

Non-marine Mollusca of Gebe Island, North Moluccas

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Abstracts

New data and previous records of non-marine molluscs from Gebe Islands, North Moluccas, are reviewed. Two species new to science from Gebe Island are described and illustrated, namely *Aphanoconia aprica* sp. nov. and *Pupina laszlowagneri* sp. nov. One new synonymy is recognized: *Planispira kurri* (L. Pfeiffer, 1847) (= *P. gebiensis* Sykes, 1904). Type material of poorly known species is discussed and illustrated for the first time. Annotated species list of terrestrial and freshwater molluscs from Gebe Island is presented for the first time. Comments on biogeographical relationships of Gebe's malacofauna are given.

Zusammenfassung

Neue und bereits publizierte Angaben von nicht-marinen Mollusken der Insel Gebe (Nord- Molukken) werden revidiert. Zwei Arten werden als neu für die Wissenschaft beschrieben und abgebildet: *Aphanoconia aprica* sp. nov. und *Pupina laszlowagneri* sp. nov. Ein neues Synonym wird vorgeschlagen: *Planispira kurri* (L. Pfeiffer, 1847) (= *P. gebiensis* Sykes, 1904). Das Typenmaterial der ungenügend bekannten Arten wird erstmals diskutiert und abgebildet. Eine kommentierte Artenliste der Land- und Süßwassermollusken der Insel Gebe wird angefügt. Einige Notizen zu biogeographischen Beziehungen der Malakofauna von Gebe werden gegeben.

Key words: Wallacea, Gebe Island, North Moluccas, Raja Ampat, terrestrial & freshwater malacofauna, nomenclature, new species, biogeography, annotated check-list

Introduction

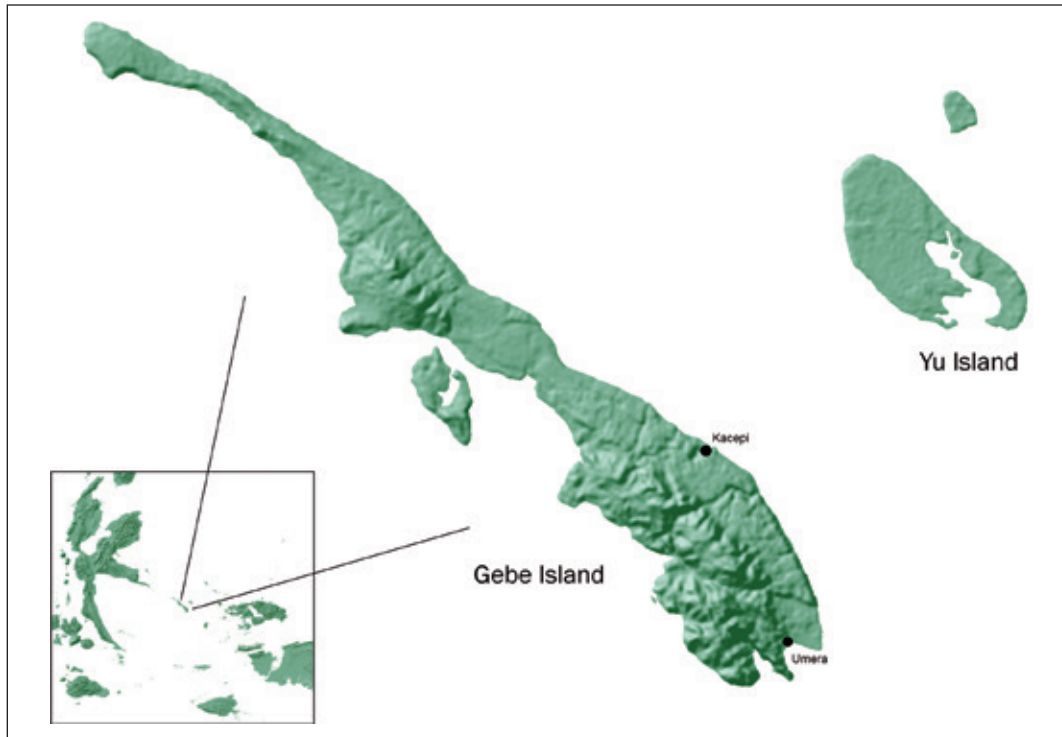
Gebe Island is situated eastwards of the Wallace's line, about midway between Halmahera (North Moluccas) and Waigeo (Raja Ampat) islands. Geologically, Gebe is situated on southern part of an arc beginning on South-eastern arm of Halmahera and extending eastward

through Gebe and Gag towards the northern part of Bird's Head Peninsula of New Guinea (SUKAMTO et al. 1981). This geological area is being called East Halmahera-Waigeo ophiolite terrane (HALL, NICHOLS 1990) or province (SUKAMTO et al. 1981). Geological history and the current geographically isolated position makes Gebe interesting in a bio- and palaeogeographical aspect. Administratively, Gebe belongs to the province of North Moluccas (Maluku Utara) of Indonesia.

Gebe is narrow and elongate island stretching from NW to SE (Map 1). Gebe's terrain is flat, rising from sea level up to ~300 m. Gebe was originally covered by dense lowland rainforest. Remnants of this forest are still present in small patches along the island (L. Wagner, personal communication). Gebe is famous for its large nickel deposits and the nickel mine, occupying western part of the island.

MAYR (1976) describes Gebe and surrounding islands of Raja Ampat Archipelago as follows: "... all these islands are so pure Papuan and form such a well-defined faunistic unit..." However, this is only true for Gebe's ichthyo- (MAYR 1876) and ornithofauna (COATES, BISHOP 1997). Contrariwise, Gebe's marsupial fauna shows strong relation with Halmahera (FLANNERY et al. 1998) and being treated as a "part of oceanic Wallacean marsupial fauna" (HABERLE et al. 2010). Only fragmentary and incomplete data is available on invertebrates of Gebe, with no published survey data or biogeographical analysis.

New malacological material from Gebe Island collected in 2011 is important for understanding biogeographical peculiarities and fauna derivation of this transitional island between the northern part of "classic" Wallacea (the Moluccas & Sulawesi) and the Papuan region (Raja Ampat, New Guinea). The following two species new to science are described and illustrated: *Aphanoconia aprica* sp. nov. and *Pupina laszlowagneri* sp. nov. Type material of Fulton's and Sykes's species, as also of *Videna hartmanni* have been studied. Other specimens from Gebe and some adjacent islands have been revised.



Map 1. Topological map of Gebe Island and neighbouring Yu Island (prepared using ArcGIS 9 software).

Materials and methods

All type labels are listed in original format, without addenda or corrections; separate labels (when more than one) are separated by slashes. Author's comments are given in square brackets. Only reliable distribution data are given. All taxa are listed systematically. References are only given with presented data on Gebe.

Abbreviations

- BMNH – British Museum (Natural History), London, United Kingdom,
 KGC – private collection Kristine Greķe, Dzidriņas, Latvia,
 MSNG – Museo Civico di storia naturale “Giacomo Doria”, Genova, Italy,
 NME – Naturkundemuseum Erfurt, Germany,
 SMF – Senckenberg Museum, Frankfurt am Main, Germany,
 Is. – island,
 Prov. – administrative province,
 vill. – village or small settlement.

History of malacological exploration

The available data on non-marine malacofauna of Gebe Island are limited to the two short papers, one of them devoted to Gebe, the other just containing descriptions of two additional species from this island.

FULTON (1904) listed six species from Gebe in his paper, including the descriptions of two new camaenid (*Papuina fallax*, *Albersia subsphoerica*) and one cyclophorid (*Leptopoma gebiensis*). Fulton noted a further three species of terrestrial molluscs collected on Gebe. In very same journal, SYKES (1904) described two new species of camaenid snails from Gebe, namely *Planispira gebiensis* and *Papuina semibrunnea*. This material was collected by John Waterstradt (Fulton's species) or was purchased from the dealer in natural history specimens, Hans Fruhstorfer (as in case with Sykes's species) and are now housed in the BMNH. HIDALGO (1913) listed just Fulton's and Sykes's publications in his bibliographical review, without adding any new data on species described by these earlier authors. BENTHEM JUTTING (1933, 1965) only mentioned Gebe as

a locality for two species, *Albersia subsphaerica* and *Papuina unicolor*.

New descriptions and nomenclatural changes

Aphanoconia aprica sp. nov. (Figs 1–6)

Holotype NME: Indonesia E, Maluku Utara Prov., Gebe Island, on the way from Kacepi to Umera vill., 29.X–03.XI.2011, secondary rainforest on limestone, leg. L.Wagner.

Paratypes 4 juvenile specimens: 2 NME, 2 KGC, same locality as in the holotype.

Measurements, holotype. Shell height 2.6 mm, width 4.6 mm; operculum height 1.7 mm, width 1.3 mm.

Description. Shell lens-shaped, slightly shiny, little transparent. Shell colouration orange-brown with paler peristome. Whorls 4¼, the embryonic whorl flat. Following ones reticulated with growth lines and very delicate thin spiral ribs visible only under strong magnification on adult shell, but more conspicuous on juvenile shells; three ribs over and four under the periphery. Periphery bluntly carinate. Base rounded. Umbilicus closed by a shiny and granulate, not sharply defined callus. Aperture broad, obliquely rotundate-triangular. Peristome thickened.

Operculum brownish with sides of calcareous plate and nucleus being transparent. Operculum shape triangular-rotundate with very thin calcareous plate bearing concentric growth lines. Inner fold very weak, almost straight at columellar margin. Denticulate projection rising over the plate on the basal angle.

Diagnosis. Similar to *Aphanoconia dunkeri* L. Pfeiffer, 1867 (Nicobar Islands), but differs in last whorl bluntly carinate (sharply carinate in *A. dunkeri*), weakly defined callus (well-defined, thick in *A. dunkeri*), and being much smaller (10.5x6 mm in *A. dunkeri*).

Etymology. Named from Latin “apricus” (sunny, clear, heliophilous), due to the orange-brown, bright colouration and lens-shaped shell.

Ecology. This species collected from leaf litter in secondary lowland rainforest.

Distribution. Known only from Gebe Island, the transitional area between North Moluccas and Raja Ampat.

Note. Generic placement of this species within numerous often poorly defined genera of recent Helicimidae is based on EGOROV (2005).

Pupina (Tylotoechus) laszlowagneri sp. nov.

(Figs 7–13)

Holotype NME: Indonesia E, Maluku Utara Prov., Gebe Island, on the way from Kacepi to Umera vill., 29.X–03.XI.2011, secondary rainforest on limestone, leg. L.Wagner.

Paratypes 18 specimens: 6 NME, 10 KGC: same locality as in the holotype [two of paratypes are juvenile shells]; 1 NME, 1 KGC: Indonesia E, Raja Ampat Prov., Wayag Island, along the southern coast, 31.X.2011, leaf debris in forest at the foot of limestone cliff, leg. L.Wagner.

Measurements, holotype. Shell height 6.4 mm, width 3.4 mm, operculum diameter 1.7 mm.

Description. Shell high conical. Shell colouration orange-brown, yellowish or horny, smooth, glossy and slightly transparent, covered by a glaze. Whorls 5, rapidly increasing in size. The last whorl occupies more than 2/3 of the of total shell height. Top bluntly pointed. Base rounded. Suture superficial, margined. Umbilicus closed. Aperture circular. Peristome slightly thickened, interrupted by two canals: one on the angular corner, second on the columellar wall. At the columellar side the canal is covered by distally rounded plate and builds a fold with broad oval exterior opening. Along the upper fissure the exterior peristome margin continues a little way up the previous whorl, with tooth-like plica defining angular canal from the left.

Operculum whitish, circular, consists of 4 to 5 spiral whorls.

Variability. This species varies slightly in shell colour (the most of the paratypes are horny or yellowish) and in shell dimensions (smallest adult paratype shell is 5.9x3.0 mm).

Diagnosis. Similar to *Pupina speculum* Tapparone Canefri, 1883 (New Guinea: northern Bird’s Head Peninsula, islands Biak & Yapen)¹, *P. perspicua* Benthem

¹ TAPPARONE CANEFRI (1883: 270, pl. 10) described *P. speculum* from “Port Dorey, Nuova Guinea” (Figs 14–16). SMITH (1897: 289, pl. 17) described *P. papuana* from “Andai, New Guinea” (Figs 17–20). Both type localities are very close (possible even same). BENTHEM JUTTING (1963: 694) synonymized these two species. After studying types of both taxa, I have discovered some differences: *P. papuana* is stouter (BENTHEM JUTTING noted this fact), its shell is much thicker and shape of peristome is different, especially on the angular corner (its external margin is curved and not straight as in *P. speculum*). However, I am not willing to split these two taxa, especially since the holotype of *P. speculum* is subadult shell and its peristome is not fully developed.

Jutting, 1963 (New Guinea: Biak Is.), and *P. augustae* Leschke, 1912 (New Guinea: Sepik River valley). *P. laszlowagneri* clearly differs from *P. speculum* by narrower last whorl, more vertical position of the aperture and smaller shell size (10x6 mm in *P. speculum*). In *P. augustae* and *P. perspicua* last whorl occupies distinctly less than 2/3 of total shell height (more than 2/3 in *P. laszlowagneri*). Additionally, *P. laszlowagneri* has much more wide peristome' angular corner canal.

Etymology. Patronymic. Named in honour of the first collector, Mr. Laszlo Wagner (Budapest, Hungary).

Ecology. This species collected from leaf litter in secondary lowland rainforest and primary coastal vegetation at the foot of limestone rocks.

Distribution. Known only from small islands Gebe and Wayag, the transitional area between North Moluccas and Raja Ampat.

Note. Paratypes of this species from Wayag Is. are the first record of non-marine molluscs registered from this island at all.

***Planispira (Planispira) kurri* (L. Pfeiffer, 1847)**

(Figs 21–28)

= *Planispira (Cristigibba) gebiensis* Sykes, 1904 **syn. nov.**

(Figs 29–36)

Type material *P. kurri*: syntype [BMNH] no label data available.²

Type material *P. gebiensis*: holotype & paratype [BMNH] gebiensis, Sykes Gebi Island [handwritten, partly underlined] / *Planispira gebiensis* n. sp. Type & var. Gebi I. [handwritten] / Larger shell = TYPE Smaller ‘‘ = var. α . **J. M. XI. p. 88. [handwritten]** / **E. R. Sykes Esq. [handwritten]** / **E.R.Sykes. Esq. [handwritten]** / 1930.4.12. 54–55. [handwritten].

Additional material: 2 specimens [BMNH] N^o. 28. H. Kurri Pfr. Ceram nothing like it M^r Wallace 2 in N. ... [handwritten, label partly destroyed and unreadable] / Type. [printed] ² / Kurri, *Pfr.* [printed] / Ceram. [printed]; 1 specimen [BMNH] gebiensis, *Sykes.* [printed] / Gebi I. [printed] / *Planispira gebiensis* Sykes Gebi Is. 1920. 1 .20. 2 [handwritten] / 1920. 1 .20. 2 [handwritten]

^{2,3} PFEIFFER (1847: 228) did not mention the type locality or any collecting data for the type specimen(s). In the collection of BMNH one shell marked with red dot (considered syntype) is stored together with two other specimens. These specimens are excluded from the type series as they are labelled ‘‘Ceram’’, collected by A.R. Wallace in 1859–60, which post-dates the publication date of the description.

ten]; 2 specimens [BMNH] Kurri, Pfr. Gebi Is, Moluccas. [handwritten, partly underlined].

In total, three specimens are labelled ‘‘*Planispira gebiensis*’’ (holo- and paratype plus one non-type) and two specimens labelled ‘‘*Planispira kurri*’’ from Gebe Is. and were published by SYKES (1904, as *P. gebiensis*) and FULTON (1904, as *P. kurri*) in same year and same journal. I was unable to find any differences in conchyliological characters between these specimens except variability in shell dimensions and colouration (already noted by both previous authors). All five Gebe specimens are conspecific among themselves and also conspecific with the type of *Planispira kurri*. Consequently, a new synonymy is proposed.

I am not familiar with current status of *Cristigibba* Tapparone Canefri, 1883 originally established as a ‘‘group’’ for *Chloritis*, later cited by various authors as a subgenus of *Chloritis* and *Planispira*, or as separate genus. Consequently, I am leaving *P. kurri* in nominative subgenus *Planispira* s. str.

Annotated list of non-marine molluscs confirmed from Gebe Island, North Moluccas

Current checklist contains 18 species (two aquatic or semiaquatic, 16 terrestrial) of molluscs confirmed from Gebe Is. This includes all previously published and 13 new records, among them 11 species of 11 genera being recorded from Gebe for the first time.

All new material was collected at the same locality – a track between two villages: Indonesia E, Maluku Utara Prov., Gebe Island, on the way from Kacepi to Umera vill., 29.X-03.XI.2011, secondary rainforest on limestone, leg. L.Wagner.

Helicinidae

Aphanoconia aprica Greke, 2012 [this paper]

Material: see description above.

General distribution: Believed endemic to Gebe Is. (North Moluccas).

Neritidae

Neritodryas subsulcata (Sowerby, 1836)

First record from Gebe. Material: 3 specimens [KGC]. General distribution: Widespread from the Andaman and Nicobar Islands through all of Malaysia, Indonesia and the Philippines to New Guinea, the Solomon Islands, New Caledonia, Fiji, and Vanuatu.

Cyclophoridae

Platyrhapha plicosa E. Martens, 1863

First record from Gebe. Material: 2 specimens [KGC].
General distribution: Endemic to the North Moluccas (Bacan Is., Gebe Is., Halmahera Is.).

Leptopoma (Leptopoma) gebiensis Fulton, 1904
(Figs 37–40)

Bibliography: FULTON (1904: 54); HIDALGO (1913: 1945).
Material: 15 specimens [KGC].

General distribution: Endemic to Gebe Is. (North Moluccas).

Note: I have studied type material of *L. (L.) gebiensis* (BMNH), *L. (L.) crenilabre* B. Strubell, 1892, *L. (L.) crenilabre obaensis* Kobelt, 1897 (both SMF) and *L. (L.) halmahericum* B. Strubell, 1892 (SMF). *L. gebiensis* is very similar to *L. halmahericum* (Halmahera Is.) (Figs 41–44) by sculpture and shape of shell, but differs in shape of aperture and structure of peristome.

Pupinidae

Pupina (Tylotoechus) laszlowagneri Greķe, 2012 [this paper]

Material: see description above.

General distribution: Believed endemic to the North Moluccas (Gebe Is.) and Raja Ampat (Wayag Is.).

Truncatellidae

Truncatella guerini A. et J.B.Villa, 1841

First record from Gebe. Material: 1 specimen [KGC].
General distribution: Bismarck Archipelago (New Britain, New Ireland), Cenderawasih Bay (islands Biak & Numfor (= Numfoor)), New Guinea (lowland parts of Bird's Head Peninsula), North Moluccas (Gebe Is.), Raja Ampat (Waigeo Is.), Aru Islands (Wokam Is.), possibly much more widely distributed in coastal areas of the Indo-Australian archipelago.

Taheitia gracilentia (Smith, 1897)

First record from Gebe. Material: 2 specimens [KGC].
General distribution: Bismarck Archipelago (New Britain, New Ireland), Cenderawasih Bay (Biak Is.), New Guinea (coastal areas of Bird's Head Peninsula and northern Papua), North Moluccas (Gebe Is.).

Ellobiidae

Pythia scarabaeus (Linnaeus, 1758)

First record from Gebe. Material: 1 specimen [KGC].

General distribution: Coastal areas of the tropical Indian and Pacific oceans eastwards to New Guinea and the Solomon Islands.

Charopidae

Beilania kobelti (C.R.Boettger, 1908)

First record from Gebe. Material: 1 specimen [KGC].
General distribution: Endemic to the Moluccas (Ambon Is., Gebe Is.) and Raja Ampat (Misool Is.).

Euconulidae

Liardetia sp.

A juvenile shell with distinct peripheral carina. Possible undescribed species. First record from Gebe.

Material: 1 specimen [KGC].

Helicarionidae

Lamprocystis subangulata O. Boettger, 1891

First record from Gebe. Material: 1 specimen [KGC].
General distribution: Endemic to the Moluccas (Ambon Is., Bacan Is., Banda Is., Gebe Is., Halmahera Is., Ternate Is.).

Ariophantidae

Naninia aulica (L. Pfeiffer, 1851)

Bibliography: FULTON (1904: 53).

Material: 2 specimens [KGC].

General distribution: The Moluccas, Bird's Head Peninsula of New Guinea, Raja Ampat & Cenderawasih Bay islands.

Trochomorphidae

Videna hartmanni (L. Pfeiffer, 1845) (Figs 45–47)

First record from Gebe. Material: 1 specimen [KGC].
General distribution: North Moluccas (Gebe Is., Morotai Is.); previously considered endemic to Morotai and only known by the holotype [BMNH].

Measurements. Holotype [BMNH] from Morotai Is.: Shell height 10 mm, width 26 mm. Specimen from Gebe Is. [KGC]: Shell height 8 mm, width 20 mm.

Camaenidae

Albersia subsphaerica Fulton, 1904 (Figs 48–51)

Bibliography: FULTON (1904: 54); HIDALGO (1913: 1945), as *Albersia suphsphaerica*.

General distribution: Cenderawasih Bay (islands Mios Korwar & Yapen), North Moluccas (Gebe Is.), Raja

Ampat (islands Salawati & Waigeo), lowland parts of Bird's Head Peninsula (not yet recorded from Tamarau or Arfak mountains), Mamberamo valley.

Planispira (Planispira) kurri (L.Pfeiffer, 1847)
= *Planispira (Cristigibba) gebiensis* Sykes, 1904 [see above for new synonymy]

Bibliography *P. kurri*: FULTON (1904: 53).

Bibliography *P. gebiensis*: SYKES (1904: 88); HIDALGO (1913: 1957), as *Planispira Gebiensis*.

General distribution: The Moluccas (islands Bacan, Gebe, Halmahera, Obi, Seram), Raja Ampat (islands Gag, Waigeo & Weeim (= Weim)), Cenderawasih Bay (Yapen Is.), N coast of New Guinea (Begoure = Beguwre = Beguwri River).

Papuina (Papuina) fallax Fulton, 1904 (Figs 52–55)

Bibliography: FULTON (1904: 53); HIDALGO (1913: 1945); BENTHEM JUTTING (1933: 111).

General distribution: Endemic to Gebe Is. (North Moluccas); known by holotype (BMNH) only.

Papuina (Papuina) semibrunnea Sykes, 1904

(Figs 56–59)

Bibliography: SYKES (1904: 90); HIDALGO (1913: 1957); BENTHEM JUTTING (1933: 136).

General distribution: Endemic to Gebe Is. (North Moluccas); known by holotype (BMNH) only.

Papuina (Papuina) unicolor (L. Pfeiffer, 1845)

(Figs 60–63)

Bibliography: FULTON (1904: 53); BENTHEM JUTTING (1933: 141; 1965: 250).

General distribution: North Moluccas (Gebe Is.), Raja Ampat (Waigeo Is.), lowland parts of Bird's Head Peninsula (not yet recorded from Tamarau or Arfak mountains).

Biogeographical notes

The invertebrate fauna of many small and mid-sized Indo-Australian islands remains completely or almost completely unknown. The lack of data reduces the opportunities for researchers of biogeography and faunistics to reconstruct the pathways of occurrence, speciation and radiation on these small and often very isolated islands, it also does not allow a comparison of the levels of endemism and the reconstruction of possible pathways of invertebrate

evolution on these small islands compared to the comparatively well studied larger ones. Even a small amount of new data on non-marine molluscs of Gebe Island fills this gap in some way. Despite our level of knowledge of non-marine malacofauna of Gebe is still far from satisfactory, some general conclusions on biogeography of Gebe's non-marine malacofauna are possible.

An analysis of the data presented here reveals that 4 of the 18 species (*Pupina laszlowagneri*, *Taheitia gracilentata*, *Albersia subsphoerica*, *Papuina unicolor*) found on Gebe Island are also recorded from New Guinea, or on surrounding islands, namely Cenderawasih Bay islands, Raja Ampat, and Bismarck Archipelago; 3 species (*Platyrrhaphe plicosa*, *Lamprocystis subangulata*, *Videna hartmanni*) belongs to Moluccan fauna and 2 among them limited to North Moluccas, 3 species (*Beilania kobelti*, *Naninia aulica*, *Planispira kurri*) are shared between both Moluccan and West Papuan fauna, 4 species (*Aphanoconia aprica*, *Leptopoma gebiensis*, *Papuina fallax*, *P. semibrunnea*) have so far only been recorded from Gebe Island. Some widespread species (*Neritodryas subsulcata*, *Truncatella guerini*, *Pythia scarabaeus*) inhabit coastal areas and are salt tolerant (VERMEULEN 1996). These species may survive on driftwood and are widely distributed on Indo-Pacific islands. *Liardetia* sp. is not possible to place in any group, as it is only identified to genus level.

In general, it is impossible to clearly describe Gebe's malacofauna as being of true Papuan or Moluccan origin. It is either mixed that is defined by the geographic position of this island mid-between Halmahera and Waigeo. Additional malacological investigations may provide light on this question.

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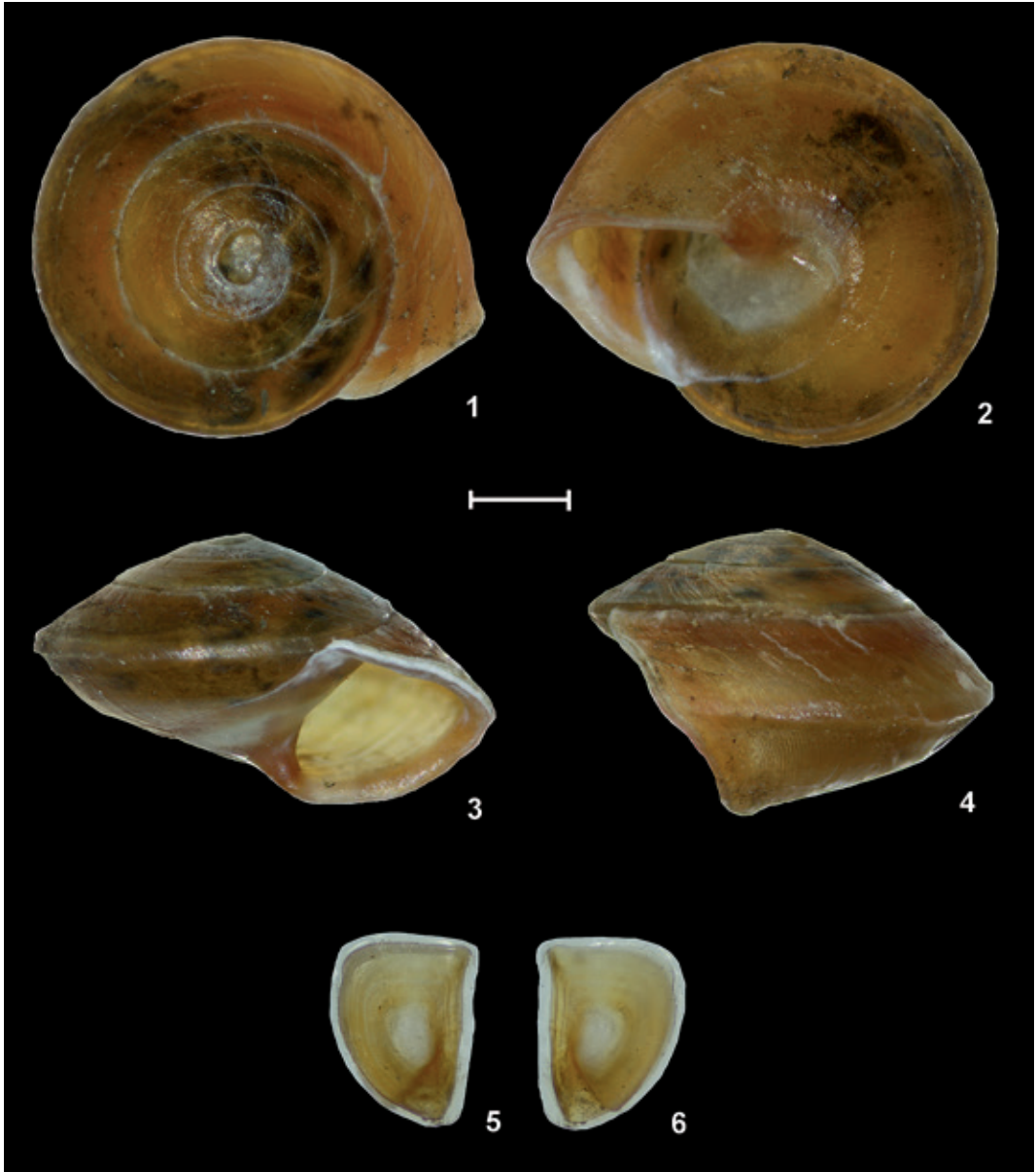
The author is very grateful to Laszlo Wagner (Budapest, Hungary) for friendly assistance with sampling on Gebe Island and for various consultations. Helpful colleagues B.Sc. Jonathan Ablett (BMNH), Maria L. Tavano (MSNG) and Dr. Ronald Janssen (SMF) are thanked for permission to work with type material and friendly help with preparing some photographs. Dr. Dmitry Telnov (The Entomological Society of Latvia, Riga) is thanked for help with preparing the manuscript and M.Sc. Darren J. Mann (Oxford University Museum of Natural History, U.K.) for help with English corrections.

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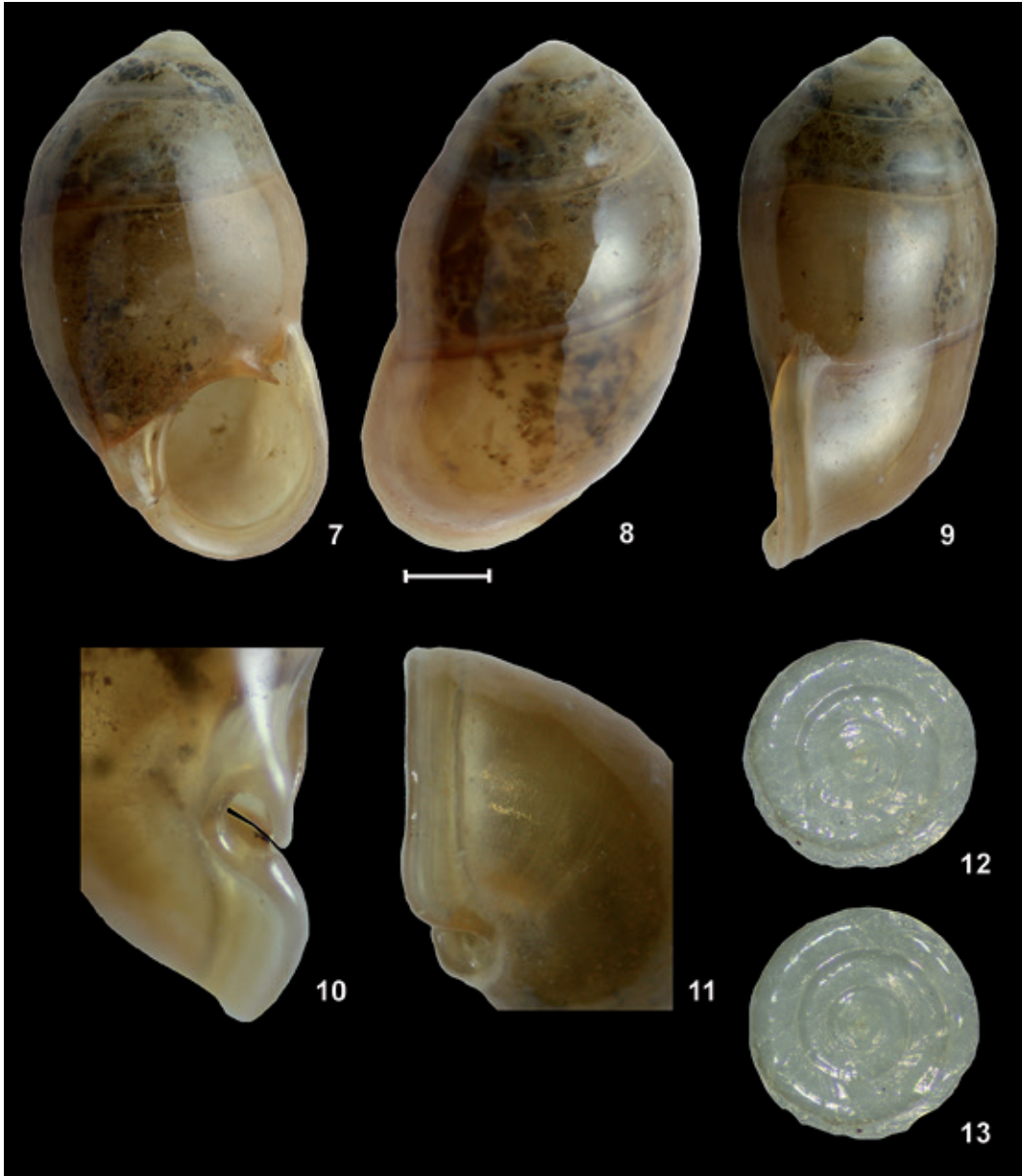
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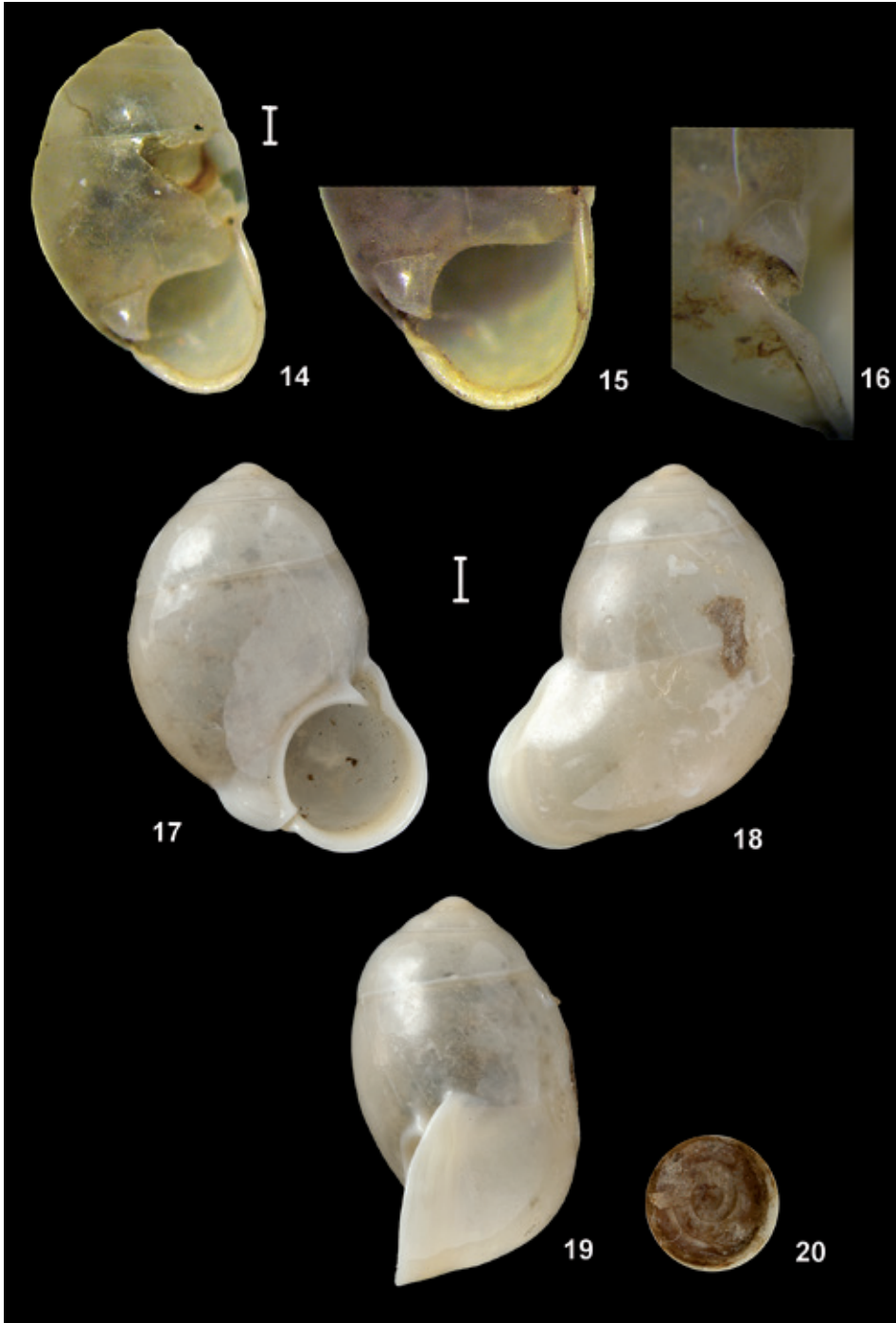
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Figures 1-6. *Aphanoconia aprica* sp. nov., holotype NME: 1 - shell, top view; 2 - bottom view; 3 - lateral view with aperture; 4 - lateral view, different position; 5 - operculum, externally; 6 - operculum, internally. Scale bar: 1 mm.



Figures 7-13. *Pupina laszlowagneri* sp. nov., holotype NME: 7 - shell, lateral view with aperture; 8 - back view; 9 - lateral view, different position; 10 - columellar margin of aperture with canal opening; 11 - bottom view; 12 - operculum, externally; 13 - operculum, internally. Scale bar: 1 mm for figures 7-11.



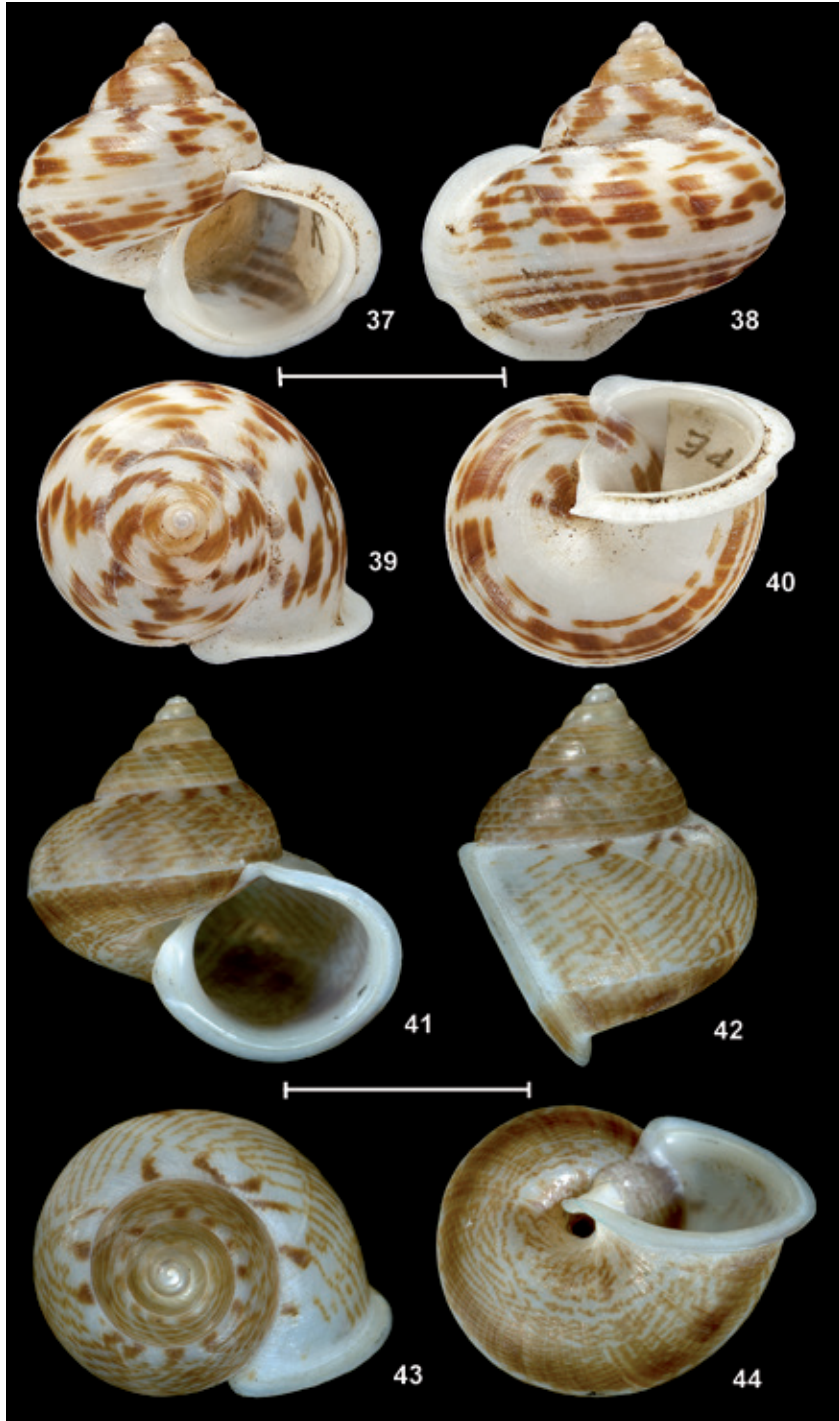
Figures 14–16. *Pupina speculum* Tapparone Canefri, 1883, holotype MSNG: 14 – shell, lateral view with aperture (Scale bar: 1 mm); 15 – aperture (strong magnification); 16 – columellar margin of aperture with canal opening (strong magnification) (photo: M. Tavano, MSNG).
 Figures 17–20. *Pupina papuana* Smith, 1897, syntype BMNH: 17 – shell, lateral view with aperture; 18 – back view; 19 – lateral view, different position; 20 – operculum, externally (photo: J. Ablett, BMNH). Scale bar: 1 mm.



Figures 21–28. *Planispira kurri* (L.Pfeiffer, 1847), different specimens from Gebe Is., det. Fulton, BMNH: 21 – shell, top view; 22 – bottom view; 23 – lateral view with aperture; 24 – lateral view, different position; 25 – top view; 26 – bottom view; 27 – lateral view with aperture; 28 – lateral view, different position (photo: J. Ablett, BMNH). Scale bar: 1 cm.

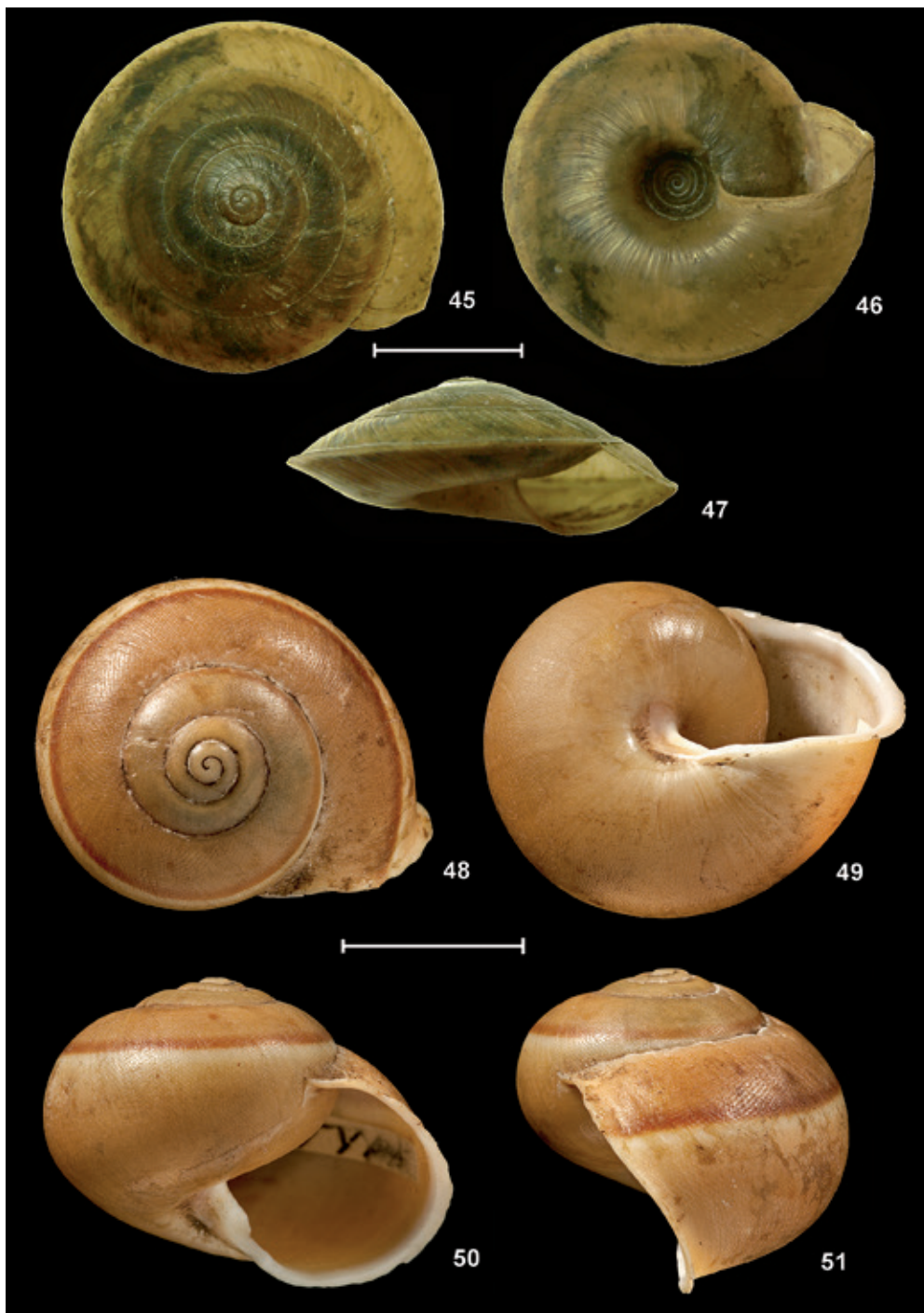


Figures 29–36. *Planispira gebiensis* Sykes, 1904: 29 – shell, top view (this and three next - holotype BMNH); 30 – bottom view; 31 – lateral view with aperture; 32 – lateral view, different position; 33 – top view (this and three next - syntype BMNH); 34 – bottom view; 35 – lateral view with aperture; 36 – lateral view, different position (photo: J. Ablett, BMNH). Scale bar: 1 cm.



Figures 37–40. *Leptopoma gebiensis* Fulton, 1904, syntype BMNH: 37 – shell, lateral view with aperture; 38 – back view; 39 – top view; 40 – bottom view (photo: J. Ablett, BMNH). Scale bar: 1 cm.

Figures 41–44. *Leptopoma halmahericum* B. Strubell, 1892, lectotype SMF: 41 – shell, lateral view with aperture; 42 – lateral view, different position; 43 – top view; 44 – bottom view (photo: R. Janssen, SMF). Scale bar: 1 cm.



Figures 45–47. *Videna hartmanni* (L. Pfeiffer, 1845), specimen from Gebe Is., between Kacepi and Umera: 45 – shell, top view; 46 – bottom view; 47 – lateral view with aperture. Scale bar: 1 cm.

Figures 48–51. *Albersia subsphaerica* Fulton, 1904, holotype BMNH: 48 – shell, top view; 49 – bottom view; 50 – lateral view with aperture; 51 – lateral view, different position (photo J. Ablett, BMNH). Scale bar: 1 cm.



Figures 52–55. *Papuina fallax* Fulton, 1904, holotype BMNH: 52 – shell, top view; 53 – bottom view; 54 – lateral view with aperture; 55 – lateral view, different position (photo: J. Ablett, BMNH). Scale bar: 1 cm.



Figures 56–59. *Papuina semibrunnea* Sykes, 1904, holotype BMNH: 56 – shell, top view; 57 – bottom view; 58 – lateral view with aperture; 59 – lateral view, different position (photo: J. Ablett, BMNH). Scale bar: 1 cm.

Figures 60–63. *Papuina unicolor* (L.Pfeiffer, 1845), specimen from Gebe Is.: 60 – shell, top view; 61 – bottom view; 62 – lateral view with aperture; 63 – lateral view, different position (photo: J. Ablett, BMNH). Scale bar: 1 cm.

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