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A new species and a new record of *Bensonella* Pilsbry & Vanatta, 1900 (Gastropoda: Eupulmonata: Hypselostomatidae) from Lao Cai province, Vietnam

Vukašin **Gojšina**[1*], Ivaylo **Dedov**[2] & Barna **Páll-Gergely**[3, 4]

Abstract. In this work, a new species of *Bensonella*, *B. didoi*, is described from Lao Cai province in northern Vietnam. The new species is compared to all similar congeners and is characterised by the whitish, nearly conical shell with nine apertural barriers and a very narrow umbilicus. Following this work, the number of *Bensonella* species known from Vietnam becomes three, distributed in Lao Cai and Son La provinces. Additionally, *B. boettgeri* (Möllendorff, 1897) is reported for the first time from Vietnam, extending the distribution of the species eastwards.

Key words. apertural barriers, Pupilloidea, taxonomy, Southeast Asia

INTRODUCTION

Bensonella Pilsbry & Vanatta, 1900 is a genus of minute hypselostomatids distributed from India to Japan, and from central China to Indonesia (Gojšina et al., 2025). Altogether, 38 species are known in the genus, and most are characterised by conical shells, a palatal tubercle situated on the palatal lip of the peristome and, among others,three barriers on the parietal side of the aperture (angular, parietal, infraparietal) (Gojšina et al., 2025). Although this concept applies to the majority of described species, there are several exceptions (see Gojšina et al., 2025). *Bensonella* species are strict limestone rock dwellers, and although many species are single-site endemics (or single area/ province endemics), a few species (e.g., *B. boettgeri* (Möllendorff, 1897), *B. lakainguta* C.-C. Hwang, 2014, *B. paviei* (Bavay & Dautzenberg, 1912)) have a much wider distribution (Páll-Gergely & White, 2022; Gojšina et al., 2025). Only one species of *Bensonella* is known from Vietnam, *B. paviei*, which is relatively widely distributed in the northern parts of the country (Son La and Lao Cai provinces). Additionally, it inhabits the adjacent regions of Laos and northern Thailand (Bavay & Dautzenberg, 1912; Gojšina et al., 2025).

In this work, we describe *B. didoi*, new species, from Lao Cai province, Vietnam, and present the first records of *B. boettgeri* from the country, further expanding the distribution of the latter species eastwards.

MATERIAL AND METHODS

The gastropods were collected by the soil sampling method (Dedov & Antonova, 2015). The method consists of collecting soil from suitable habitats for each site. The resulting sample is immersed in a standard bucket filled with water. The fraction that floats to the surface of the water is collected with a plastic strainer. Using a rectangular plastic plate, the sample is transferred into a mesh (a thin stocking) and left to dry. The sample is then sieved under laboratory conditions through a system of sieves with different hole sizes. The fractions are examined under a stereomicroscope to separate the shells from the remaining particles in the sample.

Shells were photographed via a Nikon SMZ25 digital microscope with Nikon Nis-Elements software. Shells were measured with a Nikon DS-L3 control unit. SEM images were made using a Hitachi FlexSEM 1000 II scanning electron microscope. The work of Gojšina et al. (2025) was used for terminology and necessary comparisons.

Abbreviations

AH = aperture height.
a. s. l. = above sea level.
AW = aperture width.
IBER = Institute of Biodiversity and Ecosystem Research, Sofia, Bulgaria.

Accepted by: Fred E. Wells

[1]Department of Morphology, Systematics and Phylogeny of Animals, University of Belgrade, Faculty of Biology, Studentski trg 16, 11000, Belgrade, Serbia; email: vukasin.gojsina@bio.bg.ac.rs (*corresponding author)

[2]Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, 2 Gagarin Street, 1113 Sofia, Bulgaria

[3]Plant Protection Institute, HUN-REN Centre for Agricultural Research, Brunszvik u. 2., Martonvásár, 2462, Hungary

[4]Department of Soil, Water and Natural Sciences, Albert Kázmér Faculty of Agricultural and Food Sciences of Széchenyi István University, Vár 2., 9200 Mosonmagyaróvár, Hungary

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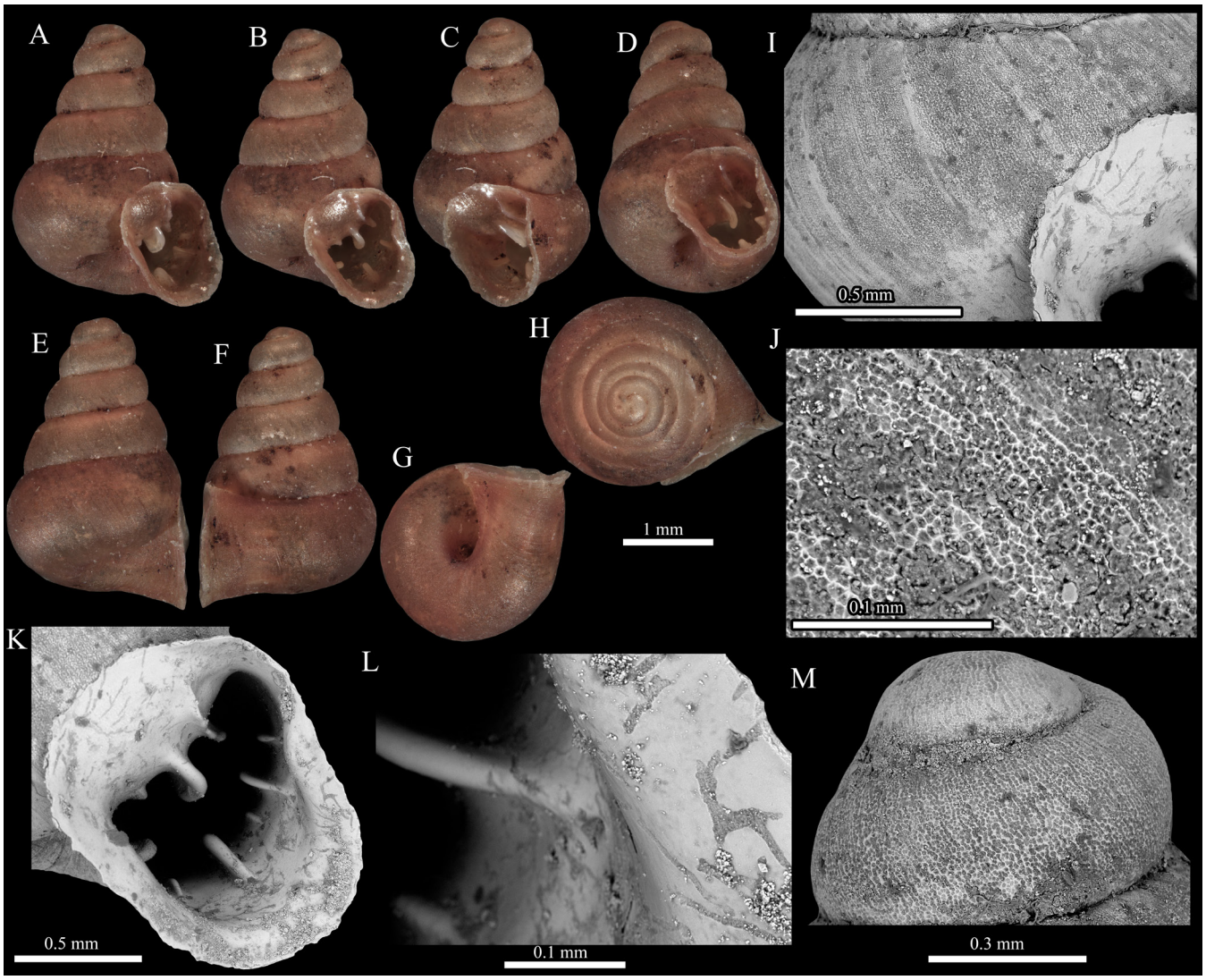

Fig. 1. *Bensonella boettgeri* from Lao Cai province, Vietnam (BG-IBER-INV-000044086). A–H, shell; I, SEM imaging showing the surface sculpture of the last whorl; J, SEM imaging showing the enlarged sculpture of the last whorl; K, SEM imaging showing the enlarged aperture; L, SEM imaging showing the detail of the peristome surface sculpture; M, SEM imaging showing the sculpture of the protoconch.

SEM = Scanning Electron Microscopy.
SH = shell height.
SW = shell width.

SYSTEMATICS

Superfamily Pupilloidea W. Turton, 1831

Family Hypselostomatidae Zilch, 1959

Genus *Bensonella* Pilsbry & Vanatta, 1900

Bifidaria (*Bensonella*) Pilsbry & Vanatta, 1900: 591.

Type species. *Pupa plicidens* W. H. Benson, 1849, by original designation.

Bensonella boettgeri (Möllendorff, 1897)
(Fig. 1)

Boysidia boettgeri Möllendorff, 1897: 70.
Boysidia (*Paraboysidia*) *boettgeri* – Pilsbry, 1917: 208–209, pl. 34, figs 7, 8.
Paraboysidia boettgeri – Benthem Jutting, 1950: 38; Benthem Jutting, 1952: 318; Benthem Jutting, 1959: 47; Zilch, 1984: 164; Maassen, 1999: 123.
Boysidia novemdentata Saurin, 1953: 115–116, fig. 1, pl. 4, fig. 4a–c.
Boysidia novemdentata – Inkhavilay et al., 2019: 59, fig. 26B.
Bensonella novemdentata – Inkhavilay & Sutcharit, 2024: 444, fig. 4.
Bensonella boettgeri – Gojšina et al., 2025: 57, figs 39B, 42, 43, 60.

Material examined. 4 shells (BG-IBER-INV-000044086, alternative collection number: 40340-4A–D) (Fig. 1), Vietnam, Lao Cai province, Sa Pa district, Ta Phin commune, Xa Xen village, Ta Phin cave, limestone rocks, forest, 22.402287°N, 103.836874°E, 1,330 m a.s.l., coll. Dedov et al., 22 September 2018.

Measurements (in mm, n= 4). SH= 2.84–3.13; SW= 1.99–2.33; AH= 1.26–1.33; AW= 1.04–1.24.

Remarks. This is the first record of the species in Vietnam. Examined specimens from Lao Cai province show the

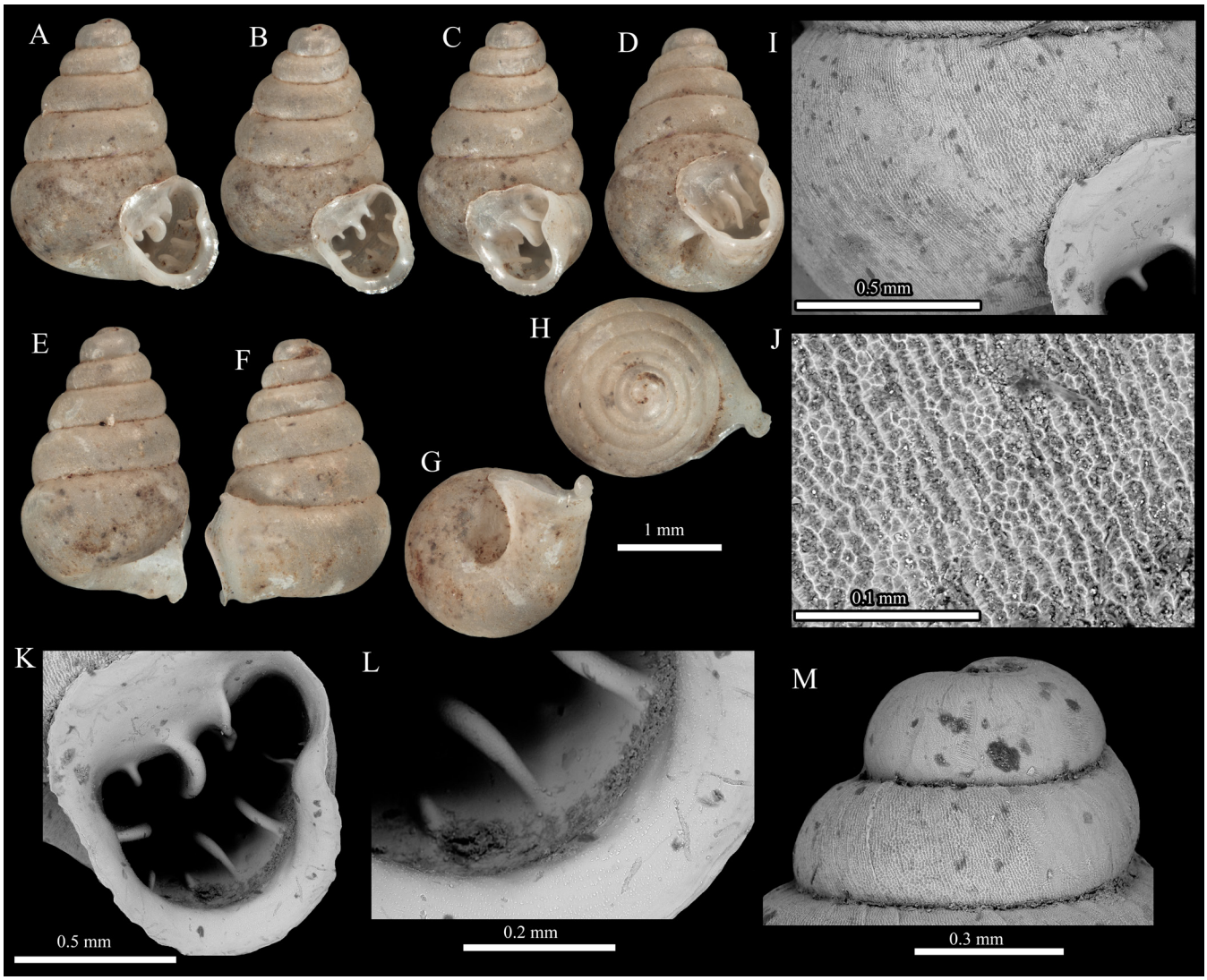

Fig. 2. Holotype of *Bensonella didoi*, new species, from Lao Cai province, Vietnam (BG-IBER-INV-000044087). A–H, shell; I, SEM imaging showing the surface sculpture of the last whorl; J, SEM imaging showing the enlarged sculpture of the last whorl; K, SEM imaging showing the enlarged aperture; L, SEM imaging showing the detail of the peristome surface sculpture; M, SEM imaging showing the sculpture of the protoconch.

typical shell morphology and apertural barrier appearance as described and figured in Inkhavilay & Sutcharit (2024) and Gojšina et al. (2025). Only minor conchological differences have been found, which are interpreted as intraspecific differences. These are the following. The lectotype of *B. boettgeri* (see Gojšina et al. 2025: fig. 42A–D) from Java has a somewhat stronger radial sculpture, and a more pointed palatal tubercle than the ones we collected in Vietnam. Compared with the syntype of *B. novemdentata* from Laos (see Gojšina et al. 2025: fig. 42E–H), the angular lamella of the Vietnamese shells seems to be somewhat interrupted (its middle is slightly lower than its outer end), and the palatal tubercle is slightly weaker.

The specimen identified as *B. novemdentata* (a junior synonym of *B. boettgeri*) and figured in Inkhavilay & Sutcharit (2024) (figure 4B therein) is not *B. boettgeri* but an undescribed *Bensonella* species due to the following: i) less slender shell due to the wider whorls (especially the last one); ii) overall stronger apertural dentition; iii) wider umbilicus and iv) more rounded aperture.

***Bensonella didoi*, new species**
(Fig. 2)

Type material. Holotype (BG-IBER-INV-000044087, alternative collection number: 40340-5A) (SH= 2.60 mm; SW= 2.00 mm) (Fig. 2): Vietnam, Lao Cai province, Sa Pa district, Ta Phin commune, Xa Xen village, Ta Phin cave, limestone rocks, forest, 22.402287°N, 103.836874°E, 1,330 m a.s.l., coll. Dedov et al., 22 September 2018. Paratypes (BG-IBER-INV-000044088, alternative collection number: 40340-5B–D): 3 shells, same data as for the holotype.

Diagnosis. Shell off-white, conical to conical-ovoid, palatal tubercle low, blunt. Aperture with 9 barriers (parietal, angular, upper palatal, interpalatal, lower palatal, infrapalatal, basal, columellar, and infraparietal).

Description. Shell weakly conical-ovoid, off-white, with 5.5–6 whorls, separated by a moderately deep suture. Protoconch/teleoconch boundary not clear due to similar surface sculpture. Protoconch finely pitted (dimpled), showing

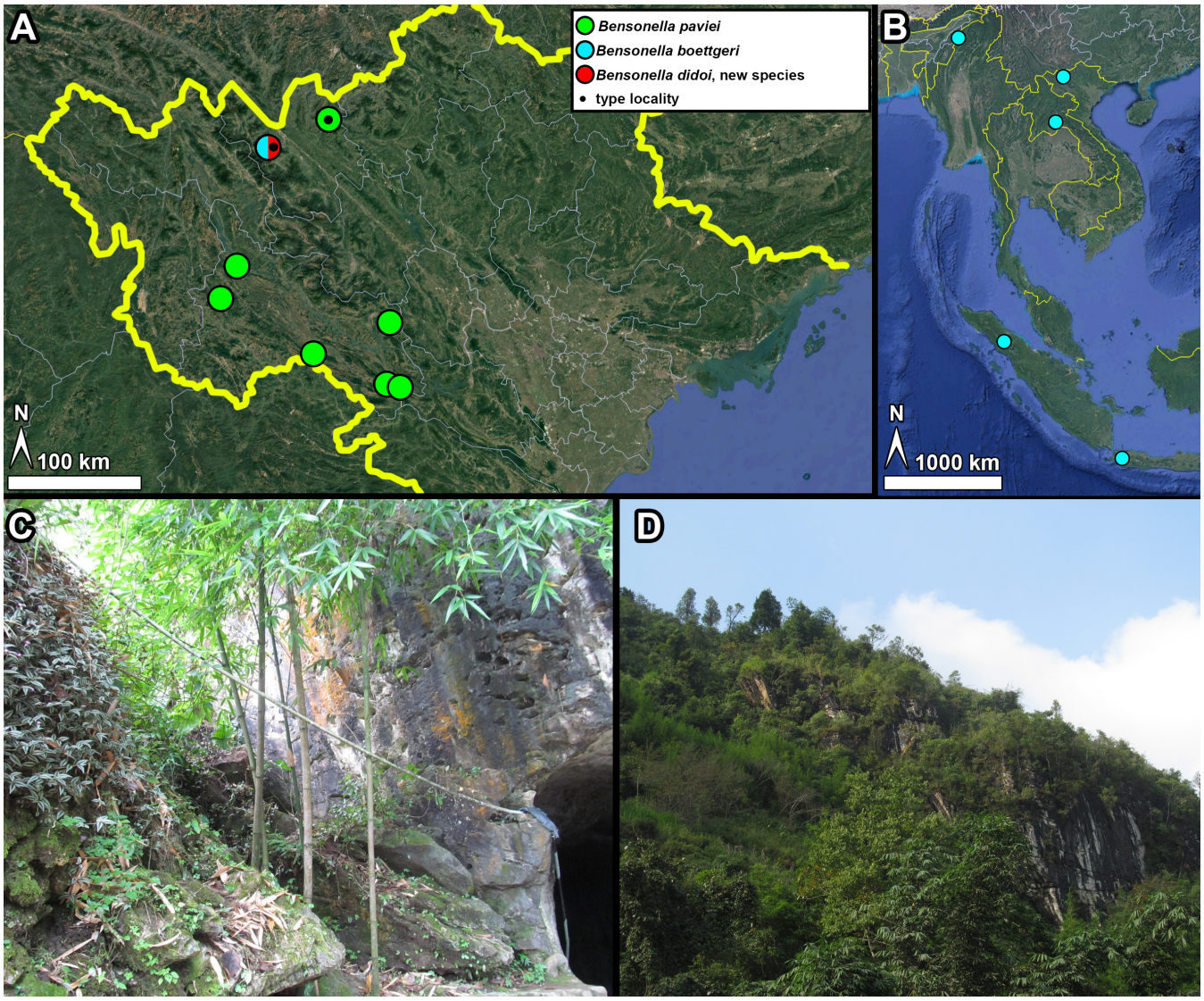

Fig. 3. Distribution map and habitat of *Bensonella* species. A, known localities of *Bensonella* in Vietnam; B, known localities of *B. boettgeri* (taken from Gojšina et al., 2025, modified); C–D, habitat of *B. boettgeri* and type locality of *B. didoi*, new species.

no signs of spiral striation. All teleoconch whorls rounded, convex. Surface sculpture fine, dimpled, consisting of only subtle radial growth lines and no spiral striae. Last whorl adnate to penultimate and almost parallel to shell axis. Peristome thickened, expanded but not reflected. Parietal part of peristome is closely adnate to penultimate whorl in form of strong, white callus. Palatal part protruded and wavy (best observable in lateral view). Aperture equipped with 9 barriers (parietal, angular, upper palatal, interpalatal, lower palatal, infrapalatal, basal, columellar and infraparietal) and weak swelling on palatal lip of peristome corresponding to usual position of palatal tubercle (but no distinct tubercle formed). Parietal lamella highest and broadest in aperture, with maximum height reaching at its middle part and curved towards lower palatal plica. It does not reach peristome edge. Angular lamella slightly wavy (its inner and outer end, and central part runs a bit closer to sinulus), slenderer and lower than the parietal lamella, surpassing it and not reaching expanding peristome edge. Three main palatal plicae (upper palatal, interpalatal, lower palatal) of equal height. Interpalatal plica slightly longer than both upper and lower palatal, lower palatal broader than upper palatal. They are all almost equidistant. Additional, small infrapalatal plica situated between lower palatal and basal. Basal plica weak, situated roughly halfway between the lower palatal plica and columellar lamella but slightly closer to the latter. Columellar lamella nearly as strong as lower palatal plica, of similar morphology as parietal lamella (highest in middle) but not curved, slightly leans towards basal lip. Infraparietal lamella developed to same extent as basal plica (only slightly higher), situated closer to parietal than to columellar lamella. Sinulus distinctly separated from rest of aperture and with no additional barriers inside. Umbilicus very narrow, measuring between ⅐ and ⅛ of shell width.

Differential diagnosis. The new species is by the shell shape similar to *Bensonella exploda* Gojšina, Hunyadi & Páll-Gergely, 2025 in Gojšina et al. (2025); *B. dracula* Gojšina, Hunyadi & Páll-Gergely, 2025 in Gojšina et al. (2025); *B. plicidens* (W. H. Benson, 1849), and *Boysidia hupeana* (Gredler, 1901). However, *B. exploda* is spirally striated, has a wider umbilicus, a comparatively smaller aperture, and a distinct palatal tubercle. *Bensonella dracula* has a strong palatal tubercle (higher and pointed), a lower palatal tubercle

and a transversal plica. *Boysidia hupeana* has an enlarged angular lamella, which is almost merged with the upper palatal plica and nearly enclosing the sinulus. Furthermore, *B. hupeana* has two palatal plicae and lacks an infraparietal lamella. *Bensonella plicidens* from the Himalaya has a well-developed palatal tubercle, spiral striation on the shell and more numerous apertural barriers. The apertural barrier arrangement of *B. didoi* is similar to that of *B. boettgeri*. However, *B. boettgeri* is brown, larger, has a conical shell (not conical-ovoid like *B. didoi*), a less rounded aperture and lacks the wavy palatal lip when observed in the lateral view.

Measurements (in mm, n= 4). SH= 2.35–2.60; SW= 1.70–2.00; AH= 0.97–1.06; AW= 0.82–1.00.

Distribution. This species is known only from the type locality (Fig. 3A, C, D).

Etymology. The species is named after the nickname of our friend and malacologist, Associate Professor Dilian Georgiev (Dido), for his friendship and valuable work on Bulgarian molluscs.

Remarks. Even though *Bensonella didoi* shows the most similar shell morphology to *Boysidia hupeana*, we describe it in *Bensonella* due to the presence of three barriers on the parietal side and a palatal tubercle-like swelling on the palatal lip of the peristome. Also, *B. hupeana* shows a very enlarged and curved angular lamella which is very closely positioned to the upper palatal plica thus almost enclosing the sinulus—a character untypical for *Bensonella*.

DISCUSSION

Following this work, the number of *Bensonella* species recorded in Vietnam is three, which is lower than the neighbouring Laos (seven species), and especially Thailand and Myanmar (13 species each). In contrast, no species of this genus are known from Cambodia, and only two are known from China (Gojšina et al., 2025). The first record of *B. boettgeri* from Vietnam extends the known distribution of this species eastwards. Previously, the species was recorded from Laos under the junior synonym *B. novemdentata* (Saurin, 1953), as well as from eastern India and Indonesia (where the type locality is) (Möllendorff, 1897; Saurin, 1953; Gojšina et al., 2025). The species exhibits a surprisingly wide and patchy distribution (Fig. 3B), which may be due either to long-distance dispersal or insufficient exploration (Gojšina et al., 2025). It is also possible that the species once had a more continuous distribution across Southeast Asia, which later became fragmented into the present, patchy pattern, following major environmental and geological changes. Our record from Vietnam is not unexpected, as it is geographically relatively close to the type locality of *B. novemdentata* in Laos. It is necessary to confirm the presence of this species in southern China, northern Thailand, and Myanmar, which would fill the current distribution gaps and render the distribution of the species relatively continuous from eastern India to Vietnam. Further distribution gaps could be addressed by finding this species on the Malay Peninsula, however, we are uncertain about its presence there, as our dense network of sampling localities in the region did not yield any specimens (Gojšina et al., 2025). The differences between the distant populations of *B. boettgeri* are exceptionally subtle, and bearing in mind the level of intraspecific variability in Hypselostomatidae (Gojšina et al., 2025), it seems that there are no solid grounds for even subspecific distinction within *B. boettgeri*. Further studies are needed to increase the number of known *Bensonella* species in Vietnam and to fill the remaining distribution gaps.

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