

# The genera *Dioryx* and *Cycloryx* (Gastropoda, Caenogastropoda, Alycaeidae) in Bhutan, with a description of four new species

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## Abstract

Samples of the genera *Dioryx* and *Cycloryx* from Bhutan are identified or described as new species. Next to the widespread *D. urnula*, 7 species of *Cycloryx* are recognized, 4 of which are endemic to Bhutan and new to science, viz. *C. pemaedai* Gittenberger & Sherub, spec. nov., *C. globhutanus* Gittenberger & Sherub, spec. nov., *C. haumbiclausus* Gittenberger & Gyeltshen, spec. nov., and *C. sajumbiclausus* Gittenberger & Gyeltshen, spec. nov. An identification key is provided for *Cycloryx* species. *Cycloryx summus* (Godwin-Austen, 1914), which was described from “Rechila Peak, Western Bhutan”, is not accepted as a Bhutanese species since its type locality is most probably in West Bengal, outside the present borders of Bhutan.

**Key words.** Gastropoda, Alycaeidae, *Dioryx*, *Cycloryx*, new species, North-East India, Nepal, Bhutan.

**ZooBank registration.** urn:lsid:zoobank.org:pub:25A85E54-26C3-4E59-B62C-B8C58EC6F6FE

## Introduction

Since the beginning in 2012 of the Bhutan Evertebrata Inventory Project of the National Biodiversity Centre (Serbithang, Thimphu, Bhutan), the Ugyen Wangchuk In-

stitute for Conservation and Environmental Research (Bumthang, Bhutan), and Naturalis Biodiversity Center (Leiden, the Netherlands), much progress has been made in improving our knowledge of the molluscan fauna of Bhutan. This was possible because of the active cooperation of several co-workers in the country, who have substantially enlarged the area from where molluscs were collected for study. It resulted in an important increase in the number of known species. In the field guide to the common molluscs of Bhutan (Gittenberger et al., 2017), for example, only one species of *Dioryx* Benson, 1859 and one species of *Cycloryx* Godwin-Austen, 1914 were illustrated, both as *Alycaeus* spec. In this article, we report from Bhutan *Dioryx urnula* (Benson, 1853) and 7 *Cycloryx* species, 4 of which as new to science.

For a detailed general introduction to the Alycaeidae, we refer to Páll-Gergely et al. (2017, 2020, 2022 personal communication). These authors showed that the geographically disjunct nominal genera *Cycloryx* and *Pincerna* Preston, 1907 cannot be distinguished conchologically but differ substantially in their DNA (unpublished data). *Cycloryx* is known now from the south-eastern Himalaya, whereas *Pincerna* is present in Peninsular Malaysia. Molecular data are not yet available for species from Vietnam, China, and Laos.

The shells of the *Cycloryx* species are more or less globular-conical and usually little higher than broad. The Bhutanese species have  $3\frac{3}{4}$ – $4\frac{1}{4}$  very convex whorls; they are 3.4–4.2 mm high and 2.7–3.8 mm broad. The protoconch has  $1\frac{1}{4}$ – $1\frac{3}{4}$  smooth whorls. There is a very short sutural tube, measuring less than  $\frac{1}{8}$  of the last whorl. *Dioryx* is represented in Bhutan by only a single species, *D. urnula*



**Figure 1.** Records of *Dioryx urnula* (Benson, 1853) (●), *Cycloryx haumbiclausus* Gittenberger & Gyeltshen, spec. nov. (■), *C. sajumbiclausus* Gittenberger & Gyeltshen, spec. nov. (▲), *C. bembex* (Benson, 1859) (▼).

(Benson, 1853), which resembles the *Cycloryx* species in shape. It can easily be distinguished from the *Cycloryx* species by the relatively long sutural tube, measuring nearly  $\frac{1}{4}$  whorl.

## Materials and Methods

The shells were collected by sieving soil samples or by hand searching (see Gittenberger et al., 2021). The specimens are in the molluscan collection of the National Biodiversity Centre (Serbithang, Thimphu, Bhutan), with some duplicates in the National Biodiversity Center Naturalis (Leiden, the Netherlands).

The number of whorls was counted in accordance to Kerney & Cameron (1979: 13). We follow Páll-Gergely et al. (2020) in subdividing the teleoconch in three parts, viz. R1, reaching from the protoconch to the posterior ending of the sutural tube, R2 bordering the sutural tube, and R3 starting with a constriction near the anterior beginning of the sutural tube and ending with the peristome. For details regarding the complex structure and the functionality of the R2 area, we refer to Páll-Gergely et al. (2016). The R2 area has a diagnostically important number of light stripes. The aperture is roughly circular and is surrounded by a more or less prominently thickened, circular, inner rim, and a more or less broadly expanded outer edge, which may be curved towards the umbilicus. We based our description of the colour of the shell on the best-preserved specimen; it

may differ from the shell colour of live snails. The ribbing is measured on the last whorl above the aperture.

Because of the paucity of distinctive characters, only descriptions are provided and diagnoses are omitted. The number of specimens is indicated after the slash after the collection number. The formal Bhutanese term “dzongkhag” refers to a district.

**Abbreviations.** H = height; NBCB = National Biodiversity Centre (Serbithang, Thimphu, Bhutan); RMNH. MOL = National Biodiversity Center Naturalis (Leiden, the Netherlands); W = width.

## Systematic Part

**Subclass Caenogastropoda Cox, 1960**  
**Superfamily Cyclophoroidea Gray, 1847**  
**Family Alycaeidae W.T. Blanford, 1864**

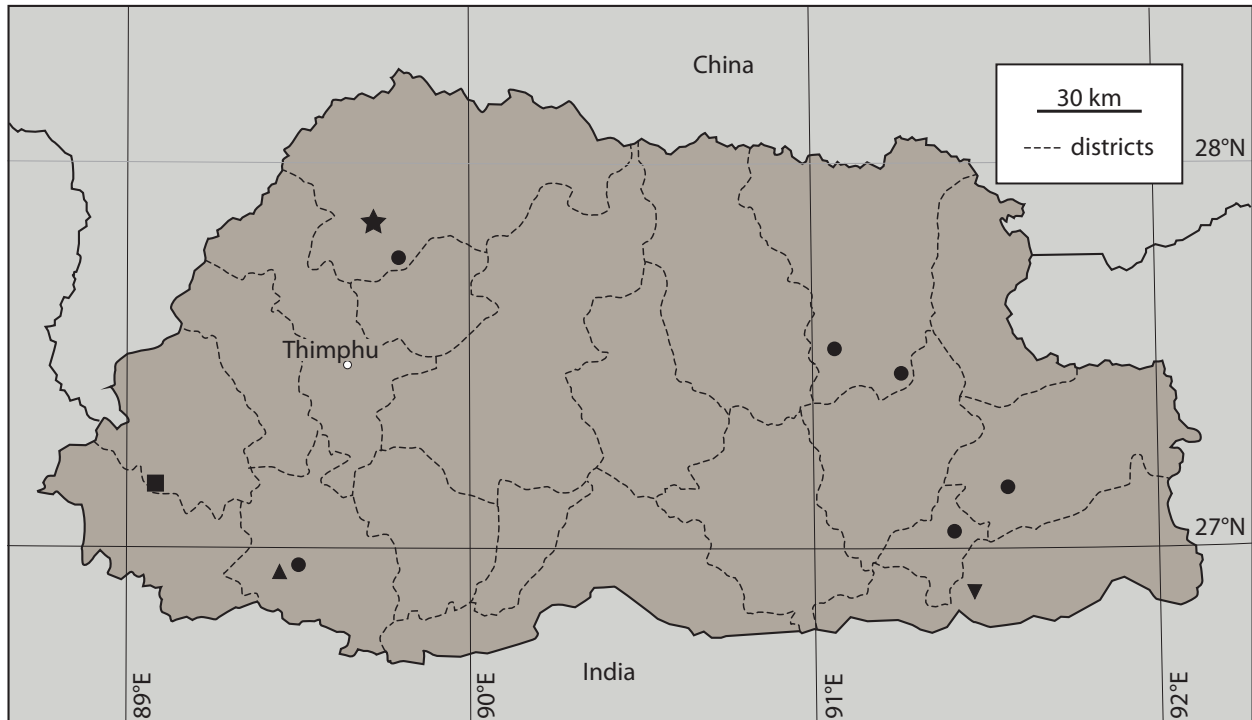
### **Genus *Dioryx* Benson, 1859**

**Type species.** *Alycaeus amphora* Benson, 1856; subsequent designation by Gude (1921: 198). Male.

### ***Dioryx urnula* (Benson, 1853)**

Figures 1–3

*Alycaeus urnula* Benson, 1853: 284 (“ad Darjiling Himalayanum”).



**Figure 2.** Records of *Cyclorix pemaledei* Gittenberger & Sherub, spec. nov. (★), *C. globhutanus* Gittenberger & Sherub, spec. nov. (▼), *C. otiphorus* (Benson, 1859) (▲), *C. constrictus* (●), *C. cf. constrictus* (■).

**Material.** Pemagatshel Dzongkhag, NW side of Pemagatshel, 1750 m a.s.l., 27°02'N 91°25'E, E. Gittenberger & Pema Leda leg. 15.iv.2015 (NBCB1283/2, RMNH.MOL. 507913/1). Trashigang Dzongkhag, Kharang La, 20 km S of Trashigang, 2300 m a.s.l., 27°09'N 91°34'E, E. Gittenberger & Pema Leda leg. 16.iv.2015 (NBCB1284/2).

**Description** ( $n = 5$ ). The colourless shell is globular conical, with  $3\frac{1}{2}$ – $3\frac{3}{8}$  whorls,  $1\frac{3}{4}$  of which of the finely granular protoconch. There is a very prominent constriction shortly behind the broadly expanded and reflected peristome, which is not clearly differentiated as an inner rim and an outer edge. The sutural tube runs along nearly  $\frac{1}{4}$  whorl. There is a minute umbilicus. R1 has irregular sculpture of relatively coarse growth lines and much finer radial and spiral lines; R2 has 50–55 stripes in 3 shells from Pemagatshel and 45–47 in 2 shells from Trashigang; R3 is smooth.

**Measurements.** W 3.7–4.6 mm, H 4.1–4.9 mm, W/H = 0.90–0.94 (NBCB1284); W 4.7–4.9 mm, H 5.2–5.4 mm, W/H = 0.90–0.91 (NBCB1283).

**Distribution.** This species is reported from North-East India, from Sikkim and West Bengal eastwards to Arunachal Pradesh and Nagaland, and Myanmar (Ramakrishna et al., 2010: 75). In Bhutan, there are only two records, situated at 1750–2300 m a.s.l. in the eastern part of the country.

**Note.** Godwin-Austen (1914) introduced four varieties, which were given subspecific status by Páll-Gergely et al. (2020). The material at our disposal is insufficient to classify to subspecies.

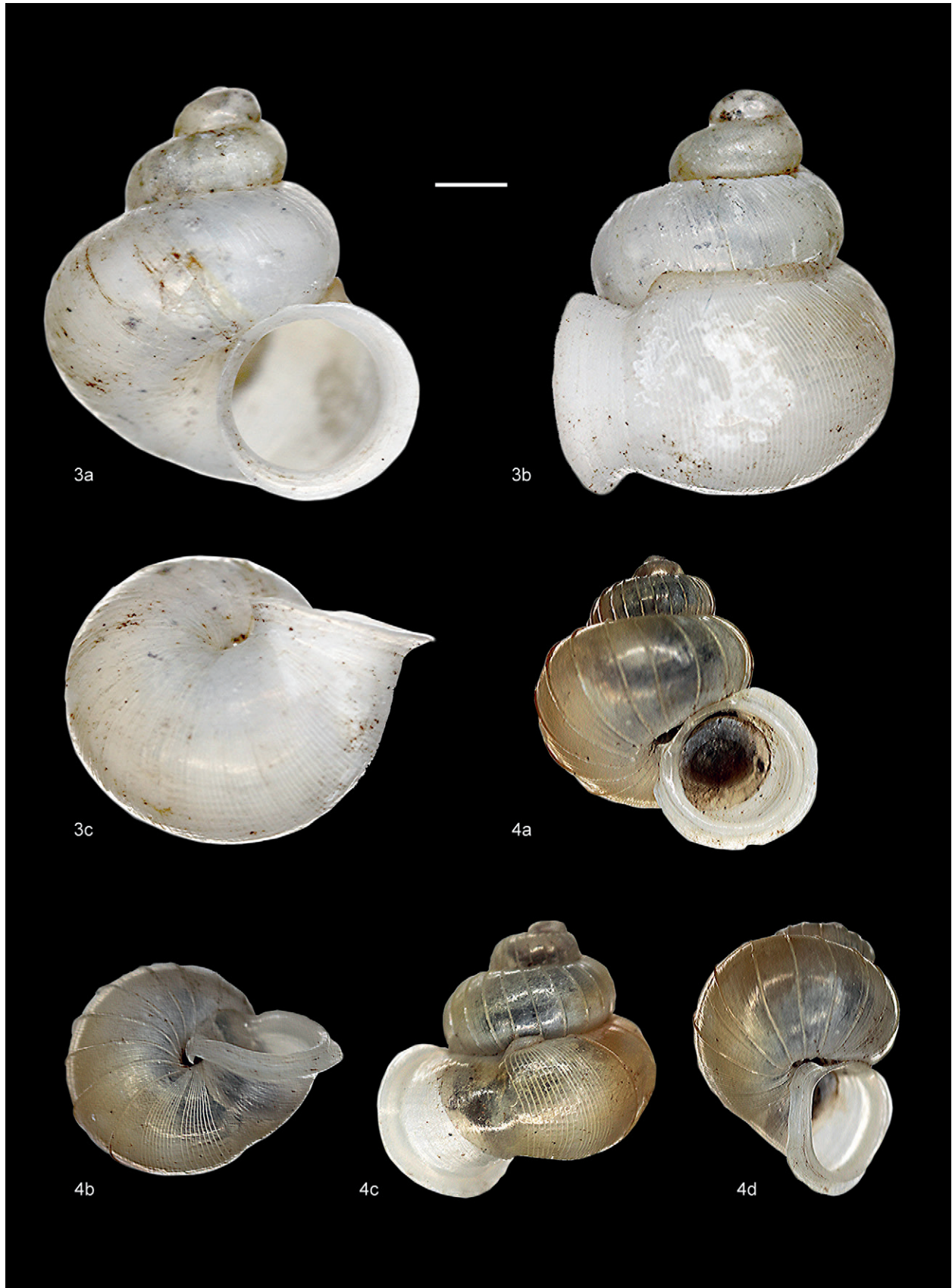
#### Genus *Cyclorix* Godwin-Austen, 1914

**Type species.** *Cyclostoma constrictum* Benson, 1851, by original designation (Godwin-Austen, 1914: 334). Male.

#### Identification key to Bhutanese

##### *Cyclorix* species

- 1a Outer edge of the peristome regularly curved towards the short parietal interruption, not covering the umbilical area in frontal view ..... 6
- 1b Outer edge of the peristome straightened at the columellar side and more or less clearly reflected towards the umbilical area, which is at least partly covered ... 2
- 2a R1 with ca 12 ribs/mm .....  
..... *C. pemaledei* Gittenberger & Sherub, spec. nov.
- 2b R1 less densely ribbed ..... 3
- 3a R2 with >12 stripes ..... 4
- 3b R2 with <12 stripes ..... *C. otiphorus* (Benson, 1859)
- 4a Shell about as high as broad, R1 widely ribbed (2 ribs/mm) .....  
..... *C. globhutanus* Gittenberger & Sherub, spec. nov.
- 4b Shell clearly higher than broad, R1 more densely ribbed ..... 5
- 5a With spiral sculpture ..... *C. haumbiclausus* Gittenberger & Gyeltshen, spec. nov.
- 5b Without spirals ..... *C. sajumbiclausus* Gittenberger & Gyeltshen, spec. nov.



**Figures 3, 4.** Alycaeidae. **3.** *Dioryx urnula* (Benson, 1853), Pemagatshel Dzongkhag, NW side Pemagatshel; H 5.4 mm (NBCB1283). **4.** *Cycloryx globhutanus* Gittenberger & Sherub, spec. nov. holotype (NBCB1258), Samdrup Jongkhar Dzongkhag, 9 km N of Samdrup Jongkhar; H 3.8 mm. Scale bar: 1 mm.

- 6a R2 with >12 stripes . . . . . *C. bembex* (Benson, 1859)  
 6b R2 with <12 stripes . . . . . 7  
 7a R1 with  $\geq 5$  ribs/mm . . . . . *C. constrictus* (Benson, 1851)  
 7b R1 with 3 ribs/mm . . . . . *C. cf. constrictus* (Benson, 1851)

*Cyclorix pemaledai*

Gittenberger & Sherub, spec. nov.

Figures 2, 9

**ZooBank registration.** urn:lsid:zoobank.org:pub:25A85E54-26C3-4E59-B62C-B8C58EC6F6FE

**Type series.** Holotype (NBCB1289), Gasu Dzongkhag, 9 km S of Gasu, 2400 m a.s.l., 27°50'N 89°43'E, E. Gittenberger & Pema Leda leg. 22.iii.2016.

**Description** ( $n = 1$ ). The greyish, weathered shell is slender-conical. R1 is densely ribbed (12 ribs/mm); R2 has ca 6 stripes; R3 is relatively short, with a constriction with 4 or 5 radial riblets near the apertural border. There is no spiral sculpture discernible. The aperture is surrounded by a scarcely thickened, not clearly expanded inner rim, which is not reflected. Only on the columellar side, is there a separate outer edge, which is curved abruptly backwards towards the narrow umbilicus but without obstructing it in frontal view.

**Measurements.** W 2.7 mm, H 3.4 mm; W/H = 0.79.

**Differentiation.** *Cyclorix pemaledai* is most similar to *C. elegans* (Godwin-Austen, 1914). A syntype of the latter taxon was studied by Páll-Gergely et al. (2020: 175). These authors mentioned an “extremely fine, pitted spiral striation between the ribs” and ca 8 stripes on R2. The shell from Gasu is weathered, which may explain the missing spiral sculpture; it has only 6 lines on R2. In *C. elegans*, the outer edge of the peristome forms “a flange hiding the umbilicus”, as shown in the shell figured by Godwin-Austen (1914: 361, pl. 147 fig. 9). Calculated on the basis of the original description and illustration, *C. elegans* is ca 2.6 mm broad and 2.9 mm high, and, thus, slightly smaller and less slender (W/H = 0.90) than *C. pemaledai*.

According to Godwin-Austen (1907: 184–185), *C. elegans* is only known from the type locality, “Shengorh Peak” in the Dafla Hills in North-East India, between 93°10' and 93°50'E and north of 27°N. This is ca 350 km to the east of the type locality of *C. pemaledai*. This geographic gap has contributed to our decision to consider *C. pemaledai* a separate species.

**Distribution.** This species is known from the type locality only, at 2400 m a.s.l.

**Etymology.** The new species is named in honour of our friend Pema Leda, who participated in the fieldwork during the initial years of the molluscan inventory in Bhutan.

*Cyclorix otiphorus* (Benson, 1859)

Figures 2, 7

*Alycaeus otiphorus* Benson, 1859: 178 (“ad Pankabari (1000

ped. alt. [305 m]) et in valle Rungun (4000 ped. [1220 m]) prope Darjiling Himalayanum”).

*Alycaeus (Cyclorix) otiphorus*—Godwin-Austen, 1914: 349, pl. 147 fig. 2; Subba Rao et al., 1995: 42, pl. 2 fig. 1.

*Cyclorix otiphorus*—Ramakrishna et al., 2010: 73.

*Chamalycaeus otiphorus*—Raheem et al., 2010, unnumbered fig.

*Pincerna otiphorus*—Páll-Gergely et al., 2020: 182.

**Material.** Chhukha Dzongkhag, Dungna area ca 10 km NE of Phuentsholing, 26°56'N 89°26'E, 1494 m a.s.l., Choki Gyeltshen, Kezang Tobgay & Nima Gyeltshen leg. 25.iii.2021 (NBCB1286/2; RMNH.MOL.507914/1).

**Description** ( $n = 3$ ). The yellowish-brown shell is globular-conical. R1 is moderately widely ribbed (4–6 ribs/mm); R2 has 7–9 stripes; R3 is nearly smooth apart from some faint growth lines. No spiral sculpture is discernible. The aperture is surrounded by a thickened inner rim and a broadly expanded outer edge, which is curved towards the narrow umbilicus, largely covering it.

**Measurements.** W 3.3–3.5 mm, H 3.9–4.0; W/H = 0.85–0.87.

**Distribution.** According to Subba Rao et al. (1995: 42), this is a widespread species occurring in North-East India, where it is known from Meghalaya (Khasi hills), Nagaland, Sikkim, and West Bengal, and in Myanmar. These data were published without any additional information and should be substantiated. In Bhutan it is known from a single locality at 1494 m a.s.l.

*Cyclorix globhutanus*

Gittenberger & Sherub, spec. nov.

Figures 2, 4

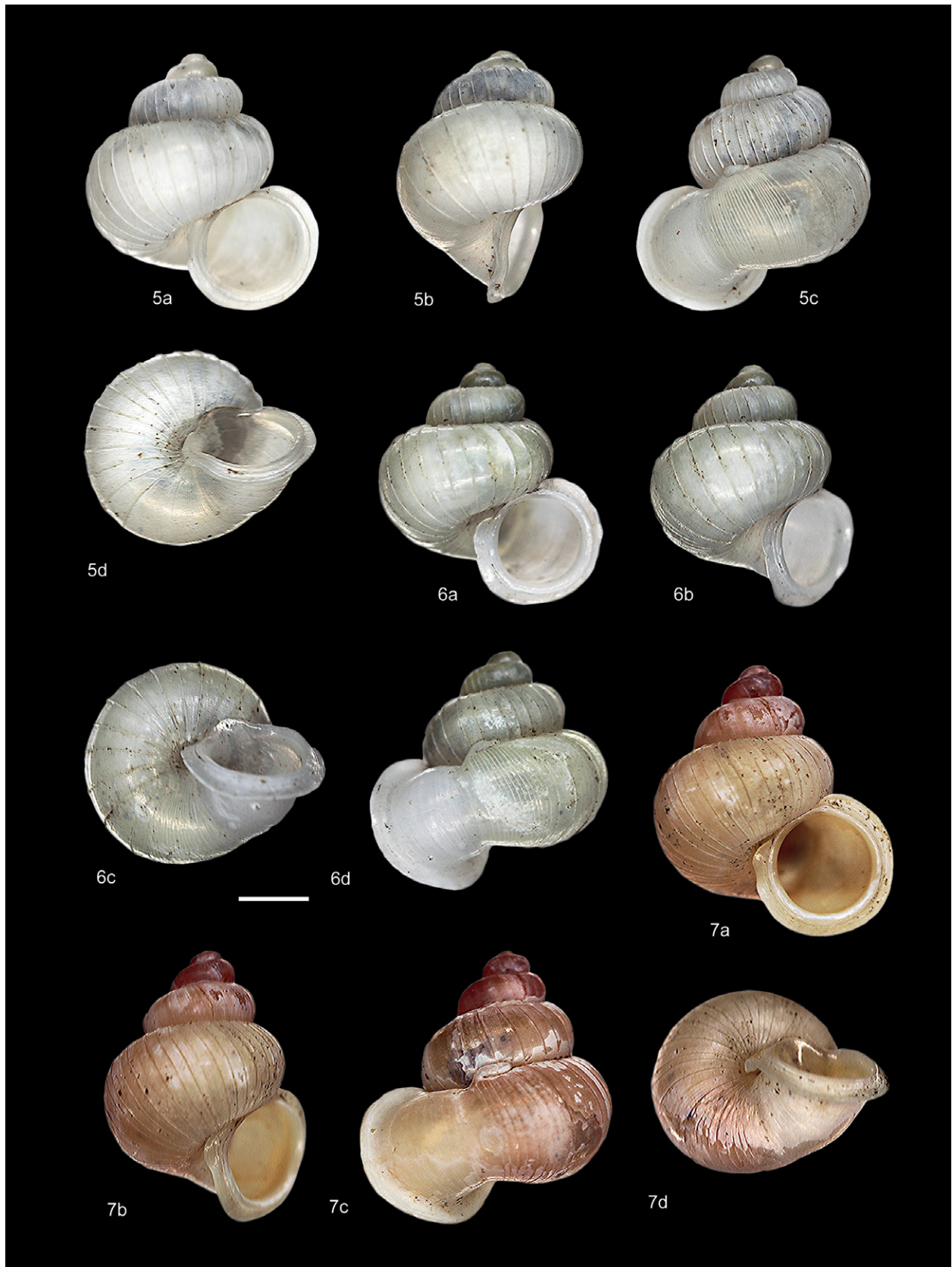
**ZooBank registration.** urn:lsid:zoobank.org:act:41F3E6C3-B6B5-4060-B5C3-E3580BF505D2

**Type series.** Holotype (NBCB1285), paratypes (NBCB 1294/1; RMNH.MOL.507915/1), Samdrup Jongkhar Dzongkhag, 9 km N of Samdrup Jongkhar, 1008 m a.s.l., warm broadleaf forest, 26°52'N 91°29'E, Sherub & Ugyen Tenzin leg. i.2020.

**Description** ( $n = 3$ ). The glassy, transparent, globular shell is nearly as broad as high. R1 is very widely ribbed (2–3 ribs/mm), without a spiral sculpture; R2 has ca. 17 stripes; R3 is nearly smooth. There is no spiral sculpture discernible. The aperture is surrounded by a thickened inner rim and a broadly expanded outer edge, that is curved towards the umbilicus, largely covering it.

**Measurements.** W 3.7–3.8 mm, H 3.8–4.0 mm; W/H = 0.95–0.97.

**Differentiation.** The polytypic *Cyclorix graphicus* (W.T. Blanford, 1862), which is also characterized by relatively broad, globular shells, has only 5–7 stripes on R2. *Cyclorix haumbiclausus*, which has an equally high number of stripes on R2, differs by having a less globular shape and



**Figures 5–7.** *Cycloryx* spec. 5. *C. sajumbiclausus*, holotype (NBCB1290), Samdrup Jongkhar Dzongkhag, 4 km NW of Samdrup Jongkhar; H 3.7 mm. 6. *C. haumbiclausus* Gittenberger & Gyeltshen, spec. nov., holotype (NBCB1272), Haa Dzongkhag, Gakiling, Rangtse Nye; H 3.5 mm. 7. *C. otiphorus* (Benson, 1859), Chhukha Dzongkhag, Dungna area ca 10 km NE of Phuentsholing; H 3.9 mm (NBCB1286). Scale bar: 1 mm.

by the presence of prominent spiral lines on R1. *Cyclorix sajumbiclausus* is more densely ribbed on R1, has a higher spire, and is smaller.

**Distribution.** This species is known from only the type locality at 1008 m a.s.l.

**Etymology.** The epithet refers to the fact that it is the most globular (*glo* after *L. globosus* = spherical) *Cyclorix* found in Bhutan (*bhutanus*).

*Cyclorix haumbiclausus*

Gittenberger & Gyeltshen, spec. nov.

Figures 1, 6

**ZooBank registration.** urn:lsid:zoobank.org:act:F03BA108-B8F7-47BC-B9F1-7294A8A9C66D

**Type series.** Holotype (NBCB1272), paratypes (NBCB1295/8; RMNH.MOL.507916/3), Haa Dzongkhag, Gakiling, Rangtse Nye, 27°05'N 89°09'E, 890 m a.s.l., Choki Gyeltshen, Kezang Tobgay, Nima Gyeltshen & Pem Zam leg. 20.iv.2021.

**Description** ( $n = 12$ ). The light greyish shell is globular-conical. R1 is widely ribbed (3–4 ribs/mm) and has prominent spiral sculpture; R2 has ca 15 stripes; R3 is nearly smooth. The aperture is surrounded by a thickened inner rim and a broadly expanded outer edge, which is not curved towards the umbilical area but partly covers the umbilicus in frontal view.

**Measurements.** W 3.2–3.5 mm, H 3.5–3.8 mm; W/H = 0.91–0.92.

**Differentiation.** By the combination of prominent spiral sculpture, many stripes on R2, and a globular-conical shape, this species can be recognized.

**Distribution.** This species is known from only the type locality at 890 m a.s.l.

**Etymology.** The epithet refers to the occurrence in Haa Dzongkhag (*ha*) and the umbilicus (*umbi*) which is covered (*L. clausus* = closed).

*Cyclorix sajumbiclausus*

Gittenberger & Gyeltshen, spec. nov.

Figures 1, 5

**ZooBank registration.** urn:lsid:zoobank.org:act:3DD3E5AC-3358-4967-9396-629555BE55F4

**Type series.** Holotype (NBCB1290), paratypes (NBCB1295/2; RMNH.MOL.507917/1), Samdrup Jongkhar Dzongkhag, 4 km NW of Samdrup Jongkhar, 260 m a.s.l., 26°49'N 91°28'E, E. Gittenberger, Choki Gyeltshen & Kezang Tobgay leg. 29.ix.2019.

**Description** ( $n = 4$ ). The light greyish shell is globular-conical. R1 is widely ribbed (3–4 ribs/mm), without a spiral sculpture; R2 has ca 25 stripes; R3 bears some faint, irregular, growth lines. The aperture is surrounded by a thickened inner rim and an expanded outer edge, which is curved towards the umbilicus. The umbilicus is largely covered.

**Measurements.** W 2.7–3.3 mm, H 3.4–3.7 mm; W/H = 0.80–0.89.

**Differentiation.** Like in *C. globhutanus* and *C. haumbiclausus*, *C. sajumbiclausus* has many stripes on R3. *Cyclorix globhutanus* has a more globular shell with more widely spaced ribs above the aperture, whereas *C. haumbiclausus* can most easily be distinguished by the presence of prominent spiral sculpture.

**Distribution.** This species is known from only the type locality at 260 m a.s.l.

**Etymology.** The epithet refers to the occurrence in Samdrup Jongkhar Dzongkhag (*saj*) and the umbilicus (*umbi*) that is covered (*L. clausus* = closed).

*Cyclorix bembex* (Benson, 1859)

Figures 1, 8, 11

*Alycaeus bembex* Benson, 1859: 178 (“in valle Rungun”).

**Material.** Chhukha Dzongkhag, SE of Gedu, 26°54'N 89°33'E, 1988 m a.s.l., Choki Gyeltshen, Kezang Tobgay & Nima Gyeltshen leg. 23.iii.2021 (NBCB1288/16; RMNH.MOL.507918/5); SE of Gedu, 26°55'N 89°33'E, 1666 m a.s.l., Choki Gyeltshen, Kezang Tobgay & Nima Gyeltshen leg. 23.iii.2021 (NBCB1287/1); Ts[h]imasham, 27°05'N 89°32'E, 2139 m a.s.l., Choki Gyeltshen, Kezang Tobgay & Nima Gyeltshen leg. 26.iii.2021 (NBCB1273/3; RHMN.MOL.507919/1).

**Description** ( $n = 26$ ). The light brownish shell is conical. R1 is nearly smooth or widely ribbed (3–4 ribs/mm), without spiral sculpture; R2 has 14–16 stripes; R3 has some faint radial riblets, which are as close as the stripes on R2. The aperture has a reflected peristome consisting of a thickened inner rim and an inconspicuous, slightly expanded outer edge.

**Measurements.** W 3.0–3.7 mm, H 3.7–4.2 mm; W/H = 0.81–0.88.

**Note.** The 21 shells in the largest sample (NBCB1288, RMNH.MOL.507918) are nearly smooth, whereas the shells in other samples have radial riblets, but they do not differ otherwise.

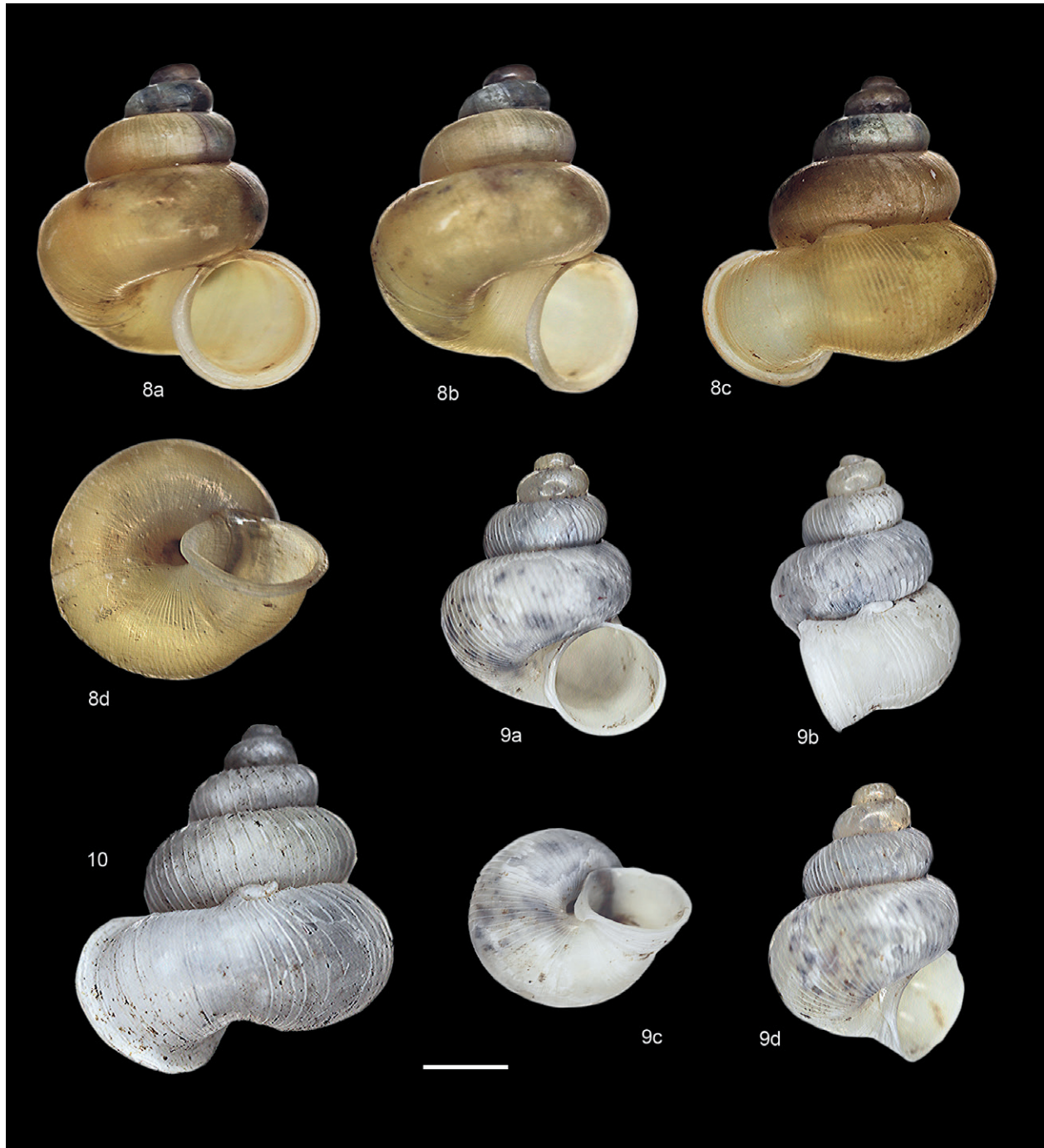
**Distribution.** This species is known from 3 localities in Chhukha Dzongkhag in western Bhutan, at 1666–2139 m a.s.l. Ramakrishna et al. (2010: 70) reported it from West Bengal in North-East India.

*Cyclorix constrictus* (Benson, 1851)

Figures 2, 10, 12–14

*Cyclostoma constrictum* Benson, 1851: 184–195 (“ad Darjiling Himalayae Sikkimensis”).

**Material.** Chhukha Dzongkhag, NW of Gedu, 26°57'N 89°30'E, 2447 m a.s.l. Choki Gyeltshen, Kezang Tobgay & Nima Gyeltshen leg. 24.iii.2021 (NBCB1292/3; RMNH.507920/2). Pemagatshel Dzongkhag, NW-side Pemagatshel, 1750 m a.s.l., 27°02'N 91°25'E, E. Gittenberger & Pema Leda



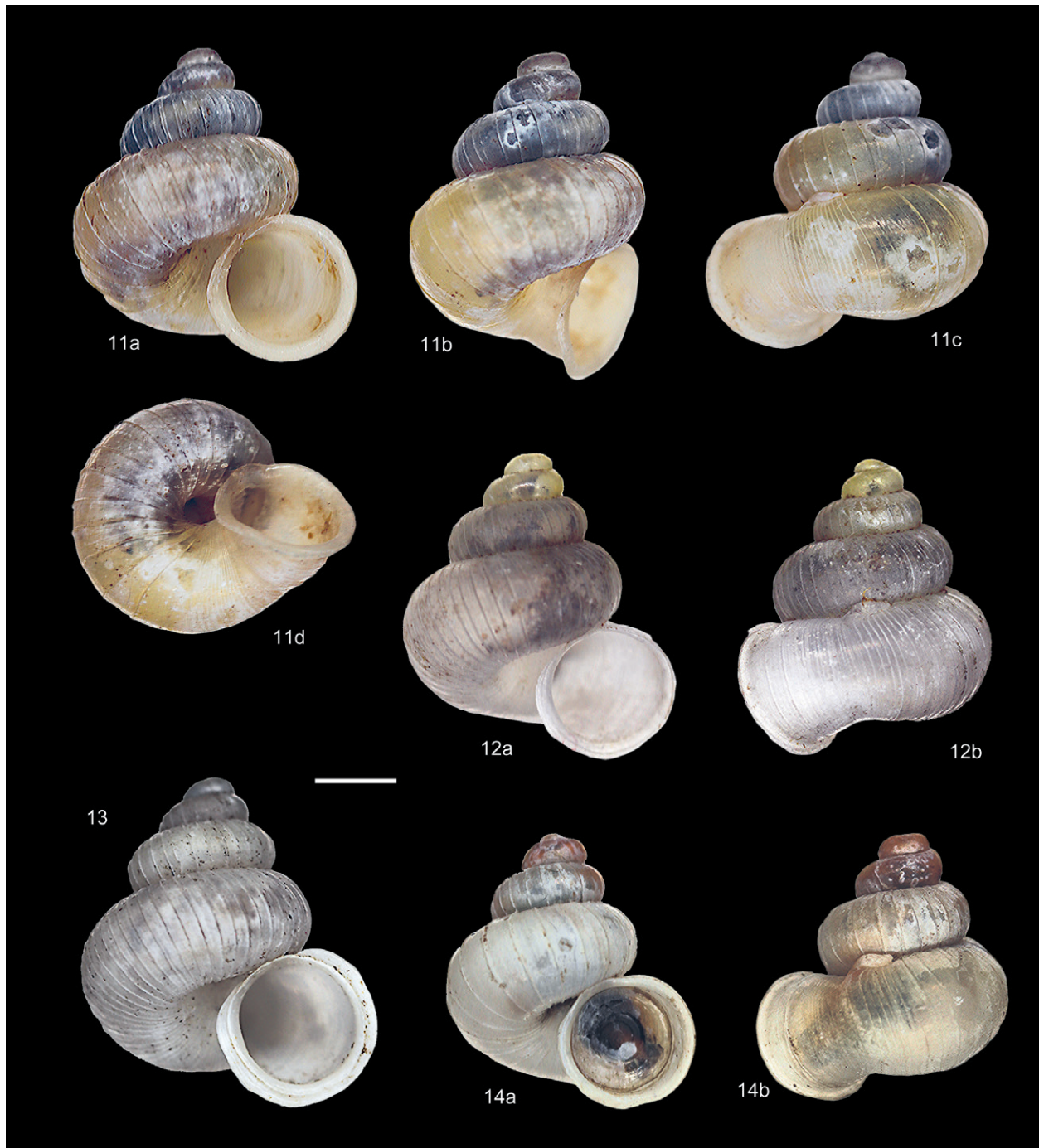
**Figures 8–10.** *Cycloryx* spec. **8.** *C. bembex* (Benson, 1859), Chhukha Dzongkhag, SE of Gedu; H 3.9 mm (NBCB1288). **9.** *C. pemaledai* Gittenberger & Sherub, spec. nov., holotype (NBCB1289), Gasa Dzongkhag, 9 km S of Gasa; H 3.4 mm. **10.** *C. constrictus* (Benson, 1851), Pemagatshel Dzongkhag, NW side Pemagatshel; H 4.2 mm (NBCB1277). Scale bar: 1 mm.

leg. 15.iv.2015 (NBCB1277/5). Gasa Dzongkhag, 20 km NNW of Punakha, Koma Tsachu near Mitesgang, 27°44'N 89°46'E, 1840 m a.s.l., Sherub leg. 20.ii.2021 (NBCB1291/1). Lhuentse Dzongkhag, Garbrag (Phag Sang), 11 km W of Gorgon, 1800 m a.s.l., 27°30'N 91°04'E, Ugyen Tenzin, Dawa Yoezer & Sherub leg. 22-ii-2017 (NBCB1296/1); Phomo, 3 km SE of Dekaling, 2095 m a.s.l., cool broadleaved forest, 27°27'N 91°14'E, Karma Wangdi et al. leg. 2020

(NBCB1297/1). Trashigang Dzongkhag, Kharang La, 20 km S of Trashigang, 2300 m a.s.l., 27°09'N 91°34'E, E. Gittenberger & Pema Leda leg. 16.iv.2015 (NBNCB1276/8; RMNH.507921/2).

More widely ribbed: Haa Dzongkhag, Gakiling, 27°10'N 89°06'E, 2214 m a.s.l., Choki Gyeltshen, Kezang Tobgay, Nima Gyeltshen & Pem Zam leg. 20.iv.2021 (NBCB1287/2; RMNH.MOL.507922/1).





**Figures 11–14.** *Cyclorpyx* spec. **11.** *C. bembex* (Benson, 1859) Chhukha Dzongkhag, Ts[h]imasham; H 3.8 mm (NBCB1273). **12, 13.** *C. constrictus* (Benson, 1851): (**12**) Trashigang Dzongkhag, Kharang La, 20 km S of Trashigang; H 3.8 mm (NBCB1276); (**13**) Pemagatshel Dzongkhag, NW-side Pemagatshel; H 4.2 mm (NBCB1277). **14.** *C. cf. constrictus* (Benson, 1851), Haa Dzongkhag, Gakiling, 2214 m a.s.l.; H 3.5 mm (NBCB1287). Scale bar: 1 mm.

**Description** ( $n = 21$ ). The greyish shell is conical. R1 has moderately dense ribbing (4–6 ribs/mm), very fine spiral sculpture is discernible in some shells; R2 has 6–10 stripes; R3 has some radial ridges, 2–5 of which may be slightly more prominent. The aperture has a reflected peristome consisting of a thickened inner rim and a more or less clearly expanded outer edge which cannot always be

distinguished from the inner rim.

**Measurements.** W 2.9–3.7 mm, H 3.1–4.2 mm; W/H = 0.88–0.94.

**Note.** Three shells from Gakiling (NBCB1287/2; RMNH. MOL.507922/1) are light brownish and more widely ribbed (3 ribs/mm), but otherwise similar to the others. They are tentatively classified here.

**Distribution.** This is the most widespread *Cyclorox* species in Bhutan, where it has been recorded at 6 localities between 1750 and 2447 m a.s.l. It has also been reported from Sikkim and West Bengal in North-East India (Ramakrishna et al., 2010: 70).

## Discussion

This article treats the species of *Dioryx* and *Cyclorox* (Alycaidae) recently discovered in Bhutan, viz. *Dioryx urnula* and 7 species of *Cyclorox*. *Dioryx urnula* was recorded at 1750–2300 m a.s.l. The *Cyclorox* species were found at altitudes from 260 m a.s.l. (*C. sajumbiclausus*) to 2400 m a.s.l. (*C. pemaledai*). The localities seem to be not randomly distributed but concentrated in the western and the eastern parts of the country (Figs 1, 2), and despite the lack of occurrences in central Bhutan between 90° and 91°E, this part of the country has not been neglected (Gittenberger et al., 2017).

The 3 Bhutanese *Cyclorox* species that could be traced in the literature all have their type localities near Darjiling in West Bengal, North-East India. These are the only *Cyclorox* species described from there by Benson (1851, 1859). The 4 *Cyclorox* species that are described as new to science are known only from the type localities.

*Cyclorox summus* (Godwin-Austen, 1914) from “Rechila Peak, Western Bhutan” was not found during our survey. This species most probably has its type locality in West Bengal outside the present borders of Bhutan. Rechi La (la = pass) is in the north-eastern part of Neora Valley National Park in West Bengal, near the trijunction of West Bengal, Sikkim, and Bhutan. *Cyclorox summus* resembles *C. bambex* in general shape but differs from that species in the umbilical region, with the peristome having a reflected outer edge. The ribbing is denser than in any of the Bhutanese species (see Godwin-Austen, 1914: pl. 147 fig. 3), and, according to Páll-Gergely et al. (2020: 183), the syntypes have an “only slightly weaker spiral striation”.

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