



## Revision of the Alycaeidae of China, Laos and Vietnam (Gastropoda: Cyclophoroidea) II: The genera *Alycaeus* and *Pincerna*

BARNA PÁLL-GERGELY

Centre for Agricultural Research, Plant Protection Institute, Eötvös Loránd Research Network, H-1022 Budapest, Herman Ottó út 15, Hungary. [pallgergely2@gmail.com](mailto:pallgergely2@gmail.com); <https://orcid.org/0000-0002-6167-7221>

### Abstract

This is the second part of the revision of Chinese, Lao and Vietnamese Alycaeidae (superfamily Cyclophoroidea), and covers the genera *Alycaeus* and *Pincerna*. Three new species are described: *Alycaeus goliath* Páll-Gergely, **n. sp.** (central Laos), *Pincerna acroptychia* **n. sp.** (Ha Giang Province, northern Vietnam), *Pincerna viginticostatus* **n. sp.** (Lang Son Province, northern Vietnam). *Pincerna vallis* Z.-Y. Chen & M. Wu, 2020 is treated as a junior synonym of *Pincerna costulosus* (Bavay & Dautzenberg, 1912), and *Pincerna clausus* D. S. Do & T. S. Nguyen, 2022 as a synonym of *Pincerna vanbuensis* (Bavay & Dautzenberg, 1900).

**Key words:** taxonomy, systematics, distribution, Southeast Asia, new species

### Introduction

The Alycaeidae include the Madagascan endemic *Boucardicus* Fischer-Piette & Bedoucha, 1965 with nearly 200 species and subspecies (Emberton 2002, Balashov & Griffiths 2015), and 436 Asian species, which are currently classified into 9 genus-group taxa (Páll-Gergely *et al.* 2020, 2021; Jirapatrasilp *et al.* 2021; MolluscaBase eds. 2022). All Asian species, with the exception of the genus *Laotia* Saurin, 1953 (see Páll-Gergely & Hunyadi 2021), are characterized by a sutural tube, which is closed at its posterior end and is in contact with several perpendicular, very narrow breathing tunnels, starting in the umbilicus (Páll-Gergely *et al.*, 2016). The Asian Alycaeidae inhabit a huge area from western India through the Himalaya to Japan in the east, Korea in the north and Indonesia to the south (Godwin-Austen 1882–1920; van Benthem Jutting 1948, 1959; Minato 1988; Páll-Gergely *et al.* 2020). The centres of the diversity, inferred from the number of genera, are the southeastern Himalaya, northern Vietnam/southern China, and peninsular Malaysia/Sumatra (Páll-Gergely *et al.* 2020).

A revision of the genera *Dicharax* Kobelt & Möllendorff, 1900 and *Metalycaeus* Pilsbry, 1900 of China, Laos and Vietnam was published recently by Páll-Gergely *et al.* (2017). This paper revises the genera *Alycaeus* Baird, 1850 and *Pincerna* Preston, 1907 of the same geographic area.

### Materials and methods

The exact descriptions of locations are given from province to village. The Chinese geographic names are presented in pinyin without tone numbers. The maps were made using Google Earth Pro.

The counting of the shell whorls (to the closest 0.25 whorl) follows Kerney & Cameron (1979: 13). Differences in size are (largest measurements of a shell) indicated in the diagnosis using the following terms: small (3–4 mm), medium-sized (4–6 mm), large (6–8 mm), very large (8–13 mm), exceptionally large (larger than 13 mm).

The sculpture of the body whorl along the sutural tube is always different from that of the other regions of the shell (Godwin-Austen 1882–1920), which is due to the breathing tunnels which run to the sutural tube (Páll-Gergely *et al.* 2016). Therefore, three regions of the teleoconch are distinguished following Páll-Gergely *et al.* (2017: fig. 1A, B): Region 1 (R1)—ranges from the beginning of the teleoconch to the beginning of the differently ribbed

region where the sutural tube lies; Region 2 (R2)—extends from the differently ribbed area to the constriction; and Region 3 (R3)—ranges from the constriction to the peristome.

### Abbreviations:

D: shell width (diameter)

H: shell height

HA: Collection András Hunyadi (Budapest, Hungary)

HE: Collection Christa Hemmen (Wiesbaden, Germany)

JG: Collection Jozef Grego (Banská Bystrica, Slovakia)

MNHN: Muséum National d'Histoire Naturelle (Paris, France)

NHM: The Natural History Museum (London, UK)

NHMUK: When citing NHM registered specimens

OK: Collection Kenji Ohara, (Nishinomiya, Japan)

PGB: Collection B. Páll-Gergely (Mosonmagyaróvár, Hungary)

RBINS: Royal Belgian Institute of Natural Sciences (Brussels, Belgium)

SMF: Senckenberg Forschungsinstitut und Naturmuseum (Frankfurt am Main, Germany)

VNMN: Vietnam National Museum of Nature (Hanoi, Vietnam)

## Taxonomy and Systematics

### Family Alycaecidae W.T. Blanford, 1864

Alycaecinae Blanford, 1864: 465.

Alycaecinae—Godwin-Austen (subfamily of Cyclophoridae), 1886: 186; Bouchet & Rocroi, 2005: 23, 248; Bouchet *et al.* 28, 340.

Alycaecidae—Kobelt & Möllendorff, 1897: 146; Egorov, 2013: 33; Páll-Gergely *et al.* 2020: 28.

### Genus *Alycaeus* Baird, 1850

*Alycaeus* Baird, 1850: 27.

*Alycaeus*—Páll-Gergely *et al.* 2020: 28.

**Type species.** *Cyclostoma gibbum* Eydoux, 1838 (non *Cyclostoma gibbum* Draparnaud, 1805) (*Alycaeus eydouxi* Venmans, 1956 is a replacement name), subsequent designation by Nevill (1878).

**Remarks.** The grammatical gender is masculine.

### *Alycaeus eydouxi* Venmans, 1956

(Figs 1E–H, 2B, E, 3A, B)

*Cyclostoma gibbum* Eydoux, 1838: 6, pl. 117, fig 1.

*Alycaeus (Alycaeus) gibbus*—Kobelt, 1902: 344–345.

*Alycaeus (Orthalycaeus) gibbus*—Godwin-Austen, 1914 (in 1882–1920): 427, pl. 156, figs 5, 5a.

*Alycaeus eydouxi* Venmans, 1956: 87, figs 6–7 (radula).

*Alycaeus eydouxi*—Egorov, 2013: fig. 58a; Páll-Gergely *et al.*, 2017: 9: fig. 3A; Páll-Gergely *et al.*, 2020: 30 figs 2A, 6A, 8.

**Type material.** Not investigated.

**Additional material examined.** VIETNAM: Annam, Touranne, leg. Fruhstorfer, coll. Möllendorff, SMF 109290/5 (Fig. 1E–H); Da Nang, Marble Mountain, collected by the NHM 2008 Vietnam Expedition, collection code: V142, 26 May 2008, NHMUK (several specimens in ethanol, Fig. 2B, E, 3A, B).

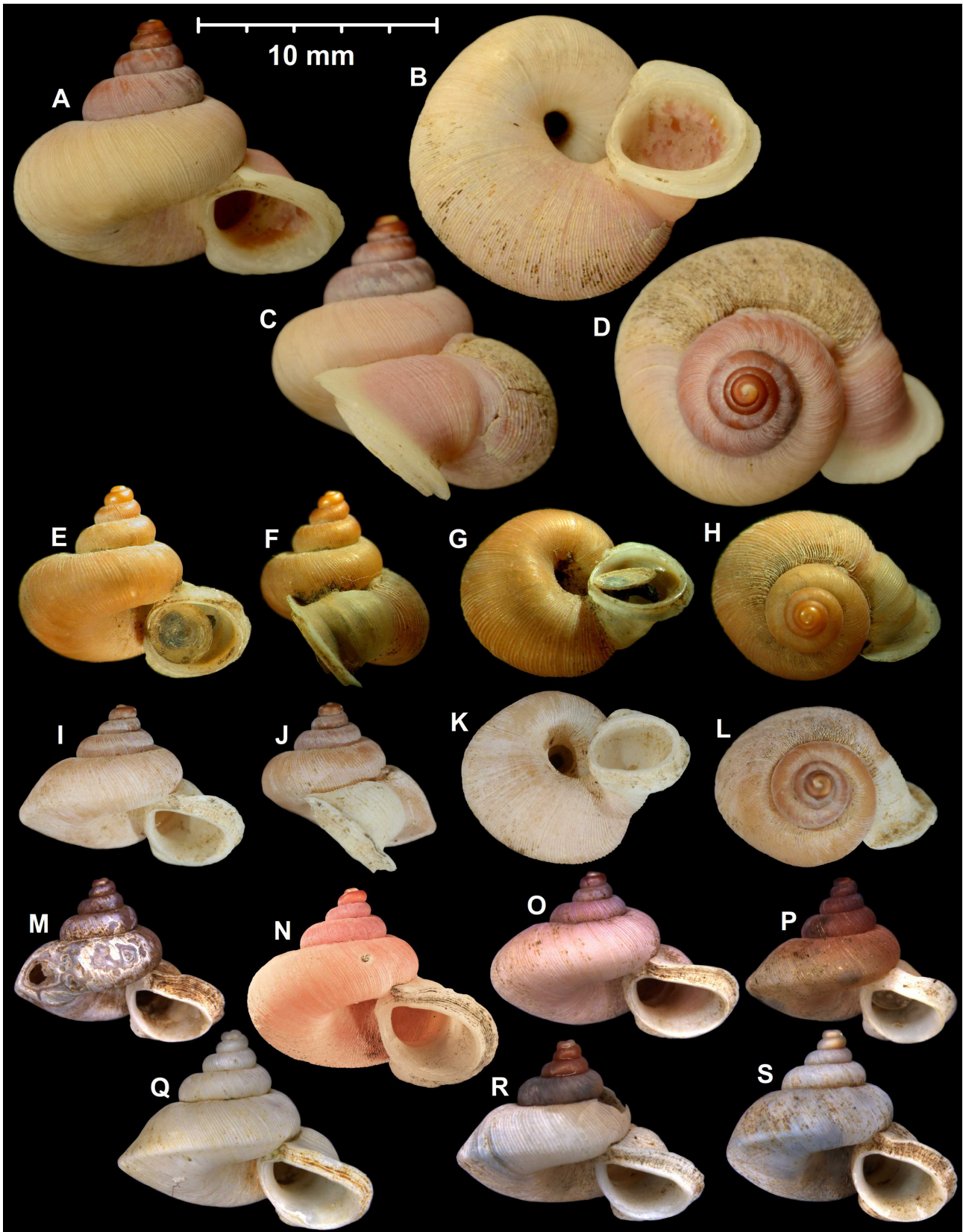
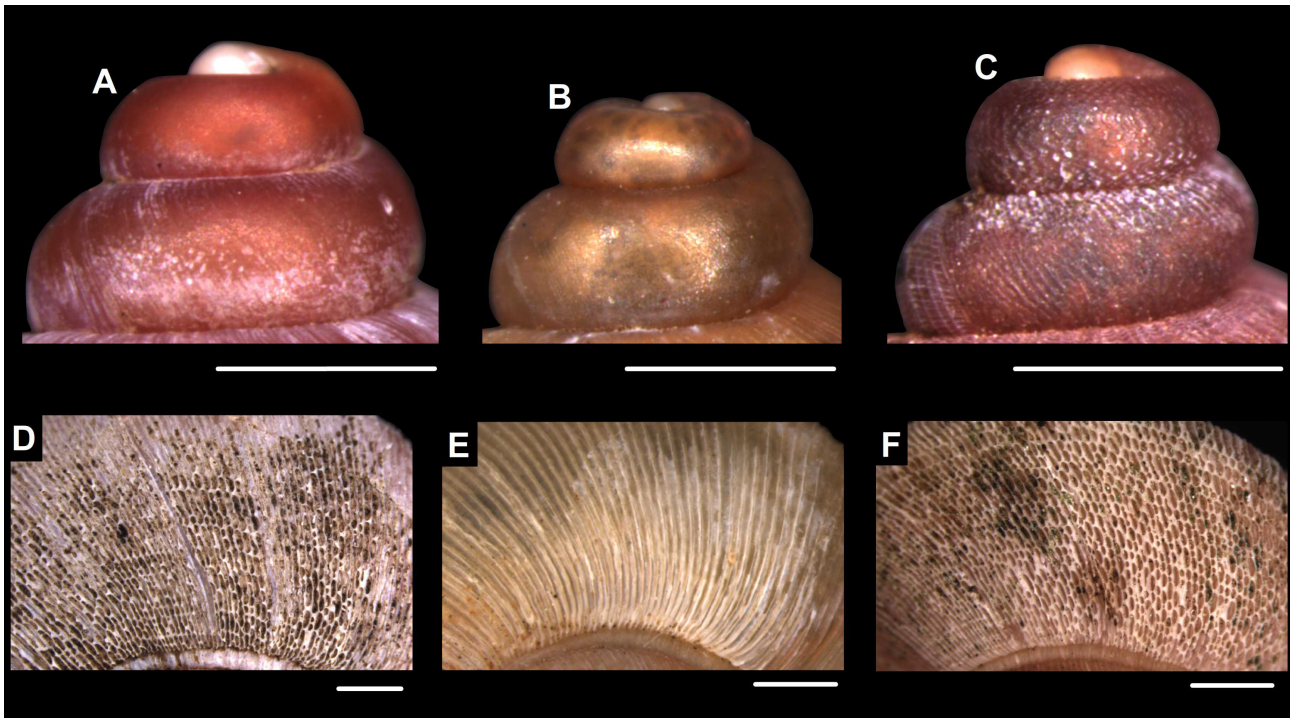
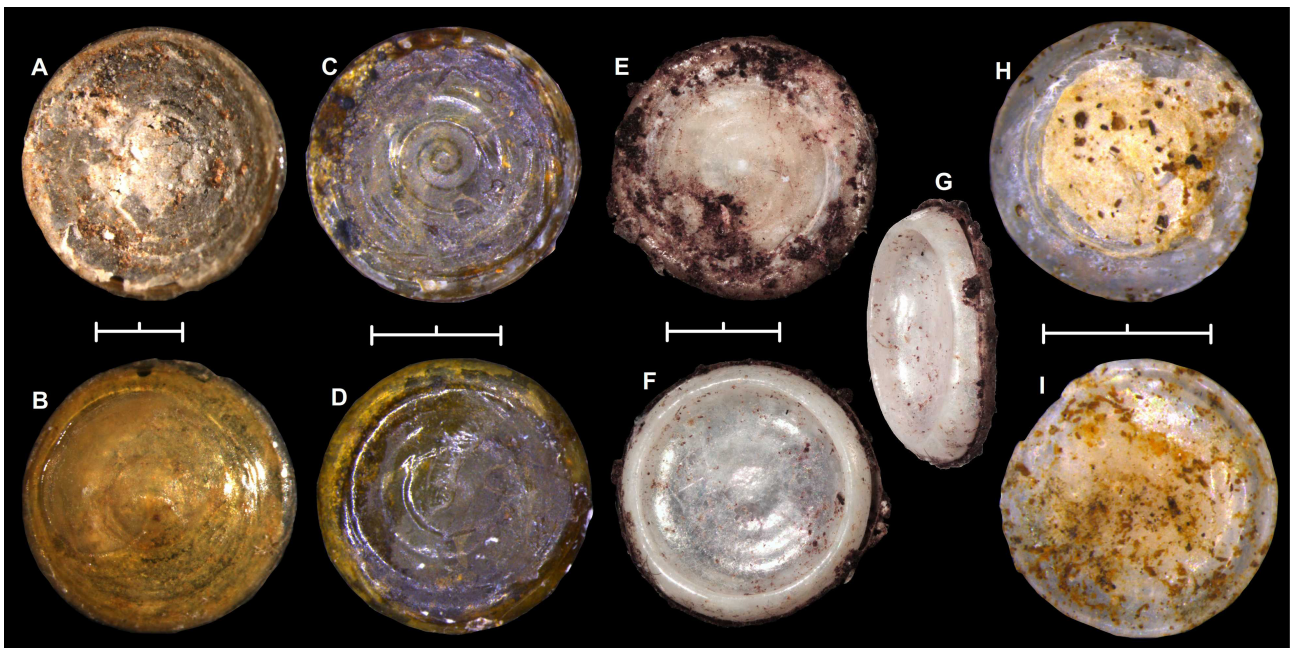


FIGURE 1. Shells of *Alycaeus* Baird, 1850 species. A–D: *Alycaeus goliath* n. sp. (holotype); E–H: *Alycaeus eydouxi* Venmans, 1956 (SMF 109290); I–L: *Alycaeus rolfbrandti* Maassen, 2006. I–L: SMF 262540 = part of the original sample, M: 25L07, N: 2019/95 (syntopic with *A. goliath* n. sp.); O: 7L07, P: 6L07, Q: 9L07, R: 11L07, S: 12L07. All photos: B. Páll-Gergely.



**FIGURE 2.** Protoconch (A–C) and R2 ribs (D–F) of *Alycaeus* Baird, 1850 species. A and D: *Alycaeus goliath* n. sp. (holotype); B and E: *Alycaeus eydouxi* Venmans, 1956 (Cochinchina, coll. V.W. MaAndrew, NHMUK); C and F: *Alycaeus rolfbrandti* Maassen, 2006 (6L07p). All photos: B. Páll-Gergely. Scales represent 1 mm.



**FIGURE 3.** Opercula of *Alycaeus* Baird, 1850 and *Pincerna* Preston, 1907 species. A–B: *Alycaeus eydouxi* Venmans, 1956 (V142, NHM); C–D: *Pincerna mouhoti* L. Pfeiffer, 1862 (Cuc Phuong NP, VNMN); E–G: *Pincerna mouhoti*, MNHN-IM-2012-27302; H–I: *Pincerna vanbuensis* (Bavay & Dautzenberg, 1900) (2012/60). Scales represent 1 mm.

**Diagnosis.** A very large alycaeid species with dominant last whorl (shell width larger than shell height) smooth protoconch, finely reticulated R1, densely ribbed, very long R2, and a long R3 with low swelling.

**Description.** Shell yellowish corneous to pink or orange (some specimens are pure white, possibly albinistic specimens); wider than high, overall shell conical with a strongly bulging last whorl; protoconch consists of 1.75 whorls, superficially smooth, matte, but higher magnification (approx. 50X) reveals some very fine radial and

reticulated sculpture on the last quarter whorl of protoconch, especially near the suture; R1 consists of 2.25–2.5 whorls, it is very much bulging, whorls separated with deep suture; R1 with weak, rather irregular radial ribs and somewhat weaker spiral striation resulting in a fine reticulated surface; R2 and R3 of approximately half whorl combined, they are roughly of the same length; R2 strongly inflated, with dense, lamella-like, straight and sharp ribs; tube situated deep inside suture; constriction between R2 and R3 short but deep; R3 with a hardly visible, very low swelling just anterior to the constriction; aperture rounded, outer peristome very much expanded but not (or very slightly) reflected, inner peristome slightly protruding; the boundary between inner and outer lips hardly visible; umbilicus open, shows only penultimate whorl.

**Measurements** (in mm). D = 10.2–12.1, H = 8.8–10.1 (NHMUK, coll. no. V87).

**Operculum.** Thin, corneous, concave; the inner surface with a low, blunt central nipple; outer side nearly smooth, without elevated lamina, multispiral.

**Variation in specimens.** There is no notable conchological variability within this species.

**Differential diagnosis.** See under *A. goliath* n. sp.

**Distribution.** Many specimens are labelled as being collected from “Cochinchina”. All samples from more exact localities were collected from the vicinity of Da Nang (= Touranne).

Habe (1965) reports the species under the name “*Dioryx gibbus* (Reeve)” from “Kao Phlong, north or Sara Buri, Central Thailand”, without an accompanying image. This record almost certainly represents another species.

### *Alycaeus goliath* Páll-Gergely n. sp.

(Figs 1A–D, 2A, D)

**Type material. Holotype:** (SH: 11.4 mm, SW: 13.9 mm), LAOS: South-Central Laos, Khammouan Province, ca. 37 km ENE of Thakhek (Muang Khammouan), ca. 4.5 km WNW of Mahaxay, on and under rocks in dry secondary forest, under a cliff facing east, limestone, clay, black soil in limestone pockets, cave deposits, alt. 150 m, 17°25.956'N, 105°09.669'E (locality code: 3L07), leg. Abdou, A. & Muratov, I.V., 25 November 2007 (MNHN-IM-2012-27319, Figs 1A–E, 2A, D). **Paratypes:** Same data as for holotype, MNHN-IM-2012-27318 (3 complete shells + 8 broken shells); Khammouan Province, 40 km from the centre of Thakhek, Mahaxay, 2.3 km southeast from Ban Na Coc, limestone wall, 155 m a.s.l., 17°25.957'N, 105°09.669'E (locality code: 2019/95), leg. A. Hunyadi, 27 September 2019, HA/1.

**Additional material examined:** Same data as for holotype, some shell fragments, MNHN-IM-2012-27318.

**Etymology.** The name *goliath* (to be used as a noun in apposition) refers to the remarkably large size of the new species.

**Diagnosis.** An exceptionally large alycaeid species with dominant last whorl (shell width larger than shell height), smooth protoconch, finely reticulated R1, very long R2 having ribs that form many connections with each other by calcareous projections, long R3 with low swelling, and a protruding inner peristome.

**Description.** Shell exceptionally large, pinkish, conical with wide last whorl; shell wider than high; protoconch consists of ca. 2 whorls, it is nearly smooth, with only indication of extremely fine ribs on the last quarter whorl; R1 consists of ca. 3 whorls; whorls bulging; sculpture of R1 dominated by weak, dense, rather irregular radial ribs and much weaker spiral striation; R2 and R3 slightly longer than half whorl combined; R2 slightly longer than R3; R2 with sharp, dense ribs, which form many connections with each other by calcareous projections, resulting in a web-like surface continuous between tube and umbilicus; tube situated deep in suture, its surface is very rough, irregularly segmented, although internally probably continuous; constriction between R2 and R3 deep but short; blunt, low swelling on R3 situated just after constriction; aperture rounded with slight upper incision; outer peristome strongly expanded and slightly reflected, inner peristome strong, sharp, protruding, clearly separated from the outer peristome, especially in the palatal region; outer peristome attached to penultimate whorl, but inner peristome does not; peristome whitish, inner side of aperture orange in colour; umbilicus open, shows all whorls.

**Operculum.** Unknown.

**Measurements (in mm).** D = 13.8–15.2, H = 11.1–12.0 (n = 5).

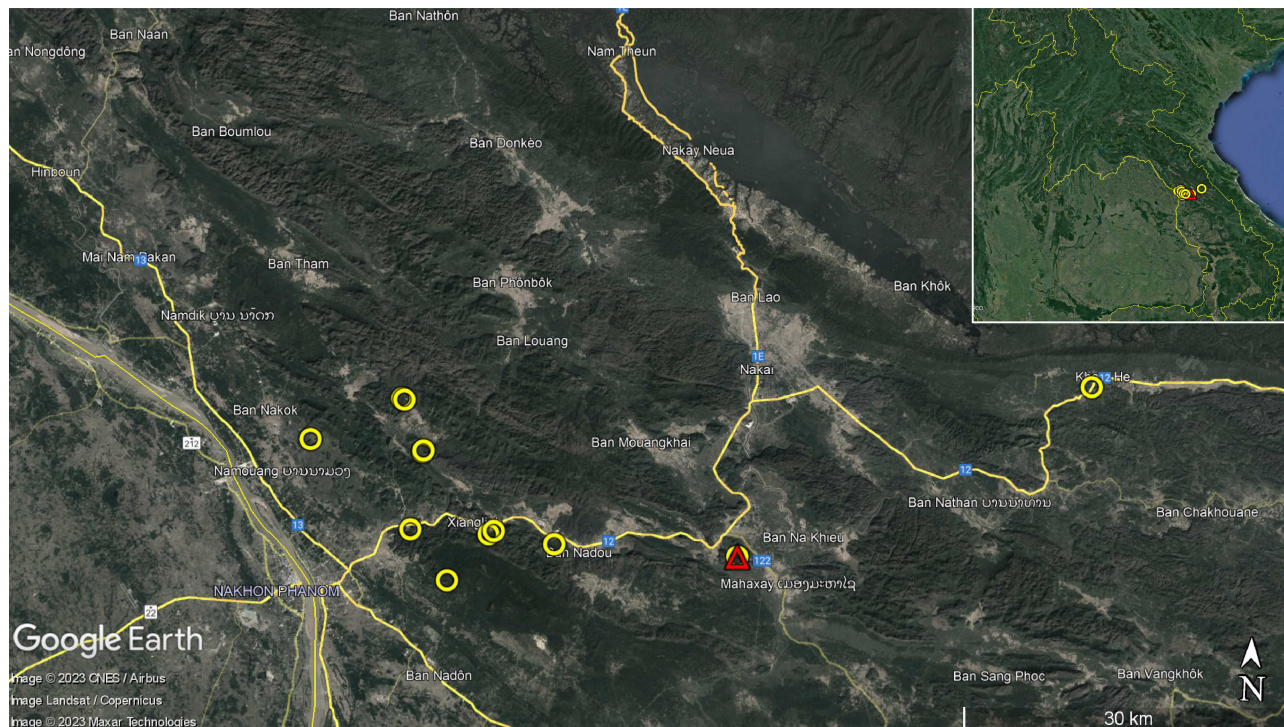
**Variation in specimens.** There are no notable conchological differences between the examined specimens.

**Differential diagnosis.** *Alycaeus goliath* n. sp. differs from *A. eydouxi* by the larger size, the more protruding inner peristome, the comparatively less bulging R2, and most importantly, the R2 ribs which form connections with

their neighbours, resulting in a web-like structure. *Alycaeus rolfbrandti* Maassen, 2006 differs from the new species by the smaller shell size and the irregularly ribbed, squamous protoconch. Although most known populations of *A. rolfbrandti* have keeled shells, three examined samples have a rounded edge of the body whorl. Therefore, although this is a useful shell character, this not sufficient to distinguish the two species. The *Alycaeus rolfbrandti* population occurring syntopically with *A. goliath* n. sp. has rounded body whorl (Fig. 1N).

**Distribution.** This species is known from the type locality only, where it lives together with *A. rolfbrandti* (Fig. 4).

**Remarks.** This is the largest species of the family, followed by *Stomacosmethis christae* (Maassen, 2006).



**FIGURE 4.** Distribution of *Alycaeus* Baird, 1850 species in central Laos. Yellow circles: *Alycaeus rolfbrandti* Maassen, 2006; Red triangle: *A. goliath* n. sp. The map was made using Google Earth Pro.

### *Alycaeus rolfbrandti* Maassen, 2006

(Figs 1I–S, 2C, F)

*Alycaeus rolfbrandti* Maassen, 2006: 136–137, figs 6–9.

*Alycaeus rolfbrandti*—Páll-Gergely *et al.*, 2017: 10, fig. 3B; Páll-Gergely *et al.*, 2020: 23, fig. 2B.

**Type material.** Type specimens were not examined by us, but other shells from the original series were available (see under additional material).

**Additional material examined.** LAOS: South-Central Laos, Khammouan Province, ca. 13.5 km N of Thakhek (Muang Khammouan), ca. 5 km SE of Ban Nakok, under limestone rocks in dry secondary forest under W facing cliff, limestone, clay, alt. 138 m, 17°30.984'N, 104°47.682'E (locality code: 9L07), leg. Abdou, A. & Muratov, I.V., 30 November 2007, MNHN-IM-2012-27322/3 complete + 1 broken shell (Fig. 1Q); South-Central Laos, Khammouan Province, ca. 15 km NE of Thakhek (Muang Khammouan), ca. 1.25 km SE of Ban Nase, near large flooded cave under W facing cliff, limestone, clay, black soil on limestone, on and under rocks in dry secondary forest, alt. 127 m, 17°30.547'N, 104°53.444'E (locality code: 7L07), leg. Abdou, A. & Muratov, I.V., 28 November 2007, MNHN-IM-2012-27325/8 shells + some shell fragments (Fig. 1O); South-Central Laos, Khammouan Province, ca. 9 km NE of Thakhek (Muang Khammouan), NW facing cliff, limestone, clay, black soil in limestone pockets, on and under rocks in dry secondary forest on and under, alt. 190 m, 17°26.757'N, 104°52.937'E (locality code: 6L07), leg. Abdou, A. & Muratov, I.V., 27 November 2007, MNHN-IM-2012-27321/19 complete shells + some shell fragments (Figs 1P, 2C, F); South-Central Laos, Khammouan Province, ca. 15.5 km ENE of Thakhek (Muang Khammouan), on and under limestone rocks in dry secondary forest under NW facing cliff, limestone, clay, black soil in limestone pockets, alt.

155 m, 17°26.817'N, 104°57.200'E (locality code: 12L07), leg. Abdou, A. & Muratov, I.V., 01 December 2007, MNHN-IM-2012-27320/1 shell (Fig. 1S); South-Central Laos, Khammouan Province, ca. 15 km ENE of Thakhek (Muang Khammouan), in the upper entrance of the large cave on NW facing steep slope, limestone, clay, black soil on limestone, on and under limestone rocks in dry secondary forest, alt. 157 m, 17°26.650'N, 104°56.944'E (locality code: 11L07), leg. Abdou, A. & Muratov, I.V., 01 December 2007, MNHN-IM-2012-27324/5 damaged shells (Fig. 1R); Kalkberge ca. 20 km östl. Takek, leg. Brandt, 08 September 1963, SMF 262540 (1 shell; labelled the holotype of "*Alycaeus carinatus* Brandt", but not mentioned by Maassen 2006, Fig. 1I–L); Same data, SMF 262541 (5 shells, labelled as paratypes of "*Alycaeus carinatus* Brandt", but not mentioned in Maassen 2006; consequently, these shells are part of the original series of *A. rolfbrandti*, but they are not paratypes since Maassen clearly had not examined them); South-Central Laos, Khammouan Province, ca. 10.5 km E of Thakhek (Muang Khammouan), on and under rocks, cave deposits, in secondary forest under entrance and in large cave on NE facing steep slope, limestone, clay, black soil on limestone, alt. 160 m, 17°24.340'N, 104°54.894'E (locality code: 25L07), leg. Abdou, A. & Muratov, I.V., 09 December 2007, MNHN-IM-2012-27323/2 complete + 2 broken shells (Fig. 1M); South-Central Laos, Khammouan Province, 2 km NWW of Ban Na village, Pha Suang Cave – S entrance, 17°33.054'N, 104°52.414'E (locality code: JG3), leg. Grego, J., 09 February 2017, JG/9, PGB/2; South-Central Laos, Khammouan Province, NE foot of Pha Soung Mountain, caverns among slope boulders, 17°33.108'N, 104°52.301'E (locality code: JG4), leg. Grego, J., 08 February 2017, JG/4; South-Central Laos, Khammouan Province, 6 km SSE of Ban Na, Tham Dan Makhia, lake cave entrance, 17°30.616'N, 104°53.475'E (locality code: JG7), leg. Grego, J., 13 February 2017, JG/4; Khammouane Province, Nhommalath, bridge on road no. 12, 43.4 km towards Nongchan, southern edge of Ban Khamhé, right side of the road, 210 m a.s.l., 17°34.743'N, 105°27.515'E (locality code: 2019/108), leg. A. Hunyadi, 30 September 2019, HA/10; Khammouane Province, 40 km from the centre of Thakhek, Mahaxay, 2.3 km southeast from Ban Na Coc, limestone wall, 155 m a.s.l., 17°25.957'N, 105°09.669'E (locality code: 2019/95), leg. A. Hunyadi, 27 September 2019, HA/4 (Fig. 1N); Bam Na Ka Yak (Nhoum) (exact locality unknown), leg. Saurin between 1950 and 1970, MNHN-IM-2012-27296/1 shell; Nhommanth (exact locality unknown), leg. Saurin, MNHN-IM-2012-27295/31 shells (shells not keeled, identical to MNHN-IM-2012-27325).

**Diagnosis.** A very large alycaeid species with dominant, usually keeled last whorl (shell wider than high), finely reticulate protoconch, finely wrinkled/scaly R1, a very long R2 having ribs forming many connections with each other by calcareous projections, and a long R3 with low swelling.

**Operculum:** Unknown.

**Measurements (in mm).** D = 8.9–11.3, H = 6.4–8.9 (multiple populations, n = 27).

**Variation in specimens.** The examined shells show variability in terms of shell size and the sharpness of the keel.

**Differential diagnosis.** Differs from *A. eydouxi* by the web-like structure of the R2 ribs, and the roughly sculptured protoconch. Moreover, most populations of *A. rolfbrandti* have strongly keeled body whorl. See also under *A. goliath* n. sp.

**Distribution.** This species is known from the limestone region on the left bank of the Mekong River, east of Nakhon Phanom (Laos, Khammouan Province). The furthest distance between the known populations is ca. 70 km (Fig. 4).

**Remarks.** This species does not require redescription due to the accurate original description. Only one addition has to be made: the R2 ribs either form projections to join each other, or they are regularly undulated, which results in a wire fence-like surface.

The majority of the populations examined have typically keeled last whorl, although specimens of some examined populations have a bluntly keel, i.e., the body whorl is almost rounded (JG4, JG7 = 7L07), while it is rounded in one population (2019/95) (see Fig. 1M–S). I found no other differences between these morphotypes, therefore they are not separated at any taxonomic levels.

## Genus *Pincerna* Preston, 1907

*Alycaeus* (*Pincerna*) Preston, 1907: 206.

*Pincerna*—Páll-Gergely 2017: 214; Páll-Gergely 2020: 167.

**Type species.** *Alycaeus* (*Pincerna*) *liratula* Preston, 1907, by original designation.

**Remarks.** The genus *Cyclorix* was treated as a junior synonym of *Pincerna* (Páll-Gergely 2017, Páll-Gergely *et al.* 2020), because the ovately conoid shells shape, the regular ribbing on the upper whorls, and the extremely short, often clubbed or pear-shaped sutural tube of the two groups are remarkably similar. However, unpublished molecular phylogenetic analysis revealed that while a Peninsular Malaysian *Pincerna* species clustered together with *Stomacosmethis* Bollinger, 1918 species from the same geographic area, the *Cyclorix* species from Myanmar and Nepal were closely related to *Dioryx* Benson, 1859 species, indicating that the morphological similarity of *Cyclorix* and *Pincerna* species are probably the result of convergence. Therefore, *Cyclorix* was resurrected by Gittenberger *et al.* (2022), who used it as a valid genus for Bhutanese species. It is not clear whether the *Pincerna* species inhabiting China, Laos and Vietnam are more closely related to the Himalayan (*Cyclorix*) or the Malaysian (*Pincerna*) group. There is a greater possibility that the Chinese, Lao and northern Vietnamese ‘*Pincerna*’ species are in fact *Cyclorix*, because of the very close similarity of some *Cyclorix* species with *P. costulosus* (see under that species). Nevertheless, until more convincing information becomes available, the species of those countries are classified in *Pincerna*, following the most recent genus-level revision of the Alycaidae (Páll-Gergely *et al.* 2020).

*Pincerna* (meaning bartender in Latin) is masculine, not feminine, despite the ‘a’ ending.

### ***Pincerna acroptychia* n. sp.**

(Fig. 5A–E)

**Type material. Holotype:** VIETNAM: Ha Giang Province, km 105.5 km on road no. 4c, between Yen Minh and Dong Van (NE of Ha Giang Town), 23°08.996’N, 105°10.332’E (locality code: Vn11-141), leg. Ch. & J. Hemmen, 21 March 2011 (SMF 370401, Fig. 5A–E).

**Diagnosis.** A medium-sized *Pincerna* species with a shell that is slightly higher than wide, R1 and R3 with elevated, sharp, lamella-like ribs (6 on R3), R2 short, with ca. 16 densely arranged, low ribs, R3 with blunt, elongated central swelling.

**Description.** The single available shell is white, although it is slightly corroded, the original colour may also be white; shell ca. as high as wide; protoconch smooth, consisting of 1.5 whorls; R1 consists of 2.25 whorls, with elevated, sharp, lamella-like ribs, rib density very slightly decreases from beginning of teleoconch towards its end, on the last quarter whorl spaces between ribs abruptly increase; R2 and R3 less than 90 degrees combined, R2 very short, consisting of ca. 16 densely arranged, low ribs (cross sectional view not examined); change between R1 and R2 abrupt due to radical change in rib density; constriction between R2 and R3 deep; R3 with blunt, elongated central swelling and 6 elevated, sharp, lamella-like ribs (similar in density to that at the end of R1); aperture large, rounded; boundary between inner and outer peristomes conspicuous; outer peristome expanded (widest in direction of umbilicus), not reflected; inner peristome slightly protruding; umbilicus open, very narrow, visible only in ventral view, in apertural view covered by reflected outer peristome.

**Operculum.** Unknown.

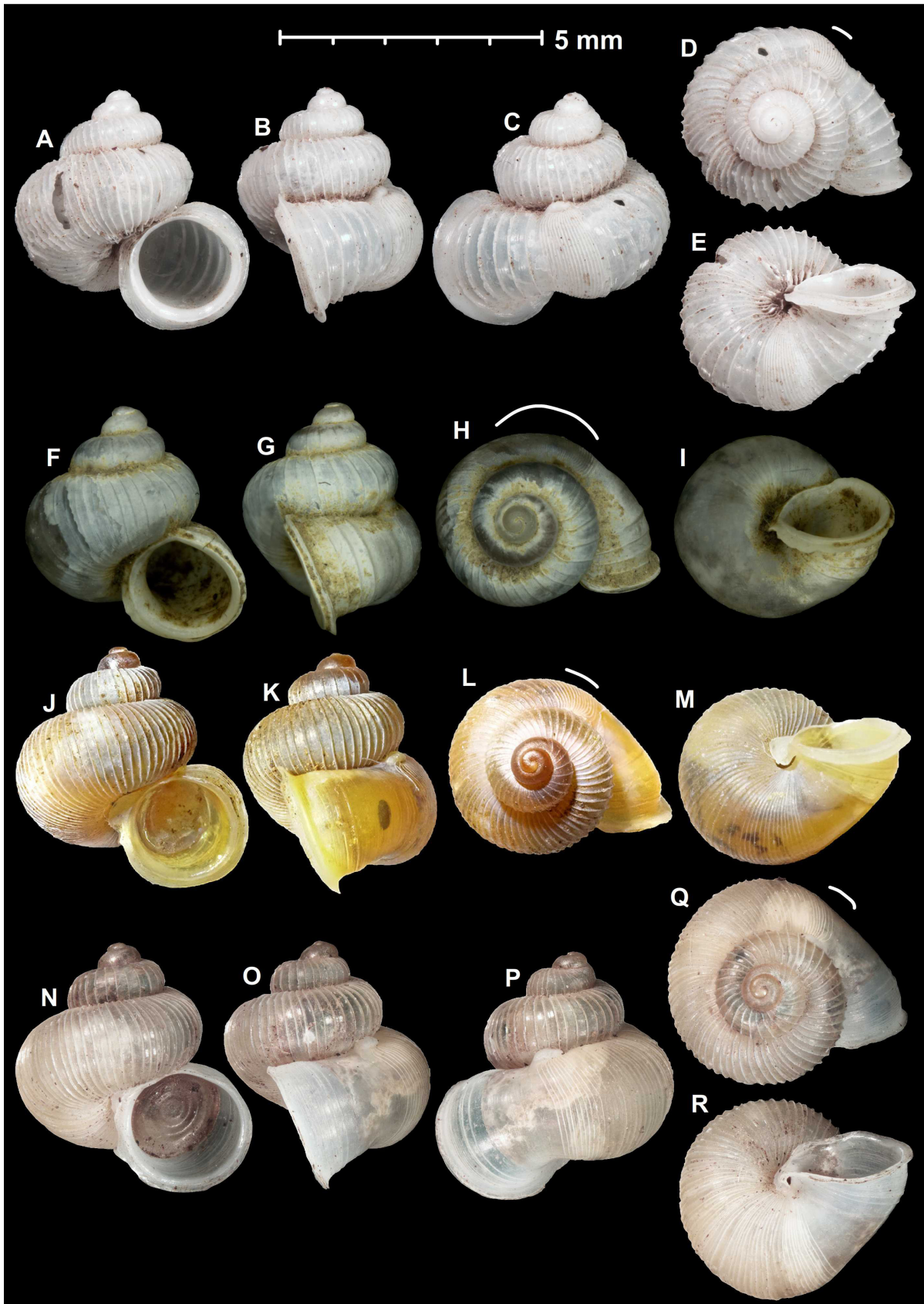
**Measurements (in mm).** D = 4.3, H = 4.4 (holotype).

**Differential diagnosis.** *Pincerna costulosus* (Bavay & Dautzenberg, 1912) is similar in overall shell shape, but that species has lower, less sharp ribs, and its R3 is smooth or ornamented by a few, low ribs. *Pincerna maolanensis* (Luo, Zhang & Zhuo, 2009) has similar rib density and its R3 is also strongly ribbed, but its R2 is much longer than that of the new species. This new species also differs from *P. yaanensis* by the strongly elevated R3 ribs, and moreover, the R3 swelling of the new species is central, whereas it is shifted towards the aperture in the Chinese species.

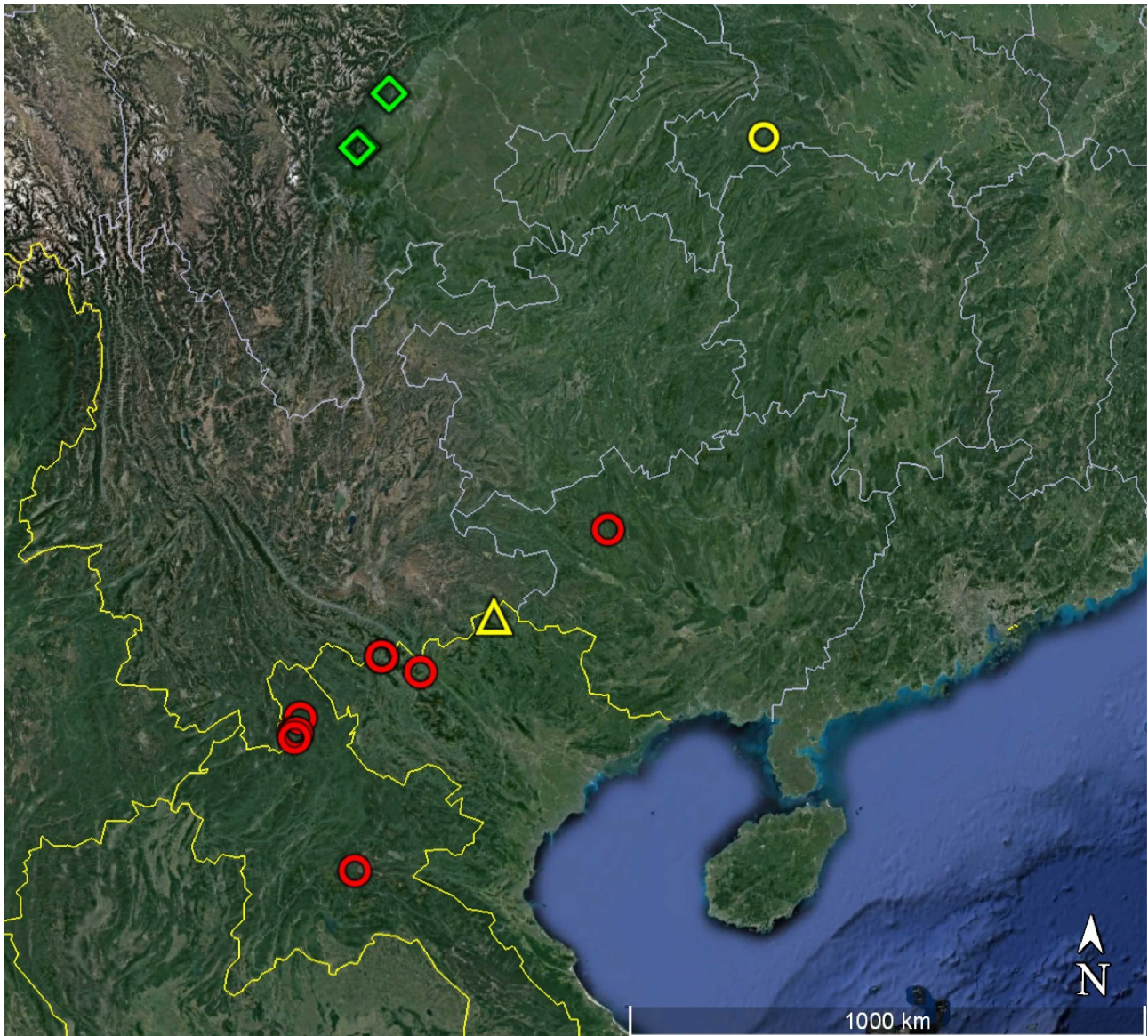
**Etymology.** The specific epithet *acroptychia* (to be used as a noun in apposition) refers to the fact that several species of the Madagascan endemic genus *Acroptychia* Crosse & P. Fischer, 1877 has a series of elevated ribs on the last whorl, similar to this new *Pincerna* species.

**Distribution.** *Pincerna acroptychia* n. sp. is known only from the type locality (Fig. 6).





**FIGURE 5.** Shells of *Pincerna* Preston, 1907 species. A–E: *Pincerna acroptychia* n. sp. (holotype); F–I: *Pincerna maolanensis* (Luo, Zhang & Zhuo, 2009) (holotype); J–M: *Pincerna yaanensis* Z.-G. Chen, 2022, holotype; N–R: *P. yaanensis*, locality 2015/53, coll. HA. Photos: Kaibaryer Meng (F–I), B. Páll-Gergely (A–E, N–R), photos from the original description (J–M). White lines indicate length of suture.



**FIGURE 6.** Distribution of *Pincerna* Preston, 1907 species. Circles: *Pincerna costulosus* (Bavay & Dautzenberg, 1912) (yellow circle indicates the type locality of *Pincerna vallis* Z.-Y. Chen & M. Wu, 2020); Yellow triangle: *Pincerna acroptychia* n. sp.; Green rhomb: *Pincerna yaanensis* Z.-Y. Chen, 2022. The map was made using Google Earth Pro.

***Pincerna* (?) *anceyi* (Mabille, 1887)**

(Fig. 7)

*Alycaeus anceyi* Mabille, 1887: 151–152, pl. 3, figs 14–15.

*Alycaeus (Alycaeus) anceyi*—Kobelt, 1902: 341.

*Alycaeus anceyi*—Páll-Gergely *et al.*, 2017: 10: fig. 3E.

*Pincerna* (?) *anceyi*—Páll-Gergely *et al.*, 2020: 170.

**Type material.** Tonkin, coll. Mabille, MNHN-IM-2000-31797 (3 syntypes, Fig. 7).

**Diagnosis.** A medium-sized alycaeid species with a shell that is slightly higher than wide, R1 glossy, R2 relatively short and smooth, R3 smooth with a blunt swelling.

**Description.** Shell slightly higher than wide; greyish with whitish peristome; protoconch rather glossy, consists of 1.75 whorls; R1 glossy, nearly smooth, with some very weak, irregular radial and spiral lines, consists of 1.75 whorls; R2 and R3 slightly shorter than quarter whorl combined, R3 being at least twice longer than R2; R2 with

approx. 28 microtunnels (slender, whitish lines), it is smooth from above, tube short but elongated; R3 smooth with a blunt swelling, glossy; constriction between R2 and R3 moderately deep; aperture conspicuously large; peristome white, outer peristome expanded and reflected; inner peristome slightly protruding; boundary between two peristomes clearly visible; umbilicus slit-like, open.

**Measurements (in mm).** D = 4.6, H = 4.8 (syntype).

**Operculum.** The outer surface of the operculum of the holotype could be examined: it is horny, multispiral, without elevated lamella.

**Variation in specimens.** Only the syntypes are known.

**Differential diagnosis.** *Alycaeus vanbuensis* Bavay & Dautzenberg, 1900 is similar, but usually larger, and its R1 is ribbed.

**Distribution.** This species is known from the type sample only.

**Remarks.** The shell shape is similar to that of *Pincerna*, but there are no strong ribs in the upper whorls, and the tube is elongated, not extremely short and piriform. The tube is short for the genus *Alycaeus*, but the shell shape agrees with other members of the genus.

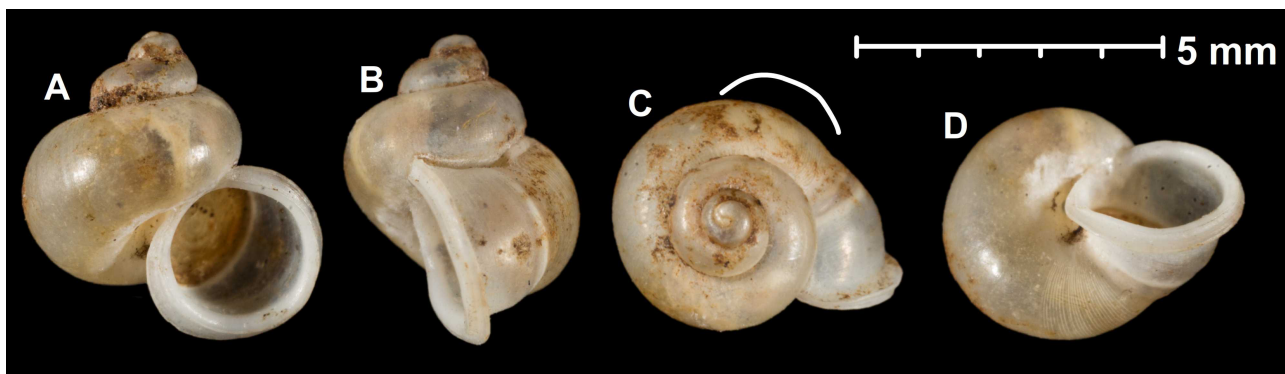


FIGURE 7. *Pincerna anceyi* (Mabille, 1887) (syntype, MNHN-IM-2000-31797).

### *Pincerna costulosus* (Bavay & Dautzenberg, 1912)

(Figs 8, 9)

*Alycaeus costulosus* Bavay & Dautzenberg, 1912: 49–50, pl. 4, figs 1–4.

*Pincerna costulosa*—Páll-Gergely *et al.*, 2017: 10, fig. 3F; Páll-Gergely 2017: 214; Páll-Gergely *et al.* 2020: 172.

*Pincerna vallis* Z.-Y. Chen & M. Wu, 2020: 42, figs 1, 4A, B, 5A. **new synonym**

*Pincerna vallis*—Páll-Gergely *et al.*, 2020: 185.

**Type material.** VIETNAM: Tonkin, Phong Tho, leg. Messenger, MNHN-IM-2000-31786 (syntype, Fig. 8A–D); Tonkin, Phong Tho, coll. Staadt, 1969, MNHN IM-2012-27043/2 (probably syntype, Fig. 8E–H).

**Additional material examined.** LAOS: Phongsaly Province, old forest on the northern bank of Nam Leng, 575 m, 21°26.039'N, 102°02.165'E (locality code: 21L05), clay, shale, leg. Abdou, A. & Muratov, I.V., 15 March 2005, MNHN IM-2012-27217/1; Phongsaly Province, old forest just north of Nam Leng (river), ca. 6 km NE of Boun Tai, 560 m, 21°25.676'N, 102°00.724'E (locality code: 31L04), clay, shale, leg. Abdou, A., Muratov, I.V., & Phothihoumphanh, N., 07 December 2004, MNHN IM-2012-27220/2; Phongsaly Province, old forest and banana plantation SE of Boun Tai, 801 m, 21°22.054'N, 102°00.034'E (locality code: 23L04), clay, shale, leg. Abdou, A. & Muratov, I.V., 02 December 2004., MNHN IM-2012-27219/1; Phongsaly Province, NNE of Nam Leng and Nam Bun confluence, 614 m, old forest near ravine, clay, shale, 21°25.925'N, 101°58.869'E (locality code: 27L05), leg. Abdou, A. & Muratov, I.V., 18 March 2005, MNHN IM-2012-27218/3 (Fig. 8I–L); Phongsaly Province, SW of Phongsaly, near the road to Boun Neua, 1343 m, 21°39.663'N, 102°05.243'E (locality code: 12L05), dry old forest in ravine, clay, shale, leg. Abdou, A. & Muratov, I.V., 10 March 2005, MNHN IM-2012-27216/1; Xiangkhoang Province, caverns among boulders at large sinkhole below small settlements (5 houses about 6 km SW of Bank Knong), 1062 m a.s.l., 19°23.265'N, 102°58.521'E (locality code: JG29), leg. Grego, J., 23 February 2017, JG/1 (Fig. 9A–D). VIETNAM: Tonkin, Lao Kay, coll. Letellier, 1949, MNHN IM-2012-27214/1 (ex MNHN IM-2012-27035, *vanbuensis*); Lao Kay, leg. Messenger no. 26, RBINS/2 (syntype mixed sample with *A. vanbuensis*). CHINA,

Hechi Shi, Fengshan Xian, Paoli Xiang, southeastern edge of Paoli, cave, 460 m a.s.l., 24°22.707'N, 107°03.825'E (locality code: 2009/104), leg. Hunyadi, A. 21 October 2009, HA/1 (identification questionable, see remarks).

**Diagnosis.** A small to medium-sized alycaeid species with a shell that is slightly higher than wide, R1 strongly, regularly ribbed, R2 extremely short, R3 or normal length, smooth, with low, central swelling.

**Description.** Shell higher than wide, yellowish or off-white when fresh; protoconch finely granulate, rather matte, consisting of 1.5 or lightly less whorls; R1 glossy, of 2.5 whorls, with regular, rather strong ribs and extremely fine spiral striation; R2 extremely short, consisting of ca. 6 lighter stripes (=breathing tunnels) only; breathing tunnels not or only very slightly elevated from the shell surface; constriction between R2 and R3 rather shallow; R3 or normal length, with low swelling; R3 nearly smooth with some widely-spaced thread-like ribs; aperture rounded; outer peristome strongly expanded and slightly reflected; inner peristome thickened, protruding; boundary between inner and outer peristomes clearly visible; umbilicus entirely or nearly entirely closed by reflected peristome.

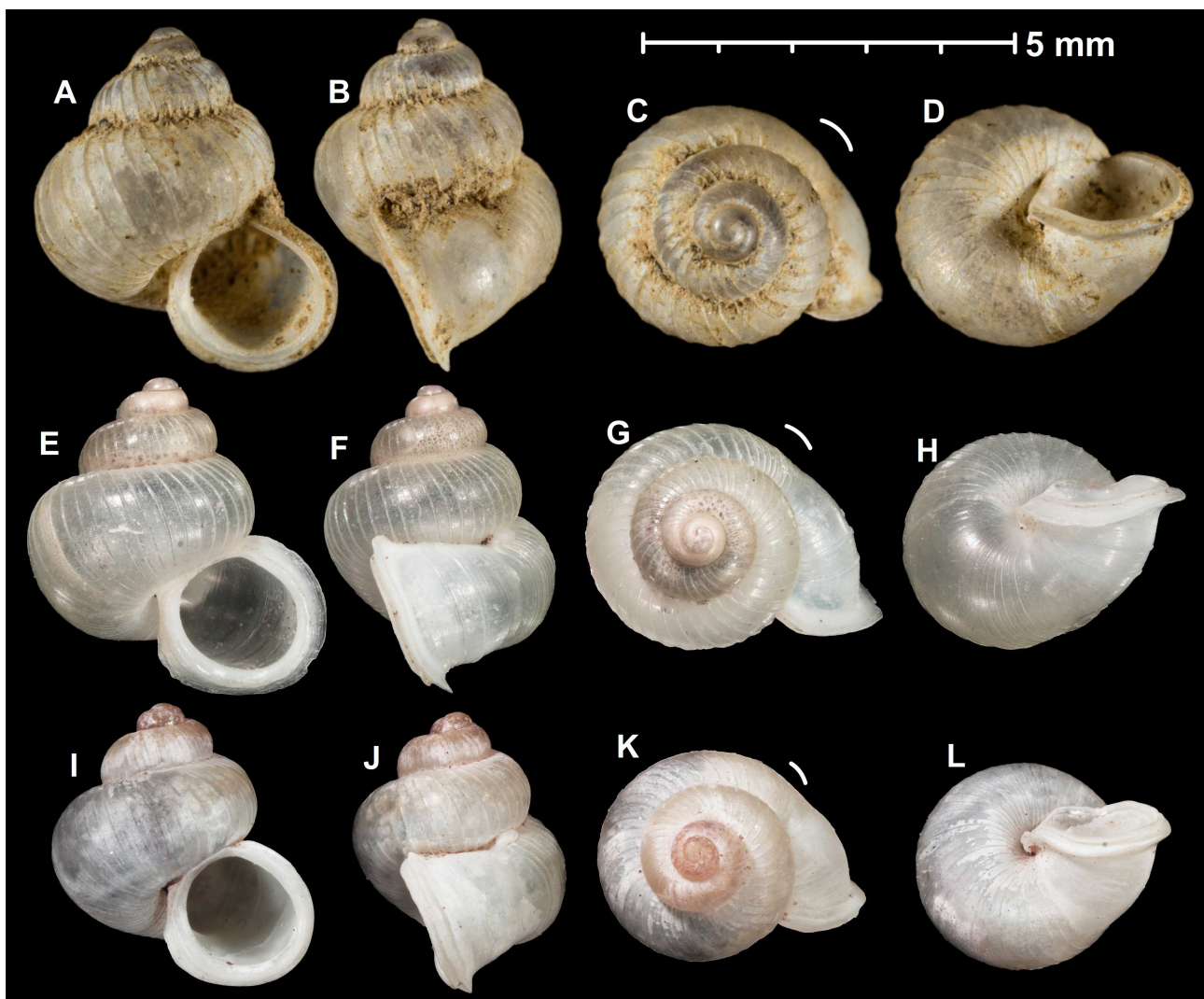
**Measurements (in mm).** D = 3.4–4.8, H = 3.9–4.9 (multiple populations, n = 7).

**Operculum:** The fragmentary operculum of a single specimen (MNHN-IM-2012-27214) was examined. Operculum semitransparent, thin, horny, concave, both outer and inner surface multispiral, no nipple found on the inner side.

**Variation in specimens.** The typical specimens from northernmost Vietnam are slightly larger than the newly collected in northern Laos.

**Differential diagnosis.** This species is easily recognisable based on the combination of the shell shape (higher than wide), regularly ribbed R1, and very short R2. See also under *Pincerna acroptychia* n. sp.

**Distribution.** This species is known from northern Laos (Phongsaly and Xiangkhoang provinces), and the northernmost part of Vietnam (Lai Chau and Lao Kay provinces) (Fig. 6).



**FIGURE 8.** Shells of *Pincerna costulosus* (Bavay & Dautzenberg, 1912). A–D: MNHN-IM-2000-31786 (syntype); E–H: Phong Tho, MNHN-IM-2012-27043 (probable syntype); I–L: Northern Laos, MNHN-IM-2012-27218.



**FIGURE 9.** Shells of *Pincerna costulosus* (Bavay & Dautzenberg, 1912). A–D: Laos, Phongsaly Province, JG29; E–H: Holotype of *Pincerna vallis* Z.-Y. Chen & Wu, 2020; I–M: *Pincerna* cf. *costulosus*, Guangxi, China, 2009/104. Photos: B. Páll-Gergely (A–D, I–H), taken from the original description (E–H).

**Remarks.** Some Indian *Cyclorhynchus* species (e.g. *C. graphicus dihingensis* (Godwin-Austen, 1914), *C. thompsoni* (Godwin-Austen, 1914), *C. burrailensis* (Godwin-Austen, 1914)) are so similar to *P. costulosus*, that it was challenging to find any notable differences by comparison under the microscope. This may indicate that Northern Lao, northern Vietnamese and Chinese *Pincerna* species belong to the genus *Cyclorhynchus*.

*Pincerna vallis* (Fig. 9E–H), described from the Chaibuxi National Forest Park, Hubei Province, China, is treated here as a junior synonym of *P. costulosus*. In its original description, Chen and Wu (2020) mentioned that *P. vallis* had a ribbed R3, which is smooth in *P. costulosus*. However, examination of several *P. costulosus* shells (including syntypes) revealed that *P. costulosus* shows some variability in this respect. The range of other northern

Vietnamese terrestrial operculate species also reach the Chinese Hubei Province, such as *Pseudopomatias amoenus* Möllendorff, 1885, *P. nitens* Páll-Gergely, 2015, *Dicharax cristatus* (Möllendorff, 1886) and *Metalycaeus heudei* (Bavay & Dautzenberg, 1900) (see Páll-Gergely *et al.* 2015, 2017).

The single shell collected in the Chinese Guangxi Province (Fig. 9I–M) is larger than any other *P. costulosus* shells (D: 4.8 mm, H: 4.9 mm), and has stronger ribs than any other samples of the same species. It is provisionally identified as *P. costulosus*, although more material from that area is necessary to understand the diversity of *Pincerna* in southern China.

### ***Pincerna* (?) *maolanensis* (Luo, Zhang & Zhuo, 2009)**

(Fig. 5F–I)

*Dioryx maolanensis* Luo, Zhang & Zhuo, 2009: 862–864, figs 1–6.

*Pincerna maolanensis*—Páll-Gergely, 2017: 10.

*Pincerna* ? *maolanensis*—Páll-Gergely *et al.*, 2020: 180, Fig. 41.

**Type material.** Mao-Lan Town, Libo County, Qian-Nan Prefecture, Guizhou Province, China, leg. Luo Tai-Chang, 2001.7.9., IZCAS TM 047081 (holotype, Fig. 5F–I).

**Diagnosis.** A small alycaeid species with a shell that is higher than wide, R1 strongly, regularly ribbed, long, smooth, R3 or normal length, with low swelling, its ribs density is similar to that of R1.

**Remarks.** *Pincerna vanbuensis* is the species most similar to *P. maolanensis* in terms of shell size and the ratios or shell regions, however, it has a denser R1 ribbing. Although the rib density of *P. vanbuensis* is variable across populations, it is never as widely-spaced as that of *P. maolanensis*. Moreover, between the main ribs of *P. maolanensis*, there are additional, thinner, lower riblets, while the area between the R1 ribs of *P. vanbuensis* is smooth. It would be important to examine several samples from northern Guangxi and southern Guizhou provinces to see whether these traits are stable across populations of *P. maolanensis* and *P. vanbuensis*, or if the two species are connected by intermediate forms.

**Distribution.** This species is known only from its type locality (Fig. 6).

### ***Pincerna mouhoti* (L. Pfeiffer, 1862)**

(Fig. 10)

*Alycaeus mouhoti* Pfeiffer, 1862: 275, pl. 36, figs 1–2.

*Alycaeus (Alycaeus) mouhoti*—Kobelt, 1902: 347.

*Alycaeus mouhoti*—Páll-Gergely *et al.*, 2017: 10.

*Pincerna mouhoti*—Páll-Gergely *et al.*, 2020: 180.

**Type material.** Lao Mountains, leg. Mr. Mouhot, ex coll. Museum Cuming, NHMUK 20170120/2 shells (probably syntypes, Fig. 10A–E).

**Additional material examined.** LAOS: Luang Prabang, coll. H. Counillon, RBINS/1; Xaysomboun Province, Long Tieng 1 km E on road to Sanasomboun, small ponor, cave deposit at foots of cliffs right side of the road, 19°5.887'N, 102°56.325'E (locality code: JG31), leg. Grego, J., 24 February 2017, JG/1; Central Laos, Luang Prabang province, ca. 6 km E of Muang Xiang Ngeun, under rocks in young forest with few old trees above spring on limestone outcrop, 19°44.772'N, 102°15.284'E, alt. 350 m (locality code: 36L06), leg. A. Abdou & I.V Muratov, 21 November 2006, MNHN-IM-2012-27293/2; Central Laos, Luang Prabang province, Phou Xuang mountain, ca. 1.5 km NE of Ban Lak Sip, ca. 5 km SE of Luang Prabang, under rocks and logs in old secondary forest under cliff, 19°51.605'N, 102°11.081'E, alt. 640 m (locality code: 39L06), leg. A. Abdou & I.V Muratov, 24 November 2006, MNHN-IM-2012-27302/30 + 2 juvenile shells; Central Laos, Luang Prabang province, ca. 6 km N of Phou Khoun, under rocks in dry secondary forest under and above cliff, 19°29.653'N, 102°24.470'E, alt. 1244 m (locality code: 34L06), leg. A. Abdou & I.V. Muratov, 16 November 2006, MNHN-IM-2012-27294/2; Central Laos, Luang Prabang province, ca. 17 km SE of Muang Xiang Ngeun, along small stream on the left side (~2 km S) of Nam Khan, on and under rocks and logs in old forest with banana, 19°40.188'N, 102°18.538'E, alt. 525 m (locality code:

13L06), leg. A. Abdou & I.V Muratov, 31 October 2006, MNHN-IM-2012-27292/7; Xiangkhoang Province, caverns among boulders at large sinkhole below small settlements (5 houses about 6 km SW of Bank Knong), 1062 m a.s.l., 19°23.265'N, 102°58.521'E (locality code: JG29), leg. Grego, J., 23 February 2017, JG/72 (Fig. 10Q–T); Luang Prabang Province, 3.1 km from Nong Khiaw towards Pak Xeng, Tham Pha Toke, environment of the cave, 345 m a.s.l., 20°33.215'N, 102°37.722'E (locality code: 2019/114), leg. A. Hunyadi, 5 October 2019, HA/1. VIETNAM: Nghệ An Province, northwestern edge of Anh Sơn towards Con Cuông, next to a cement company, left side of the road, 30 m, 18°56.574'N, 105°03.609'E (locality code: 2012/8), leg. Hunyadi, A., 15.05.2012, HA/2 (Fig. 10M–P); Dien Bien Province, ca. 12 km from Tuan Giao to Dien Bien Phu (left side off road), 21°31.483'N, 103°21.792'E (locality code: Vn10-111), leg. Hemmen, 10 October 2010, HE/1+1; Thang Hoa Province, eastern part of the Ben En National Park (outside the Park), road to the lake (ca. 22 km SE Yen Cat), 19°36.785'N, 105°34.513'E (locality code: Vn12-285), leg. Hemmen, Ch., 07 October 2012, HE/4; Vietnam, Ninh Binh Province, Cuc Phuong National Park, 290 m, near 20°18.435'N, 105°38.885'E (locality code: WVD2), leg. W. van Devender, 14–17 May 2011, VNMN/1 (Fig. 10U–X); Thanh Hoa Province, Ben En National Park (between Yen Cat to Thanh Hoa) ca. 1 km off road no. 45, 45.7 km to Thanh Hoa (right off road), 19°40.421'N, 105°31.066'E (locality code: Vn12-226B), leg. Hemmen, 05 October 2012, HE/4 (Fig. 10I–L); Same data, 20 October 2011, HE/3; Thanh Hóa Province, Như Thanh District, Hải Vân, Hang Lò Cao Kháng Chiến, vicinity of cave entrance, 22 m a.s.l., 19°37.079'N, 105°34.629'E (locality code: 2020/41), leg. Hunyadi, A., 11 February 2020, Coll. HA/1; Thanh Hóa Province, 42.7 km south from centre of Ngọc Lặc on the road Hồ Chí Minh, Thường Xuân District, Tân Thành, Bản Nha, eastern edge of the village, 65 m a.s.l., 19°45.709'N, 105°25.537'E (locality code: 2020/39), leg. Hunyadi, A., 14 February 2020, Coll. HA/7; Thanh Hóa Province, Như Thanh District, Hải Long, Vườn Quốc Gia Bến En, Hồ Sông Mực 2, northern side, 20 m a.s.l., 19°37.817'N, 105°32.941'E (locality code: 2020/42), leg. Hunyadi, A., 15 February 2020, Coll. HA/1; Sơn La Province, right side off road Mộc Châu to Sơn La, 20°52.567'N, 104°35.310'E (locality code: Vn11-104), leg. Ch. Hemmen, 14 October 2011, HE/3; Thanh Hoa Province, km 585 on road no. 15 Yen Cat to Ngọc Lặc 1 km right off road no. 15, 19°45.589'N, 105°25.521'E (locality code: Vn12-268), leg. Ch. Hemmen, 14 April 2012, HE/1; Sơn La Province, Mộc Châu 5 km towards Sơn La, right side of the road no. 6, 755 m, 20°52.551'N, 104°35.318'E (locality code: 2012/60), leg. Hunyadi, A., 06 June 2012, HA/3 (Fig. 10E–H); Sơn La Province, Mộc Châu District, Vân Hồ, northwestern edge of Pa Cốp towards Bó Nhàng, 980 m, 20°46.001'N, 104°45.203'E (locality code: 2020/24), leg. Hunyadi, A., 10 February 2020, HA/1; Sơn La Province, Mộc Châu, Hang Dơi, vicinity of cave entrance, 865 m a.s.l., 20°50.960'N, 104°38.335'E (locality code: 2020/26), leg. Hunyadi, A., 11 February 2020, Coll. HA/1; Sơn La Province, 24 km northwest from centre of Sơn La towards Thuận Châu, Chiềng Pắc, left side of the road, 565 m a.s.l., 21°24.707'N, 103°45.794'E (locality code: 2020/13), leg. Hunyadi, A., 7 February 2020, Coll. HA/2.

**Diagnosis.** A medium-sized to large, yellowish or rarely reddish species with very finely reticulated R1, smooth and long R2, R3 with blunt swelling and weak inner peristome.

**Description.** Shell yellowish or rarely reddish when fresh; slightly wider than high; protoconch smooth, glossy, consists of 1.5, or slightly more whorls; R1 consists of 2 whorls, it is rather glossy, with irregular, low ribs and extremely fine spiral striation (most easily visible near the suture); R2 and R3 of ca. 110 degrees combined, they are of the same length; R2 without elevated ribs; thinner light and thicker dark stripes alternate; cross sectional view not examined; constriction between R2 and R3 deep; R3 rather matte, with low swelling; aperture conspicuously large, rounded; outer peristome expanded (especially in direction of umbilicus), but not reflected; boundary between inner and outer peristomes not conspicuous; umbilicus open, narrow, partly covered by peristome.

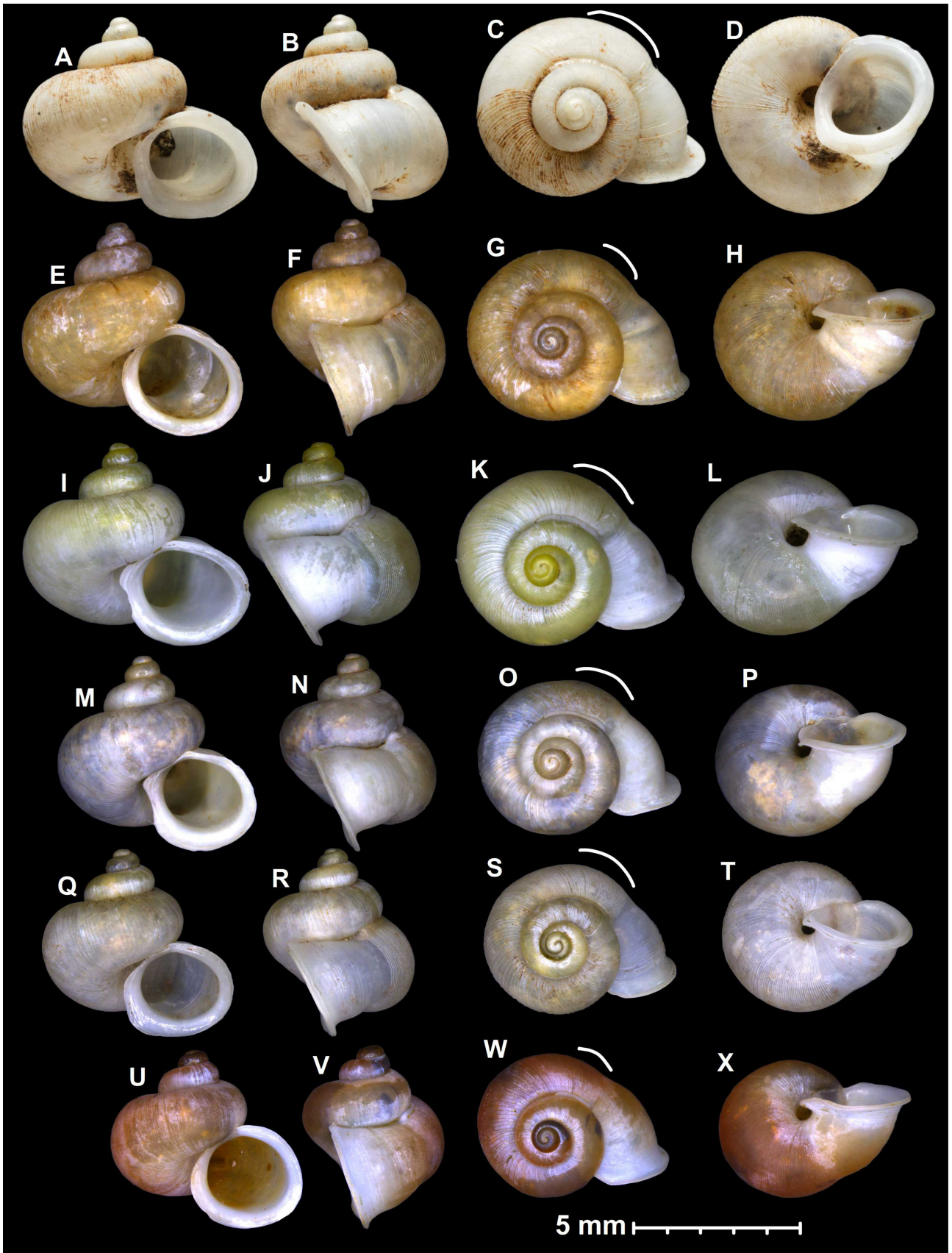
**Measurements (in mm).** D = 5.7–7.5, H = 5.2–7.0 (multiple populations, n = 14).

**Operculum.** The operculum of two specimens were examined (Cuc Phuong N. P., VNMN; MNHN-IM-2012-27302, see Fig. 3C–G). Operculum calcareous, relatively thick, slightly concave (strongly concave with elevated inner rim in MNHN-IM-2012-27302); inner surface multispiral without elevated nipple; outer surface multispiral, matte.

**Variation in specimens.** The examined shells show some variability in terms of shell colour, shell size, length of R2 (moderately long to long), and the intensity of ribbing on R1 (entirely smooth to finely ribbed). In some specimens the inner and outer peristomes can be as distinct as in *P. vanbuensis*.

**Differential diagnosis.** See under *A. vanbuensis*.

**Distribution.** The species was described from “Lao Mountains, Camboja” (most probably the vicinity of Louang Prabang). Newly collected specimens from Northern Vietnam and Northern Laos were examined here (Fig. 11).



**FIGURE 10.** *Pincerna mouhoti* (L. Pfeiffer, 1863). A–D: Syntype (NHMUK 20170120); E–H: 2012/60; I–L: Vn11-226; M–P: 2012/8; Q–T: JG29; U–X: Cuc Phuong NP, VNMN. Photos: H. Taylor (A–D) and B. Páll-Gergely (E–X).



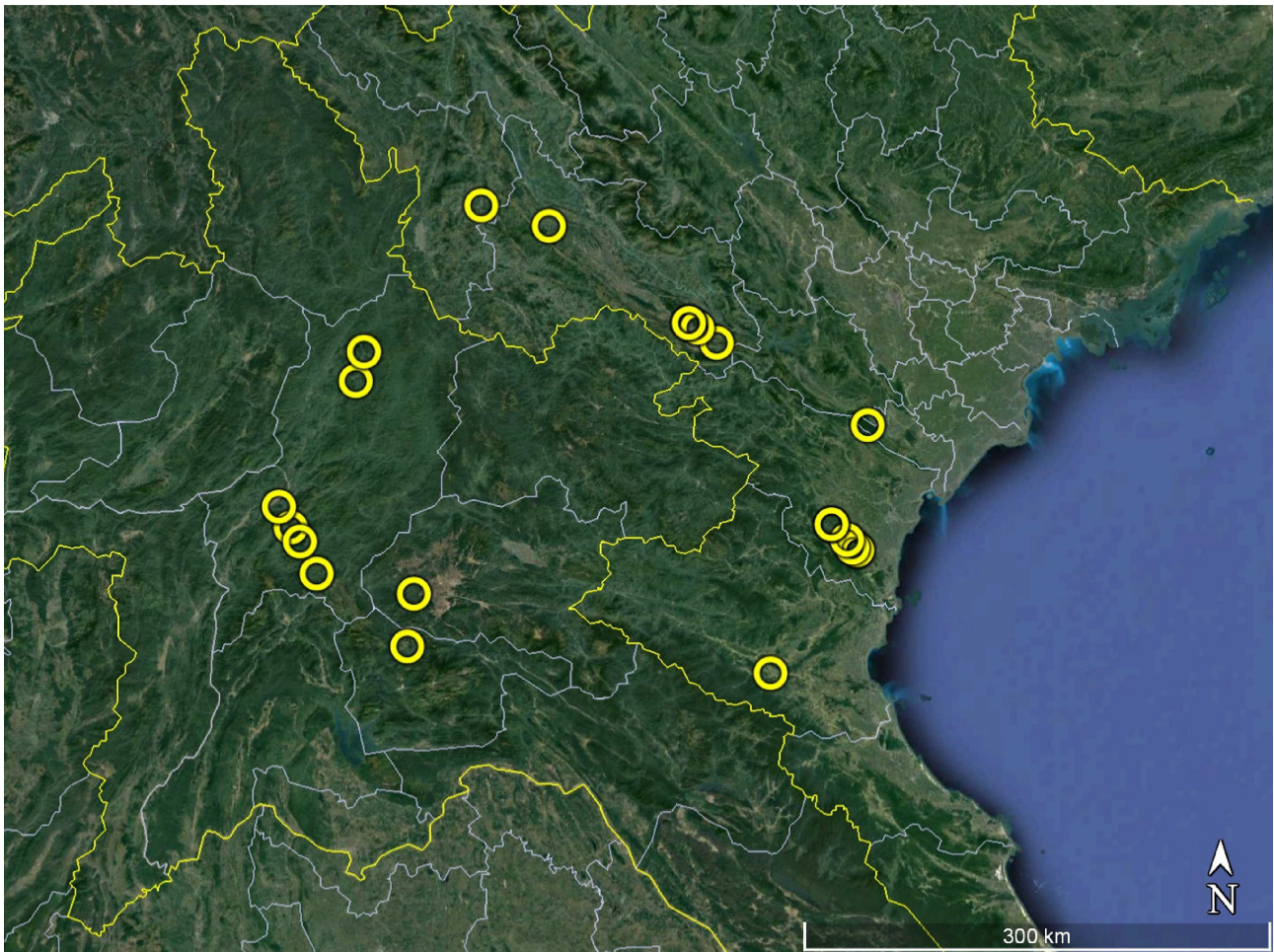


FIGURE 11. Distribution of *Pincerna mouhoti* (L. Pfeiffer, 1863). The map was made using Google Earth Pro.

***Pincerna* (?) *vanbuensis* (Bavay & Dautzenberg, 1900)**

(Figs 3H–I, 12, 14G)

*Alycaeus* (*Dioryx*) *vanbuensis* Bavay & Dautzenberg, 1900a: 119–120.

*Alycaeus* (*Dioryx*) *vanbuensis*—Bavay & Dautzenberg, 1900b: 455–456, pl. 11, figs 19–21.

*Dioryx vanbuensis*—Kobelt, 1902: 340; Varga, 1972: 136, figs 24–25.

*Alycaeus vanbuensis*—Páll-Gergely *et al.*, 2017: 10, fig. 3C.

*Pincerna* (?) *vanbuensis* —Páll-Gergely *et al.*, 2020: 184.

*Pincerna clausus* D. S. Do & T. S. Nguyen, 2022: 372, figs. 1, 4A–C, 5A–F, 6D; Tables 1, 2. **new synonym**

**Type material.** VIETNAM: Tonkin, Van-Bu, leg. Dr. R. Bavay, MNHN-IM-2000-31798 (syntype, Fig. 12A–D).

**Additional material examined.** CHINA: Guangxi (广西), Hechi Shi (河池市), Tiane Xian (天峨县), Qimu Xiang, cross towards Lahaoyan (拉号岩), 600 m, 24°51.130'N, 107°11.670'E (locality code: 2013/8B), leg. A. Hunyadi & M. Szekeres, 12 September 2013, HA/10; Guangxi (广西), Tiane Xian (天峨县), Qimu Xiang (恺暮乡), Douloulieshita (都楼烈士塔), 602 m, 24°51.114'N, 107°11.666'E (locality code: 20111021A), leg. Ishibe, T., Ohara, K., Okubo, K. & Otani, J.U., 21 October 2011, OK/2; Guangxi (广西), Tiane Xian (天峨县), Kaimu Xiang (岂暮乡), Lahaoyan (拉号岩), 685 m, 24°50.993'N, 107°09.963'E (locality code: 20111021B), leg. Ishibe, T., Ohara, K., Okubo, K. & Otani, J.U., 21 October 2011, OK/2 (Fig. 12M–P). LAOS: Luang Prabang Province, 19.5 km north of Nong Khiaw, north of Muang Ngoi Neua, vicinity of Tham Panay, 405 m, 20°42.903'N, 102°40.549'E (locality code: 2019/116), leg. A. Hunyadi, 6 October 2019, HA/2; Luang Namtha Province, 43.8 km southwest from centre of Luang Namtha, towards Vieng Phou Kha, Phou Lan, 100 m from the left side of the road, 770 m a.s.l., 20°44.529'N, 101°11.101'E (locality code: 2019/123), leg. A. Hunyadi, 8 October 2019, HA/8; Khammuan

Province, Nhommalath, bridge on road no. 12, 43.4 km towards Nongchan, southern edge of Ban Khamhé, right side of the road, 210 m a.s.l., 17°34.743'N, 105°27.515'E (locality code: 2019/108), leg. A. Hunyadi, 30 September 2019, HA/1 (small shell size and ribbing is similar to *A. vanbuensis*, 'simple' peristome reminiscent of *A. mouhoti*, although the shell may not be fully adult); Luang Prabang Province, 8 km south from centre of Luang Prabang, Tad Thong, environment of the waterfall, 445 m a.s.l., 19°50.145'N, 102°7.939'E (locality code: 2019/112), leg. A. Hunyadi, 4 October 2019, HA/1. VIETNAM: Nat Son, leg. Messenger, RBINS/2; Lao Kay, leg. Messenger no. 26, RBINS/2 (mixed sample with *P. costulosus*); Phong Tho, leg. Messenger, no. 32, RBINS/1; Son La Province, Mộc Châu 5 km towards Son La, right side of the road no. 6, 755 m, 20°52.551'N, 104°35.318'E (locality code: 2012/60), leg. Hunyadi, A., 06 June 2012, HA/5; Son La Province, 17.7 km northwest from centre of Son La towards Thuận Châu, Bon Phăng, left side of the road, 755 m a.s.l., 21°21.974'N, 103°47.440'E (locality code: 2020/14), leg. Hunyadi, A., 07 February 2020, HA/2 (Fig. 3H, I); Son La Province, Yên Châu District, Lóng Phiêng, 40 km from centre of Mộc Châu towards Pa Lao, left side of the road, 760 m a.s.l., 20°54.683'N, 104°24.040'E (locality code: 2020/22), leg. Hunyadi, A., 09 February 2020, HA/7; Son La Province, Mộc Châu District, Nông trường Mộc Châu, Ngũ Động Bản Ôn, 895 m a.s.l., 20°52.489'N, 104°42.533'E (locality code: 2020/23), leg. Hunyadi, A., 10 February 2020, HA/2; Son La Province, 24 km northwest from centre of Son La, towards Thuận Châu, Chiềng Pắc, left side of the road, 565 m a.s.l., 21°24.707'N, 103°45.794'E (locality code: 2020/13), leg. Hunyadi, A., 07 February 2020, HA/1; Son La Province, Quỳnh Nhai District, 20 km north from junction towards Thuận Châu, Chiềng Khoang, cave above the village, 315 m a.s.l., 21°33.441'N, 103°40.909'E (locality code: 2020/9), leg. Hunyadi, A., 07 February 2020, HA/1; Son La Province, Mộc Châu District, Vân Hồ, northwestern edge of Pa Cốp towards Bó Nhàng, 980 m, 20°46.001'N, 104°45.203'E (locality code: 2020/24), leg. Hunyadi, A., 10 February 2020, HA/5; Son La Province, right side off road Mộc Châu to Son La, 20°52.567'N, 104°35.310'E (locality code: Vn11-104), leg. Hemmen, Ch., 14 October 2011, HE/17 (Fig. 12I–L), Same data, 02.10.2012., HE/3; Tonkin, Phong Tho, Coll. Staadt, 1969, MNHN IM-2012-27215/2 (ex MNHN IM-2012-27043, *costulosus*, Fig. 12Q–U, 14G); Tonkin, Lao Kay, coll. Letellier, 1949, MNHN IM-2012-27035/1.

**Diagnosis.** A small to medium sized species with regularly ribbed R1, smooth and long R2, R3 with blunt swelling, clearly separate inner and outer peristomes and a protruding inner peristome.

**Description.** Shell yellowish-corneous or off-white when fresh, slightly wider than high; protoconch smooth, consisting of ca. 2 whorls; R1 of ca. 2 whorls, with widely-spaced, thread-like, regular ribs (strongest near the suture) and extremely fine spiral striation; R2 and R3 approx. 110 degrees combined, R2 slightly shorter than R3; constriction between R2 and R3 relatively shallow; R2 without elevated ribs; the whole surface smooth with slender light and thicker darker stripes alternating; cross-sectional view not examined; R3 usually with 1–5 widely-spaced, thread-like ribs; aperture rounded; outer peristome expanded and slightly reflected; inner peristome protruding, thickened; boundary between inner and outer peristomes clearly visible; umbilicus open but narrow, partly of entirely covered by reflected outer lip.

**Operculum.** The inner and outer surfaces of the operculum of a single specimen (2012/60) was examined (Fig. 3H–I). Operculum calcareous, slightly concave, inner surface somewhat corroded, but no elevated nipple is discernible; outer surface white, glossy, not multispiral.

**Measurements (in mm).** D = 3.8–5.5, H = 3.8–5.1 (shells from multiple populations, n = 20).

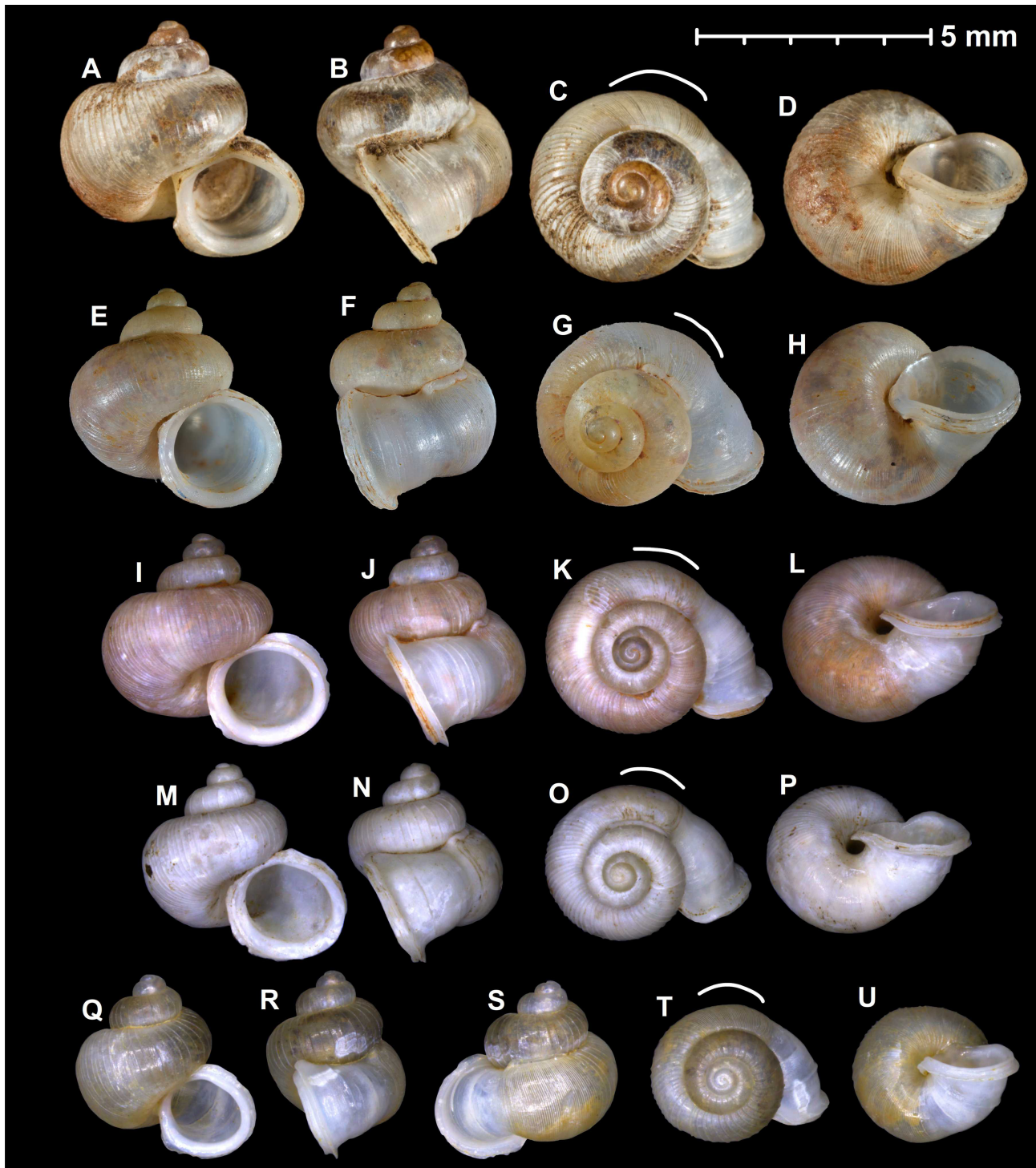
**Variation in specimens.** The examined samples show variability in terms of shell size, density and strength of R1 ribs. The umbilicus can be closed in those populations in which the body whorl is relatively narrow.

**Differential diagnosis.** *Alycaeus vanbuensis* is most similar to *A. mouhoti*, but differs from that species on the basis of the smaller shell, stronger R1 ribs, and overall thicker peristome. In most cases the boundary between inner and outer peristomes is more clearly visible and the inner peristome is protruding in *A. vanbuensis* than in *A. mouhoti*, although there are exceptions (similar traits are rarely visible in *A. mouhoti*).

**Distribution.** The type locality (Van Bu is situated in Son La Province, northwestern Vietnam). Additional historical samples are known from Phong Tho (Lai Chau Province), and Lao Kai Province. New localities are reported here from northern Guangxi (China) (Fig. 13).

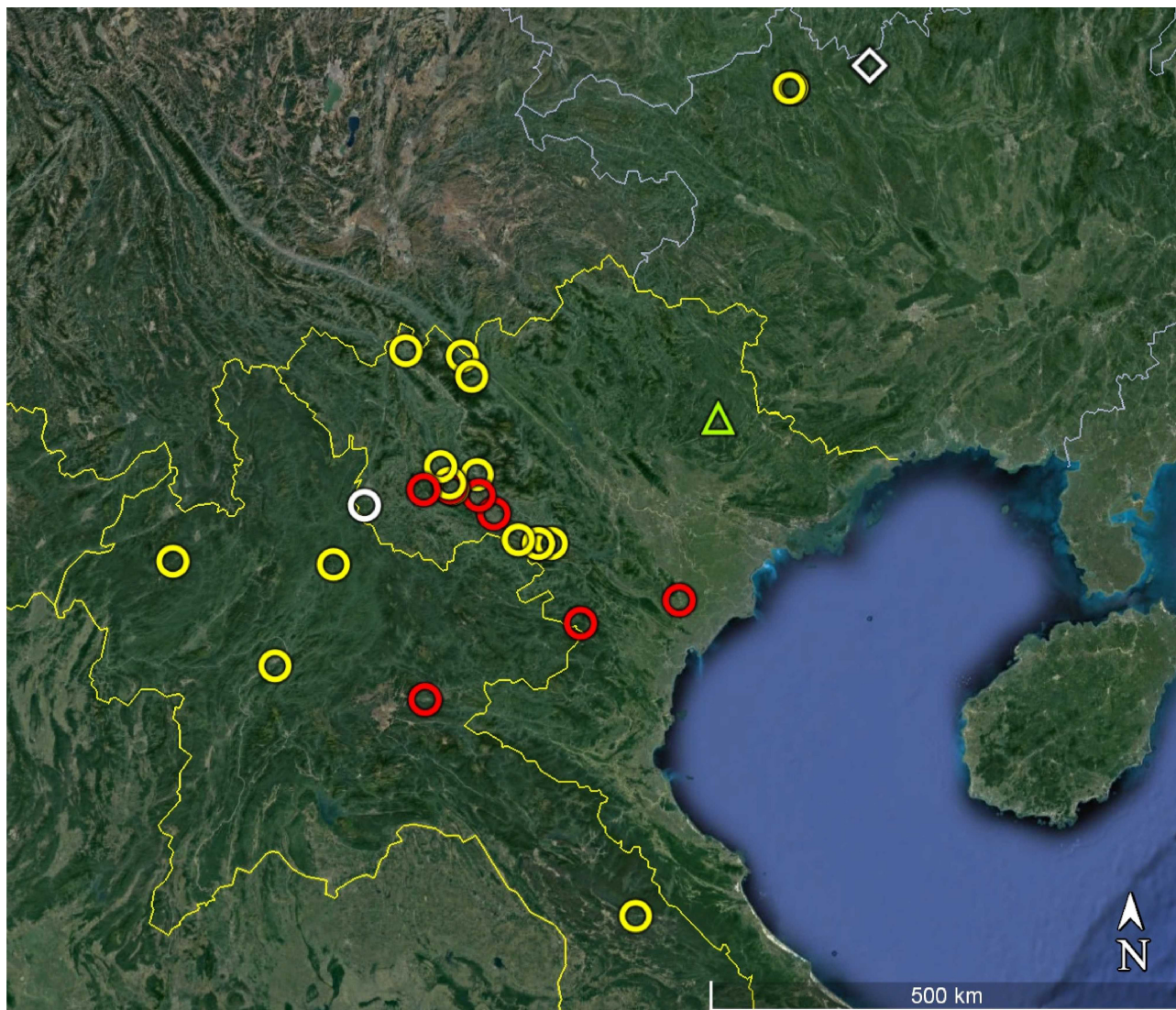
**Remarks.** Do and Nguyen (2022) described *Pincerna clausa* from Điện Biên Province, Vietnam. According to them, that species has a closed umbilicus, while it is open in the most similar species, *P. vanbuensis*. Furthermore, it has a stronger spiral striation on R1, a weaker ribbing on R2, compared to *P. vanbuensis*. Here I treat *P. clausa* (correctly would be *clausus* as *Pincerna* is masculine) as a junior synonym of *P. vanbuensis* because of the following reasons: It is true that most *P. vanbuensis* populations have an open umbilicus and it is closed in *P. clausus*, however,

a closed umbilicus is rarely found in other populations of *P. vanbuensis* when the body whorl is narrow (Fig. 12Q–U). Therefore, this character is considered as part of intraspecific variability. While the holotype of *P. clausus* (Fig. 12E–H) indeed possesses stronger spiral striation than most *P. vanbuensis* shells, at least one of the figured paratypes (fig. 4B in Do & Nguyen 2022) has weak spiral striation on R1. This suggests that the strength of spiral striation is variable within populations. It is not true that *P. clausus* has stronger R2 ribs than *P. vanbuensis*, because those of *P. vanbuensis* do not elevate from the surface of R2. Instead, they form a smooth R2 area. Overall, *P. clausus* seems to fit the morphological variability of *P. vanbuensis*. Moreover, it is known from a single site within the area of that species, therefore there is no strong reason to maintain it as an independent species.



**FIGURE 12.** *Pincerna vanbuensis* (Bavay & Dautzenberg, 1900). A–D: Syntype of *Alycaeus vanbuensis* (MNHN-IM-2000-31798); E–H: holotype of *Pincerna clausus* Do & Nguyen, 2022 (photos from the original description); I–L: Vn11-104A; M–P: 2011.10.21B; Q–U: MNHN-IM-2012-27215. Photos: B. Páll-Gergely (A–D, I–U), taken from the original description (E–H).

The *P. vanbuensis* localities mentioned by Do and Nguyen (2022) in the material examined and the localities plotted on the map (fig 1. therein) do not match completely. Here I plotted the sites (Fig. 13) mentioned in that paper.



**FIGURE 13.** Distribution of *Pincerna* Preston, 1907 species. Circles: *Pincerna vanbuensis* (Bavay & Dautzenberg, 1900); White rhomb: *Pincerna maolanensis* (Luo, Zhang & Zhuo, 2009); Green triangle: *Pincerna viginticosatus* n. sp. Yellow circle: samples examined in this study; Red circles: Samples mentioned by Do & Nguyen 2022; White circle: type locality of *Pincerna clausus* Do & Nguyen, 2022 (synonym of *P. vanbuensis*). The map was made using Google Earth Pro.

### *Pincerna viginticosatus* n. sp.

(Figs 14A–F)

**Type material. Holotype** (D=4.2 mm, H=4.0 mm): VIETNAM, Lạng Sơn Province, Bắc Sơn District, Long Dong, 3.8 km from junction 1B-241, 390 m a.s.l., 21°56.728'N, 106°19.447'E (locality code: 2020/51), leg. Hunyadi, A., 18 February 2020 (HNHM 105383, Figs 14A, B). **Paratypes:** Same data as for holotype, HA (2 shells).

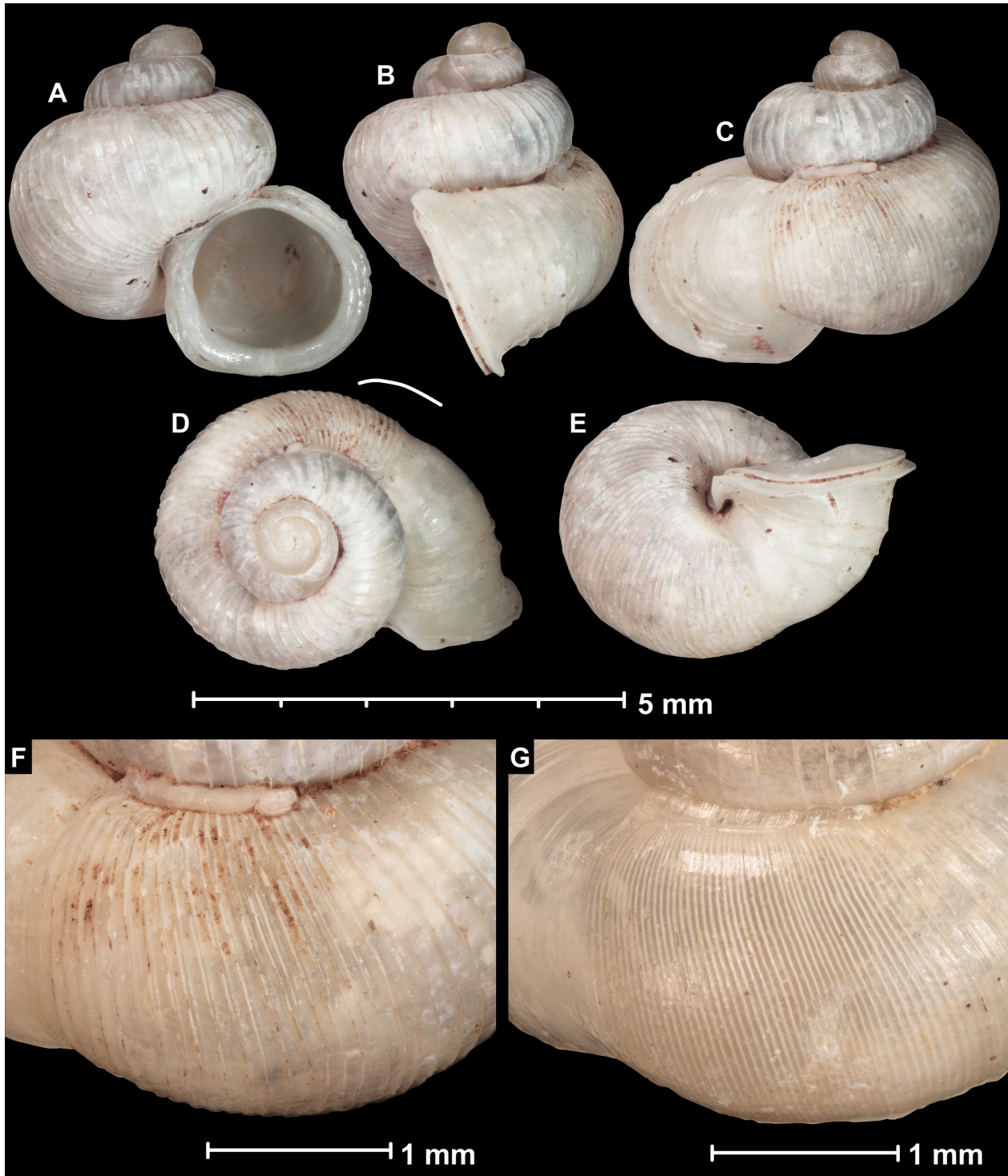
**Diagnosis.** A medium sized *Pincerna* species with regularly ribbed R1, long R2 with ca. 20 slightly elevated ribs, R3 with blunt central swelling, clearly separate inner and outer peristomes, a protruding inner peristome, and a closed umbilicus.

**Description.** Shell yellowish-corneous or off-white, although all three available shells were somewhat corroded; slightly wider than high; protoconch smooth, yellowish, consisting of ca. 1.5–1.75 whorls; R1 of ca. 1.5 whorls, with widely-spaced, thread-like, regular ribs (strongest near the suture) and extremely fine spiral striation; ribs ca. 26–28 on last half whorl of R1; R2 and R3 approx. 110 degrees combines, R2 ca. half of length of R3; constriction

between R2 and R3 relatively shallow; R2 with ca. 20–22 regular, slightly elevated, dense ribs; cross-sectional view not examined; R3 with long, central swelling, with 3–4 thread-like ribs on its anterior part; aperture rounded; outer peristome expanded and reflected at the basal and columellar part; inner peristome protruding, expanded; boundary between inner and outer peristomes clearly visible; umbilicus entirely closed by reflected outer peristome.

**Operculum.** Unknown.

**Differential diagnosis.** This new species is similar to *P. vanbuensis* in shell shape, but differs from it in the R2 sculpture. While in *P. vanbuensis* the R2 is smooth and consists of 46–60 lighter and darker alternating stripes, this new species has ca. 20–22 slightly elevated ribs. *Pincerna maolanensis* (which is possibly a synonym of *P. vanbuensis*) also possesses a smooth R2.



**FIGURE 14.** Shells of *Pincerna* Preston, 1907 species. A–F: *Pincerna viginticosatus* n. sp. (holotype, HHNM 105383); G: R2 of *Pincerna vanbuensis* (Bavay & Dautzenberg, 1900) (MNHN-IM-2012-27215, same as on Fig. 12E). All photos: B. Páll-Gergely.

**Measurements (in mm).** D = 4.1–4.2, H = 3.9–4.0 (n = 3).

**Etymology.** The specific epithet (meaning twenty ribs) refers to the key character of this species (presence of ca. 20 R2 ribs instead more numerous lighter and darker alternating stripes of *P. vanbuensis*).

**Distribution.** This new species is known only from the type locality (Fig. 13).

**Remarks.** This species differs from *Pincerna vanbuensis* only in the fine morphology of R2 sculpture. This is not unusual in the family Alycaeidae. For example, *Dicharax moellendorffi* (Kobelt & Möllendorff, 1886) differs from the otherwise very similar *Dicharax cristatus* (Möllendorff, 1886) by the smooth R2 (Páll-Gergely *et al.* 2017). Also, *Metalycaeus minatoi* Páll-Gergely, 2017 possesses a smooth R2, while that of *M. vinctus* (Pilsbry, 1902), which is its putative sister species, is ribbed (Páll-Gergely & Asami 2017).

### ***Pincerna yaanensis* Z.-Y. Chen, 2022**

(Figs 5J–R)

*Pincerna yaanensis* Z.-Y. Chen, 2022: 118.

**Type locality.** “Bifengxia scenic spot [碧峰峡风景区], Bifengxia town [碧峰峡镇], Yaan City [雅安市], Sichuan Province [四川省], China, 102°59'23"E, 30°04'26"N”.

**Additional material examined.** CHINA, Sichuan, Chengdu Shi, Dujiangyan Shi, Qingcheng Shan, Fangningqiao 200 m towards Zushidian, 1130 m a.s.l., 30°54.337'N, 103°33.282'E (locality code: 2015/53), leg. Hunyadi, A., 6 June 2015, HA/1 (Fig. 5N–R).

**Distribution.** This species is known from two closely situated localities in central Sichuan. Here I report this species from another site ca. 100 km north from the known localities (Fig. 6).

**Remarks.** *Pincerna yaanensis* is a recently described species from central Sichuan. According to the original description, it is larger than *P. costulosus*, it has a ribbed R3 (smooth in *P. costulosus*), has a more convex body whorl, denser ribs, and an umbilicus completely covered by the reflected peristome. After examining several *P. costulosus* shells belonging to multiple populations, the differences between *P. costulosus* and *P. yaanensis* do not seem to be convincing. The difference in size between *P. yaanensis* and *P. costulosus* is only minimal; the difference regarding R3 is not correct, because some *P. costulosus* shells (even syntypes, see Fig. 8E–H) have ribs on R3; the rib density is also variable across populations of *P. costulosus* (although probably still denser than in any *P. costulosus* shell); and the umbilicus is completely covered in some *P. costulosus* shells (see Fig. 8E–H). *Pincerna yaanensis* should be kept as an independent species because of the R3 of *P. costulosus* has a central swelling, whereas it is shifted towards the aperture in *P. yaanensis*.

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