multispiral, consisting of approximately 2 whorls; protoconch diameter 480 µm.

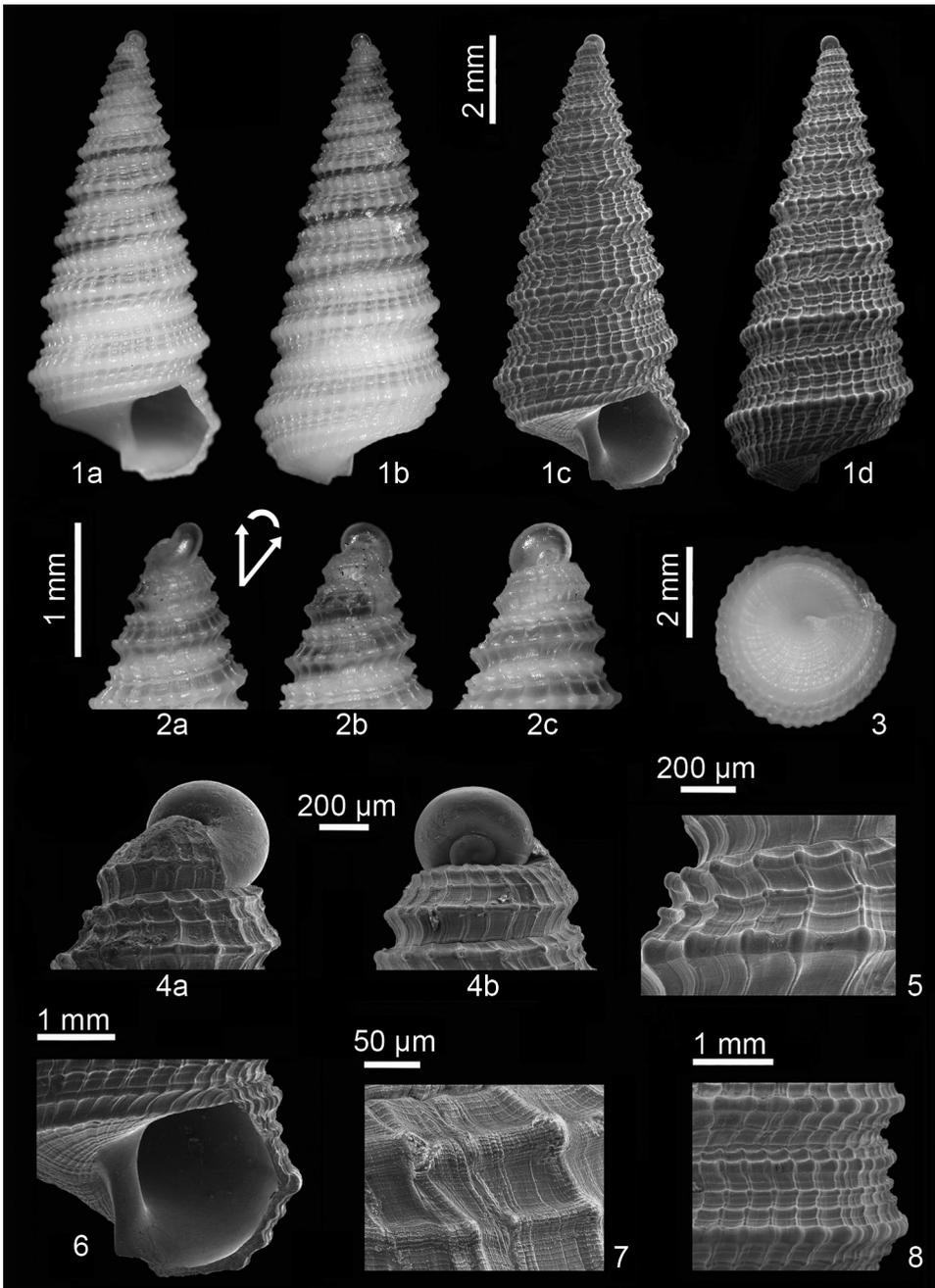
Teleoconch milky-white, translucent, semitransparent; cone-shaped with rounded whorls. Suture not distinct. Pattern of spiral (more prominent) and axial ribs (34 on last whorl) crossing at approximately right angles in the upper part of the whorl, spirals ribs are slightly opisthocline in the lower part. Spiral and axial ribs are forming evident nodules that are to some extent aculeate at several intersections. Regular spacing between axial and spiral ribs, their crossing form a well ordered arrangement in the upper part of the whorl, while rhomboids in the lower part. The bigger rows of rectangles and rhomboids are above and below the most prominent primary spiral rib that is positioned at about 2/3 of the spire. Spiral sculpture consisting in a rib pattern as "1+1+2+1+1". The four ribs on the upper part of the whorl quite evident, the first one is at the suture and exposed at the base of shell, the second one is stronger, the third and fourth show the same strength of the first one. The lower part of the whorl shows the strongest rib, while the lowermost one that serves as attachment of the subsequent whorl is weak (fig. 29, rib 7). Additional fine spiral threads are visible between the major spiral ribs, starting from the eighth whorl. At high magnification a spiral micro-sculpture is visible, consisting of very fine crenulated and partially interrupted threads, which completely cover the teleoconch. One strong and exposed basal rib (fig. 29, rib 8) and six fine spiral regular threads are visible at the basal area, crossed by many axial growth lines. Umbilicus closed. Aperture small, rounded, columellar and outer lips thin.

Distribution. – Known only from the type locality.

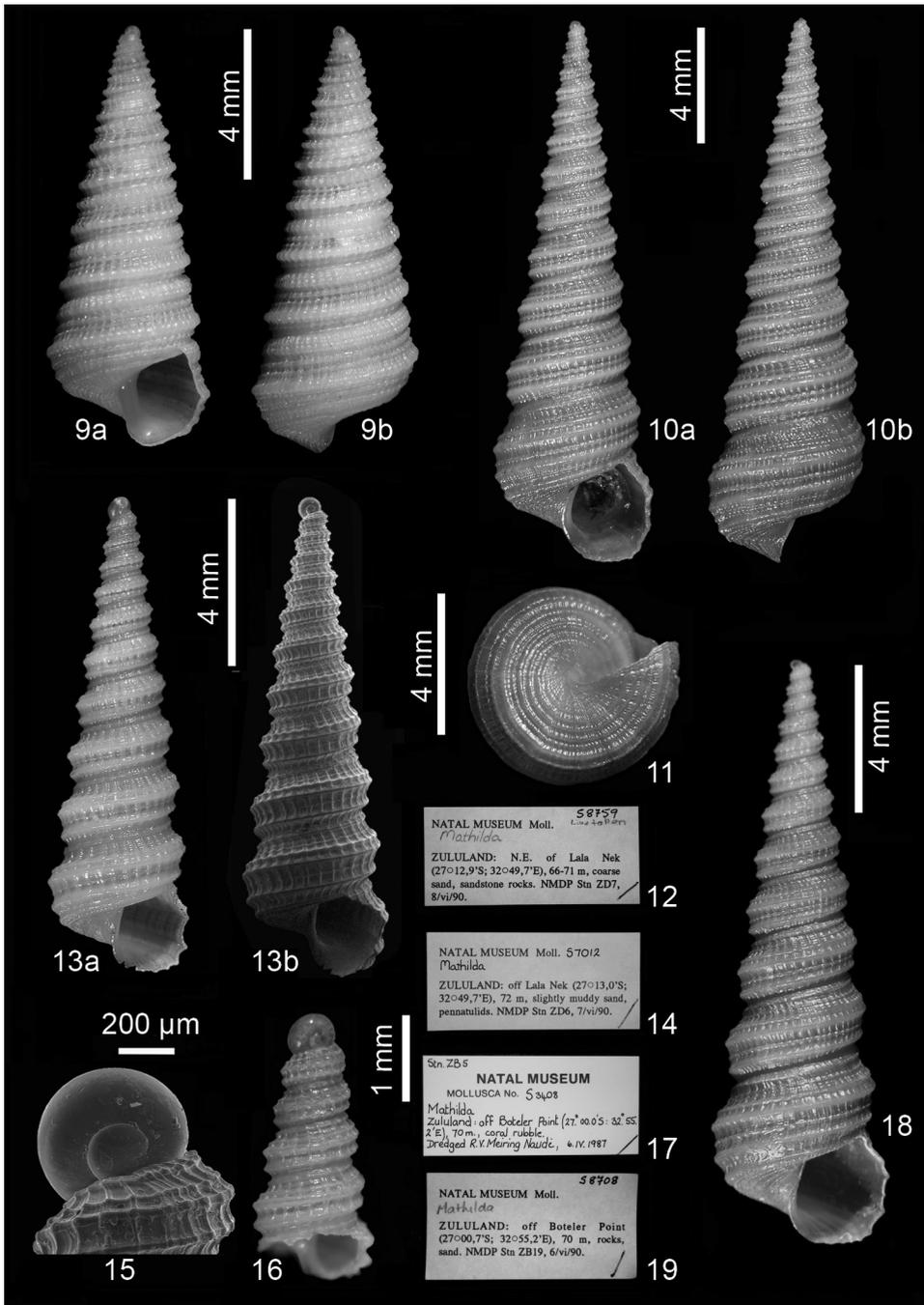
	H (mm)	D (mm)	H/D	TW	PD (µm)
Holotype	10.6	4.5	2.35	9.3	480
Paratype A	12.2	4.6	2.65	10.7	470
Paratype B*	10.0	4.0	2.50	9.5	?

\*Apex broken

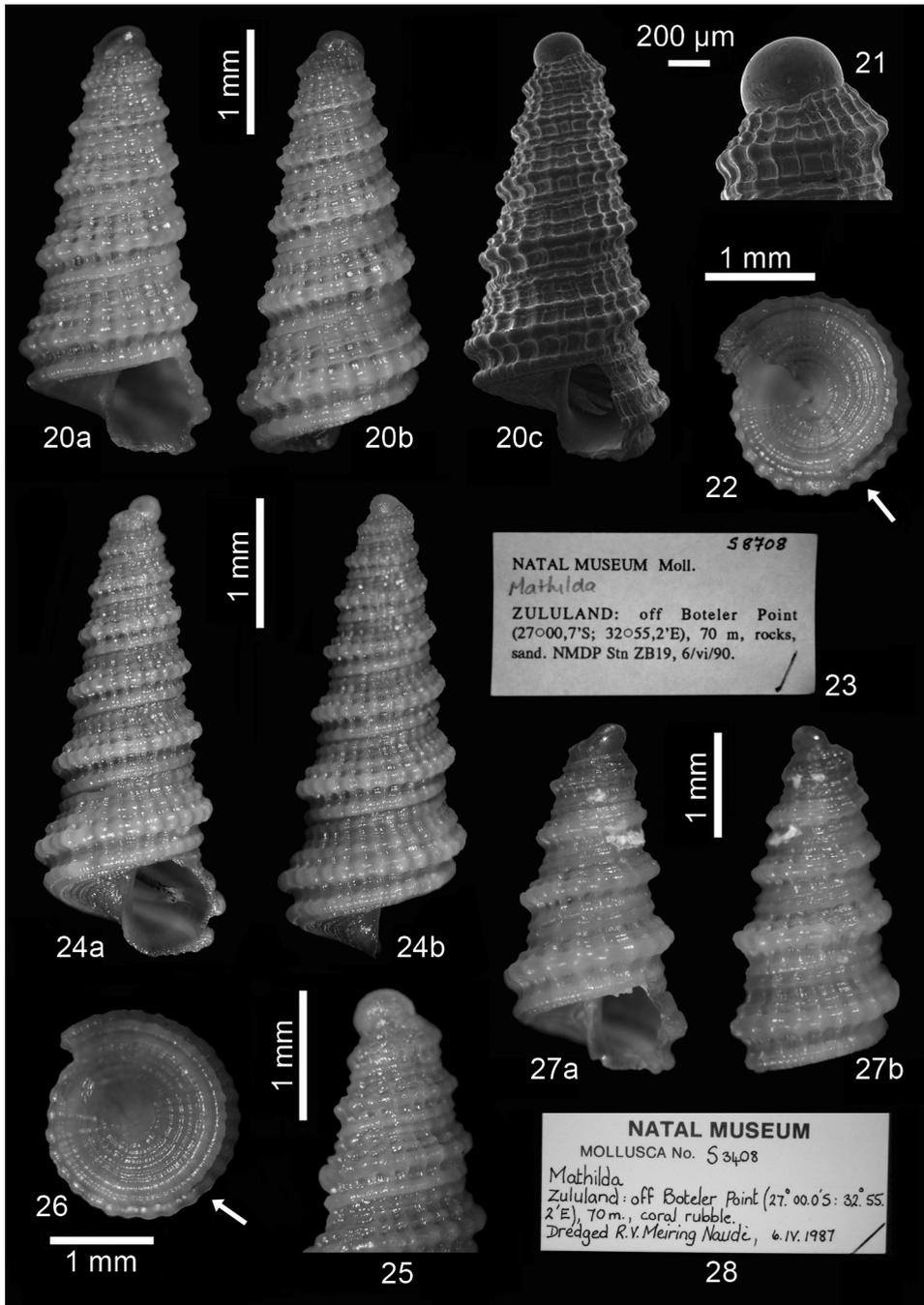
**Table 1.** Shell characters of *M. mozambicensis* spec. nov.



Figs 1-8. *Mathilda mozambicensis* spec. nov., holotype, 10.6×4.5 mm. 1a-d, optical and SEM (uncoated) frontal and dorsal views; 2a-c, optical details of protoconch and sketch of angle measured between protoconch and teleoconch axis; 3, basal view; 4a-b, SEM details of protoconch; 5-8, SEM details of the teleoconch sculpture.



Figs 9-19. Shells and museum labels of *Mathilda* species. 9a-b, *Mathilda mozambicensis* spec. nov., paratype A; 10-18, shells of *Mathilda amanda* Thiele, 1889. 10a-b, frontal and dorsal views; 11, basal view; 12, S8759 label; Zululand, Lala Neck, Stn ZD7, 66-71 m; 13a-b, frontal and dorsal views; 14, S7012 label; Zululand, Lala Neck, Stn ZD6, 72 m; 15, details of protoconch; 16, frontal view; 17, S3408 label; Zululand, off Boteler Point, Stn ZB5, 70 m; 18, frontal view; 19, S8708 label, Zululand, Lala Neck, Stn ZD6, 72 m



Figs 20-28. Shells and museum labels of *Mathilda herberti* spec. nov. 20-23, holotype. 20a-c, optical and SEM (uncoated) frontal and dorsal views; 21, SEM details of the protoconch; 22, basal view arrow pointing to the separation of rib 5; 23, S8708 label, Zululand, Lala Neck, Stn ZD6, 72 m. 24-26, paratype A. 24a-b, frontal and dorsal views; 25, details of sculpture; 26, basal view, arrow pointing to the separation of rib 5. 27-28, paratype B. 27a-b, frontal and dorsal views; 28, S3408 label, Zululand, off Boteler Point, Stn ZB5, 70 m.

Etymology. – The species is named after the Republic Mozambique, where the type locality is located.

Remarks. – The three specimens of the new taxon were apparently live-collected and show very constant morphological features. *Mathilda mozambicensis* clearly differs from the other mathildids by its peculiar rib pattern (“1+1+2+1+1”, fig. 29). Among the species that can be somewhat compared to the new taxon there is the South African *M. salve*, which shows a similar outline but a totally diverse teleoconch sculpture (Bieler 1995: pp. 611, 612; figs 31, 39) and a bigger protoconch (560-620 µm) (Bieler 1995: pp. 611, 613; fig. 34). In particular, *M. salve* shows a “2+2” pattern of exposed primary sculpture on the last whorl, with the fifth rib more or less exposed.

*Mathilda herberti* spec. nov. Smriglio & Di Giulio (figs 20-28, 30)

Type series. – South Africa, Zululand, off Boteler Point, 27°00.7'S 32°55.2'E (Stn ZB19) (NMSA/S8708/T2386/holotype; W6651/T2387, S3408/T2388 and W6652/T2389/paratypes A-C).

Description. – Shell rather small, holotype 4.8×2.3 mm, slender pagoda-shaped, spire about one fourth of total height.

Protoconch smooth, globular, transparent reddish-brown, hyperstrophic, approximately diverging 40-45° from teleoconch axis; embryonic whorl not exposed, multispiral, number of whorls not ascertained; protoconch diameter 500 µm.

Teleoconch reddish-brown, translucent, cone-shaped with angulated whorls. Base acutely angled. Suture not distinct. Pattern of spiral (more prominent) and axial ribs (24 on last whorl) crossing at approximately right angles. Spacing of the axial ribs regular, the crossing of spiral and axial ribs form a well ordered arrangement of rectangles, the bigger created between the third and the fourth spiral ribs. Spiral sculpture consisting of four ribs (“2+1+1” pattern), the two uppermost ones and the fourth lowermost one (that serves as attachment of the subsequent whorl) weak, while the middle third rib is the most prominent. One additional fine spiral thread is visible among the first and the second spiral ribs, starting from the third whorl. In the last whorl, a strong basal rib (fig. 30, rib 5), covered and not visible at the suture in the previous whorls, on half the base is more exposed and separated, forming a clear double keel. Another basal rib and four irregular threads are visible at the basal area, crossed by many axial growth lines. Umbilicus closed. Aperture small, angulated, columellar and outer lips thin.

Habitat. – The specimens were dredged from a bottom with rocks, sand and coral rubble at 70 m depth.

Distribution. – Only known from type locality.

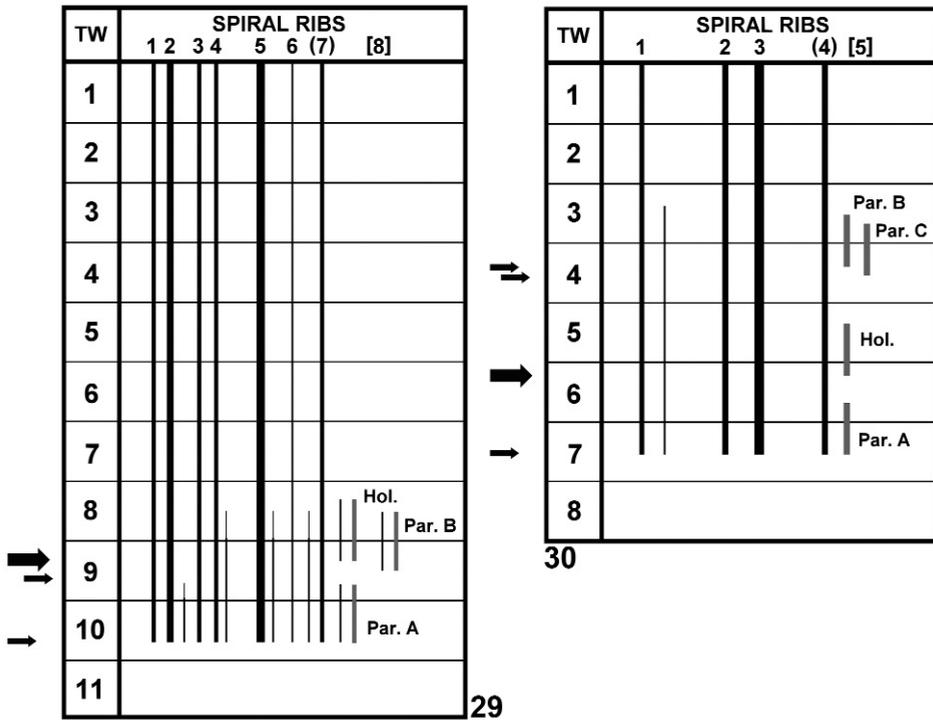
Etymology. – This species is named in honour of Dr Dai Herbert, recognized scientist who greatly contributed to malacology, and particularly to the knowledge of land snails of South Africa.

Remarks. – This new taxon shares a “2+1+1” rib pattern (fig. 30) with some small mathildids discussed by Bieler (1995: 610); among these only *Mathilda hendersoni* Dall, 1927, can be considered vaguely similar to *M. herberti*. The new taxon can be easily separated conchologically, i.e. by being less pagoda-shaped, with a completely different sculpture (Bieler, 1995: 620). It is noteworthy to mention that paratype A shows a slightly different protoconch development, albeit conserving a PD value on the average (table 2), since its embryonic whorl is partially exposed (fig 25).

	H (mm)	D (mm)	H/D	TW	PD (µm)
Holotype	4.8	2.3	2.08	5.4	500
Paratype A*	6.5	2.0	3.25	7.5	490
Paratype B	3.1	1.2	2.58	4.3	480
Paratype C	3.2	1.2	2.66	4.5	510

\*Embryonic whorl partially exposed

Table 2. Shell characters of *M. herberti* spec. nov.



Figs 29-30. Diagrams of spiral sculpture of the new mathildids, showing relative position and strength of exposed spiral ribs of teleoconch whorls (TW). Rib number in parentheses indicates primary spiral rib serving as attachment of subsequent whorl. Rib number in square parentheses indicates primary basal spiral rib. Arrows indicate holotype/paratype positions. 29, *M. mozambicensis* ; 30, *M. herberti*.

*Mathilda amanda* Thiele, 1889 (figs 10-19)

This mathildid most probably belong to a complex of species which share the typical "2+2" pattern (Bieler, 1995: 606). During comparative studies carried out with the *Mathilda* shells from the Natal Museum, kindly provided by Dr Herbert, we identified as *M. amada* some specimens in the same dredged material of *M. herberti*. With the record of these shells from South Africa the wide distribution of *M. amanda* (Bieler, 1995: 605), hitherto reported from east Africa (Tanzania) to Japan, is further extended.

Discussion. – With this contribution, the number of mathildids known from the south-eastern coast of Africa is increased by two new species, *M. mozambicensis* and *M. herberti*, and the new record of *M. amanda*. We like to recall the remarkable rib pattern shown by *M. mozambicensis* ("1+1+2+1+1"), never observed before in other mathildids, which reveals a much more complicated shell sculpture of this interesting group of gastropods.

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