

# A new tiny *Conus* species from the Philippines (Gastropoda, Conidae)

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A species of *Conus* (*Pseudolilliconus*) from the Philippines is described as new to science and named *C. (P.) molaerivus* spec. nov. in honour of Robert G. Moolenbeek. It has been found in shallow waters off Mactan, Samar and Mindanao. It is compared to *Conus* (*Pseudolilliconus*) *traillii* A. Adams, 1855, and similar species and morphs.

Key words: Conidae, *Pseudolilliconus*, *molaerivus*, new species, Indo-Pacific, Philippines.

## INTRODUCTION

The subgenus *Conus* (*Pseudolilliconus*) Tucker & Tenorio, 2009, is a recently described taxon to encompass tiny *Conus* species. *Pseudolilliconus* was originally described as a genus, but Puillandre et al. (2014, 2015) classified it as a subgenus under *Conus*. This subgenus accommodates the tiniest *Conus* species of the whole family and as such it is an interesting group within a family with mostly rather large to sometimes very large shells. *Pseudolilliconus* taxa live in rather shallow water, but were mostly overlooked due to the relatively small size of the shells. Empty shells are mostly collected from shell grit (Leo van Gemert, personal communication). Puillandre et al. (2014) recognise seven valid species within this subgenus. The Dutch malacologist Robert Moolenbeek was involved in the description of two species: *Conus* (*P.*) *boschorum* Moolenbeek & Coomans, 1993, and *Conus* (*P.*) *kuiperi* Moolenbeek, 2006 (the latter originally described in the subgenus *Lilliconus* G. Raybaudi Massilia, 1994).

The former species has been designated as the type species of *Pseudolilliconus*.

At present (Puillandre et al., 2014, 2015) the following species are included in the subgenus *Pseudolilliconus*: *boschorum* Moolenbeek & Coomans, 1993; *korni* G. Raybaudi Massilia, 1993; *kuiperi* Moolenbeek, 2006; *levis* (Bozzetti, 2012); *scalarispira* (Bozzetti, 2012); *traillii* A. Adams, 1855; *visseri* Delsaerd, 1990; *wallacei* (Lorenz & Morrison, 2004). The two almost smooth species from Madagascar described by Bozzetti [*C. (P.) levis* (Bozzetti, 2012) and *C. (P.) scalarispira* (Bozzetti, 2012)] may belong to a different subgenus because of the morphological differences compared to the other species with well visible spiral ribbing; in addition Madagascar is rather isolated if one takes the distribution of the other *Pseudolilliconus* species into consideration.

Below a new *Conus* (*Pseudolilliconus*) species is described, which has been found in the Philippines. This species is dedicated to Robert G. Moolenbeek; the general look of the new species resembles a reversed cone with ice-cream topping.

Abbreviations: AMD, Aart M. Dekkers collection (Blokker, The Netherlands); AW, Alain van 't Woud collection (Den Hoorn, The Netherlands); BMNH, British Museum (Natural History) (London, U.K.); H, Height; HD, Henk Dekker collection (Winkel, The Netherlands); JG, Jeroen Goud collection (Leiden, The Netherlands); LvG, Leo van Gemert collection (Zeist, The Netherlands); RM, Robert Moolenbeek collection (Ankeveen, The Netherlands); RV, Rob Vink collection (Vlaardingen, The Netherlands); RMNH, Naturalis Biodiversity Center (Leiden, The Netherlands).

## SYSTEMATIC PART

Superfamily Conoidea Fleming, 1822

Family Conidae Fleming, 1822

*Conus* Linnaeus, 1758

subgenus *Pseudolilliconus* Tucker & Tenorio, 2009.

Type species (by original designation): *Conus boschorum*

Moolenbeek & Coomans, 1993

***Conus (Pseudolilliconus) molaerivus spec. nov.***

(Figs 1-7)

Type material, all from Philippines. – Holotype (Fig. 1):

RMNH.5004022, H 4.6 mm. Cebu, Mactan Island, 10-20 m, ix.2015. Paratypes (Figs 2-7): Type locality, AMD/2; Mindanao, Surigao, 20 m, v.2015, AMD/2 + LvG/1 + RV/1; Samar, Guian, shallow water, iii.2015, AMD/1 + RM/2; Mindanao, Surigao, 10-20 m, vi.2015, AMD/1 + RMNH/2 + RM/2 + HD 36920/2; Mindanao, Surigao, 10-20 m, viii.2015, AMD/5; Mindanao, Surigao, 10-20 m, iv.2016, AW/1.

Type locality. – Philippines, Central Visayas, Mactan Island.

Distribution. – Shells are only known from the Philippines: Central Visayas (Mactan), Samar (Guian) and Mindanao (Surigao). All shells come from one vendor, and are dived in 10-20 meters.

Description. – Shell tiny, H 4.0-5.1 mm (holotype H 4.6 mm), almost biconic, with 4.5 convex whorls, well-marked but not very deep sutures. Protoconch worn off; the remainder is white. On the first post nuclear whorl, a small alternate white and brown line appears just above the suture. On the second post nuclear whorl whitish axially aligned flames on a more cream background; the flames are a little raised and not sharply marked. The whole spire is of the same design including the upper part of the body whorl. On the body whorl the alternate white and brown line proves to be two close set lines of which one is apparently covered by the following whorl (on the spire). Thereunder about 14-15 similar thin lines which get coarser and broader towards the abapical end of the shell. These lines are a little raised. The alternate white and brown parts on the lines are roughly on the same axial place on the shell which therefore looks like bearing (imaginary) flames.

Shoulder rounded, sutural ramp smooth. The part of the ramp that is covered with the white flames is a little bit raised compared to the spaces between them. Mouth slender; widens a little towards the abapical end because of the concavity of the shell near the axis.

Habitat. – Rocky environment in rather shallow water.

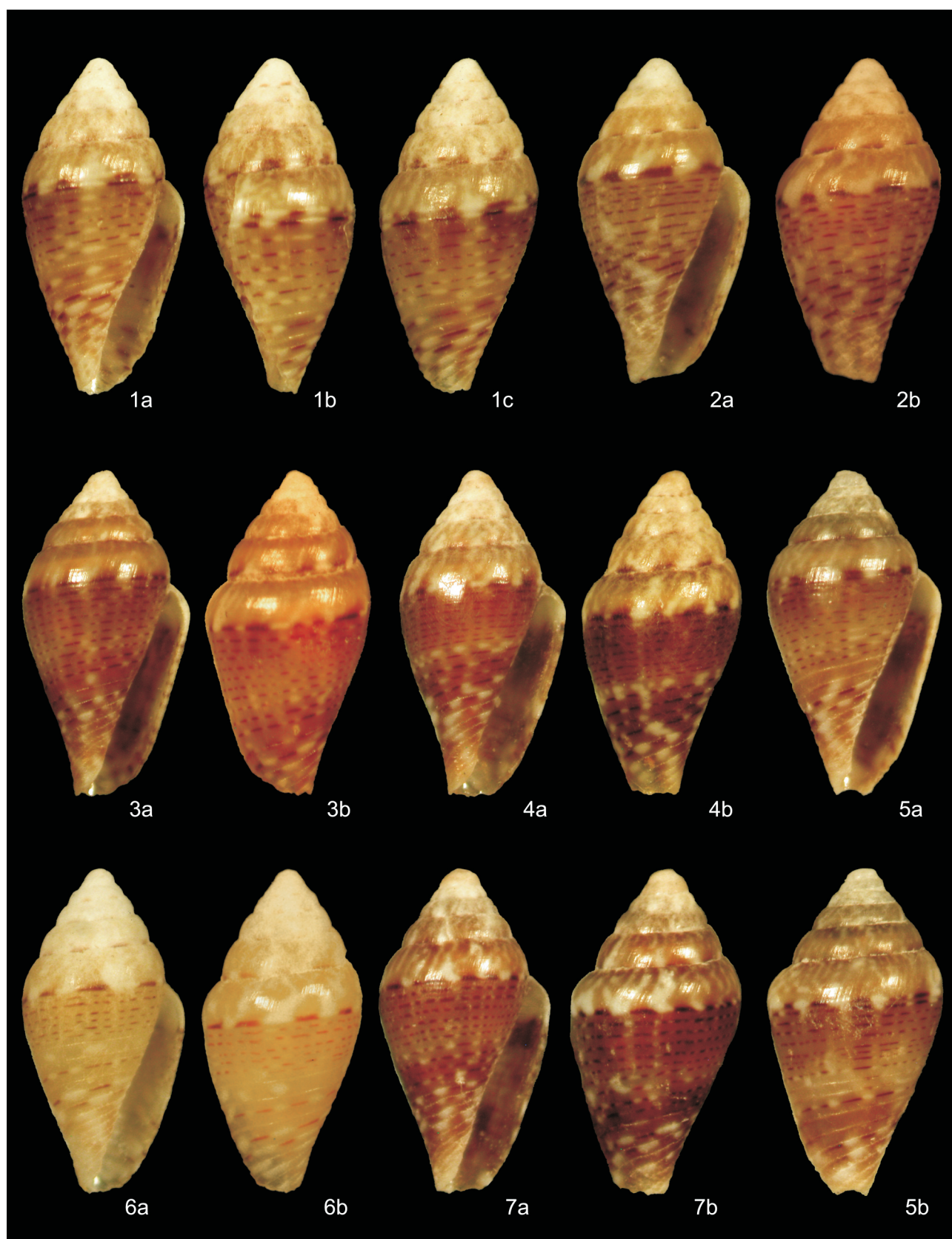
Etymology. – This tiny cone shell is named in honour of Robert G. Moolenbeek (Ankeveen, the Netherlands), Conidae specialist and former curator of the Malacology Department of the now closed Zoologisch Museum Amsterdam (ZMA). He was for many years host of the monthly meetings in the ZMA of the former Amsterdam-based shell club 'De Kreukel' of which the author was a regular visitor in the last 10 years of the existence of this shell club. The Dutch family name "Moolenbeek" can be translated in English as mill (= "moolen" in old Dutch or "molen" in present day Dutch) and brook (= "beek" in Dutch). The Latin noun for mill is "molae" and the Latin noun for brook is "rivus". The combination 'molaerivus' is used to name the new species.

Comparison and remarks – The shells vary in size between 4.0 and 5.1 mm in height. There is some variation in the pattern of the dashed spiral lines, but generally there is little variability of the shells, both within and between populations. Some shells are lighter in colour than the holotype (for a more yellowish paratype see Fig. 6a-b).

*Conus (P.) korni* from the Gulf of Aden (Somalia) has about the same small spiral lines (some showing the alternate white and brown colour and some just brown), but there are also 2 brown bands (underlying the lines, ground colour) and a shoulder marked with broader alternate white and brown streaks. *C. (P.) kuiperi* from Oman has characteristic stepped spire whorls, and spiral ribs above and below the suture. The latter is also the case with *C. (P.) visseri* from Thailand. *C. (P.) boschorum* from Oman can be readily recognized by its marked shoulder. *C. levis* and *C. scalarispira* from Madagascar have a predominantly smooth last whorl, and are mainly monochromatic.

*Conus (P.) molaerivus spec. nov.* has the same outline as *C. (P.) traillii* and the recently described *C. (P.) wallacei*. The latter species is known from southwestern Sulawesi; it differs from *C. molaerivus* by its soft pink-purplish ground colour and by the spiral lines that show a highly regular alternating pattern of brown and white dots (in *C. molaerivus* the spiral lines consist of a series of alternating brown and white stripes, not dots).

*Conus (P.) traillii* has been described from Malacca, Malaysia (holotype BMNH no. 1961129; see Fig. 8). Contrary to the other *Pseudolilliconus* taxa, this species has been reported from a large area. It has been recorded from Malaysia, Indonesia (e.g. Java, Bali, Kalimantan, Sulawesi) and the Philippines (Lorenz & Morrison, 2004; Moolenbeek & Goud, 2008). The shells show considerable variation in ground colour and the presence/absence of spiral colour bands. However, irrespective of this variation, *C. traillii* has only a maximum of three (rarely four) spiral colour



**Figs 1-7.** *Conus (Pseudolilliconus) molaerivus* spec. nov. from the Philippines. 1, Holotype, Cebu, Mactan Island, 10-20 m, ix.2015, RMNH 5004022, H 4.6 mm. 2, Paratype, Cebu, Mactan Island, 10-20 m, ix.2015, AMD, H 4.2 mm. 3, Paratype, Mindanao, Surigao, 20 m, v.2015, AMD, H 5.1 mm. 4, Paratype, Samar, Guian, shallow water, iii.2015, AMD, H 4.6 mm. 5, Paratype, Mindanao, Surigao, 10-20 m, vi.2015, AMD, H 4.5 mm. 6-7, Paratypes, Mindanao, Surigao, 10-20 m, viii.2015, AMD, H 4.7 mm and 4.0 mm, respectively.



**Figs 8-9.** *Conus (Pseudolilliconus) trailii* A. Adams, 1855. 1, Holotype (BMNH), Malacca, H. 7.2 mm, dorsal and ventral view. 2, Philippines, Mactan Island, dived, 10-20 m, i.2015, HD 35809, H 6.5 mm.

bands below the suture (but often no bands are present), whereas in *C. molaerivus* always 5 or more of such bands are seen.

The species boundary of *C. trailii* is not entirely clear. For example, Moolenbeek & Goud (2008) consider *C. wallacei* a synonym of *C. trailii*, whereas Puilandre et al. (2014, 2015) listed both taxa as separate species, as does the WoRMS database. Furthermore, *Conus micarius* Hedley, 1912, from Australia (Queensland) has been placed as a synonym under *C. trailii* by Moolenbeek & Goud, whereas WoRMS listed it as *Mitromorpha micaria* within the family Mitromorphidae (so not even a Conidae!). The shells mentioned as *Conus* cf. *trailii* by Moolenbeek & Goud (2008: pl. 2 figs 11-13) from Gam (Papua) show a solid brown to purple broad band from under the shoulder to the abapical end, and has widely spaced raised spiral bands all over the last body whorl and are also present on the spire. Thus it seems unlikely that they belong to *C. trailii* indeed.

*Pseudolilliconus* shows a broad, paucispiral protoconch (Moolenbeek & Goud, 2008: pl. 1 fig. 4). This implicates a short larval stage, meaning that the distribution potential of *Pseudolilliconus* is limited. A non-planktonic reproduction facilitates the establishment of local (endemic) species, a situation that is more and more shown by research based on molecular techniques, which often reveal hidden species in till then known as a single 'variable species' (own observations based on research literature; not listed in the references).

*Conus (P.) trailii* from the Philippines (Fig. 9) is most likely the most commonly seen Pacific representa-

tive of the tiny *Conus* species discussed here (own observation based on Internet shell offerings). It has been offered from Mactan, Olango, Mindoro and Punta Engaño, with either a dark or yellow ground colour of the shell. Irrespective of the ground colour, all specimens show prominent white spots on the whorl between the suture and the adapical end. Such a pattern is not seen in the new Philippine species, where the white spots are much less prominent in size. Apart from that, as mentioned earlier, *C. molaerivus* differs from *C. trailii* by the presence of five or more spiral colour bands. The spiral colour bands of *C. molaerivus* show alternating brown and white stripes, whereas in the Philippine specimens of *C. trailii* these are dots, not stripes. The nearby presence of various populations of both *C. trailii* and *C. molaerivus* in the Philippines without any intermediates is clearly in favour of the specific status of *C. molaerivus*.

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