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## New Indo-Pacific species of the genus *Teretia* Norman, 1888 (Gastropoda: Raphitomidae)

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### Abstract

Four new species are assigned to the genus *Teretia* Norman, 1888 in the family Raphitomidae Bellardi, 1875 and herein described: *Teretia neocaledonica* **sp. nov.**, *T. sysoevi* **sp. nov.**, *T. tongaensis* **sp. nov.** from the southeastern Pacific and *Teretia tavianii* **sp. nov.** from the Gulf of Aden. The new species represent the first Indo-Pacific record of a genus previously known in the recent molluscan fauna by only two species from the Atlantic Ocean-Mediterranean Sea and Southern Africa. A possible Tethyan origin for the genus *Teretia* is suggested.

**Key words:** Systematics, Mollusca, biodiversity

### Introduction

The conoidean family Turridae *sensu* Powell, 1966 is the largest family in Mollusca with about 4,000 named living species (Tucker, 2004) and 358 recognized genera and subgenera (Bouchet *et al.*, 2011). Despite this large number of described species, the total number of extant “turrid” species is likely to be much higher with Bouchet *et al.* (2008) suggesting that 5,000 turritiform gastropods occur in the South Pacific alone, a considerable part of which is still underexplored. In this paper we describe four new species from the Indo-Pacific that resemble members of *Teretia* Norman, 1888, a genus well represented in the Tertiary of Europe but previously known in the Holocene by only two species from the Atlantic-Mediterranean Sea and Southern Africa. Although the discovery of the new species suggests a remarkable recent diversification, we were unable to find records of fossils of the genus *Teretia* in the Indo-Pacific. Based on these findings and information available from literature, it is hypothesized that *Teretia* had a wide west-east distribution thus providing an additional example of the well-documented faunal exchanges between different sectors of Tethys Realm as defined by Harzhauser *et al.* (2002). Inclusion of *Teretia* in the family Raphitomidae follows the revised classification of the Conoidea proposed by Bouchet *et al.* (2011) in which the traditional polyphyletic taxon Turridae is resolved as 13 monophyletic families.

### Material and methods

Three species were dredged off New Caledonia (*T. neocaledonica* **sp. nov.**, and *T. sysoevi* **sp. nov.**) and Tonga Islands (*T. tongaensis* **sp. nov.**) by the French Tropical Deep-Sea Benthos Programme, a joint project of the Institut de Recherche pour le Développement (IRD) and the Muséum National d’Histoire Naturelle, Paris. *Teretia tavianii* **sp. nov.** was dredged off the Gulf of Aden in September 1992. Descriptions and measurements are based on shells oriented in the traditional way, spire up with the aperture facing the viewer. SEM micrographs were taken using a Hitachi S-2400. The following abbreviations are used in the text: MZB = Museo di Zoologia dell’Università di Bologna; MNHN = Muséum National d’Histoire Naturelle, Paris; l = length; b = shell width; a = aperture length; a/l = ratio of aperture length to total shell length; b/l = ratio of shell width to total length; dd = empty shell(s); stn =

Based on teleoconch sculpture, *Teretia* species can be assigned to different subgroups: a “*Teretia anceps*-group” (including *T. anceps*, *T. fusianceps*, *T. polycarinatum*, *T. pentacarinifera*, *T. intermedia* and the living *T. teres* and *T. acus*) that is characterized by species with prominent, somewhat lamelliform, spiral cords (the peripheral cord equal to slightly stronger than other cords), and a “*T. turritelloides*-group” (including species such *T. turritelloides*, *T. elegantissima* (Fig. 3.G) and *T. monterosatoi*) that have a peripheral cord stronger than other cords sometimes projecting like a keel and rendering angular the whorl profile. According to Brunetti & Vecchi, 2003) *T. turritelloides* and *T. elegantissima* (but not *T. monterosatoi*) have a well developed microscopic sculpture of pustules or granules on shell surface, while *Teretia anceps* and *T. teres* have a smooth surface. In contrast to this statement, under SEM the surface of *T. teres* is seen to be covered by a microscopic sculpture of granules. A possible third subgroup includes species such *Teretia guersi* and *Homotoma multicingula*.

Two of the new species here discussed, namely *Teretia neocaledonica* **sp. nov.** and *T. sysoevi* **sp. nov.**, are morphologically comparable with some members of the “*T. turritelloides*-group” in type of spiral sculpture (a prominent peripheral cord and two weak cords on subsutural ramp) and microsculptural features. Compared to their fossil congeners, *Teretia neocaledonica* **sp. nov.** and *T. sysoevi* **sp. nov.**, have a less prominent peripheral cord but the significance of this difference is uncertain.

A similar situation occurs, for example, in the raphitomine genus *Cryptodaphne* Powell, 1942. *Cryptodaphne pseudodrillia* Powell, 1942, type species of the genus, has distinctly keeled whorls while in the recent *Cryptodaphne rugosa* Sysoev, 1997 the peripheral angulation varies from distinct to weak (“*in the paratypes [...] the strength and relative position of the main spiral keel vary a little*”) according to Sysoev, 1997: p.335) and in *C. kilburni* Morassi & Bonfitto, 2006, an otherwise “typical” *Cryptodaphne* species, there is no evident peripheral angulation.

*Teretia tavianii* **sp. nov.** has relatively prominent spiral cords and a (relatively) scarcely developed microscopic sculpture of granules as for members of the “*Teretia anceps*-group”. *Teretia tongaensis* **sp. nov.** has a sculpture of numerous, not very prominent spiral cords and relatively well developed microscopic sculpture on shell surface; these features suggest that it probably belongs to the “*T. guersi*-group”.

The presence of different morphological subgroups within the genus and the relatively less prominent spiral sculpture in the recent species may suggest that *Teretia*, as presently construed, is polyphyletic. However, in the absence of soft parts for anatomical and/or molecular studies, we consider preferable assign the new species to *Teretia* on the basis of general resemblance in shell features refraining from proposing new and doubtful genera or subgenera. Similarly the allocation of the new Indo-Pacific species in any other raphitomine group such, for example, genus *Pleurotomella*, should in our opinion be rejected on the basis of clear morphological discrepancies.

The resemblance between the recent Indo-Pacific species here discussed and members of *Teretia* from the Tertiary of Europe suggests a Tethyan origin for the genus. Despite extensive survey in literature we were unable to track records of *Teretia* species in the Tertiary of the Indo-Pacific region which may suggest the hypothesis that *Teretia* the genus had a wide west-east distribution, i.e. from western sectors to eastern ones of the large biogeographic unit defined Tethys Realm by Harzhauser *et al.* (2002), until the late Early Miocene, when the final breakdown of the eastern sectors (Atlantic and Mediterranean) from the eastern ones (Indo-Pacific) occurred (Rögl, 1998; Harzhauser *et al.*, 2002).

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