

## A new species of the genus *Alvania* Risso, 1826 (Caenogastropoda Rissoidae) from Sri Lanka

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### ABSTRACT

A new shallow-water species of the genus *Alvania* Risso, 1826 (Caenogastropoda Rissoidae) from Sri Lanka is described and illustrated. *Alvania perugia* n. sp. is compared with some similar congeners, especially the sister species *Alvania taprobana* Amati et Perugia, 2026, which differs from the new species almost exclusively in the protoconch morphology (and larval development). Further taxonomic and biological informations on this group are provided.

### KEY WORDS

Gastropoda; Rissoidae; Indian Ocean; new species; taxonomy; larval shells.

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### INTRODUCTION

The genus *Alvania* Risso, 1826 (Caenogastropoda Rissoidae), as currently accepted, includes numerous small to medium 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 281 known recent species and 213 extinct ones (MolluscaBase, 2026) from the Northeastern Atlantic and Mediterranean, Northwestern Atlantic and Caribbean, Eastern Pacific, Indo-West Pacific, temperate Australia, and South Africa (Ponder, 1985). The genus dates back to the European Oligocene (Cossmann & Pissarro, 1913; Lozouet, 1998; Garilli & Parrinello, 2010) with the extant fauna being the re-

sult of a remarkable diversification from the Miocene to the Pleistocene (e.g. Sacco, 1895; L. Seguenza, 1903).

Features of the embryonic/larval shells (protoconch) have been traditionally employed in the taxonomy of *Alvania* species (e.g.: *Alvania aartseni* Verduin, 1986, *Alvania campanii* Tisselli et Giunchi, 2013, *Alvania nestaresi* Oliverio et Amati, 1990, *Alvania oetyliaca* Amati et Chiarelli, 2017, *Alvania pilipina* Amati et Perugia, 2026). In particular, under the assumption that poecilogony has not been proven in this group (Bouchet, 1989), multi-spiral v. paucispiral protoconchs (indicating planktotrophic v. lecithotrophic larval development, respectively) have been used to discriminate sibling species differing in their larval development (Oliverio, 1996).

A new species is here described, based on a single empty shell, sorted out a bioclastic sand sample from Sri Lanka (Indian Ocean). It is almost indistinguishable from *Alvania taprobana* Amati et Perugia, 2026, except that in the new species the protoconch is paucispiral.

## MATERIAL AND METHODS

The material examined consisted of empty shells sorted out of bioclastic sand samples, collected from the intertidal zone to 2–3 m depth, comprising the type series of *Alvania taprobana* (Amati & Perugia, 2026) and the single specimen of the new species. The shells were measured under a stereomicroscope (with magnification X90) with a micrometric eyepiece with  $\pm 10\%$  deviation, using the method of Verduin (1982). Light photographs were taken with a digital camera mounted on a stereomicroscope and digitally edited with Combine-Z (Hadley, 2006).

We have used a standardised format for the citation of specimen data in the “Type material” and the “Other material examined” sections, as described by Chester et al. (2019), with the following data-fields: Country (or major geographic area) • number of specimens (lv and/or dd); locality data (from largest to smallest); geographic coordinates (in decimal degrees); depth; date (format “dd Mmm. YYYY”); other collecting data (e.g. legit, habitat); collection and catalogue code.

ABBREVIATIONS AND ACRONYMS. dd: empty shell(s). MNHN: Muséum national d’Histoire naturelle (Paris, France). SEM: Scanning Electron Microscope.

## RESULTS

### *Systematics*



Figure 1. Type locality (red dot) of *Alvania perugia* n. sp., Hikkaduwa, Sri Lanka.

Classis GASTROPODA Cuvier, 1795  
 Subclassis CAENOGASTROPODA Cox, 1960  
 Ordo LITTORINIMORPHA Golikov et Starobogato-  
 tov, 1975  
 Superfamilia RISSOOIDEA J.E. Gray, 1847  
 Familia RISSOIDAE J.E. Gray, 184  
 Genus *Alvania* Risso, 1826: 140  
 Type species: *Alvania europea* Risso, 1826: 142, pl.  
 IX, fig. 116, currently accepted as *Alvania cimex*  
 (Linnaeus, 1758) by subsequent designation  
 (Nevill 1885: 105).

*Alvania perugia* n. sp. - Figs. 2–4, 8–11  
<https://zoobank.org/2837979F-9933-42D1-8C34-A4FC267BC6E4>

TYPE MATERIAL. Holotype. SRI LANKA • 1 dd; Hikkaduwa; 6.13°N, 80.08°E; depth 2–3 m; Oct. 2006; I. Perugia legit, rocky bottom and pebbles, height 2.08 mm, width 1.21 mm, Figs. 2–4, 8–11; MNHN-IM-2000-40554.

TYPE LOCALITY. Sri Lanka, Hikkaduwa, 6.13°N, 80.08°E (Fig. 1).

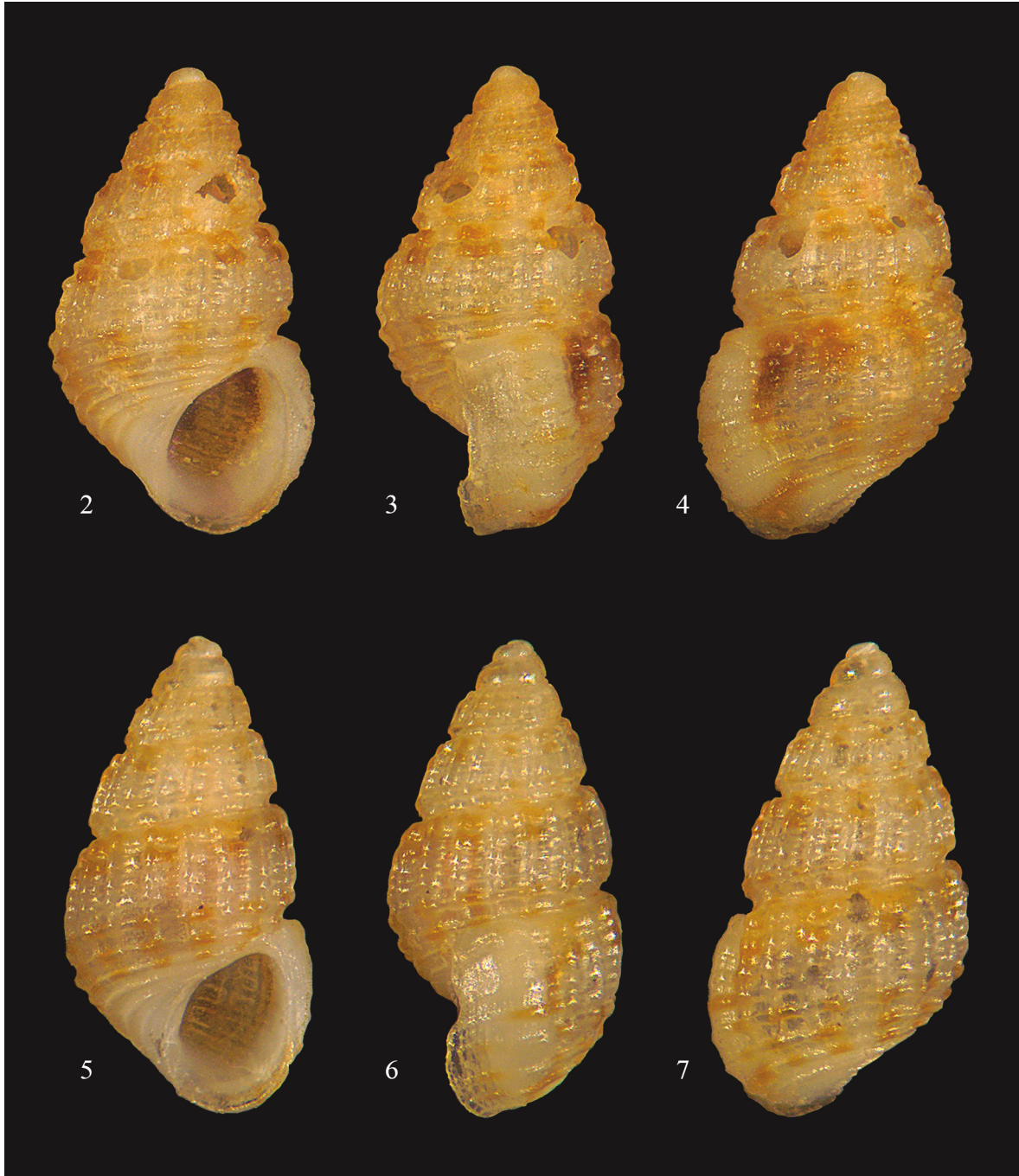
DIAGNOSIS. Shell small for the genus c. 2 mm, protoconch paucispiral; ovate-conical, robust, teleoconch with double sculpture (axial and spiral) of same thickness, slightly opisthocline axial ribs; peristome simple with large varix. Whitish-yellow with series of subsutural and basal spots.

DESCRIPTION OF THE HOLOTYPE. Shell (Figs. 2–4, 8–11) small for the genus, height 2.08 mm, width 1.21 mm, height/width ratio 1.72, ovate-conical. Protoconch paucispiral, of 1.30 whorls, height 0.25 mm, diameter of the nucleus 0.11 mm, diameter of the first half whorl 0.20 mm, maximum diameter 0.31 mm, sculptured by 10 irregular spiral cordlets with a zigzagging pattern, often fused or intertwined, more numerous on the nucleus (Fig. 10). Protoconch-teleoconch boundary well marked, slightly prosocline (Fig. 11). Teleoconch of 3.7 slightly convex whorls, with suture impressed, scarcely canaliculated. Axial sculpture on the last whorl of 16 opisthocline ribs, thinner than interspaces, gradually vanishing at the base. Spiral sculpture of non-equidistant cords, twelve on last whorl, six (I–VI) above the aperture and six (VII–XII) on the base; cords I, II, III and V starting immediately after the protoconch-teleoconch boundary, cords I and III weaker than oth-

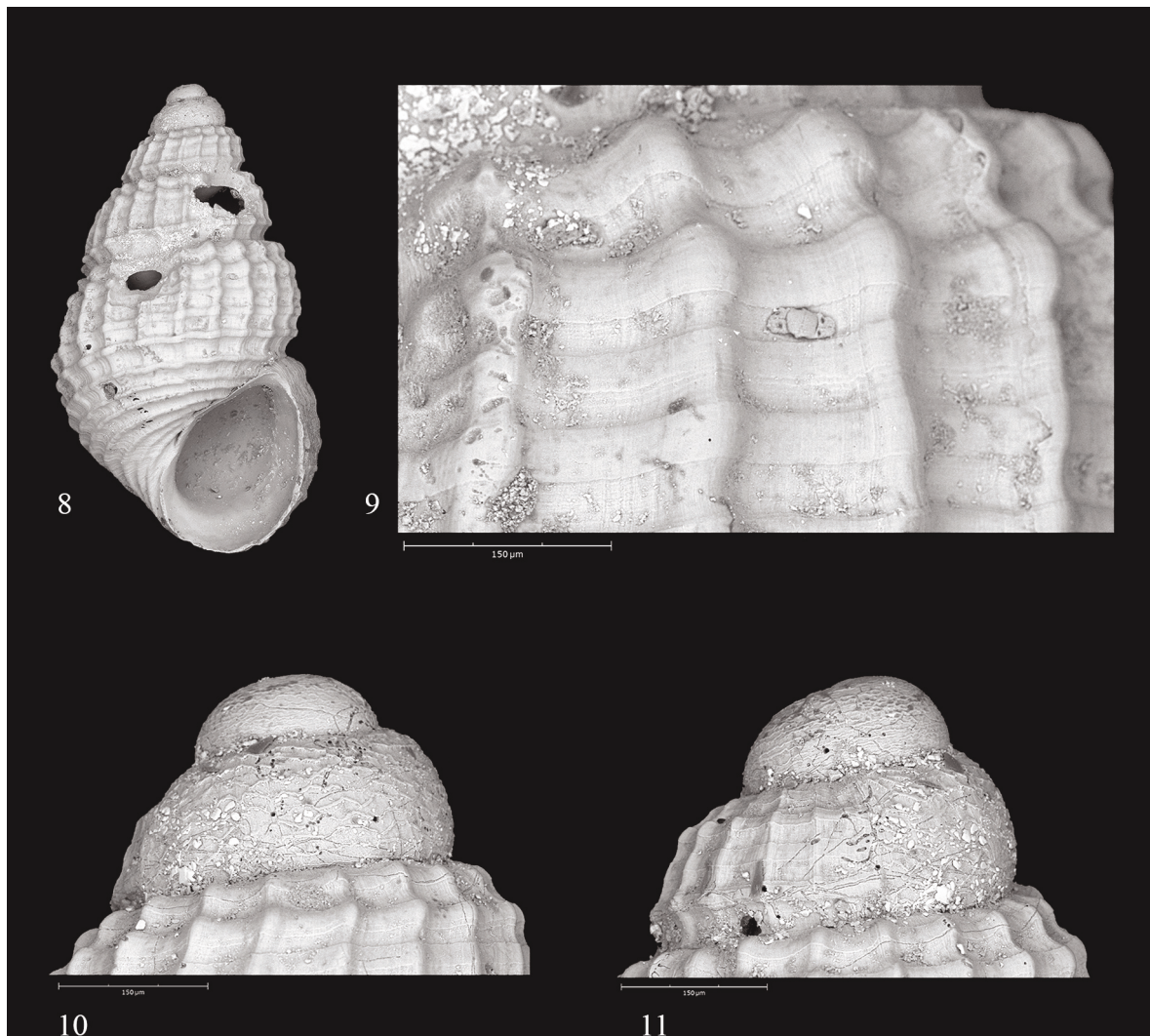
ers. Rounded tubercles at the intersections. Teleoconch microsculpture of spiral threads on the entire surface, more marked in the interspaces, crossing the growth lines (Fig. 9). Umbilical chink absent. Aperture piriform, height 0.85 mm,

height/aperture height ratio 2.45, peristome continuous, outer varix large prosocline, outer lip sharp, internally smooth.

Coloration of shell yellow-whitish with two series of subsutural spots and three series of basal



Figures 2–4. *Alvania perugia* n. sp., holotype, Hikkaduwa, Sri Lanka, height 2.08 mm, width 1.21 mm, MNHN-IM-2000-40554. Figures 5–7. *Alvania taprobana* Amati et Perugia, 2026, holotype, Hikkaduwa, Sri Lanka, height 2.1 mm, width 1.05 mm.



Figures 8–11. *Alvania perugia* n. sp., holotype, Hikkaduwa, Sri Lanka, height 2.08 mm, width 1.21 mm, MNHN-IM-2000-40554. Fig. 8: shell. Fig. 9: detail of the microsculpture of the last whorl. Figs 10, 11: detail of the first whorls. Scale bars: 9–11 = 150 µm.

spots, two brown spots behind the varix, the sub-sutural darker. Operculum and soft parts unknown.

**ETYMOLOGY.** Named after Ivan Perugia (Ravenna, Italy), for the precious contribution in making the examined material available. Used as a noun in apposition.

**DISTRIBUTION.** The species is known only from the type locality.

**REMARKS.** The only specimen examined of *A. perugia* n. sp., was found in the same sample as the type series of *Alvania taprobana* Amati et Perugia, 2026. *Alvania taprobana* (Amati & Perugia, 2026:

10, fig. 5; fig. 8. D; Figs. 5–7) is almost indistinguishable from the new species except for the protoconch, which is multispiral (v. paucispiral in *A. perugia* n. sp.) reflecting two contrasting larval developmental strategies: planktotrophic v. non planktotrophic, respectively.

*Alvania ogasawarana* (Pilsbry, 1904), from Hahajima, Ogasawara, Japan (Pilsbry, 1904: 26, pl. IV, fig. 41; Amati & Perugia, 2026: 13, fig. 7A–D), differs from *A. perugia* n. sp. in its first whorls more acute; the sculpture of the spiral cords and axial ribs thinner, with smaller tubercles at intersections; the axial ribs more flexuous. The proto-

conch, of 1.20 whorls, is sculptured with 5–6 thin, non-equidistant spiral cordlets, interspersed with microtubercles v. 1.30 whorls, sculptured with 10 zigzagging spiral cordlets, often fused or intertwined, more numerous on the nucleus in *A. perugia* n. sp.

*Alvania crystallina* (Garrett, 1873) from Fiji Islands (Garrett, 1873: 216, pl. 2, fig. 24) differs from *A. perugia* n. sp., in its lower height/width ratio (2.13 vs 1.72), the more obtuse protoconch; the umbilical chink present v. absent; with more numerous axial ribs (more than 20 v. 16).

Marine shelled gastropods are very special models for eco-evolutionary studies, since the type of larval development is indicated by the morphology of their larval shells (Jablonski & Lutz, 1980), usually preserved at the tip of the adult shell. Larval strategies are crucial in the evolution of species (e.g.: Jablonski & Lutz, 1983; Oliverio, 1996). The loss of larval planktotrophy has occurred repeatedly in caenogastropods resulting in pairs of species, with similar to almost identical teleoconchs and different protoconchs (multi. v. paucispiral) (see Bouchet, 2002; Oliverio, 1996; 1997). Such pairs of species with a different larval development are already known in present day Rissoidae (see e.g. *Alvania rudis* (R.A. Philippi, 1844) / *Alvania litoralis* (F. Nordsieck, 1972), *Alvania cimex* (Linnaeus, 1758) / *Alvania mamillata* Risso, 1826, *Rissoa auriscalpium* (Linnaeus, 1758) / *Rissoa italiensis* Verduin, 1985, *Rissoa similis* Scacchi, 1836 / *Rissoa scurra* (Monterosato, 1917) and *Rissoa guerinii* Récluz, 1843 / *Rissoa lia* (Monterosato, 1884).

*Alvania perugia* n. sp. / *Alvania taprobana*, are therefore a new pair of species with similar teleoconchs but with different larval development, and which represent the first case of sister species for the Indian Ocean. A rare case of sister species was recently reported in Muricidae Rafinesque, 1815 in the tropics (Houart et al., 2025).

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