An overlooked second species of *Thatcheria* from Western Australia (Gastropoda: Conoidea: Raphitomidae)

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With 2 Text-Figures, 1 Map and 21 Figures on 2 Plates

Keywords

Raphitomidae, *Thatcheria janae*, new species, Western Australia.

Abstract

Thatcheria janae n. sp. from Northwestern Australia differs from the Pacific *T. mirabilis* ANGAS 1877 by a lower shell mass, a paler coloration, and a thinner, more angular carinal keel, which is nodulose instead of smooth in the first three teleoconch whorls in many specimens. Differences in the relative shell's width/length ratio, and the slightly inflated instead of straight body whorl are obvious when comparing larger series of specimens.

Zusammenfassung

Thatcheria janae n. sp. vom Nordwesten Australiens unterscheidet sich von der Pazifischen *T. mirabilis* ANGAS 1877 durch geringeres Schalengewicht, eine blassere Gehäusefärbung und einen dünneren, schärferen Außenrand, der auf den ersten drei Umgängen des Teleoconches warzig statt glattrandig ist. Weitere Unterschiede im Weiten/Längenverhältnis und der Form des letzen Umganges sind bei Betrachtung größerer Serien offensichtlich.

Introduction

In conchology, as in other disciplines dealing with morphological features, the power of the first impression must not be underestimated (GLADWELL, 2005). The “blink” that conchologists experience in seashells is best described as “something that *feels* different”, but it may be difficult to put into words what it is that caused the impression. In the case of the Western Australian population of the supposedly unmistakable *Thatcheria mirabilis*, the first author had a “blink” when he held his first specimens in hand about 25 years ago, but did not pursue this any further. Although that extensive population was already reported by WELLS (1985), it had not been given attention by taxonomists since. On closely comparing larger series of shells, several subtle, but consistent conchological differences between the nominate Pacific *T. mirabilis* and the Western Australian population were found. When pointed out to the second author, he agreed that there was an overlooked species, which we herewith describe as:

***Thatcheria janae* n. sp.**

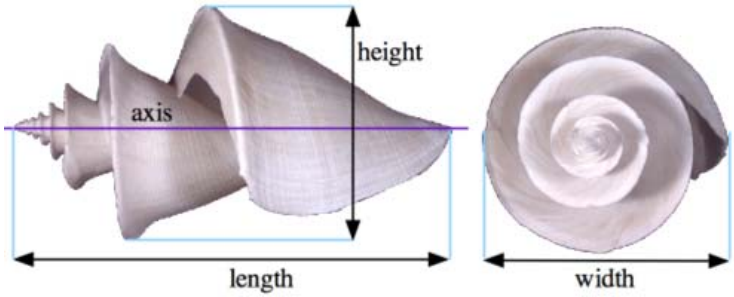
Material and Methods

A total of 65 live collected specimens of the new species were available to us, of which 34 were preserved well enough for morphometrical analysis. Shells with chipped apex or broken lip had to be excluded from the measurements (marked *). For comparison, 60 specimens of *Thatcheria mirabilis* from Pacific localities were also examined.

Measuring the shell's length was done along its axis. The width and height were measured parallel to the axis (Figure 1). The mass ratio (mR) was calculated after the formula first applied on cowries (Cypraeidae) by LORENZ & BEALS (2013). It was discussed in detail by BRIDGES & LORENZ (2013) and LORENZ (2017). It represents the relation between the actual mass of a shell against an hypothetical block of aragonite with the shell's maximum dimensions of length, width, and height, calculated after the formula mR = (weight / (length × width × height × 0.00293)) × 100]. The data below is enumerated as length × width × height [measured weight in grams, and mass ratio]. An asterisk* indicates that the shell is damaged.

Holotype: 81.7 × 50.2 × 43.7 [12.1 g, mR = 2.3] coll. Western Australian Museum No. xxxxxx.

Paratype 1: 84.4 × 50.9 × 44.4 [12.0 g, mR = 2.1]; Paratype 2: 78 × 49.1 × 41.9 [10.6 g, mR = 2.3]; Paratype 3: 88.5 × 49.7 × 45.5 [12.7 g, mR = 2.2]; Paratype 4: 93.2 × 52.0 × 47.8 [13.4 g, mR = 2]; Paratype 5: 88.9 × 50.9 × 47.1 [14.5 g, mR = 2.3]; Paratype 6: 80.6 × 49.4 × 45.0 [12.3 g, mR = 2.3]; Paratype 7: 98.9 × 55.9 × 50.3 [16.4 g, mR = 2.0]; Paratype 8: 83.5 × 49.5 × 45.4 [11.7 g, mR = 2.1]; Paratype 9: 99.6 × 57.3 × 51.3 [19.2 g, mR = 2.2]; Paratype 10: 63.4 × 45.1 × 35.1 [7.4 g, mR = 2.5]*; Paratype 11: 76.8 × 48.5 × 41.3 [10.3 g, mR = 2.3]; Paratype 12: 81.9 × 50.5 × 45.8 [10.7 g, mR = 1.9]; Paratype 13: 62.1 × 41.8 × 36.2 [6.9 g, mR = 2.5]*; Paratype 14: 67.6 × 42.8 × 38.7 [6.7 g, mR = 2.0]; Paratype 15: 77.2 × 46.4 × 41.7 [9.0 g, mR = 2.1]; Paratype 16: 66.0 × 40.0 × 34.8 [6.6 g, mR = 2.5]*; Paratype 17: 98.2 × 54.6 × 49.9 [17.0 g, mR = 2.2]; Paratype 18: 75.2 × 47.3 × 42.1 [10.6 g, mR = 2.4]; Paratype 19: 83.1 × 47.6 × 41.9 [10.0 g, mR = 2.1]; Paratype 20: 81.1 × 47.9 × 43.7 [10.9 g, mR = 2.2]; Paratype 21: 95.2 × 55.6 × 51.6 [16.8 g, mR = 2.1]; Paratype 22: 101.7 × 59.7 × 55.5 [23.3 g, mR = 2.4]; Paratype 23: 92.5 × 54.8 × 47.7 [15.3 g, mR = 2.2]; Paratype 24: 88.3 × 51.0 × 46.1 [12.3 g, mR = 2.0]; Paratype 25: 77.7 × 47.6 × 43.2 [10.0 g, mR = 2.1]; Paratype 26: 87.2 × 51.4 × 46.5 [13.3 g, mR = 2.2]; Paratype 27: 86.3 × 48.0 × 42.3 [11.9 g, mR = 2.3]; Paratype 28: 82 × 48.1 × 43.7 [11.1 g, mR = 2.2]; Paratype 29: 84.8 × 49.8 × 45.5 [11.9 g, mR = 2.1]; Paratype 30: 82.1 × 46.7 × 43.7 [11.9 g, mR = 2.4]; Paratype 31: 94.2 × 56.2 × 51.2 [16.6 g, mR = 2.1]; Paratype 32: 95.9 × 59.5 × 53.9 [22.8 g, mR = 2.5]*; Paratype 33: 97.3 × 56.6 × 50.8 [19.5 g, mR = 2.4]; Paratype 34: 81.1 × 47.3 × 42.8 [10.4 g, mR = 2.2]; Paratype 35: 83.9 × 50.0 × 43.6 [10.7 g, mR = 2]; plus paratypes 36-64 in coll. MSF. All from the Rowley Shoals area, off NW Australia, trawled at approximately 380-450 m.



Text-Fig. 1: Scheme of how measurements were taken for a *Thatcheria.*

Description

The shell is characterized by a distinctly pagoda-form outline with sharply keeled whorls and a wide aperture. It is of large size (to 105 mm), and remarkably light-weighted (mR 1.9-2.5). The protoconch is missing in the holotype. The first three post-nuclear whorls show a fine coronation along the slightly thickened carinal keel. In later whorls, the keel is smooth, but irregular due to numerous chips along its edge. There are nine post-nuclear whorls of remarkable geometry: each whorl increases in width and height versus the preceding one by the golden ratio, with little deviation. The sharply angular carinal keel is projecting and flaring in the early whorls. It is slightly bent up, bordering the flat and smooth sutural ramps in the last three whorls. The area below the keel is concave. The shell surface is almost smooth, with a weak sculpture of spiral striae of variable width and narrow interspaces. Axial sculpture does not exist, but the body whorl shows regular longitudinal growth lines and there are scars of the anal sinus on the shoulder slope, especially thickened just below the suture. The sculpture is partly dissolved in a glossy area along the columellar side of the wide aperture. The sides of the body whorl are slightly inflated. The outer lip is rounded, with the widest part in the posterior-third below the carinal keel; the edge of the lip is thin and not thickened. The anal notch is wide, occupying the complete shoulder slope, asymmetrical and evenly curved, its deepest part just below the suture. Its proportions and the relation between its position and the total height of the shell also approach the golden ratio. The ground color is pale cream white. There are some barely notable transverse dashes of slightly darker cream on the body whorl.

The paratypes all agree with this description. The relative width of the shell varies, but not the relative proportions of the whorls and the shoulder ramps. All adult specimens examined have nine post-nuclear whorls. The axial striae vary considerably in density and structure. Larger shells may appear almost smooth. The thin texture of the shell makes it prone to chips and damages. Some specimens show severe bite-marks and healed breaks. Shells with intact early post-nuclear whorls are rare, only

one specimen retains a part of a pale brown, possibly paucispiral, protoconch (Paratype 16, see Plate 1 Figure 10). The animal characteristics are unrecorded.

Type locality and distribution

The Holotype and the paratype specimens were trawled at 380 to 450 m off the Rowley Shoals area, NW Australia (*locus typicus*). The range of *T. janae* n. sp. extends along the continental Shelf between 13°33'S 122°54'E and 18°49' S 116°50'E (WELLS, 1985). It has been reported off Port Hedland, at 250 m (Wilson, 1994)

Etymology

The new species is named in honor of JANA P. KRATZSCH, well-known underwater photographer and partner of the first author.

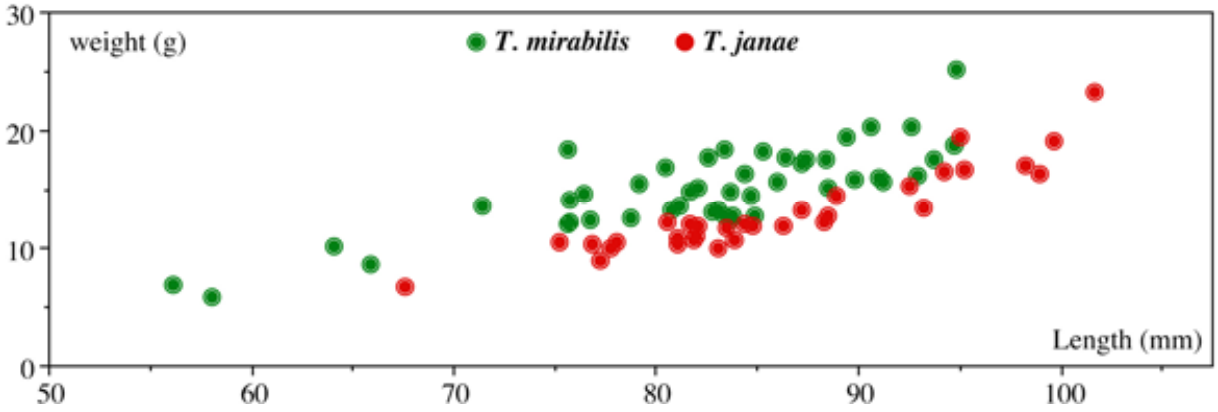
Discussion

Thatcheria mirabilis is undoubtedly one of the most exquisitely shaped seashells. It has served as an inspiration to many artists and designers, such as FRANK LLOYD WRIGHT (1867-1959), whose architecture of the Guggenheim Museum in New York City was influenced by this peculiar shell. Its documented range includes Japan, China, and the Philippines as well as Papua New Guinea and the Solomons (unpublished records based on MNHN material). It lives at depths ranging from 120 to 400 m. The geographical distance to the range of *T. janae* is considerable (approximately 2,500 km, see Map 1). *T. mirabilis* does not show local or bathymetrical variations, but varies individually in size and the intensity of its coloration. At first glance, the new species seems to barely differ from *T. mirabilis* from the Western Pacific. This impression is caused by the exceptional, spectacular shape of *Thatcheria*, which easily sidetracks one's attention from more subtle details. On direct comparison of series of shells, however, it becomes apparent that the new species is characterized by a set of conchological features:

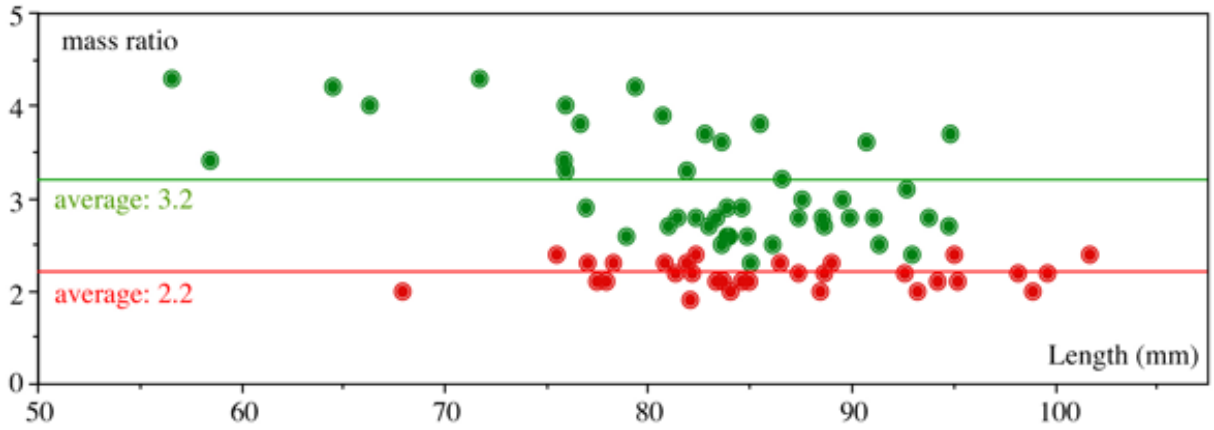
• The overall coloration of the shell is paler, ranging from yellow white to pale cream, with dashes of darker cream, whereas, *T. mirabilis* is more saturate brown, with paler and darker reddish longitudinal lines, contrasting with its white aperture. This difference in color, when compared side by side, is quite obvious.

• The shell of *T. janae* is thinner, and consequently, lighter in weight than that of *T. mirabilis*. This difference is reflected in comparing the measured weight against the shell's length (Fig. 2a), and also, if the other shell measurements are included in the mass ratio (mR) (Fig. 2b). In *T. mirabilis*, the mR is quite variable, ranging from 2.3 to 4.4, with an average of 3.2. The average mR of *T. janae* n. sp. is 2.2, and is less variable, ranging from 1.9 to 2.5. In other words, the amount of shell-matter of *T. mirabilis* is about one third higher than that of *T. janae* n. sp.

In the works on Conoidea, the mass in relation to the length is still used in the characterization of species, e.g. in RÖCKEL et. al. (1995), KOHN (2014), and MONNIER et al. (2018), but has not reliably functioned in the direct comparison of taxa (MELAUN, 2008). As a useful tool of characterization and comparison of cowries, the mR has been tested rather comprehensively (LORENZ & BEALS (2013), MONT & LORENZ (2013), LORENZ (2017)), and is here used for another Gastropod family for the first time. The data reveals that the mR works also in the comparison of the two similar species discussed herein: the shell's measured weight is increasing in direct proportion with the shell's dimensions, and the mR is a constant regardless of the shell's length.



Text-Fig. 2a: Weight (in gram) against shell length (in mm).



Text-Fig. 2b: Mass ratios (mR) against shell length, with average values.

• The body whorl of *T. janae* n. sp.is notably more inflated in its mid-section, whereas, in *T. mirabilis*, it is rather evenly tapering below the carinal keel.

• The apex of *T. janae* n. sp. is nearly always eroded and so are the early postnuclear whorls. In the few shells where the first postnuclear whorls are well-preserved, a regular coronation is discernible along the carina. In a few cases, the fine nodules continue as indistinct crenulations on the fourth post-nuclear whorl. In *T. mirabilis*, there is no comparable coronation, but very fine ribbing of the carinal keel of the first two post-nuclear whorls in occasional specimens. However, when viewed under the same magnification, the early spire of *T. mirabilis* appears smooth, and that of *T. janae* n. sp. is faintly to distinctly coronate, depending on the preservation of the shell.

• The carinal keel of *T. mirabilis* is rather solid, with a rounded, slightly bent-up edge. The keel of *T. janae* n. sp. is thinner, often more projecting, and sharply angular in most shells. It is rather flaring and less distinctly bent-up. It is also quite brittle, so that in *T. janae* n. sp. the keel easily chips and usually has a somewhat “gnawed” appearance, especially in earlier whorls.

• The general impression and also the morphometrical data reveals that on average, *T. janae* n. sp.is slightly broader (average with/length ratio = 60 opposed to 58 in *T. mirabilis*), with a lower spire. However, this feature applies to the majority, but not to all specimens. Like *T. mirabilis*, *T. janae* n. sp. varies in the general shape, as well as the strength and structure of the axial striae of the body whorl.

• The anal notch of *T. mirabilis* is usually slightly wider than that of *T. janae* n. sp. On average, the spiral striae of *T. janae* n. sp. appear broader and coarser than those of *T. mirabilis*. However, both of these differences are only reproducible on comparing larger series of shells.

A peculiar procedure to distinguish between look-alike species is known as the “turning test”. It has first been described for the cowries *Cypraea tigris* LINNAEUS 1758 and *Cypraea pantherina* SOLANDER 1786 (LORENZ & HUBERT 1993 p. 527). While *C. tigris* can be balanced on its back, *C.*

pantherina will turn over. This can also be observed in the two species discussed herein. As a consequence of a slightly different architecture, shells of *T. janae* n. sp. can be made to rest on their back on a flat surface rather easily, while with the shells of *T. mirabilis*, this is quite difficult or simply impossible.

The area inhabited by *T. janae* n. sp. yields a wealth of endemic deep water gastropods with ties to Pacific rather than Indian Ocean species: *Perotrochus westralis* (WHITEHEAD 1987), *Calliostoma bellatrix* WILLAN 2002, *Teramachia claydoni* POPPE 1986, *Benthovoluta claydoni* HARASEWYCH 1987, *Amalda herlaari* VAN PEL 1989, *Chryseofusus westralis* FRAUSSEN & HADORN, 2003, *Tudivasum kurtzi* (MACPHERSON 1964), *Plicaustraconus adami* (WILS 1988), *Comitas galatheae* POWELL 1969, as well as several other turrids and members of associated families. This phenomenon suggests that the Northwestern Australian deep water gastropod fauna comprises numerous relict populations of Pacific origin, and the species described herein adds depth to this observation.

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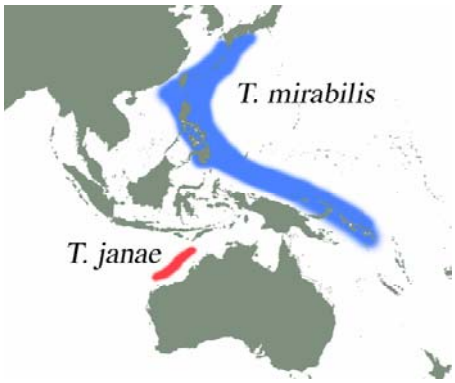

Map 1: Distributions of *Thatcheria* species.

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Plate 1 (on pp. ##)

Figs 1-5: *Thatcheria janae* n. sp. (82 mm), Holotype, Rowley Shoals, Northwestern Australia.

Fig. 6: *T. janae* n. sp., Holotype, axial striae in body whorl. Scale = 10 mm.

Fig. 7: *T. janae* n. sp., Paratype 1 (84 mm), anal notch.

Fig. 8: *T. janae* n. sp., detail of thinner carinal keel.

Fig. 9: *Thatcheria mirabilis*, detail of thicker carinal keel.

Fig. 10: *T. janae* n. sp., Paratype 16, partly preserved protoconch and early whorls. Scale = 1 mm.

Fig. 11: *T. janae* n. sp., Paratype 7, early whorls showing a coronate carinal keel. Scale = 1 mm.

Fig. 12: *T. mirabilis*, Taiwan, early whorls showing a smooth carinal keel. Scale = 1 mm.

Plate 2 (on pp. ##)

Figs 1+2: *T. janae* n. sp. (84 mm), Paratype 1.

Fig. 3: *T. janae* n. sp. (87 mm), Paratype 26.

Fig. 4: *T. janae* n. sp. (89 mm), Paratype 3. Arrow pointing at the more inflated area of the body whorl (see Fig. 7).

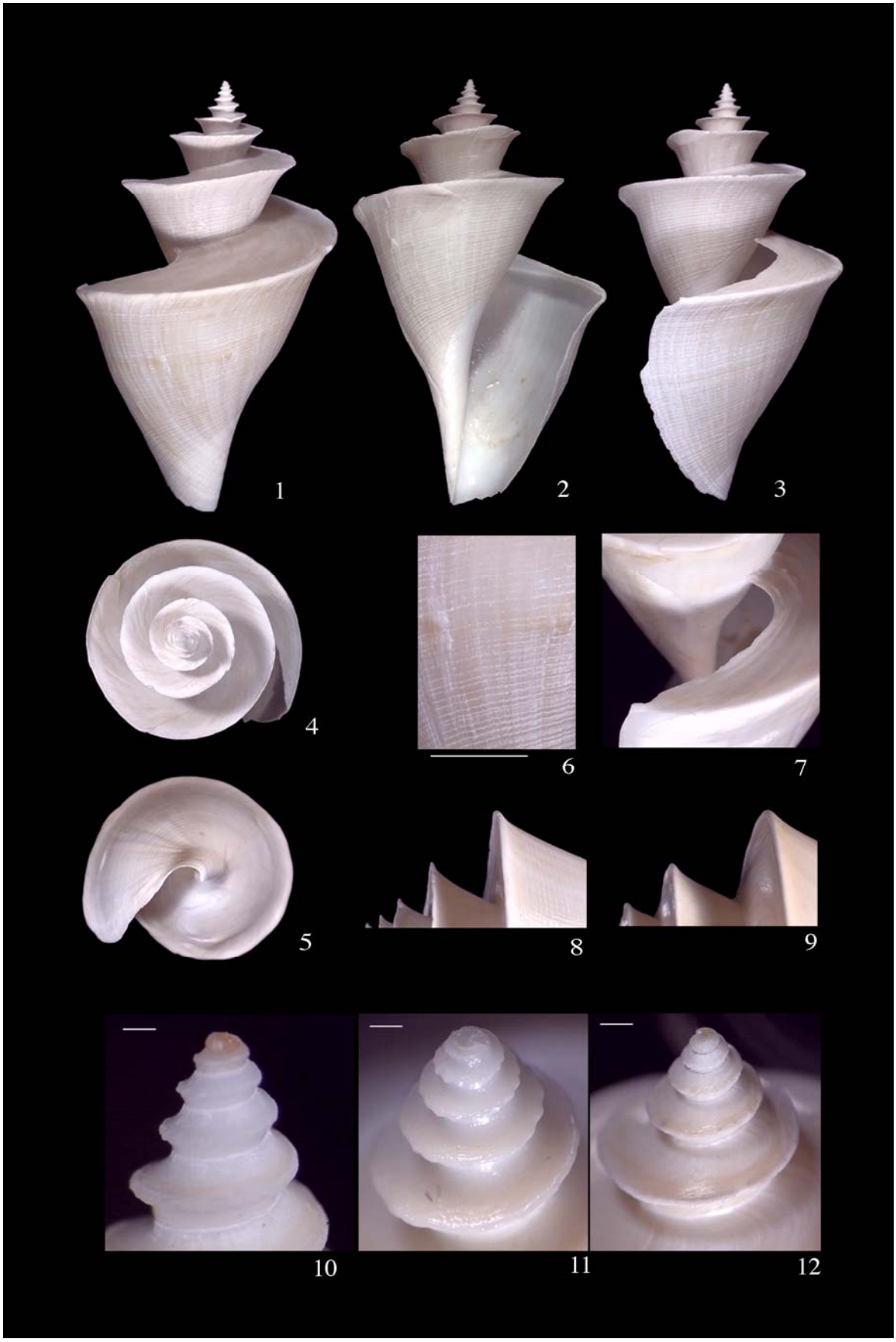
Fig. 5: *T. janae* n. sp. (82 mm), Paratype 12, showing narrower anal notch.

Fig. 6: *T. mirabilis* (77 mm), Taiwan, showing wider anal notch.

Figs 7+8: *T. mirabilis* (77 mm), Taiwan.

Fig. 9: *T. mirabilis* (91 mm), E China. Note the longitudinally oriented pattern.

Plate 1



Explanation on p. ##.

Plate 2

Explanation on p. ##.