

**Another twist in the tale: a new species of *Opisthostoma*  
(Gastropoda, Diplommatinidae) from Peninsular Malaysia**

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A new species of terrestrial gastropod belonging to the family Diplommatinidae Pfeiffer, 1856, is described from a single limestone karst from Peninsular Malaysia. *Opisthostoma gittenbergeri* spec. nov., differs from its congeners by having its protoconch and top whorls together markedly oblique in relation to the body whorls.

Key words: Gastropoda, Caenogastropoda, Diplommatinidae, *Opisthostoma*, taxonomy, limestone hill, Malaysia.

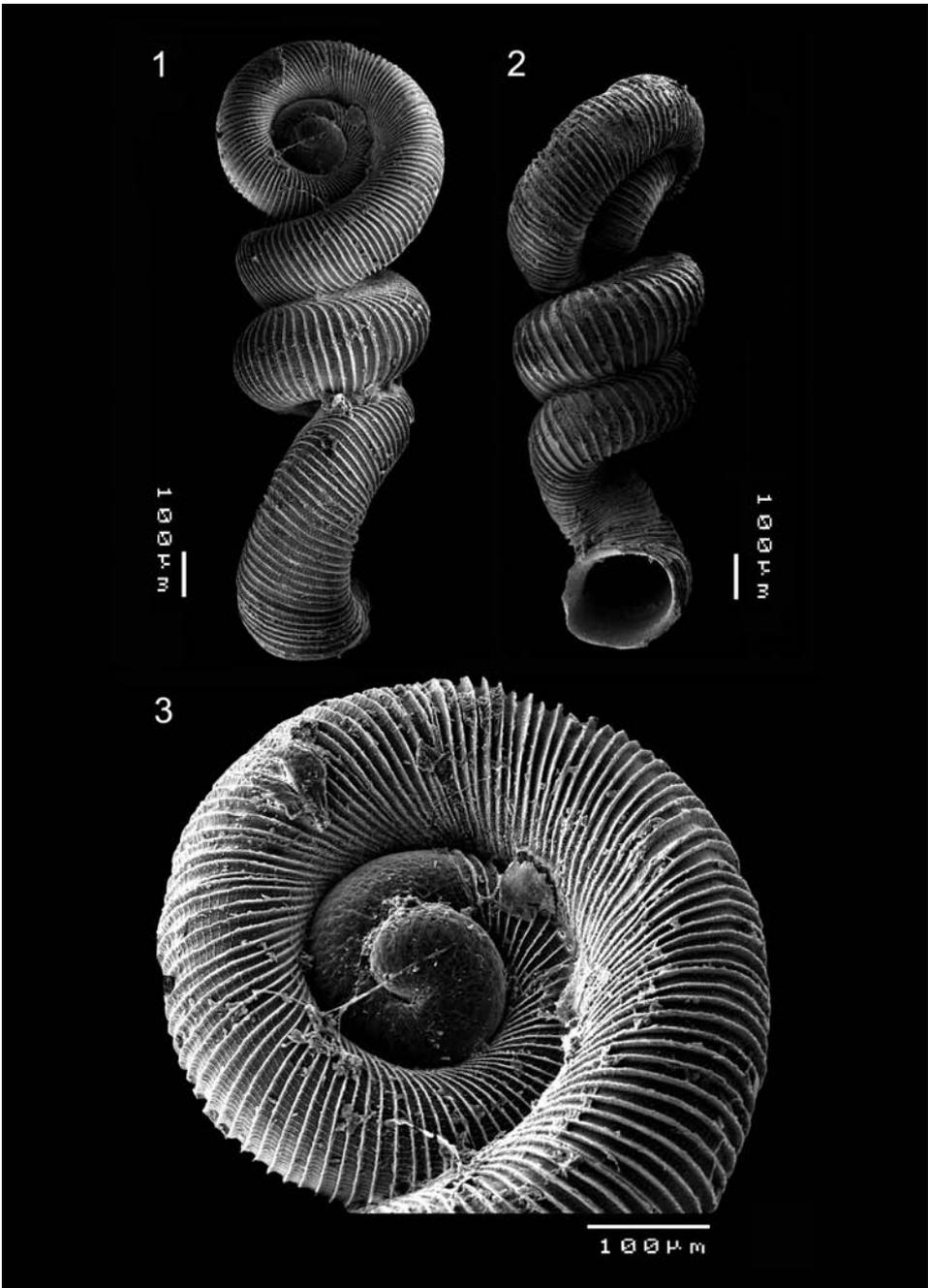
## INTRODUCTION

Taxonomic work on the terrestrial gastropod genus *Opisthostoma* began more than a century ago, but aspects of their peculiar shell-coiling strategy were only introduced to the general scientific community relatively recently (see Gittenberger, 1995). Unlike the majority of gastropod shells, most of which are right-handed, *Opisthostoma* shells are considered 'sinistroid' due to a reversal in the coiling direction in the last half whorl.

*Opisthostoma* species described from Malaysia thus far (Van Benthem Jutting, 1954, 1961; Vermeulen, 1994) predominantly display coiling patterns typically found within the genus. Recent surveys at limestone karsts in Peninsular Malaysia, however, have uncovered new species of *Opisthostoma* with aberrantly coiled shells. For example, *O. vermiculum* Clements & Vermeulen, 2008, possesses four different coiling axes - the highest number known for a shelled gastropod. In addition, its body whorls thrice detach and twice reattach to preceding whorls without any reference support (Clements et al., 2008)

Here, we report a new species of *Opisthostoma* with yet another atypical shell-coiling pattern. The whorls of *O. gittenbergeri* spec. nov. coil around three axes (as do most of its congeners), but its shell is uniquely characterized by its protoconch and top whorls, which are together markedly oblique in relation to the body whorls.

Abbreviations for collections: RMNH, National Museum of Natural History *Naturalis* (formerly Rijksmuseum van Natuurlijke Historie), Leiden; ZRC.MOL, Zoological Reference Collection, Mollusc Section, Raffles Museum of Biodiversity Research, National University of Singapore, Singapore.



Figs 1-3. *Opisthostoma gittenbergeri* n. sp. 1-2, two views from different sides; 3, detail of the protoconch. Photographs by R. Clements, RMBR, Singapore.

## SYSTEMATIC PART

Diplommatinidae Pfeiffer, 1856

*Opisthostoma* Blanford & Blanford, 1860Type species: *Opisthostoma nilgircum* Blanford & Blanford, 1860*Opisthostoma gittenbergeri* spec. nov. (figs 1-3)

Material examined. – Peninsular Malaysia, Perak, Gunung Datok, 4° 36'N, 101°09'E, 17.vii.2005, leg. R. Clements. (RMNH 109.610/holotype; paratypes: ZRC.MOL.002827, ZRC.MOL.002828).

Description. – Shell minute, thin, white, shiny. Apex not or hardly oblique. Whorls altogether  $4\frac{2}{3}$ - $5\frac{1}{2}$ , coiled at two different axes; top whorls  $2\frac{1}{3}$ - $2\frac{3}{4}$ , discoid with the outer whorl distinctly raised above the level of the apex, passing into the body whorls without a completely detached whorl section; body whorls  $2\frac{1}{8}$ - $2\frac{5}{8}$ , coiled around an axis turned 45-80° with respect to the axis of the top whorls, together forming an approximately cylindrical body which widens slightly towards the apex; tuba  $\frac{3}{4}$ - $\frac{7}{8}$  whorl, gradually turning downwards, the last  $\frac{1}{4}$ - $\frac{3}{8}$  whorl detached, coiling around an axis at 60-80° with respect to the axis of the body whorls. Constriction slight, with an inconspicuous transverse lamella in the basal edge. Spire with numerous straight (not sinuous), fine radial ribs, on the top whorls densely placed, 4-5 ribs/0.1 mm, somewhat more spaced elsewhere, with 3-4 and 2-4 ribs/0.1 mm on the body whorls and the tuba respectively. Spiral striation present, fine. Umbilicus open in the body whorls, up to 0.03 mm wide. Aperture more or less turned downwards, plane of aperture turned approx. 45-80° with respect to the axis of the body whorls, outline elliptic or rhombic with rounded edges and with the longest axis perpendicular with respect to the axis of the body whorls. Peristome double, outer peristome hardly flaring beyond the radial ribs next to it; inner peristome somewhat protruding from the outer, reflected, in particular on the side turned to the apex of the shell.

Dimensions. – Total length 1.4-1.5 mm; largest width (the diameter of the discoid top whorls) 0.55-0.6 mm; body whorl 0.4-0.5 mm long, 0.45-0.55 mm wide; tuba 0.5-0.6 mm long; aperture approx. 0.25-0.3 mm high and 0.35 mm wide.

Derivatio nominis. – Named after the editor-in-chief, Dr Edmund Gittenberger, for his outstanding contributions to the field of molluscan phylogenetics, and more specifically, for giving this remarkable genus its day in the sun (see Gittenberger, 1995).

Remarks. – The axis of the tuba has no fixed orientation with respect to the top whorls, which renders some variability to the type series. However, the mode of coiling is constant and we can assume the series does not consist of mutant individuals. It appears that *O. gittenbergeri* is endemic to a single limestone hill. Given that limestone karsts in the region are gravely threatened by limestone quarrying activities (Clements et al., 2006), this species warrants urgent conservation attention.

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