

The land snail genus *Pincerna* Preston, 1907 (Gastropoda: Alycaeiidae) from Vietnam and Laos, with description of a new species

Do Duc Sang* & Nguyen Thanh Son

Abstract. *Pincerna* Preston, 1907 is an Asian land snail genus, which is currently classified in the family Alycaeiidae Blanford, 1864, in the superfamily Cyclophoroidea Gray, 1847. Five species of *Pincerna* are recognised in Vietnam and Laos, including *Pincerna anceyi* (Mabille, 1887), *Pincerna costulosus* Bavay & Dautzenberg, 1912, *Pincerna mouhoti* (L. Pfeiffer, 1862), *Pincerna vanbuensis* (Bavay & Dautzenberg, 1900), and *Pincerna clausa*, new species, from a limestone hill in Điện Biên Province, northwestern Vietnam. *Pincerna clausa* is most similar to *Pincerna vanbuensis*, but differs in having a closed umbilicus, stronger spiral striation on protoconch region R1, and weaker ribs on R2.

Key words. taxonomy, Alycaeiidae, protoconch, distribution, Điện Biên

INTRODUCTION

At present, 231 species of land molluscs are known from Laos, 11 of which belong to the Alycaeiidae, while the corresponding number in Vietnam is more than 850 species, including 24 species of Alycaeiidae (Schileyko, 2011; Páll-Gergely et al., 2017, 2021; Raheem et al., 2017; Inkhavilay et al., 2019; Páll-Gergely & Grego, 2019). *Pincerna* Preston, 1907 is an Asian land snail genus, which is currently classified in the family Alycaeiidae Blanford, 1864, in the superfamily Cyclophoroidea Gray, 1847. Four species of *Pincerna* are recognised in Vietnam and Laos, including *Pincerna anceyi* (Mabille, 1887), *Pincerna costulosus* Bavay & Dautzenberg, 1912, *Pincerna mouhoti* (L. Pfeiffer, 1862), and *Pincerna vanbuensis* (Bavay & Dautzenberg, 1900). In recent years, numerous new species of land molluscs have been discovered from the habitats of these two countries (Maassen, 2006; Inkhavilay et al., 2016; Páll-Gergely et al., 2017, 2018, 2019, 2020; Páll-Gergely & Hunyadi, 2018, 2021; Do et al., 2020, 2021). These research results show there is considerable land mollusc diversity in Vietnam and Laos.

Pincerna is one of the nine genera of the family Alycaeiidae (*Alycaeus* Gray, 1850; *Chamalycaeus* Möllendorff, 1897; *Dicharax* Kobelt & Möllendorff, 1900; *Dioryx* Benson, 1859; *Laotia* Saurin, 1953; *Messageria* Bavay & Dautzenberg, 1904; *Metalycaeus* Pilsbry, 1900; *Stomacosmethis* Bollinger,

1918) (Foon & Liew, 2017; Páll-Gergely et al., 2020; Chen & Lin, 2021; Páll-Gergely & Hunyadi, 2021). It was originally described as a subgenus of *Alycaeus* based on the type species *Alycaeus (Pincerna) liratulula* Preston, 1907, and was diagnosed as follows: “operculum horny, convex below, concave above, bearing in the centre of the upper surface a hollow protuberance in the form of a circular cup, the margin of which is slightly reflexed outwards” (Preston, 1907: 206). The genus currently includes 37 nominal species and ranges from the southeastern Himalayas to Laos, Vietnam, the Malay Peninsula, Sumatra, and northern Borneo (Páll-Gergely et al., 2020; Vermeulen & Liew, 2022). Shells of *Pincerna* and several other alycaeid genera (*Alycaeus*, *Stomacosmethis* and *Dioryx*) are similar mainly in shell shape, sculpture, umbilicus, and operculum. Such similarities have made it difficult to classify alycaeid species. Therefore, further taxonomic research on the family Alycaeiidae is required.

In this paper, we present an overview of *Pincerna* Preston, 1907 from Vietnam and Laos, including the description of *Pincerna clausa*, new species, and diagnoses of the four species previously reported from the area.

MATERIAL AND METHODS

This study is based on material collected during field surveys in several locations throughout Vietnam in 2012–2021. The specimens were collected by sieving soil samples and by manual searching. Key terminology for shell morphology follows Kerney & Cameron (1979) on counting of the shell whorls (to the closest 0.25 whorl), Páll-Gergely et al. (2017) on regions of shell (Protoconch, Regions 1–3), and Foon & Liew (2017) on shell morphometric characters. In particular, shell height (SH) was measured from the apex to the lowest part of the peristome parallel to the coiling axis. Shell width

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(SW) was measured at the widest section perpendicular to the coiling axis (Foon & Liew, 2017). Measurements were carried using digital vernier calliper to the nearest 0.1 mm. Photographs of the shells were taken using a Nikon® Z6 II camera attached with coupled reversed lenses (Nikkor 180mm f2.8 AIS/Nikkor 50mm f1.8 D). The depth of field (DoF) was stacked from 30 to 60 single photos using Helicon Focus® 7.6.1.

Photos of the syntypes of four nominal species of Vietnam and Laos used for comparative analysis were accessed from the official websites of the museums where they are deposited (Muséum National d'Histoire Naturelle, Paris - MNHN, The Natural History Museum, London - NHMUK, and Royal Belgian Institute of Natural Sciences Brussels - RBINS). Specimens mentioned in this paper are deposited in the collections of the Vietnam National Museum of Nature (VNMN) and the Zoological Collection of Biological Museum (ZMHU), Hanoi University of Science (Vietnam National University, Hanoi).

TAXONOMY

Subclass Caenogastropoda Cox, 1960

Superfamily Cyclophoroidea Gray, 1847

Family Alycaecidae T.W. Blanford, 1864

Genus *Pincerna* Preston, 1907

Alycaeus (*Pincerna*) Preston, 1907: 206. Type species: *Alycaeus* (*Pincerna*) *liratula* Preston, 1907, by monotypy.
Alycaeus (*Cycloryx*) Godwin-Austen, 1914: 334.
Chamalycaeus (*Cycloryx*) – Thiele, 1929: 108; Wenz, 1938: 478.
Alycaeus (*Pincerna*) – Thiele, 1929: 108; Wenz, 1938: 479; Egorov, 2013: 33.
Chamalycaeus (*Cycloryx*) – Egorov, 2013: 36.
Pincerna – Páll-Gergely, 2017: 214; Páll-Gergely et al., 2017: 10; 2020: 167; Vermeulen & Liew, 2022: 27.

Diagnosis. Shell globose to conical, usually translucent; whorls 3½–5, increase regularly; protoconch glossy, smooth, 1–1¾ whorls; R1 usually with strong, regularly spaced ribs and weak spiral striation; R2 smooth to prominently ribbed, usually short, with slender, relatively dense and regular ribs; umbilicus narrow and often closed by the reflected columellar extension of peristome; Operculum thin, translucent, usually flat on both the outer and inner surfaces (Egorov, 2013; Páll-Gergely, 2017; Páll-Gergely et al., 2020; Vermeulen & Liew, 2022: 27).

Distribution. The genus *Pincerna* is widely distributed in Asia from the southeastern Himalayas to Laos, Vietnam, the Malay Peninsula, Sumatra, and northern Borneo (Páll-Gergely et al., 2020; Vermeulen & Liew, 2022).

Remarks. *Pincerna* is probably most closely related to *Stomacosmethis*, which is similar in shell size and shape (Páll-Gergely et al., 2020). The shells of *Pincerna* species

are all globular, with more widely spaced ribs on R1, not colourful, mostly white and translucent, thin operculum, which is relatively flat on both the outer and inner surface. In contrast, the shells of *Stomacosmethis* species are triangular with densely ribbed on R1, extremely short R2, usually brightly coloured yellow or orange, thin operculum with outer surface usually elevated (Foon & Liew, 2017; Páll-Gergely et al., 2020).

Pincerna anceyi (Mabille, 1887)

(Figs. 1, 2A, 6A; Tables 1, 2)

Alycaeus anceyi Mabille, 1887: 151, pl. 3, figs. 14, 15 (type locality: Tonkin Vietnam).
Alycaeus (*Orthalycaeus*) *anceyi* – Kobelt & Möllendorff, 1897: 147.
Alycaeus (*Alycaeus*) *anceyi* – Kobelt, 1902: 341.
Alycaeus anceyi – Fischer, 1891: 108; Fischer & Dautzenberg, 1904: 432; Páll-Gergely et al., 2017: 10, fig. 3E.
Pincerna anceyi – Páll-Gergely et al., 2020: 170.

Types examined. Tonkin, col. Balansa, 1887, MNHN-IM-2000-31797/ 3 (syntypes) (Figs. 2A, 6A).

Diagnosis. *Pincerna anceyi* is characterised by a medium-sized, globose shell with R1 nearly smooth, some fine ribbing near suture; R2 short, with very weak and regularly spaced stripes.

Distribution. *Pincerna anceyi* is known from northern Vietnam (Quảng Ninh Province) (Fischer & Dautzenberg, 1904).

Remarks. In comparison with other congeners from Vietnam and Laos, *P. anceyi* can be identified by its smooth shell surface and spiral striation not visible on R1. Fischer & Dautzenberg (1904) recorded this species from “Ile Ké-bao, golfe du Tonkin” (most probably refers to Cái Bâu Island, Vân Đồn District, Quảng Ninh Province) and other species of the Alycaecidae from northern Vietnam (*Dioryx compactus*, *Dicharax fracterculus*, *Alycaeus gibbus*, *Metalycaeus heudei*, *Dioryx major*, *Dioryx messengeri*, *Dioryx pilula*, *Dioryx requiescens*, *Pincerna vanbuensis*), Laos (*Dioryx bacca*, *Dioryx cariniger*, *Pincerna mouhoti*) and Thailand (*Chamalycaeus canaliculatus*, *Metalycaeus distinctus*, *Stomacosmethis roebeleni*). This species is probably endemic to northern Vietnam.

Pincerna costulosus Bavay & Dautzenberg, 1912

(Figs. 1, 2D, E, 6C; Tables 1, 2)

Alycaeus costulosus Bavay & Dautzenberg, 1912: 49, pl. 4, figs. 1–4 (type locality: Phong Thổ, Lai Châu, Vietnam).
Pincerna costulosa – Páll-Gergely et al., 2017: 10, fig. 3F; 2020: 172; Chen & Wu, 2020: 45, figs. 1, 4C, D.

Types examined. Phong Tho, Tonkin, col. Messenger, MNHN-IM-2000-31786 (syntypes) (Fig. 2D); Phong-Tho, col. Messenger, No. 29, RBINS 525426.

Additional material examined. ZMHU/ 4 (Fig. 2E), Vietnam, Lai Châu Province, Phong Thổ District, Không Lào

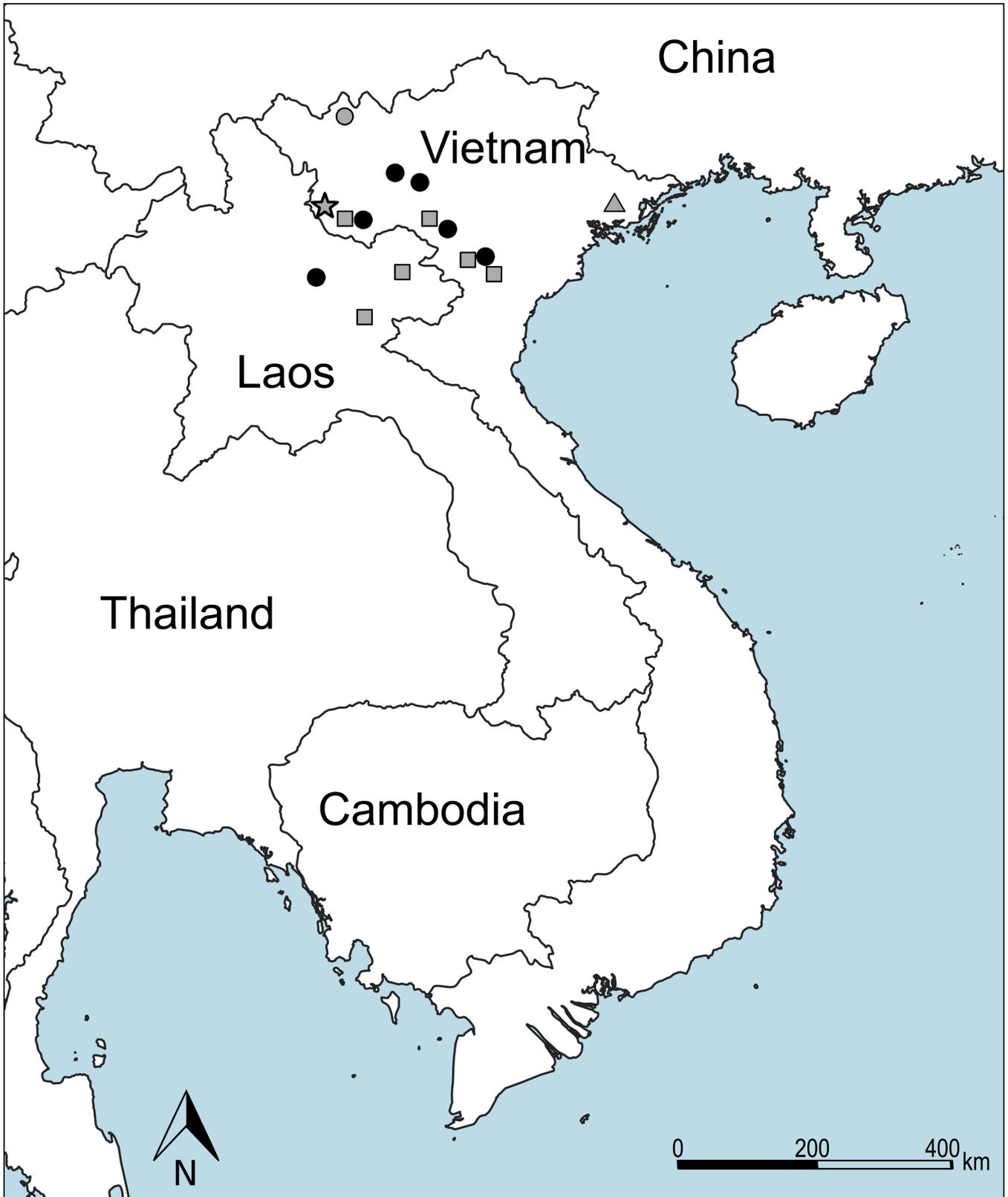


Fig. 1. Distribution of *Pincerna* species in Vietnam and Laos. Triangle: *Pincerna anceyi*; Grey circle: *Pincerna costulosus*; Black circles: *Pincerna mouhoti*; Squares: *Pincerna vanbuensis*; Star: *Pincerna clausa*, new species. The localities are detailed in Table 1.

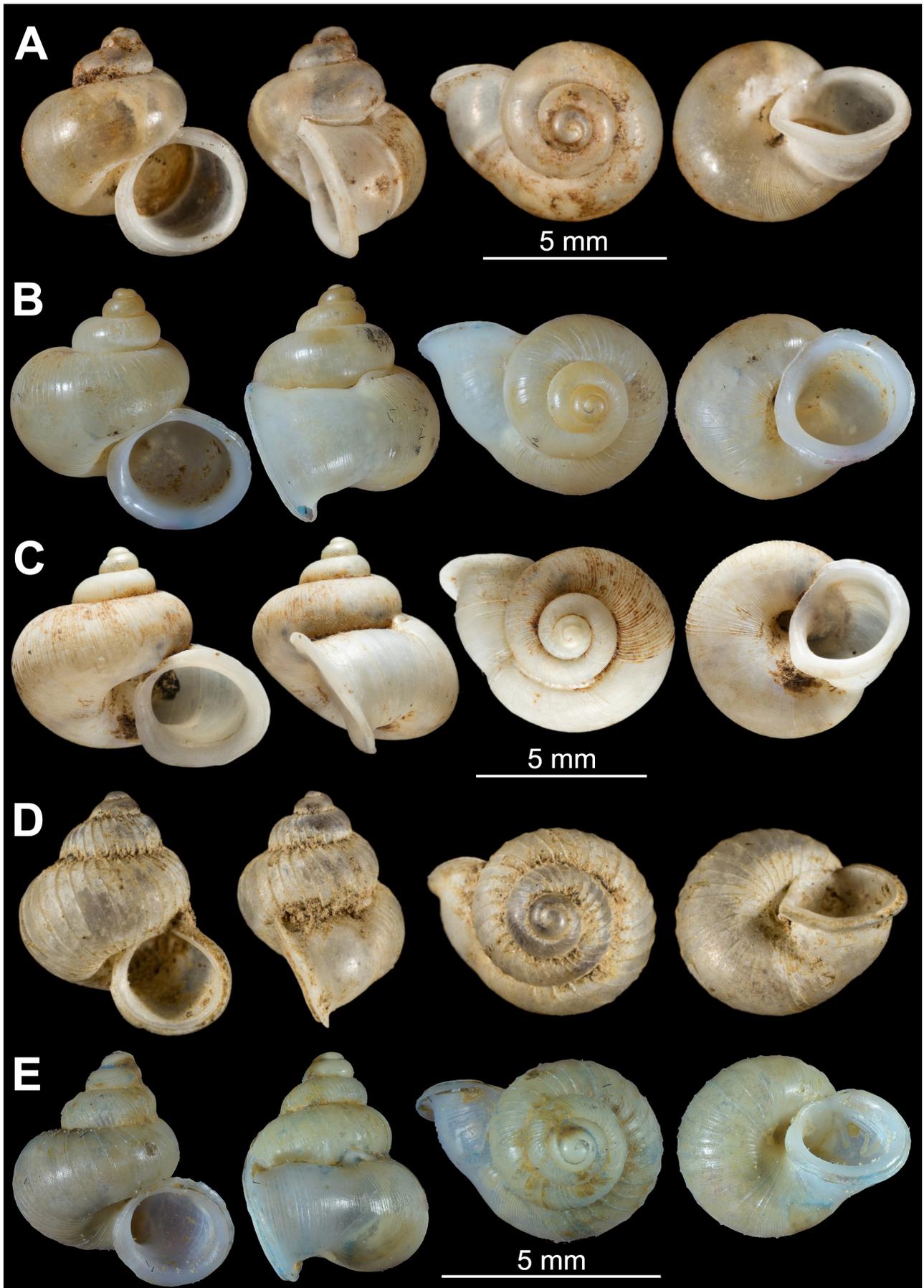


Fig. 2. Shells (apertural view, dorsal view, ventral view, and side view) of *Pincerna* species. A, *Pincerna anceyi* (Mabille, 1887), syntype MNHN-IM-2000-31797; B, C, *Pincerna mouhoti* (L. Pfeiffer, 1862): B, specimen from Mững La, Son La, Vietnam, ZMHU; C, syntype NHMUK 20170120; D, E, *Pincerna costulosus* Bavay & Dautzenberg, 1912: D, syntype MNHN-IM-2000-31786; E, specimen from Phong Thỏ, Lai Châu, Vietnam, ZMHU.

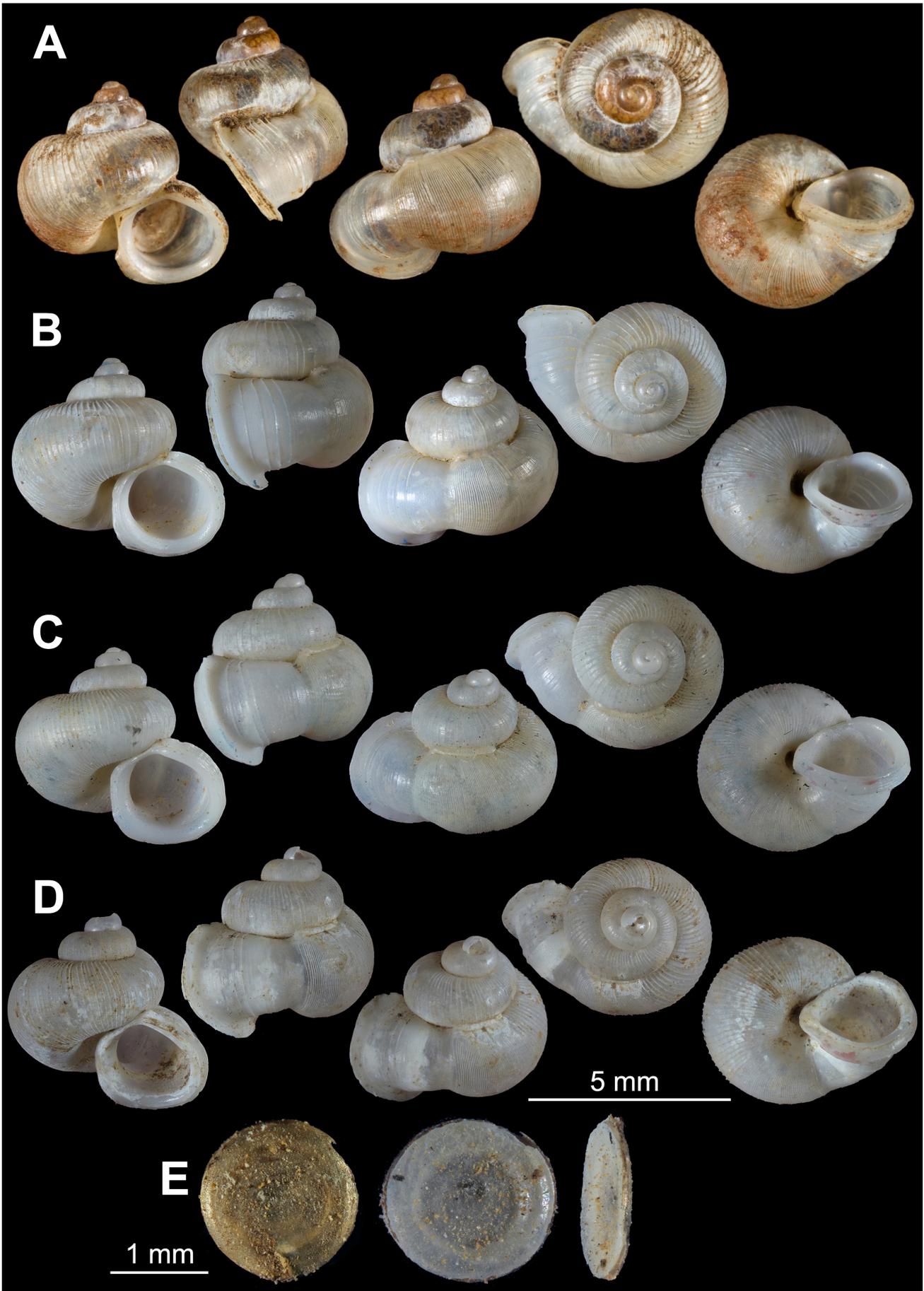


Fig. 3. Shells (apertural view, dorsal view, ventral view, and side view) and operculum (outer surface, inner surface, and side view) of *Pincerna vanbuensis* (Bavay & Dautzenberg, 1900). A, syntype MNHN-IM-2000-31798; B, E, specimen from Thuận Châu, Sơn La, Vietnam, ZMHU; C, specimen from Khoune, Xieng Khouang, Laos, ZMHU; D, specimen from Xiengkho, Houaphanh, Laos, ZMHU.

Commune, limestone outcrops, 22°35'20"N, 103°23'52"E, 889 m above sea level (a.s.l.), col. D.S. Do & V.T. Sin, 14 July 2015.

Diagnosis. *Pincerna costulosus* is characterised by a small sized, translucent, high conical shell with strongly, regularly ribs on R1, and R2 extremely short.

Distribution. *Pincerna costulosus* is known from northwestern Vietnam (Lai Châu Province) and Southwest China (Yunnan Province) (Chen & Wu, 2020).

Remarks. The species is quite stable in terms of shell characters, although only a few shells are known. *Pincerna costulosus* has been recently recorded from Xishuangbanna, Yunnan Province, China (Chen & Wu, 2020). The present record extends the distributed range circa 400 km to the west.

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

(Figs. 1, 2B, C, 6B; Tables 1, 2)

Alycaeus mouhoti L. Pfeiffer, 1863a (1862): 275, pl. 36, figs. 1, 2. (type locality: Lao Mountains, Laos).

Alycaeus mouhoti – L. Pfeiffer, 1863b: 228, 229, pl. 59, figs. 9–11; von Martens, 1867: 67; Reeve, 1878: pl. 3, species 19; Fischer, 1891: 108; Fischer & Dautzenberg, 1904: 432; Páll-Gergely et al., 2017: 10; Inkhavilay et al., 2019: 12, figs. 4A, B.

Alycaeus (Orthalycaeus) mouhoti – Kobelt & Möllendorff, 1897: 147; Ancey, 1898: 138.

Alycaeus (Alycaeus) mouhoti – Kobelt, 1902: 347; Saurin, 1953: 113.

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

Types examined. Lao Mountains, leg. Mouhot, NHMUK 20170120 (syntypes) (Figs. 2C, 6B).

Additional material examined. ZMHU/ 7, Vietnam, Hòa Bình Province, Mai Châu District, Hang Kia - Pà Cò Nature Reserve, near the road No. 6, between Hòa Bình and Sơn La, under rocks in primary forest, 20°45'47"N, 104°52'26"E, 829 m a.s.l., col. D.S. Do, 03 September 2017; ZMHU/ 8, Vietnam, Sơn La Province, Vân Hồ District, Vân Hồ Commune, Pa Cốp Village, densely vegetated limestone hill, 21°45'56"N, 104°44'30"E, 1013 m a.s.l., col. D.S. Do & V.T. Sin, 26 October 2013; ZMHU/ 7 (Fig. 2B), Vietnam, Sơn La Province, Mường La District, Mường Bú Commune, entrance of the Thăm Bó Cave, limestone slope with woody regrowth, 21°24'05"N, 104°06'13"E, 715 m a.s.l., col. D.S. Do & T.L. Nguyen, 27 October 2012; ZMHU/ 2, Vietnam, Sơn La Province, Phù Yên District, Mường Do Commune, Lẩn Village, steep limestone cliff, woody regrowth at foot, 21°11'46"N, 104°47'06"E, 674 m a.s.l., col. D.S. Do, 12 July 2014; ZMHU/ 3, Vietnam, Sơn La Province, Thuận Châu District, Co Mạ Commune, Cópia Nature Reserve, steep limestone slope with dense disturbed vegetation, 21°21'26"N, 103°31'18"E, 1246 m a.s.l., col. D.S. Do & T.H. Nguyen, 08 June 2013; ZMHU/ 2, Vietnam, Sơn La Province, Yên Châu District, Yên Sơn Commune, Chi Đầy Cave, primary forest on limestone, 21°08'30"N, 104°10'29"E, 815 m a.s.l., col. D.S. Do & X.H. Nguyen, 02 September 2017.

Diagnosis. *Pincerna mouhoti* is characterised by a medium-sized, translucent shell with rather regular ribs on R1, R2 long, smooth, slender and equal-spaced ribs and open umbilicus.

Distribution. *Pincerna mouhoti* is known from Laos (Luang Phrabang Province) and Vietnam (Sơn La and Hòa Bình Provinces) (Fischer, 1891; Saurin, 1953; Inkhavilay et al., 2019; this study).

Remarks. Figure 4E in Inkhavilay et al. (2019) shows that the shell surface is smooth, R2 long and smooth, and therefore it may belong to *P. mouhoti*.

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

(Figs. 1, 3A–E, 6E; Tables 1, 2)

Alycaeus (Dioryx) vanbuensis Bavay & Dautzenberg, 1900a: 120 (type locality: Van-Bu = Sơn La Province, Vietnam).

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

Dioryx vanbuensis – Kobelt, 1902: 340; Do et al., 2015: 120, fig. 2C.

Alycaeus vanbuensis – Fischer & Dautzenberg, 1904: 432; Páll-Gergely et al., 2017: 10, fig. 3C; Inkhavilay et al., 2019: 13, figs 4C–E.

Pincerna vanbuensis – Páll-Gergely et al., 2020: 184.

Material examined. Type material. Tonkin, Van-Bu, leg. Dr. R. Bavay, MNHN-IM-2000-31798 (syntype) (Figs. 3A, 6E); Van Bu, Tonkin, RBINS 525448 (paratypes).

Additional material examined. ZMHU/ 20, Vietnam, Sơn La Province, Thuận Châu District, Co Mạ Commune, Cópia Nature Reserve, steep limestone slope with dense disturbed vegetation, 21°21'25"N, 103°31'14"E, 1239 m a.s.l., col. D.S. Do & T.H. Nguyen, 08 June 2013; ZMHU/ 11, Vietnam, Sơn La Province, Mai Sơn District, Mường Bằng Commune, Nà Hoi Village, limestone hill with degraded regrowth, 21°18'11"N, 104°02'16"E, 779 m a.s.l., col. D.S. Do & T.L. Nguyen, 22 November 2013; ZMHU/ 23 (Figs. 3B, E), Vietnam, Sơn La Province, Thuận Châu District, Bon Phặng Commune, Đóm Hượn Village, 21°22'23"N, 103°46'19"E, 605 m a.s.l, limestone karst, col. D.S. Do & T.D. Luong, 20 August 2013; ZMHU/ 5, Vietnam, Sơn La Province, Yên Châu District, Yên Sơn Commune, Chi Đầy Cave, primary forest on limestone, 21°08'30"N, 104°10'29"E, 815 m a.s.l., col. D.S. Do & X.H. Nguyen, 02 September 2017; ZMHU/ 4, Vietnam, Hòa Bình Province, Mai Châu District, Tân Sơn Commune, Bó Liêm Village, under rocks in old secondary forest, 20°10'29"N, 104°58'17"E, 553 m a.s.l., col. D.S. Do & C. Vilachark, 07 January 2018; ZMHU/ 9, Vietnam, Ninh Bình Province, Cúc Phương National Park, limestone outcrops in shale bedrock of primary forest, 20°21'13"N, 105°54'22"E, 297 m, col. D.S. Do & T.L. Nguyen, 19 August 2016; ZMHU/ 26 (Fig. 3C), Laos, Xieng Khouang Province, Khoune District, Nam Phan Commune, Pa Kha Village, limestone area near village, 19°31'59"N, 103°31'01"E, col. C. Vilachark, 26 July 2018; ZMHU/ 18 (Fig. 3D), Laos, Houaphanh Province, Xiengkho District, Na Tong Village, limestone hills, col. P.S.L. Ti Khun, 20 August 2018.



Fig. 4. Shell (apertural view, dorsal view, ventral view, and side view) of *Pincerna clausa*, new species. A, holotype VNMN-IZ 002.304; B, C, paratypes ZMHU. MOL 044.

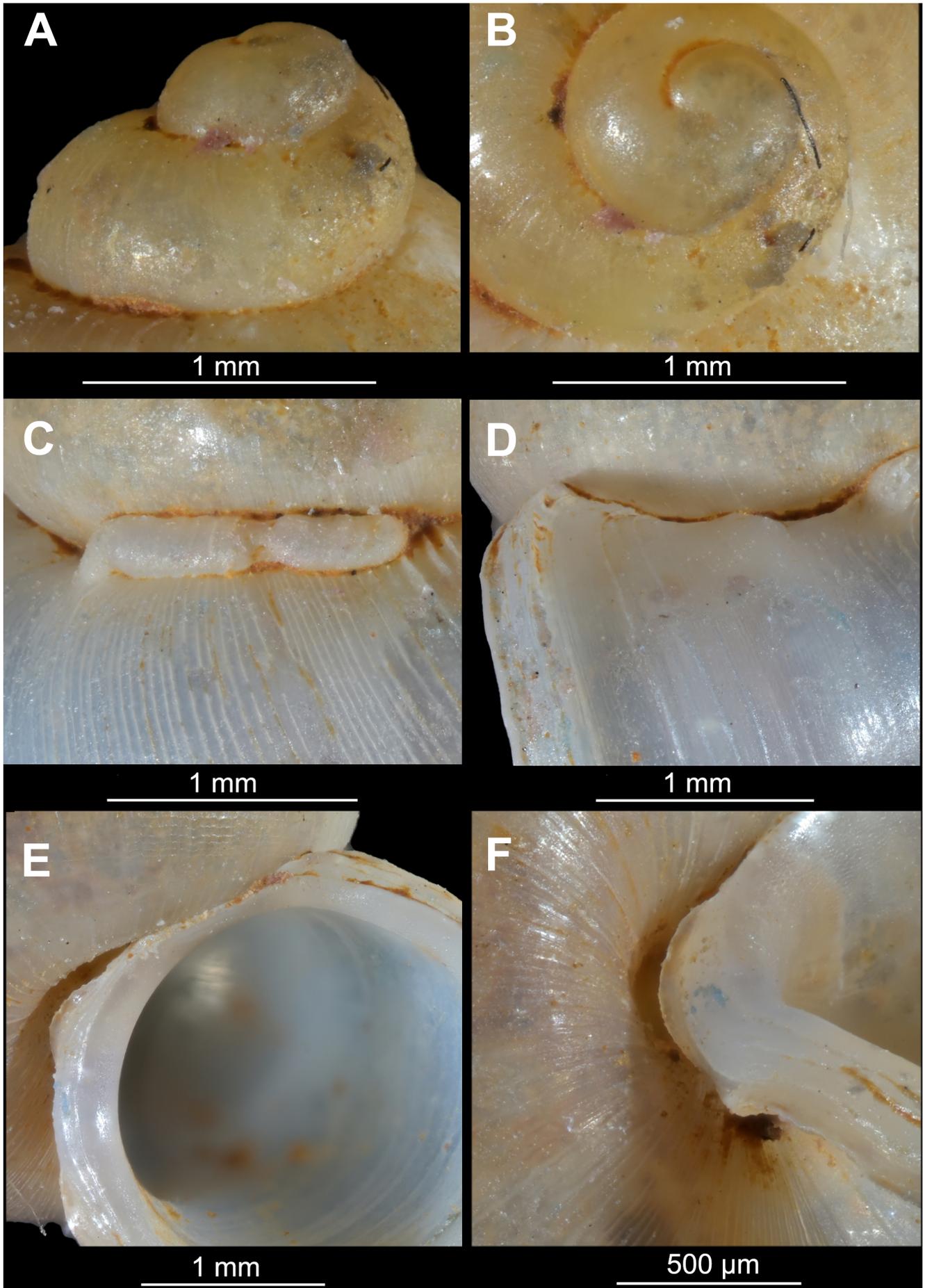


Fig. 5. Details of the shell of *Pincerna clausa* n. sp. (holotype VNMN-IZ 002.304). A–B, protoconch; C, R2 and sutural tube; D, R3 and boundary between R2 and R3; E, aperture; F, umbilicus.

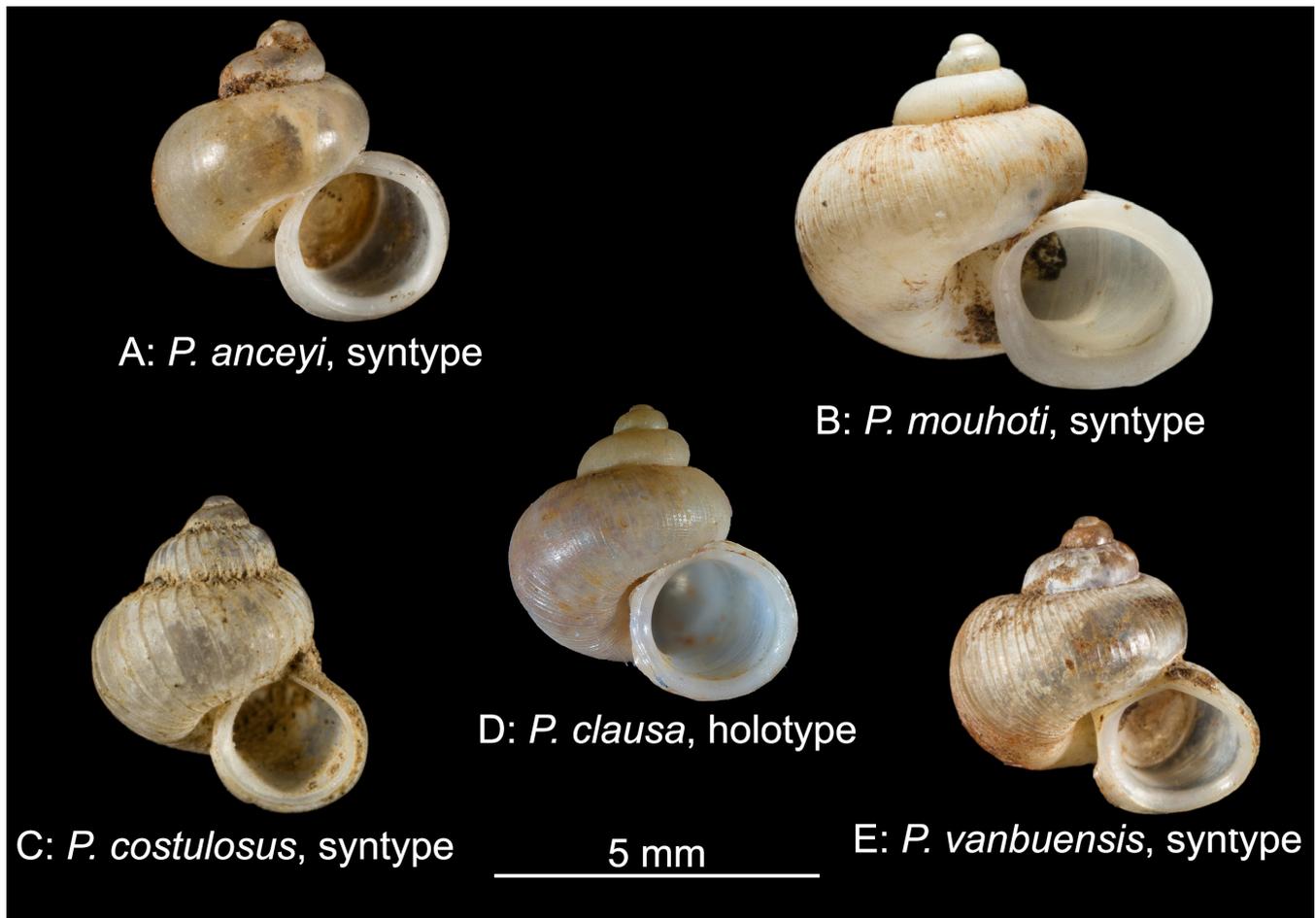


Fig. 6. Synoptic view of Vietnamese and Laos *Pincerna* species. A, MNHN-IM-2000-31797; B, NHMUK 20170120; C, MNHN-IM-2000-31786; D, VNMN-IZ 002.304; E, MNHN-IM-2000-31798.

Diagnosis. *Pincerna vanbuensis* is characterised by a small sized, globular shell with irregular, clearly visible ribs on R3.

Distribution. This species is known from Vietnam (Sơn La, Hòa Bình, Quảng Ninh, Ninh Bình Provinces) and Laos (Luang Namtha and Luang Phrabang Provinces) (Vermeulen & Maassen, 2003; Inkhavilay et al., 2019).

Remarks. Its type locality Van-bu most probably refers to “Vạn Bú” Province, which was established in 1895 and remained until 1904. This species clearly differs from *P. anceyi* and *P. costulosa* because its R2 is relatively long, while its R1 possesses clearly visible and regular spaced ribs. The operculum of three specimens have been examined. The inner surface of operculum is smooth, glossy and has no central nipple. The outer surface is relatively flat, with indistinct appressed multilamellae. *Pincerna vanbuensis* is a very variable species in terms of shell size, sculpture of R1 and R3, number of R2 ribs and the extension of the columella (see Tables 1, 2).

***Pincerna clausa*, new species**

(Figs. 1, 4A–C, 5A–F, 6D; Tables 1, 2)

Type material. Holotype (1 shell, height 5.2 mm, width 5.0 mm; Figs. 4A, 6D) (VNMN-IZ 002.304), Vietnam, Điện Biên Province, Điện Biên District, Na Ủ Commune, near Tây

Trang international border gate at the Vietnam - Laos border region, exposed limestone with little soil and vegetation of herbs, 814 m a.s.l., 21°13'34"N, 102°58'3"E, col. D.S. Do & C. Vilachark, 08 December 2018; Paratypes: 3 paratypes (ZMHU. MOL 044), same data as holotype.

Etymology. This new species is named for its conspicuous closed umbilicus (Latin: *clausa* = close).

Diagnosis. *Pincerna clausa*, new species, is characterised by a small sized, globular shell with clearly spiral striation on R1 and a closed umbilicus, which is completely obscured by the reflected columellar extension.

Description. Shell globose, off-white, rather glossy, medium sized (height 5.1–5.3 mm, width 4.9–5.0 mm). Spire high, slightly obtuse (spire height 1.3–1.4, spire width 1.8–2.0 mm). Whorls 4.25–4.5, the periphery rounded. Suture rather deep. Protoconch smooth, glossy, without spiral striation, 1.25–1.75 whorls. R1 of 2.0 whorls, with rather regular, indistinct and low ribs, and clearly spiral striation; on the first part of R1 the ribs are rather weak and irregular, on the last part, however, they are close together and sharp, with well visible spiral striation (Figs. 4, 6D). R1 and R2 boundary conspicuous due to denser and slender R2 ribs. R2 and breathing tube relatively long (breathing tube length ca 1.2–1.4 mm), consisting of 34–41 stripes, which are slender

Table 1. Shell size variation of *Pincerna* spp. specimen collections in this study

Species and locality	No. of specimens	Shell height (SH, in mm)	Shell width (SW, in mm)	SH/SW ratio	Aperture diameter (in mm)
<i>Pincerna anceyi</i>					
1. Tonkin, Vietnam (Mabille, 1887)	–	5.0	3.5–5.0	1.00	–
<i>Pincerna costulosus</i>					
2. Không Lào, Phong Thổ, Lai Châu, Vietnam	4	4.8–5.3	4.6–5.2	1.02–1.04	2.4–2.8
<i>Pincerna mouhoti</i>					
3. Ngoy, Luang Phrabang, Laos (Inkhavilay et al., 2019)	–	5.25	6.3–7.7	0.68	–
4. Hang Kia – Pà Cò Nature Reserve, Hòa Bình, Vietnam	7	6.2–6.5	6.5–6.9	0.92–0.97	3.5–3.8
5. Pa Cốp, Vân Hồ, Sơn La, Vietnam	10	6.2–6.5	6.2–7.0	0.94–1.00	3.4–3.8
6. Thảm Bó Cave, Mường La, Sơn La, Vietnam	17	6.8–7.1	6.7–6.8	1.00–1.04	3.8–4.0
7. Lăn, Mường Do, Phù Yên, Sơn La, Vietnam	2	6.9–7.0	6.7–6.8	1.02–1.03	3.7–3.8
8. Copia Nature Reserve, Sơn La, Vietnam	3	6.0–6.2	6.2–6.3	0.95–1.00	3.2–3.4
<i>Pincerna vanbuensis</i>					
9. Copia Nature Reserve, Sơn La, Vietnam	20	5.4–5.6	5.7–5.8	0.93–0.97	3.1–3.3
10. Chi Đầy Cave, Yên Châu, Sơn La, Vietnam	5	4.5–4.8	5.0–5.2	0.90–0.93	2.5–2.7
11. Tân Sơn, Mai Châu, Hòa Bình, Vietnam	4	4.9–5.0	5.0–5.1	0.90–0.94	2.5–2.6
12. Cúc Phương N.P., Ninh Bình, Vietnam	9	4.8–5.1	4.9–5.0	0.96–1.02	2.4–2.6
13. Nam Phan, Khoune, Xieng Khaong, Laos	26	5.0–5.4	5.3–5.7	0.93–0.95	2.8–3.0
14. Xiengkho, Houaphanh, Laos	18	5.0–5.1	4.9–5.2	0.95–1.04	2.8–3.1
<i>Pincerna clausa</i>, new species					
15. Na Ủ, Điện Biên, Điện Biên, Vietnam	4	5.1–5.3	4.9–5.0	1.04–1.06	3.0–3.1

Table 2. Comparison of diagnostic conchological characters among *Pincerna* species in this study.

Species	Sculpture of R1	No. of R2 ribs	R2 length compared to R3	Umbilicus	Number of whorls
<i>P. anceyi</i>	weakly ribbed	26	≤ R3	narrow	4.5
<i>P. costulosus</i>	strongly ribbed	14–20	≤ R3	narrow	4.5–5.0
<i>P. mouhoti</i>	strongly ribbed	35–76	≥ R3	wide	4.5
<i>P. vanbuensis</i>	strongly ribbed	65–71	~ R3	narrow	4.25–4.5
<i>P. clausa</i>	weakly ribbed	34–41	≤ R3	closed	4.25–4.5

and slightly elevated from the surface, overall surface slightly wrinkled. R3 slightly longer than R2; boundary between R2 and R3 distinct due to constriction and change in sculpture. R3 smooth, glossy, with some widely spaced, irregular and weak ribs on the terminal part. Aperture circular, moderately expanded (aperture diameter 3.0–3.1 mm). Peristome double, slightly thickened; outer peristome sharp, expanded but not reflected; inner peristome protruding, sharp; outer and inner peristomes are clearly separated. Umbilicus narrow and completely obscured by the reflected columellar extension.

Operculum. Unknown.

Distribution. The new species is thus far known only from the limestone hill in Na Ủ Commune, Điện Biên District, Điện Biên Province, northwest Vietnam (Fig. 1).

Remarks. This new species has a similar shell shape as *Pincerna vanbuensis* but differs in having a closed umbilicus, stronger spiral striation on R1, and weaker ribs on R2. *Pincerna clausa*, new species, also resembles *Pincerna costulosus* in shell shape but differs in its more pronounced spiral striation as well as R1 with denser and weaker ribs. It differs from *Pincerna anceyi* by having much stronger, more widely-spaced ribs, well visible spiral striation and closed umbilicus. It differs from *P. mouhoti* by having a narrow umbilicus and smaller shell size.

DISCUSSION

Up to now, five species of *Pincerna* have been found from Vietnam and Laos, mainly in forests over limestone.

Among these, *P. vanbuensis* clearly shows large intraspecific variability in terms of shell size, sculpture and the formation of peristome, while *P. costulosus* and *P. mouhoti* show little intraspecific variability in terms of shell characters (Figs. 2, 3).

In Vietnam, *Pincerna* species have not yet been recorded in the south-central and southern regions. This is probably due to the lack of major limestone habitats, along with the difference in climatic and floristic characters in central and southern Vietnam when compared with northern Vietnam. In addition, southern Vietnam (or the Mekong Delta) has quite a homogeneous topography, consisting of relatively flat geologic structures with mainly red basaltic soils and alluvial soil (Averyanov et al., 2003; Sterling & Hurley, 2005; Sterling et al., 2006). However, currently our knowledge of fauna in central and southern Vietnam and Laos is still limited, so more field surveys are needed and molecular studies will certainly help with generating a better assessment of its diversity.

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