

## TWO NEW SPECIES OF THE GENUS *INDOARTEMON* (GASTROPODA: STYLOMMATOPHORA: STREPTAXIDAE) FROM NORTHWESTERN VIETNAM

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**ABSTRACT:** Two new species of the genus *Indoartemon* are described from Son La Province, Northwestern Vietnam. *Indoartemon parallelilabris* n. sp., has an oblique-heliciform shell with an axially deflected last whorl. Apertural dentition consists of one large parietal lamella, one triangular palatal lamella, and one distinct, knob-shaped columellar lamella. *Indoartemon deformis* n. sp., has an approximately triangular aperture, a wide and deep umbilicus, and apertural dentition consisting of one large parietal lamella and one strong palatal lamella. Additionally, new records of *Indoartemon fuchsianus tonkinianus* Jaekel, 1950 are provided.

**KEY WORDS:** Streptaxinae, taxonomy, endemic, Son La, Vietnam

### INTRODUCTION

The Streptaxidae Gray, 1860 are carnivorous terrestrial snails which are widely distributed across the tropics and subtropical areas of South America, Africa and Asia (VAN BRUGGEN 1967, SCHILEYKO 2000, SUTCHARIT et al. 2010, PÁLL-GERGELY et al. 2015). Streptaxid taxa are particularly diverse in Africa and Southeast Asia (VAN BENTHEM JUTTING 1954, SCHILEYKO 2000, SIRIBOON et al. 2013, 2014, INKHAVILAY et al. 2016). Currently, the Streptaxidae are divided into five subfamilies comprising some 114 genera and about a thousand nominal species. The five subfamilies are Enneinae Bourguignat, 1883, Marconiinae Schileyko, 2000, Odontartemoninae Schileyko, 2000, Orthogibbinae Germain, 1921, and Streptaxinae Gray, 1860 (RICHARDSON 1988, SCHILEYKO 2000). *Indoartemon* Forcart, 1946 is a poorly known genus with 10 nominal species. Most species of this genus are distributed in Southeast Asia (Myanmar, Thailand, Laos, Vietnam), but there are additional species of the genus known from Sri Lanka, India and Southern China (GUDE

1903, SCHILEYKO 2000, 2011, SIRIBOON et al. 2014, INKHAVILAY et al. 2016).

In Vietnam, the Streptaxidae are currently the third largest pulmonate family with 34 species, after the Camaenidae, Clausiliidae and Ariophantidae (SCHILEYKO 2011, DO & DO 2015, BUI et al. 2019, VERMEULEN et al. 2019). Eight streptaxid genera (*Discartemon* Pfeiffer, 1856, *Indoartemon* Forcart, 1946, *Elma* H. Adams, 1866, *Haploptychius* Möllendorff, 1905, *Stemmatopsis* Mabille, 1887, *Oophana* Ancey, 1884, *Sinoennea* Kobelt, 1904, and *Gulella* L. Pfeiffer, 1856) are known to occur within the region. So far three species of the genus *Indoartemon* have been reported from Vietnam. Two of them, namely *Indoartemon fuchsianus tonkinianus* Jaekel, 1950, and *I. eburneus* (Pfeiffer, 1861), were originally described from Vietnam. In addition, SCHILEYKO (2011) listed *I. tridens* (Möllendorff, 1898) as occurring in Vietnam. However, the type locality “Boloven” is possibly Boloven Plateau, Paksong, Champasak, Laos (INKHAVILAY et al. 2016). Thus, the occurrence of this species in Vietnam is questionable.

Hitherto, the surveys of terrestrial snails in Vietnam have yielded a large number of streptaxid species (VARGA 2012, DO & DO 2015, DO 2017, BUI

et al. 2019, VERMEULEN et al. 2019). The present paper describes another two species from Vietnam in the genus *Indoartemon*.

## MATERIAL AND METHODS

This study is based on material collected during surveys by the first author in Northwestern Vietnam in 2013–2019. The terminology used in the description of shell characters, including features of the aperture, peristome, whorls, umbilicus, and apertural dentition, follows RICHARDSON (1988), SCHILEYKO (2000), and SIRIBOON et al. (2014). All measurements were taken to the nearest 0.1 mm using Vernier calipers. Shell height was measured from the apex to the lowest part of the peristome parallel to the coiling axis. Shell width was measured at

the widest section perpendicular to the coiling axis. Whorls were counted (to the nearest  $\frac{1}{4}$  whorl) as described by KERNEY & CAMERON (1979: 13).

The type material mentioned in this paper is deposited in the collections of the Vietnam National Museum of Nature (VNMN) and Zoological Collection of Biological Museum (ZMHU), Hanoi University of Science (Hanoi, Vietnam). Abbreviations: AH – aperture height, AW – aperture width, SH – shell height, SW – shell width.

## SYSTEMATIC PART

**Family: Streptaxidae Gray, 1860**

**Subfamily: Streptaxinae Gray, 1860**

**Genus: *Indoartemon* Forcart, 1946**

**Type species:** *Streptaxis eburnea* Pfeiffer, 1861, by original designation.

**Diagnosis.** Shell subglobose to ovoid, thickened and solid, transparent to translucent. Shell surface glossy, nearly smooth or with transverse ridges. Body whorl expanded, distorted, more or less deviated from the vertical axis. Aperture sub-circular to semi-ovate, oblique, with reflexed and more or less thickened margins. Apertural dentition consisting of one strong parietal lamella, one palatal lamella, and sometimes one columellar lamella. Umbilicus narrowly open and deep.

***Indoartemon parallelilabris* n. sp.**

Figs 1–10, 30

**Type material.** Holotype: SH 6.8 mm, SW 7.8 mm, AH 4.0 mm, AW 3.1 mm; Vietnam, Son La Province, Thuan Chau District, Co Ma Commune, Copia Nature Reserve,  $21^{\circ}21.63'N$ ,  $103^{\circ}31.03'E$ , 1,237 m a.s.l., leg. NGUYEN T. H. & DO D. S. 08.06.2013 (VNMN\_IZ 000.000.177). Paratypes: with the same data (dry: ZMHU.MOL 034); Vietnam, Son La Province, Thuan Chau District, Long He Commune, limestone area with densely vegetated,  $21^{\circ}24.42'N$ ,  $103^{\circ}30.62'E$ , 1,183 m a.s.l., leg. NGUYEN T. H. & DO D. S., 08.06.2013 (ZMHU.MOL 043).

**Diagnosis.** A medium sized *Indoartemon* species with axially deflected body whorl, concave on ventral side.

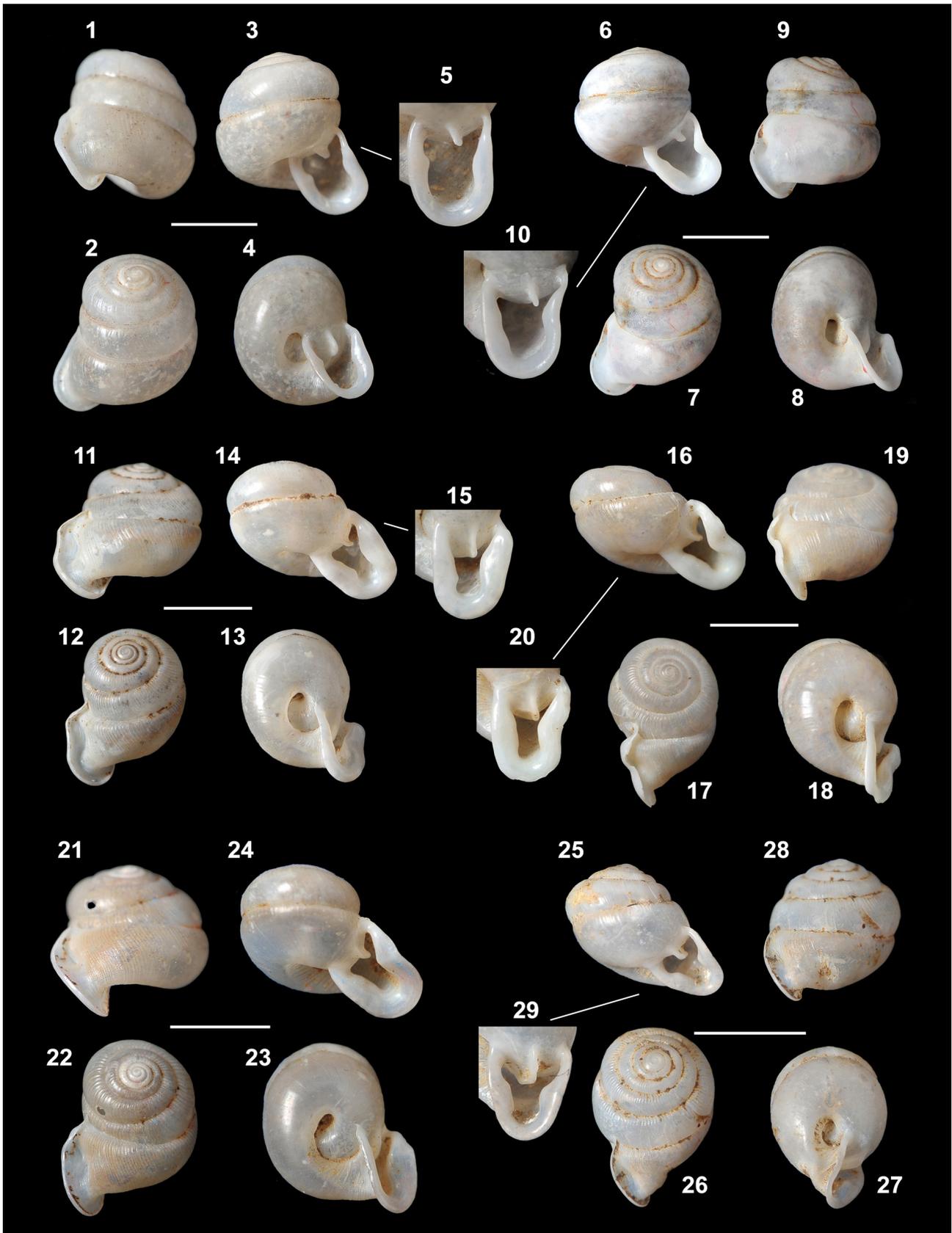
Aperture approximately rectangular; apertural dentition consisting of one large parietal lamella, one triangular palatal lamella, and one distinct, knob-shaped columellar lamella.

**Description.** Shell medium-sized, oblique-helical, thick, white, glassy translucent. Spire protruded, sides subparallel, apex slightly raised. Whorls  $6\frac{3}{4}$ , the first four regularly increasing in width, but the last whorls suddenly expanded. First two whorls smooth, subsequent ones with fine, regular, close-set, somewhat wavy transverse ribs, penultimate and body whorl glossy, with transverse ridges diminishing below the periphery. First whorls slightly convex, and regularly coiled, penultimate whorl well-rounded at the periphery, body whorl shouldered, axially deflected, and concave on ventral side. Sutures shallow though somewhat impressed. Aperture oblique, approximately rectangular, with palatal and columellar sides almost straight, basal side broadly rounded. Peristome discontinuous, thickened and expanded, with basal and columellar sides parallel to each other. Apertural dentition with one large parietal lamella in the middle of parietal side, wing-shaped and pointing towards the palatal lamella. Palatal lamella subtriangular and extended at the base. On the columellar side a single, distinct, knob-shaped lamella. Umbilicus narrow and deep.

**Measurements.** Paratypes: SH 7.2–7.9 mm, SW 6.8–7.0 mm, AH 3.9–4.2 mm, AW 3.1–3.5 mm.

**Habitat.** Shells were collected from a sparsely vegetated limestone area, under damp soil with leaf litter.

**Distribution.** Vietnam, Son La Province, Thuan Chau District, Copia Nature Reserve.



Figs 1–29. Shells of *Indoartemon* species: *I. parallelilabris* n. sp.: 1–5 – holotype VNMN\_IZ 000.000.177 (shell width 7.8 mm), 6–10 – paratype ZMHU.MOL 034; 11–24 – *I. deformis* n. sp.: 11–15 – holotype VNMN\_IZ 000.000.180 (shell width 8.9 mm), 16–24 – paratypes ZMHU.MOL 035; 25–29 – *I. fuchsianus tonkinianus* (ZMHU) (shell width 7.5 mm). Scale bars 5 mm. All photos: DO D. S. & NGUYEN T. S.

**Etymology.** The name of the new species is derived from its characteristic aperture with the palatal side and columellar side almost parallel, from the Latin 'paralleli', meaning 'parallel' and 'labris', meaning 'lip'.  
**Remarks.** *I. parallelilabris* sp. nov., differs from *I. fuchsianus tonkiniana* Jaekel, 1950 in its larger shell, higher spire, narrow, deep umbilicus, and approximately rectangular aperture with one distinct columellar lamella. *I. parallelilabris* sp. nov. differs from *I. eburneus* (Pfeiffer, 1861) in its smaller shell, shouldered, axially deflected bodywhorl concave on the ventral side, and the presence of columellar lamella. The species is relatively variable in terms of spire height, shape of the last two whorls, formation of the palatal and columellar lamellae, and the extent of expansion of apertural sides.

***Indoartemon deformis* n. sp.**

Figs 11–24, 30

**Type material.** Holotype: SH 6.9 mm, SW 8.9 mm, AH 4.8 mm, AW 4.1 mm; Vietnam, Son La Province, Mai Son District, Co Noi Commune, Lech Village (21°07.52'N, 104°09.30'E, 685 m a.s.l.), leg. PHUNG T. N. & DO D. S. 02.11.2013 (VNMN\_IZ 000.000.180). Paratypes: with the same data (dry: ZMHU.MOL 035).

**Diagnosis.** A medium sized *Indoartemon* species with an approximately triangular aperture which is substantially occluded by the palatal and columellar sides. Apertural dentition consisting of one large parietal lamella, and one strong palatal lamella. Umbilicus wide and deep.

**Description.** Shell medium-sized, oblique-ovate, fairly thin, white, glassy translucent. Spire little elevated, rounded. Protoconch whorls almost flat, following whorls slightly convex and regularly coiled, body whorl shouldered, axially deflected. First two whorls smooth, subsequent ones with fine, regular, wavy transverse ribs, penultimate and body whorl glossy, with transverse ridges diminishing below the periphery. The fine transverse ridges are also clearly visible around the umbilicus. Suture distinct but not deep. Aperture oblique, approximately triangular, with palatal, columellar and parietal sides occluding it, basal side rounded. Peristome discontinuous, reflected, glossy, thickened and expanded, with columellar side straight, basal side rounded and palatal side slightly undulating. Apertural dentition consisting of one large, slightly bent parietal lamella, which continues 2–2.5 mm into the aperture, and one strong palatal lamella. There is no columellar lamella. Umbilicus wide and deep.

**Measurements.** Paratypes: SH 5.9–7.0 mm, SW 8.4–9.1 mm, AH 3.9–4.3 mm, AW 3.8–4.1 mm.

**Habitat.** This species was collected from several localities within the restricted limestone area. Its habi-

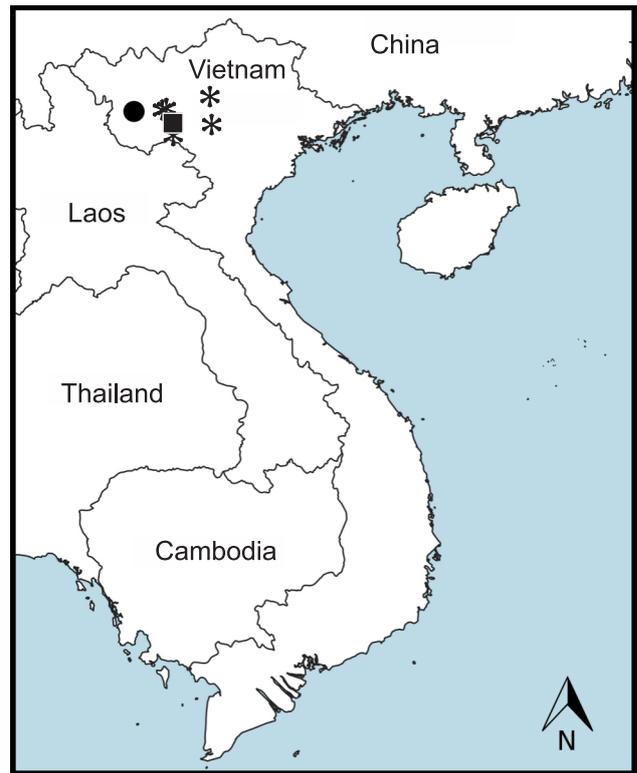


Fig. 30. Map showing the type localities of *I. parallelilabris* n. sp. (black circle), *I. deformis* n. sp. (black square) and new localities of *I. fuchsianus tonkinianus* (black asterisks)

tats included a cave, limestone with disturbed forest and small isolated limestone hills.

**Distribution.** Vietnam, Son La Province, Mai Son District, Co Noi Commune. Presumably endemic to the northwestern Vietnam.

**Etymology.** The name of the new species is derived from its characteristic body whorl, from the Latin 'deformis', meaning 'distorted', used as an adjective.

**Remarks.** This species may be confused with *I. fuchsianus tonkiniana* Jaekel, 1950, which has a similar shell. The new species, however, differs in its expanded sides of peristome, and its larger and more depressed shell. The species differs from *I. eburneus* in its smaller shell, lower spire and in the body whorl being much more deviated from the vertical axis. *I. deformis* n. sp. can be distinguished from *I. parallelilabris* n. sp. in its larger shell, thicker and more expanded peristome, body whorl much more deviated from the vertical axis and wider umbilicus.

***Indoartemon fuchsianus tonkinianus* Jaekel, 1950**

Figs 25–30

*Indoartemon fuchsianus tonkiniana* JAECKEL 1950: 18, pl. 1, fig. 4. Type locality: Tonkin (Northern Vietnam).

*Indoartemon fuchsianus tonkiniana* – SCHILEYKO 2011: 23.



**Remarks.** This species has been reported from its type locality, Tonkin Vietnam, but the area is large and the locality could not be located on the map. Its new records from Northwestern Vietnam are: Muong Do, Phu Yen, Son La (21°11.77'N, 104°47.10'E, 674 m a.s.l.), Muong Bang, Mai Son, Son La (21°22.65'N, 104°03.83'E, 744 m a.s.l.), Tham Bo Cave area, Muong Bu, Muong La, Son La (21°24.08'N, 104°06.22'E, 718 m a.s.l.), Van Ho, Van Ho, Son La (21°45.93'N, 104°44.50'E, 1,013 m a.s.l.), Chi Day Cave area, Chieng Son, Yen Chau, Son La (21°08.50'N, 104°10.48'E, 815 m a.s.l.).

### *Indoartemon eburneus* (Pfeiffer, 1861)

*Streptaxis eburnea* PFEIFFER 1861: 23. Type locality: Cochin China (Southern Vietnam).

*Streptaxis eburneus* – CROSSE & FISCHER 1864: 328; PFEIFFER 1868: 447; GUDE 1903: 226, pl. 4, g. 4–6; FISCHER & DAUTZENBERG 1904: 2; SCHILEYKO 2000: 777, fig. 1013.

*Odonartemon (Odonartemon) eburneus* – KOBELT 1905: 91, pl. 58, fig. 21–23; THIELE 1931: 730.

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*Oophana (Indoartemon) eburnea* – FORCART 1946: 215. *Indoartemon eburneus* – ZILCH 1960: 562, fig. 1196; ZILCH 1961; SCHILEYKO 2011: 23; SIRIBOON et al. 2014: 162, fig. 1, 3A–B.

**Distribution.** *I. eburneus* is known from Southern Vietnam, and Thailand (Loei).

**Remarks.** The type locality (Cochin China) could not be located on the map. No material of this species was found in the present study.

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