

New taxa of Clausiliidae from Bulgaria

(Gastropoda: Pulmonata)

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Abstract

In the present article a new species and three new subspecies are described, *Macedonica teodora* n. sp., *Bulgarica varnensis gabrovnica* n. ssp., *Bulgarica varnensis trimontsiana* n. ssp., *Balea (Alinda) kaeufeli eninskoensis* n. ssp. The article presents the clausiliid fauna from the region, as well as the sympatric clausiliid species. Some ecological data for the habitats are also presented.

Key words: Gastropoda, Pulmonata, Clausiliidae, *Macedonica*, *Bulgarica*, *Balea (Alinda)*, taxonomy, Bulgaria.

Introduction

Nowadays, the valid Bulgarian clausiliid fauna consists of 57 taxa, 60 % are Bulgarian endemics, 24 % are endemics for the Balkan Peninsula and only 16 % are widespread. A small part of them is widely distributed in almost all mountainous areas in the country. Another bigger part of the fauna is specific only for Bulgaria and the taxa are locally distributed — Stara Planina Mountains 12, Rhodope Mountains 11, Pirin Mountains 4, Rila Mountains 2, Strandza Mountains 1, Sredna Gora Mountains 1, Dobrudza 1. The Bulgarian territory is relatively well studied; nevertheless more detailed research is needed in the future. This is indispensable because of the rather fragmentary character of the clausiliid fauna distribution. Many species are “insular” distributed and to range them it is necessary to investigate all isolates of clausiliid habitats in the mountains. In the course of our research over the past years in the Rhodope Mountains, only a few taxa with insular location were identified: *Macedonica hartmuti* IRIKOV 2003, *M. zilchi* URBANSKI 1972, *M. brabeneci* NORDSIECK 1974, *Laciniaria bajula mursalicae* (URBANSKI 1969), *Bulgarica bulgariensis bulgariensis* (L. PFEIFFER 1848).

The new taxa described here are the result of detailed research in some areas of the Rhodope Mountains, Stara Planina Mountains and in the city of Plovdiv, supplementing the group of Bulgarian endemic clausiliids with insular distribution.

Material

The records of the two new subspecies of *Bulgarica varnensis* (L. PFEIFFER 1848) are listed. They are shown on UTM-maps (Figs. 6, 13; squares 10×10 km) to present the distribution of all *B. varnensis* taxa hitherto known.

Some specimens from the collections of Dr. I. DEDOV (27 shells from 9 stations in Bulgaria) and the collections of Mr. D. GEORGIEV (36 shells from 9 stations in Bulgaria) were used for additional comparison.

Measurements are generally in millimetres. The following abbreviations are used:

I = index of correlation (width of shell as percent of its length); R/2 (see NORDSIECK 1973) = number of ribs on 2 mm of the whorl (before its last turn); M = mean values.

Systematic section

Alopiinae: Cochlodinini

Macedonica teodora n. sp.

Figs. 1–5

Differential diagnosis: *Macedonica teodora* n. sp. has a shell closely resembling the ribbed forms of *M. marginata* (ROSSMÄSSLER 1835). The newly discovered species differs from the similar *M. marginata frivaldskyana* (ROSSMÄSSLER 1839) by its strongly ribbed shell with prominent whitish ribs on all whorls (*M. frivaldskyana* has distinct ribs predominantly on the upper whorls) and by its well-developed closing apparatus with almost constant presence of very well shaped massive middle palatal plica and long sutural plica.

Description (figs. 1, 2): The shell is slender, spindle-shaped, with horny-brown colour, in the older shells with grey-white surface layer. The surface is radially ribbed with fine, evenly spaced, sharp, whitish ribs. They are coloured white (of different intensity), most often in their upper part to the suture and rarely over the whole length. The ribs on the last whorl are evenly spaced, slightly bigger, and on the overlapping positions with the palatal plicae there are compact white knots. The whorls are $10\frac{1}{4}$ – $12\frac{1}{4}$, subconvex, separated by a slightly incised white suture. The aperture is pear-shaped, with a widely open, thick pale yellow apertural lip. The upper lamella is slightly projecting and situated at a distance from the spiralis, approximately the size of its length. The spiralis is situated deep inside and hardly visible at a cursory glance. The lamella columellaris is distinctly protruding horizontally in the aperture and extends deeper inside the whorls than the spiralis. A small part of the lower end of the subcolumellaris is clearly visible when viewed perpendicularly into the aperture. The palatal plicae are very well developed, long and located in the dorsal and lateral part of the last whorl. The palatal plicae are with lunella rudiment. The principal plica is long and protruding, the size of the upper palatal plica is about half the length of principal plica. The lower palatal plica is of medium length and is situated prominently in the front part of the aperture. Often a short but massive middle palatal plica can be observed, as well as a well developed sutural plica. The external part of the clausilium plate is saddle-shaped, curved. The excision between external and internal part is distinct.

Genital anatomy (figs. 3–5): The canalis serosus is poorly developed. The diverticulum of bursa copulatrix is equally long compared to the bursa and its stalk. The swollen pedunculus and the free oviduct are shorter than the vagina. The vaginal retractor inserts above the pedunculus at some distance from the transitional point between the vagina and the pedunculus. The penis is shorter than the vagina and contains a big, long penial



Figs. 1–2: *Macedonica teodora* n. sp., holotype SMF 328245: South Bulgaria, Chernatitsa Ridge, Western Rhodope Mountains. 1. frontal view $\times 5$; 2. dorsal and lateral $\times 7$; H = 19.0 mm, all photos by E. NEUBERT.

papilla, which is $\frac{2}{3}$ the length of the penis. The penial papilla has longitudinal folds. The distal part of the genital system in general is of a smaller size. The epiphallus has a short distal and a long proximal part separated by the insertion of the retractor penis, and as a whole it is longer than the penis. The retractor penis has one branch. The vagina and the atrium are weakly swollen.

Etymology: This taxon is dedicated to my wife, Mrs TEODORA IRIKOVA, in gratitude for the support and for the invaluable help during the multiple research trips to various areas in Bulgaria.

Type material: Holotype SMF 328245, Bulgaria, Western Rhodope Mountains, Chernatitsa Ridge, 2 km north-east of the village of Zabardo, Kamaka Rock Peak, 1600 m alt., 12.08.2004, on the rocks; paratypes SMF 328246/10.

Additional paratypes: coll. IRIKOV/15, 2.08.2004 and 12.08.2004; coll. DEDOV/5, coll. NORDSIECK 11208/10 from the same location, 2.08.2004.

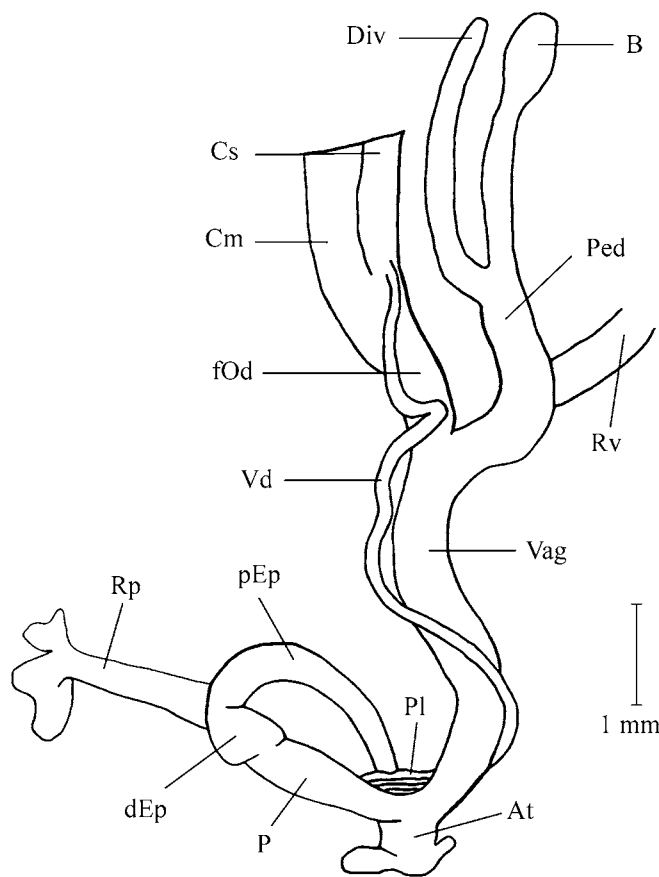


Fig. 3

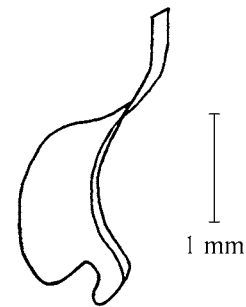


Fig. 5

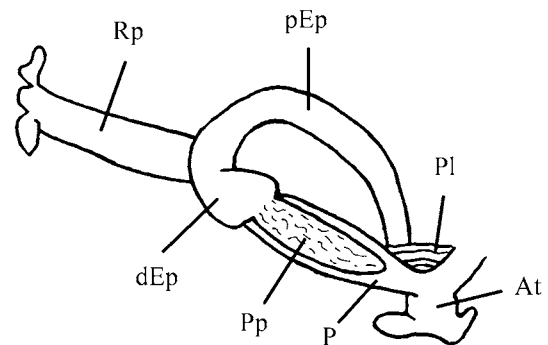


Fig. 4

Figs. 3–5: *Macedonica teodora* n. sp. 3. situs of the genital system; 4. male part of genital system with internal structure of the penis; 5. clausilium plate (scale bars represent 1 mm). — Acronyms (proximal-distal seen from the ovotestis): At = atrium, B = bursa copulatrix, Cm = canalis mucosus, Cr = canalis serosus, dEp = distal part of epiphallus, Div = diverticulum, fOd = free oviduct, P = penis, Ped = pedunculus, pEp = proximal part of epiphallus, Pl = penial ligament, Pp = penis papilla, Rp = retractor penis, Rv = retractor vaginae, Vag = vagina, Vd = vas deferens.

Measurements (holotype): Shell height: 19.0 mm; shell width: 4.4 mm; aperture height: 4.4 mm; aperture width: 3.2 mm; paratypes: Shell height: 15.5–20.4 mm; shell width: 4.0–4.5 mm; aperture height: 3.9–5.0 mm; aperture width: 2.9–3.5 mm.

Variation: Variations are present in the shell size, the degree of ribbing (smaller or significantly distinct ribs) and the intensity of the ribs coloration in white (the ribs range from purely white colouring in the suture to entirely white).

Relationships: The position of the vagina retractor insertion above the pedunculus differentiates the new species from *M. marginata*, *M. hartmuti* and other species of the *marginata*-group. The long penial papilla is closer to some species of the *macedonica*-group, like *M. zilchi* for example, rather than to the species of the *marginata*-group. Considering the size of distal part of genital system, the new species corresponds more to *M. marginata* than to the species of the *macedonica*- and

frauenfeldi-groups. The vagina and the atrium are not swollen like in *M. marginata* and *M. hartmuti*.

Distribution/Ecology: *M. teodora* n. sp. occurs in South Bulgaria, the Chernatitsa Ridge in the Western Rhodope Mountains, close to the valley of the Chepelarska River, at 2 km NE of the village of Zabardo. The species is found at 1600 m alt. on limestone rocks with a southern and south-eastern exposure. The animals live in the more damp and shaded parts of the rocks and in deep crevices among *Geranium* sp. and moss. The species is distinctly dominant over the sympatric clausiliid species. The rocky “island” “Kamaka” (The Rock) is isolated from the nearby limestone massifs by coniferous forests (*Abies alba*, *Pinus sylvestris*, *P. nigra*, *Picea excelsa*) and by meadows and pastures as well. The entire concomitant fauna occurs in other neighbouring calcareous regions as well, for example, in the nearby rock formation “Chudnite Mostove” (“The Wonderful Bridges”), as distinct of *M. teodora* n. sp.

Discussion: The genital anatomy of this new species shows transitional characteristics among the *marginata*- and *macedonica*-groups. The presence of a big penial papilla is more common for the species of *macedonica*-group which live mostly in the South of the Balkan Peninsula, but the structure of the genital system shows a closer relationship to *M. marginata* and the other species of the *marginata*-group. This is a transitional case between the species of both groups in the Rhodope Mountains like *M. hartmuti* IRIKOV. The genital anatomy of *M. hartmuti* is identical to that of *M. marginata* but its shell and biotope have a greater similarity with that of the *macedonica*-group (IRIKOV 2003). In *M. teodora* n. sp., the shell is similar to the *marginata*-group, the biotope is typical for the *macedonica*-group, and the genital anatomy is transitional between the two groups.

The Western Rhodope Mountains form a small geographical territory, where five species of the genus *Macedonica* were found so far (mostly on Bulgarian territory): *M. marginata*, *M. hartmuti*, *M. brabeneci* and *M. teodora* n. sp. of the *marginata*-group and *M. zilchi* of the *macedonica*-group. Due to the geographical location of the Rhodope Mountains on the Balkan Peninsula as well as to the presence of karst areas, species of the *macedonica*- and *marginata*-groups are found here sympatrically, some of them with transitional traits between the groups. The very local occurrence of *M. teodora* is another case of “insular” distribution of some *Macedonica*-species on the limestone rocks of the Rhodope Mountains. Isolated occurrences on the rocks are found for *M. zilchi* and *M. hartmuti* as well. The fragmentary distribution patterns of the clausiliid fauna in the Western Rhodope Mountains is mainly caused by the mosaic character of the limestone landscapes, which additionally are fragmented and isolated by forests and herbaceous habitats. With the discovery of *M. teodora* n. sp., the number of endemic Bulgarian species of *Macedonica* increases to six: *M. martae* (SAJÓ 1968), *M. pinteri* (SAJÓ 1968), and those species endemic for the Rhodope Mountains, i.e. *M. zilchi*, *M. brabeneci*, *M. hartmuti* and *M. teodora* n. sp.

On the rocky limestone “island-peak” “Kamaka”, the following clausiliid species were found sympatrically with *M. teodora* n. sp.: *Micridyla pinteri* (NORDSIECK 1973), *Laciniaria bajula lunella* NORDSIECK 1973, *Balea biplicata* (MONTAGU 1803), *B. perversa* (LINNAEUS 1758) and *Bulgarica denticulata* (OLIVIER 1801). In the nearby valley of the Chepelarska River, from the town of Asenovgrad to the town of Chepelare, the following clausiliid fauna is present: *Cochlodina laminata* (MONTAGU 1803), *Macedonica marginata*, *Laciniaria plicata* (DRAPARNAUD 1801), *Laciniaria macilenta* (ROSSMÄSSLER 1842), *Laciniaria bajula bajula* (SCHMIDT 1868), *Balea biplicata*, *Bulgarica fraudigera* (ROSSMÄSSLER 1839), and *Bulgarica denticulata*.

The Western Rhodope Mountains can be considered as a region rich in *Macedonica* taxa. Probably it is a cen-

tre of radiation for species of *Macedonica*, as it may hold true for other clausiliid groups as well.

Zoogeography: Bulgarian endemic species.

Baleinae

Bulgarica varnensis varnensis (L. PFEIFFER 1848)

Figs. 6, 7, 8, 12

1848 *Clausilia varnensis* L. PFEIFFER, Zeitschrift für Malakozoologie, xxx: 8.

The nominate subspecies is distributed in Bulgaria in Dobrudzha, Stara Planina Mountains, Sredna Gora Mountains, the Gornotrakiiska Lowland and the Black Sea Coast (fig. 6), and in Romania in a part of Dobrudzha and a part of the Walachian Lowlands.

Below a list of authors is presented, which reported on the species or one of its synonyms and who offered actual records in Bulgaria. The complete known distribution of the nominate subspecies and its subspecies in Bulgaria is presented on the UTM grid maps (figs. 6, 13).

The record of *B. v. varnensis* from the city of Plovdiv (HESSE 1911, 1916a) is problematic and, most likely, is confused with *Bulgarica fritillaria* (FRIVALDSKY 1835). Many shells of this species can be found in the debris of the Maritsa River, which are carried by the tributaries of the river from the North-Western Rhodope Mountains and from neighbouring mountain regions.

Records from literature: HESSE (1916b): *Alinda varnensis*: Aladzha Monastery (NH 78), *A. varnensis socialis*: Beloslav (NH 58); PETRBOK (1925): *Clausilia varnensis* var. *socialis*: Devnya (NH 48); JAECKEL, KLEMM & MEISE (1957): *Laciniaria varnensis*: Bulgaria; URBANSKI (1960a): *L. (Bulgarica) varnensis*: Burgas (NH 30); URBANSKI (1960b): *L. (B.) varnensis socialis*: Provadia (NH 38), Beloslav (NH 58); HUDEC (1967): *L. (B.) varnensis*: Aladzha Monastery and Varna (NH78); PINTÉR (1968): *L. varnensis*: Stara Planina Mountains, Veslets (GN 19), Stoletov Peak, Shipka Pass (LH63); SAJÓ (1968): *L. (B.) varnensis*: Veslets (GN 19), Stoletov Peak, Shipka Pass (LH63), *L. (B.) invisa*: Shipka Pass (LH63); NORDSIECK (1973): *Bulgarica (Bulgarica) varnensis*: Varna (NH78), Stara Planina Mountains, Lakatnik (FN 96, FN 97), from the Iskar River gorge to Varna, North Bulgaria, “Walachei” by Bucharest and the whole of Dobrudzha in South-East Romania; DAMIANOV & LIKHAREV (1975): *L. (B.) varnensis*: Eastern Stara Planina Mountains and Dobrudzha – Preobrazensky Monastery (LH 87), Etropole (GN 44), Brestnitsa (KH 77), North-East Rhodope Mountains, the Black Sea Coast from Varna to Balchik (MH 78, MH 88, NH 79, NH 89, NJ 80, NJ 90), Stara Planina Mountains west of Troyan, Rousse (MJ 15), Malko Tarnovo (NG 44); KÖRNIG (1983): *B. varnensis*: the Black Sea Coast – the rocks near Varna, Aladzha Monastery (NH78), Sozopol (NG 59), Arkutino (NG 58); Stara Planina Mountains – Lakatnik (FN 96, FN 97).

Additional records (checked by the author): The Black Sea Coast: Zlatni Pyasatsi (NH 89), 7 specimens; Aladzha Monastery (NH 89), 5 specimens; Kamen Bryag “Yailata” (PJ 21), 1 specimen; Rusalka (PJ 20), 2 specimens; Durankulak Lake (PJ 23), 3 specimens. — Dobrudzha: Rous-

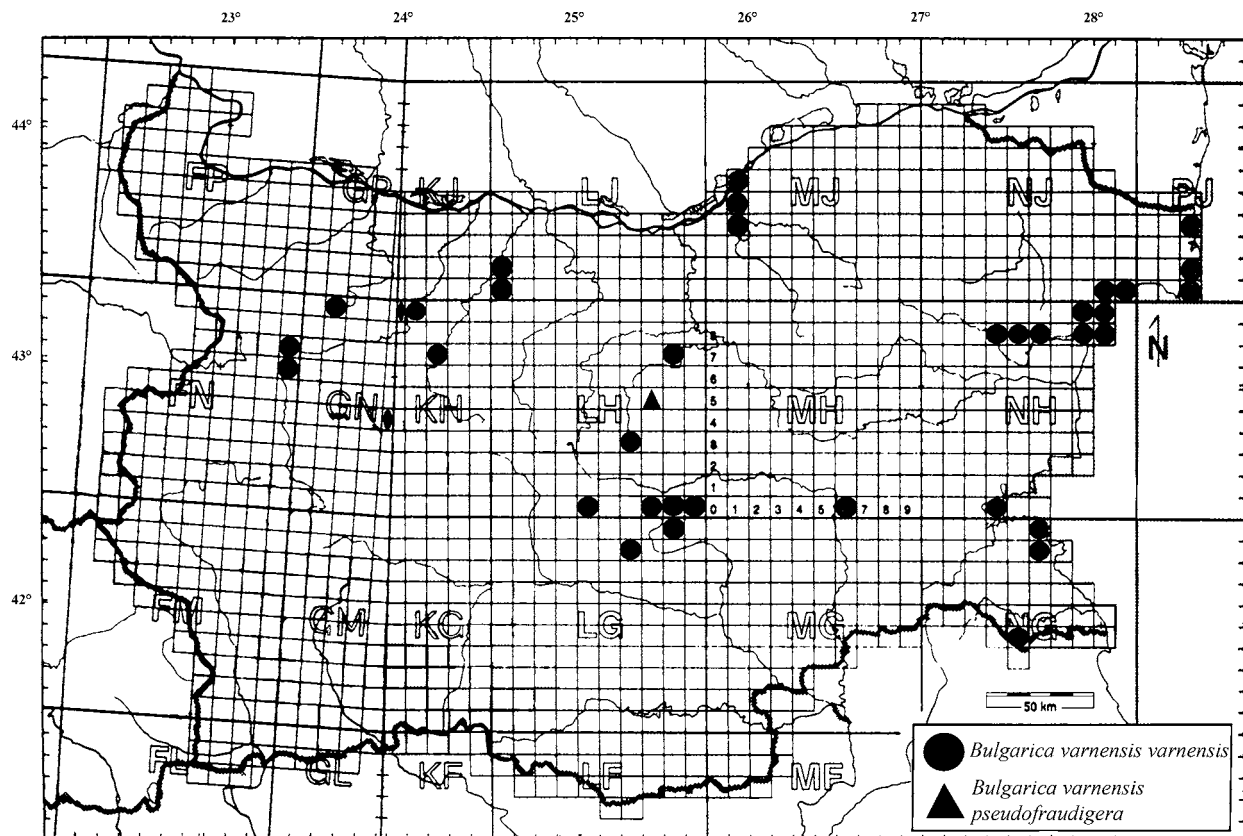


Fig. 6. The currently known distribution of *Bulgarica varnensis varnensis* (L. PFEIFFER 1848) and *Bulgarica varnensis pseudofraudigera* NORDSIECK 1973 in Bulgaria.

senski Lom (MJ 13; MJ 14), 3 specimens; Pleven (LJ 00; LJ 01), 3 specimens; Resets (KH 59; KH 69), 3 specimens. — Stara Planina Mountains: Lakatnik (FN 96; FN 97), 1 specimen (coll. DEBOV). — Sredna Gora Mountains: the south slopes north of Stara Zagora (LH 89), 7 specimens; Zmevo (LH 80), 5 specimens; Lyulyak (LH 90), 4 specimens; Stara Zagora (LG 89), 4 specimens. — The Gornotrakiiska Lowland: Stojan Zaimov (LG 08), 5 specimens; Stara Zagora Mineral Baths (LH 70), 3 specimens; Rozovets (LH 40), 5 specimens; Yambol (MH 50), 3 specimens (coll. GEORGIEV).

Measurements: Shell height: 14.2–17.0 mm, $M = 15.2$ mm; shell width: 3.3–4.1 mm, $M = 3.6$ mm; aperture height: 3.2–4.1 mm, $M = 3.5$ mm; aperture width: 2.2–3.0 mm, $M = 2.7$ mm. I: 21.9–26.5, $M = 23.8$; R/2: 15–20, $M = 16.5$.

***Bulgarica varnensis pseudofraudigera* H. NORDSIECK 1973**

Figs. 6, 11, 12

1973 *Bulgarica varnensis pseudofraudigera* H. NORDSIECK, Archiv für Molluskenkunde, **104** (4/6): 199, Taf. 7 fig. 23.

Distribution: Known only from the locus typicus, in north-east Bulgaria, the Bacho Kiro Cave, near Dryanovo (Fig. 6) and Drjanovski manastir.

Note: Descriptive details can be taken from NORDSIECK (1973). NORDSIECK reports on a sympatric occur-

rence of *varnensis* and *pseudofraudigera* at Drjanovski manastir (NORDSIECK pers. comm. 2006) and subsequently supposes *B. pseudofraudigera* as a species separate from *B. varnensis*. Nonetheless, this taxon is provisionally kept on subspecific level here, because according to NORDSIECK, the sympatry is based on a few shells only, and the problem requires an additional investigation.

***Bulgarica varnensis gabrovnica* n. ssp.**

Figs. 10, 12, 13

Differential diagnosis (fig. 7–11): It differs from *B. v. varnensis*, *B. v. pseudofraudigera* and *B. v. trimontsiana* n. ssp. by its large and very distinct, uniformly and sparsely situated, comparatively few ribs [in *gabrovnica* $R/2 = 9–14$, $M = 12$, *varnensis* $R/2 = 15–20$, *pseudofraudigera* $R/2 = 22–26$, *trimontsiana* $R/2 = 15–20$, $M = 18$], which are completely white in the fresh shells (in all other subspecies there are only fragments of white strokes on the ribs). It differs from the other subspecies by the very markedly developed two keels, which are similar as in *B. bulgariensis* and *B. fraudigera*, and by its strong and long superior palatal plica. In the distal part of the clausilium plate, there is a calloused thickened excrescence. The clausilium plate with a smaller external angle if compared to the nomi-



Figs. 7–11: *Bulgarica varnensis* ssp.: 7. *B. v. varnensis* (L. PFEIFFER 1848), original lot (?), SMF 145411, Varna, coll. ROSSMÄSSLER ex FRIVALDSKY (1847), H = 16.6 mm. 8. *B. v. varnensis*, paratype of *Bulgarica dobrogensis* (LOOSJES & NEGREA 1968), SMF 198972, Cave de la Cheia, Dobrogea, ex LOOSJES (1970), H = 14.7 mm. 9. *B. v. trimontsiana* n. ssp., holotype SMF 328251, South Bulgaria, city of Plovdiv, Gornotrakiiska Lowland, H = 16.2 mm. 10. *B. v. gabrovnica* n. ssp., holotype, SMF 328249, South Bulgaria, valley of Gabrovnitsa River, Central Stara Planina Mountains, H = 12.8 mm. 11. *B. v. pseudofraudigera* H. NORDSIECK 1973, holotype SMF 227700, Northeast Bulgaria, cave Bacho Kiro close to Dryanovo, ex coll. H. NORDSIECK, H = 18.05 mm. Frontal view $\times 5$, dorsal view $\times 7$, all photos by E. NEUBERT.

nate subspecies. The external side of the tongue-shaped part is less rounded than in *B. v. varnensis*.

Etymology: Named after the valley of Gabrovnitsa River in Stara Planina Mountains.

Type material: Holotype SMF 328249, South Bulgaria, valley of Gabrovnitsa River, southern slopes of Central Stara Planina Mountains, at about 20 km northwest of the town of Kazanluk (LH 52, fig. 13), 600–800 m alt., 17.04.2004 under stones; paratypes SMF 328250/5 (dry).

Additional paratypes: coll. IRIKOV/6, leg. GEORGIEV and TERZIEV, 6.07.2001, coll. IRIKOV/19, coll. NORDSIECK 11176/4, the same locality, leg. IRIKOV 17.04.2004.

Measurements (holotype): Shell height: 12.8 mm; shell width: 3.5 mm; aperture height: 3.0 mm; aperture width: 2.2 mm; paratypes: shell height: 12.1–18.3 mm, M = 14.7; shell width: 3.1–4.7 mm, M = 3.6; aperture height: 2.9–3.9 mm, M = 3.4; aperture width: 2.0–2.8 mm, M = 2.3. I: 21.8–28.2, M = 24.8; R/2: 9–14, M = 12.

Distribution/Ecology: *B. v. gabrovnica* n. ssp. is only known from the type locality. The animals live under stones and at the base of rocks at about 600–800 m alt. The habitat is considerably dry. *B. v. gabrovnica* is common in the gorge of Gabrovnitsa River, where it remains longitudinally isolated due to

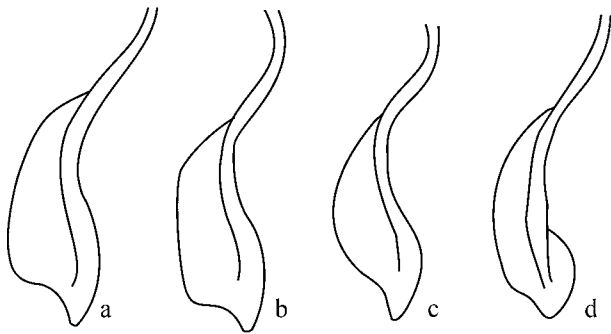


Fig. 12: Clausilium plates of *Bulgarica varnensis* ssp.: a. *v. pseudofraudigera*, b. *v. gabrovnitsana* n. ssp., c. *v. varnensis*, d. *v. trimontsiana* n. ssp.

the rugged mountain relief. Vertically, the distribution is limited by the plain and the alpine mountain zone. Other clausiliid species that occur here are *Macedonica marginata*, *Laciniaria plicata*, *Balea biplicata* and *Bulgarica denticulata thessalonica*.

***Bulgarica varnensis trimontsiana* n. ssp.**

Figs. 9, 12, 13

Differential diagnosis (figs. 7–11): It differs from *B. v. varnensis*, *B. v. pseudofraudigera* and *B. v.*

gabrovnitsana n. ssp. in its much more distinctly ribbed and distinctly shaped keels, the almost always significantly reduced superior palatal plica, which most often remains as palatal callosity only. The clausilium plate is with comparatively narrow tongue-shaped part, the distal part is significantly thickened, callous and with triangular shape and relatively small external angle (fig. 12).

Etymology: Named after the ancient name of the city of Plovdiv.

Type material: Holotype SMF 328251, South Bulgaria, Gornotrakiiska Lowland, city of Plovdiv, on one of the seven hills in the city, known as “Trihalmie” (= Trimontium) [LG 16 (42°08'47.5"N 24°45'88.6"E; 42°09'04.9"N 24°45'05.7"E) fig. 13], 200–300 m alt, 12.01.2005, in rock clefts; paratypes SMF 328252/10 (dry).

Additional paratypes: coll. IRIKOV/totally 70, coll. NORDSIECK 10975/7, 11028/9 from the same location: 15.05.2002 leg. IRIKOV, 27.05.2003 leg. Georgiev; 28.10.2003, 30.05.2003, 12.01.2005 leg. IRIKOV.

Measurements (holotype): Shell height: 16.2 mm; shell width: 3.9 mm; aperture height: 4.0 mm; aperture width: 2.8 mm; paratypes: shell height: 14.6–19.6 mm, M = 16.7; shell width: 3.6–4.0 mm, M = 3.9; aperture height: 3.0–4.1 mm, M = 3.8; aperture width: 2.4–3.2 mm, M = 2.9.

I: 21.0–24.0, M = 23.0; R/2: 15–20, M = 18.

Distribution/Ecology: *Bulgarica varnensis trimontsiana* n. ssp. is only known from the locus typi-

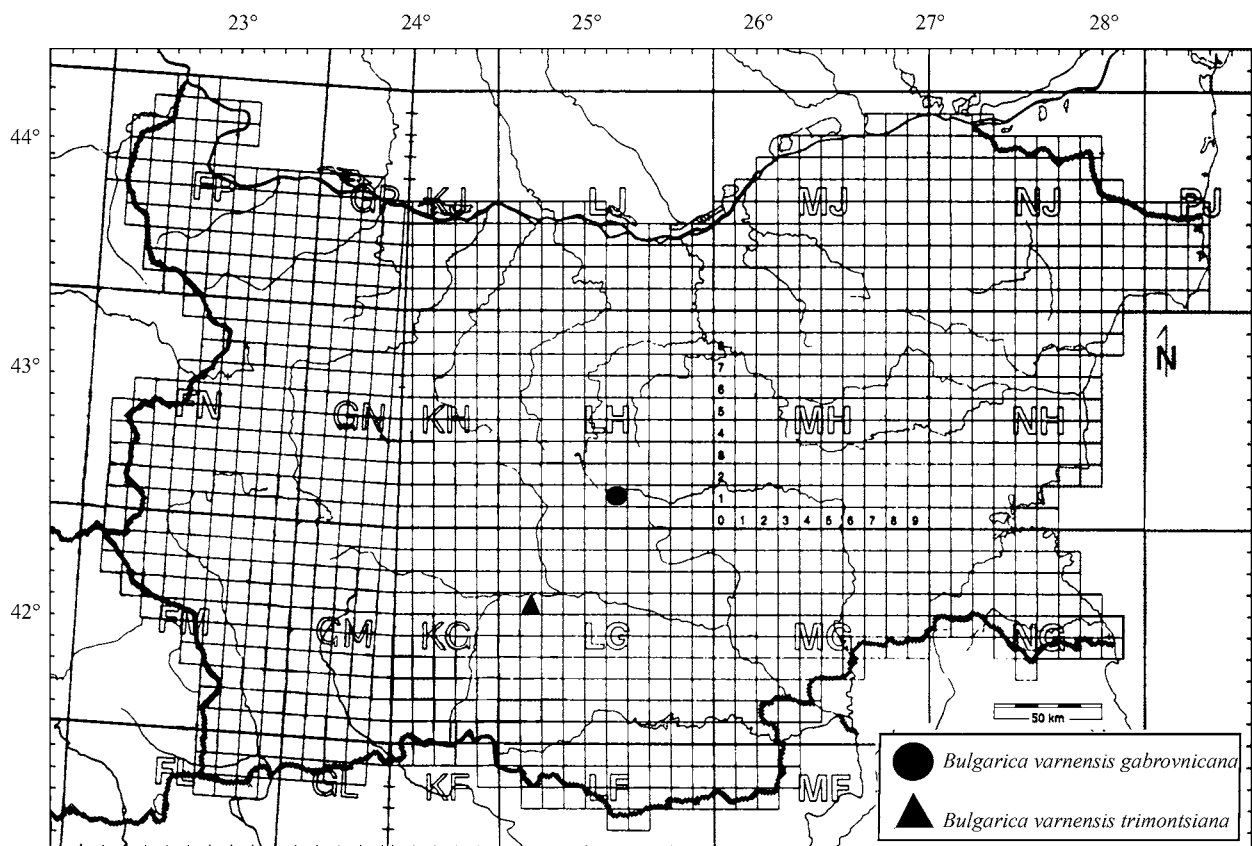
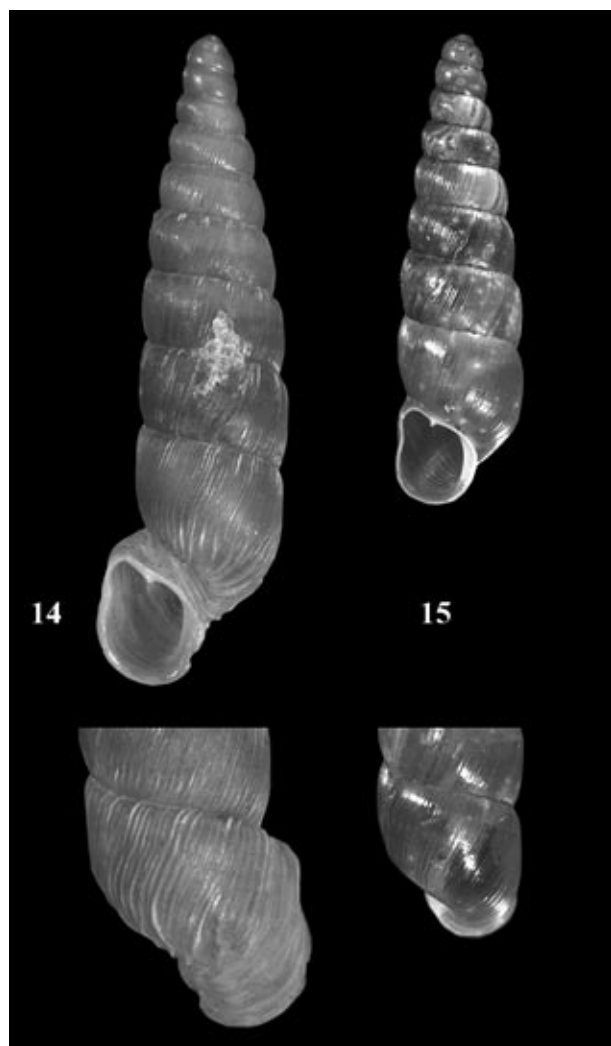


Fig. 13. Distribution of *Bulgarica varnensis gabrovnitsana* n. ssp. and *Bulgarica varnensis trimontsiana* n. ssp. in Bulgaria.



Figs. 14–15: *Balea (Alinda) kaeufeli* ssp. 14. *B. k. kaeufeli* (BRANDT 1961), holotype SMF 166931, Stara Planina, Sveti Nikola at the Schipka pass, H = 10.8 mm. 15. *B. k. eninskoensis* n. ssp., holotype SMF 328247, Southern Bulgaria, Eninsko Gorge, valley of Eninska River, Stara Planina Mountains, H = 7.9 mm. Frontal view $\times 8$, dorsal view $\times 10$, all photos by E. NEUBERT.

cus. The species lives isolated on three of the seven hills in the city of Plovdiv. These are connected to each others forming one “hill” with three summits. The animals live among syenite rocks in restricted, not built up sites, at 200–300 m alt. The local distribution pattern of this subspecies results from a small “insular”-habitat population and its complete isolation from the urban environment and from the plain. On the same hill the clausiliids *Laciniaria plicata* and *Balea biplicata* are found as well. On some of the other hills *Bulgarica denticulata thessalonica* occurs.

To the author’s opinion, the following conchiological traits can be used for distinguishing the subspecies of *B. varnensis*: 1) size, number and density of the ribs on the shell; 2) white coloration of the ribs (entirely white or with fragments of white strokes); 3) degree of formation,

size and protuberance of the dorsal keels; 4) degree of formation, shape, size and position of the upper palatal plica; 5) the form of tongue-shaped part and the distal section of clausilium plate.

Identification key

1. Both keels prominent..... 3.
2. Basal keel well-developed, dorsal keel poorly developed..... 4.
- 3a. The shell is coarsely ribbed, with large, evenly distributed few ribs (R/2 9–14), which are entirely white in fresh shells. The external tongue-shaped part of the clausilium plate is slightly rounded; the distal part is comparatively wide and with a small external angle (figs. 10, 12)
..... *v. gabrovnica*
- 3b. The shell is finely ribbed, with small, irregularly distributed, larger ribs (R/2 22–26), with only fragments of white strokes. The external tongue-shaped part of the clausilium plate is regularly rounded; the distal part is wide with a comparatively bigger external angle (figs. 11, 12)
..... *v. pseudofraudigera*
- 4a. The shell with a slightly protruding basal keel, the superior palatal plica \pm well developed and varies from well developed to considerably reduced. The tongue-shaped part of clausilium plate is wide, with a big external angle in the distal part (figs. 7–8, 12) *v. varnensis*
- 4b. The shell has a significantly protruding basal keel, the superior palatal plica is almost always completely reduced, and most often only a palatal callosity remains. The tongue-shaped part of the clausilium plate is narrower, and in the distal part the external angle is indistinct (figs. 9, 12) *v. trimontsiana*.

Balea (Alinda) kaeufeli eninskoensis n. ssp.

Fig. 15

Differential diagnosis (figs. 14–15): Differs from the nominate subspecies (fig. 14) by the lack of white colouration on the suture and on the ribs and the absence of keels. The occipital part of the last whorl is slightly rounded and greatly swollen; it lacks folds around the columella, which may be considered as rudiments of the lower lamella.

Genital anatomy: The structure of the genital organs is typical of that of the genus *Balea (Alinda)* H. & A. ADAMS 1855 and is very similar to *B. biplicata*, from which it differs by the lack of peculiar protuberance on the vagina in the atrium section, by the lack of ligament binding parepipallus with the penis, and by the presence of many ligaments which bind not only the parepipallus

but the pseudoepiphallus as well with the proximal part of the vagina and the free oviduct.

Etymology: Named after Eninsko Gorge in the valley of the Eninska River in the Stara Planina Mountains.

Type material: Holotype SMF 328247, South Bulgaria, Eninsko Gorge in the valley of the Eninska River, the southern slopes of Stara Planina Mountains, at about 7–8 km north of the town of Kazanluk (LH 72), 500–900 m alt., 7.04.2004 on rocks; paratypes SMF 328248/5 (dry).

Additional paratypes: coll. IRIKOV/5, coll. NORDSIECK 11177/2, 11213/4, leg. IRIKOV, 7.04.2004 from the same location.

Measurement (holotype): Shell height: 7.9 mm; shell width: 2.3 mm; aperture height: 1.9 mm; aperture width: 1.4 mm; paratypes: shell height: 7.5–8.6 mm; shell width: 2.2–2.3 mm.

Distribution/Ecology: *Balea* (A.) *kauefeli eninskoensis* n. ssp. is only known from the locus typicus. The animals live on rocks, among accumulations of

soil and leaves, as well as among the foliage of *Hedera helix* under mesophyllic conditions. The species is mainly found in areas near the river dominated by wood- and bush-type vegetation, and it is rarely found on bare rocks in the high parts of the gorge devoid of any vegetation. It lives sympatrically with the following clausiliid species: *M. marginata*, *L. plicata*, *B. biplicata* and *B. denticulata thessalonica*.

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