


# A review of the present-day Australian species of the gastropod subgenus *Rissoina* (*Rissolina*) (Rissooidea: Rissoinidae) with descriptions of two new species

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SLEURS, W.J.M., 2023. A review of the present-day Australian species of the gastropod subgenus *Rissoina* (*Rissolina*) (Rissooidea: Rissoinidae) with descriptions of two new species. – *Basteria*, 87 (1): 37-76. Leiden. Published 20 March 2023.

The Australian species of the rissoinid subgenus *Rissoina* (*Rissolina*) are reviewed based on the examination of material mainly from the collections of the Australian Museum (Sydney). A total of 15 species is recognized, two of which are new: *Rissoina* (*Rissolina*) *backeljauwi* spec. nov. and *R. (Rissolina) ponderorum* spec. nov. Two species are (re)described using open nomenclature. Lectotypes are selected for *R. mercurialis* R. B. Watson, 1886 and *R. signata* O. Boettger, 1893. Some anatomical aspects of *R. angasii* Pease, 1871, *R. duclosi* Montrouzier, 1866, *R. heronensis* (Laseron, 1956) and *R. ponderorum* spec. nov. are described.

Key words: Mollusca, Gastropoda, *Rissoina* (*Rissolina*), Australia, Lord Howe Island, Norfolk Island, taxonomy.

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## INTRODUCTION

The Rissoinidae is a family of small to medium-sized marine snails, with more than 300 present day species (Sleurs, 1992) with a worldwide, temperate to tropical distribution. Ponder (1985) recognized the following subgenera within the genus *Rissoina* d'Orbigny, 1840: *Rissoina* s.s., *Rissolina* A. Gould, 1861, *Phosinella* Mörch, 1876, *Apataxia* Laseron, 1956, *Pachyrissoina* O. Boettger, 1893 and the fossil *Buvignieria* Cossmann, 1921. Sleurs (1993) added the subgenera *Moerchiella* G. Nevill, 1885 and *Ailinzebina* Ladd, 1966. The subgenera of *Rissoina* are mainly distinguished by sculptural features of the shell. As pointed out by Ponder

(1985) groupings based on sculptural features probably are polyphyletic so that the delimitation of the subgenera may be artificial. For convenience and in the absence of new evidence, I continue to use this probably artificial subgeneric arrangement within *Rissoina*.

The present paper deals with the Australian members of the subgenus *Rissolina*. The presence of a more or less prominent spiral basal fold and the rather prominent axial ribs on the teleoconch distinguish species of the subgenus *Rissolina* from those of other *Rissoina* subgenera. The spiral sculpture is weak to absent, except for microscopic striae that can only be visualized by SEM examination and which appear to be present in all species investigated. Anatomical research on members of *Rissolina* was previously performed by Kosuge (1965) and Ponder (1985). The anatomical features here described by me for three other species confirm Ponder's observation that there is hardly any variation in anatomical features between members of the subgenus *Rissolina*. However, the penial features range from quite simple to very complex structures and appear to be of value in distinguishing species that are barely distinguishable by shell features.

The oldest members of *Rissolina* are known from the Burdigalian (early Miocene) of South-West India (Harzhauser, 2014), South-Central Java (Reich et al., 2014) and Borneo (Beets, 1941). Ladd (1966) reported several *Rissolina* species from the early Miocene of the Indo-West Pacific. Ponder (1985) mentioned *R. aturensis* Cossmann & Peyrot, 1918 from the Miocene of France, but judging from the original figures of this species, the typical basal fold appears to be very weakly developed, unlike typical *Rissolina* species.

The distribution area of living members of the subgenus *Rissolina* is mainly limited to shallow waters of the Indo-West Pacific. Two species are recorded from the tropical western Atlantic (*R. indiscreta* Leal & Moore, 1989 from the north-eastern and eastern coast of Brazil and *R. harryleei* Rolán & Fernández-Garcés, 2009 from Bermuda). Based on the material available to me (mainly from the Australian Museum collections), 15 species live around Australia, two of which are new: *Rissoina* (*Rissolina*) *backeljauwi* spec. nov.

and *R. (Rissolina) ponderorum* spec. nov. Two other species are described using open nomenclature. Literature records of *Rissolina* species from Australian waters are very rare and mostly appear in lists without any description and/or illustration, which makes identification very unreliable. Therefore, only records of *R. (Rissolina) angasii* from Tasmania (Grove & de Little, 2014) are included.

## MATERIALS AND METHODS

The majority of the material used in this study were empty shells obtained from the collections of the Australian Museum, Sydney. Shells were measured as described by Sleurs (1993) using a stereomicroscope with an ocular micrometer. The number of whorls were counted with an accuracy of 0.25 whorls. Helicon Focus software (v.8) was used to stack the images taken by a Cmax camera mounted on a Euromex stereomicroscope. Scanning electron microscopy (SEM) was conducted on the shell of some species and on the radula and penis of *R. (Rissolina) ponderorum* spec. nov. Shells, penis and radula were mounted on pin stubs and sputter coated with an ultrathin (30nm) layer of gold. The penis of a dissected specimen of *R. (Rissolina) ponderorum* spec. nov. was dehydrated with an acetone series and subjected to critical point drying. Anatomical investigations of *Rissoina (Rissolina) angasii*, *R. (Rissolina) duclosi*, *R. (Rissolina) heronensis* and *R. (Rissolina) ponderorum* spec. nov. were carried out under a WILD M5 stereomicroscope with camera lucida.

Abbreviations used in 'shell measurements': H – Height (length) of shell; Hs – Height (length) of spire; W – Width (diameter) of last whorl; Wpen – Width (diameter) of penultimate whorl; Nax – number of axial ribs on last whorl; Naxp – number of axial ribs on penultimate whorl; Nwhorls – number of whorls of teleoconch. The measurements of H, Hs, W and Wpen are all given in mm.

Abbreviations used in anatomical illustrations:

a.c.	anterior chamber of stomach
b.c.	bursa copulatrix
c.m.	columellar muscle
ct.	ctenidium
d.g.	digestive gland
e.m.c.	posterior end of mantle cavity
f.p.	fecal pellet
g.p.	genital porus
h.g.	hypobranchial gland
int.	intestine
k.	kidney
l.c.ga.	left cerebral ganglion
l.c.t.	left cephalic tentacle
l.o.g.	lower oviduct gland
l.p.g. ratio	length of pleuro-suboesophageal connective

	divided by the sum of the length of the left pleural ganglion, the suboesophageal connective and the suboesophageal ganglion
l.pl.ga.	left pleural ganglion
l.p.t.	left pallial tentacle
m.t.	metapodial tentacle
oes.	oesophagus
os.	osphradium
ov.	ovary
p.	penis
p.c.	posterior chamber of stomach
p.d.	penial duct
pr.g.	prostate gland
r.p.g. ratio	length of pleuro-supraoesophageal connective divided by the sum of the length of the left pleural ganglion, the pleuro-supraoesophageal connective and the supraoesophageal ganglion (Davis et al., 1976)
r.pl.ga.	right pleural ganglion
r.p.t.	right pallial tentacle
s.d.	sperm duct
s.r.	receptaculum seminis
s.s.	style sac
st.	stomach
sub.oes.ga.	suboesophageal ganglion
sup.oes.ga.	supraoesophageal ganglion
t.	testis
u.o.g.	upper oviduct gland
v.	vestibulum
v.d.	vas deferens
v.s.	vesicula seminal

Institutional abbreviations – AMS: Australian Museum Sydney; ANSP: Academy of Natural Sciences of Philadelphia; LACM: Los Angeles County Museum; MHN: Muséum Bordeaux Science et Nature; NHMUK: Natural History Museum, London; NMNZ: Museum of New Zealand Te Papa Tongarewa, Wellington; NHMW: Natural History Museum, Vienna; RBINS: Royal Belgian Institute of Natural Sciences, Brussels; SMF: Senckenberg Museum Frankfurt; USNM: United States National Museum, Washington; ZSI: Zoological Survey of India, Calcutta.

L.T.: low tide; number of specimens in square brackets.

## SYSTEMATIC PART

**Family Rissoinidae Stimpson, 1865**

**Genus *Rissoina* d'Orbigny, 1840**

**Subgenus *Rissolina* A. Gould, 1861**

***Rissoina (Rissolina) angasii* Pease, 1871**

Figs 1-9

*Rissoina turricula* Angas, 1867: 114, pl. 13 fig. 20. Type locality: Australia, New South Wales, Sydney, Port Jackson.

Type material: holotype NHMUK 1870.10.26.121. Primary junior homonym of *Rissoina turricula* Pease, 1860.

*Rissoina angasii* Pease, 1871: 20. Nomen novum for *R. turricula* Angas, 1867 (not Pease, 1860).

*Rissoina flexuosa* — Weinkauff, 1884: 88, pl. 15d fig. 13 (not Gould, 1861).

*Rissolina angasi* — Gatliff & Gabriel, 1922: 149; Laseron, 1950: 262, fig. 9.

*Rissoina angasii* — Grove & de Little, 2014: 19.

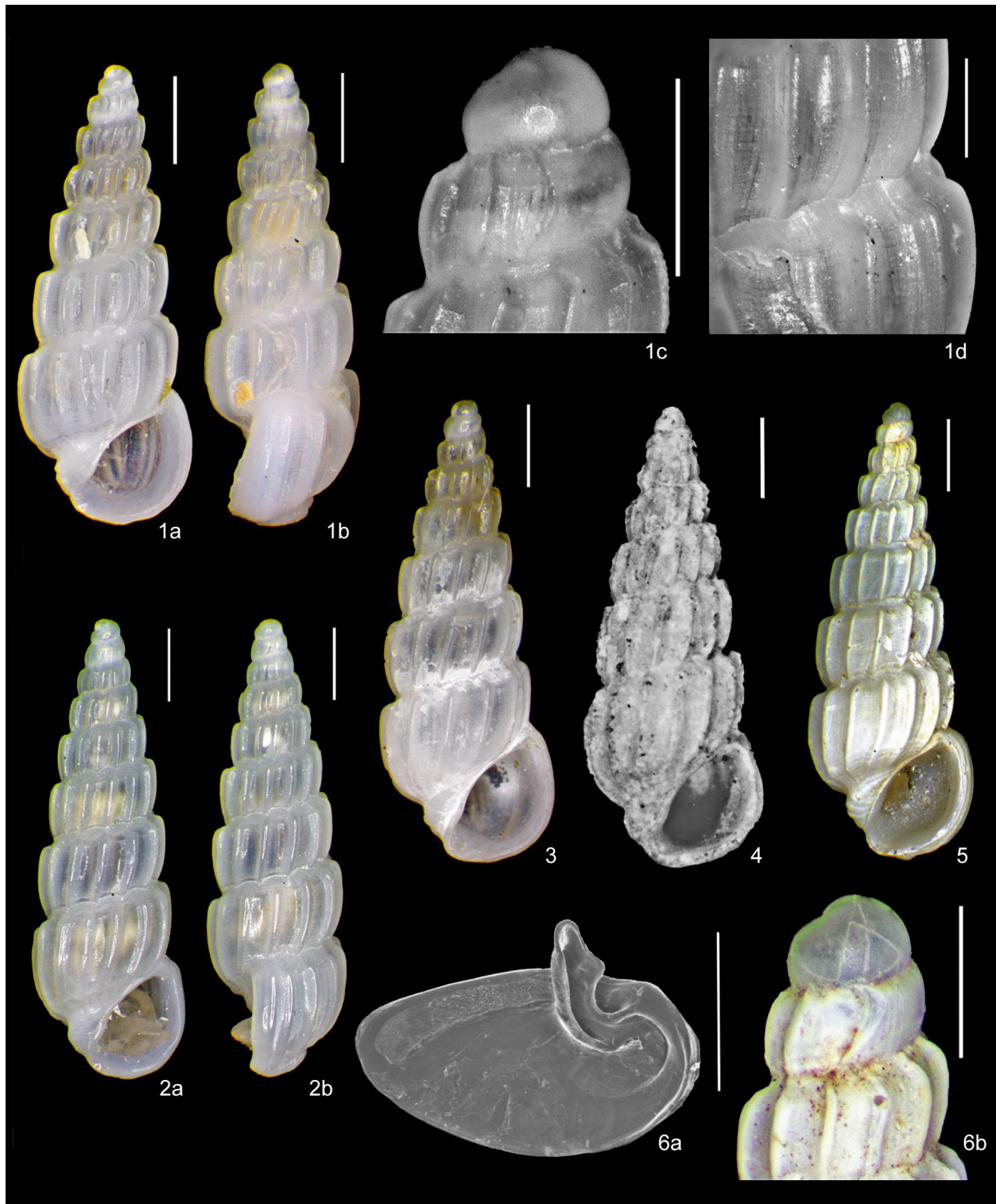
Description. — Shell small to medium-sized, turreted, narrowly and elongate conical, rather stout. Protoconch of non-planktotrophic larval type; of 1 convex, smooth whorl; protoconch-teleoconch boundary sharply demarcated with slightly sinuous, weakly to moderately thickened margin. Teleoconch of 5.25 to 7 weakly convex whorls; suture strongly undulating, moderately impressed; spire whorls strongly angulate below suture; last whorl strongly angulate below suture and strongly contracted near base. Axial sculpture of prominent, narrow, sharp, rather distantly spaced, weakly to moderately opisthocline ribs; interspaces deep and wide. Two adapical whorls with one subsutural spiral rib; subsequent spire whorls with indistinct irregularly spaced spiral riblets in interspaces between axial ribs; last whorl with some closely spaced, slightly more prominent spiral riblets between the periphery and moderately prominent basal spiral fold; axial ribs on last whorl extending to inner lip of aperture, spiral fold weakly to moderately nodular by intersecting axial ribs. Aperture lenticular; inner lip very narrow, very thin; anterior channel narrow, moderately deep, weakly elongate with anterior margin weakly reflected dorsally; inner side of outer lip thin; very weak and narrow labial varix, bearing one or two axial riblets; spiral riblets of last whorl extending onto varix; outer lip moderately opisthocline in profile. Shell colour uniform white. Operculum typical of (sub)genus; peg open over its entire length.

Shell measurements. — Holotype of *Rissoina turricula* Angas, 1867 (NHMUK, 1870.10.26.121): H 5.3, Hs 3.4, W 2.1, Nax 12, Naxp 14, Nwh 6. Additional shells (n = 20): H 4.4–7.3 ( $\mu = 5.7$ ), Hs 2.9–5.1 ( $\mu = 3.9$ ), W 1.7–2.6 ( $\mu = 2.1$ ), Nax 10–13 ( $\mu = 11.3$ ), Naxp 12–15 ( $\mu = 12.9$ ), Nwh 5.25–7 ( $\mu = 6.25$ ).

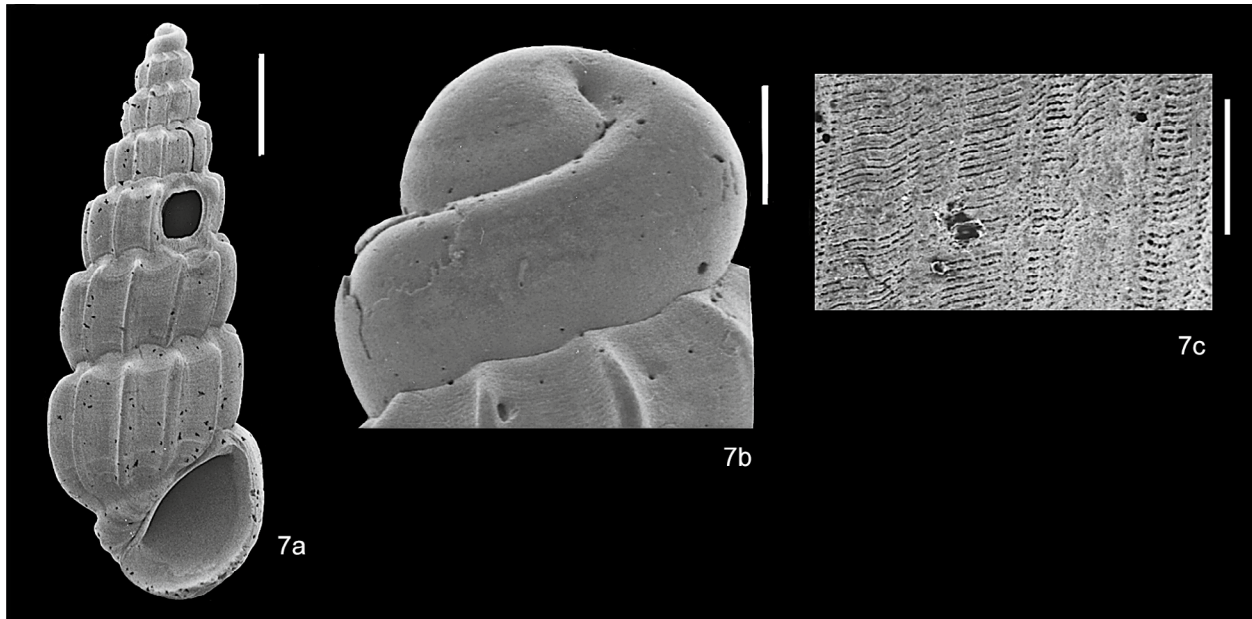
Anatomy. — Hypobranchial gland very narrow, thin. Stomach-style sac ratio 7.9; stomach length-width ratio 3.8 (n = 1). Male with narrow and simple penis with very short filament at distal end; penial duct closed; prostate gland relatively large and thick and closed (? or sealed) over its entire length; seminal vesicle very thin and narrow compared to other members of Rissoinidae. No female specimens available for examination.

Material examined. — **Western Australia.** Bathurst

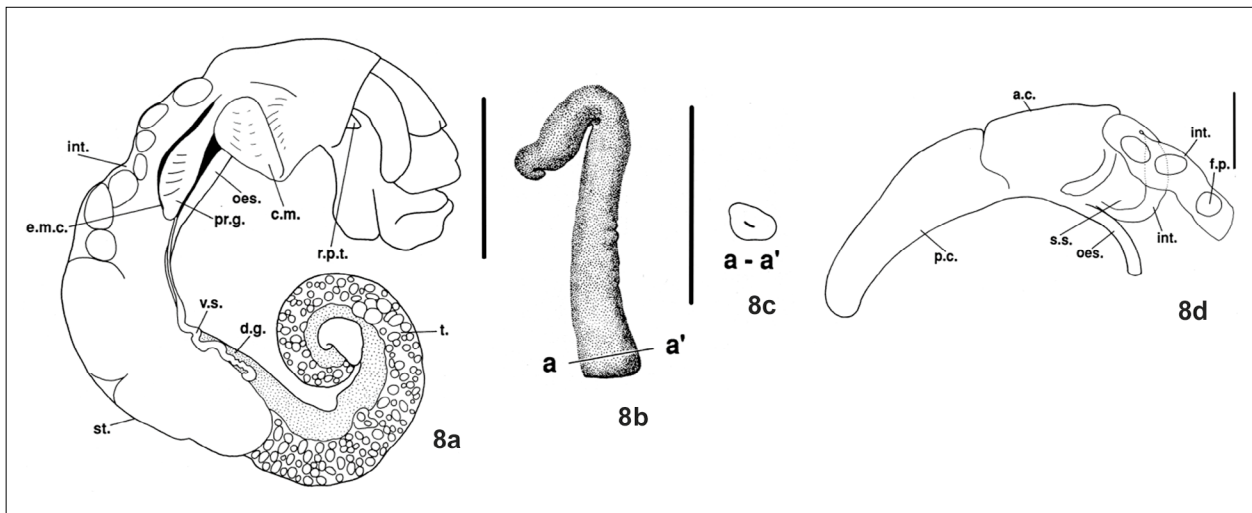
Point, Basin side of Rottneest Island, on beach, xii.1972, J. Hewitt [2] (AMS); W side of Carnac Island, off Freemantle, in large sheltered pool on outer coast, ca. 6 m, 2.ii.1972, W.F. & J.M. Ponder [2] (AMS #822); Woodmans Point, Cockburn Sound, from dredge dump on beach, dump from between and Carnac Island, 1973–74, J. Hewitt, [1] (AMS); Garden Island, at SW end, S of Perth, on beach, 31.i.1972, W.F. & J.M. Ponder & N. Coleman [4] (AMS); Point Peron, 48 km S of Perth, (32°16'S, 115°41'E), on exposed SW side, 2–3 m, 27.i.1972, W.F. & J.M. Ponder [5] (AMS C.160295); Ellensbrook (= South Cowaramup), near Margaret River mouth (33°53'S, 114°59'E), shell sand on beach, W. Anson [1] (AMS C.160304); Margaret River mouth (33°57'S, 114°59'E), W. Anson [1] (AMS C.160276); South Cowaramup, on beach, 1972, H. Baker [3] (AMS); S of Cowaramup Bay, near mouth of Margaret River, H. Baker [1] (AMS); S of Cowaramup, ii.1973, W. Anson [14] (AMS); South Point, S side of Two Peoples Bay, near Albany, in large sheltered pool, on outer coast, 2.ii.1972, W.F. & J.M. Ponder [2] (AMS); E side of Hopetoun Jetty, W side of sheltered limestone reef, on mixed algae, 0–1 m, 4.ii.1972, W.F. & J.M. Ponder [2] (AMS); West Island, SE of Hopetoun, on algae, 15 m, 12.v.1973, J. Shepherd [1] (AMS); Two Mile Beach, Hopetoun, 9–12.i.1975, N. Hewitt [6] (AMS); ca. 13 km E of Twilight Cove, Esperance, on beach, 9.xii.1971, W.F. & J.M. Ponder [1] (AMS #2129); Observatory Point, Esperance (33°55'S, 121°47'E), in sand patches in rocks at cliff base, 7.i.1975, N. Hewitt [2] (AMS C.160303); Woody Island, Archipelago of the Recherche, 7.i.1944, G.P. Whitley [1] (AMS C.69480); E of Hood Point, Great Australian Bight, stn. G2/108, vii.1962, 150 m, C.S.I.R.O. "Gascoyne", J. Voorwinde [4] (AMS); S of Eucla, stn. G2/97/62, 78 m [1] (AMS). **South Australia.** Point Sinclair, shell sand, 0.1 m, 9.ii.1972, W.F. Ponder [2] (AMS); St. Francis, Nuyts Archipelago, reef, 15–37 m, N. Coleman [1] (AMS); Tumby Bay, shell sand, viii.1962, J. Voorwinde [2] (AMS); approx. 3 km E of Normanville, 72 km S of Adelaide, on rock strewn, medium exposed platform, 12.i.1971, W.F. Ponder [1] (AMS); Stokes Bay, N coast of Kangaroo Island, coralline algae on vertical rock faces, 7 m, 4.iii.1978, I. Loch [1] (AMS). **Victoria.** Port Fairy, coll. R. Bell [3] (AMS); Flinders, Western Port, 1950s, J. Kerslake [33] (AMS), vii.1956, J. Kerslake [4] (AMS); Merricks, Western Port Bay (38°24'S, 145°06'E), on sheltered platform, 21.ii.1969, W.F. Ponder & R. Burn [1] (AMS C.155130; in alcohol); Western Port, just N of Arms Point, Sandy Point (38°24.3'S, 145°14.2'E), dredged, sandy mud and shell, 7.5 m, 28.ii.1977, W.F. Ponder [3] (AMS); between Eagle and Crawfish Rock, NW Arm Western Port Bay (38°16'S, 145°17'E), 15.ii.1969, 3.6–5.5 m, W.F. Ponder & B.J. Smith [6] (AMS C.160302); Point Lounsdale, near Geelong, coralline washings from pools, 18.ix.1973, W.F. Ponder & R. Burch [1] (AMS160298); Portsea, Port Phillip, 10.iv.1973, J. Kerslake [1] (AMS C.91126); Cowes, Phillip Island, Western Port Bay, J. Voorwinde [1] (AMS); Point Leo, Western Port



**Figs 1-6.** *Rissoina* (*Rissolina*) *angasii* Pease, 1871. **1a-d.** Werri Beach, New South Wales: frontal (a), lateral (b), protoconch (d), microsculpture (d) (AMS C.153799). **2a-b.** South Cowaramup, Western Australia: frontal (a), lateral (b) (AMS C.160304). **3.** Tamar Heads, Tasmania: frontal (AMS C.160309). **4.** Holotype of *Rissoina turricula* Angas, 1867, Port Jackson, Sydney, New South Wales (NHMUK 1870.10.26.121). **5.** Between Eagle Island and Crawfish Rock, Victoria: frontal (AMS C.160302). **6a-b.** Merricks, Western Port Bay, Victoria: operculum, SEM (a), protoconch (b) (AMS C.155130). Scale bar: **1a-b, 2-5** = 1 mm; **1c-d, 6a-b** = 0.5 mm.



**Fig. 7.** *Rissoina* (*Rissolina*) *angasii* Pease, 1871. Sydney, New South Wales: frontal, SEM (a), protoconch, SEM (b), microsculpture, SEM (c) (AMS C.20859). Scale bar: **7a** = 1 mm; **7b-c** = 0.1 mm.



**Fig. 8.** *Rissoina* (*Rissolina*) *angasii* Pease, 1871. Merricks, Western Port Bay, Victoria: right side of uncoiled male (a), dorsal aspect of penis (b), section through penis at position marked in b (c), stomach (d) (AMS C.155130). Scale bar: **8a** = 1 mm; **8b-d** = 0.5 mm.

Bay, viii.1956-ii.1957, J. Kerslake [2] (AMS); Ocean Beach, Flinders, sheltered rock pools on platform, L.T., 28.ii.1977, B. Duckworth [1] (AMS). **Tasmania.** “Tasmania”, Beddome [6] (AMS); East Cove, Deal Island, Bass Strait (39°30’S, 147°20’E), transect 2, stn. 4, 6-15 m, 03-10 v.1974, S.A. Shepherd, S.A. Fisheries [1] (AMS); Tamar Heads (41°04’S, 146°46’E) [5] (AMS C.160309). **New South Wales.** Blue Lagoon Beach, S of the Entrance (33°23’S, 151°29’E), near rocks, 16.xi.1984, J. Kerslake [1] (AMS); Long Reef, Collaroy (33°45’S, 151°19’E), 26 m, J. Voorwinde [5] (AMS C.160261); Long Reef, Collaroy, Sydney, 1946-51, L. Woolacoot [1] (AMS); Long Reef, J. Ker-

slake [5] (AMS) + [3] (AMS); Long Reef [1] (AMS); Sydney [7] (AMS C.32670) [1] (AMS C.20661); Sydney (33°51’S, 151°15’E), 1904, H.L. Kesteven [19] (AMS C.20859); E of Sydney, stn. G2/56/62, 150 m, 18.vi.1962, coll. C.S.I.R.O. HMAS “Gascoyne” [1] (AMS); Bradley’s Head, Sydney, L. Woolacoot [1] (AMS); North Harbour, Sydney, 1944, L. Woolacoot [4] (AMS); Sydney Harbour, A.J. Henn [11] (AMS); off Chinaman’s Beach, Middle Harbour, Sydney, dredged, ca. 9 m, 27.vi.1952, J. Kerslake [1] (AMS); Balmoral, Middle Harbour, L. Woolacoot [9] (AMS); Balmoral, Cox [5] (AMS); Chinaman’s Beach, Middle Harbour, Sydney, vi.1949, L. Woola-

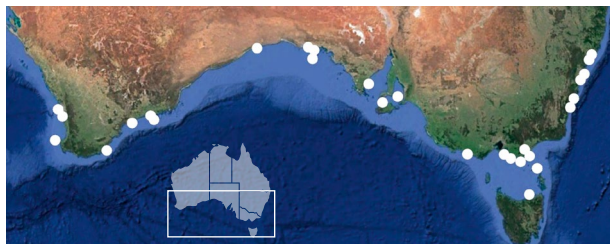


Fig. 9. Map showing records of *Rissoina* (*Rissolina*) *angasii* Pease, 1871 (map source: Google Earth).

cott [1] (AMS); Middle Harbour, Sydney, L. Woolacott, ex H. Mort [5] (AMS); Middle Harbour, Sydney, C. Hedley [40] (AMS C.32670); Middle Harbour, J. Brazier [2] (AMS); Middle Harbour, Sydney, 5 m, J. Voorwinde [6] (AMS); Quarantine Bay, Sydney, 11-18 m, J. Voorwinde [2] (AMS); Western Channel, off Sow and Pigs Reef, Sydney Harbour, dredged, ca. 1875, J. Brazier [2] (AMS); Maroubra Bay, Sydney, J. Brazier [2] (AMS); La Perouse, Botany Bay, 29.viii.1919, J. Brazier [1] (AMS); La Perouse, Botany Bay, 23.vii.1923, J. Brazier [1] (AMS); La Perouse, J. Brazier [7] (AMS); Little Fairlight, Sydney [13] (AMS); Kurnell, Sydney, L. Woolacott [2] (AMS); Green Point, Watson's Bay, Port Jackson, 9-14.5 m, vi.1865, J. Brazier [1] (AMS); Port Jackson [holotype *turricula*]; Beach, 28.v.1939, T. Iredale [1] (AMS); Little Coogie Bay, S of Sydney, 23.vi.1895, J. Brazier [1] (AMS); Little Coogie Bay, Sydney (33°55'S, 151°16'E), J. Brazier [5] (AMS C.160299) + [1] (AMS C.160286); Little Coogie Bay, Sydney, J. Brazier [18] (AMS 160298); Little Coogie Bay, large rock pool, 13.vii.1895, J. Brazier [3] (AMS); Little Coogie Bay, vii.1895 [1] (AMS); Cronulla, beach, J. Voorwinde [4] (AMS); Boat Harbour, near Cronulla, J. Kerslake [1] (AMS); Shellharbour (34°35'S, 150°52'E), J. Voorwinde [4] (AMS C.160300); Shellharbour, 1942, L. Woolacott [9] (AMS); Shellharbour, T. Iredale [5] (AMS); Shellharbour, L. Woolacott [1] (AMS); Gerringong, xi.1952, L. Woolacott [4] (AMS C.160301, #1995); Ocean Beach at Bendalong, N of Lake Conjola, shell grit, 17.iii.1976, C.J. Murray [2] (AMS) + [1] (AMS); Ulladulla, vii.1965, J. Kerslake [2] (AMS); Ulladulla, J. Voorwinde [7] (AMS).

Literature records (Grove & de Little, 2014): **Tasmania**. Currie Harbour (39°55'37"S, 143°50'40"E); Fitzmaurice Bay (40°03'42"S, 143°52'59"E); Seal Point (40°06'38"S, 143°58'40"E).

Distribution. — SW Western Australia (Rottnest Island), through South Australia, Victoria, northern Tasmania and New South Wales (Blue Lagoon) (Fig. 9).

Remarks. — Apart from the strongly variable shell length and the strength of the basal spiral fold, *R. (Rissolina) angasii* Pease, 1871 appears to be very uniform in shell shape and sculpture.

*Rissoina (Rissolina) angasii* strongly resembles *R. (Rissolina) turricula* Pease, 1860 s.l. and is contrasted under the section "Remarks" of the latter species. *Rissoina (Risso-*

*lina) angasii* is very similar to *R. (Rissolina) isolata* (Laseyron, 1956) from Christmas Island, but differs in having a protoconch of non-planktotrophic larval type, in the spire whorls and last whorl being more prominently angulated below the suture and in the axial ribs on the last whorl being more densely spaced.

***Rissoina (Rissolina) backeljau* spec. nov.**

Figs 10-17

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Type material. — Holotype (C.160048/1) in AMS, collected and presented by M. Ward; 5 paratypes (C.160048/2-6) from the type locality in AMS.

Type locality. — Australia, Northern Territory, Darwin, 32 km off Point Charles (12°10'S, 130°22'E), 27.5-36 m., 14.vii.1938.

Etymology. — In honour of Prof. Dr. Thierry Backeljau, head of the Operational Directorate Taxonomy and Phylogeny (RBINS), who supported me in various ways during my research on the Rissoinidae and Zebinidae.

Description. — Shell medium-sized, more or less broadly conical, stout. Protoconch of non-planktotrophic larval type (probably of direct development), dome-shaped, of 1 to 1.25 smooth whorls; diameter of protoconch I 0.3 mm; protoconch-teleoconch boundary sharply demarcated with orthocline to weakly curved, non-thickened margin. Teleoconch of 5 to 5.5 almost flat, weakly angulate whorls below suture; last whorl moderately contracted near shell base; suture weakly undulating, weakly impressed. Axial sculpture of prominent, very narrow, rounded, very distantly spaced, almost orthocline to weakly opisthocline ribs. Spiral sculpture of one weak, almost inconspicuous spiral rib below suture, giving spire whorls and last whorl weakly angled appearance; interspaces between axial ribs of spire whorls and last whorl with weak, very irregular and irregularly spaced, spiral threads or lirae; last whorl with prominent, narrow and weakly nodular spiral fold just below contraction near shell base; last whorl usually with 2 moderately prominent, distantly spaced spiral riblets just above contraction and with some weaker spiral lirae below and/or above spiral riblets. Aperture: lenticular; inner lip thin, weakly thickened near transition to rather wide, shallow and weakly elongate anterior channel; anterior margin moderately curved dorsally; inner side of outer lip thin; prominent and rather wide labial varix, bearing very weak spiral ribs on abapical half; outer lip almost orthocline in profile. Shell colour white. Operculum unknown.

Shell measurements. — Holotype: H 4.2, Hs 2.8, W 1.8, Nax 13, Naxp14, Nwh 5.5. Paratype 1: H 4.4, Hs 2.7, W 2.0,



**Figs 10-15.** *Rissoina* (*Rissolina*) *backeljauui* spec. nov. **10a-b.** Holotype, 32 km off Point Charles, Darwin, Northern Territory: frontal (a), lateral (b) (AMS C.160048/1). **11.** Paratype n°3, same locality: frontal (AMS C.160048/4). **12.** Paratype n°5, same locality: frontal (AMS C.160048/6). **13.** Onslow, Western Australia: frontal (AMS C.160263). **14a-b.** Joseph Bonaparte Gulf, Western Australia: frontal (a), lateral (b) (AMS C.163194). **15.** Same locality: frontal (AMS C.163194). Scale bar = 1 mm.

Nax 12, Naxp 13, Nwh 5.5. Paratype 2: H 4.0, Hs 2.5, W 1.8, Nax 12, Naxp 13, Nwh 5.5. Paratype 3: H 3.7, Hs 2.2, W 1.7, Nax 12, Naxp 13, Nwh 5. Paratype 4: H 4.4, Hs 2.6, W 2.1, Nax 12, Naxp 12, Nwh 5.5. Paratype 5 (subadult specimen): H 4.1, Hs 2.6, W 1.7, Nax 15, Naxp 14, Nwh 5.

Anatomy. — Animal unknown.

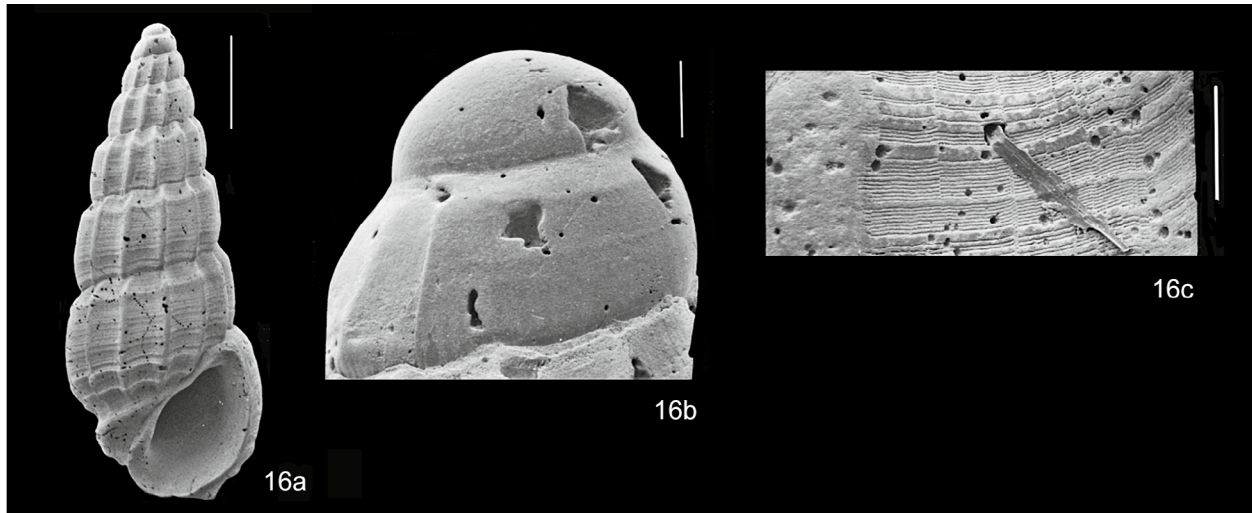
Additional material examined. — **Western Australia.** Six Mile Creek, Port Hedland (20°19'S, 118°40'E), x.1974, M. Seymour [3] (AMS C.160264); flat around old Onslow Jetty, Onslow (21°38'S, 115°07'E), L.T., sand and rock flats, semi-sheltered, 16.i.1972, W.F. Ponder [7] (AMS C.160263).

Distribution. — Only known from Northern Terri-

tory (Darwin) and Western Australia (Port Hedland and Onslow) (Fig. 17).

Remarks. — The type series of *Rissoina* (*Rissolina*) *backeljauui* spec. nov. shows some variation in the shell being more or less broadly conical and elongate and in the axial ribs being more or less opisthocline. The specimens from Onslow (AMS C.160263) differ from the type material in having rather prominent spiral ribs on the anterior  $\frac{3}{4}$  of the last whorl (and in some specimens on the spire whorls) and in the protoconch being slightly wider. In all other respects, however, they are identical to the type material.

*Rissoina* (*Rissolina*) *backeljauui* spec. nov. resembles *R.*



**Fig. 16.** *Rissoina* (*Rissolina*) *backeljauui* spec. nov. 32 km off Point Charles, Darwin, Northern Territory: frontal, SEM (a), protoconch, SEM (b), microsculpture, SEM (c) (AMS C.160048). Scale bar: **16a** = 1 mm; **16b-c** = 0.1 mm.



**Fig. 17.** Map showing records of *Rissoina* (*Rissolina*) *backeljauui* spec. nov. (map source: Google Earth).

(*Rissolina*) *torresiana* Laseron, 1956 in shell shape and sculpture, but differs markedly in having a protoconch of non-planktotrophic larval type and in the whorls of the teleoconch being less angulate below the suture; furthermore the axial ribs are more widely spaced in *R. torresiana* and the latter species has a pale yellow band running above the suture of the spire whorls and near the periphery of the last whorl; finally, the spiral riblets above the contraction near the shell base, are usually more prominent in *R. (Rissolina) backeljauui* spec. nov., although this feature appears to be rather variable.

*Rissoina* (*Rissolina*) *backeljauui* spec. nov. superficially resembles *R. (Rissolina) cardinalis* Brazier, 1877, but differs

essentially in having a protoconch of non-planktotrophic development and in having a markedly less elongate spire. *Rissoina* (*Rissolina*) *backeljauui* spec. nov. resembles *R. (Rissolina) crassa* Angas, 1871 in shell shape, but differs in being markedly smaller and in having weak, very irregular and irregularly spaced, spiral threads or lirae in the interspaces between the axial ribs on both the spire whorls and last whorl.

***Rissoina* (*Rissolina*) *cardinalis* Brazier, 1877**

Figs 18-22

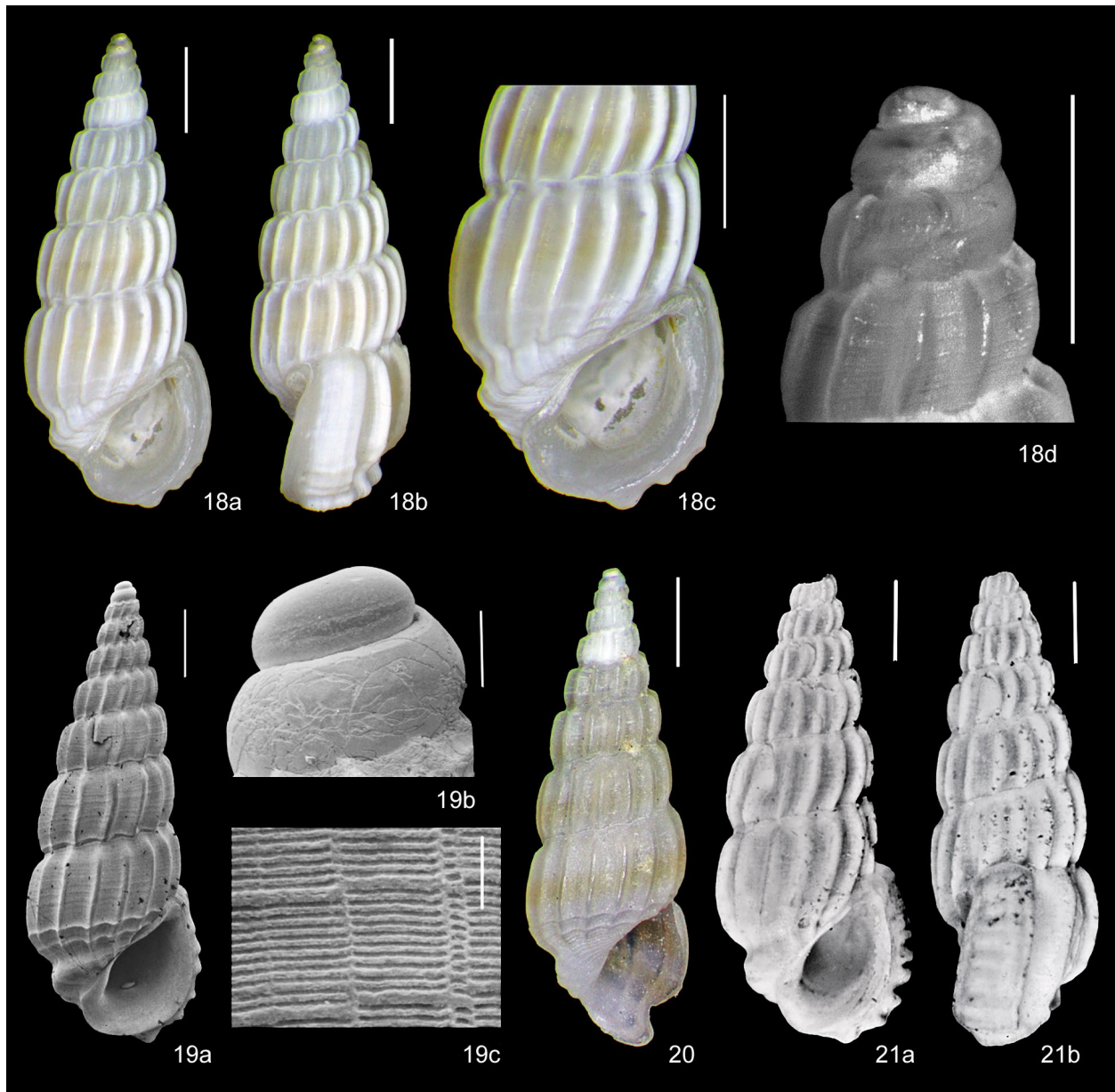
*Rissoina cardinalis* Brazier, 1877: 368. Type locality: Papua New Guinea, Katow, dredged, sandy mud, 15 m. Type material: 25 syntypes (A.141ii) in AMS, vii.1875, “Chevert Expedition”, collected by J. Brazier (on permanent loan from Macleay Museum, Sydney).

*Costalynia birestes* Laseron 1956: 397, figs 23-24. Type locality: Australia, N. Queensland, Torres Strait, Cape York, Albany Passage, 7.3-25.6 m. Type material: holotype (C.102458) in AMS.

*Rissoina* (*Rissolina*) *cardinalis* — Ponder, 1985: 183, fig. 134 E.

Description. — Shell medium-sized up to 6.1 mm, narrowly conical, stout. Protoconch of planktotrophic larval type, of 2, relatively weakly convex whorls, each being 1.5 times wider than high; protoconch-teleoconch boundary sharply demarcated with rather shallow sinusigeral notch and with moderately thickened margin. Teleoconch of 6.75 to 7.75 very weakly convex whorls; spire whorls weakly angulate below and above suture; last whorl weakly angulate below suture and strongly contracted near base; suture





**Fig. 18-21.** *Rissoina* (*Rissolina*) *cardinalis* Brazier, 1877. **18a-d.** 32 km off Point Charles, Darwin, Northern Territory: frontal (a), lateral (b), detail of last whorl (c), protoconch (d) (AMS C.160048). **19a-c.** Same locality: frontal, SEM (a), protoconch, SEM (b), microsculpture, SEM (c) (AMS C.160048). **20.** Same locality: juvenile specimen (AMS C.160049). **21a-b.** *Rissoina cardinalis* Brazier, syntype, Katow, Papua New Guinea: frontal (a), lateral (b) (AMS A14iii). Scale bar: **18, 19a, 20-21** = 1 mm; **19b** = 0.1 mm; **19c** = 0.02 mm.

weakly undulating, not impressed. Axial sculpture of prominent, very narrow, rather distantly spaced, rounded to sharp, weakly opisthocline ribs; interspaces rather deep and slightly wider than axial ribs. Spiral sculpture absent on spire whorls, apart from some very weak and irregular and irregularly spaced lirae; last whorl with a rather variable number of spiral riblets – usually 2 or 3 – above contraction near shell base; last whorl with prominent, narrow and nodular spiral fold below contraction; spiral fold bearing some very fine inconspicuous spiral lirae.

Aperture D-shaped; inner lip thin, apart from moderately prominent swelling near rather wide, shallow and short anterior channel; anterior margin of anterior channel moderately curved dorsally; inner side of outer lip thin; prominent and moderately wide labial varix, bearing very prominent spiral ribs on its entire length or restricted on abapical half; outer lip very weakly opisthocline in profile. Shell colour: most specimens uniform white; some specimens with pale-brown spiral band, located on abapical half of spire whorls and on adapical half of last whorl.

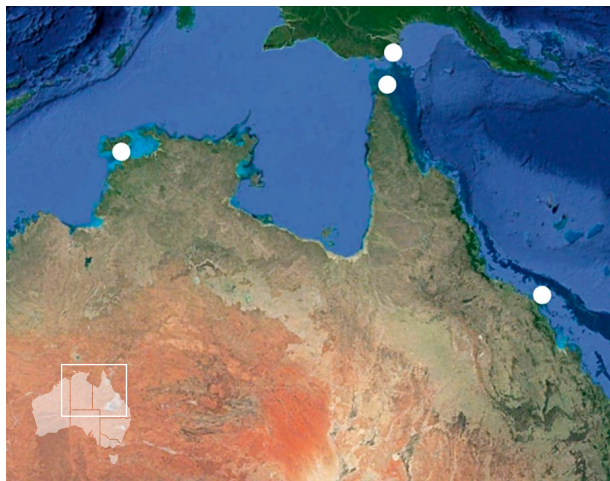


Fig. 22. Map showing records of *Rissoina* (*Rissolina*) *cardinalis* Brazier, 1877 (map source: Google Earth).

Operculum unknown.

Shell measurements. — Syntype of *Rissoina cardinalis* Brazier, 1877 (AMS A.141, protoconch broken): H ?5.4, Hs ?3.6, W 2.5, Nax 11, Naxp 15, Nwh >6.25. Holotype of *Cos-talynia birestes* Laseron, 1956 (AMS C.102458): H 6.9, Hs 4.5, W 2.7, Nax 12, Naxp 15, Nwh 7.75. Additional shells (n = 16 except where noted): H 5.3-6.1 ( $\mu = 5.8$ ), Hs 3.5-4.5 ( $\mu = 3.8$ ), W 2.1-2.7 ( $\mu = 2.3$ ), Nax 9-13 ( $\mu = 11.1$ ), Naxp 11-17 ( $\mu = 14.8$ ), Nwh (n = 14) 6.75-7.75.

Anatomy. — Animal unknown.

Additional material examined. — **Northern Territory.** 32 km N of Point Charles (12°10'S, 130°22'E), Darwin, 22 m, 7.vii.1938, M. Ward [5] (AMS C.160049); 32 km off Point Charles, 27.5-36.6 m, 14.vii.1938, M. Ward [8] (AMS C.160048). **Queensland.** Off Murray Island, Torres Strait (9°56'S, 144°04'E), 9-15 m, 30.viii-3.x.1907, C. Hedley [1] (AMS C.160297, in part); "Torres Strait", 22 m, C. Hedley [7] (AMS C.8077); Lindeman Island (20°27'S, 149°02'E), N of Mackay, T. Iredale [9] (AMS C.160047).

Distribution. — Queensland (Lindeman Island) to Northern Territory (Point Charles) and from southern Papua New Guinea (Katow) (Fig. 22).

Remarks. — *Rissoina* (*Rissolina*) *cardinalis* (Brazier, 1877) strongly resembles *R. (Rissolina) plicatula* A. Gould, 1861 in shell shape and sculpture, but differs essentially in having more angulate whorls, in having less numerous spiral lirae near the shell base and in lacking the fine, very densely spaced striations in the interspaces between the axial ribs; furthermore, the axial ribs are slightly less widely spaced – especially on the abapical whorls – in *R. (Rissolina) cardinalis*.

*Rissoina* (*Rissolina*) *cardinalis* superficially resembles *R. (Rissolina) torresiana* (Laseron, 1956) and is contrasted under the section "Remarks" of the latter species.

*Rissoina* (*Rissolina*) *cardinalis* superficially resembles *R. (Rissolina) backeljau* spec. nov. and is contrasted where the latter is described.

*Rissoina* (*Rissolina*) *cardinalis* resembles *R. (Rissolina) hernandezi* Faber & Gori, 2016 and is contrasted under the section "Remarks" of the latter species.

*Rissoina* (*Rissolina*) *cardinalis* resembles *R. (Rissolina) ponderorum* spec. nov. and is contrasted where the latter species is described.

### *Rissoina* (*Rissolina*) *crassa* Angas, 1871

Figs 23-26

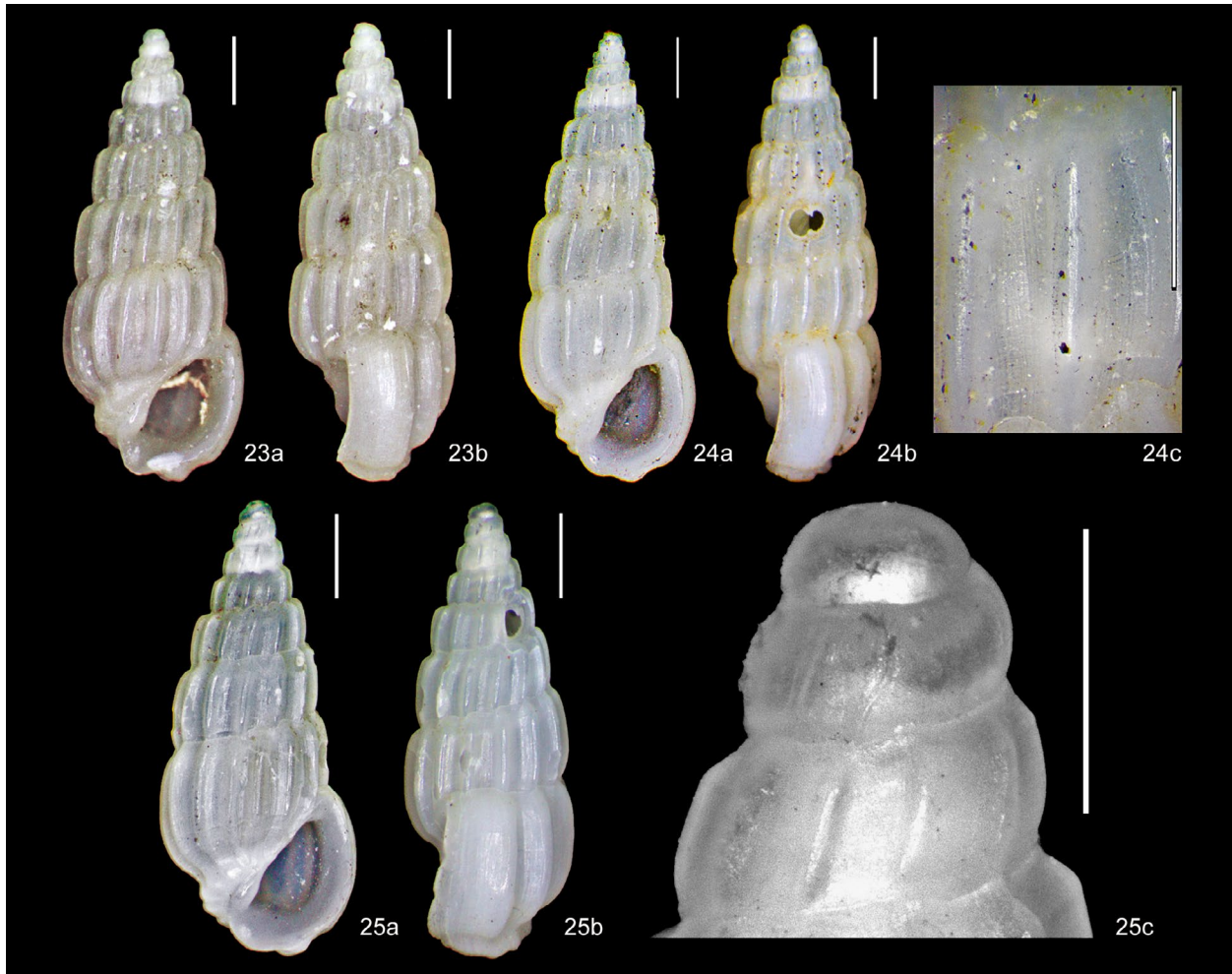
*Rissoina crassa* Angas, 1871: 17, pl. 1 fig. 16. Type locality: Australia, New South Wales, Sydney, Port Jackson, Bottle and Glass Rocks. Type material: 2 syntypes (1871.7.5.16) in NHMUK, leg. J. Brazier, G.F. Angas.

Description. — Shell medium-sized to large (up to 8 mm), narrowly to elongate conical, very stout. Protoconch of non-planktotrophic larval type, of one convex, smooth whorl; protoconch-teleoconch boundary distinct with a weakly sinuous, non-thickened margin. Teleoconch of 6 to 7.25 very weakly convex whorls; spire whorls moderately angulate below weakly undulating, very weakly impressed suture; last whorl moderately contracted near shell base. Axial sculpture of prominent, rather sharp and wide, almost orthocline to weakly opisthocline, distantly spaced ribs; interspaces deep and slightly wider than axial ribs. Spiral sculpture absent, apart from moderately prominent and moderately nodular spiral fold below contraction near shell base. Microsculpture of weak, irregular and rather irregularly spaced microscopic axial threads in interspaces between axial ribs; axial threads almost absent on adapical spire whorls. Aperture ovate; inner lip rather narrow and thin, apart from rather prominent thickening near transition to moderately deep, narrow and moderately elongate anterior channel; anterior margin of anterior channel moderately curved dorsally; inner side of outer lip thin; very prominent, moderately narrow to rather wide labial varix; outer lip orthocline in profile. Shell colour uniform white. Operculum unknown.

Shell measurements. — Syntype of *Rissoina crassa* Angas, 1871 (NHMUK, 1871.7.5.16, protoconch broken): H ?6.4, Hs ?4.0, W 2.7, Nax 11, Nwh >6. Additional shells (n = 9, except where noted): H 5.5-7.7 ( $\mu = 7.0$ ), Hs 3.5-5.0 ( $\mu = 4.5$ ), W 2.4-3.1 ( $\mu = 2.9$ ), Naxp (n = 7) 12-14 ( $\mu = 13$ ), Nwh 6.0-7.25.

Anatomy. — Animal unknown.

Additional material examined. — **New South Wales.** Shell Beach, ca. 8 km S of Yamba (29°32'S, 153°22'E) [1] (AMS C.160270); off Nelson Head, Port Stephens (32°43'S, 152°10'E), 15-18 m, 27.x.1980, J. Hall & I. Loch [2] (AMS C.160270); Bal-



**Figs 23-25.** *Rissoina* (*Rissolina*) *crassa* Angas, 1871. **23a-b.** Balmoral, Sydney, New South Wales: frontal (a), lateral (b) (AMS C.160296). **24a-c.** Same locality: frontal (a), lateral (b), microsculpture (c) (AMS C.160296). **25a-c.** 8 km S. of Yamba, New South Wales: frontal (a), lateral (b), protoconch (c) (AMS C.160265). Scale bar = 1 mm.



**Fig. 26.** Map showing records of *Rissoina* (*Rissolina*) *crassa* Angas, 1871 (map source: Google Earth).

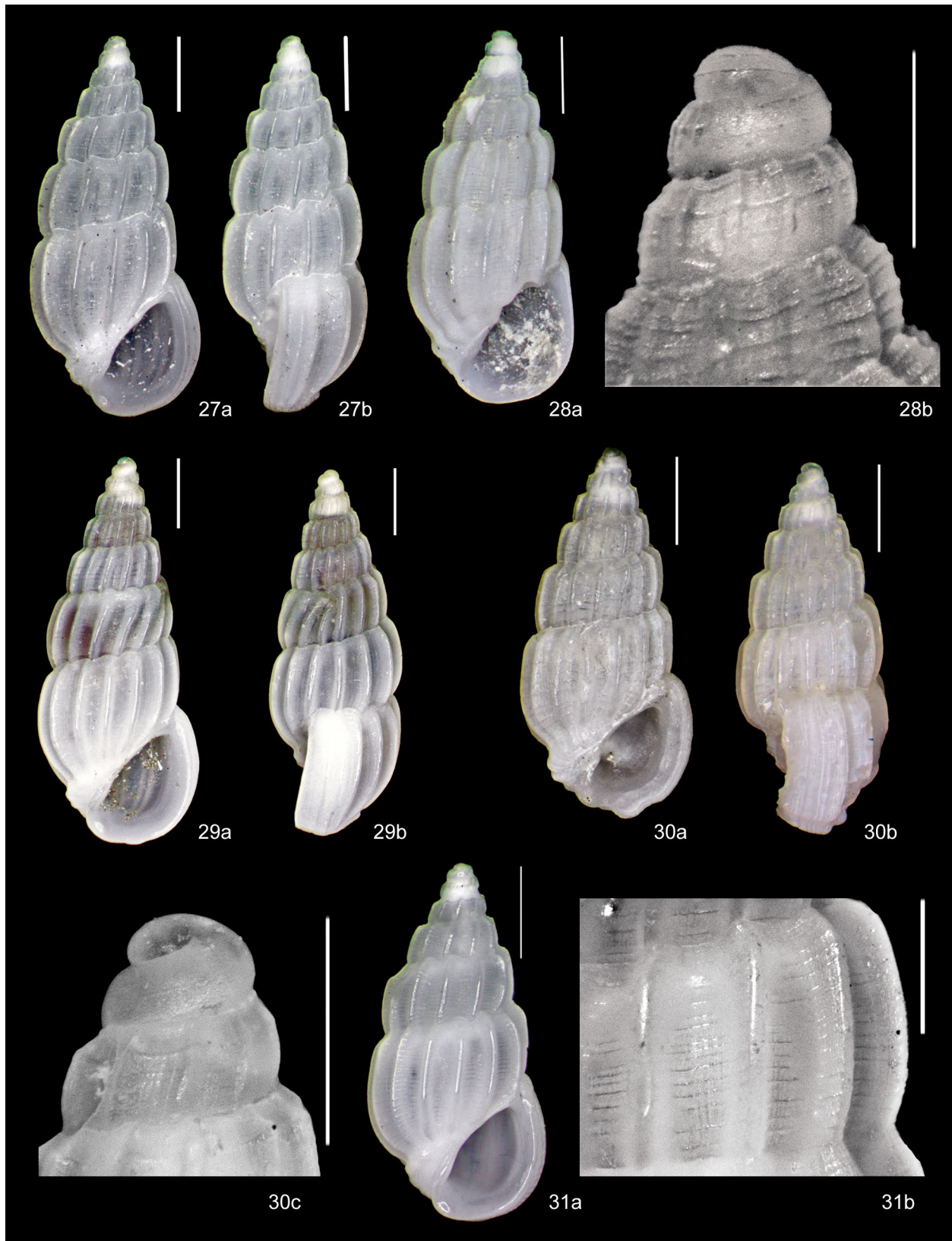
moral, Sydney (33°49'S, 151°15'E), R.M. Stanley [3] (AMS C.160296); Little Coogie Bay (33°55'S, 151°16'E), J. Brazier [5] (AMS C.160287); "Sydney", Hedley [2] (Collection Dautzenberg, RBINS).

**Distribution.** — New South Wales (Sydney to Yamba) (Fig. 26).

**Remarks.** — In some specimens a weak spiral rib occurs on the adapical third of the adapical spire whorls, but otherwise no or little variation has been observed among the small series of specimens examined.

*Rissoina* (*Rissolina*) *crassa* (Angas, 1871) strongly resembles the partially sympatric species *R. (Rissolina) hernandezii* (Faber & Gori, 2016) and is contrasted under the section "Remarks" of the latter species.

The two syntypes of *Rissoina crassa* lack the protoconch, and are therefore hardly distinguishable from the sympatric and closely resembling species *R. (Rissolina) hernandezii*. However, the absence of fine spiral lirae on the adapi-



**Figs 27-31.** *Rissoina* (*Rissolina*) *duclosi* Montrouzier, 1866. **27a-b.** Wilson Island, Queensland: frontal (a), lateral (b) (AMS C.160056). **28a-b.** Same locality: frontal (a), protoconch (b) (AMS C.160055). **29a-b.** Heron Island, Queensland: frontal (a), lateral (b) (AMS C.89040). **30a-c.** Masthead Island, Queensland: frontal (a), lateral (b), protoconch (c) (AMS C.19066). **31a-b.** Michaelmas Cay, Queensland: frontal (a), microsculpture (b) (AMS C.153841). Scale bar: **27, 28a, 29-31** = 1 mm; **28b** = 0.5 mm.

cal spire whorls strongly suggests that both syntypes are *R. (Rissolina) crassa*.

In the collections of the NHMUK are 2 specimens (1984.152) labelled “*Rissoa (oina) australis*, probable syntypes, Conch. Icon., XX *Rissoa*, sp.123, Mrs. Wright Colln.” Both specimens are badly worn and probably conspecific with the syntypes of *R. crassa* Angas. However, they differ markedly from both the original description and illustration of *Rissoina australis* as Sowerby mentions: “shell very small, white, cancellated deeply with nodulous, distant, longitudinal ribs and few spiral ridges”. Typical *R. (Rissolina) crassa* specimens however, lack the spiral sculpture apart from the spiral fold near the shell base.

*Rissoina (Rissolina) crassa* is probably more common along the coast of NSW than is suggested by the scant data in the material examined. The AMS houses several lots labelled ‘*R. crassa*’, but most contain only weathered specimens or specimens lacking the protoconch, making identification very uncertain.

***Rissoina (Rissolina) duclosi* Montrouzier, 1866**

Figs 27-33, 35-37

? *Rissoina scalariana* A. Adams, 1853: 265. Type locality: Philippines, Burias Island, Type material: 3 syntypes (1984.133) in NHMUK, H. Cuming collection.

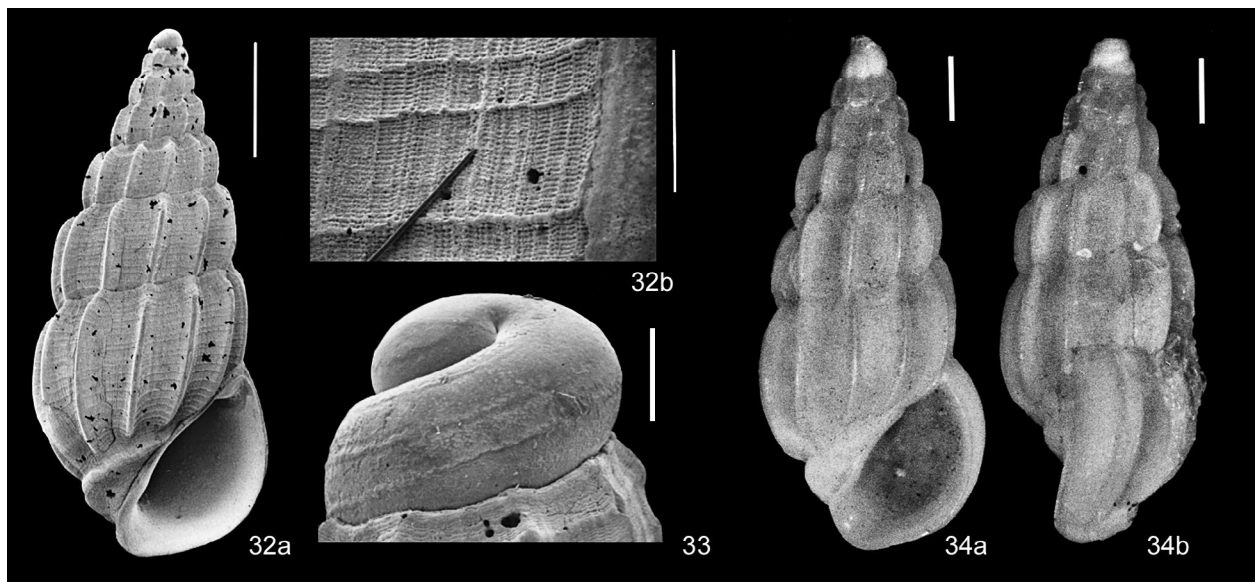
*Rissoina duclosi* Montrouzier in Souverbie & Montrouzier, 1866: 257, pl. 9 fig. 8. Type locality: New Caledonia, Ile Art. Type material: 3 syntypes in MHNH.

*Rissoina duclosi* — Weinkauff, 1881: 54, pl. 14 fig. 9; Tryon, 1887: 378, pl. 56 fig. 49; Faber, 2013: 20, figs 25-28.

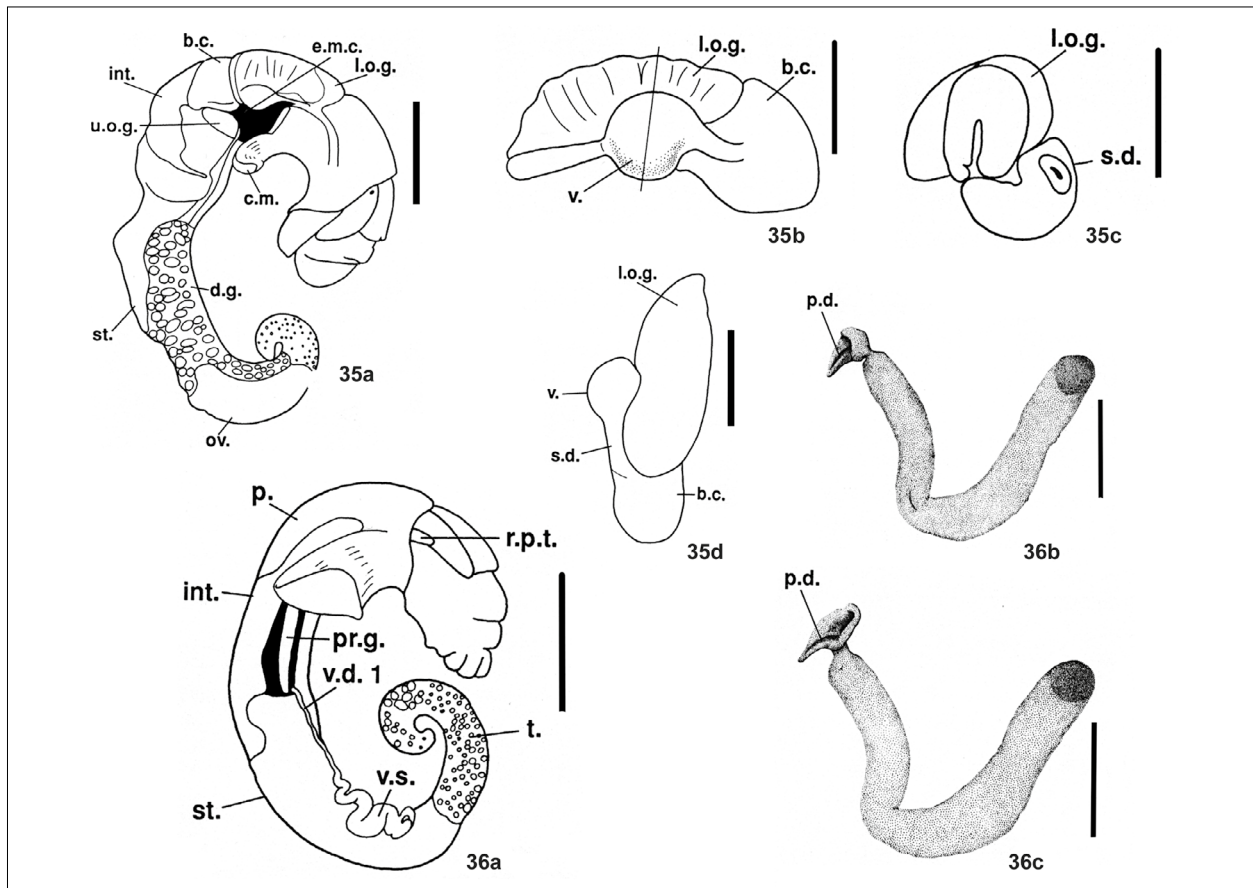
*Costalynia cardinalis* — Laseron, 1956: 395, figs 16-17 (not Brazier, 1877).

*Rissoina (Rissolina) duclosi* — Sleurs & Strack, 2021: 38, figs 6 a-c.

Description. — Shell medium-sized to moderately large (up to 7 mm), elongate to broadly conical, rather thick. Protoconch of non-planktotrophic larval type; of about 1.25 moderately convex smooth whorls or with 1 to 3 fine, rather distantly spaced fine spiral threads (only observable in fresh specimens); protoconch-teleoconch boundary distinct with weakly sinuous, non-thickened margin. Teleoconch of 5.25 to 7, weakly convex whorls; spire whorls weakly to moderately angulate below suture; last whorl variable ranging from weakly angulate below suture to smoothly curving to contraction at shell base; suture weakly to moderately undulating, very weakly impressed; last whorl very weakly to moderately contracted near base. Axial sculpture of moderately prominent, very narrow, sharp, very distantly spaced ribs; interspaces rather deep and wider than axial ribs, with extremely fine, rather irregularly but densely spaced axial threads. Spiral sculpture of narrow lirae; number of lirae variable ranging from about 10 on apical spire whorls, to almost absent or up to 20 on abapical spiral whorls and last whorl; strength of lirae and distance between lirae variable; last whorl with relatively weak and weakly nodular spiral fold, bearing densely spaced, moderately prominent parallel spiral threads. Aperture ovate to D-shaped; inner lip



**Figs 32-33.** *Rissoina (Rissolina) duclosi* Montrouzier, 1866. **32a-b.** Murray Island, Queensland: frontal, SEM (a), microsculpture, SEM (b) (AMS C.29512). **33.** Sovi Bay, Fiji: protoconch, SEM (AMS C.159805). **Figs 34a-b.** *Rissoina scalariana* A. Adams, 1853. Syntype, Burias Island, Philippines: frontal (a), lateral (b) (NHMUK 1984.133). Scale bar: **32a, 34** = 1 mm; **32b, 33** = 0.1 mm.



**Fig. 35-36.** *Rissoina* (*Rissolina*) *duclosi* Montrouzier, 1866. Heron Island, Queensland. **35a-d.** Female specimen: right side of uncoiled specimen (a), left side of genitalia excluding upper oviduct gland, uppermost section of oviduct and ovary (b), transverse section of lower oviduct gland and sperm duct marked in b (c), dorsal aspect of lower oviduct gland and sperm duct (d). **36a-c.** Male specimen: right side of uncoiled specimen (a), latero-ventral aspect of penis (b), same specimen as b, rotated 45° (c) (AMS C.155123). Scale bar: **35a, 36a** = 1 mm; **35b-d, 36b-c** = 0.5 mm.

very thin and narrow, apart from very weak swelling near transition to wide, shallow and slightly elongate anterior channel; anterior margin of anterior channel weakly dorsally curved; inner side of outer lip thin; rather weak and narrow labial varix, bearing weak axial riblets; outer lip very weakly opisthoclinal in profile. Shell colour uniform white. Operculum typical of genus, with peg open over its entire length and weakly bilobed distally at columellar side.

Shell measurements. — Syntype of *Rissoina duclosi* Montrouzier, 1866 (MHNb, “figured specimen”): H 5.4, Hs 3.5, W 2.3, Nwh 7. Additional shells (n= 41): H 4.3-7.0 ( $\mu$  = 4.9), Hs 2.6-4.4 ( $\mu$  = 3.1), W 1.5-2.9 ( $\mu$  = 2.16), Nax 10-15 ( $\mu$  = 12.5), Naxp 12-15 ( $\mu$  = 12.1) Nwh 5.25-7.

Anatomy. — Hypobranchial gland moderately wide and thick. Stomach-style sac ratio 7.9; stomach length-width ratio: 3.9 (n = 2). Male with slender penis; distal end of penis with short, subovate, spoon-shaped lobe; outer margin of lobe with very short filament in which penial duct ends; penial duct closed; prostate gland very narrow, open. Female with sperm tube as long as lower oviduct gland with

central part very strongly swollen; bursa copulatrix larger than upper oviduct gland. Nervous system with r.p.g. ratio 0.49 (n = 2); left pleural ganglion and suboesophageal ganglion almost abutting.

Additional material examined. — **Queensland.** off Mur-



**Fig. 37.** Map showing records of *Rissoina* (*Rissolina*) *duclosi* Montrouzier, 1866 (map source: Google Earth).

ray Island (09°56'S, 144°04'E), Torres Strait, 30.viii-03.x.1907, C. Hedley [49] (AMS C.29512); Two Isles (15°01'S, 145°26'E), 5.viii.1916, C. Hedley [1] (AMS C.41440); Batt Reef (16°26'S, 145°47'E), E of Port Douglas, intertidal, 30.vii.1973, I. Loch [1] (AMS C.160059); Michaelmas Cay (16°35'S, 146°01'E), NE of Cairns, 20.vii.1971, I. Loch [1] (AMS C.153843); Michaelmas Cay (16°36'S, 145°59'E), G.B.R. Boring Expedition, v-vi.1926, T. Iredale & G.P. Whitley [1] (AMS C.153841); Michaelmas Cay (16°36'S, 145°59'E), G.B.R. Boring Expedition, v-vi.1926, T. Iredale & G.P. Whitley [ > 50] (AMS C.160060); Michaelmas Cay, G.B.R. Boring Expedition, v-vi.1926, T. Iredale & G.P. Whitley [20] (AMS C.153842); Sudbury Reef, E of Cairns (17°00'S, 146°15'E), 19.vi.1971, I. Loch [10] (AMS C.160058); Gould Reef (19°26'S, 148°52'E), Bowen, algal washings from *Halimeda* taken at reef flat, on inside edge of reef, 25-28.viii.1973, I. Loch [1] (AMS C.160057); Wilson Island (23°18'S, 151°57'E), Capricorn Group, E side under coral boulders on dead reef, littoral collection, 8-11.ix.1970, P.H. Colman [2] (AMS C.160055); Wilson Island, under stones on reef flat, on N side, 4.i.1977, W.F. & W.F. (jr.) Ponder [2] (AMS C.160056); Heron Island (23°26'S, 151°57'E), J. Voorwinde [3] (AMS C.89040/in part); Heron Island, T. Iredale [1] (AMS C.153982); S side Heron Island, on rubble in mid-lagoon, 0.8-0.5 m, 2.ii.1977, W.F. Ponder [1] (AMS C.153816); Heron Island (23°26'S, 151°57'E), J. Laseron [2] (AMS C.160149); Heron Island (23°26'S, 151°57'E), red algae from outer reef crest opposite lab., 21.ix.1970, W.F. Ponder [10] (AMS C.160255); Heron Island, S side, under beach rock, 4.i.1977, W.F. Ponder [4] (AMS C.155123; in alcohol); Masthead Island (23°32'S, 151°45'E), Capricorn Group, dredged, 31-37 m, 25-29.x.1904, C. Hedley [1] (AMS C.153840) + [4] (AMS C.19066/in part).

Distribution. — Queensland (from Masthead Island to Murray Island) (Fig. 37) and tropical western Pacific, from the Philippines to Fiji.

Remarks. — *Rissoina* (*Rissolina*) *duclosi* Montrouzier, 1866 shows considerable variation with respect to the shell shape, which ranges from broadly to elongate conical; in most specimens the axial ribs are rather distantly spaced and only a few specimens with closely spaced ribs were observed. The spiral lirae are usually present and rather prominent on the adapical whorls and spire whorls, but in some specimens they are rather irregularly spaced to almost absent on the abapical spire whorls and/or last whorl. The protoconch usually bears 1 to 3 more or less distinct fine spiral threads, but also fresh specimens with a smooth protoconch were observed.

*Rissoina* (*Rissolina*) *duclosi* superficially resembles *R.* (*Rissolina*) sp. B, but differs essentially in its non-planktotrophic protoconch, in the teleoconch whorls being less angulate and less convex and in having less prominent, less numerous and less densely spaced spiral lirae.

*Rissoina* (*Rissolina*) *duclosi* is very similar in shell shape and sculpture to a species from the Maldives, identified as

*R. hernandezi* by Faber & Gori (2016) from which it differs primarily by the non-planktotrophic protoconch instead of the planktotrophic protoconch. A discussion on the replacement name *R.* (*Rissolina*) *hernandezi* is provided below where the latter species is redescribed and discussed.

For a comparison with other morphologically related species see Sleurs & Strack (2021) who discussed the similarities with *R.* (*Rissolina*) *canaliculata* (Schwartz von Mohrenstern, 1860), *R.* (*Rissolina*) *plicata* (A. Adams, 1853), *R.* (*Rissolina*) *scalariana* (A. Adams, 1853) and *R.* (*Rissolina*) *sismondiana* (Issel, 1869).

### ***Rissoina* (*Rissolina*) *hernandezi* Faber & Gori, 2016**

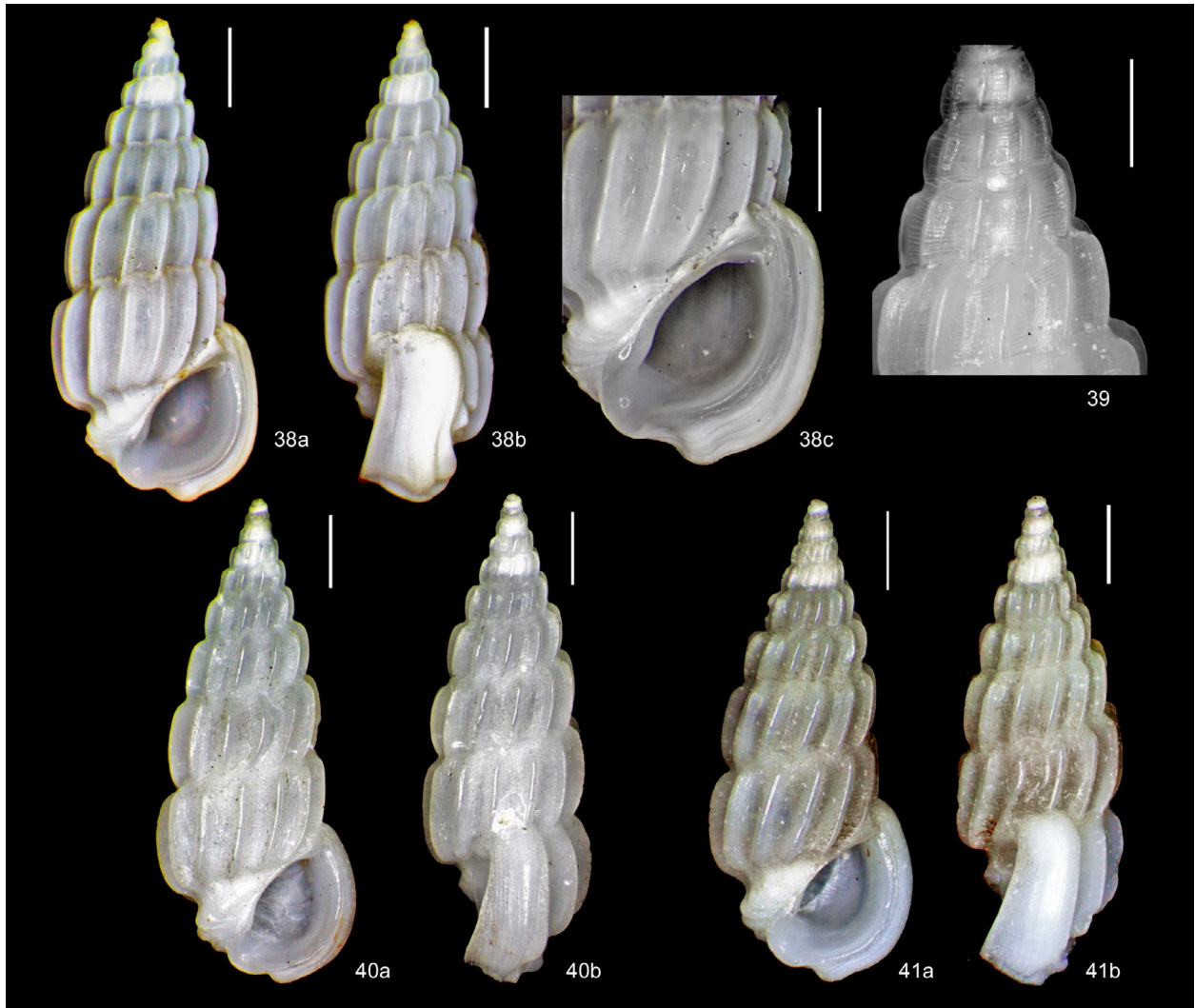
Figs 38-43

*Fractoralla decipiens* Laseron, 1956: 399, fig. 29 (not *Rissoina decipiens* Smith, 1890). Type locality: Australia, Queensland, Gladstone, Curtis Island. Type material: holotype (C.102430) in AMS; 3 paratypes (C.108953) from Curtis Island (23°35'E, 151°08'E), collected by J. Laseron, in AMS.

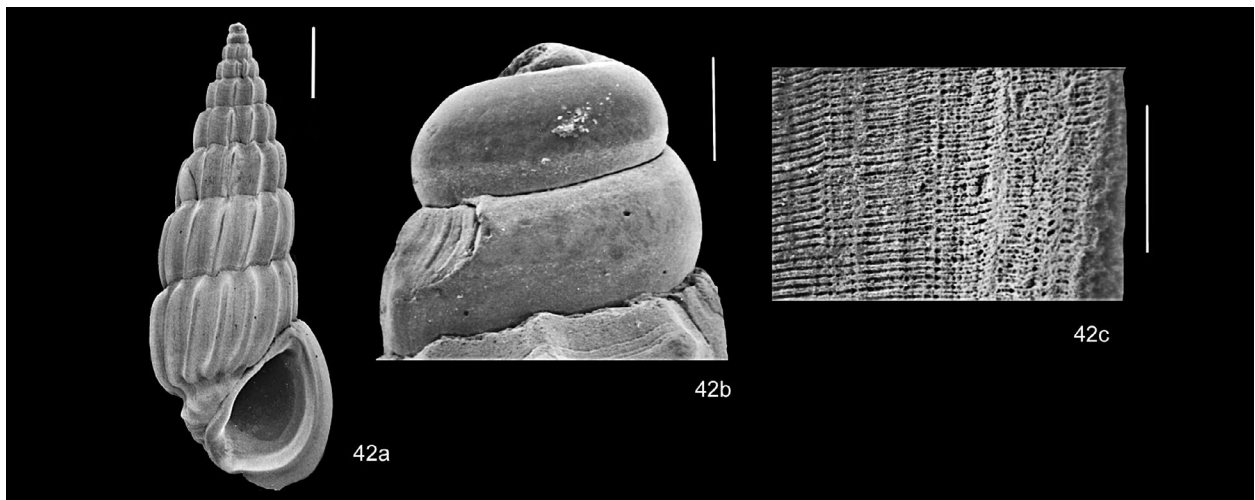
*Rissoina* (*Rissolina*) *crassa* — Ponder, 1985: 183, fig. 134 F-H.

Description. — Shell medium-sized, stout, more or less elongate conic with last whorl moderately wide. Protoconch of planktotrophic larval type; of 2 strongly convex, rather low whorls with deeply impressed suture; protoconch-teleoconch boundary clearly demarcated with deep sinusigeral notch and moderately thickened margin. Teleoconch of 7 to 8 very weakly convex to almost flat whorls; moderately angulate below undulating and very weakly impressed suture; last whorl strongly angulate anteriorly below suture and posteriorly just above prominent contraction near shell base. Axial sculpture of prominent, very narrow, sharp, opisthoclinal, very distantly spaced ribs; interspaces deep and wide. Spiral sculpture of weak lirae on adapical spire whorls; spiral sculpture absent on subsequent spire whorls, apart from microscopic striae (only detectable with SEM) in interspaces between axial ribs; last whorl with prominent, moderately nodular and narrow spiral fold below contraction near shell base and with some very fine, densely spaced spiral lirae just above contraction. Aperture D-shaped; inner lip narrow and thin, apart from weak swelling near transition to narrow and moderately deep and moderately elongate anterior channel; anterior margin of anterior channel moderately curved dorsally; inner side of outer lip thin; prominent, wide labial varix. Shell colour uniform white. Operculum typical of genus (Ponder, 1985: fig. 134H)

Shell measurements. — Holotype of *Fractoralla decipiens* Laseron, 1956 (AMS C.102430, protoconch broken): H ? 6.1, Hs ? 3.8, W 2.5, Nax 10, Naxp 13, Nwh >7. Additional shells (n = 20): H 5.3-7.2 ( $\mu = 6.1$ ), Hs 2.9-4.6 ( $\mu = 3.8$ ), W 2.2-2.9 ( $\mu = 2.5$ ).



**Figs 38-41.** *Rissoina* (*Rissolina*) *hernandesi* Faber & Gori, 2016. **38a-c.** Angourie Point, Yamba, New South Wales: frontal (a), lateral (b), detail of last whorl (c) (AMS C.160269). **39.** Mooloolaba, N of Caloundra, Queensland: detail of early spire whorls (AMS C.160053). **40a-b.** Long Reef, Collaroy, New South Wales: frontal (a), lateral (b) (AMS C.160260). **41a-b.** Caloundra beaches, Queensland: frontal (a), lateral (b) (AMS, C.160050). Scale bar = 1 mm.



**Fig. 42.** *Rissoina* (*Rissolina*) *hernandesi* Faber & Gori, 2016. Angourie Point, Yamba, New South Wales: frontal, SEM (a), protoconch, SEM (b), microsculpture, SEM (c) (AMS C.160269). Scale bar: **42a** = 1 mm; **42b-c** = 0.1 mm.





Fig. 43. Map showing records of *Rissoina* (*Rissolina*) *hernandezii* Faber & Gori, 2016 (map source: Google Earth).

= 2.7),  $N_{ax}$  11-14 ( $\mu = 12.5$ ),  $N_{axp}$  12-15 ( $\mu = 12.9$ ),  $N_{wh}$  7-8.

**Anatomy.** — Radula typical of genus (Ponder, 1985: fig. 134G). Internal anatomy unknown.

**Additional material examined.** — **Queensland.** Between Cairns Reef and Hope Island (15°42'S, 145°30'E), SE of Cooktown, 9-18 m, 2-6.viii.1906, C. Hedley [49] (AMS C.160054); Alexandra Head (26°40'S, 153°07'E), 1963, J. Kerslake, [17] (AMS C.160052); Mooloolabah (26°41'S, 153°08'E), N of Caloundra, vi.1963, N. & V. Gomersal, [27] (AMS C.160053); Caloundra (26°49'S, 153°10'E), T. Iredale [22] (AMS C.160051); Caloundra beaches, 1963, J. Kerslake [14] (AMS C.160050); Caloundra, 1963, J. Kerslake [7] (AMS C.160253); Caloundra, J. Voorwinde [ $>50$ ] (AMS C.160254). **New South Wales.** Angourie Point (29°29'S, 153°22'E), under stones in large sheltered pool, 6.x.1979, W.F. Ponder, W. Rudman, I. Loch and A. Waren [4] (AMS C.160269); Shelly Beach, ca. 8 km S of Yamba (29°32'S, 153°22'E), [5] (AMS C.160265); Minnie Waters (29°47'S, 151°19'E), stone washings from sheltered back reef, 7.x.1979, W.F. Ponder [2] (AMS C.160268); Woolgoolga (30°06'S, 153°13'E), J. Kerslake, [3] (AMS C.160288); Long Reef, Collaroy (33°45'S, 151°19'E), 1946-51, L. Woolcott [1] (AMS C.160266); Long Reef, Collaroy, J. Voorwinde [3] (AMS C.160285); Long Reef, Collaroy, J. Voorwinde [5] (AMS C.160260); Long Reef, Collaroy, J. Kerslake [2] (AMS C.160267).

**Distribution.** — From New South Wales (Collaroy) to

Queensland (Cairns) (Fig. 43).

**Remarks.** — Faber & Gori (2016) proposed a new name *Rissoina hernandezii* for *Fractoralla decipiens* Laseron, 1956; the latter species must be considered a junior homonym of *Rissoina decipiens* E.A. Smith, 1890 since the genus *Fractoralla* is considered a synonym of *Rissoina* (Ponder, 1985). However, the species from the Maldives illustrated and briefly described by Faber & Gori (2016) as *R. hernandezii* is not conspecific with the type material of *Rissoina decipiens* (Laseron, 1956), but is most similar to *R. (Rissolina) duclosi* Montrouzier, 1866, from which it differs primarily by the planktotrophic protoconch instead of the lecithotrophic protoconch in *R. (Rissolina) duclosi*. According to Art.72.7 of the ICZN (1999), *Fractoralla decipiens* and *Rissoina hernandezii* are objective synonyms and 'both the nominal taxa they denote have the same name-bearing type despite [...] any different taxonomic usage of the replacement name'.

Apart from the more or less opisthocline axial ribs, and the more or less elongate spire, *Rissoina (Rissolina) hernandezii* shows little or no variation in shell morphology among the specimens examined.

*Rissoina (Rissolina) hernandezii* strongly resembles *R. (Rissolina) crassa* Angas, 1871, but differs essentially in having a protoconch of planktotrophic larval type, in the shell base being more contracted and in the axial ribs - in particular on the adapical spire whorls - on the average, being slightly sharper; furthermore, *R. (Rissolina) hernandezii* has fine spiral lirae on the adapical spire whorls, which are absent in *R. (Rissolina) crassa*.

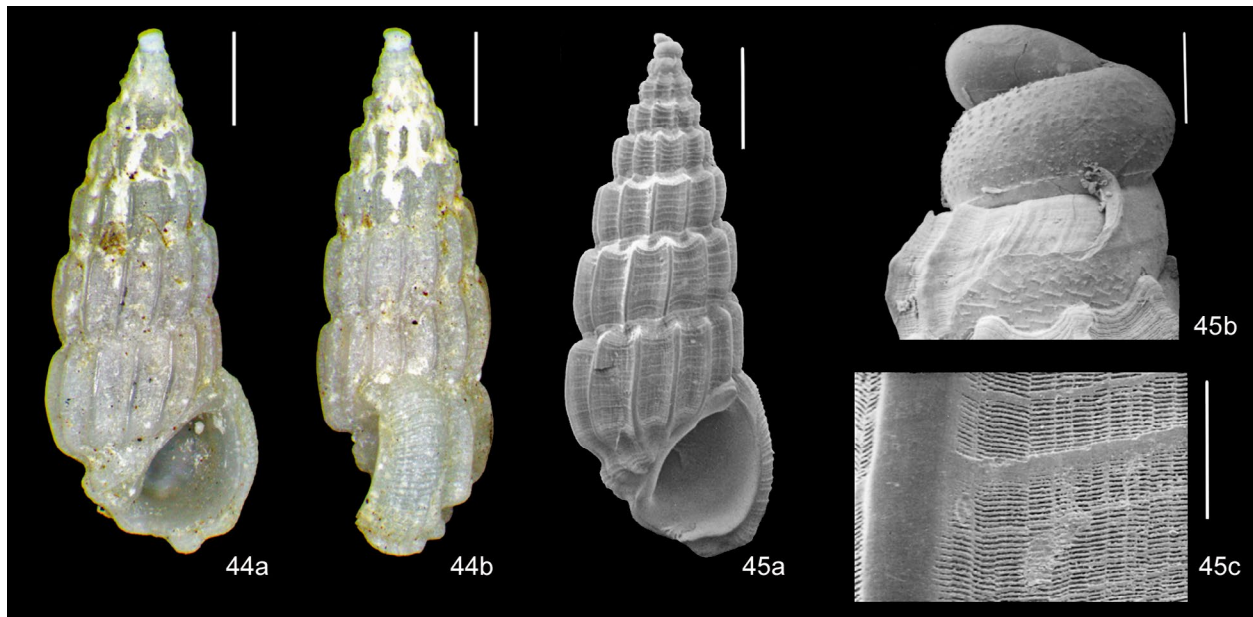
*Rissoina (Rissolina) hernandezii* strongly resembles a probably so far undescribed species from South Africa, from which it differs in having a protoconch of planktotrophic larval type.

*Rissoina (Rissolina) hernandezii* is very similar to *R. (Rissolina) cardinalis* Brazier, 1877, but differs in having a more contracted shell base, in lacking the moderately prominent riblets just above the contraction near the shell base and in lacking the axial ribs on the labial varix; furthermore, the axial ribs are slightly less prominent and slightly more densely spaced in *R. (Rissolina) cardinalis*.

*Rissoina (Rissolina) hernandezii* superficially resembles *R. (Rissolina) heronensis* (Laseron, 1956), but differs essentially in having a less cylindrical protoconch, in the absence of the spiral sculpture on the abapical spire whorls and on the last whorl and in lacking the prominent spiral lirae on the labial varix; furthermore, the axial ribs are narrower and slightly sharper in *R. (Rissolina) heronensis*.

*Rissoina (Rissolina) hernandezii* strongly resembles *R. (Rissolina) ponderorum* spec. nov. and is contrasted where the latter species is introduced.

*Rissoina (Rissolina) hernandezii* is probably more common than listed under the section "Material examined", but since worn or partly broken shells are almost indistin-



**Figs 44-45.** *Rissoina* (*Rissolina*) *heronensis* (Laseron, 1956). **44a-b.** *Fractoralla heronensis* Laseron, 1956, paratype, Heron Island, Queensland: frontal (a), lateral (b) (AMS C.108592). **45a-c.** Papara, Tahiti: frontal, SEM (a), protoconch, SEM (b), microsculpture, SEM (c) (AMS C.159847). Scale bar: **44, 45a** = 1 mm; **45b-c** = 0.1 mm.

guishable from *R. (Rissolina) crassa* specimens, they were not mentioned here.

***Rissoina (Rissolina) heronensis* (Laseron, 1956)**

Figs 44-45, 47-48

? *Rissoina obeliscus* Schwartz von Mohrenstern, 1860: 121, fig. 15. Type locality: Mauritius. Type material: 1 syntype (25754) in NHMW. — Weinkauff, 1880: 20, pl. 7 fig. 8; Tryon, 1887: 376, pl. 54 fig. 9.

*Fractoralla heronensis* Laseron, 1956: 399, figs 30-31. Type locality: Australia, Queensland, Capricorn Group, Heron Island. Type material: holotype (C.102431) in AMS and 4 paratypes in AMS (C.108952) from Heron Island (23°26'S, 151°57'E), collected by J. Laseron.

*Rissoina (Rissolina) turricula* — Orr Maes, 1967: 110, pl. 5 fig. H (not Pease, 1860).

*Rissoina (Rissoina) heronensis* — Sleurs & Preece, 1994: 69, pl. 3 fig. 1. Sleurs & Strack, 2021: 40, figs 7a-b.

**Description.** — Shell medium-sized, elongate conical, rather stout; last whorl moderately contracted near base. Protoconch of planktotrophic larval type; cylindrical, elongate, of 2 whorls; nucleus tilted with respect to axis of teleoconch; protoconch II whorls low, convex and sculptured with irregularly spaced spiral rows of irregular pustules; protoconch-teleoconch boundary distinct with a deep sinusigeral notch and with a sharp, backwards curved

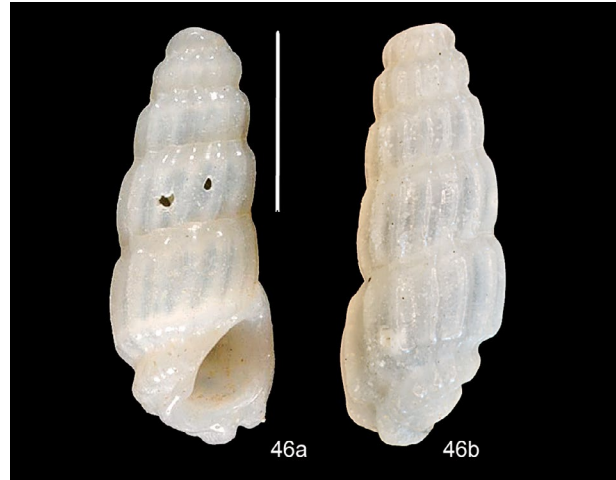
margin. Teleoconch of 6.5 to 7.5 weakly convex to almost flat whorls; adapical spire whorls strongly angulate below very weakly undulating, barely impressed suture; abapical spire whorls and last whorl slightly less angulate than adapical whorls. Axial ribs narrow, sharp, distantly spaced, weakly opisthocline ribs, latter slightly more rounded on last whorl. Spiral sculpture of prominent, very narrow lirae, being relatively more prominent and more distantly spaced on adapical spire whorls than on abapical whorls and last whorl; shell base with moderately prominent, weakly nodular spiral fold below contraction near shell base; spiral fold bearing 5 to 6 moderately prominent spiral lirae. Aperture lenticular; inner lip narrow, thin, apart from weak swelling near transition to very narrow, deep and slightly elongate anterior channel with anterior margin very weakly curved dorsally; inner side of outer lip thin; prominent and moderately wide labial varix, bearing prominent, densely spaced spiral lirae; outer lip weakly opisthocline in profile. Shell colour uniform white. Operculum: typical of genus with peg open over its entire length.

**Shell measurements.** — Holotype of *Fractoralla heronensis* Laseron, 1956 (AMS C.102431, protoconch broken): H ? 5.8, ? Hs 3.8, W 2.5, Nax 12, Naxp 14, Nwh 7. Additional shells (n = 7 except where noted): H 4.9-6.1 ( $\mu = 5.7$ , n = 6), Hs 3.2-4.0 ( $\mu = 3.8$ ), W 2.1-2.6 ( $\mu = 2.4$ ), Nax 10-13 ( $\mu = 12.1$ ), Naxp 12-15 ( $\mu = 13.9$ ), Nwh 7.0-7.50 ( $\mu = 7.20$ , n = 6).

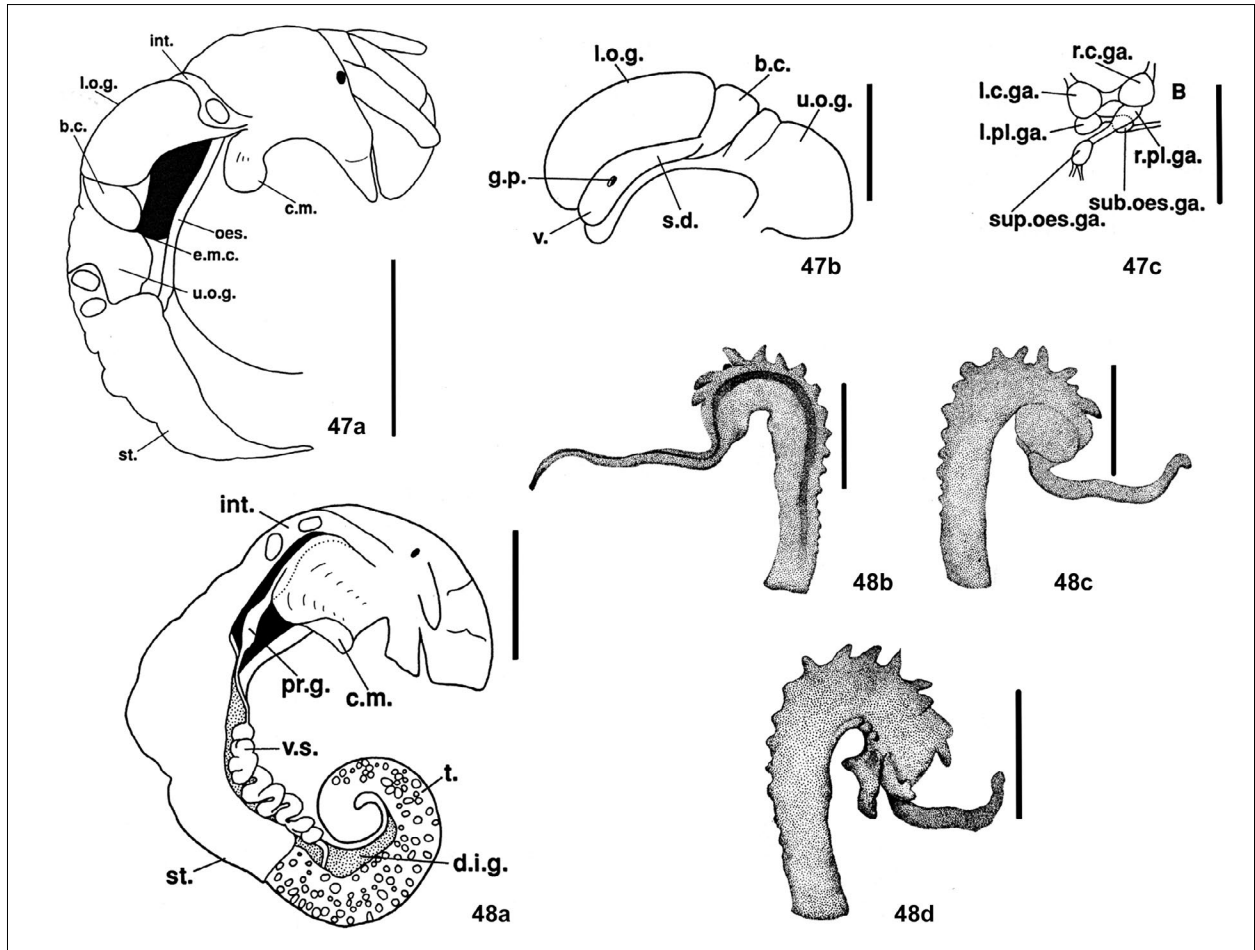
**Anatomy.** — Internal anatomy: hypobranchial gland moderately wide, rather thin. Stomach-style sac ratio 9.3; stomach length-width ratio: 3.9 (n = 1). Male with slender

penis with very long and narrow filament at distal end; outer margin of penis, apart from filament, deeply undulated; penial stalk with small ovate lobe ventrally, near the transition to filament, folded over distal end of stalk; penial duct open at least over proximal half; pallial vas deferens open just before entering penis; prostate gland very thin, narrow and open. Female with sperm tube about as long as lower oviduct gland, weakly expanded anteriorly; bursa copulatrix smaller than upper oviduct gland. Nervous system: r.p.g. ratio 0.39; l.p.g. ratio 0.18 (n = 1).

Additional material examined. — **Queensland.** Heron Island, L.T., reef flat, 19.viii.1987, W. Sleurs [1] (RBINS in alcohol); Gillett Cay, Swain Reefs (21°43'S, 152°25'E), S Barrier Reef, intertidal, 13-20.x.1962, Aust. Mus. Party [4] (AMS C.160271); Gillett Cay, 37 m, x.1962, Aust. Mus. Party [1] (AMS C.160045); Masthead Island (23°32'S, 151°45'E), Capricorn Group, dredged, 31-37 m, 25-29.x.1904, C. Hedley [2] (AMS C.19066).



**Fig. 46.** *Fractoralla praecida* Laseron, 1956. Holotype, Darwin, Northern Territory: frontal (a), lateral (b) (AMS C.102435). Scale bar: 2 mm. (Photographs by R. Springthorpe (a) and A.C. Miller (b), © AMS reproduced by kind permission).



**Figs 47-48.** *Rissoina* (*Rissolina*) *heronensis* (Laseron, 1956). **47a-c.** SW side of West Island, Cocos (Keeling) Islands, female: anterior portion of uncoiled specimen (a), left side of reproductive system excluding the uppermost section of oviduct and ovary (b), dorsal aspect of circumoesophageal and oesophageal ganglia, excluding pedal and buccal ganglia (c) (ANSP 287695). **48a-d.** Heron Island, Queensland, male: right side of uncoiled specimen (a), dorsal aspect of penis (b), ventral aspect of penis (c), ventral aspect of penis with ovate lobe folded back (d) (RBINS). Scale bar = 1 mm.

Distribution. — Queensland (from Masthead Island to Gillett Cay), Indian Ocean (Cocos Islands) and central Indo-Pacific (to Society Islands and Pitcairn Islands).

Remarks. — *Rissoina* (*Rissolina*) *heronensis* (Laserson, 1956) strongly resembles *R. (Rissolina) turricula* Pease, 1860 s.l., in shell shape and sculpture, but is readily distinguished in having a cylindrical protoconch of planktotrophic larval type.

*Rissoina* (*Rissolina*) *heronensis* is similar to *R. (Rissolina) hernandezii* Faber & Gori, 2016, and is contrasted under the section “Remarks” of the latter.

The holotype of *Fractoralla praecida* Laserson, 1956 (AMS C.102435) (Fig. 46) superficially resembles *R. (Rissolina) heronensis* in shell shape and axial sculpture, but it lacks the protoconch; some fine irregular and irregularly spaced spiral threads are visible, but the surface is too worn to give a clear image of the spiral sculpture.

For a discussion on the similarities of *R. (R.) heronensis* with *R. obeliscus*, see Sleurs & Strack (2021).

***Rissoina* (*Rissolina*) *mercurialis* R. B. Watson, 1886**

Figs 49-55

*Rissoina mercurialis* R. B. Watson, 1886: 619, pl. 46 fig. 8. Type locality: Australia, Queensland, Cape York, Wednesday Island, 14.5 m (“8 fathoms”). Type material: 2 syntypes in NHMUK, coll. H.M.S. Challenger Expedition, lectotype here designated (1887.2.9.2049). One syntype (1887.2.9.2050) is conspecific with *Zebina* (*Schwartziella*) *subfirmata* (O. Boettger).

*Rissoina mercurialis* — Tryon, 1887: 378, pl. 54 fig. 14.

*Costalynia bilinea* Laserson, 1956: 397, figs 25-26. Type locality: Australia, Queensland, Torres Strait, Cape York, Murray Island. Type material: holotype (C.102457) and 5 paratypes (C.108956) in AMS.

*Rissoina bilinea* — Faber & Gori, 2016: 98, figs 8-9.

*Rissoina* (*Rissoina*) *subfuniculata* — Sleurs & Strack, 2021: 41, figs 9a-c (? not Weinkauff, 1881).

Description. — Shell medium-sized, elongate conical, rather stout. Protoconch of planktotrophic larval type; of 2 rather wide, strongly convex whorls with deeply impressed suture and with very narrow peripheral carina; protoconch-teleoconch boundary distinct with rather deep and narrow sinusigeral notch with folded edge. Teleoconch of about 6, moderately convex whorls; adapical spire whorls rounded angulate just below weakly undulating, very weakly impressed suture. Axial sculpture of prominent, narrow, rounded, moderately opisthocline, rather distantly spaced ribs; interspaces slightly wider, rather deep; axial ribs on last whorl crossing basal spiral fold and extending to peristome. Spiral sculpture of adapi-

cal spire whorls with rather prominent lirae in interspaces between axial ribs; lirae less prominent on subsequent spire whorls; abapical spire whorls and last whorl with very fine, very closely spaced spiral threads in interspaces and crossing axial ribs; last whorl with usually 2 and exceptionally up to 5, distantly spaced spiral ribs below periphery; base of last whorl with rather wide, weakly nodular, flattened spiral fold, bearing moderately prominent spiral lirae. Aperture small, lenticular; inner lip very thin, very narrow, weakly thickened near transition to very narrow, shallow and weakly elongate anterior channel; inner side of outer lip thin; very prominent, rather wide labial varix, bearing some irregular axial riblets and some irregularly spaced spiral lirae. Shell colour yellowish white. Operculum unknown.

Shell measurements. — Lectotype of *Rissoina mercurialis* R. B. Watson, 1886 (NHMUK, 1887.2.9.249, lectotype here selected): H 4.1, Hs 2.6, W 1.6, Nax 14, Naxp 17, Nwh 6. Holotype of *Costalynia bilinea* Laserson, 1956 (AMS C.102457): H 4.3, Hs 2.7, W 1.8, Nax 14, Naxp 17, Nwh 6. Additional shells (n = 19): H 3.7-4.9 ( $\mu = 4.3$ ), Hs 2.5-3.3 ( $\mu = 2.8$ ), W 1.5-1.8 ( $\mu = 1.7$ ), Nax 15-20 ( $\mu = 17.7$ ), Naxp 15-19 ( $\mu = 16.9$ ), Nwh 6-6.50.

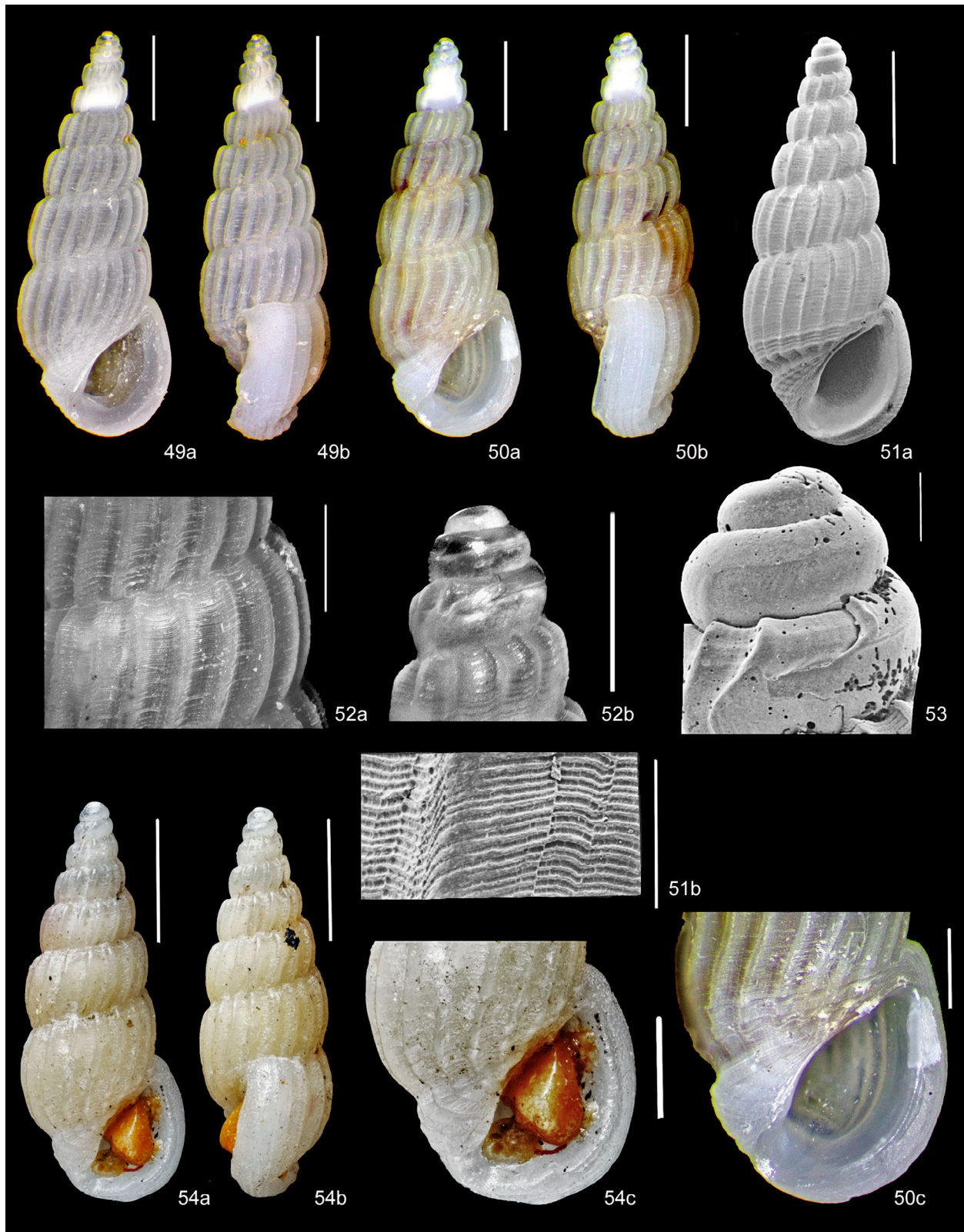
Anatomy. — Animal unknown.

Additional material examined. — **Queensland.** Off Murray Island (09°56'S, 144°04'E), Torres Strait, 9-15 m, 30.viii-3.x.1907, C. Hedley [35] (AMS C.160280); Lizard Island (14°42'S, 145°27'E), SW end of South Island, at base of reef face, 9-12 m, 11.xii.1974, W.F. Ponder [17] (AMS C.160282); Lizard Island, N end of South Island, on rubble outer side of reef, 10 m, 18.i.1980, W.F. Ponder [2] (AMS C.160043); Lizard Island, off Chinamans Point, on weed on mud bottom, 6 m, 13.i.1980, W.F. Ponder [4] (AMS C.153800); SW side of Lizard Island [6] (LACM 79-53); SE side of Lizard Island [33] (LACM 79-55); between Cairns Reef and Hope Island, SE of Cooktown (15°42'S, 145°30'E), 9-18 m, 3-6.viii.1906, C. Hedley [23] (AMS C.27363); Michaelmas Cay (16°36'S, 145°59'E), G.B.R. Boring Expedition, v-vi.1926, T. Ireland & G.P. Whitley [13] (AMS C.160281).

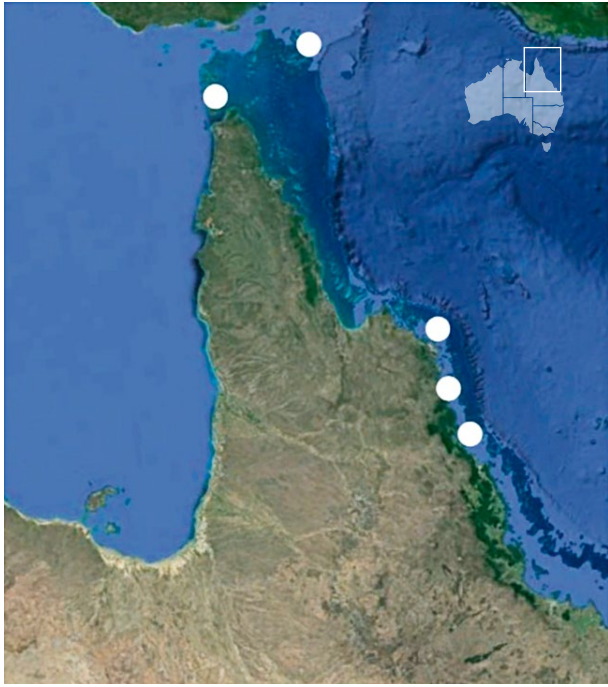
Distribution. — Queensland from Michaelmas Cay to Murray Island (Fig. 55), Maldives (Faber & Gori, 2016) and Ambon, Indonesia (Sleurs & Strack, 2021).

Remarks. — Apart from some variation with respect to the number of spiral riblets on the abapical third of the last whorl, no other variation has been observed among the lots of *Rissoina* (*Rissolina*) *mercurialis* collected from various locations in Queensland. Both, the lectotype of *R. (Rissolina) mercurialis* and the holotype and paratypes of *R. (Rissolina) bilinea* (Laserson, 1956) are within the range of observed variation and therefore both taxa are considered conspecific.

Very similar specimens were observed from the western and central Indo-Pacific, ranging from Sri Lanka to the Philippines and Papua New Guinea. All specimens examined are characterized by a protoconch which is indistinguishable from the protoconch of *R. (Rissolina) mercurialis*.



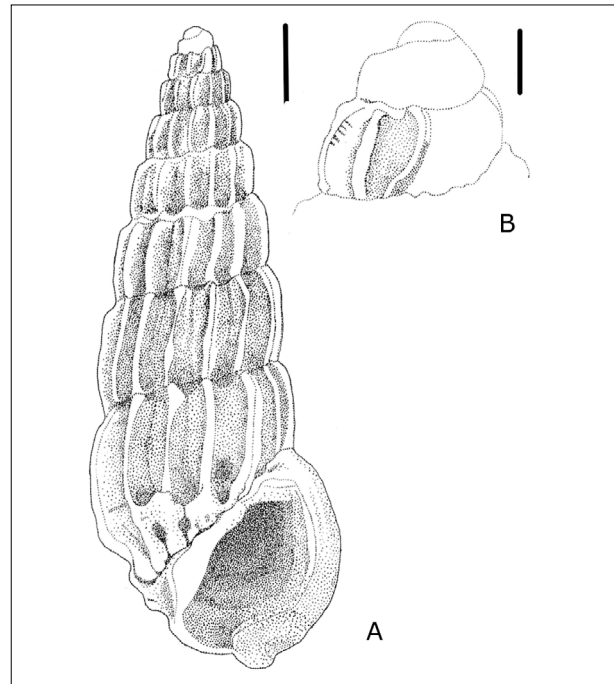
**Fig. 49-54.** *Rissoina* (*Rissolina*) *mercurialis* R. B. Watson, 1886. **49a-b.** Off Chinamans Point, Lizard Island, Queensland: frontal (a), lateral (b) (AMS C.153800). **50a-c.** Michaelmas Cay, Queensland: frontal (a), lateral (b), detail of basal fold (c) (AMS C.160281). **51a-b.** Murray Island, Torres Strait, Queensland: frontal, SEM (a), microsculpture, SEM (b) (AMS C.160280). **52a-b.** Lizard Island, Queensland: microsculpture (a), protoconch (b) (AMS C.153800). **53.** Lee side of Laing Island, Hansa Bay, Papua New Guinea: protoconch, SEM (LACM 80-30). **54a-c.** Lectotype of *Rissoina mercurialis* R. B. Watson, 1886, Wednesday Island, Queensland: frontal (a), lateral (b), detail of basal fold (c) (NHMUK 1887.2.9.2049). Scale bar: **49-52, 54** = 1 mm; **50c** = 0.5 mm; **51b, 53** = 0.1 mm (**54a-c:** photographs by Kevin Webb, © NHMUK reproduced by kind permission).



**Fig. 55.** Map showing records of *Rissoina* (*Rissolina*) *mercurialis* R. B. Watson, 1886 (map source: Google Earth).

*Rissoina* (*Rissolina*) *mercurialis* is very similar to *R. (Rissolina) subfuniculata* Weinkauff, 1881 and both taxa were considered conspecific by Sleurs & Strack (2021). The specific name *Rissoina* (*Rissolina*) *subfuniculata* appeared for the first time in G. Nevill's "Hand List" (1885) as a nomen nudum. Weinkauff (1881) then gave a rather vague description and illustration of this species, and explicitly mentioned the presence of two spiral ribs on the "underside" of the last whorl, apart from the basal spiral fold, a character which is typical in *R. (Rissolina) bilinea*. The Zoological Survey of India holds 2 specimens labelled "*Rissoina subfuniculata* Nevill, Types, Donor ?, Reg. no. 1992, Loc. Persian Gulf". It is not clear whether these specimens were used by Weinkauff for the description of *Rissoina subfuniculata*, but the description broadly corresponds to the present 'type' specimens, in particular by the presence of the two spiral riblets just above the basal spiral fold. However, I did not find traces of the fine spiral sculpture on the teleoconch which is observed in all specimens I examined from Ambon (Indonesia), Queensland and Papua New Guinea. Research of additional material could provide more clarity on the possible conspecificity of both taxa.

*Rissoina* (*Rissolina*) *mercurialis* superficially resembles *R. (Rissolina) ponderorum* spec. nov. and is contrasted where the latter species is described.



**Fig. 56.** *Rissoina monilifera* G. Nevill, 1885. Holotype, Japan: frontal (A), protoconch (B) (ZSI M10756/2). Scale bar: **a** = 1 mm; **b** = 0.2 mm.

#### *Rissoina* (*Rissolina*) cf. *monilifera* G. Nevill, 1885

Figs 56-61

? *Rissoina monilifera* G. Nevill, 1885: 79. Type locality: "Japan". Type material: holotype (ZSI M10756/2) in ZSI.

**Description.** — Shell large for genus, narrowly to elongate conical, very stout; last whorl strongly contracted near base. Protoconch of non-planktotrophic larval type, of  $1\frac{1}{2}$  whorls, with one, very prominent, rounded, rather wide spiral carina, starting at boundary between protoconch I and protoconch II and running on adapical third of protoconch II, giving whorl strongly angulate appearance; spiral carina becoming gradually less prominent towards transition to teleoconch; protoconch-teleoconch boundary abrupt with very weakly sinuous, moderately thickened margin. Teleoconch of 5 to 7 flat whorls, latter weakly angulate below and roundly angulate above almost rectilinear, not impressed suture. Axial sculpture of prominent, rather sharp, distantly spaced and weakly opisthocline ribs with rather wide base; interspaces deep. Spiral lirae on 3 to 4 adapical spire whorls, becoming gradually less prominent and more distantly and irregularly spaced on subsequent spire whorls and last whorl; rather prominent, rounded spiral cord just above contraction near shell base; spiral cord bearing densely spaced, fine spiral threads; one prominent, nodular spiral fold just below contraction. Microsculp-

ture of adapical spire whorls of irregular axial threads; microsculpture apparently absent on subsequent whorls. Aperture ovate; inner lip thin, weakly expanded; anterior channel very short, moderately deep, very narrow with anterior margin weakly bent dorsally; outer lip thin internally, with prominent, rather narrow labial varix; outer lip very weakly opisthocline in profile. Shell colour uniform white. Operculum unknown.

Shell measurements (n = 18). — H 5.2-7.4 ( $\mu = 6.1$ ), Hs 3.2-4.9 ( $\mu = 3.9$ ), W 2.2-3.0 ( $\mu = 2.6$ ), Wp 1.7-2.3 ( $\mu = 1.9$ ), Nax 12-14 ( $\mu = 12.8$ ), Naxp 12-14 ( $\mu = 13.3$ ), Nwh 5-7 ( $\mu = 6.11$ ).

Anatomy. — Animal unknown.

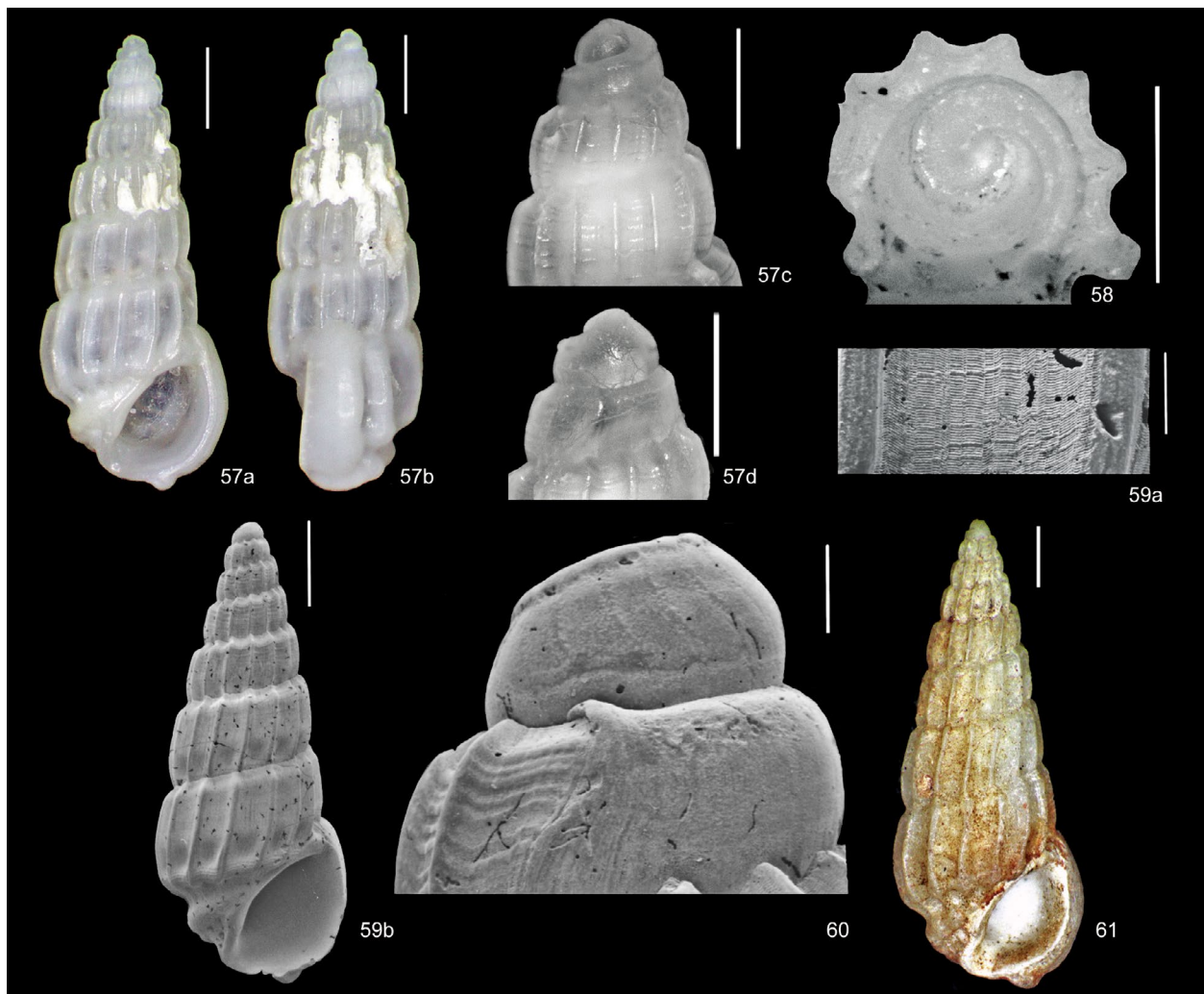
Material examined. — **Norfolk Island.** “Norfolk Island” (29°02'S, 167°57'E), R. Bell [34] (AMS C.160283) [1] (AMS C.159832); “Norfolk Island”, 1910-1911, R. Bell [1] (AMS C.159831); “Norfolk Island”, C. Hedley [8] (AMS C.31037); “Nor-

folk Island”, L. Woolacott [10] (AMS C.159834); off Duncombe Beach (29°00'S, 167°56'E), N Norfolk Island, 31 m, H. Quintal [6] (AMS C.159833); Bumbora Beach, S of Norfolk Island, shell sand, 13.ix.1975, C. Short [1] (AMS C.159817) + [1] (AMS C.159787); Slaughter Bay, 1960's, M. Hoare [1] (AMS C.159835).

Distribution. — *Rissoina* (*Rissolina*) cf. *monilifera* appears to be endemic to Norfolk Island.

Remarks. — Nevill's (1885) description of *Rissoina monilifera* is extremely short and very tenuous: “Long. 8, diam. 3 mil. A very handsome and distinct species, resembling the fossil *R. lamellosa*, Desmoulins, Schwartz, Pl. II, fig. 14, from Dax. 1 Japan; ex Mr. Damon (A. Adams; labelled “*R. monilifera*”)”.

*Rissoina* (*Rissolina*) cf. *monilifera* is hardly distinguishable from the holotype of *Rissoina monilifera* G. Nevill, 1884 in shell shape and sculpture and in protoconch char-

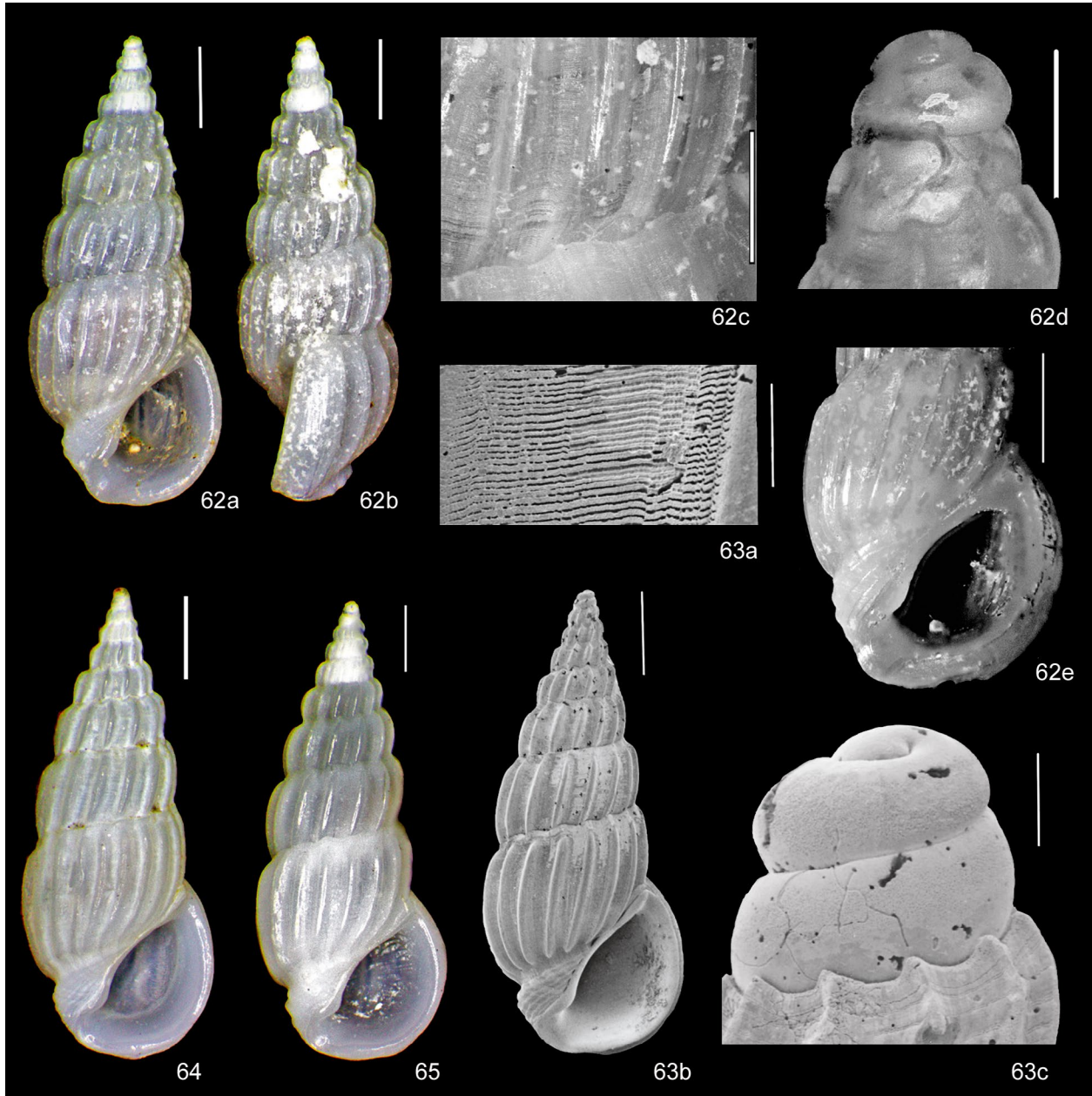


**Figs 57-61.** *Rissoina* (*Rissolina*) cf. *monilifera* G. Nevill, 1885. Norfolk Island. **57a-d.** Frontal (a), lateral (b), protoconch and early spire whorls (c), protoconch showing protoconch-teleoconch boundary (d) (AMS C.160283). **58.** Protoconch of juvenile specimen, top view showing carina (AMS C.159834). **59a-b.** Microsculpture, SEM (a), frontal, SEM (b) (AMS C.160283). **60.** Protoconch showing protoconch-teleoconch boundary, SEM (AMS C.160283). **61.** Frontal (AMS C.16023). Scale bar: **57a-b, 59b, 61** = 1 mm; **57c-d, 58** = 0.5 mm; **59a, 60** = 0.1 mm.

acters and differs only in having spiral lirae on the spire whorls. In particular, the protoconch of both the holotype and Norfolk Island specimens are identical and also unique to *Rissoina* (*Rissolina*) species. However, the type locality “Japan” of *R. monilifera* remains doubtful. According to the original description the specimen appears to have been collected by A. Adams and handed over to Robert Damon, a dealer in natural history specimens (Dance, 1986). It is therefore conceivable that the type locality is not where the

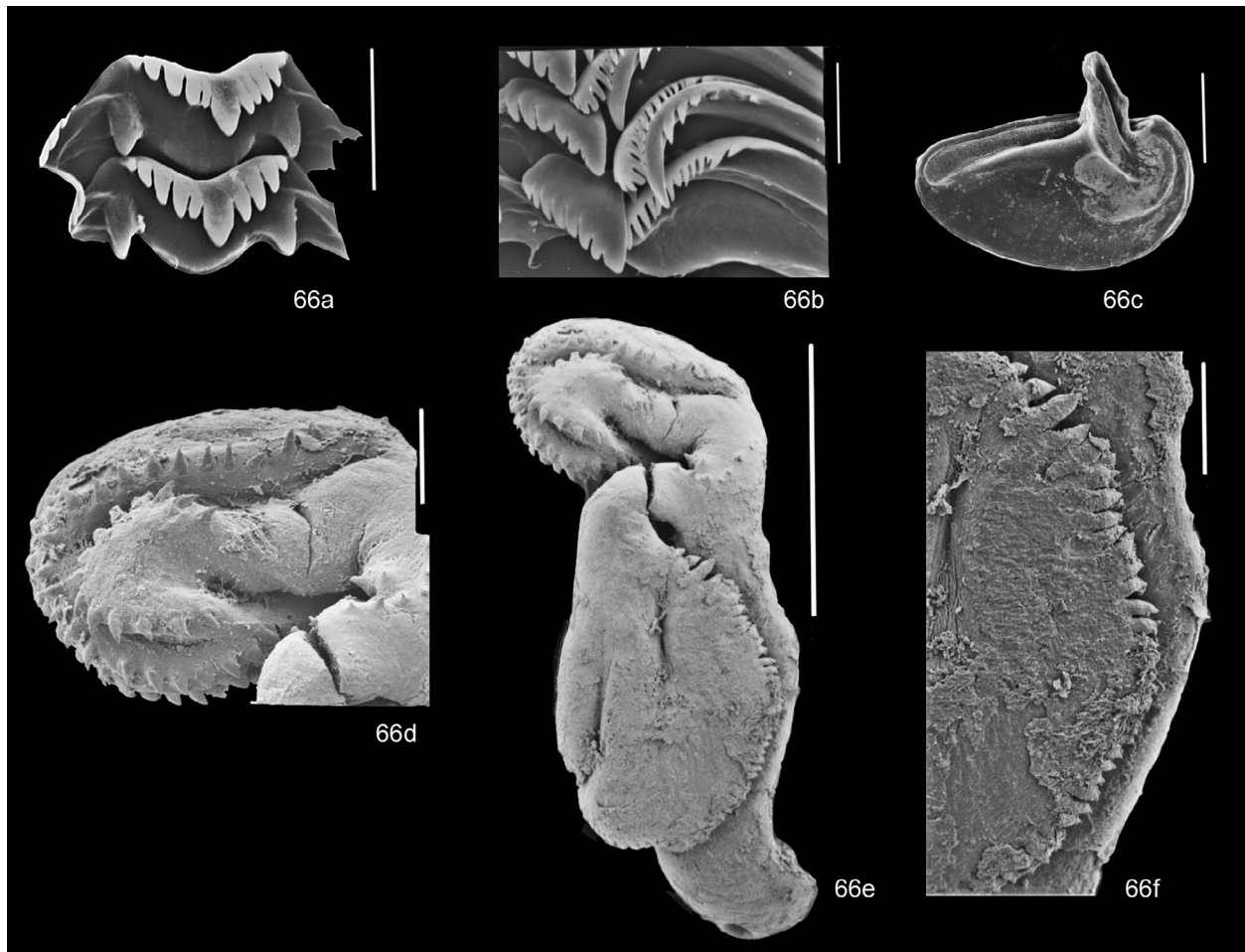
specimen was actually collected, which is supported by the lack of reliable mention of this species from Japan in recent articles, and since I have never found similar specimens in the rissoinid collections that I examined.

*Rissoina* (*Rissolina*) cf. *monilifera* resembles larger specimens of *R. (Rissolina) turricula* Pease, 1860 s.l., but differs essentially in having a distinct protoconch bearing a prominent carina and in the moderately prominent spiral fold above the contraction near the shell base; furthermore the



**Figs 62-65.** *Rissoina* (*Rissolina*) *ponderorum* spec. nov. **62a-e.** Holotype, Horrocks Beach, N Geraldton, Western Australia: frontal (a), lateral (b), microsculpture of penultimate whorl (c), protoconch (d), detail of basal fold (e) (AMS C.160305/1). **63a-c.** Horrocks Beach, N Geraldton, Western Australia: microsculpture, SEM (a), frontal, SEM (b), protoconch, SEM (c) (AMS C. 160305). **64.** Trigg, near Perth, Western Australia: frontal (AMS C.160292). **65.** South Point, S side of Two Peoples Bay, E of Albany, Western Australia, frontal (AMS C.160308). Scale bar: **62a-c, 62e, 63b, 64-65** = 1 mm; **62d** = 0.25 mm; **63a, 63c** = 0.1 mm.





**Fig. 66a-f.** *Rissoina* (*Rissolina*) *ponderorum* spec. nov. Wadup, S of Yallingup, Western Australia. **a.** Central radular teeth, SEM. **b.** Lateral and marginal radular teeth, SEM. **c.** Operculum, SEM. **d-f.** Penis: dorsal side, showing short penial spines, SEM (d), dorsal aspect of penis, SEM (e), detail of serrated margin of anterior lobe, SEM (f) (AMS C.155145). Scale bar: **66a-b** = 0.01 mm; **66c, e** = 0.5 mm; **66d, f** = 0.1 mm.

spire whorls and last whorl of *R. (Rissolina) turricula* s.l. bear numerous and regularly spaced spiral lirae, which are only present on the adapical spire whorls of *R. (Rissolina)* cf. *monilifera*.

***Rissoina (Rissolina) ponderorum* spec. nov.**

Figs 62-71

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*Rissoina (Rissolina)* cf. *crassa* — Ponder 1985: 83, fig. 54C.

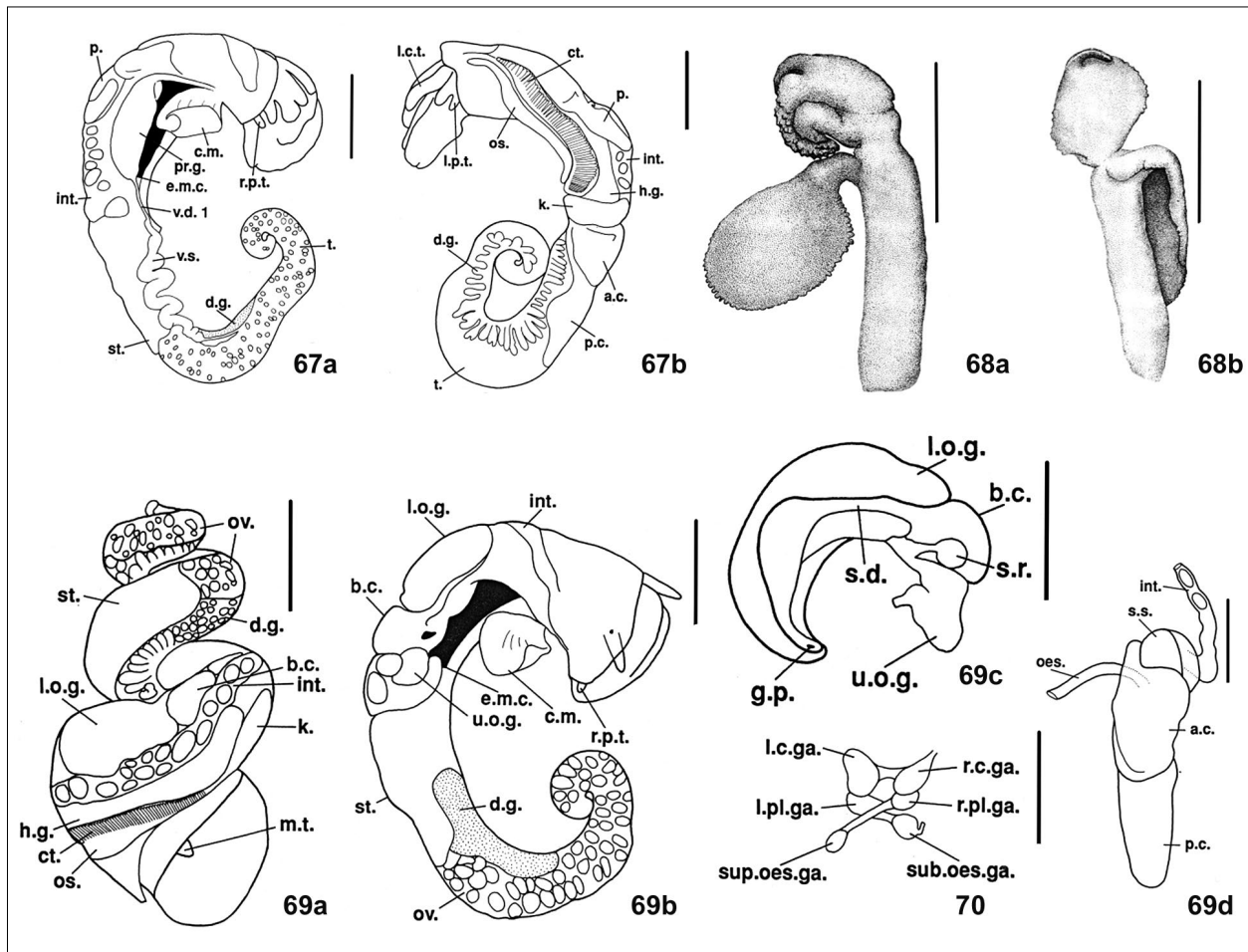
Type material. — Holotype (AMS C.160305/1) and 6 paratypes from the type locality (AMS C.160305/2-7).

Type locality. — Australia, Western Australia, N of Geraldton, Horrock's Beach (28°23'S, 114°26'E), on limestone platform, mixed algae, 9.i.1972, collected by W.F. Ponder.

Etymology. — Named after Dr. Winston F. Ponder and

Juliet M. Ponder, for their considerable efforts in collecting many micro-molluscs in Australia and the Indo-Pacific, contributing to the knowledge of many groups of lesser known species.

Description. — Shell medium-sized, elongate conical, stout. Protoconch of planktotrophic larval type; of 2 strongly convex, rather low whorls with deeply impressed suture; protoconch-teleoconch boundary clearly demarcated with moderately deep sinusigeral notch and thickened margin. Teleoconch of 7 to 8 very weakly convex to almost flat whorls, weakly angulate below moderately undulating and weakly impressed suture; last whorl moderately convex, smoothly curving to basal spiral fold. Axial sculpture of prominent, very narrow, opisthocline ribs; interspaces of adapical whorls wider than axial ribs, and subequal to ribs on last whorl. Spiral sculpture of adapical spire whorls of very weak lirae; spiral sculpture absent on subsequent spire whorls, apart from microscopic (only observable through SEM) striae in interspaces between axial



**Figs 67-70.** *Rissoina* (*Rissolina*) *ponderorum* spec. nov. **67a-b.** Thevernard Island, near Ceduna, Western Australia: right side of uncoiled male specimen (a), left side of uncoiled male specimen (b) (AMS C.155148). **68a-b.** Wyadup, S of Yallingup, Western Australia: ventral aspect of penis (a), dorsal aspect of penis with small lobe folded outside (b) (AMS C.155145). **69a-d.** Thevernard Island, near Ceduna, Western Australia: female specimen removed from shell (a), right side of uncoiled female (b), left side of female genitalia, excluding uppermost section of oviduct and ovary (c), outer side of stomach (d) (AMS C.155148). **70.** Wyadup, S of Yallingup, Western Australia: dorsal aspect of circumoesophageal and oesophageal ganglia, excluding pedal and buccal ganglia (AMS C.155145). Scale bar: **67-69** = 1 mm; **70** = 0.5 mm.

ribs; last whorl with prominent, narrow spiral fold below contraction near shell base, bearing about 4 spiral grooves. Aperture D-shaped; inner lip narrow and thin, apart from weak swelling near transition to narrow and moderately deep and short anterior channel; anterior margin of anterior channel weakly curved dorsally; inner side of outer lip thin, externally with moderately prominent, narrow labial varix. Shell colour: white. Operculum: peg open over its entire length; inner side of operculum with pinkish narrow band next to sausage-shaped muscle attachment area.

Shell measurements. — Holotype: H 6.0, Hs 3.7, W 2.4, Nax 17, Naxp17, Nwh 7.5. Paratype 1: H 6., Hs 3.7, W 2.6, Nax 17, Naxp 16, Nwh 8. Paratype 2: H 5.6, Hs 3.5, W 2.3, Nax 17, Naxp 16, Nwh 7. Paratype 3: H 5.7, Hs 3.6, W 2.4, Nax 20, Naxp 17, Nwh 7.25. Paratype 4: H 5.5, Hs 3.4, W 2.3, Nax 17, Naxp 17, Nwh 7. Paratype 5: H 5.4, Hs 3.5, W 2.3, Nax 16,

Naxp 15, Nwh 7. Paratype 6: H 6.2, Hs 3.9, W 2.6, Nax 17, Naxp 17, Nwh 8.

Anatomy. — Radula: central tooth with formula:  $\frac{4-5+1+4-5}{1}$ ; lateral teeth with about 8 cusps on its inner margin and ca. 5 cusps on its outer margin.

Hypobranchial gland rather thick and narrow. Stomach-style sac ratio: 5.2; stomach length-width ratio: 3.4 (n = 3). Nervous system: r.p.g. ratio 0.45; l.p.g. ratio 0.25 (n = 1). Male with large and open prostate gland; penis large with penial duct closed; penial stalk moderately narrow; distal end bilobed; anterior lobe bent anteriorly, situated near distal end of stalk, ovate, rather thin, with a deeply serrated inner margin; distal lobe subcircular with ventral side bearing narrow, distally located filament; penial duct terminating in distal filament; outer margin of distal lobe weakly serrate and dorsally with small lobe near transition

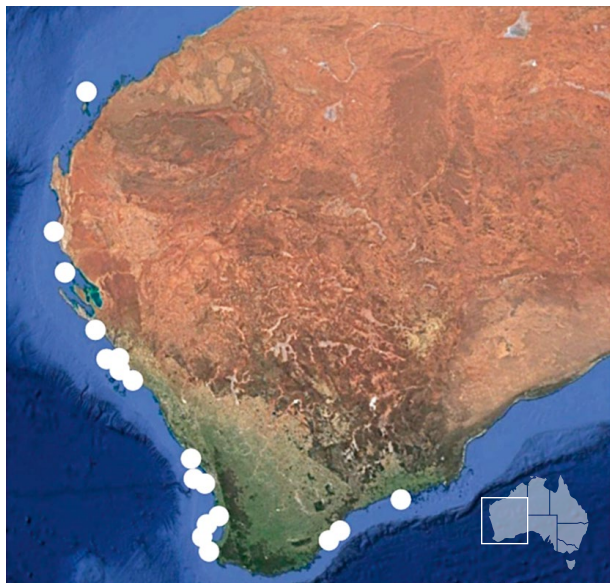


Fig. 71. Records of *Rissoina (Rissolina) ponderorum* spec. nov. (map source: Google Earth).

to penial stalk; small lobe not fully separated from main lobe; dorsal side of distal lobe bearing double row of short spines, just next to small lobe. Female with sperm tube moderately widened centrally; bursa copulatrix subequal to upper oviduct gland.

Additional material examined. — **Western Australia.** Montebello Island, 18.ix.1945, G.P. Whitley [2] (AMS); Yardie Creek, S of NW Cape, seaward side of mouth, ix.1969, F. Plant [2] (AMS); Point Quobba, x.1969, F. Plant [6] (AMS), [7] (AMS); Point Quobba, reef behind island, 0-2 m, 23.i.1972, W.F. & J.M. Ponder [4] (AMS); Shark Bay, W. Burrows [6] (AMS C.45291); Murchison River mouth (27°42'S, 114°10'E), on rocks at S side, x.1967 & x.1969, F. Plant [4] (AMS C.160290); Bluff Point, N of Geraldton, on beach, 1973-74, J. Hewitt [11] (AMS); Horrock's Beach (28°23'S, 114°26'E), N of Geraldton, on limestone platform, mixed algae, 9.i.1972, W.F. Ponder [22] (AMS C.160305); Horrock's Beach, on algae on upper edge of reef platform, 9.i.1972, W.F. Ponder [3] (AMS); Geraldton, A.U. Henn [22] (AMS C.9228); Lighthouse Point, Port Danison, near Geraldton, just below L.T., 1967, 1969, F. Plant [1] (AMS); Abrahos, A.U. Henn [1] (AMS C.10628); Greenough River mouth, round rocky headlands, x.1969, F. Plant [11] (AMS); Waterman Beach, N of Perth, 16.ix.1969, Slack-Smith, [1] (AMS); W end of Thomson Bay, Rottnest Island, mixed algae, 0-2 m, 30.i.1972, W.F. & J.M. Ponder [1] (AMS), [2] (AMS), [3] (AMS); West End Reef, Rottnest Island, *Lithothamnion* washings from intertidal reef edge, viii.1969, Slack-Smith [1] (AMS); Bathurst Point, basin side of Rottnest Island, on beach, xii.1973, J. Hewitt [2] (AMS); Triggs, near Perth (31°52'S, 115°45'E), on coralline, on platform, open coast, 0-2 m, 29.i.1972, W.F. Ponder [5] (AMS

C.160292); Triggs, on large red and brown algae on platform, open coast, 0-2 m, 19.i.1972, W.F. Ponder [3] (AMS); W side of Garden Island, L.T. in pools, shell sand, 31.ii.1972, W.F. Ponder [20] (AMS); on beach at SW end of Garden Island (32°14'S, 115°41'E), S of Perth, 31.i.1972, W.F. & J.M. Ponder & N. Coleman [42] (AMS C.160293); Cockburn Sound, 2 km SW of Woodman Point (32°08'S, 115°44'E), J. Voorwinde [1] (AMS C.160291); Woodman Point, Cockburn Sound, under stones, exposed side, 12.xii.1971, W.F. & J.M. Ponder [2] (AMS); Boat ramp, ca. 1.6 km S of Woodman Point, Cockburn Sound, 15.xii.1971, W.F. & J.M. Ponder, B.R. Wilson & N. Coleman [16] (AMS C.100758) + [1] (AMS); Point Peron, ca. 58 km S of Perth (32°16'S, 115°41'E), on exposed SW side, shell sand, 2-3 m, 27.i.1972, W.F. & J.M. Ponder [41] (AMS C.160294) + [2] (AMS); W side of Carnac Island, off Fremantle, mixed algae washings, 4-8 m, 18.xii.1971, W.F. & J.M. Ponder, B.R. Wilson & N. Coleman, [1] (AMS); Wadup (33°41'S, 115°00'E), S of Yallingup, 1.i.1972, W.F. Ponder & B.R. Wilson [10] (AMS C.155145; in alcohol); 0.4-0.8 km off Peppermint Grove Beach, between Bunbury and Busselton, in shell sand, 4.6-7.6 m, 28.xii.1971, W.F. & J.M. Ponder & R. Hanley [25] (AMS); 0.4-0.8 km off Peppermint Grove Beach, between Bunbury and Busselton, on algae, 6 m, 28.xii.1971, W.F. Ponder & R. Hanley [1] (AMS); Bunker Bay, 11 km W of Dunsborough, on short algae, semi-sheltered, open coast, 0.5-2.5 m, 24.xii.1971, W.F. Ponder & B.R. Wilson [3] (AMS); off Dunsborough, on limestone and coral reef in shellsand, 16.5 m, 27.xii.1971, W.F. & J.M. Ponder, B.R. Wilson & N. Coleman [2] (AMS); Dunsborough, 0-3.6 m, 25-27.xii.1971, W.F. & J.M. Ponder & B.R. Wilson [22] (AMS, C.101042); Dunsborough, 0-2 m, 24.xii.1971, W.F. & J.M. Ponder & B.R. Wilson [2] (AMS); off Dunsborough, on limestone and coral reef, algae wash, 16.5 m, 27.xii.1971, W.F. Ponder, B.R. Wilson & N. Coleman [6] (AMS); Dunsborough, 0-3.6 m, 25-27.xii.1971, W.F. & J.M. Ponder & B.R. Wilson [27] (AMS); Bunkers Bay, near Dunsborough, 31.xii.1971, W.F. & J.M. Ponder & B.R. Wilson [1] spec. (AMS); on N side of Cape Naturaliste lighthouse, 30-31.xii.1971, W.F. Ponder & G. Wilson [1] (AMS); Geographe Bay, J.C. Cox [1] (AMS); S of Cowaramup, ii.1973, W. Anson [24] (AMS); South Cowaramup, on beach, 1972, H. Baker, [8] (AMS); S of Cowaramup Bay, near mouth of Margaret River, H. Baker, [3] (AMS); Ellensbrook (= South Cowaramup), near Margaret River mouth, shell sand on beach, i.1972, W. Anson [37] (AMS); Kilcarnup, N side of Margaret River, shell sand on beach, 1.i.1972, W.F. Ponder [3] (AMS); Margaret River (33°58'S, 114°59'E), ii.1973, W. Anson [2] (AMS C.160289); Flinders Bay, Augusta, L.T., under rocks, 1.8 m, ii.1973, W. Anson [1] (AMS); Albany, coll. T. Carter [2] (AMS, C.56999); South Point, S side of Two Peoples Bay (34°58'S, 118°11'E), E of Albany, in sheltered large pool on exposed coast, 2.ii.1972, W.F. Ponder [21] (AMS C.160308); Observatory Point, Esperance, in sand patches in rocks at cliff base, 7.i.1975, N. Hewitt [4] (AMS).

Distribution. — Only known from Western Australia, from Montebello Islands to Observatory Point, Esperance (Fig. 71).

Remarks. — Very little variation in shell characters has been observed between the fairly extensive series of specimens of *Rissoina* (*Rissolina*) *ponderorum* spec. nov. examined.

This new species was found in the collections of the AMS labelled as *Rissoina* (*Rissolina*) cf. *crassa* Angas, 1871, from New South Wales from which it differs primarily by the planktotrophic protoconch; furthermore the axial ribs are slightly less prominent and the spiral lirae on the basal fold slightly more prominent in *R. (Rissolina) ponderorum* spec. nov.

*Rissoina (Rissolina) ponderorum* spec. nov. strongly resembles specimens of *R. (Rissolina) hernandezii* Faber & Gori, 2016 from Queensland and New South Wales, but differs in having less prominent and -in particular on the last whorl- more closely spaced axial ribs, in having a less contracted last whorl and in the basal spiral fold bearing distantly spaced spiral grooves.

*Rissoina (Rissolina) ponderorum* spec. nov. differs from *R. (Rissolina) mercurialis* R. B. Watson, 1886 in being markedly larger, in the axial ribs of the last whorl being less sigmoid shaped and in having less prominent spiral striae in the interspaces between the axial ribs.

*Rissoina (Rissolina) ponderorum* spec. nov. is very similar to *R. (Rissolina) cardinalis* Brazier, 1877, but the axial ribs are slightly more closely spaced and the basal fold is less nodular.

### ***Rissoina (Rissolina) signata* O. Boettger, 1893**

Figs 73-75

*Rissoina (Rissolina) signata* O. Boettger, 1893: 187. Type locality: Philippines, Tablas, Bacjauan near Badajoz. Type material: lectotype, here designated in SMF (225098/1) and one paralectotype (here designated) SMF 225099/1.

? *Fractoralla transita* Laseron, 1956: 399, fig. 28. Type locality: Australia, Northern Territory, Darwin. Type material: holotype (C.102432) in AMS.

? *Rissoina (Rissolina) costulata* — Kosuge, 1965: 134, pl. 15 fig. 3, textfigs 18-28 (not Dunker, 1860).

*Rissoina (Rissolina) plicatula* — Sleurs & Strack, 2021: 40, fig. 8. (? not Gould, 1861).

Description. — Shell medium-sized, narrowly elongate conical, stout; last whorl weakly contracted near base. Protoconch of planktotrophic larval type, subcylindrical, of 2 moderately convex whorls; last ½ of last whorl with centrally located, very fine carina; protoconch-teleoconch boundary distinct with deep sinusigeral notch, with weakly

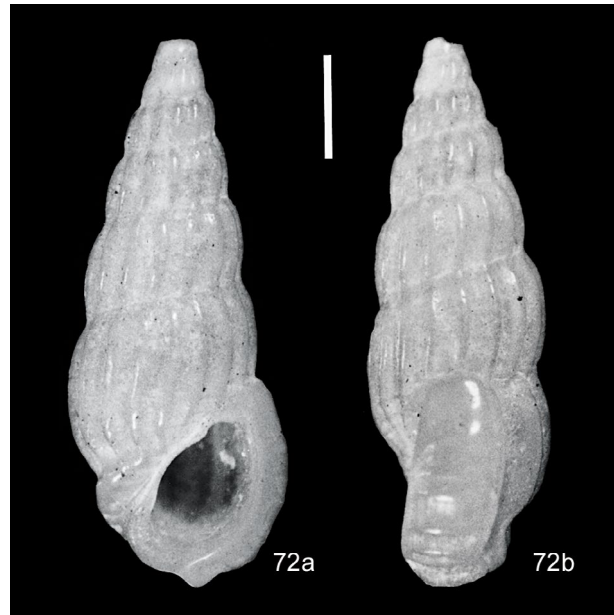
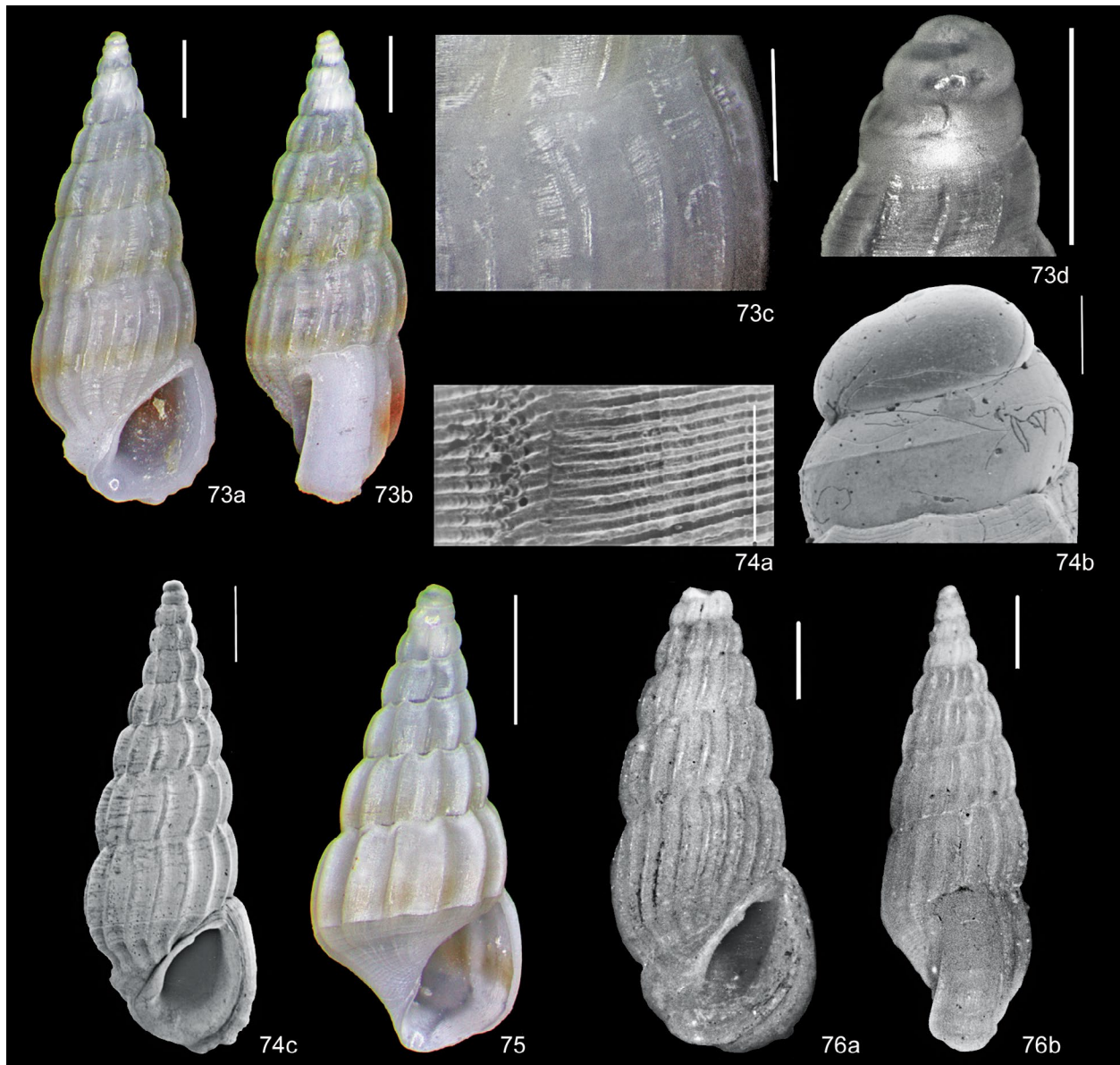


Fig. 72. *Fractoralla transita* Laseron, 1956. Holotype, Darwin, Northern Territory: frontal (a), lateral (b) (AMS C.102432). Scale bar: 1 mm.

thickened margin. Teleoconch of 7 to 7½ moderately convex whorls, with weakly undulating, very weakly impressed suture. Axial sculpture of moderately prominent, rather sharp and distantly spaced, moderately to strongly opisthocline ribs; axial ribs relatively wider and more prominent on adapical than on abapical spire whorls and last whorl and sigmoidal on last whorl. Spiral sculpture of adapical spire whorls of weak, irregular and rather irregularly spaced lirae in interspaces between axial ribs; last whorl with 5 to 8, densely and regularly spaced fine spiral lirae just above contraction near shell base; all whorls with microscopic densely spaced spiral threads, crossing top of axial ribs and intersected by irregular and irregularly spaced axial threads; shell base with rather weak, rounded, weakly nodular spiral fold below contraction; spiral fold bearing very weak, rather irregular spiral lirae; Aperture lenticular to ovate; inner lip thin, apart from weak swelling near transition to very wide and extremely short posterior channel and apart from slightly more prominent swelling near transition to rather deep, wide and slightly elongate anterior channel; anterior margin moderately curved dorsally; inner side of outer lip thin; prominent, wide labial varix, bearing spiral striations throughout and spiral ribs on abapical half; outer lip weakly opisthocline in profile. Shell colour of spire whorls white with pale yellowish-brown spiral band just above suture; last whorl with nearly centrally located spiral band. Operculum: unknown.

Shell measurements (n = 2). — Lectotype of *Rissoina (Rissolina) signata* O. Boettger, 1893 (SMF 225098/1): H 6.4, Hs



**Figs 73-75.** *Rissoina* (*Rissolina*) *signata* O. Boettger, 1893. **73a-d.** S end of South Island, Lizard Island, Queensland: frontal (a), lateral (b), microsculpture spire whorl (c), protoconch (d) (AMS C.160042). **74a-c.** S end of South Island, Lizard Island, Queensland: microsculpture spire whorl, SEM (a), protoconch, SEM (b), frontal, SEM (c) (AMS C.160042). **75.** Carter Reef, Queensland: juvenile specimen, frontal (AMS C.160044). **Figs 76a-b.** *Rissoina plicatula* A. Gould, 1861. Holotype, Port Lloyd, Bonin Islands, Japan: frontal (a), lateral (b) (USNM 947). Scale bar: **73a-b, 74c, 75, 76a-b** = 1 mm; **73c-d** = 0.5 mm; **74a-b** = 0.1 mm.

4.3, W 2.4, Nax 15, Nwh 7.25. Holotype of *Fractoralla transitata* Laseron, 1956 (AMS C.102432, protoconch broken): H ? 5.5, ? Hs ? 3.4, W 2.2, Nax 11, Naxp 16, Nwh >7. Additional shells (n= 2): H 6.1-6.3, Hs 4.0-4.2, W 2.4-2.5, Nax 15-16, Naxp 15, Nwh 7.0-7.25.

Anatomy. — Animal unknown.

Additional material examined. — **Queensland.** Carter Reef (14°33'S, 145°36'E), rubble on face of platform bommie, behind reef, 6-9 m, 14.i.1980, W.F. Ponder [1] (AMS C.160044); S end of South Island, Lizard Island (14°42'S,

145°27'E), on outer side of reef, 15 m, 16.i.1980, W.F. Ponder [4] (AMS C.160042).

Distribution. — From Carter Reef and Lizard Island, Queensland and in the Central Indo-Pacific from Indonesia, to the Philippines and the E. coast of Papua New Guinea.

Remarks. — The specimens from Queensland are identical to the lectotype of *Rissoina signata* O. Boettger, 1893 in the SMF (225098/1). Sleurs & Strack (2021) reported several specimens as *Rissoina* (*Rissoina*) *plicatula* A. Gould, 1861 which are identical to the Queensland specimens.

However, after comparing the specimens from Queensland with the holotype of *R. plicatula* (Fig. 76) from the Bonin Islands, I hesitate to consider them conspecific with the latter species. The lectotype of *R. plicatula* has a broken apex making comparison of larval development impossible; furthermore *R. plicatula* has more rounded and – in particular on the last whorl – more closely spaced axial ribs.

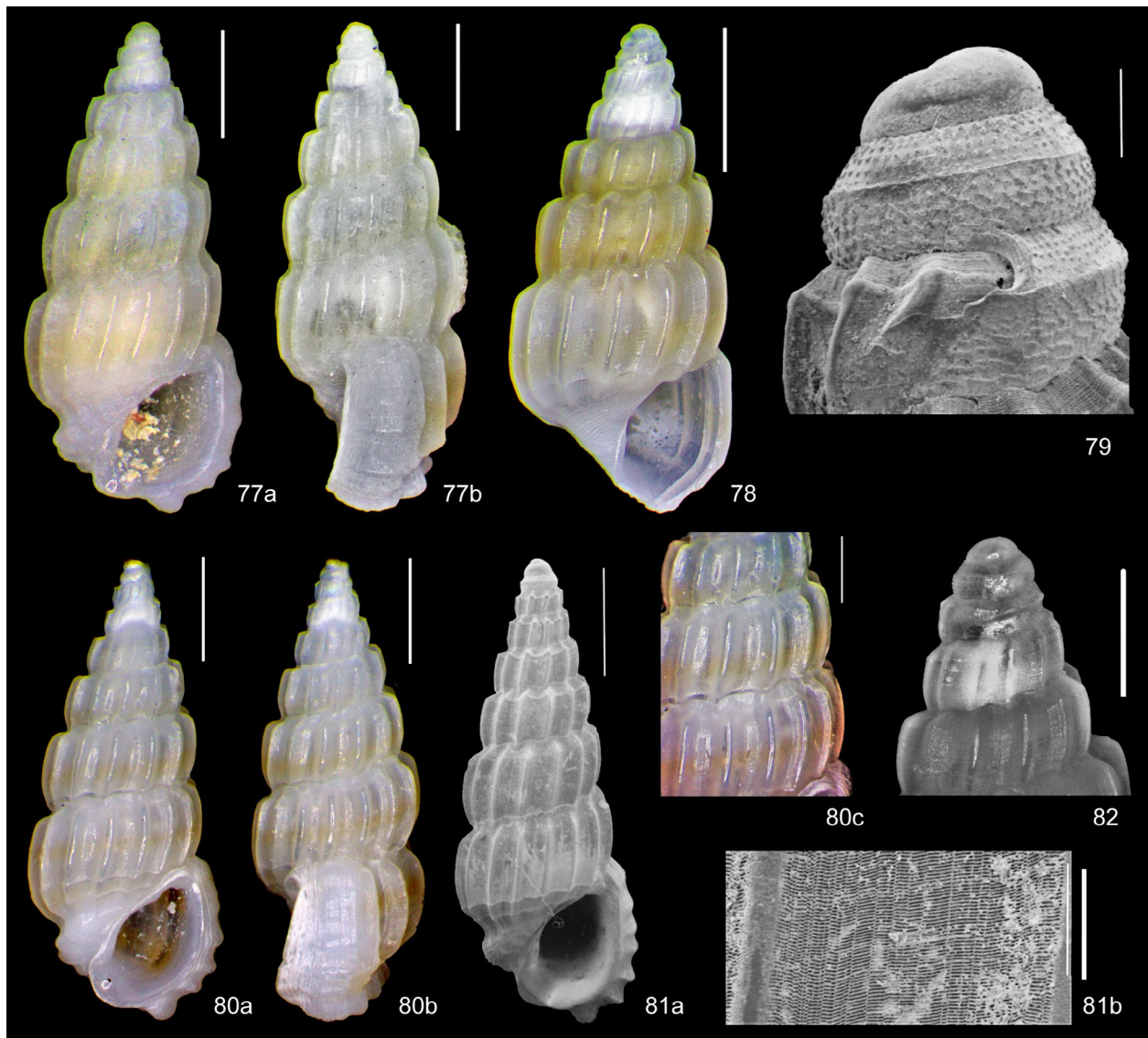
The holotype of *Fractoralla transita* Laseron (AMS C.102432) (Fig. 72) is corroded and has a broken protoconch, but judging from the overall shape of the shell and the sculpture, it is probably conspecific with *R. (Rissolina) signata*.

*Rissoina (Rissolina) signata* is similar to the syntype of

*Rissoina funiculata* Sowerbie, 1866 (MHNB) from New Caledonia, but differs in having densely and regularly spaced fine spiral lirae just above the contraction near the shell base, which are absent in *R. (Rissolina) funiculata*. However, the shell shape and the sculpture, consisting of densely spaced spiral striations, are very similar as observed in specimens of *R. (Rissolina) signata*.

*Rissoina (Rissolina) signata* resembles *R. (Rissolina) spec. A* in shell shape and sculpture and is contrasted under the section “Remarks” of the latter species.

*Rissoina (Rissolina) signata* resembles the syntype of the Japanese species *R. (Rissolina) laevicostulata* Pilsbry, 1904 (ANSP



**Figs 77-82.** *Rissoina (Rissolina) torresiana* (Laseron, 1956). **77a-b.** Gillett Cay, Swains Reef, Queensland: frontal (a), lateral (b) (AMS C.160145). **78.** Gillett Cay, Swains Reef, Queensland: juvenile specimen, frontal (AMS C.160145). **79.** N of Baros Island, N Malé Atoll, Maldives: protoconch, SEM (LACM 83-09). **80a-c.** S end of South Island, Lizard Island, Queensland: frontal (a), lateral (b), detail of sculpture of spire whorls (c) (AMS C.160042). **81a-b.** N of Baros Island, N Malé Atoll, Maldives: frontal, SEM (a), microsculpture, SEM (b) (LACM 83-09). **82.** Gillett Cay, Swains Reef, Queensland: protoconch (AMS C.160145). Scale bar: 77-78, 80-81a = 1 mm; 79, 81b = 0.1 mm.

70906) but differs essentially in being markedly larger, in having less densely spaced axial ribs and in having several narrow spiral lirae just above the spiral fold, instead of two rather distantly spaced spiral riblets in *R. (Rissolina) laevecostulata*.

***Rissoina (Rissolina) torresiana* (Laseron, 1956)**

Figs 77–82

*Costalynia torresiana* Laseron, 1956: 395, fig. 18. Type locality: Australia, N Queensland, Torres Strait, Cape York, Murray Island (09°56'S, 144°04'E). Type material: holotype (C.102452) in AMS; 1 paratype (108954) in AMS from Murray Island (09°56'S, 144°04'E), presented by C. Hedley.

*Rissoina torresiana* — Faber & Gori, 2016: 102, figs 19–22.

*Rissoina (Rissolina) torresiana* — Sleurs & Strack, 2021: 41.

Description. — Shell medium-sized, broadly to narrowly conical, stout; last whorl strongly contracted near shell base. Protoconch of planktotrophic larval type, conical, of 2.25 whorls; last 1.25 whorl with prominent, centrally located carina, giving protoconch angular appearance; whorls of protoconch II with spirally arranged, closely spaced sharp pustules, with pustules below carina often more or less coalescing; protoconch-teleoconch boundary sharply distinct with deep sinusigeral notch and strongly thickened margin. Teleoconch of 5.5 to 7 weakly convex whorls, strongly angulate below moderately undulating, very weakly impressed suture. Axial sculpture of prominent, very narrow, sharp, rather distantly spaced, weakly opisthocline ribs. Spiral sculpture of adapical spire whorls with fine, densely spaced lirae, crossing axial ribs; spiral lirae becoming gradually less prominent on subsequent spire whorls; spiral sculpture almost absent on last whorl, except for about 2 fine spiral riblets above contraction near shell base; moderately prominent and rather nodular spiral fold below contraction; spiral fold bearing about 5, densely spaced and rather prominent spiral lirae. Aperture ovate; inner lip narrow and thin, apart from weak swelling near transition to very narrow, shallow and moderately elongate anterior channel, with anterior margin moderately curved dorsally; outer lip thin internally with prominent and moderately wide labial varix, bearing weak to rather prominent spiral ribs and fine, irregularly spaced axial threads. Shell colour white with yellowish, wide, spiral band on adapical half of spire whorls and on periphery of last whorl. Operculum: unknown.

Shell measurements. — Holotype of *Costalynia torresiana* Laseron, 1956 (AMS C.102452), H 4.4, Hs 2.8, W 1.9, Nax 10, Naxp 13, Nwh 5.75; Paratype (AMS C.108954), H 4.9, Hs 3.1, W 2.1, Nax 11, Naxp 14, Nwh 6. Additional shells (n = 2): H 4.3–4.6, Hs 2.8–2.9, W 1.9–2.0, Nax 13–14, Naxp 15, Nwh 6.0–6.25

Anatomy. — Animal unknown.

Additional material examined. — **Queensland.** Off Murray Island (09°56'S, 144°04'E), 9–15 m, 30viii-03.x.1907, C. Hedley [6] (AMS C.160297); S end of South Island, Lizard Island (14°42'S, 145°27'E), 15 m, on outer side of reef, 16.i.1980, W.F. Ponder [3] (AMS C.160042); Gillett Cay (21°43'S, 152°25'E), Swain Reefs, off central Queensland, 27–33 m, dredged inside reef, coral rubble, 16–19.x.1962, Austr. Mus. Party [3] (AMS C.160046); Gillett Cay, 37 m, x.1962, Austr. Mus. Party [1] (AMS C.160045); Gillett Cay, 45 m, 17–19.x.1962, Austr. Mus. Party [1] (AMS C.160145).

Distribution. — Queensland from Murray Island to Gillett Cay (Swain Reefs) and from the Maldives in the Indian Ocean to the Society Islands in the Central Pacific.

Remarks. — *Rissoina (Rissolina) torresiana* (Laseron, 1956) shows some variation in the spire being more or less elongate and in the variable strength of the spiral lirae on the adapical spire whorls, but is distinctive among its congeners in its protoconch sculpture.

*Rissoina (Rissolina) torresiana* superficially resembles *R. (Rissolina) cardinalis* Brazier, 1877, but differs essentially in having a more conical protoconch with a prominent centrally located carina; furthermore *R. (Rissolina) torresiana* is smaller than *R. (Rissolina) cardinalis* and the whorls are more angulate below the suture.

*Rissoina (Rissolina) torresiana* superficially resembles *R. (Rissolina) backeljauwi* spec. nov. and is contrasted where the latter species is introduced.

*Rissoina (Rissolina) torresiana* is similar to *R. (Rissolina) atimovatae* Faber, 2018 from Madagascar, but differs primarily in having a protoconch suggesting a planktotrophic larval development, while the protoconch of *R. (Rissolina) atimovatae* clearly suggests a non-planktotrophic development; furthermore the teleoconch whorls of *R. (Rissolina) torresiana* are more angulate.

***Rissoina (Rissolina) turricula* Pease, 1860 s.l.**

Figs 83–97

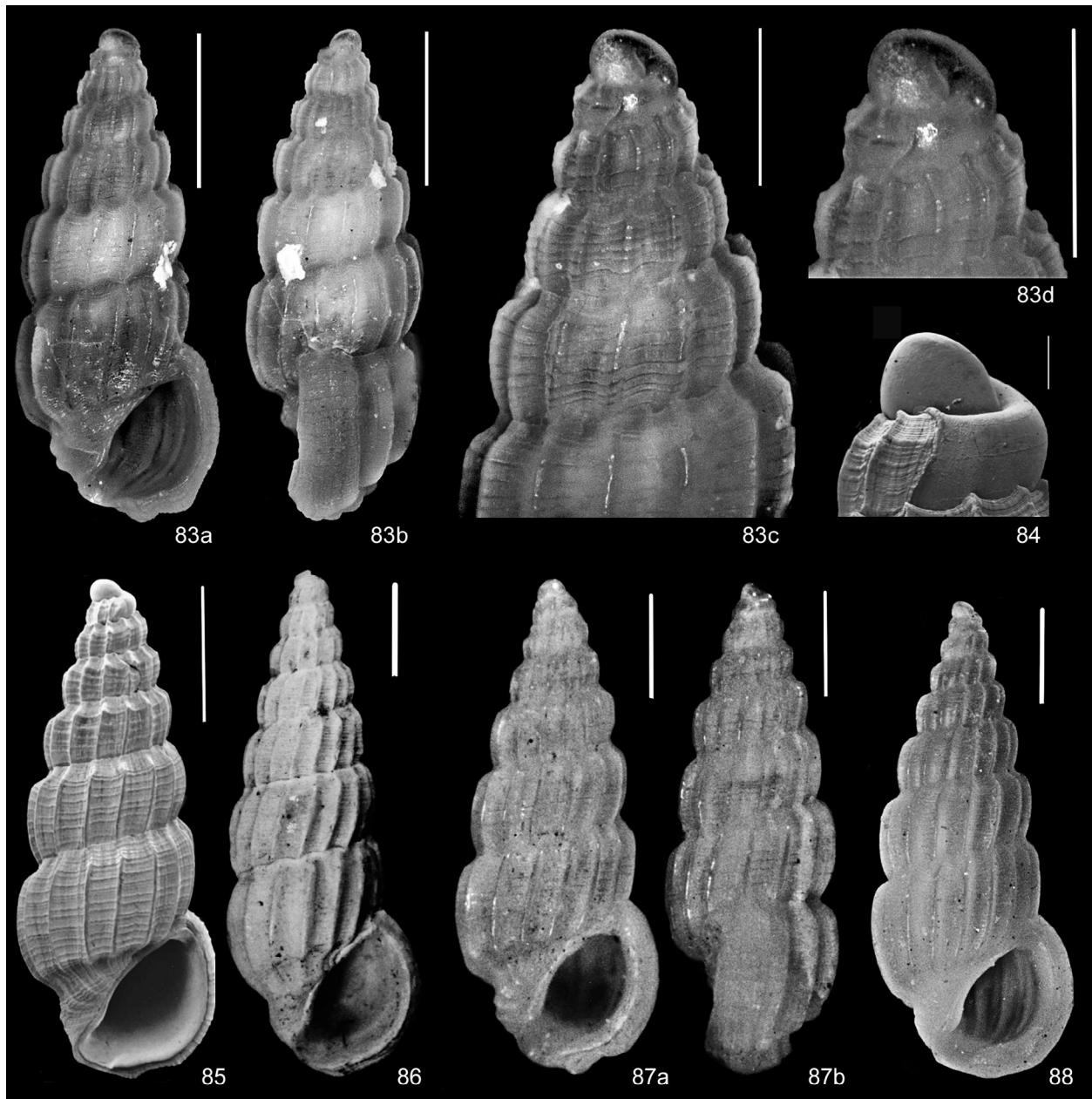
? *Rissoina costata* A. Adams, 1853: 266. Type locality: “Cobiga, Peru”. Type material: 7 syntypes (1975.014) in NHMUK.

*Rissoina costata* — Schwartz von Mohrenstern, 1860: 53, fig. 16; Weinkauff, 1880: 20, pl. 8 fig. 1; Tryon, 1887: 376, pl. 56 fig. 57.

*Rissoina turricula* Pease, 1860: 438. Type locality: “Sandwich Islands” (= Hawaiian Islands). Type material: lectotype (1962.845) and 3 paralectotypes (1962.846) selected by Kay (1965) in NHMUK.

*Rissoina turricula* — Weinkauff, 1881: 80, pl. 15c fig. 6 (in part); Kay, 1965: 69, pl. 11 fig. 10; Kay, 1979: 85, fig. 29; Leal & Moore, 1989: 142, figs 10–11.

*Rissoina (Rissolina) turricula engleri* Rehder, 1980: 26, pl. 5



**Figs 83-88.** *Rissoina* (*Rissolina*) *turricula* Pease, 1860 s.l. **83a-d.** Pixie Reef, Queensland: frontal (a), lateral (b), sculpture of spire whorls (c), protoconch (d) (AMS C.160275). **84.** Raoul Island, Kermadec Islands: protoconch, SEM (NMNZ M.56649). **85.** Nonaurau, Hawaii: frontal, SEM (USNM 346443). **86.** *Rissoina costata* A. Adams, 1853, syntype, "Cobiga, Peru": frontal (NHMUK 1975.014). **87a-b.** *Rissoina turricula* Pease, 1860, lectotype, Hawaiian Islands: frontal (H), lateral (I) (NHMUK 1962.845). **88.** *Rissoina turricula engleri* Rehder, 1980, holotype, Hanga Papara, La Pelouse Bay, Easter Island (USNM 755993). Scale bar: **83a-b, 85-88** = 1 mm; **83c-d** = 0.5 mm; **84** = 0.1 mm.

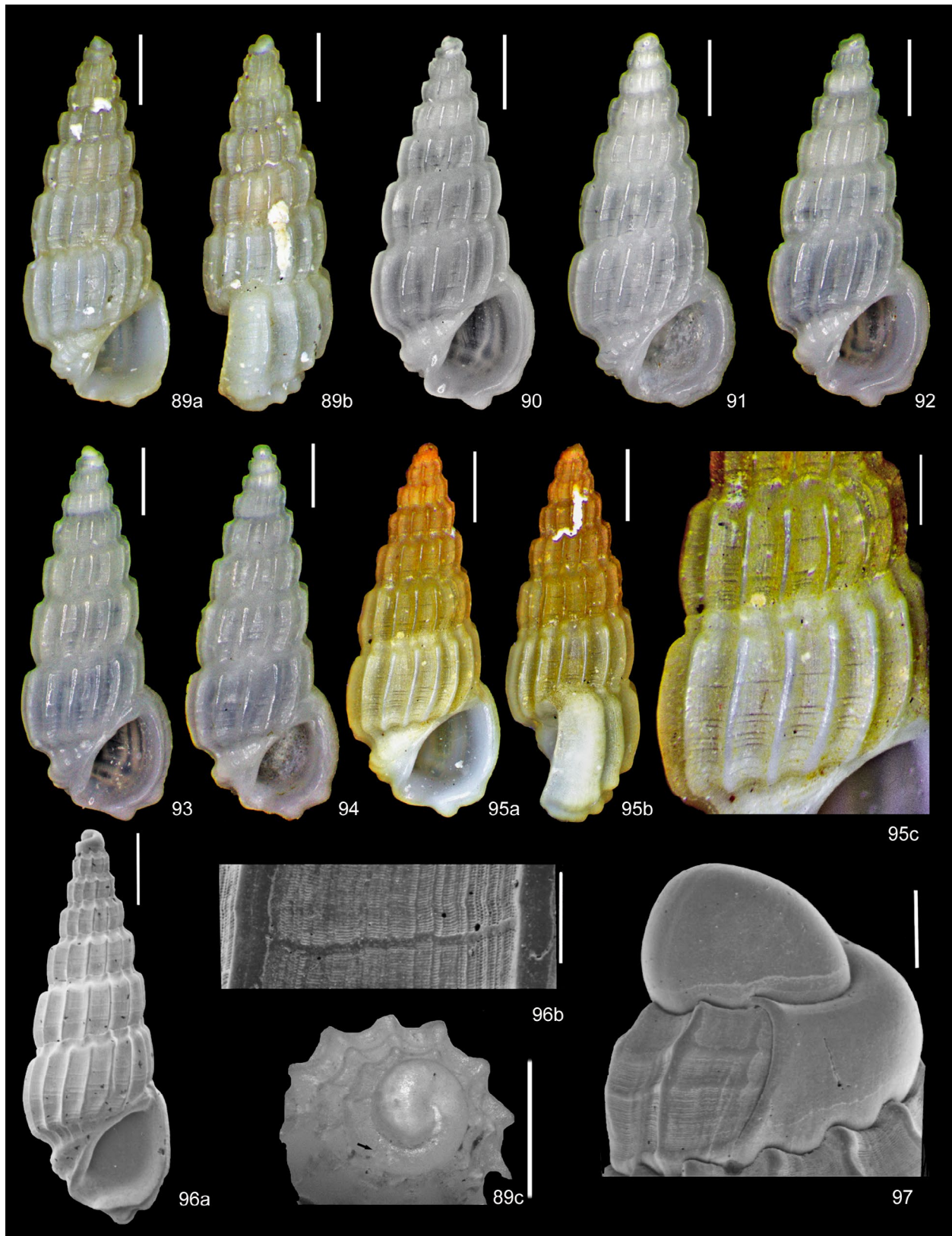
fig. 6. Type locality: Hanga Papara, La Pelouse Bay, Easter Island. Type material: holotype (755993) and 8 paratypes (710704) in USNM.

*Rissoina* (*Rissoina*) *costata* — Sleurs & Preece, 1994: 69, pl. 1 figs 3, 6.

**Description.** — Shell small (Pixie Reef specimen: 3.3 mm) to medium-sized (Lord Howe specimen: 6.5 mm); narrowly to broadly conical, turreted; last whorl strongly contracted

near base. Protoconch translucent white, of non-planktotrophic larval type, of about 1 whorl, with nucleus tilted with respect to axis of teleoconch; protoconch-teleoconch boundary distinct, with slightly sinuous, weakly thickened margin. Teleoconch of 5.5 to 7.5 flat to weakly convex whorls, moderately angulate below weakly undulating and very weakly impressed suture. Axial sculpture of prominent, very narrow, distantly spaced, weakly opisthoclinal, weakly rounded to sharp ribs with rather deep and wide





**Figs 89-97.** *Rissoina* (*Rissolina*) *turricula* Pease, 1860 s.l. Lord Howe Island. **89a-c.** Frontal (a), lateral (b), apical view of protoconch with arrow indicating protoconch-teleoconch boundary (c) (AMS C.159822). **90-94.** Shells, frontal view showing variation in shape and sculpture (AMS C.160257). **95a-c.** Frontal (a), lateral (b), detail of sculpture of penultimate and last whorl (c) (AMS C.159827). **96a-b.** Frontal, SEM (a), microsculpture, SEM (b) (AMS C.159822). **97.** Protoconch, SEM (AMS C.159822). Scale bar: **89-95b, 96a** = 1 mm; **89c, 95c** = 0.5 mm; **96b, 97** = 0.1 mm.

interspaces. Spiral sculpture of spire whorls and last whorl with more or less distantly and irregularly spaced spiral lirae. Last whorl with very prominent spiral fold, separated from adapical portion of last whorl by rather shallow and wide furrow; axial ribs on last whorl extending onto groove and spiral fold, making fold appear nodular. Aperture ovate; inner lip thin, narrow, with very weak swelling near transition to very narrow, rather deep, weakly elongate anterior channel; outer lip thin internally with moderately prominent labial varix with spiral lirae of last whorl extending to varix; outer lip orthocone in profile. Shell colour uniform white. Operculum: unknown.

Shell measurements. — Queensland, Pixie Reef (n = 1): H 3.3, Hs 2.1, W 1.4 mm, Nax 13, Naxp 15, Nwh 5.5. Lord Howe (n = 26): H 4.7-6.5 ( $\mu = 5.40$ ), Hs 2.9-4.3 ( $\mu = 3.45$ ), W 2.0-2.7 ( $\mu = 2.21$ ), Nax 10-14 ( $\mu = 11.9$ ), Naxp 13-17 (14.6), Nwh 6-7.50 ( $\mu = 6.39$ ).

Anatomy. — Animal unknown.

Material examined. — **Queensland.** Pixie Reef (16°33'S, 145°52'E), 4.xi.1928, G.B.R. British Exp. [1] (AMS C.160275). **Lord Howe Island.** “Lord Howe Island” (31°33'S, 159°05'E), R. Bell [54] (AMS C.59717), [1] (AMS C.159825), [35] (AMS C.159822), [16] (AMS C.159827); Lord Howe Island, dredged 36.5 m, R. Bell [>50] (AMS C.160257); NE side of Lord Howe Island (31°31'S, 159°05'E), dredged in up to 27.5 m, R. Bell, [11] (AMS C.159826); Lord Howe Island, S end of lagoon reef, inner sheltered pools, algae washings, L.T., 23.iv.1978, W.F. Ponder & P.H. Colman [7] (AMS C.159789); Neds Beach (31°31'S, 159°04'E), on algae, in sheltered large pool on E side, L.T., 22.iv.1978, W.F. Ponder & P.H. Colman [1] (AMS C.159828); Lord Howe Island, S end of lagoon, algae washings outer reef crest, L.T., 23.iv.1978, W.F. Ponder & P.H. Colman [1] (AMS C.159823); Signal Point (31°31.5'S, 159°04'E), stone washings in pool, L.T., 21.iv.1978, W.F. Ponder & P.H. Colman [4] (AMS C.159788), [3] (AMS C.153914, in part); NE side of Lord Howe Island, dredged in up to 27.5 m, R. Bell [>50] (AMS C.160258).

Distribution. — *Rissoina* (*Rissoina*) *turricula* s.l. is widespread in the central Pacific, and in addition to Pixie Reef and Lord Howe Island it is reported from the following localities: Trobriand Islands, Funafuti, Marshall Islands, Hawaii, Line Islands, Pitcairn Islands, Easter Islands and Kermadec Islands (all pers. observ.)

Remarks. — *Rissoina* (*Rissolina*) *turricula* Pease, 1860 s.l. is very common on Lord Howe Island, while the AMS holds only one specimen from Pixie Reef, Queensland. Both the specimens from Lord Howe Island and Pixie Reef strongly resemble the lectotype of *Rissoina turricula* Pease, 1860 in shell shape and sculpture, but the specimen from Pixie Reef differs in being markedly smaller. I examined several specimens from the Central Pacific, which are almost indistinguishable on the basis of shell features from the specimens from Lord Howe Island and Pixie Reef. Among this series of specimens variation with respect to the shell length (2.6-

6.5 mm) and shell length/width ratio was observed; furthermore the spiral lirae on the teleoconch are more or less regularly and densely spaced and therefore vary in number. The protoconch has been shown to be similar and very typical across all specimens observed in being of non-planktotrophic larval type, consisting of about 1 whorl, which is tilted with respect to the axis of the teleoconch. Based on the material examined, this species is also very common in Hawaii (Kay, 1965; 1979 and personal observation by the author) and occurs in several widely separated places in the central Pacific (see: geographical distribution). If these populations represented a single widespread species, it would have a very unusual distribution pattern, as no other rissoinid species with a similar distribution pattern have been reported to date. Therefore, I speculate that *R. (Rissolina) turricula* Pease may constitute a species complex that includes several morphologically similar species, rather than one widespread single species. Anatomical and DNA analyses may shed light on this issue. The syntypes of *Rissoina costata* A. Adams, 1853 also fall within the variation range observed and are strongly similar to the lectotype and paralectotypes of *Rissoina turricula* Pease. If the presumed species complex were to represent a single heterogeneous species, *R. (Rissolina) costata* should be considered a subjective senior synonym of *R. (Rissolina) turricula* and would take priority over the latter's specific name. However, the type locality of *R. (Rissolina) costata* remains doubtful as Adams (1853) reported this species from “Cobiga, Peru”, which may have been meant as Cobija, Chile; unfortunately all syntypes lack the protoconch. An extensive search for this species in the LACM collections and in the literature, however, has not allowed me to find any traces of this ‘species’ from the eastern Pacific Ocean. Schwartz von Mohrenstern (1860) reported specimens from Peru corresponding to the syntypes of *R. costata*; however, in his collection we found only one lot of 2 specimens (NHMW 25755) from the “Philippines” that are conspecific with *R. (Rissolina) costata*. Because the type locality of the latter remains doubtful, I prefer to use the specific name *R. (Rissolina) turricula* in a broad sense for all the central Pacific specimens that are indistinguishable based on shell features.

*Rissoina (Rissolina) turricula engleri* Rehder, 1980 from Easter Island represents a larger subspecies of *R. (Rissolina) turricula* s.l. but is otherwise indistinguishable in protoconch and teleoconch features.

*Rissoina (Rissolina) turricula* s.l. strongly resembles *R. (Rissolina) fratercula* Sleurs & Preece, 1994 but differs by its larger size, less elongate shell and more angulate whorls; the spiral sculpture is slightly more prominent in *R. (Rissolina) turricula* s.l.: protoconch features of both species are identical.

Faber & Kaiser (2015) reported *Rissoina* aff. *fratercula* from Clipperton Isl.; the illustrated specimen shows general resemblance to *R. (Rissolina) turricula* s.l., but differs in the absence of the spiral microsculpture and in the

extremely small size of 1.8 mm. Weinkauff (1881) considered specimens of *R. (Rissolina) turricula* from Hawaii (“Sandwich Is.”) conspecific with specimens from Mauritius and Sri Lanka. I did not find any specimens similar to *R. (Rissolina) turricula* s.l. from Madagascar or Sri Lanka, but I examined one specimen from Réunion which strongly resembles the latter; this specimen however differs in the protoconch bearing 2 very prominent spiral cords and it represents a different (and probably undescribed) species.

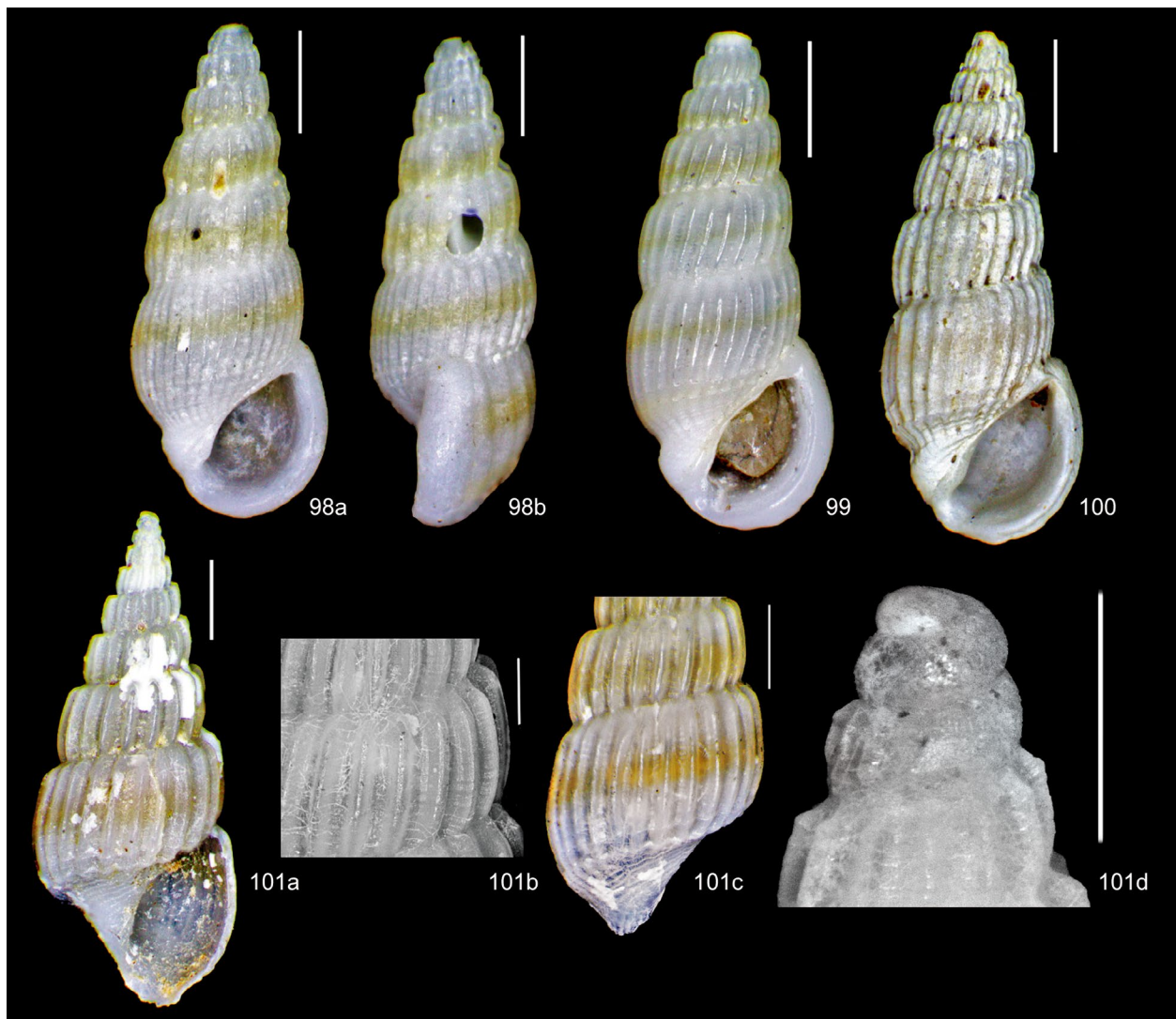
*Rissoina (Rissolina) turricula* s.l. is very similar to *R. (Rissolina) angasii* Pease, 1871 from southern Australia, but differs (1) in the protoconch being tilted with respect to axis of teleoconch (2) in having less angular whorls, (3) in having a deeper spiral furrow and a more prominent spiral fold near the shell base, (4) in having moderately prominent spiral lirae which are almost absent in *R. (Rissolina) angasii* and

(5) in the anterior apertural channel being relatively deeper and narrower than in *R. (Rissolina) angasii*.

Large specimens of *Rissoina (Rissolina) turricula* s.l. are very similar to *R. (Rissolina) heronensis* (Laseron, 1956) but differ (1) in having a non-planktotrophic protoconch, (2) in having less sharply angled whorls and (3) in having much less prominent and less regularly spaced spiral lirae on the labial varix.

*Rissoina (Rissolina) turricula* s.l. strongly resembles *R. (Rissolina) aspera* Faber, 2013 from the Philippines in shell shape but differs in having less prominent spiral ribs which form strong and sharp nodules where crossing the axial ribs in the latter species.

*Rissoina (Rissolina) turricula* s.l. superficially resembles *R. (Rissolina) cf. monilifera* G. Nevill, 1885 and is contrasted under the “Remarks” of the latter species.



**Figs 98-101.** *Rissoina (Rissolina)* spec. A. **98a-b.** Mouth Greenough River, Geraldton, Western Australia: frontal (a), lateral (b) (AMS C.159883). **99.** Bluff Point, N Geraldton: frontal (AMS C.159878). **100.** 1.6 km S of Woodman Point, Cockburn Sound, Western Australia: frontal (AMS C.100758). **101a-d.** Horrocks Beach, N of Geraldton, Western Australia: juvenile specimen, frontal (a), detail of sculpture spire whorl (b), dorsal view of last and penultimate whorls (c), protoconch (d) (AMS C.160305). Scale bar **98-100** = 2 mm; **101a, c** = 1 mm; **101b, d** = 0.5 mm.

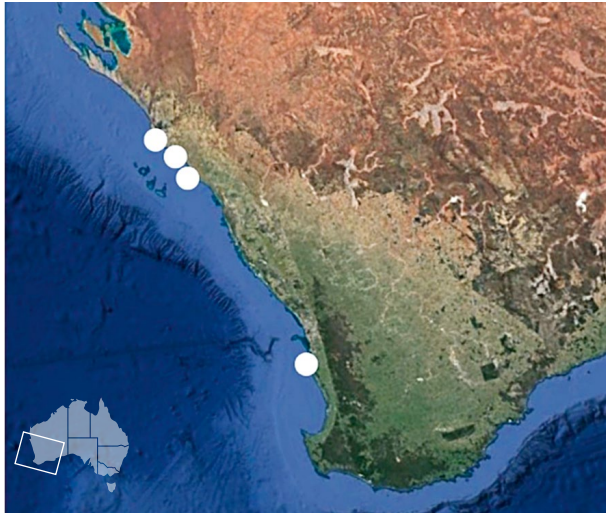


Fig. 102. Records of *Rissoina* (*Rissolina*) spec. A (map source: Google Earth).

***Rissoina* (*Rissolina*) spec. A**

Figs 98-102

Description. — Shell large for genus (up to 9 mm), rather stout, elongate conic of about 6.5 whorls. Protoconch (based on subadult specimen AMS C.160305) of planktotrophic larval type (diameter of protoconch I: 0.16 mm); protoconch-teleoconch boundary eroded. Apical spire whorls moderately shouldered, almost flat to very weakly convex, last whorl gently curved, weakly contracted at base; suture not impressed, weakly undulating. Axial ribs of apical spire whorls moderately prominent, rounded with deep, more or less equidistant interspaces; axial ribs gradually less prominent and slightly more closely spaced on last whorl. Spiral sculpture of closely spaced lirae in interspaces between axial ribs, weakly intersecting axial ribs; spiral lirae more prominent on apical whorls; last whorl with about 7 moderately prominent spiral riblets between periphery and shell base, intersecting the lower part of axial ribs, giving it reticular appearance. Basal fold rather weak. Aperture lenticular, parietal side of inner lip thin and weakly thickened near transition to anterior channel; posterior channel very short, rounded; outer lip very weakly opisthoclinal to orthoclinal with narrow, rounded, weakly thickened labial varix. Shell colour white with pale chestnut brown spiral band on lower half of spire whorls and running on periphery on last whorl.

Shell measurements (n = 4 except where noted). — L 8.3-9.2 ( $\mu$  = 8.8), Ls 5.1-5.8 ( $\mu$  = 5.5) D 3.7-3.8 ( $\mu$  = 3.7), Dn-1 2.6-2.8 ( $\mu$  = 2.7, n = 3), Nax 26-29 ( $\mu$  = 27.2), Naxp 24-26 ( $\mu$  = 25).

Material examined. — **Western Australia.** Horrock's Beach, N of Geraldton (28°23'S, 114°26'E), on limestone platform, mixed algae, 9.i.1972, W.F. Ponder [1] (AMS C.160305

in part); Bluff Point, N Geraldton (28°45'S, 114°37'E), on beach, 1973-74, J. Hewitt [5] (AMS C.159878); Mouth of Greenough River, Geraldton (28°52'S, 114°38'E), shell sand, x.1969, F. Plant [1] (AMS C.159883); Boat Ramp, 1.6 km S of Woodman Point, Cockburn Sound, 15.xii.1971, W.F. & J.M. Ponder, B.R. Wilson & N. Coleman [1] (AMS C.100758).

Distribution. — Restricted to Western Australia from Horrock's Beach to Cockburn Sound (Fig. 102).

Remarks. — *Rissoina* (*Rissolina*) spec. A is very similar in shell shape and sculpture to *R. (Rissolina) signata* O. Boettger, 1893 but differs in being markedly larger; furthermore the axial ribs on the apical spire whorls and last whorl are relatively weaker and more numerous than in *R. (Rissolina) signata*. Very likely *R. (Rissolina)* sp. A represents an undescribed taxon, but so far I have only seen a limited number of adult shells, all of which lack the protoconch; in one juvenile the protoconch is present but too eroded to be adequately described. Therefore, I prefer to use the open nomenclature in anticipation of better conserved material.

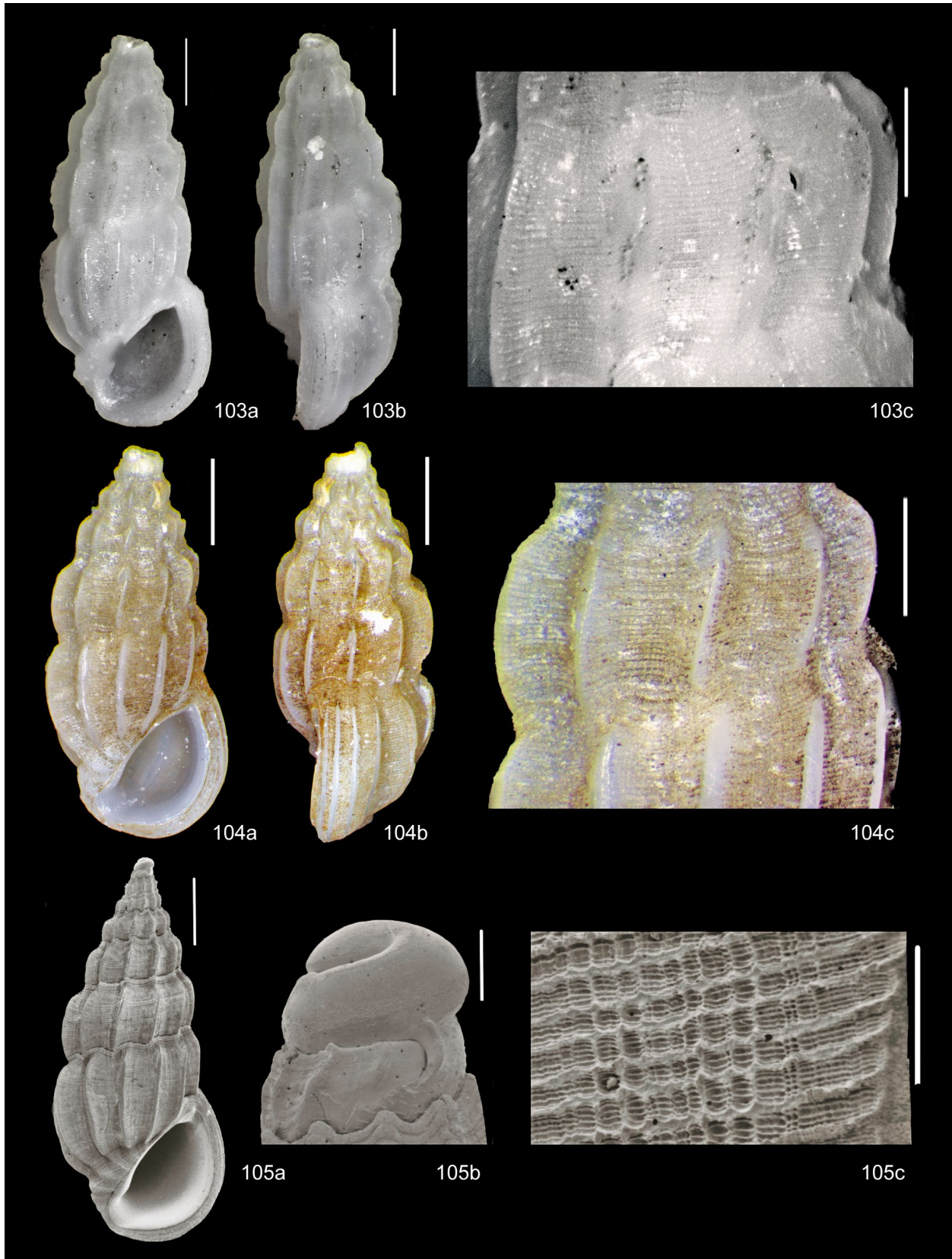
***Rissoina* (*Rissoina*) spec. B**

Figs 103-105

Description. — [The description is mainly based on fresh specimens from various localities in the central Indo-Pacific, which are indistinguishable from the worn specimens from Queensland]. Shell medium-sized, elongate to broadly conical, rather stout. Protoconch of planktotrophic larval type, of 1.50 convex whorls, with first whorl weakly tilted; protoconch-teleoconch abrupt, with rather shallow sinusigeral notch and with moderately thickened margin. Teleoconch of 6.25 to 7 whorls; apical spire whorls strongly convex; subsequent whorls gradually less convex; apical spire whorls subangulate below moderately undulating, very weakly impressed suture. Axial sculpture of very prominent, very narrow, sharp to weakly rounded, distantly spaced, very weakly opisthoclinal ribs. Spiral sculpture of prominent, densely spaced lirae, the latter usually less prominent on apical spire whorls and on last whorl; spiral lirae usually crossing top of axial ribs. Last whorl with relatively weak and weakly nodular spiral fold bearing densely spaced, prominent spiral lirae. Aperture ovate; inner lip very thin and narrow, except for very weak swelling near transition to moderately elongate, narrow, rather shallow anterior channel; outer lip thin internally and with very narrow, very weak labial varix; outer lip almost orthoclinal in profile. Shell colour uniform white.

Shell measurements (n = 2, both specimens lacking protoconch): H 5.3-6.1, Hs 3.3-3.8, W 2.4-2.7, Nax 11-12, Naxp 10-11, Nwh >5.

Material examined. — **Queensland.** Arlington Reef, NE of Cairns (16°42'S, 146°04'E), intertidal, 1.vii.1969, I. Loch [1] (AMS C.160039); Moore Reef, E of Cairns (16°54'S, 146°12'E),



**Figs 103-105.** *Rissoina* (*Rissolina*) spec. B. **103a-c.** Arlington Reef, NE of Cairns, Queensland: frontal (a), lateral (b), detail of sculpture of spire whorl (c) (AMS C.160037). **104a-c.** Rarotonga, Cook Islands: frontal (a), lateral (b), microsculpture (c) (AMS C.159798). **105a-c.** SE of Aitutaki, N Cook Islands: frontal, SEM (a), protoconch, SEM (b), microsculpture, SEM (c) (ANSP 278227). Scale bar: **103a-b, 104a-b, 105a** = 1 mm; **103c, 104c** = 0.5 mm; **105b-c** = 0.1 mm.

8.viii.1971, I. Loch [1] (AMS C.160038).

Distribution. — Central and Eastern Indo-Pacific from Okinawa to the Society Islands.

Remarks. — This species appears to be very rare in Queensland as only 2 weathered specimens were found in the AMS' large rissoinid collections. This as yet seemingly undescribed taxon is more common in the central and eastern Indo-Pacific: I have seen specimens from Okinawa, Matabungkay (Philippines), the east coast of Papua New Guinea, the Solomon Islands, New Caledonia, Vanuatu, Fiji, Cook Islands and Society Islands. Apart from the strength of the basal spiral fold, no or little variation in shell shape and sculpture was observed between the series of specimens examined.

*Rissoina* (*Rissolina*) spec. B. superficially resembles *R. (Rissolina) duclosi* Montrouzier, 1866 and is contrasted under the section "Remarks" of the latter.

## DISCUSSION

Fifteen species of the subgenus *Rissoina* (*Rissolina*) are recognized from the Australian waters, including Norfolk Island and Lord Howe Island, with very little geographical overlap between them. Six species are more or less widespread in the Indo-West Pacific: *Rissoina* (*Rissolina*) *duclosi*, *R. (Rissolina) heronensis*, *R. (Rissolina) mercurialis*, *R. (Rissolina) signata*, *R. (Rissolina) torresiana* and *R. (Rissolina) spec. B. Rissoina (Rissolina) duclosi* occurs throughout the Great Barrier Reef and is rather common in the tropical western Pacific. The fairly wide distribution range in the tropical Western Pacific is rather unusual for a species with a non-planktotrophic larval development. *Rissoina* (*Rissolina*) *mercurialis* is only recorded from the northern Barrier Reef and from some localities in the Western Indo-Pacific. However, some specimens referred to *R. (Rissolina) subfuniculata* are very similar to *R. (Rissolina) mercurialis* and may turn out to be conspecific with it. In this case, the range of *R. (Rissolina) mercurialis* should be extended to Sri Lanka in the Indian Ocean and to the Philippines and Okinawa. *Rissoina* (*Rissolina*) *heronensis* is widespread in the Indo-West Pacific from Cocos Islands to the Society Islands and Pitcairn, but the Australian records are limited to a few specimens from the southern Great Barrier Reef. Three species with a more or less wide distribution in the Indo-West Pacific are very uncommon in tropical Australian waters and are only known from a few Australian localities so far: *Rissoina* (*Rissolina*) *signata*, *R. (Rissolina) torresiana* and *R. (Rissolina) spec. B. Rissoina (Rissolina) hernandezi* and *R. (Rissolina) crassa* are endemic to the Australian east coast. *Rissoina* (*Rissolina*) *hernandezi* has a protoconch which suggests a planktotrophic larval development and has been recorded between SE

of Cooktown in northern Queensland and Collaroy in New South Wales. In contrast, *Rissoina* (*Rissolina*) *crassa* has a protoconch of non-planktotrophic larval development and appears to be restricted to New South Wales, particularly to the area between Yamba and Sydney. Hence there is a very small geographic overlap between the two species, roughly between Yamba and Collaroy. However specimens lacking the protoconch are hardly distinguishable from each other. Additional well-preserved material may show that the distributional overlap may be greater than suggested by the examined material. Examination of the penial features and a DNA analysis may clarify the phylogenetic relationship between the two species. *Rissoina* (*Rissolina*) *backeljauwi* and *R. (Rissolina) sp. A* are apparently endemic to Australia, but only known from a very limited number of specimens.

*Rissoina* (*Rissolina*) *angasii* is a common and well-known endemic species of the temperate Australian waters. No other *R. (Rissolina)* species were reported from temperate Australian waters, except *R. (Rissolina) ponderorum* spec. nov., which is endemic to Western Australia where it is recorded from the tropical (Montebello Islands) to warm temperate waters (Observatory Point, Esperance). *Rissoina* (*Rissolina*) *cardinalis* is endemic to Queensland (Lindeman Island) and Northern Territory (Point Charles), but with an extension of the distribution further north to southern Papua New Guinea.

*Rissoina* (*Rissolina*) cf. *monilifera* is endemic to Norfolk Island and no other similar species are known from Australia. However, the holotype of *R. (Rissolina) monilifera* was described from Japan, but there have been no additional reports of the species since then. Besides the similar shell morphology, the most striking resemblance between the holotype and the specimens from Lord Howe Island is the distinctive morphology of the protoconch with the strong carina on the upper third of the whorl. However, it is unlikely that the holotype from Japan would be closely related to the Norfolk specimens, given the large geographical distance between the two sites.

*Rissoina* (*Rissolina*) *turricula* s.l. is rather common on Lord Howe Island and only one very small specimen was reported from Pixie Reef. As discussed earlier, *R. (Rissolina) turricula* s.l. may represent a species complex and the specimens from Lord Howe may involve a distinct endemic species.

## ACKNOWLEDGEMENTS

For the loan of types and other specimens I am indebted to the following (former) curators and collection managers: Dr. Winston F. Ponder, Philip Colman and Ian Loch (AMS), Dr. George Davis and Ms. Andi Garback (ANSP), Ms. Kathy

Way (NHMUK), Dr. Jackie Van Goethem and Dr. Yves Samyn (RBINS), the late Dr. James McLean, the late Gale Sphon and Lindsey Groves (LACM), Dr. Janine Prud'homme (MHNB), the late Dr. Erhard Wawra (NHMW), Dr. Ronald Janssen (SMF), the late Dr. Richard Houbriek (USNM) and Dr. N.V. Subba Rao (ZSI). I thank Prof. Dr. Thierry Backeljau, Prof. Dr. Ruud Bank, Dr. Rüdiger Bieler and Dr. Bruce Marshall for critically reading drafts of the manuscript and making valuable suggestions for improvement. I am very grateful to Jan Johan ter Poorten for his help and assistance with the lay-out of the illustrations.

I am grateful to Andreia Salvador (NHMUK) and Alison Miller (AMS) for permission to use type material images of *Rissoina mercurialis* and *Fractoralla praecida* respectively. Julien Cillis (formerly RBINS) is gratefully acknowledged for making the scanning electron micrographs.

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