

A new species of *Alvania* Risso, 1826 from the Western Indian Ocean (Gastropoda Rissoidae)

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ABSTRACT

A new species of the rissoid genus *Alvania* Risso, 1826 (Gastropoda Rissoidae) is described based on shells sorted out of a bioclastic sand sample collected with a trap box for *Marginella* species in Manda Toto Island (Lamu Archipelago, Kenya). It is compared with the most similar congeners.

KEY WORDS

Gastropoda; Rissoidae; Western Indian Ocean; *Alvania*; new species; taxonomy.

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INTRODUCTION

The genus *Alvania* Risso, 1826 (Gastropoda Rissoidae) as currently conceived includes a speciose group of small to large sized rissoid species living from the lower intertidal to bathyal depths, mostly on the continental shelf, where they are prevalently associated with algal facies (e.g.: Ponder, 1985; Gofas, 2007; Ávila et al., 2012), with few representatives in deeper waters down to 4700 m depth (Bouchet & Warén, 1993). They feed on diatoms, dinoflagellates, and detritus, with the deep-sea species presumably being selective deposit feeders (Ponder, 1985).

The genus *Alvania* comprises 279 known Recent species and 201 fossil ones (MolluscaBase, 2024) from the northeastern Atlantic Ocean and Mediterranean Sea, the northwestern Atlantic and the Caribbean, the eastern Pacific Ocean, the Indo-West Pacific Ocean, the temperate Australia, and South Africa (Ponder, 1985).

The Rissoidae are not considered in the limited general literature concerning the malacofauna of

Kenya (e.g.: Fowler, 2016). Furthermore, the few authors that have worked on rissoids from Kenya, have not, or only marginally treated the genus *Alvania* (e.g.: Bosch et al., 1998; Callea et al., 2005; Amati, 2024). A new species has been found in a bioclastic sand sample for Kenya, and it is described here

MATERIAL AND METHODS

The specimens studied herein have been sorted out a bioclastic sand sample, collected with a trap box for *Marginella* species, in Manda Toto Island (Lamu Arcipelago, Kenya) -2.21817, 41.01517, at approximately 2 m depth, in February 2023. The shells were studied and measured under a Kyowa stereomicroscope, with a micrometric eyepiece (with magnification X90, $\pm$ 10% deviation), using the method of Verduin (1982). Photographs have been taken with a Sony Cyber-shot DSC-W110 digital camera mounted on a Kyowa KBS and a Kyowa SDZ-P stereomicroscopes, edited with the software Combine-Z (Hadley, 2006). Current systematics is based on MolluscaBase (2024).

ABBREVIATIONS AND ACRONYMS. AMS: The Australian Museum (Sydney, Australia); BA: Bruno Amati collection (Roma, Italy); dd: empty shell(s). MNHN: National Museum of Natural History (Paris, France); ZMB: Museum für Naturkunde – Leibniz-Institut für Evolutions-und Biodiversitätsforschung an der Humboldt-Universität zu Berlin, Berlin (Germany); vs: *versus*.

RESULTS

Systematics

Classis GASTROPODA Cuvier, 1795
Subclassis CAENOGASTROPODA Cox, 1960
Ordo LITTORINIMORPHA Golikov et Starobogatov, 1975
Superfamilia RISSOOIDEA Gray, 1847
Familia RISSOIDAE Gray, 1847
Genus *Alvania* Risso, 1826

TYPE SPECIES. *Alvania europea* Risso, 1826: 142, pl. IX, fig. 116 synonym of *Alvania cimex* (Linnaeus, 1758) by subsequent designation (Nevill, 1885: 105).

Alvania pettinellii n. sp. (Figs 1; 2–8; Table 1)
<https://www.zoobank.org/A67F5EB7-588B-4BDF-ACF4-7804BD83B3A1>

DIAGNOSIS. *Alvania* small for the genus (height <2 mm), with rather robust shell; protoconch paucispiral; teleoconch morphologically scarcely variable; spiral sculpture predominant over the axial one. Coloration yellowish with quadrangular brownish subsutural and basal blotches.

TYPE MATERIAL. Holotype. KENYA • dd (height 1.57 mm, width 0.92 mm, Figs 2–5, 7, 8); Lamu Archipelago, Manda Toto Island; -2.21817, 41.01517; 2 m; bioclastic sand; Feb. 2023; Domenico Pettinelli legit; MNHN-IM-2000-39447. Paratypes. KENYA • 2 dd; same locality data as holotype; BA.

TYPE LOCALITY. Manda Toto Island, Lamu Archipelago, Kenya; 2.21817, 41.01517; 2 m depth.

DESCRIPTION OF THE HOLOTYPE. Shell (Figs 2–4). Small for the genus, height 1.57 mm, width 0.92 mm, height/width ratio 1.71, solid, ovate-conical. Protoconch (Figs 5, 7, 8) paucispiral, dome-shaped, of 1.3 whorls, height 0.276 mm, nucleus diameter 0.113 mm, fist half whorl diameter 0.188 mm, maximum diameter 0.363 mm; sculptured by 9 thin cordlets, slightly wrinkled. Protoconch-teleoconch boundary well marked, slightly opisthocline.

Teleoconch of 3.1 convex whorls, with sutures impressed. Spiral sculpture stronger than axial, of non-equidistant smooth cords, 8 on the last whorl, 3 above the aperture and 5 on the base. Cords I, II

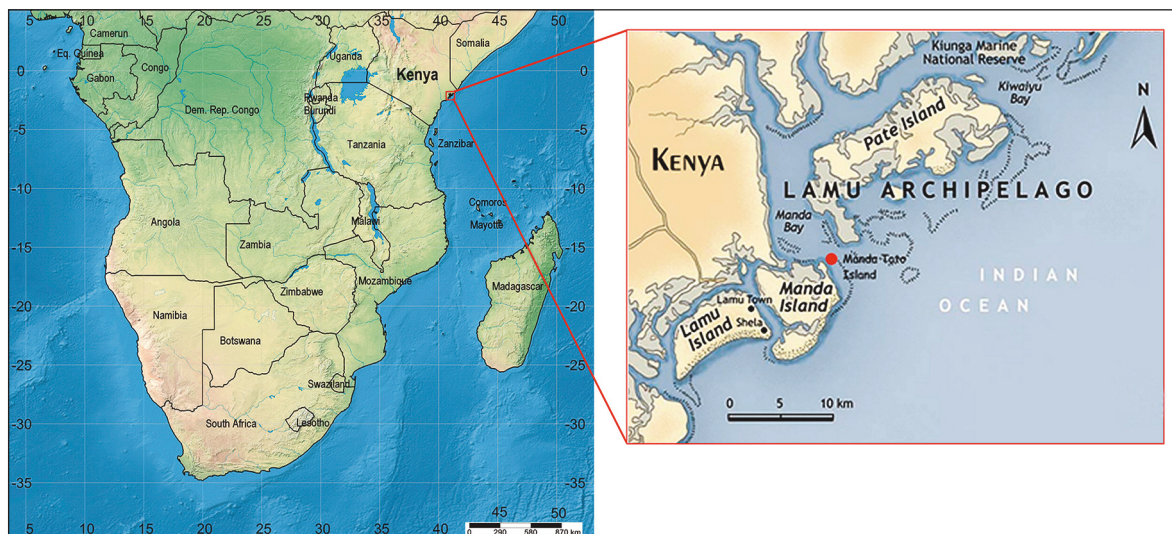
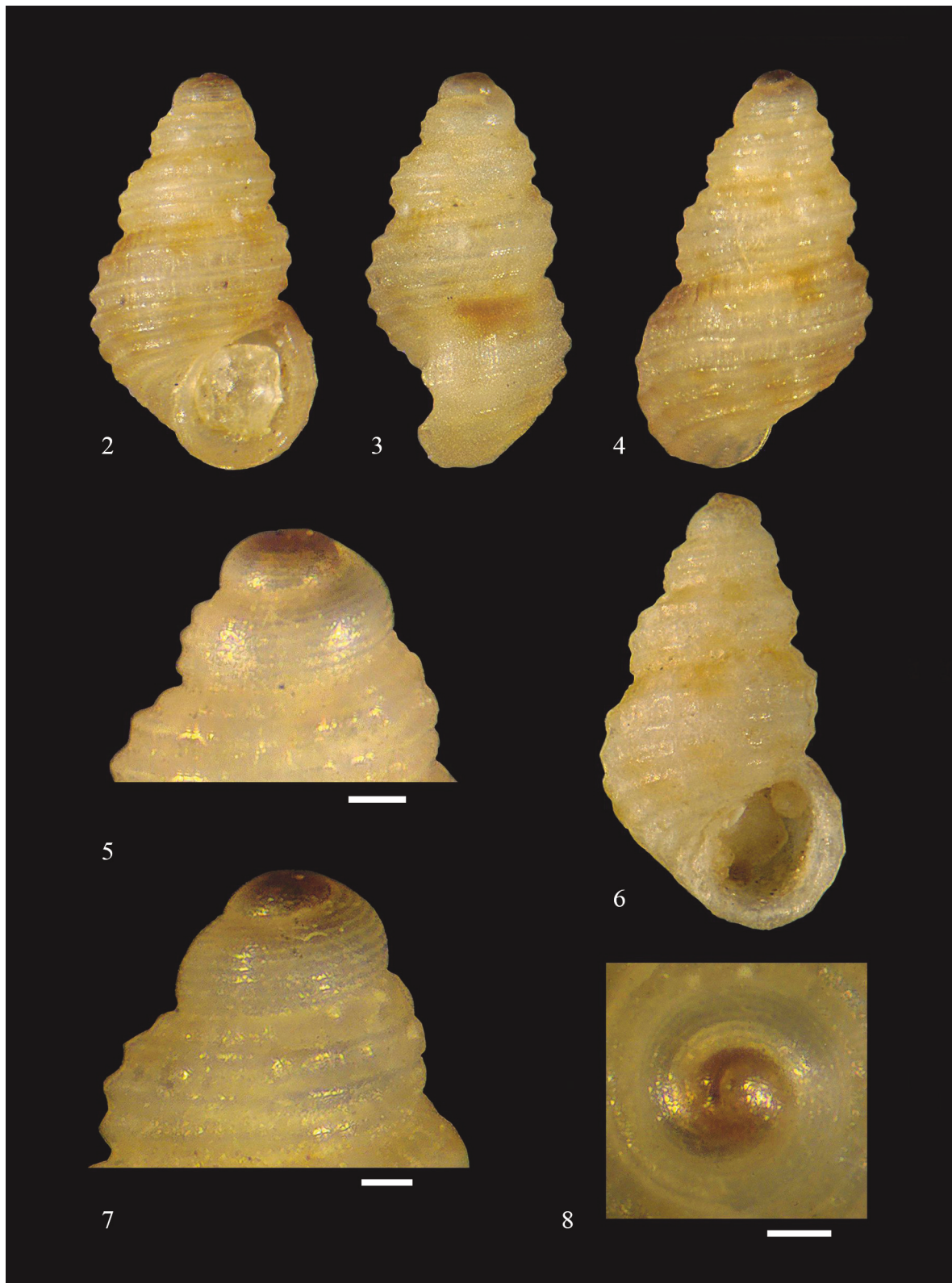


Figure 1. Type locality (red dot) of *Alvania pettinellii* n. sp., Indian Ocean, Kenya, Lamu Archipelago, Manda Toto Island.



Figures 2–8. *Alvania pettinellii* n. sp. Figs 2–5, 7, 8: holotype, Manda Toto Island (Kenya), height 1.57 mm (MNHN-IM-2000-39447). Fig. 6: paratype, Manda Toto Island (Kenya), height 1.73 mm (BA). Scale images 2–4, 6. Scale bars: 5, 7, 8, 100 μ m.

and III starting immediately after the protoconch-teleoconch boundary (Fig. 5); interspace between cords I and II slightly larger than between cords II and III. Numerous thin orthoclin3 axial riblets in the interspaces, c. 35 on the last whorl, interrupted on spiral cord IV; no thickening at the intersections. Umbilical fissure absent. Aperture pyriform, height 0.67 mm, height/aperture height ratio 2.34, peristome continuous, outer lip sharp, internally smooth, varix broad, slightly prosocline.

Colour: teleoconch yellowish with quadrangular brownish subsutural and basal blotches, and a darker subsutural spot on the outer lip. Initial part of the protoconch (nucleus and first half whorl) dark brown (Fig. 8).

Operculum and soft parts unknown.

VARIABILITY. Only three specimens examined, two adults and one juvenile: no significant variation detected (Table 1). Maximum measurements: height 1.73 mm, width 0.97 mm, height/width ratio 1.78, aperture height 0.67 mm, height/aperture height ratio 2.58 (Fig. 6).

ETYMOLOGY. Named after Domenico Pettinelli (Roma) who collected the bioclastic sand sample in which the new species was found and made it available for study.

DISTRIBUTION. *Alvania pettinellii* n. sp. so far known only on empty shells from the type locality: the western Indian Ocean in East Africa (Kenya), in 2 m depth (Fig. 1).

REMARKS. *Alvania isolata* (Laseron, 1956) from Australia (see Laseron, 1956: 439, fig. 144; Ponder, 1985: 142, figs 93 A, B; Amati *et al.*, 2023: 808, figs 4A–H; 48; Fig. 9), differs from *A. pantanellii* n. sp.

in its teleoconch with axial and spiral sculpture of equal thickness; the four spiral cords on the whorls *vs* three in *A. pettinellii* n. sp.; the protoconch with 4–5 smooth spiral cordlets *vs* 9 thin cordlets in *A. pettinellii* n. sp.; the different chromatic pattern (whitish, with series of pairs of short brown lines *vs* yellowish with quadrangular brownish subsutural and basal blotches in *A. pettinellii* n. sp.).

Alvania albachiarae Perugia, 2021 from Oman (see Perugia, 2021: 1, pl. 1, figs. d–f), differs from *A. pettinellii* n. sp. in its four spiral cords on the teleoconch *vs* three in *A. pettinellii* n. sp.; the cords I, II, III and IV starting immediately after the protoconch-teleoconch boundary *vs* cords I, II, III in *A. pettinellii* n. sp.; the axials thicker and fewer, forming tubercles at the intersections with spirals.

Alvania denseclathrata Thiele, 1925 from southern Africa, (see Thiele, 1925: 81, pl. 6, fig. 11; Amati *et al.*, 2023: 806, figs 2A–G; 48; Fig. 10), differs from *A. pettinellii* n. sp. in its larger size (height 2.2 mm *vs* 1.73 mm in *A. pettinellii* n. sp.); the axial and spiral sculpture denser, of equal thickness *vs* spirals thicker than axials in *A. pettinellii* n. sp.; the coloration uniform whitish, devoid of spots, present in *A. pettinellii* n. sp.

Alvania herosae Amati, Di Giulio *et al.* Oliverio, 2024 from French Polynesia (see Amati *et al.*, 2023: 811, figs 7A–E; 8A–E; 9A–F; 10A–D; 11A–D; 12A–E; 13A–I; 49A; 53B, C; Fig. 11), differs from *A. pettinellii* n. sp. in its more robust axial sculpture which, at the intersection with the spiral cords, forms evident tubercles, absent in *A. pettinellii* n. sp.; the different chromatic pattern (protoconch monochrome and columellar area brownish *vs* nucleus and first half whorl dark brown, and columellar area yellowish in *A. pettinellii* n. sp.).

Protoconch	1	2	3	Min–max	Mean	St. dev.
Height	0.276	0.263	0.238	0.238–0.276	0.259	0.019
Diameter of the nucleus	0.113	0.125	0.113	0.113–0.125	0.117	0.007
Diameter first half whorl	0.188	0.225	0.213	0.188–0.225	0.209	0.019
Maximum diameter	0.363	0.350	0.325	0.325–0.363	0.346	0.019
N° of whorls	1.3	1.3	1.3	1.3	1.3	0
Paucispiral	yes	yes	yes	yes	yes	

Table 1. Measurements of the protoconch of *Alvania pettinellii* n. sp. in mm, with range, mean, and standard deviation. 1. Holotype, 2, 3 paratypes. All from the type locality.

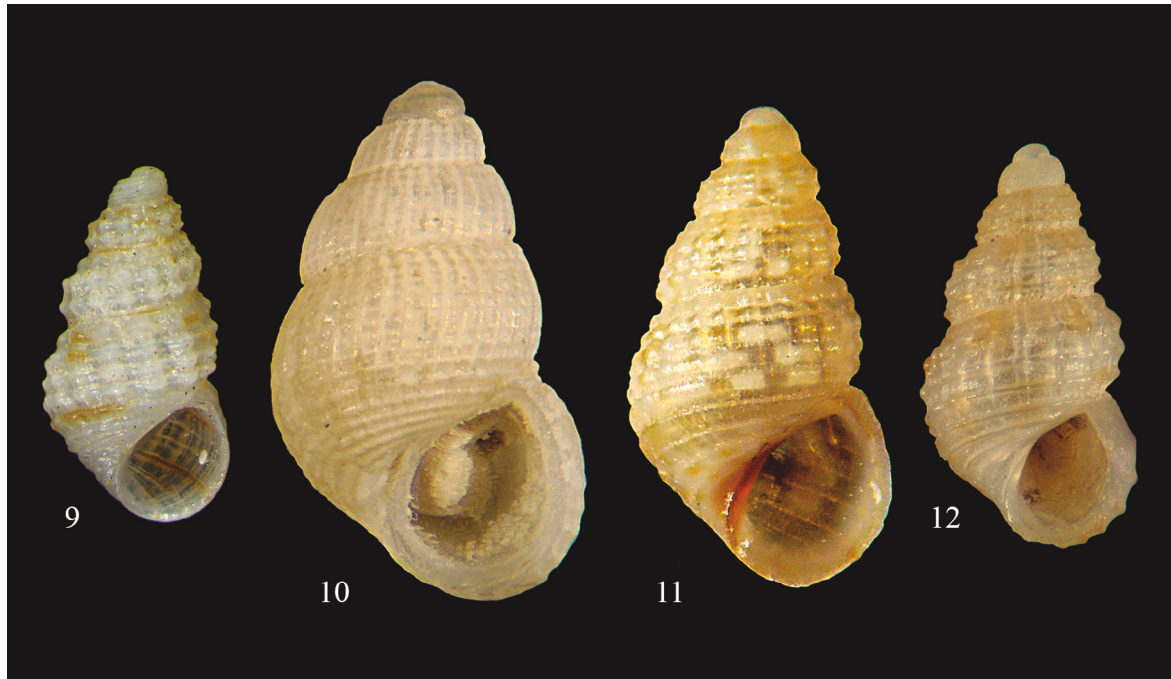


Figure 9. *Alvania isolata* (Laseron, 1956), holotype, height 1.5 mm, Christmas Island, depth unknown, AMS C.102476, (photo: A.C. Miller; copyright: Australian Museum). Figure 10. *Alvania denseclathrata* (Thiele, 1925), lectotype, height 2.2 mm, South Africa, Valdivia Stn 95, 80 m, ZMB/Moll. N ° 64984. Figure 11. *Alvania herosae* Amati, Di Giulio et Oliverio, 2023, holotype, Australes, Rapa, Tupuaki Bay, Atelier RAPA Stn 21, 5 m, height 2.02 mm, MNHN-IM-2000-38704. Figure 12. *Alvania uapou* Amati, Di Giulio et Oliverio, 2023, holotype, height 1.70 mm, Marquesas, Ua Pou, Motu Mokohe, Atelier MARQUISES Stn 20, 10–15 m, MNHN-IM-2000-38710. Scale images.

Alvania uapou Amati, Di Giulio et Oliverio, 2024 from French Polynesia (see Amati et al., 2023: 824, figs 18A–F; 19A–E; 49C; 53F; Fig. 12) differs from *A. pettinellii* n. sp. in its most robust and fewer axials; the protoconch sculptured with seven zig-zag spiral threads vs nine thin cordlets in *A. pettinellii* n. sp.

Alvania sp. 1 (see Hasekawa, 2006: 107, 108, fig. 3) from Philippines differs from *A. pettinellii* n. sp. in its spiral and axial sculpture of equal robustness vs spirals thicker than axials in *A. pettinellii* n. sp.; the aperture internally lyrate vs smooth in *A. pettinellii* n. sp.; the different chromatic pattern (with small brownish spots scattered on the whitish background vs yellowish with quadrangular brown subsutural and basal blotches in *A. pettinellii* n. sp.).

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