ABSTRACT. Vietnam with its limestone ranges that are concentrated mainly in northern, north–central and southern parts, and many different limestone islands running along the coastline, has a phylogenetically-diverse land snails fauna dominated by endemic species. The genus Cyclophorus (Cyclophoridae) in Vietnam is studied. Sixty species and subspecies from various habitats of limestone areas throughout Vietnam are confirmed and recorded. New species and subspecies, Cyclophorus implicatus kanhoensis ssp. nov., from Northwestern Vietnam, and Cyclophorus tamdaoensis sp. nov., from Northern Vietnam are described and discussed. In this paper, the Cyclophorus courbeti var. leucostoma Dautzenberg et Fischer, 1905, is elevated to subspecies.

There are good reasons to suppose that the country of Vietnam, with a surface of 331,210 km², variety of habitats, with many limestone ranges that are concentrated mainly in north-western, north-eastern, north-central and southern parts, and many different limestone islands running along the coastline of Vietnam, will have a diverse land snail fauna with many endemic species.

The study of the land snails of Vietnam, has a long and rich history. Virtually all of our current knowledge of the diversity and distribution of the Vietnam land snail fauna is based on the publications and collections from the end of the 19th century to the early 20th century workers, particularly Bavay and Dautzenberg [1899–1909], Crosse and Fischer [1863], Crosse [1867], Fischer [1891–1898], Fischer and Dautzenberg [1904], Mabile [1887–1889], Möllendorff [1898–1901], Morlet [1886–1892]. In recent years work on the land snail fauna of Vietnam has concentrated on broad patterns of distribution and on highlighting the importance of land snails as a significant component of Vietnam biodiversity and in urgency need of research and conservation [Vermeulen, Maassen, 2003; Vermeulen et al., 2008; Schileyko, 2011; Nordsieck, 2011; Páll-Gergely et al., 2015, 2017; Thach, 2016, 2017; Oheimb et al., 2018].

The aim of this paper is to provide a comprehensive and updated checklist of Cyclophorus, including diagnostic characters, photographs, distribution data of all species, in order to present a baseline species inventory for future Cyclophorus studies, particularly conservation and breeding.

Material and methods

The data included here are based on published records and field investigations from 2002–2018. Specimens and shells were collected by hand searching in the following regions in Vietnam: (1) North-

The exact descriptions of locations are given from province to village. The Vietnamese geographic names are presented in Romanized form. The exact GPS coordinates for each collection site was specified. If no exact GPS coordinates were available for a collection site, approximate coordinates were determined based on available locality information or map.

All species were identified by their shell characters. In addition to the shell size, shell shape and sculpture, features of the peristome and umbilicus as well as the periphery are important characters to diagnose species.

Shell measurements were made for the adult specimen using digital calipers. The specimen was measured with accuracy 0.1 mm, with expanded lip of aperture included. Shell height (H) was measured along the columnellar axis passing through apex to apertural base. Shell width (D) is the maximum width perpendicular to columnella axis. Shell whorls were counted according to Kerney and Cameron [1979] (precision 0.25). Differences in size are indicated in the diagnosis using the following terms: small-sized (<25 mm), medium (25–35 mm), large (35–45 mm), very large (>45 mm). Specimens were photographed showing peripheral, apertural, apical and umbilical views [Nantarat et al., 2014b].

Considering the known ranges of the species, seven zoogeographical regions of Vietnam are recognizable as follows [Nordsieck, 2011; Schileyko, 2011]:

1. North-eastern: Lang Son, Ha Giang, Cao Bang, Bac Kan, Thai Nguyen, Tuyen Quang, Bac Ninh, Yen Bai (part)
2. North-western: Son La, Lai Chau, Dien Bien, Yen Bai, Lao Cai, Hoa Binh (part), Thanh Hoa (part)
3. Coastal North-eastern: Quang Ninh, Hai Phong
5. North Central: Thanh Hoa, Quang Tri, Quang Binh, Thua Thien Hue
6. South Central: Gia Lai, Quang Nam, Binh Dinh, Khanh Hoa
7. Southern: Tay Ninh, Ba Ria–Vung Tau, Dong Nai, Kien Giang, An Giang

Collected material has been deposited in the Vietnam National Museum of Nature (VNMN_JZ), Biology Museum of Hanoi National University of Education (HNUEM_OC), Hanoi, Vietnam; Center for Biodiversity and Environment Research, Tay Bac University (CBER-TBU), Son La, Vietnam; Soil Organism Research Center of Hanoi National University of Education (SORC), Hanoi, Vietnam and private collections.

Additional abbreviations:

D – shell width;
DDS – private collection Do Duc Sang (Son La, Vietnam);
DVN – private collection Do Van Nhuong (Hanoi, Vietnam);
H – shell height;
MNHN – Muséum National d’Histoire Naturelle, Paris, France;
NHMUK – Natural History Museum, London, UK;
RBINS – Royal Belgian Institute of Natural Sciences, Brussels, Belgium.

Systematic part

Class Gastropoda Cuvier, 1795
Clade Caenogastropoda Cox, 1960
Superfamily Cyclophoroidea J.E. Gray, 1847
Family CYCLOPHORIDAE J.E. Gray, 1847
Genus Cyclophorus Montfort, 1810


Type species – Helix volvulus O.F. Müller, 1774; OD.

Cyclophorus affinis Theobald, 1858
Figs 1.1, 13A

Cyclophorus affinis Theobald, 1858: 246; Hanley, Theobald, 1876: 1, pl. 2, fig. 7, pl. 48, fig. 2, pl. 104, fig. 1; Pfeiffer, 1876: 405; Nevill, 1878: 270; Nantarat et al., 2014a: 99–111, fig. 1A; Nantarat et al., 2014b: 4, fig. 2C.

Cyclophorus haughtoni. – Stoliczka, 1871: 147 (not of Theobald, 1858).
Cyclophorus (Eucyclophorus) affinis. – Kobelt, Möllendorff, 1897: 110.
Cyclophorus (Cyclophorus) affinis. – Kobelt, 1902: 135.
Cyclophorus (Salpingophorus) affinis. – Kobelt, 1908: 654, 656, fig. 6–7.
Cyclophorus affinis var. picta Gude, 1921: 88, fig. 15, 89.

Type locality: Maulmein, Myanmar.

Type material: Lectotype NHMUK 1903.7.1. 1454 [Nantarat et al., 2014b: fig. 2C].


# Table 1. Dimensions, diagnostic characters and distribution of Vietnamese *Cyclophorus* species.

<table>
<thead>
<tr>
<th>No</th>
<th>Species</th>
<th>Dimensions (mm)</th>
<th>Diagnosis characters</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>H: 24.0–28.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>H: 23.6–24.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>pernobilis</em></td>
<td>H: 31.2–35.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>H: 38.6–49.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>H: 27.3–36.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>H: 28.0–34.6</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>H: 36.3–41.8</td>
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<td></td>
<td></td>
<td>H: 32.5–38.0</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>H: 28.0–34.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>leucostoma</em></td>
<td>H: 29.1–37.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>leucostoma</em></td>
<td>H: 27.5–35.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>H: 23.6–25.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>H: 20.3–23.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>dodrans</em></td>
<td>H: 37.0–46.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td><em>dodrans</em></td>
<td>D: 42.0–48.1</td>
<td>Shell from large to very large. Spire very tall. Last whorl rounded or slightly edged. Peristome very thick, simple</td>
<td>North-western and Central Vietnam: Hoa Binh, Son La, Thanh Hoa Provinces</td>
</tr>
<tr>
<td></td>
<td><em>fasciatus</em></td>
<td>H: 35.3–40.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>H: 40.0–43.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td><em>eudeli</em></td>
<td>D: 30.2–33.6</td>
<td>Shell medium sized. Spire tall. Last whorl well-rounded without edge. Peristome very thick, double</td>
<td>Central and Southern Vietnam: Binh Dinh, Kien Giang Provinces</td>
</tr>
<tr>
<td></td>
<td></td>
<td>H: 29.7–33.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>Species</td>
<td>Dimensions (mm)</td>
<td>Diagnosis characters</td>
<td>Distribution</td>
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</tr>
<tr>
<td>19</td>
<td>fargesianus</td>
<td>29.2–33.1</td>
<td>Shell medium sized. Spire very tall. Periphery usually with a row of white spots, and a distinct edge. Peristome simple or double</td>
<td>Northern Vietnam: Tuyen Quang, Phu Tho, Hoa Binh, Son La Provinces. Elsewhere: China</td>
</tr>
<tr>
<td>22</td>
<td>fruhstorferi langsonensis</td>
<td>47.0–47.7</td>
<td>Shell very large. Spire low. Shell covered with thin, fibrous periostracum. Periphery with a slight keel. Peristome thick, simple</td>
<td>North-eastern Vietnam: Lang Son, Hai Phong Provinces</td>
</tr>
<tr>
<td>26</td>
<td>huberi</td>
<td>49.5–55.9</td>
<td>Shell very large. Spire tall. Last whorl well-rounded. Peristome simple. Umbilicus wide</td>
<td>South Central Vietnam: Quang Nam Province</td>
</tr>
<tr>
<td>27</td>
<td>ignilabris</td>
<td>47.2–52.7</td>
<td>Shell very large. Spire tall. Shell covered with thin, fibrous periostracum. Periphery with a distinct keel. Peristome thick, simple</td>
<td>North-eastern and Coastal North-eastern Vietnam: Quang Ninh, Lang Son Provinces</td>
</tr>
<tr>
<td>29</td>
<td>implicatus kanhoensis subsp. nov.</td>
<td>25.2–27.1</td>
<td>Shell medium sized. Last whorl flattened and with a distinct keel</td>
<td>North-western Vietnam: Lai Chau Province</td>
</tr>
<tr>
<td>30</td>
<td>jourdyi</td>
<td>28.2–33.4</td>
<td>Shell medium sized. Spire very tall. Last whorl well-rounded, stout without edge. Umbilicus narrow, 1/2 covered by the peristome</td>
<td>Northern to Southern Vietnam: Lang Son, Thai Nguyen, Tuyen Quang, Quang Ninh, Hai Phong, Ha Noi, Vinh Phuc, Ninh Binh, Hoa Binh, Son La, Thanh Hoa, Quang Tri, Kien Giang Provinces</td>
</tr>
<tr>
<td>31</td>
<td>labiosus</td>
<td>38.3–42.2</td>
<td>Shell large. Spire slightly low. Last whorl well-rounded without edge. Peristome very thick, simple</td>
<td>Northern Vietnam: Lang Son, Son La Provinces. Elsewhere: Thailand</td>
</tr>
<tr>
<td>32</td>
<td>malayanus</td>
<td>37.3–50.2</td>
<td>Shell large to very large. Spire tall. Last whorl well-rounded, stout and expanded. Aperture very wide</td>
<td>Northern Vietnam: Hanoi, Ninh Binh, Hoa Binh, Son La, Thanh Hoa Provinces. Elsewhere: Malaysia, Thailand, Indonesia, India</td>
</tr>
<tr>
<td>33</td>
<td>mansuyi</td>
<td>35.0–40.7</td>
<td>Shell large. Spire low. Last whorl well-rounded and expanded. Peristome slightly thickened, simple. Umbilicus very wide, not covered by the peristome</td>
<td>Northern Vietnam: Cao Bang, Quang Ninh, Hai Phong, Son La, Lai Chau Provinces</td>
</tr>
<tr>
<td>No</td>
<td>Species</td>
<td>Dimensions (mm)</td>
<td>Diagnosis characters</td>
<td>Distribution</td>
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</tr>
<tr>
<td>34</td>
<td>martensianus</td>
<td>D 31.2–39.0 H 28.5–34.6</td>
<td>Shell medium sized to large. Spire very tall. Periphery usually a row of white spots, and a distinct edge. Peristome simple</td>
<td>North-eastern to North Central Vietnam: Bac Kan, Lang Son, Tuyen Quang, Quang Ninh, Hanoi, Thanh Hoa Provinces. Elsewhere: China</td>
</tr>
<tr>
<td>36</td>
<td>monachus</td>
<td>D 39.3–40.4 H 20.5–21.1</td>
<td>Shell large. Spire very low. Last whorl rounded without edge. Umbilicus very wide</td>
<td>Southern Vietnam: Tay Ninh Province</td>
</tr>
<tr>
<td>37</td>
<td>muspratti</td>
<td>D 43.8–51.3 H 36.8–41.7</td>
<td>Shell large to very large. Spire very tall. Periphery with a distinct keel. Peristome thick, simple and expanded. Umbilicus very wide</td>
<td>Red river Delta Vietnam: Hanoi Province. Elsewhere: India</td>
</tr>
<tr>
<td>38</td>
<td>orthostylus</td>
<td>D 37.5 H 26.5</td>
<td>Shell large. Spire tall. Umbilicus wide</td>
<td>Central Vietnam</td>
</tr>
<tr>
<td>39</td>
<td>paviei</td>
<td>D 32.4–35.5 H 26.1–32.0</td>
<td>Shell medium sized. Spire tall. Last whorl well-rounded with slight edge. Peristome slightly thick, simple and slightly expanded</td>
<td>Southern Vietnam: Dong Nai Province. Elsewhere: Cambodia</td>
</tr>
<tr>
<td>40</td>
<td>pfeifferi</td>
<td>D 41.1–46.3 H 32.0–36.7</td>
<td>Shell large. Spire very tall. Last whorl well-rounded with a distinct edge. Aperture very wide. Peristome thick, simple and expanded</td>
<td>Northern Vietnam: Lang Son, Son La Provinces</td>
</tr>
<tr>
<td>41</td>
<td>polystictus</td>
<td>D 34.7–37.2 H 31.2–33.5</td>
<td>Shell medium sized. Spire tall. Last whorl well-rounded with slight edge. Peristome simple and very thick</td>
<td>Northern-eastern Vietnam: Tuyen Quang, Lang Son, Bac Kan Provinces. Elsewhere: China</td>
</tr>
<tr>
<td>43</td>
<td>saturnus</td>
<td>D 54.1–55.2 H 44.3–45.0</td>
<td>Shell very large. Spire tall. Last whorl well-rounded without edge. Peristome very thick, simple and expanded</td>
<td>Northern Vietnam: Lang Son Province (?) and Southern. Elsewhere: Cambodia, Thailand</td>
</tr>
<tr>
<td>45</td>
<td>songmaensis</td>
<td>D 48.5–56.2 H 35.7–47.0</td>
<td>Shell very large. Spire tall. Last whorl well-rounded with a distinct keel. Umbilicus wide</td>
<td>Vietnam: Lang Son Province. Elsewhere: Thailand</td>
</tr>
<tr>
<td>46</td>
<td>speciosus</td>
<td>D 42.0–49.5 H 34.5–41.2</td>
<td>Shell large to very large. Spire tall. Last whorl well-rounded with a distinct edge. Peristome thick, simple and expanded</td>
<td>Northern Vietnam: Ha Giang, Tuyen Quang, Ninh Binh, Hoa Binh, Son La, Thanh Hoa Provinces. Elsewhere: Thailand</td>
</tr>
<tr>
<td>49</td>
<td>tetrachrous</td>
<td>D 27.0–34.0 H 17.0</td>
<td>Shell medium sized. Spire low. Shell pale brown, usually with an irregular zig-zag pattern of dark brown at the periphery; umbilical region whitish to pale yellowish.</td>
<td>Northern Vietnam</td>
</tr>
</tbody>
</table>
Cyclophorus amoenus (Pfeiffer, 1854)
Figs 1.2, 13B–C

Cyclostoma (Cyclophorus) amoenum Pfeiffer, 1852a [1854]: 62.

Cyclostoma amoenum. – Pfeiffer, 1852b: 66; Pfeiffer, 1854d: 346. Taf. XLV, Fig. 11, 12.

Cyclophorus (Litostylus) amoenus. – Kobelt, Möllendorff, 1897: 105; Kobelt, 1902: 97.

Table 1 (Finished)

<table>
<thead>
<tr>
<th>No</th>
<th>Species</th>
<th>Dimensions (mm)</th>
<th>Diagnosis characters</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>D (mm)</td>
<td>H (mm)</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td><em>theodori</em></td>
<td>37.5–39.3</td>
<td>27.2–30.1</td>
<td>Shell large. Spire tall. Last whorl well-rounded with a slightly edge. Umbilicus wide, 1/3 covered by the peristome. Peristome simple or double, thick and expanded.</td>
</tr>
<tr>
<td>52</td>
<td><em>trouiensis</em></td>
<td>38.2–48.3</td>
<td>26.5–34.8</td>
<td>Shell from large to very large. Spire low. Shell covered with thin, fibrous periostracum. Periphery with a distinct keel. Peristome very thick, simple.</td>
</tr>
<tr>
<td>53</td>
<td><em>trouiensis</em> benedi</td>
<td>57.0–59.0</td>
<td>36.0–37.0</td>
<td>Shell very large. Spire low. Periphery with a distinct keel. Peristome very thick, simple.</td>
</tr>
<tr>
<td>54</td>
<td><em>trouiensis</em> omphalotropis</td>
<td>41.0–47.0</td>
<td>32.0–35.0</td>
<td>Shell from large to very large. Spire low. Periphery with a distinct keel.</td>
</tr>
<tr>
<td>56</td>
<td><em>volvulus</em></td>
<td>28.2–35.0</td>
<td>20.9–32.3</td>
<td>Shell medium sized. Spire very tall. Last whorl well-rounded without edge. Umbilicus narrow, always covered by the peristome. Peristome simple, very thick and expanded.</td>
</tr>
<tr>
<td>57</td>
<td><em>zebrinus</em></td>
<td>24.3</td>
<td>23.0</td>
<td>Shell small. Spire very tall. Last whorl well-rounded without or with a slight edge. Peristome slightly thickened, simple, sometimes discontinuous. Umbilicus narrow, 3/4 covered by the peristome.</td>
</tr>
<tr>
<td>59</td>
<td><em>Cyclophorus</em> sp.2</td>
<td>47.0</td>
<td>35.0</td>
<td>Shell very large. Spire low. Periphery with a distinct keel. Aperture very wide. Peristome very thick, simple and very expanded.</td>
</tr>
<tr>
<td>60</td>
<td><em>Cyclophorus</em> sp.3</td>
<td>29.2</td>
<td>22.6</td>
<td>Shell medium sized. Spire low. Last whorl well-rounded with a distinct edge. Umbilicus wide, 1/4 covered by the peristome. Peristome simple, thick and expanded.</td>
</tr>
</tbody>
</table>

OUS narrow bands of brownish below the periphery and umbilical region. Peristome cream-coloured or white, thickened and expanded.

Dimensions: D 29.6–34.0, H 24.0–28.3 mm (n = 29).

The genus *Cyclophorus* in Vietnam

*Cyclophorus amoenus*. – Pfeiffer, 1858: 50; Reeve, 1861: species 40, pl. X, fig. 40a–b; Pfeiffer, 1865: 65; Möllendorff, 1900: 135; Möllendorff, 1901a: 50; Nantarat et al., 2014a: 99–111, fig. 1B; Nantarat et al., 2014b: 4, fig. 3A–B.

**Type locality:** Unknown.

**Type material:** Lectotype NHMUK 20130113/1, paralectotype NHMUK 20130113/2 [Nantarat et al., 2014b: fig. 3A–B].

**Material examined.**

**Dna2010/002** Vietnam, Dong Nai Province, Vinh Cuu District, Phu Ly Commune, Vinh An Forest Enterprise, near Central Agency of South, Limestone hill with depleted primary forest, 11°22.47'N, 107°03.37'E, 29 m, leg. V.N. Do, 22 May 2010; **Kgi2013/002** Vietnam, Kien Giang Province, Kien Luong District, Binh An Commune, Mo So mountain area, sparsely vegetated limestone rocks, 10°11.28'N, 104°39.12'E, 24 m, leg. V.B. Nguyen, 16 June 2013; **Kgi2014/005** Vietnam, Kien Giang Province, Kien Luong District, Binh An Commune, Nho mountain area, dry limestone scree slope with low woodland, 10°16.54'N, 104°34.00'E, 21 m, leg. V.B. Nguyen, 08 December 2014.

**Diagnosis.** Shell medium in size. Last whorl rounded and stout. Aperture rounded and expanded. Peristome white or cream-coloured, thickened and distinctly reflected, double or simple.

**Dimensions:** D 28.7–30.3, H 23.6–24.2 mm (n = 9).

**Distribution.** In Vietnam, known from Dong Nai, Kien Giang Provinces and Central (Insel Baymin) (Möllendorff, 1900). Elsewhere, in Thailand [Nantarat et al., 2014a].

**Remark.** This species was recorded from Baymin Island by Möllendorff [1900: 135]. The discovery of *Cyclophorus amoenus* from Dong Nai and Kien Giang Provinces extends the range of this species for 1000 km and is the first record in Southern Vietnam.

*Cyclophorus aquilus* (Sowerby, 1843) Figs 1.3, 13D

*Cyclostoma aquilum* Sowerby, 1843a: 61.

*Cyclostoma perdix* var. *aquilum*. – Sowerby, 1843b: 122, pl. 79, fig. 128, 131.


*Cyclophorus aquilus*. – Pfeiffer, 1846: 14, pl. 8, fig. 1–2; Pfeiffer, 1852a: 57; Reeve, 1861: sp. 45, fig. 45a–b; Martens, 1867: 134; Kobelt, 1886: 31, Taf. 2, Fig. 11–13; Fischer, 1891: 102; Morlet, 1891b: 246; Ho, 1995: 93; Nantarat et al., 2014b: 5, fig. 3E–F.

**Type locality:** Singapore.

**Type material.** Lectotype NHMUK 20110225/1, paralectotype NHMUK 20110225/2-3 [Nantarat et al., 2014b: fig. 3E–F].

**Material examined.** Sla2012/001b Vietnam, Son La Province, Muong La District, Muong Bu Commune, entrance of the Tham Bo Cave, Limestone slope with woody regrowth, 21°24.05'N, 104°06.13'E, 715 m, leg. D.S. Do and N.C. Bui, 27 October 2012; **Sla2013/004a** Vietnam, Son La Province, Thuan Chau District, Bon Phang Commune, Nam Tien Village, Limestone slope with woody regrowth, 21°23.44'N, 103°46.23'E, 661 m, leg. D.S. Do and T.D. Luong, 16 August 2013; **Sla2017/001b** Vietnam, Son La Province, Van Ho District, Suoi Bang Commune, left side of the road to Tang Me Cave, Steep limestone slope with disturbed forest, 20°58.55'N, 104°48.37'E, 745 m, leg. D.S. Do and T.B. Nguyen, 12 May 2017.

**Diagnosis.** Shell large, conical, with tall spire. Shell pale yellowish to brownish, with an irregular zig-zag pattern, with one wide darker brown band below the periphery; umbilical region pale yellowish. Umbilicus wide, to 1/4 covered by the peristome.

**Dimensions:** D 36.1–43.0, H 31.2–35.2 mm (n = 6).

**Distribution.** In Vietnam, known from Son La Province. Elsewhere, in Singapore, Thailand, Ma-
Cyclophorus bensoni
Cyclophorus pernobilis

**Remark.** This species was previously recorded from Song-ma locality (the locality can be Ma River or Song Ma District of Son La Province) by Morlet [1891b: 246].

**Cyclophorus aurantiacus pernobilis**

**Gould, 1844**  
Figs 1.4, 14D

**Cyclophorus pernobilis** Gould, 1844: 458, pl. 24, fig. 11; Pfeiffer, 1846: 30, Taf. 3, Fig. 15; Pfeiffer, 1852a: 57; Hanley, Theobald, 1870: 1, pl. 1, fig. 7; Nevill, 1878: 266; Martens, 1886: 159, Taf. 14, Fig. 3–4; Tapparone-Canechi, 1889: 307.

**Cyclophorus (Salpingophorus) aurantiacus var. pernobilis.** – Kobelt, Möllerndorff, 1897: 109; Kobelt, 1902: 125; Gude, 1921: 71.

**Cyclophorus aurantiacus pernobilis.** – Kobelt, 1908: 612, Taf. 82, Fig. 5–6, Taf. 84, Fig. 6; Nantarat et al., 2014a: 99–111, fig. 1.Cv.

**Type locality:** King Island, Myanmar.

**Type material.** Not seen.

**Material examined.** Hbi2014/003 Vietnam, Hoa Binh Province, Kim Boi District, Thuong Tien Commune, Khu Village, Sparsely vegetated limestone rocks, 20°38.51'N, 105°26.17'E, 303 m, leg. V.N. Do, 26 December 2014; Sla2013/004a Vietnam, Son La Province, Thuan Chau District, Co Ma Commune, Coptia Nature Reserve, Steep limestone slope with dense disturbed vegetation, 21°21.26'N, 103°31.18'E, 1246 m, leg. D.S. Do and T.H. Nguyen, 08 June 2013; Sla2015/008 Vietnam, Son La Province, Son La City, Chong Xom Commune, La Muong Village, left side of the road to Muong La District, Exposed limestone with little soil and vegetation of herbs, 21°22.39'N, 103°55.43'E, 809 m, leg. D.S. Do, 28 August 2015; Dbi2010/002 Vietnam, Dien Bien Province, Dien Bien District, Na U Commune, near the Tay Trang border region, Exposed limestone with little soil and vegetation of herbs, 21°12.11'N, 102°55.49'E, 615 m, col. P.D. Dinh, 10 July 2010.

**Diagnosis.** Shell very large. Spire medium tall. Periphery with a distinct edge. Peristome simple. Umbilicus open and very wide. Dimensions: D 51.0–60.0, H 38.6–49.5 mm (shells from different localities, n = 17).

**Distribution.** In Vietnam, known from Hoa Binh, Son La, Dien Bien Provinces. Elsewhere, in Myanmar, Thailand, Malaysia [Gude, 1921; Nantarat et al., 2014a].

**Remark.** This subspecies differs from *Cyclophorus aurantiacus andersoni* in its larger shell, distinct edge at the periphery, very wide umbilicus and more thickened, expanded peristome.

**Cyclophorus bensoni** (Pfeiffer, 1854)  
Figs 1.5, 14C

**Cyclostoma bensoni** Pfeiffer, 1854: 158; Pfeiffer, 1853: 244, pl. 32, fig. 11–13.  
**Cyclophorus (Glossostylus) bensoni.** – Kobelt, 1902: 108.  
**Cyclophorus bensoni var. cryptophaloides** Gude, 1921: 57, 58.

**Cyclophorus bensoni.** – Pfeiffer, 1852b: 63; Benson, 1854: 414; Pfeiffer, 1865: 64; Hanley, Theobald, 1870: 16, pl. 34, fig. 5; Nevill, 1878: 270; Rochebrune, 1882: 64; Nantarat et al., 2014a: 99–111, fig. 1D; Nantarat et al., 2014b: 6, fig. 4D.

**Type locality:** Unknown.

**Type material.** Lectotype NHMUK 20130115 [Nantarat et al., 2014b: fig. 4D].

**Material examined.** Kgi2008/001 Vietnam, Kien Giang Province, Kien Luong District, Binh An Commune, Mo So mountain area, Sparsely vegetated limestone rocks, 10°11.30'N, 104°39.02'E, 22 m, leg. V.N. Do, 08 July 2008.

**Diagnosis.** Shell large, conical with tall spire. Shell yellowish brown, usually with numerous darker brown bands below the periphery.

Dimensions: D 37.8, H 33.0 mm (n = 1).

**Distribution.** In Vietnam, known from Kien Giang Province. Elsewhere, in Thailand, India, Cambodia [Rochebrune, 1882; Gude, 1921; Nantarat et al., 2014a].

**Remark.** In Vietnam, the species is known from a small area, and only one specimen was collected.

**Cyclophorus cambodgensis** Morlet, 1884  
Figs 2.6, 14A–B

**Cyclophorus cambodgensis** Morlet, 1884: 388, pl. XI, fig. 3, 3a–c; Fischer, 1891: 102; Do et al., 2015: 120, fig. 2E.

**Cyclophorus (Litostylus) cambodgensis.** – Kobelt, Möllerndorff, 1897: 105; Kobelt, 1902: 98; Kobelt, 1908: 616, Taf. 83, Fig. 1–2.

**Cyclophorus (Kobeltostylus) cambodgensis.** – Vermeulen, Maassen, 2003: 20; Egorov, Greke, 2007: 58–64, fig. 1.M.

**Type locality:** Cambodia.

**Type material.** Not seen.

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**Diagnosis.** Shell large sized. Spire medium. Last
whorl well-rounded without edge. Peristome simple, thick and reflected. Umbilicus wide.

Dimensions: D 35.2–46.0, H 27.3–36.1 mm (shells from different localities).

**Distribution.** In Vietnam, known from Bac Kan, Lang Son, Quang Ninh, Hai Phong, Hanoi, Ha Nam, Ninh Binh, Vinh Phuc, Phu Tho, Hoa Binh, Son La, Thanh Hoa, Thua Thien Hue, Dong Nai, Kien Giang Provinces [Vermeulen, Maassen, 2003]. Elsewhere, in Cambodia [Morlet, 1884].

**Remark.** *Cyclophorus cambodgensis* is a very variable species in terms of shell characters. The population assigned to *C. cambodgensis* inhabiting Ham Rong mountain area, Thanh Hoa Province, differs from those from all other areas of Vietnam in smaller shell. This species is widespread in limestone hills from Northern to Southern Vietnam.

**Cyclophorus cantori** (Benson, 1851)

Figs 2.7, 15E

*Cyclostoma cantori* Benson, 1851: 186; Pfeiffer, 1852b: 65; Pfeiffer, 1854a: 383, Taf. 50, Fig. 4–8.

*Cyclophorus (Eucyclophorus) cantori.* – Kobelt, Möllendorff, 1897: 110.

*Cyclophorus cantori* Reeve, 1861: sp. 54, pl. 13, fig. 54a–b; Pfeiffer, 1865: 65; Fischer, 1891: 103; Kongim et al., 2006: 1–6, fig. 2B; Nantarat et al., 2014a: 99–111, fig. 1E.

*Cyclophorus (Cyclostoma) cantori.* – Kobelt, 1902: 135.

**Type locality:** Insulam Penang, Malaysia.

**Type material:** Not seen.


**Diagnosis.** Shell large, conical with tall spine. Shell dark brown, with an irregular zig-zag pattern; umbilical region pale brownish, with numerous dark brown bands.

Dimensions: D 37.4–45.0, H 32.5–38.0 mm (shells from different localities).

**Distribution.** In Vietnam, known from Lang Son, Tuyen Quang, Bac Kan Provinces. Elsewhere, in China [Möllendorff, 1882; Yen, 1939].

**Cyclophorus consociatus** Smith, 1893

Figs 2.9, 15C

*Cyclophorus consociatus* Smith, 1893: 13; Nantarat et al., 2014a: 99–111, fig. 1F; Nantarat et al., 2014b: 7, fig. 5B–C.

*Cyclophorus (Eucyclophorus) consociatus.* – Kobelt, Möllendorff, 1897: 110.


**Type locality:** Annam Vietnam.

**Type material:** Lectotype NHMUK 1893.2.26.8, paralecotypes NHMUK 1893.2.26.9–10 [Nantarat et al., 2014b: fig. 5B–C].


**Diagnosis.** Shell large. Spire tall. Last whorl well-rounded without edge. Peristome simple. Umbilicus narrow, always covered by peristome.

Dimensions: D 31.7–40.7, H 28.0–34.6 mm (n = 7).

**Distribution.** In Vietnam, known from Binh
The genus *Cyclophorus* in Vietnam


**Remark.** The original description did not include an illustration and specific locality. Möllendorff subsequently [1898: 81] recorded and included “Songcan” locality of the species. The “Songcan” locality can be Con River (Song Con) of Binh Dinh Province, central Vietnam.

*Cyclophorus courbeti* courbeti Ancey, 1888

Figs 3.10, 15D

*Cyclophorus courbeti* Ancey, 1888a: 93, fig. 8; Fischer, 1891: 104; Fischer, Dautzenberg, 1904: 39; van Benenthem Jutting, 1959: 68; Kongim et al., 2006: 1–8, fig. 2C; Nantarath et al., 2014a: 99–111, fig. 1G.

*Cyclophorus* (Eucyclophorus) *courbeti*. – Kobelt, Möllendorff, 1897: 110.


*Cyclophorus courbeti*, form minor Dautzenberg, Fischer, 1908: 205.

*Cyclophorus* (Salpingophorus) *courbeti*. – Kobelt, 1908: 617, Taf. 85, Fig. 1–5.

**Type locality:** Lang-Son and Bac-Ninh, Vietnam.

**Type material:** Not seen.


Cyclophorus courbeti leucostoma
Dautzenberg et Fischer, 1905

**Distribution.** In Vietnam, known from Ha Giang, Bac Kan, Hoa Binh Provinces [Dautzenberg, Fischer, 1905b].

**Remark.** This species distinguished from congeners by its very tall conical spire, distinct sculpture and periphery with a distinct keel.

**Cyclophorus cryptomphalus** Benson, 1857

*Figs 3.12, 16C*

**Cyclophorus cryptomphalus** Benson, 1857: 206; Theobald, 1858: 247; Pfeiffer, 1858: 58; Reeve, 1861: sp. 37, pl. 9, fig. 37a–b; Pfeiffer, 1865: 68; Hanley, Theobald, 1876: 2, pl. 3, fig. 7; Nevill, 1878: 270; Gude, 1921: 59; Nantarat et al., 2014a: 99–111, fig. 1H.

**Cyclophorus (Glossotylus)** cryptomphalus. – Kobelt, Möllendorff, 1897: 107; Kobelt, 1902: 110; Kobelt, 1908: 643, Taf. 91, Fig. 5.

**Type locality:** Ava regni Burmanorum, India.

**Type material:** Not seen.

**Material examined.** *Bka2009/003* Vietnam, Lang Son Province, Van Ho District, Suoi Bang Commune, Pua Lai Village, Limestone hill with depleted primary forest, 20°58.54’N, 104°48.31’E, 7615 m, leg. D.S. Do and T.B. Nguyen, 12 May 2017; *Sla2013/002c* Vietnam, Lai Chau Province, Pua Lai Village, Limestone hill with little soil and vegetation of herbs, 21°19.33’N, 103°58.49’E, 617 m, col. T.T. Nguyen, 19 October 2013; *Tho2014/001* Vietnam, Thanh Hoa Province, Thach Thanh District, Thach Lam Commune, Limestone slope with woody regrowth, 105°29.11’E, 541 m, leg. V.N. Do, 15 August 2014.

**Diagnosis.** Shell brownish to dark brown, below the periphery often with one darker brown band; umbilical region white or pale brown. Peristome whitish, thickened and reflected.

**Dimensions:** D 31.1–34.2, H 23.6–25.8 mm (n = 4).

**Distribution.** In Vietnam, known from Son La, Thanh Hoa Provinces. Elsewhere, in Thailand, Indonesia [van Benthem Jutting, 1959; Kongim et al., 2006; Nantarat et al., 2014a].

**Cyclophorus dilatatus** Heude, 1886

*Figs 3.13, 16D*

**Cyclophorus dilatatus** Heude, 1886: 208; Heude, 1890: 125, pl. 36, fig. 5.

**Cyclophorus (Eucyclophorus) dilatatus.** – Kobelt, Möllendorff, 1897: 110.

**Cyclophorus (Cyclophorus) dilatatus.** – Kobelt, 1902: 137.

**Cyclophorus (Litostylus) dilatatus.** – Kobelt, 1908: 622, Taf. 86, Fig. 10–12.

**Type locality:** Ta-li-fou, Yun-nan, China.

**Type material:** Not seen.

posed limestone with little soil and vegetation of herbs, 20°40.19'N, 105°38.03'E, 455 m, leg. D.S. Do, 21 February 2018; Sla2013/017 Vietnam, Son La Province, Van Ho District, Xuan Nha Commune, Na An Village, Steep limestone slope with disturbed forest, 20°43.25'N, 104°47.44'E, 346 m, leg. D.S. Do, 26 October 2013.

**Diagnosis.** Shell small to medium sized, conical, with very tall spire. Shell brown, often with one or two white bands at umbilical region. Aperture rounded and expanded. Peristome white or cream-coloured, slightly thickened and distinctly reflected, double or simple.

Dimensions: D 21.6–26.3, H 20.3–23.6 mm (shells from different localities, n = 54)

**Distribution.** In Vietnam, known from Lang Son, Bac Kan, Hoa Binh, Son La Provinces. Elsewhere, in China, Laos [Heude, 1886].

**Remark.** This species is distinguished from congeners by its small shell, tall spire, pronounced spiral ridges and distinct keeled periphery.

*Cyclophorus dodrans dodrans* Mabille, 1887

Figs 4.14, 16A

*Cyclophorus dodrans* Mabille, 1887a: 14; Mabille, 1887b: 145, pl. III, fig. 13; Fischer P., 1891: 104; Aney, 1888a: 84, fig. 3; Fischer H., 1898: 332; Fischer, Dautzenberg, 1904: 428; Dautzenberg, Fischer, 1905a: 166, 1905b: 433; Dautzenberg, Fischer, 1908: 205.

*Cyclophorus (Litostylus) dodrans.* – Kobelt, Möllendorff, 1897: 105; Kobelt, 1908: 608, Taf. 82, Fig. 3–4.

*Cyclophorus (Salpingophorus) dodrans.* – Kobelt, 1902: 128.

**Type locality:** Than Moi, Lang Son, Vietnam.

**Type material:** Syntype MNHN–IM–2000–33790.

**Material examined.** Lso2009/004 Vietnam, Lang Son Province, Huu Lung District, Quyet Thang Commune, Ray Village, Steep limestone cliff with woody regrowth, 21°38.23'N, 106°13.17'E, 608 m, leg. V.N. Do, 13 April 2009; Tqu2017/016 Vietnam, Tuyen Quang Province, Na Hang District, Thanh Tuong Commune, Na Don Village, Limestone mountain with disturbed forest, 22°17.58'N, 105°22.30'E, 466 m, leg. V.N. Do, 11 July 2017; Tng2017/006 Vietnam, Thai Nguyen Province, Vo Nhai District, Than Sa–Phuong Hoang Nature Reserve, Limestone mountain with disturbed forest, 21°50.51'N, 105°53.19'E, 260 m, leg. D.S. Do and T.B. Nguyen, 14 May 2017; Hph2008/001 Vietnam, Hai Phong City, An Lao District, Tuong Thanh Commune, Voi mountain area, Small isolated limestone hill, 20°50.47'N, 106°34.08'E, leg. V.N. Do and T.M. Ngo, 22 August 2008; Hbi2013/003 Vietnam, Hoa Binh Province, Lac Thuy District, Dong Tam Commune, Limestone cliffs on the left side of the road to Nho Quan District (Ninh Binh Province), 20°29.31'N, 105°49.05'E, leg. V.N. Do and T.N. Pham, 01 May 2017.

**Diagnosis.** Shell very large. Spire low. Shell covered with thin, fibrous periostracum. Shell brown, with one wide band of darker brown below the periphery; umbilical region white, usually with fewer brown markings than elsewhere. Last whorl rounded. Peristome very thick, simple.

Dimensions: D 53.6–64.3, H 37.0–46.8 mm (shells from different localities).

**Distribution.** In Vietnam, known from Lang Son, Ha Giang, Thai Nguyen, Tuyen Quang, Hai Phong, Cao Bang, Hoa Binh Provinces [Dautzenberg, Fischer, 1905b, 1908]. Elsewhere, in China (?).

**Remark.** This species is distinguished from congeners by its large and more thick shell, low conical spire, distinct sculpture, rounded periphery.

*Cyclophorus dodrans fasciatus* Kobelt, 1908

Figs 4.15, 16B

*Cyclophorus dodrans fasciatus* Kobelt, 1908: 623, Taf. 87, Fig. 1–3.

**Type locality:** Annam Vietnam.

**Type material:** Not seen.

**Material examined.** Hbi2013/002 Vietnam, Hoa Binh Province, Yen Thuy District, Yen Lac Commune, Yen Hoa Village, Sparsely vegetated limestone rocks, 20°23.10'N, 105°36.46'E, 409 m, leg. T.Q. Bui, 20 September 2013; Sla2013/001 Vietnam, Son La Province, Mai Son District, Co Noi Commune, Lech Village, Limestone cliff with woody regrowth, 21°07.33'N, 104°09.22'E, 669 m, leg. D.S. Do.
Cyclophorus eudeli (Pfeiffer, 1853)

Figs 4.18, 17C–D

Cyclostoma expansus Pfeiffer, 1853b

Figs 4.17, 17A–B

Cyclophorus donghoiensis
Thach et Huber, 2017

Cyclophorus donghoiensis Thach et Huber in Thach, 2017: 13, pl. 5, fig. 50–53.

Type locality: Bo Trach, Dong Hoi, Quang Binh, Central Vietnam.

Type material: Holotype NHMUK–20170273.

Material examined. No material was available.

Diagnosis. Shell very large, conical with very tall spire. Shell brownish to dark brown, often with numerous bands of darker brown below the periphery. Umbilicus wide, sometimes partly covered by the peristome.

Dimensions: D 42.0–48.1, H 35.3–40.2 mm (shells from different localities, n = 20).

Distribution. In Vietnam, known from Bo Trach, Dong Hoi District, Quang Binh Province [Thach, 2017].

Cyclophorus eudeli Smith, 1893

Figs 4.17, 17A–B

Cyclophorus eudeli Smith, 1893: 13; Nantarath et al., 2014b: 8, fig. 6B–C.

Cyclophorus (Eucyclophorus) eudeli. – Kobelt, Möllendorff, 1897: 110; Möllendorff, 1898: 81.

Cyclophorus (Cyclophorus) eudeli. – Kobelt, 1902: 137.

Type locality: Annam Vietnam.

Type material: Lectotype NHMUK 1893.2.26.5, paratype NHMUK 1893.2.26.6–7 [Nantarath et al., 2014b: fig. 6B–C].


Diagnosis. Shell medium in size. Shell brown or with brown zigzag pattern, often with one narrower darker brown band below the periphery. Last whorl rounded and stout. Aperture rounded and expanded.

Peristome white or cream-coloured, very thickened and distinctly reflected, always double.

Dimensions: D 30.2–33.6, H 29.7–33.1 mm (n = 5).

Distribution. In Vietnam, known from Binh Dinh, Kien Giang Provinces [Smith, 1893; Möllendorff, 1898].

Remark. The species has previously been recorded from Song-cang locality (Con River, Binh Dinh Province) [Möllendorff, 1898: 81].

Type material: Lectotype NHMUK 20130086/1, paratype NHMUK 20130086/2–3 [Nantarath et al., 2014b: fig. 7E–F].

Material examined. Hbi2016/002 Vietnam, Hoa Binh Province, Mai Chau District, Mai Chau Town, left side of the road No. 15. Limestone hills with sparsely vegetated, 20°39.56’N, 105°07.33’E, 574 m, leg. V.N. Do, 05 September 2016; Sla2013/012 Vietnam, Son La Province, Son La City, Chieng Ngan Commune, Khoang Village, 21°19.28’N, 103°58.55’E, 566 m, Limestone hill with regrowth, leg. D.S. Do and T.T. Nguyen, 26 October 2013; Sla2013/005 Vietnam, Son La Province, Thuan Chau District, Bon Phang Commune, Dom Huon Village, Limestone hills with sparsely vegetated, 21°22.23’N, 103°46.19’E, 605 m, leg. D.S. Do and T.D. Luong, 02 November 2013; Sla2014/002 Vietnam, Son La Province, Son La City, Quyet Tam Ward, Residential Sub-division N.o 5, Steep limestone cliff with woody regrowth, 21°19.29’N, 103°56.07’E, 749 m, leg. D.S. Do, T.D. Luong, 11 December 2014; Sla2014/003 Vietnam, Son La Province, Son La City, Chieng Sinh Ward, Sang Village, Foot of limestone cliff with degraded regrowth, near gardens with Coffea sp., 21°19.06’N, 103°56.41’E, 697 m, leg. D.S. Do, 11 December 2014; Sla2013/005 Vietnam, Son La Province, Thuan Chau District, Bon Phang Commune, Dom Huon Village, Limestone hills with sparsely vegetated, 21°22.23’N, 103°46.19’E, 605 m, leg. D.S. Do and T.D. Luong, 02 November 2013; Tho2014/008 Vietnam, Thanh Hoa Province, Thach Thanh District, Thach Lam Commune, Noi Thanh Village, Primary forest on limestone, 20°20.51’N, 105°29.09’E, 538 m, leg. V.N. Do, 15 August 2014.

Diagnosis. Shell medium in size, conical, with tall spire. Shell brown, usually with an irregular zigzag pattern of dark brown; umbilical region whitish, with numerous bands of dark brown. Umbilicus wide, half covered by peristome. Peristome cream-coloured or white, thickened and expanded.
Dimensions: D 26.2–33.0, H 21.3–28.0 mm (shells from different localities, n = 38).

**Distribution.** In Vietnam, known from Hoa Binh, Son La, Thanh Hoa Provinces. Elsewhere, in Thailand, Malaysia, Myanmar [Kobelt, 1902; Gude, 1921; Ntantar et al., 2014a].

*Cyclophorus fargesianus* Heude, 1885

Figs 5.19, 18A

*Cyclophorus fargesianus* Heude, 1885: 89, Taf. 23, Fig. 2; Yen, 1939: 20, Taf. 1, Fig. 39.
*Cyclophorus (Eucyclophorus) fargesianus.* – Möllendorff, 1886a: 162; Kobelt, Möllendorff, 1897: 110.
*Cyclophorus (Cyclophorus) fargesianus.* – Kobelt 1902: 138.
*Cyclophorus (s. str.) fargesianus.* – Kobelt 1908: 618, Taf. 85, Fig. 6–7.

**Type locality:** Tschen-k’eou, Szechwan, China.

**Type material:** Not seen.


**Diagnosis.** Shell medium in size, conical, with tall spire. Shell colour brownish, often with a row of white spots at the periphery; umbilical region white to pale brown, usually with numerous narrow brownish bands. Peristome white or cream-co-
Shell very large. Spire low. Shell
covered with thin, fibrous periostracum. Periphery
with a slight keel. Peristome thick, simple.
Dimensions: D 47.0–47.7, H 35.7–36.5 mm (n = 3).

**Distribution.** In Vietnam, known from Lang Son and Hai Phong Provinces [Kobelt, 1908].

**Remark.** *Cyclophorus fruhstorferi langsonensis* differs from *Cyclophorus fruhstorferi fruhstorferi* in its smaller shell, but taller spire and a slightly more pronounced peripheral keel.

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**Cyclophorus fulguratus** Pfeiffer, 1852

**Figs 5.23, 18D**

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**Cyclophorus fulguratus** Pfeiffer, 1852a: 63.

**Cyclophorus fulguratus**. – Pfeiffer, 1852b: 80; Benson, 1856: 232; Pfeiffer, 1858: 58; Theobald, 1876: 232; Pfeiffer, 1887: 331; Möllendorff, 1900: 135; Tapparone–Canefri, 1889: 308; Fischer P., 1891: 103; Fischer H., 1898: 331; Möllendorff, 1900: 135; Kongim et al., 2006: 1–8; fig. 2E; Nantarat et al., 2014a: 99–111, fig. 1K; Nantarat et al., 2014b: 11, fig. 8A–B; Nantarat et al., 2014c: 12, fig. 4A–B, 5A–C.

**Cyclostoma (Cyclophorus) fulguratum.** – Pfeiffer, 1854d: 345, Taf. XLY, Fig. 9–10.

**Cyclostoma (Cyclophorus) fulguratum var. major** Pfeiffer, 1869: 440, Taf. XCVIII, Fig. 1–2.

**Cyclostoma fulguratus var. patens** Nevill, 1878: 271.

**Cyclostoma fulguratus var. barniana** Ancy, 1888a: 93, fig. 5.

**Cyclostoma fulguratus var. subflorida** Ancy, 1888a: 93, fig. 7.

**Cyclostoma (Glossostylus) fulguratus.** – Kobelt, Möllendorff, 1897: 107; Kobelt, 1902: 112; Gude, 1921: 61; Solem, 1966: 10; Budha et al., 2015: 3.

**Cyclostoma (Glossostylus) fulguratus var. barniana** Kobelt, 1902: 112.

**Cyclostoma (Glossostylus) fulguratus var. subflorida** Kobelt, 1902: 112.

**Type locality:** Unknown.

**Type material:** Lectotype NHMUK 20130117/1, parakelectotypes NHMUK 20130117/2–3 [Nantarat et al., 2014b: fig. 8A–B].

**Material examined.** Tqu2018/013 Vietnam, Tuyen Quang Province, Son Duong District, Hop Thanh Commune,

**Diagnosis.** Shell medium sized to large. Spire tall. Last whorl well-rounded without edge. Peristome thick, simple.

**Dimensions:** D 29.7–37.5, H 20.6–29.5 mm (shells from different localities).

**Distribution.** In Vietnam, known from Tuyen Quang, Lang Son, Thai Nguyen, Bac Kan, Cao Bang, Hanoi, Ninh Binh, Vinh Phuc, Hoa Binh, Son La, Thanh Hoa, Quang Binh, Khanh Hoa Provinces [Ancy, 1888a; Möllendorff, 1900; Solem, 1966]. Elsewhere, in Thailand, Myanmar, Nepal, Cambodia [Pfeiffer, 1852a; Tapparone-Canefri, 1889; Gude, 1921; Nantarat et al., 2014a; Budha et al., 2015].

**Remark.** *Cyclophorus fulguratus* is a very variable species in terms of shell characters. This species is widespread in limestone hills from Northern to Central Vietnam.

*Cyclophorus haughtoni* Theobald, 1858

**Figs 6.24, 19D**

*Cyclophorus haughtoni* Theobald, 1858: 246; Hanley, Theobald 1876: 1, pl. 1, fig. 6, pl. 48; fig. 6; Pfeiffer, 1876: 405; Nevill, 1878: 270; Tapparone-Canefri, 1889: 308; Nantarat et al., 2014a: 99–111, fig. 1L; Nantarat et al., 2014b: 12, fig. 10A–B.

*Cyclophorus haughtoni* var. phayrei Nevill, 1878: 405.

*Cyclophorus haughtoni* var. picta Nevill, 1878: 405.


*Cyclophorus (Salpingophorus) haughtonii.* – Kobelt, 1897: 109; Kobelt, 1902: 129; Kobelt, 1908: 661, Taf. 94, Fig. 4.

**Type locality:** Maulmein, Myanmar.

**Type material:** Lectotype NHMUK 1888.12.4. 1953, pararelectotype NHMUK 1888.12.4.1954 [Nantarat et al., 2014b: fig. 10A–B].


**Diagnosis.** Shell large, conical, with very tall spire. Shell colour brownish, umbilical region white to yellowish. Last whorl rounded, stout, with numerous wide brownish bands below the periphery and umbilical region. Umbilicus open, deep, sometimes partly covered by the peristome.

**Dimensions:** D 38.1, H 33.7 mm (n = 1).

**Distribution.** In Vietnam, known only from Gia
Cyclophorus herklotsi Martens, 1861
Figs 6.25, 19C
Cyclophorus herklotsi Martens, 1861: 42; Pfeiffer, 1865: 63; Martens, 1867: 13, pl. 3, fig. 1; Noseworthy et al. 2007: 71; Nantarat et al., 2014a: 99–111, fig. 1M.

**Type locality:** Japan.

**Type material:** Not seen.

**Material examined.** Agi2015/005 Vietnam, An Giang Province, Tri Ton District, Co To Commune, Co To mountain area, Isolated limestone hill with depleted primary forest, 10°24.11'N, 105°00.26'E, 437 m, leg. V.B. Nguyen, 23 June 2015; Agi2015/013 Vietnam, An Giang Province, Thoai Son District, Oc To Town, Ba The mountain area, Isolated limestone hill, 10°14.49'N, 105°08.26'E, 77 m, leg. V.B. Nguyen, 27 June 2015; Dna2010/009 Vietnam, Dong Nai Province, Vinh Cuu District, Phu Ly Commune, Small isolated limestone hill with primary forest, 11°22.31'N, 107°08.36'E, leg. V.N. Do, 26 May 2010.

**Diagnosis.** Shell very large, conical with very tall spire. Rounded dorsal whorls with numerous spiral ridges.

Dimensions: D 18.9–22.1, H 19.1–25.0 mm (n = 27)

**Distribution.** In Vietnam, known from Dong Nai, An Giang Provinces. Elsewhere, in Japan, South Korea, Thailand [Noseworthy et al. 2007; Nantarat et al., 2014a].

**Remark.** This species is distinguished from Cyclophorus zebrinus by its circular and flat peristome.

Cyclophorus huberi Thach, 2016
Thach, 2016: 35, fig. 50', 99°–104°.

**Type locality:** Kham Duc, Quang Nam, Vietnam.

**Type material:** Holotype MNHN IM-2000-31889.

**Material examined.** No material was available.

**Diagnosis.** Shell very large. Spire tall. Last whorl rounded. Peristome simple.

Dimensions: D 49.5–52.7, H 33.2–39.8 mm [Thach, 2016].

**Distribution.** In Vietnam, known only from Quang Nam Province [Thach, 2016].

**Remark.** This species is distinguished from congeners by large size, reticulate sculpture at exterior surface and presence of a broad concave area below suture of body whorl [Thach, 2016].

Cyclophorus ignilabris Möllendorff, 1901
Figs 6.27, 20D
Cyclophorus (Litostylus) ignilabris Möllendorff, 1901b: 117; Kobelt, 1902: 537; Kobelt, 1908: 600, Taf. 80, Fig. 1–2.

**Type locality:** Bah-mun Island, Tonkin Vietnam.

**Type material:** Not seen.

**Material examined.** Dna2010/009 Vietnam, Lang Son Province, Chi Lang District, Sao Mai Commune, Gio Cave, 21°42.31'N, 106°36.58'E, 374 m, leg. V.N. Do, 20 July 2005; Qni2011/003 Vietnam, Quang Ninh Province, Cam Pha City, Quang Hanh Ward, Limestone hill with regrowth, 20°59.15'N, 107°11.38'E, 166 m, leg. V.N. Do, 25 April 2011; Qni2015/002 Vietnam, Quang Ninh Province, Van Don District, Dai Xuyen Commune, Dai Van Village, 21°12.38'N, 107°29.13'E, 98 m, leg. V.N. Do, 12 April 2011; Qni2015/002 Vietnam, Quang Ninh Province, Uong Bi City, Yang Danh Ward, Limestone rocks near coal-mine, 21°06.57'N, 106°48.22'E, 203 m, leg. V.N. Do, 14 April 2015; Qni2015/009 Vietnam, Quang Ninh Province, Hoanh Bo District, Ha My Pass, Limestone cliffs on the right of the road to Bac Giang Province, 21°11.820'N, 106°51.242'E, 287 m, leg. V.N. Do, 15 April 2015.

**Diagnosis.** Shell very large, conical with tall spire. The first whorl moderately convex, the others almost flat to slightly convex; periphery with a distinct keel that continues up to the peristome. Shell covered with thin, fibrous periostracum. Shell white to yellowish brown, often with one wide band of darker brown below the periphery. Peristome expanded and thickened.

Dimensions: D 47.2–52.7, H 33.2–39.8 mm (n = 17).

**Distribution.** In Vietnam, known from Quang Ninh and Lang Son Provinces.

**Remark.** This species was collected from North-eastern Vietnam (Quang Ninh, Lang Son Provinces) with distribution range, including the islands and mainland.

Cyclophorus implicatus implicatus Bavay et Dautzenberg, 1908
Figs 6.28, 20A
Cyclophorus implicatus Bavay, Dautzenberg, 1908: 249; Bavay, Dautzenberg, 1909: 285, Taf. XI, Fig. 5–7; Nantarat et al., 2014b: 13, fig. 11C; Do et al., 2015: 120, fig. 2F.

**Type locality:** Muong Bo and Binh-Lu, Lai Chau, Vietnam.

**Type material:** Lectotype MNHN-IM-2000-33829.


**Diagnosis.** Shell very large, conical with tall spire. The first whorl moderately convex, the others almost flat to slightly convex; periphery with a distinct keel that continues up to the peristome. Shell covered with thin, fibrous periostracum. Shell white to yellowish brown, often with one wide band of darker brown below the periphery. Peristome expanded and thickened.

Dimensions: D 49.5–52.7, H 33.5–38.6 mm [Thach, 2016].

**Distribution.** In Vietnam, known from Quang Ninh and Lang Son Provinces.

**Remark.** This species was collected from North-eastern Vietnam (Quang Ninh, Lang Son Provinces) with distribution range, including the islands and mainland.
The genus *Cyclophorus* in Vietnam

Province, Huu Lung District, Quyet Thang Commune, Ray Village, Limestone karst, 21°38.23’N, 106°13.17’E, 608 m, leg. V.N. Do, 13 April 2009.

**Diagnosis.** Shell medium in size, conical, with low to medium high spire. Shell pale yellowish to brown, usually with an irregular zig-zag pattern of dark brown, often with a row of white spots at the periphery, with one, two or three narrower bands of darker brown below the periphery.

Dimensions: D 28.1–37.4, H 21.3–25.5 mm (shells from different localities)

**Distribution.** In Vietnam, known from Ha Giang, Lang Son, Lai Chau, Son La Provinces.

**Remark.** The species is easily recognisable and can be separated from congeners without difficulty by shell morphology and sculpture. Colour pattern highly variable.

*Cyclophorus implicatus* kanhoensis
Do et Do subsp. nov.
Figs 6.29, 20B–C

urn:lsid:zoobank.org:act:15B8177D-7AF2-4EA4-9495-B509CCC84733

**Type material.** Holotype VNMN_IZ 000.000.155, Vietnam, Lai Chau Province, Muong Te District, Kan Ho Commune, Si Thau Chai Village, 22°17.55’N, 102°47.39’E, 812 m, leg. D.S. Do, 16 September 2015. Paratype: same locality and data (CBER–TBU 2015/1).

**Diagnosis.** A medium sized species with tall spire, flattened whorls and with a distinct keel at the periphery.

**Description.** Shell medium in size, conical, with tall spire. Shell white to pale brown, with an irregular zig-zag pattern of brown, below the periphery often with a band of darker brown; umbilical region whitish to pale yellowish, with fewer brown markings than elsewhere, often with numerous narrow bands of dark brown. Whorls 5–5½, rounded, somewhat flattened, periphery with a distinct keel; protoconch (1½–2 whorls) glossy, finely ribbed; teleoconch slightly, rather irregularly finely ribbed, spiral lines visible mainly at the periphery side where sometimes they are as strong as the ribs. Suture relatively shallow, but channelled. Spiral sculpture present, fine, wavy and weaker on the ventral side. Umbilicus 3.8–4.1 mm wide, deep, sometimes partly covered by the peristome. Peristome white or cream-coloured, slightly to distinctly thickened and distinctly reflected, double or simple. Callus well-developed. The operculum is unknown.

**Measurements** (in mm). Holotype: D 25.2, H 20.1, Paratype: D 27.1, H 21.0 mm.

**Distribution.** This new subspecies is thus far known only from limestone slope with disturbed forest in Kan Ho Commune, Muong Te District, Lai Chau Province, Vietnam.

**Etymology.** The specific epithet is derived from the type locality of this new subspecies, Kan Ho Commune, Muong Te District, Lai Chau Province.

**Remark.** This new subspecies differs from *Cyclophorus implicatus implicatus* Bavay et Dautzenberg, 1908 in its larger shell and distinct keel. To date no living specimens have been found.

*Cyclophorus jourdyi* Morlet, 1886
Figs 7.30, 21A–B

*Cyclophorus jourdyi* Morlet, 1886a: 4; Morlet, 1886b: 260, 281, pl. XIV, fig. 1, 1a; Mabille, 1887b: 143; Fischer P., 1891: 103; Fischer, Dautzenberg, 1904: 428; Dautzenberg, Fischer, 1905a: 168; 1905b: 433; Nantarat et al., 2014a: 99–111, fig. 1N.

*Cyclophorus jourdyi* var. *longsonensis* Morlet, 1891b: 246.

*Cyclophorus* (*Glossostylus*) *jourdyi*. – Kobelt, Möllendorff, 1897: 107; Kobelt, 1902: 113; Kobelt, 1908: 678, Taf. 99, Fig. 7, 8.

**Type locality:** Halong, Tonkin Vietnam.


**Material examined.** Lso2009/005 Vietnam, Lang Son Province, Huu Lung District, Quyet Thang Commune, Ray Village, Steep limestone cliff with woody regrowth,
21°38.23′N, 106°13.17′E, 608 m, leg. V.N. Do, 27 November 2010; 

**Cyclophorus labiosus** (Pfeiffer, 1854) 
Figs 7.31, 21C

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**Remark.** This species is widespread in limestone hills from Northern to Southern Vietnam.
Cyclophorus malayanus

Cyclophorus malayanus

Cyclophorus malayanus var. saturna

Cyclophorus malayanus var. minor

Cyclophorus (Salpingophorus) malayanus

Cyclophorus martensianus var. minor

The genus Cyclophorus in Vietnam

Cyclophorus mansuyi

Dautzenberg et Fischer, 1908

Figs 7.33, 22A–B

Cyclophorus mansuyi

Dautzenberg, Fischer, 1908: 204, pl. VIII, fig. 1–4.

Type locality: Quang-Huyen, Cao Bang, Vietnam.

Type material: Syntypes MNHN IM-2000-33835, MNHN IM-2000-33836.


Diagnosis. Shell large, spire low. Last whorl well-rounded and expanded. Peristome slightly thickened, simple. Umbilicus very wide, not covered by the peristome.

Dimensions: D 35.0–40.7, H 23.9–28.3 mm (n = 18)

Distribution. In Vietnam, known from Cao Bang, Quang Ninh, Hai Phong, Son La, Lai Chau Provinces [Dautzenberg, Fischer, 1908].

Remarks. The species is distinguished from its congeners by its large shell, distinct sculpture, rounded periphery and more thickened, expanded umbilicus. Colour pattern highly variable, cream-coloured to pale red. The species is easily recognisable and can be separated from congeners without difficulty by shell morphology and sculpture. This species can be endemic to Vietnam.

Cyclophorus martensianus

Möllendorff, 1874

Figs 8.34, 22D

Cyclophorus martensianus

Möllendorff, 1874: 78; Möllendorff, 1875: 120, pl. 3, fig. 3; Martens, 1875: 127; Pfeiffer, 1876: 110; Nevill, 1878: 267; Greder, 1881: 32; Heude, 1882: 1, pl. 12, fig. 1, 5; Möllendorff, 1882: 275; Ancey, 1888b: 354; Yen, 1941: 185.

Cyclophorus martensianus var. davidi

Ancey, 1888b: 355
Cyclophorus martensianus martensianus – Yen, 1939: 20, 22 D.S. Do, V.N. Do


Diagnosis. Shell from medium to large, conical with tall spire. Shell dark brownish, umbilical region pale brownish with numerous narrow band.

Dimensions: D 31.2–39.0, H 28.5–34.6 mm (shells from different localities).

Distribution. In Vietnam, known from Bac Kan, Lang Son, Tuyen Quang, Quang Ninh, Hanoi, Thanh Hoa Provinces. Elsewhere, in China [Möllendorff, 1874; Yen, 1939, 1941].

Remarks. This species is distinguished from its congeners by its tall spire and periphery with a weak keel that continues up to the peristome. The two subspecies of Cyclophorus martensianus (C. martensianus nankingensis Heude, 1882, pl. 89, fig. 7–9; C. martensianus pallens Heude, 1882, pl. 89, fig. 15–17) were recorded from China by Kobelt [1908: 634–635]. Yen [1939: 20] redescribed and recorded three subspecies (C. martensianus martensianus Möllendorff, 1874, Taf. 1, Fig. 34–36, loc. Kiukiang, Kiangsi; C. martensianus ngankinensis Heude, 1882, Taf. 1, Fig. 37, loc. Anking, Anhwei; C. martensianus macroformis Yen, 1939, Taf. 1, Fig. 38, loc. Hupei).

Cyclophorus martensianus – Kobelt, 1902: 140.

Cyclophorus (Cyclophorus) martensianus var. davidis Kobelt, 1902: 140 (loc. Westliches Szechuan, China).

Cyclophorus (Cyclophorus) martensianus var. mollendorffii A. Kobelt, 1903: 140 (loc. Westliches Szechuan, China).

Cyclophorus (Cyclophorus) martensianus var. nankingensis Kobelt, 1902: 140 (loc. Nanking, China).

Cyclophorus (Cyclophorus) martensianus var. pallens Kobelt, 1902: 141 (loc. Hupei, China).

Cyclophorus (s. str.) martensianus. – Kobelt, 1908: 633, Taf. 89, Fig. 1–6.

Cyclophorus martensianus martensianus. – Yen, 1939: 20, Taf. 1, Fig. 34–36.

Type locality: China.

Type material: Not seen.


**Diagnosis.** Shell small, conical and brownish, with an irregular zig-zag pattern of white. Spire tall. Periphery with a distinct keel. Peristome thin and slightly expanded. Umbilicus narrow.

Dimensions: D 17.1–21.3, H 15.2–18.4 mm (n = 29).

**Distribution.** In Vietnam, known from Lai Chau and Son La Provinces.

**Remarks.** This species is distinguished from its congeners by small shell, distinct sculpture and periphery with a distinct keel. Shell characters are stable. The populations assigned to this species inhabit several regions of North-western Vietnam. This species is known only from Vietnam where it occurs in Lai Chau and Son La Provinces. The species was not present in samples collected from surveys conducted in the surrounding provinces.

*Cyclophorus monachus* (Morelet, 1866)  
Figs 8.36, 23D

*Cyclostoma monachus* Morelet, 1866: 166.  
*Cyclophorus annamiticus* Crosse, 1867: 204, pl. VI, fig. 6; Möllendorff, 1898: 80; Kobelt, 1908: 619, Taf. 86, Fig. 1–4.

*Cyclophorus monachus*. –Pfeiffer, 1876: 403; Nantarat et al., 2014b: 17, fig. 13B–C.

*Cyclophorus cooperus* Heude, 1888: 243; Heude, 1890: 126, pl. 36, fig. 4; Fischer P., 1891: 102, 104.

*Cyclophorus (Litostylus) annamiticus*. – Kobelt, Möllendorff, 1897: 105.

*Cyclophorus (Litostylus) monachus*. – Kobelt, 1902: 100.

**Type locality:** Cochinchina, Vietnam.  
**Type material:** Lectotype NHMUK 1893.2.4.499, paralectotype NHMUK 1893.2.4.500. [Nantarat et al., 2014b: fig. 13B–C].

**Material examined.** Tai2011/001 Vietnam, Tay Ninh Province, Tay Ninh City, Thanh Tan Commune, Ba Den mountain area, Limestone mountain with disturbed forest, 11°22.48′N, 106°10.52′E, 466 m, leg. V.N. Do, 15 June 2011.

**Diagnosis.** Shell large, with very low spire. Last whorl rounded, stout, with one wide band of yellowish above the periphery. Shell colour brownish or pale brownish, umbilical region yellowish to pale brown. Umbilicus very wide and not covered by the peristome. Peristome white, thickened and reflected.

Dimensions: D 39.3–40.4, H 20.5–21.1 mm (n = 3).

**Distribution.** In Vietnam known only from Tay Ninh Province.

**Remark.** This species is known only from Vietnam where it occurs in Ba Den mountain, Tay Ninh Province (which has tourism activities). The species was not present in samples collected from surveys conducted in the surrounding areas. The species has been exploited and eaten by local communities, so it would also become one of the most threatened *Cyclophorus*. Management policies need to be developed in order to raise awareness of the environmental degradation caused by tourism and human activities.

*Cyclophorus muspratti* Godwin-Austen et Beddome, 1894  
Figs 8.37, 23A–B

*Cyclophorus muspratti* Godwin-Austen, Beddome, 1894: 506; Nantarat et al., 2014b: 18, fig. 14A–B.

*Cyclophorus (Litostylus) muspratti*. – Kobelt, Möllendorff, 1897: 105; Kobelt, 1902: 101; Kobelt, 1908: 662, Taf. 96, Fig. 5–6; Gude, 1921: 49.

**Type locality:** Naga Hills, and Maokokehung, Naga Hills, India.  
**Type material:** Holotype NHMUK 1903.7.1.1427, paratypes NHMUK 1903.7.1.1427 [Nantarat et al., 2014b: fig. 14A–B].

**Material examined.** Hno2002/002 Vietnam, Hanoi City, Ba Vi District, left side of road from Hanoi to Ba Vi National Park, in leaf litter bellow high limestone walls above road, 21°04.33′N, 105°21.40′E (map), leg. V.N. Do, 19 September 2002.

**Diagnosis.** Shell large to very large, conical, with very tall spire. Shell brownish, below the periphery often with numerous bands of darker brown.

Dimensions: D 43.8–51.3, H 36.8–41.7 mm (n = 2).

**Distribution.** In Vietnam known only from Ha noi Province (Ba Vi National Park). Elsewhere, in India [Godwin-Austen, Beddome, 1894; Nantarat et al., 2014b].

**Remark.** This species is distinguished from its congeners by its larger shell, flattened whorls and with a distinct keel at the periphery. Two specimens were collected from Ba Vi National Park. This appears to be the first record of the species from Vietnam.

*Cyclophorus orthostylus* Möllendorff, 1898  
Cyclophorus (Litostylus) orthostylus Möllendorff, 1898: 80; Kobelt, 1902: 101; Kobelt, 1908: 663, Taf. 96, Fig. 7–8.

**Type locality:** Boloven, Annam Vietnam.  
**Type material:** Not seen.

**Material examined.** Boloven, Annam Vietnam.  
**Diagnosis.** Shell large, spire tall. Umbilicus very wide.

Dimensions: D 37.5, H 26.5 mm (according to the original description).

**Distribution.** Known from Central Vietnam [Möllendorff, 1898].

**Remark.** The original description by Möllendorff [1898] did not give an illustration of the species. Kobelt [1908] redescribed and figured the species. This species is distinguished from its con-
genera by its open umbilicus not covered by the peristome.

*Cyclophorus paviei* Morlet, 1884
Figs 9.39, 23C

*Cyclophorus paviei* Morlet, 1884: 389, pl. XI, fig. 4, 4a; Fischer P., 1891: 103; Aguilar-Amat, 1932: 8.

*Cyclophorus (Eucyclophorus) paviei.* – Kobelt, Möllendorff, 1897: 110; Kobelt, 1908: 615, Taf. 83, Fig. 7–8.

*Cyclophorus (Cyclophorus) paviei.* – Kobelt, 1902: 141.

**Type locality:** Dey-Chrathom, Cambodia.

**Type material:** Not seen.

**Material examined.** Dna2010/015 Vietnam, Dong Nai Province, Vincu District, Subregion No. 93, Small isolated limestone hill with primary forest, 21°40.46’N, 106°22.35’E, 133 m, leg. V.N. Do, 24 May 2010.

**Diagnosis.** Shell medium in size, conical, with slightly elevated spire, somewhat keeled periphery and fine, complex brown mottled pattern. Shell yellowish brown to pale brown, often with three or four narrower bands of darker brown below the periphery.

**Dimensions:** D 32.4–35.5, H 26.1–32.0 mm (n = 15).

**Distribution.** In Vietnam known from Dong Nai Province. Elsewhere, in Cambodia [Morlet, 1884].

**Remark.** The species was previously recorded from Central Vietnam [Aguilar-Amat, 1932].

*Cyclophorus pfeifferi* Reeve, 1861
Figs 9.40, 24A

*Cyclophorus pfeifferi* Reeve, 1861: sp. 11, pl. III, fig. 11a–b; Pfeiffer, 1865: 64; Rochebrune, 1882: 64; Fischer P., 1891: 104; Nantarat et al., 2014a: 99–111, fig. 1S.

*Cyclophorus (Salpingophorus) pfeifferi.* – Kobelt, Möllendorff, 1897: 109; Kobelt, 1902: 131.

**Type locality:** Pulo–Pangang, Malaysia.

**Type material:** Not seen.

**Material examined.** Sla2012/001a Vietnam, Son La Province, Muong La District, Muong Bu Commune, entrance of the Tham Bo Cave, Limestone slope with woody regrowth, 21°24.05’N, 104°06.13’E, 715 m, leg. D.S. Do and N.C. Bui, 27 October 2012; Sla2013/003a Vietnam, Son La Province, Mai Son District, Muong Bang Commune, Bang Village, Limestone hill with degraded regrowth, 21°22.39’N, 104°03.50’E, 744 m, leg. D.S. Do and T.L. Nguyen, 08 November 2013; Sla2013/003a Vietnam, Son La Province, Muong La District, Muong Bu Commune, Gian Village, Limestone hill near the road to Bo Cop Village, 21°25.08’N, 104°01.50’E, 683 m, leg. D.S. Do and T.L. Nguyen, 08 November 2013.

**Diagnosis.** Shell medium in size, conical, with tall spire. Shell yellowish brown, with an irregular zig-zag pattern.

**Dimensions:** D 34.7–37.2, H 31.2–33.5 mm (n = 5).

**Distribution.** In Vietnam known from Lang Son, Son La Province [Möllendorff, 1901b].

**Remark.** This species is distinguished from its congeners by its slightly thickened periphery with a distinct edge that continues up to the peristome.

*Cyclophorus pyrostoma* Möllendorff, 1882
Figs 9.42, 24C

*Cyclophorus pyrostoma* Möllendorff, 1882: 271, Taf. 9, Fig. 6; Yen, 1939: 22, Taf. 1, Fig. 46; Yen, 1941: 186; Thach, 2016: 36, fig. 105*.

*Cyclophorus (Eucyclophorus) pyrostoma.* – Kobelt, Möllendorff, 1897: 111.

*Cyclophorus (Cyclophorus) pyrostoma.* – Kobelt, 1902: 142.

*Cyclophorus (s. str.) pyrostoma.* – Kobelt, 1908: 628, Taf. 87, Fig. 11, 12.

**Type locality:** Hainan, China.

**Type material:** Not seen.

**Material examined.** Tqu2010/016 Vietnam, Tuyen Quang Province, Tuyen Quang City, An Khang Commune, Thuc Thuy Village, Small limestone outcrops in clayey soil, 21°40.53’N, 105°28.9’E, 359 m, col. T.N. Nguyen, 30 June 2010; Tqu2017/050 Vietnam, Tuyen Quang Province, Yen Son District, Phu Lam Commune, right side off road Yen Son to Yen Bai Province, Limestone hill with degraded regrowth, 21°45.46’N, 105°07.38’E, 402 m, leg. V.N. Do, 09 June 2017; Lso2009/007a Vietnam, Lang Son Province, Huan Lung District, Quyet Thang Commune, Ray Village, Steep limestone cliff with woody regrowth, 21°38.24’N, 106°13.15’E, 611 m, leg. V.N. Do, 30 April 2009; Bka2009/005 Vietnam, Bac
The genus *Cyclophorus* in Vietnam

Kan Province, Cho Moi District, Hoa Muc Commune, Exposed limestone with little soil and vegetation of herbs, 22°03.54’N, 105°50.46’E, 341 m, leg. V.N. Do, 14 May 2009; Bka2017/011 Vietnam, Bac Kan Province, Ba Be District, Nam Mau Commune, Ba Be National Park, Limestone slope with disturbed forest, 22°24.48’N, 105°36.19’E, 201 m, leg. V.N. Do, 10 November 2017.

**Diagnosis.** Shell medium in size, conical, with tall spire. Shell brownish to dark brown; umbilical region pale brownish, with numerous bands of dark brown. Peristome pale yellowish to brownish red, thickened and expanded.

Dimensions: D 30.3–36.8, H 26.3–31.2 mm (shells from different localities).

**Distribution.** In Vietnam known from Tuyen Quang, Lang Son, Bac Kan Provinces. Elsewhere, in China [Möllendorff, 1882].

**Remark.** This species is very species in terms of shell characters.

*Cyclophorus saturnus* Pfeiffer, 1862

*Cyclophorus saturnus* Pfeiffer, 1862a: 116, pl. XII, fig. 6; Pfeiffer, 1865: 61; Martens, 1867: 65; Rochebrune, 1882: 64; Fischer P., 1891: 102; Kongim et al., 2006: 1–8, fig. 2G; Nantarat et al., 2014a: 99–111, fig. 1T; Nantarat et al., 2014b: 21, fig. 18A–B.

*Cyclophorus (Salpingophorus) saturnus.* – Kobelt, Möllendorff, 1897: 109; Kobelt, 1902: 132.

**Type locality:** Cambodia.

**Type material:** Lectotype NHMUK 20130119/1, paralectotype NHMUK 20130119/2–3 [Nantarat et al., 2014b: fig. 18A–B].

**Materials examined.** No material was available.

**Diagnosis.** Shell very large, spire tall. Last whorl rounded without edge. Aperture very wide. Peristome very thick, simple and expanded.

Dimensions: D 49.8–51.2, H 39.5–40.0 mm [Nantarat et al., 2014b].

**Distribution.** In Vietnam, known from Lang Son Province [Fischer P., 1891] and along the border region with the Cambodia [Nantarat et al., 2014b]. Elsewhere, in Cambodia, Thailand [Pfeiffer, 1862a; Nantarat et al., 2014b].

**Remark.** This species is distinguished from its congeners by its larger shell, indistinct sculpture with complex brown mottled pattern, white or cream-coloured, distinctly thickened and reflected peristome. The species was previously recorded from Than-Moi area (Lang Son Province) [Fischer, 1891].

*Cyclophorus siamensis* (Sowerby, 1850)

*Figs 9.44, 24D*

*Cyclostoma siamense* Sowerby, 1850: 158, pl. XXXI.a, fig. 292–293; Pfeiffer, 1852b: 56; Pfeiffer, 1854a: 323, pl. 42, fig. 5, 6.

*Cyclophorus siamensis.* – Pfeiffer, 1858: 41; Reeve, 1861: sp. 19, pl. V, fig. 19a–b; Pfeiffer, 1865: 61; Fischer P., 1891: 102; Morlet, 1891b: 246; Nantarat et al., 2014b: 23, fig. 20A–B.
Muong La District, Muong Bu Commune, Gian Village, Limestone hill near the road to Bo Cop Village, 21°25.08N, 104°01.50E, 683 m, leg. D.S. Do and T.L. Nguyen, 09 April 2017;

Distribution. In Vietnam, known from Lang Son, Ninh Binh, Hoa Binh, Son La Provinces. Elsewhere, in Thailand, India [Sowerby, 1850; Kobelt, 1902; Nantarat et al., 2014b].

Remark. The species was previously recorded from Song-ma [Morlet, 1891b]. The species is easily recognisable and can be separated from congeners without difficulty by shell morphology and sculpture.

Cyclophorus songmaensis Morlet, 1891
Figs 10.45, 25A

Cyclophorus songmaensis Morlet, 1891b: 246, 250, pl. V, fig. 5; Morlet, 1891a: 27; Fischer P., 1891: 104; Nantarat et al. 2014a: 99–111, fig. 1V.

Cyclophorus (Salpingophorus) songmaensis. – Kobelt, Möllen-dorff, 1897: 109; Kobelt, 1902: 133.

Cyclophorus dodrans songmaensis. – Kobelt, 1908: 623, Taf. 87, Fig. 4; Thach, 2016: fig. 106º.

Type locality: Song-ma (Tonkin), Vietnam.

Type material: Not seen.


Diagnosis. Shell large, with tall spire. Shell brownish, with an irregular zig-zag pattern, with a wide band of darker brown below the periphery; umbilical region whitish with three or four narrow bands of dark brown.

Dimensions: D 48.5–56.2, H 35.7–47.0 mm (shells from different localities).


Remark. This species is distinguished from its congeners by its periphery with a distinct keel that continues up to the peristome.

Cyclophorus speciosus (Philippi, 1847)
Figs 10.46, 25B

Cyclostoma speciosum Philippi, 1847: 123.

Cyclophorus speciosus. – Pfeiffer, 1852b: 56; Pfeiffer, 1858: 41; Reeve, 1861: sp. 4, pl. I, fig. 4a–b); Pfeiffer, 1865: 61; Nevill, 1878: 267; Fischer P., 1891: 102; Fischer, Dautzenberg, 1904: 427; Dautzenberg, Fischer, 1905b: 433; Gude, 1921: 84; Kongim et al., 2006: 1–8, fig. 2H; Nantarat et al. 2014a: 99–111, fig. 1W.

Cyclophorus theobaldianus Benson, 1857: 206; Hanley, Theobald, 1876: 1, pl. I, fig. 2.


Cyclophorus edulis Mabille, 1889: 14.
Cyclophorus (Salpingophorus) speciosus var. aureolabis. – Kobelt, Möllendorff, 1897: 109.

**Cyclophorus (Annularia) speciosus.** – Solem, 1966: 10.

**Type locality:** Thailand.

**Type material:** Not seen.

**Material examined.** Thq2017/041 Vietnam, Tuyen Quang Province, Na Hang District, Thanh Tuong Commune, Na Don Village, Limestone mountain with disturbed forest, 22°17.58'N, 105°22.30'E, 466 m, leg. V.N. Do, 11 July 2017; Nbi2012/008 Vietnam, Ninh Binh Province, Tam Diep City, Yen Son Commune, Oc mountain area, Steep limestone slope with disturbed forest, 20°11.33'N, 105°53.26'E, 359 m, leg. V.N. Do, 6 July 2012; Hbi2012/003 Vietnam, Hoa Binh Province, Da Bac District, Tu Ly Commune, U Bo Village, Limestone hill with mainly regrowth and bamboo thickets, 20°51.11'N, 105°11.57'E, 602 m, leg. T.L. Bui, 08 August 2012; Hbi2014/004 Vietnam, Hoa Binh Province, Lac Son District, An Nghia Commune, Lao Thanh Village, Limestone outcrops in primary forest, 20°24.24'N, 105°30.21'E, col. T.Q. Bui, 16 April 2014; Hbi2015/017 Vietnam, Hoa Binh Province, Cao Phong District, Tay Phong Commune, Limestone hill with degraded regrowth, 20°42.30'N, 105°18.16'E, 517 m, col. T.N. Phung, 10 July 2015; Sla2012/013 Vietnam, Son La Province, Muong La District, Muong Bu Commune, entrance of the Tham Bo Cave, Limestone slope with woody regrowth, 21°23.05'N, 103°46.39'E, 620 m, leg. D.S. Do and T.D. Luong, 20 October 2013; Sla2013/004a Vietnam, Son La Province, Thuan Chau District, Co Ma Commune, Copia Nature Reserve, Steep limestone slope with dense disturbed vegetation, 21°21.26'N, 103°31.18'E, 1246 m, leg. D.S. Do and T.H. Nguyen, 08 June 2013; Sla2014/025 Vietnam, Son La Province, Phu Yen District, Muong Do Commune, Lan Village, Primary forest on limestone slope with rock outcrops, 21°11.46'N, 104°47.06'E, 674 m, leg. D.S. Do, 13 July 2014; Sla2014/026 Vietnam, Son La Province, Quynh Nhai District, Chieng Khoang Commune, Khoang Village, Limestone outcrops with little soil and vegetation, 21°34.27'N, 103°41.51'E, 398 m, leg. D.S. Do, 05 September 2014; Sla2017/008 Vietnam, Son La Province, Van Ho District, Suoi Bang Commune, left side of the road to Tang Me Cave, Steep limestone slope with disturbed forest, 20°58.55'N, 104°48.37'E, 745 m, leg. D.S. Do and T.B. Nguyen, 12 May 2017; Tho2013/014 Vietnam, Thanh Hoa Province, Thach Thanh District, Thach My Commune, Noi Thanh Village, Primary forest on limestone, 20°17.33'N, 105°33.59'E, 376 m, col. T.Q. Bui, 20 September 2013.

**Diagnosis.** Shell from large to very large, conical, with tall spire. Shell dark brownish, with an irregular zig-zag pattern.

**Dimensions:** D 42.0–49.5, H 34.5–41.2 mm (shells from different localities).

**Distribution.** In Vietnam, known from Ha Giang, Tuyen Quang, Ninh Binh, Hoa Binh, Son La, Thanh Hoa Provinces [Dautzenberg, Fischer, 1905b]. Elsewhere, in Thailand, Laos, Cambodia, Myanmar [Fischer P., 1891; Reeve, 1961; Solem, 1966].

**Remark.** *Cyclophorus speciosus* is a very variable species in terms of shell characters. This species is distinguished from its congeners by its larger shell, indistinct sculpture, somewhat keeled periphery and fine, complex brown mottled pattern.

**Cyclophorus subfloridus** Ancey, 1888

Figs 10.47, 25C

*Cyclophorus fulguratus var. subfloridus* Ancey, 1888a: 9, fig. 7.

*Cyclophorus (Glossostylus) subfloridus.* – Kobelt, 1902: 112; Kobelt, 1908: 638, Taf. 90, Fig. 4–9.

*Cyclophorus subfloridus.* – Aguilar-Amat, 1932: 8; Kongim et al., 2006: 1–8, fig. 21; Natarat et al. 2014a: 99–111, fig. 1X).

**Type locality:** Than moi, Tonkin Vietnam.

**Type material:** Not seen.

**Material examined.** Lso2009/097 Vietnam, Lang Son Province, Hua Lung District, Quyet Thang Commune, Ray Village, Steep limestone cliff with woody regrowth, 21°38.23'N, 106°13.17'E, 608 m, leg. V.N. Do, 27 April 2009; Lso2017/045 Vietnam, Lang Son Province, Hua Lung District, Hua Lien Commune, Hua Lien Nature Reserve, Primary forest on limestone, 21°40.46'N, 106°22.35'E, 549 m, leg. V.N. Do, 25 April 2017; Tng2017/016 Vietnam, Thai Nguyen Province, Vo Nhai District, Than Sa–Phuong Hoang Nature...
Description. Shell medium to large in size, conical, with low spire. Shell whitish to pale yellow, but with an irregular zig-zag pattern of brown or dark brown speckles, often with a darker brown band below the periphery; umbilical region whitish, often with numerous rows of brownish spots. Whorls 5–5½, well-rounded, periphery without edge; protoconch (2–3 whorls) glossy; teleoconch very finely, rather irregularly ribbed, spiral lines visible mainly at the periphery. Suture distinctly channelled from the start of the teleoconch onwards. Spiral sculpture present, fine, wavy and weaker on the ventral side. Umbilicus 4.2–4.9 mm wide, deep, to 1/3 covered by the peristome. Peristome creamy, distinctly thickened and reflected, double or simple. Callus well-developed. The operculum is unknown.

Measurements (in mm). Holotype: D 28.8, H 23.0 mm. Paratypes (type locality, n = 7): D 28.0–30.9, H 22.4–26.6 mm.

Distribution. This new species is thus far known only from limestone outcrops in clayey soil in Rung Rinh mountain area, Tam Dao National Park, Vinh Phuc Province, Vietnam.

Etymology. The specific epithet is derived from the type locality of this new species, the Tam Dao National Park, Vinh Phuc Province, Vietnam.

Remark. This new species is most similar to Cyclophorus affinis Theobald, 1858 in shell shape but differs in having a low conical spire, double peristome, often consisting of thick, overlapping layers towards the outer margin, or simple. To date no living specimens have been found.

Cyclophorus tetrachrous Mabille, 1887

Cyclophorus tetrachrous Mabille, 1887a: 13; 1887b: 146. Cyclophorus (Litostylus) tetrachrous. – Kobelt, Möllendorff, 1897: 106; Kobelt, 1902: 104.

Type locality: Tonkin Vietnam.

Type material: Not seen.

Materials examined. No material was available.

Diagnosis. Shell medium in size. Spire low. Shell pale brown, usually with an irregular zig-zag pattern of dark brown at the periphery; umbilical region whitish to pale yellowish.

Dimensions: D 27.0–34.0, H 17.0 mm (according to the original description).

Distribution. In Vietnam, known from North- ern region [Mabille, 1887a, 1887b].

Remark. The original description by Mabille [1887a] did not give an illustration of the species or a specific locality.

Cyclophorus theodori Ancey, 1888

Figs 11.50, 26C

Cyclophorus theodori Ancey, 1888a: 92, fig. 4; Fischer P., 1891: 104. Cyclophorus (Eucyclophorus) theodori. – Kobelt, Möllendorff, 1897: 111.
The genus *Cyclophorus* in Vietnam

*Cyclophorus* (Cylophorus) theodori. – Kobelt, 1902: 143.

*Cyclophorus* (Salpingophorus) theodori. – Kobelt, 1908: 681, Taf. 100, Fig. 3, Taf. 102, Fig. 9–10.

**Type locality:** Lang-son and Bac-Ninh, Vietnam.

**Type material:** Holotype RBINS/MT/525934.


**Diagnosis.** Shell large in size. Shell cream-coloured to brown, usually with an irregular zig-zag pattern of dark brown, often with one wide bands of darker brown below the periphery; umbilical region whitish to pale yellowish. Spire tall conical.

**Dimensions:** D 37.5–39.3, H 27.2–30.1 mm (shells from different localities, n = 44).

**Distribution.** In Vietnam, known from Thai Nguyen, Lang Son, Tuyen Quang, Hoa Binh Provinces.

**Remark.** Colour pattern highly variable. The species was previously recorded from Bac Ninh Province [Ancey, 1888a: 92].

*Cyclophorus tornatus* Morlet, 1892

Figs 11.51, 26D

*Cyclophorus* tornatus Morlet, 1892: 322, pl. VIII, fig. 3, 3a–b.

*Cyclophorus* (Eucyclophorus) tornatus. – Kobelt, Möllendorff, 1897: 111.

*Cyclophorus* (Cylophorus) tornatus. – Kobelt, 1902: 143.

*Cyclophorus* (s. str.) tornatus. – Kobelt, 1908: 679, Taf. 99, Fig. 9–10.

**Type locality:** Lai-Chan, Tonkin Vietnam.

**Type material:** Not seen.


**Diagnosis.** Shell large, conical, brownish, with an irregular zig-zag pattern of dark brown, with one wide darker brown band below the periphery, umbilical region white to pale yellowish.

*Cyclophorus trouiensis trouiensis* Wattebled, 1886

Figs 11.52, 27A

*Cyclophorus trouiensis* Wattebled, 1886: 55, pl. IV, fig. 1; Fischer P., 1891: 103; Vermeulen, Maassen, 2003: 20.

*Cyclophorus* (Glossostylus) trouiensis. – Möllendorff, 1898: 81; Kobelt, Möllendorff, 1899: 133; Kobelt, 1902: 119; Kobelt, 1908: 666, Taf. 97, Fig. 10–11.

**Type locality:** Annam Vietnam.

**Type material:** Not seen.


**Diagnosis.** Shell large, conical, brownish, with an irregular zig-zag pattern of dark brown, with one wide darker brown band below the periphery, umbilical region white to pale yellowish.
Dimensions: D 38.2–48.3, H 26.5–34.8 mm (n = 17).

**Distribution.** In Vietnam, known from Quang Ninh, Hai Phong and Hue Provinces [Wattebled, 1886; Vermeulen, Maassen, 2003].

**Remark.** This species is distinguished from its congeners by its distinct sculpture and periphery with a distinct keel.

*Cyclophorus trouiensis bendei* Varga, 1972


**Type locality:** Vietnam.

**Type material:** Not seen.

**Material examined.** no material was available.

**Diagnosis.** Shell very large, spire low. Periphery with a distinct keel. Peristome very thick, similar to that of last whorl. One wide darker brown band below the periphery and with a zig-zag pattern of pale yellowish.

Dimensions: D 57.0–59.0, H 36.0–37.0 mm (according to the original description).

**Distribution.** It is known from Northern Vietnam [Varga, 1972].

**Remark.** The original description by Varga [1972] did not give a collection locality. This subspecies is distinguished from its congeners by its one wide darker brown band below the periphery and a distinct keel of last whorl.

*Cyclophorus trouiensis omphalotropis* Möllendorff, 1900

*Cyclophorus trouiensis omphalotropis* Möllendorff, 1900: 135.

*Cyclophorus (Glossostylus) trouiensis var. omphalotropis* Kobelt, 1902: 120.

**Type locality:** Phuc-son, Annam Vietnam.

**Type material:** Not seen.

**Material examined.** no material was available.

**Diagnosis.** Shell from large to very large, spire low. Periphery with a distinct keel.

Dimensions: D 41.0–47.0, H 32.0–35.0 mm (according to the original description).

**Distribution.** In Vietnam, known from Da Nang [Möllendorff, 1900].

**Remark.** The original description by Möllendorff [1900] did not give an illustration of the subspecies. This subspecies is distinguished from *Cyclophorus trouiensis bendei* by its smaller shell and a distinct keel [Möllendorff, 1900].

*Cyclophorus unicus* Mabille, 1887

Figs 11.55, 27B

*Cyclophorus unicus* Mabille, 1887a: 14; Mabille, 1887b: 143; Fischer P., 1891: 104; Fischer, Dautzenberg, 1904: 429; Dautzenberg, Fischer, 1905a: 167, pl. IV, fig. 6–8.

*Cyclophorus (Litostylus) unicus.* – Kobelt, Möllendorff, 1897: 106; Kobelt, 1902: 104; Kobelt, 1908: 637, Taf. 90, Fig. 1–3.

**Type locality:** Tonkin Vietnam.

**Type material:** Syntype MNHN–IM–2000–33789.

**Material examined.** Qni2011/002a Vietnam, Quang Ninh Province, Cam Pha City, Quang Hanh Ward, Steep limestone slope with disturbed forest, 20°59.14’N, 107°12.42’E, 174 m, leg. V.N. Do, 25 April 2011; Hbi2016/004 Vietnam, Hoa Binh Province, Lac Thuy District, Lac Long Commune, Woodland on dry soil and limestone rock, 20°30.34’N, 105°47.08’E, 367 m, leg. T.N. Pham and V.N. Do, 01 May 2016; Tho2015/003 Vietnam, Thanh Hoa Province, Thach Thanh District, Thach Lam Commune, Limestone slope with woody regrowth, 20°20.29’N, 105°29.43’E, 266 m, leg. T.Q. Bui, 13 July 2015.

**Diagnosis.** Shell medium to large, conical, with low spire. Shell dark brownish, usually with an irregular zig-zag pattern of pale yellowish.

Dimensions: D 32.3–38.0, H 23.4–26.5 mm (n = 9).

**Distribution.** In Vietnam, known from Quang Ninh, Hoa Binh, Thanh Hoa Provinces.

**Remark.** The original description by Mabille, 1887 [1887a, b] did not give an illustration of the species and a collection locality. Dautzenberg and Fischer [1905a] redescribed and figured the species. The species was previously recorded from Fai Ts Long Archipelago (Long Chau Archipelago, Hai Phong City) [Dautzenberg and Fischer, 1905a].

*Cyclophorus volvulus* (O.F. Müller, 1774)

Figs 12.56, 27C

*Helix volvulus* O.F. Müller, 1774: 82.

*Cyclostoma trochiforme* Eydoux, Souleyet, 1852: 533, pl. 30, fig. 18–21.

*Cyclophorus volvulus.* – Pfeiffer, 1852b: 58; Pfeiffer, 1858: 42; Reeve, 1861: sp. 24, pl. VI, fig. 24a–b; Crosse, Fischer, 1863: 366; Pfeiffer, 1865: 62; Martens, 1867: 64; Morelet, 1875: 280; Fischer P., 1891: 101; Vermeulen, Maassen, 2003: 20; Konig et al., 2006: 1–8, fig. 2J; Vermeulen et al. 2008: 150; Natarrat et al. 2014a: 99–111, fig. 1Z.

*Cyclophorus (Eucyclophorus) volvulus.* – Kobelt, Möllendorff, 1897: 111.

*Cyclophorus (Cyclophorus) volvulus.* – Kobelt, 1902: 143; Egorov, Greke, 2007: 58–64, fig. 1A.

**Type locality:** Insel Pulo–Conдор, Cochinchina Vietnam (?) [Kobelt, 1902].

**Type material:** Not seen.

**Material examined.** Lso2005/031 Vietnam, Lang Son Province, Chí Lang District, Sao Mai Commune, Gio cave area, Steep limestone cliff with primary forest, 21°42.31’N, 106°36.58’E, 106 m, leg. V.N. Do, 20 May 2005; Tng2017/030 Vietnam, Thai Nguyen Province, Vo Hai District, Than Sa–Phuong Hoang Nature Reserve, Densely vegetated limestone hill, 21°50.51’N, 105°53.19’E, 260 m, leg. D.S. Do and T.B. Nguyen, 14 May 2017; Qni2008/006 Vietnam, Quang Ninh Province, Quang Yen Town, Hoang Tan Commune, Limestone cliff with woody regrowth and grassland, 20°54.08’N, 106°55.13’E, 306 m, leg. V.N. Do, 05 August 2008; Qni2011/003 Vietnam, Quang Ninh Province, Ha Long Bay area, Dau Go Island, Thien Cung Cave, drift material washed together over sinkhole in cave, 20°54.32’N, 107°01.16’E, 30 m, leg. V.N. Do, 26 April 2011; Hph2007/001 Vietnam, Hai Phong City, An Lao District, An Tien Commune, Voi mountain area,
Sparlsely vegetated limestone rocks, 20°50.20’N, 106°33.42’E, leg. V.N. Do, 16 August 2007; **Hph2008/004** Vietnam, Hai Phong City, An Lao District, Truong Thanh Commune, Voi mountain area, Small isolated limestone hill, 20°50.47’N, 106°34.08’E, leg. V.N. Do, 22 August 2008; **Hph2016/020** Vietnam, Hai Phong City, Cat Ba National Park, Trung Trang Cave, Steep limestone cliff with woody regrowth, 20°47.4’N, 106°59.41’E, 38 m, leg. D.S. Do, 14 October 2016; **Hph2017/002** Vietnam, Hai Phong City, Cat Ba National Parks, right side of the road to Kim Giao Hill, Primary forest on limestone, 20°47.48’N, 106°59.40’E, 56 m, leg. D.S. Do, 16 October 2017; **Hno2012/003** Vietnam, Hanoi City, My Duc District, Huong Son Commune, Yen Vi Village, Small hill just behind of Trinh Temple, exposed limestone with little soil and vegetation, 20°34.21’N, 105°46.37’E, 313 m, leg. V.N. Do, 15 July 2012; **Hbi2016/009** Vietnam, Hoa Binh Province, Lac Thuy District, Lac Long Commune, Woodland on dry soil and limestone rock, 20°30.34’N, 105°47.08’E, 367 m, leg. T.N. Pham and V.N. Do, 01 May 2016; **HNUE-OC888/002** Vietnam, Son La Province, Van Ho District, Lien Hoa Commune, Non Village, Primary forest on limestone, 20°58.54’N, 104°52.4’E, 427 m, leg. D.S. Do, 03 July 2015; **Sla2015/003** Vietnam, Son La Province, Chiang An Commune, Son La Pass, Limestone outcrops in thick clayey soil, 21°19.40’N, 103°53.12’E, 765 m, leg. D.S. Do, 22 April 2015; **Tho2014/007** Vietnam, Thanh Hoa Province, Thach Thanh District, Thach Lam Commune, Noi Thanh Village, Primary forest on limestone, 20°20.51’N, 105°29.09’E, 538 m, leg. D.S. Do, 16 October 2017; **Kgi2014/002** Vietnam, Kien Giang Province, Hon Soc mountain area, Limestone outcrops in thick clayey soil, 10°08.31’N, 104°52.39’E, 42 m, leg. V.B. Nguyen, 15 December 2013; **Kgi2013/001** Vietnam, Kien Giang Province, Hon Dat District, Tho Son Commune, Hon Me mountain area, Limestone outcrops in thick clayey soil, 10°08.36’N, 104°52.47’E, 42 m, leg. V.B. Nguyen, 18 June 2013; **Kgi2013/003** Vietnam, Kien Giang Province, Hon Dat District, Tho Son Commune, Hon Soc mountain area, Limestone outcrops in thick clayey soil, 10°08.31’N, 104°52.39’E, 46 m, leg. V.B. Nguyen, 18 June 2013; **Kgi2014/002** Vietnam, Kien Giang Province, Hon Dat District, Tho Son Commune, Hon Soc mountain area, Limestone outcrops in thick clayey soil, 10°08.32’N, 104°52.43’E, 45 m, leg. V.N. Do, 05 July 2014.

**Diagnosis.** Shell medium in size, with tall spire. Shell brownish to dark brown, with an irregular zig-zag pattern of white or pale yellowish, with one wider darker brown band below the periphery. Umbilicus narrow, to 4/5 covered by the peristome.

**Dimensions:** D 28.2–35.0, H 20.9–32.3 mm (shells from different localities).

**Distribution.** In Vietnam, known from Lang Son, Thai Nguyen, Quang Ninh, Hai Phong, Hanoi, Hoa Binh, Son La, Thanh Hoa, An Giang, Ba Ria–Vung Tau (Con Dao Island), Kien Giang Provinces [Fischer P., 1891; Vermeulen, Maassen, 2003]. Elsewhere, in Malaysia, Thailand, Cambodia, China (Hong Kong), India [Eydoux, Souleyet, 1852; Reeve, 1861; Fischer P., 1891; Egorov, Greke, 2007; Natarat et al. 2014c].

**Remark.** *Cyclophorus volvulus* is a very variable species in terms of shell characters.

*Cyclophorus zebrinus* (Benson, 1836)

*Figs 12.57, 27D*

*Cyclotoma zebrinus* Benson, 1836: 355.

*Cyclophorus zebrinus*. – Pfeiffer, 1852b: 71; Pfeiffer, 1854a: 256, Taf. 34, Fig. 21–23; Reeve, 1861: sp. 46, pl. XI, fig. 46a–b; Pfeiffer, 1865: 66; Godwin–Austen, 1876: 173; Hanley, Theobald, 1876: 1, pl. 2; Nevill, 1878: 268; Mar- tens, 1886: 160; Morlet, 1891b: 246; Gude, 1921: 86; Dey, Mitra, 2000: 11; Vermeulen et al. 2008: 151; Natarat et al. 2014a: 99–111, fig. 1R.

*Cyclophorus zebrinus aureolabris* Nevill, 1878: 268 (loc. near Sibaggar).

*Cyclophorus zebrinus var. minor* Tapparone–Canefri, 1889: 309.

*Cyclophorus (Glossostylus) zebrinus*. – Kobelt, Möllendorff, 1897: 108; Kobelt, 1902: 123.

**Type locality:** Assam (Manipur, Khasi–und Dafla–Berge), India.

**Type material:** Not seen.

Cyclophorus sp.1
Figs 12.58, 28A


Diagnosis. Shell small, conical with tall spire. Shell yellowish to brownish, with an irregular zigzag pattern of dark brown, with one wider darker brown band below the periphery; umbilical region pale yellowish. Umbilicus open, deep, to 3/4 covered by the peristome.

Dimensions: D 24.3, H 23.0 mm (n = 1).


Remark. This species is distinguished from its congeners by its smaller shell, thin callus, and somewhat keeled periphery. The species was recorded from Long-son and Song-ma regions by Morlet [1891b], but during the field trips, we found no specimens.

Cyclophorus sp.2
Figs 12.59, 28B

Material examined. Tho2013/001 Vietnam, Thanh Hoa Province, Thach Thanh District, Thach My Commune, Noi Thanh Village, Primary forest on limestone, 20°17.33’N, 105°38.03’E, 376 m, col. T.Q. Bui, 20 September 2013.

Diagnosis. Shell medium in size, conical, with tall spire. Shell dark brownish, with a pale yellowish band above the periphery; umbilical region pale yellowish, with numerous narrow brown bands. Umbilicus open, deep and to 3/4 covered by the peristome. Peristome discontinuous, white, slightly thickened and reflected.

Dimensions: D 29.9, H 26.0 mm (n = 1).

Remark. This species is similar to Cyclophorus fulguratus, but has a smaller shell, the last whorl distinctly, obtusely shouldered close to the suture, obtuse spiral ridge, periphery with a slight to distinct, obtuse edge.

Cyclophorus sp.3
Figs 12.60, 28C


Diagnosis. Shell medium in size, conical, with low spire. Umbilicus open and to 1/3 covered by the peristome. Periphery with a distinct keel that continues up to the peristome.

Dimensions: D 29.2, H 22.6 mm (n = 1, corroded shell).

Remarks. This species is similar to Cyclophorus affinis Theobald, 1858, but has a lower conical spire, periphery with a distinct keel that continues up to the peristome, peristome thickened and expanded.

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We would like to thank Barna Páll-Gergely, Parm Viktor von Oheimb and Miklós Szekeres for providing useful references. We thank the Editor-in-Chief, Yuri I. Kantor and the reviewers, who have contributed significantly with their constructive comments to the improvement of the present paper. In addition, we thank many of our colleagues and students who collected the specimens and deposited at Center for Biodiversity and Environment Research, Tay Bac University (CBER–TBU) and Soil Organism Research Center of Hanoi National University of Education, Vietnam (SORC–HNUE).

References

Table 2. Vietnamese localities mentioned in the paper.

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<td>cambodgensis, malayanus, volvulus</td>
</tr>
<tr>
<td>Quang-Huyen, Quang-uyen (town)</td>
<td>Cao Bang</td>
<td>massuyi</td>
</tr>
<tr>
<td>Rivière Noire (river)</td>
<td>Northern Vietnam</td>
<td>massiei</td>
</tr>
<tr>
<td>Saigon (city, nation)</td>
<td>Ho Chi Minh</td>
<td>monachus</td>
</tr>
<tr>
<td>Songcan (river)</td>
<td>Binh Dinh</td>
<td>consociatus, eudeli</td>
</tr>
<tr>
<td>Song-ma, Song-Ma</td>
<td>Dien Bien, Son La, Thanh Hoa</td>
<td>massiei, songmaensis, aquilus</td>
</tr>
<tr>
<td>Tay-ninh, Taininh (province)</td>
<td>Tay Ninh</td>
<td>monachus</td>
</tr>
<tr>
<td>Than Moi, Than-moi (village ?)</td>
<td>Lang Son</td>
<td>dodrans, fulguratus, polystictus, saturnus, subfloridus</td>
</tr>
<tr>
<td>Tonkin, Tongking (region)</td>
<td>Northern Vietnam</td>
<td>fruhoferi, jourdyi, massiei, tetrachrous, unicus</td>
</tr>
<tr>
<td>Trouié (mountain)</td>
<td>Thua Thien Hue</td>
<td>trouiensis</td>
</tr>
<tr>
<td>Tuyen Kwan (province)</td>
<td>Tuyen Quang</td>
<td>fruhoferi</td>
</tr>
<tr>
<td>Yen Lac (town)</td>
<td>Bac Kan</td>
<td>pyrosotma</td>
</tr>
</tbody>
</table>


Kerney M.P., Cameron R.A.D. 1979. A field guide to the...
The genus *Cyclophorus* in Vietnam


Mabille J. 1889.


Varga A. 1972. Neue Schnecken-Arten aus Vietnam (Gas-
The genus Cyclophorus in Vietnam


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РЕЗЮМЕ. Вьетнам характеризуется многочисленными известняковыми горными образованиями, концентрирующимися в северной, северо-центральной и южной частях, а также многочисленными разнообразными известняковыми островами, расположенными вдоль береговой линии. Соответственно, в регионе отмечены филогенетически разнообразные фауны наземных брюхоногих моллюсков, в которой доминируют эндемичные виды. Исследован род Cyclophorus (Cyclophoridae) во Вьетнаме. Всего в различных местообитаниях Вьетнама найдено 60 видов и подвидов. Описан новый вид Cyclophorus tamdaoensis sp. nov. из северного Вьетнама и новый подвид Cyclophorus implicatus kanhoensis ssp. nov., из северо-западного Вьетнама. Вариетет Cyclophorus courbeti var. leucostoma Dautzenberg et Fischer, 1905 поднят до ранга подвида.
FIG. 13. A. *Cyclophorus affinis* Theobald, 1858, Sla2013/011 Chieng Ngan, Son La; B, C. *Cyclophorus amoenus* (Pfeiffer, 1854), Kgi2014/005 Kien Luong, Kien Giang; D. *Cyclophorus aquilus* (Sowerby, 1843), Sla2013/004a Thuan Chau, Son La.
The genus *Cyclophorus* in Vietnam

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**FIG. 20.** A. *Cyclophorus implicatus implicatus* Bavay et Dautzenberg, 1908, Lch2015/100 Phong Tho, Lai Chau; B. *Cyclophorus implicatus kunhoensis* subsp. nov., VNMN_IZ 000.000.155, C. CBER–TBU 2015/1 Muong Te, Lai Chau; D. *Cyclophorus ignilabris* Möllendorff, 1901, Qmi2015/009 Hoanh Bo, Quang Ninh.
The genus *Cyclophorus* in Vietnam

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**FIG. 24.**

- **A.** *Cyclophorus pfefferi* Reeve, 1861, Dbi2017/001 Tuan Giao, Dien Bien;  
- **B.** *Cyclophorus polyistictus* Möllendorff, 1901, Sla2013/003a Muong La, Son La;  
- **C.** *Cyclophorus pyrostoma* Möllendorff, 1882, Bka2009/005 Cho Moi, Bac Kan;  
- **D.** *Cyclophorus siamensis* Sowerby, 1850, Nbi2012/002 Tam Diep, Ninh Binh.
FIG. 27. A. Cyclophorus trouiensis trouiensis Wattebled, 1886, Hph2016/015 Cat Ba, Hai Phong; B. Cyclophorus unicus Mabille, 1887, Qni2011/002a Cam Pha, Quang Ninh; C. Cyclophorus volvulus (Müller, 1774), Hph2016/020 Cat Ba, Hai Phong; D. Cyclophorus zebrinus (Benson, 1836), Kgi2015/001 Kien Luong, Kien Giang.
The genus *Cyclophorus* in Vietnam

FIG. 28. **A.** *Cyclophorus* sp.1, Tho2013/001 Thach Thanh, Thanh Hoa; **B.** *Cyclophorus* sp.2, Hbi2018/001 Luong Son, Hoa Binh; **C.** *Cyclophorus* sp.3, Sla2013/001c Chieng Ngan, Son La.