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Monograph

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A review of *Chamalycaeus*, *Cycloryx* and *Dicharax* species of the Himalaya and Myanmar and seven new species of Alycaeinae from the Blue Mountain, Mizoram, India (Gastropoda, Caenogastropoda, Cyclophoridae)

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Abstract. In this paper, we revise the genera *Chamalycaeus*, *Cycloryx* and *Dicharax* of the Himalayas and Myanmar. Another aim of this work was to identify the 13 species of Alycaeinae collected on the Blue Mountain, Mizoram State, northeastern India. Out of the 13 species from the Blue Mountain, seven are new and are described here: *Chamalycaeus mizoramensis* Páll-Gergely & Aravind sp. nov., *Chamalycaeus reflectus* Páll-Gergely & Aravind sp. nov., *Cycloryx rohiniae* Páll-Gergely & Aravind sp. nov., *Dicharax praeda* Páll-Gergely & Aravind sp. nov., *D. semivivus* Páll-Gergely & Aravind sp. nov., *D. umashaankeri* Páll-Gergely & Aravind sp. nov., *D. ganeshaiahi* Páll-Gergely & Aravind sp. nov. Altogether, 109 species are recognized, and all are figured. Furthermore, 37 new synonyms are reported, 32 of which were described by Godwin-Austen.

Keywords. Taxonomy, systematics, operculum, sutural tube, microtunnels.

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Introduction

The Alycaeinae W.T. Blanford, 1864 is a subfamily of the terrestrial caenogastropod family Cyclophoridae Gray, 1847. The characteristic feature of Alycaeinae is the sutural tube, which is closed at its outer end and is in contact with numerous perpendicularly running microtunnels. This sutural tube and microtunnel system allows gas exchange even when the operculum closes the apertural opening (Páll-Gergely *et al.* 2016). Some additional taxa, such as the Madagascan endemic *Boucardicus* Fischer-Piette & Bedoucha, 1965 and the southeast Asian genera *Laotia* Saurin, 1953 and *Messageria* Bavay & Dautzenberg, 1904, do not possess a sutural tube, have nevertheless been assigned to the Alycaeidae W.T. Blanford, 1864, too (Emberton 2002; Egorov 2019; Chen & Lin 2021). A recent publication has shown that *Laotia*, also a Southeast Asian cyclophorid genus *Platyrhaphe* Möllendorff, 1890, and *Boucardicus* possess microtunnel systems, but they are different to, and have appeared independently from that of the Alycaeinae (Páll-Gergely *et al.* 2024).

There are 370 currently known species and 43 subspecies of Alycaeinae (MolluscaBase eds 2025) distributed from the Western Ghats (Raheem *et al*. 2014; Aravind & Páll-Gergely 2018; Bhosale *et al.* 2025) to the Western Himalaya (Sajan *et al.* 2020) and to Japan (Minato 1988). There are three areas that can be considered as centres of high diversity for this family based on the number of genera, namely northern Vietnam/Southern China, Peninsular Malaysia/Sumatra, and the Southeastern Himalayas (Páll-Gergely *et al.* 2020).

The Himalayan region, especially in India, has been extensively studied during the end of the 19th and the beginning of the 20th centuries (Benson 1853, 1856; Godwin-Austen 1871, 1874, 1875, 1876, 1882–1920; Möllendorff 1902). Recent interest has also turned towards this region with the descriptions of new species or revisions (Sajan *et al.* 2020; Gittenberger *et al.* 2022, 2024). While Alycaeinae of other regions and genera have been revised in recent years (Foon & Liew 2017; Páll-Gergely *et al.* 2017; Páll-Gergely & Auffenberg 2019; Jirapatrasilp *et al.* 2021; Páll-Gergely 2023), no species-level revision of Himalayan Alycaeinae has been carried out. In this paper, we revise the genera *Chamalycaeus* Möllendorff, 1897, *Cycloryx* Godwin-Austen, 1914 and *Dicharax* Kobelt & Möllendorff, 1900 in the Himalaya region and Myanmar. Adding the species occurring in the latter country is necessary, because some Himalayan species are also known from western and central areas of Myanmar.

There are no historical records of Alycaeinae from the Indian state of Mizoram in the northeast region (Fig. 1). The present paper also reports on material collected from Blue Mountain by the last author. In the absence of a comprehensive revision of the region's Alycaeinae, the identification of the newly collected specimens from Mizoram would not be possible without reviewing the species groups to which they belong. Therefore, the current paper reports 13 species of Alycaeinae from Mizoram, including seven new ones, and also reveals 37 new synonyms.

Material and methods

The Blue Mountain (22°40′ N, 93°03′ E), also known as Phawngpui in the state of Mizoram, is situated in the northeast region of India, bordering Myanmar in the east. Blue Mountain is the highest mountain peak in the Mizo Hills (or Lushai Hills), with an elevation of 2157 m a.s.l., situated in Lawngtlai district (Rintluanga 2009). The Blue Mountain is part of the Phawngpui National Park, established in 1992, and covers an area of 50 km^2. The temperature ranges from 0–30°C, with an average rainfall of 3000 mm received during southwest monsoon.

Shells of Alycaeinae were photographed using a Nikon SMZ25 digital microscope with Nikon Nis-Elements software (Institute for Soil Sciences, HUN-REN Centre for Agricultural Research, Budapest). Following photography, all shells were measured using a Keyence VHX 5000 Digital microscope.

The counting of the shell whorls (to the closest 0.25 whorl) follows Kerney & Cameron (1979: 13). 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), because of the presence of microtunnels running 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 (see also Fig. 2). The latter region usually bears 1–3 swellings of various morphology (Fig. 2).

Historical localities mentioned in the text are compiled in Supp. file 1.

Abbreviations

D = shell diameter
H = shell height
R1 = Region 1 (see above)
R2 = Region 2 (see above)
R3 = Region 3 (see above)

Repositories

ATREE = collection of the Ashoka Trust for Research in Ecology and the Environment, Bangalore, India
CASIZ = National Zoological Museum of China, Institute of Zoology, Chinese Academy of Sciences, Beijing, China
HA = Collection András Hunyadi, Budapest, Hungary

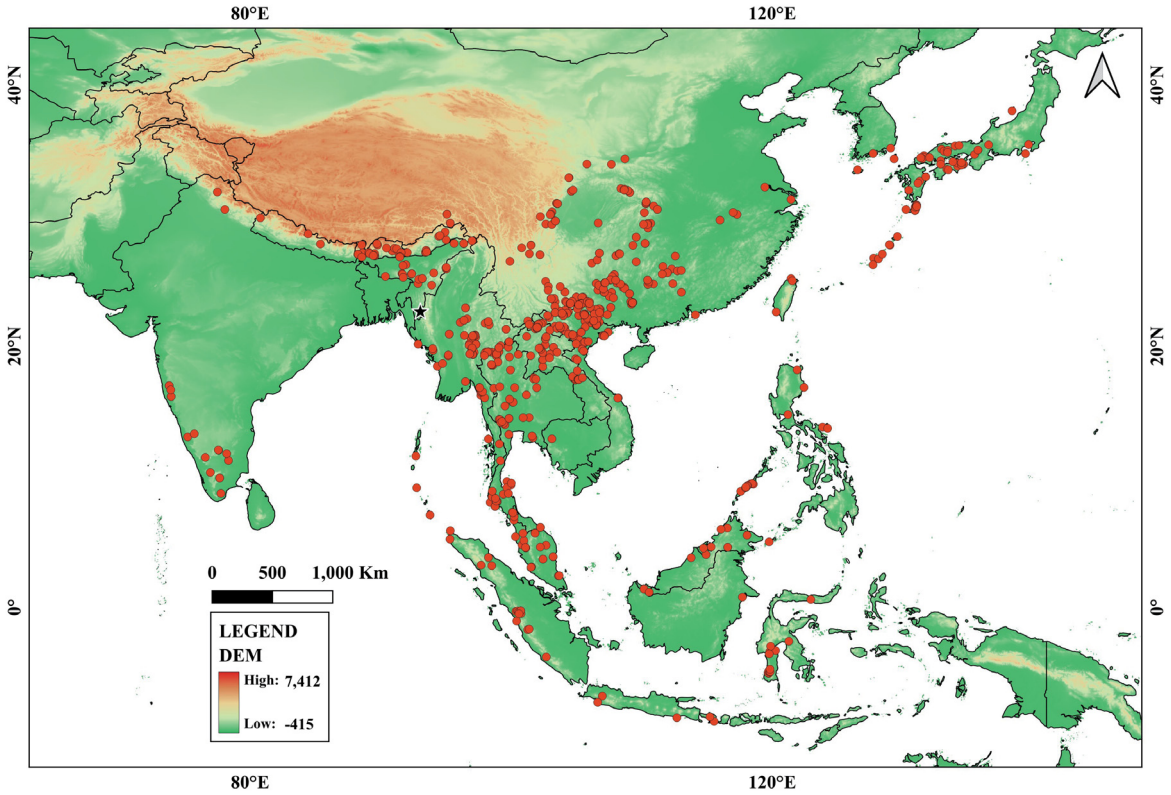

Fig. 1. Black asterisk shows the geographic position of the Blue Mountain in Mizoram State, India. Red localities indicate all available sites of Alycaeinae W.T. Blanford, 1864 in the literature.

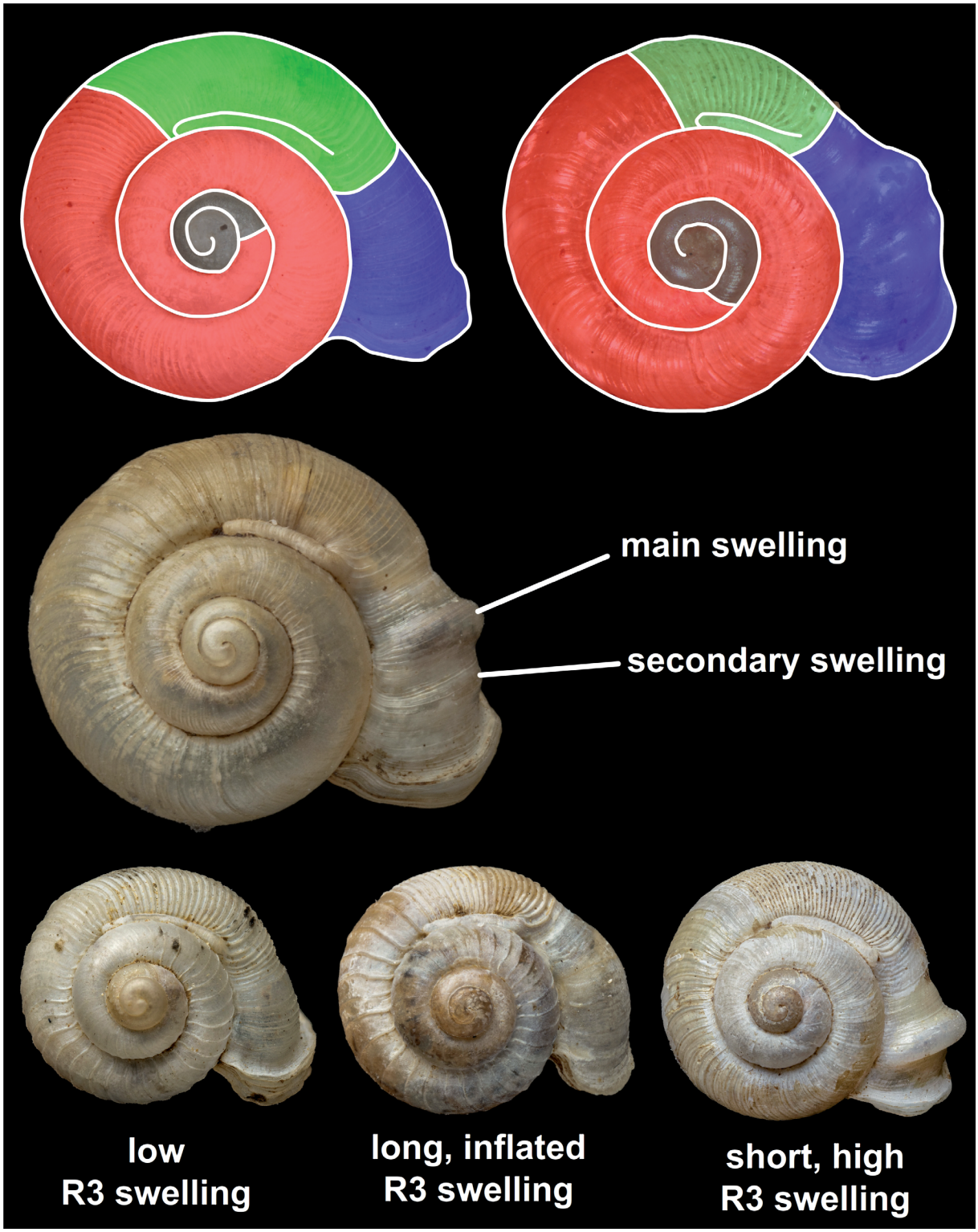

Fig. 2. Regions of the Alycaeinae W.T. Blanford, 1864 shell and terminology used to describe R3 swellings. Dark area = protoconch (embryonic whorls); red area = R1; green area = R2; blue area = R3 (based on Páll-Gergely *et al.* 2017).

HNHM = Hungarian Natural History Museum, Budapest, Hungary
MCZ = Museum of Comparative Zoology, Massachusetts, USA
NBCB = National Biodiversity Centre, Serbithang, Thimphu, Bhutan
NHM = The Natural History Museum, London, UK
NHMUK = When citing lots deposited in the NHM
NHMW = Museum of Natural History of Vienna, Vienna, Austria
NZSI = National Zoological Collection of the Zoological Survey of India (when citing specimens deposited in the ZSI), India
PGB = Collection Barna Páll-Gergely, Mosonmagyaróvár, Hungary
SMF = Senckenberg Forschungsinstitut und Naturmuseum, Frankfurt am Main, Germany
UF = Florida Museum of Natural History, University of Florida, Gainesville, USA
UMZC = University Museum of Zoology, Cambridge, UK
ZSI = Zoological Survey of India, Kolkata, India

Results

The material collected at the Blue Mountain in Mizoram State, India, contained the following 13 species (see Fig. 3):

Chamalycaeus mizoramensis Páll-Gergely & Aravind sp. nov.
Chamalycaeus sculpturus (Godwin-Austen, 1875)
Chamalycaeus reflectus Páll-Gergely & Aravind sp. nov.
Chamalycaeus sp. (material insufficient for description)
Cycloryx major (Godwin-Austen, 1893)
Cycloryx rohiniae Páll-Gergely & Aravind sp. nov.
Dicharax succineus (W.T. Blanford, 1862)
Dicharax glaber (W.T. Blanford, 1865)
Dicharax praeda Páll-Gergely & Aravind sp. nov.
Dicharax semivivus Páll-Gergely & Aravind sp. nov.
Dicharax umashaankeri Páll-Gergely & Aravind sp. nov.
Dicharax ganeshaiahi Páll-Gergely & Aravind sp. nov.
Metalycaeus polygonoma (W.T. Blanford, 1862)

Taxonomy and systematics

Class Gastropoda Cuvier, 1795
Subclass Caenogastropoda Cox, 1960
Order Architaenioglossa Haller, 1890
Superfamily Cyclophoroidea Gray, 1847

Family **Cyclophoridae** Gray, 1847

Cyclophoridae Gray, 1847: 181.

Subfamily **Alycaeinae** W.T. Blanford, 1864

Alycaeinae W.T. Blanford, 1864: 465.

Remarks

In our previous publications (Páll-Gergely *et al.* 2016, 2017, 2020, 2021; Páll-Gergely & Asami 2017; Páll-Gergely & Auffenberg 2019; Páll-Gergely & Hunyadi 2022; Páll-Gergely 2023), we treated this group as a family of its own right. However, the recent molecular phylogeny (Páll-Gergely *et al.* 2024)

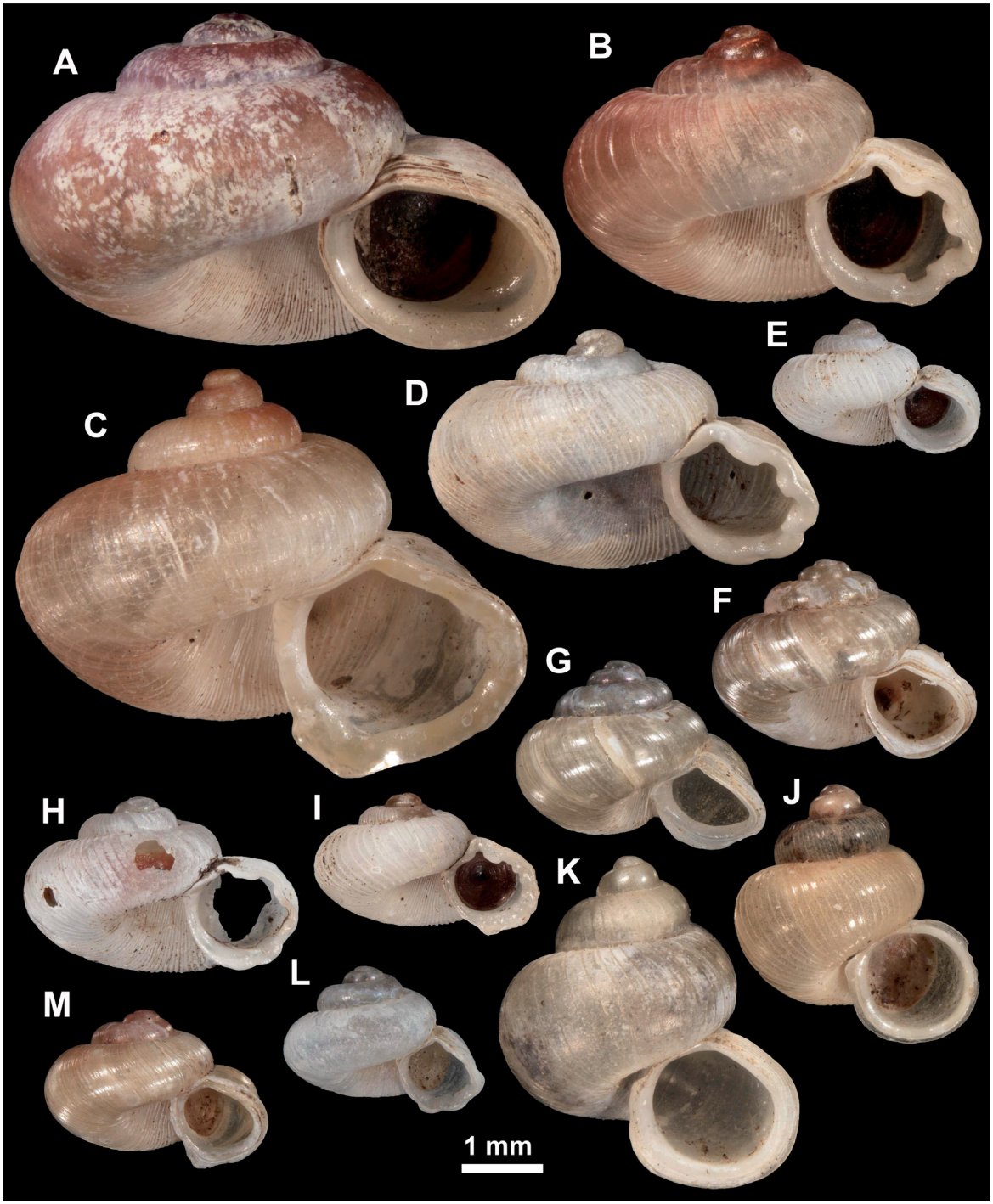

Fig. 3. Synoptic view of the alycaeid species collected on the Blue Mountain, Mizoram State, India. **A**. *Dicharax glaber* (W.T. Blanford, 1865). **B**. *Dicharax succineus* (W.T. Blanford, 1862). **C**. *Metalycaeus polygonoma* (W.T. Blanford, 1862). **D**. *Chamalycaeus mizoramensis* Páll-Gergely & Aravind sp. nov. **E**. *Dicharax reflectus* Páll-Gergely & Aravind sp. nov. **F**. *Dicharax ganeshaiahi* Páll-Gergely & Aravind sp. nov. **G**. *Dicharax praeda* Páll-Gergely & Aravind sp. nov. **H**. *Dicharax* sp. 3 (material insufficient for description). **I**. *Dicharax* cf. *sculpturus* (Godwin-Austen, 1875). **J**. *Cycloryx major* (Godwin-Austen, 1893). **K**. *Cycloryx roniniae* Páll-Gergely & Aravind sp. nov. **L**. *Dicharax semivivus* Páll-Gergely & Aravind sp. nov. **M**. *Dicharax umashaankeri* Páll-Gergely & Aravind sp. nov. All photos: B. Páll-Gergely.

suggested treating Alycaeinae as a family would result in numerous paraphyletic groups, and therefore, Cyclophoridae should be maintained at the family rank, and Alycaeinae is to be treated as one of its subfamilies.

Genus ***Chamalycaeus*** Möllendorff, 1897

Alycaeus (*Chamalycaeus*) Möllendorff, 1897b: 93.

Remarks

Chamalycaeus is characterised by a smooth (or pitted) protoconch and a spirally striated R1. Most species classified in *Chamalycaeus* here are transferred from the genus *Dicharax* (see Páll-Gergely *et al.* 2020).

Although no spiral striation was found on the protoconch of *Chamalycaeus oglei* (Godwin-Austen, 1914) (see Páll-Gergely *et al.* 2020), it is moved to the genus *Metalycaeus* Pilsbry, 1900 due to its similarity with *M. brahma* (Godwin-Austen, 1886) and other Himalayan species of *Metalycaeus*. Furthermore, *Chamalycaeus perplexus* (Godwin-Austen, 1914) is moved to *Metalycaeus* due to its similarity with *M. polygonoma*.

Chamalycaeus mizoramensis species group

Remarks

Chamalycaeus mizoramensis sp. nov. is classified in its own species group, as this species is not similar to any other species of Alycaeinae in the region.

Chamalycaeus mizoramensis Páll-Gergely & Aravind sp. nov.
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Fig. 4

Diagnosis

A relatively large species of *Chamalycaeus* with a ca half whorl-long R2+R3, and R3 with a low central swelling and a fringed aperture.

Etymology

This species is named after the state of Mizoram, where the Blue Mountain is situated.

Type material examined

Holotype

INDIA – **Mizoram** • empty shell (D: 4.8 mm, H: 3 mm); Blue Mountain, Lawngtlai district; 22.727° N, 93.135° E; 1400 m a.s.l.; 27 Jan. 2019; N.A. Aravind leg.; AR15; NZSI LM1715.

Description

Shell off-white/ivory in colour, not translucent; shell outline slightly oval in dorsal view; spire slightly elevated, low conical; body whorl rounded; protoconch low, finely granular, spiral striae lacking, consisting of nearly 2 whorls; R1 of 1.75 whorls, with rather irregular, dense, low ribs (last half whorl of R1 with ca 55–60 ribs) and weaker, denser spiral striation; boundary between R1 and R2 not conspicuous because R2 ribs are only slightly higher and sharper than R1 ribs, but R2 area more inflated than R1; sutural tube conspicuously shorter than R2, probably due to teratological condition; R2 with ca 50–52 straight, sharp but low ribs; R2+R3 ca half whorl, R3 shorter than R2, boundary between R2 and

R3 clearly visible due to a slight constriction; R3 with long and low central swelling; R3 ribs stand approximately as densely as R1 ribs, with the exception of the beginning of R3 with more widely-spaced ribbing; aperture strongly oblique to shell axis, rounded with 5 small bays on the palatal side, resulting in a fringed peristome; boundary between inner and outer peristomes is not conspicuous but clearly visible, inner peristome thickened, slightly protruding and expanded; outer peristome thin, sharp, slightly expanded, especially towards umbilicus; umbilicus relatively narrow, ca one fourth of shell width, rounded.

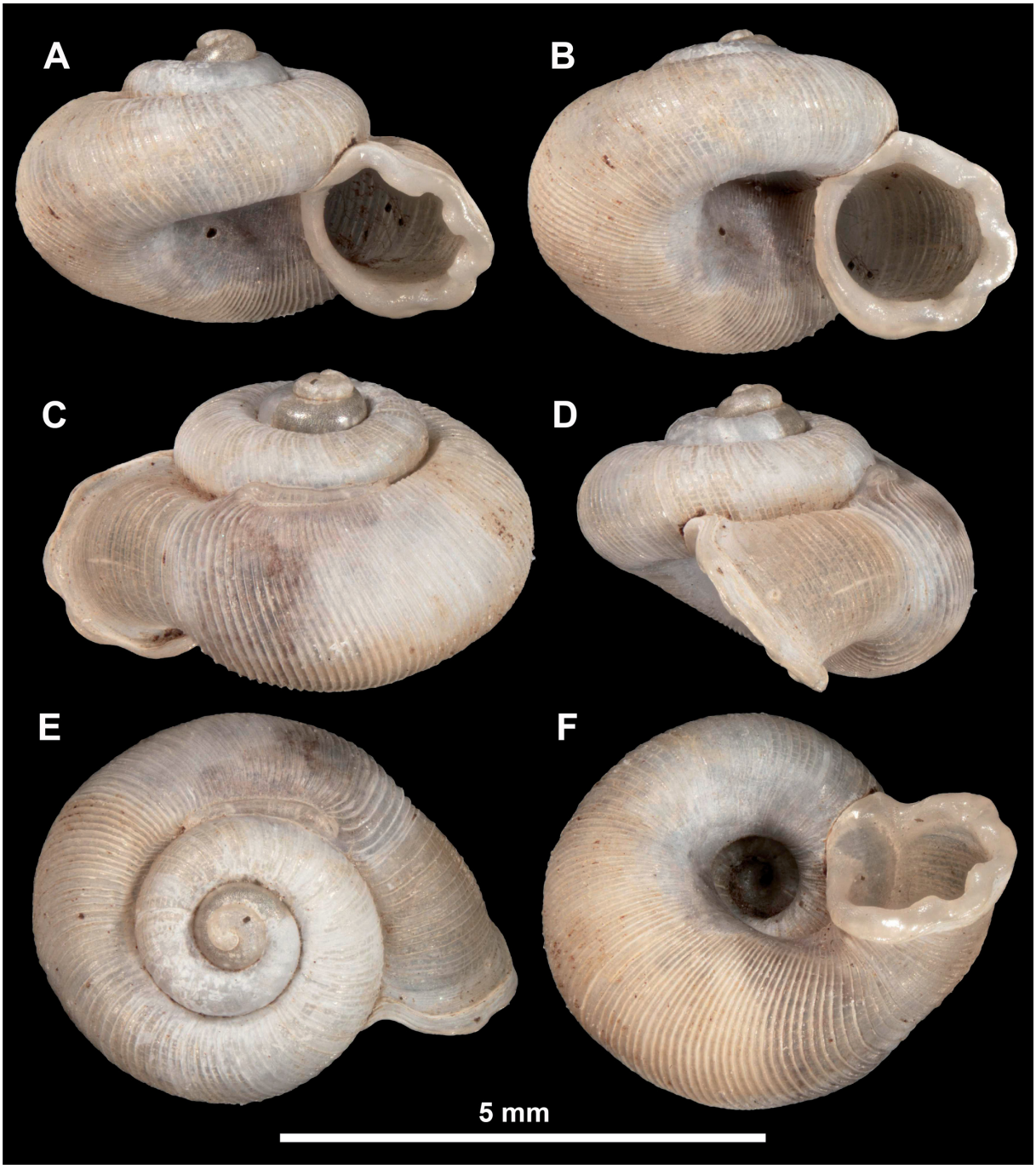

Fig. 4. *Chamalycaeus mizoramensis* Páll-Gergely & Aravind sp. nov., holotype (NZSI LM1715). All photos: B. Páll-Gergely.

Measurements. D: 4.8 mm, H: 3 mm.

Distribution

Known only from the Blue Mountain region.

Differential diagnosis

No other species of *Chamalycaeus* resembles *Chamalycaeus mizoramensis* sp. nov. The relatively large size, the fringed aperture, the dense, fine ribbing on R1 and R3, and the long R2+R3 (ca half whorl) are characteristic of this species.

Chamalycaeus armillatus species group

Remarks

Three tiny species from Myanmar belong here, which are characterized by widely-spaced R1 ribs, a short R2, a low and blunt R3 swelling, and a circular aperture.

Chamalycaeus armillatus (Benson, 1856)
Fig. 5A–D

Alycaeus armillatus Benson, 1856: 227.

Alycaeus armillatus – Sowerby 1877: pl. 5, species 38. — Godwin-Austen 1914: 406, pl. 151 figs 3, 3a.
Alycaeus (*Dicharax*) *armillatus* – Kobelt 1902: 365. — Gude 1921: 236–237.
Chamalycaeus armillatus – Páll-Gergely *et al.* 2020: 36; 2021: 14, fig. 10b. — Preece *et al.* 2022: 79, fig. 32b.

Diagnosis

See under *C. humilis* (W.T. Blanford, 1862) and *C. irmatallus* Páll-Gergely, 2021.

Type locality

“ad Thyet-Mio”.

Chamalycaeus humilis (W.T. Blanford, 1862)
Fig. 5E–I

Alycaeus humilis W.T. Blanford, 1862: 136–137.

Alycaeus humilis – Sowerby 1877: pl. 5, species 40. — Godwin-Austen 1914: 408–409, pl. 151 fig. 8.
Alycaeus (*Dicharax*) *humilis* – Kobelt 1902: 372. — Gude 1921: 255–256.
Dicharax humilis – Páll-Gergely *et al.* 2020: 64.

Type material examined

MYANMAR • holotype (single shell mentioned in the original description: Fig. 5E–I); River Bank, Myanoung, Pegu; NHMUK 1906.4.4.69.

Type locality

“ad Akouktoung, ad ripas fluminis Irawaddi, in provincia Burmana Pegu”.

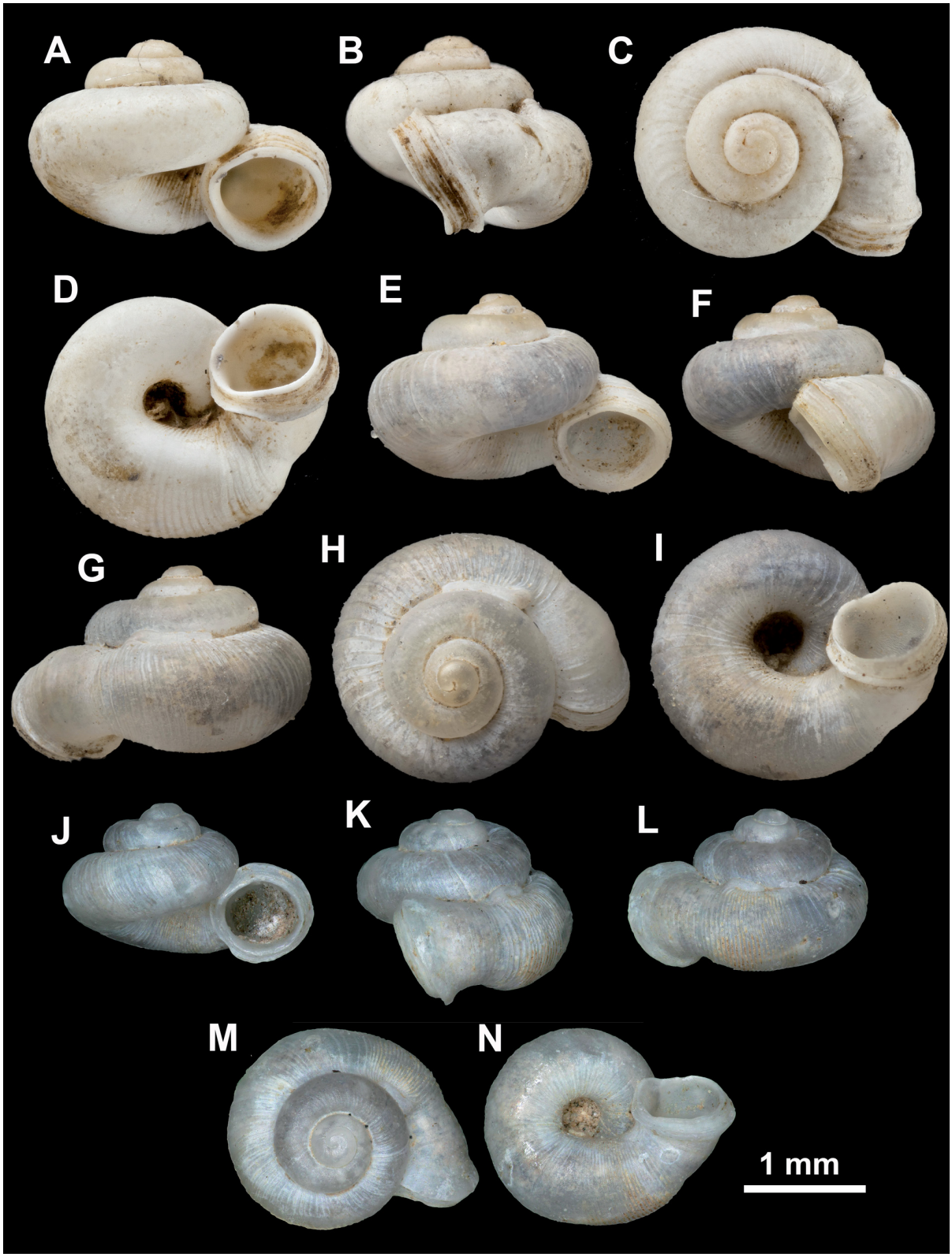

Fig. 5. Species of the *Chamalycaeus armillatus* species group. **A–D**. *Chamalycaeus armillatus* (Benson, 1856), holotype (UMZC I.102995) (from Preece *et al.* 2022). **E–I**. *Chamalycaeus humilis* (W.T. Blanford, 1862), holotype (NHMUK 1906.4.4.6). **J–N**. *Chamalycaeus irmatallus* Páll-Gergely, 2021, holotype (UF 279508) (from Páll-Gergely *et al.* 2021). Photos: Kevin Webb (A–I), B. Páll-Gergely (J–N).

Differential diagnosis

This species has a comparatively smaller aperture than *C. armillatus*. *Chamalycaeus irmatallus* has denser and finer R1 ribs, more expanded outer peristome and a less inflated R3 swelling.

Remarks

Only a single, corroded shell is known, therefore the important traits (presence or absence of spiral striation on the teleoconch) could not be examined without doubt. We classified this species in the genus *Dicharax* in our previous catalogue, but during the revision of Himalayan *Dicharax*, we had to reconsider our decision. Since the shell shape of *A. humilis* is most similar to the geographically closely occurring *Chamalycaeus armillatus* and *C. irmatallus*, we move this species to *Chamalycaeus*.

Chamalycaeus irmatallus Páll-Gergely, 2021
Fig. 5J–N

Chamalycaeus irmatallus Páll-Gergely in Páll-Gergely *et al.*, 2021: 14–15, figs 9, 10a.

Type material examined

THAILAND • holotype; Surat Thani Province, Limestone Mt, 6 km S of Na San; 8°39.583′ N, 99°23.883′ E; 100 m a.s.l.; 3 Jun. 1987; F.G. Thompson leg.; UF 279508 • 11 paratypes; same data as for preceding; UF 551216.

Additional material examined

MYANMAR • 6 shells (see Páll-Gergely *et al.* 2021: fig. 10); Thayet-myo, Pegu; Blanford coll.; NHMUK 1906.4.4.71.

Type locality

"Thailand, Surat Thani Province, limestone mtn., 6 km S of Na San, 8°39.583′ N, 99°23.883′ E; 100 m a.s.l.".

Differential diagnosis

Chamalycaeus armillatus has a more rounded body whorl, longer R2 and R3, and a thicker peristome with greater distance between the edges of the inner and outer peristomes (Páll-Gergely *et al.* 2021). See also under *C. humilis*.

Chamalycaeus asaluensis species group

Remarks

The species belonging here are characterized by a low conical, colourless shell, a strongly ribbed R1 (rib density relatively low), and an upper incision in the aperture. The aperture shape (fringed to circular) and the shape of R3 swelling are highly variable.

Some species of this species group have been classified in the genus *Dicharax* (see Páll-Gergely *et al.* 2020), because spiral striation could not be observed on them, partly because the examined shells were corroded, and partly because the spiral striation on the shells are naturally weak and difficult to observe.

Chamalycaeus asaluensis (Godwin-Austen, 1914)
Fig. 6

Alycaeus asaluensis Godwin-Austen, 1914: 385–386, pl. 145 figs 2, 2a–b.
Alycaeus barowliensis Godwin-Austen, 1914: 352, pl. 141 fig. 4. **Syn. nov.**

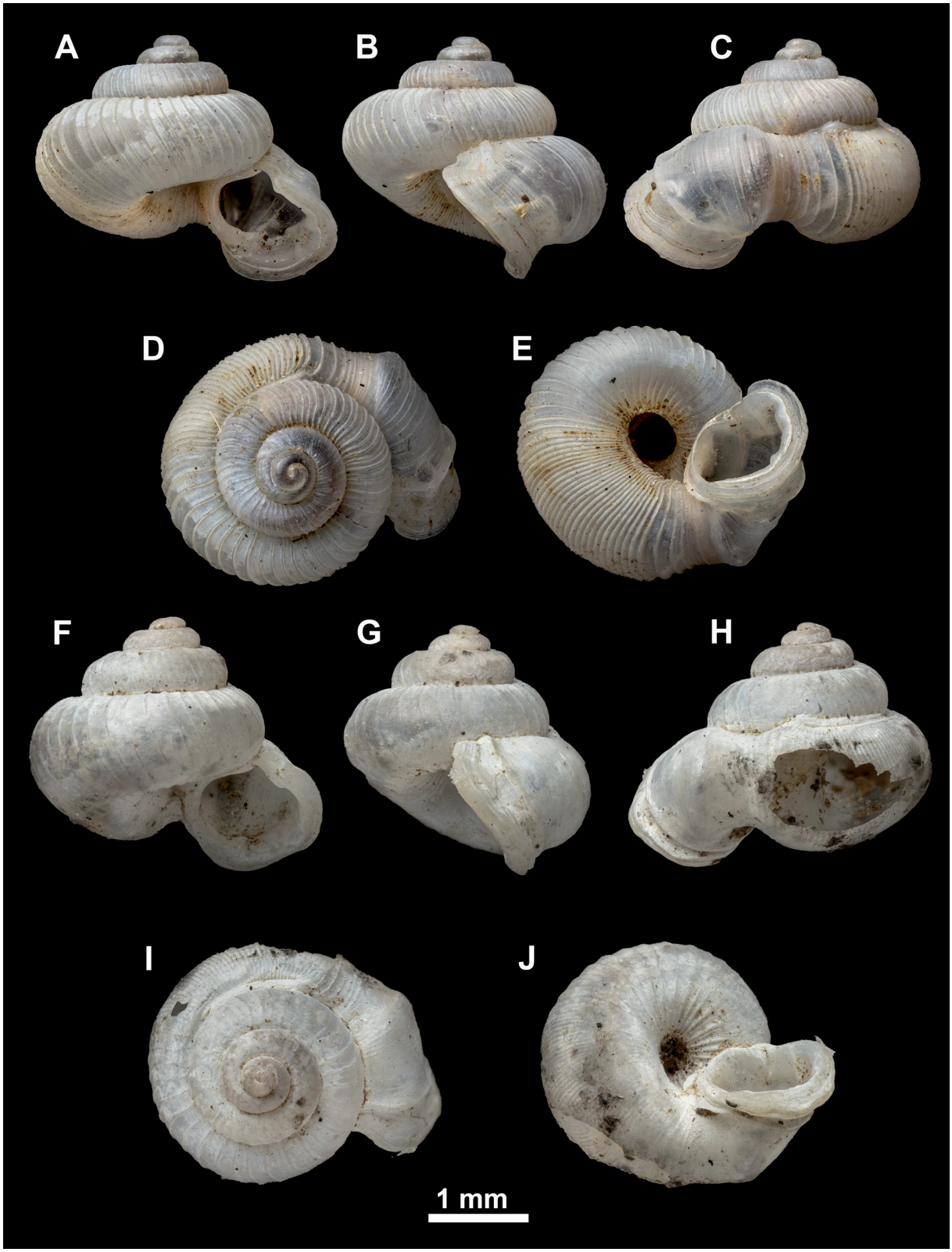

Fig. 6. Shells of *Chamalycaeus asaluensis* (Godwin-Austen, 1914). **A–E**. Syntype (NHMUK 1903.7.1.2636). **F–J**. Holotype of *Alycaeus barowliensis* Godwin-Austen, 1914 (NHMUK 1903.7.1.2723). All photos: Kevin Webb.

Alycaeus crispatus var. – Godwin-Austen 1874: 93, pl. 4 fig. 2.
Alycaeus barowliensis – Gude 1921: 205.
Alycaeus (*Dicharax*) *asaluensis* – Gude 1921: 237.
Alycaeus (*Alycaeus*) *burowliensis* [sic] – Ramakrishna *et al.* 2010: 46.
Chamalycaeus (*Dicharax*) *asaluensis* – Ramakrishna *et al.* 2010: 56.
Dicharax asaluensis – Páll-Gergely *et al.* 2020: 54.
Dicharax (?) *barowliensis* – Páll-Gergely *et al.* 2020: 77.

Diagnosis

Differs from the congeners by the long R3 swelling having straight anterior part.

Type material examined

INDIA • 2 syntypes of *A. asaluensis* (Fig. 6A–E); Dihung, N. Cachar; Godwin-Austen coll.; NHMUK 1903.7.1.2636 • holotype of *A. barowliensis* (single shell mentioned in the original description: Fig. 6F–J); Barowli R. Durrang, Assam; Godwin-Austen coll.; NHMUK 1903.7.1.2723.

Type localities

"Barowli River, Akha Hills, Durrang, Assam" (*A. barowliensis*); "Neuglo", "Phulong" and "Dihung River, N. Cachar, north of Asalu" (*A. asaluensis*).

Differential diagnosis

Dicharax aspidentatus Gittenberger, Choki Gyeltshen & Sherub Sherub, 2024 has a higher spire and larger distance between the inner and outer peristomes. *Chamalycaeus crispatus* (Godwin-Austen, 1871) has a constriction anterior to the R3 swelling, is glossier and less densely ribbed. *Dicharax rugosus* (Godwin-Austen, 1914) has a higher spire, a shorter R3 swelling and more strongly fringed peristome.

Remarks

Only the corroded holotype of *A. barowliensis* is known, which is very similar to *C. asaluensis*, but has a slightly more globose shell (and narrower umbilicus) and more widely-spaced ribs on R1. Nevertheless, given their geographic proximity and that all other traits are identical, these differences are best explained by intraspecific variability.

This species was included in the genus *Dicharax* due to the absence of spiral striation (Páll-Gergely *et al.* 2020). However, the shell shape and other characters agree with this species group, and therefore, it is reclassified in the genus *Chamalycaeus*.

Chamalycaeus crispatus (Godwin-Austen, 1871)
Fig. 7

Alycaeus crispatus Godwin-Austen, 1871: 91–92, pl. 4 fig. 1.
Alycaeus crispatus var. *rywukensis* Godwin-Austen, 1914: 373–374, pl. 154 figs 3, 3a. **Syn. nov.**
Alycaeus crispatus var. *minimus* Godwin-Austen, 1914: 373, pl. 148 figs 5, 5a. **Syn. nov.**

Alycaeus crispatus – Godwin-Austen 1875: 8, pl. 4 fig. 3; 1914: 371–372, 389, pl. 145 figs 1, 1a–b.
Alycaeus (*Dicharax*) *crispatus* – Kobelt 1902: 367. — Gude 1921: 242–243.
Alycaeus (*Dicharax*) *crispatus* var. *minima* – Gude 1921: 243–244.
Alycaeus (*Dicharax*) *crispatus* var. *rywukensis* – Gude 1921: 244.
Chamalycaeus (*Dicharax*) *crispatus* – Ramakrishna *et al.* 2010: 58.
Dicharax (?) *crispatus* – Páll-Gergely *et al.* 2020: 82.
Dicharax (?) *crispatus minimus* – Páll-Gergely *et al.* 2020: 83.

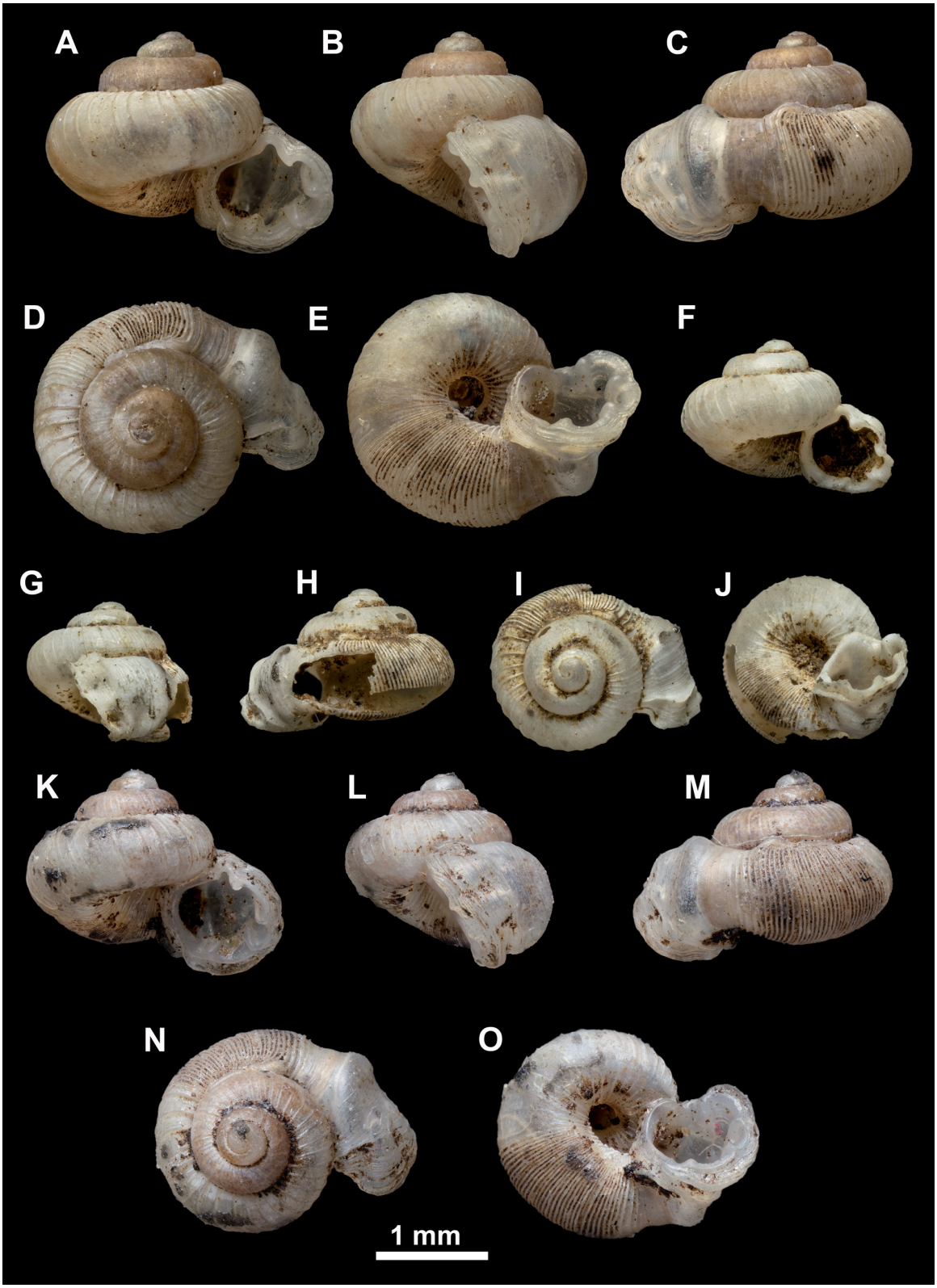

Fig. 7. Shells of *Chamalycaeus crispatus* (Godwin-Austen, 1871). **A–E**. Syntype of *Alycaeus crispatus* Godwin-Austen, 1871 (NHMUK 1903.7.1.2635). **F–J**. Syntype of *Alycaeus crispatus* var. *rywukensis* Godwin-Austen, 1914 (NHMUK 1903.7.1.2637). **K–O**. Holotype of *Alycaeus crispatus* var. *minimus* Godwin-Austen, 1914 (NHMUK 1906.4.4.176). All photos: Kevin Webb.

Dicharax (?) *crispatus rywukensis* – Páll-Gergely *et al.* 2020: 83.
Dicharax crispatus – Gittenberger *et al.* 2024: 205, figs 24, 27.

Diagnosis

The narrow and high R3 swelling distinguishes this species from other congeners of the same species group.

Type material examined

INDIA • 5 syntypes of *A. crispatus* (Fig. 7A–E); Shibak, Habiang Garo Hills; NHMUK 1903.7.1.2635 • 11 syntypes of *A. crispatus*; same container as previous (probably same locality); NHMUK 1903.7.1.2759 • holotype of *A. crispatus* var. *minimus* (single shell mentioned in the original description: Fig. 7K–O); Habiang Garo Hills, W. Khasi; Godwin-Austen leg.; NHMUK 1906.4.4.176 • 2 syntypes of *A. crispatus* var. *rywukensis* (Fig. 7F–J); Rywuk, Garo Hills, South base of; Godwin-Austen coll.; NHMUK 1903.7.1.2637.

Type localities

"Khasia, Jaintia and N. Cachar Hills" (*A. crispatus*); "Habiang Garo Hills, West Khasi" (*A. crispatus* var. *minimus*); "Rywuk Valley of the Garo Hills" (*A. crispatus* var. *rywukensis*).

Differential diagnosis

Dicharax rugosus has a higher spire, and a more strongly and densely ribbed R1. See also under *C. asaluensis*.

Remarks

Godwin-Austen (1914: 372) stated in his previous paper (Godwin-Austen 1871: 93) that the *Alycaeus crispatus* variety from north Cachar was renamed *A. asaluensis*. The originally figured sample (Godwin-Austen 1871: pl. 4 fig. 1) is from Shibak, Gabir Valley (Godwin-Austen 1914: 372).

Alycaeus crispatus and *A. crispatus* var. *minimus* do not differ in any important shell characters, and therefore, the latter is a junior synonym of the former. *Alycaeus crispatus* var. *rywukensis* is smaller than the previous two and has a ribbed instead of glossy R3. Nevertheless, we interpret this as intraspecific variability.

Gittenberger *et al.* (2024) reported this species from Bhutan. We agree with their identification based on the photos they provided.

This species was included in the genus *Dicharax* due to the absence of spiral striation (Páll-Gergely *et al.* 2020). However, the shell shape and other characters agree with this species group, and therefore, it is reclassified in the genus *Chamalycaeus*. Furthermore, re-examination of the syntypes of *A. crispatus* var. *makarsae* revealed spiral striation on the teleoconch.

Chamalycaeus logtakensis (Godwin-Austen, 1914)
Fig. 8

Alycaeus logtakensis Godwin-Austen, 1914: 394–395, pl. 155 fig. 6.
Alycaeus tanghali Godwin-Austen, 1914: 401, pl. 137 figs 3, 3a–b. **Syn. nov.**

Alycaeus logtakensis – Gude 1921: 209–210.
Alycaeus (*Alycaeus*) *logtakensis* – Ramakrishna *et al.* 2010: 48.
Dicharax (?) *logtakensis* – Páll-Gergely *et al.* 2020: 94.
Chamalycaeus tanghali – Páll-Gergely *et al.* 2020: 46.

Diagnosis

The low R3 without conspicuous swelling distinguishes this species from all congeners of this species group.

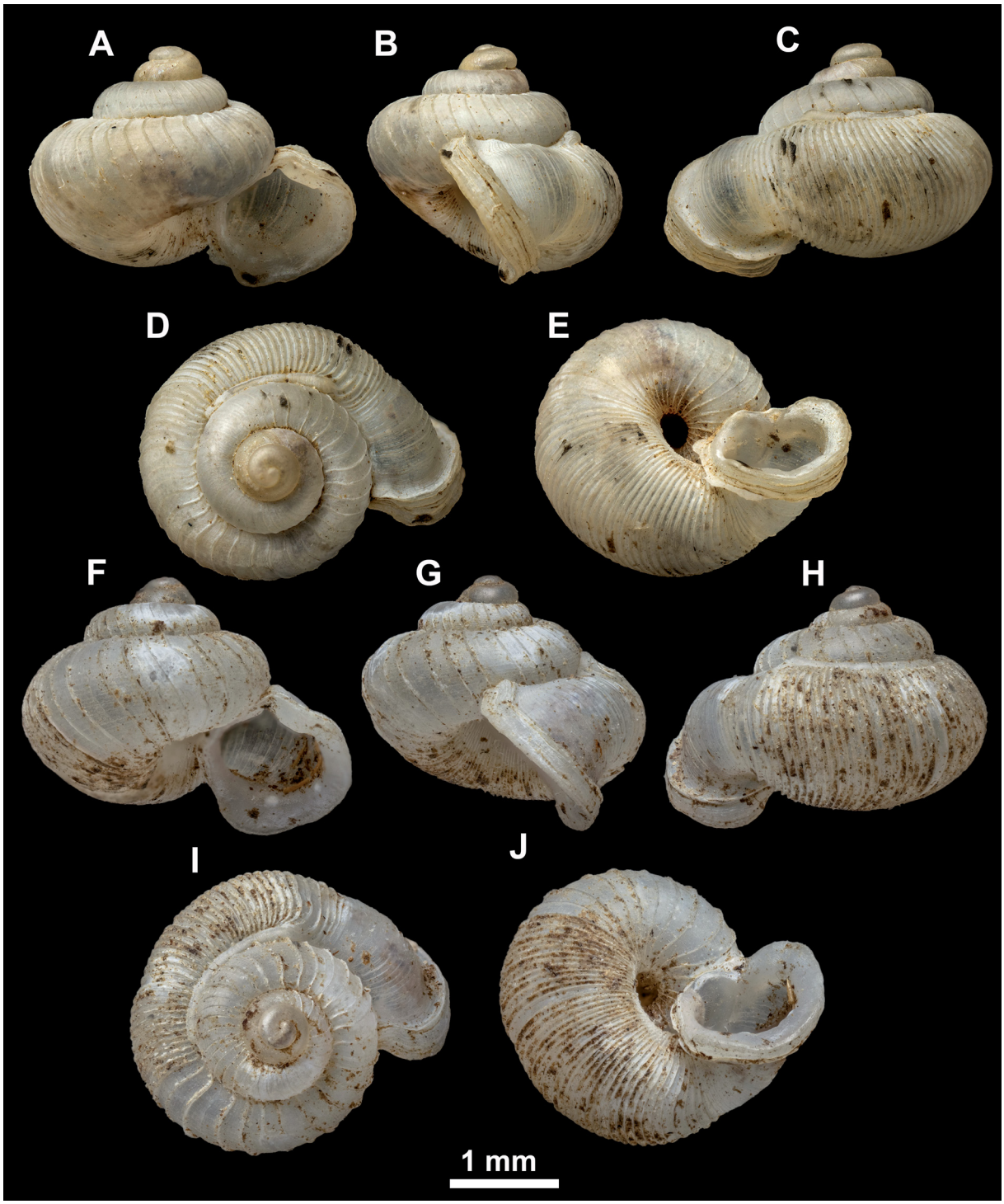

Fig. 8. Shells of *Chamalycaeus logtakensis* (Godwin-Austen, 1914). **A–E**. Syntype (NHMUK 1903.7.1.2639). **F–J**. Syntype of *Alycaeus tanghali* Godwin-Austen, 1914 (NHMUK 1903.7.1.2671). All photos: Kevin Webb.

Type material examined

INDIA • 1 syntype of *A. logtakensis* (Fig. 8A–E); on a low hill, Logtak Lake, Munipur; Godwin-Austen coll.; "figured"; NHMUK 1903.7.1.2639 • 6 syntypes of *A. tanghali*; Munipur; figured by Godwin-Austen; NHMUK 1903.7.1.2671 (Fig. 8F–J).

Type localities

"Logtak Lake, Munipur (No. 2639 B.M. Coll.), on a low hill near the northern shore" (*A. logtakensis*); "Munipur. Exact locality not recorded; somewhere on the northern side of the valley" (*A. tanghali*).

Differential diagnosis

The most similar species is *C. sculpturus*, but that species has a less fringed aperture and a more rounded body whorl.

Remarks

There are no conchological differences between *A. logtakensis* and *A. tanghali*, and they are both from central Manipur State. Their descriptions were published in the same work but *A. tanghali* appeared a few pages later, therefore *A. logtakensis* is chosen to be the valid name. Godwin-Austen (1914) compared *A. tanghali* only with *A. sculptilis*.

Alycaeus logtakensis was included in the genus *Dicharax* because no spiral striation was observed on the corroded syntype (Páll-Gergely *et al.* 2020). However, re-examination of the syntype of *A. logtakensis* revealed spiral striation on the teleoconch. *Chamalycaeus tanghali* was already classified in *Chamalycaeus* due to spiral striation on the teleoconch.

Chamalycaeus reflectus Páll-Gergely & Aravind sp. nov.
urn:lsid:zoobank.org:act:E606B321-913F-409B-BCD7-B47531BB01DD
Figs 9–10, 12A

Diagnosis

A small species of *Chamalycaeus* with a ca quarter whorl-long R2+R3, an R3 with a low central swelling (situated slightly closer to the peristome), a strongly expanded outer peristome, and a rounded inner peristome.

Etymology

The specific epithet refers to the reflected outer peristome, which is characteristic of this species.

Type material examined

Holotype

INDIA – **Mizoram** • 1 empty shell (D: 1.9 mm, H: 1.4 mm, Figs 9, 12A); Blue Mountain, Lawngtlai district; 22.727° N, 93.135° E; 1400 m a.s.l.; 27 Jan. 2019; N.A. Aravind leg.; Ar55; NZSI LM1723.

Paratype

INDIA – **Mizoram** • 1 empty shell; same data as for holotype; NZSI LM1724.

Additional material examined

INDIA – **Mizoram** • 2 empty shells; same data as for holotype; Ar56; NZSI LM1725 • 1 empty shell (Fig. 10); same data as for holotype; AR44; NZSI LM1913. – **Tripura** • 1 empty shell (Fig. 11); South Tripura, Purba Patichhari, Towards Garji from Santirbazar; 23°24.227′ N, 91°30.294′ E; 31 Jan. 2021; Nipu Kumar Das leg.; NZSI LM 1906.

Description

Shell small, white, fresh shell possibly translucent; shell outline rather rounded in dorsal view; spire slightly elevated, low conical; body whorl rounded; protoconch low, finely granular, spiral striae lacking, consisting of ca 1.5 whorls; R1 of slightly under 1.5 whorls, with strong, sharp, but relatively low radial ribs that become more widely-spaced towards R2; last half whorl of R1 with ca 18 ribs, space between last two R1 ribs twice as large as distance between two ribs half whorl behind the end of R2; spiral striation absent; boundary between R1 and R2 conspicuous due to the sudden increase in rib density;

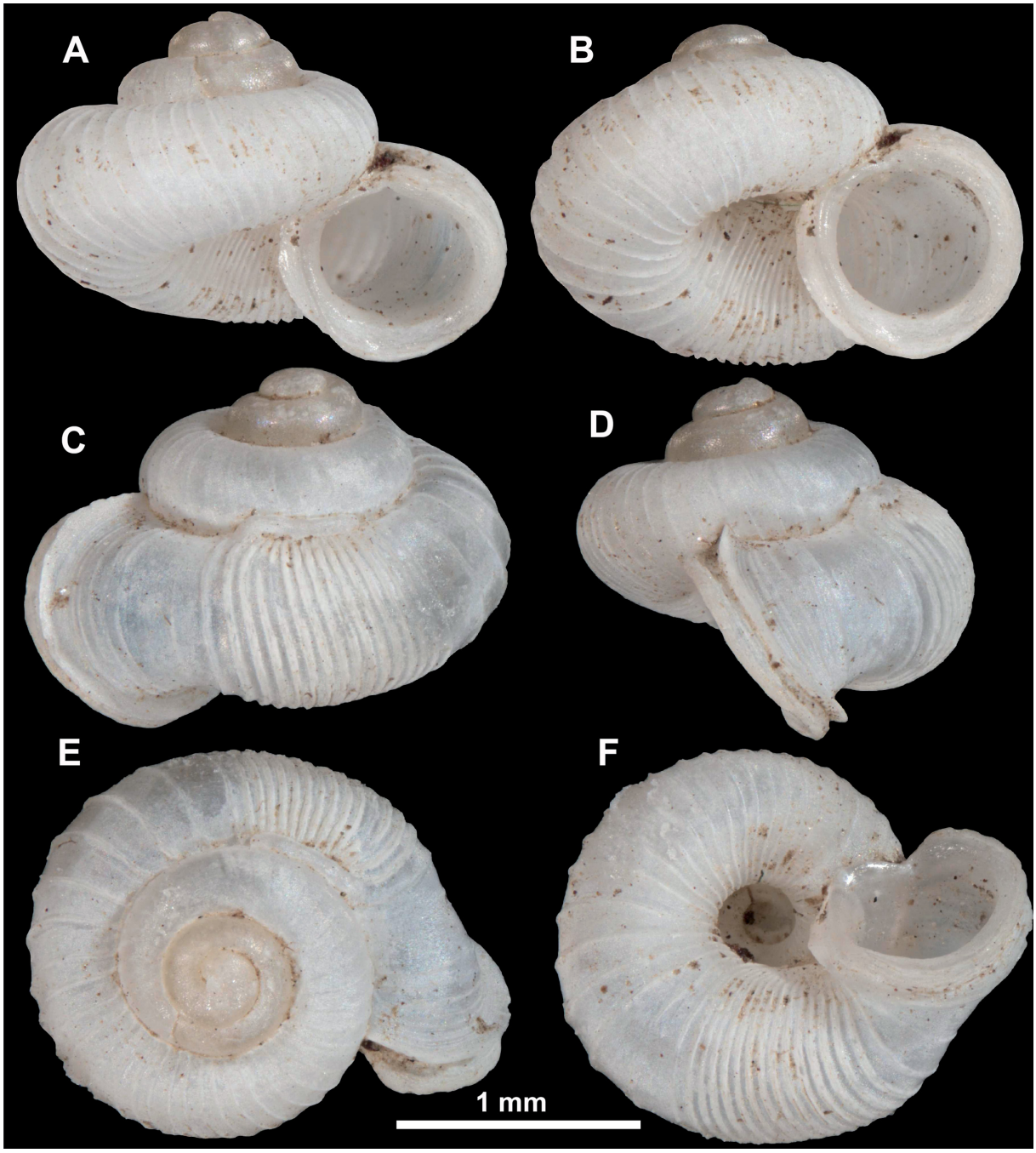

Fig. 9. *Chamalycaeus reflectus* Páll-Gergely & Aravind sp. nov., holotype, Ar55, specimen1 (NZSI LM1723). All photos: B. Páll-Gergely.

R2 with ca 16 straight, sharp but low ribs; R2+R3 ca quarter whorl or slightly more; R3 and R2 of comparable length, boundary between R2 and R3 clearly visible due to a slight constriction; R3 with moderately long swelling that is situated closer to R3; R3 nearly smooth, with ca 3 weak ribs between swelling and outer peristome; aperture oblique to shell axis, rounded; boundary between inner and outer peristomes conspicuous; inner peristome strongly thickened, protruding and expanded; outer peristome thin, sharp, strongly reflected; umbilicus narrow, ca one fifth of shell width, rounded.

Measurements. D: 1.9–2.5 mm, H: 1.4–1.9 mm.

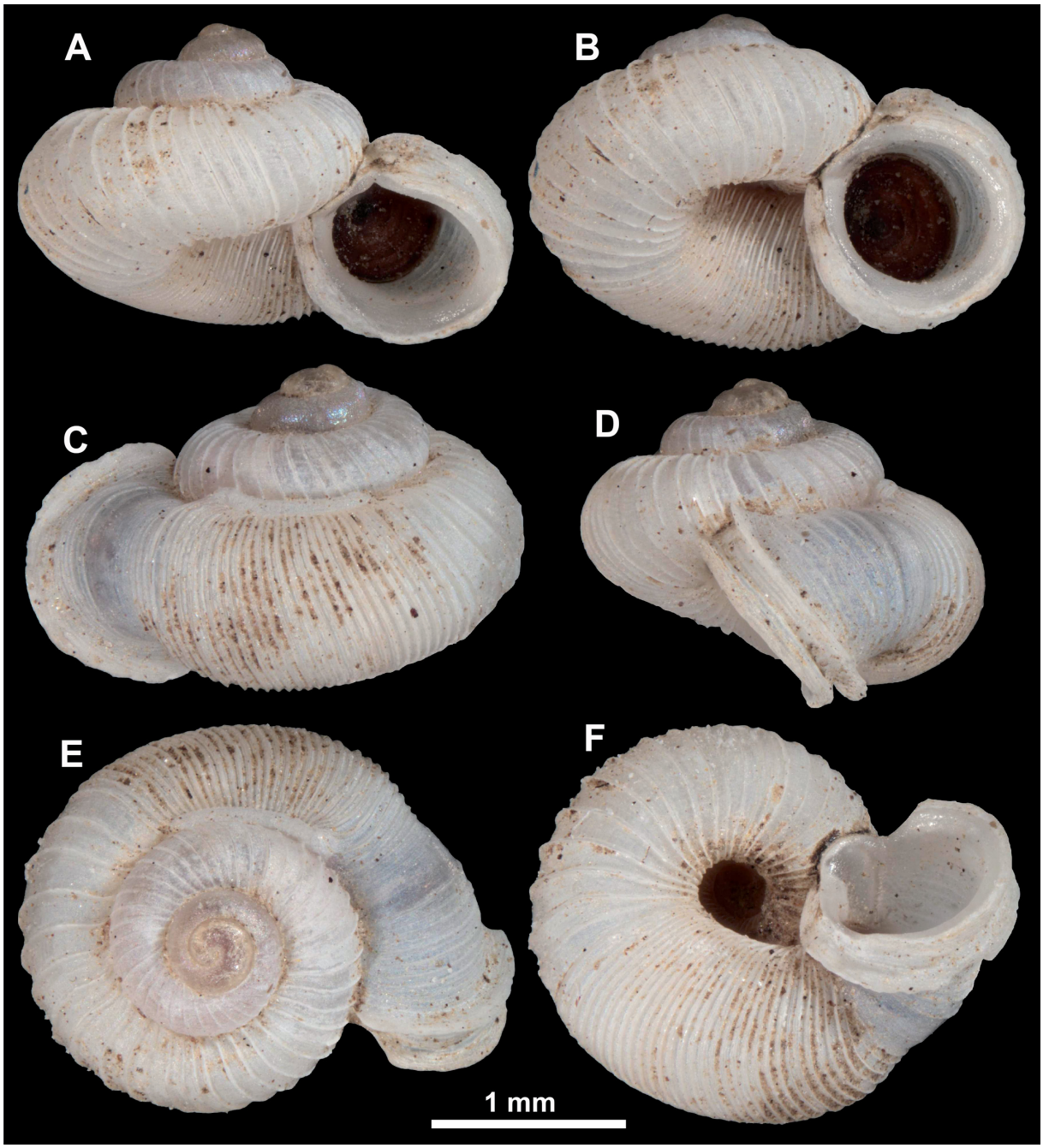

Fig. 10. *Chamalycaeus* cf. *reflectus* Páll-Gergely & Aravind sp. nov., Ar44 (NZSI LM1913). All photos: B. Páll-Gergely.

Distribution

Known only from the Blue Mountain region.

Differential diagnosis

We have not found any similar species in the historical collection other than *C. sculpturus*, with which this species is sympatric. *Chamalycaeus sculpturus* is similar in shell shape and sculpture, and the ratios

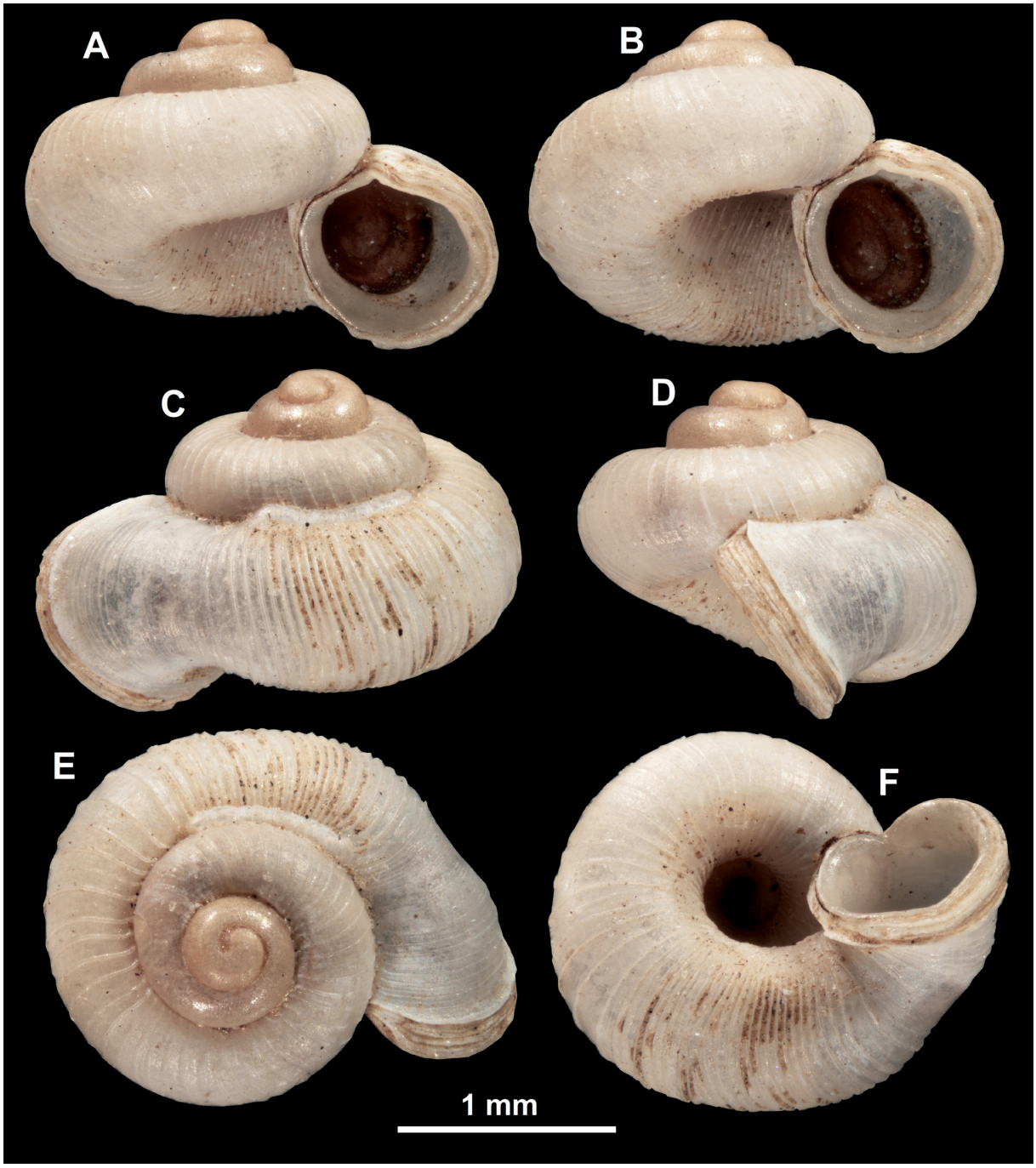

Fig. 11. *Chamalycaeus* cf. *reflectus* Páll-Gergely & Aravind sp. nov., Tripura (NZSI LM 1906). All photos: B. Páll-Gergely.

of regions. However, its peristome is dominated by the inner peristome, which is fringed and thickened, while the outer peristome is not expanded. In contrast, *C. reflectus* sp. nov. has a smooth (not fringed) inner, and a strongly expanded outer peristome. Furthermore, the upper apertural incision on *C. crispatus* is stronger and the R1 ribs (most clearly visible in the area just preceding R2) are denser. The peristome of *C. sculptilis* (Fig. 13A–D) is similar to that of *C. reflectus*, but that species is larger and has a strongly keeled body whorl.

Remarks

The single shell Ar44 (Fig. 10) is larger than the two type specimens and has a longer R2, while the sculpture and the morphology of the inner and outer peristomes of the type specimens and the Ar44 specimen is identical. We need more extensive material to understand whether the observed differences represent an intraspecific diversity or differences between species. The two Ar56 specimens are identical with the Ar44 specimen but are strongly corroded. The single shell from Tripura (Fig. 11) is similar to the holotype, but has a less expanded outer peristome, and denser R1 and R2 ribs. Nevertheless, for the time being, we consider it conspecific with *C. reflectus* sp. nov.

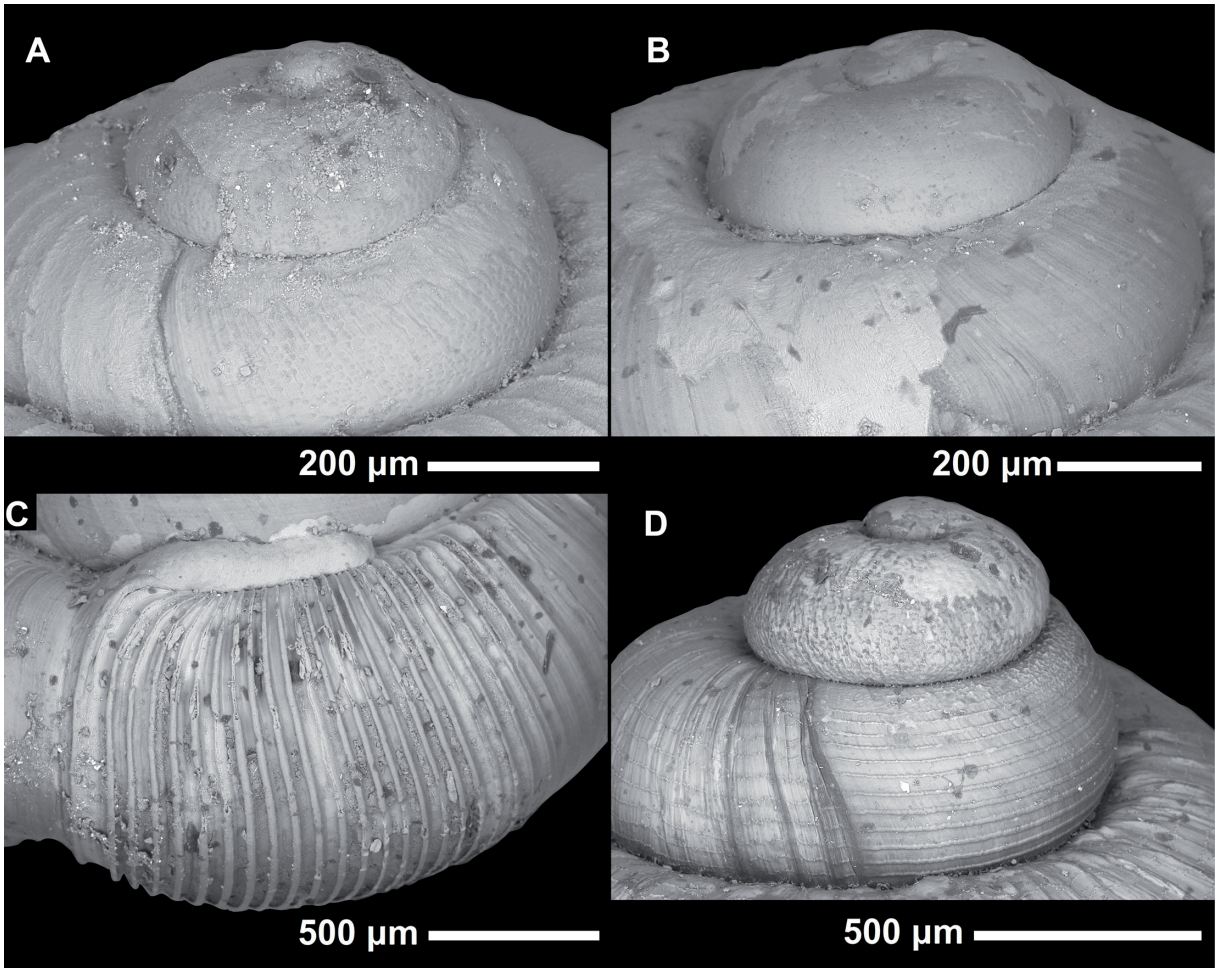

Fig. 12. Sculpture of Alycaeidae W.T. Blanford, 1864. **A**. Protoconch of *Chamalycaeus reflectus* Páll-Gergely & Aravind sp. nov., holotype, Ar55, specimen1 (NZSI LM1723). **B–C**. *Dicharax praeda* Páll-Gergely & Aravind sp. nov., holotype, Ar67 (NZSI LM1740). **B**. Protoconch. **C**. R2. **D**. Protoconch of *Metalycaeus polygonoma* (W.T. Blanford, 1862), Ar48 (NZSI LM1762). All images: B. Páll-Gergely.

Chamalycaeus sculptilis (Benson, 1856)
Fig. 13A–D

Alycaeus sculptilis Benson, 1856: 226–227.
Alycaeus margarita Theobald in Hanley & Theobald, 1874: 39, pl. 97 fig. 7 (renamed *A. microstoma* by Sowerby 1877).
Alycaeus microstoma Sowerby, 1877: pl. 4, species 28.

Alycaeus sculptilis – Sowerby 1877: pl. 4, species 32, figs a–b. — Godwin-Austen 1914: 398, 412, pl. 139 figs 7, 7a, pl. 155 fig. 8.
Alycaeus (*Chamalycaeus*) *sculptilis* – Kobelt 1902: 362. — Gude 1921: 233.
Chamalycaeus (*Chamalycaeus*) *sculptilis* – Ramakrishna *et al.* 2010: 55.
Chamalycaeus sculptilis – Páll-Gergely *et al.* 2020: 44–45. — Preece *et al.* 2022: 79, fig. 32c (neotype designation).

Diagnosis

Differs from all other species of this genus by the keeled body whorl and the finely beaded peristome. See also under *Dicharax bhucarinatus* Gittenberger & Sherub Sherub, 2024.

Type material examined

MYANMAR • neotype (designated by Preece *et al.* 2022: fig. 13a–d); Thyet Myo; Bens. coll.; UMZC I.102845.A • 2 shells; same data as for preceding; UMZC I.102845.B, I.102845.C

Additional material examined

MYANMAR • 1 shell; Pegu, Thayet-myo; "typical", "aperture figured"; NHMUK 1906.4.4.70.

Type locality

"raro ad Thyet-Mio prope fluvium Irawadi, non procul a finibus provinciae Burmanicae Britannicae" [rarely at Thyet-Mio near the river Irawadi, not far from the borders of British Burma] (translation by Preece *et al.* 2022).

Chamalycaeus sculpturus (Godwin-Austen, 1875)
Figs 14–16

Alycaeus sculpturus Godwin-Austen 1875: 8, pl. 4 fig. 2.
Alycaeus crispatus var. *makarsae* Godwin-Austen, 1914: 372, pl. 158 fig. 13. **Syn. nov.**

Alycaeus (*Alycaeus*) *sculpturus* – Kobelt 1902: 351. — Ramakrishna *et al.* 2010: 51.
Alycaeus sculpturus – Godwin-Austen 1914: 398–399, pl. 145 figs 6, 6a–b. — Gude 1921: 218.
Alycaeus (*Dicharax*) *crispatus* var. *makarsae* – Gude 1921: 243.
Dicharax (?) *sculpturus* – Páll-Gergely *et al.* 2020: 103.
Dicharax (?) *crispatus makarsae* – Páll-Gergely *et al.* 2020: 83.

Type material examined

INDIA • 1 syntype of *A. sculpturus* (Fig. 14A–E); Sikhami, NE Munipur; NHMUK 1903.7.1.2666 • 4 syntypes of *A. sculpturus* (Fig. 14F–J); Mungching, Munipur; NHMUK 1903.7.1.2667 • 8 syntypes of *A. crispatus* var. *makarsae* (Fig. 14K–O); Makarsa, Khasi; Godwin-Austen leg.; NHMUK 1903.7.1.2638.

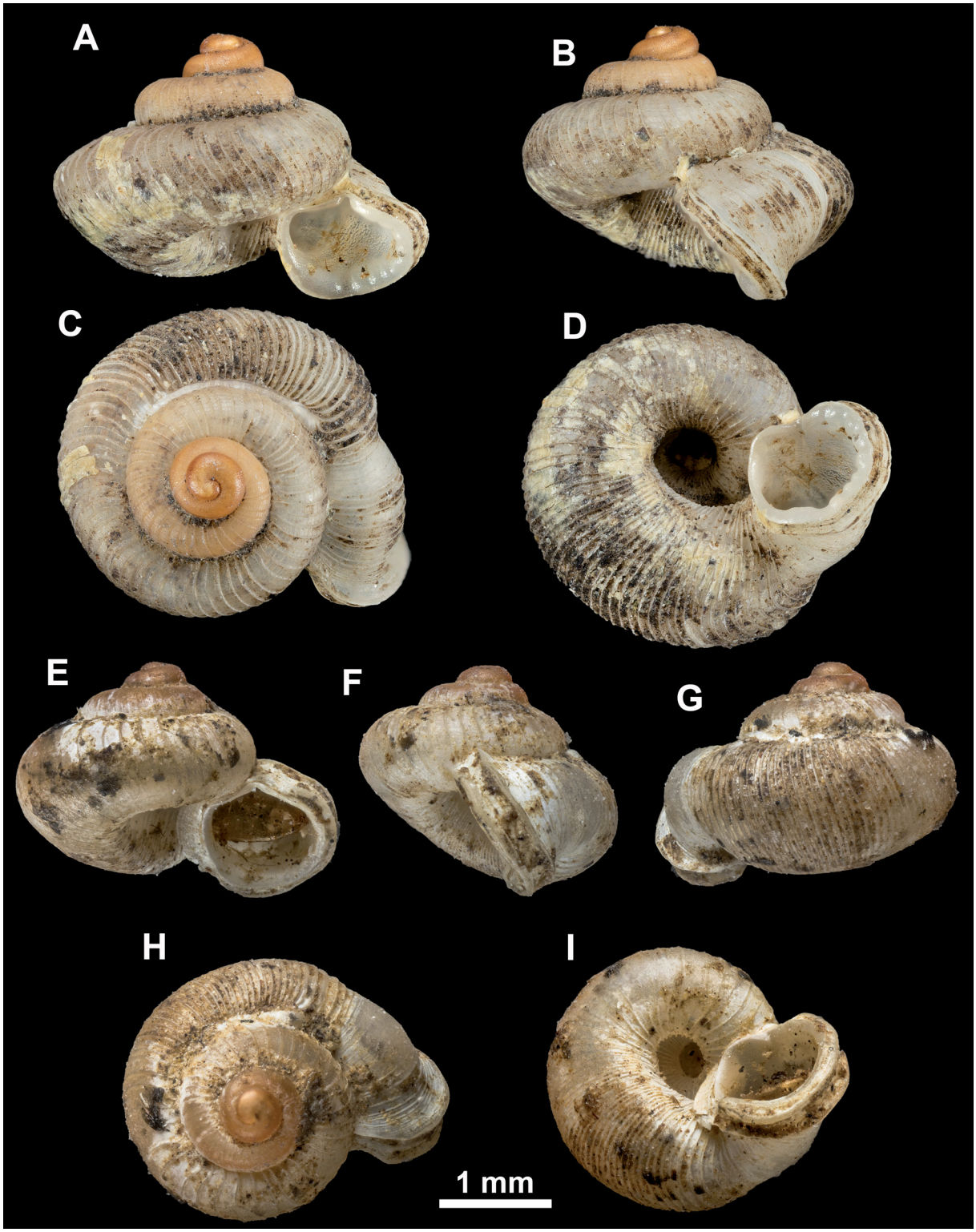

Fig. 13. Shells of species of *Chamalycaeus* Möllendorff, 1897. **A–D**. *Chamalycaeus sculptilis* (Benson, 1856), neotype (UMZC I.102845.A), designated by Preece *et al.* (2022). **E–I**. *Chamalycaeus sylheticus* (Godwin-Austen, 1914), holotype (NHMUK 1903.7.1.55). Photos: A–D = Kevin Webb; E–I = Harold Taylor.

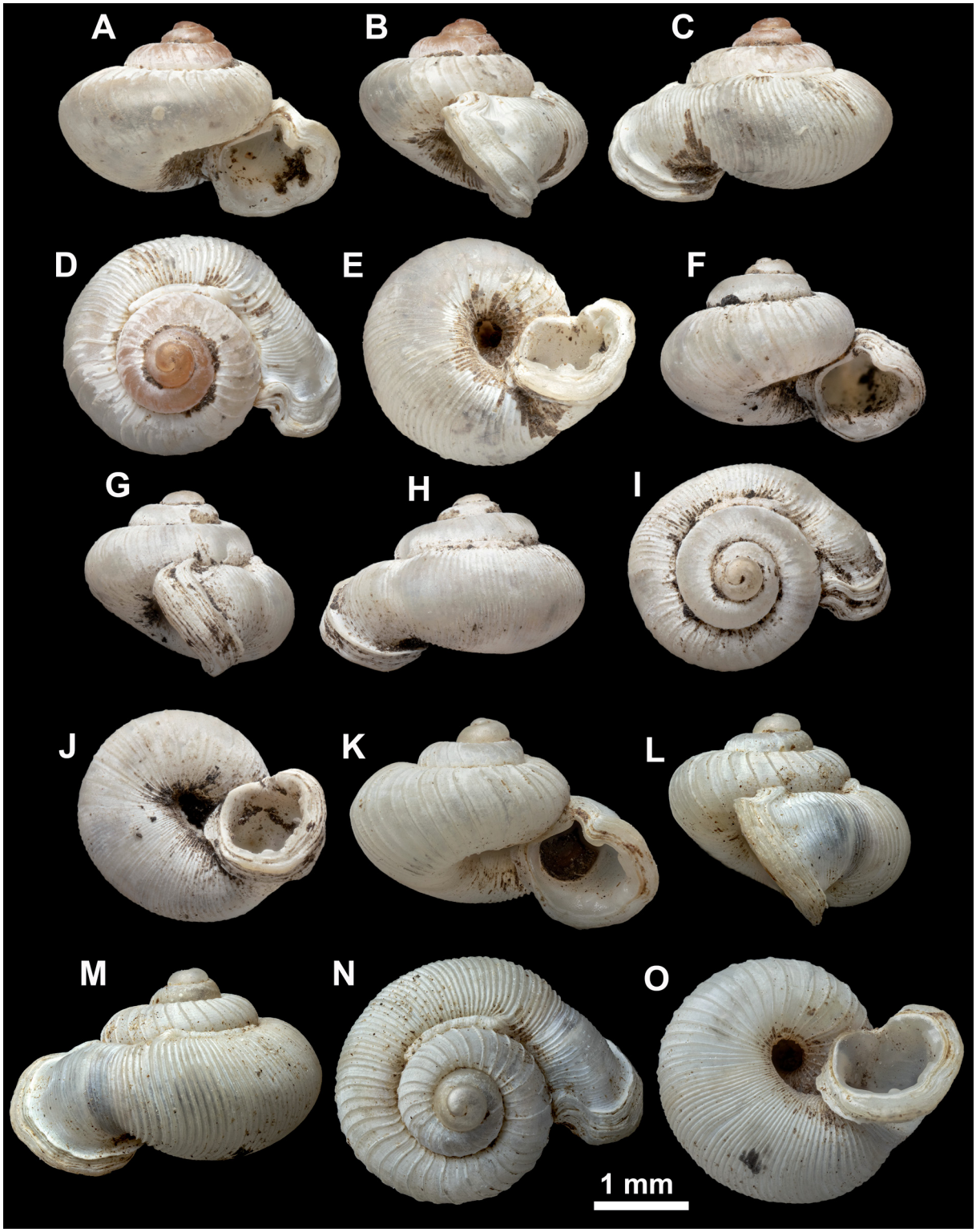

Fig. 14. Shells of *Dicharax sculpturus* (Godwin-Austen, 1875). **A–E**. Syntype (NHMUK 1903.7.1.2666). **F–J**. Syntype (NHMUK 1903.7.1.2667). **K–O**. Syntype of *Alycaeus crispatus* var. *makarsae* Godwin-Austen, 1914 (NHMUK 1903.7.1.2638). All photos: Kevin Webb.

Additional material examined

INDIA – **Mizoram** • 1 empty shell (Fig. 15); Blue Mountain, Lawngtlai district; 22.727° N, 93.135° E; 1400 m a.s.l.; 27 Jan. 2019; N.A. Aravind leg.; Ar68; NZSI LM1720 • 1 empty shell; same data as for preceding; Ar61; NZSI LM1721 • 2 complete shells (Fig. 16) + 2 broken shells; same data as for preceding; Ar74; NZSI LM1722.

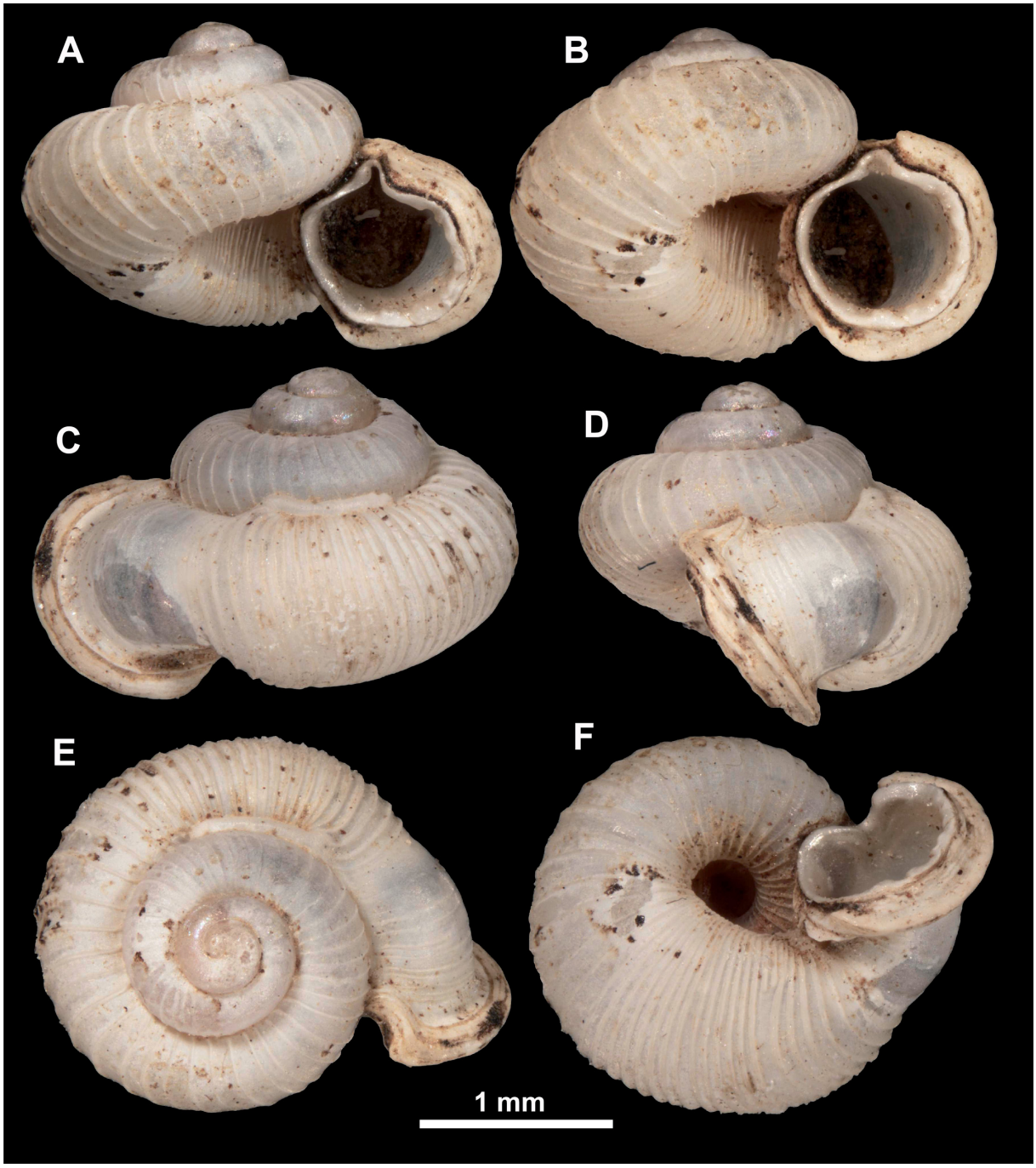

Fig. 15. *Dicharax sculpturus* (Godwin-Austen, 1875) from the Blue Mountain, Ar68 (NZSI LM1720). All photos: B. Páll-Gergely.

Type localities

"on the hill ranges from near Tellizo Peak to the eastward, and on Mungching Hill in Munipur" (*A. sculpturus*); "Makarsa, N. Khasi Hills (or more correct, Maokarsa; the common Khasi prefix "Mao" meaning a stone)" (*A. crispatus* var. *makarsae*).

Remarks

The type specimens of *A. sculpturus* and *A. crispatus* var. *makarsae* show no notable differences; therefore, the latter is a junior synonym of the former. The specimens collected in the Blue Mountain

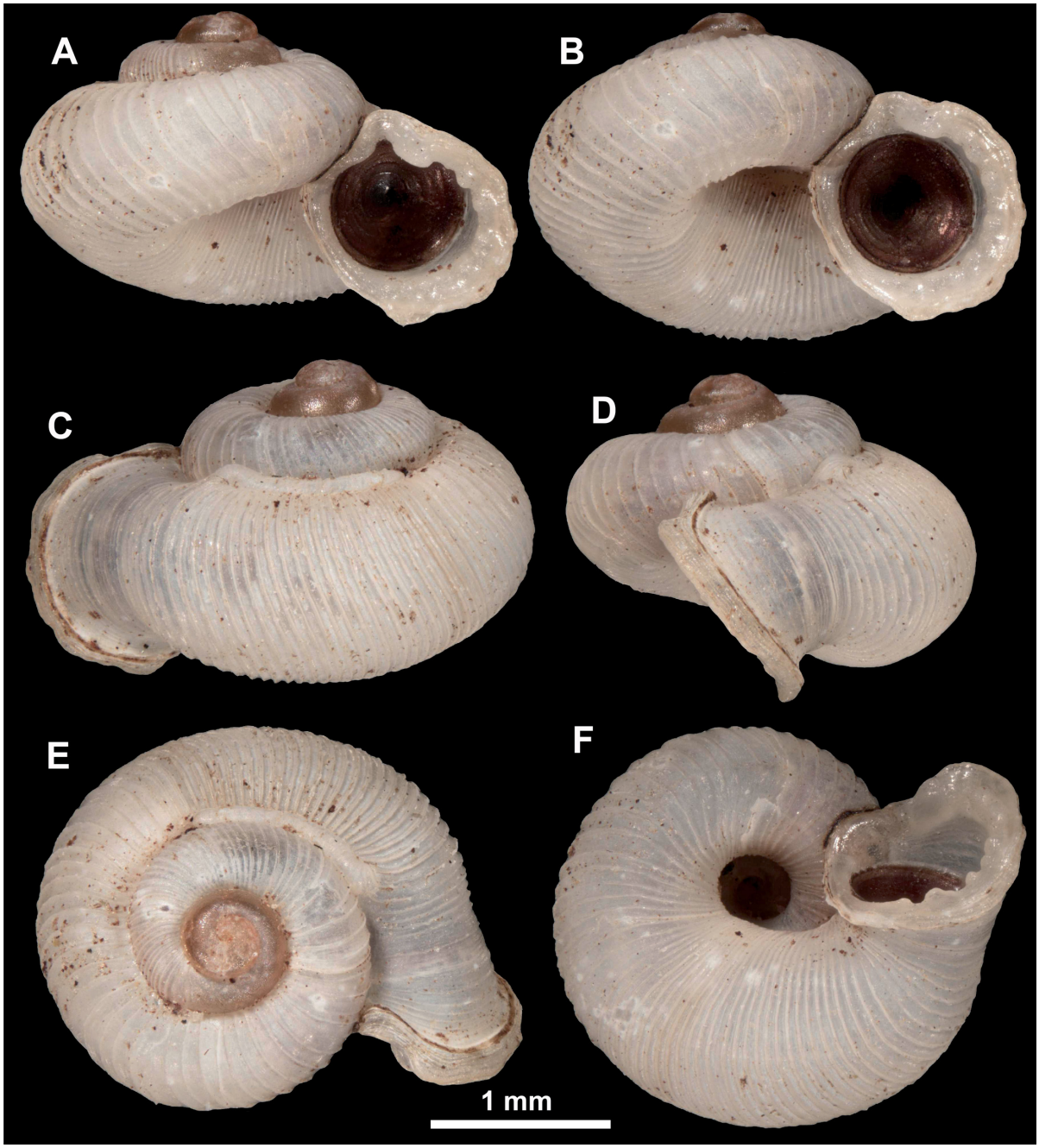

Fig. 16. *Dicharax sculpturus* (Godwin-Austen, 1875), Ar74 (NZSI LM1722). All photos: B. Páll-Gergely.

(Figs 15–16) are slightly smaller than typical *C. sculpturus* and *A. crispatus* var. *makarsae* shells and have multiple tiny knobs along the peristome but otherwise are very similar to those species. These knobs are probably homologous with the tips of triangle-shaped structures (termed chevrons in Gittenberger *et al.* 2024) in the aperture of typical *C. sculpturus* shells and many other alycaeine species (i.e., two tiny knobs of one shell are homologous with the two tips of a single triangle in the other). A similar case was observed in a Chinese species; typical *Dicharax fimbriatus* (Bavay & Dautzenberg, 1912) shells had triangular thickenings along the peristome, while its synonym, *Chamalycaeus plicilabris multidentatus* Yen, 1939, had multiple tiny knobs along the peristome (Páll-Gergely *et al.* 2017).

This species was included in the genus *Dicharax* due to the absence of spiral striation (Páll-Gergely *et al.* 2020). However, re-examination of the syntypes of *A. sculpturus* and *Alycaeus crispatus* var. *makarsae* revealed some spiral striation on the teleoconch.

Chamalycaeus solidus (Godwin-Austen, 1914)
Fig. 17

Alycaeus theobaldi var. *solidus* Godwin-Austen, 1914: 383–384, pl. 155 fig. 10.
Alycaeus kezamaensis Godwin-Austen, 1914: 393, pl. 149 fig. 1. **Syn. nov.**

Alycaeus (*Dicharax*) *kezamaensis* – Gude 1921: 258.
Alycaeus (*Dicharax*) *theobaldi* var. *solida* – Gude 1921: 273–274.
Chamalycaeus (*Dicharax*) *kezamaensis* – Ramakrishna *et al.* 2010: 62.
Dicharax kezamaensis – Páll-Gergely *et al.* 2020: 66.
Dicharax theobaldi solidus – Páll-Gergely *et al.* 2020: 75.

Diagnosis

This species can be distinguished from other species of this species group by the long and inflated R3 swelling. *Chamalycaeus sylheticus* is the most similar species; for comparisons, see under that species.

Type material examined

INDIA • 1 syntype of *A. kezamaensis* (Fig. 17F–J); Kezama, Naga Hills; Godwin-Austen coll.; NHMUK 1903.7.1.2556 • 4 syntypes of *A. theobaldi* var. *solidus* (Fig. 17A–E); Garo Hills; NHMUK 1903.7.1.2560.

Type localities

"Kezama, Anghami-Naga Hills" (*A. kezamaensis*); "Garo Hills" (*A. theobaldi solidus*).

Remarks

Alycaeus kezamaensis is very slightly smaller than the syntypes of *A. theobaldi solidus*, but all other traits (shell and aperture shape, morphology and ratios of shell regions, sculpture) are identical. Therefore, they represent the same species. *Alycaeus kezamaensis* was introduced later in the same publication, therefore the valid name is *Chamalycaeus solidus*. *Chamalycaeus solidus* is a species of its own right, because it differs in important traits from *D. theobaldi*, namely the latter is more depressed, its R2 is longer, and the R3 swelling is lower and shorter (and they belong to different genera).

This species was included in the genus *Dicharax* due to the absence of spiral striation on the corroded syntypes of *Alycaeus theobaldi* var. *solidus* and *Alycaeus kezamaensis* (Páll-Gergely *et al.* 2020). Nevertheless, the other conchological characters agree with species of this species group, and therefore, this species is reclassified in *Chamalycaeus*.

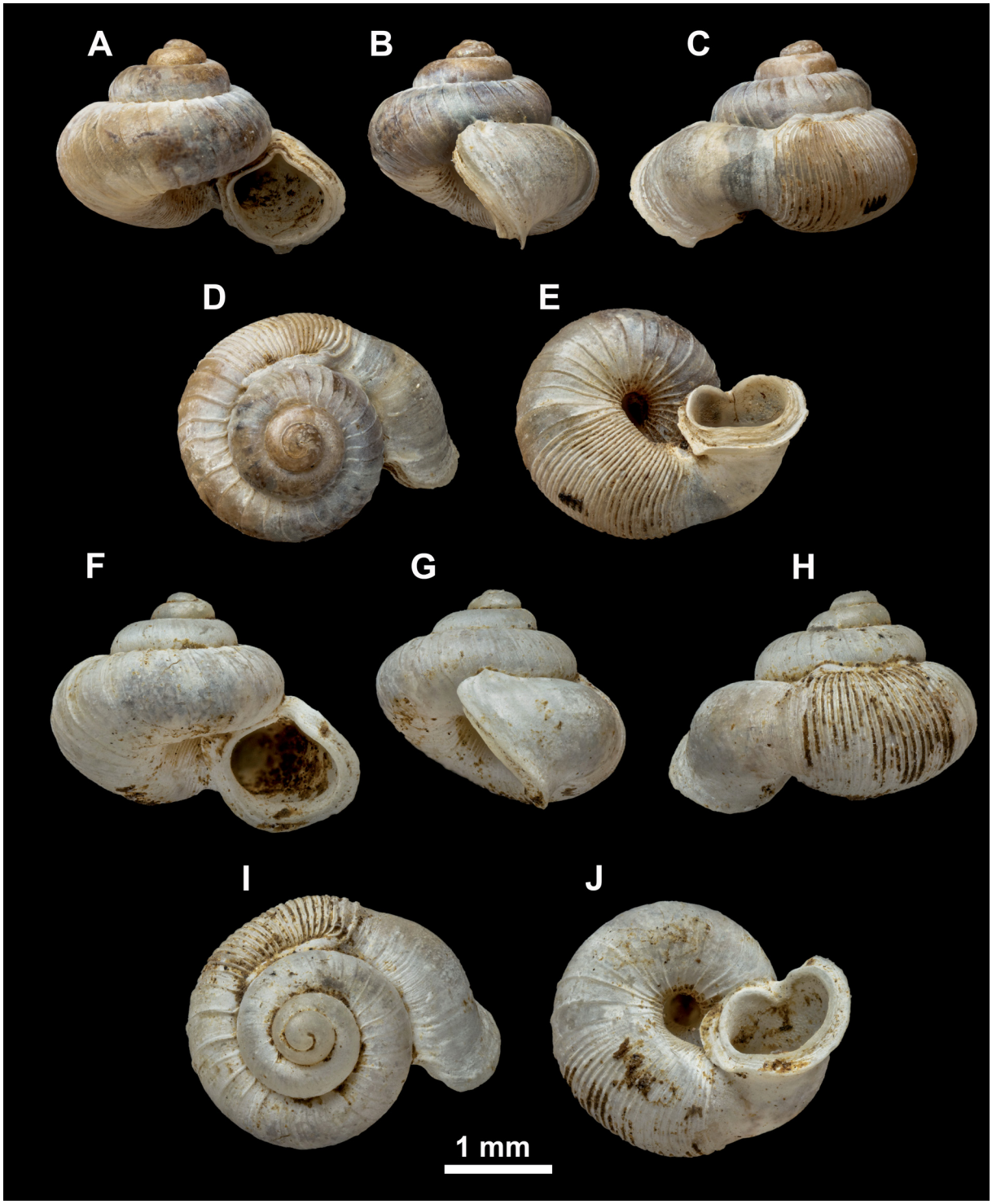

Fig. 17. *Chamalycaeus solidus* (Godwin-Austen, 1914). **A–E**. Syntype of *Alycaeus kezamaensis* Godwin-Austen, 1914 (NHMUK 1903.7.1.2556). **F–J**. Syntype of *A. solidus* (NHMUK 1903.7.1.2560). All photos: Kevin Webb.

Chamalycaeus sylheticus (Godwin-Austen, 1914)
Fig. 13F–I

Alycaeus sylheticus Godwin-Austen, 1914: 382, pl. 154 figs 4, 4a.

Alycaeus sylheticus – Gude 1921: 220.
Dicharax sylheticus – Páll-Gergely *et al.* 2020: 74; 2021: 23, fig. 16.

Type material examined

BANGLADESH • holotype (single shell mentioned in the original description: Fig. 13F–I); S Sylhet Hills; W. Channel leg.; NHMUK 1903.7.1.55.

Type locality

"South Sylhet Hills".

Differential diagnosis

The most similar species is *C. solidus* in terms of shell shape and sculpture, but that species is slightly larger, has a more elevated spire, and a more bulging R3 swelling.

Remarks

This species was included in the genus *Dicharax* in spite of the presence of spiral striation, because the R2 ribs were typical of that genus (Páll-Gergely *et al.* 2020). However, the critical revision of Himalayan species of *Chamalycaeus* and *Dicharax* revealed that *C. sylheticus* belongs to this species group of *Chamalycaeus* due to other conchological traits (colourless shells, strong and widely-spaced R1 ribs, upper apertural notch).

Chamalycaeus sp.
Fig. 18

Material examined

INDIA – **Mizoram** • 1 shell (Fig. 18); Blue Mountain, Lawngtlai district; 22.727° N, 93.135° E; 1400 m a.s.l.; 27 Jan. 2019; N.A. Aravind leg.; Ar66; NZSI LM1726 • 1 shell; same data as for preceding; AR59; NZSI LM1912.

Remarks

This is probably a new species, of which we had two specimens, but both had a broken R2. Since this is a crucial region for species recognition, we do not formally describe this species.

Genus ***Cycloryx*** Godwin-Austen, 1914

Alycaeus (*Cycloryx*) Godwin-Austen, 1914: 334.

Type species

Cyclostoma constrictum Benson, 1851, by original designation.

Elongated ***Cycloryx***

Remarks

The species belonging here usually have a conical or elongated conical shell and a thin peristome.

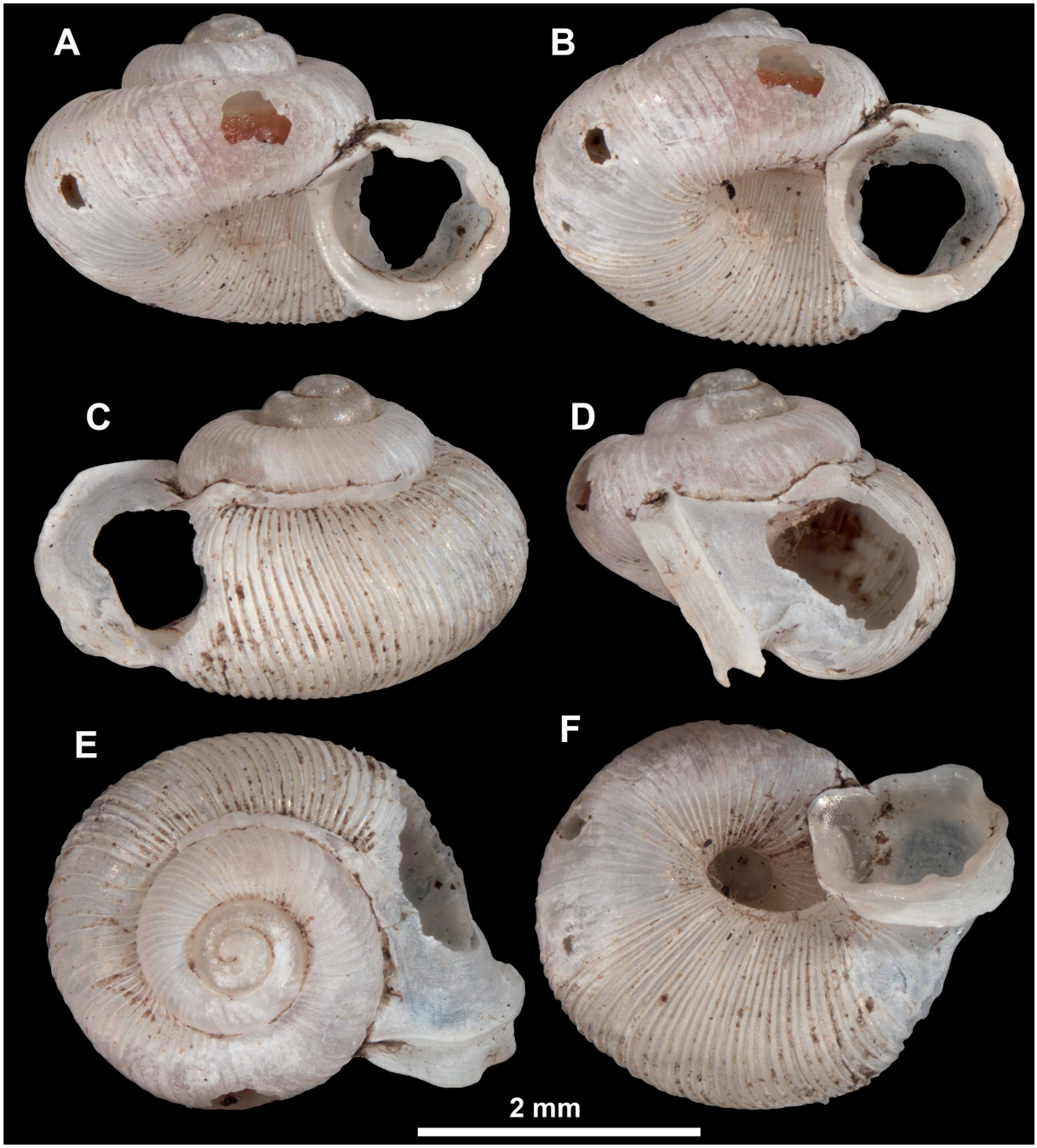

Fig. 18. *Chamalycaeus* sp., Ar66 (NZSI LM1726). All photos: B. Páll-Gergely.

Cycloryx bembex (Benson, 1859)
Fig. 19A–H

Alycaeus bembex Benson, 1859: 178–179.

Alycaeus bembex – Sowerby 1877: pl. 5, species 42. — Godwin-Austen 1884: pl. 51 fig. 5.
Alycaeus (*Alycaeus*) *bembex* – Kobelt 1902: 342.
Alycaeus (*Cycloryx*) *bembex* – Godwin-Austen 1914: 346–347, pl. 147 figs 1, 1a. — Gude 1921: 275–276.

Cycloryx bembex – Ramakrishna *et al*. 2010: 70.
Pincerna bembex – Páll-Gergely *et al.* 2020: 170.

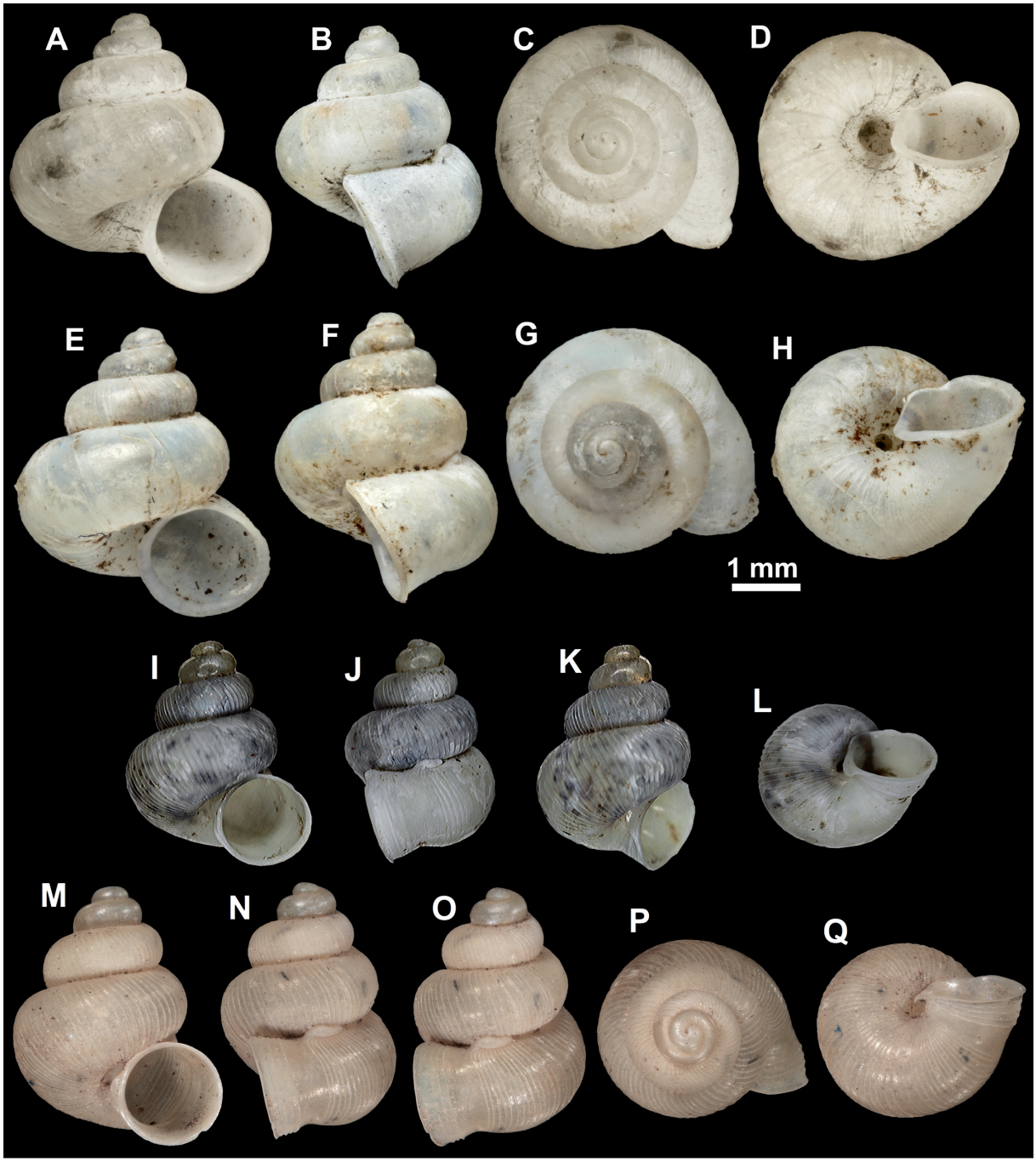

Fig. 19. Shells of species of *Cycloryx* Godwin-Austen, 1914. **A–D**. *C. bembex* (Benson, 1859), syntype (UMZC I.102730). **E–H**. *C. bembex* (Benson, 1859) (NHMUK 1906.4.4.44/1, W.T. Blanford collection). **I–L**. *C. pemaledai* Gittenberger & Sherub Sherub, 2022, holotype (NBCB1289), from Gittenberger *et al*. 2022). **M–Q**. *C.* cf. *pemaledai* (ATREE/2019/LS6001). Photos: Kevin Webb (A–H), B. Páll-Gergely (M–Q).

Diagnosis

This species can be distinguished from others due to the practically smooth, conical shell, and the thin peristome.

Type material examined

INDIA • 1 syntype (Fig. 19A–D); UMZC I.102730 • 6 possible syntypes (one of them separated in a different vial and marked with a "T"); Darjiling; NHMUK 1906.4.4.44 (Fig. 19E–H). The latter lot was not considered type by Preece *et al.* (2022).

Type locality

"in valle Rungun".

Cycloryx constrictus (Benson, 1851)
Fig. 20A–D

Cyclostoma constrictum Benson, 1851: 184–195.
Alycaeus constrictus var. *minor* Benson, 1859: 181.

Alycaeus constrictus – Sowerby 1877: pl. 5, species 41.
Alycaeus (*Alycaeus*) *constrictus* – Kobelt 1902: 343.
Alycaeus (*Cycloryx*) *constrictus* – Godwin-Austen 1914: 347–349, pl. 147 figs 4, 4a, pl. 154 figs 1, 1a. — Gude 1921: 277–278.
Alycaeus (*Cycloryx*) *constrictus* var. *minor* – Godwin-Austen 1914: 348.
Cycloryx constrictus – Ramakrishna *et al.* 2010: 70.
Pincerna constricta – Páll-Gergely 2017: 218, fig. 1a. — Páll-Gergely *et al.* 2020: 171.

Diagnosis

This species can be recognized based on the high conical shell shape, widely-spaced ribs, and thin peristome. R2 with several (ca 10) low ribs.

Type material examined

INDIA • holotype (see Fig. 20A–D and Preece *et al.* 2022); UMZC I.103745.

Additional material examined

INDIA • 5 shells; Rungun Valley, Darjiling; NHMUK 1906.4.4.41.

Type locality

"ad Darjiling Himalayæ Sikkimensis".

Cycloryx costatus (Godwin-Austen, 1914)
Fig. 20E–I

Alycaeus (*Cycloryx*) *costatus* Godwin-Austen, 1914: 360–361, pl. 154 figs 2, 2a.

Alycaeus (*Cycloryx*) *costatus* – Gude 1921: 278.
Cycloryx costatus – Ramakrishna *et al*. 2010: 71.
Pincerna costata – Páll-Gergely 2017: 214. — Páll-Gergely *et al.* 2020: 171.

Type material examined

INDIA • 18 syntypes (Fig. 20E–I); Toruputu Peak, Dafla Hills, Dikrang Valley, Dafla; Godwin-Austen leg.; NHMUK 1903.7.1.2596.

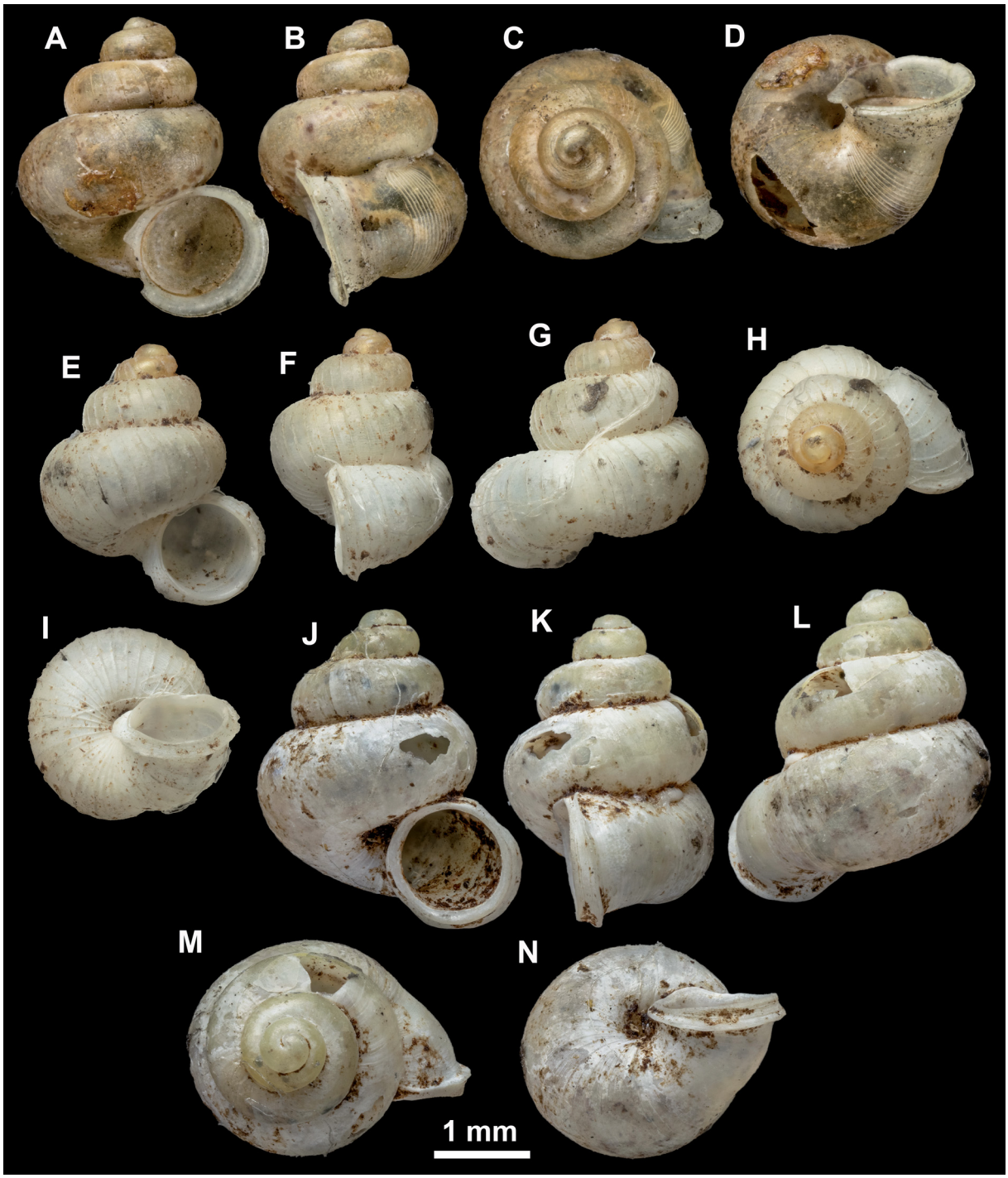

Fig. 20. Shells of species of *Cycloryx* Godwin-Austen, 1914. **A–D**. *C. constrictus* (Benson, 1851), holotype (UMZC I.103745). **E–I**. *C. costatus* (Godwin-Austen, 1914), syntype (NHMUK 1903.7.1.2596). **J–N**. *C. tenellus* (Godwin-Austen, 1914), holotype (NHMUK 1906.5.5.87). All photos: Kevin Webb.

Type locality

"Dikrang Valley, Dafla Hills".

Differential diagnosis

In size, shape and R1 sculpture it is similar to *C. constrictus*, but has only 4–5 R2 ribs.

Cycloryx elegans (Godwin-Austen, 1914)
Fig. 21A–E

Alycaeus (*Cycloryx*) *elegans* Godwin-Austen, 1914: 361, pl. 147 fig. 9.
Alycaeus (*Cycloryx*) *khunhoensis* Godwin-Austen, 1914: 403, pl. 147 fig. 8. **syn. nov.**

Alycaeus (*Cycloryx*) *elegans* – Gude 1921: 279.
Alycaeus (*Cycloryx*) *khunhoensis* – Gude 1921: 282.
Cycloryx elegans – Ramakrishna *et al.* 2010: 71.
Cycloryx khunhoensis – Ramakrishna *et al.* 2010: 72.
Pincerna elegans – Páll-Gergely 2017: 214. — Páll-Gergely *et al.* 2020: 175.
Pincerna khunhoensis – Páll-Gergely 2017: 214. — Páll-Gergely *et al.* 2020: 178.

Diagnosis

This species is characterized by a conical shell and dense ribbing on the entire surface. The peristome is thin, but the umbilicus is slightly covered by a reflected outer peristome.

Type material examined

INDIA • 1 syntype of *C. elegans* (Fig. 21A–E); Shengorh Pk, Dafla Hills; Godwin-Austen coll.; NHMUK 1903.7.1.2594 • 1 syntype of *A. khunhoensis* (Fig. 21F–J); Khunho Peak, Naga Hills; Godwin-Austen leg.; NHMUK 1903.7.1.2520.

Type localities

"Shengorh Peak, Dafla Hills" (*C. elegans*); "Khunho Peak, Naga Hills" (*C. khunhoensis*).

Remarks

This species is similar to *C. constrictus*, but is characterized by a thinner peristome and finer ribbing. *Cycloryx granum* has similar sculpture, but it is more globular in shape.

Cycloryx khunhoensis has slightly less dense ribbing than *C. elegans*, which we interpret as part of the intraspecific variability.

Cycloryx pemaledai Gittenberger & Sherub Sherub, 2022
Fig. 19I–Q

Cycloryx pemaledai Gittenberger & Sherub Sherub in Gittenberger *et al.*, 2022: 76, figs 2, 9.

Cycloryx cf. *pemaledai* – Aravind & Páll-Gergely 2023: 355, fig. 1.

Diagnosis

This species can be recognized based on the short R3.

Type material examined

Photos of the holotype (Fig. 19I–L) examined.

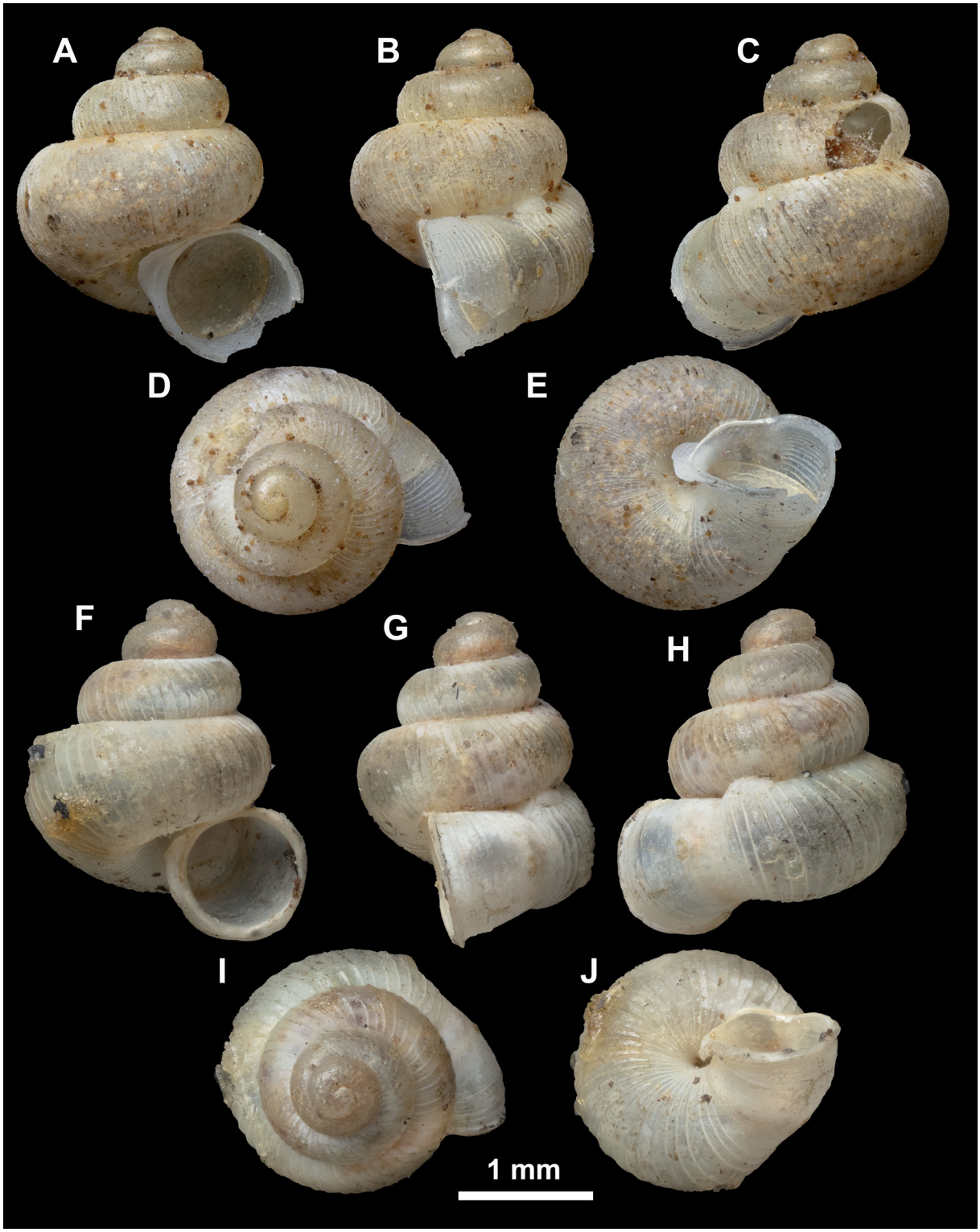

Fig. 21. Shells of *Cycloryx elegans* (Godwin-Austen, 1914). **A–E**. Syntype (NHMUK 1903.7.1.2594). **F–J**. *Cycloryx khunhoensis* (Godwin-Austen, 1914), syntype (NHMUK 1903.7.1.2520). All photos: Kevin Webb.

Additional material examined

INDIA • 2 shells (Fig. 19M–Q); North Sikkim, 2 km N of Lachen, towards Gurudongmar Lake; 27.74487° N, 88.54439° E; 2749 m a.s.l.; 27 Nov. 2019; N.A. Aravind leg.; ATREE/2019/LS6001, ATREE/2019/LS6002.

Type locality

"Gasa Dzongkhag, 9 km S of Gasa, 2400 m a.s.l., 27°50′N 89°43′E" (Bhutan).

Cycloryx tenellus (Godwin-Austen, 1914)
Fig. 20J–N

Alycaeus (*Cycloryx*) *tenellus* Godwin-Austen, 1914: 417, pl. 155 figs 3–4, 4a.

Alycaeus (*Cycloryx*) *tenellus* – Gude 1921: 285.
Pincerna tenella – Páll-Gergely *et al.* 2020: 183.

Diagnosis

A species with somewhat questionable status (see Remarks). The only known shell is characterized by a somewhat conical-ovoid shell, smooth initial whorls, widely-spaced ribbing in the lower whorls and thin peristome.

Type material examined

MYANMAR • holotype (single shell mentioned in the original description: Fig. 20J–N); Shan Hills, in the same slide as N. 22; Fedden leg.; NHMUK 1906.5.5.87.

Type locality

"Shan States".

Remarks

It is larger than any known species in this group. It is most similar to *C. constrictus* but has weaker ribbing (upper whorls smooth, although the holotype is strongly corroded). The more obvious separation between the inner and outer peristomes of this species compared to the figured syntype of *C. constrictus* is not a stable character, because in the other available lot of *C. constrictus* (NHMUK 1906.4.4.41) there are shells with similar peristome to that of the holotype of *C. tenellus*. A single shell is known of this species and very few of *C. constrictus*. If more material becomes available, it may happen that *C. tenellus* will be moved to the synonymy of *C. constrictus*.

Globular ***Cycloryx***

Remarks

The species belonging here usually have a globular shell and a strongly expanded outer peristome.

Cycloryx burrailensis (Godwin-Austen, 1914)
Fig. 22A–E

Alycaeus (*Cycloryx*) *burrailensis* Godwin-Austen, 1914: 403, pl. 147 figs 6, 6a.

Alycaeus (*Cycloryx*) *burrailensis* – Gude 1921: 276.
Cycloryx burrailensis – Ramakrishna *et al.* 2010: 70.
Pincerna burrailensis – Páll-Gergely *et al.* 2020: 170.

Type material examined

Lectotype (hereby selected: Fig. 22A–E)
INDIA • Japvo Peak, Naga Hills; elev. 9890 f; Godwin-Austen leg.; acc. no. 1830, NHMUK 1903.7.1.2591.1.

Paralectotypes
INDIA • 5 specs; same data as for lectotype; NHMUK 1903.7.1.2591.2 to 1903.7.1.2591.6 • several specs in two vials, one of the vials with a single shell and a pink wool; Munipur side of the Burrail; NHMUK 1903.7.1.2606.

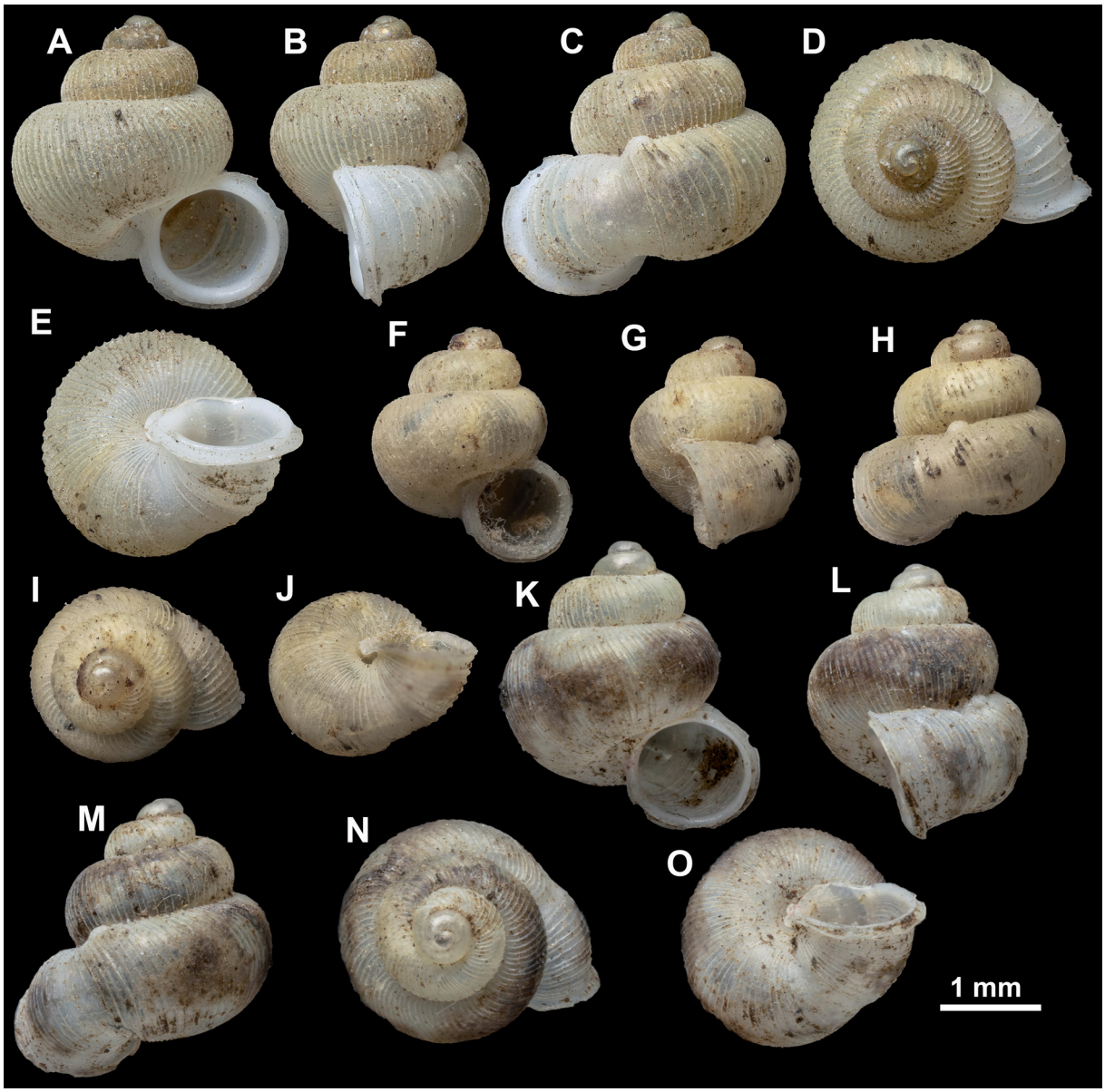

Fig. 22. Shells of species of *Cycloryx* Godwin-Austen, 1914. **A–E**. *C. burrailensis* (Godwin-Austen, 1914), lectotype (hereby designated) (NHMUK 1903.7.1.2591). **F–J**. *C. granum* (Godwin-Austen, 1893), syntype (NHMUK 1903.7.1.2511). **K–O**. *C. multicostulatus* (Godwin-Austen, 1914), syntype (NHMUK 1903.7.1.2557). All photos: Kevin Webb.

Type localities

"Japvo Peak, Naga Hills, 9890 ft"; "Munipur side of the Burrail"; Angaoluo Peak.

Differential diagnosis

Densely ribbed, similar to *C. granum*, but has wider spaces between R3 ribs.

Remarks

In the type collection in the same box we found the three vials (1: Japvo peak, labelled as "var. *minor*", 2591; 2: several shells with label "2606"; 3: single shell, also with label "2606" and a pink wool [which usually indicates that it is the "type"]). Besides the size, the difference between shells from the two localities is that R3 is much more densely ribbed in "var. *minor*" (from Japvo Peak).

In the original description, the type locality was given as "Japvo Peak, Naga Hills, 9890 ft", and it is later added that "obtained also on the Munipur side of the Burrail, No. 2606 B.M.; and Angaoluo Peak, No. 2749 B.M.". One understanding of Godwin-Austen's concept is to accept only the lot from Japvo Peak as syntypes, and none of the shells from the other two sites. However, in that case specimens from Burrail would be excluded from the type series, which would be strange for a species named "*burrailensis*". Moreover, although not mentioned in the original description, the shells from Japvo Peak were labelled as "var. *minor*, 2591", suggesting, that the ones from Burrail should be considered "typical". Lastly, the description states that there is a "distant fine costulation between sutural tube and aperture", which unambiguously refers to the larger form from Burrail (NHMUK 1903.7.1.2606). Therefore, we accept shells belonging to all three lots as syntypes.

The single shell from Angaoluo Peak was also found in the general collection, and it is similar to the ones from Burrail in size and formation of the aperture, but the R1 ribbing is approximately half as dense.

Since the syntypes were collected at three different localities, and are somewhat different in shell traits, we hereby select a lectotype to avoid further nomenclatural confusion.

Cycloryx dihingensis (Godwin-Austen, 1914)
Fig. 23A–E

Alycaeus (*Cycloryx*) *graphicus* var. *dihingensis* Godwin-Austen, 1914: 363–364, 404, pl. 146 figs 6, 6a.

Alycaeus (*Cycloryx*) *graphicus* var. *dihingensis* – Gude 1921: 281–282.
Pincerna graphica dihingensis – Páll-Gergely *et al.* 2020: 178.

Diagnosis

This species can be recognized by its large size, the reflected outer peristome in the direction of the umbilicus, and the thick peristome (protruding inner peristome). See also under *Cycloryx rohiniae* sp. nov.

Type material examined

INDIA • 2 syntypes (Fig. 23A–E); Sadia, Assam; NHMUK 1903.7.1.2516.

Type locality

"Sadia, Assam, 350 ft".

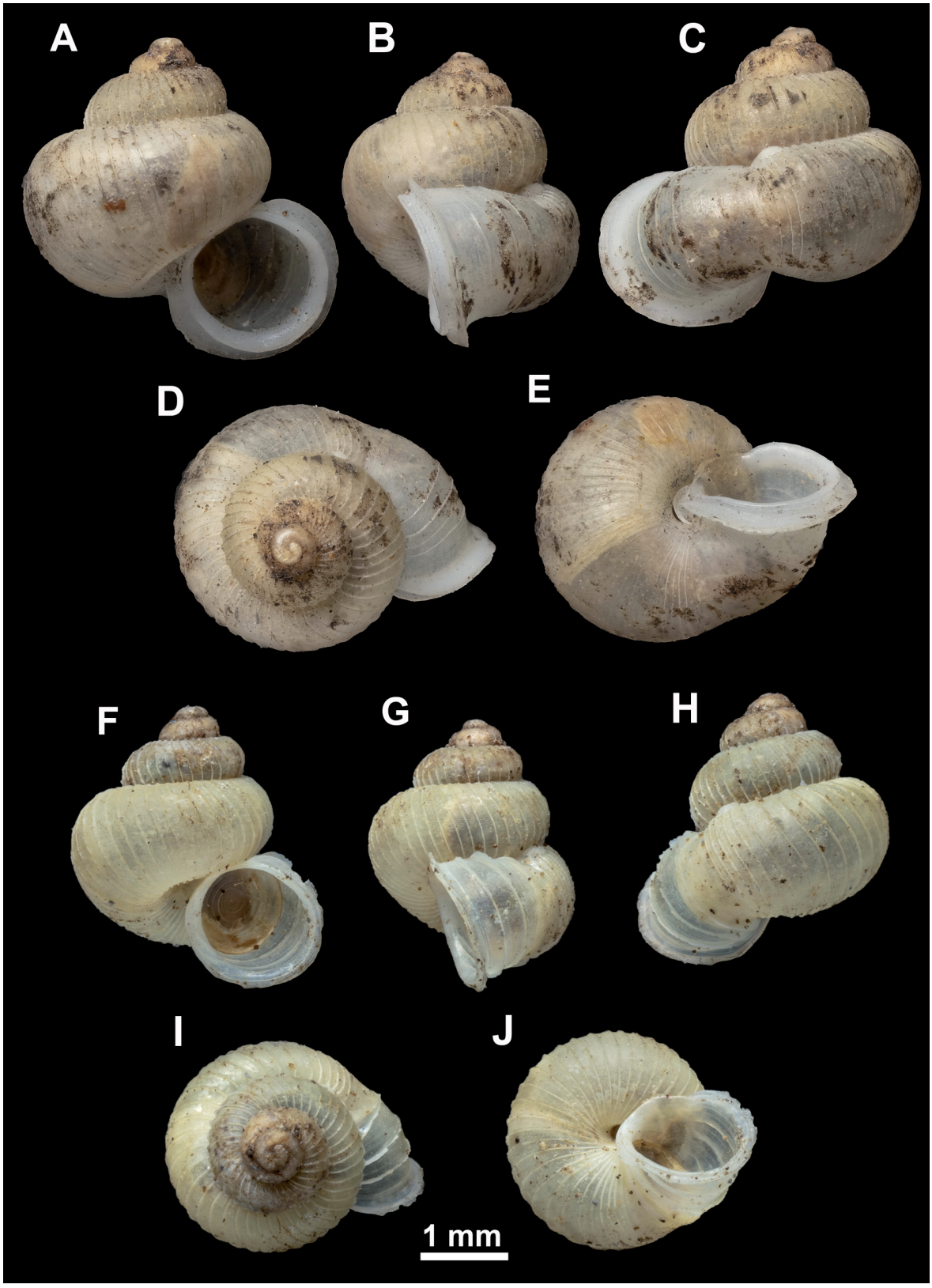

Fig. 23. Shells of species of *Cycloryx* Godwin-Austen, 1914. **A–E**. *C. dihingensis* (Godwin-Austen, 1914), syntype (NHMUK 1903.7.1.2516). **F–J**. *C. paucicostatus* (Godwin-Austen, 1914), syntype (NHMUK 1903.7.1.2595). All photos: Kevin Webb.

Remarks

Similar to *C. major*, but it is larger and has a thicker peristome with more protruding inner peristome. Similar in size to *A. otiphorus*, but has a more globular shell, stronger ribbing on the apical whorls, and ribs on R3.

Cycloryx globhutanus Gittenberger & Sherub Sherub, 2022
Fig. 24A–D

Cycloryx globhutanus Gittenberger & Sherub Sherub in Gittenberger *et al.*, 2022: 76, figs 2, 4.

Diagnosis

This species can be recognized based on the very widely-spaced R1 ribs and the smooth R2 with numerous slender microtunnels.

Type locality

"Samdrup Jongkhar Dzongkhag, 9 km N of Samdrup Jongkhar, 1008 m a.s.l., warm broadleaf forest, 26°52′N 91°29′E" (Bhutan).

Cycloryx granum (Godwin-Austen, 1893)
Fig. 22F–O

Alycaeus otiphorus var. Godwin-Austen, 1871: 93, pl. 5 fig. 6.
Alycaeus (*Dioryx*) *granum* Godwin-Austen, 1893: 593–594.
Alycaeus (*Cycloryx*) *multicostulatus* Godwin-Austen, 1914: 404, pl. 147 fig. 7. **Syn. nov.**
Alycaeus (*Cycloryx*) *burrailensis* Godwin-Austen, 1914: 403 (in part).

Alycaeus (*Dioryx*) *granum* – Godwin-Austen 1897: 4–5, pl. 63 fig. 6.
Alycaeus (*Alycaeus*) *granum* – Kobelt 1902: 345.
Alycaeus (*Cycloryx*) *granum* – Godwin-Austen 1914: 364. — Gude 1921: 279–280.
Alycaeus (*Cycloryx*) *multicostulatus* – Gude 1921: 282–283.
Cycloryx granum – Ramakrishna *et al.* 2010: 71.
Cycloryx multicostulatus – Ramakrishna *et al.* 2010: 73.
Pincerna granum – Páll-Gergely *et al.* 2020: 177.
Pincerna multicostulata – Páll-Gergely *et al.* 2020: 181.

Diagnosis

Shell globular, ribs dense on the entire shell.

Type material examined

INDIA • 1 syntype of *A. granum* (Fig. 22F–J); Margarita, near Sadia, Assam; Godwin-Austen coll.; NHMUK 1903.7.1.2511 • 1 syntype of *A. multicostulatus* (Fig. 22K–O); Munipur, head of Lanier Rr; Godwin-Austen leg.; NHMUK 1903.7.1.2557.

Type localities

"Margarita, foot of Eastern Naga Hills" (*A. granum*); "Head of the Lanier River, Lahupa Naga Hills, N.E. Manipur" (*A. multicostulatus*).

Remarks

Types of *C. granum* are much smaller than *C. multicostulatus*, but there is no difference between those shells other than shell size. Specimens from the Japvo Peak, Naga Hills (labelled as "*A. burrailensis* var. *minor*", see also *A. burrailensis*) are intermediate in size between *C. granum* and *C. multicostulatus*. Therefore, we treat the latter as a junior synonym of the former.

Cycloryx haumbiclausus Gittenberger & Choki Gyeltshen, 2022
Fig. 24E–H

Cycloryx haumbiclausus Gittenberger & Choki Gyeltshen in Gittenberger *et al.*, 2022: 78, figs 1, 6.

Diagnosis

This species can be recognized by the widely-spaced R1 ribs and the smooth R2 with numerous slender microtunnels.

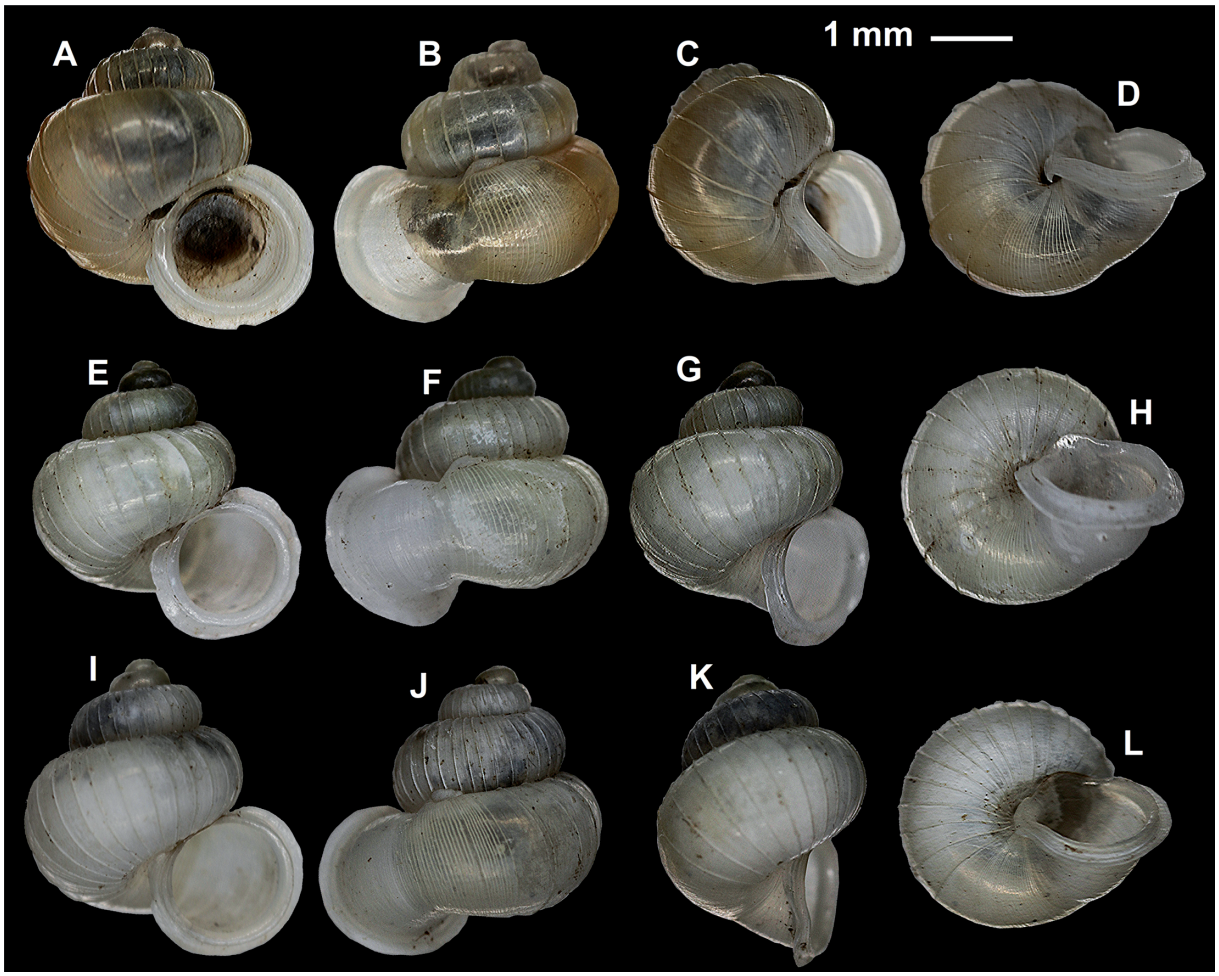

Fig. 24. Shells of species of *Cycloryx* Godwin-Austen, 1914 from Bhutan. **A–D**. *C. globhutanus* Gittenberger & Sherub Sherub, 2022, holotype (NBCB 1285). **E–H**. *C. haumbiclausus* Gittenberger & Choki Gyeltshen, 2022, holotype (NBCB 1272). **I–L**. *C. sajumbiclausus* Gittenberger & Choki Gyeltshen, 2022, holotype (NBCB 1290). All photos from Gittenberger *et al.* (2022).

Type locality

"Haa Dzongkhag, Gakiling, Rangtse Nye, 27°05′N 89°09′E, 890 m a.s.l." (Bhutan).

Differential diagnosis

Differs from *C. sajumbiclausus* by the presence of spiral striation.

Cycloryx graphicus (W.T. Blanford, 1862)
Fig. 25

Alycaeus graphicus W.T. Blanford, 1862: 137–138.
Alycaeus (*Dioryx*) *graphicus* var. *minor* Godwin-Austen, 1874: 149, pl. 3 fig. 4.
Alycaeus (*Cycloryx*) *difficilis* Godwin-Austen, 1914: 415–416, pl. 155 figs 2, 2a. **Syn. nov.**

Alycaeus graphicus var. – Theobald 1870: 398, pl. 18 fig. 3.
Alycaeus graphicus – Sowerby 1877: pl. 4, species 34.
Alycaeus (*Alycaeus*) *graphicus* – Kobelt 1902: 345.
Alycaeus (*Cycloryx*) *graphicus* – Godwin-Austen 1914: 361, 419–420, pl. 146 figs 1, 1a–b. — Gude 1921: 280–281.
Alycaeus (*Cycloryx*) *graphicus* var. *minor* – Godwin-Austen 1914: 403, pl. 144 figs 9, 9a.
Alycaeus (*Cycloryx*) *difficilis* – Gude 1921: 278–279.
Cycloryx graphicus – Ramakrishna *et al*. 2010: 72.
Pincerna graphica – Páll-Gergely *et al.* 2020: 177.
Pincerna difficilis – Páll-Gergely *et al.* 2020: 175.

Diagnosis

This species can be recognized based on the dense R1 ribs, the R3 with widely-spaced ribs, the thick peristome (protruding inner peristome) and that the outer peristome is not reflected abruptly towards umbilicus (i.e., it does not form a sharp angle below the umbilicus).

Type material examined

MYANMAR • 4 syntypes of *A. graphicus* (Fig. 25A–E); Moditoung, Tongoop Pass, Arakan; NHMUK 1906.4.4.42 • 2 syntypes of *A. difficilis* (Fig. 25F–J); Shan States; Fedden leg.; NHMUK 1906.5.5.22.

Type localities

"in montibus Arakanensibus provinciam Burmanam Pegu ad Arakan secernentibus" (*A. graphicus*); "Shan Hills" (*A. difficilis*).

Remarks

Alycaeus graphicus and *A. difficilis* are identical in all shell traits (except minor difference in rib density), therefore they are treated as synonyms. The ribs of this species are more widely-spaced than those of *C. major*, although no other differences were found.

Cycloryx major (Godwin-Austen, 1893)
Figs 26, 27F–J

Alycaeus (*Dioryx*) *granum* var. *major* Godwin-Austen, 1893: 594.
Alycaeus (*Cycloryx*) *mangutensis* Godwin-Austen, 1914: 377–378, pl. 146 figs 5, 5a.
Alycaeus (*Cycloryx*) *graphicus* var. *variabilis* Godwin-Austen, 1914: 403–404, pl. 146 fig. 4. **Syn. nov.**
Alycaeus (*Cycloryx*) *thompsoni* Godwin-Austen, 1914: 404, pl. 146 figs 3, 3a. **Syn. nov.**

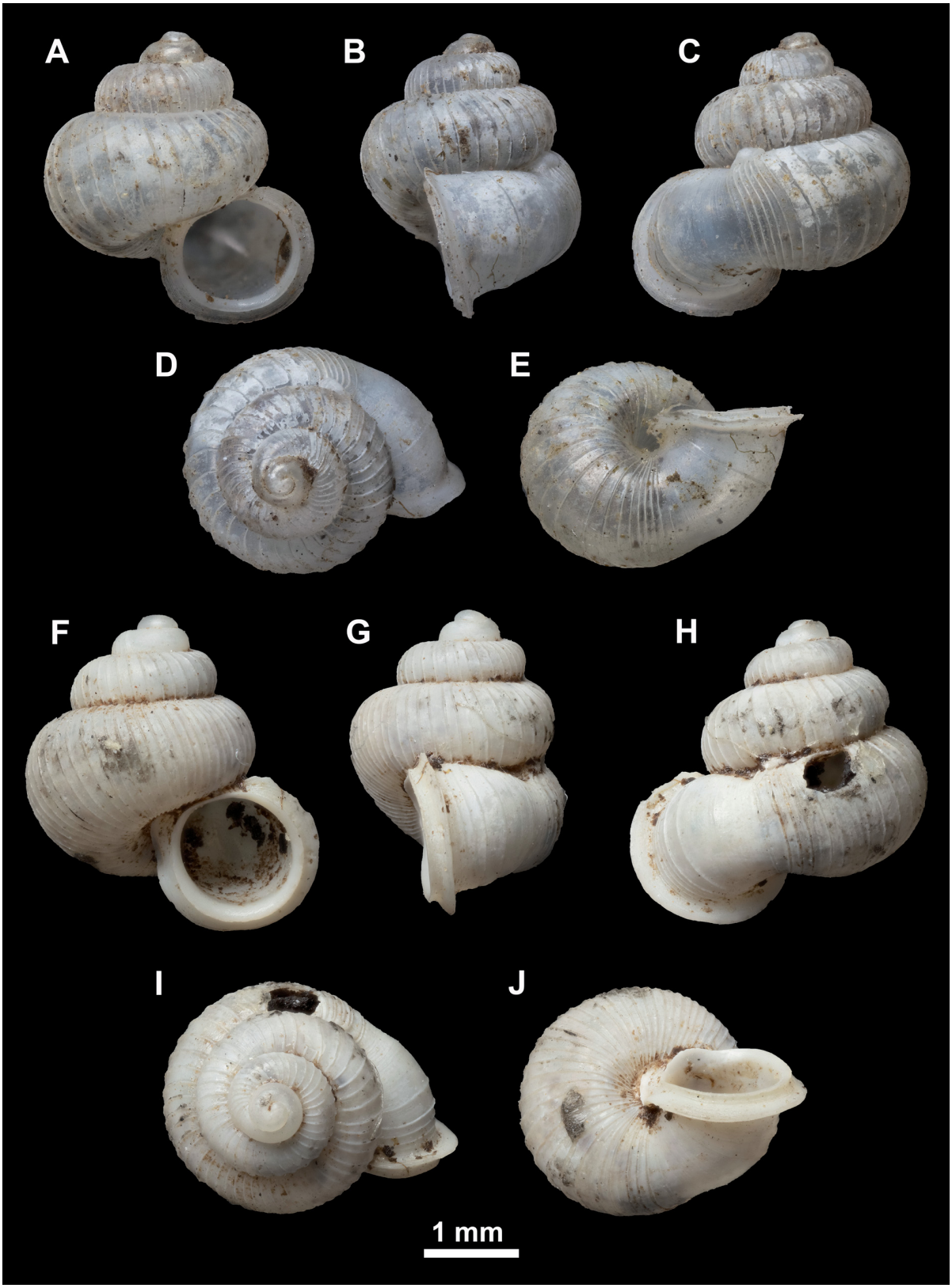

Fig. 25. Shells of *Cycloryx graphicus* (W.T. Blanford, 1862). **A–E**. Syntype (NHMUK 1906.4.4.42). **F–J**. *Alycaeus* (*Cycloryx*) *difficilis* Godwin-Austen, 1914, syntype (NHMUK 1906.5.5.22). All photos: Kevin Webb.

Alycaeus (*Cycloryx*) *mangutensis* – Gude 1921: 282.
Alycaeus (*Cycloryx*) *thompsoni* – Gude 1921: 285.
Cycloryx mangutensis – Ramakrishna *et al.* 2010: 72.
Cycloryx thompsoni – Ramakrishna *et al.* 2010: 74.
Pincerna major – Páll-Gergely *et al.* 2020: 179.
Pincerna graphica variabilis – Páll-Gergely *et al.* 2020: 179.
Pincerna thompsoni – Páll-Gergely *et al.* 2020: 183.

Diagnosis

This species can be recognized by the dense R1 ribbing, the regular ribbing on R3, and the angle below the umbilicus, formed by the reflected outer peristome.

Type material examined

INDIA • 8 syntypes of *A. major* (Fig. 26A–E); Mangat Valley, Jiantia Hills; Godwin-Austen leg.; NHMUK 1903.7.1.2518 • 17 syntypes of *A. graphicus* var. *variabilis* (Fig. 26F–J); Lhota Naga; NHMUK 1903.7.1.2607 • 1 syntype of *A. thompsoni* (Fig. 26K–O); Munipur; Godwin-Austen coll.; NHMUK 1903.7.1.2550.

Additional material examined

INDIA – **Mizoram** • 1 empty shell (Fig. 27F–J); Blue Mountain, Lawngtlai district; 22.727° N, 93.135° E; 1400 m a.s.l.; 27 Jan. 2019; N.A. Aravind leg.; Ar53; NZSI LM1716.

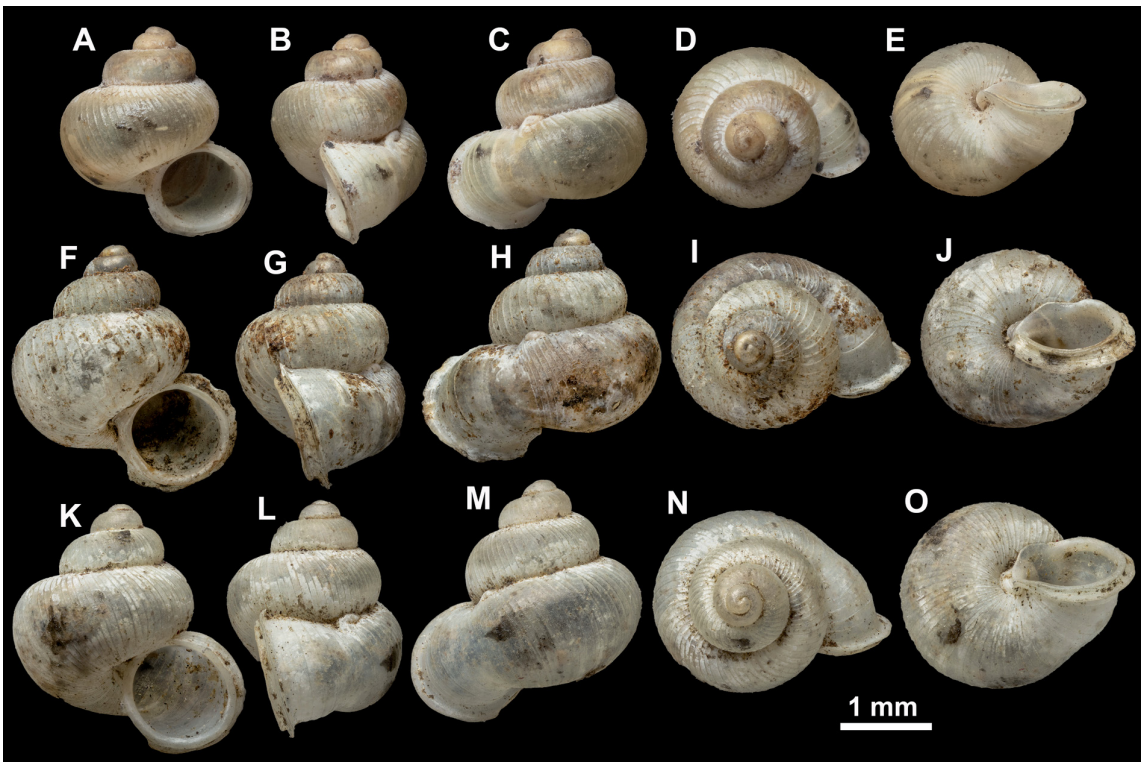

Fig. 26. Shells of *Cycloryx major* (Godwin-Austen, 1893). **A–E**. Syntype of *Alycaeus* (*Dioryx*) *granum* var. *major* Godwin-Austen, 1893 (= *Alycaeus mangutensis* Godwin-Austen, 1914) (NHMUK 1903.7.1.2518). **F–J**. Syntype of *Alycaeus* (*Cycloryx*) *graphicus* var. *variabilis* Godwin-Austen, 1914 NHMUK 1903.7.1.2607). **K–O**. Syntype of *Alycaeus* (*Cycloryx*) *thompsoni* Godwin-Austen, 1914 (NHMUK 1903.7.1.2550). All photos: Kevin Webb.

Type localities

"Mangut Valley, Jaintia Hills" (*A. major*); "Lhota Naga" (*A. graphicus* var. *variabilis*); "Munipur" (*A. thompsoni*).

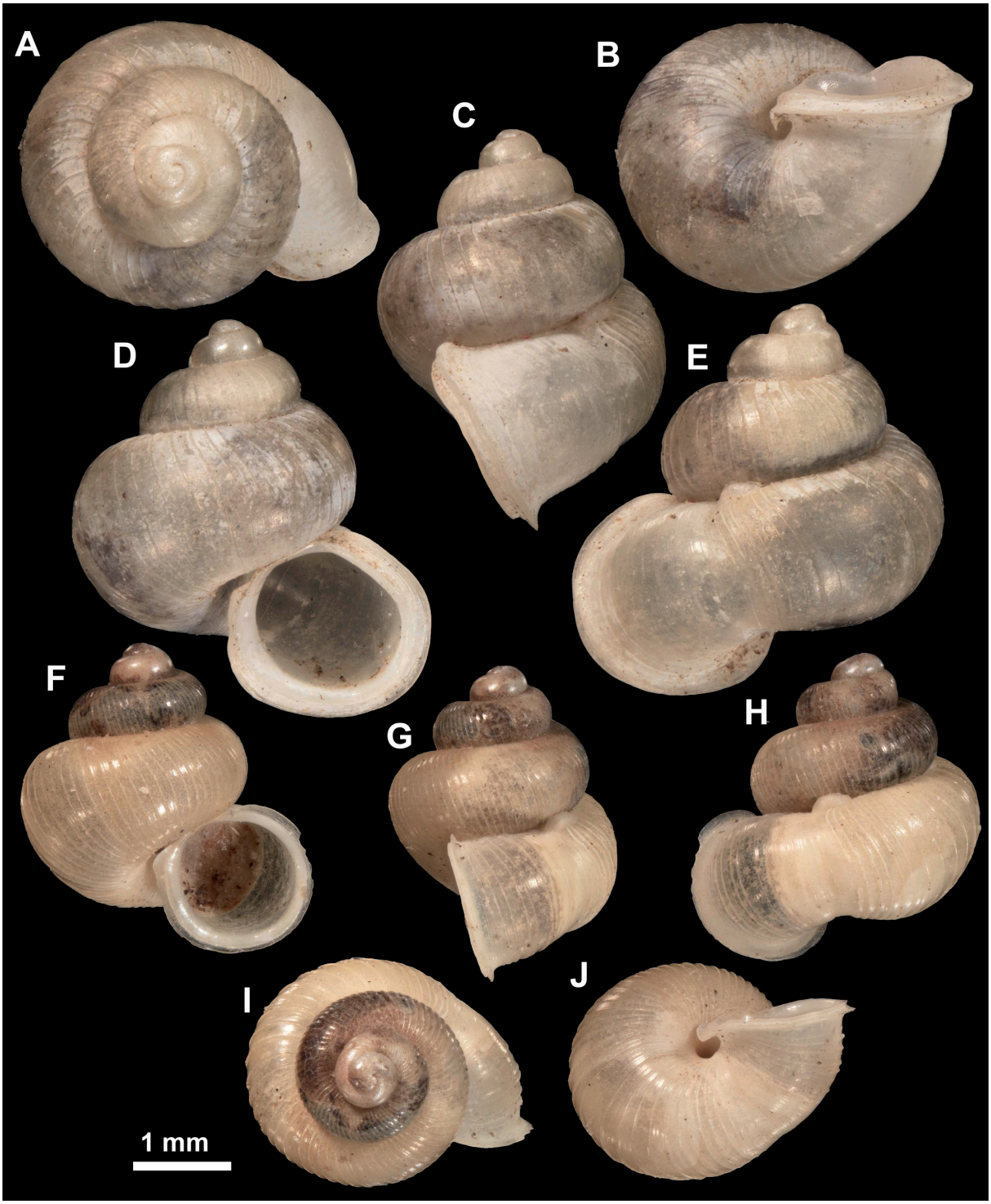

Fig. 27. Shells of species of *Cycloryx* Godwin-Austen, 1914 from the Blue Mountain. **A–E**. *C. rohiniae* Páll-Gergely & Aravind sp. nov., holotype (NZSI LM1717). **F–J**. *Cycloryx major* (Godwin-Austen, 1893), Ar53 (NZSI LM1716). All photos: B. Páll-Gergely.

Differential diagnosis

Cycloryx graphicus has more widely-spaced ribs than *C. major*, and the outer peristome does not form a sharp angle below the umbilicus in that species.

Remarks

The specimen from Blue Mountain is practically identical to the type specimens of *P. major* in all shell characters (size, shape, rib density). Specimens labelled as "*A. graphicus* var." from the Burroi Gorge, Dafla Hills (NHMUK 1903.07.1.2598) are also identical, although most specimens are larger.

Although slightly larger, *A. thompsoni* and *A. graphicus* var. *variabilis* also have similar traits. Therefore, they are treated as synonyms of *Cycloryx major*.

Cycloryx margarita (Theobald, 1874)
Fig. 28

Alycaeus margarita Theobald in Hanley & Theobald, 1874: 39, pl. 95 fig. 10.
Alycaeus (*Cycloryx*) *graphiarius* Godwin-Austen, 1914: 416, pl. 146 figs 7, 7a. **Syn. nov.**

Alycaeus margaritus – Sowerby 1877: pl. 1, species 5.
Alycaeus (*Alycaeus*) *margarita* – Kobelt 1902: 347.
Alycaeus (*Cycloryx*) *margarita* – Godwin-Austen 1914: 416.
Alycaeus margarita – Gude 1921: 211–212.
Alycaeus (*Cycloryx*) *graphiarius* – Gude 1921: 280.
Pincerna margarita – Páll-Gergely *et al.* 2020: 180.
Pincerna graphiaria – Páll-Gergely *et al.* 2020: 177.

Diagnosis

This species is characterized by a globular shell, and widely-spaced, strong ribs on the entire shell surface.

Type material examined

MYANMAR • 1 syntype of *A. margarita* (Fig. 28A–D); Upper Salwin; NHMUK 1888.12.4.892 • 1 syntype of *A. margarita*; Upper Salwin; NHMUK 1888.12.4.893 • 3 syntypes of *A. graphiarius* (Fig. 28E–I, mentioned as 1 syntype in Páll-Gergely *et al.* 2020); Shan States; Fedden leg.; Blanford coll.; NHMUK 1906.4.4.21 (two of them are *A. margarita*, the third shell belongs to another species, see remarks).

Type locality

"Shan Provinces" (*A. margarita*); not specified for *A. graphiarius*.

Remarks

Two syntypes of *A. graphiarius* agreed with the original description (Godwin-Austen, 1914) by having widely-spaced ribs, but the third shell had much denser ribbing, and therefore, it clearly belongs to a different species.

The two sparsely ribbed syntypes of *A. graphiarius* are identical to those of *A. margarita* in all shell characters (size, shape, density of ribs), therefore the former is a junior synonym of the latter.

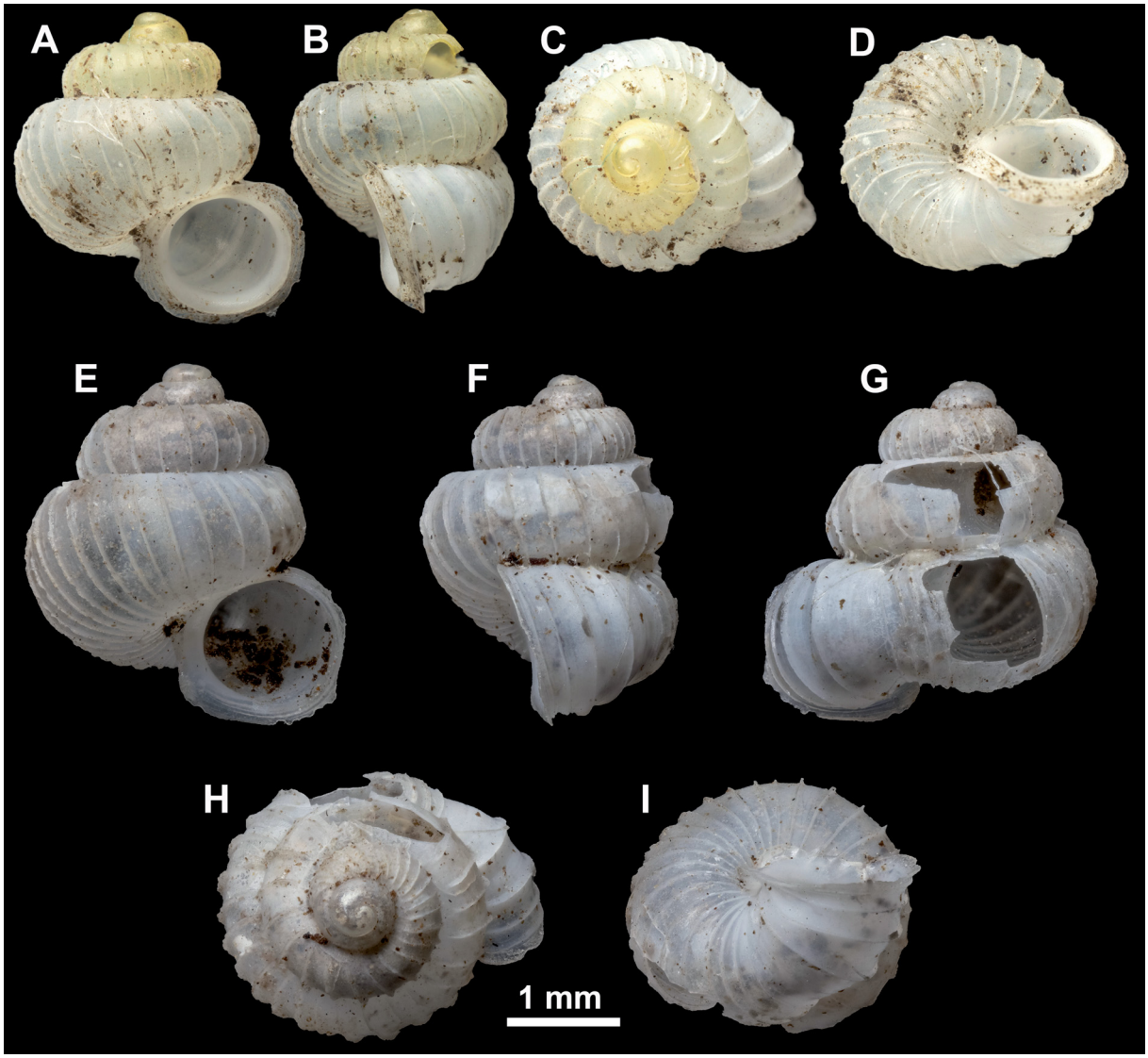

Fig. 28. Shells of *Cycloryx margarita* (Theobald, 1874). **A–D**. Syntypes (NHMUK 1888.12.4.892, 1888.12.4.893). **E–I**. Syntype of *Alycaeus* (*Cycloryx*) *graphiarius* Godwin-Austen, 1914 (NHMUK 1906.4.4.21). All photos: Kevin Webb.

Cycloryx otiphorus (Benson, 1859)
Fig. 29

Alycaeus otiphorus Benson, 1859: 178–179.
Alycaeus (*Cycloryx*) *summus* Godwin-Austen, 1914: 349–350, pl. 147 figs 3, 3a. **Syn. nov.**

Alycaeus otiphorus – Sowerby 1877: pl. 4, species 30.
Alycaeus (*Alycaeus*) *otiphorus* – Kobelt 1902: 347.
Alycaeus (*Cycloryx*) *otiphorus* – Godwin-Austen 1914: 349, pl. 147 figs 2, 2a–b. — Gude 1921: 283.
Alycaeus (*Cycloryx*) *summus* – Gude 1921: 284–285.
Cycloryx otiphorus – Ramakrishna *et al.* 2010: 73.
Pincerna otiphorus – Páll-Gergely *et al.* 2020: 182.
Pincerna summa – Páll-Gergely *et al.* 2020: 182.

Diagnosis

This species can be recognized based on the large, conical shell, and the weak sculpture. See also under *Cycloryx rohiniae* sp. nov.

Type material examined

INDIA • 1 syntype of *A. otiphorus* (see Preece *et al.* 2022: fig. 33e); no locality data; UMZC I.102555 • 12 syntypes of *A. summus* (Fig. 29F–J); Rechila Pk, W. Bhutan; Godwin-Austen leg.; NHMUK 1903.7.1.2573.

Additional material examined

INDIA • single shell from the R. McAndrew collection (Fig. 29A–D); UMZC I.102560 • 1 shell of *A. otiphorus*; Darjiling; "compared with typical sp in Museum Cambridge"; NHMUK 1903.7.1.2565.

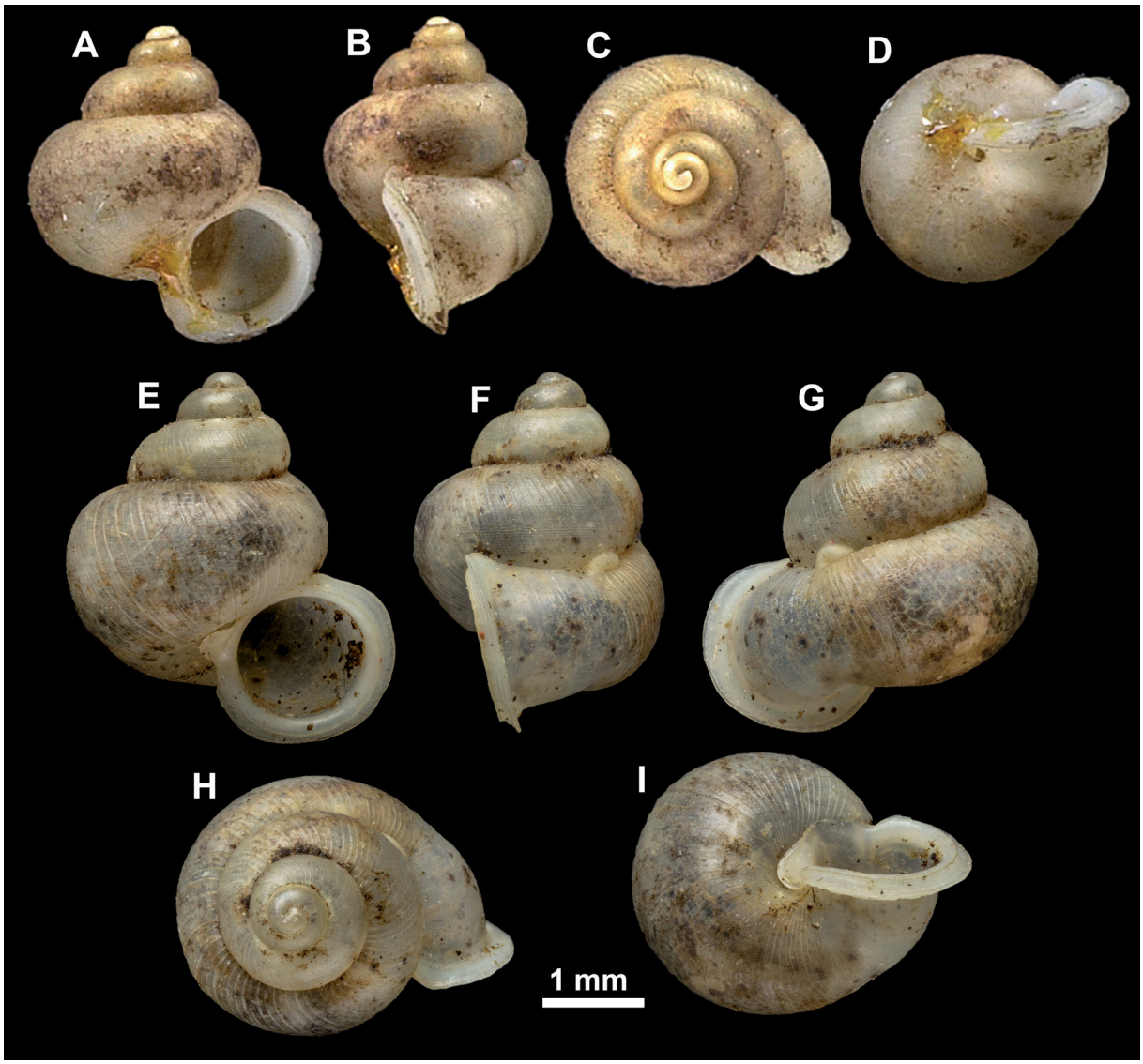

Fig. 29. Shells of *Cycloryx otiphorus* (Benson, 1859). **A–E**. UMZC I.102560. **F–I**. Syntype of *Alycaeus* (*Cycloryx*) *summus* Godwin-Austen, 1914 (NHMUK 1903.7.1.2573). Photos: Harold Taylor (A–D) and Kevin Webb (E–I).

Type localities

"ad Pankabari (1000 ped. alt.) et in valle Rungun (4000 ped.) prope Darjiling Himalayanum" (*A. otiphorus*); "Rechila Peak, Western Bhutan" (*A. summus*).

Remarks

Alycaeus summus is identical to *A. otiphorus*, therefore the former is a junior synonym of the latter. Unlike other members of this species group, *A. otiphorus* has a rather conical shell (instead of conical-globular), but it is classified here due to the expanded and reflected outer peristome.

Cycloryx paucicostatus (Godwin-Austen, 1914)
Fig. 23F–J

Alycaeus paucicostatus Godwin-Austen, 1914: 361, pl. 147 figs 5, 5a.

Alycaeus (*Cycloryx*) *paucicostatus* – Gude 1921: 284.
Cycloryx paucicostatus – Ramakrishna *et al.* 2010: 73.
Pincerna paucicostata – Páll-Gergely *et al.* 2020: 182.

Diagnosis

This species can be distinguished from all congeners based on the lamella-like ribs on R3.

Type material examined

INDIA • 2 syntypes (Fig. 23F–J); Toruputu Pk, Dafla Hills; NHMUK 1903.7.1.2595.

Type locality

"Torúpútú Peak, Dafla Hills".

Differential diagnosis

The most similar species is *C. burrailensis*, but that species has denser R1 ribs.

Cycloryx rohiniae Páll-Gergely & Aravind sp. nov.
urn:lsid:zoobank.org:act:80122B22-6AEE-4698-8E7A-62068B3CAE76
Fig. 27A–E

Diagnosis

A large species of *Cycloryx* with smooth R3.

Etymology

The new species is named after Ms Rohini Nilekani, author, environmentalist and acclaimed philanthropist.

Type material examined

Holotype

INDIA – **Mizoram** • empty shell (D: 3.7 mm, H: 4.1 mm, Fig. 27A–E); Blue Mountain, Lawngtlai district; 22.727° N, 93.135° E; 1400 m a.s.l.; 27 Jan. 2019; N.A. Aravind leg.; Ar37; NZSI LM1717.

Paratype

INDIA – **Mizoram** • 1 empty shell; same data as for holotype; Ar34; NZSI LM1718 • 1 empty shell; same data as for holotype; Ar35; NZSI LM1719.

Description

Shell large for the genus, all available shells slightly corroded, original colour may be greenish-yellowish, semitranslucent; shell conical or conical-globular, height and width approximately equivalent; body whorl rounded; protoconch smooth, glossy, consisting of 1.5 or slightly fewer whorls; R1 of ca 2–2.25 whorls, regularly ribbed, rib density gradually decreases towards end of R2 (last half whorl with ca 16 ribs); ribs thread-like, low; fine, dense spiral striation discernible between ribs; boundary between R1 and R2 not conspicuous, but clearly visible due to increase in rib density (R2 ribs twice as dense as ribs at the end of R1); R2 practically smooth, its "ribs" (6–7 in number) are not elevated from the surface, represented as slender, light stripes; sutural tube short, cylindrical; R2+R3 ca quarter whorl, R3 ca 3 times as long as R2; boundary between R2 and R3 clearly visible due to a shallow constriction; R3 with a low central, long swelling, smooth, only fine growth lines visible but no ribs; aperture slightly oblique to shell axis, rounded; inner and outer peristomes clearly separated; inner peristome slightly protruding and expanded; outer peristome strongly expanded, sharp, and reflected in direction of umbilicus; umbilicus open, narrow, the reflected outer peristome curves into umbilicus, terminating at its centre.

Operculum. A single operculum of the Ar35 shells was examined. The inner side is smooth, without central swelling, outer side multispiral, without elevated lamina.

Measurements. D: 3.7 mm, H: 3.5–4.1 mm.

Distribution

Known only from the Blue Mountain region.

Differential diagnosis

The only species with similar size and lack of R3 ribs is *C. otiphorus*, which has a more pointed (more triangular) shell, and has denser ribs on the apical part. *Cycloryx dihingensis*, which is similar in shell shape, has strong R3 ribs. All these species inhabit Assam, which geographically is distant from Mizoram.

Cycloryx sajumbiclausus Gittenberger & Choki Gyeltshen, 2022
Fig. 24I–L

Cycloryx sajumbiclausus Gittenberger & Choki Gyeltshen in Gittenberger *et al.*, 2022: 78, figs 1, 5.

Diagnosis

This species can be recognized based on the widely-spaced R1 ribs and the smooth R2 with numerous slender microtunnels. It differs from *C. haumbiclausus* based on the absence of spiral striation.

Type locality

"Samdrup Jongkhar Dzongkhag, 4 km NW of Samdrup Jongkhar, 260 m a.s.l., 26°49′N 91°28′E" (Bhutan).

Genus ***Dicharax*** Kobelt & Möllendorff, 1900

Charax Benson, 1859: 177.
Dicharax Kobelt & Möllendorff, 1900: 186 (replacement name for *Charax* Benson, 1859, non *Charax* Scopoli, 1777 [Pisces]).

Type species

Alycaeus hebes Benson, 1857, subsequent designation by Gude (1921: 236).

Dicharax species group 1

Remarks

This species group is characterized by a usually strongly ribbed shell, a fringed aperture, and most species (exception: *D. floridus*) have a large space between the inner and outer peristomes.

The R3 swelling of *D. obscurus* is similar to that of the species belonging to the species group 5, but it is included in this group due to the fringed aperture and the large space between the two peristomes.

See also remarks under *Dicharax* species group 2 regarding *D. bicrenatus*.

Dicharax aspidentatus Gittenberger, Choki Gyeltshen & Sherub Sherub, 2024
Fig. 30A–D

Dicharax aspidentatus Gittenberger, Choki Gyeltshen & Sherub Sherub in Gittenberger *et al.*, 2024: 199, figs 18, 21, 45.

Type locality

"between Duenmang Tsachu and Gongphu Zero Point, 24 km SE of Zhemgang, 335 m a.s.l., 27°02'N 90°48'E, scree in warm broadleaf forest" (Bhutan).

Differential diagnosis

Probably the most similar species is *D. rugosus* due to the similar shell and aperture shape as well as rib density. However, that species has a shorter distance between the inner and outer peristomes and has a wider umbilicus. For the differences with other Bhutanese species see Gittenberger *et al.* (2024). See also under *Chamalycaeus asaluensis* and *D. umbiclausus*.

Dicharax floridus Páll-Gergely & Hunyadi, 2022
Fig. 31A–E

Dicharax floridus Páll-Gergely & Hunyadi, 2022: 95, fig. 1.

Type material examined

MYANMAR • holotype (Fig. 31A–E); Shan State, Hopong centre 7.4 km towards Namsang, rd. #4 N 5 km, near Parpant Cave; 20°850.9630′ N, 97°814.2670′ E; 1170 m a.s.l.; 6 Oct. 2018; A. Hunyadi, K. Okubo and J.U. Otani, leg.; HA (to be deposited in the HNHM).

Type locality

"Myanmar, Shan State, Hopong centre 7.4 km towards Namsang, rd. #4 N 5 km, near Parpant Cave, 20°850.9630'N, 97°814.2670'E, 1170 m a.s.l."

Differential diagnosis

This species differs from its congeners in this species group by the strongly expanded outer peristome and the smaller distance between the two peristomes. Some species of *Chamalycaeus* are also similar to *Dicharax floridus*, but their outer peristome is less expanded.

Dicharax jaintiacus (Godwin-Austen, 1871)
Fig. 32

Alycaeus Jaintiacus Godwin-Austen, 1871: 92–93, pl. 5 fig. 3.

Alycaeus serratus Godwin-Austen, 1874: 148–149, pl. 3 fig. 6. **Syn. nov.**
Alycaeus jaintiacus var. *crassus* Godwin-Austen, 1914: 375, pl. 137 figs 5, 5a. **Syn. nov.**

Alycaeus (*Alycaeus*) *serratus* – Kobelt 1902: 351. — Ramakrishna *et al.* 2010: 51.
Alycaeus (*Dicharax*) *jaintiacus* – Kobelt 1902: 372. — Gude 1921: 256.
Alycaeus jaintiacus – Godwin-Austen 1914: 375, pl. 143 figs 3, 3a–b.
Alycaeus serratus – Godwin-Austen 1914: 400, pl. 144 figs 6, 6a–b. — Gude 1921: 219.

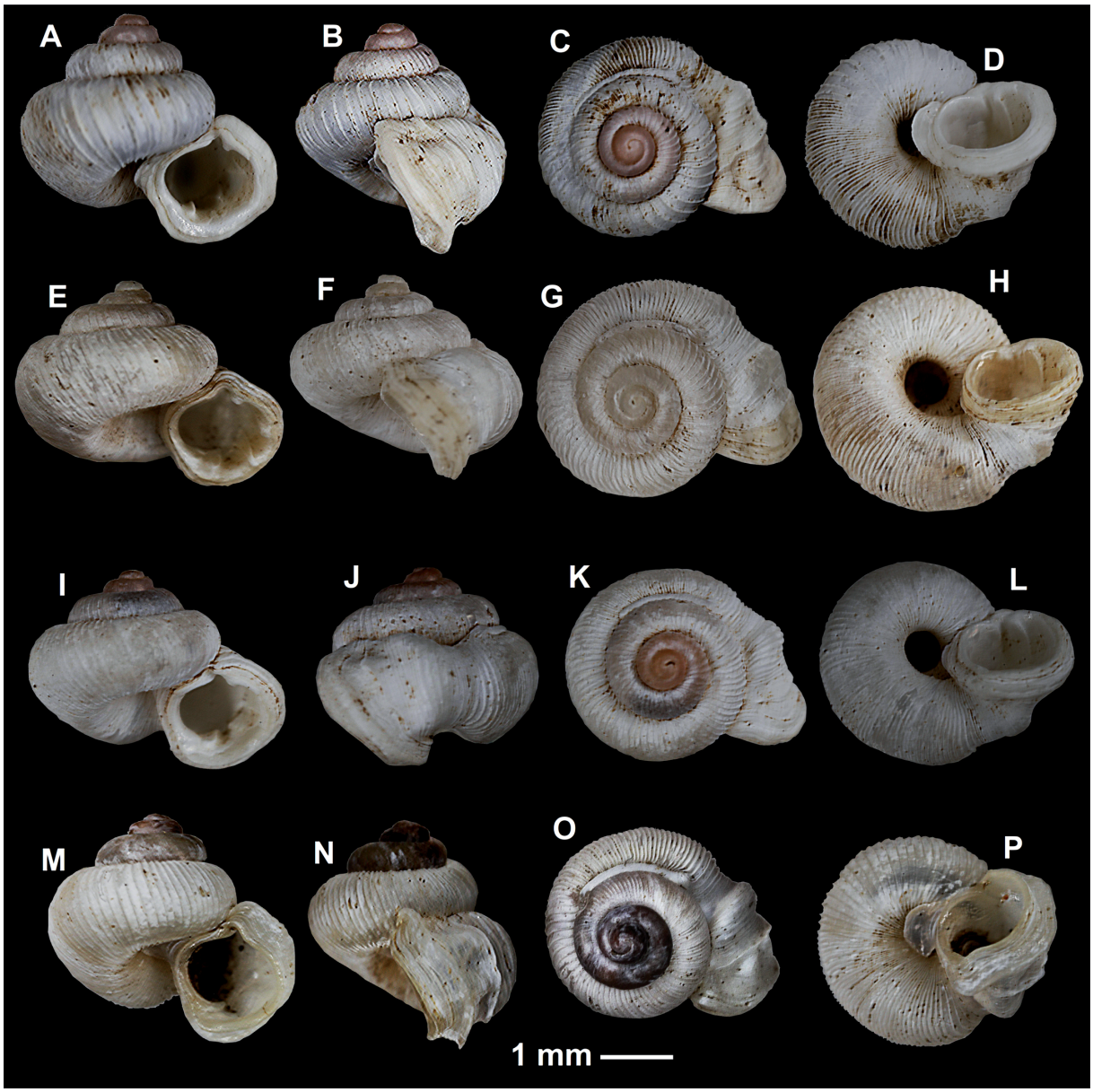

Fig. 30. Shells of species of *Dicharax* Kobelt & Möllendorff, 1900 from Bhutan. **A–D**. *D. aspidentatus* Gittenberger, Choki Gyeltshen & Sherub Sherub, 2024, holotype (NBCB 1439). **E–H**. *D. trashidentatus* Gittenberger, Choki Gyeltshen & Kezang Tobgay, 2024, holotype (NBCB 1337). **I–L**. *D. zhemdentatus* Gittenberger & Choki Gyeltshen, 2024, holotype (NBCB 1622). **M–P**. *D. umbiclausus* Gittenberger, Choki Gyeltshen & Kezang Tobgay, 2024, holotype (NBCB 1343). All photos from Gittenberger *et al.* (2024).

Chamalycaeus (*Dicharax*) *jaintiacus* – Ramakrishna *et al.* 2010: 61.
Alycaeus (*Dicharax*) *jaintiacus* var. *crassa* – Gude 1921: 256–257.
Dicharax jaintiacus – Páll-Gergely *et al.* 2020: 65.
Dicharax jaintiacus crassus – Páll-Gergely *et al.* 2020: 65.
Dicharax (?) *serratus* – Páll-Gergely *et al.* 2020: 103.

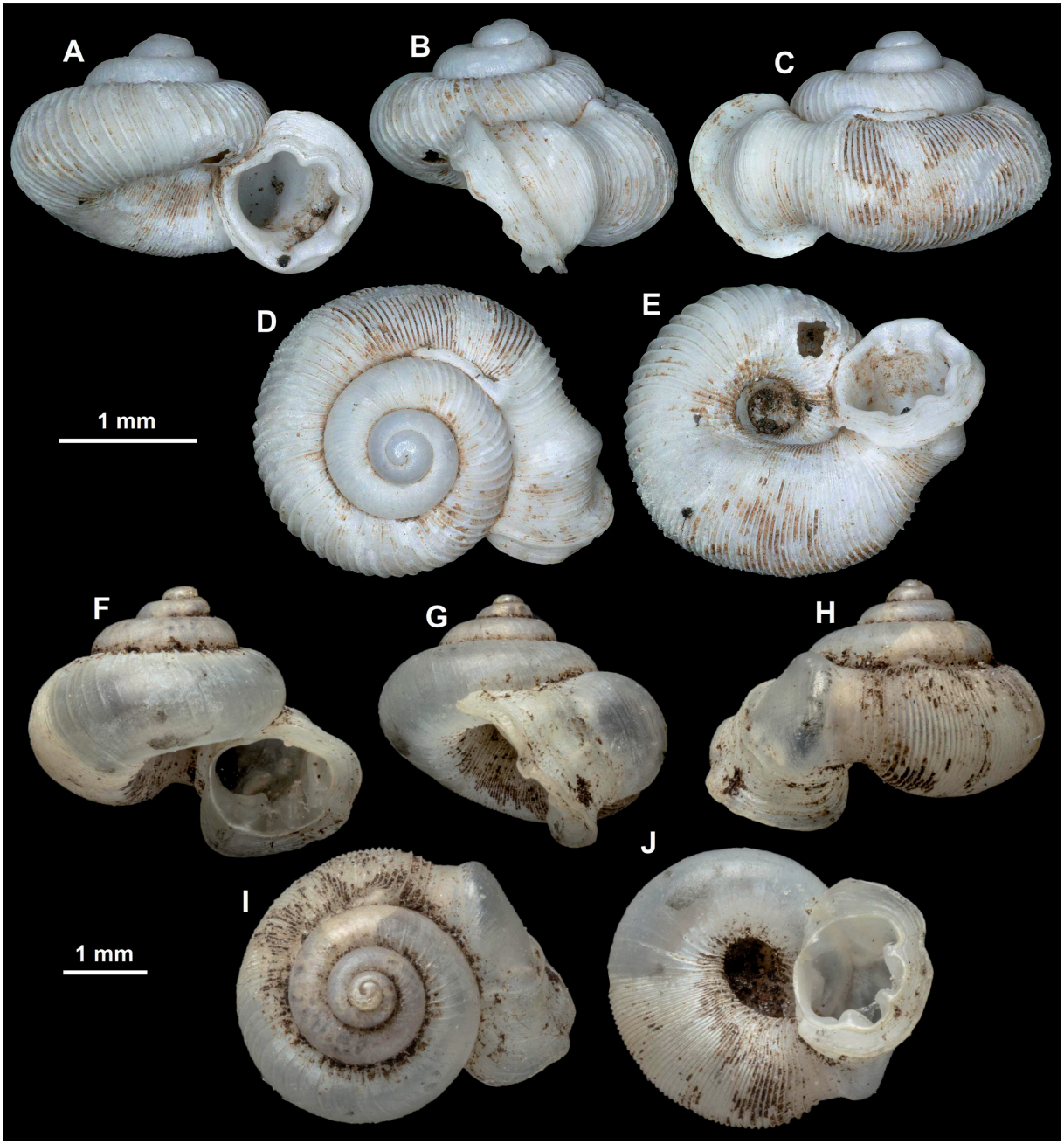

Fig. 31. Shells of species of *Dicharax* Kobelt & Möllendorff, 1900. **A–E**. *D. floridus* Páll-Gergely & Hunyadi, 2022, holotype (HA, to be deposited in the HNHM). **F–J**. *D. obscurus* (Godwin-Austen, 1914), syntype (NHMUK 1913.3.16.8). Photos: B. Páll-Gergely (A–E, from Páll-Gergely & Hunyadi 2022) and Kevin Webb (F–J).

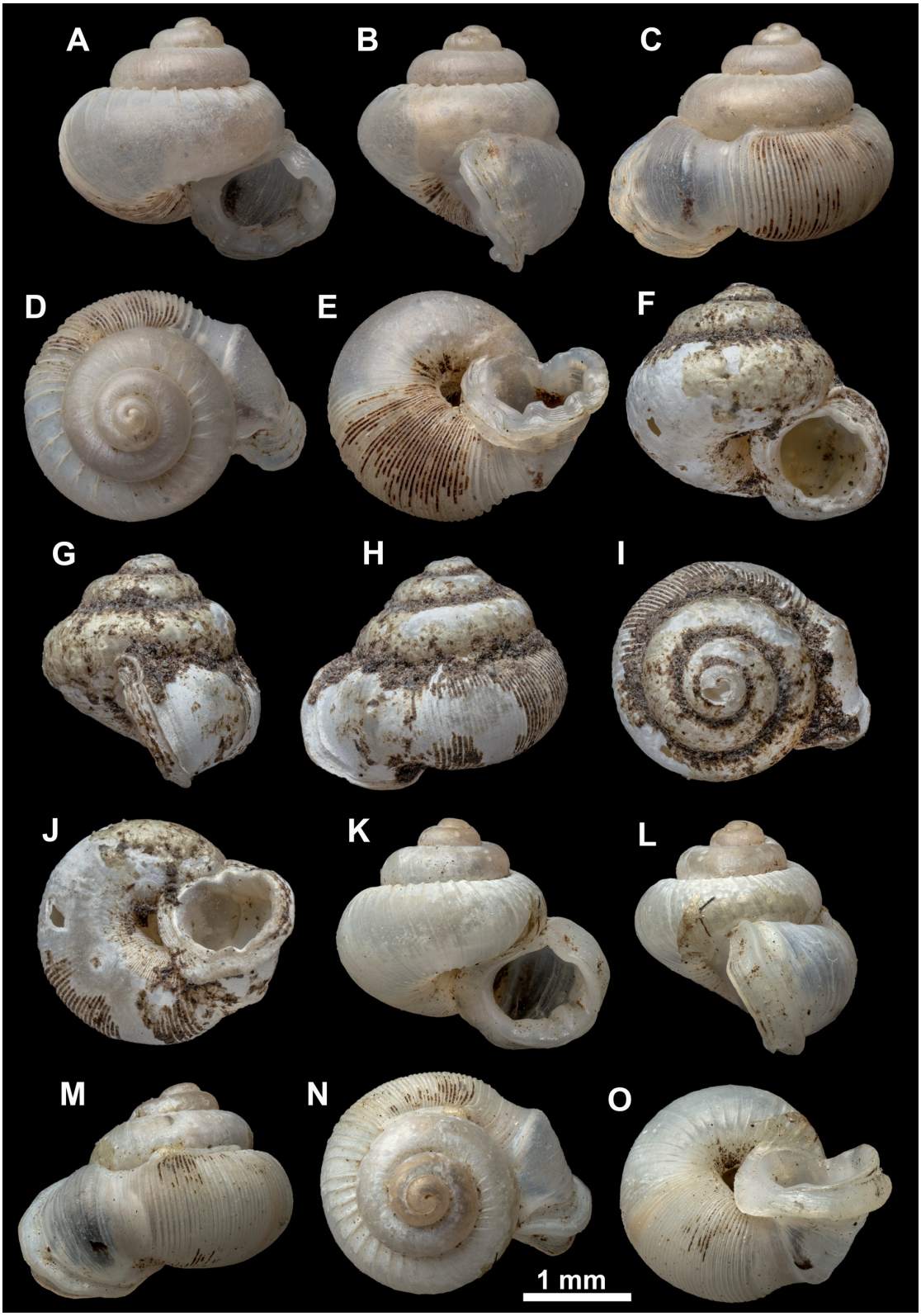

Fig. 32. Shells of *Dicharax jaintiacus* (Godwin-Austen, 1871). **A–E**. Syntype of *Alycaeus jaintiacus* Godwin-Austen, 1871 (NHMUK 1903.7.1.2686). **F–J**. Syntype of *A. serratus* Godwin-Austen, 1874 (NHMUK 1903.7.1.2487). **K–O**. Syntype of *A. jaintiacus* var. *crassus* Godwin-Austen, 1914 (NHMUK 1903.7.1.2752). All photos: Kevin Webb.

Diagnosis

The elevated spire, rather smooth R1 (with the exception of strong, widely-spaced ribs along the suture), the long R3 swelling with straight anterior part, and the strongly fringed aperture distinguish this species from its congeners.

Type material examined

INDIA • 14 syntypes of *A. jaintiacus* (Fig. 32A–E); Nongjinghi, Jaintia Hills; Godwin-Austen leg.; NHMUK 1903.7.1.2686 • 4 syntypes of *A. jaintiacus* var. *crassus* in 2 vials (Fig. 32K–O); Nonjinghi, Jaintia; Godwin-Austen coll.; NHMUK 1903.7.1.2752 • 1 syntype of *A. serratus* (Fig. 32F–J); Laisen Valley, Jiantia Hills; NHMUK 1903.7.1.2487.

Type localities

"in Nongjinghi, Jaintia" (*A. jaintiacus*); "in Nongjinghi, Jaintia, 4563 feet" (*A. jaintiacus* var. *crassus*); "Laisen Trigl. station, Munipur Hills" (*A. serratus*).

Differential diagnosis

The most similar is *D. obscurus*; for comparisons, see under that species. Species of the *Dicharax* species group 7 (*D. chennelli* and similar species) resemble *D. jaintiacus*, but the distance between their two peristomes is smaller, their R3 swelling is more inflated and usually have R3 depressions. In contrast, *D. jaintiacus* has a less inflated R3 without depressions.

Remarks

Dicharax jaintiacus var. *crassus* is practically identical to the nominotypical form, therefore it is treated here as a junior synonym. *Alycaeus serratus* is slightly smaller and has a shallower R3 swelling, but all other shell characters are very similar, and they were described from the same geographic region; therefore, *Alycaeus serratus* is hereby synonymised with *D. jaintiacus*. *Alycaeus serratus* was not compared with *A. jaintiacus* in its original description.

Dicharax muspratti (Godwin-Austen, 1914)
Fig. 33A–E

Alycaeus muspratti Godwin-Austen, 1914: 396, pl. 148 fig. 1.

Alycaeus (*Raptomphalus*) *muspratti* – Gude 1921: 289.
Chamalycaeus (*Raptomphalus*) *muspratti* – Ramakrishna *et al.* 2010: 69.
Dicharax (?) *muspratti* – Páll-Gergely *et al.* 2020: 97.

Type material examined

INDIA • 16 syntypes (Fig. 33A–E); E. Naga; R.H. Beddome coll.; NHMUK 1912.4.16.273.

Type locality

"Eastern Naga".

Differential diagnosis

Dicharax dohertyi (of which no specimens were available, see under *D. dohertyi*) and *D. rugosus* are similar in sculpture and aperture formation, but they have a higher spire. *Dicharax trashidentatus* is very similar to *D. muspratti* in shell and aperture shape and shell sculpture, but it also has a higher spire and denser R1 ribs. *Dicharax rugosus* is also similar due to the strong R1 ribs, the large distance between the inner and outer peristomes and the fringed aperture, but it has a higher spire.

Dicharax obscurus (Godwin-Austen, 1914)
Fig. 31F–J

Alycaeus obscurus Godwin-Austen, 1914: 378–379, pl. 154 figs 9, 9a.

Alycaeus (*Dicharax*) *obscurus* – Gude 1921: 263.
Chamalycaeus (*Dicharax*) *obscurus* – Ramakrishna *et al.* 2010: 64.
Dicharax (?) *obscurus* – Páll-Gergely *et al.* 2020: 100.

Type material examined

INDIA • 1 syntype (Fig. 31F–J); Cherra Poonje; Godwin-Austen leg.; NHMUK 1913.3.16.8.

Type locality

"Cherra Poonje".

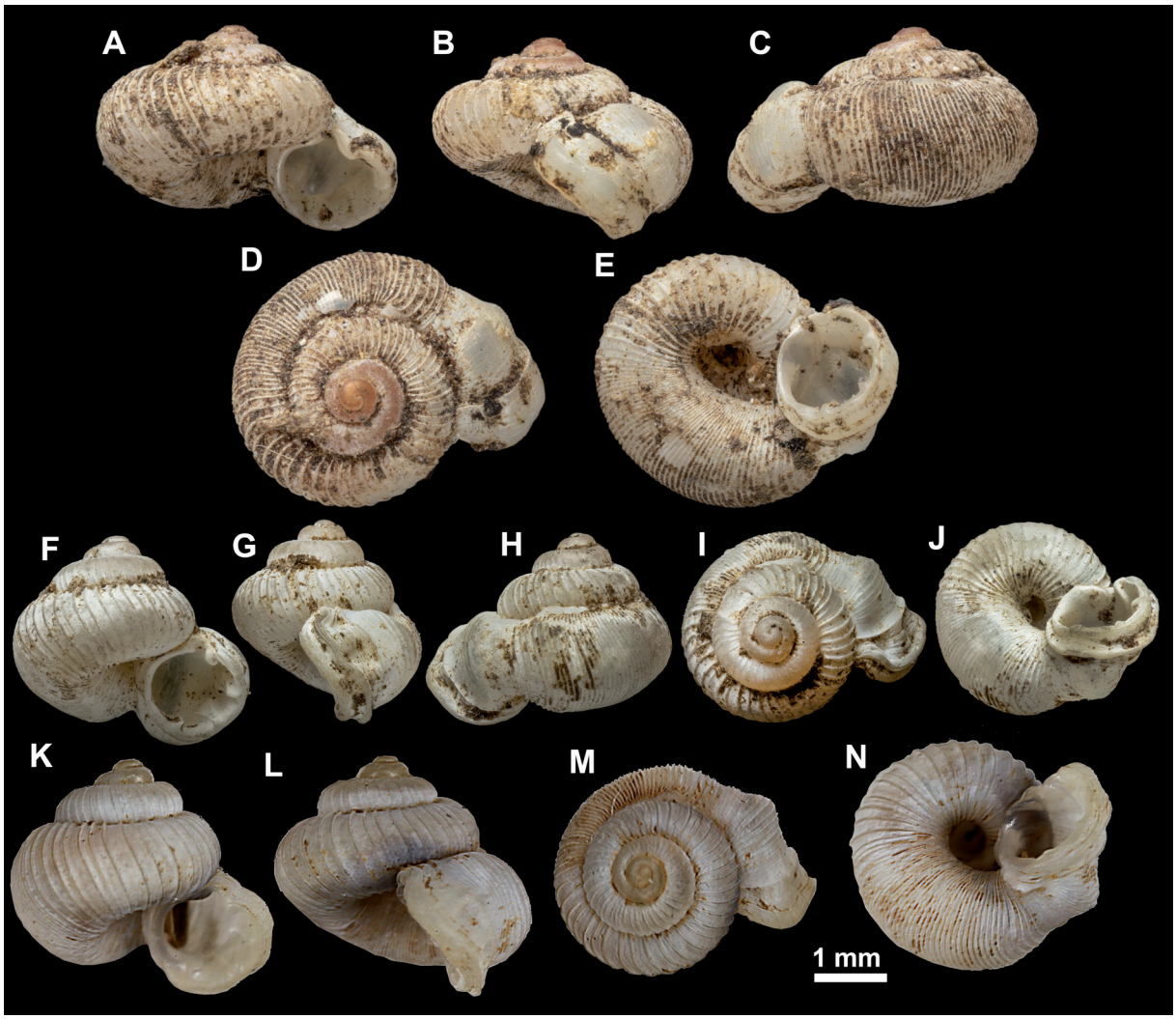

Fig. 33. Shells of species of *Dicharax* Kobelt & Möllendorff, 1900. **A–E**. *D. muspratti* (Godwin-Austen, 1914), syntype (NHMUK 1912.4.16.273). **F–J**. *D. rugosus* (Godwin-Austen, 1914), syntype (NHMUK 1903.7.1.2641). **K–O**. *D. rugosus*, holotype of *D. sajodentatus* Gittenberger & Choki Gyeltshen, 2024. Photos: Kevin Webb (A–J) and from Gittenberger *et al.* 2024 (K–N).

Differential diagnosis

The most similar species in this species group is *D. jaintiacus*, which has a more globular shell, possesses more widely-spaced R1 ribs, and a less expanded outer peristome. Species of the *Dicharax* species group 7 are similar to *D. obscurus* in the formation of the R3 swelling, but the distance between their two peristomes is smaller and their R3 swelling is more inflated and usually have depressions and/or grooves.

Dicharax rugosus (Godwin-Austen, 1914)
Fig. 33F–N

Alycaeus rugosus Godwin-Austen, 1914: 359, pl. 141 figs 7, 7a.
Dicharax sajodentatus Gittenberger & Choki Gyeltshen in Gittenberger *et al.*, 2024: 200, figs 19, 21. **Syn. nov.**

Alycaeus (*Dicharax*) *rugosus* – Gude 1921: 268–269.
Chamalycaeus (*Dicharax*) *rugosus* – Ramakrishna *et al.* 2010: 66.
Metalycaeus rugosus – Páll-Gergely *et al.* 2020: 154.

Diagnosis

The combination of the strongly ribbed R1, the rather centrally located R3 swelling, the large distance between the inner and outer peristomes and the fringed aperture distinguishes this species from its congeners.

Type material examined

BHUTAN • holotype of *Dicharax sajodentatus* (Fig. 33K–N) (photographs examined).

INDIA • 3 syntypes of *D. rugosus* (figured specimen indicated by pink wool; Fig. 33F–J); Burroi Gorge, Dafla; NHMUK 1903.7.1.2641.

Type localities

"Burroi Gorge, Dafla Hills" (*A. rugosus*); "Samdrup Jongkhar Dzongkhag: N of Bangtar, Phuntshothang, 26°53'N 91°42'E, 375 m a.s.l." (*D. sajodentatus*).

Differential diagnosis

For differences with newly described Bhutanese species (*D. zhemdentatus*, *D. trashidentatus*, *D. umbiclausus* and *D. aspidentatus*) see Gittenberger *et al.* (2024) (under the name *D. sajodentatus*). See also under *C. asaluensis*, *C. crispatus*, *C. dohertyi* and *D. muspratti*.

Remarks

During the examination of *A. rugosus*, we found traces of a spiral striation on the teleoconch, based on which we classified that species in the genus *Metalycaeus* (see Páll-Gergely *et al.* 2020). However, the re-examination revealed that those spiral lines were probably part of lower shell layers of the corroded syntypes, and moreover, Gittenberger *et al.* (2024) described several similar species from Bhutan that can undoubtedly be assigned to *Dicharax*.

The comparison of syntypes of *D. rugosus* and *D. sajodentatus* revealed that their shell shape, sculpture and formation of the peristome are identical; therefore, we treat the latter as a synonym of the former.

Dicharax trashidentatus Gittenberger, Choki Gyeltshen & Kezang Tobgay, 2024
Fig. 29E–H

Dicharax trashidentatus Gittenberger, Choki Gyeltshen & Kezang Tobgay in Gittenberger *et al.*, 2024: 203, figs 21–22.

Type locality

"Trashigang Dzongkhag: 3 km E of Trashigang, 825 m a.s.l., 27°21''N 91°35'E" (Bhutan).

Differential diagnosis

In shell shape and sculpture this species is practically identical with *D. zhemdentatus*. The only difference is that the chevrons (for the terminology see Gittenberger *et al.* 2024) reach the peristome edge, and do not in *D. zhemdentatus*. Therefore, we maintain this as a valid species until intermediate forms become available. For the differences with other Bhutanese species see Gittenberger *et al.* (2024). See also under *Dicharax muspratti*.

Dicharax umbiclausus Gittenberger, Choki Gyeltshen & Kezang Tobgay, 2024
Fig. 29M–P

Dicharax umbiclausus Gittenberger, Choki Gyeltshen & Kezang Tobgay in Gittenberger *et al.*, 2024: 204, figs 3, 21, 23.

Type locality

"Samdrup Jongkhar Dzongkhag: 20 km N of Samdrup Jongkhar, 1680 m a.s.l., 26°59'N 91°31'E" (Bhutan).

Differential diagnosis

The most similar species is *D. aspidentatus*, which has a slightly open umbilicus, more widely-spaced ribs, and a lower R3 swelling. For other differences, see Gittenberger *et al.* 2024.

Dicharax zhemdentatus Gittenberger & Choki Gyeltshen, 2024
Fig. 30I–L

Dicharax zhemdentatus Gittenberger & Choki Gyeltshen in Gittenberger *et al.*, 2024: 204, figs 20–21.

Type locality

"Zhemgang Dzongkhag: Ngangla - Trong (= Tong), 2 km N of Ngangla, c. 17 km NE of Panbang, 1085 m a.s.l., 26°58'N 91°03'E" (Bhutan).

Differential diagnosis

For diagnosis and differences with other Bhutanese species see Gittenberger *et al.* (2024). See also under *D. trashidentatus*.

Dicharax species group 2

Remarks

This species group is characterized by a strongly elevated, short R3 swelling that is situated very close to the outer peristome, and a slightly to strongly crenulated peristome.

Dicharax bicrenatus is classified in this species group due to the small distance between the R3 swelling and the outer peristome. However, it also has a large distance between the two peristomes, which is characteristic of *Dicharax* species group 1.

Dicharax bicrenatus (Godwin-Austen, 1874)
Fig. 34A–E

Alycaeus bicrenatus Godwin-Austen, 1874: 148, pl. 3 fig. 5.

Alycaeus (*Dicharax*) *bicrenatus* – Kobelt 1902: 365. — Gude 1921: 238–239.
Alycaeus bicrenatus – Godwin-Austen 1884: pl. 51 fig. 4; 1914: 386–387, pl. 144 figs 5, 5a–b.
Chamalycaeus (*Dicharax*) *bicrenatus* – Ramakrishna *et al.* 2010: 56.
Dicharax (?) *bicrenatus* – Páll-Gergely *et al.* 2020: 79.

Diagnosis

The combination of the small shell size, the large distance between the inner and outer peristomes, the depressed shell, the fine ribbing, and the short R3 swelling defines this species.

Type material examined

INDIA • 7 syntypes in two vials (Fig. 34A–E); Kopamedza, Naga Hills; NHMUK 1903.7.1.2490.

Type locality

"Kopamedza Peak, Naga Hill, 8–9,000 feet, in forest".

Dicharax bjiminaensis Gittenberger & Choki Gyeltshen, 2024
Fig. 35A–D

Dicharax bjiminaensis Gittenberger & Choki Gyeltshen in Gittenberger *et al.*, 2024: 212, figs 35–36.

Type locality

"Thimphu Dzongkhag: road W of quarry near Bjimina (13 km SW of Thimphu), 2700 m a.s.l., 27°24'N 89°34'E" (Bhutan).

Differential diagnosis

The combination of the densely ribbed R1, the elevated, short R3 swelling situated close to the outer peristome, the large distance between the inner and outer peristomes is true for this species and for *D. lunabulbus*. However, the latter species is much smaller, it has a more undulated inner peristome, a larger distance between the inner and outer peristomes, and more widely-spaced R2 ribs. *Dicharax vanderbijli* has a smaller distance between the inner and outer peristomes, and has more lamella-like and widely-spaced ribs.

Dicharax crenatus (Godwin-Austen, 1871)
Fig. 34F–J

Alycaeus crenatus Godwin-Austen, 1871: 90–91, pl. 3 fig. 5.

Alycaeus crenatus – Godwin-Austen 1874: 150; 1914: 388–389, pl. 143 figs 8, 8a–b. — Sowerby 1877: pl. 1, species 1, figs a–b.
Alycaeus (*Dicharax*) *crenatus* – Kobelt 1902: 366. — Gude 1921: 241.
Chamalycaeus (*Dicharax*) *crenatus* – Ramakrishna *et al.* 2010: 57.
Dicharax crenatus – Páll-Gergely *et al.* 2020: 56.

Type material examined

INDIA • 2 syntypes (Fig. 34F–J); Mokarsa, Khasi Hills; Godwin-Austen coll.; NHMUK 1903.7.1.2642.

Type locality

"On Burrail Range, N. Cachar, at ca 5000 feet".

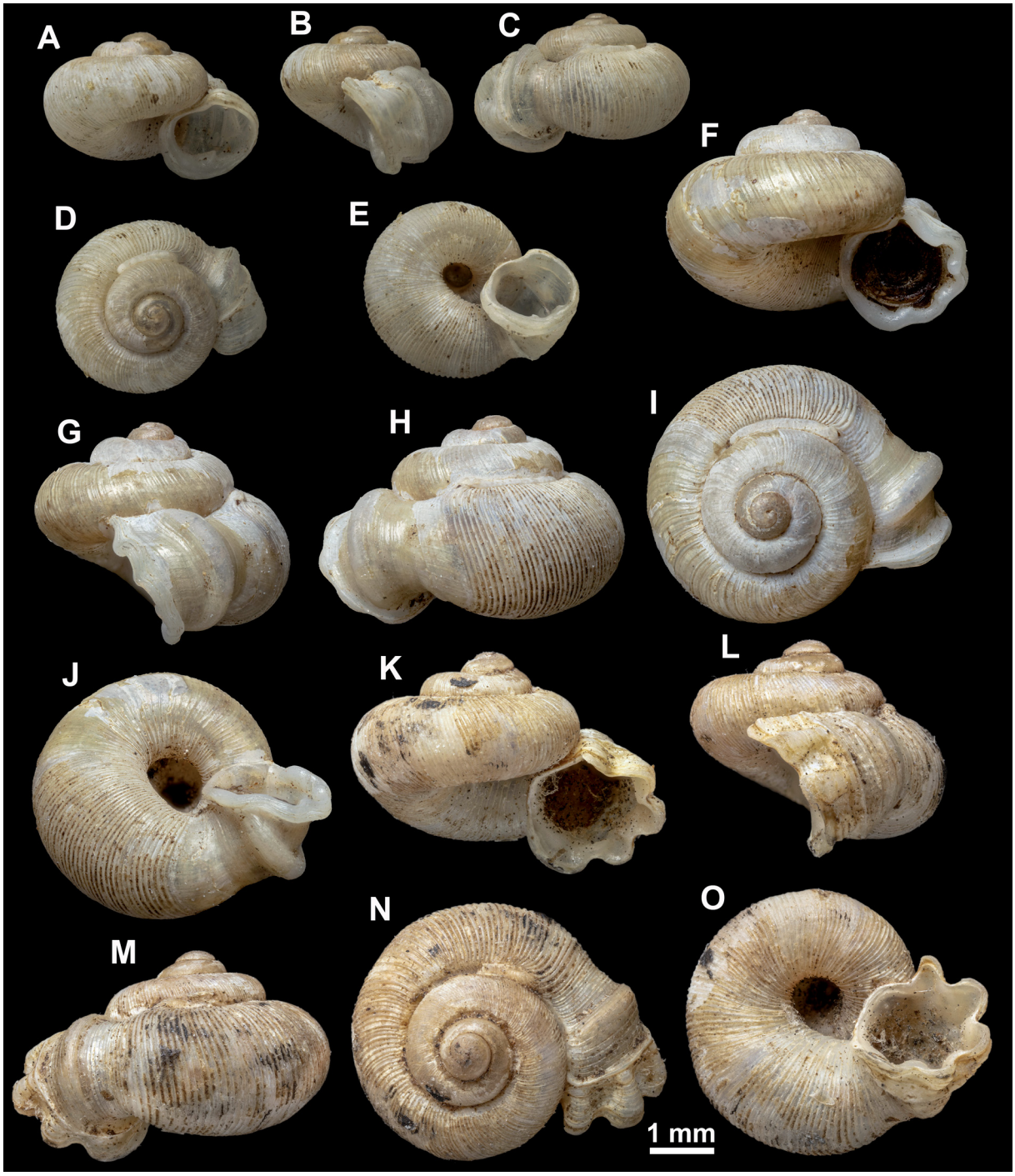

Fig. 34. Shells of species of *Dicharax* Kobelt & Möllendorff, 1900. **A–E**. *D. bicrenatus* (Godwin-Austen, 1874), syntype (NHMUK 1903.7.1.2490). **F–J**. *D. crenatus* (Godwin-Austen, 1871), syntype (NHMUK 1903.7.1.2642). **K–O**. *D. digitatus* (H.F. Blanford, 1871) (NHMUK 1903.7.1.1253). All photos: Kevin Webb.

Differential diagnosis

Dicharax daflaensis has a smooth R2, while *D. crenatus* possesses curved R2 ribs. Moreover, the R3 swelling of *D. daflaensis* is more conical, i.e., less abruptly elevating. *Dicharax tangmaiensis* has a more strongly undulated inner peristome, and a smooth R2 surface. While in *D. crenatus* the R2 and R3 are of comparable length, in *D. davisi* and *D. ochraceus* the R3 is much longer than the R2.

Remarks

In the original description, Godwin-Austen (1871) gave "Burrail Range, N. Cachar" as the type locality. Later (Godwin-Austen 1914: 389) explained that he found two shells in his collection (from Mokarsa in the NW Khasi Hills, no. 2642), based on which the drawings of *A. crenatus* were made in the original description (Godwin-Austen 1871), but their locality was not mentioned in the original description. Based on ICZN Art. 72.4.1.1, the two shells from Mokarsa are also part of the type series. Even if Godwin-Austen referred to one of the shells as "the type shell" (Godwin-Austen 1914: 389), this does not constitute a valid lectotype designation (Art 74.5), because the condition of "unambiguousity" has not been met (we do not know which of the two shells were selected to be "the type").

Godwin-Austen (1874) noted that "*A. crenatus* was found as far east as Shiroifurar, also at Kezakenomih and Yémai". Those samples were not examined by us.

Dicharax cucullatus (Theobald, 1870)
Fig. 36A–J

Alycaeus cucullatus Theobald, 1870: 396–397, pl. 18 fig. 2.
Alycaeus davisi Godwin-Austen, 1914: 408, pl. 148 figs 9, 9a.

Alycaeus cucullatus – Sowerby 1877: pl. 2, species 12. — Godwin-Austen 1914: 407, pl. 155 fig. 5.
Alycaeus (*Dicharax*) *cucullatus* – Kobelt 1902: 367–368. — Gude 1921: 244–245.
Alycaeus (*Chamalycaeus*) *davisi* – Gude 1921: 226.
Dicharax cucullatus – Páll-Gergely *et al.* 2020: 57. — Jirapatrasilp *et al.* 2021: 4, figs 2–3, 4a–b, 5a, 6h (treated *D. davisi* as a junior synonym).
Dicharax davisi – Páll-Gergely *et al.* 2020: 58.

Type material examined

MYANMAR • 2 syntypes of *D. cucullatus*; Shan States; NHMUK 1888.12.4.951-952 • 4 syntypes of *A. davisi*; Shan States; Woodthorpe leg.; NHMUK 1903.7.1.1630.

Type localities

"Shan States" (*A. cucullatus*); "Siam and Shan boundary" (*A. davisi*).

Differential diagnosis

The most similar species is *D. ochraceus*, which is smaller, and has more widely-spaced R2 ribs (Jirapatrasilp *et al.* 2021). See also under *D. digitatus*.

Remarks

This is a variable species regarding the aperture shape and the height of R3 swelling (see Jirapatrasilp *et al.* 2021).

Dicharax digitatus (H.F. Blanford, 1871)
Fig. 34K–O

Alycaeus digitatus H.F. Blanford, 1871: 41–42, pl. 2 fig. 4.

Alycaeus (*Dicharax*) *digitatus* – Kobelt 1902: 369. — Gude 1921: 248.
Alycaeus digitatus – Godwin-Austen 1914: 339–340, pl. 134 figs 5, 5a.
Chamalycaeus (*Dicharax*) *digitatus* – Ramakrishna *et al.* 2010: 59.
Dicharax digitatus – Páll-Gergely *et al.* 2020: 59.

Diagnosis

The high and short R3 swelling, which is situated close to the outer peristome, the strongly fringed inner peristome, the large distance between the inner and outer peristomes, and the protruding finger-like projections on the inner peristome distinguish this species from all congeners.

Material examined

INDIA • 1 shell (probably not syntype, but figured by Godwin-Austen 1914; Fig. 34K–O); Rechila Pk, Sikkim; W. Robert leg.; NHMUK 1903.7.1.1253.

Type locality

"apud Darjeeling in vallo Rungno fluminis Himalayæ Sikkimensis".

Differential diagnosis

Other species of this species group may also have finger-like projections of the peristome (*D. cucullatus*, *D. ochraceus*, *D. plectocheilus*, *D. tangmaiensis*), but in those cases the outer peristome 'follows' the projections, while in *D. digitatus* the outer peristome stops at a single, straight line. See also under *D. bicrenatus*.

Dicharax lunabulbus Gittenberger, Choki Gyeltshen & Kezang Tobgay, 2024
Fig. 35E–H

Dicharax lunabulbus Gittenberger, Choki Gyeltshen & Kezang Tobgay in Gittenberger *et al.*, 2024: 214, figs 38, 43.

Type locality

"Chhukha Dzongkhag: SE of Gedu, 26°54'N 89°33'E, 1988 m a.s.l." (Bhutan).

Differential diagnosis

Dicharax vanderbijli has more widely-spaced R1 ribs, smaller distance between the inner and outer peristomes, and a less fringed aperture. See also under *D. bicrenatus* and *D. bjiminaensis*.

Dicharax ochraceus (Godwin-Austen, 1893)
Fig. 36K–O

Alycaeus ochraceus Godwin-Austen, 1893: 594–595.

Alycaeus ochraceus – Godwin-Austen 1897: 3, pl. 63 figs 7, 7a–b; 1914: 411.
Alycaeus (*Dicharax*) *ochraceus* – Kobelt 1902: 374. — Gude 1921: 263.
Dicharax ochraceus – Páll-Gergely *et al.* 2020: 69.

Type material examined

MYANMAR • 2 syntypes (Fig. 36K–O); Ruby mine Disr., Up. Burma; Doherty leg.; NHMUK 1903.7.1.2684.

Type locality

"Ruby Mines District, Upper Burmah".

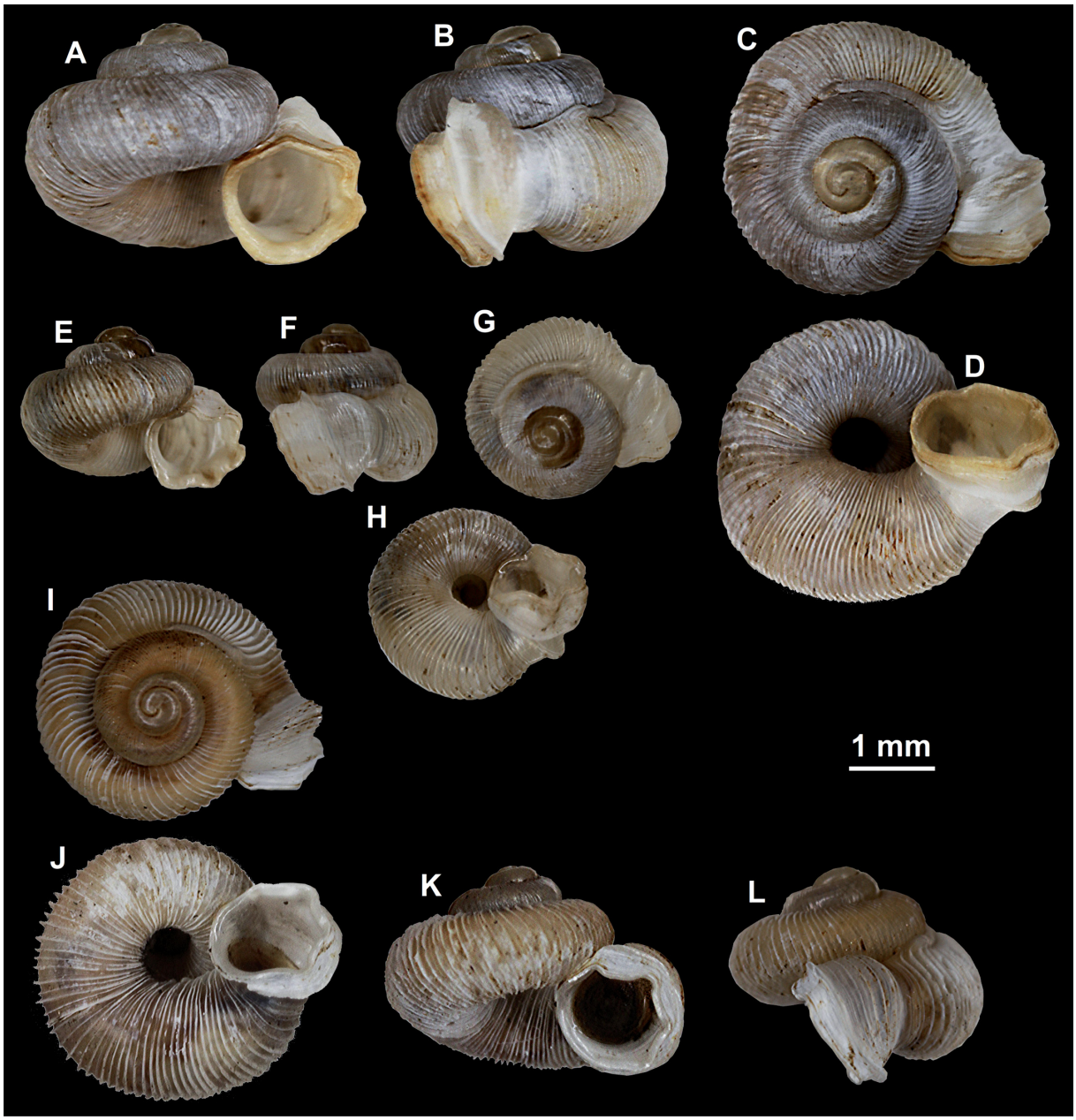

Fig. 35. Shells of species of *Dicharax* Kobelt & Möllendorff, 1900 from Bhutan. **A–D**. *D. bjiminaensis* Gittenberger & Choki Gyeltshen, 2024, holotype (NBCB 1342). **E–H**.*D. lunabulbus* Gittenberger, Choki Gyeltshen & Kezang Tobgay, 2024, holotype (NBCB 1621). **I–L**. *D. vanderbijli* Gittenberger & Choki Gyeltshen, 2024, holotype (NBCB 1423). All figures from Gittenberger *et al.* (2024).

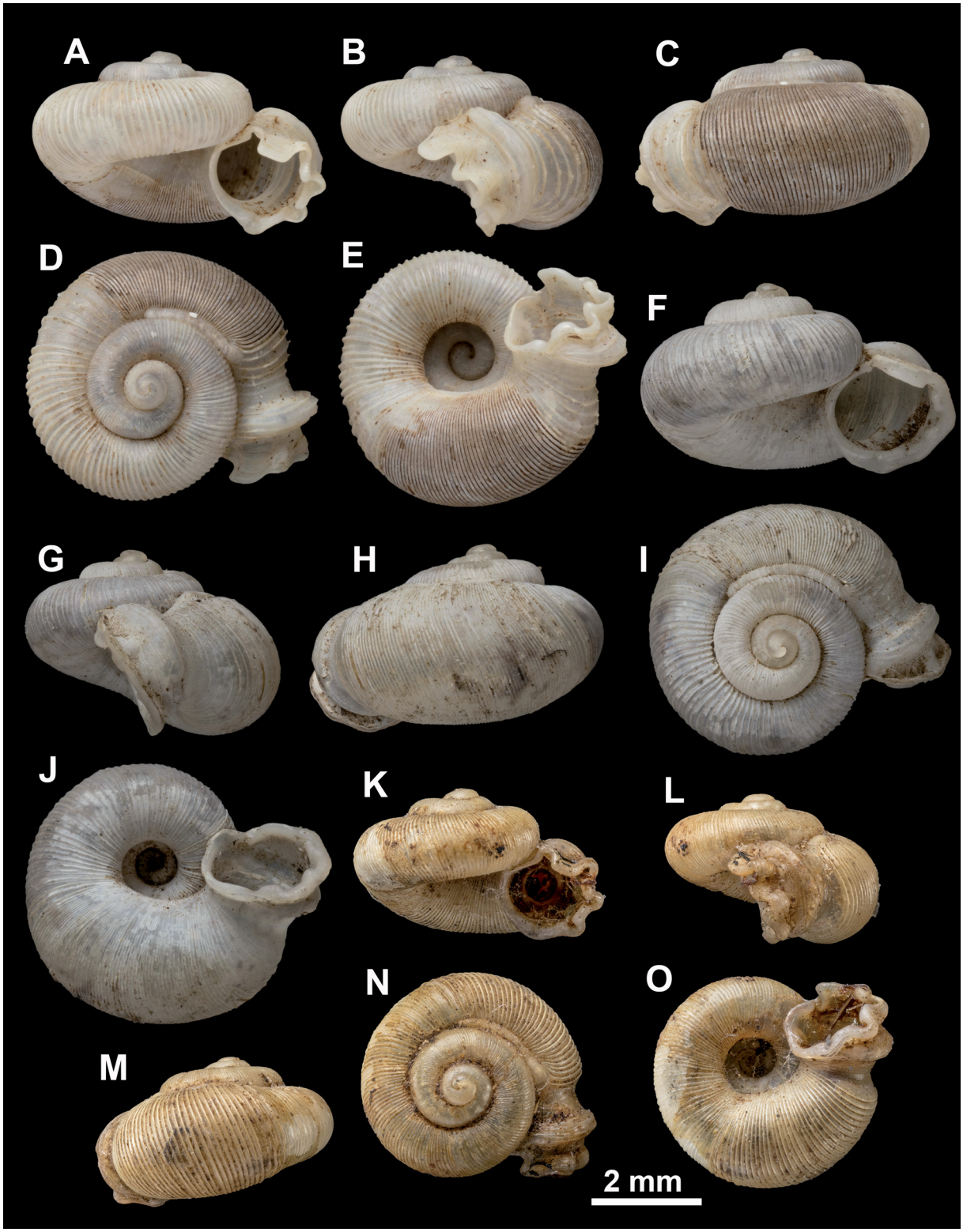

Fig. 36. Shells of species of *Dicharax* Kobelt & Möllendorff, 1900. **A–E**. *D. cucullatus* (Theobald, 1870), syntypes (NHMUK 1888.12.4.951-952). **F–J**. *D. cucullatus*, syntype of *Dicharax davisi* (Godwin-Austen, 1914) (NHMUK 1903.7.1.1630). **K–O**. *D. ochraceus* (Godwin-Austen, 1893), syntype (NHMUK 1903.7.1.2684). All photos: Harold Taylor.

Differential diagnosis

See under *D. cucullatus* (the most similar species) and *D. digitatus*.

Dicharax plectocheilus (Benson, 1859)
Fig. 37A–D

Alycaeus plectocheilus Benson, 1859: 180.

Alycaeus plectocheilus – Sowerby 1877: pl. 2, species 14. — Godwin-Austen 1914: 342–343, pl. 134 figs 4, 4a–c.
Alycaeus (*Dicharax*) *plectochilus* [sic] – Kobelt 1902: 375. — Gude 1921: 264–265.
Alycaeus plectocheilus, large var. – Godwin-Austen 1914: 342–343, pl. 133 figs 3, 3a–c.
Chamalycaeus (*Dicharax*) *plectochilus* – Ramakrishna *et al.* 2010: 65.
Dicharax plectocheilus – Páll-Gergely *et al.* 2017: 54. — Preece *et al.* 2022: 80, fig. 38e–f. — Gittenberger *et al*. 2024: 214, figs 39–40, 43.
Dicharax (?) *plectocheilus* – Páll-Gergely *et al.* 2020: 101.

Type material examined

INDIA • 2 syntypes (Fig. 37A–D); Darjiling, Rungun Valley; Blanford coll.; NHMUK 1906.4.4.184.

Type locality

"in valle Rungun".

Differential diagnosis

There are two other species in this species group with smooth R2 surface: *D. subdigitatus* and *D. tangmaiensis*. The former has a larger shell, has a larger distance between the R3 swelling and the peristome, and less protruding peristomal projections; the latter is much larger than *D. plectocheilus* and has a less elevated R3 swelling. See also under *D. digitatus*.

Dicharax subdigitatus (Godwin-Austen, 1876)
Fig. 37E–I

Alycaeus sub-digitatus Godwin-Austen, 1876: 177.

Alycaeus (*Dicharax*) *daflaensis* var. *subdigitata* – Kobelt 1902: 368.
Alycaeus (*Dicharax*) *daflaensis* var. *subdigitatus* – Gude 1921: 246.
Dicharax (?) *daflaensis subdigitatus* – Páll-Gergely *et al.* 2020: 84.

Type material examined

INDIA • 3 syntypes; Shengorh Peak, Dafla Hills; Godwin-Austen coll.; NHMUK 1903.7.1.2498.

Type locality

"Shengorh Peak" and "Tánir ridge at 4000 feet".

Differential diagnosis

Dicharax tangmaiensis is larger, and has a shorter distance between the R3 swelling and the peristome. See also under *D. plectocheilus*.

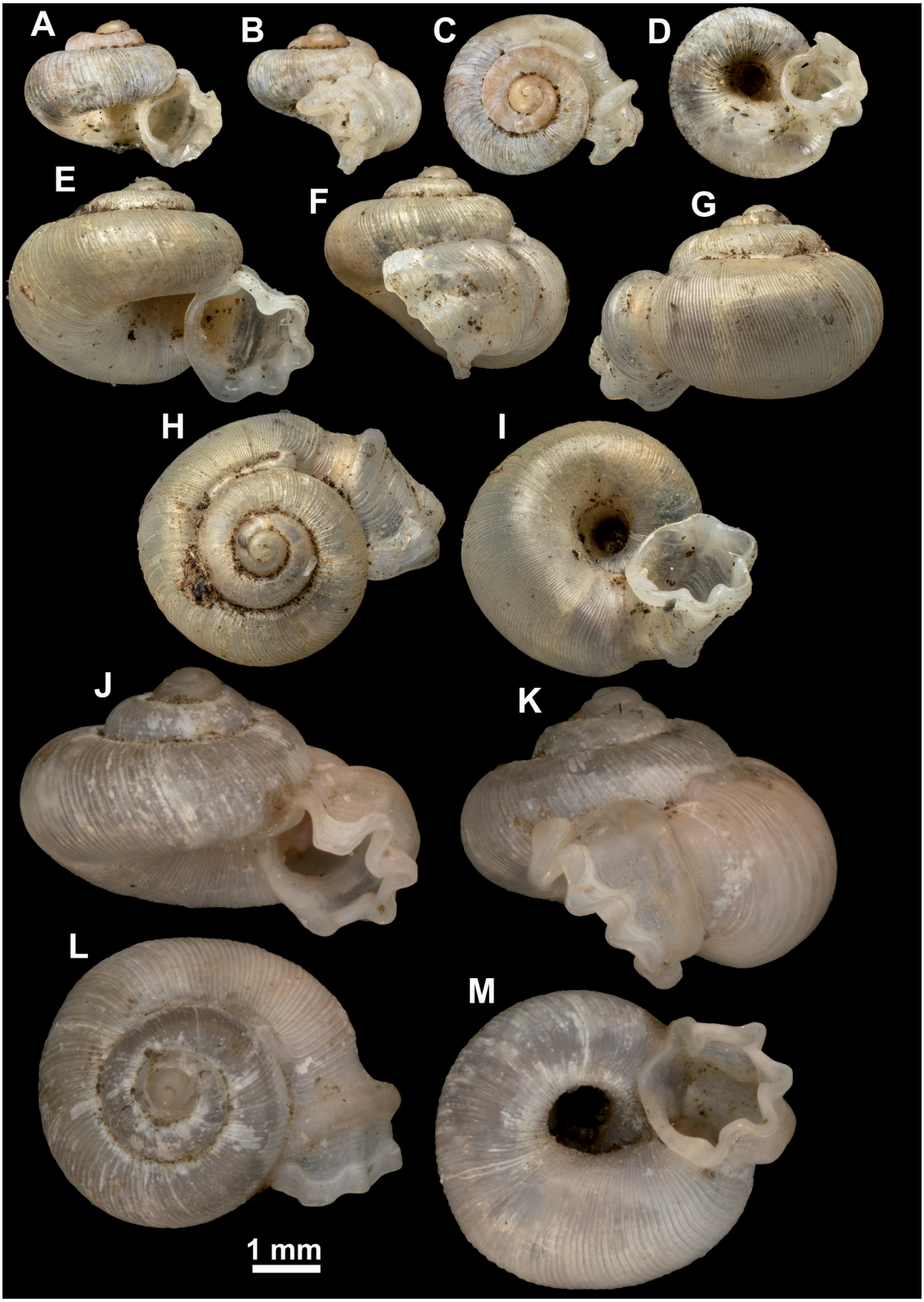

Fig. 37. Shells of species of *Dicharax* Kobelt & Möllendorff, 1900. **A–D**. *D. plectocheilus* (Benson, 1859), syntype (NHMUK 1906.4.4.184). **E–I**. *D. subdigitatus* (Godwin-Austen, 1876), syntype (NHMUK 1903.7.1.2498). **J–M**. *D. tangmaiensis* (Chen & Zhang, 2001), holotype (CASIZ TM 0010054). Photos: Harold Taylor (A–D), Kevin Webb (E–I) and Kaibaryer Meng (J–M).

Remarks

The shell regions and the sculpture are similar to *D. digitatus*, but the undulation of the peristome started anterior to the R3 swelling. Moreover, the R3 swelling is situated at a greater distance from the peristome edge. Therefore, *D. subdigitatus* is a species in its own right, instead of a subspecies of *D. daflaensis*.

Dicharax tangmaiensis (Chen & Zhang, 2001)
Fig. 37J–N

Chamalycaeus tangmaiensis Chen & Zhang, 2001: 184–185, 188–189, figs 1–4.

Dicharax (?) *tangmaiensis* – Páll-Gergely *et al.* 2017: 107–108.
Dicharax tangmaiensis – Páll-Gergely *et al.* 2020: 73, fig. 17.

Diagnosis

A large species with smooth R2. See under *D. digitatus* and *D. plectocheilus* and *D. subdigitatus*.

Type material examined

CHINA • holotype (Fig. 37J–N); Tong-Mai Town, Bo-Mi County, Tibet Autonomous Region; 20 Jun. 1980; Chen De-Niu leg.; CASIZ TM 0010054 • 1 paratype; same data as for holotype; CASIZ TM 0010056.

Type locality

"Tongmai Town, (30°01'N, 95°E), Bomi County, Tibet Autonomous Region, China".

Dicharax vanderbijli Gittenberger & Choki Gyeltshen, 2024
Fig. 35I–L

Dicharax vanderbijli Gittenberger & Choki Gyeltshen in Gittenberger *et al.*, 2024: 212, figs 35, 37.

Type locality

"Paro Dzongkhag: 12 km SW of Paro, 3680 m a.s.l., 27°22'N 89°19'E" (Bhutan).

Differential diagnosis

Most similar to *D. lunabulbus* and *D. bjiminaensis*. For comparisons with those species, see the respective species.

Dicharax species group 3

Remarks

This species group is characterized by the relatively large (around 5 mm), usually finely ribbed shell, two R3 swellings, and a rounded (not fringed) aperture.

One species is known from the Himalayan region (*D. mutatus*), while the other three are known from central Myanmar (*D. bifrons*, *D. spatiosus*, *D. woodthorpei*).

Dicharax bifrons (Theobald, 1870)
Fig. 38A–E

Alycaeus bifrons Theobald, 1870: 396, pl. 18 fig. 1.

Alycaeus bifrons – Sowerby 1877: pl. 6, species 48. — Godwin-Austen 1914: 407, pl. 139 figs 3, 3a.
Alycaeus (*Dicharax*) *bifrons* – Kobelt 1902: 365–366. — Gude 1921: 239.
Dicharax (?) *bifrons* – Páll-Gergely *et al.* 2020: 79.

Type material examined

MYANMAR • 3 syntypes (Fig. 38A–E); Shan States; NHMUK 1888.12.4.956-958.

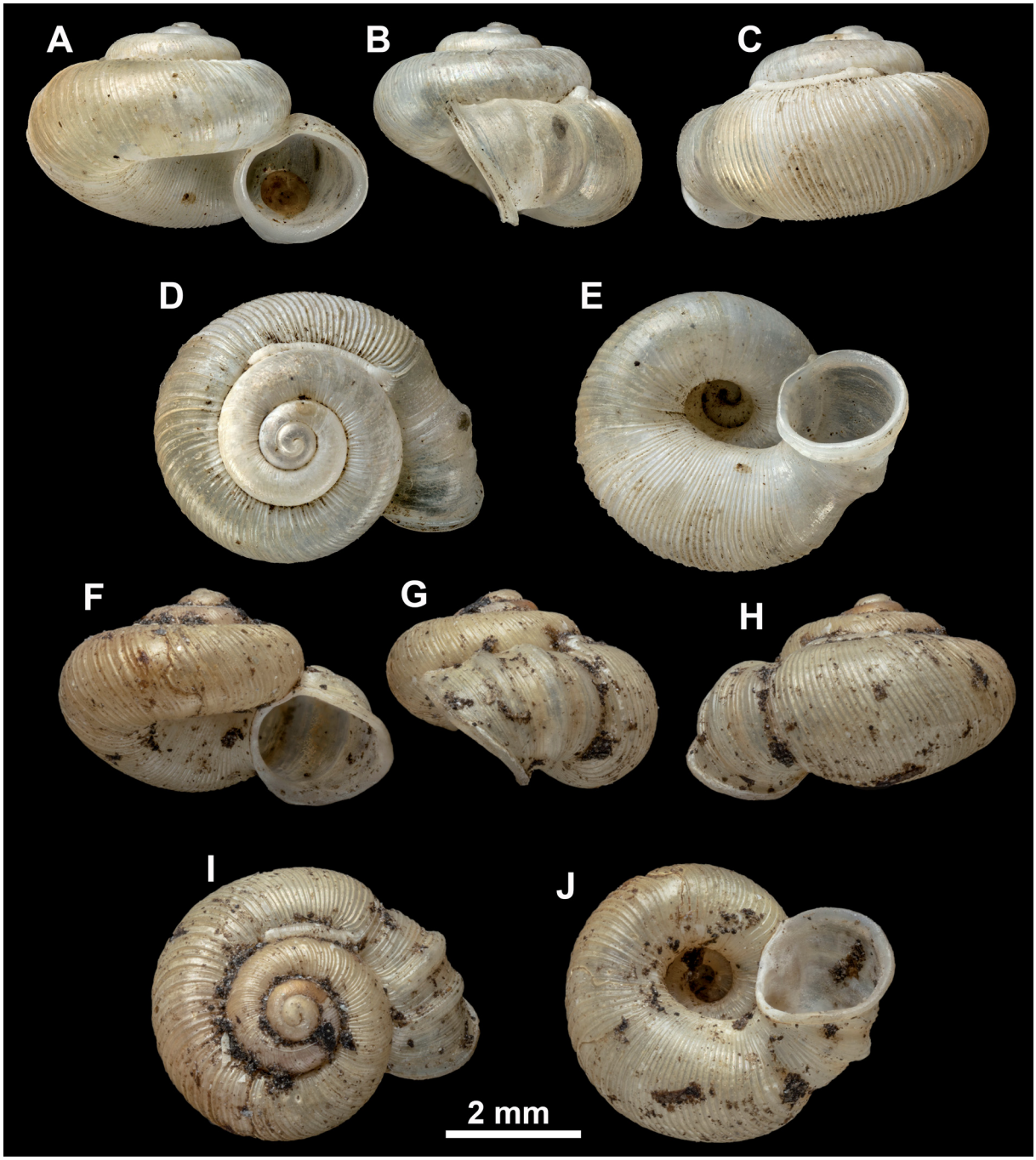

Fig. 38. Shells of species of *Dicharax* Kobelt & Möllendorff, 1900. **A–E**. *D. bifrons* (Theobald, 1870), syntypes (NHMUK 1888.12.4.956-958). **F–J**. *D. mutatus* (Godwin-Austen, 1876), syntype (NHMUK 1903.7.1.2495). Photos: Harold Taylor (A–E) and Kevin Webb (F–J).

Type locality

"Shan States".

Differential diagnosis

The most similar species is *D. mutatus*, which has a longer R2 and more pronounced R3 swellings.

Dicharax mutatus (Godwin-Austen, 1876)
Fig. 38F–J

Alycaeus mutatus Godwin-Austen, 1876: 177–178, pl. 7 figs 11, 11a.

Alycaeus (*Dicharax*) *mutatus* – Kobelt 1902: 373–374. — Gude 1921: 260–261.
Alycaeus mutatus – Godwin-Austen 1914: 357, pl. 145 figs 9, 9a.
Chamalycaeus (*Dicharax*) *mutatus* – Ramakrishna *et al.* 2010: 63.

Type material examined

INDIA • 9 syntypes (Fig. 38F–J); Toruputu Peak, Dafla Hills; Godwin-Austen coll.; NHMUK 1903.7.1.2495.

Type locality

"On Torúpútú, Tánir, and Shengorh Peaks, at 6–7000 feet elevation, in the dead leaves and moss about the roots of the forest".

Differential diagnosis

Dicharax spatiosus is larger, has a longer R2, a more elevated main R3 swelling, and a clearer distinction between the inner and outer peristomes. For differences with the most similar species, *D. bifrons*, see under that species.

Dicharax spatiosus Páll-Gergely & Hunyadi, 2022
Fig. 39A–E

Dicharax spatiosus Páll-Gergely & Hunyadi, 2022: 97, fig. 5.

Diagnosis

The large shell, long R2, two elevated swellings on R3, and the circular (not fringed) aperture distinguishes this species from all congeners. See also under *D. mutatus* and also the original description of *D. spatiosus* for further comparisons.

Type material examined

MYANMAR • holotype (Fig. 39A–E); Shan State, 7.5 km N of Pinlaung, Tar Kge, near "Big Bang Cave"; 20°810.2730′ N, 96°847.4420′ E; 1540 m a.s.l.; A. Hunyadi, K. Okubo and J.U. Otani leg.; coll. HA (to be deposited in the HNHM).

Type locality

"Myanmar, Shan State, Pinlaung centre N 7.5 km, Tar Kge, near „Big Bang Cave", 20810.2730N, 96847.4420E, 1540 m a.s.l.".

Dicharax woodthorpi (Godwin-Austen, 1914)
Fig. 39F–J

Alycaeus woodthorpi Godwin-Austen, 1914: 414, pl. 155 fig. 14.

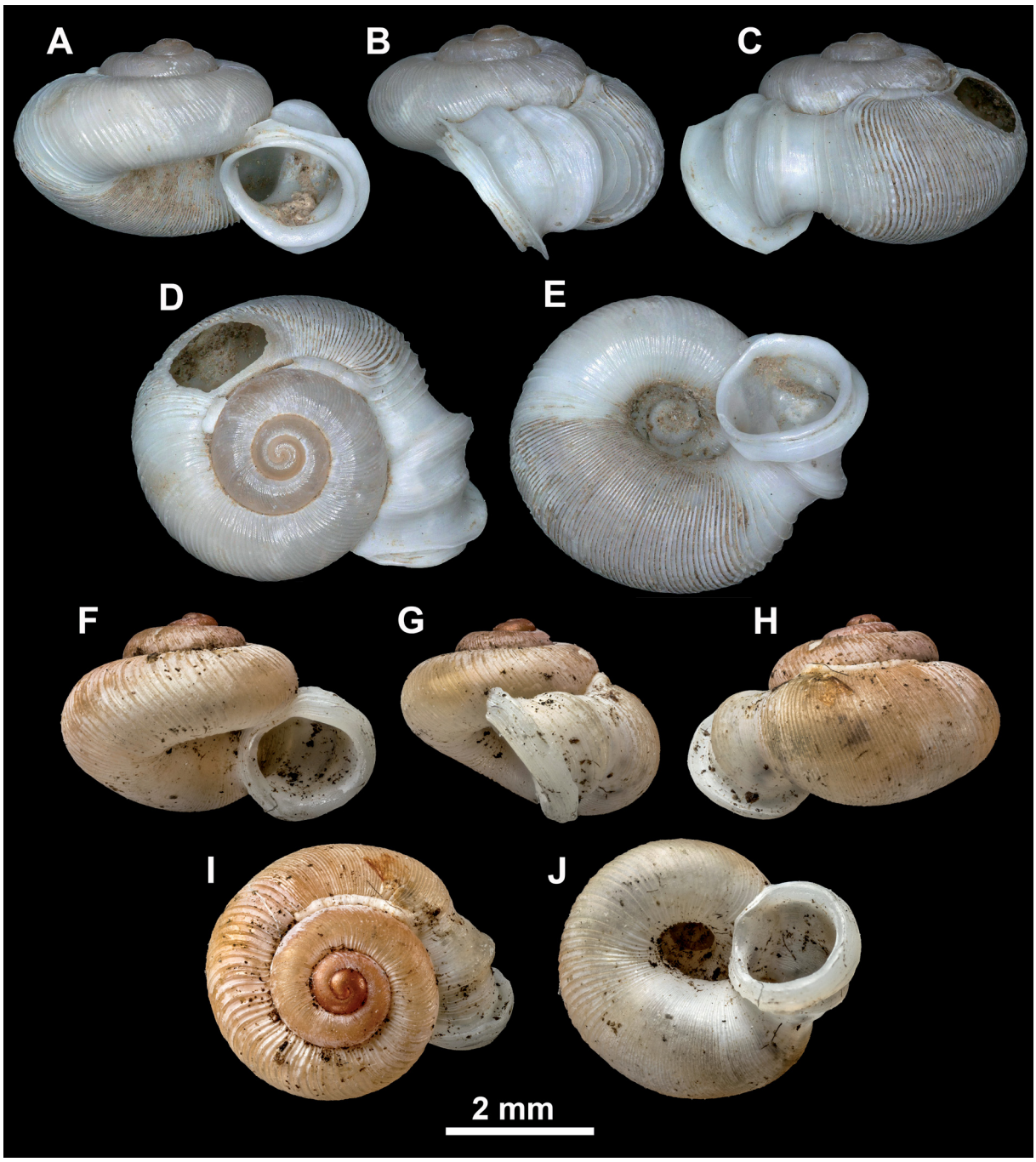

Fig. 39. Shells of species of *Dicharax* Kobelt & Möllendorff, 1900 from Myanmar. **A–E**. *D. spatiosus* Páll-Gergely & Hunyadi, 2022, holotype (coll. HA, to be deposited in the HNHM). **F–J**. *D. woodthorpi* (Godwin-Austen, 1914), syntype (NHMUK 1903.7.1.3064). Photos: B. Páll-Gergely (A–E) (from Páll-Gergely & Hunyadi 2022) and Harold Taylor (F–J).

Alycaeus (*Dicharax*) *woodthorpei* [sic] – Gude 1921: 275.
Dicharax (?) *woodthorpei* – Páll-Gergely *et al.* 2020: 107; 2021: 37, fig. 20b.

Diagnosis

This species differs from the other three species of the same species group by the smooth R2.

Type material examined

MYANMAR • 22 syntypes in two vials (Fig. 39F–J); Fort Stedman, Burma; Woodthorpe leg.; NHMUK 1903.7.1.3064.

Additional material examined

MYANMAR • 2 shells; Burma; E.R. Sykes coll.; acc. no. 1825; NHMUK 20150126.

Type locality

"Fort Stedman, Burma".

Differential diagnosis

There are several species with smooth R2 surface (mostly in *Dicharax* species group 8), but *D. woodthorpei* can be distinguished from them by the relatively large shell, the double R3 swelling and the rounded aperture.

Dicharax species group 4

Remarks

This species group is characterized by the relatively large (around 5 mm), finely ribbed R1, smooth R2, two R3 swellings, and the fringed aperture. Species of the *Dicharax* species group 3 also have double R3 swellings, but have rounded apertures.

Both species are known from the Indian Himalaya.

Dicharax duoculmen (Godwin-Austen, 1914)
Fig. 40A–E

Alycaeus duoculmen Godwin-Austen, 1914: 365, pl. 157 figs 2, 2a.

Alycaeus (*Raptomphalus*) *duoculmen* – Gude 1921: 286–287.
Chamalycaeus (*Raptomphalus*) *duoculmen* – Ramakrishna *et al.* 2010: 68.
Dicharax (?) *duoculmen* – Páll-Gergely *et al.* 2020: 86.

Type material examined

INDIA • holotype (single shell mentioned in the original description: Fig. 40A–E); Tsanspu Valley; Oakes leg.; NHMUK 1903.7.1.3582.

Type locality

"Tsanspu Valley".

Differential diagnosis

The most similar species is *D. magnificus*, which has a stronger R1 sculpture, a more strongly fringed aperture and a sharper keel on the umbilical side of R2.

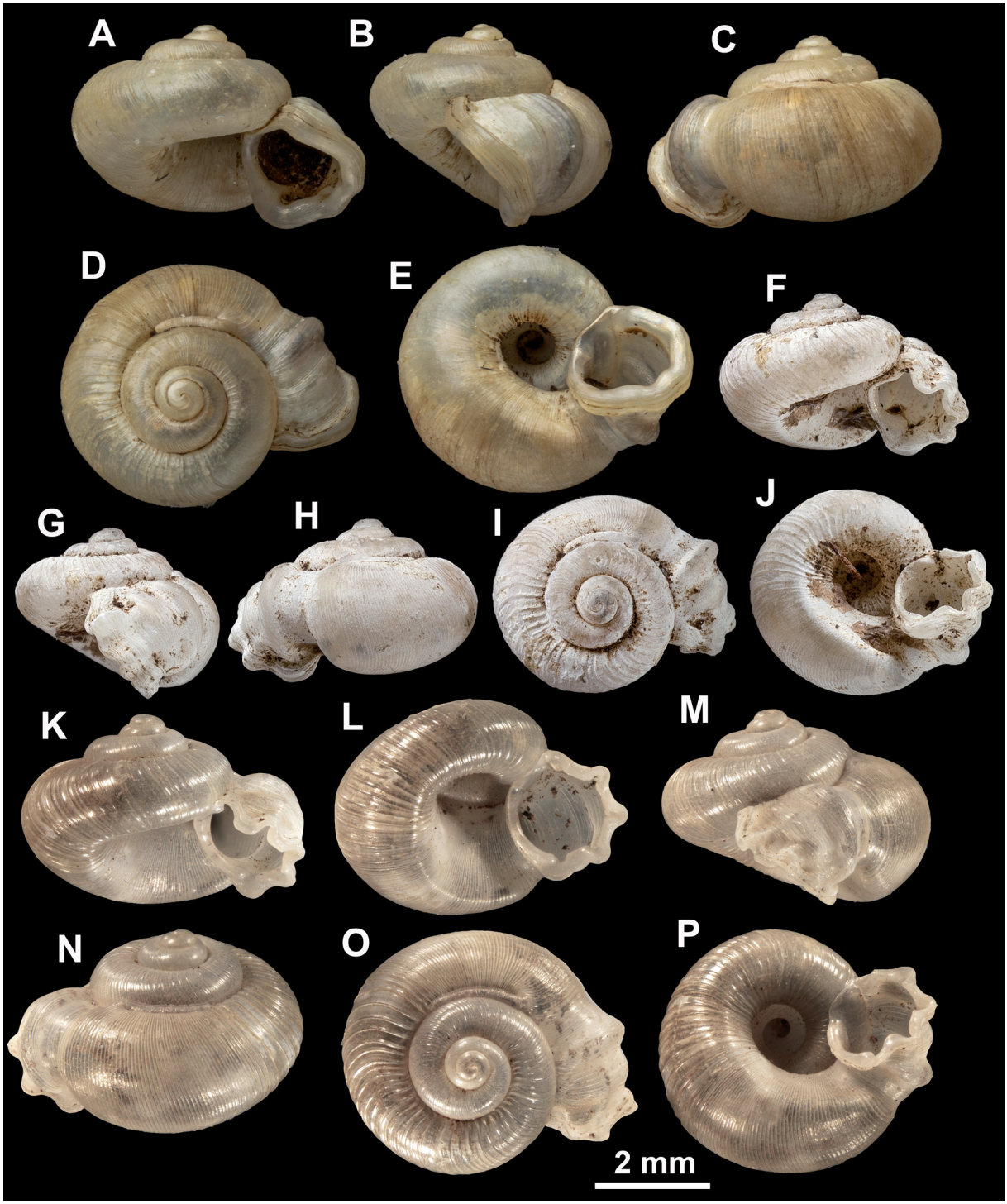

Fig. 40. Shells of species of *Dicharax* Kobelt & Möllendorff, 1900. **A–E**. *D. duoculmen* (Godwin-Austen, 1914), holotype (NHMUK 1903.7.1.3582). **F–J**. *D. magnificus* (Godwin-Austen, 1914), syntype (NHMUK 1903.7.1.3115). **K–P**. *D. magnificus* from Kalek-Rottung Road (NZSI LM1914). Photos: Kevin Webb (A–E), Harold Taylor (F–J) and B. Páll-Gergely (K–P),

Dicharax magnificus (Godwin-Austen, 1914)
Fig. 40F–P

Alycaeus (*Raptomphalus*) *magnificus* Godwin-Austen, 1914: 366, pl. 156 figs 1, 1a–b.

Alycaeus (*Raptomphalus*) *magnificus* – Gude 1921: 288.
Chamalycaeus (*Raptomphalus*) *magnificus* – Ramakrishna *et al.* 2010: 69.
Metalycaeus (?) *magnificus* – Páll-Gergely *et al.* 2020: 146, fig. 31b.

Type material examined

INDIA • 1 syntype (Fig. 40F–J); Yamney Valley, Abor Hills; NHMUK 1903.7.1.3115.

Additional material examined

INDIA • 1 shell (Fig. 40K–P); Arunachal Pradesh, 2 km from Kalek towards Rottung, base of the dry bamboo clumps, in semi-evergreen forest; 28°6.067′ N, 95°10.378′ E; 784 m a.s.l.; 24 April 2022; Aravind N.A. and Surya Narayanan leg.; NZSI LM1914 • 7 shells; same data as for preceding; ATREE.

Type locality

"Yamne valley, Abor Hills".

Differential diagnosis

See under *Dicharax duoculmen*.

Remarks

Based on the spiral striae visible on the protoconch of the syntype, this species has been classified in *Metalycaeus* (see Páll-Gergely *et al.* 2020). Re-examination of that syntype revealed that those spiral striae are parts of lower shell layers; therefore, those are not homologous with those of species of *Metalycaeus*, which are raised striae. Furthermore, additional, fresh shells collected at Kalek-Rottung Road clearly lack spiral striation, showing that this is a species of *Dicharax*. *Dicharax magnificus* is the type species of *Raptomphalus* Godwin-Austen, 1914, and as a consequence, that taxon is a synonym of *Dicharax* (instead of *Metalycaeus*).

Dicharax species group 5

Remarks

This species group is characterized by shells with an elevated spire and relatively low R3 swelling. Other traits are variable. It is likely that *D. globosus* and *D. vestitus* are relatives, because other than the shell height they share the strong ribs, which are peculiarly oblique. *Dicharax burchi*, and *D. verrucosus* are also similar in the R3 swelling that is situated close to the aperture. *Dicharax conicus* may not be related to the other high-spired species, and can be recognized by its peculiar outer peristome.

Dicharax burchi Jirapatrasilp & Páll-Gergely, 2021
Fig. 41A–E

Dicharax burchi Jirapatrasilp & Páll-Gergely in Jirapatrasilp *et al.*, 2021: 9, figs 6f, 10, 11a.

Type material examined

THAILAND • holotype; Khon Kaen Province, Tham Phaya Nakharat; 16°48′32.8″ N, 101°57′23.9″ E; 21 Jul. 2020; P. Tongkerd and A. Pholyotha leg.; CUMZ 7428. For other specimens, see Jirapatrasilp *et al.* (2021).

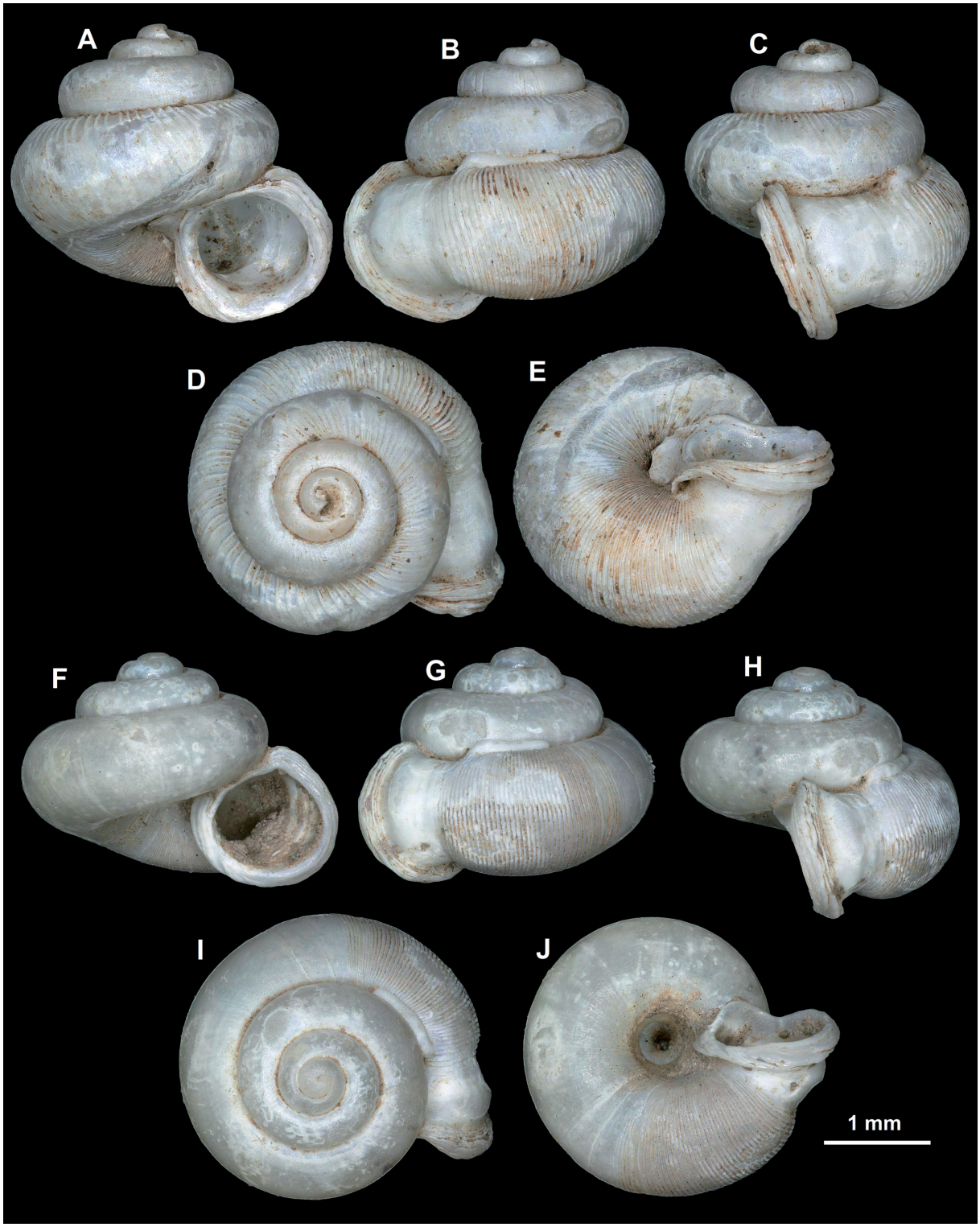

Fig. 41. Shells of species of *Dicharax* Kobelt & Möllendorff, 1900. **A–E**. *D. burchi* Jirapatrasilp & Páll-Gergely, 2021, specimen from Shan States (coll. HA). **F–J**. *D. verrucosus* Páll-Gergely & Hunyadi, 2021, holotype (HNHM 104862). All photos: B. Páll-Gergely (A–E: from Jirapatrasilp *et al.* 2021; F–J: from Páll-Gergely *et al.* 2021).

Additional material examined

MYANMAR • 1 shell (Fig. 41A–E); Shan State, ca 6 km E of Hsihseng centre, right side of rd + 500 m on unpaved rd, limestone hill; 20°8.002′ N, 97°18.024′ E; 1000 m a.s.l.; 7 Oct. 2018; A. Hunyadi, K. Okubo and J.U. Otani leg.; coll. HA (locality code: 2018/41).

Type locality

"Tham Phaya Nakharat, Khon Kaen Province, Thailand, 16°48'32.8"N, 101°57'23.9"E".

Differential diagnosis

Differs from the most similar *D. verrucosus* by the more elevated spire and the longer R3.

Dicharax conicus (Godwin-Austen, 1871)
Fig. 42

Alycaeus conicus Godwin-Austen, 1871: 87–88, pl. 3 fig. 1.
Alycaeus conicus var. *nanus* Godwin-Austen, 1914: 388, pl. 138 figs 6, 6a–b. **Syn. nov.**
Dicharax conicus jatingaensis Páll-Gergely in Páll-Gergely *et al.*, 2020: 56 (replacement name for *Alycaeus conicus* var. *nanus* Godwin-Austen, 1914, non *Alycaeus nanus* Möllendorff, 1886)

Alycaeus conicus – Sowerby 1877: pl. 1, species 9. — Godwin-Austen 1914: 387–388, pl. 143 figs 4, 4a–b. — Gude 1921: 208.
Alycaeus (*Alycaeus*) *conicus* – Kobelt 1902: 342. — Ramakrishna *et al.* 2010: 47.
Alycaeus conicus var. *nana* – Gude 1921: 208.
Dicharax conicus – Páll-Gergely *et al.* 2020: 45.

Diagnosis

Besides the elevated spire, this species can be distinguished from its congeners based on the nearly smooth R1, and the peculiar outer peristome, which is strongly expanded and turns anteriorly.

Type material examined

INDIA • 12 syntypes of *A. conicus* (Fig. 42A–E); Samiamri, E of the Kopili R.; Godwin-Austen leg.; NHMUK 1903.7.1.2674 • 12 syntypes of *A. conicus* var. *nanus* (Fig. 42F–J); Jatinga Valley, N. Cachar; NHMUK 1903.7.1.2675.

Additional material examined

INDIA • 1 shell (included with type lot, but not mentioned in the original description and not considered as part of the type series); Khasi Hills; NHMUK 1903.7.1.2565.

Type localities

"Was abundant on the Limestone Hill east of Kopili river, North Cachar District, and was occasionally also found in other places, but rare" (*A. conicus*); "Jatinga Valley, North Cachar Hills" (*A. conicus* var. *nanus*).

Remarks

Besides a slight difference in shell size, we found no important conchological traits that differ between *A. conicus* and *A. conicus* var. *nanus*; therefore, we see no reason to maintain the latter as a subspecies.

Dicharax globulus (Godwin-Austen, 1874)
Fig. 43A–E

Alycaeus globulus Godwin-Austen, 1874: 147–148, pl. 3 fig. 4.

Alycaeus (*Dicharax*) *globulus* – Kobelt 1902: 371. — Gude 1921: 254.
Alycaeus globulus – Godwin-Austen 1914: 392, pl. 144 figs 4, 4a–b.
Chamalycaeus (*Dicharax*) *globulus* – Ramakrishna *et al.* 2010: 60.
Dicharax (?) *globulus* – Páll-Gergely *et al.* 2020: 63.

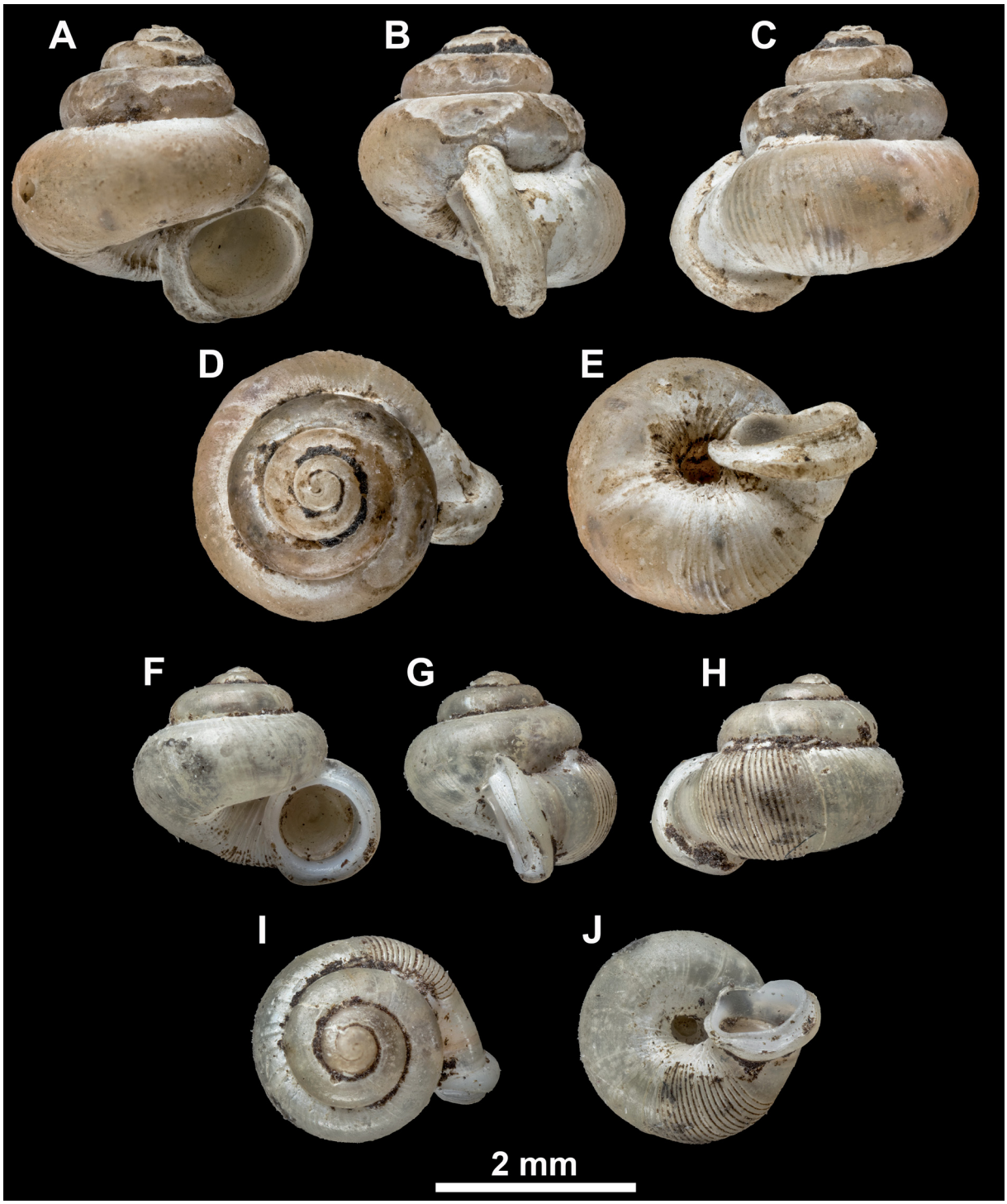

Fig. 42. *Dicharax conicus* (Godwin-Austen, 1871). **A–E**. Syntype of *Alycaeus conicus* (NHMUK 1903.7.1.2674). **F–J**. Syntype of *A. conicus* var. *nanus* (NHMUK 1903.7.1.2565). All photos: Harold Taylor.

Diagnosis

Differs from all congeners by the deep longitudinal grooves of the R3.

Type material examined

INDIA • 13 syntypes (Fig. 43A–E); Phunggum, Lahupa Naga Hills, Munipur; NHMUK 1903.7.1.2486.

Type locality

"Phunggum, a Naga village at head of the Lanier valley, at 5,000 feet".

Remarks

It appears that the outer peristome of this species is situated close to the R3 swelling. Such extended space between the inner and outer peristomes is visible in other species as well, and most extreme in the cases of *D. bicrenatus*, *D. digitatus*, *D. rugosus* and *D. umbiclausus*. However, in *D. globulus* the relatively large area between the two peristomes bears deep longitudinal grooves between the aperture and the R3 swelling.

Dicharax verrucosus Páll-Gergely & Hunyadi, 2021
Fig. 41F–J

Dicharax verrucosus Páll-Gergely & Hunyadi in Páll-Gergely *et al.,* 2021: 44, fig. 34.

Type material examined

MYANMAR • holotype (Fig. 41F–J); Shan State, Taunggyi, hill above Aye Say Tee Pagoda, Dragon Cave; 20°47.489′ N, 97°03.036′ E; 1380 m a.s.l.; A. Hunyadi, K. Okubo and J.U. Otani leg.; HNHM 104862. See other specimens in Páll-Gergely *et al.* (2021).

Type locality

"Myanmar, Shan State, Taunggyi, hill above Aye Say Tee Pagoda, Dragon Cave, 20°47.489'N, 97°03.036'E, 1380 m a.s.l."

Differential diagnosis

See under *D. burchi* and in the original description.

Dicharax vestitus vestitus (W.T. Blanford, 1862)
Fig. 43F–J

Alycaeus vestitus W.T. Blanford, 1862: 138–139.
Alycaeus vestitus var. *minor* W.T. Blanford, 1862: 138.

Alycaeus vestitus – Sowerby 1877: pl. 1, species 3. — Godwin-Austen 1914: 424–425, pl. 139 figs 2, 2a. — Gude 1921: 220–221.
Alycaeus (*Alycaeus*) *vestitus* – Kobelt 1902: 352.
Dicharax vestitus – Páll-Gergely *et al.* 2017: 71; 2020: 75.

Type material examined

MYANMAR • holotype (single shell mentioned in the original description: Fig. 43F–J); Moditoung; NHMUK 1906.4.4.53.

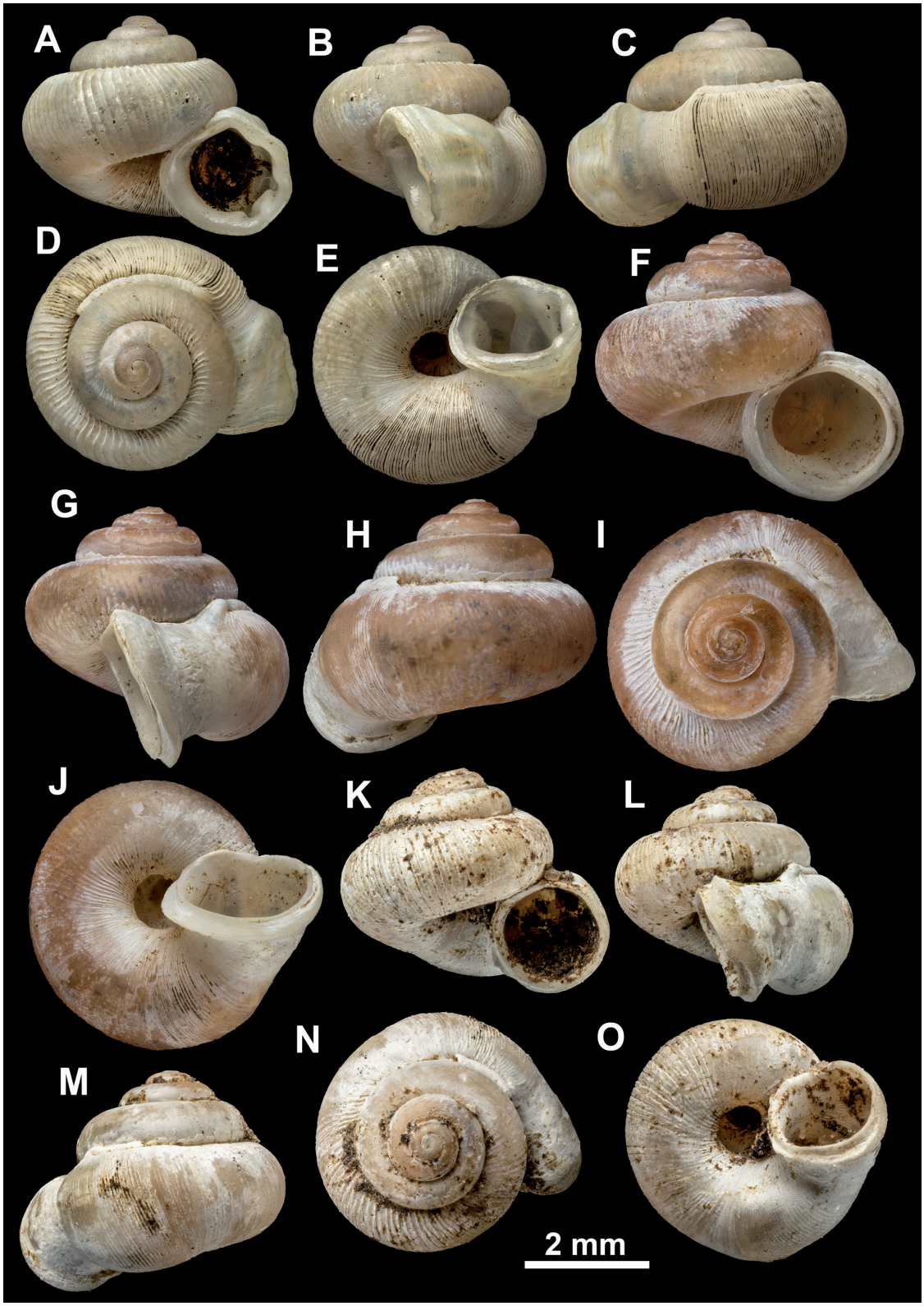

Fig. 43. Shells of species of *Dicharax* Kobelt & Möllendorff, 1900. **A–E**. *D. globulus* (Godwin-Austen, 1874), syntype (NHMUK 1903.7.1.2486). **F–J**. *D. vestitus vestitus* (W.T. Blanford, 1862), holotype (NHMUK 1906.4.4.53. **K–O**. *D. vestitus akyabensis* (Godwin-Austen, 1914), syntype (NHMUK 1888.12.4.251-252). Photos: Kevin Webb (A–E) and Harold Taylor (F–O).

Additional material examined

MYANMAR • 2 additional non-type specimens in the same lot from Alori Khyoung and Mamya Khyoung; NHMUK 1906.4.4.53.

Type locality

"in montibus Arakanensibus".

Differential diagnosis

Probably the most closely related species is *D. globulus* due to the peculiar oblique R1 ribs. That species, however, has longitudinal grooves on R3, and a fringed aperture.

Dicharax vestitus akyabensis (Godwin-Austen, 1914)
Fig. 43K–O

Alycaeus vestitus var. *akyabensis* Godwin-Austen, 1914: 425–426, pl. 155 fig. 7.

Alycaeus vestitus var. *akyabensis* – Gude 1921: 221.
Dicharax vestitus akyabensis – Páll-Gergely *et al.* 2020: 75.

Type material examined

MYANMAR • 2 syntypes (Fig. 43K–O); Baumi, Akyab; NHMUK 1888.12.4.251-252.

Type locality

"Baumi, Akyab".

Remarks

Dicharax vestitus akyabensis is smaller and has a thinner peristome than the nominotypical subspecies, which probably indicates intraspecific variability. Nevertheless, we maintain the two subspecies until more material becomes available.

Dicharax species group 6

Remarks

This species group is characterized by large, depressed shells and rounded (not fringed) apertures. Species of this species group are distributed from Myanmar (Ayeyarwady and Yangon Regions) to the Naga Hills.

Dicharax glaber (W.T. Blanford, 1865)
Figs 44–49

Alycaeus glaber W.T. Blanford, 1865: 84.
Alycaeus edei Godwin-Austen, 1914: 391–392, pl. 149 figs 2, 2a. **Syn. nov.**
Alycaeus levis Godwin-Austen, 1914: 394, pl. 138 figs 3, 3a. **Syn. nov.**

Alycaeus glaber – Sowerby 1877: pl. 4, species 31. — Godwin-Austen 1914: 418–419, pl. 151 fig. 1.
Alycaeus (*Dicharax*) *glaber* – Kobelt 1902: 371. — Gude 1921: 253.
Alycaeus levis – Gude 1921: 209–210.
Alycaeus (*Chamalycaeus*) *edei* – Gude 1921: 227.
Alycaeus (*Alycaeus*) *levis* – Ramakrishna *et al.* 2010: 48.
Chamalycaeus (*Chamalycaeus*) *edei* – Ramakrishna *et al.* 2010: 53.

Dicharax (?) *edei* – Páll-Gergely *et al.* 2020: 86.
Dicharax (?) *glaber* – Páll-Gergely *et al.* 2020: 89.
Dicharax (?) *levis* – Páll-Gergely *et al.* 2020: 92.

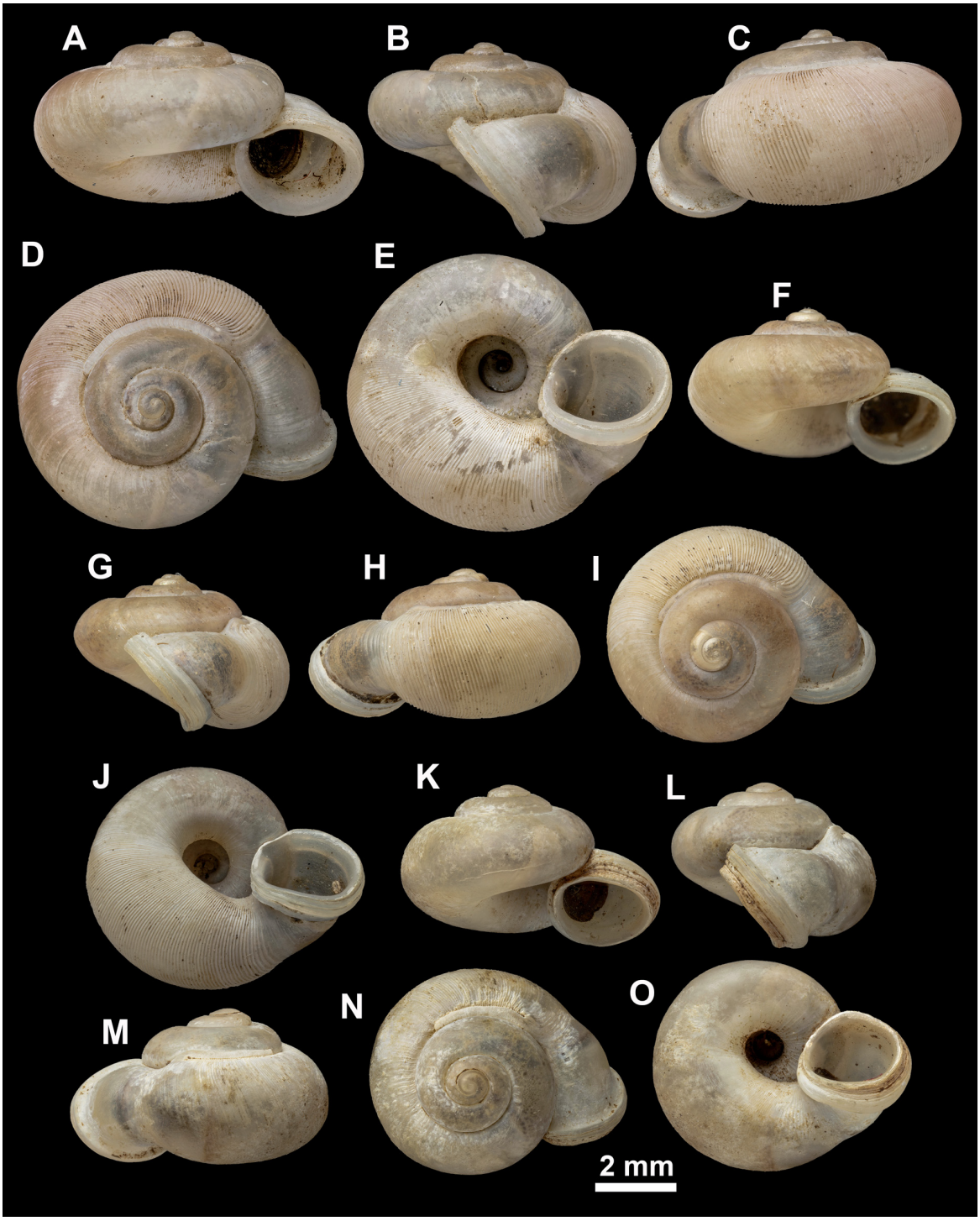

Fig. 44. *Dicharax glaber* (W.T. Blanford, 1865). **A–E**. Possible syntype of *Alycaeus glaber* W.T. Blanford, 1865 (NHMUK 1906.4.4.181). **F–J**. Syntype of *Alycaeus edei* Godwin-Austen, 1914 (NHMUK 1903.7.1.1665). **K–O**. Holotype of *Alycaeus levis* Godwin-Austen, 1914 (NHMUK 1903.7.1.2631). Photos: Harold Taylor (A–E) and Kevin Webb (F–O).

Type material examined

MYANMAR • possible syntypes of *A. glaber* (Fig. 44A–E); Akyab; W.T. Blanford coll.; NHMUK 1906.4.4.181 • 2 shells of (*A. glaber*); Akyab, Arakan; NHMUK 20191066 • 8 syntypes of *A. edei* in 2 vials (Fig. 44F–J); Naraindhur, Cachar; F. Ede leg.; NHMUK 1903.7.1.1665 • holotype of *A. levis* (single shell mentioned in the original description: Fig. 44K–O); Munipur; Godwin-Austen coll.; NHMUK 1903.7.1.2631.

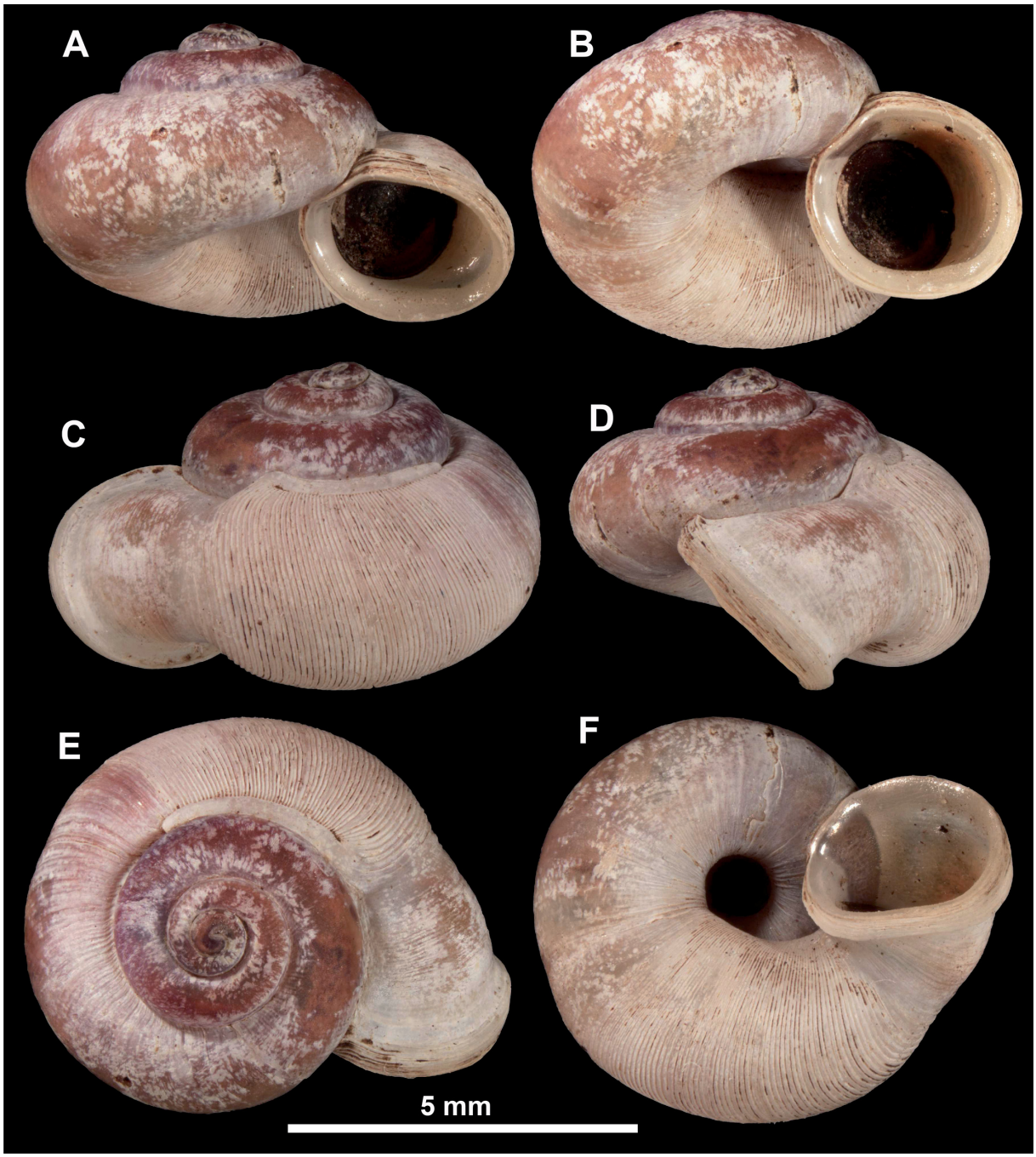

Fig. 45. *Dicharax glaber* (W.T. Blanford, 1865), Ar19 (NZSI LM1737). All photos: B. Páll-Gergely.

Additional material examined

INDIA – **Mizoram** • 1 empty shell; Blue Mountain, Lawngtlai district; 22.727° N, 93.135° E; 1400 m a.s.l.; 27 Jan. 2019; N.A. Aravind leg.; Ar29; NZSI LM1730 • 1 empty shell; same data as for preceding; Ar39; NZSI LM1731 • 1 empty shell; same data as for preceding; Ar52; NZSI LM1732 • 1 empty shell; same data as for preceding; Ar30; NZSI LM1733 • 1 empty shell; same data as for preceding; Ar64 (Fig. 48); NZSI LM1734 • 2 empty shells; same data as for preceding; Ar54 (Fig. 46); NZSI LM1735 • 2 empty shells; same data as for preceding; Ar20 (Fig. 47B–D [operculum]); NZSI

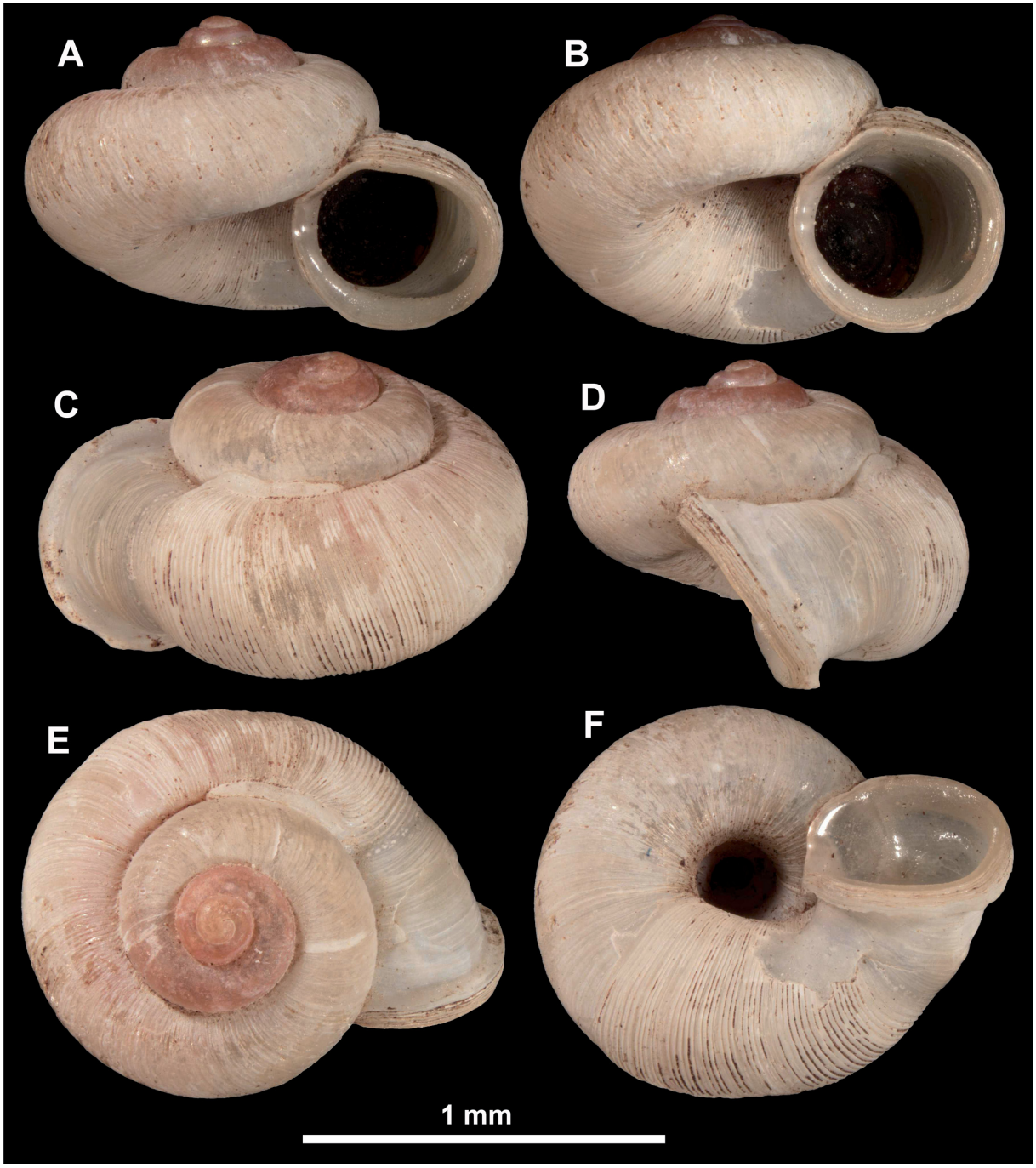

Fig. 46. *Dicharax glaber* (W.T. Blanford, 1865), Ar54 (NZSI LM1735). All photos: B. Páll-Gergely.

LM1736 • 1 empty shell (Fig. 45); same data as for preceding; Ar19; NZSI LM1737 • 1 empty shell; same data as for preceding; Ar65; NZSI LM1738 • 1 empty shell; same data as for preceding; Ar41 (Fig. 47A); ZSI LM1739 • 1 empty shell; same data as for preceding; Ar28; ZSI LM1905.

Fig. 47. *Dicharax glaber* (W.T. Blanford, 1865). **A**. Specimen Ar41 (ZSI LM1739), aperture. **B–D**. Specimen Ar20 (NZSI LM1736), operculum. All photos: B. Páll-Gergely.

Type localities

"Akyab, Arakan; the hills south of the harbour" (*A. glaber*); "Naraindhur, Cachar, No. 1665 B.M." [probably Narainpur Village, Rajabazar Tehsil, Cachar District: 24°30.4′ N, 92°52.2′ E] (*A. edei*); "Gaziphimi, Lahupa Naga Hills, Munipur" [probably Gaziphema, Naga Hills, Manipur: 25°30′ N, 94° 23.3′ E] (*A. levis*).

Differential diagnosis

There are few species of *Dicharax* of this size. For comparisons with other species, see under *D. magnus* and *D. ingrami*.

Additional information on the morphology

A cross sectional view of R2 was examined in a specimen (Fig. 48): anterior crust forms a significantly elevated rib, which has an anterior projection (i.e., the R2 ribs are curved towards the aperture); the anterior crust folds over the much weaker posterior crust; microtunnel narrow compared to the ribs, its cross sectional view subcircular.

A *D. glaber* shell from the Blue Mountain apparently has short chevrons on the inner surface of its aperture (Fig. 47A). The tendency towards a fringed aperture appears in several species (see other examples in Páll-Gergely *et al.* 2017, 2021).

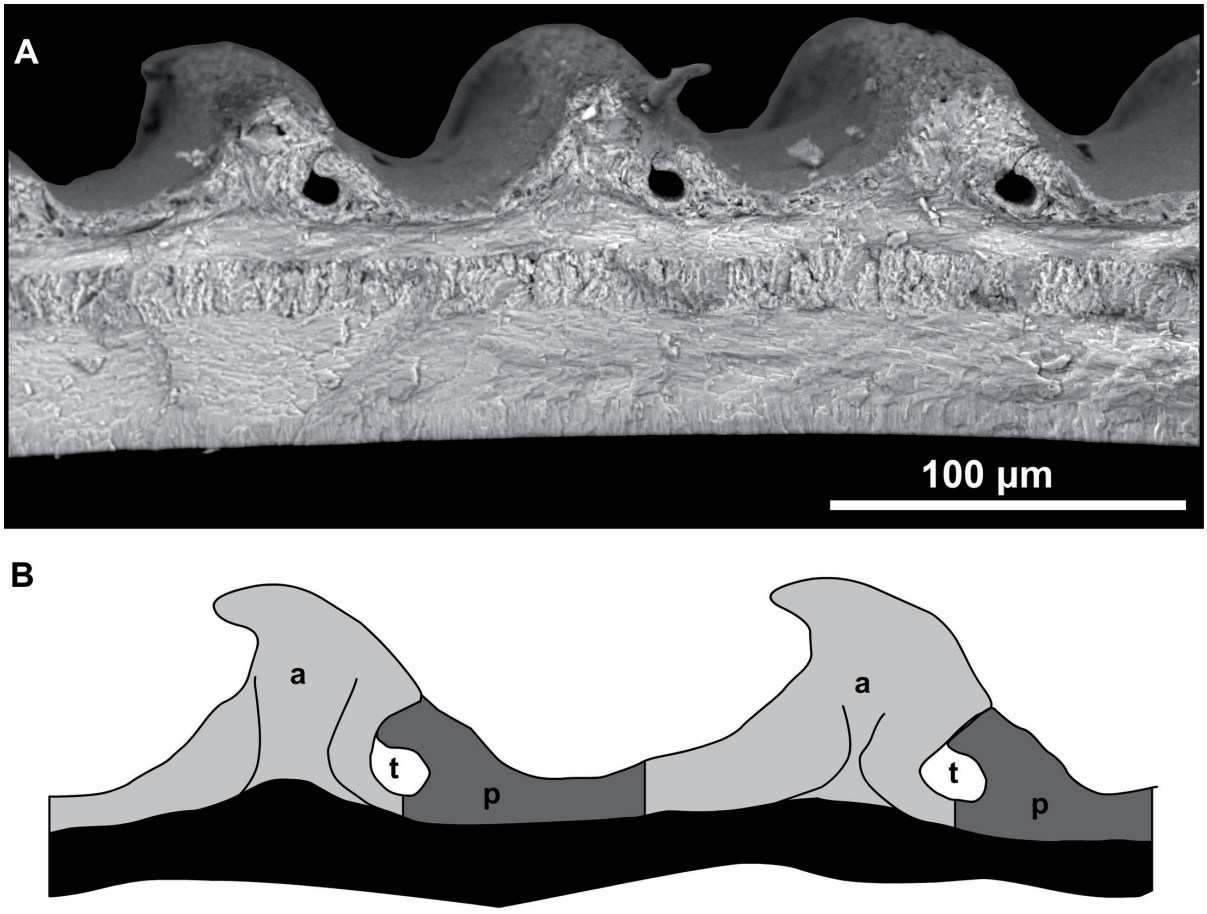

Fig. 48. *Dicharax glaber* (W.T. Blanford, 1865), Ar64 (NZSI LM1734). **A**. Cross sectional view. **B**. Schematic drawing of R2. All images: B. Páll-Gergely. Abbreviations: a = anterior crust; p = posterior crust; t = microtunnel.

Operculum (Fig. 47B–D): colour chocolate brown, outer surface multispiral, without elevated lamina, inner side with a strongly elevated, knob-like nipple.

Distribution

This species is known from northeastern Myanmar and the neighbouring Indian areas (Fig. 49).

Remarks

The type specimens of *A. glaber*, *A. edei* and *A. levis* are very similar, and the notable differences (i.e., the more rounded shape of *A. glaber* and the strongly reflected outer peristome of *A. edei*) are considered to be intraspecific variability. The shells from the Blue Mountain are identical to the type specimens of *A. edei* with the exception of the strongly reflected outer peristome (similar cases were reported for *D. notus* (Godwin-Austen, 1914), see Páll-Gergely *et al.* 2021: fig. 26).

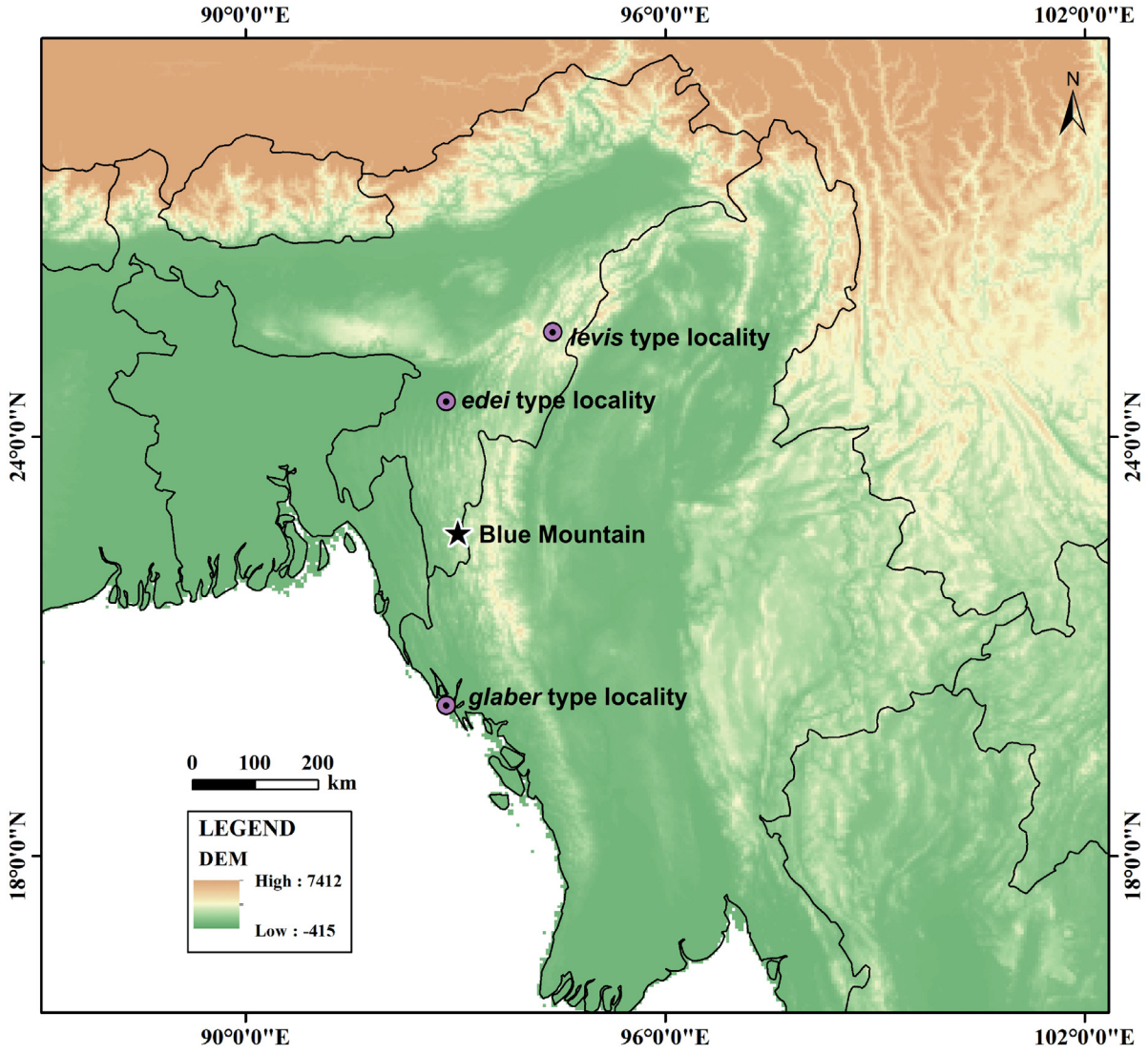

Fig. 49. Distribution of *Dicharax glaber* (W.T. Blanford, 1865).

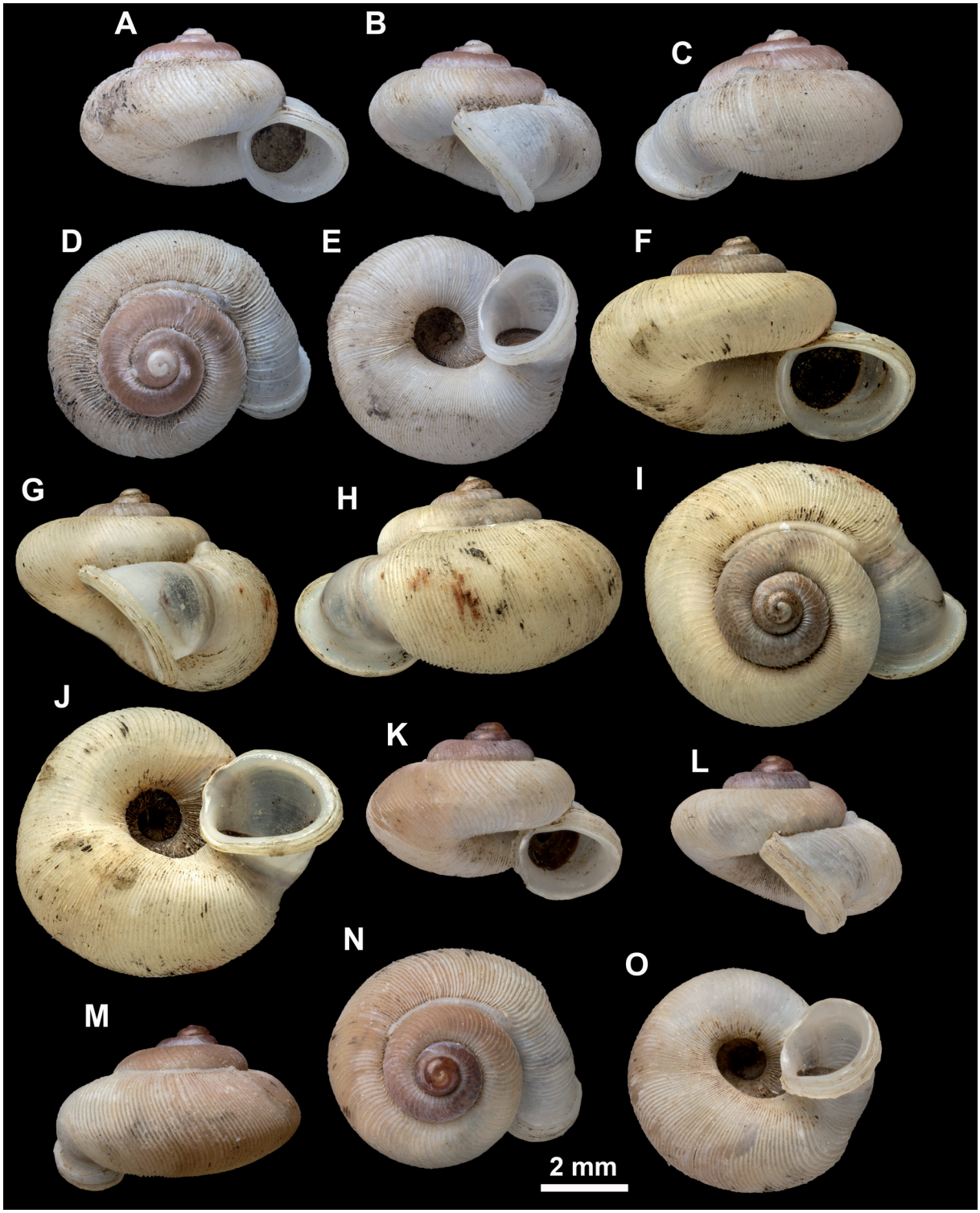

Fig. 50. Shells of *Dicharax ingrami* (W.T. Blanford, 1862). **A–E**. Probable syntype of *Alycaeus ingrami* from Tongoop, Arakan, coll. Blanford (NHMUK 1906.4.4.68). **F–J**. Syntype of *Alycaeus ingrami nagaensis* Godwin-Austen, 1871 (NHMUK 1903.7.1.2615). **K–O**. Syntype of *Alycaeus anonymus* Godwin-Austen, 1914 (NHMUK 1906.4.4.67.a). Photos: Kevin Webb (A–J) and Harold Taylor (K–O).

Dicharax ingrami (W.T. Blanford, 1862)
Fig. 50

Alycaeus ingrami W.T. Blanford, 1862: 135–136.
Alycaeus ingrami var. *nagaensis* Godwin-Austen, 1871: 92, pl. 5 fig. 2. **Syn. nov.**
Alycaeus anonymus Godwin-Austen, 1914: 405–406, pl. 139 figs 1, 1a. **Syn. nov.**

Alycaeus ingrami – Sowerby 1877: pl. 6, species 54. — Godwin-Austen 1886: 193–194, pl. 44 figs 1, 1a–c; 1914: 421.
Alycaeus nagaensis – Godwin-Austen 1884: pl. 51 figs 3, 7; 1886: 195, pl. 44 figs 3, 3a–c; 1914: 396–397, pl. 143 figs 2, 2a– b.
Alycaeus (*Chamalycaeus*) *ingrami* – Kobelt 1902: 357. — Gude 1921: 228–229.
Alycaeus (*Chamalycaeus*) *nagaensis* – Kobelt 1902: 359. — Gude 1921: 230.
Alycaeus anonymus – Gude 1921: 205.
Chamalycaeus (*Chamalycaeus*) *nagaensis* – Ramakrishna *et al.* 2010: 54.
Dicharax anonymus – Páll-Gergely *et al.* 2020: 53.
Dicharax (?) *ingrami* – Páll-Gergely *et al.* 2020: 90.
Dicharax (?) *nagaensis* – Páll-Gergely *et al.* 2020: 98.

Type material examined

MYANMAR • 7 shells, probable syntypes of *A. ingrami* (figured by Godwin-Austen 1886 and Fig. 50A–E); Tongoop, Arakan; Blanford coll.; NHMUK 1906.4.4.68 • 1 shell of *A. ingrami*; Arakan, "authentic", "type var.", 1944, No. 450; NHMUK • 2 syntypes of *A. anonymus* (Fig. 50K–O); Akouktoung, Pegu; NHMUK 1906.4.4.67a • 7 syntypes of *A. nagaensis* in 2 vials (Fig. 50F–J); Asalu, N. Cachar; NHMUK 1903.7.1.2615.

Type localities

"prope Tongoop in Arakan" (*A. ingrami*); "Akouk-toung, Pegu: Type; also Thoudaung and Yenandoung, Pegu" (*A. anonymus*); "Neighbourhood of Asálú, rather local in its distribution, but abundant" (*A. nagaensis*).

Differential diagnosis

Dicharax glaber has glossy initial whorls and R3, while those are regularly ribbed in *D. ingrami* (although the R3 is glossy in the type specimens of *A. nagaensis*). No other differences have been found between *D. glaber* and *D. ingrami*, and the difference regarding the R3 sculpture is rather minor, therefore, they may be considered synonyms. However, since we know of no specimens showing intermediate character states, we maintain both species as valid. See also under *D. magnus*.

Remarks

The type specimens of *A. anonymus* and *A. ingrami* are very similar, the only differences are that the former has a slightly keeled body whorl and a stronger sculpture. Nevertheless, these differences are considered intraspecific variability. Godwin-Austen (1914), when describing *A. anonymus*, did not compare it with any other species. The type specimens of *A. nagaensis* also do not differ from those of *A. anonymus* and *A. ingrami* except for their larger size, which is not sufficient for species level distinction. Therefore, both *A. nagaensis* and *A. anonymus* are junior synonyms of *D. ingrami*.

Dicharax magnus (Godwin-Austen, 1893)
Fig. 51A–E

Alycaeus magnus Godwin-Austen, 1893: 594.

Alycaeus (*Alycaeus*) *magnus* – Kobelt 1902: 346–347. — Ramakrishna *et al.* 2010: 49.
Alycaeus magnus – Godwin-Austen 1914: 395, pl. 138 figs 1, 1a. — Gude 1921: 210–211, fig. 33.
Dicharax (?) *magnus* – Páll-Gergely *et al.* 2020: 95.

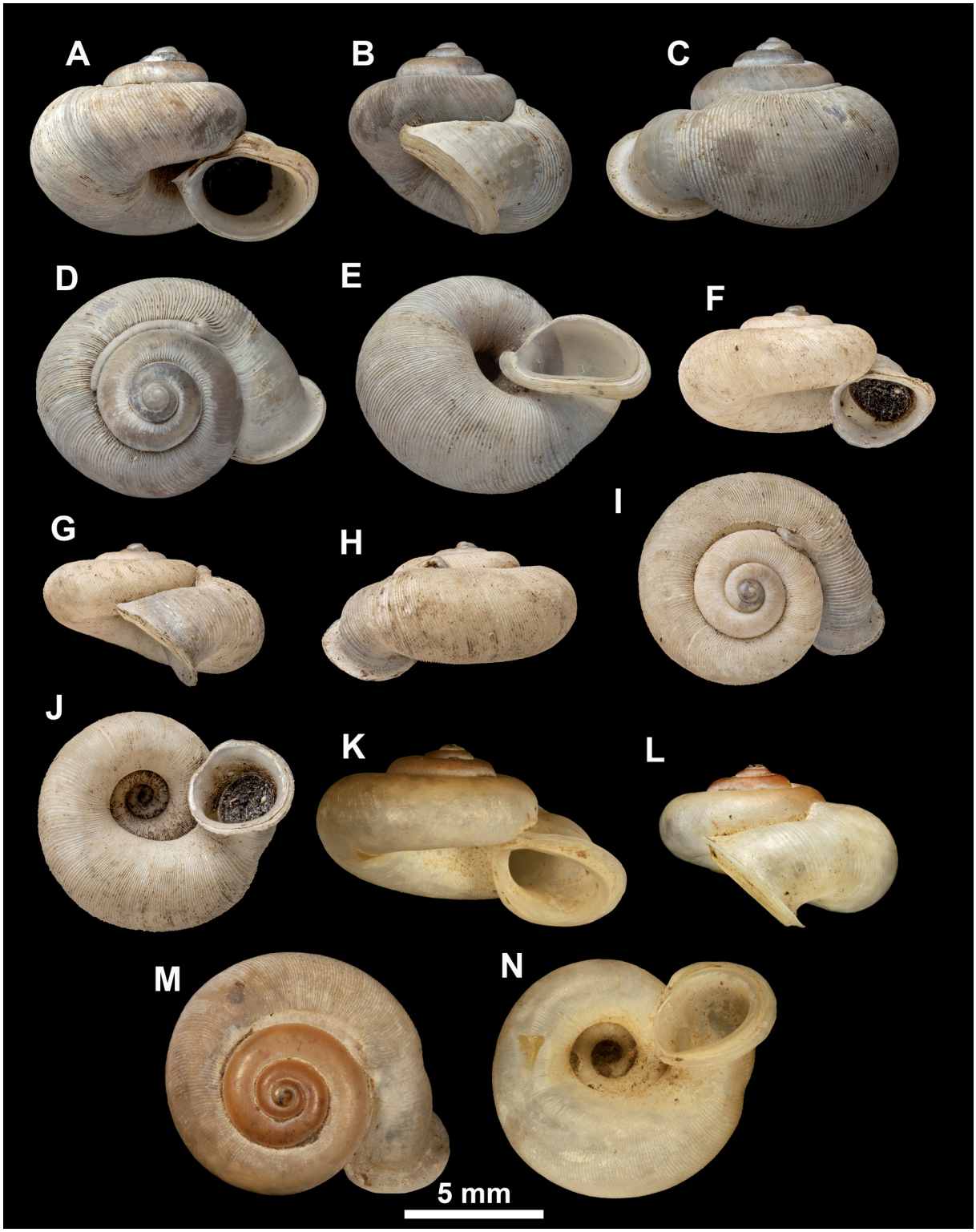

Fig. 51. Shells of species of *Dicharax* Kobelt & Möllendorff, 1900. **A–E**. *D. magnus* (Godwin-Austen, 1893), syntype (NHMUK 1903.7.1.1480). **F–J**. *D. umbonalis* (Benson, 1856), holotype of *Alycaeus sandowayensis (*NHMUK 1903.7.1.2558). **K–N**. *D. umbonalis*, syntype (UMZC I.103005.A). Photos: Kevin Webb (A–E) and Harold Taylor (F–N).

Type material examined

INDIA • 1 syntype (Fig. 51A–E); Naga Hills; Beddome fr.; NHMUK 1903.7.1.1480.

Type locality

"Naga Hills, 150 miles eastward of Kohima".

Differential diagnosis

This species is much larger than *D. glaber*, has ribbed initial whorls, and the outer peristome partly covers the umbilicus. The same is true when comparing *A. magnus* with *D. ingrami*, but both species have ribbed initial whorls.

Dicharax umbonalis (Benson, 1856)
Fig. 51F–N

Alycaeus umbonalis Benson, 1856: 225–226.
Alycaeus sandowayensis Godwin-Austen, 1914: 423–424, pl. 139 figs 4, 4a. **Syn. nov.**

Alycaeus umbonalis – Sowerby 1877: pl. 4, species 36. — Godwin-Austen 1886: 194–195, pl. 44 figs 2, 2a–c; 1914: 413, 424.
Alycaeus (*Chamalycaeus*) *umbonalis* – Kobelt 1902: 364. — Gude 1921: 235–236.
Alycaeus (*Chamalycaeus*) *sandowayensis* – Gude 1921: 232.
Dicharax (?) *sandowayensis* – Páll-Gergely *et al.* 2020: 103.
Dicharax (?) *umbonalis* – Páll-Gergely *et al.* 2020: 106.

Diagnosis

This species differs from all other congeners of this species group by the wide umbilicus and less inflated R2.

Type material examined

MYANMAR • holotype of *A. sandowayensis* (single shell mentioned in the original description: Fig. 51F–J); Mai-i, Sandoway Dist., Arakan; Stoliczka leg.; NHMUK 1903.7.1.2558 • 3 syntypes of *A. umbonalis* (Fig. 51K–N); Burmah; UMZC I.103005.

Additional material examined

MYANMAR • 5 shells of *A. umbonalis*; Akoutong, Burma; Blanford coll.; NHMUK.

Type localities

"ad Akaouktong, prope ripas fluvii Irawadi" (*A. umbonalis*); "Mai-i, Sandoway District, Arakan" (*A. sandowayensis*).

Remarks

The holotype of *A. sandowayensis* is a smaller shell than typical *A. umbonalis*, but since all shell characters are identical, we treat it as a synonym of the latter species. In the original description of *A. sandowayensis*, Godwin-Austen (1914) did not compare it with any other species.

Dicharax species group 7

Remarks

This species group is characterized by a strongly swollen R3, which has its more elevated posterior end ("tip") close to the constriction between R2 and R3.

Dicharax chennelli (Godwin-Austen, 1886)
Fig. 52A–E

Alycaeus chennelli Godwin-Austen, 1886: 192–193, pl. 48 fig. 2.

Alycaeus chennelli – Godwin-Austen 1914: 387.
Alycaeus chennelli var. – Godwin-Austen 1914: 387.
Alycaeus (*Dicharax*) *chennelli* – Kobelt 1902: 366. — Gude 1921: 240–241.
Chamalycaeus (*Dicharax*) *chennelli* – Ramakrishna *et al.* 2010: 57.
Dicharax chennelli – Páll-Gergely *et al.* 2020: 55.

Type material examined

INDIA • 8 syntypes (Fig. 52A–E); Piknui, Naga Hills; A. Chennell leg.; NHMUK 1903.7.1.2612 • 10 shells of "*chennelli* var."; Lhota Naga Hills; A. Chennell leg.; NHMUK 1903.7.1.2613.

Type localities

"Piknúi, Naga Hills"; "Lhota Naga Hills" (*chennelli* var.).

Differential diagnosis

The only stable character which distinguishes *D. chennelli* from *D. diagonius* is the presence of a lower apertural incision in the former, whilst it is absent in the latter.

Dicharax damsangensis (Godwin-Austen, 1886)
Fig. 53A–E

Alycaeus damsangensis Godwin-Austen, 1886: 192, pl. 43 figs 3, 3a–c.

Alycaeus (*Dicharax*) *damsangensis* – Kobelt 1902: 368. — Gude 1921: 246–247.
Alycaeus (*Charax*) *damsangensis* – Godwin-Austen 1914: 339.
Dicharax damsangensis – Páll-Gergely *et al.* 2020: 55. — Gittenberger *et al*. 2024: 207, figs 27–29. (probably not this species).

Type material examined

BHUTAN • 12 syntypes (Fig. 53A–E); Damsang, W. Bhutan; Robert leg.; NHMUK 1903.7.1.2677.

Type locality

"Damsang Peak, Western Bhutan Hills".

Differential diagnosis

The most similar species is *D. notatus*, which has a more inflated R3 and denser R1 ribs. *Dicharax nowgongensis* (Godwin-Austen, 1914) is also similar, but its basal lip is rounded.

Remarks

The specimens figured by Gittenberger *et al*. (2024) from Bhutan differ from the type specimens in the denser R1 ribbing and the ribbed R3 (vs smooth in *D. damsangensis*). Therefore, they likely represent an undescribed species.

Dicharax diagonius (Godwin-Austen, 1871)
Fig. 52F–J

Alycaeus diagonius Godwin-Austen, 1871: 88–89, pl. 3 fig. 2.

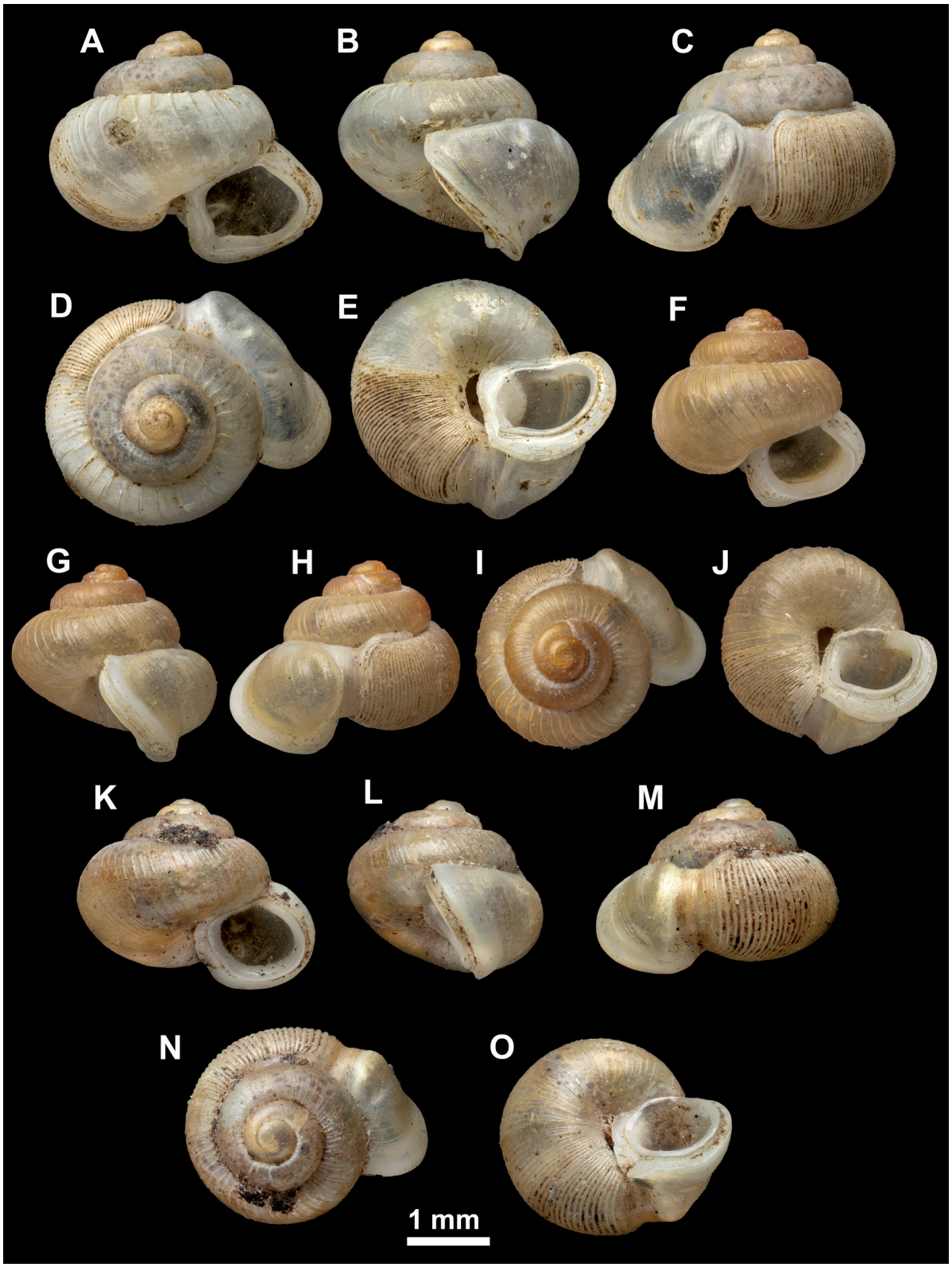

Fig. 52. Shells of species of *Dicharax* Kobelt & Möllendorff, 1900. **A–E**. *D. chennelli* (Godwin-Austen, 1886), syntype (NHMUK 1903.7.1.2612). **F–J**. *D. diagonius* (Godwin-Austen, 1871), syntype (NHMUK 1903.7.1.2678). **K–O**. *D. subculmen* (Godwin-Austen, 1893), syntype (NHMUK, 1903.7.1.2687). All photos: Kevin Webb.

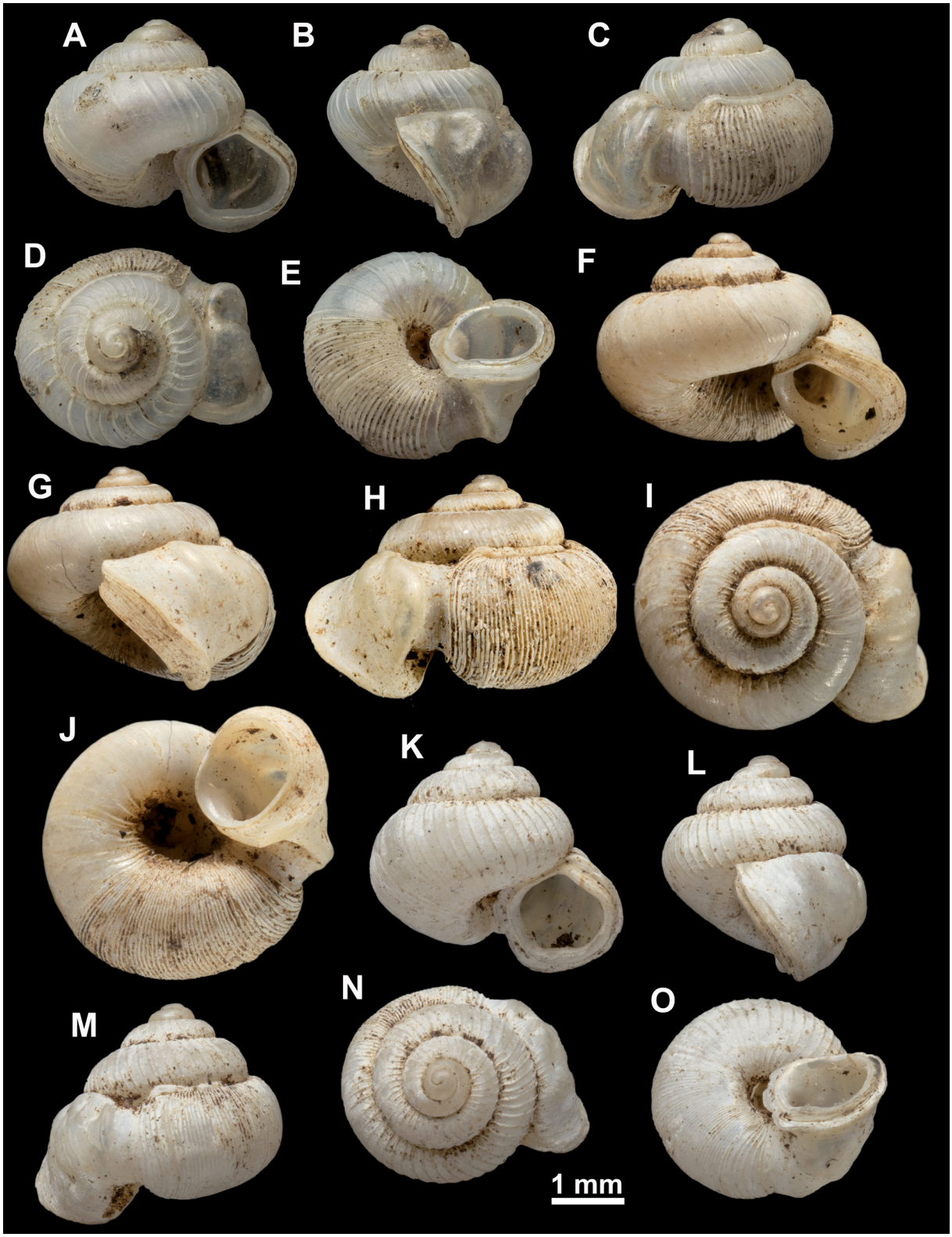

Fig. 53. Shells of species of *Dicharax* Kobelt & Möllendorff, 1900. **A–E**. *D. damsangensis* (Godwin-Austen, 1886), syntype (NHMUK 1903.7.1.2677). **F–J**. *D. hebes* (Benson, 1857), neotype (designated by Preece *et al.* 2022 (NHMUK 1888.12.4.909). **K–O**. *D. notatus* (Godwin-Austen, 1876), syntype (NHMUK 1903.7.1.2672). All photos: Kevin Webb.

Alycaeus diagonus [sic] – Sowerby 1877: pl. 1, species 2.
Alycaeus (*Dicharax*) *diagonius* – Kobelt 1902: 368–369. — Gude 1921: 247–248.
Alycaeus diagonius – Godwin-Austen 1914: 389–390, pl. 143 figs 5, 5a–b.
Chamalycaeus (*Dicharax*) *diagonius* – Ramakrishna *et al.* 2010: 58.
Dicharax damsangensis – Páll-Gergely *et al.* 2020: 59.

Type material examined

INDIA • 10 syntypes (Fig. 52F–J); Diyung Valley, N of Asalu, N. Cachar; Godwin-Austen coll.; NHMUK 1903.7.1.2678.

Type locality

"The Diyung valley, north of Asálú, in Cachar District".

Differential diagnosis

This species has a longer and more pointed R3 swelling and more widely-spaced R1 than *Dicharax subculmen* (Godwin-Austen, 1893). See also under *D. chennelli* and *D. habiangensis* (Godwin-Austen, 1914).

Dicharax habiangensis (Godwin-Austen, 1914)
Fig. 54

Alycaeus habiangensis Godwin-Austen, 1914: 374, pl. 138 figs 2, 2a–b.
Alycaeus generosus Godwin-Austen, 1914: 374, pl. 138 figs 8, 8a–b. **Syn. nov.**

Alycaeus (*Dicharax*) *habiangensis* – Gude 1921: 254.
Alycaeus (*Cycloryx*) *generosus* – Gude 1921: 279.
Chamalycaeus (*Dicharax*) *habiangensis* – Ramakrishna *et al.* 2010: 61.
Cycloryx generosus – Ramakrishna *et al.* 2010: 71.
Dicharax generosus – Páll-Gergely *et al.* 2020: 63.
Dicharax habiangensis – Páll-Gergely *et al.* 2020: 63.

Type material examined

INDIA • holotype (single shell mentioned in the original description: Fig. 54A–E) of *A. habiangensis*; Habiang Garo, W. Khasi; Godwin-Austen leg.; NHMUK 1903.7.1.2649 • 2 syntypes of *A. generosus* (Fig. 54F–J); Khasi Hills, Godwin-Austen coll.; NHMUK 1903.7.1.2566.

Type localities

"Habiang Garo, on the West Khasi border" (*A. habiangensis*); "Khasi Hills" (*A. generosus*).

Differential diagnosis

Both *D. subculmen* and *D. diagonius* have a longer R2, a ribbed R1, and a less bulging R3. See also under *D. nitidus*.

Remarks

The only difference between the two syntypes of *A. generosus* and the single, subadult syntype of *A. habiangensis* is the very slightly shallower R3 dent of the latter, suggesting that they represent the same species. The original description of *A. habiangensis* immediately followed that of *A. generosus*, and in the face of the nearly identical shells, they were not compared with each other; except for the umbilical view, they were not illustrated from the same views. We selected *A. habiangensis* to be the accepted name because it is known from a more precise locality than *A. generosus*.

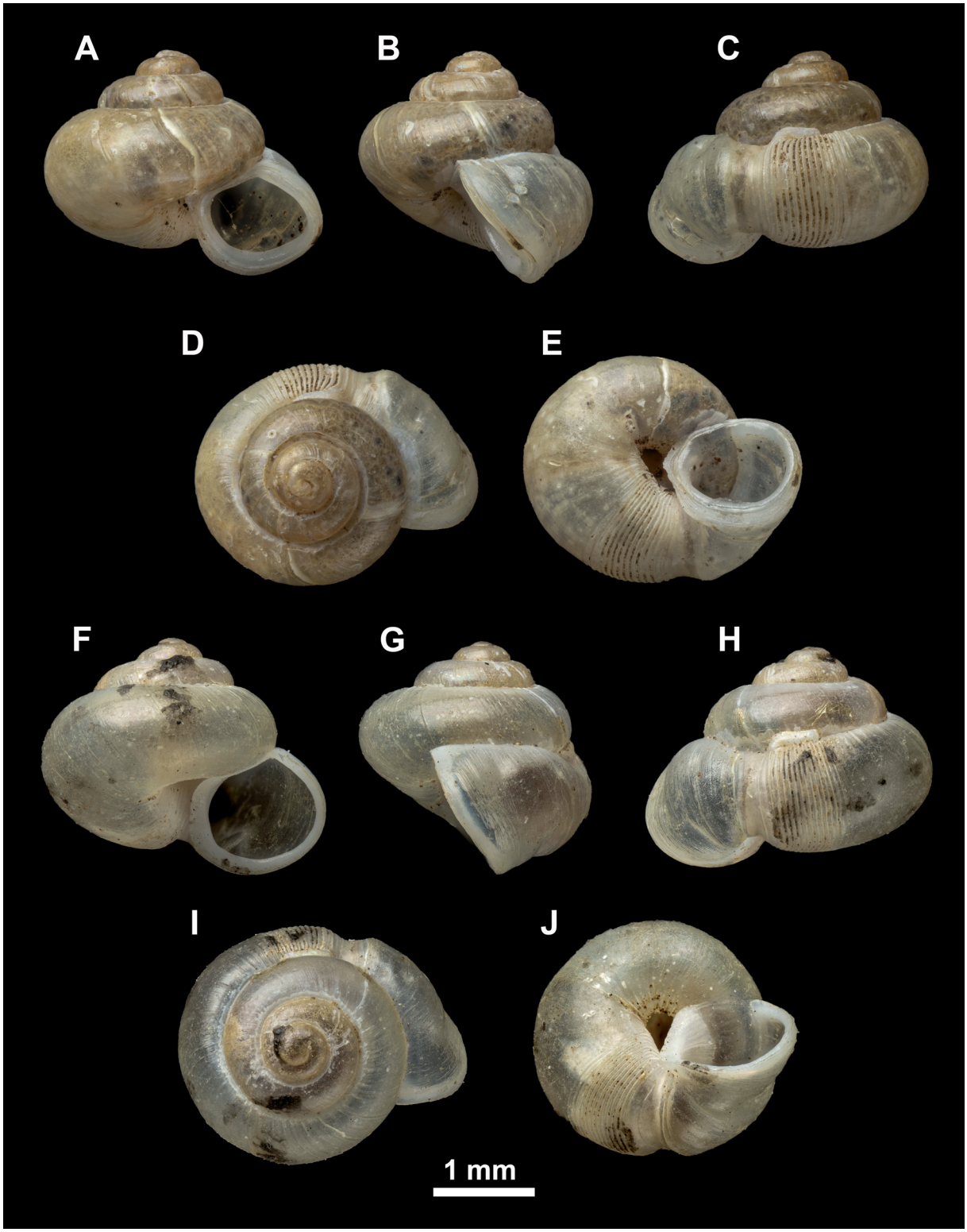

Fig. 54. Shells of *Dicharax habiangensis* (Godwin-Austen, 1914). **A–E**. Syntype of *Alycaeus habiangensis (*NHMUK 1903.7.1.2649). **F–J**. Syntype of *A. generosus* Godwin-Austen, 1914 (NHMUK 1903.7.1.2566). All photos: Kevin Webb.

Dicharax hebes (Benson, 1857)
Fig. 53F–J

Alycaeus hebes Benson, 1857: 204–205.

Alycaeus hebes – Sowerby 1877: pl. 6, species 52. — Godwin-Austen 1886: 191, pl. 43 figs 1, 1a–c; 1914: 374–375, pl. 145 figs 5, 5a–b.
Alycaeus (*Dicharax*) *hebes* – Kobelt 1902: 371. — Gude 1921: 255.
Chamalycaeus (*Dicharax*) *hebes* – Ramakrishna *et al.* 2010: 61.
Dicharax hebes – Páll-Gergely *et al.* 2017: 10, fig. 5; 2020: 64, fig. 13a; 2024, fig. 12d. — Preece *et al.* 2022: 80, fig. 31c–d.

Diagnosis

The relatively large shell, the nearly smooth R1, the formation of the R3 swelling and the rounded aperture distinguishes this species from its congeners.

Type material examined

INDIA • neotype (designated by Preece *et al.* 2022: Fig. 53F–J); Teria Ghat is in the Khasi Hills; Theobald leg.; NHMUK 1888.12.4.909.

Additional material examined

INDIA • 3 shells; Khasi Berge; Möllendorff coll.; SMF 109244 • 1 shell; Nongphrian, Khasi Hills; Dr Alfred Oberwimmer coll.; NHMW (mixed sample with *D. theobaldi*) • 1 shell; same data as for preceding; NHMW 14715 (mixed sample with *D. theobaldi*).

Type locality

“ad Teria Ghát”.

Dicharax nitidus (W.T. Blanford, 1862)
Fig. 55

Alycaeus nitidus W.T. Blanford, 1862: 141.
Alycaeus kurzianus Theobald & Stoliczka, 1872: 330, pl. 11 fig. 2. **Syn. nov.**

Alycaeus kurzianus – Sowerby 1877: pl. 3, species 22. — Godwin-Austen 1914: 409–410, pl. 151 figs 7, 7a.
Alycaeus nitidus – Sowerby 1877: pl. 3, species 25. — Godwin-Austen 1914: 421–422, pl. 151 figs 4, 4a.
Alycaeus (*Chamalycaeus*) *nitidus* – Kobelt 1902: 360. — Gude 1921: 230–231.
Alycaeus (*Dicharax*) *kurzianus* – Kobelt 1902: 373. — Gude 1921: 258–259.
Chamalycaeus (*Chamalycaeus*) *nitidus* – Ramakrishna *et al.* 2010: 54.
Dicharax nitidus – Páll-Gergely *et al.* 2020: 68.
Dicharax (?) *kurzianus* – Páll-Gergely *et al.* 2020: 90, fig. 91.

Type material examined

MYANMAR • 3 possible syntypes of *A. nitidus* (Fig. 55A–E); Manya Khyoung, Arakan; Blanford coll.; NHMUK 1906.4.4.54 • 3 probable syntypes of *A. kurzianus* (labelled as “*kurtzianus*”; the locality does not match with the original description, but the specimens are identical to the figured one) (Fig. 55F–J); Nr. Prome, Pegu; F. Stoliczka leg.; NHMUK 1903.7.1.2700 • 1 syntype of *A. kurzianus*; Nattoung, Prome; W. Theobald coll.; NZSI M.24974 • 6 syntypes of *A. kurzianus*; same data as for preceding; NZSI M.25021.

Type localities

"prope Tongoop in Arakan" (*A. nitidus*); "Nattoung in provincia Barmana, Prome dicta" (*A. kurzianus*).

Differential diagnosis

The most similar species due to the tiny, glossy shell and the short R2 is *D. habiangensis*, which has a larger R3 swelling and a basally rounded aperture. See also under *D. semivivus* sp. nov.

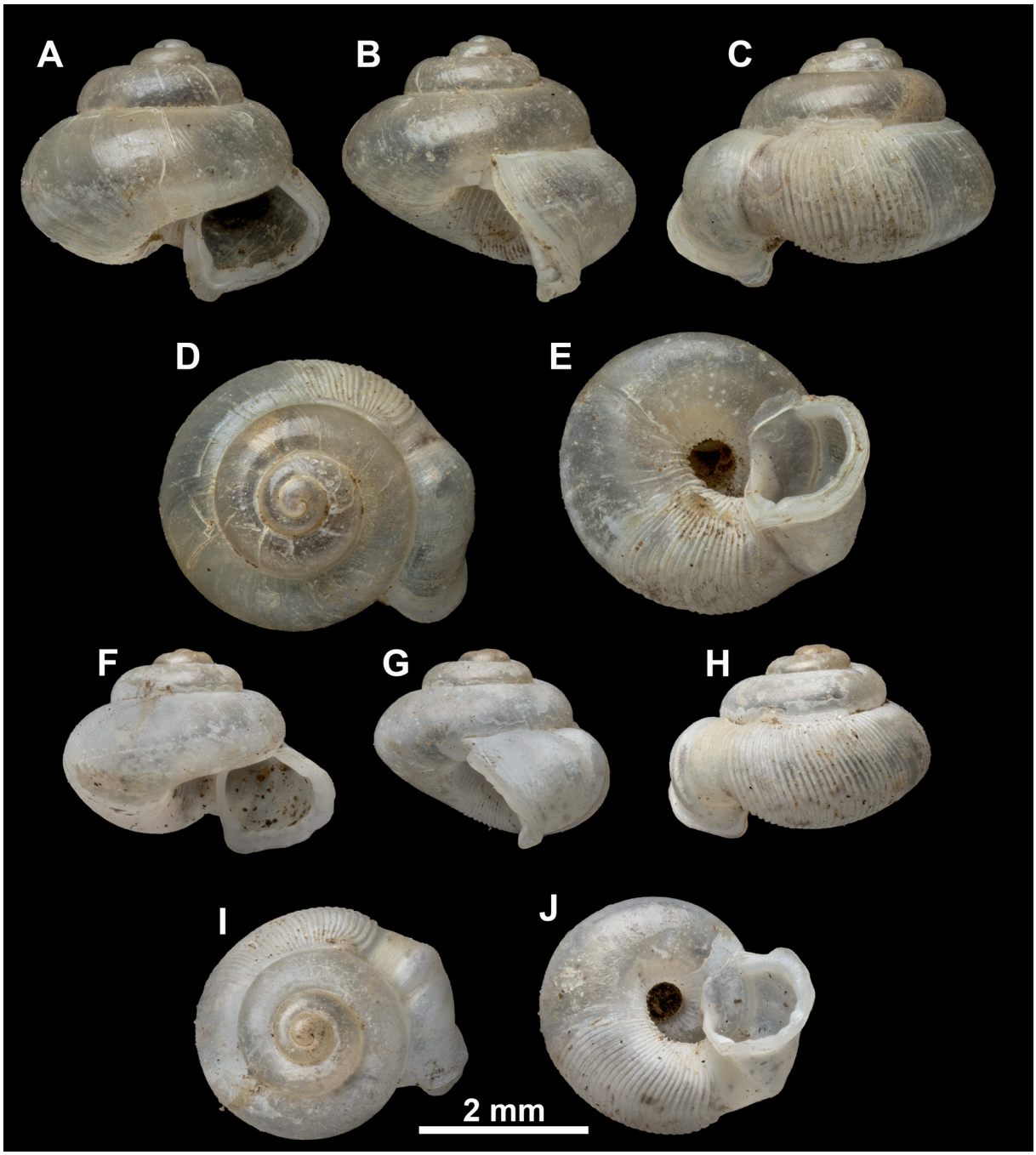

Fig. 55. *Dicharax nitidus* (W.T. Blanford, 1862). **A–E**. Syntype of *Alycaeus nitidus* (NHMUK 1906.4.4.54). **F–J**. Possible syntype of *A. kurzianus* Theobald & Stoliczka, 1872 (NHMUK 1903.7.1.2700). All photos: Harold Taylor.

Remarks

Dicharax nitidus and *D. kurzianus* agree in all important traits (shell and aperture shape, shell size, length of shell regions, sculpture), and no notable difference was found between them. Therefore, *D. kurzianus* is a junior synonym of *D. nitidus*. The two species were not compared in the original description of *D. kurzianus*.

Dicharax nitidus was described from Tongoop (Taungup Pass at 18°40.1′ N, 94°44.5′ E), whereas *D. kurzianus* from Nattoung, which could not be located on the map. According to the additional information about Nattung, it is in "Mendon District, Pegu", and close to Prome (= Pyay). A mountain with the name "Nattaung" is located at 18°48.6′ N, 97°2.2′ E, ca 190 km east from Pyay, therefore it is probably not the same as Nattung. Nevertheless, the Taungup Pass and Pyay are situated geographically close to each other.

Dicharax notatus (Godwin-Austen, 1876)
Fig. 53K–O

Alycaeus notatus Godwin-Austen, 1876: 176, pl. 7 figs 9, 9a, b.

Alycaeus notatus – Godwin-Austen 1886: 191–192, pl. 43 figs 2, 2a–c; 1914: 358–359, pl. 145 figs 8, 8a.
Alycaeus (*Dicharax*) *notatus* – Kobelt 1902: 374. — Gude 1921: 262.
Chamalycaeus (*Dicharax*) *notatus* – Ramakrishna *et al.* 2010: 64.
Dicharax notatus – Páll-Gergely *et al.* 2020: 68.

Diagnosis

The elevated spire, relatively dense R1 ribs and the strongly inflated R3 swelling distinguishes this species from its congeners. See under *D. damsangensis*.

Type material examined

INDIA • 4 syntypes (Fig. 53K–O); Toruputu Peak, Dafla Hills; elev. 3000 ft; NHMUK 1903.7.1.2672 • 2 syntypes; Dafla Hills; Godwin-Austen coll.; NHMUK 1903.7.1.2544. Both samples are in the same box but in different vials.

Type locality

"On the slopes of Torúpútú Peak at 3000 feet".

Dicharax nowgongensis (Godwin-Austen, 1914)
Fig. 56

Alycaeus nowgongensis Godwin-Austen, 1914: 397, pl. 137, figs 4, 4a–b.

Alycaeus nowgongensis – Gude 1921: 213.
Alycaeus (*Alycaeus*) *nowgongensis* – Ramakrishna *et al.* 2010: 49.
Dicharax nowgongensis – Páll-Gergely *et al.* 2020: 69.

Type material examined

INDIA • holotype (single shell mentioned in the original description: Fig. 56A–G); Koliaghur nr Tezpur, Assam; NHMUK 1903.7.1.2682.

Type locality

"Koliaghur or Koliahur, Nowgoug District, Assam".

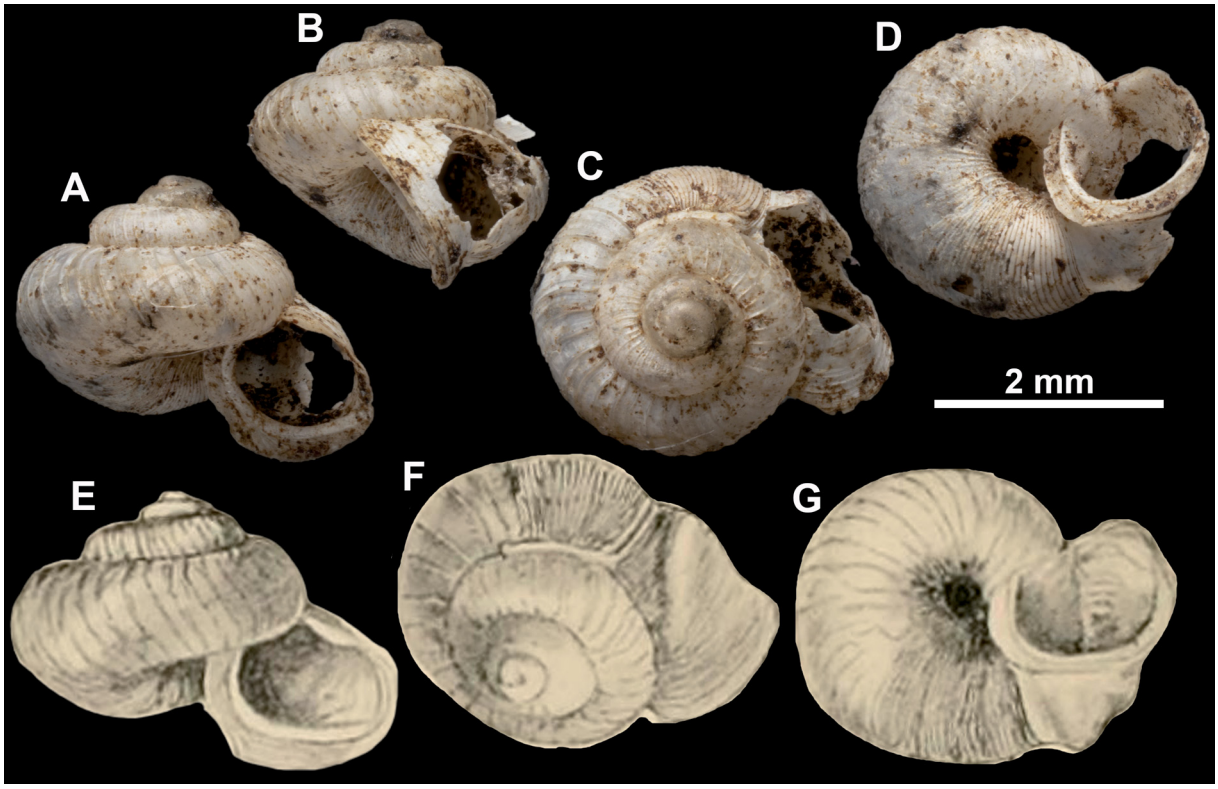

Fig. 56. *Dicharax nowgongensis* (Godwin-Austen, 1914). **A–D**. Holotype (NHMUK 1903.7.1.2682). **E–G**. Drawings from the original description. Photos: Harold Taylor (A–D).

Differential diagnosis

Similar to *D. chennelli*, *D. damsangensis*, *D. diagonius* and *D. vitreus*, which have similar R1 sculptures. Unfortunately, the holotype specimen is broken at its R3, making it difficult to examine some key characters. Nevertheless, *D. nowgongensis* has a rounded aperture and a relatively low-spired shell, which differs from most congeners of the same species group.

Dicharax praeda Páll-Gergely & Aravind sp. nov.
urn:lsid:zoobank.org:act:B752AA96-1639-4C84-8102-4798657CCCD9
Figs 12B–C, 57

Diagnosis

A small species of *Dicharax* with glossy R1 and R3, a combined length of R2+R3 reaching nearly half a whorl, and a strongly inflated R3 bearing a single dent near the suture on the upper part of the R3 swelling.

Etymology

The specific epithet '*praeda*' (Latin for 'prey') refers to the dent on R3 resembling a bite trace. To be used as a noun in apposition.

Type material examined

Holotype

INDIA – **Mizoram** • empty shell (D: 3 mm, H: 2.4 mm, Figs 12B–C, 57); Blue Mountain, Lawngtlai district; 22.727° N, 93.135° E; 1400 m a.s.l.; 27 Jan. 2019; N.A. Aravind leg.; Ar67; NZSI LM1740.

Paratype

INDIA – **Mizoram** • 1 empty shell; Blue Mountain, Lawngtlai district; 22.727° N, 93.135° E; 1400 m a.s.l.; 27 Jan. 2019; N.A. Aravind leg.; Ar67; NZSI LM1741.

Description

Shell small, yellowish, glossy, semitranslucent; shell outline rather rounded in dorsal view except for the conspicuously inflated R3; spire elevated, conical; body whorl rounded; protoconch low, glossy,

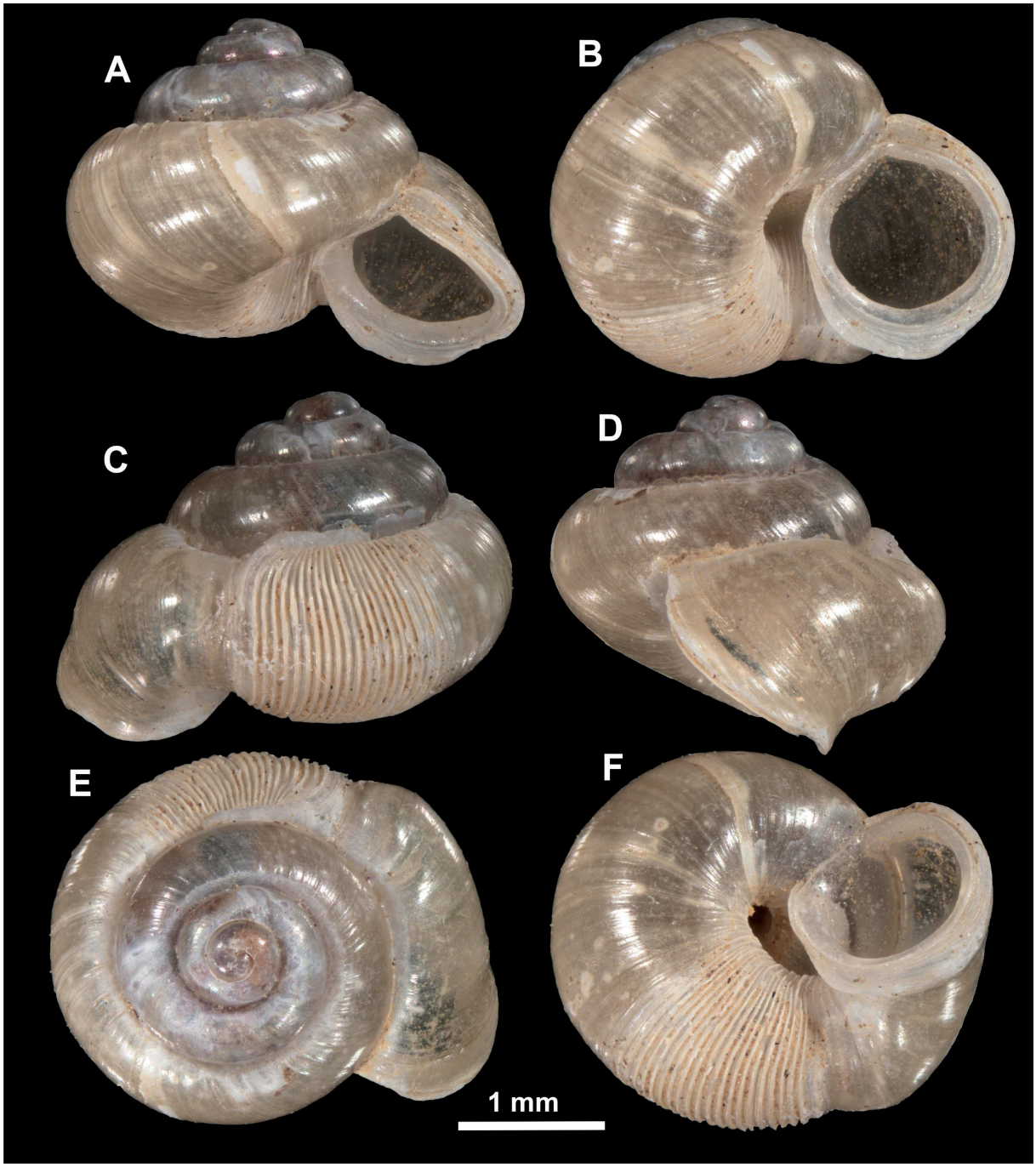

Fig. 57. *Dicharax praeda* Páll-Gergely & Aravind sp. nov., holotype (NZSI LM1740). All photos: B. Páll-Gergely.

consisting of ca 1.5 whorls; R1 of 1.75–2 whorls, glossy, smooth, with some inconspicuous, widely-spaced, incomplete (i.e., present only near the suture) ribs on the last ca 0.75 whorl of R1; spiral striation absent; boundary between R1 and R2 conspicuous due to the sudden change to a regularly ribbed surface; R2 with ca 22–26 straight, sharp, lamella-like ribs; R2 ribs slightly curved towards aperture, the spaces between the ribs are wider than the width of a single rib; R2+R3 nearly half whorl; R3 slightly longer than R2; boundary between R2 and R3 clearly visible due to a deep constriction; entire R3 strongly swollen, forming a blunt tip towards constriction; a shallow, inconspicuous, elongated dent is situated near the upper end of the swelling, nearly touching the suture; aperture strongly oblique to shell axis, rounded with a slight upper (parieto-palatal) incision; boundary between inner and outer peristomes conspicuous; inner peristome slightly thickened and protruding; outer peristome more conspicuous, moderately sharp, strongly expanded, especially on the upper palatal and basal side; umbilicus very narrow, slit-like.

Measurements. D: 2.9–3 mm, H: 2.4 mm.

Distribution

Known only from the Blue Mountain region.

Differential diagnosis

The most similar species is *Dicharax diagonius*, which has complete R1 ribs on the entire region (absent on the first 1.5 whorl, and on the last ca 1 whorl present only near the suture in the new species), more curved R2 ribs, and a more pointed tip of the R3 swelling.

Dicharax chennelli differs from the new species in the following characteristics: the ribs near the suture of R1 are stronger in *D. chennelli*, and the R2 ribs are more curved towards the aperture, forming an almost continuous flat area, while the R2 ribs of the new species are rather straight, and therefore they do not form a flat surface. The dorsal side of the R3 swelling of *D. chennelli* bears two dents, one situated on the upper part, and the lower at its middle, both being the same distance from the suture. In contrast, the upper dent nearly touches the suture in the new species, and the lower dent is not visible. Furthermore, the tip of the swelling (i.e., the part situated closest to the constriction) is sharper in *D. chennelli*, and blunter in the new species. Lastly, *D. chennelli* has a basal incision, while the aperture of the new species is perfectly rounded.

Dicharax habiangensis has a shorter R2 and R3, the R2 ribs are more curved, the dent on the R3 is situated at some distance from the suture (touching the suture in the new species), and the entire R3 is separated from the penultimate whorl by the deeper suture.

Dicharax subculmen has a lower spire, denser ribbing on R1, and a deeper dent on the R3 swelling. *Dicharax nowgongensis* has stronger and more complete R1 ribs, but the R3 of the holotype of that species was broken.

Dicharax subculmen (Godwin-Austen, 1893)
Fig. 52K–O

Alycaeus subculmen Godwin-Austen, 1893: 593.

Alycaeus subculmen – Godwin-Austen 1897: 4, pl. 63 figs 4, 4a; 1914: 398.
Alycaeus (*Dicharax*) *subculmen* – Kobelt 1902: 377. — Gude 1921: 270–271.
Chamalycaeus (*Dicharax*) *subculmen* – Ramakrishna *et al.* 2010: 67.
Dicharax (?) *subculmen* – Páll-Gergely *et al.* 2020: 105.

Diagnosis

The small shell, the rather weak R1 ribs, and the relatively less swollen R3 swelling distinguish this species from its congeners. See also under *D. habiangensis* and *Dicharax praeda* sp. nov.

Type material examined

INDIA • 3 syntypes (Fig. 52K–O); Naga Hills; Doherty leg.; NHMUK 1903.7.1.2687.

Type locality

"Naga Hills".

Dicharax vitreus Gittenberger & Kezang Tobgay, 2024
Fig. 58

Dicharax vitreus Gittenberger & Kezang Tobgay in Gittenberger *et al.*, 2024: 205, figs 25–27.

Type locality

"Dagana Dzongkhag: [302] Lhamoizingkha, Pubji near Quarry, ca 250 m a.s.l., 26º45'N 89º48'E" (Bhutan).

Differential diagnosis

Similar to *D. chennelli* and *D. diagonius*, but the R2 ribs are seemingly more widely-spaced (although the photos in the original description of *D. vitreus* are of low quality). Moreover, *D. vitreus* lacks the basal incision in the aperture, which is present in *D. chennelli*.

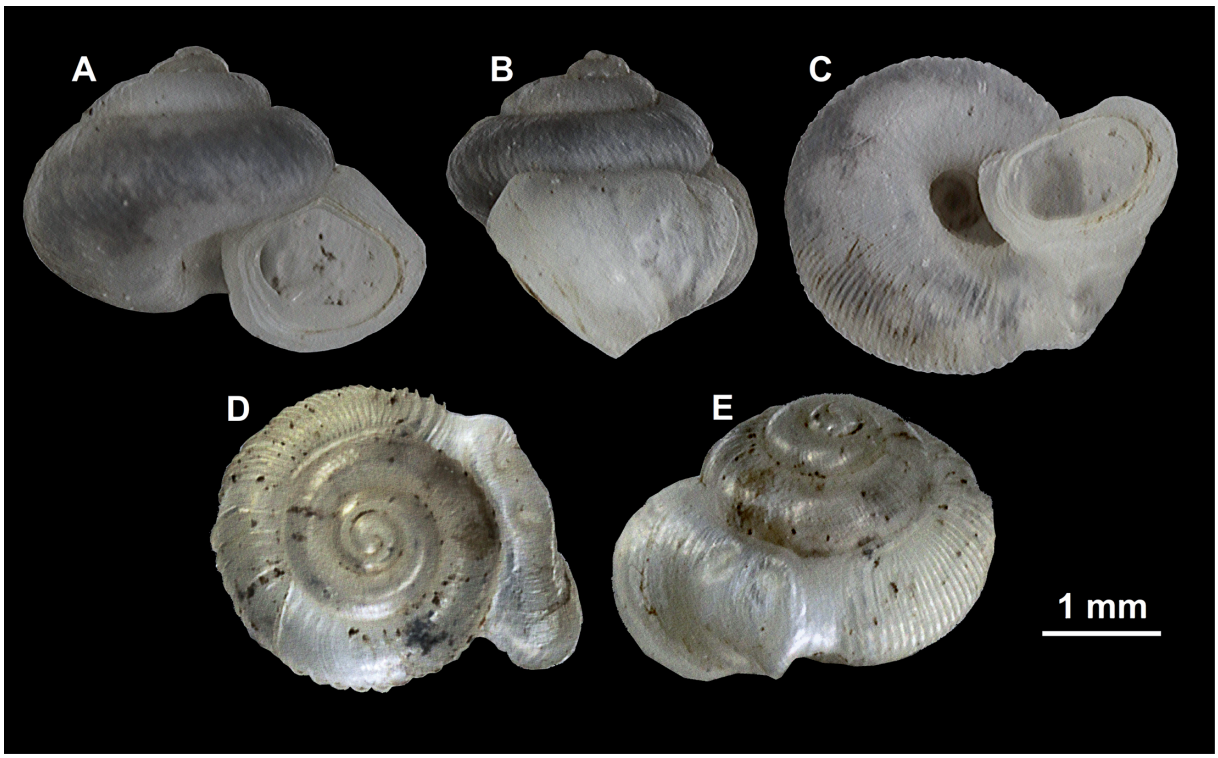

Fig. 58. *Dicharax vitreus* Gittenberger & Kezang Tobgay, 2024. **A–C**. Holotype (NBCB 1483). **D–E**. Paratype (NBCB 1620). All photos from Gittenberger *et al.* (2024).

Dicharax species group 8

Diagnosis

This species group is characterized by mostly small (smaller than 3 mm), mostly glossy species. The aperture is not fringed or slightly fringed.

Dicharax akhaensis (Godwin-Austen, 1914)
Fig. 59

Alycaeus akhaensis Godwin-Austen, 1914: 352, pl. 141 figs 1, 1a–b.
Alycaeus burroiensis Godwin-Austen, 1914: 354, pl. 141 figs 6, 6a. **Syn. nov.**
Alycaeus gemma Godwin-Austen, 1914: 355–356, pl. 149 figs 6, 6a. **Syn. nov.**

Alycaeus (*Dicharax*) *gemma* – Gude 1921: 252.
Alycaeus (*Cycloryx*) *burroiensis* – Gude 1921: 277.
Alycaeus (*Raptomphalus*) *akhaensis* – Gude 1921: 286.
Chamalycaeus (*Dicharax*) *gemma* – Ramakrishna *et al.* 2010: 60.
Chamalycaeus (*Raptomphalus*) *akhaensis* – Ramakrishna *et al.* 2010: 68.
Dicharax (?) *akhaensis* – Páll-Gergely *et al.* 2020: 76.
Dicharax (?) *burroiensis* – Páll-Gergely *et al.* 2020: 80.
Dicharax (?) *gemma* – Páll-Gergely *et al.* 2020: 88.

Diagnosis

This species is characterized by strong, widely-spaced R1 ribs, a short R2+R3, a smooth R2, two low R3 swellings and a slightly fringed peristome.

Type material examined

INDIA • holotype of *A. akhaensis* (single shell mentioned in the original description: Fig. 59A–E); Akha Hills, Barowli River; Godwin-Austen coll.; NHMUK 1903.7.1.2683 • 1 syntype of *A. burroiensis* (Fig. 59F–J); Burroi Rr., Dafla; NHMUK 1903.7.1.2653 • 3 corroded syntypes of *A. gemma* in two vials (Fig. 59K–O); No. 7. camp, Dikrang Valley, Dafla; NHMUK 1903.7.1.2601.

Type localities

"Barowli Gorge, Durrang District, Assam, foot of the Akha Hills" (*A. akhaensis*); "Burroi Gorge, Dafla Hills" (*A. burroiensis*); "No. 7 Camp, Dikrang Valley, Dafla Hills" (*A. gemma*).

Differential diagnosis

Dicharax lahupaensis (Godwin-Austen, 1914) has a ribbed R2, and its aperture is less fringed.

Remarks

Both *A. akhaensis* and *A. burroiensis* are represented in the NHM by single, corroded specimens. Acknowledging that the important characters (mostly the fine sculpture and the formation of R3) could not be very clearly seen on the shells, we could not find any conchological differences that would justify their distinction. Therefore, we treat *A. burroiensis* as a junior synonym of *Dicharax akhaensis*. *Alycaeus gemma* also agrees in all important shell characters (ratios of shell regions, R3 swellings, fringed aperture), but its shell has a rather oval outline in dorsal view. Nevertheless, this is also considered part of intraspecific variability, and therefore, *A. gemma* is also treated as a junior synonym of *A. akhaensis*. See also under *D. khasiacus*.

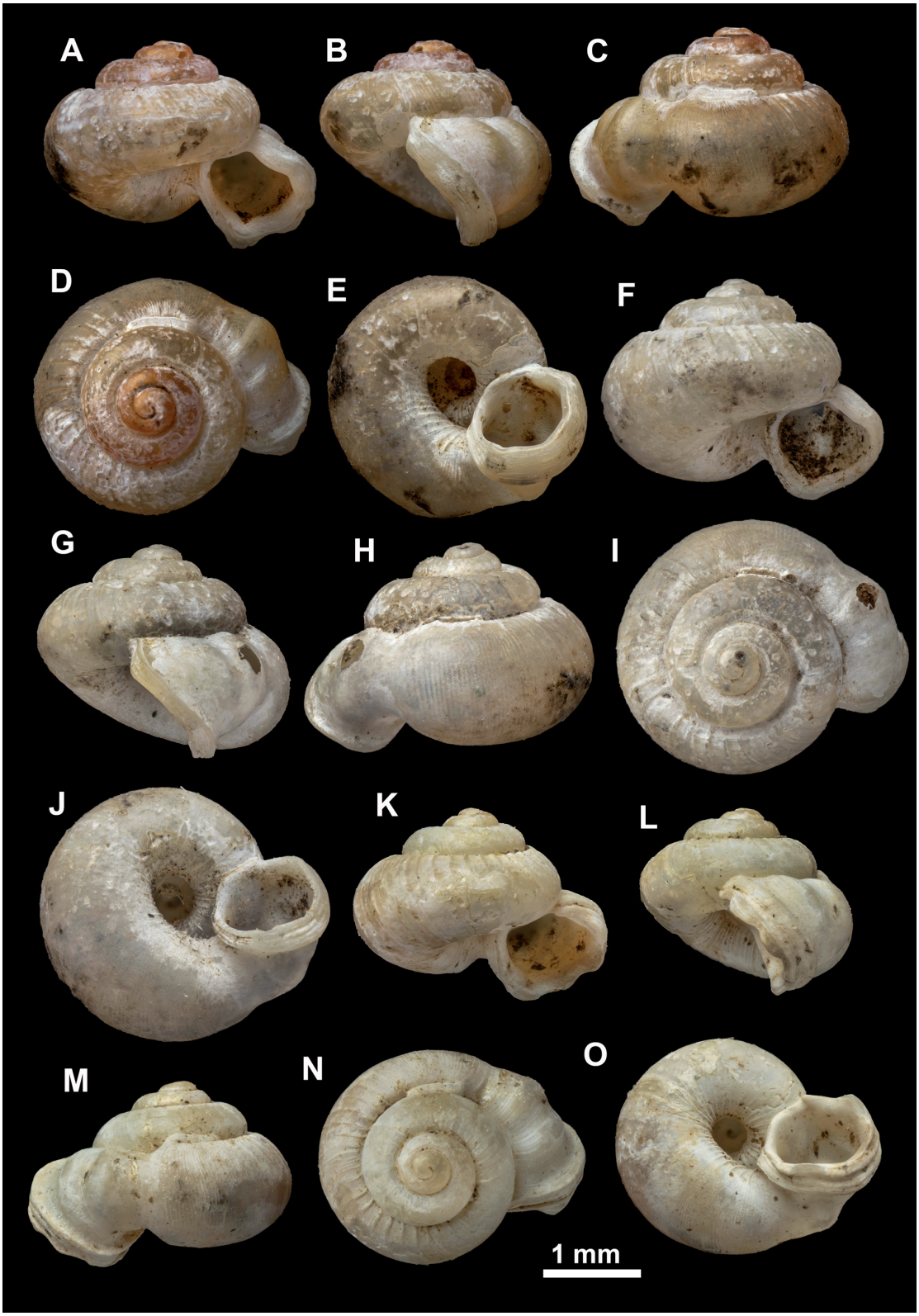

Fig. 59. Shells of *Dicharax akhaensis* (Godwin-Austen, 1914). **A–E**. Holotype of *Alycaeus akhaensis* (NHMUK 1903.7.1.2683). **F–J**. Syntype of *A. burroiensis* Godwin-Austen, 1914 (NHMUK 1903.7.1.2653). **K–O**. Syntype of *A. gemma* Godwin-Austen, 1914 (NHMUK 1903.7.1.2601). All photos: Kevin Webb.

Dicharax birugosus (Godwin-Austen, 1893)
Fig. 60

Alycaeus bi-rugosus Godwin-Austen, 1893: 593.
Alycaeus birugosus var. *minor* Godwin-Austen, 1914: 370, pl. 155 figs 9, 9a.

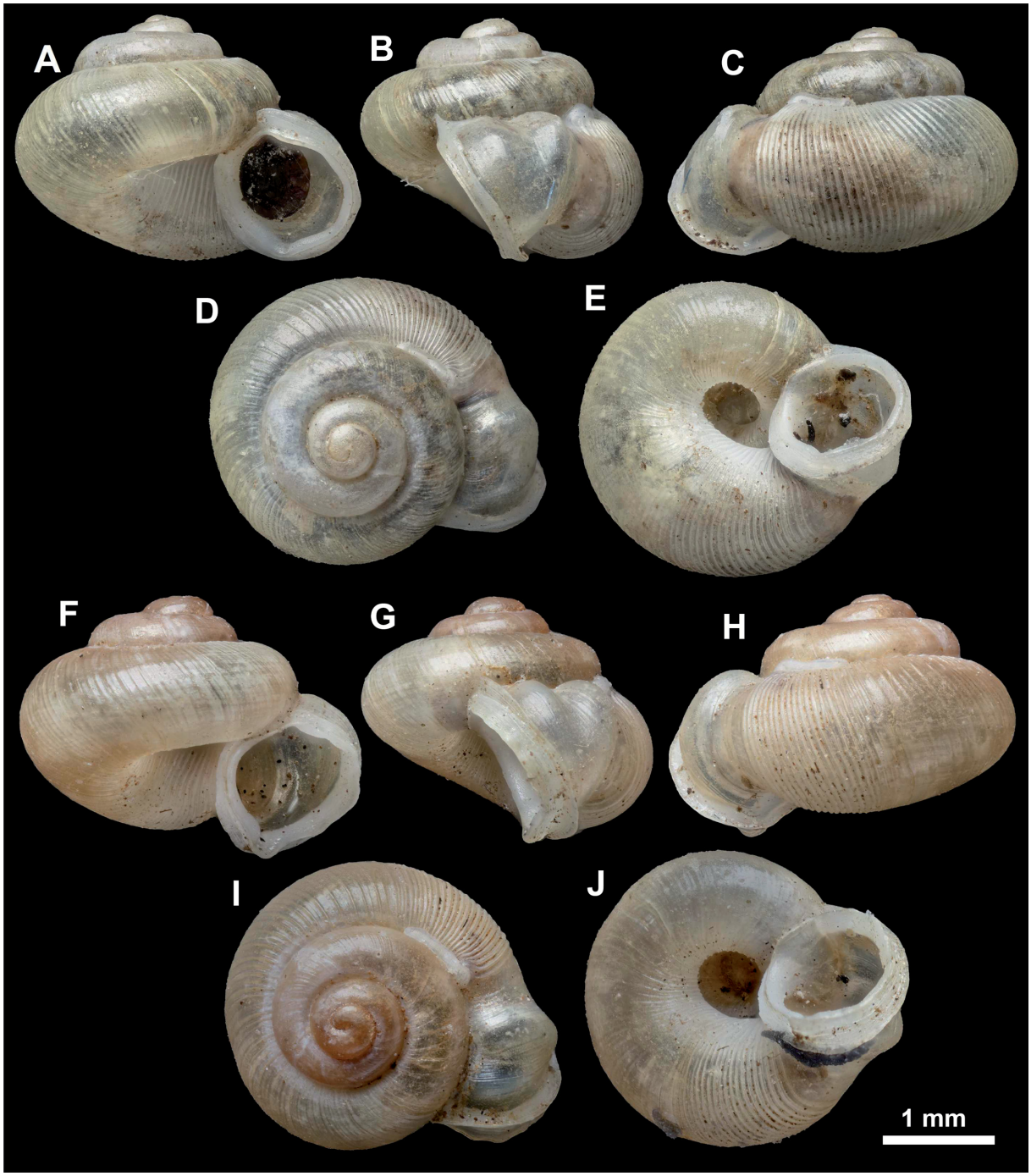

Fig. 60. Shells of *Dicharax birugosus* (Godwin-Austen, 1893). **A–E**. *Alycaeus canaliculus* Godwin-Austen, 1914, syntype (NHMUK 1903.7.1.2764). **F–J**. *A. birugosus* Godwin-Austen, 1893, syntype (NHMUK 1903.7.1.2628). All photos: Kevin Webb.

Alycaeus bi-rugosus – Godwin-Austen 1897: 387, pl. 63 figs 5, 5a.
Alycaeus (*Dicharax*) *birugosus* – Kobelt 1902: 366.
Alycaeus birugosus – Godwin-Austen 1914: 370, 387.
Alycaeus canaliculus Godwin-Austen, 1914: 371, pl. 154 fig. 11.
Alycaeus birugosus var. – Godwin-Austen 1914: 370, pl. 154 figs 7, 7a.
Alycaeus (*Chamalycaeus*) *canaliculus* – Gude 1921: 225.
Alycaeus (*Dicharax*) *birugosus* – Gude 1921: 239–240.
Alycaeus (*Dicharax*) *birugosus* var. *minor* – Gude 1921: 240.
Chamalycaeus (*Chamalycaeus*) *canaliculus* – Ramakrishna *et al.* 2010: 53.
Chamalycaeus (*Dicharax*) *birugosus* – Ramakrishna *et al.* 2010: 57.
Dicharax (?) *birugosus* – Páll-Gergely *et al.* 2020: 79, fig. 19 (treated *A. canaliculus* as a junior synonym).

Diagnosis

The characteristic, oblique main R3 swelling, and the small secondary swelling distinguish this species from its congeners. See under *Dicharax umashaankeri* sp. nov.

Type material examined

INDIA • 2 syntypes of *A. birugosus* (Fig. 60A–E); Khasi Hills; Godwin-Austen leg.; NHMUK 1903.7.1.2628 • 1 syntype of *Alycaeus birugosus* var. *minor* (labelled as *duorugosus* var. *minor*); Garo Hills; NHMUK 1903.7.1.2755 • 1 syntype of *A. canaliculus* (Fig. 60F–J); Teria Ghat, Khasi; Godwin-Austen leg.; NHMUK 1903.7.1.2764.

Additional material examined

INDIA • 7 shells (labelled as "*birugosus* var."); Jawai, Jiantia Hills, 282a; Godwin-Austen leg., NHMUK 1903.7.1.2571.

Type localities

"Khasi Hills and Manipur" (*A. birugosus*); "Garo Hills" (*A. birugosus* var. *minor*); "Teria Ghat, foot of the Khasi Hills" (*A. canaliculus*).

Dicharax daflaensis (Godwin-Austen, 1876)
Fig. 61A–E

Alycaeus daflaensis Godwin-Austen, 1876: 176–177, pl. 7 figs 12, 12a–b.

Alycaeus (*Dicharax*) *daflaensis* – Kobelt 1902: 368. — Gude 1921: 245–246.
Alycaeus daflaensis – Godwin-Austen 1914: 354–355, pl. 145 figs 11, 11a–b.
Chamalycaeus (*Dicharax*) *daflaensis* – Ramakrishna *et al.* 2010: 58.
Dicharax (?) *daflaensis* – Páll-Gergely *et al.* 2020: 84.

Type material examined

INDIA • lectotype (designated by Páll-Gergely *et al.* 2020) (Fig. 61A–E); Toruputu Peak, Dafla Hills; Godwin-Austen coll.; NHMUK 1903.7.1.2497.1 • 6 paralectotypes; same data as for preceding; NHMUK 1903.7.1.2497.2-7.

Type locality

"Torúpútú Peak, 7000 feet".

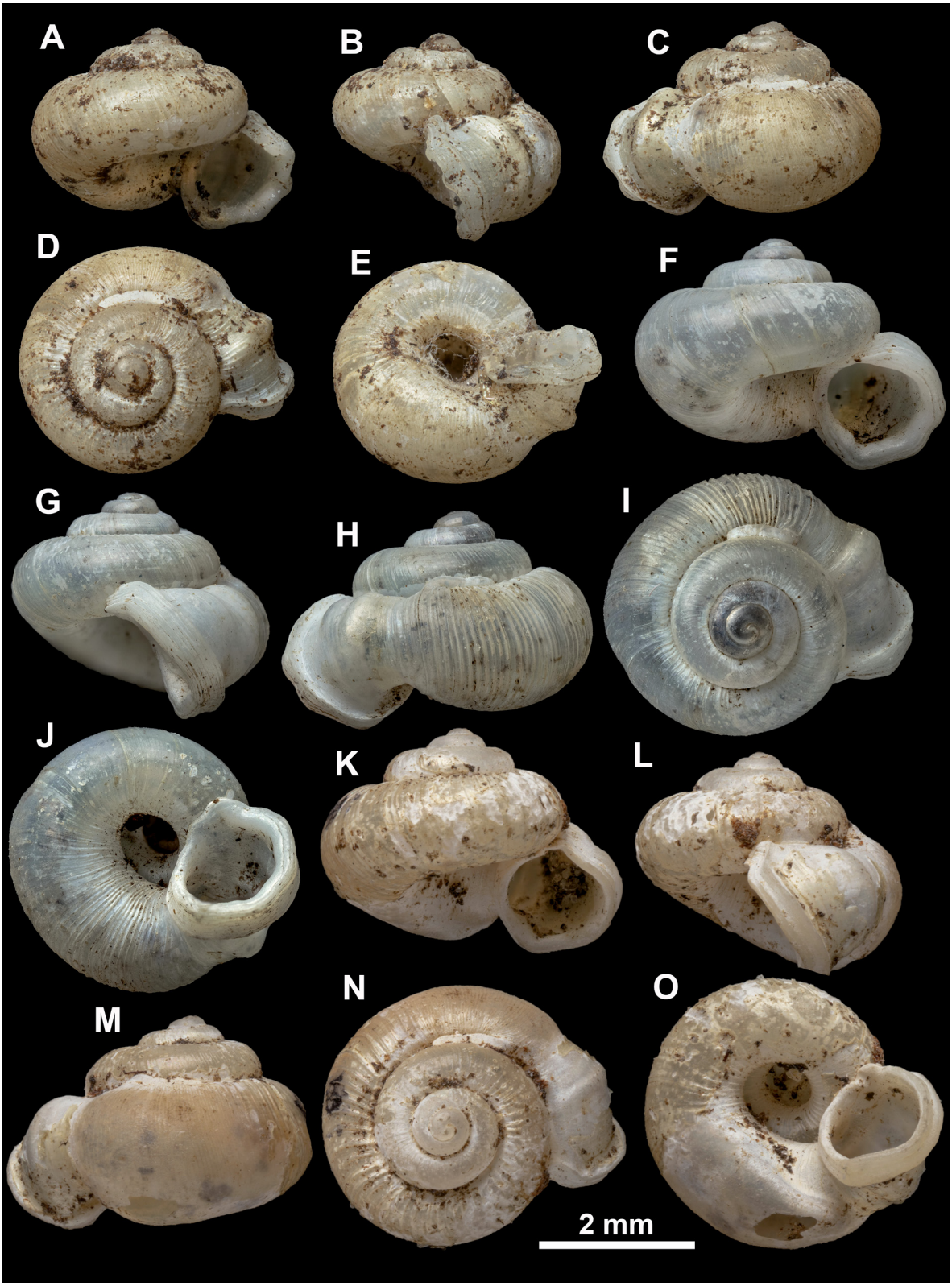

Fig. 61. Shells of species of *Dicharax* Kobelt & Möllendorff, 1900. **A–E**. *D. daflaensis* (Godwin-Austen, 1876), lectotype (NHMUK 1903.7.1.2497.1). **F–J**. *D. lahupaensis* (Godwin-Austen, 1914), syntype (NHMUK 1903.7.1.2655). **K–O**. *Dicharax pachitaensis* (Godwin-Austen, 1886), syntype (NHMUK 1903.7.1.2614). All photos: Kevin Webb.

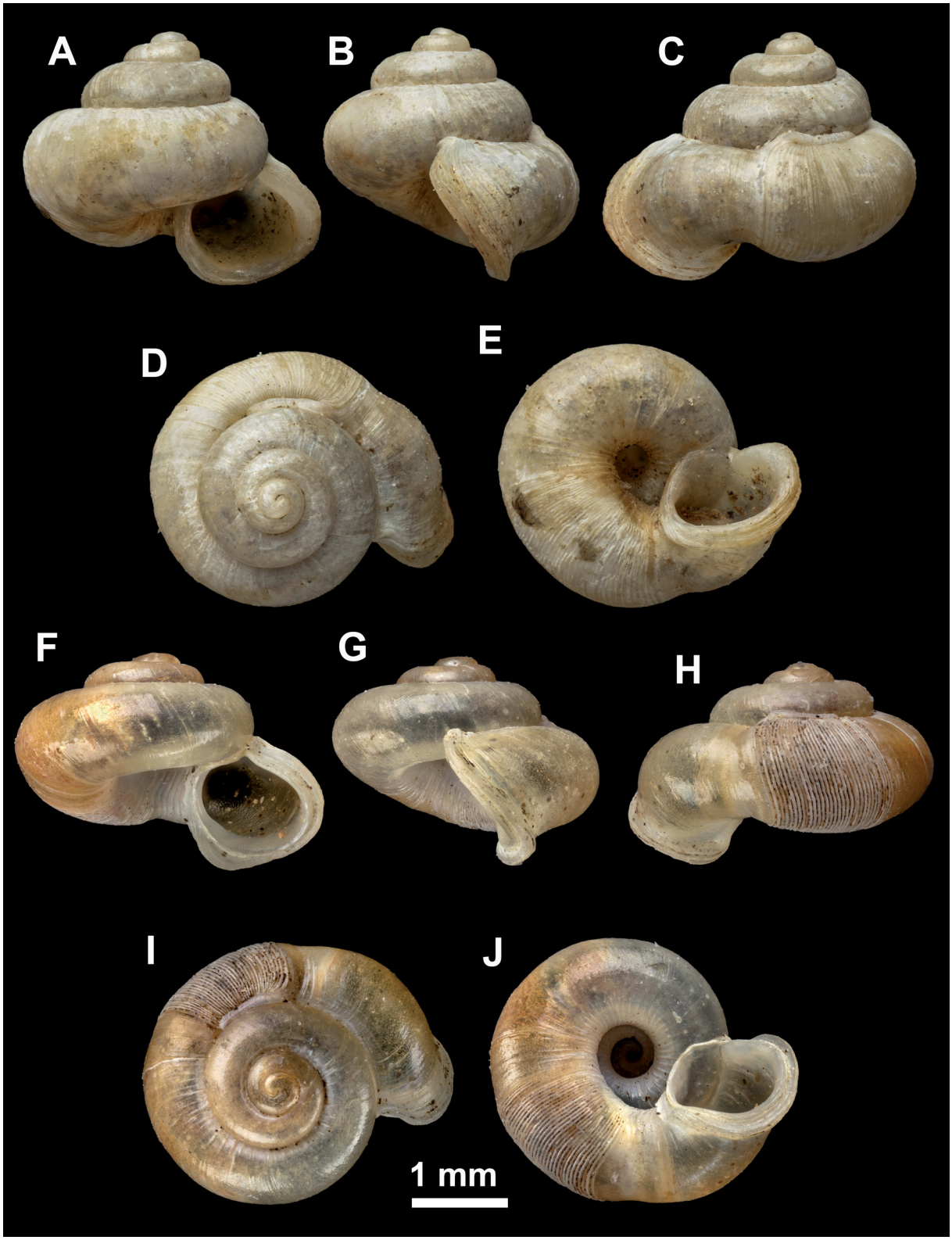

Fig. 62. Shells of species of *Dicharax* Kobelt & Möllendorff, 1900. **A–E**. *D. dalingensis* (Godwin-Austen, 1914), syntype (NHMUK 1903.7.1.1251). **F–J**. *D. politus* (W.T. Blanford, 1865), probably syntype (NHMUK 1906.4.4.178). Photos: Kevin Webb (A–E) and Harold Taylor (F–J).

Differential diagnosis

Within this species group, *D. gemmula* is the most similar due to the similarly shaped R3 swelling, the smooth R2 and the overall smooth shell surface. Nevertheless, the aperture of *D. gemmula* is not fringed.

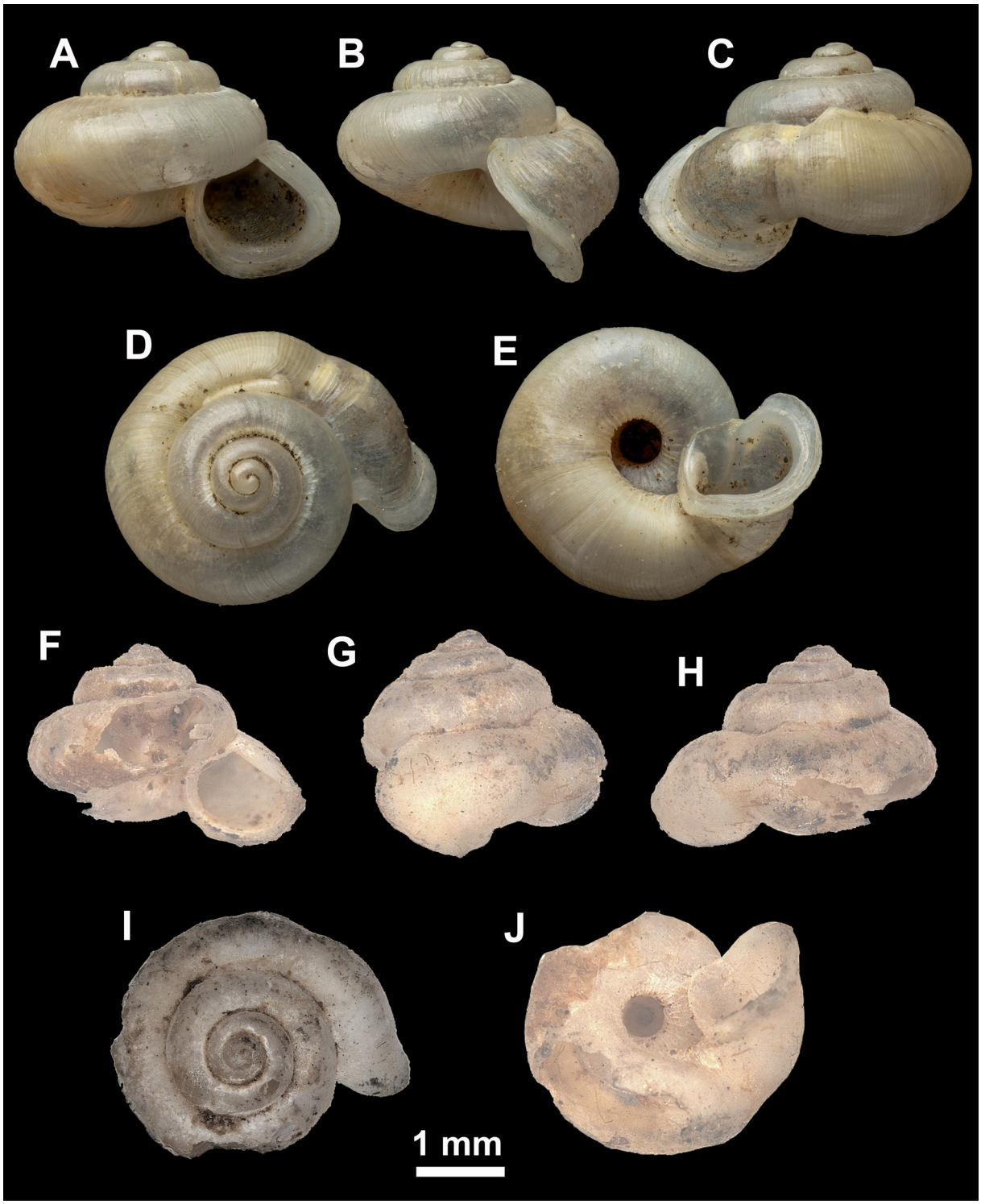

Fig. 63. Shells of *Dicharax lenticulus* (Godwin-Austen, 1874). **A–E**. NHMUK 1903.7.1.2552. **F–J**. Holotype (NZSI M.8075). Photos: Kevin Webb (A–E) and Sheikh Sajan (F–J).

Dicharax lahupaensis is also similar, but it has elevated R2 ribs (smooth in *D. daflaensis*), and its R3 swelling is situated at a greater distance from the aperture. *Dicharax pachitaensis* (Godwin-Austen, 1886) has a less elevated R3 swelling, stronger R1 ribs, more rounded aperture, and a keeled umbilical part of R2. See also under *D. crenatus*.

Dicharax dalingensis (Godwin-Austen, 1914)
Fig. 62A–E

Alycaeus dalingensis Godwin-Austen, 1914: 338–339, pl. 134 figs 3, 3a–c.

Alycaeus (*Dicharax*) *dalingensis* – Gude 1921: 246.
Dicharax (?) *dalingensis* – Páll-Gergely *et al.* 2020: 85.

Type material examined

INDIA • 7 syntypes (Fig. 62A–E); Rechila Pk, Sikkim; W. Robert leg.; NHMUK 1903.7.1.1251.

Type locality

"Rechila Peak, Daling District, on Sikkim and Bhutan Boundary (10,300 ft.)".

Differential diagnosis

The most similar species are *D. lenticulus* (Godwin-Austen, 1874), *D. nongtungensis* (Godwin-Austen, 1914) and *D. politus* (W.T. Blanford, 1865), due to the smooth shell surface and the long, inflated R3 swelling. *Dicharax lenticulus* is larger and has a more depressed shell. *Dicharax nongtungensis* is smaller, more depressed, and has a more strongly expanded outer peristome. Lastly, *D. politus* is much more depressed, its R2 ribs are separated (R2 surface is smooth in *D. dalingensis*), and has a more inflated R3 swelling. See also under *D. ganeshaiahi* sp. nov. and *D. nattoungensis* (Godwin-Austen, 1914).

Dicharax ganeshaiahi Páll-Gergely & Aravind sp. nov.
urn:lsid:zoobank.org:act:ADABA8B7-0D4C-4330-83F7-4CBE3CC2604A
Figs 64, 65A–C, 66A–B

Diagnosis

A small species of *Dicharax* with a glossy shell, smooth, short R2 (combined length of R2+R3 ca quarter whorl, R3 ca twice as long as R2), an R3 with a central, blunt swelling, a rounded aperture with shallow upper and lower incisions, and a strongly expanded outer peristome.

Etymology

This species is named after Prof. K.N. Ganeshaiah, Founder, Trustee of Ashoka Trust for Research in Ecology and the Environment (ATREE), Bangalore, India. He has contributed immensely to the understanding of the ecology, evolution, and conservation of Indian flora and fauna. He is also a popular science communicator in the vernacular language and has published over 32 books in the Kannada language.

Type material examined

Holotype

INDIA – **Mizoram** • empty shell (D: 3.2 mm, H: 2.3 mm, Fig. 64); Blue Mountain, Lawngtlai district; 22.727° N, 93.135° E; 1400 m a.s.l.; 27 Jan. 2019; N.A. Aravind leg.; Ar62; NZSI LM1755.

Paratypes

INDIA – **Mizoram** • 8 empty shells; Blue Mountain, Lawngtlai district; 22.727° N, 93.135° E; 1400 m a.s.l.; 27 Jan. 2019; N.A. Aravind leg.; Ar62; NZSI LM1756 • 2 empty shells; same data as for preceding; Ar47; NZSI LM1757 • 1 empty shell (Fig. 65A–C, 66A–B); same data as for preceding; Ar27; NZSI LM1758 • 6 empty shells; same data as for preceding; Ar72; NZSI LM1759.

Additional material examined

INDIA – **Mizoram** • 1 corroded empty shell; same data as for holotype; Ar47; NZSI LM1760 • 6 corroded empty shells; same data as for holotype; Ar72; NZSI LM1761.

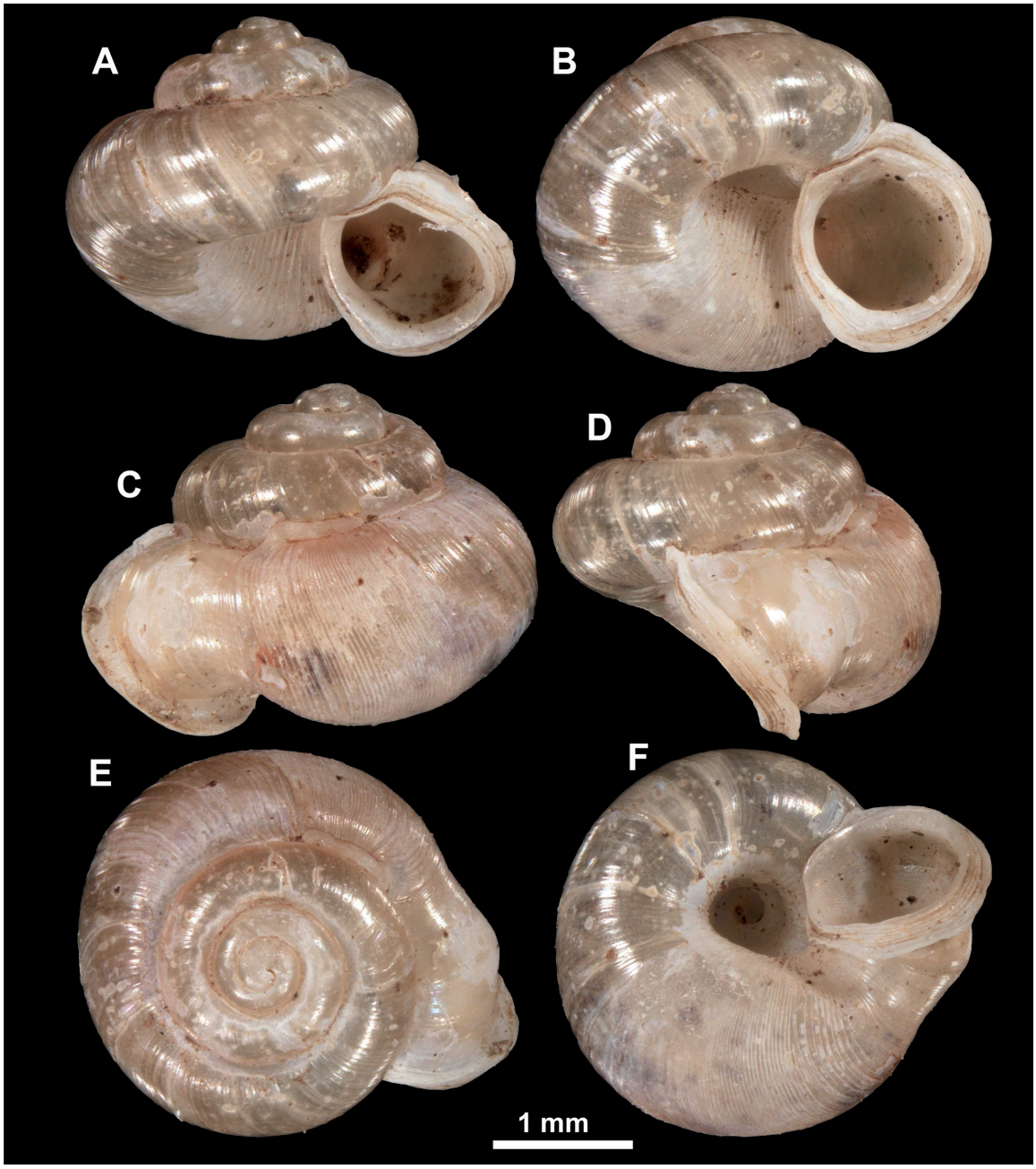

Fig. 64. *Dicharax ganeshaiahi* Páll-Gergely & Aravind sp. nov., holotype (NZSI LM1755). All photos: B. Páll-Gergely.

Description

Shell small, yellowish or pinkish when fresh, semitranslucent; entire shell surface glossy; shell outline rounded in dorsal view, R2 and end of R3 conspicuously swollen, although not in all specimens; spire elevated, conical; body whorl rounded; protoconch low, smooth, consisting of 1.25–1.5 whorls; R1 of ca 1.5–1.75 whorls, smooth, glossy, last ca quarter whorl of some specimens with weak, widely-spaced ribs, while in other specimens entire R3 remains smooth; some weak ribs of the last ca quarter whorl visible inside umbilicus; boundary between R1 and R2 not conspicuous, in the case of specimens with ribbed end of R1 the change between the two regions is more clearly visible due to the large increase in rib density; R2 without elevated ribs, but very densely arranged lighter and darker alternating stripes (more than 40 in number); cross sectional view of R2 was examined in a specimen (Fig. 66C–D): anterior crust forms no rib, it is entirely flat; instead of folding over the posterior crust, the posterior crust covers the larger part of the microtunnels, and the anterior crust only covers the edge of the posterior crust; microtunnel wide compared to anterior and posterior crusts, its cross sectional view teardrop-shaped;

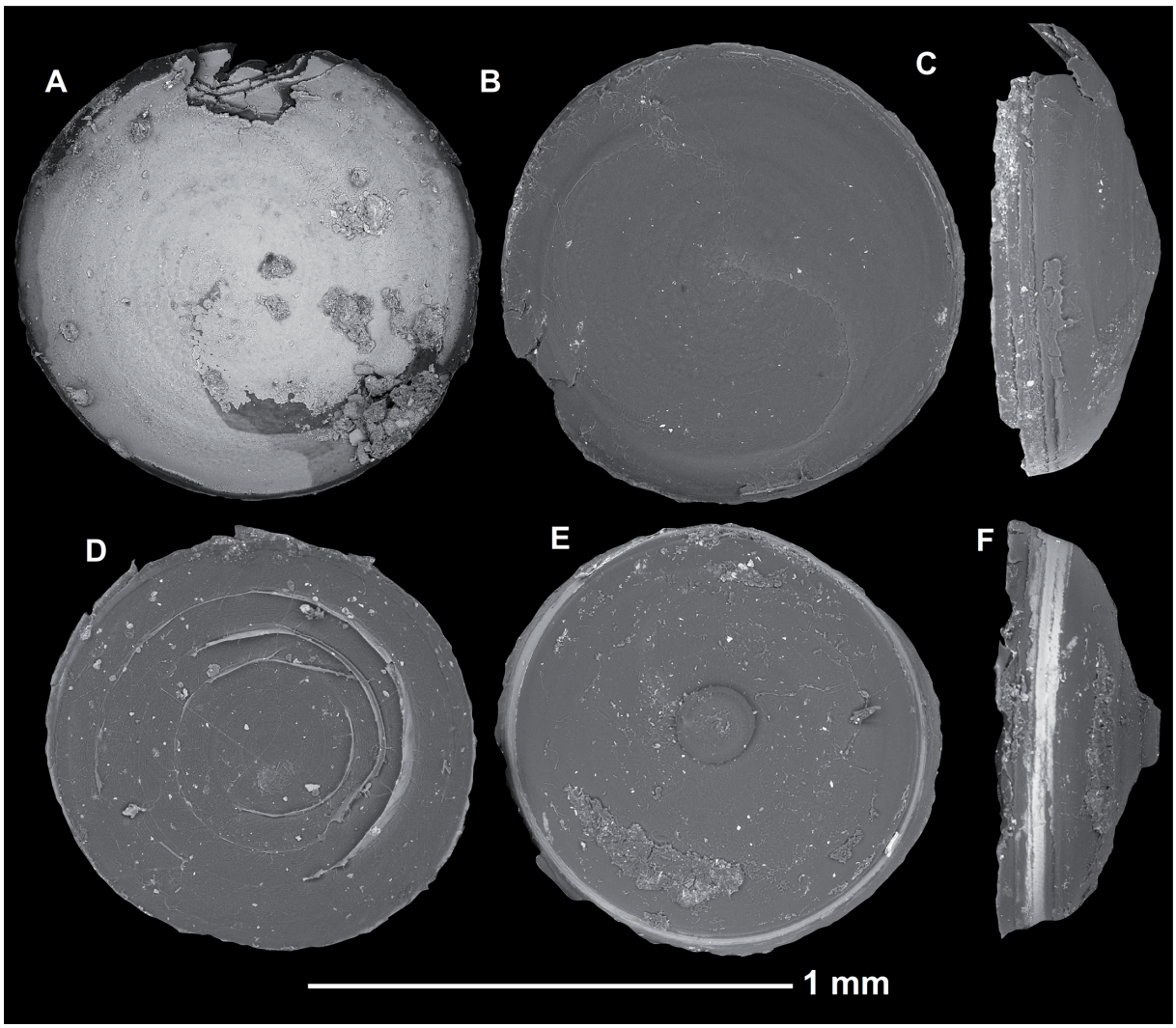

Fig. 65. Opercula of species of *Dicharax* Kobelt & Möllendorff, 1900. **A–C**. *D. ganeshaiahi* Páll-Gergely & Aravind sp. nov., paratype, Ar27 (NZSI LM1758). **D–F**. *D. umashaankeri* Páll-Gergely & Aravind sp. nov., paratype, Ar73, specimen2 (NZSI LM1743). A and D: outer side, B and E: inner side, C and F: lateral side. All images: B. Páll-Gergely.

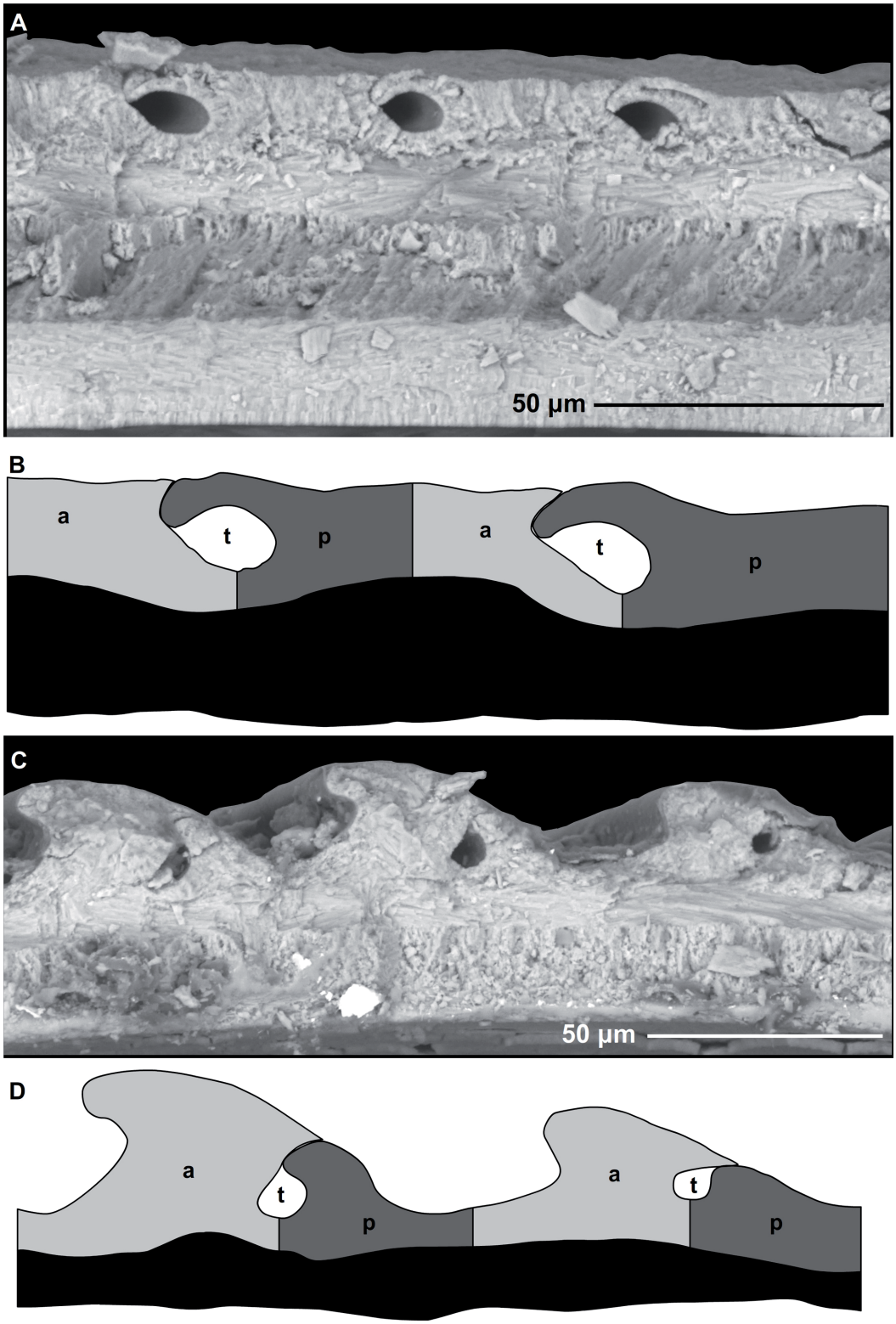

Fig. 66. Cross-sectional view (A, C) and schematic drawing (B, D) of R2 of species of *Dicharax* Kobelt & Möllendorff, 1900. **A–B**. *D. ganeshaiahi* Páll-Gergely & Aravind sp. nov., paratype, Ar27 (NZSI LM1758). **C–D**. *D. umashaankeri* Páll-Gergely & Aravind sp. nov., paratype, Ar73, specimen2, NZSI LM1743. All images: B. Páll-Gergely. Abbreviations: a = anterior crust; p = posterior crust; t = microtunnel.

R2+R3 ca 90 degrees; R3 ca twice as long as R2; boundary between R2 and R3 clearly visible due to a shallow constriction; R3 with a low, central, triangular swelling; aperture strongly oblique to shell axis, rounded with a shallow upper (parieto-palatal), and a shallow lower (basal) incision; inner and outer peristomes clearly separated (mostly at the parietal, palatal and columellar part and less so at the basal part); inner peristome slightly protruding; outer peristome strongly expanded and reflected; umbilicus ca one fourth of shell width, almost rounded, although its part facing R2 is nearly straight, forming a slight keel on the umbilical side of R2.

Operculum. Inner side smooth, without central nipple; outer side smooth, without any sculpture (Ar27).

Measurements. D: 2.8–3.4 mm, H: 2.1–2.4 mm.

Differential diagnosis

Dicharax dalingensis (Fig. 62A–E) is similar in having a smooth R2, but has longer R2 and R3, and a higher spire.

Dicharax lenticulus (Fig. 63) also has a smooth R2, but is much larger, and has a longer R2 and R3. Moreover, both *D. dalingensis* and *D. lenticulus* have an incision between the penultimate whorl and peristome, while the peristome is attached to the penultimate whorl in the new species.

Dicharax pachitaensis (Fig. 61K–O), which is probably the most similar species, also has a smooth R2, but the combined length of R2 and R3 is usually (not always) longer than that of the new species. Moreover, *D. pachitaensis* has prominent ribs near the suture on the dorsal side, the R3 swelling is situated a greater distance from the peristome, and its aperture has deeper upper and lower incisions.

Remarks

The cross-sectional view of R2 of two species of Alycaeinae with smooth R2 is known: *Dicharax moellendorffi* (Kobelt & Möllendorff, 1886) (see Páll-Gergely *et al*. 2017) and *Metalycaeus minatoi* Páll-Gergely, 2017 (see Páll-Gergely & Asami 2017). Even though the R2 surfaces are similar, the fine structure of the R2 (i.e., how the anterior and posterior crusts fold over each other to make the microtunnels) is very different. In the case of *D. moellendorffi*, the anterior crust has a strong posterior projection that covers the anterior crust. In the case of *Metalycaeus minatoi*, the anterior and posterior crusts meet just above the microtunnel, and in the new species the posterior crust has an elongated anterior projection covering the microtunnel.

Dicharax gemmula (Benson, 1859)
Fig. 67

Alycaeus gemmula Benson, 1859: 179–180.
Alycaeus (*Charax*) *subhumilis* Möllendorff, 1897a: 41. **Syn. nov.**

Alycaeus gemmula – Sowerby 1877: pl. 5, species 37. — Godwin-Austen 1886: 190, pl. 48 figs 4, 4a–c.
Alycaeus (*Dicharax*) *gemmula* – Kobelt 1902: 370–371. — Gude 1921: 252–253.
Alycaeus (*Dicharax*) *subhumilis* – Kobelt 1902: 377. — Gude 1921: 271, pl. 1 figs 1–2.
Alycaeus (*Charax*) *gemmula* – Godwin-Austen 1914: 340.
Alycaeus (*Charax*) *subhumilis* – Godwin-Austen 1914: 344–345, pl. 133 figs 2–2c.
Chamalycaeus (*Dicharax*) *subhumilis* – Zilch 1957: 146, pl. 6 fig. 24. — Ramakrishna *et al.* 2010: 67.
Chamalycaeus (*Dicharax*) *gemmula* – Ramakrishna *et al.* 2010: 60.
Dicharax (?) *gemmula* – Páll-Gergely *et al.* 2020: 89.
Dicharax (?) *subhumilis* – Páll-Gergely *et al.* 2020: 105, fig. 25.

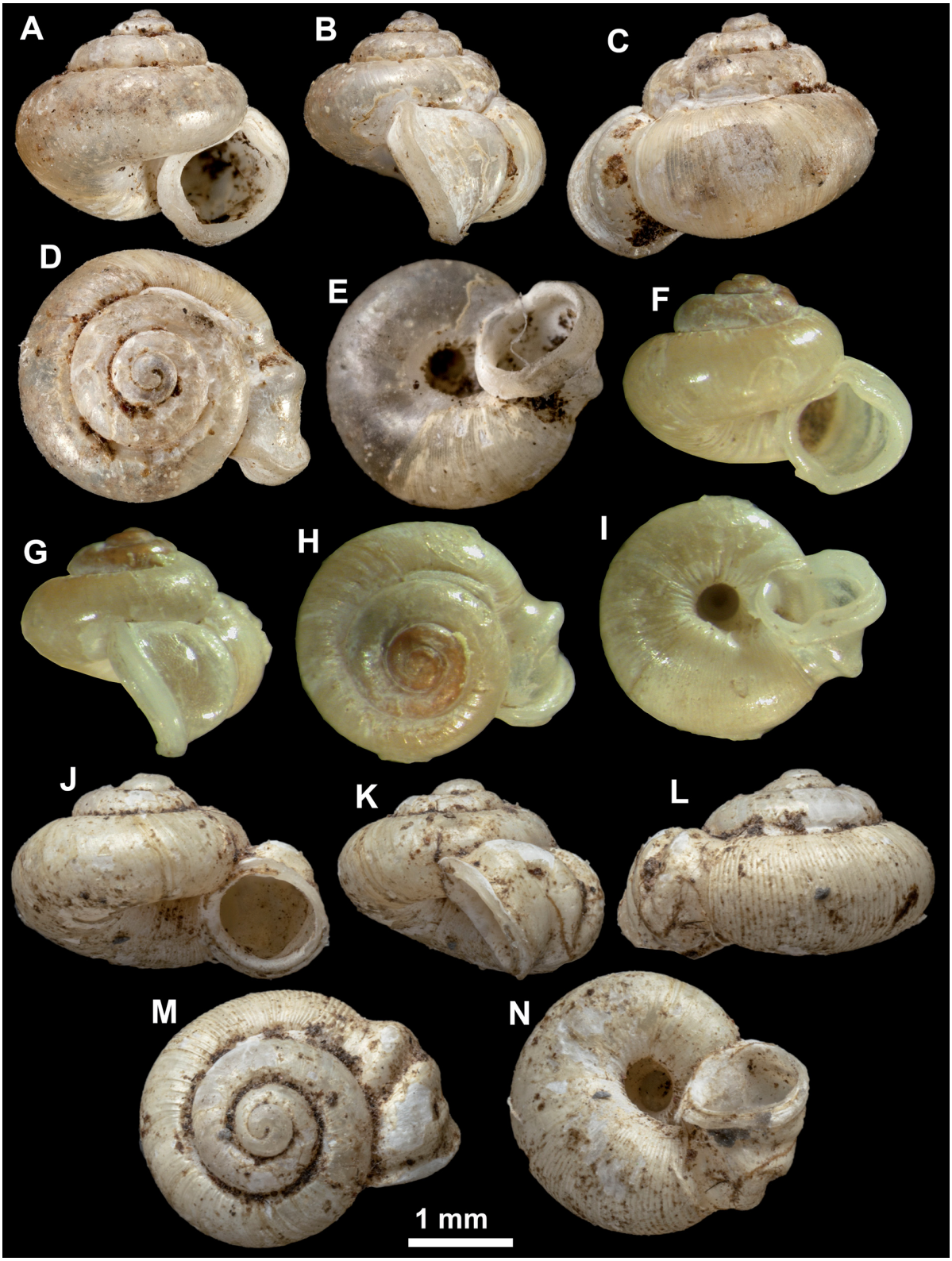

Fig. 67. Shells of species of *Dicharax* Kobelt & Möllendorff, 1900. **A–I**. *D. gemmula* (Benson, 1859). **A–E**. Holotype (NHMUK 1906.4.4.55). **F–I**. Lectotype of *D. subhumilis* (Möllendorff, 1897) (SMF 109224). **J–N**. *D. multirugosus* (Godwin-Austen, 1874), syntype (NHMUK 1903.7.1.2485). Photos: Harold Taylor (A–E), B. Páll-Gergely (F–I) and Kevin Webb (J–N).

Diagnosis

This species is characterized by a tiny, glossy shell, smooth R2 and a single, sharp R3 swelling, R2+R3 only slightly longer than a quarter whorl.

Type material examined

INDIA • neotype (designated by Preece *et al.* 2022: Fig. 67A–E); Darjiling; Blanford coll.; NHMUK 1906.4.4.55 • lectotype of *A. subhumilis* (designated by Zilch 1957: Fig. 67F–I); Vorderindien: Darjiling; Möllendorff coll.; SMF 109224 • 1 paralectotype of *A. subhumilis*; same data as for preceding; SMF 109225.

Type localities

"in valle Rungun" (*A. gemmula*); "in montibus Darjiling Indiae" (*A. subhumilis*).

Differential diagnosis

Dicharax lahupaensis is similar in general shell and aperture shape, but it has two R3 swellings, and its R2 has separate ribs (R3 surface is smooth in *D. gemmula*). See also under *D. daflaensis*.

Remarks

No notable differences were found between the types of *A. gemmula* and *A. subhumilis*, therefore the latter is a junior synonym of the former.

Dicharax khasiacus (Godwin-Austen, 1871)
Fig. 68

Alycaeus Khasiacus Godwin-Austen, 1871: 90, pl. 3 fig. 4.
Alycaeus duorugosus Godwin-Austen, 1914: 391. **Syn. nov.**

Alycaeus khasiacus – Sowerby 1877: pl. 1, species 8. — Godwin-Austen 1914: 356, 376–377, 393, pl. 143 figs 7, 7a–b.
Alycaeus (*Dicharax*) *khasiacus* – Kobelt 1902: 372–373. — Gude 1921: 257–258.
Alycaeus khasiacus var. – Godwin-Austen 1914: 356.
Alycaeus (*Dicharax*) *duorugosus* – Gude 1921: 249.
Chamalycaeus (*Dicharax*) *duorugosus* – Ramakrishna *et al.* 2010: 59.
Chamalycaeus (*Dicharax*) *khasiacus* – Ramakrishna *et al.* 2010: 62.
Dicharax (?) *khasiacus* – Páll-Gergely *et al.* 2020: 90.
Dicharax (?) *duorugosus* – Páll-Gergely *et al.* 2020: 86.

Diagnosis

Dicharax khasiacus is characterized by the rounded outline, the short, smooth R2, and the two, anteriorly situated R3 swellings.

Type material examined

INDIA • 29 syntypes of *A. khasiacus* (Fig. 68A–E); Lailangkote, Khasi Hills; NHMUK 1903.7.1.2650 • 1 syntype of *A. duorugosus* (Fig. 68F–J); Burrail; Godwin-Austen coll.; NHMUK 1903.7.1.2771.

Additional material examined

INDIA • 4 shells; Jawai, Assam; Oberwimmer coll.; NHMW • 2 shells; same data as for preceding; NHMW 14711 • 4 shells; Jawai, India; Dr. Leo P. Rušnov coll., ex coll. Dr W. Blume ex coll. W.F. Webb; NHMW 15168.

Type localities

"On the highest parts of the Khasi and Jiantia Hills" (*A. khasiacus*); "Burrail Range, Naga" "Also Angaoluo Trigonometrical Station, No. 2572; South Barak, No. 2629, and Munipur, No. 2654 B.M." (*A. duorugosus*).

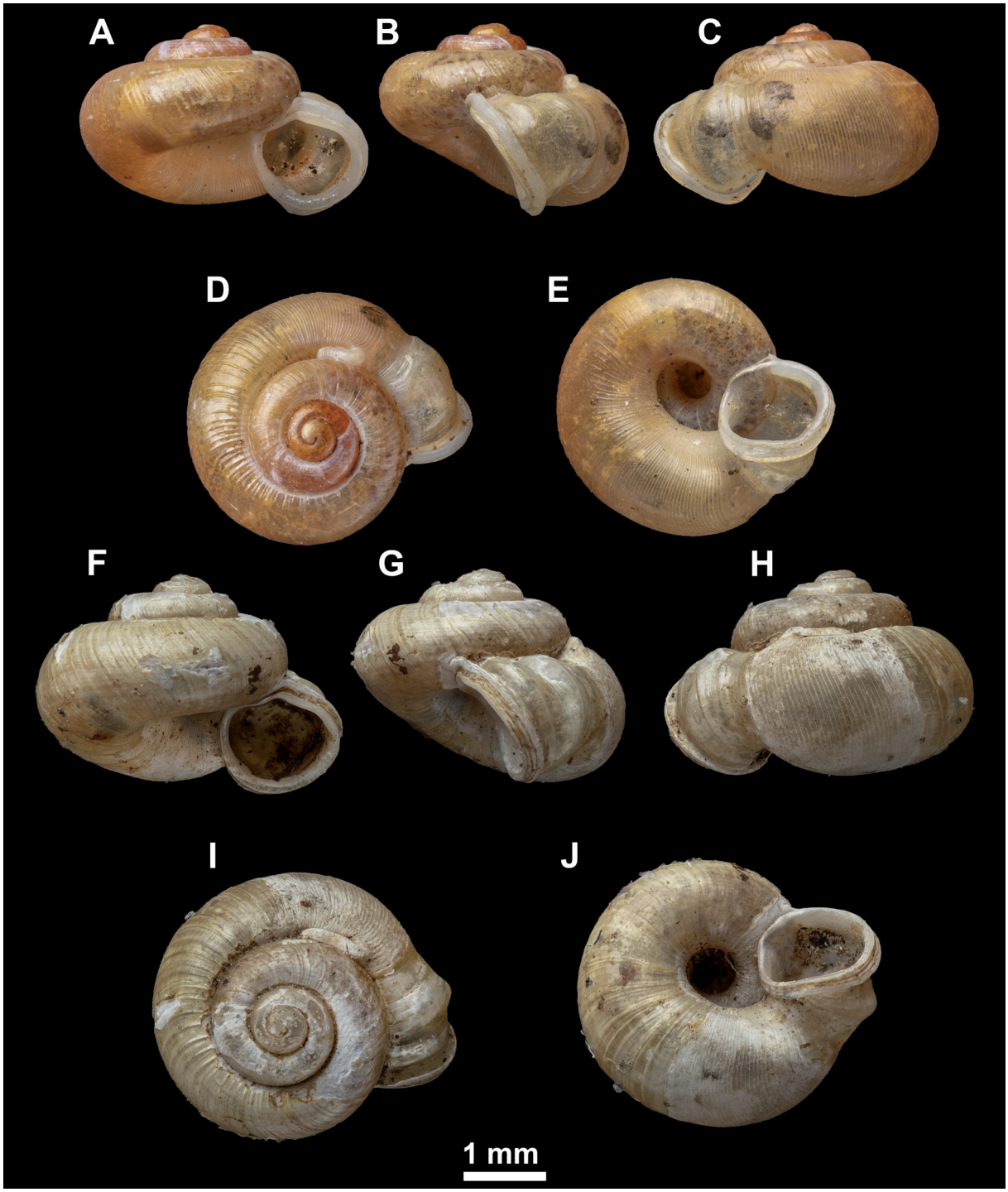

Fig. 68. Shells of *Dicharax khasiacus* (Godwin-Austen, 1871). **A–E**. Syntype of *Alycaeus khasiacus* Godwin-Austen, 1871 (NHMUK 1903.7.1.2650). **F–J**. Syntype of *A. duorugosus* Godwin-Austen, 1914 (NHMUK 1903.7.1.2771). All photos: Kevin Webb.

Differential diagnosis

Dicharax lahupaensis has a ribbed R2 (smooth in *D. khasiacus*) and a thicker peristome. *Dicharax akhaensis* is larger, has a shorter R3 swelling, and a less fringed aperture.

Remarks

The single examined syntype of *A. duorugosus* fits the morphological variability of the 29 syntypes of *A. khasiacus*; therefore the former is a junior synonym of the latter.

Dicharax lahupaensis (Godwin-Austen, 1914)
Fig. 61F–J

Alycaeus lahupaensis Godwin-Austen, 1914: 394, pl. 141 figs 3, 3a.

Alycaeus (*Raptomphalus*) *lahupaensis* – Gude 1921: 287–288.
Chamalycaeus (*Raptomphalus*) *lahupaensis* – Ramakrishna *et al.* 2010: 68.
Dicharax lahupaensis – Páll-Gergely *et al.* 2020: 66.

Diagnosis

This species is characterized by a ribbed R2, two low R3 swellings, a fringed aperture and a strongly expanded outer peristome. See also under *D. akhaensis*, *D. daflaensis*, *D. gemmula* and *D. khasiacus*.

Type material examined

INDIA • 10 syntypes (Fig. 61F–J); Gaziphimih, N.E. Munipur; NHMUK 1903.7.1.2655.

Type locality

"Gaziphimi, Lahupa Naga Hills, Munipur".

Dicharax lenticulus (Godwin-Austen, 1874)
Fig. 63

Alycaeus lenticulus Godwin-Austen, 1874: 147.

Alycaeus lenticulus – Godwin-Austen 1914: 340–341, pl. 136 figs 2, 2a.
Alycaeus (*Dicharax*) *lenticulus* – Gude 1921: 259–260.
Chamalycaeus (*Dicharax*) *lenticulus* – Ramakrishna *et al.* 2010: 63
Dicharax (?) *lahupaensis* – Páll-Gergely *et al.* 2020: 92.

Type material examined

INDIA • holotype (single shell mentioned in the original description: Fig 63F–J); Darjeeling; Godwin-Austen coll.; NZSI M.8075 • several shells (Fig. 63A–E); Rissom Pk. (W. Bhutan); Godwin-Austen Coll.; NHMUK 1903.07.01.2552.

Type locality

"Darjeeling".

Differential diagnosis

Dicharax nongtungensis is smaller, has a thicker peristome and a narrower umbilicus. *Dicharax politus* has a more depressed shell and a more strongly inflated R3 swelling. See also under *D. dalingensis*, *D. ganeshaiahi* sp. nov., and *D. nattoungensis*.

Remarks

This species was described based on a strongly corroded shell (Godwin-Austen 1874). Later, Godwin-Austen (1914) provided a more complete description and drawings based on multiple additional specimens. We received photos of the holotype (Fig. 63F–J) from the Zoological Survey of India, and could confirm that the figured shell (Fig. 63A–E) is conspecific with the holotype.

Dicharax multirugosus (Godwin-Austen, 1874)
Fig. 69A–E

Alycaeus multirugosus Godwin-Austen 1874: 149, pl. 3 fig. 7.

Alycaeus (*Dicharax*) *multirugosus* – Kobelt 1902: 373. — Gude 1921: 260.
Alycaeus multirugosus – Godwin-Austen 1914: 395–396, pl. 144 figs 7, 7a.
Chamalycaeus (*Dicharax*) *multirugosus* – Ramakrishna *et al.* 2010: 63.
Dicharax (?) *multirugosus* – Páll-Gergely *et al.* 2020: 97.

Type material examined

INDIA • 2 syntypes (Fig. 69A–E); head of Lanier River NE of Munipur; Godwin-Austen coll.; NHMUK 1903.7.1.2485.

Type locality

"Hills at head of the Lanier River, Naga Hills, ca. 5–6,000 feet".

Remarks

An easily recognisable species based on the three R3 swellings.

Differential diagnosis

Due to the complicated R3 swelling, this species is similar to some species of the *Dicharax* species group 7, but differs from most of those species by the more depressed shell, the rounded aperture, and the R3 swelling separated into 3 parts. See also under *D. umashaankeri* sp. nov.

Dicharax nattoungensis (Godwin-Austen, 1914)
Fig. 70A–E

Alycaeus nattoungensis Godwin-Austen, 1914: 410–411, pl. 155 figs 15, 15a.

Alycaeus nattoungensis – Gude 1921: 212–213.
Dicharax (?) *nattoungensis* – Páll-Gergely *et al.* 2020: 98, fig. 24.

Type material examined

MYANMAR • holotype (single shell mentioned in the original description: Fig. 70A–E); Nattoung Hills, Mendon District, Pegu, Burma; Theobald coll.; NZSI M.8036.

Type locality

"Nattoung Hills".

Differential diagnosis

Dicharax dalingensis, *D. lenticulus* and *D. politus* have a more inflated R3 swelling preceded by a deeper constriction between R2 and R3. *Dicharax nongtungensis* has a more oval outline in dorsal view and a

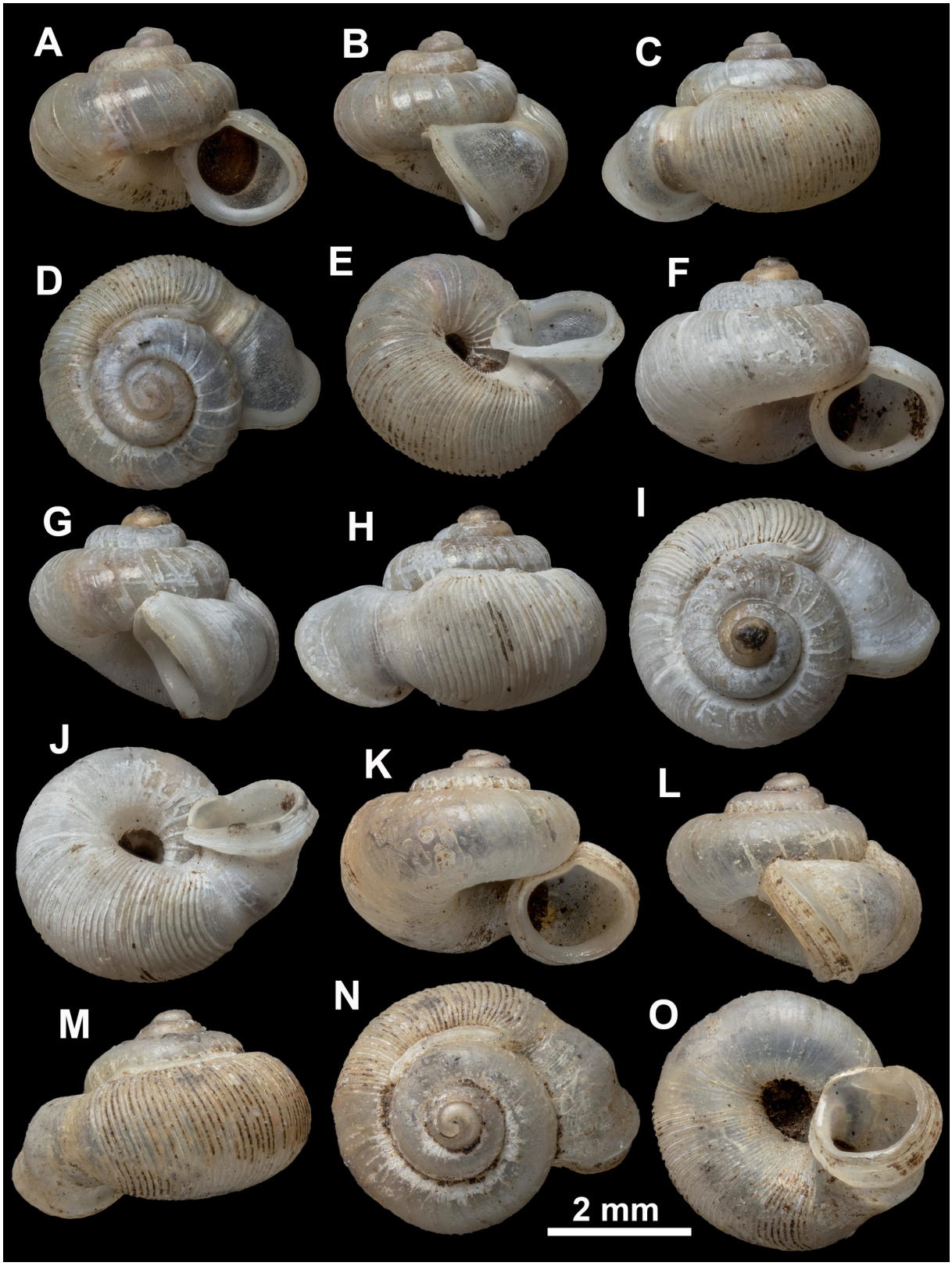

Fig. 69. Shells of *Dicharax theobaldi* (W.T. Blanford, 1862). **A–E**. Syntype of *Alycaeus theobaldi* (NHMUK 1906.4.4.60). **F–J**. Syntype of *A. theobaldi* var. *diyungensis* (NHMUK 1903.7.1.2546). **K–O**. Syntype of *A. maosmaiensis* (NHMUK 20191067). All photos: Kevin Webb.

more expanded outer peristome (thicker peristome). *Dicharax pusillus* is similar in general shell shape, but is much smaller and has a more strongly expanded peristome.

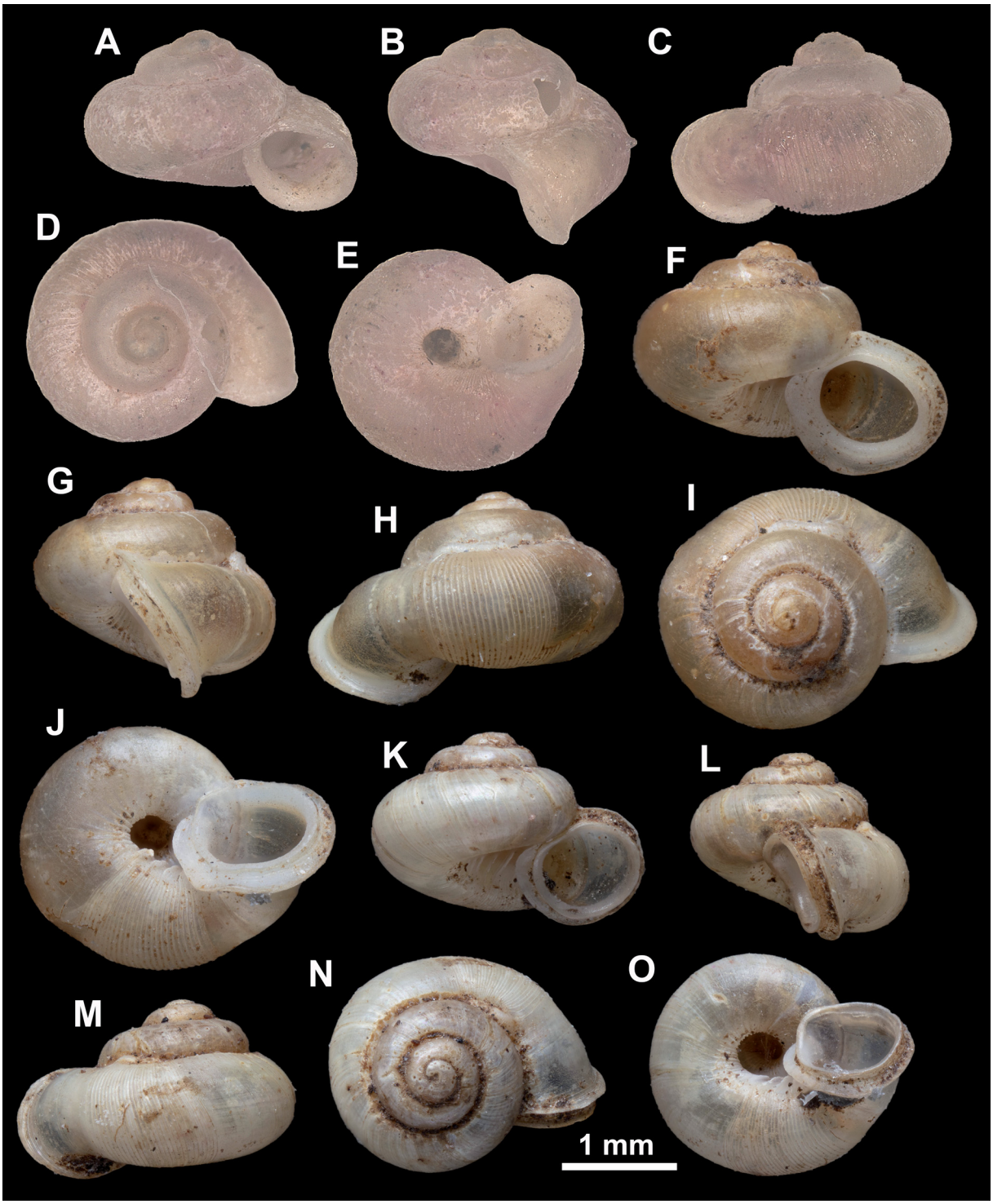

Fig. 70. Shells of species of *Dicharax* Kobelt & Möllendorff, 1900. **A–E**. *D. nattoungensis* (Godwin-Austen, 1914), holotype (NZSI M.8036). **F–J**. *D. nongtungensis* (Godwin-Austen, 1914), syntype (NHMUK 1903.7.1.2692). **K–O**. *Dicharax pusillus* (Godwin-Austen, 1871), syntype (NHMUK 1903.7.1.2688). Photos: Sheikh Sajan (A–E) and Kevin Webb (F–O).

Dicharax nongtungensis (Godwin-Austen, 1914)
Fig. 70F–J

Alycaeus nongtungensis Godwin-Austen, 1914: 378, pl. 138 figs 5, 5a.

Alycaeus (*Dicharax*) *nongtungensis* – Gude 1921: 261.
Chamalycaeus (*Dicharax*) *nongtungensis* – Ramakrishna *et al.* 2010: 64.
Dicharax (?) *nongtungensis* – Páll-Gergely *et al.* 2020: 98. — Gittenberger *et al*. 2024: 210, figs 33, 35. (identification questionable).

Type material examined

INDIA • 21 syntypes (Fig. 70F–J); Nongtung; Godwin-Austen coll.; NHMUK 1903.7.1.2692.

Additional material examined

INDIA • 2 shells; Nontung; Dr Leo P. Rušnov coll., ex coll. Dr. W. Blume, ex coll. W.F. Webb; NHMW 15144 • 4 shells; Nongtung, Burmah; NHMW 14890.

Type locality

"Nongtung, Jaintia Hills".

Differential diagnosis

Dicharax politus is more depressed, has a deeper constriction and a more inflated R3 swelling. *Dicharax pusillus* is smaller, has a shorter R2 and a less expanded outer peristome. See also under *D. dalingensis*, *D. lenticulus* and *D. nattoungensis*.

Remarks

The specimen form Bhutan is indeed similar to the syntypes of *D. nongtungensis*, but has a less inflated R3 swelling.

Dicharax notus (Godwin-Austen, 1914)
Fig. 71A–E

Alycaeus notus Godwin-Austen, 1914: 411, pl. 155 fig. 12.

Alycaeus (*Dicharax*) *notus* – Gude 1921: 262.
Dicharax notus – Páll-Gergely *et al.* 2020: 69; 2021: 32, figs 24–27. — Jirapatrasilp *et al.* 2021: 7, figs 4c–d, 5b, 6e, 7a–b.

Diagnosis

Dicharax notus and *D. omissus* are relatively widespread and variable species in northern Thailand and neighbouring central Myanmar. Regarding their conchological variability and identification, see Páll-Gergely *et al.* (2021).

Type material examined

MYANMAR • 15 syntypes (Fig. 71A–E); Fort Stedman, Burma; Woodthorpe coll.; NHMUK 1903.7.1.3065. See also Páll-Gergely *et al.* (2021).

Type locality

"Fort Stedman, Burma".

Dicharax omissus (Godwin-Austen, 1914)
Fig. 71F–J

Alycaeus omissus Godwin-Austen, 1914: 411, pl. 155 fig. 13.

Alycaeus (*Chamalycaeus*) *omissus* – Gude 1921: 231.
Dicharax (?) *omissus* – Páll-Gergely *et al.* 2020: 100; 2021: 38, figs 29–30. — Jirapatrasilp *et al*. 2021: 7, figs 6a, 8a–b.

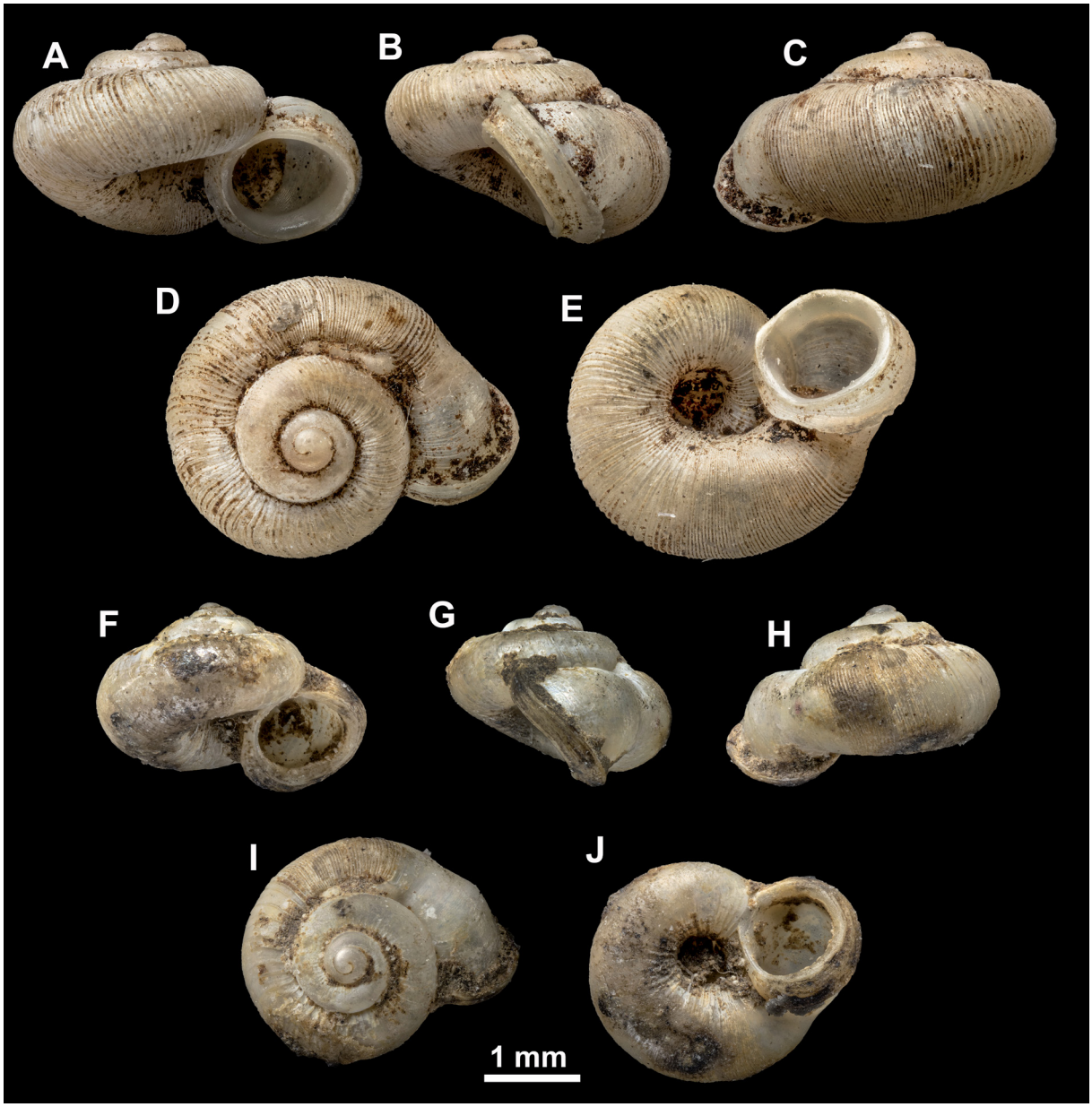

Fig. 71. Shells of species of *Dicharax* Kobelt & Möllendorff, 1900. **A–E**. *D. notus* (Godwin-Austen, 1914), syntype (NHMUK 1903.7.1.3065). **F–J**. *D. omissus* (Godwin-Austen, 1914), syntype (NHMUK 1914, 1903.7.1.1228). All photos: Harold Taylor.

Diagnosis

See under *D. notus* and Páll-Gergely *et al.* (2021).

Type material examined

THAILAND/MYANMAR • 2 syntypes (Fig. 71F–J); Siam and Shan boundary; Woodthorpe coll.; NHMUK 1903.7.1.1228. See also Páll-Gergely *et al.* (2021).

Type locality

"Siam and Shan boundary".

Dicharax pachitaensis (Godwin-Austen, 1886)
Fig. 61K–O

Alycaeus pachitaensis Godwin-Austen, 1886: 190–191, pl. 48 figs 5, 5a–c.

Alycaeus (*Dicharax*) *pachitaensis* – Kobelt 1902: 374. — Gude 1921: 264.
Alycaeus pachitaensis – Godwin-Austen 1914: 359.
Chamalycaeus (*Dicharax*) *pachitaensis* – Ramakrishna *et al.* 2010: 65.
Dicharax (?) *pachitaensis* – Páll-Gergely *et al.* 2020: 100.

Diagnosis

This species is characterized by a smooth shell (with the exception of widely-spaced R1 ribs along the suture), a smooth R2, two low R3 swellings, a rounded aperture with upper and lower incisions, and a keeled umbilical part of R2. See also under *D. daflaensis* and *D. ganeshaiahi* sp. nov.

Type material examined

INDIA • 3 syntypes (Fig. 61K–O); Pachita village, Dafla Hills; Godwin-Austen coll.; NHMUK 1903.7.1.2614.

Type locality

"Pachita village (Camp no. 7 of the Expeditionary Force, 1874–75), Dafla Hills, Assam".

Dicharax politus (W.T. Blanford, 1865)
Fig. 62K–O

Alycaeus politus W.T. Blanford, 1865: 83–84.

Alycaeus politus – Sowerby 1877: pl. 5, species 39. — Godwin-Austen 1914: 422, pl. 139 figs 5, 5a. — Gude 1921: 214–215.
Alycaeus (*Alycaeus*) *politus* – Kobelt 1902: 348.
Dicharax politus – Páll-Gergely *et al.* 2020: 71.

Diagnosis

This species is characterized by a glossy, depressed shell, a finely ribbed R2, a strongly inflated, long R3 swelling, and a deep constriction between R2 and R3. See also under *D. dalingensis*, *D. lenticulus*, *D. nattoungensis* and *D. nongtungensis*.

Type material examined

MYANMAR • 3 probable syntypes (Fig. 62K–O); Phungdo, Arakan; Blanford coll.; NHMUK 1906.4.4.178.

Type locality

"Phuong do, near Cape Negrais, Arakan".

Dicharax pusillus (Godwin-Austen, 1871)
Fig. 70K–O

Alycaeus pusillus Godwin-Austen, 1871: 89–90, pl. 3 fig. 3.

Alycaeus pusillus – Sowerby 1877: pl. 1, species 7. — Godwin-Austen 1914: 379–380, 398, pl. 143 figs 6, 6a–b. — Gude 1921: 215–216.
Alycaeus (*Alycaeus*) *pusillus* – Kobelt 1902: 348. — Ramakrishna *et al.* 2010: 50.
Dicharax (?) *pusillus* – Páll-Gergely *et al.* 2020: 102.

Diagnosis

This species is characterized by a small shell, a smooth R2, and the nearly smooth transition between R2 and R3 (no constriction between the two). See also under *D. nattoungensis* and *D. nongtungensis*.

Type material examined

INDIA • 5 syntypes (Fig. 70K–O); Jawai, Jaintia; NHMUK 1903.7.1.2688.

Type locality

"near Jawai", "on the banks of the Kopili river on the road from Jawai to Asálú, viâ Súfai".

Dicharax semivivus Páll-Gergely & Aravind sp. nov.
urn:lsid:zoobank.org:act:FDBFC556-730F-4891-9B87-ABDBD8B2EBA4
Fig. 72

Diagnosis

A small species of *Dicharax* with smooth R1, having some widely-spaced ribs on the last whorl of R1, a combined R2+R3 length of ca 150 degrees, an R3 with a single, low, central swelling, and a moderately fringed peristome.

Etymology

The specific epithet '*semivivus*' ('half-alive, almost dead') refers to the condition of the holotype, which was corroded, but was probably alive when found.

Type material examined

Holotype

INDIA – **Mizoram** • empty shell (D: 2.4 mm, H: 1.8 mm, Fig. 72); Blue Mountain, Lawngtlai district; 22.727° N, 93.135° E; 1400 m a.s.l.; 27 Jan. 2019; N.A. Aravind leg.; Ar45; NZSI LM1754.

Description

Shell small, off-white, semitranslucent; shell surface corroded but the holotype (single available specimen) was probably alive judging from the in situ presence of the operculum; shell outline slightly oval in dorsal view; spire elevated, conical; body whorl rounded; protoconch low, smooth, its boundary not visible due to corrosion consisting of 1.5 whorls; R1 of ca 1.75 whorls, corroded, nearly smooth, last whorl with widely-spaced, low ribs near suture and inside umbilicus, no ribs reach mid part of whorls; boundary between R1 and R2 conspicuous due to the sudden increase in rib density; R2 with ca 26 low ribs, spaces between the ribs are approximately the width of a single rib or narrower; R2+R3

ca 150 degrees; R3 slightly longer than R2; boundary between R2 and R3 clearly visible due to a deep constriction; R3 with a low central swelling, anterior and posterior slopes are declivous; aperture strongly oblique to shell axis, rounded with a shallow upper (parieto-palatal), a deep lower (basal) incision and a fringed palatal part; together with the upper and lower incisions, there are 5 incisions on the peristome; peristome thin overall, boundary between inner and outer peristomes conspicuous; inner peristome slightly protruding; outer peristome only slightly expanded, not reflected, undulated following the fringed inner peristome; umbilicus ca one fourth of shell width, nearly rounded.

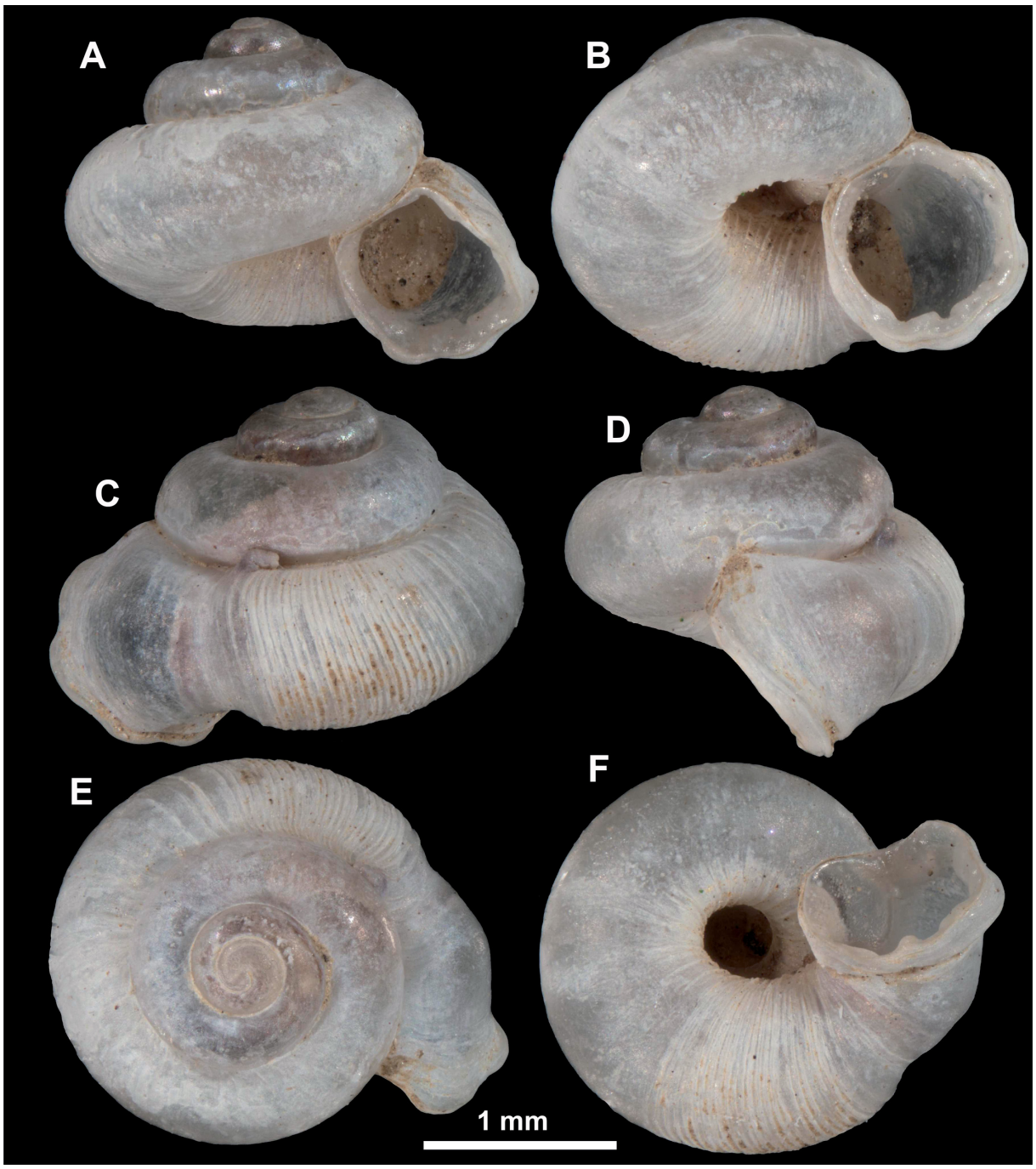

Fig. 72. *Dicharax semivivus* Páll-Gergely & Aravind sp. nov., holotype (NZSI LM1754). All photos: B. Páll-Gergely.

Operculum. The outer side is smooth, inner side could not be examined.

Measurements. D: 2.4 mm, H: 1.8 mm.

Distribution

Known only from the Blue Mountain region.

Differential diagnosis

The most similar species is *Dicharax nitidus* (Fig. 55), but it is larger, and has a longer R3, with a more posteriorly-situated swelling. *Dicharax jaintiacus* (Fig. 32) is larger, has a higher spire and a narrower umbilicus, a more strongly expanded outer peristome and a more strongly fringed aperture.

Dicharax theobaldi (W.T. Blanford, 1862)
Fig. 69F–J

Alycaeus Theobaldi W.T. Blanford, 1862: 142–143.
Alycaeus theobaldi var. *diyungensis* Godwin-Austen, 1914: 401–402, pl. 138 fig. 4. **Syn. nov.**
Alycaeus maosmaiensis Godwin-Austen, 1922: 365, text figs. **Syn. nov.**

Alycaeus theobaldi – Sowerby 1877: pl. 5, species 44. — Godwin-Austen 1914: 359–360, pl. 149 figs 3, 3a–b; 1914: 382–383, pl. 145 figs 4, 4a.
Alycaeus (*Dicharax*) *theobaldi* – Kobelt 1902: 377–378. — Gude 1921: 272–273.
Chamalycaeus (*Dicharax*) *theobaldi* – Ramakrishna *et al.* 2010: 67.
Dicharax maosmaiensis – Páll-Gergely *et al.* 2020: 67.
Dicharax theobaldi – Páll-Gergely *et al.* 2020: 73.
Dicharax theobaldi diyungensis – Páll-Gergely *et al.* 2020: 73.

Diagnosis

The combination of the strong, widely-spaced R1 ribs, the relatively widely-spaced R2 ribs and the blunt, central R3 swelling distinguish this species from its congeners.

Type material examined

INDIA • 1 syntype of *A. theobaldi* (Fig. 69F–J); Khasi Hills, NHMUK 1906.4.4.60 • 12 syntypes of *Alycaeus theobaldi* var. *diyungensis* (Fig. 69F–J); Diyung Valley, N of Asalu; NHMUK 1903.7.1.2546 • 1 syntype of *A. maosmaiensis* (Fig. 69K–O) separated in a vial with pink wool + 4 additional syntypes; Maosmai, nr Cherrapoonjee, Khasi; NHMUK 20191067.

Additional material examined

INDIA • 3 shells; Nongphrian, Khasi Hills; Dr Alfred Oberwimmer coll.; NHMW (mixed sample with *D. hebes*) • 1 shell; same data as for preceding; NHMW 14715 (mixed sample with *D. hebes*).

Type localities

“in montibus Khasi” (*A. theobaldi*); “Diyung Valley, north of Asalu, N. Cachar” (*A. theobaldi* var. *diyungensis*); “Khasi Hills, near Cherrapunji, at the mouth of the Maosmai cave” (*A. maosmaiensis*).

Remarks

According to the original description of *Alycaeus theobaldi* var. *diyungensis*, that variety differs from the typical *A. theobaldi* in the following traits: “This Diyung Valley species is a departure from *A. theobaldi* of the Khasi Hills in having the apex less high and conical, the suture more impressed, the shell more

openly umbilicated; costulation next suture stronger" (Godwin-Austen 1914: 402). However, we do not see any of these differences comparing the type specimens of the two taxa. Therefore, we treat *D. theobaldi diyungensis* as a junior synonym of *D. theobaldi*.

The type specimens of *D. theobaldi*, *D. theobaldi diyungensis* and *D. maosmaiensis* are similar in shell size and shell shape, while the sculpture of R1 shows differences. Namely, *D. theobaldi* and *D. theobaldi diyungensis* have strong, widely-spaced ribs that are more or less regular at the beginning of R1, and become irregular and more widely-spaced towards its end, while *D. maosmaiensis* has a smooth beginning of R1, and at the end of R1 the ribs are relatively weak, and slightly denser than in the other two nominal taxa. Nevertheless, these differences are considered part of the intraspecific variability. A similar case (intraspecific variability in R1 rib density) was shown in the case of *Dicharax notus* (see Páll-Gergely *et al.* 2021).

Dicharax umashaankeri Páll-Gergely & Aravind sp. nov.
urn:lsid:zoobank.org:act:DB661D38-F5BD-4993-96D6-BA0C40F17753
Figs 65D–F, 66C–D, 73

Diagnosis

A small species of *Dicharax* with glossy R1 and R3, a combined R2+R3 length of ca 150 degrees, an R3 with a clearly separated main swelling and a secondary swelling, and a rounded aperture with a slight upper incision.

Etymology

This species is named after Prof. R. Uma Shaanker, Founder Trustee of Ashoka Trust for Research in Ecology and the Environment (ATREE), Bangalore, India. He has contributed immensely to the understanding of ecology, evolution, and conservation of flora and fauna of the Western Ghats, India.

Type material examined

Holotype

INDIA – **Mizoram** • empty shell (D: 2.7 mm, H: 2 mm, Fig. 73); Blue Mountain, Lawngtlai district; 22.727° N, 93.135° E; 1400 m a.s.l.; 27 Jan. 2019; N.A. Aravind leg.; Ar73; NZSI LM1742.

Paratypes

INDIA – **Mizoram** • 28 empty shells; same data as for holotype; NZSI LM1743 • 2 empty shells; same data as for holotype; Ar58; NZSI LM1744 • 1 empty shell; same data as for holotype; Ar75; NZSI LM1907 • 3 empty shells; same data as for holotype; Ar40; NZSI LM1745 • 1 empty shell; same data as for holotype; Ar50; NZSI LM1746 • 3 empty shells; same data as for holotype; Ar63; NZSI LM1747 • 1 empty shell; same data as for holotype; Ar25; NZSI LM1748 • 1 empty shell; same data as for holotype; Ar24; NZSI LM1749 • 1 empty shell; same data as for holotype; Ar15; NZSI LM1750 • 1 empty shell; same data as for holotype; Ar15; NZSI LM1908.

Additional material examined

INDIA – **Mizoram** • 2 juvenile empty shell (Fig. 65D–F, 66C–D); same data as for holotype; NZSI LM1751 • 1 broken shell; same data as for holotype; Ar21, NZSI LM1752 • 3 corroded/broken shells; same data as for holotype; Ar36, NZSI LM1753.

Description

Shell small, light yellowish to orange or ochre, in some specimens with reddish apex; glossy, semitranslucent; shell outline slightly oval in dorsal view; spire slightly elevated, low conical; body whorl rounded; protoconch low, glossy, consisting of 1.25–1.5 whorls; R1 of ca 1.5 whorls, glossy,

nearly smooth, with some inconspicuous, dense, low riblets, in some specimens ribs increase in strength on the last ca quarter whorl; spiral striation absent; boundary between R1 and R2 conspicuous due to the sudden change to a regularly, densely ribbed surface; R2 with ca 18–22 straight, sharp, lamella-like ribs; R2 ribs low, blunt, curved towards aperture, spaces between the ribs are approximately the width of a single rib; cross sectional view of R2 was examined in a specimen (Fig. 66C–D): anterior crust forms

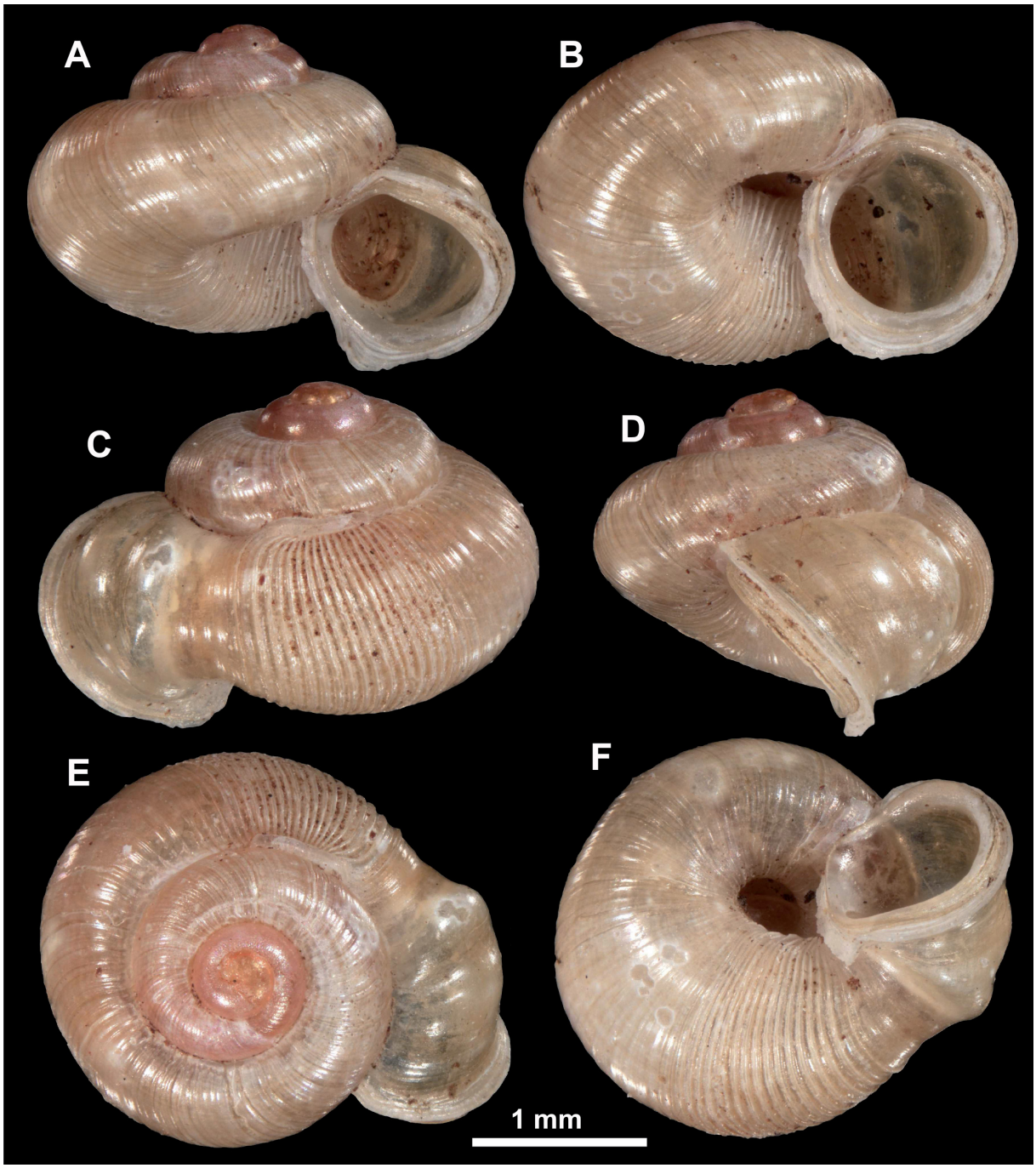

Fig. 73. *Dicharax umashaankeri* Páll-Gergely & Aravind sp. nov., holotype (NZSI LM1742). All photos: B. Páll-Gergely.

a significantly elevated rib, which has an anterior projection (i.e., the R2 ribs are curved towards the aperture); anterior crust folds over the much weaker posterior crust; microtunnel wide compared to ribs, its cross sectional view teardrop-shaped; R2+R3 ca 150 degrees; R3 slightly longer than R2; boundary between R2 and R3 clearly visible due to a deep constriction; R3 forms a blunt tip towards constriction and possesses two swellings; the upper swelling is visible only on the dorsal side, stops at the centre of the whorl, while the lower swelling (i.e., the one situated closer to the aperture) reaches the ventral side of shell; the dent separating the two swellings is elongated, beginning at the suture; aperture strongly oblique to shell axis, rounded with a very slight upper (parieto-palatal) incision; boundary between inner and outer peristomes conspicuous; inner peristome slightly thickened, protruding; outer peristome more conspicuous, sharp, strongly expanded, and reflected towards umbilicus; umbilicus very narrow, ca 1/5 –1/6 of shell width, elongated, oval.

Operculum. Outer surface multispiral, without elevated lamina, inner side with an elevated, flat-topped nipple.

Measurements. D: 2.6–3.1 mm, H: 2–2.2 mm.

Distribution

Known only from the Blue Mountain region.

Differential diagnosis

Dicharax akhaensis is similar in having two swellings and being glossy, but differs from the new species by having more widely-spaced R1 ribs, denser R2 ribs (and possibly lower, although the holotype is corroded), a fringed aperture, and a wider umbilicus.

Dicharax birugosus is similar in colour, size, sculpture and length of R1 and R2, but its R3 is shorter than that of the new species, the aperture is slightly fringed and has a deep basal incision. Moreover, the two swellings are arranged differently: the main swelling is oblique to the constriction in *Dicharax birugosus*, and rather parallel in the new species, while the area on which the secondary swelling is situated is much wider in the new species.

Dicharax subculmen belongs to the "Elephant *Dicharax*" species group but is somewhat similar to this new species, at least in dorsal view. Nevertheless, the new species has a more depressed shell and a wider umbilicus, a deeper ditch between the primary and secondary R3 swellings, a longer R3 with a larger distance between the peristome and the secondary swelling, and a thinner peristome.

Dicharax kurzianus has a fringed aperture.

Dicharax multirugosus has a more depressed shell, and has three separate R3 swellings.

Dicharax species group 9

Remarks

This species group is characterized by a low and blunt R3 swelling that is situated close to the outer peristome, and a slightly fringed to rounded peristome.

Dicharax montanus (Nevill, 1881)
Fig. 74A–E

Alycaeus montanus Nevill, 1881: 149, pl. 6 fig. 5.

Alycaeus (*Chamalycaeus*) *montanus* – Kobelt 1902: 359. — Gude 1921: 229.
Alycaeus montanus – Godwin-Austen 1914: 341–342, pl. 136 figs 3, 3a.
Chamalycaeus (*Chamalycaeus*) *montanus* – Ramakrishna *et al.* 2010: 54.
Dicharax (?) *montanus* – Páll-Gergely *et al.* 2020: 97, fig. 23.

Diagnosis

This species differs from the other species of this species group by the absence of an R3 swelling.

Type material examined

INDIA • 1 syntype (labelled as holotype) (Fig. 74A–E); Sikkim; elev. 11000 ft; Dr Stoliczka coll.; NZSI M.8082.

Type locality

"Sikkim, at 11,000 ft".

Dicharax rechilaensis (Godwin-Austen, 1914)
Fig. 74F–J

Alycaeus rechilaensis Godwin-Austen, 1914: 343–344, pl. 134 figs 2, 2a.

Alycaeus (*Dicharax*) *rechilaensis* – Gude 1921: 267.
Dicharax (?) *rechilaensis* – Páll-Gergely *et al.* 2020: 102.

Type material examined

INDIA • holotype (single shell mentioned in the original description: Fig. 74F–J); Rechila Pk, Sikkim; N. Robert leg.; NHMUK 1903.7.1.1252.

Type locality

"Rechila Peak, Daling District, on Sikhim-Bhutan Frontier, 10,300 feet".

Differential diagnosis

Dicharax strangulatus has a shallower constriction between R2 and R3, and the R3 swelling of that species is less steep. See also under *D. montanus* and *D. strigatus*.

Dicharax strangulatus (L. Pfeiffer, 1846)
Fig. 74K–O

Cyclostoma strangulatum L. Pfeiffer, 1846: 86.

Alycaeus strangulatus – Sowerby 1877: pl. 6, species 47. — Godwin-Austen 1914: 337, pl. 136 figs 1, 1a.
Alycaeus (*Dicharax*) *strangulatus* – Kobelt 1902: 376. — Gude 1921: 269.
Chamalycaeus (*Dicharax*) *strangulatus* – Ramakrishna *et al.* 2010: 66.
Dicharax strangulatus – Sajan *et al.* 2020: 523, figs 1a–b, 2a–l. — Páll-Gergely *et al.* 2020: 104.

Type material examined

INDIA • 1 shell ("possible syntype") (Fig. 74K–O); NHMUK 1856.9.15.18 • at least 5 shells; Mussoorie, N.W Himalaya,"figd"; NHMUK 1903.7.1.2501 • several shells; NHMUK 1928.7.28.85-104 (from general collection). See also newly collected specimens examined in Sajan *et al.* (2020).

Type locality

"Bengalia".

Differential diagnosis

See under *D. rechilaensis*.

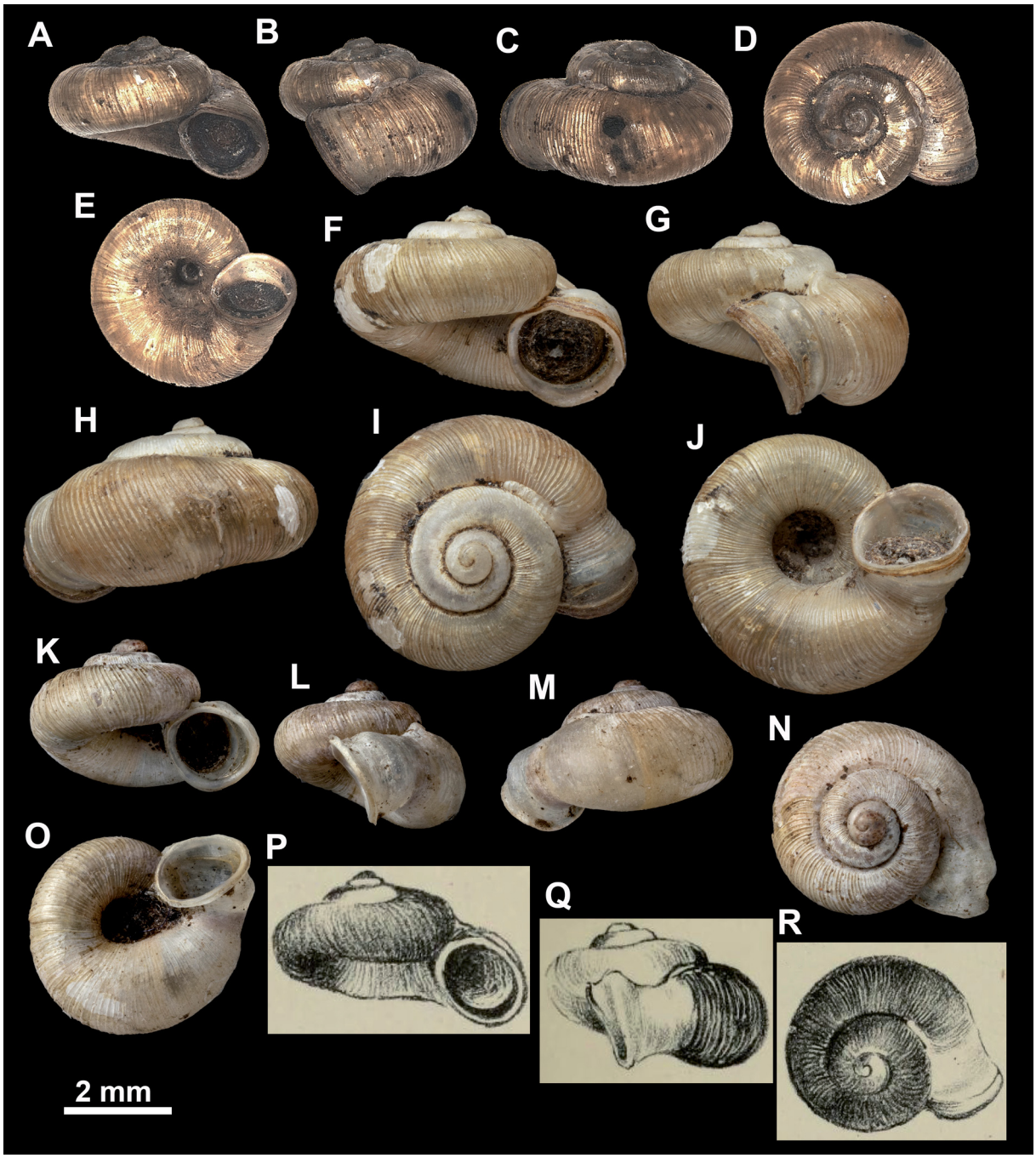

Fig. 74. Shells of species of *Dicharax* Kobelt & Möllendorff, 1900. **A–E**. *D. montanus* (Nevill, 1881), syntype (NZSI M.8082). **F–J**. *D. rechilaensis* (Godwin-Austen, 1914), holotype (NHMUK 1903.7.1.1252). **K–O**. *D. strangulatus* (L. Pfeiffer, 1846), possible syntype (NHMUK 1856.9.15.18). **P–R**. *D. strigatus* (Godwin-Austen, 1874), drawings from the original description. Photos: Sheikh Sajan (A–E), Kevin Webb (F–J) and Harold Taylor (K–O).

Dicharax strigatus (Godwin-Austen, 1874)
Fig. 74P–R

Alycaeus strigatus Godwin-Austen, 1874: 146–147, pl. 3 fig. 2.

Alycaeus (*Chamalycaeus*) *strigatus* – Kobelt 1902: 363. — Gude 1921: 234–235.
Alycaeus strigatus – Godwin-Austen 1914, 381, 401, pl. 144 figs 2, 2a–b.
Chamalycaeus (*Chamalycaeus*) *strigatus* – Ramakrishna *et al.* 2010: 56.
Dicharax (?) *strigatus* – Páll-Gergely *et al.* 2020: 105.

Material examined

The syntypes should be in the Indian Museum (see Nevill 1878), but they have not been located there; therefore, they are considered lost (Páll-Gergely *et al.* 2020).

Type locality

"Assam".

Remarks

This species may be conspecific with *D. rechilaensis*, but in the absence of available specimens of *D. strigatus*, we cannot compare the two species properly. According to the original description of *D. strigatus*, the shell is 0.15 inch (ca 3.8 mm), while *D. rechilaensis* is 5 mm (Godwin-Austen 1914). The drawing of *D. strigatus* in lateral view (Fig. 74Q) agrees clearly with the photo of *D. rechilaensis* in the same view (Fig. 74G). However, the apical view (Fig. 74R) shows a shallower constriction than in *D. rechilaensis* (Fig. 74I). Because of the mismatch of the measurements and the anomalies of the figures, we maintain this as a valid species, until more information becomes available.

Dicharax species group 10

Remarks

This species group is characterized by dense ribbing on the entire shell, and rounded aperture.

Dicharax bhucarinatus Gittenberger & Sherub Sherub, 2024
Fig. 75A–D

Dicharax bhucarinatus Gittenberger & Sherub Sherub in Gittenberger *et al.*, 2024: 209, figs 27, 32.

Diagnosis

Differs from its congeners by the densely ribbed shell, and the keeled body whorl.

Type locality

"Samdrup Jongkhar Dzongkhag: 7 km NNW of Daifam (= Jomotshangkha), Toka Phu, 940 m a.s.l., 26º57'N 92º04'E" (Bhutan).

Differential diagnosis

As mentioned in the original description (Gittenberger *et al.* 2024), the only species of Alycaeinae in the region with a keeled body whorl is *Chamalycaeus sculptilis*, which has a beaded peristome. Nevertheless, *D. bhucarinatus* was described based on the corroded holotype and therefore, the sculpture could not be examined. Thus, it may belong to *Chamalycaeus* (more likely than *Metalycaeus*, as mentioned by Gittenberger *et al.* 2024).

Dicharax bhudepressus Gittenberger, Choki Gyeltshen & Kezang Tobgay, 2024
Fig. 75E–H

Dicharax bhudepressus Gittenberger, Choki Gyeltshen & Kezang Tobgay in Gittenberger *et al.*, 2024: 211, figs 34–35.

Diagnosis

Not similar to any other species of *Dicharax*. Although no spiral striation was mentioned in the original description, this species rather resembles some species of *Metalycaeus*, such as *M. heudei* (Bavay & Dautzenberg, 1900) (see Páll-Gergely *et al.* 2017). However, the photos in the original description are not of sufficient resolution to see the fine sculpture. We keep this species in *Dicharax* until we will have the opportunity to examine the holotype or additional material. Nevertheless, this species is not similar to any species of *Metalycaeus* from the Himalayas.

Type locality

"Zhemgang Dzongkhag: 19.5 km SE of Tingtibi, 780 m a.s.l., 27°01'N 90°49'E" (Bhutan).

Dicharax crassipalatum Gittenberger & Sherub Sherub, 2024
Fig. 75I–L

Dicharax crassipalatum Gittenberger & Sherub Sherub in Gittenberger *et al.*, 2024: 209, figs 27, 30–31.

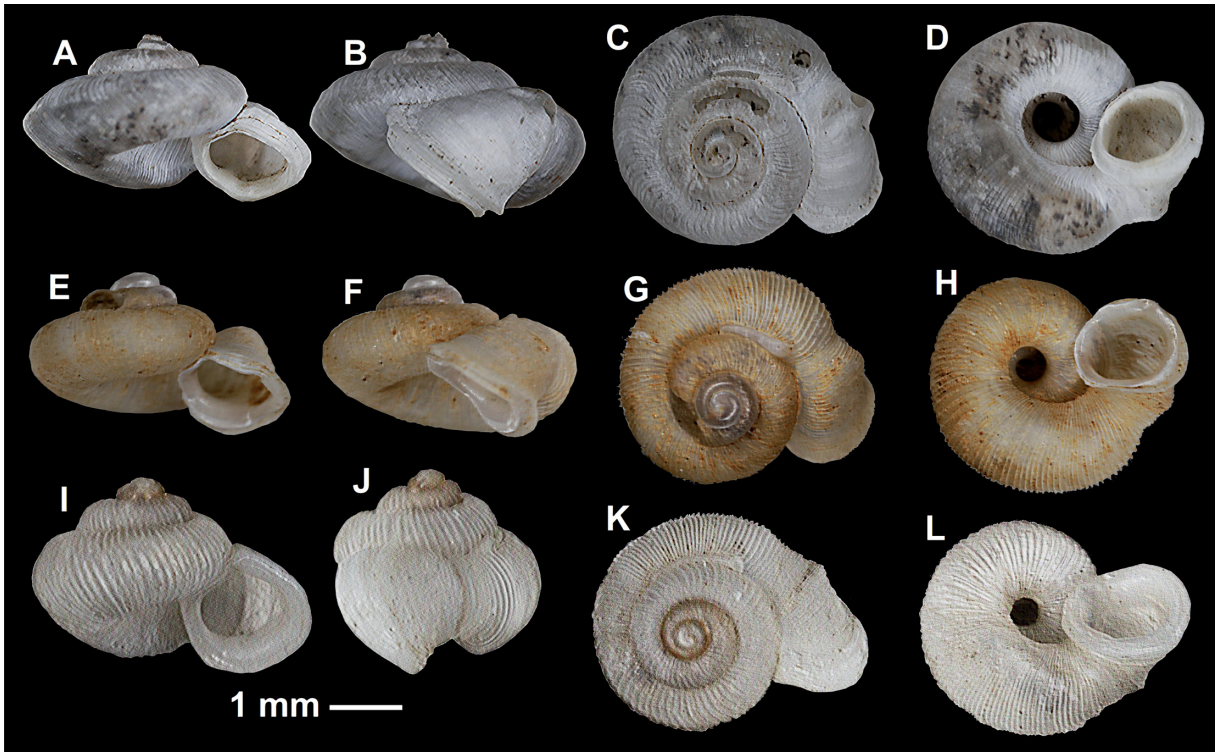

Fig. 75. Shells of species of *Dicharax* Kobelt & Möllendorff, 1900. **A–D**. *D. bhucarinatus* Gittenberger & Sherub Sherub, 2024, holotype (NBCB 1352). **E–H**. *D. bhudepressus* Gittenberger, Choki Gyeltshen & Kezang Tobgay, 2024, holotype (NBCB 1365). **I–L**. *D. crassipalatum* Gittenberger & Sherub Sherub, 2024, holotype (NBCB 3214). All photos from Gittenberger *et al.* (2024).

Diagnosis

The dense ribbing, simple peristome and the morphology of R3 swelling distinguish this species from all other Alycaeinae from the region.

Type locality

"Mongar Dzongkhag: 3 km N of Mongar, 1070 m a.s.l., 27º19'N 91º13'E" (Bhutan).

Dicharax species group 11

Remarks

This species group is characterized by a relatively large, ribbed shell, and a slightly fringed aperture (both from Myanmar).

Dicharax avae (W.T. Blanford, 1863)
Fig. 76

Alycaeus avae W.T. Blanford, 1863: 323–324.

Alycaeus avae – Sowerby 1877: pl. 3, species 20. — Godwin-Austen 1914: 406–407, pl. 151 fig. 6.
Alycaeus (*Dicharax*) *avae* – Kobelt 1902: 365. — Gude 1921: 238.
Dicharax avae – Páll-Gergely *et al.* 2020: 64.

Diagnosis

This species can be recognized based on the relatively large, densely ribbed shell, and the strongly oblique aperture.

Type material examined

MYANMAR • 6 syntypes (Fig. 76); Shan Hills, E of Ava, Burma; Blanford coll.; NHMUK 1906.4.4.61.

Type locality

"The hills east of Mandalay and Ava".

Dicharax succineus (W.T. Blanford, 1862)
Figs 77–80

Alycaeus succineus W.T. Blanford, 1862: 139–140.
Alycaeus vulcani W.T. Blanford, 1863: 323. **Syn. nov.**
Alycaeus blanfordi Godwin-Austen, 1914: 418, pl. 148 fig. 3. **Syn. nov.**

Alycaeus succineus – Sowerby 1877: pl. 2, species 16. — Godwin-Austen 1914: 424, pl. 151 fig. 2.
Alycaeus vulcani – Sowerby 1877: pl. 2, species 17. — Godwin-Austen 1914: 413–414, pl. 151 figs 5, 5a. — Gude 1921: 221–222.
Alycaeus (*Dicharax*) *succineus* – Kobelt 1902: 377. — Gude 1921: 271–272.
Alycaeus (*Alycaeus*) *vulcani* – Kobelt 1902: 352.
Alycaeus blanfordi – Gude 1921: 206.
Chamalycaeus vulcani – Páll-Gergely *et al.* 2020: 48.
Dicharax (?) *succineus* – Páll-Gergely *et al.* 2020: 106.
Dicharax (?) *blanfordi* – Páll-Gergely *et al.* 2020: 106.

Diagnosis

The large shell, widely-spaced ribs, the long R2, relatively low R3 swelling and the fringed aperture distinguish this species from its congeners. Based on the lamella-like ribs, this species rather resembles species of *Chamalycaeus* and *Metalycaeus* (e.g., *M. brahma*, see Páll-Gergely *et al.* 2020), but lacks the spiral striation on its entire shell.

Type material examined

MYANMAR • 1 syntype of *A. succineus* (Fig. 77A–E); Tangoop Pass, Arakan Hills; NHMUK 1906.4.4.52 • holotype of *A. blanfordi* (single specimen mentioned in the original description: Fig. 77F–J); Chwegalé, Arakan Hills; NHMUK 1906.4.4.177 • 1 shell, labelled as syntype of *A. vulcani*; Ava, Burma; MCZ 135705 • 4 shells, possible syntypes of *A. vulcani*; Puppadoung; ex coll. Theobald; NHMUK 1888.12.4.939-942 • 2 shells (possible syntypes of *A. vulcani*); Puppa Hill, Ava; Blanford leg.; Crosse coll. 1899, Sykes coll. 1954; NHMUK • possible syntypes of *A. vulcani* (Fig. 78A–E); Pupa Hills, Burma, extinct volcano; W.T. Blanford coll.; NHMUK 1906.4.4.49 • possible syntypes of *A. vulcani* (Fig. 78F–J); Puppa Ava, Burma; H.F. Blanford coll., ex coll. auctoris; NHMUK 20160325.

Additional material examined

INDIA – **Mizoram** • 1 empty shell (Fig. 79); Blue Mountain, Lawngtlai district; 22.727° N, 93.135° E; 1400 m a.s.l.; 27 Jan. 2019; N.A. Aravind leg.; Ar70; NZSI LM1727 • 2 empty shells; same data as for preceding; Ar26; NZSI LM1728 • 1 empty shell; same data as for preceding; Ar22; NZSI LM1729.

Type localities

"in montibus Arakanensibus" (*A. succineus*); "on the upper portion of the isolated peak of Puppa, an extinct volcano lying ca 40 miles E. S. E. of the town of Pu-gán in the territories of the king of Ava" (*A. vulcani*); "Chwegali, Arakan Hills" [probably Chaingalain Village, Rati Taung: 20°23.8'N 92°39.9'E] (*A. blanfordi*).

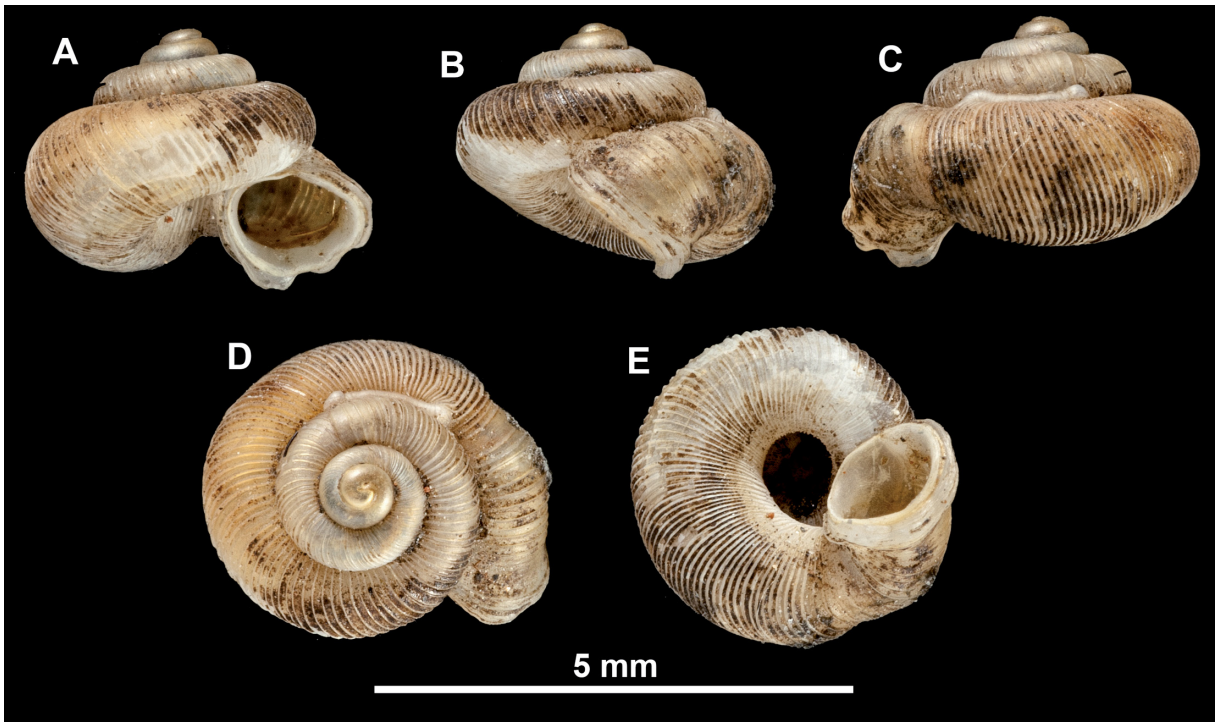

Fig. 76. *Dicharax avae* (W.T. Blanford, 1863), syntype (NHMUK 1906.4.4.61). Photos: Harold Taylor.

Distribution

This species is known from the western part of Myanmar and the Indian state of Mizoram (Fig. 80).

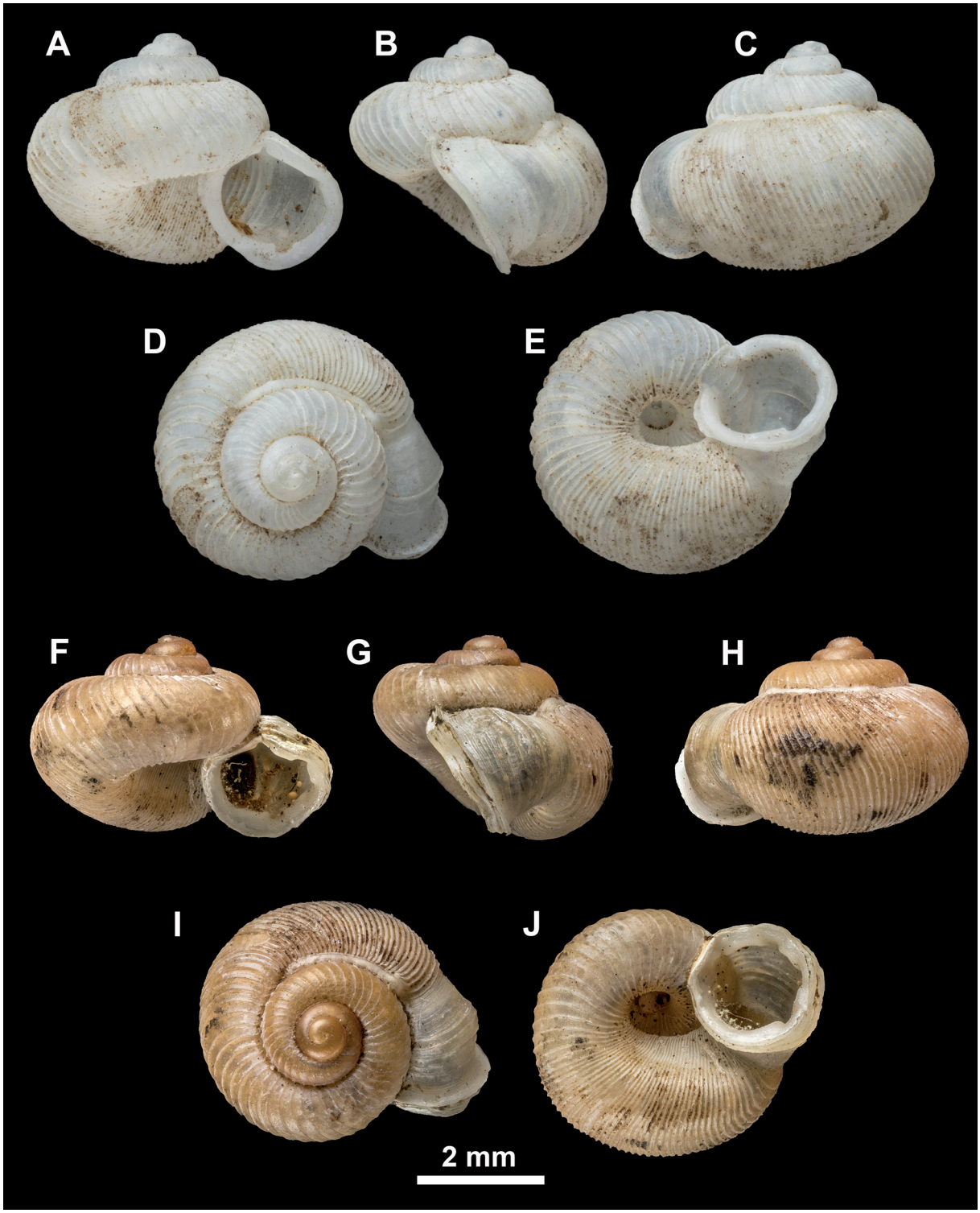

Fig. 77. *Dicharax succineus* (W.T. Blanford, 1862). **A–E**. Syntype of *Alycaeus succineus* Blanford, 1862 (NHMUK 1906.4.4.52). **F–J**. Holotype of *A. blanfordi* Godwin-Austen (NHMUK 1906.4.4.177). All photos: Harold Taylor.

Remarks

The type specimens of *Alycaeus blanfordi*, *A. succineus* and *A. vulcani* are nearly identical. There is no notable difference in shell size, shape, and sculpture. Therefore, they are treated as synonyms, and the oldest name, *D. succineus*, is valid. Blanford (1863), when describing *D. vulcani*, compared that species with *D. succineus*, and wrote that it was more globose than *A. succineus*. The opposite is true;

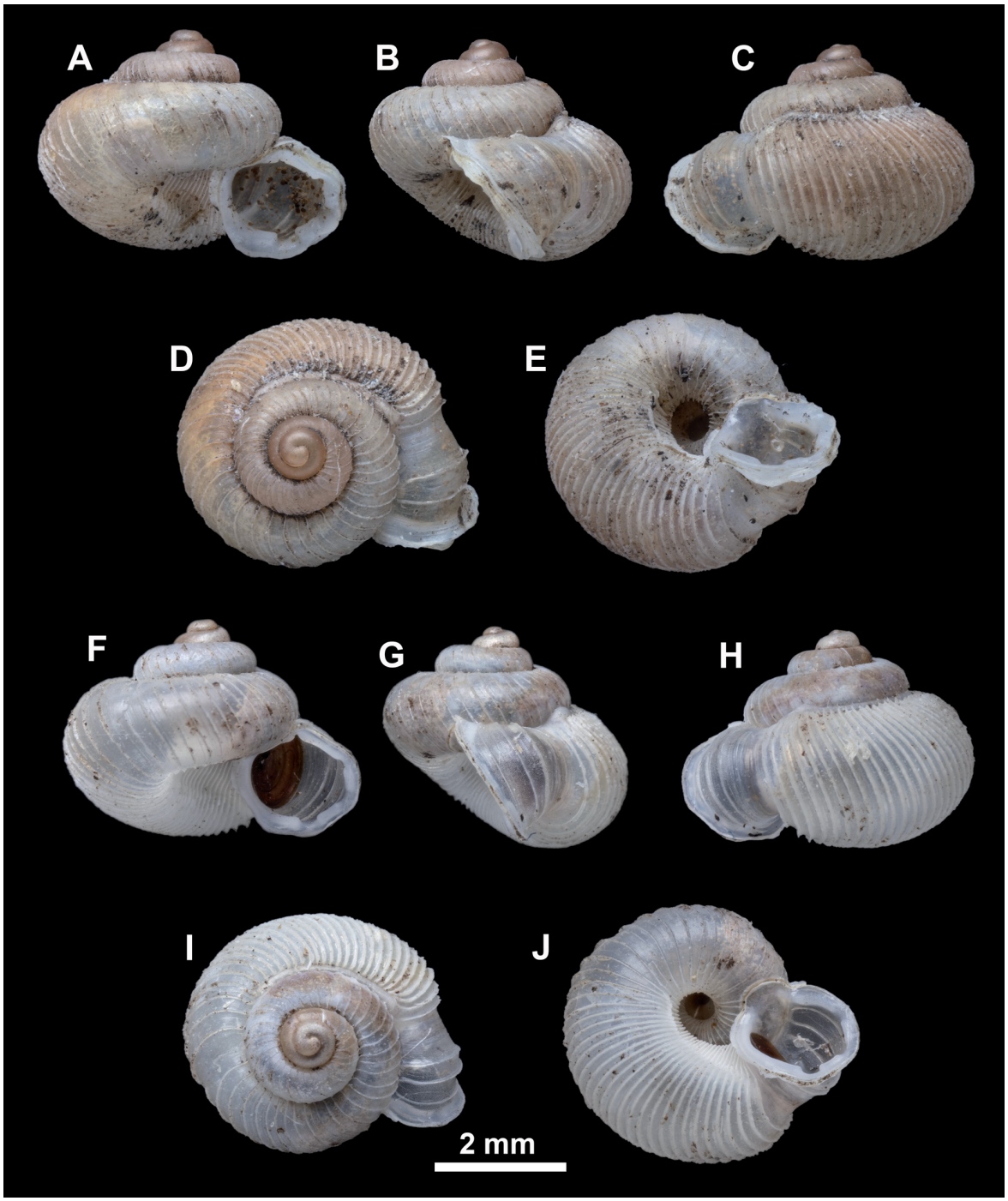

Fig. 78. *Dicharax succineus* (W.T. Blanford, 1862). **A–E**. Syntype of *Alycaeus vulcani* (NHMUK 1906.4.4.49). **F–J**. Syntype of *A. vulcani* (NHMUK 20160325). Photos: Harold Taylor (A–E) and Kevin Webb (F–J).

the syntype of *A. succineus* is slightly more globular than that of *A. vulcani*, although the difference represents intraspecific variability. Godwin-Austen (1914) did not compare *A. blanfordi* with any other species and only noted that the species had very distinctive characters and was worthy of being named.

The specimens from the Blue Mountain differ from the ones from the Arakan Mountains (types of *A. blanfordi*, *A. succineus* and *A. vulcani*) by having a glossy R3, while that of the specimens in the Arakan Mountains are matte with some growth lines. We consider this difference insufficient for species-level distinction.

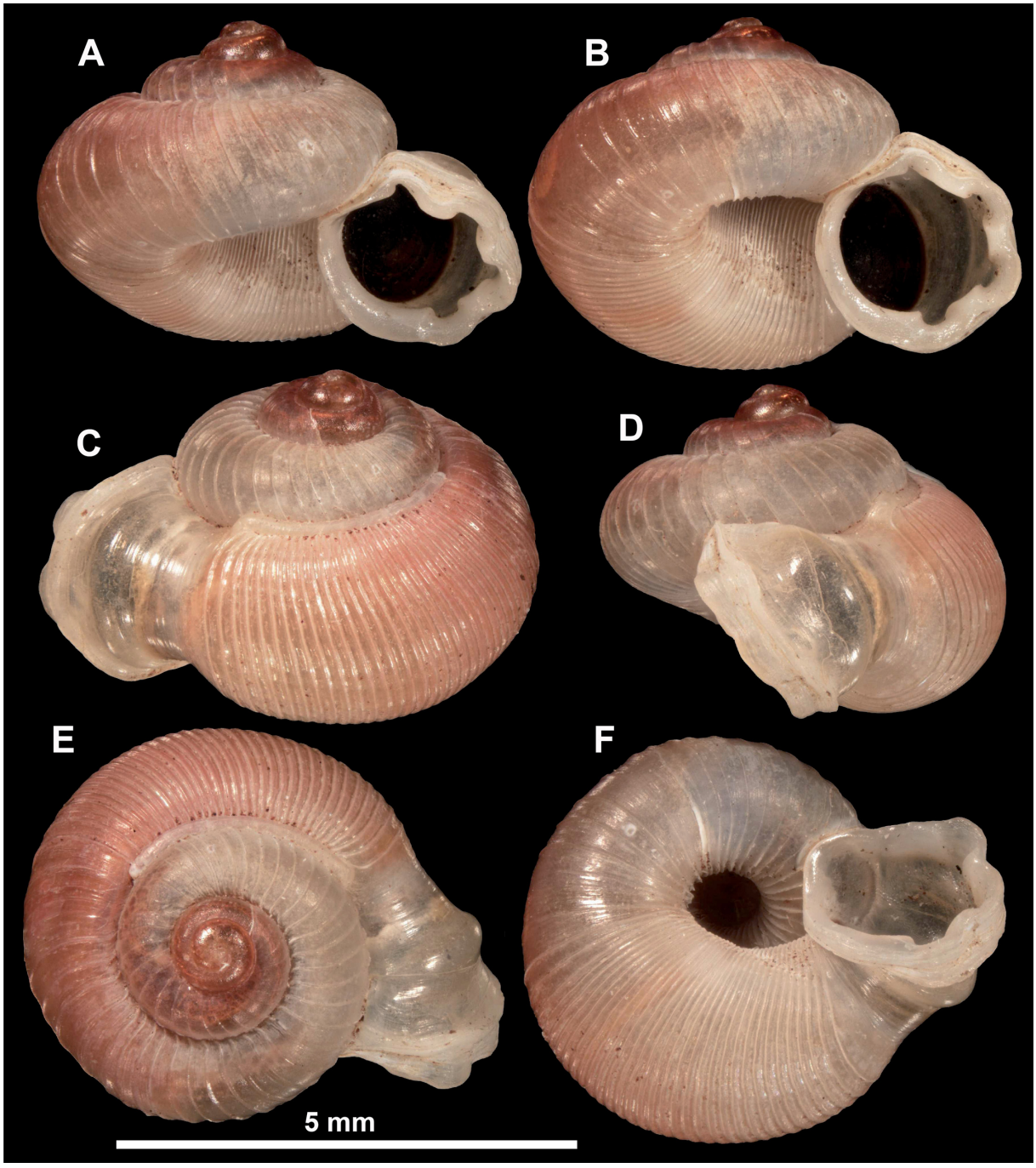

Fig. 79. *Dicharax succineus* (W.T. Blanford, 1862), Ar70, NZSI LM1727. All photos: B. Páll-Gergely.

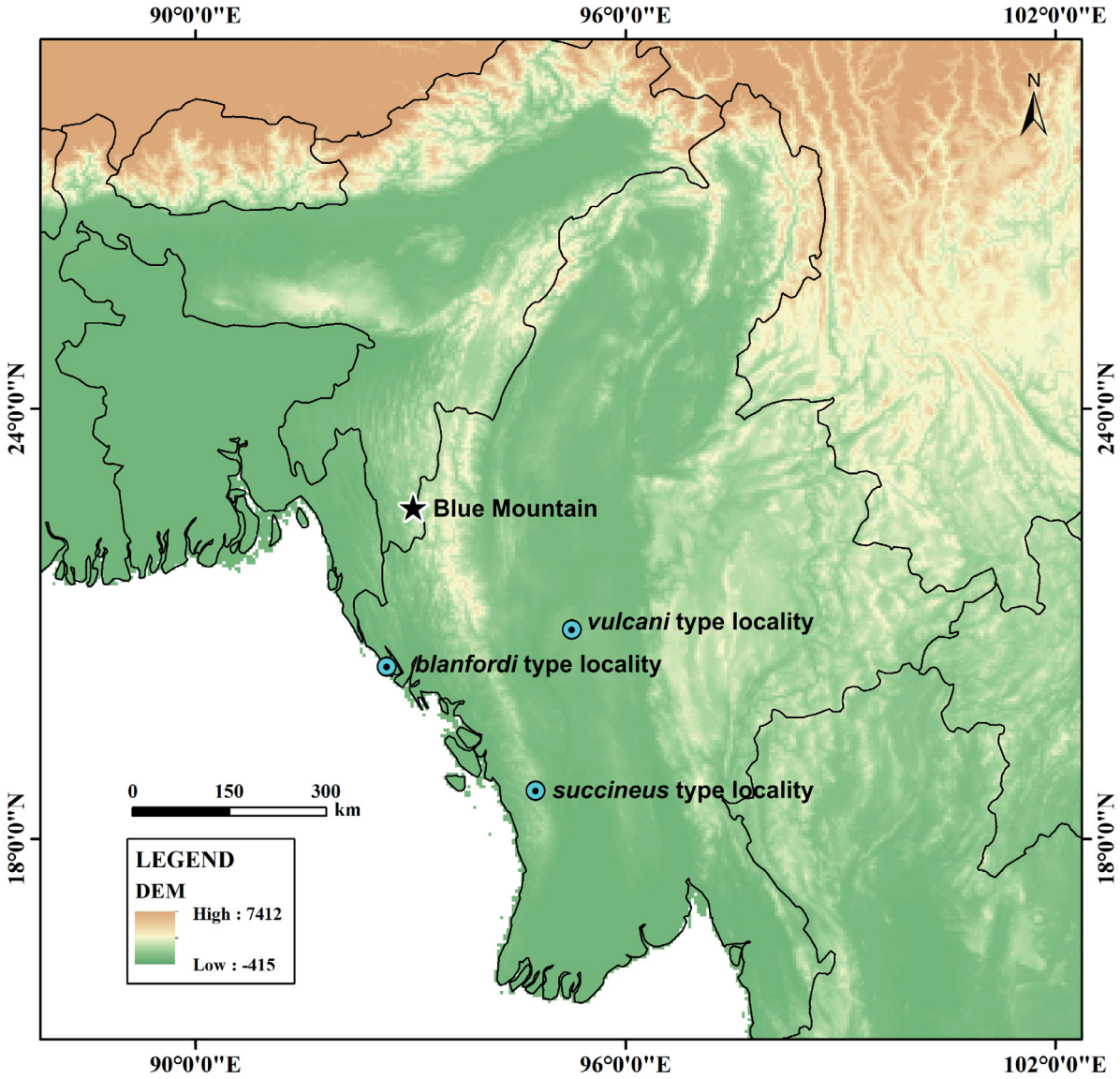

Fig. 80. Distribution of *Dicharax succineus* (W.T. Blanford, 1862).

Dicharax species group 12

Remarks

This species group is not based on morphology, but all species from Myanmar which could not be classified elsewhere are lumped here.

Dicharax ataranensis (Godwin-Austen, 1914)
Fig. 81A–J

Alycæus ataranensis Godwin-Austen, 1914: 426, pl. 148 figs 4, 4a–b.

Alycæus (*Dicharax*) *ataranensis* – Gude 1921: 237.
Dicharax ataranensis – Páll-Gergely *et al.* 2020: 77, fig. 18; 2021: 25, fig. 18.

Diagnosis

R1 nearly smooth (with only some strong, widely-spaced ribs near the suture), R3 swelling conical, upper edge of peristome strongly protruding. Based on these traits, this species can be easily distinguished from its congeners.

Type material examined

MYANMAR • holotype (single shell mentioned in the original description: Fig. 81A–E); Ataran, Burma; ex Dr F. Stoliczka coll.; NZSI M.8073.

Additional material examined

MYANMAR • 1 shell (Fig. 81F–J); Kayin State, ca 51 km ESE of Mudon Centre, NE of Htimahto, NE point of Kwooprai Hill; 16°2.396′ N, 97°58.200′ E; 30 m a.s.l.; 10 Oct. 2018; A. Hunyadi, K. Okubo and J.U. Otani leg.; Coll. HA.

Type locality

"Ataran".

Dicharax dohertyi (Godwin-Austen, 1893)
Fig. 81K–L

Alycaeus dohertyi Godwin-Austen, 1893: 595.

Alycaeus dohertyi – Godwin-Austen 1897: 3, pl. 63 figs 3, 3a. — Godwin-Austen 1914: 408.
Alycaeus (*Dicharax*) *dohertyi* – Kobelt 1902: 369. — Gude 1921: 248–249.
Dicharax (?) *dohertyi* – Páll-Gergely *et al.* 2020: 85.

Material examined

The type specimens of this species are probably lost (Páll-Gergely *et al.* 2020).

Type locality

"Momeit, Burmah".

Differential diagnosis

According to the drawings (Fig. 81K–L), the most similar species is probably *D. rugosus*, but in that species only the inner surface of the peristome is fringed. See also under *D. muspratti*.

Dicharax stoliczkii (Godwin-Austen, 1874)
Fig. 82

Alycaeus Stoliczkii Godwin-Austen, 1874: 147, pl. 3 fig. 3.
Alycaeus (*Charax*) *peilei* Preston, 1914: 22–23, figure on page 23. **Syn. nov.**

Alycaeus stoliczkii – Sowerby 1877: pl. 6, species 53. — Godwin-Austen 1914: 399–400, pl. 144 figs 3, 3a–b.
Alycaeus (*Chamalycaeus*) *stoliczkai* [sic] – Kobelt 1902: 363. — Gude 1921: 233–234.
Alycaeus peilei – Godwin-Austen 1914: 397–398.
Alycaeus (*Dicharax*) *peilei* – Gude 1921: 264.
Chamalycaeus (*Chamalycaeus*) *stoliczkai* [sic] – Ramakrishna *et al.* 2010: 55.
Chamalycaeus (*Dicharax*) *peilei* – Ramakrishna *et al.* 2010: 65.

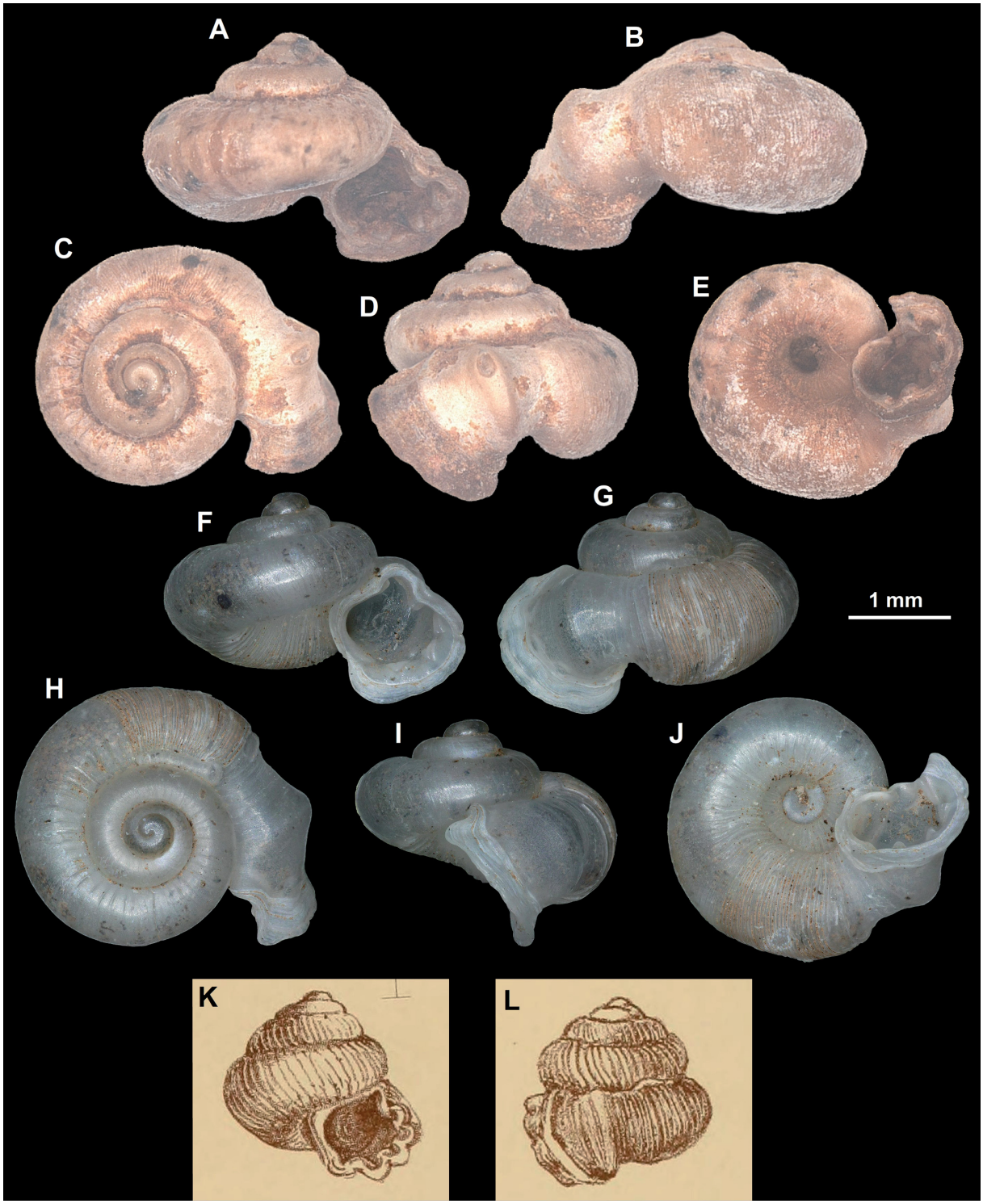

Fig. 81. Shells of species of *Dicharax* Kobelt & Möllendorff, 1900. **A–E**. *D. ataranensis* (Godwin-Austen, 1914), holotype (NZSI M.8073). **F–J**. *D. ataranensis* (from Páll-Gergely *et al*. 2021). **K–L**. *D. dohertyi* (Godwin-Austen, 1893) (from Godwin-Austen 1897 [1882–1920]). Figs K–L are not to scale. Photos: Sheikh Sajan (A–E) and Barna Páll-Gergely (F–J) (from Páll-Gergely *et al*. 2021).

Dicharax (?) *peilei* – Páll-Gergely *et al.* 2020: 101.
Dicharax (?) *stoliczkii* – Páll-Gergely *et al.* 2020: 104.

Diagnosis

The large shell size, the long R2+R3, and the aperture shape distinguish this species from all other Alycaeinae.

Type material examined

INDIA • 3 syntypes of *A. stoliczkii* (Fig. 82A–E); Naga Hills; NHMUK 1903.7.1.2622 • 1 syntype of *A. peilei* (Fig. 82F–J); Naga Hills; Preston coll.; NHMUK 1915.1.4.1281.

Type localities

"Angaoluo Peak, Nágá Hills at 7,000 feet"; "further to the east at Kezakenomih, and at the head of the Lanier River at ca. 5,000 feet where the specimens are much larger" (*A. stoliczkii*); "Naga Hills" (*A. peilei*).

Differential diagnosis

The most similar species is *D. glaber*, but *D. stoliczkii* has a more oval shell (rather rounded in *D. glaber*), a fringed aperture and a secondary swelling touching the penultimate whorl near the peristome.

Remarks

Alycaeus (*Charax*) *peilei* is identical with *Alycaeus stoliczkii* and therefore it is treated as a junior synonym. In the original description of the first species, Preston (1914) did not compare his new species with any other species.

Genus ***Metalycaeus*** Pilsbry, 1900

Alycaeus (*Metalycaeus*) Pilsbry, 1900: 382 (section of *Alycaeus*).

Metalycaeus – Páll-Gergely & Asami 2017: 4. — Páll-Gergely *et al.* 2017: 73; 2020: 137 (treated *Raptomphalus* Godwin-Austen, 1914 as a junior synonym).

Type species

Alycaeus (*Metalycaeus*) *melanopoma* Pilsbry, 1900 (Páll-Gergely *et al.* 2017; fig. 31a) (junior synonym of *Metalycaeus nipponensis* (Reinhardt, 1877), see Minato 1988), subsequent designation by Thiele (1929: 108).

Metalycaeus polygonoma (W.T. Blanford, 1862)
Figs 83–88

Alycaeus polygonoma W.T. Blanford, 1862: 140–141.
Alycaeus distinctus Godwin-Austen, 1893: 592. **Syn. nov.**
Alycaeus rotundatus Godwin-Austen, 1914: 359, pl. 154 fig. 6. **Syn. nov.**
Alycaeus kamakiaensis Godwin-Austen, 1914: 375–376, pl. 141 fig. 8. **Syn. nov.**
Metalycaeus posteriobulbus Gittenberger & Sherub Sherub in Gittenberger *et al.*, 2024: 193, figs 1, 6–7. **Syn. nov.**

Alycaeus ingrami var. – Godwin-Austen 1871: 91–92, pl. 4 fig. 3.
Alycaeus polygonus [sic] – Sowerby 1877: pl. 2, species 11.
Alycaeus (*Dicharax*) *polygonoma* – Kobelt 1902: 375. — Gude 1921: 265–266.

Alycaeus polygonoma – Godwin-Austen 1914: 423, pl. 141 fig. 5.
Alycaeus distinctus – Godwin-Austen 1914: 363; 1914: 390, pl. 145 figs 3, 3a–b.
Alycaeus distinctus var. – Godwin-Austen 1914: 363, pl. 137 figs 2, 2a–b, 391, pl. 149 fig. 4 (2 varieties).

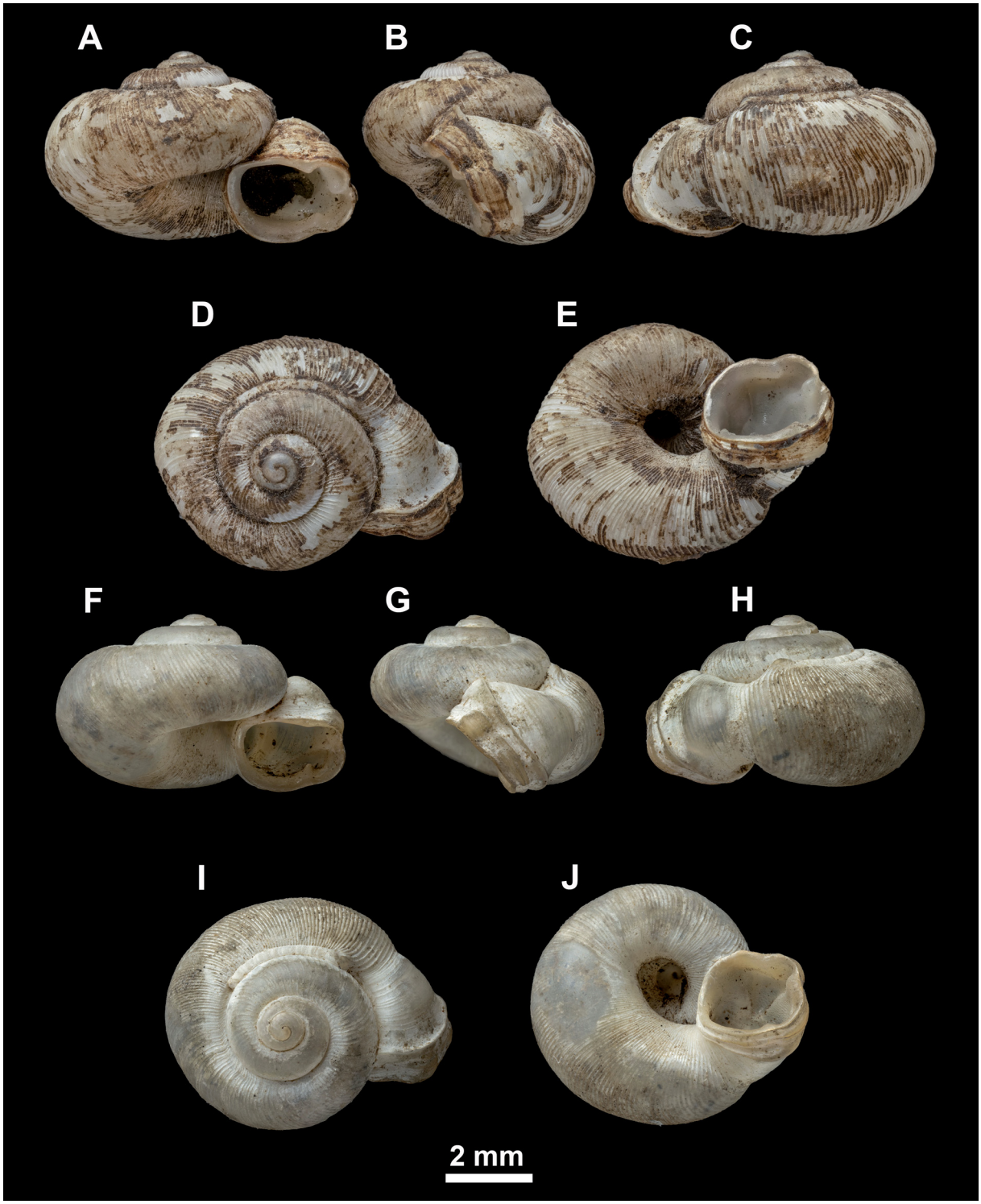

Fig. 82. Shells of *Dicharax stoliczkii* (Godwin-Austen, 1874). **A–E**. Syntype (NHMUK 1903.7.1.2622). **F–J**. Syntype of *Alycaeus peilei* Preston, 1914 (NHMUK 1915.1.4.1281). All photos: Kevin Webb.

Alycaeus kamakiaensis – Gude 1921: 209.
Alycaeus rotundatus – Gude 1921: 217.
Alycaeus (*Chamalycaeus*) *distinctus* – Gude 1921: 226–227.

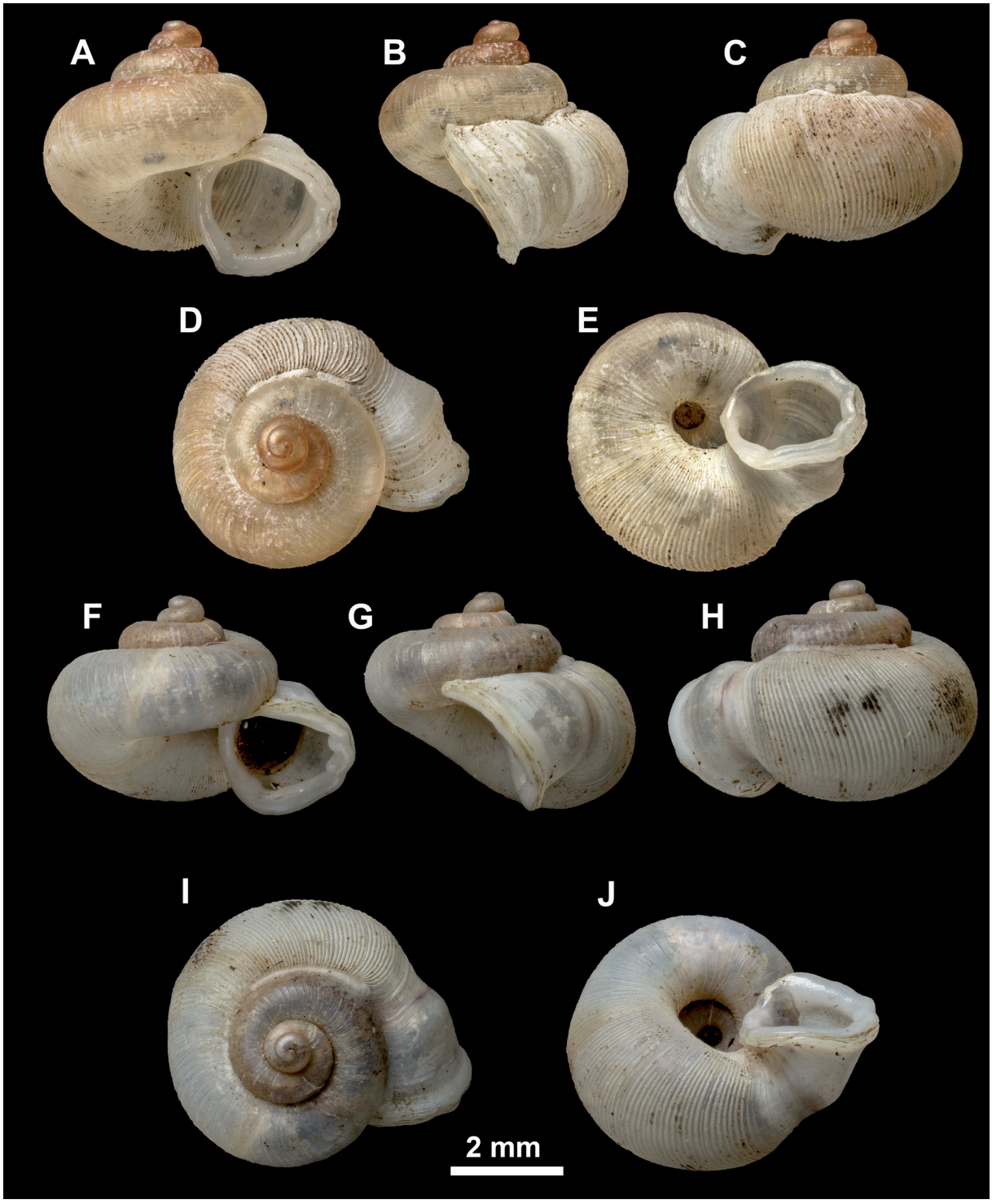

Fig. 83. Shells of *Metalycaeus polygonoma* (W.T. Blanford, 1862). **A–E**. Syntype of *Alycaeus polygonoma* W.T. Blanford, 1862 (NHMUK 1906.4.4.51). **F–J**. Syntype of *A. distinctus* Godwin-Austen, 1893 (NHMUK 1903.7.1.2619). All photos: Kevin Webb.

Alycaeus (*Alycaeus*) *kamakiaensis* – Ramakrishna *et al.* 2010: 48.
Alycaeus (*Alycaeus*) *rotundatus* – Ramakrishna *et al.* 2010: 51.
Chamalycaeus (*Chamalycaeus*) *distinctus* – Ramakrishna *et al.* 2010: 53.
Metalycaeus distinctus – Páll-Gergely *et al.* 2020: 142.

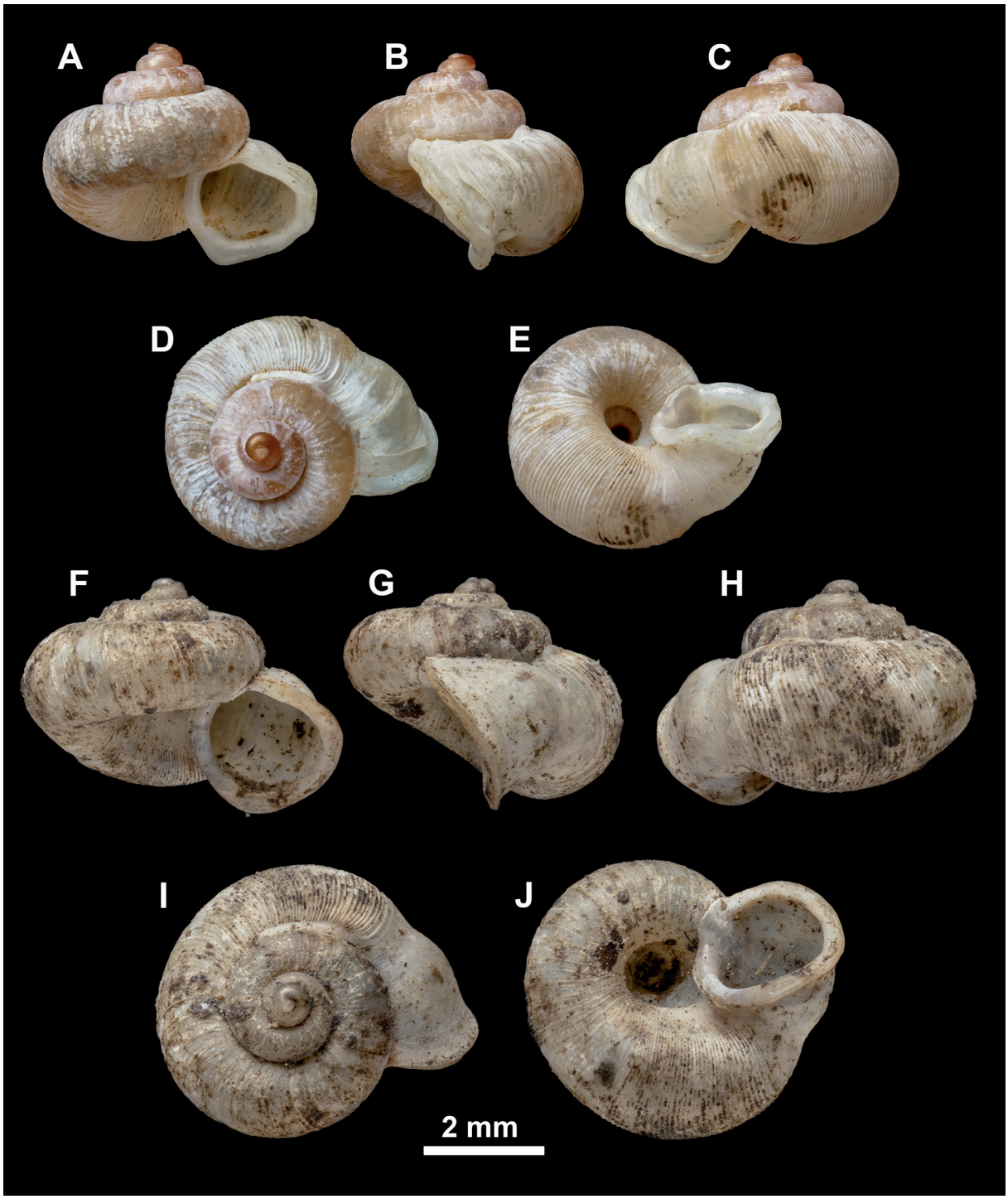

Fig. 84. Shells of *Metalycaeus polygonoma* (W.T. Blanford, 1862). **A–E**. Syntype of *Alycaeus kamakiaensis* Godwin-Austen, 1914 (NHMUK 1903.7.1.2705). **F–J**. Holotype of *A. rotundatus* Godwin-Austen, 1914. All photos: Kevin Webb.

Metalycaeus kamakiaensis – Páll-Gergely *et al.* 2020: 145.
Metalycaeus polygonoma – Páll-Gergely *et al.* 2020: 151.
Metalycaeus rotundatus – Páll-Gergely *et al.* 2020: 153.

Diagnosis

This species can be recognised based on the relatively large aperture, finely undulated peristome, the elongated basal peristome edge and the blunt centrally located R3 swelling. We indicate that the

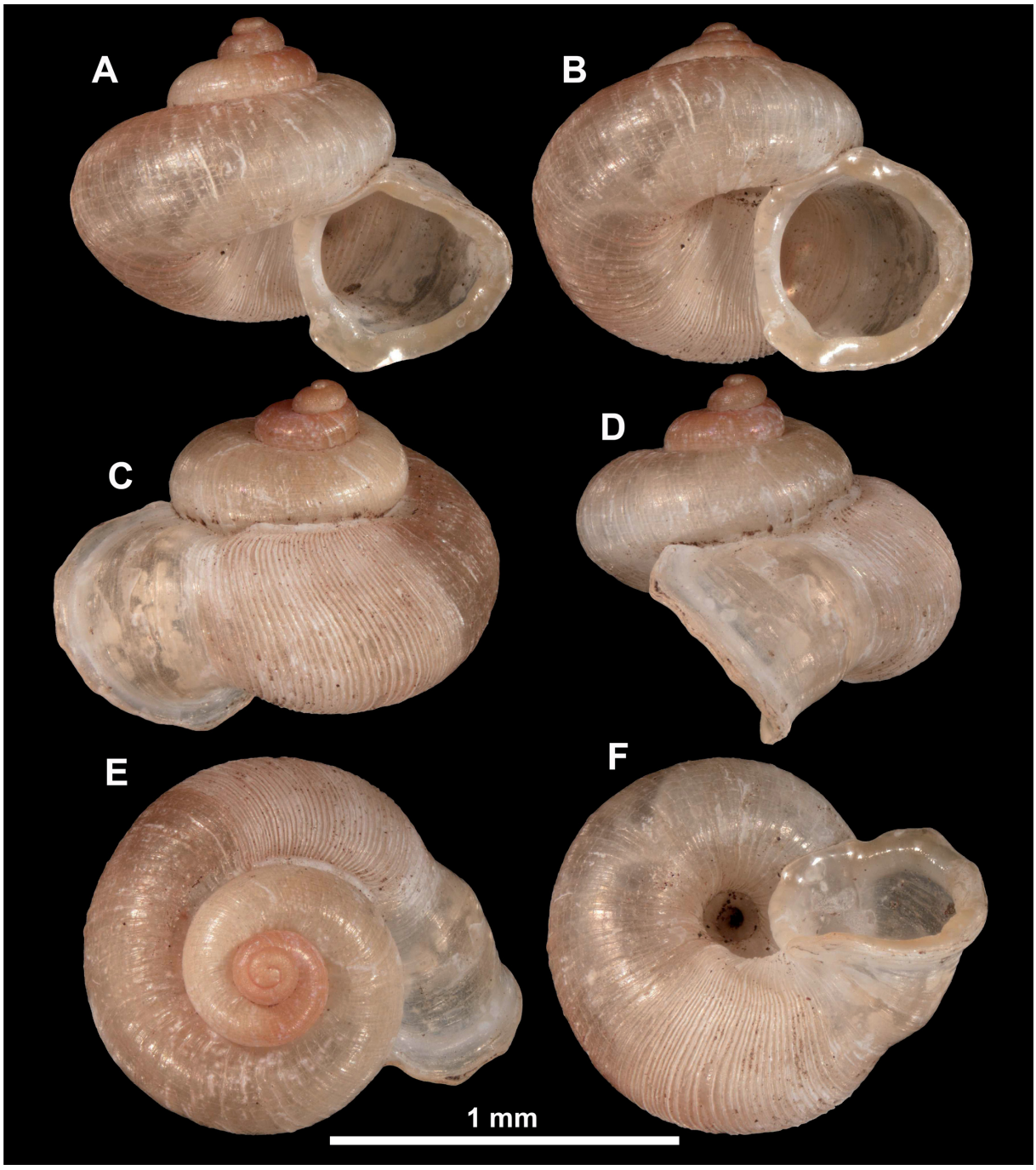

Fig. 85. *Metalycaeus polygonoma* (W.T. Blanford, 1862), Ar48 (NZSI LM1762).

Himalayan species of *Metalycaeus* are not revised in this study, and a comprehensive revision should identify the species-specific traits.

Type material examined

INDIA • 10 syntypes of *A. distinctus* (Fig. 83F–J); Naga Hills; NHMUK 1903.7.1.2619 • 1 syntype of *A. kamakiaensis* (Fig. 84A–E); Kamakia Hill, Gowhatty, Assam; NHMUK 1903.7.1.2705 • holotype (single shell mentioned in the original description: Fig. 83F–J) of *A. rotundatus*; Dafla Hills (?); NHMUK 1903.7.1.2543.

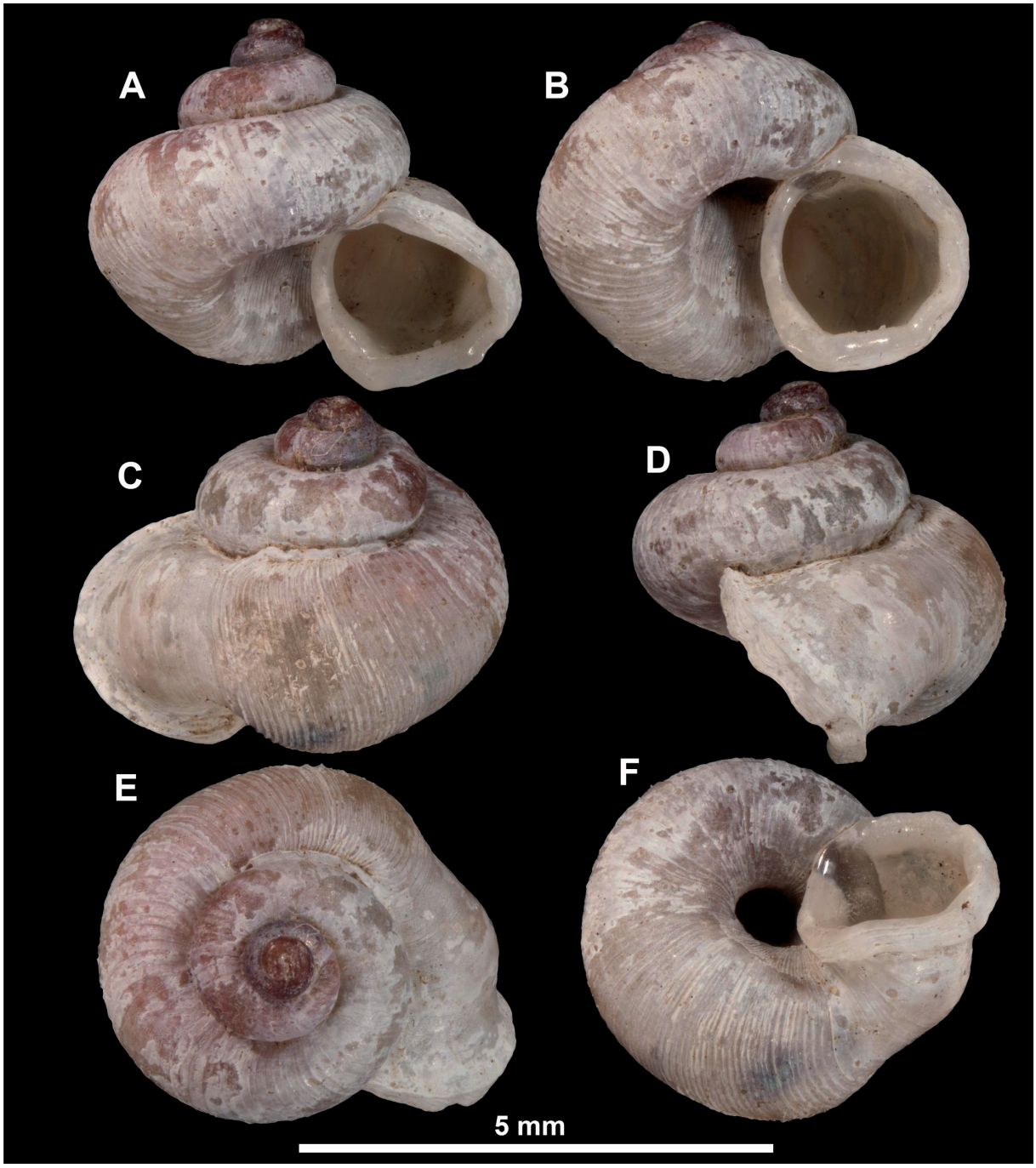

Fig. 86. *Metalycaeus polygonoma* (W.T. Blanford, 1862), Ar71 (NZSI LM1763).

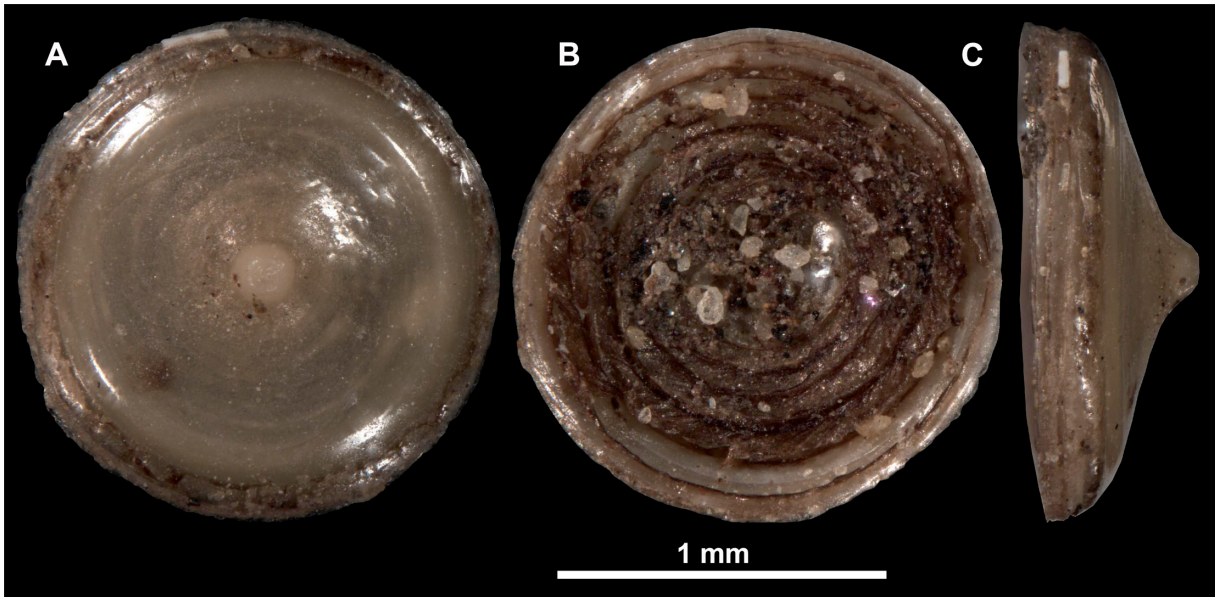

Fig. 87. Operculum of *Metalycaeus polygonoma* (W.T. Blanford, 1862), Ar71 (NZSI LM1763).

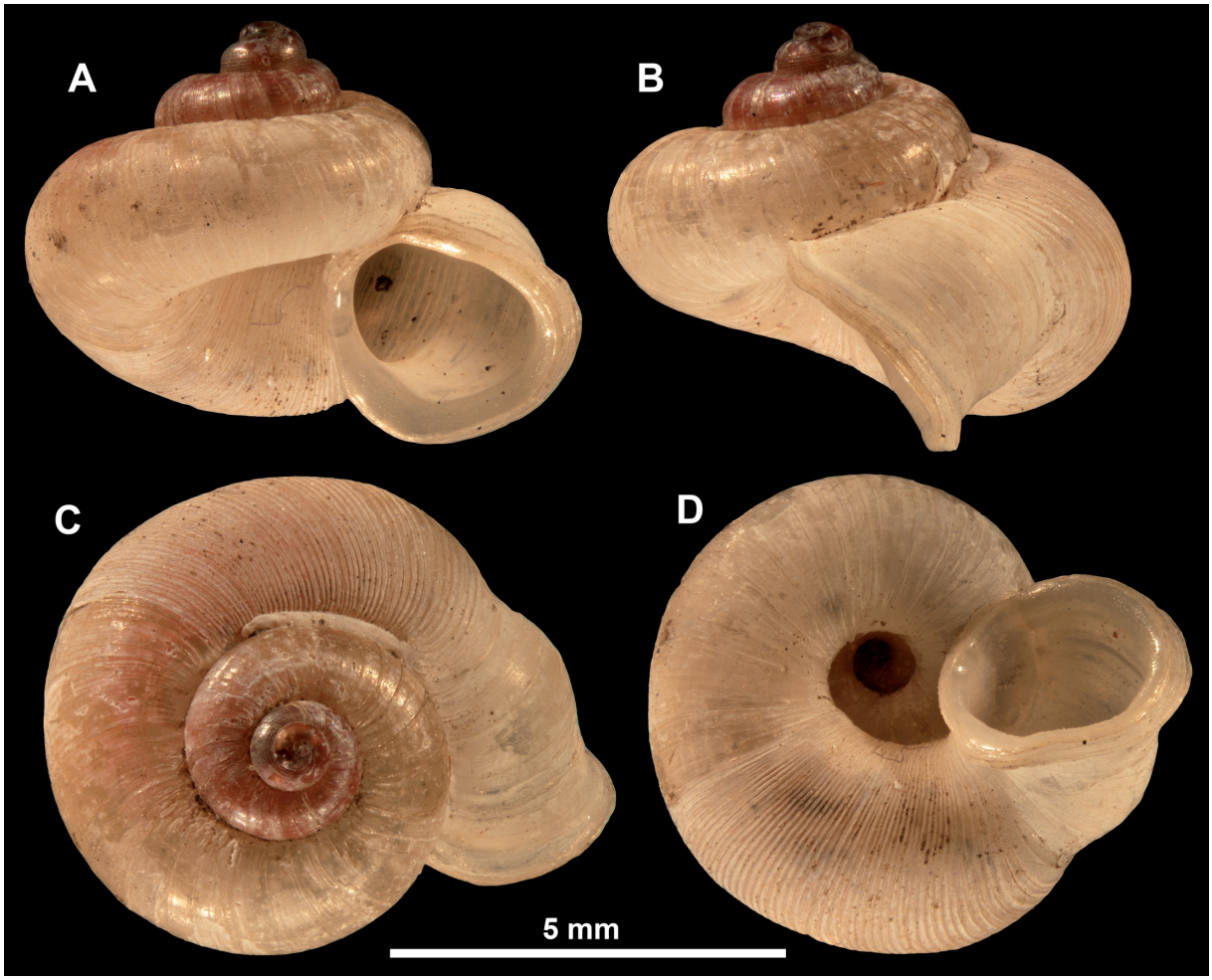

Fig. 88. *Metalycaeus polygonoma* (W.T. Blanford, 1862) from Bangladesh (coll. PGB).

MYANMAR • 2 syntypes of *A. polygonoma* in different vials (Fig. 83A–E); Tongoop Pass, Arakan Hills; NHMUK 1906.4.4.51.

Additional material examined

BANGLADESH • 2 shells (Fig. 88); Chittagong, natural mango garden on a river bank; 22°31.559′ N, 92°7.652′ E; 27 Sep. 2024; T. Saito and M.S. Shariar leg.; Coll. PGB.

INDIA • 2 shells of "*Alycaeus distinctus* var."; Sadia, Assam; NHMUK 1903.7.1.2620 • 19 + 6 shells of "*Alycaeus distinctus* var."; Jatinga Valley, N. Cachar; Godwin-Austen coll.; NHMUK 1903.7.1.2576 • 1 empty shell (Figs 12D, 85); Blue Mountain, Lawngtlai district; 22.727° N, 93.135° E; 1400 m a.s.l.; 27 Jan. 2019; N.A. Aravind leg.; Ar48; NZSI LM1762 • 2 empty shells (Figs 86–87[operculum]); same data as for preceding; Ar71; NZSI LM1763 • 1 empty shell; same data as for preceding; Ar43; NZSI

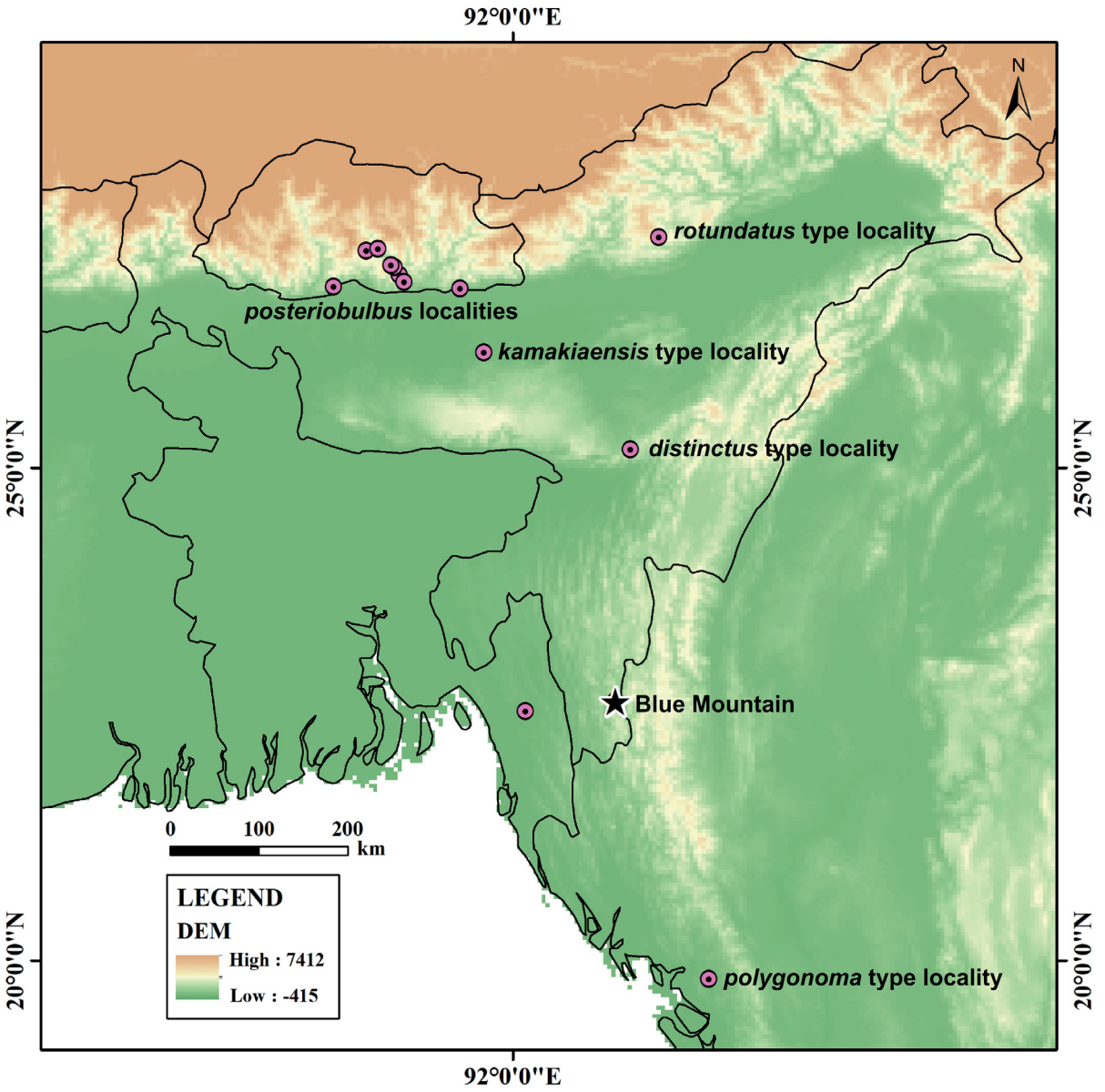

Fig. 89. Distribution of *Metalycaeus polygonoma* (W.T. Blanford, 1862).

LM1909 • 5 empty shells; same data as for preceding; Ar46; NZSI LM1910 • 2 empty shells; same data as for preceding; Ar51; NZSI LM1911.

Type localities

"in montibus Arakanensibus" (*A. polygonoma*); "Neighbourhood of Asálú, N. Cachar Hills" (*A. distinctus*); "Kamakia Temple Hill near Gowhatty, Assam" (*A. kamakiaensis*); "Dafla hills" (*A. rotundatus*); "Zhemgang Dzongkhag: between Duenmang Tsachu and Gongphu Zero Point, 24 km SE of Zhemgang, 335 m a.s.l., 27°02'N 90°48'E, scree in warm broadleaf forest" (*M. posteriobulbus*).

Distribution

The new information reveals that *M. polygonoma* has a larger distribution than previously thought; its area spans from Bhutan and the Dafla Hills (India) to the Arakan Mountains in Myanmar (Fig. 89). Furthermore, this species is reported from Bangladesh for the first time. With these localities, *M. polygonoma* is one of the few species of Alycaeinae with a large distributional area besides *Metalycaeus heudei* (Páll-Gergely *et al.* 2017, 2021), *Dicharax fimbriatus* and *D. cristatus* (Möllendorff, 1886) (see Páll-Gergely *et al.* 2017).

Remarks

Type specimens of *A. polygonoma*, *A. distinctus*, *A. kamakiaensis*, *A. rotundatus* and *M. posteriobulbus* do not differ in any important conchological characters; therefore, the latter four are junior synonyms of the former. The types of those five species and the newly collected samples from the Blue Mountain show slight variability in shell size, length of R2, width of umbilicus, and the degree of undulation of the peristome, but all differences are attributed to intraspecific variability.

Discussion

The genus-level revision of the Alycaeinae (Páll-Gergely *et al.* 2020) revealed that three geographic areas can be considered as biodiversity centres for this subfamily, namely the southeastern Himalayas, northern Vietnam/southern China, and Peninsular Malaysia/Sumatra, each inhabited by five genera. The Himalayan region has been intensively studied at the end of the 19th and beginning of the 20th centuries, mostly by Benson, Theobald, the Blanford brothers and Godwin-Austen. However, although our previous paper (Páll-Gergely *et al.* 2020) grouped the Himalayan species into genera based on key characters (mostly shell sculpture), and some synonyms were spotted, no species-level revision of Himalayan and Burmese Alycaeinae has been published since the works of Godwin-Austen (1882–1920) and Gude (1921).

Besides revising the Himalayan and Burmese Alycaeinae, the other aim of this paper was to present the rich Alycaeinae fauna from the Blue Mountain, Mizoram State, northeast India. The studied material is particularly interesting because no Alycaeinae specimens have ever been reported from the state of Mizoram (Fig. 1). Out of the 13 species we identified from the Blue Mountain, seven are described here as new. Their identification and description were only possible after revision of the genera and species groups they belonged to. Therefore, we revised the Himalayan and Burmese species of the genera *Chamalycaeus*, *Cycloryx*, and *Dicharax*, by examining and comparing type specimens. A single species of *Alycaeus* (see Aravind & Páll-Gergely 2023) and several species of *Metalycaeus* are known from the region (Páll-Gergely *et al.* 2020). However, a revision of *Metalycaeus* was not necessary to identify the species from the Blue Mountain, because only a single species of *Metalycaeus* is found there.

This revision recognizes 108 species in the following genera: *Chamalycaeus*: 12 species (3 of them known only from Myanmar), *Cycloryx*: 18 species (3 of them known only from Myanmar), and

Table 1. List of taxa treated as synonyms in this paper. The synonyms recognized in this study are marked in bold.

Synonyms	Accepted name
anonymus Godwin-Austen, 1914	***Dicharax ingrami*** (W.T. Blanford, 1862)
barowliensis Godwin-Austen, 1914	***Chamalycaeus asaluensis*** (Godwin-Austen, 1914**)**
blanfordi Godwin-Austen, 1914	***Dicharax succineus*** (W.T. Blanford, 1862)
burroiensis Godwin-Austen, 1914	***Dicharax akhaensis*** **(**Godwin-Austen, 1914**)**
canaliculus Godwin-Austen, 1914	*Dicharax birugosus* (Godwin-Austen, 1893)
crassus Godwin-Austen, 1914	***Dicharax jaintiacus*** (Godwin-Austen, 1871)
davisi Godwin-Austen, 1914	*Dicharax cucullatus* (Theobald, 1870)
difficilis Godwin-Austen, 1914	***Cycloryx graphicus*** (W.T. Blanford, 1862)
distinctus Godwin-Austen, 1893	***Metalycaeus polygonoma*** (W.T. Blanford, 1862)
diyungensis Godwin-Austen, 1914	***Dicharax theobaldi*** (W.T. Blanford, 1862)
duorugosus Godwin-Austen, 1914	***Dicharax khasiacus*** (Godwin-Austen, 1871)
edei Godwin-Austen, 1914	***Dicharax glaber*** (W.T. Blanford, 1865)
gemma Godwin-Austen, 1914	***Dicharax akhaensis*** **(**Godwin-Austen, 1914**)**
generosus Godwin-Austen, 1914	***Dicharax habiangensis*** **(**Godwin-Austen, 1914**)**
graphiarius Godwin-Austen, 1914	***Cycloryx margarita*** (Theobald, 1872)
kamakiaensis Godwin-Austen, 1914	***Metalycaeus polygonoma*** (W.T. Blanford, 1862)
kezamaensis Godwin-Austen, 1914	***Chamalycaeus solidus*** **(**Godwin-Austen, 1914**)**
khunhoensis Godwin-Austen, 1914	***Cycloryx elegans*** **(**Godwin-Austen, 1914**)**
kurzianus Theobald & Stoliczka, 1872	***Dicharax nitidus*** (W.T. Blanford, 1862)
levis Godwin-Austen, 1914	***Dicharax glaber*** (W.T. Blanford, 1865)
makarsae Godwin-Austen, 1914	***Chamalycaeus sculpturus*** (Godwin-Austen, 1875)
maosmaiensis Godwin-Austen, 1922	***Dicharax theobaldi*** (W.T. Blanford, 1862)
minimus Godwin-Austen, 1914	***Chamalycaeus crispatus*** (Godwin-Austen, 1871)
multicostulatus Godwin-Austen, 1914	***Cycloryx granum*** (Godwin-Austen, 1893)
nagaensis Godwin-Austen, 1871	***Dicharax ingrami*** (W.T. Blanford, 1862)
nanus Godwin-Austen, 1914	***Dicharax conicus*** (Godwin-Austen, 1871)
peilei Preston, 1914	***Dicharax stoliczkii*** (Godwin-Austen, 1874)
posteriobulbus Gittenberger & Sherub Sherub, 2024	***Metalycaeus polygonoma*** (W.T. Blanford, 1862)
rotundatus Godwin-Austen, 1914	***Metalycaeus polygonoma*** (W.T. Blanford, 1862)
rywukensis Godwin-Austen, 1914	***Chamalycaeus crispatus*** (Godwin-Austen, 1871)
sajodentatus Gittenberger & Choki Gyeltshen, 2024	***Dicharax rugosus*** **(**Godwin-Austen, 1914**)**
sandowayensis Godwin-Austen, 1914	***Dicharax umbonalis*** (Benson, 1856)
serratus Godwin-Austen, 1874	***Dicharax jaintiacus*** (Godwin-Austen, 1871)
subhumilis Möllendorff, 1897	***Dicharax gemmula*** (Benson, 1859)
summus Godwin-Austen, 1914	***Cycloryx otiphorus*** (Benson, 1859)
tanghali Godwin-Austen, 1914	***Chamalycaeus logtakensis*** **(**Godwin-Austen, 1914**)**
thompsoni Godwin-Austen, 1914	***Cycloryx major*** (Godwin-Austen, 1893)
variabilis Godwin-Austen, 1914	***Cycloryx major*** (Godwin-Austen, 1893)
vulcani W.T. Blanford, 1863	***Dicharax succineus*** (W.T. Blanford, 1862)

Dicharax: 78 species (18 of them known only from Myanmar). Furthermore, *Metalycaeus polygonoma* is also added because it is recorded from the Blue Mountain.

We found 37 new synonyms of Indian and Burmese Alycaeinae (see Table 1). The majority of those names (29) were originally described as species, while the remaining ones (8) were first introduced as varieties. Among all new synonyms recognized in this study, 31 were described by H. H. Godwin-Austen, who was the most active author of alycaeid names during the "Golden Era" of malacology (Godwin-Austen 1871, 1874, 1875, 1876, 1882–1920, 1922). Altogether, there are 107 species of Alycaeinae which were described by Godwin-Austen from India and Myanmar (taxa below species level not counted), and we currently treat 35 of them as synonyms (Páll-Gergely *et al.* 2020 and this paper). A number of these synonyms are due to a different interpretation of conchological differences by Godwin-Austen and ourselves. However, we note that in several cases he named practically identical shells as distinct species without comparing them to each other. Nevertheless, this does not diminish the enormous contribution of Godwin-Austen towards our knowledge of Himalayan land snail diversity. Our contribution warns that understanding of species boundaries may change over time, and description of species cannot be done without revising old taxonomic concepts and examining type specimens.

Our results also show that some species of Alycaeinae are widespread (Páll-Gergely *et al.* 2017, 2021, this paper), similar to some other cyclophoroidean groups (e.g., Páll-Gergely *et al.* 2015), which emphasises that a new species should be compared not only with the geographically most closely occurring species. Further extensive surveys from this and surrounding regions might yield additional new species and help us understand the true distribution and diversity of Alycaeinae in the Indo-Burma biodiversity hotspot.

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Supplementary file

Supp. file 1. Historical localities mentioned in the text. https://doi.org/10.5852/ejt.2025.1029.3131.13933