

A checklist and classification of terrestrial prosobranch snails from Son La, north-western Vietnam

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ABSTRACT. Son La is a province in the north-western Vietnam; the mountain chain running in the north-west – south-east direction has very little known so far diverse terrestrial snail fauna dominated by endemic species. This is the first checklist of the terrestrial prosobranch snails from Son La. It includes 42 species, belonging to 17 genera in five families, of which three species are endemic (*Dioryx vanbuensis*, *Cyclophorus implicatus*, and *Scabrina vanbuensis*). In this study two species are recorded for the first time for Vietnam (*Chamalyscaeus paviei*, *Scabrina laciniata*) and 32 additional species are added to the species list of the Son La.

Introduction

Son La is a province in the north-western Vietnam, with a territory of 14,125 km². Son La topography is deeply differentiated, forming many valleys, basins, alternating mountains with an average elevation of 700 m a.s.l., and variety of different kinds of habitats, e.g. natural forest, limestone mountains, plantation, disturbed habitats. Thus, it is believed that Son La has rich fauna of land snails, which is little known so far.

The study of the terrestrial snails of the north-west of Vietnam, and of the wider Vietnam regions, has a long and rich history, extending back to the 19th century. Virtually all of our current knowledge of the diversity and distribution of the Son La snail fauna is based on the publication and collections of 19th century and early 20th century workers, particularly those of A. Bavay, Ph. Dautzenberg, H. Fischer, L. Morlet, L. Pfeiffer, E.A. Smith, P. Fischer, O.F. Möllendorff, and J. Mabille. Despite the fact that the study of Vietnam terrestrial prosobranch snails is still in its infancy, there is a need for at least a provisional checklist as a starting point for further studies. The present paper aims at providing such a list.

The data included here are based on published records and field investigations from 2012-2015 by the authors. The list provides taxonomic notes where necessary, as well as distribution ranges of genera and species. An attempt was made to standardize

the use of geographic names. The systematic arrangement at family group levels is based on Bouchet and Rocroi [2005], while genera and species are arranged alphabetically. The list includes 42 species, belonging to 17 genera in five families.

Material and methods

Terrestrial prosobranch snails were sampled throughout Son La province, in 2010-2014. Collecting was done in various habitats including limestone forests, caves, and limestone karsts. Complete adult shells were counted for whorl number (W), and measured for shell height (H), shell width (W), and aperture width (WA).

Materials examined in this study are deposited in the following institutions: SORC, Soil Organism Research Center of Hanoi National University of Education (HNUE); VNMN, The Vietnam National Museum of Nature; HNUEM, Hanoi National University of Education Museum of Biology.

Zoogeographical remarks. On the basis of the analysis of known ranges of species, four zoogeographical regions of northern Vietnam (with corresponding provinces) may be recognized:

1. North-eastern Tonkin: Cao Bang, Ha Giang, Lang Son, Bac Kan, Ha Nam, Ha Noi, Vinh Phuc, Phu Tho;
2. North-western Tonkin: Dien Bien, Lai Chau, Son La, Hoa Binh, Lao Cai;
3. Coastal north-eastern Tonkin: Quang Ninh, Hai Phong;
4. Southern Tonkin and northernmost Annam: Thanh Hoa, Ninh Binh, Hoa Binh.

Systematic part

Class Gastropoda Cuvier, 1795

Clade Caenogastropoda Cox, 1960

Superfamily Cyclophoroidea J.E. Gray, 1847

Family CYCLOPHORIDAE J.E. Gray, 1847

Subfamily Alycaeinae Blanford, 1864

Remark. Some authors have erroneously attributed Alycaeinae to Gray, 1850. However, ac-

cording to Boucher and Rocroi [2005] the correct authorship is of W.T. Blanford, 1864 [Budha *et al.*, 2015]. Alycaeiinae comprises four genera namely *Alycaeus* J.E. Gray, 1850, *Chamalycaeus* Kobelt et Möllendorff, 1897, *Cipangocharax* Shintaro, 1934, and *Dioryx* Benson, 1859. Currently, three genera of Alycaeiinae have been recorded from Vietnam: *Alycaeus*, *Chamalycaeus*, and *Dioryx* [Kobelt, 1902; Vermeulen, Maassen, 2003; Dang, 2008; Tarruella, Lleixà, 2011].

Genus *Chamalycaeus* Kobelt et Möllendorff, 1897

Type species. *Alycaeus andamaniae* Benson, 1861 [subsequent designation (SD), Wenz, 1938]

Distribution. India, Nepal, Myanmar, China, Taiwan, Korea, Thailand, Laos, Philippines, Indonesia, Malaysia, Australia, and Vietnam [Kobelt, Möllendorff, 1897; Kobelt, 1902; Yen, 1939; Budha *et al.*, 2015].

Chamalycaeus depressus
(Bavay et Dautzenberg, 1912)
(Fig. 1A)

Bavay, Dautzenberg, 1912 : 51, pl. VI, fig. 10-13 (*Alycaeus*).

Type locality. Bac Ha, Lao Cai, Vietnam.

Dimensions: H 2.0-2.2, W 3.5-4.2, WA 1.5-1.6 mm.

Distribution. N Vietnam (Lao Cai, Son La: Van Ho, Moc Chau and Thuan Chau districts).

Remark. This species was known only from NW Tonkin region. New distribution records from Son La.

Chamalycaeus fraterculus
(Bavay et Dautzenberg, 1900)
(Fig. 1B)

Bavay, Dautzenberg, 1900: 120, pl. XI, fig. 11-14 [*Alycaeus (Charax)*]; Kobelt, 1902: 370 [*Alycaeus (Dicharax)*]; Dang, 2008: 9, 11 [*Alycaeus (Charax)*]; Tarruella, Lleixà, 2011: 72 (*Alycaeus*).

Type locality. Tonkin, Vietnam.

Dimensions: H 2.4-3.0, W 4.6-5.0, WA 1.8-2.0 mm.

Distribution. N Vietnam (Ninh Binh, Quang Ninh, Thanh Hoa, Son La: Copia natural reserve, Son La pass area).

Remark. New distribution records from Son La.

Chamalycaeus heudei
(Bavay et Dautzenberg, 1900)
(Fig. 1C)

Bavay, Dautzenberg, 1900: 121, 458, pl. XI, fig. 15-18 [*Alycaeus (Charax)*]; Kobelt, 1902: 372 [*Alycaeus (Dicharax)*]; Dang, 2008: 9, 11 [*Alycaeus (Charax)*]; Tarruella, Lleixà, 2011: 72 (*Alycaeus*).

Type locality. Tonkin, Vietnam.

Dimensions: H 3, W 5, WA 2 mm

Distribution. N Vietnam (Ninh Binh, Thanh Hoa, Son La: Copia natural reserve, Van Ho district).

Remark. New distribution records from Son La.

Chamalycaeus paviei
(Bavay et Dautzenberg, 1912)
(Fig. 1D)

Bavay, Dautzenberg, 1912: 50, pl. VI, fig. 5-8 [*Alycaeus*].

Type locality. Xieng khouang, Laos.

Dimensions: H 4.5-5.0, W 5.0-6.0, WA 2.3-2.5 mm.

Distribution. Laos; Vietnam (Son La: Song Ma, Van Ho, Moc Chau, Yen Chau, Mai Son and Thuan Chau districts).

Remark. New record for Vietnam.

Chamalycaeus sp. 1
(Fig. 1E)

Dimensions: H 3.0-3.3, W 6.0-6.2, WA 2.1-2.3 mm.

Distribution. N Vietnam (Son La: Moc Chau and Na San plateaus, Yen Chau district).

Chamalycaeus sp. 2
(Fig. 1F)

Dimensions. H 2.8-3.0, W 5.0-5.4, WA 2.2-2.3 mm.

Distribution. N Vietnam (Son La: Pa Che village, Van Ho commune, Van Ho district).

Genus *Dioryx* Benson, 1859

Type species. *Cyclostoma distortus* Haines, 1855 (SD, Gude, 1921).

Distribution. Myanmar, Laos, China, Malaysia, Taiwan, Vietnam [Kobelt, Möllendorff, 1897; Kobelt, 1902; Yen, 1939; Dang, 2008; Tarruella, Lleixà, 2011; Budha *et al.*, 2015].

Dioryx compactus (Bavay et Dautzenberg, 1900)
(Fig. 2A)

Bavay, Dautzenberg, 1900: 119, pl. XI, fig. 9-10 [*Alycaeus (Dioryx)*]; Kobelt, 1902: 337 (*Dioryx*); Dang, 2008: 9 [*Alycaeus (Dioryx)*]; Tarruella, Lleixà, 2011: 75.

Type locality. Bac Kan, Vietnam.

Dimensions: H 6.5-7.0, W 5.5-6.0, WA 3.5-4.0 mm.

Distribution. N Vietnam (Bac Kan, Son La: Limestone forest areas).

Remark. This species was known only from NW Tonkin and NE Tonkin regions. New distribution records from Son La.

Dioryx messengeri (Bavay et Dautzenberg, 1900)
(Fig. 2B)

Bavay, Dautzenberg, 1900: 119, pl. XI, fig. 7-8 [*Alycaeus*

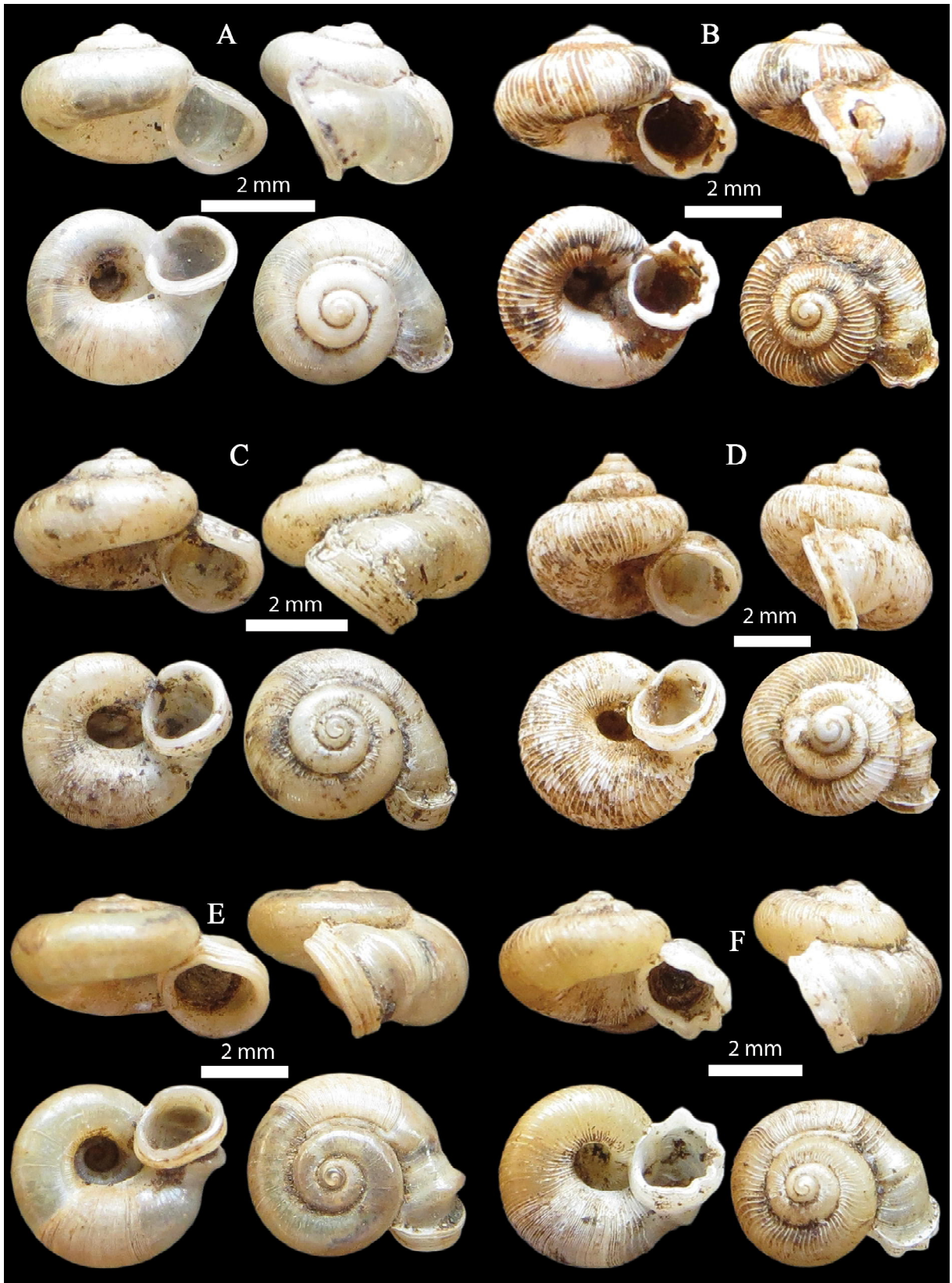


FIG. 1. **A.** *Chamalycaeus depressus*, **B.** *Chamalycaeus fraterculus*, **C.** *Chamalycaeus heudei*, **D.** *Chamalycaeus paviei*, **E.** *Chamalycaeus* sp. 1, **F.** *Chamalycaeus* sp. 2.

РИС. 1. **A.** *Chamalycaeus depressus*, **B.** *Chamalycaeus fraterculus*, **C.** *Chamalycaeus heudei*, **D.** *Chamalycaeus paviei*, **E.** *Chamalycaeus* sp. 1, **F.** *Chamalycaeus* sp. 2.

(*Dioryx*); Kobelt, 1902: 339 (*Dioryx*); Dang, 2008: 9 [*Alycaeus* (*Dioryx*)]; Tarruella, Lleixà, 2011: 75, fig. 4D.

Type locality. That Khe, Trang Diòn, Lang Son, Vietnam.

Dimensions. H 8.5-10.0, W 6.5-8.0, WA 4.0-5.0 mm.

Distribution. N Vietnam (Lang Son, Ninh Binh, Quang Ninh, Thanh Hoa, Son La: Quynh Nhai, Van Ho and Thuan Chau districts).

Remark. New distribution records from Son La.

Dioryx vanbuensis (Bavay et Dautzenberg, 1900)
(Fig. 2C)

Bavay, Dautzenberg, 1900: 120, pl. XI, fig. 19-21 [*Alycaeus* (*Dioryx*)]; Kobelt, 1902: 340 (*Dioryx*); Dang, 2008: 9 (*Alycaeus*); Tarruella, Lleixà, 2011: 75.

Type locality. Ta Bu, Muong La, Son La, Vietnam.

Dimensions: H 5.0-6.0, W 5.0-6.2, WA 3.0-3.2 mm.

Distribution. N Vietnam (Son La: Muong La, Bac Yen and Phu Yen districts, Na San and Moc Chau plateaus).

Remark. This species can be endemic to the north-west region. Hence, additional studies are necessary to verify its distribution [Do, Do, 2014].

Genus ***Laotia*** Saurin, 1953

Type species. *Laotia pahiensis* Saurin, 1953 [by monotypy (M)]

Distribution. Laos, Vietnam: Ha Noi [Saurin, 1953; Páll-Gergely, 2014].

Remark. The taxonomic positions of the genus *Laotia* is uncertain (Diplommatinidae or Alycaeiidae) [Páll-Gergely, 2014]. According to this study, *Laotia* represents a group of Alycaeiinae (Cyclophoridae) without a tube.

Laotia christahemmenae Páll-Gergely, 2014
(Fig. 2D)

Páll-Gergely, 2014: 289, fig. 3.

Type locality. Ba Vi national park, Ha Noi, Vietnam.

Dimensions: H 2.5-2.6, W 4.4-5.1, WA 2.2-2.3 mm.

Distribution. N Vietnam (Ha Noi, Son La: Van Ho and Yen Chau districts).

Remark. This is the only species of *Laotia* recorded from Vietnam. New distribution records from Son La.

Subfamily Cyclophorinae J.E. Gray, 1847

Genus ***Cyclophorus*** Montfort, 1810

Type species. *Helix volvulus* O.F. Müller, 1774, (OD).

Distribution. Subtropical and tropical Asia [Kobelt, Möllendorff, 1897; Kobelt, 1902; Yen, 1939; Nantararat *et al.*, 2014; Raheem *et al.*, 2014; Budha *et al.*, 2015].

Remark. *Cyclophorus* is the most species rich genus in the Cyclophoridae encompassing about 180 nominal species [Nantararat *et al.*, 2014].

Cyclophorus cambodgensis Morlet, 1884
(Fig. 2E)

Morlet, 1884: 388, pl. XI, fig. 3, 3^a; Fischer, 1891: 102; Kobelt, Möllendorff, 1897: 105 [*Cyclophorus* (*Litostylus*) *cambodgensis*]; Kobelt, 1902: 98; Dang, 2008: 11.

Type locality. Cambodia.

Dimensions: H 29-35, W 33-44, WA 23-26 mm.

Distribution. Cambodia, Vietnam (Ninh Binh, Quang Ninh, Thanh Hoa, Dong Nai, Kien Giang, Son La: Limestone forest areas).

Remark. Widely distributed from Cambodia to N and S Vietnam. New distribution records from Son La.

Cyclophorus implicatus
Bavay et Dautzenberg, 1908
(Fig. 2F)

Bavay, Dautzenberg, 1908: 249; 1909: 285, pl. XI, fig. 5-7; Nantararat *et al.*, 2014: 8, fig. 11C.

Type locality. Muong Bo, Muong Te, Lai Chau, Vietnam.

Dimensions. H 20-26, W 28-36, WA 14-18 mm.

Distribution. N Vietnam (Lai Chau, Son La: Mai Son and Thuan Chau districts).

Remark. This species can be endemic to the Northwest region. New distribution records from Son La.

Cyclophorus massiei Morlet, 1891
(Fig. 3A)

Morlet, 1891: 251, pl. VII, fig. 2; Kobelt, 1902: 114 [*Cyclophorus* (*Glossostylus*)]; Kobelt, Möllendorff, 1897: 107; Dang, 2008: 9.

Type locality. Basins of Da and Ma rivers, Vietnam.

Dimensions. H 16-18, W 19-22, WA 12-14 mm.

Distribution. N Vietnam (Basins of Da and Ma rivers, Son La: Muong La district).

Remark. New distribution records from Son La.

Cyclophorus volvulus (O.F. Müller, 1774)
(Fig. 3B)

Müller, 1774: 82 [*Helix*]; Crosse, Fischer, 1863: 366; Kobelt, 1902: 143 [*Cyclophorus* (*Cyclophorus*)]; Kobelt, Möllendorff, 1897: 111; Dang, 2008: 9.

Type locality. Not specified.

Dimensions: H 24-28, W 29-35, WA 19-22 mm.

Distribution. Malaysia, Thailand, Vietnam (Ninh

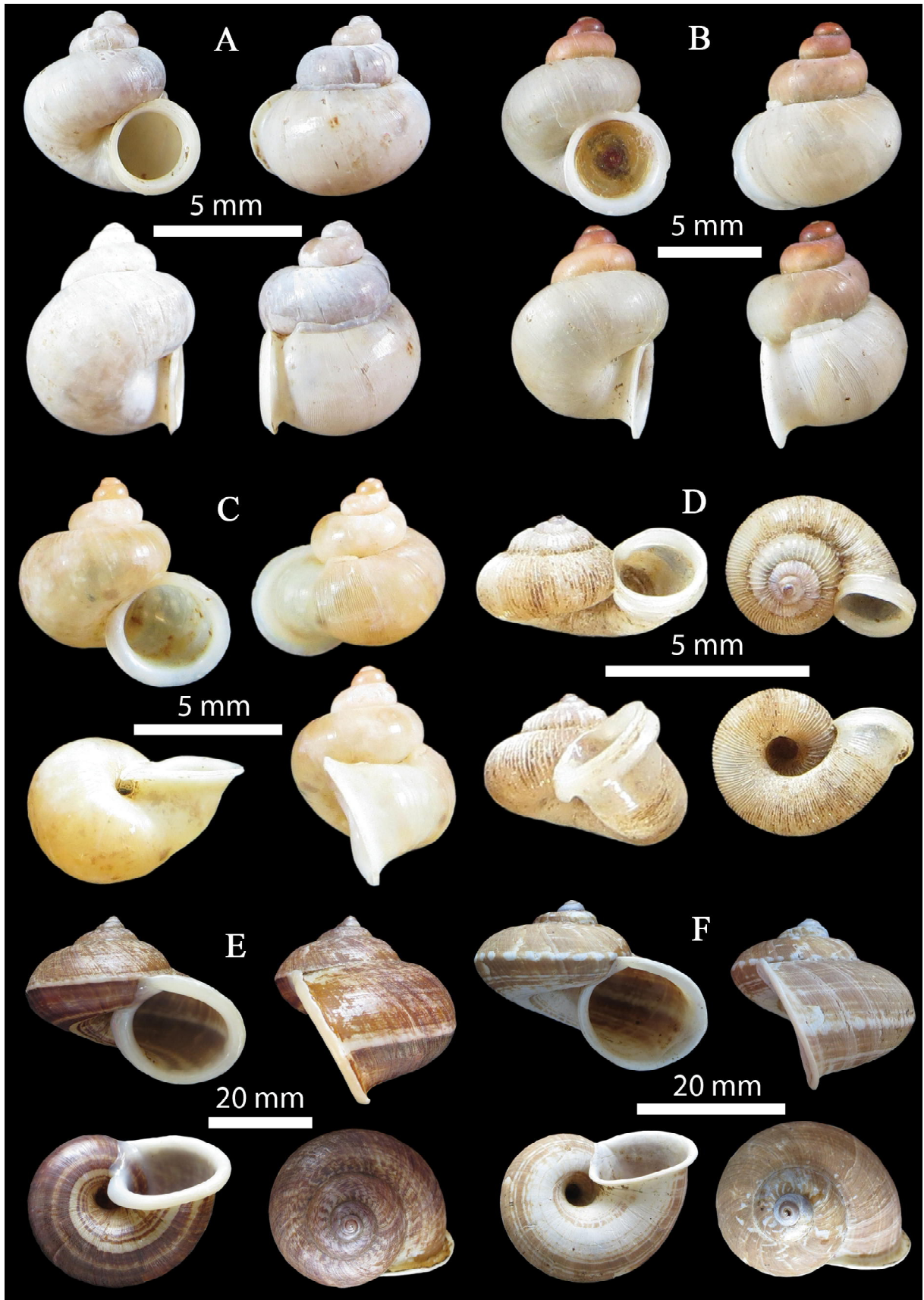


FIG. 2. A. *Dioryx compactus*, B. *Dioryx messengeri*, C. *Dioryx vanbuensis*, D. *Laotia christahemmenae*, E. *Cyclophorus cambodgensis*, F. *Cyclophorus implicatus*.

PHC. 2. A. *Dioryx compactus*, B. *Dioryx messengeri*, C. *Dioryx vanbuensis*, D. *Laotia christahemmenae*, E. *Cyclophorus cambodgensis*, F. *Cyclophorus implicatus*.

Binh, Thanh Hoa, Ba Ria – Vung Tau, Quang Ninh, Son La: Van Ho, Moc Chau and Yen Chau districts).

Remark. New distribution records from Son La.

Genus *Cyclotus* Swainson, 1840

Type species. *Cyclostoma taylorianum* Pfeiffer, 1851 (SD, Gray, 1847).

Distribution. China, Taiwan, Laos, Vietnam, Thailand, Papua New Guinea, Indonesia, Malaysia, Philippines [Kobelt, Möllendorff, 1897; Kobelt, 1902; Yen, 1939].

Cyclotus lubricus (Dautzenberg et Fischer, 1908) (Fig. 3C)

Dautzenberg, Fischer, 1908: 201, pl. VII, fig. 5-8 (*Opisthoporus*).

Type locality. Quang Uyen, Cao Bang, Vietnam. Dimensions: H 12-15, W 18-22, WA 10-12 mm.

Distribution. N Vietnam (Cao Bang, Son La: Van Ho and Yen Chau districts).

Remark. This species was known only from NW Tonkin and NE Tonkin regions. New distribution records from Son La.

Genus *Japonia* A. Gould, 1859

Type species. *Cyclophorus scissimargo* Benson, 1856 (SD, Kobelt, 1879).

Distribution. China, Taiwan, Laos, Malaysia, Philippines, Thailand, Vietnam [Kobelt, Möllendorff, 1897; Kobelt, 1902; Yen, 1939; Dang, 2008].

Japonia fischeri (Morlet, 1886) (Fig. 3D)

Morlet, 1886b: 278, pl. XIII, fig. 3, 3a, 3b (*Lagocheilus*); Kobelt, Möllendorff, 1897: 83 [*Lagocheilus* (*Lagocheilus*)]; Kobelt, 1902: 42 [*Japonia* (*Lagocheilus*)]; Fischer, 1891: 107 (*Lagocheilus*); Dang, 2008: 9 (*Lagocheilus*).

Type locality. Ha Long bay, Quang Ninh, Vietnam.

Dimensions. H 7-9, W 8-10, WA 4-5 mm.

Distribution. N Vietnam (Cao Bang, Quang Ninh, Son La: Limestone forest areas).

Remark. This species was known only from NW Tonkin and NE Tonkin regions. New distribution records from Son La.

Japonia scissimargo (Benson, 1856) (Fig. 3E)

Benson, 1856: 228 (*Cyclophorus* ?); Fischer, 1891: 106 (*Lagocheilus*); Kobelt, Möllendorff, 1897: 84 [*Lagocheilus* (*Lagocheilus*)]; Dautzenberg, Fischer, 1905a: 169, pl. IV, fig. 14, 15 (*Lagocheilus*); 1905b: 439: var. *major*; Dang, 2008: 10.

Type locality. Tenasserim, Myanmar.

Dimensions. H 6.5-7.5, W 6-7, WA 3.5-4.0 mm.

Distribution. Myanmar, N Vietnam (Quang Ninh,

Son La: Quynh Nhai, Thuan Chau and Van Ho districts).

Remark. New distribution records from Son La.

Genus *Platyrhaphé* Möllendorff, 1890

Type species. *Cyclotus pusillus* Sowerby, 1843 (OD).

Distribution. China, Malaysia, Philippines, Vietnam [Möllendorff, 1901; Kobelt, 1902; Yen, 1939; Dang, 2008].

Platyrhaphé leucacme Möllendorff, 1901 (Fig. 3F)

Möllendorff, 1901: 80; Kobelt, 1902: 184; Dang, 2008: 11.

Type locality. Chi Lang, Lang Son, Vietnam.

Dimensions. H 6.5-7.2, W 9.3-9.9, WA 3.6-3.9 mm.

Distribution. N Vietnam (Lang Son, Dien Bien, Ninh Binh, Thanh Hoa, Son La: Thuan Chau and Phu Yen districts).

Remark. New distribution records from Son La.

Platyrhaphé sordida (Pfeiffer, 1855) (Fig. 4A)

Pfeiffer, 1855: 103 [*Cyclostoma* (*Cyclotus*) *sordidum*]; Fischer, 1891: 99; Kobelt, Möllendorff, 1897: 84 (*Platyrhaphé*); Kobelt, 1902: 187 (*Platyrhaphé*); Dang, 2008: 8 (*Procyclus sordidus*).

Type locality. China.

Dimensions. H 9-11, W 12-13, WA 5.5-6.0 mm.

Distribution. China, Philippines, N Vietnam (Tonkin, Son La: Mai Son district).

Remark. New distribution records from Son La.

Genus *Pterocyclos* Benson, 1832

Type species. *Pterocyclos rupestris* Benson, 1832 (M).

Distribution. India, Sri Lanka, South-East Asia [Kobelt, 1902; Dang, 2008; Sutcharit *et al.*, 2014].

Remark. Two different spellings, viz. *Pterocyclos* and *Pterocyclus*, are widely used in the literature and both attributed to Benson [1832]. However, the name *Pterocyclus* is an unjustified emendation that has been erroneously used as a valid name [Budha *et al.*, 2015].

Pterocyclos prestoni Bavay et Dautzenberg, 1909 (Fig. 4B)

Bavay, Dautzenberg, 1909: 283, pl. XI, fig. 1-4 (*Pterocyclos*); Kobelt, 1909: 82 (*Pterocyclus fruhstorferi* Möllendorff mss.).

Type locality. Binh Lu, Tam Duong, Lai Chau, Vietnam.

Dimensions: H 7.5-9.0, W 18.5-20.0, WA 7.5-8.0 mm.

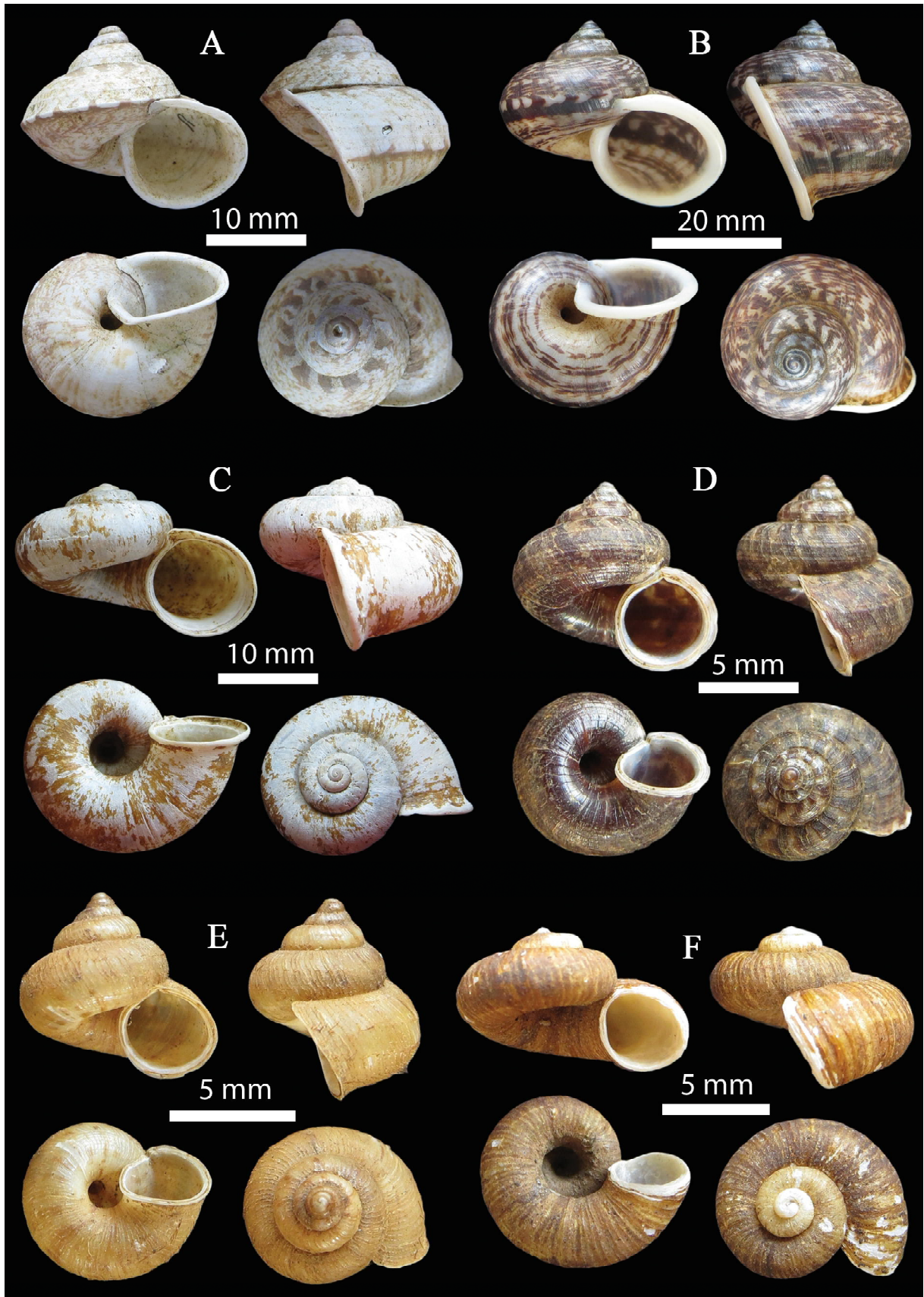


FIG. 3. A. *Cyclophorus massiei*, B. *Cyclophorus volvulus*, C. *Cyclotus lubricus*, D. *Japonia fischeri*, E. *Japonia scissimargo*, F. *Platyrrhaphe leucacme*.

РИС. 3. А. *Cyclophorus massiei*, В. *Cyclophorus volvulus*, С. *Cyclotus lubricus*, D. *Japonia fischeri*, E. *Japonia scissimargo*, F. *Platyrrhaphe leucacme*.

Distribution. Vietnam: Lai Chau, Tuyen Quang, Son La (Muong La district).

Remark. New distribution records from Son La.

Genus *Rhiostoma* Benson, 1860

Type species. *Rhiostoma haughtoni* Benson, 1860 (SD, Gude, 1921).

Distribution. Cambodia, Thailand, Malaysia, Vietnam, Indonesia, Myanmar [Kobelt, 1902; Tarruella, Lleixà, 2010].

Rhiostoma morleti Dautzenberg et Fischer, 1905 (Fig. 4C)

Morlet, 1891: 247 (*Pterocyclus planorbulus*); Dautzenberg, Fischer, 1905b: 429, pl. X, fig. 1-4.

Type locality. Luang Prabang, Laos.

Dimensions: H 13-16, W 26-35, WA 10-13 mm.

Distribution. Laos, N Vietnam (Ha Giang, Lang Son, Son La: limestone forest areas).

Remark. This species is widespread in disturbed habitats in limestone areas. New distribution records from Son La.

Rhiostoma sp.
(Fig. 4D)

Dimensions: H 12-17, W 22-29, WA 8-9 mm.

Distribution. N Vietnam: Son La (Mai Son, Thuan Chau and Quynh Nhai districts).

Genus *Scabrina* W.T. Blanford, 1863

Type species. *Cyclophorus calyx* Benson, 1856 (by monotypy).

Distribution. South and Southeast Asia [Kobelt, 1902; Yen, 1939; Dang, 2008; Budha *et al.*, 2015].

Scabrina laciniata (Heude, 1885)
(Fig. 4E)

Heude, 1885: 92, pl. XXIII, fig. 8, 8a, 8b (*Myxostoma laciniatum*); Möllendorff, 1886: 159 [*Cyclophorus (Scabrina) laciniatus*]; Kobelt, Möllendorff, 1897: 88; Kobelt, 1902: 88; Yen, 1939: 19, taf. 1, fig. 31.

Type locality. Sichuan, China.

Dimensions. H 6-7, W 12-14, WA 4.0-4.5 mm.

Distribution. China, N Vietnam (Son La: Mai Son, Thuan Chau, Van Ho, Muong La, and Song Ma districts).

Remark. New species record for Vietnam.

Scabrina vanbuensis (Smith, 1896)
(Fig. 4F)

Smith, 1896: 130 (*Pterocyclus*); Kobelt, Möllendorff, 1897: 88; Dang, 2008: 9 (*Pterocyclus*).

Type locality. Ta Bu, Muong La, Son La, Vietnam.

Dimensions: H 6-7, W 10-12, WA 3.5-4.5 mm

Distribution. Vietnam: Son La (Basin of Da river).

Remark. This species can be endemic to the north-west region [Do, Do, 2014].

Family DIPLOMMATINIDAE

L. Pfeiffer, 1856

Subfamily Diplommatinae L. Pfeiffer, 1856

Genus *Diplommatina* Benson, 1849

Type species. *Bulimus folliculus* L. Pfeiffer, 1846 (SD, G. Nevill, 1878).

Distribution. India, Nepal, China, Taiwan, Indonesia, Malaysia, Singapore, Philippines, Japan, Papua New Guinea, Fiji, Vietnam [Kobelt, 1902; Yen, 1939; Maassen, 2007; Dang, 2008; Budha *et al.*, 2015].

Diplommatina balansai Morlet, 1886
(Fig. 5A)

Morlet, 1886a: 5; 1886b: 261, 284, pl. XIII, fig. 1, 1a, 1b [*Diplommatina (Palaina)*]; Bavay, Dautzenberg, 1903: 221 (var. *robusta*, pl. X, fig. 1-4; var. *elata*, pl. X, fig. 7-8; var. *intermedia*, pl. X, fig. 5-6); Dautzenberg, Fischer, 1905b: 422; Dang, 2008: 9.

Type locality. Elephant mountain, Hai Phong, Vietnam.

Dimensions: H 4.0-4.3, W 1.6-1.7, WA 0.8-0.9 mm.

Distribution. N Vietnam (Hai Phong, Son La: Mai Son, Muong La and Phu Yen districts).

Remark. This species was known only from NW Tonkin and coastal northeastern Tonkin regions. New distribution records from Son La.

Diplommatina clausilioides
Bavay et Dautzenberg, 1912
(Fig. 5B)

Bavay, Dautzenberg, 1912: 42, pl. V, fig. 3-4.

Type locality. Muong Hum, Bat Xat, Lao Cai, Vietnam.

Dimensions. H 6-7, W 3.0-3.2, WA 2.3-2.5 mm.

Distribution. N Vietnam (Lao Cai, Son La: Mai Son, Muong La, Van Ho, Song Ma and Yen Chau districts).

Remark. This species was known only from NW Tonkin region. New distribution records from Son La.

Diplommatina demangei
Bavay et Dautzenberg, 1912
(Fig. 5C)

Bavay, Dautzenberg, 1912: 40, pl. V, fig. 1-2; Dang, 2008: 10.

Type locality. Mudflat of Red river, Vietnam.

Dimensions: H 4, W 2, WA 1.4 mm.

Distribution. Vietnam (Da Nang, Ha Noi, Ha Nam, Hoa Binh, Lang Son, Ninh Binh, Thanh Hoa, Son La: Mai Son, Muong La, Van Ho, Phu Yen and Yen Chau districts).

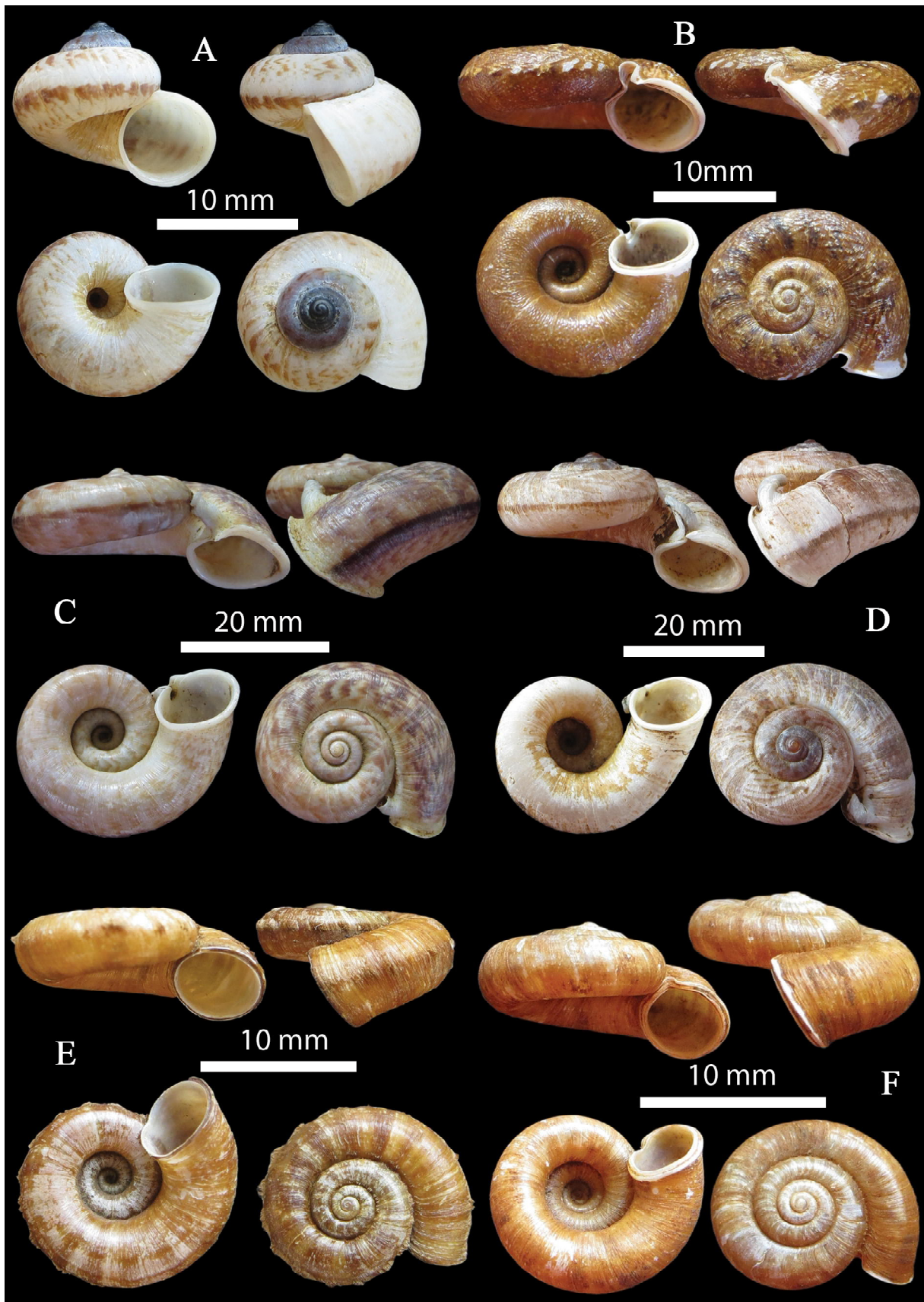


FIG. 4. A. *Platyraphe sordida*, B. *Pterocyclos prestoni*, C. *Rhiostoma morleti*, D. *Rhiostoma* sp., E. *Scabrina laciniana*, F. *Scabrina vanbuensis*.

РИС. 4. А. *Platyraphe sordida*, В. *Pterocyclos prestoni*, С. *Rhiostoma morleti*, D. *Rhiostoma* sp., E. *Scabrina laciniana*, F. *Scabrina vanbuensis*.

Remark. New distribution records from Son La.

Diplommatina messengeri Ancey, 1903
(Fig. 5D)

Ancey in Bavay, Dautzenberg, 1903: 224, pl. XI, fig. 1-2 [*Diplommatina (Sinica)*]; Dang, 2008: 10.

Type locality. Bac Kan, Vietnam.

Dimensions: H 3.0-3.5, W 2.0-2.2, WA 1.8-1.9 mm.

Distribution. N Vietnam (Bac Kan, Lang Son, Son La: limestone areas).

Remark. This species was known only from NW Tonkin and NE Tonkin regions. New distribution records from Son La.

Family PUPINIDAE L. Pfeiffer, 1853
Subfamily Pupininae L. Pfeiffer, 1853
Genus *Pupina* Vignard, 1829

Type species. *Pupina keraudreni* Vignard, 1829 (M).

Distribution. China, Taiwan, Japan, Papua New Guinea, Australia, South-East Asia [Kobelt, 1902; Yen, 1939; Dang, 2008].

Pupina anceyi Bavay et Dautzenberg, 1899
(Fig. 5E)

Bavay, Dautzenberg, 1899: 53, pl. III, fig. 5, 5^a; Kobelt, 1902: 306; Dang, 2008: 9.

Type locality. That Khe, Trang Dinh, Lang Son, Vietnam.

Dimensions: H 7.5-8.0, W 4.5-5.0, WA 2.8-3.0 mm.

Distribution. N Vietnam (Lang Son, Son La: Van Ho, Moc Chau and Yen Chau districts).

Remark. This species was known only from NW Tonkin and NE Tonkin regions. New distribution records from Son La.

Pupina dorri Dautzenberg, 1893
(Fig. 5F)

Dautzenberg, 1893: 164, pl. VIII, fig. 3, 3a-c; Kobelt, Möllendorff, 1897: 146; Kobelt, 1902: 311; Dautzenberg, Fischer, 1905a: 171; Dang, 2008: 9.

Type locality. Hai Phong, Vietnam.

Dimensions: H 6.5, W 4.0, WA 2.0 mm.

Distribution. Vietnam (Hai Phong, Ha Nam, Quang Ninh, Lang Son, Ninh Binh, Thanh Hoa, Vinh Phuc, Son La: Na San plateau).

Remark. This species is widespread in natural habitats in limestone areas of Tonkin and North Annam. New distribution records from Son La.

Pupina exclamationis Mabille, 1887
(Fig. 6A)

Mabille, 1887: 137, pl. IV, fig. 11, 12; Kobelt, Möllendorff, 1897: 146; Kobelt, 1902: 312; Dang, 2008: 9.

Type locality. Tonkin, Vietnam.

Dimensions: H 8-9, W 4.5-5.0, WA 3.0-3.2 mm.

Distribution. N Vietnam (Quang Ninh, Ninh Binh, Thanh Hoa, Vinh Phuc, Son La: limestone areas).

Remark. New distribution records from Son La.

Pupina tonkiniana Bavay et Dautzenberg, 1899
(Fig. 6B)

Bavay, Dautzenberg, 1899: 54, pl. III, fig. 6, 6^a; Kobelt, 1902: 323; Dang, 2008: 9.

Type locality. That Khe, Trang Dinh, Lang Son, Vietnam

Dimensions: H 10.0-10.5, W 4.5-5.0, WA 3.9-4.1 mm.

Distribution. N Vietnam (Lang Son, Son La: Phu Yen, Bac Yen, Van Ho districts).

Remark. This species was known only from NW Tonkin and NE Tonkin regions. New distribution records from Son La.

Pupina verneau Dautzenberg et Fischer, 1905
(Fig. 6C)

Dautzenberg, Fischer, 1905b: 440, pl. X, fig. 13-15.

Type locality. Ha Giang, Vietnam.

Dimensions: H 7.5-8.0, W 4.5-5.0, WA 2.5-2.7 mm.

Distribution. N Vietnam (Ha Giang, Son La: limestone areas).

Remark. This species was known only from NW Tonkin and NE Tonkin regions. New distribution records from Son La.

Pupina sp.1
(Fig. 6D)

Dimensions: H 10.0-10.8, W 5.3-5.6, WA 3.9-4.0 mm.

Distribution. N Vietnam (Son La: Na San and Moc Chau plateaus).

Pupina sp.2
(Fig. 6E)

Dimensions: H 10.0-10.5, W 5.3-5.5, WA 3.5 mm.

Distribution. N Vietnam (Son La: Van Ho and Yen Chau districts).

Genus *Pseudopomatias* Möllendorff, 1885

Type species. *Pseudopomatias amoenus* Möllendorff, 1885 (M).

Distribution. Asia: from north-eastern India to Taiwan [Kobelt, 1902; Dang, 2008; Páll-Gergely *et al.*, 2015].

Remark. The taxonomic positions of *Pseudopomatias* have been debated. *Pseudopomatias* and related genera are associated with limestone areas but little is known about their ecology. Based on

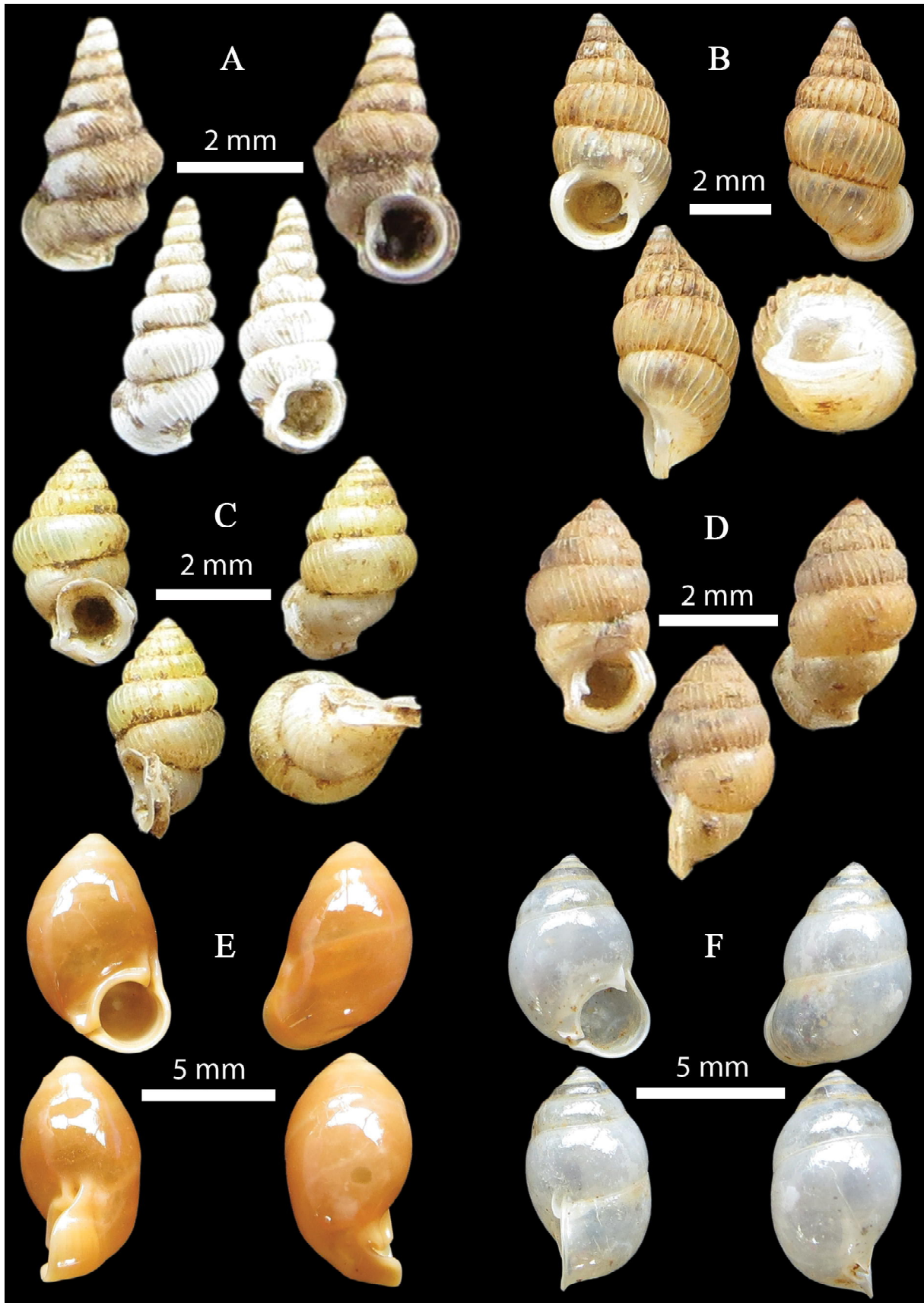


FIG. 5. A. *Diplommatina balansai*, B. *Diplommatina clausilioides*, C. *Diplommatina demangei*, D. *Diplommatina messengeri*, E. *Pupina anceyi*, F. *Pupina dorri*.

РИС. 5. А. *Diplommatina balansai*, В. *Diplommatina clausilioides*, С. *Diplommatina demangei*, D. *Diplommatina messengeri*, E. *Pupina anceyi*, F. *Pupina dorri*.

available distribution records, there are two geographical centres of the *Pseudopomatias* diversity, one in north-eastern India and another one in Northern Vietnam [Páll-Gergely *et al.*, 2015].

Pseudopomatias amoenus Möllendorff, 1885
(Fig. 6F)

Möllendorff, 1885: 164; 1886: 177; Kobelt, Möllendorff, 1897: 140 (var. *tumidula*); Möllendorff, 1901: 81; Kobelt, 1902: 273 (var. *tumidula*); Yen, 1939: 26, pl. 2, fig. 26; Fischer, Dautzenberg, 1904: 429; Dautzenberg, Fischer, 1908: 206, pl. VI, fig. 10-11; Dang, 2008: 9.

Type locality. Hubei, China.

Dimensions: H 8.5-10.0, W 3.5-4.0, WA 2.4-2.6 mm.

Distribution. China, N Vietnam (Cao Bang, Lao Cai, Lai Chau, Lang Son, Ninh Binh, Phu Tho, Son La; Muong La and Thuan Chau districts).

Remark. *P. amoenus* inhabits a large geographical area of over 1300 km from Northern Vietnam to the Chinese Chongqing and Hubei provinces [Páll-Gergely *et al.*, 2015].

Pseudopomatias maasseni
Páll-Gergely et Hunyadi, 2015
(Fig. 7A)

Páll-Gergely *et al.*, 2015: 37, fig. 6F, 13A-C.

Type locality. Van Ho, Son La, Vietnam.

Dimensions. H 13.5-19.5, W 4.5-6.5, WA 3.5-5.0 mm.

Distribution: China, N Vietnam (Bac Kan, Ha Giang, Lao Cai, Lai Chau, Son La; Mai Son, Van Ho and Thuan Chau districts).

Pseudopomatias sophiae Páll-Gergely, 2015
(Fig. 7B)

Páll-Gergely *et al.*, 2015: 41, fig. 6B, 9F.

Type locality. Trinh Tuong, Bat Xat, Lao Cai, Vietnam.

Dimensions: H 5.5-6.0, W 2.3-2.5, WA 1.5-1.6 mm.

Distribution: N Vietnam (Lao Cai, Son La; Mai Son, Phu Yen and Muong La districts).

Remark. This species was known only from NW Tonkin region. New distribution records from Son La.

Genus ***Pupinella*** J.E. Gray, 1850

Type species. *Cyclostoma pupiniformis* (Sowerby, 1842) (M).

Distribution. South-East Asia, China, Taiwan, Japan, Papua New Guinea, Australia, Queensland [Kobelt, 1902; Bavay, Dautzenberg, 1908, 1909].

Pupinella mansuyi
(Dautzenberg et Fischer, 1908)
(Fig. 7C)

Dautzenberg, Fischer, 1908: 207, pl. VI, fig. 12-15 (*Eupupina*).

Type locality. Quang Uyen, Cao Bang, Vietnam.

Dimensions: H 10-11, W 5.0-5.5, WA 4.0 mm.

Distribution. N Vietnam (Cao Bang, Son La; Mai Son, Muong La, Phu Yen and Van Ho districts).

Remark. This species was known only from NW Tonkin and NE Tonkin regions. New distribution records from Son La.

Genus ***Rhaphaulus*** L. Pfeiffer, 1856

Type species. *Anaulus bombycinus* Pfeiffer, 1855 (by typification of replaced name).

Distribution. Cambodia, Laos, India, Malaysia, Thailand, Myanmar, Vietnam [Kobelt, 1902; Páll-Gergely *et al.*, 2014].

Rhaphaulus tonkinensis Páll-Gergely, 2014
(Fig. 7D)

Páll-Gergely *et al.*, 2014: 565, fig. 1A-F.

Type locality. Van Ho, Son La, Vietnam.

Dimensions: H 14-15, W 7.5-8.0, WA 6.0-6.2 mm.

Distribution. N Vietnam (Thanh Hoa, Son La; Moc Chau, Van Ho and Thuan Chau Districts).

Clade Cycloneritimorpha Frýda, 1998
Superfamily Helicinoidea Férussac, 1822
Family HELICINIDAE Férussac, 1822

Genus ***Geotrochatella*** Fischer, 1891

Type species. *Trochatella mouhoti* Pfeiffer, 1862 (SD, H.B. Baker, 1922).

Distribution. China, Vietnam [Fischer, 1891].

Geotrochatella jourdyi Dautzenberg, 1895
(Fig. 7E)

Dautzenberg, 1895: 25, pl. V, fig. 1; Dang, 2008: 10 (*Pseudotrochatella*).

Type locality. Ha Long Bay, Quang Ninh, Vietnam.

Dimensions: H 7.0-7.3, W 13-14, WA 7.0 mm.

Distribution. Vietnam: Quang Ninh, Son La (Limestone habitats).

Remark. This species was known only from NW Tonkin and Coastal northeastern Tonkin regions. New distribution records from Son La.

Superfamily Hydrocenoidea Troschel, 1857
Family HYDROCENIDAE Troschel, 1856

Genus ***Georissa*** W.T. Blanford, 1864

Type species. *Hydrocena pyxis* Benson, 1856 (OD).

Distribution. Europe, Africa and Asia [Blanford, 1864; Fischer, 1891].

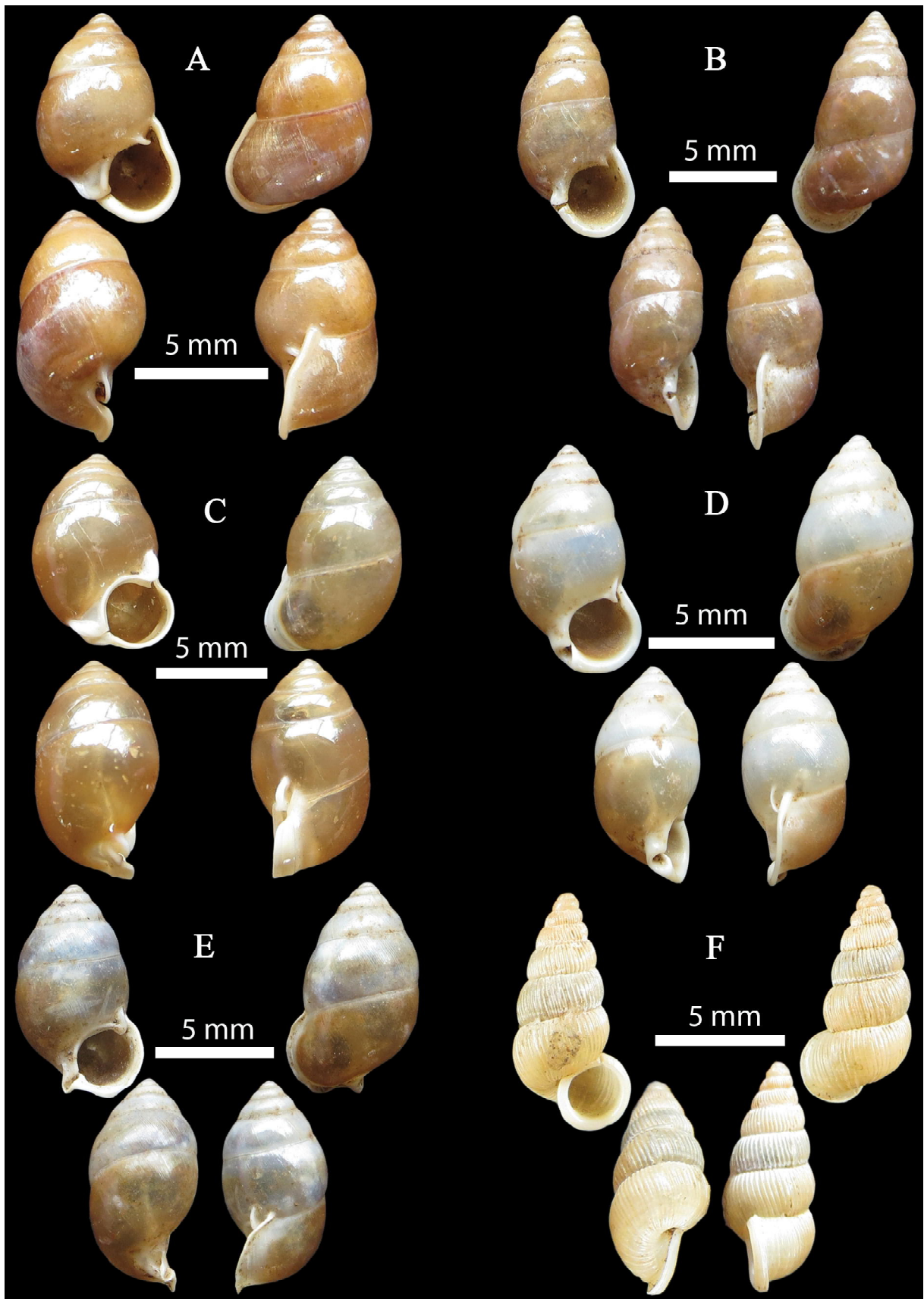


FIG. 6. A. *Pupina exclamationis*, B. *Pupina tonkiniana*, C. *Pupina verneai*, D. *Pupina* sp.1, E. *Pupina* sp.2, F. *Pseudopomatias amoenus*.

РИС. 6. А. *Pupina exclamationis*, В. *Pupina tonkiniana*, С. *Pupina verneai*, D. *Pupina* sp.1, E. *Pupina* sp.2, F. *Pseudopomatias amoenus*

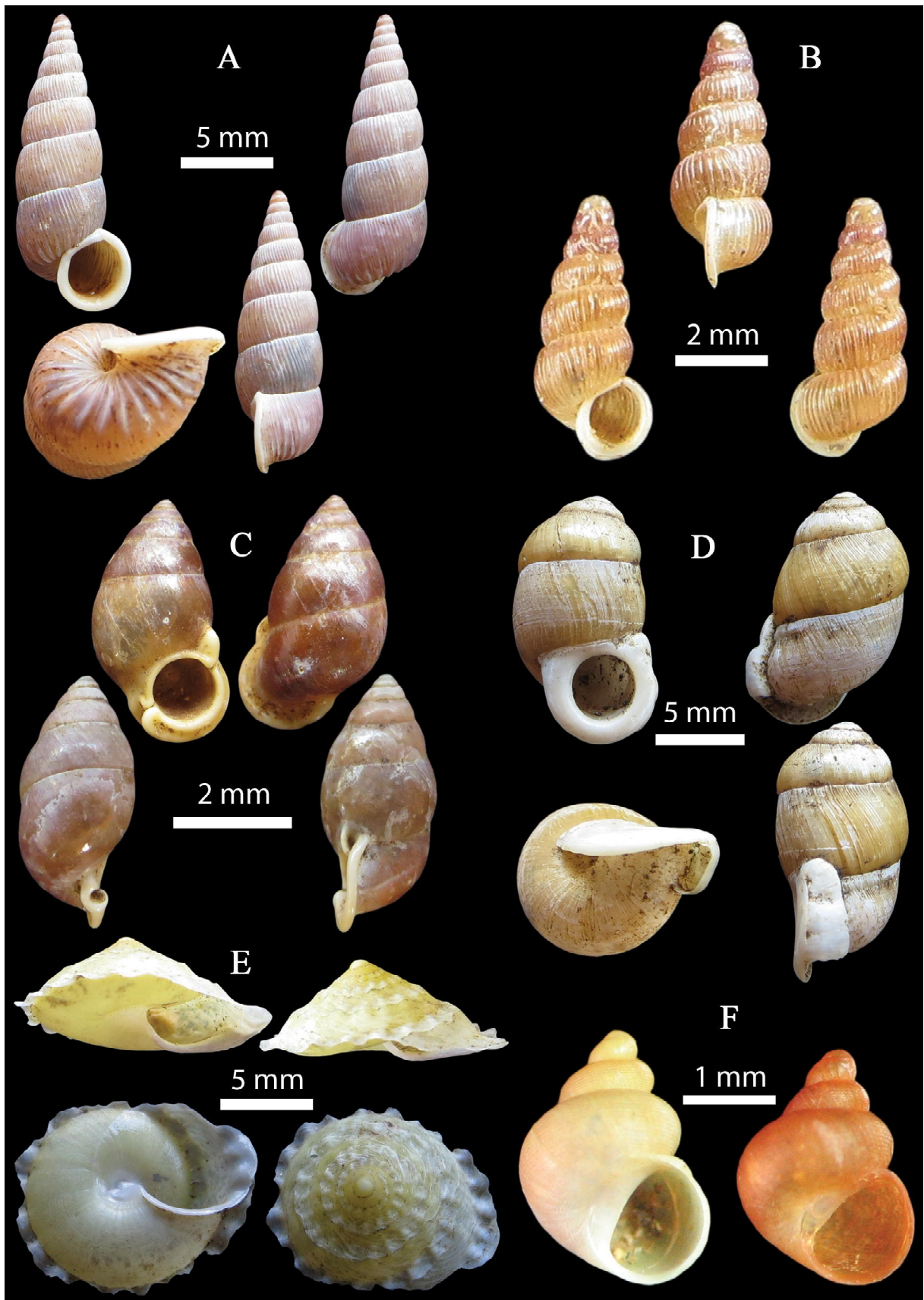


FIG. 7. **A.** *Pseudopomatias maasseni*, **B.** *Pseudopomatias sophiae*, **C.** *Pupinella mansuyi*, **D.** *Raphaulus tonkinensis*, **E.** *Geotrochatella jourdyi*, **F.** *Georissa decora*.

FIG. 7. **A.** *Pseudopomatias maasseni*, **B.** *Pseudopomatias sophiae*, **C.** *Pupinella mansuyi*, **D.** *Raphaulus tonkinensis*, **E.** *Geotrochatella jourdyi*, **F.** *Georissa decora*.

Georissa decora Möllendorff, 1900
(Fig. 7F)

Möllendorff, 1900: 138; Dang, 2008: 10.

Type locality. Da Nang, Vietnam.

Dimensions: H 3.0-3.2, W 2.4, WA 0.8-0.9 mm.

Distribution. Vietnam (Da Nang, Ha Nam, Quang Ninh, Thanh Hoa, Son La: Basin of Da river).

Remark. New distribution records from Son La.

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Чеклист и классификация наземных переднежаберных брюхоногих моллюсков из Сон Ла, северо-западный Вьетнам

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РЕЗЮМЕ. Сон Ла – провинция в северо-западном Вьетнаме. Горная цепь, протянувшаяся там в направлении с северо-запада на юго-восток характеризуется разнообразной, слабо изученной фауной наземных брюхоногих, в которой доминируют эндемичные виды. Данная работа является первым чеклистом наземных переднежаберных брюхоногих Сон Ла. Отмечено 42 вида принадлежащих 17 родам пяти семейств. Три вида являются эндемиками (*Diorux vanbuensis*, *Cyclophorus implicatus*, и *Scabrina vanbuensis*). Два вида впервые отмечены во Вьетнаме (*Chamalyscaeus paviei*, *Scabrina laciniana*), 32 вида добавлены в списки фауны Сон Ла.