

# Taxonomic reassessment of *Indoartemon vietnamensis* Thach, 2020, with the description of a new subspecies of *I. huberi* (Thach, 2016) from Vietnam

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**ABSTRACT.** The taxonomic status of *Indoartemon vietnamensis* Thach, 2020 is reassessed. The morphology of *I. vietnamensis* falls within the intraspecific variation of *I. huberi* (Thach, 2016). The similarities suggest that *I. vietnamensis* should be treated as a junior subjective synonym of *I. huberi*. Furthermore, a new subspecies of the genus *Indoartemon* is described from Chua Chan Mountain, Dong Nai Province, Vietnam. *Indoartemon huberi chuachanensis* subsp. nov., has oblique-heliciform shell with axially deflected last whorl, narrow and deep umbilicus, aperture with one strong parietal lamella and one small palatal lamella, slightly enlarged columellar fold along the columellar margin.

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Таксономическая переоценка *Indoartemon vietnamensis* Thach, 2020, с описанием нового подвида *I. huberi* (Thach, 2016) из Вьетнама

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**РЕЗЮМЕ.** Пересмотрен таксономический статус *Indoartemon vietnamensis* Thach, 2020. Морфология *I. vietnamensis* укладывается в пределы внутривидовой изменчивости *I. huberi* (Thach, 2016). Сходство между видами указывают на то, что *I. vietnamensis* следует рассматривать как младший субъективный синоним *I. huberi*. Кроме того, описан новый подвид рода *Indoartemon*, отмеченный на горе Чуа Чан (провинция Донгнай, Вьетнам). *Indoartemon huberi chuachanensis* subsp. nov. обладает косо-хелицевидной раковиной с аксиально отклонённым последним оборотом, пупок имеет форму капли, устье с одной выраженной парietальной пластинкой и одной небольшой палатальной пластинкой, колумеллярная часть перистомы расширена, образуя зубовидную структуру.

1988; Schileyko, 2000]. The genus currently comprises about 15 described species distributed from Sri Lanka and India to southern China and Southeast Asia [Siriboon *et al.*, 2014; Inkhavilay *et al.*, 2016; Páll-Gergely *et al.*, 2020; MolluscaBase, 2025]. The genus is characterized by a subglobose to ovoid shell shape. The shell surface is glossy, nearly smooth or bears transverse ridges. The apertural dentition typically includes one parietal and one palatal lamella, although some species [e.g., *I. cingalensis* (Benson, 1853), *I. gracilis* (Collett, 1898), *I. layardianus* (Benson, 1853), and *I. tridens* (Möllendorff, 1898)] may possess additional lamellae such as basal, columellar, or upper-parietal lamellae [Benson, 1853; Collett, 1898; Inkhavilay *et al.*, 2016; Do, Nguyen, 2020; Preece *et al.*, 2022].

*Indoartemon huberi* (Thach, 2016) was originally described as *Streptartemon huberi* from Doan Ket Commune, Bao Loc city, Lam Dong province, Vietnam. However, Doan Ket is actually a ward belonging to Da Huoai District instead of Bao Loc City [Council of Ministers of The Socialist Republic of Vietnam, 1986]. This means the type locality is confused about actually from Da Huoai District or Bao Loc City. Subsequently, Páll-Gergely *et al.* [2020] transferred this species to genus *Indoartemon* Forcart, 1946 from Damb'ri waterfall, Bao Loc City, Lam Dong Province, Vietnam. As a result of this action, *Indoartemon huberi* Thach, 2018 became a secondary homonym of *I. huberi* (Thach, 2016), and was therefore later renamed *I. franzhuberi* Thach, 2021 [Thach, 2021].

## Introduction

*Indoartemon* Forcart, 1946 is a carnivorous land snail genus belonging to the family Streptaxidae and subfamily Streptaxinae [Forcart, 1946; Richardson,

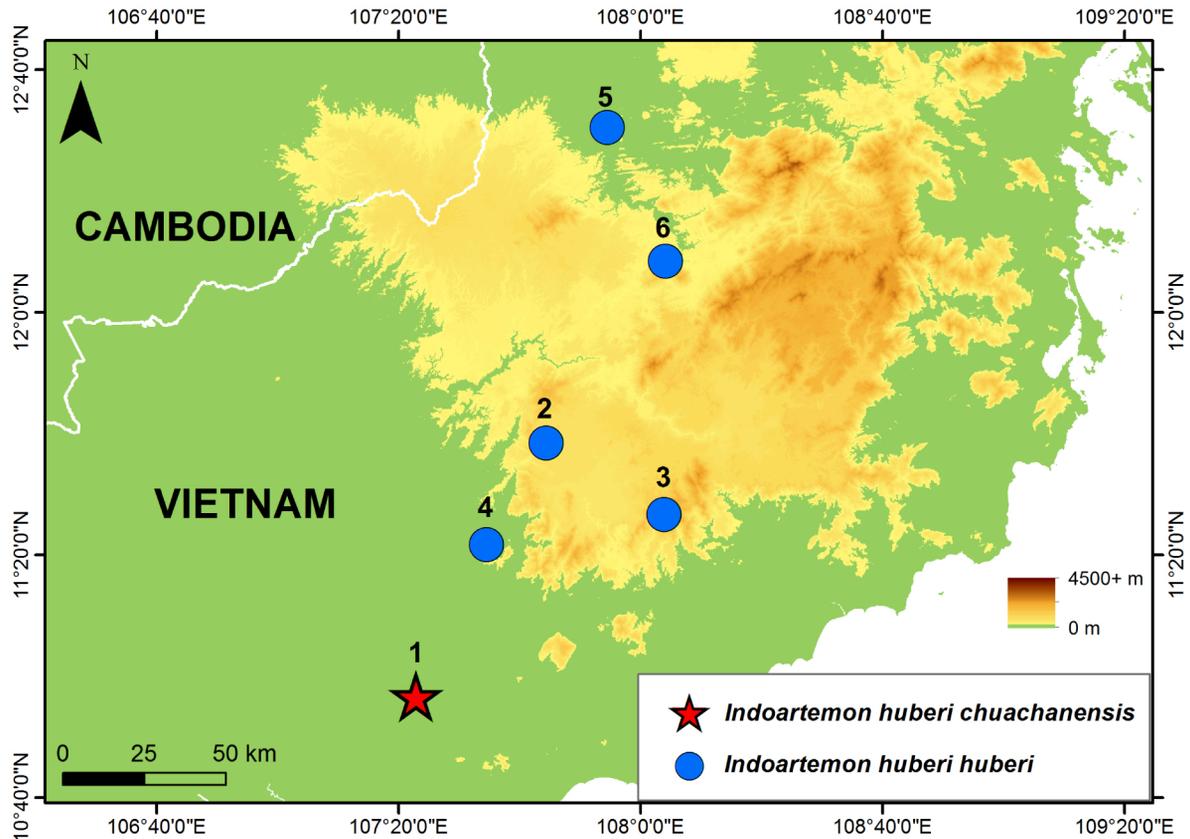


FIG. 1. Map of location of *Indoartemon huberi huberi* and *Indoartemon huberi chuachanensis* subsp. nov. in Vietnam: 1 – Chua Chan Mountain, Xuan Loc District, Dong Nai Province; 2 – Damb’ri waterfall, Bao Loc City, Lam Dong Province; 3 – Di Linh Commune (formerly Gung Re Commune, Di Linh District), Lam Dong Province; 4 – Nam Thanh Commune, Lam Dong Province (formerly Da Kai Commune, Duc Linh District, Binh Thuan Province); 5 – C8 lava cave, Dak Nong UNESCO Global Geopark, Lam Dong Province (formerly Dak Nong Province); 6 – Dam Rong Commune (formerly Dam Rong District, Lieng S’rônH Commune), Lam Dong Province, Vietnam.

РИС. 1. Карта местонахождений *Indoartemon huberi huberi* и *Indoartemon huberi chuachanensis* subsp. nov. во Вьетнаме: 1 – гора Чуа Чан, район Суан Лок, провинция Донгнай; 2 – водопад Дамбри, город Бао Лок, провинция Ламдонг; 3 – коммуна Зи Линь (ранее коммуна Гунг Ре, район Зи Линь), провинция Ламдонг; 4 – коммуна Нам Тхань, провинция Ламдонг (ранее коммуна Да Кай, район Зык Линь, провинция Бинь Тхуан); 5 – лавовая пещера C8, Глобальный геопарк ЮНЕСКО Дак Нонг, провинция Ламдонг (ранее провинция Дак Нонг); 6 – коммуна Дам Ронг (ранее район Дам Ронг, коммуна Лиенг Срон), провинция Ламдонг, Вьетнам.

*Indoartemon vietnamensis* Thach, 2020 was described based on only two specimens from Lam Dong Province, Vietnam. However, Thach [2020] compared this species only with *Indoartemon tridens* (Möllendorff, 1898) and *I. huberi* Thach, 2018 (now is *I. franzhuberi*). Moreover, Thach [2020] published 140 new species and subspecies in April, just one month after the publication of Páll-Gergely *et al.* [2020] in March, which may have resulted in potential misidentifications.

In this study, the taxonomic status of *Indoartemon vietnamensis* is reassessed. Furthermore, we describe one new subspecies belonging to the genus *Indoartemon* from Chua Chan Mountain, Xuan Loc District, Dong Nai Province, Vietnam.

## Materials and methods

Shells of *Indoartemon* were collected from Viet-

nam between 2023 and 2025. The descriptions of shell characters, including features of the aperture, peristome, whorls, umbilicus, and apertural dentition, follows Richardson [1988], Schileyko [2000], and Siriboon *et al.* [2014], and Do and Nguyen [2020]. Shell height, shell width, aperture height, aperture width, and apical angle were measured following Siriboon *et al.* [2013]. Whorls were counted according to the method described by Kerney and Cameron [1979].

The collected materials are deposited in at the collections of Institute of Life Sciences (ILSCZ), 9/621, Xa Lo Ha Noi Streets, Linh Trung Ward, Thu Duc City, Ho Chi Minh City, Vietnam.

**Abbreviations.** SH, shell height; SW, shell width; AH, aperture height; AW, aperture width; AA, apical angle; MNHN, Muséum National d’Histoire Naturelle (Paris, France); ILSCZ, Institute of Life Sciences (Ho Chi Minh City, Vietnam).



FIG. 2. Shells of *Indoartemon huberi* (Thach, 2016) and *Indoartemon vietnamensis* Thach, 2020: **A–D**, holotype of *Indoartemon huberi*, MNHM-IM-2000-31898, **E–F**, holotype of *Indoartemon vietnamensis*, MNHM-IM-2000-35528, **G**, aperture of paratype 1 of *Indoartemon huberi*. Photographs from Muséum national d'Histoire naturelle (MNHM), Thach [2016], Thach [2020].

РИС. 2. Раковины *Indoartemon huberi* (Thach, 2016) и *Indoartemon vietnamensis* Thach, 2020: **A–D**, голотип *Indoartemon huberi*, MNHM-IM-2000-31898, **E–F**, голотип *Indoartemon vietnamensis*, MNHM-IM-2000-35528, **G**, устье паратипа 1 *Indoartemon huberi*. Фотографии предоставлены Национальным музеем естественной истории (MNHM), Thach [2016], Thach [2020].

## Systematic part

Class Gastropoda Cuvier, 1795  
 Subclass Heterobranchia Gray, 1840  
 Order Stylommatophora Schmidt, 1855  
 Superfamily Streptaxoidea Gray, 1860  
 Family Streptaxidae Gray, 1860  
 Subfamily Streptaxinae Gray, 1860

### Genus *Indoartemon* Forcart, 1946

*Odontartemon* (*Odontartemon*) Kobelt, 1905: 91 (non Pfeiffer, 1856). Thiele, 1931: 730.

*Oophana* (*Indoartemon*) Forcart, 1946: 215; Benthem Jutting, 1954: 95.

*Indoartemon* Forcart, 1946: Zilch, 1960: 562; Richardson, 1988: 223–225. Schileyko, 2000: 776–777; Siriboon *et al.*, 2014: 162–166; Inkhavilay *et al.*, 2016: 25–26.

**Type species:** *Streptaxis eburneus* L. Pfeiffer, 1861; original designation.

### *Indoartemon huberi huberi* (Thach, 2016) (Figs 1, 2–4, Table 1)

*Streptartemon huberi* Thach, 2016: 60, figs 263–265.

*Indoartemon huberi*. – Páll-Gergely *et al.*, 2020: 45.

*Indoartemon vietnamensis* Thach, 2020: 34, figs 422–425, **new synonym**.

**Type material.** Holotype of *Indoartemon huberi*, MNHM-IM-2000-31898, Doan Ket Commune, Bao Loc City, Lam Dong Province, Vietnam; paratype 1 of *Indoartemon huberi* [Thach, 2016: figs 2 A–D, G]; holotype of *Indoartemon vietnamensis*. MNHM-IM-2000-35528, Lam Dong Province, Vietnam [Thach, 2020: figs 2 E–F].

**Other material.** Damb'ri waterfall, Bao Loc City, Lam Dong Province, Vietnam, 11°38.5'N, 107°44.5'E, coll. T.T. Tran, 10.05.2023, ILSCZ 01 (1 shell); Di Linh Commune (formerly Gung Re Commune, Di Linh District), Lam Dong Province, Vietnam, 11°26.6117'N, 108°3.9567'E, coll. T.T.

Tran, 15.05.2023, ILSCZ 02 (1 shell); Nam Thanh Commune, Lam Dong Province (formerly Da Kai Commune, Duc Linh District, Binh Thuan Province), Vietnam, 11°21.8767'N, 107°34.5833'E, coll. T.T. Tran, 10.07.2023, ILSCZ 03–04 (2 shells); C8 lava cave, Dak Nong UNESCO Global Geopark, Lam Dong Province (formerly Dak Nong Province), Vietnam, 12°30.5417'N, 107°54.5850'E, coll. T.G. Tran, 18.10.2023, ILSCZ 05 (1 shell); Dam Rong Commune (formerly Dam Rong District, Liêng S'rônH Commune), Lam Dong Province, Vietnam, 12°7.81'N, 108°4.4417'E, coll. T. Zam, 25.06.2025, ILSCZ 15–16 (2 shells).

**Re-description.** Shell oblique heliciform, white, and translucent; whorls 6–6½. Spire low and convex with distinct suture. Shell surface glossy with thin transverse ridges, nearly smooth with few transverse ridges near peristome; varices absent. Embryonic shell about 2½ whorls with smooth surface; following whorls intermediately coiled. Shell periphery rounded; last whorl axially deflected. Penultimate whorl not extended beyond last whorl. Aperture triangular with sinulus; peristome discontinuous, and slightly expanded. Apertural dentition with one large, strong parietal lamella, and one palatal lamella. A very low columellar fold sometimes present, occasionally appearing as two weak ridges (Fig. 4A, B). Umbilicus narrow and deep.

**Variation.** Measurements of shells are presented in table 1.

**Distribution.** The species is known from Bao Loc City, Di Linh Commune, Nam Thanh Commune, Dak Nong UNESCO Global Geopark, and Dam Rong Commune, Lam Dong Province, Vietnam.

**Remarks.** Both *Indoartemon huberi* (Thach, 2016) and *Indoartemon vietnamensis* Thach, 2020 were discovered from Lam Dong Province and differ in only two characters in their original descriptions: columellar fold (present in *I. huberi* vs. absent in *I. vietnamensis*) and umbilicus (narrowly open in *I. hu-*

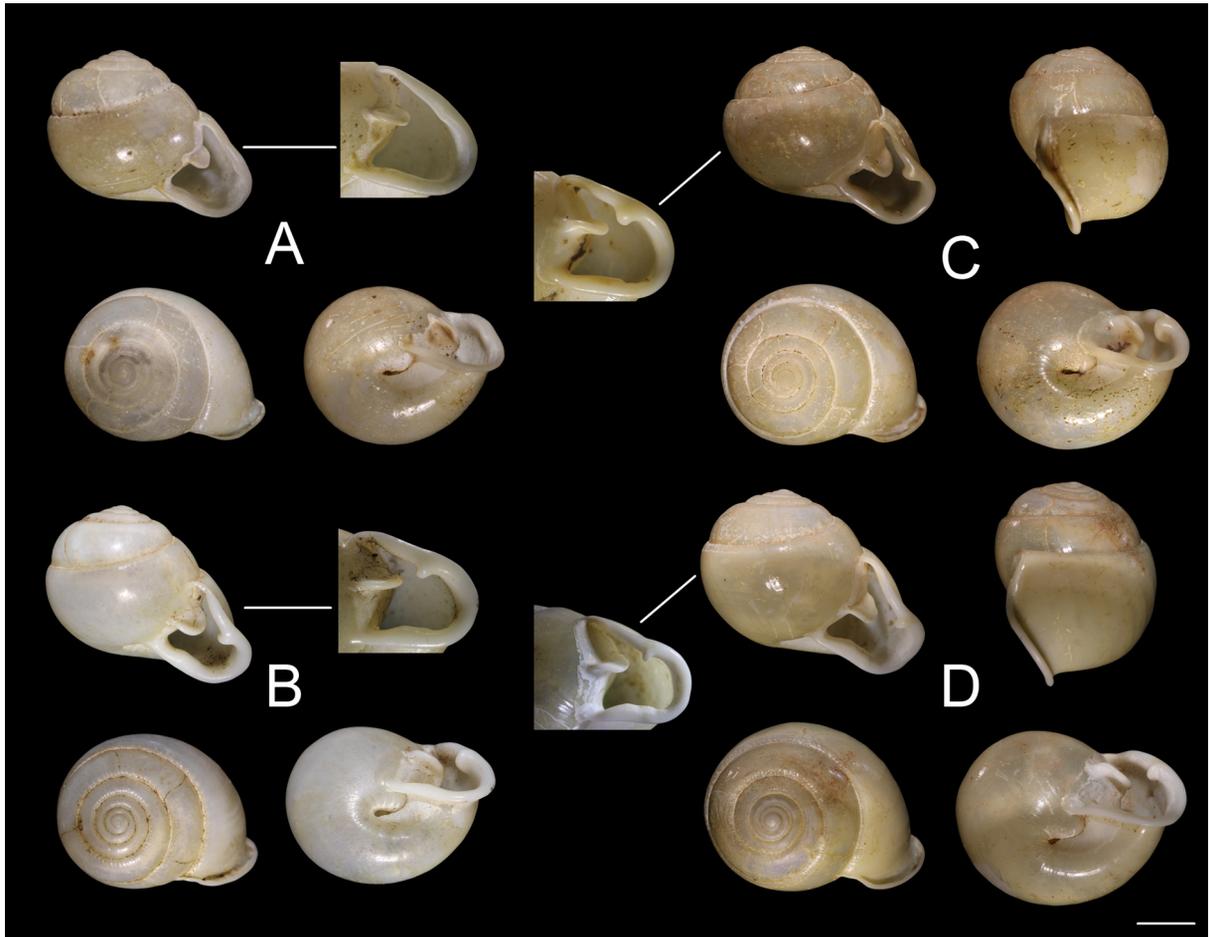


FIG. 3. Shells of *Indoartemon huberi huberi* (Thach, 2016): **A.** specimen ILSCZ 01, **B.** specimen ILSCZ 05, **C.** specimen ILSCZ 02, **D.** specimen ILSCZ 03. Scale bars 5 mm. Photographs by Tran Thinh Gia.

РИС. 3. Раковины *Indoartemon huberi huberi* (Thach, 2016): **A.** образец ILSCZ 01, **B.** образец ILSCZ 05, **C.** образец ILSCZ 02, **D.** образец ILSCZ 03. Масштабные линейки — 5 мм. Фотографии Тран Тхинь Зя.

Table 1. Shell measurements of *Indoartemon huberi chuachanensis* subsp. nov., and *I. huberi huberi* (Thach, 2016) from Vietnam.

Табл. 1. Измерения раковин *Indoartemon huberi chuachanensis* subsp. nov. и *I. huberi huberi* (Thach, 2016) из Вьетнама.

| Character        | Name  |   |
|------------------|---|---|
|                  | <i>Indoartemon huberi huberi</i> (Thach, 2016)<br>(n=7)   | <i>Indoartemon huberi chuachanensis</i> subsp.<br>nov. (n=9)      |
| SH (mm)          | 13.1–14.8   | 10.0–11.5   |
| SW (mm)          | 17.5–19.9   | 16.9–19.1   |
| SH/SW ratio      | 0.74–0.78   | 0.55–0.62   |
| AH (mm)          | 8.6–10.5  | 8.6–9.6   |
| AW (mm)          | 6.9–8.7   | 6.2–7.2   |
| AA (°)           | 15  | 25–30   |
| Embryonic whorls | 2–2½  | 2–2¼  |
| Whorls           | 6–6½  | 6–6¼  |
| Aperture         | 1 strong parietal; 1 small palatal  | 1 strong parietal; 1 small palatal                                |
| Columellar fold  | Not present (1 specimen), or present as a ridge with one peak (2 specimens), or with two ridges (4 specimens) | Present as a ridge with one peak                                  |
| Distribution     | Lam Dong Province (formerly Binh Thuan, Lam Dong, and Dak Nong Provinces), Vietnam                            | Chua Chan Mountain, Xuan Loc District, Dong Nai Province, Vietnam |

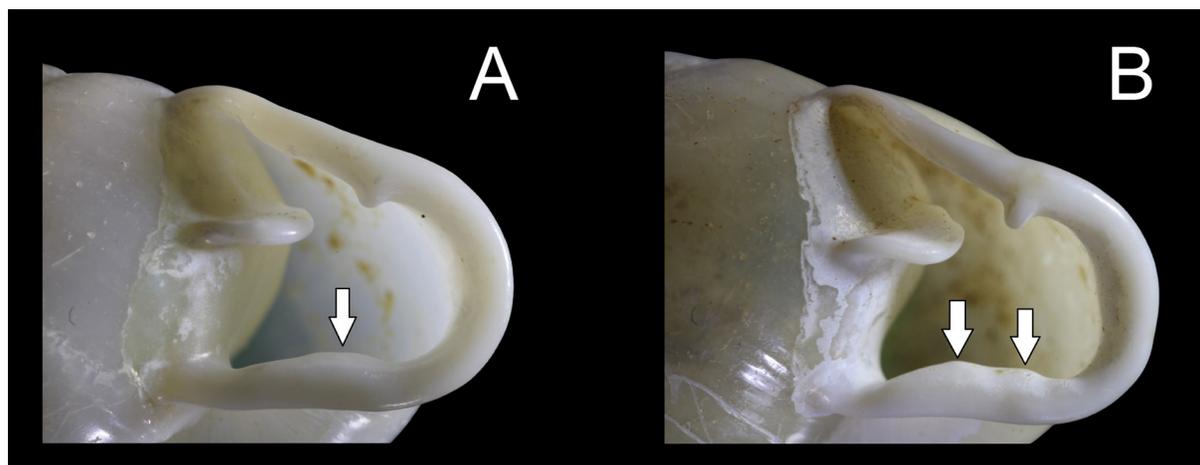


FIG. 4. Aperture of *Indoartemon huberi huberi* (Thach, 2016): **A.** specimen ILSCZ 04 with columellar enlarged with one peak, **B.** specimen ILSCZ 03 with columellar enlarged with two peaks. Arrow indicated peak of enlarged columellar. Photographs by Tran Thinh Gia, and Duong Thao Nhu Ha.

РИС. 4. Устье *Indoartemon huberi huberi* (Thach, 2016): **A.** образец ILSCZ 04 с утолщённой губой с одной вершиной, **B.** образец ILSCZ 03 с утолщённой губой с двумя вершинами. Стрелка указывает на вершину утолщённой губы. Фотографии Тран Тхинь Зя и Зьонг Тхао Нью Ха.

*beri* vs. widely open in *I. vietnamensis*). However, the presence of columellar fold is the result of variation in the degree of enlargement of the columellar margin among individuals. The paratype 1 of *I. huberi* shows a less developed columellar fold although this paratype has same shell width and just a little lower shell height. The umbilicus also shows intraspecific variation, being narrow and deep in most specimens. Therefore, we treat *I. vietnamensis* as a junior subjective synonym of *I. huberi*.

#### *Indoartemon huberi chuachanensis*

subsp. nov.

(Figs 1, 5, Table 1)

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**Type material.** Holotype: ILSCZ 06, Chua Chan Mountain, Xuan Loc District, Dong Nai Province, Vietnam, 10°56.05'N, 107°23.02'E, 582 m a.s.l., coll. T.G. Tran, 01.05.2025. Paratypes: ILSCZ 07–14 (8 shells), same locality and date as the holotype.

**Diagnosis.** *Indoartemon huberi chuachanensis* subsp. nov. is separated from all congeners with axially deflected last whorl, and thin transverse ridges with strong ribs below the sutures, around, and inside umbilicus. Aperture axially deflected with one strong parietal lamella and one small palatal lamella. Columellar margin slightly enlarged, forming a low columellar fold. Umbilicus narrow, deep, and not covered by the columellar margin of the aperture.

**Description.** Shell of the holotype oblique heliiform with medium-sized (SH 11.0, SW 17.9, SH/SW ratio 0.61), white, semi-translucent; whorls 6¼. Spire low and convex, with distinct suture. Shell surface

glossy with thin transverse ridges nearly smooth and strongly near peristome; varices absent. Embryonic shell about 2 whorls with smooth surface; following whorls intermediately coiled. Shell periphery rounded; last whorl axially deflected. Penultimate whorl not extended beyond last whorl. Aperture subtriangular (AH 8.9, AW 6.9) with sinulus; peristome discontinuous, and slightly expanded. Apertural dentition with one large, strong parietal lamella, and one small palatal lamella. A slightly enlarged columellar fold present along the columellar margin. Umbilicus narrow and deep.

**Variation.** Measurements of shells are presented in Table 1. The umbilicus opening with normally teardrop-shaped present in shells: ILSCZ 08, ILSCZ 10–12.

**Distribution.** This subspecies is known from the type locality only.

**Etymology.** The new subspecies is named from the type locality Chua Chan Mountain, Xuan Loc District, Dong Nai Province, Vietnam.

**Remarks.** *Indoartemon huberi chuachanensis* subsp. nov. can be distinguished from *I. huberi huberi* (Thach, 2016) by having more depressed shell shape (vs. more elevated in *I. huberi huberi*), having apical angle 25–30° (vs. 15°), and having aperture much more deviated from the vertical axis (vs. less deviated from the vertical axis). *I. huberi chuachanensis* subsp. nov. closely related to *I. fuchsianus* (Gredler, 1881) but the new subspecies differs from *I. fuchsianus* by having penultimate whorl not expanded beyond the last whorl (vs. expanding beyond the last whorl in *I. fuchsianus*), having small and thin palatal lamella (vs. strong and wide palatal lamella),

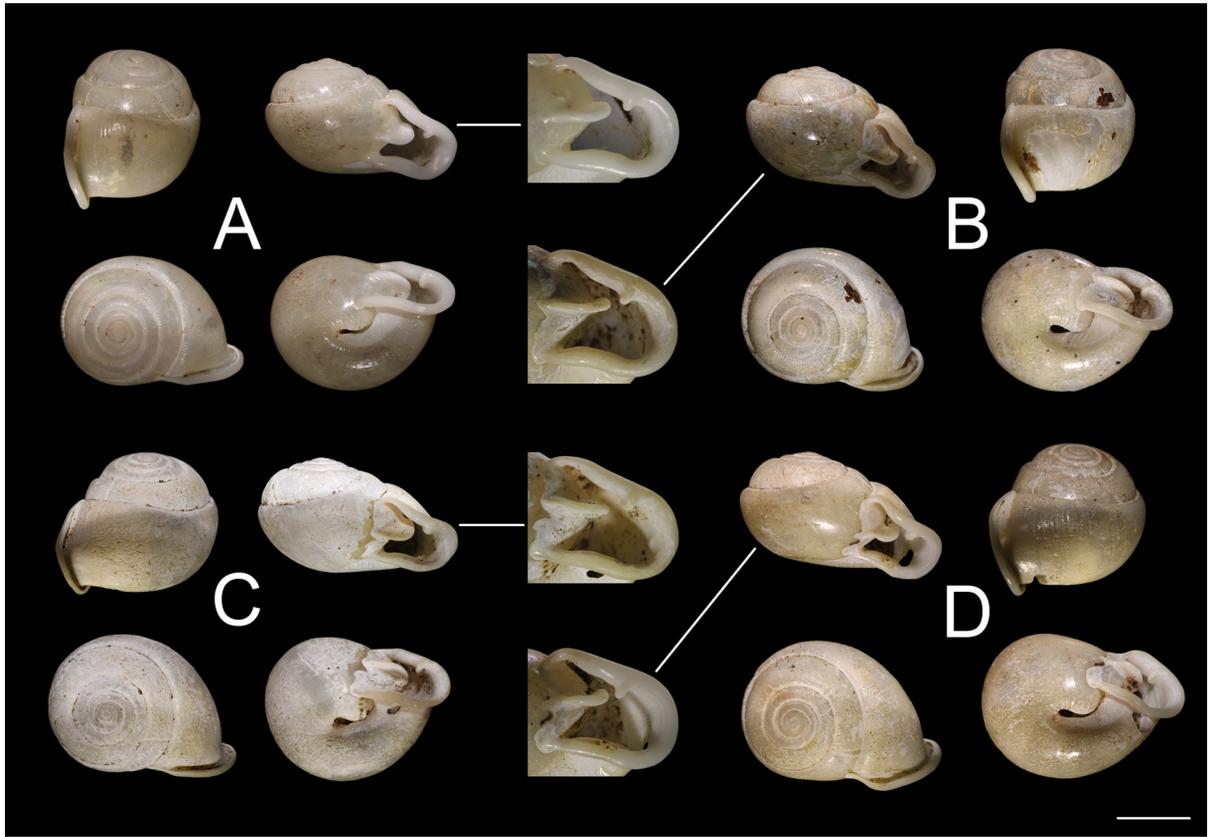


FIG. 5. Shells of *Indoartemon huberi chuachanensis* subsp. nov.: A. holotype ILSCZ06, B. paratype ILSCZ12, C. paratype ILSCZ08, D. paratype ILSCZ09. Scale bars 5 mm. Photographs by Tran Think Gia.

РИС. 5. Раковины *Indoartemon huberi chuachanensis* subsp. nov.: A. голотип ILSCZ06, B. паратип ILSCZ12, C. паратип ILSCZ08, D. паратип ILSCZ09. Масштабные линейки — 5 мм. Фотографии Тран Тхинь Зя.

and sub-triangular aperture (vs. lanceolate-triangular aperture).

Furthermore, *I. huberi chuachanensis* subsp. nov. differs from *I. bidens* (Möllendorff, 1883) by having  $6\frac{1}{4}$  whorls (vs. 6 in *I. bidens*), penultimate whorl not expanded beyond the last whorl (vs. expanding beyond the last whorl); *I. huberi chuachanensis* subsp. nov. differs from *I. cingalensis* (W. H. Benson, 1853) by having  $6\frac{1}{4}$  whorls (vs. 6 in *I. cingalensis*), penultimate whorl not expanded beyond the last whorl (vs. slightly expanding beyond the last whorl), aperture dentition lacking upper-parietal lamella, columellar lamella (vs. present), present columellar side enlarged to form a weak columellar fold (vs. absent); *I. huberi chuachanensis* subsp. nov. differs from *I. deformis* D. S. Do et T. S. Nguyen, 2020 by having penultimate whorl not expanded beyond the last whorl (vs. expanding beyond the last whorl in *I. deformis*), having small and thin palatal lamella (vs. strong and wide palatal lamella), peristome less thickened and expanded (vs. peristome thickened and expanded); *I. huberi chuachanensis* subsp. nov. differs from *I. diodonta* Inkhavilay et Panha, 2016 by having penultimate whorl not expanded beyond the last whorl (vs. slightly expanding beyond the last whorl in *I. diodonta*), columellar margin un-

covered umbilicus (vs. covered umbilicus), present columellar side enlarged to form a weak columellar fold (vs. absent); *I. huberi chuachanensis* subsp. nov. differs from *I. eburneus* (L. Pfeiffer, 1861) by having  $6-6\frac{1}{4}$  whorls (vs.  $7\frac{1}{4}-7\frac{3}{4}$  in *I. eburneus*), penultimate whorl not expanded beyond the last whorl (vs. slightly expanding beyond the last whorl), columellar margin uncovered umbilicus (vs. covered umbilicus); *I. huberi chuachanensis* subsp. nov. differs from *I. franzhuberi* Thach, 2021 by having columellar margin uncovered umbilicus (vs. covered umbilicus in *I. franzhuberi*), aperture much more deviated from the vertical axis (vs. less deviated from the vertical axis), shell surface with weak transverse ridges (vs. strong transverse ridges); *I. huberi chuachanensis* subsp. nov. differs from *I. gracilis* (Collett, 1898) by having  $6-6\frac{1}{4}$  whorls (vs.  $4\frac{1}{2}$  in *I. gracilis*), penultimate whorl not expanded beyond the last whorl (vs. expanding beyond the last whorl), aperture dentition lacking basal lamella (vs. present); *I. huberi chuachanensis* subsp. nov. differs from *I. layardianus* (W. H. Benson, 1853) by having  $6-6\frac{1}{4}$  whorls (vs. 5 in *I. layardianus*), penultimate whorl not expanded beyond the last whorl (vs. expanding beyond the last whorl), aperture dentition lacking upper-parietal lamella, basal

lamella, columellar lamella (vs. present); *I. huberi chuachanensis* subsp. nov. differs from *I. medius* Siriboon & Panha, 2014 by having penultimate whorl not expanded beyond the last whorl (vs. expanding beyond the last whorl in *I. medius*), shell periphery round (vs. keeled), columellar margin uncovered umbilicus (vs. covered umbilicus), present columellar side enlarged to form a weak columellar fold (vs. absent); *I. huberi chuachanensis* subsp. nov. differs from *I. parallelilabris* D. S. Do & T. S. Nguyen, 2020 by having penultimate whorl not expanded beyond the last whorl (vs. expanding beyond the last whorl in *I. parallelilabris*), having small and thin palatal lamella (vs. strong and wide palatal lamella), peristome less thickened and expanded (vs. peristome thickened and expanded); *I. huberi chuachanensis* subsp. nov. differs from *I. prestoni* (Gude, 1903) by having 6–6¼ whorls (vs. 7–7¾ in *I. prestoni*), columellar margin uncovered umbilicus (vs. covered umbilicus), aperture much more deviated from the vertical axis (vs. less deviated from the vertical axis); *I. huberi chuachanensis* subsp. nov. differs from *I. schomburgi* (Yen, 1939) by having penultimate whorl not expanded beyond the last whorl (vs. expanding beyond the last whorl in *I. schomburgi*), aperture dentition with only 1 palatal lamella (vs. 4 palatal lamella); *I. huberi chuachanensis* subsp. nov. differs from *I. tridens* (Möllendorff, 1898) by having 6–6¼ whorls (vs. 5½ in *I. tridens*), penultimate whorl not expanded beyond the last whorl (vs. expanding beyond the last whorl), columellar margin uncovered umbilicus (vs. covered umbilicus).

In addition, the oblique-heliciform shell and axially deflected last whorl of *I. huberi chuachanensis* subsp. nov. resemble those of species in the genus *Perrottetia* Kobelt, 1905. However, this new subspecies differs from all *Perrottetia* species by lacking longitudinal furrows (vs. present) and by having only 1 parietal lamella (vs. always 2). Further studies are needed to clarify possible evolutionary or biogeographic relationships between the two genera, especially with genetic analyses.

## Discussion

Chua Chan Mountain is an isolated peak, separated from the Truong Son Mountain Range and surrounded by flat agricultural land. In addition to being the type locality of *Indoartemon huberi chuachanensis* subsp. nov. among invertebrates, it is also the type (and only known) locality of two recently described geckos among vertebrates: *Gekko russeltraini* Ngo, Bauer, Wood et Grismer, 2009, and *Cyrtodactylus huynhi* Ngo et Bauer, 2008 [Ngo et al. 2009]. To date, no comprehensive malacological surveys have been conducted on Chua Chan Mountain. Moreover, this mountain is facing several threats from tourism activities, such as noise pollution and

waste accumulation [Nguyen et al., 2023]. Further fieldwork is recommended to better document the biodiversity of this isolated mountain and to assess the potential threats to its montane biota.

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