

The first record of *Wilhelminaia minuscula* Preston, 1913 from Australia and the designation of lectotypes for *W. mathildae* Preston, 1913 and *W. minuscula* (Gastropoda, Eupulmonata, Microcystidae)

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ABSTRACT

Wilhelminaia minuscula Preston, 1913 is recorded from Australia for the first time from locations in north-east Queensland. Lectotypes are designated for *W. minuscula* and *W. mathildae* Preston, 1913 from syntype material in the Natural History Museum, London. Shell microsculpture (protoconch and teleoconch) has allowed type material from Indonesia to be associated with Australian material of the two species. The types of the species are illustrated for the first time and additional information on their shell features is presented in revised descriptions of both species. Eastern Australian and Top End locality records for both *W. minuscula* and *W. mathildae* are provided that indicate a pattern of natural dispersal, combined with a small number of possible introductions.

Wilhelminaia Preston, 1913 (family Microcystidae) was introduced for two species from the Indonesian island of Beilan Beilan (= Belang Belang), north-west of Obi Island, Moluccas. The specimens were among two bags of leaf litter sent by the owner Mr Diepenheim and sorted by H.B. Preston, with the assistance of renowned Australian malacologist, Tom Iredale. *Wilhelminaia mathildae* (type of the genus) and *W. minuscula* were described but never figured and no type specimens were designated. There has been ongoing uncertainty about the status of the former species (Solem 1959, p. 92; 1988, p. 547) probably due to the unknown whereabouts of type material (Solem 1959, p. 92, B.J. Smith 1992, p. 244). With the discovery of specimens tentatively identified as *W. minuscula*, among lots of *W. mathildae* from north-east Queensland, an attempt was made to locate type material for these two species. Using the fact that B.J. Smith (1992), in the catalogue of Australia's non-marine Mollusca, had cited Preston's Norfolk Island land snail types as being in the NHMUK, enquiries were made to that institution in one last effort to locate type material of the two species. Fortunately, specimens of both species from the Preston collections were verified as syntypes in 2013.

Preston did not designate holotypes for either species; consequently lectotypes are herein designated from the NHMUK syntypes to stabilise nomenclature and the specimens are illustrated along with images of Queensland specimens to show the relative sizes of the two species (Fig. 1). Data labels that accompany the type specimens are also illustrated (Fig. 2). SEMs of the surface sculpture of the protoconch and teleoconch of both species, based on type and local material, are provided (Figs 3–5). Preston's 1913 descriptions are revised to incorporate this additional information on shell morphology.

Previously Solem (1988, p. 547; 1991, p. 170) had provided Northern Territory (Top End) and Western Australian (Kimberley) records for *W. mathildae*. Here we provide all eastern Australian records from the QM and AM databases for both the widespread *W. mathildae* and the newly recorded *W. minuscula*. Additional records of *W. mathildae* from the Top End, housed in Vince Kessner's private collection, are provided to complete the inventory.

An accompanying map showing the relative distributions of the two species in Queensland and the Top End is included (Fig. 6).

While *W. mathildae* has been recorded from Papua, Indonesia, Caroline Islands, Vanuatu, Solomons and Australia (Solem 1988, p. 547), there has been no subsequent recording of *W. minuscula* apart from Preston's initial record from Belang Belang Island, Indonesia. There is also a significant gap in the distribution of *W. mathildae*, with virtually no records between the Indonesian locality and the widespread occurrence of the species in Australia. These issues are discussed and possible reasons for these anomalies are advanced.

MATERIALS AND METHODS

Apart from material in the Natural History Museum, London (NHM) and the Field Museum of Natural History (FMNH), other material cited here is deposited in the collections of the Queensland Museum, Brisbane, Queensland (QMMO), the Australian Museum, Sydney, New South Wales (AMSC) and the private collection of Vince Kessner (VK). Illustrations of the syntype material of both species and accompanying micrographs were provided by the NHM; local material was photographed in the Queensland Museum. Specimens were studied using a WILD M5 stereo microscope and images of Queensland shells were taken with a Visionary Digital BK-Plus lab system camera setup in the Queensland Museum's Digital Imaging Unit (QMDIU). Shell sculpture of local specimens was investigated and photographed using a TM-1000 Tabletop Scanning Electron Microscope (SEM) located in the Queensland Museum. Specimens were observed both gold-coated and uncoated. Specimens were scanned in the NHM using a JEOL IT500 SEM and were observed uncoated.

Abbreviations: AM: Australian Museum, Sydney; H/D: height/diameter; NEQ: north-east Queensland; NHM/NHMUK: Natural History Museum, London; NSW: New South Wales; PNG: Papua New Guinea; QM: Queensland Museum.

Using shell microsculpture in taxonomic determination of glass-snails

Shell microsculpture was used in this study to

verify species identity and generic demarcation. This approach is based on unpublished and ongoing investigations by one author (JS) on the microscopic glass-snails belonging to Microcystidae and Helicarionidae of eastern Australia and PNG-Indonesian regions. These studies have shown

that protoconch microsculpture can be a useful generic marker when animal tissue is not available for dissection and molecular analysis. Teleoconch microsculpture, in combination with shell coiling pattern and shell shape, can also be an informative adjunct in making taxonomic determinations.

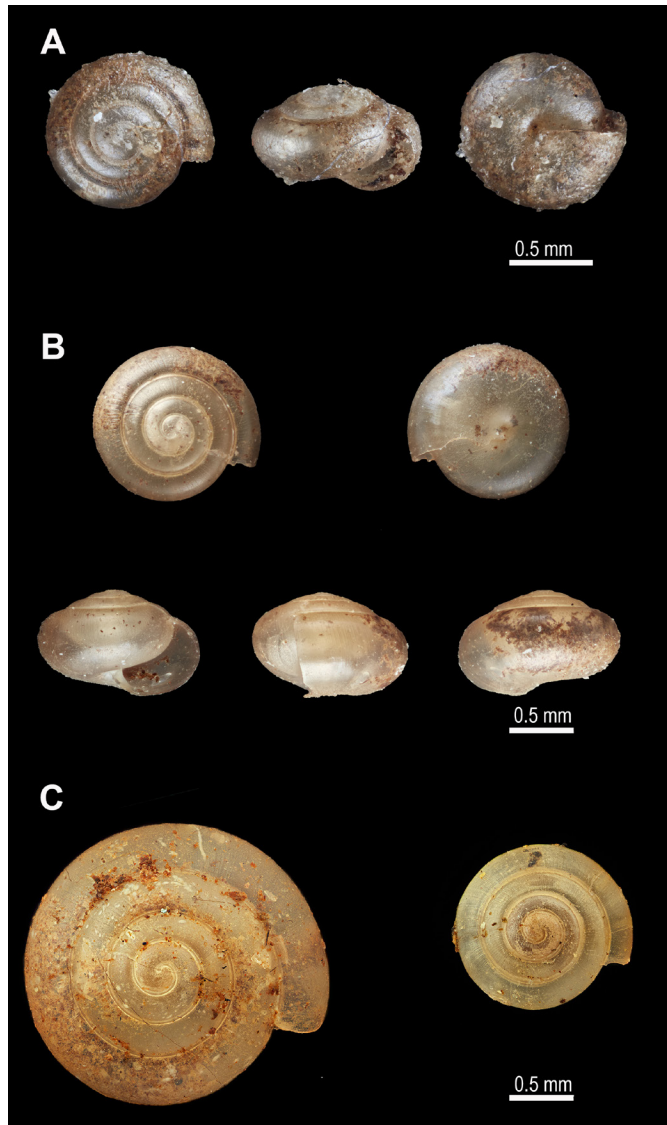


Figure 1. Shells. **A.** *Wilhelminaia minuscula* Preston, 1913, lectotype designated herein, NHMUK 1914.1.7.464, Beilan Beilan (= Belang Belang) Island, Indonesia; **B.** *Wilhelminaia mathildae* Preston 1913, lectotype designated herein, NHMUK 20130187/1, Beilan Beilan (= Belang Belang) Island, Indonesia; **C.** Showing relative shell sizes. **(left)** *Wilhelminaia mathildae*, QMMO87930, Tolga Scrub, Atherton Tableland, NEQ. **(right)** *Wilhelminaia minuscula*, QMMO87922, Tolga Scrub, Atherton Tableland, NEQ.

SYSTEMATICS

Infraorder EUPULMONATA

Superfamily LIMACOIDEA

Family MICROCYSTIDAE Thiele, 1931

Wilhelminaia Preston, 1913

Wilhelminaia Preston, 1913: p. 435; Solem 1959: p. 92; Solem 1988: p. 547; B.J. Smith, 1992: p. 244; Stanisic et al., 2010: p. 344; Stanisic et al., 2018: p. 216.

Type species: *Wilhelminaia mathildae* Preston, 1913 — original designation.

Diagnosis: Shell minute, pale to dark brown, glassy, depressedly turbate with a slightly elevated spire; protoconch microsculpture of 13–15 moderately spaced, spiral rows of prominent punctations and weak, curved growth ridges; teleoconch with numerous spiral rows of elongate punctations (*mathildae*) or faintly punctate spiral striae (*minuscula*); columella dilated across a minutely to narrowly open umbilicus.

Remarks: Preston (1913) introduced *Wilhelminaia* for two species of minute land snails from the Indonesian island of Beilan Beilan (= Belang Belang) described below. Shell microsculpture distinguishes these species from other microscopic sympatric glass-snails from the region, routinely placed in the Indian genus *Microcystina* Mörch, 1872 by various authors. The microsculpture of the type of *Microcystina* (*M. rinki* Mörch, 1872) and other *Microcystina* species from the Andaman and Nicobar Islands in the Bay of Bengal are examined and provided for comparison (Fig. 7). The latter shows the protoconch microsculpture in these species consisting of numerous, closely spaced incised spiral striae, in contrast to the more widely spaced spiral rows of punctations exhibited by *Wilhelminaia* species.

Wilhelminaia minuscula Preston, 1913

(Figs 1A, 3A, 4A–B)

Wilhelminaia minuscula Preston, 1913: p. 435.

Preferred common name: Microscopic Glass-snail.

Type material: *Lectotype* (designated herein): NHMUK 1914.1.7.464. Island of Beilan Beilan

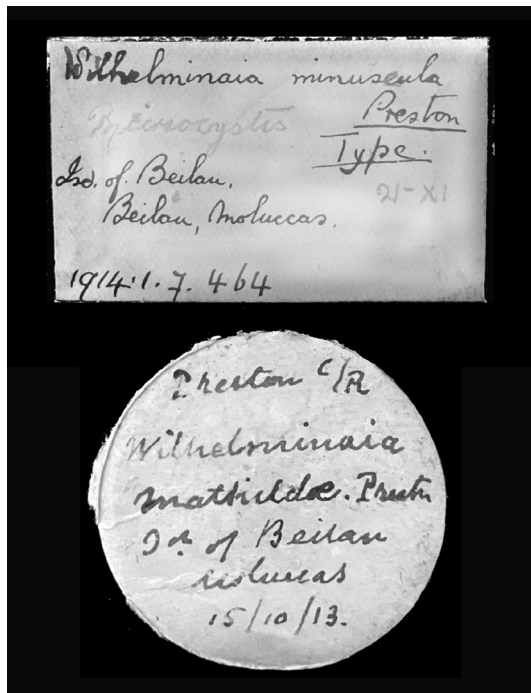


Figure 2. Data labels accompanying the syntype specimens.

(= Belang Belang), off north-west coast of Obi, Moluccas. Coll. Mr Diepenheim.

Material examined: All NEQ. QMMO68357, 27RC, Mt Consider limestone, SE Mt Molloy, (16° 45' 44" S, 145° 24' 05" E), vine thicket/limestone, in litter, coll. J. Stanisic & L. Little, 18.ix.1999; QMMO74172, 3RC, Cooyar Beach, c. 5 km E of Mossman (16° 27' S, 145° 24' E), tall vine thicket on sand, litter, coll. J. Stanisic & D. Potter, 29.vi.1983; QMMO19624, 2RC, alongside Gillies Highway, Mulgrave River valley, NEQ (17° 08' S, 145° 46' E), complex notophyll vine forest on hillside, in litter, coll. J. Stanisic, 29.ix.1980; QMMO48839, 13RC, Mossman, east at Four Mile Beach, Port Douglas (16° 30' S, 145° 28' E), behind beach, in litter, coll. B Jenkins, 19.i.1981; QMMO87922, 10RC, Tolga Scrub, Atherton Tableland, (17° 14' S, 145° 29' E), rainforest, in litter, coll. G. Annabell, 9.iv.1985; AMSC.612276, 5RC, S of Cooktown, Shipton's Flat State Forest (15° 48' 00" S, 145° 15' 00" E), coll. Queensland Museum/Australian Museum Rainforest Survey, 23.x.1975.

Description: Shell minute, dark brown, glassy, depressedly turbate with a slightly elevated spire;

whorls 3.70–4.125 (mean 3.97), evenly coiled, rounded at the periphery; sutures impressed, margined below; height of shell 0.63–0.87 mm (mean 0.71), H/D 0.53–0.79 (mean 0.62); diameter 1.11–1.18 mm (mean 1.14). Protoconch 1.5 whorls, sculptured with 13–15 widely spaced, spiral rows of prominent punctations and

weak, curved growth ridges; teleoconch with widely spaced and faintly punctate spiral striae. Aperture oblique, lunate; umbilicus reduced to a minute chink, columella slightly dilated below. Measurements based on five adult specimens from the Tolga Scrub, NEQ (QMMO87922).

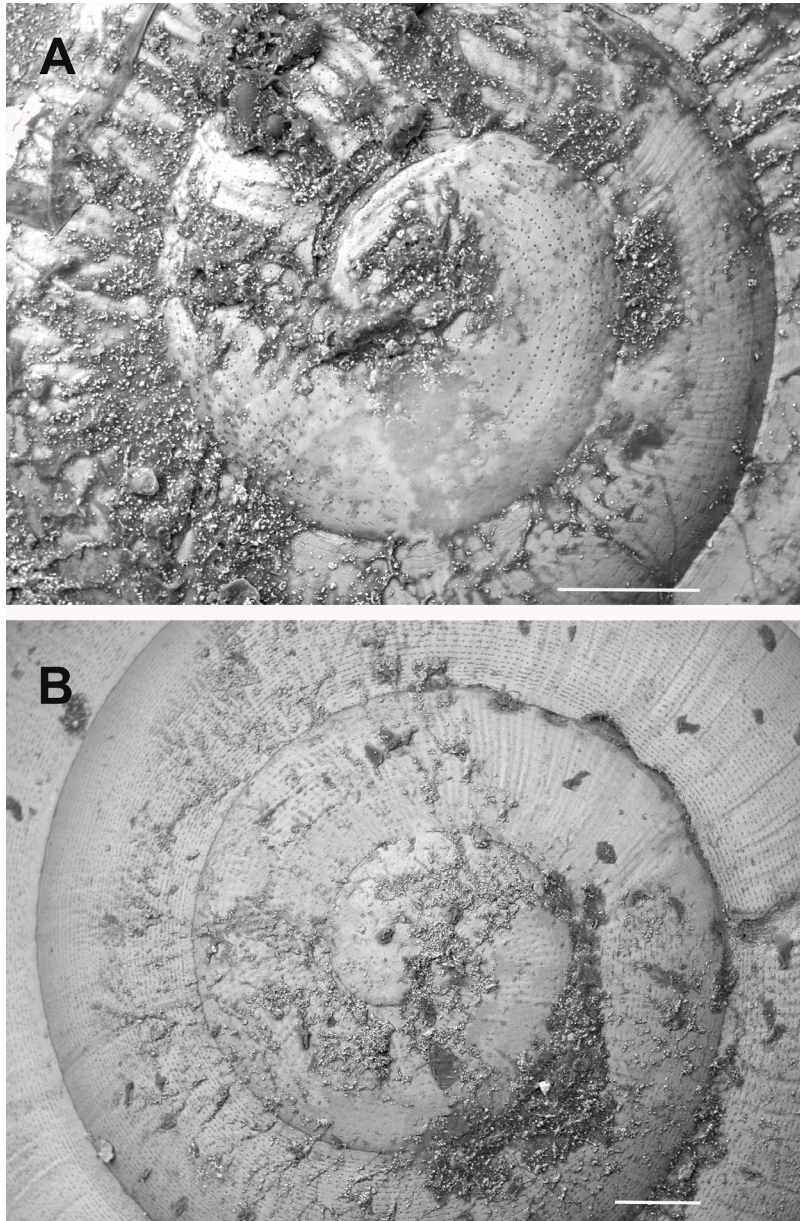


Figure 3. Shell microsculpture (protoconch and teleoconch) of lectotypes. **A.** *Wilhelminaia minuscula*, NHMUK 1914.1.7.464; **B.** *Wilhelminaia mathildae*, NHMUK 20130187/1. Scale bars = 100 μ m.

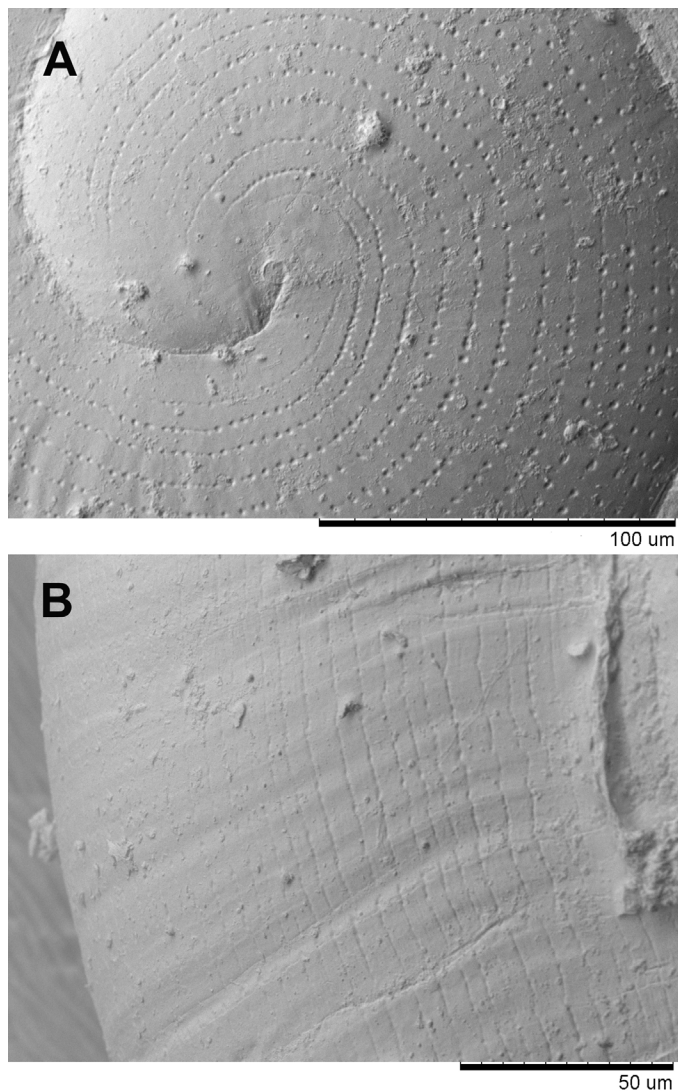


Figure 4. Shell microsculpture. *Wilhelminaia minuscula* QMMO74172, Cooyar Beach, NEQ. **A.** Protoconch; **B.** Teleoconch.

Distribution and habitat: North-east Queensland; in rainforest living in litter and under forest debris.

Remarks: The specimens of *W. minuscula* recorded here were discovered among lots of *W. mathildae* in the QM collections, some mixed in with the latter. Presumably, these were all misidentified as juveniles of *W. mathildae*. In his remarks on the species, Preston (1913) stated in relation to *W. minuscula* ‘the species is, in many respects, a miniature of *W. mathildae*’. *W. minuscula* is one of the world’s smallest land snails and can be easily overlooked

as a distinct species in litter samples. These records are the only detections of the species since Preston’s initial 1913 record.

***Wilhelminaia mathildae* Preston, 1913**
(Figs 1B, 3B, 5A–B)

Wilhelminaia mathildae Preston, 1913: p. 435; Solem 1959: p. 92; Solem 1988: p. 547, figs 185–189; B.J. Smith 1992: p. 244; Stanisic et al. 2010: p. 344, sp. 522 (with figure); Stanisic et al. 2018: p. 216, sp. 239 (with figure).

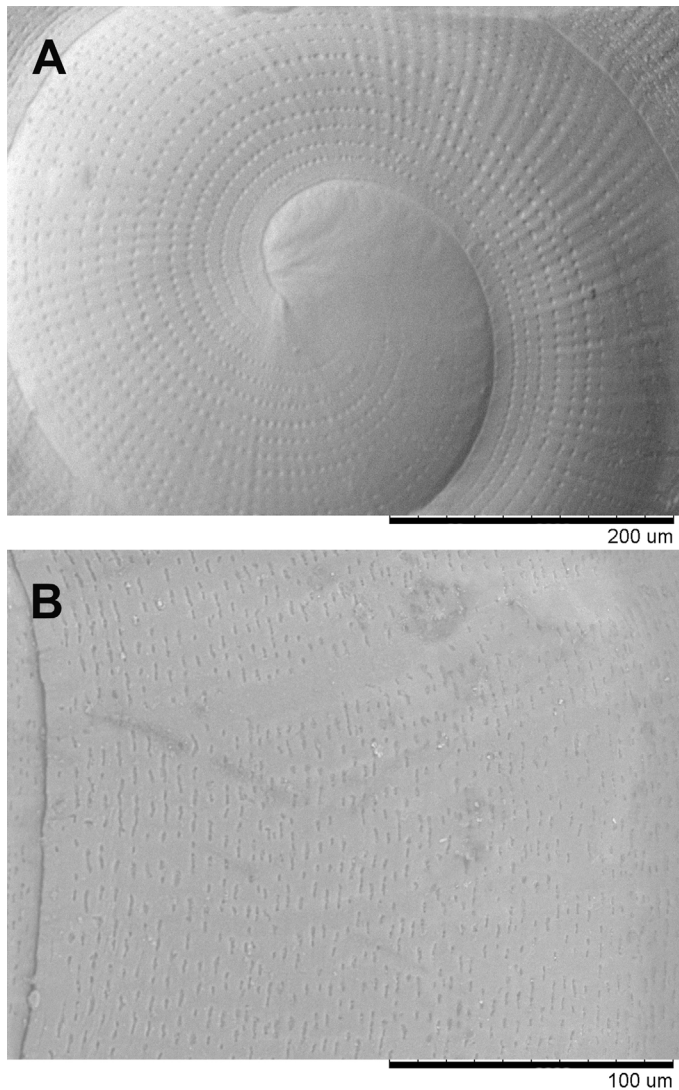


Figure 5. Shell microsculpture. *Wilhelminaia mathildae*, VK9805, Maningrida, west Arnhem Land, NT. **A.** Protoconch; **B.** Teleoconch.

Common name: Miniscule Glass-snail.

Comparative remarks: Adult *W. mathildae* can be readily distinguished from *W. minuscula* by size. Both species are microscopic but *W. mathildae* is almost twice the size of *W. minuscula* at comparable whorl counts (mean diameter 1.91 mm versus 1.14 mm). However, differences in shell surface microsculpture unequivocally separate the two species. Protoconch microsculpture is similar in both (as one might expect in congeneric species),

consisting of 13–15 widely spaced spiral rows of prominent punctations. However, where the teleoconch microsculpture of *W. mathildae* becomes a series of numerous, more closely spaced spiral rows of minute, irregular, elongate pits, *W. minuscula* becomes a series of widely spaced and faintly pitted, incised spiral striae.

Type material: *Lectotype* (designated herein): NHMUK 20130187/1, Island of Beilan Beilan (= Belang Belang), off north-west coast of Obi, Moluccas. Coll. Mr Diepenheim.



Figure 6. Map showing distribution of *Wilhelminaia* species in eastern Australia.

Paralectotype: NHMUK 20130187/2, same data as lectotype.

Material examined: QMMO6200, 1RC, Gordon Creek, Iron Range, NEQ (12° 43' S, 143° 17' E), alt. 100 m, mesophyll vine forest, coll. M.J. Bishop, vii.1976; QMMO19623, 6RC, alongside Gillies Highway, Mulgrave River valley, NEQ (17° 08' S, 145° 46' E), complex notophyll vine forest on hillside, litter, coll. J. Stanisic, 29.ix.1980; QMMO87930, 5RC, Tolga Scrub, Atherton Tableland, (17° 14' S, 145° 29' E), rainforest, in litter, coll. G. Annabell, 9.iv.1985; QMMO73813, 1RC, Dan Dan Scrub, SW Calliope, SEQ (24° 10' 40" S, 152° 05' 30" E), vine thicket/*Araucaria*, coll. J. Stanisic & G. Ingram, 6.x.1998; 22 km N of Ramingining, east Arnhem Land, Top End, VK9803. PNG: QMMO87882, 1RC, Varirata NP, near Sogeri, PNG (9° 26' 13" S, 147° 22' 08" E), coll. J. Worsfold, xii.1999.

Description: Shell tiny, pale to golden brown, glassy, depressedly turbinate with a slightly elevated

spire; whorls 4.0–4.375 (mean 4.23), evenly coiled, rounded at the periphery; sutures impressed, margined below; height of shell 1.10–1.29 mm (mean 1.19), H/D 0.60–0.66 (mean 0.62); diameter 1.80–2.00 mm (mean 1.91). Protoconch 1.5 whorls, with microsculpture of approximately 15 moderately spaced, spiral rows of prominent punctations and weak, curved growth ridges; teleoconch with numerous more closely spaced, spiral rows of minute and irregularly elongate punctations. Aperture oblique, lunate; columella outwardly dilated across an extremely narrow umbilicus. Measurements based on five adult specimens from the Tolga Scrub, NEQ (QMMO87930).

Distribution and habitat: From the Kimberley region in the north-west of Western Australia, across Australia's Top End, Torres Strait, Cape York and down the eastern edge of the continent as far south as the Miriam Vale region in south-east Queensland. Specimen data indicate that the species generally prefers living in rainforest environments but also inhabits degraded and disturbed habitats where it may have been introduced; living in litter and under forest debris.

Remarks: *Wilhelminaia mathildae* Preston, 1913 has a widespread occurrence in rainforest habitats in eastern Australia, indicating that the distribution is mainly the result of natural dispersal, similar to occurrences in the Kimberley and Northern Territory (Solem 1988, p. 247; 1991, p. 170). Solem (1988) also raised the potential of introduction in some Northern Territory localities. The same scenario is indicated for the eastern Australian records. Rainforest records imply natural dispersal while 'urbanised' records suggest accidental introduction.

DISCUSSION

The discovery of *Wilhelminaia minuscula* hidden among collections of *W. mathildae* is not surprising. The microscopic size of the former, among one of the smallest land snails worldwide, has probably resulted in the mis-identification of the species as a juvenile of *W. mathildae*. *Wilhelminaia minuscula* currently has a relatively restricted distribution in north-east Queensland but may have a wider distribution in Australia than the current records indicate. The species has been recorded living sympatrically with

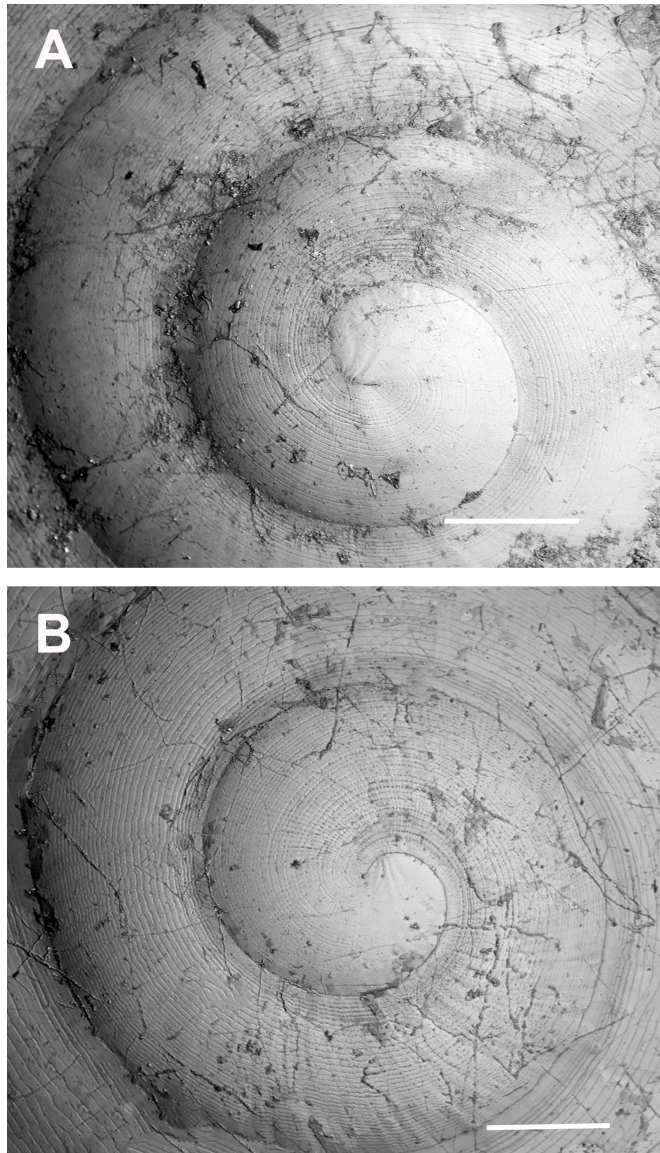


Figure 7. Shell microsculpture (protoconch and teleconch) of Indian *Microcystina*. **A.** *Microcystina rinki* (Mörch, 1872), NHMUK 1903.71.889, Nicobar Island, Bay of Bengal, India; **B.** *Microcystina stewarti* Blanford, 1904, NHMUK 1903.71.898, Andaman Island, Bay of Bengal, India.

W. mathildae in several north Queensland localities (Tolga Scrub, Mulgrave River Valley, Shipton's Flat) and reaffirms the sympatry documented by Preston (1913). Why this species clusters in geographically proximate localities in north-east Queensland is not clear and requires further investigation.

Wilhelminaia mathildae has one of the largest

contiguous ranges of any Australian land snail, comparable to the distribution of some Australian Pupillidae (Stanisic et al. 2010, 2018).

The widespread records of *W. mathildae* in Australia contrast with an almost total lack of species records in the PNG-Indonesian region, where there have been few detections since its initial description.

Neither Hedley (1891) nor Iredale (1941), in their detailed coverage of the New Guinea land snail fauna, recorded the species while documenting the presence of other minute and tiny species of glass-snails. The Dutch malacologist W.S.S. ('Tera') van Benthem Jutting, whose many studies documented the land Mollusca of the Malay Peninsula, Dutch New Guinea and the Indo-Australian Archipelago (including the islands of Sumatra, Java, Sumba and several smaller Moluccan islands) only ever recorded *W. mathildae* once, from a plantation, Cloudy Bay, east of Port Moresby, PNG (Jutting 1964). This scarcity of detections of these microscopic snails in the PNG-Indonesian region may be related to the collection methods used. In Australia, land snail surveys since the mid-1970's have consistently included litter collection and sorting by microscope as essential elements in the process of specimen recovery (pers. obs.). This technique may not have been applied to the snail surveys undertaken to the north of Australia such as PNG and Indonesia. Notably, Preston's detection of the two *Wilhelminaia* species was from leaf litter, whereby the two species along with other land snails were recovered as dead shells.

During this investigation, we had access to the private land snail collection of Jack Worsfold who spent several years in PNG and amassed a significant collection of PNG land snails, including 19 lots of microscopic microcystids recovered as dead shells from litter sorting. These snails were donated to QM for study as part of this project and were investigated with SEM. Scans revealed only one specimen of *W. mathildae* from PNG's Central Province. On one hand, this result verifies the possible rarity of the species in PNG, but it may also indicate the difficulty of detecting this tiny species even through litter sorting.

The protoconchs of *W. mathildae* specimens cited by Solem (1988, 1991) from the Pacific islands (Caroline, Vanuatu, Solomons) should be re-examined by SEM. Without scrutinising the microsculpture there can be no certainty about their correct identification. The use of SEM to detail shell microsculpture is recommended for confirming the identification of *Wilhelminaia* species.

ACKNOWLEDGEMENTS

Thanks are due to Lily Kumpe from the QMDIU for providing high-resolution images of local specimens of *Wilhelminaia minuscula* and *W. mathildae* used in this study and to Alison Miller, Collection Manager, Australian Museum, for providing museum records of both species. We are also grateful to Jack Worsfold and Vince Kessner for access to their collections and use of their specimen records.

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APPENDIX

Eastern Australian records of *Wilhelminaia mathildae* from the collections of the Queensland Museum, Brisbane and Australian Museum, Sydney.

Museum records are presented in a north-south regional order. Regional abbreviations used are as follows:

TS: Torres Straits, CYP: Cape York Peninsula, WT: Wet Tropics, north-east Queensland, EU: Einasleigh Uplands, NEQ: north-east Queensland, MEQ: mid-eastern Queensland, SEQ: south-east Queensland.

Queensland Museum, Brisbane

CYP: Wenlock R Xing, c. 17.7 km N, Peninsula Rd, QMMO30679; Shelburne Bay, c. 0.5 km from beach on Nixon's-Double Pt Rd, QMMO21500; Lamond Hill, Iron Range, QMMO6254; Lockerbie, c. 5.6 km N, Cape York Rd, QMMO21969; Gordon Ck, Iron Range, QMMO6202, QMMO6256, QMMO6257; Blue Mts, c. 40 km NE Coen, QMMO74014. **EU:** Laura-Palmerville Rd, c. 66.6 km along road, QMMO23367; Mt Molloy, SE at Mt Consider, QMMO68357; Mt Mulligan, gorge at N end, QMMO53199; Great Basalt Wall, via Charters Towers at Toomba Station, QMMO79851, QMMO79860; Hann Tableland, QMMO80016, QMMO80030; Charters Towers, NW at Toomba Station, Great Basalt Wall, QMMO58553; Bakers Blue Mt, c. 17 km SW of Mt Molloy, upper slopes, QMMO73843, QMMO57380. **NEQ:** Tully, E at Dunk I, QMMO60546; Mossman, c. 4.4 km W, Mossman Gorge, QMMO48841; Mount Spec NP, QMMO87923; Mena Creek Environmental Park, QMMO87924; Malanda SW at 'Cloudland', Windsor Tbl'd, QMMO48838; QMMO80005; Lyons Lookout, Mossman-Mt Molloy Rd, QMMO87929; Innisfail, E at Kurrimine Bch Environmental Pk, QMMO20528; opposite Hinchinbrook Lookout, N of Ingham, NEQ, QMMO87925; Kirrama Ra, via Kennedy, QMMO48837; Kurrimine Beach Environmental Park, QMMO87931; Danbulla SF, Lake Tinaroo, QMMO87927; Ellis Beach, N of Cairns, QMMO87928; Flecker Botanic Gardens, Cairns, QMMO87926; Cape Tribulation, 2 km WNW, QMMO48378, QMMO48524, QMMO48538; Cardwell Gap, N Ingham, QMMO16175; Cardwell Range, S of Cardwell on Main Hwy, QMMO30550; Cardwell,

Conn Ck, on Ingham-Cardwell Rd, QMMO16181; Cardwell, QMMO87932; Cairns, W at Crystal Cascades, QMMO48840; Brooklyn Holdings, Mount Carbine Seat, QMMO80048, QMMO80049. **SEQ:** Rockhampton, SE at South Ulam limestone Mine, QMMO36257; Miriam Vale, c. 40 km NW in Eurimbula NP, QMMO54575.

Australian Museum, Sydney

TS: N end of Saibai Village, Saibai Island, AMSC.582656. **NEQ:** Townsville, Mt. Elliott, Alligator Creek, AMSC.471529; Twelve Mile Scrub, near Ayton, Bloomfield River, AMSC.425507; W of Port Douglas, Spear Creek State Forest, AMSC.425508; S of Cooktown, Shipton's Flat State Forest, AMSC.425509; Port Douglas, Four Mile Beach near caravan park, AMSC.425502; Magnetic Is, Ned Lee Creek, AMSC.124264; Mt Elliott, near Townsville, AMSC.471519; Finlay State Forest, near Ayton, Bloomfield River, AMSC.425510; N Qld, Lake Tinaroo, Danbulla State Forest, AMSC.468542; Kurrimine Beach, S of Innisfail, AMSC.425503; Lake Barrine, Atherton Tableland, AMSC.582606; Helenvale, S of Cooktown, AMSC.425514; Mossman Gorge, circuit track, AMSC.525021; Fritz Creek S.F. nr Ayton, Bloomfield River, AMSC.425504; GBR, Cairns Reef lagoon & between Cairns Reef & Hope Is, AMSC.425506; Giru, Haughton River, AMSC.471534; Dowah Creek, Crystal Cascades, W of Cairns, AMSC.425512; Barron River, Barron Gorge Power Stn, near Cairns, AMSC.425500, AMSC.425511; Cardwell Range, Kirrama State Forest Rd at Yuccabine Creek, AMSC.425501. **MEQ:** Yeppoon, Limestone Creek, AMSC.469926; Saint Helens Beach, N of Mackay, AMSC.471515; Proserpine River estuary, at boat launching ramp off Conway Rd. opposite Flying Fox Islands on NE side, AMSC.425505; Proserpine, Cathu SF, AMSC.468539; Prosperine, Jaxut SF: AMSC.468536; Mackay, Andergrove, Wattle Street, AMSC.469918; Mackay, Mt Bassett, AMSC.469915; Keppel Sands N end: AMSC.469925. **SEQ:** Rockhampton, Joskeleigh, AMSC.469921; Eurimbula S.F., S of Gladstone: AMSC.425513.

Top End records from the Vince Kessner collection, additional to those given in Solem (1988)

Rocky Point, 14 km NE Maningrida, west Arnhem Land, Top End, VK9794; 32.5 km NE of Djarrakpi Outstation turnoff, east Arnhem Land, Top End,

VK9796; Rose River Crossing (Policeman Crossing), Gulf of Carpentaria, VK9797; 37 km NE of Djarrakpi Outstation turnoff, east Arnhem Land, Top End, VK9798; Table Hill, east Arnhem Land, Top End, VK9799; 14 km N of Ramingining, east Arnhem Land, Top End, VK9800; 50 km NE of Djarrakpi Outstation turnoff, east Arnhem Land, Top End, VK9801; Shady Beach, Yirrkala, Gove Peninsula, east Arnhem Land, Top End, VK9802; Rocky Point, 15 km N of Numbulwar, Gulf of Carpentaria, west Arnhem Land, Top End, VK9804; Old rubbish dump, Maningrida, west Arnhem Land, Top End, VK9805; Vine thicket near the barge landing at Black Point, Cobourge Peninsula, Top End, VK28101.

Additional records from the Field Museum of Natural History, Chicago, USA

The Lakes, Weipa, FMNH222600; 2 km SE of Somerset, Cape York, FMNH222439; Cape Tribulation Road, 2 km E of Bloomfield River Crossing, NEQ, FMNH222830; Fitzroy Island, near Nudey Beach, near Cairns, FMNH222887.