

REVIEW OF *RHAPHAULUS* L. PFEIFFER 1856 AND *STREPTAULUS* BENSON 1857 SPECIES WITH DESCRIPTION OF *R. TONKINENSIS* N. SP. FROM VIETNAM (GASTROPODA: PUPINIDAE)

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Abstract A middle-sized pupinid species was recently discovered in Vietnam and described here as *Rhaphaulus tonkinensis* n. sp. Its shell is characterized by a thick, rather flat outer tube which turns downwards along the peristome margin. This new species represents the first record of the species from Vietnam. A checklist of *Rhaphaulus* and *Streptaulus* taxa, photos of most known species (mainly type specimens) and a comprehensive map are presented. The taxonomic position of the genus *Streptaulus* is discussed.

Key words Gastropoda, Cyclophoroidea, Pupininae, taxonomy, Vietnam.

INTRODUCTION

The systematics of the whole Cyclophoroidea Gray 1847 dates back to the monograph of Kobelt (1902) and is based on conchological characters only, including the morphology of the operculum. Information on the anatomy are comparatively rare in the literature, and are usually restricted to a few species per genus.

The family Pupinidae L. Pfeiffer 1853 is a group of the superfamily Cyclophoroidea, usually characterized by “pupoid” shell, and long bursa copulatrix (Tielecke, 1940). The approximately 20 genera of Pupinidae are widely distributed from south and east Asia to Melanesia, Micronesia and, mainly northern, Australia (see literature cited in Kongim *et al.*, 2013).

The pupinid genus *Rhaphaulus* L. Pfeiffer 1856 and its seemingly closest relative, *Streptaulus* Benson 1857 can be recognized by their middle-sized (8–19 mm) shell, thin operculum and a complete tube at the upper (=sutural, posterior) edge of the aperture. The shape and direction of the tube serves as primary distinguishing character between species within these genera. *Rhaphaulus* is distributed from north-eastern India through the Malay Peninsula to Borneo, whereas the area of *Streptaulus* restricted to north-eastern India. Nine species of these genera were described from north-eastern India (see Godwin-Austen,

1917), three species from northern Borneo (see Kobelt, 1902), whereas five species are known from the areas in between, namely southern Myanmar and Peninsular Malaysia (Theobald & Stoliczka, 1872; Smith, 1897; Sykes, 1903; see also the checklist). Recently an unknown species of the genus *Rhaphaulus* was collected in northern Vietnam, which is being described here. Shells (where available, types) of other *Rhaphaulus* and *Streptaulus* species were photographed and are published here.

MATERIAL AND METHODS

Comparative material We investigated the collection of the SMF and NHMUK for comparative (preferably type) material. Type specimens of the following species were found: *Rhaphaulus aborensis* Godwin-Austen 1917, *R. assamicus* Godwin-Austen 1886, *R. kuekenthali* Kobelt 1897, *R. lorraini* L. Pfeiffer 1856, *R. oakesi* Godwin-Austen 1917, *R. perakensis* E. A. Smith 1897, *R. shimangensis* Godwin-Austen 1917, *R. yamneyensis* Godwin-Austen 1917 and *Streptaulus luyorensis* Godwin-Austen 1917. The type specimen of *Streptaulus miriensis* Godwin-Austen 1917 had been destroyed before the description was published (see original description). The figured specimen of *R. chrysalis* (L. Pfeiffer 1852) (Fig. 11) is labelled as a type, but the locality on the label is “Siam” (Thailand), whereas in the original description

it is "Ava" (Mandalay Province, Myanmar). That specimen is similar to the one figured by Godwin-Austen (1882–1920), but it lacks the tube. The *Rhaphaulus pachysiphon* Theobald & Stoliczka 1872 specimen investigated by us is not the type specimen, but it was figured in the Mollusca of India (Godwin-Austen, 1882–1920: pl. 47, fig 3.), and it seems to be identical with the figure published in the original description. In the case of *Rhaphaulus ascendens* Sykes 1903, *R. bombycinus* (L. Pfeiffer 1855), *R. jalorensis* Sykes 1903, *R. pfeifferi* Issel 1874 and *R. ascendens* Sykes 1903 (synonym of *lorraini*) we were not able to locate the type specimens in those two museums, and had to rely on drawings published in the literature. Although the type of *Streptaulus blanfordi* Benson 1857 has not been found, the species is represented by several samples in those museum collections.

Abbreviations HA, private collection of András Hunyadi, Budapest; HNHM, Hungarian Natural History Museum, Budapest; NHMUK: The Natural History Museum (London, UK); SH, private collection of Steve Hubrecht, Heverlee, Belgium, SMF: Senckenberg Forschungsinstitut und Naturmuseum (Frankfurt am Main, Germany).

TAXONOMIC DESCRIPTIONS

Family PUPINIDAE L. Pfeiffer 1853

Subfamily Pupininae

Genus *Rhaphaulus* L. Pfeiffer 1856

Type species *Anaulus bombycinus* L. Pfeiffer 1855, by subsequent monotypy.

Remarks According to its original description (Benson, 1857), the genus *Streptaulus* (type species: *blanfordi* Benson 1857) has a long sutural tube (similar to that of *Alycaeus* Gray 1850), whereas *Rhaphaulus* has a short tube pointing upwards above the aperture or ending in a short upright tube. Kobelt (1902) also separated these two genera based on the morphology of the tube and mentioned other distinguishing shell characters, namely the shell sculpture (shiny in *Streptaulus* and ribbed with dark periostracum in *Rhaphaulus*) and the strength and formation of the apertural rim. Godwin-Austen (1886) has not distinguished the two genera arguing that the animals (=bodies) do not differ and the difference

between the two genera rests on a single shell character (long sutural tube) which varies even in the same species (*blanfordi*), being sometimes upright ("var. *intubus*"), and sometimes directed downwards ("var. *tortuosus*"). In a later publication (Godwin-Austen, 1917) however, he used the name *Streptaulus* for two new species, namely *luyorensis* and *miriensis*, stating that the long sutural tube is a good distinguishing character between the two genera. Gude (1921) has not separated *Rhaphaulus* and *Streptaulus*, using the argument of Godwin-Austen (1886).

The evaluation of the morphology of the tube from a taxonomic point of view is difficult because although the differences are indeed clear (*Streptaulus* has a very long tube attached to the suture with minor perforations, whereas the tube of *Rhaphaulus* is not perforated and although in some species points backwards, never runs strictly along the suture), not much information is known concerning the formation of upwards and downwards pointing tube in *S. blanfordi*. We believe that those exceptional tubes may be the result of "abnormal" growth resulting in teratological specimens. Concerning the morphology of the apertural lip, we have not found notable differences between the two genera. The taxonomic importance of the shiny shell surface is also questionable. *Streptaulus* species indeed have shiny shells, whereas most *Rhaphaulus* have a matt, ribbed surface. On the other hand, for example, *R. kuekenthali* (Fig. 10) also possesses a relatively shiny shell, which does not support the usefulness of this character.

One may find differences between the general shell shapes of the two genera. In *Rhaphaulus* the penultimate whorl dominates the shell, being almost as wide as the upper whorls (observed from apertural view) combined, and the aperture is shifted to the right side of the shell, whereas it seems that in *Streptaulus* the whorls increase in size more regularly and the aperture is not much shifted to the edge of the shell. These morphological characters do, however, show clinal variation across *Streptaulus* and *Rhaphaulus*.

In face of the failure to find shell characters which would support the separate identity of *Streptaulus*, we here distinguish the two genera based on the tube morphology, but conceding that more research is necessary to show the reciprocal monophyly of *Streptaulus* and *Rhaphaulus*.

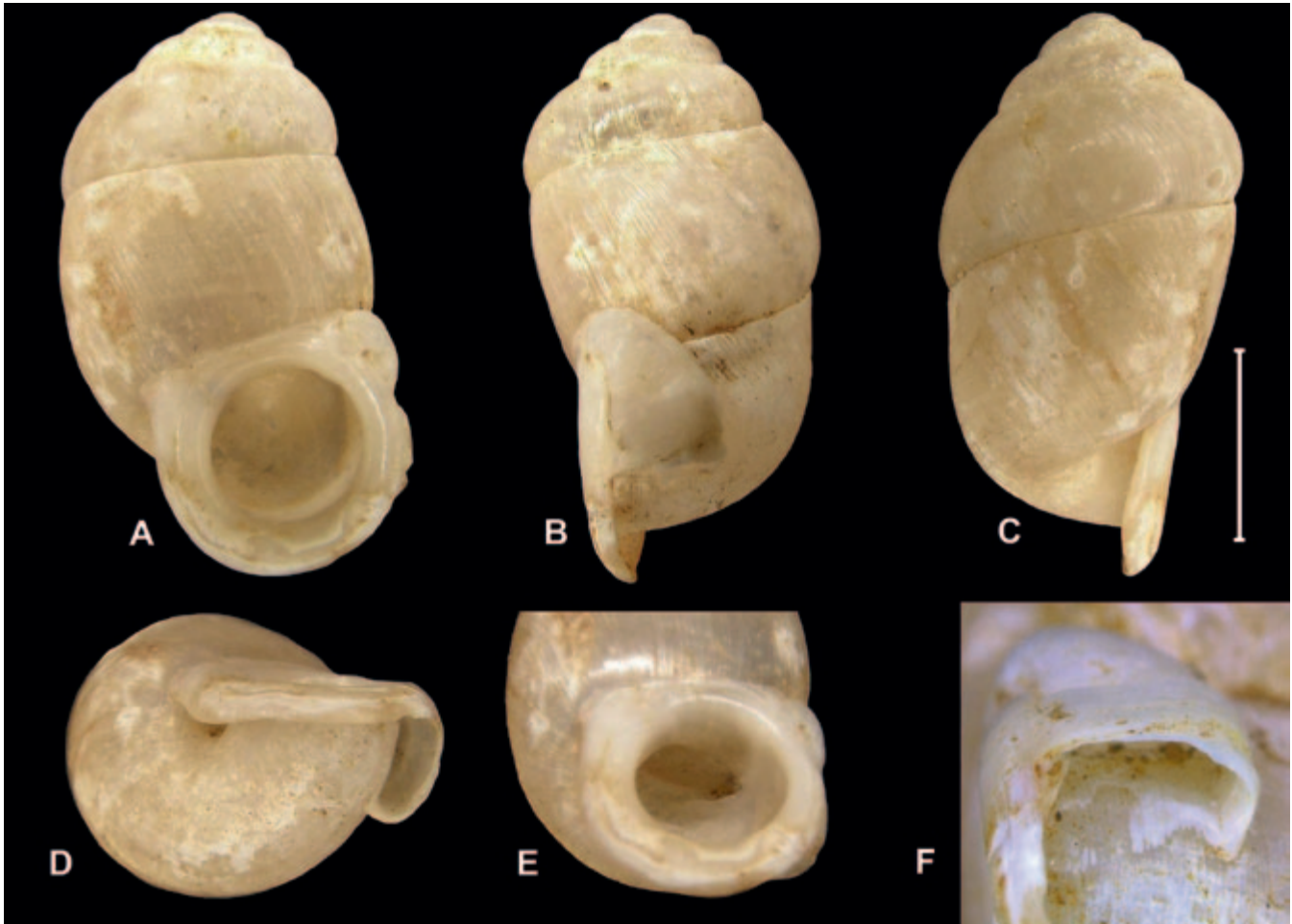


Figure 1 *R. tonkinensis* n. sp. Vietnam, Sơn La Prov., Hà Nội 156 km towards Mộc Châu, left side of the road nr. 6, rocky wall, 1110 m, 20°45.993'N, 104°53.868'E, leg. Hunyadi, A., 06.11.2012, HNHM 98757, holotype; Figs 1A–1E: holotype from different views, Fig 1F: terminal part of the tube of *R. tonkinensis* n. sp. Scale represents 5 mm (refers to Figs 1A–E).

Rhaphaulus tonkinensis n. sp.
Fig. 1

Holotype 1 sh, Vietnam, Sơn La Prov., Hà Nội 156 km towards Mộc Châu, left side of the road nr. 6, rocky wall, 1110 m, 20°45.993'N, 104°53.868'E, leg. Hunyadi, A., 06 xi 2012, HNHM 98757.

Paratypes Vietnam, Sơn La Prov., Hà Nội 156 km towards Mộc Châu, left side of the road nr. 6, rocky wall, 1110 m, 20°45.993'N, 104°53.868'E, leg. Hunyadi, A., 06.11.2012, HA (1 shell); Vietnam, Thanh Hóa Prov., Pu Luong N. P., surroundings of village Am, 20°28.185'N, 105°13.309'E, collected by local people, 05.10.2010, excoll Hemmen, SH (2 shells);

Type locality Vietnam, Sơn La Prov., Hà Nội 156 km towards Mộc Châu, left side of the

road nr. 6, rocky wall, 1110 m, 20°45.993'N, 104°53.868'E.

Measurements Shell height: 14.2–15.0 mm, shell width: 8.2–9.3 mm (n=2).

Diagnosis A medium-sized *Rhaphaulus* species with thick, flat tube which turns sharply downwards along the apertural margin, extending to nearly the total height of the last whorl. The tube is attached to the peristome lip.

Description Shell brownish-corneous or whitish, elongate cylindrical, with somewhat pointed apex. Frontal surface of the penultimate whorl flattened. The 4.5–4.75 whorls separated by moderately deep suture. Shell surface characterized by rather regular, inconspicuous growth lines. Growth lines about two times denser on



Figures 2–8 Shells of *Streptaulus* Benson 1857 and *Rhaphaulus* L. Pfeiffer 1856 species. Fig. 2. *S. blanfordi* Benson 1857, Vorderindien: Darjiling, coll. Möllendorff, SMF 109859; Fig. 3. *S. luyorensis* Godwin-Austen 1917, Luyor, Abor Hills, leg. Capt. Oakes, NHMUK 1903.7.1.3360, Syntype; Fig. 4. *R. aborensis* Godwin-Austen 1917, Abor Hills, leg. Capt. Oakes, NHMUK 1903.7.1.3080, syntype; Fig. 5. *R. oakesi* Godwin-Austen 1917, Abor Hills, leg. Capt. Oakes, NHMUK 1903.7.1.3276, syntype; Fig. 6. *R. shimangensis* Godwin-Austen 1917, India, Abor Hills, Shimang Valley, leg. Oakes, NHMUK 1903.7.1.3148, syntype; Fig. 7. *R. yamneyensis* Godwin-Austen 1917, Abor, Yamne Valley, leg. Oakes, NHMUK 1903.7.1.3129, holotype; Fig. 8. *R. assamicus* Godwin-Austen 1886, Assam, Brahmakund, NHMUK 1903.7.1.3074, syntype. Scale represents 5 mm.

last whorl than on penultimate whorl. Peristome simple but very much thickened and expanded. Slit-like umbilicus not visible from apertural view of shell due to thickened peristome.

Outer tube turned down sharply along apertural margin, extending to nearly total height of last whorl. Tube tapers towards end and has slight incision around middle section. Consists of three parts: (1) expanded and reflected palatal side of peristome covered with thin lime layer; (2) body whorl with thin lime layer (see Fig. 1E); (3) tube covering other two parts. Whole tube attached to reflexed peristome lip, although a shallow suture visible between peristome and tube. In holotype, suture disappears at middle part of palatal peristome, at the end of tube (i.e. tube and peristome are truly fused). Paratypes differ in that sutures are continuous until the end of tubes.

“Peristomal tube” (“tube” inside aperture) not a tube in the strict sense, only a sharp arc visible which runs parallel with upper suture. The arc and initial part of tube (visible inside aperture) are about quarter of a whorl long together. Tube opens at end of arc.

Operculum unknown.

Derivation of name The species is named after the distribution area (Tonkin=northern Vietnam).

Geographic range The new species is known from two localities in Sơn La and Thanh Hóa provinces, approximately 45 km from each other. This is the first record of the genus from Vietnam.

Comparisons The tube of all other *Rhaphaulus* species has a round transverse section, whereas in the case of the new species the transverse section of the tube is more than two times longer than it is high. *Rhaphaulus lorraini* (Fig. 9), *R. perakensis* (Fig. 12) and *R. jalorensis* have a shorter tube, less reflexed apertural lip and the aperture in these species is smaller in relation to the shell height than in the new species. *Rhaphaulus pachysiphon* (Fig. 13) has a more tumid, corpulent shell, thicker and wider apertural margin and its tube is also shorter and more slender, having a rounded transverse section. *Rhaphaulus assamicus* (Fig. 8) is larger and a bit more slender in shape, with a pointed apex. Its tube is slimmer than that of *R. tonkinensis* n. sp. Moreover, the apertural rim of *R. assamicus* is wider in the

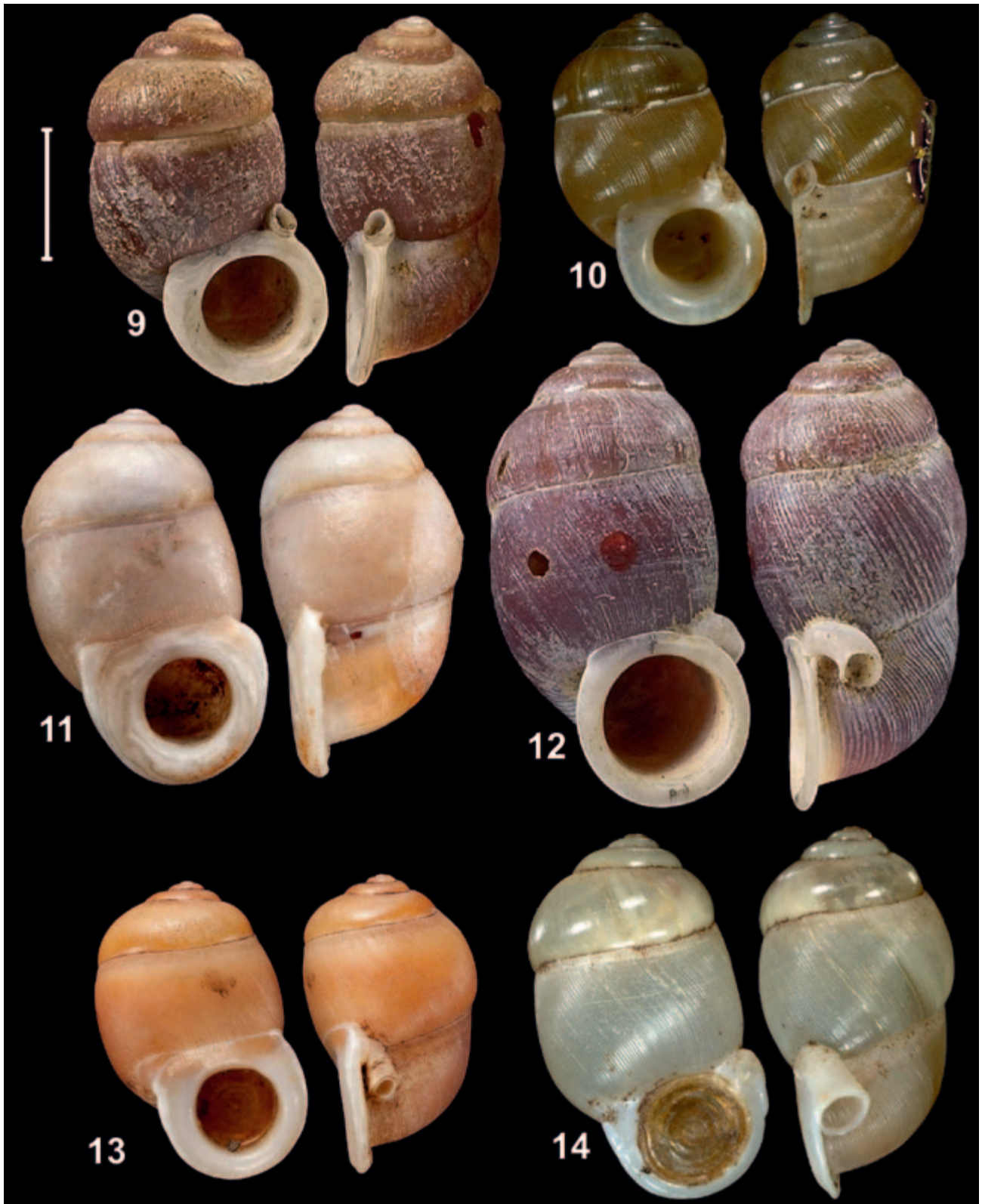
direction of the umbilicus. *Rhaphaulus chrysalis* is very similar in shape and size to the new species, but has a thicker apertural “plate”, smaller aperture in relation to the shell height and an upward turning short tube (missing in the figured shell, Fig. 11). Teratological specimens of *Streptaulus blanfordi* (“*S. blanfordi* var. *tortuosus*”) are much smaller, have a shiny shell and have more slender tubes free from the apertural margin.

Remarks There is a discrepancy in the literature regarding the direction of the tube of *R. assamicus*, namely on the drawing of Godwin-Austen (1886; original description) it turns straight downwards along the peristome margin, whereas on the photo by the same author (Godwin-Austen, 1917) it is oblique, free from the apertural rim. A sample investigated by us (Miri Hills, coll. Godwin-Austen, NHMUK 1903.7.1.3426) contained a shell with a tube being attached to the peristome margin and another shell with a tube being free from it. In the type series of *R. assamicus* two shells had normal, straight tubes along the apertural margin, and one shell had the tube turning obliquely downwards, ending some distance from the apertural margin.

A single shell labelled *Rhaphaulus pachysiphon* (SMF 109824, Fig. 14) from the Attaram Valley is very similar to the new species, but has a wider umbilicus, more bulging and wider last whorl, relatively weaker apertural rim and its tube is also shorter and more slender, having a rounded transverse section. More investigation is needed to shed light on the identity of that specimen.

CONCLUSIONS

Geographically distant populations of the genus *Rhaphaulus* having differences in shell characters are usually believed to represent distinct species. Here, a Vietnamese population having a characteristic, very wide and flat, long tube running along the apertural margin is described as a new species. However, the taxonomy of the genus *Rhaphaulus* is far from being well resolved. Species of the genus are rare in nature and therefore they are usually represented in collections by very few shells per locality. As a result, our knowledge on interspecific variability and species delimitation based on conchological characters is limited. Future research should focus on the genus by putting more effort into collecting



Figures 9–14 Shells of *Raphaulus* L. Pfeiffer 1856 species. Fig. 9. *R. lorraini* L. Pfeiffer 1856, Pulo Penang, NHMUK 20130454, holotype; Fig. 10. *R. kuekenthali* Kobelt 1897, Borneo, Baram-gebiet, leg Küenthal, coll. Kobelt, SMF 109823, holotype; Fig. 11. *R. chrysalis* (L. Pfeiffer 1852), Siam, NHMUK 2013.04.16; Fig. 12. *R. perakensis* E. A. Smith 1897, Larut, Perak, NHMUK 1897.3.15.41–2, holotype; Fig. 13. *R. pachysiphon* Theobald & Stoliczka 1872 Malmein, NHMUK 1903.7.1.3072; Fig. 14. *Raphaulus* sp., Vorderindien: Attaram Valley, SMF 109824. Scale represents 5 mm.

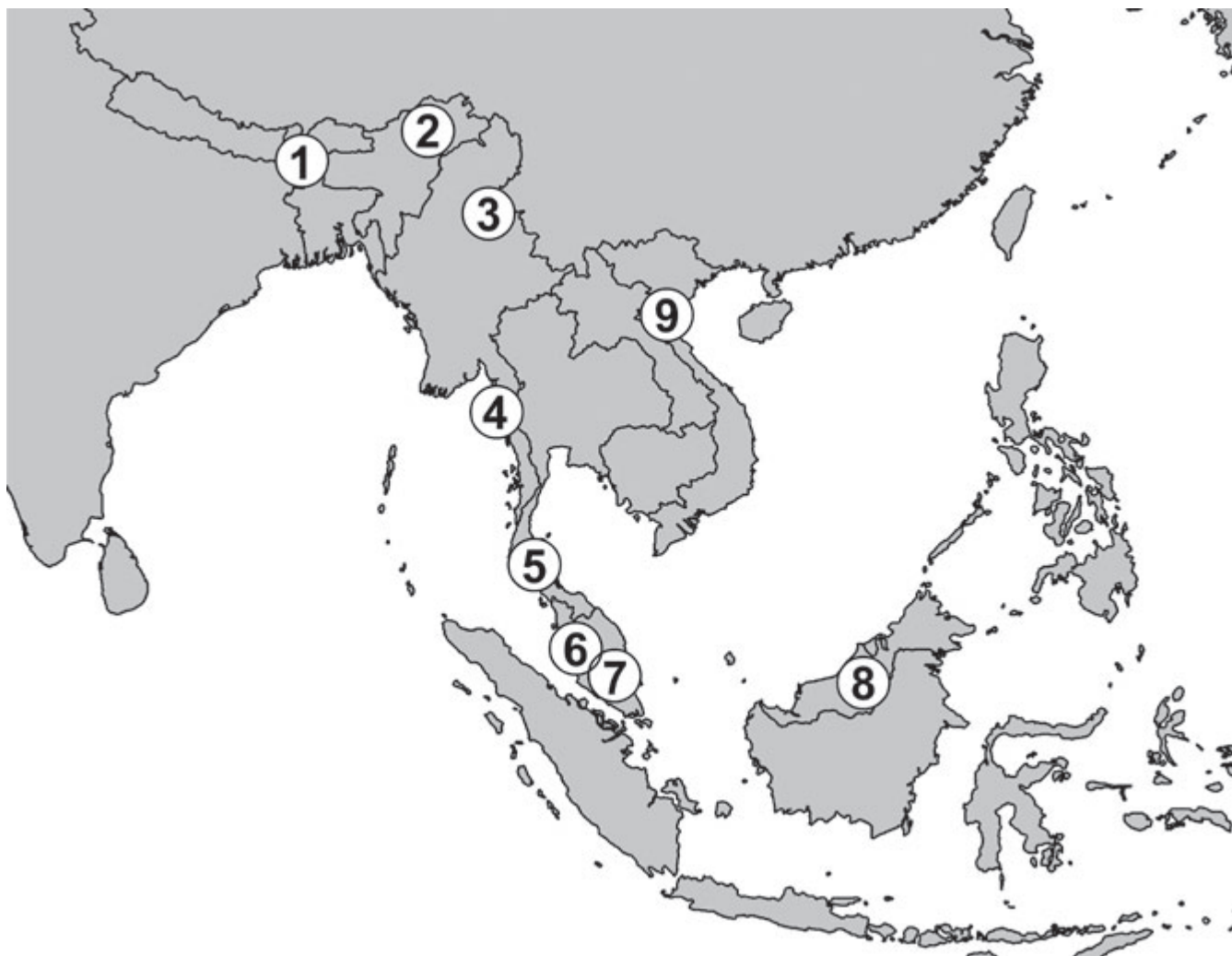


Figure 15 Approximate geographic position of the type localities of the genus *Rhabphaulus* L. Pfeiffer 1856. Legends: 1: *blanfordi*; 2: *aborensis*, *assamicus*, *luyorensis*, *miriensis*, *oakesi*, *shimangensis*, *yamneyensis*; 3: *chrysalis*; 4: *pachysiphon*; 5: *ascendens* [synonym of *lorraini*]; 6: *perakensis*; 7: *jalorensis*, *lorraini*; 8: *bombycinus*, *kuekenthali*, *pfeifferi*; 9: *tonkinensis* n. sp.

in terms of number of samples and number of individuals per site.

The genus *Rhabphaulus* is widely distributed in south-east Asia (from north-eastern India to Borneo), but the number of species is relatively low, to our knowledge being fourteen (see list below). The distribution of the genus *Rhabphaulus* (Fig. 15) resembles an “empty circle”. Two species were reported from southern Thailand (see Hemmen & Hemmen, 2001), but no *Rhabphaulus* are known from a large area within this circle (northern Thailand, Cambodia and Laos). The distribution of the hitherto known species suggests that *Rhabphaulus* species may be found in northern Thailand, Cambodia, Southern Vietnam and Laos.

Widely distributed genera are not unusual within the family Pupinidae (*Pupina*, *Pupinella*, *Pseudopomatias*, etc.; see Kobelt, 1902). Similar distribution patterns can be seen in the genus *Schistoloma* (including *Pinteria* Varga 1972), which is distributed from the Himalayas to the Philippines (Kobelt, 1902; Tumpeesuwan & Panha, 2008).

CHECKLIST OF *RHAPHAULUS* AND *STREPTAULUS* TAXA

Rhabphaulus aborensis Godwin-Austen 1917
[north-eastern India, type locality: “Abor Hills”] (Fig. 4)

- Rhaphaulus ascendens* Sykes 1903 [western Malaysia, type locality: "Patalung"] (synonym of *R. lorraini* after Laidlaw, 1928)
- Rhaphaulus assamicus* Godwin-Austen 1886 [north-eastern India, type locality: "Brahmakhund"] (Fig. 8)
- Rhaphaulus bombycinus* (L. Pfeiffer 1855) [type locality: "Borneo, Sarawak"]
- Rhaphaulus chrysalis* (L. Pfeiffer 1852) [north-eastern India and Myanmar, type locality: "Ava"] (Fig. 11)
- Rhaphaulus jalorensis* Sykes 1903 [western Malaysia, type locality: "Bukit Bisar, on the borders of Jalor, altitude 2000 feet"] (described as *perakensis* var. *jalorensis*; possibly valid species according to Laidlaw 1928)
- Rhaphaulus kuekenthali* Kobelt, 1897 [Borneo, type locality: "ad fluvium Baram ins. Borneo septentrionalis"] (illustration in Kobelt 1898) (Fig. 10)
- Rhaphaulus lorraini* L. Pfeiffer 1856, [western Malaysia, type locality: "Pulo Penang"] (Fig. 9)
- Rhaphaulus oakesi* Godwin-Austen 1917 [north-eastern India, type locality: "Abor Hills"] (Fig. 5)
- Rhaphaulus perakensis* E. A. Smith 1897 [western Malaysia, type locality: "Maxwell's Hill, Larut, Perak"] (Fig. 12)
- Rhaphaulus pfeifferi* Issel 1874 [Borneo, type locality: "Territorio di Sarawak"]
- Rhaphaulus pachysiphon* Theobald & Stoliczka 1872 [southern Myanmar, type locality: "Prope Moulmain, valle Ataran fluminis"] (Fig. 13)
- Rhaphaulus shimangensis* Godwin-Austen 1917 [north-eastern India, Type locality: "Shimang Valley"] (Fig. 6)
- Rhaphaulus yamneyensis* Godwin-Austen 1917 [north-eastern India, type locality: "Yamne Valley"] (Fig. 7)
- Streptaulus blanfordi* Benson 1857 [north-eastern India, type locality: "prope Darjiling, in montibus Himalayanis Sikkimensibus"] (Fig. 2)
- Streptaulus luyorensis* Godwin-Austen 1917 [north-eastern India, type locality: "Luyor Valley"] (Fig. 3)
- Streptaulus miriensis* Godwin-Austen 1917 [north-eastern India, type locality: "Miri Hills"]

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LITERATURE

- BENSON WH 1857 Characters of *Streptaulus* a new genus and several species of the *Cyclostomacea* from Sikkim, the Khasi Hills Ava and Pegu. *Annals and Magazine of Natural History Series 2* 19: 201–211.
- GODWIN-AUSTEN HH 1882–1920 *Land and freshwater Mollusca of India, including South Arabia, Baluchistan, Afghanistan, Kashmir, Nepal, Burma, Pegu, Tenasserim, Malaya Peninsula, Ceylon and other islands of the Indian Ocean; Supplementary to Masers Theobald and Hanley's Conchologica Indica*. Taylor and Francis, London. VI+257+442+65 pp., 165 pls.
- GODWIN-AUSTEN HH 1917 Zoological results of the Abor Expedition, 1911–12. XLVII Mollusca, VII. Cyclophoridae (in part). *Records of the Indian Museum* 8: 493–580.
- GUDE GK 1921 *The Fauna of British India including Ceylon and Burma. Mollusca.—III. Land operculates (Cyclophoridae, Truncatellidae, Assimineidae, Helicinidae)*. Taylor and Francis, London. 386 pp.
- HEMMEN J & HEMMEN C 2001 Aktualisierte Liste der terrestrischen Gastropoden Thailands. *Schriften zur Malakozoologie* 18: 35–70.
- ISSEL A 1874 Molluschi Borneensi. Illustrazione delle specie terrestri e d'acqua dolce raccolte nell'isola di Borneo. Dai Signori G. Doria e O. Beccari. *Annali del Museo civico di storia naturale di Genova, Series* 16: 366–486.
- KOBELT W 1897 Diagnosen neuer Arten aus Kükenthals Ausbeute. *Nachrichtsblatt der Deutschen Malakozoologischen Gesellschaft* 29 (3/4): 25–28.
- KOBELT W 1898 Land- und Süßwasserkonchylien In Kükenthal W Ergebnisse einer Zoologischen Forschungsreise in der Molukken und Borneo, Zweiter Teil: Wissenschaftliche Reiseergebnisse, Band 2. *Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft* 24 (1): 19–92.
- KOBELT W 1902 *Das Tierreich. Mollusca: Cyclophoridae*. R. Friedländer und Sohn, Berlin. 662 pp.
- KONGIM B, SUTCHARIT C, NAGGS F & PANHA S 2013 Taxonomic revision of the Elephant Pupinid snail genus *Pollicaria* Gould, 1856 (Prosobranchia, Pupinidae). *ZooKeys* 287: 19–40.

- LAIDLAW FF 1928 A list of the land and fresh-water Mollusca of the Malay peninsula with notes. *The Journal of the Malaysian Branch of the Royal Asiatic Society* **6**: 25–37
- PFEIFFER L 1852 Description of eighteen new species of land shells, from the collection of H. Cuming, Esq. *Proceedings of the Zoological Society of London* **20**: 83–87.
- PFEIFFER L 1854–1860 *Novitates Conchologicae. Series prima. Mollusca extramarina. Beschreibung und Abbildung neuer oder kritischer Land- und Süßwasser-Mollusken. (Mit Einschluss der Auriculaceen)*. Th. Fischer, Cassel. 138 pp.
- PFEIFFER L 1855 Descriptions of a new genus and twenty-three new species of *Pneumonopoma*, from the collection of H. Cuming, Esq. *Proceedings of the Zoological Society of London* **23**: 101–106.
- PFEIFFER L 1856 Descriptions of twenty-five new species of land-shells, from the collection of H. Cuming, Esq. *Proceedings of the Zoological Society of London* **24**: 32–36.
- SMITH EA 1898 Description of *Rhapaulus perakensis*, n. sp., with a list of the known species of the genus. *Proceedings of the Malacological Society of London* **3** (1): 17–19.
- SYKES ER 1903 On the land operculate Mollusca collected during the “Skeat Expedition” to the Malay Peninsula in 1899–1900. *Proceedings of the Zoological Society of London* **1903**(1): 194–199.
- THEOBALD W & STOLICZKA F 1872 Notes on Barmese and Arakanese land shells, with descriptions of a few species. *Journal of the Asiatic Society of Bengal* **41**(2): 329–334.
- TIELECKE H 1940 Anatomie, Phylogenie und Tiergeographie der Cyclophoriden. *Archiv für Naturgeschichte* **9**: 317–371.
- TUMPEESUWAN S & PANHA S 2008 First Record of the Genus *Schistoloma* Kobelt, 1902 (Prosobranchia: Pupinidae) in Thailand. *The Natural History Journal of Chulalongkorn University* **8**(1): 65–67.
- VARGA A 1972 Neue Schnecken-Arten aus Vietnam (Gastropoda, Cyclophoridae) *Annales Historico-Naturales Musei Nationalis Hungarici* **64**: 133–137.

