

A new species of Alycaeidae, *Pincerna yanseni* n. sp. from Sumatra, with the resurrection of the genus *Pincerna* Preston, 1907 (Gastropoda: Cyclophoroidea)

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Abstract. *Pincerna yanseni* n. sp. is described from six localities in west Sumatra, Indonesia. Shell characters, including a cross-sectional view of the breathing tunnels, as well as the operculum and radula are described and illustrated. Surprisingly, this new species is most similar to northeastern Indian species assigned to the genus *Cyclorhynchus* Godwin-Austen, 1914. The main shell characters of *Cyclorhynchus* and *Pincerna* (ovately conoid shells shape; regular ribbing on the upper whorls; extremely short, often clubbed or pear-shaped sutural tube) are remarkably similar. Therefore, *Cyclorhynchus* is designated as a junior synonym of *Pincerna* Preston, 1907, herein.

Key words. taxonomy, systematics, distribution, new species, Indonesia, Sumatra, Alycaeidae

INTRODUCTION

The Alycaeidae include the Madagascan endemic *Boucardicus* Fischer-Piette & Bedoucha, 1965, with approximately 200 species and subspecies (Emberton, 2002; Balashov & Griffiths, 2015), and roughly 350 Asian species and subspecies, which are currently classified into 11 genus-group taxa. All Asian species are characterised by a sutural tube that is closed at its posterior end and is in contact with several perpendicularly running, very narrow breathing tunnels, which originate in the umbilicus (Páll-Gergely et al., 2016). The Asian Alycaeidae occur from western India eastward to Japan, Korea in the north and Indonesia to the south (Godwin-Austen, 1882–1920; Benthem Jutting, 1948, 1959; Minato, 1988). The centres of the Asian diversity, inferred by the number of known species, are the southeastern Himalaya region, Japan, and the Malay Archipelago.

10 species and subspecies of Alycaeidae have been reported from Sumatra and its satellite islands: *Chamalycaeus longituba* (Martens, 1867), *Chamalycaeus troglodytes* (Rensch, 1934), *Chamalycaeus crassicollis* (Benthem Jutting, 1959), *Alycaeus liratus* (Preston, 1907), *Alycaeus sumatranus* (Martens, 1900), *Alycaeus praetextus* (Benthem Jutting, 1959), *Alycaeus crenilabris laevis* Benthem Jutting, 1959, *Alycaeus crenilabris latecostatus* Benthem Jutting, 1959, *Alycaeus reinhardtii sabangensis* (Rensch, 1933) and *Alycaeus wilhelminae* (Maassen, 2006) (see Rensch, 1933; Benthem Jutting, 1959; Maassen, 2006).

Recently, I was unable to assign specimens received from West Sumatra island to a known species, and these are described as a new species herein. Interestingly, the new species is remarkably similar to some *Cyclorhynchus* species, mostly known from northeastern India.

MATERIAL & METHODS

Among the examined specimens of the new species, one was collected alive and the shell contained a desiccated body. The body was placed in distilled water overnight and then soaked in 2M KOH solution for approximately 20 hours. The extremely fragile radula was preserved in 70% ethanol, and later examined by SEM.

The shells and radula were directly observed without coating under a low vacuum SEM (Miniscope TM-1000, Hitachi High-Technologies, Tokyo).

Nomenclature (Terminology). Determination of number of shell whorls (precision to 0.25 whorl) follows Kerney & Cameron (1979: 13). The sculpture of the body whorl along the sutural tube always differs from that of the other regions of the shell (Godwin-Austen, 1882–1920). This is because the breathing tunnels run perpendicular to the sutural tube (Páll-Gergely et al., 2016). Therefore, I distinguish three regions of the teleoconch. Region 1 (R1) extends from the point of origin of the teleoconch to the beginning of the sculpturally-distinct region along the suture. Region 2 (R2) includes the sculpturally-distinct region prior to the constriction of the body whorl (this is located immediately posterior to the peristome). Region 3 (R3) extends from the constriction to the peristome. The nomenclature (terminology) of the breathing tunnels follows Páll-Gergely et al. (2016).

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Comparisons. *Pincerna yanseni* n. sp. was compared with all similar species described from Sumatra, the neighbouring islands and Peninsular Malaysia. Furthermore, it was compared with type specimens of all *Cyclorix* species in the NHM. The comparisons with only the most similar species are provided here. The following samples formed the basis of comparisons:

Pincerna liratulula Preston, 1907: NHMUK 1907.5.20.191–192 (2 syntypes)

Pincerna thieroti (Morgan, 1885): MNHN-IM-2000-31799; syntype

Pincerna constrictum (Benson, 1851): NHMUK 1906.04.04.41 (5 syntypes)

Pincerna costata (Godwin-Austen, 1914): NHMUK 1903.07.01.2596 (18 syntypes)

Pincerna elegans (Godwin-Austen, 1914): NHMUK 1903.07.01.2594 (holotype)

Pincerna khunhoensis (Godwin-Austen, 1914): NHMUK 1903.07.01.2520 (holotype)

Abbreviations.

HNHM	: Hungarian Natural History Museum, Budapest
MZB	: Museum Zoologicum Bogoriense, Bogor, Indonesia
NHM	: The Natural History Museum (London, UK)
NHMUK	: When citing NHM registered specimens
PGB	: Collection B. Páll-Gergely (Mosonmagyaróvár, Hungary)
WM	: Collection Wim J. M. Maassen (Echt, The Netherlands)
YSC	: Collection Y. Chen (Medan, Sumatera Utara, Indonesia)
ZRC	: Zoological Reference Collection of the Lee Kong Chian Natural History Museum, National University of Singapore

TAXONOMY AND SYSTEMATICS

Family Alycaecidae W.T. Blanford, 1864

Alycaecinae Blanford, 1864: 465

Genus *Pincerna* Preston, 1907

Pincerna Preston, 1907: 206. (introduced as a subgenus of *Alycaeus*, but apparently used on genus level).

Alycaeus (*Cyclorix*) Godwin-Austen, 1914: 334. **New synonym**

Type species. *Pincerna liratulula* Preston, 1907, by monotypy. *Alycaeus thieroti* Morgan, 1885 (Type locality: “G. Lano” near Perak) is very similar to *Pincerna liratulula* (“Ke-lantan” in the Malay Peninsula); the latter might be a junior synonym of the former.

Remarks. The genus-level revision of the family Alycaecidae is in progress and beyond the scope of the present paper. However, to place the new species in a genus correctly, some information on the relationship of the genus *Cyclorix* Godwin-Austen, 1914, and *Pincerna* Preston, 1907, must be added.

The discovery of *Pincerna yanseni* n. sp. is surprising because it shows only superficial similarity with most other Alycaecidae of the Malay Archipelago, but it is similar to many species from northeastern India and Myanmar classified in the genus *Cyclorix*. The genus *Cyclorix* (type species: *Alycaeus constrictus* Benson, 1851 by original designation, Fig. 1A) was erected as a subgenus of *Alycaeus* Baird, 1850, and was diagnosed on the basis of the ovately conoid shell shape, the regular ribbing on the upper whorls, and the extremely short, often clubbed or pear-shaped sutural tube (Godwin-Austen, 1914). Godwin-Austen (1914) only included species from northeastern India and Burma (Rakhin = Arakan, and the Shan States). However, the diagnosis of *Cyclorix* matches several species extralimital to the distributional range as defined by Godwin-Austen: *Alycaeus costulosus* Bavay & Dautzenberg, 1912 (northern Vietnam), *Alycaeus globosus* H. Adams, 1870 and its subspecies (Borneo), *Dioryx maolanensis* Luo et al., 2009 (Guizhou, China), *Alycaeus thieroti* Morgan, 1885 (Perak, Malay Peninsula), and *Pincerna liratulula* Preston, 1907 (Malay Peninsula and Sumatra). Some populations of the latter species have a slightly longer tube than the other species, but have the typical rather globular shell shape with strong radial sculpture.

Originally, the subgenus *Pincerna* was diagnosed on the basis of a “circular cup” on the outer surface of the operculum. The outer surface of operculum, however, has limited taxonomic value on the genus level in the Alycaecidae, especially that outer rings have been developed in multiple alycaeid genera (Páll-Gergely et al., in press). Consequently, no important shell characters distinguish *Cyclorix* and *Pincerna*, and they should be synonymised. Because *Pincerna* has been introduced earlier, *Cyclorix* is a junior synonym.

Pincerna yanseni Páll-Gergely n. sp.

Figs. 1B, 2A–F, 3A–E, 4.

Type material. Holotype (1 shell: MZB.Gst. 18.970), Indonesia, Sumatera Barat (West Sumatra), Solok Selatan (South Solok Regency), Koto Parik Gadang Diatesh subdistric, Goa [=cave] Pinti kayu, Near Sungai [=river] Dareh, approximate GPS position: 1.3027°S, 101.1164°E, found in soil sample collected by local people, 26 February – 2 March 2015.

Paratypes: HNHM 99999/1, NHMUK 201700137/1, SMF 349027/1, PGB/2, YSC/15, Same data as holotype; WM/11, IND.38, West Sumatra, Baso, 14 km NW of Bukittinggi in direction Payakumbuh, overgrown limestone outcrop along road, approx. GPS coordinates: 0°16.6'S, 100°29'E, coll. Maassen, W.J.M., July 1996; WM/1, IND.42 West Sumatra, near entrance of Cave Gua Pangian, 3 km N of village Lintau, SE of Bukittinggi, 0°28'19.5"S, 100°45'11.7"E, coll. Maassen, W.J.M., July 1996; WM/3, Same locality, coll. Maassen, W.J.M., July 1997; IND.66 West Sumatra, Kampung Desa Gadut, limestone rocks near the village, E of Payakumbuh, 0°15'36.0"S, 100°43'58.7"E, leg. Maassen W.J.M., July 1997, WM/3 paratypes; WM/3, IND.67 West Sumatra, Kampung Desa Gadut, limestone rocks half hour walk from village, E of Payakumbuh, 0°15'35.1"S,



Fig. 1. Shells of *Pincerna* species. A, *Pincerna constricta* (Benson 1851) (type species of *Cyclorhynchus*), NHMUK 1906.4.4.41 (syntype); B, *Pincerna yanseni* n. sp. MZB.Gst. 18.970 (holotype); C, *Pincerna liratula* Preston, 1907 (type species of *Pincerna*), NHMUK 1907.5.20.191, (syntype). Scale = 1 mm, upper scale refers to A–B. Photos: H. Taylor (A, C) and B. Páll-Gergely (B).

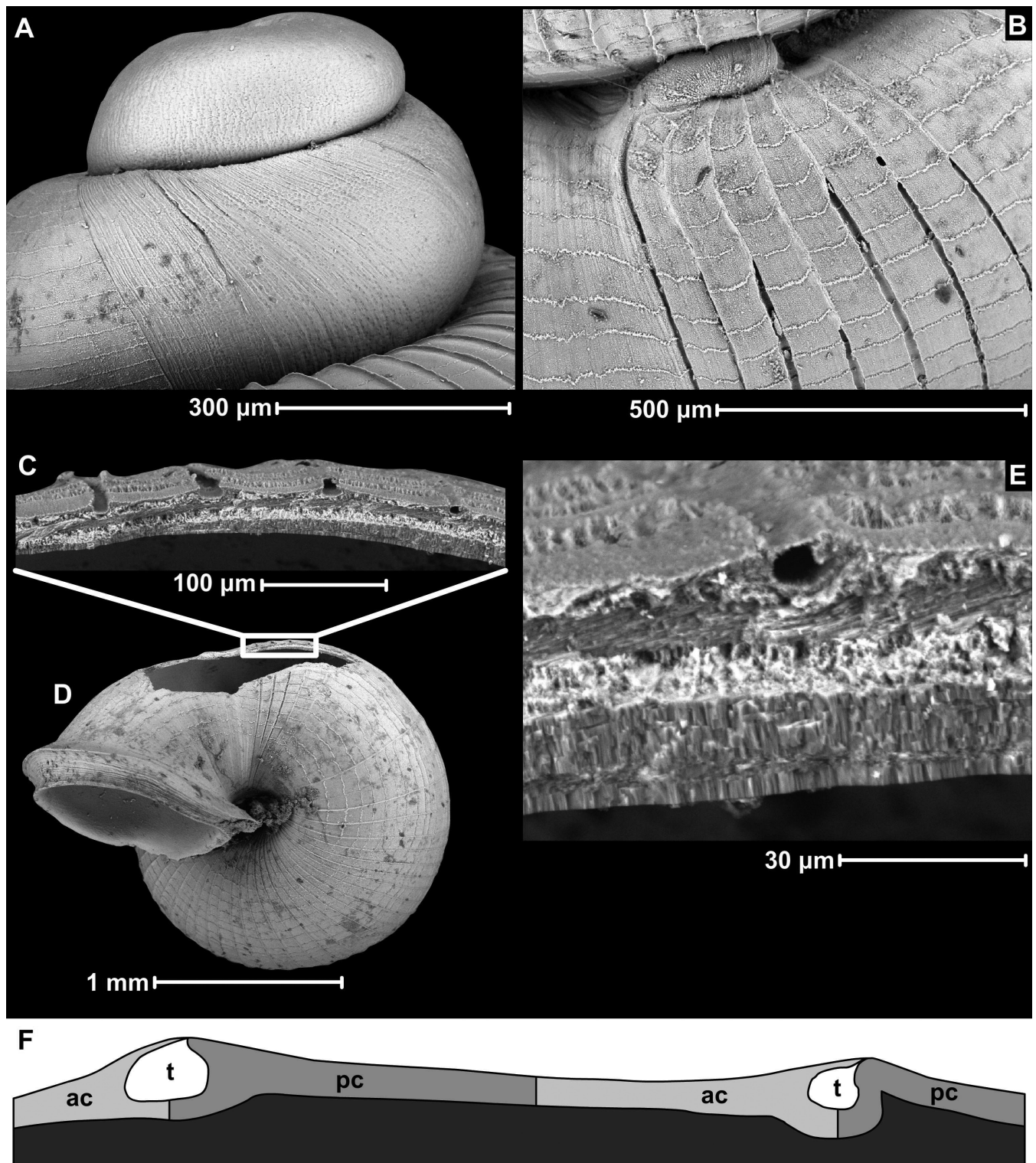


Fig. 2. Details of the shell of *Cycloryx yanseni* n. sp. (all specimens were collected at the site IND.65). A, protoconch (specimen3); B, sutural tube and the corresponding breathing tunnels (specimen2); C–E, cross sectional view of the breathing tunnels (specimen1); F, schematic drawing of the breathing tunnels. Abbreviations: ac, anterior crust; pc, posterior crust; t, tunnel.

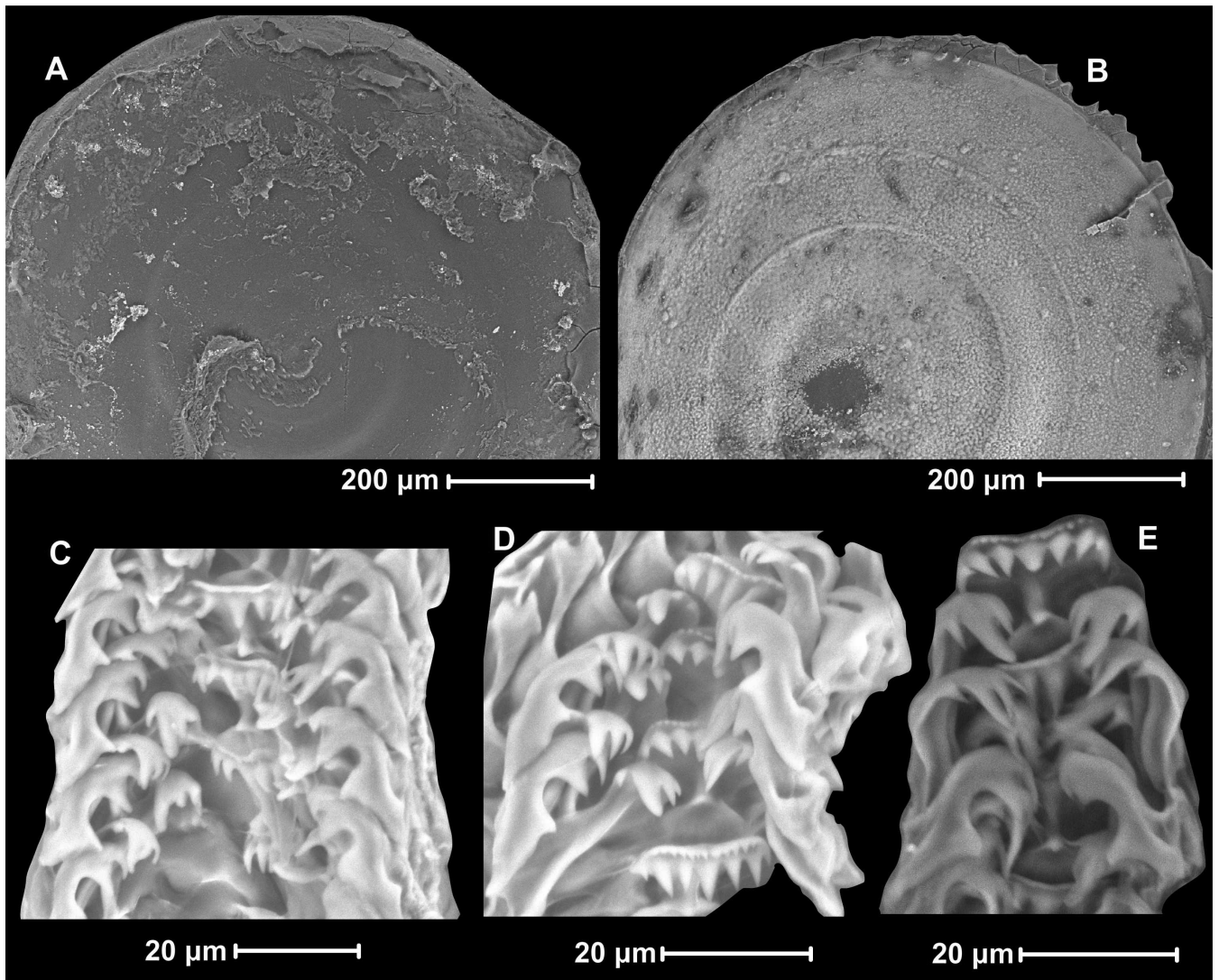


Fig. 3. Inner (A) and outer (B) side of the operculum and radula (C–E) of *Pincerna yanseni* n. sp. (population: IND.35).

100°44'01.1"E, coll. Maassen, W.J.M, July 1997; WM/1 (live collected specimen), IND.35 West Sumatra, Bungus Bay, 25 km SE of Padang, 2 km N of village near waterfall, coll. Maassen, W.J.M, July 1997; PGB/5, WM/33 + 3 figured shells, ZRC.MOL.9410/2, IND.65 West Sumatra, at cave near Sitimbuk, 30 km E of Bukittinggi, 0°21'05.6"S, 100°34'10.1"E, coll. Maassen, W.J.M, July 1996.

Etymology. This new species is dedicated to Yansen Chen (Medan, Indonesia), who first called my attention to this species and provided shell material.

Description. (Figs. 1B, 2A–F): Shell conical ovoid, translucent; 3.5–3.75 rounded whorls, suture deep; protoconch slightly more than 1.5 whorls; protoconch glossy, lacking prominent sculptural features (Fig. 2A); first 1.75 whorls of R1 with low, relatively dense, regular ribs and weaker, dense spiral striation; this sculpture gradually changes to a more sparsely ribbed region, which spans approximately half a whorl; R2 and tube very short, with 8–9 ribs that are very slender and only slightly elevated from the surface; R2 ribs lighter in colour than rest of shell; anterior crust thin, nearly horizontal, without an elevated rib, forming a tunnel with

the more robust posterior crust (Figs. 2B–F); R3 with fine, regular spiral, and irregular radial lines, the spiral ones are dominant; aperture rounded; outer peristome widened, sharp, expanded, but not reflexed, and does not cover the umbilicus as in most other *Pincerna* species; inner peristome slightly protruding, sharp; the two peristomes are clearly separated; umbilicus open, slit-like.

Operculum. The operculum of one specimen could be examined. The inner surface is smooth, no central nipple observed (Fig. 3A). The outer surface nearly smooth, but its multispiral character discernible (Fig. 3B).

Radula. (Fig. 3C–E): Radula taenioglossate. Teeth arranged in v-shaped rows, each transverse row with seven teeth (2-1-1-1-2). Rachidian tooth strongly constricted in its middle part, and having seven short, very attenuate cusps, of which the central one is the largest; the two cusps on either side of the central cusp subequal, whereas the single outermost cusp is very small. The inner marginal and the two outer marginal teeth have shallower constriction of the plates, and are longer and more slender than the central tooth. The inner marginal teeth have four cusps, the third (counting from the

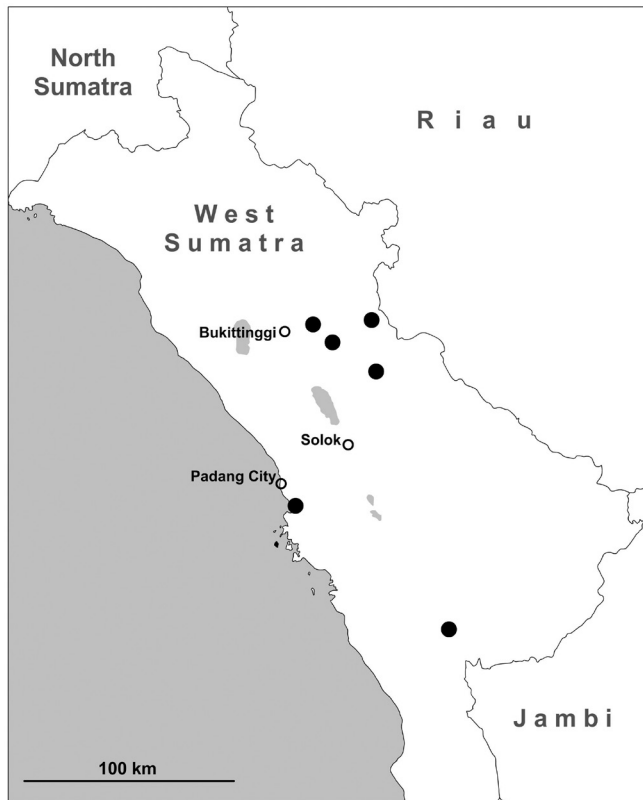


Fig. 4. Distribution (filled circles) of *Pincerna yanseni* n. sp.

side of the rachidian tooth) is the largest. The outer marginal teeth have four very attenuate, triangular cusps.

Measurements. Shell diameter: 2.4–2.6 mm, Shell height: 2.6–2.8 mm (n=3).

Differential diagnosis. In shape and sculpture, *Pincerna yanseni* n. sp. resembles *Pincerna liratula*, which also inhabits Sumatra. However, *P. liratula* is much larger than the new species, the constriction between R2 and R3 is deeper, has a larger thickening on R3, and a weaker inner peristome. Moreover, some *P. liratula* populations have a more elongated tube. Two Sumatran subspecies of *Alycaeus crenilabris* are slightly larger, have much longer tubes, stronger radial ribs, and weaker spiral sculpture.

Extralimital *Pincerna* species differ from *P. yanseni* n. sp. in the following shell characters: *P. constricta*: similar in size and shape to the new species, but has a more elevated spire, stronger and more widely-spaced ribs, weaker spiral striation; *P. costata*: similar in size, but has much stronger, more widely-spaced ribs, weaker spiral striation and stronger constriction; *P. elegans*: similar to the new species in terms of shell shape and size, but with denser ribs and much finer and denser spiral striation. Moreover, *P. elegans* has a thin projection of the outer peristome which occludes the umbilicus; *P. khunhoensis*: similar to the new species in shell size, but has a more elevated spire which results in a rather conical shell shape. Moreover, *P. khunhoensis* possesses stronger, more widely-spaced ribs, much weaker spiral striation, and a less expanded peristome.

Type locality. Indonesia, Sumatera Barat (West Sumatra), Solok Selatan (South Solok Regency), Koto Parik Gadang Diateh subdistrict, Goa [=cave] Pinti Kayu, near Sungai [=river] Dareh, approximate GPS position: 1.3027°S, 101.1164°E.

Distribution. *Pincerna yanseni* n. sp. is known from six localities in West Sumatra Province, Sumatra Island, Indonesia (Fig. 4).

Remarks. The cross sectional view of the breathing tunnels have only been described in *Alycaeus conformis* (Fulton, 1902) so far (Páll-Gergely et al., 2016). In that species, the anterior crust folds over the posterior one, and has a blunt, but well-developed rib on the anterior crust. The formation of the breathing tubes is species or species group-specific (unpublished information), and should be described in details in as many alycaeid species as possible.

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LITERATURE CITED

- Adams H (1870) Descriptions of two new genera and five new species of shells. *Proceedings of the Zoological Society of London*, 1870: 793–795.
- Baird W (1850) *Nomenclature of Molluscan Animals and Shells in the Collection of the British Museum. Part I. Cyclophoridae*. Printed by order of the trustees [by Spottiswoodes and Shaw], London, 69 pp.
- Balashov I & Griffiths O (2015) Two new species of minute land snails from Madagascar: *Boucardicus monchenko* sp. nov. and *B. ambindaensis* sp. nov. (Caenogastropoda: Cyclophoridae). *Zootaxa*, 4052(2): 237–240.
- Bavay A & Dautzenberg P (1912) Description de Coquilles nouvelles de l'Indo-Chine. *Journal de Conchyliologie*, 60: 1–54.
- Benson WH (1851) Geographical notices, and characters of fourteen new species of *Cyclostoma*, from the East Indies. *The Annals and Magazine of Natural History, Ser. 2*(8): 184–195.
- Bentham Jutting WSS van (1948) Systematic studies on the non-marine mollusca of the Indo-Australian archipelago. 1. Critical revision of the Javanese operculate landshells of the families Hydrocenidae, Helicinidae, Cyclophoridae, Pupinidae and Cochlostomatidae. *Treubia*, 19: 539–604.
- Bentham Jutting WSS van (1959) Catalogue of the non-marine Mollusca of Sumatra and of its satellite islands. *Beaufortia*, 7(83): 41–191.
- Blanford WT (1864) On the classification of the Cyclostomacea of eastern Asia. *The Annals and Magazine of Natural History, Ser. 3*, 13: 441–465.
- Emberton KC (2002) The genus *Boucardicus*, a Madagascan endemic (Gastropoda: Cyclophoridae: Alycaeinae). *Archiv für Molluskenkunde*, 130(1–2): 1–199.
- Fischer-Piette E & Bedoucha J (1965) Mollusques terrestres operculés de Madagascar. *Mémoires du Muséum National d'Histoire Naturelle, Series A, Zoologie*, 33(2): 49–91.

- Fulton HC (1902) Descriptions of a new *Alycaeus* from Perak and a *Bulimulus* from Bolivia. The Annals and Magazine of Natural History, 7(9): 68–69.
- Godwin-Austen HH (1882–1920) Land and Freshwater Mollusca of India, including South Arabia, Baluchistan, Afghanistan, Kashmir, Nepal, Burmah, Pegu, Tenasserim, Malay Peninsula, Ceylon and Other Islands of the Indian Ocean,. Supplementary to Masers Theobald and Hanley's Conchologica Indica. Taylor and Francis, London, 257 pp.
- Kerney MP & Cameron RAD (1979) A Field Guide to the Land Snails of Britain and North-west Europe. Collins, London, 288 pp.
- Luo T-C, Zhang W-H & Zhou W-C (2009) A new species of the genus *Dioryx* Benson from China (Prosobranchia, Mesogastropoda, Cyclophoridae). Acta Zootaxonomica Sinica, 34(4): 862–864. [In Mandarin Chinese]
- Maassen WJM (2006) Remarks on *Alycaeus* species from South-East Asia, with the descriptions of four new species with keeled shells (Gastropoda, Caenogastropoda, Cyclophoridae). Basteria, 70: 133–139.
- Martens E von (1867): Die Preussische Expedition Nach Ost-Asien. Nach Amtlichen Quellen. Zoologischer Theil. Zweiter Band. Die Landschnecken. Verlag der Königlichen Geheimen Ober-Hofbuchdruckerei, Berlin, 447 pp.
- Martens E von (1900) Ueber Land- und Süsswasser-Schnecken aus Sumatra. Nachrichtenblatt der Deutschen Malakozoologischen Gesellschaft, 32: 3–18.
- Minato H (1988) A Systematic and Bibliographic List of the Japanese Land Snails. Editeur inconnu, 294 pp.
- Morgan J de (1885) Mollusques terrestres et fluviatiles du Royaume de Péak et des pays voisins (presque'Ile Malaise). Bulletin de la Société Zoologique de France, 10: 353–429.
- Páll-Gergely B, Naggs F & Asami T (2016) Novel shell device for gas exchange in an operculated land snail. Biology Letters, 12: 20160151.
- Páll-Gergely B, Hunyadi A, Đỗ ĐS, Naggs F & Asami T (in press): Revision of the Alycaeidae of China, Laos and Vietnam (Gastropoda: Cyclophoroidea) I: The genera *Dicharax* and *Metalycaeus*. Zootaxa (in press).
- Preston HB (1907) Description of a new subgenus and species of *Alycaeus* from Ke-Lan-Tan. Proceedings of the Malacological Society of London, 7: 206.
- Rensch B (1933) Die Molluskenfauna von Pulu Weh und ihre zoogeographischen Beziehungen. Zoologischer Anzeiger Leipzig, 102: 195–208.
- Rensch B (1934) Landmollusken der Deutschen Limnologischen Sunda-Expedition. Archiv für Hydrobiologie, Supplement 12: 739–758.