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The Mollusks (Mollusca: Gastropoda, Bivalvia) of Sakar Mts (South Bulgaria): an updated check list and new distributional data

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Abstract. The mollusk fauna of Sakar Mts has been the subject of multiple studies over the years, yet significant knowledge gaps remain. The earliest records date back to Damyanov & Liharev (1975), who reported seven species. Subsequent studies expanded the known diversity to 83 species, including gastropods and bivalves. This study presents additional findings from sporadic field collections, contributing 14 new species (13 gastropods and 1 bivalve) and updating the distribution of 32 species. As a result, the known mollusk fauna of Sakar now comprises 97 species. The findings emphasize the need for further exploration, particularly in underexplored habitats such as anthropogenic areas and wetlands.

Key words: snails, mussels, Balkan Peninsula, species, distribution.

Introduction

The first data on the mollusks of the Sakar Mountain were presented by Damyanov & Liharev (1975). They reported seven species from the region: *Arion silvaticus* Lohmander, 1937, *Mediterranea inopinata* (Uličný, 1887), *Morlina urbanskii* (Riedel, 1963), *Vitrea pygmaea* (O. Boettger, 1880), *Limax graecus* (Simroth, 1889), *Deroceras thersites* (Simroth, 1886), and *Tandonia cristata* (Kaleniczenko, 1851). It was not until 30 years after the publication of their *Fauna of Bulgaria* that Georgiev (2005) reported data on an additional 51 species, including, for the first time, representatives of freshwater mussels. Later, in their paper on the genus *Cecilioides* in Bulgaria, Georgiev & Stoycheva (2013) reported species of the genus from Sakar. In 2016, Irikov & Gerdzhikov (2016) added another 27 taxa to the fauna of the mountains: 21 terrestrial and six freshwater species and subspecies. These authors also provided rather critical remarks regarding the previous work of Georgiev (2005) in the region.

Despite the two extensive studies by Georgiev (2005) and Irikov & Gerdzhikov (2016), it is clear that the malacofauna of this interesting southern Bulgarian region, with its diverse habitats and microhabitats, is still not fully known. Many anthropogenic areas, as well as wetlands, remain unexplored. In this study, we present our data from sporadic mollusk collections, which complement the available information on species composition and distribution in the Sakar region, without claiming to provide a comprehensive analysis of the mollusk communities in the area. We believe that many new discoveries concerning this fascinating group of invertebrates can still be made there.

Material and Methods

The material (living specimens and shells) was collected by hand or following the soil sampling procedure proposed by Dedov & Antonova (2015). The materials are housed in Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, Sofia and Plovdiv University gastropods' collection.

1. Mixed forest (*Pinus nigra* plantation) between Dobroselets and Chukarovo villages, N42 09 27.6 E26 21 18.3, 175 m a. s. l., 06.05.2022, D. Georgiev leg., det.;

2. Deposits of Sinapovska Reka River at Chukarovo village, N42 09 07.7 E26 23 36.1, 132 m a. s. l., 06.05.2022, D. Georgiev leg., det.;

3. Same locality and date but found living in the area, not as empty shells in river deposits, D. Georgiev leg., det.;

4. Radovets village, near cave gallery, 02.04.1992, P. Stoev & G. Seizov leg., I. Dedov det.;

5. Ustrem village, St. Troitsa Monastery, near river, after quarry, 130-180 m, 22-23.05.1995, P. Mitov leg., I. Dedov det.;

6. Ustrem village, Suhata Dupka cave, near cave, 30.03.1992, P. Stoev leg., I. Dedov det.;

7. Bogomil village, 300 m, 22.05.1995, P. Mitov leg., I. Dedov det.;

8. Ustrem village, Tyasnata Propast cave, 28-30.03.1992, P. Stoev & G. Senikov leg., H. Nordsieck det.;

9. Yerusalimovo village, near a dam, N41 52 56.4 E26 04 58.2, 119 m a. s. l., 16-18.06.2022, I. Dedov leg., det.;

10. Matochina village, N41 50 59.4 E26 32 29.9, 162 m a. s. l., 16-18.06.2022, I. Dedov leg., det.;

11. Matochina village, N41 51 07.4 E26 32 48.6, 170 m a. s. l., 16-18.06.2022, I. Dedov leg., det.;

12. SW of Yerusalimovo village, N41 52 14.8 E26 05 04.2, 61 m a. s. l., 16-18.06.2022, I. Dedov leg., det.;

13. Topolovgrad district (E of the town), road to Oreshnik village, N42 04 45.3 E26 21 40.0, 335 m a. s. l., I. Dedov leg., det.;

14. Between Sladun and Varnik villages, N41 51 23.3 E26 29 02.5, 112 m a. s. l., 10.06.2022, I. Dedov leg., det.;

15. Lyubimets town district, SW of Yerusalimovo village, N41 52 05.02", E26 05 00.53, , 63 m a. s. l., 16-18.06.2022, I. Dedov leg., det.;

16. S of Bulgarska Polyana village, Quercus vegetation, N42 00 04.2 N26 11 28.8, 555 m a. s. l., 16-18.06.2022, I. Dedov leg., det.;

17. E of Ravna Gora village, N41 52 37.52 E26 22 21.97, 462 m a. s. l., 16-18.06.2022, I. Dedov leg., det.;

18. NW of Levka village, N41 52 47.6 E26 16 29.8, 211 m a. s. l., 16-18.06.2022, I. Dedov leg., det.;

19. E of Sladun village, near the road to Matochina village, N41 51 23.3 E26 28 32.8, 127 m a. s. l., 16-18.06.2022, I. Dedov leg., det.;

20. Harmanli town district, near Maritsa River, NW of Rogozinovo village, N41 55 50.0 E25 55 54.7, 70 m a. s. l., 16-18.06.2022, I. Dedov leg., det.

The species names were corrected according currently accepted names (MolluscaBase, 2022), and distributions (about Unionidae, considering Araujo et al., 2018).

Abbreviations and signs used in the species list: D&L – Damyanov & Liharev (1975), DG – Georgiev (2005), G&S – Georgiev & Stoycheva (2013), I&G – Irikov & Gerdzhikov (2016), 1, 2, 3, … - number of locality from the current study, * - new record for Sakar Mts.

Results and Discussion

Till now a total of 83 species of molluscs were known from Sakar Mts (Gastropoda 75, Bivalvia 8). After the study this list was updated with 14 species (Gastropoda 13, Bivalvia 1), as follows. A total of 97 mollusk species are known now to inhabit the area of Sakar. New distributional data for 32 species was also obtained.

Species list:

Gastropoda

Neritidae
Theodoxus fluviatilis (Linnaeus, 1758): I&G

Pomatiidae
Pomatias elegans (O.F. Müller, 1774): DG, I&G, 6, 13, 14

Ellobiidae
Carychium minimum O. F. Müller, 1774: DG, 2, 14, 17, 18

Valvatidae
Valvata piscinalis (O.F. Müller, 1774): I&G

Lymnaeidae
Galba truncatula (O. F. Müller, 1774): DG, I&G, 2, 12, 15, 18
Radix auricularia (Linnaeus, 1758): DG, I&G

Physidae
Physella acuta (Draparnaud, 1805): DG, I&G

Planorbidae
Ancylus fluviatilis (O.F. Müller, 1774): DG, I&G
***Anisus spirorbis* (Linnaeus, 1758):** 2
***Gyraulus albus* (O. F. Müller, 1774):** 2
***Gyraulus crista* (Linnaeus, 1758):** 2
***Hippeutis complanatus* (Linnaeus, 1758):** 14, 18
Planorbarius corneus (Linnaeus, 1758): I&G
Planorbis planorbis (Linnaeus, 1758): DG (reported as *P. carinatus* O. F. Müller, 1774), I&G

Vertiginidae
Vertigo antivertigo (Draparnaud, 1801): DG, 2, 12, 15, 18
Vertigo pygmaea (Draparnaud, 1801): DG, 2, 15, 17
Truncatellina cylindrica (Ferussac, 1821): DG, 2, 11, 14

Valloniidae
***Acanthinula aculeata* (O. F. Müller, 1774)**: 3, 14
Vallonia costata (O. F. Müller, 1774): DG, 2, 14
***Vallonia enniensis* (Gredler, 1856):** 17
Vallonia pulchella (O. F. Müller, 1774): DG, I&G, 2, 15, 18

Enidae
Chondrula microtragus (Rossmässler, 1839): DG, I&G, 7, 10, 13, 14, 19
Chondrula tricuspidata (Küster, 1841): I&G
Eubrephulus bicallosus (L. Pfeiffer, 1847): DG, I&G
Mastus carneolus (Mousson, 1863): I&G
Mastus rossmaessleri (L. Pfeiffer, 1846): DG, I&G, 3
Merdigera obscura (O. F. Müller 1774): I&G, 2
Multidentula ovularis (Olivier, 1801): DG
Pseudojaminia seductilis (Rossmässler, 1837): DG, I&G, 5, 11, 13
Zebrina detrita (O. F. Müller, 1774): DG, I&G
Zebrina kindermanni (L. Pfeiffer, 1850): DG, I&G

Cochlicopidae
Cochlicopa lubrica (O. F. Müller, 1774): DG, I&G, 2, 3, 12, 15, 18
Cochlicopa lubricella (Rossmassler, 1835): DG, 1, 12, 15

Clausiliidae
***Alinda atanasovi atanasovi* (Urbanski, 1964):** 8
Alinda biplicata orientalis Nordsieck, 2008: DG, I&G
Cochlodina laminata laminata (Montagu, 1803): I&G
Laciniaria plicata plicata (Draparnaud, 1801): I&G
Strigillaria (Bulgarica) denticulata (Olivier, 1801): DG, I&G, 1, 3, 10

Succineidae
Succinea oblonga Draparnaud, 1801: DG, I&G, 3, 18
Oxyloma elegans (Rissso, 1826): I&G

Ferussaciidae
Cecilioides tumulorum (Bourguiugnat, 1856): DG (reported as *Cecilioides spelaeus* (A. Wagner, 1914), G&S
Cecilioides acicula (O. F. Müller, 1774): G&S, 11
***Cecilioides veneta* (Strobel, 1855):** 14

Punctidae
Punctum pygmaeum (Draparnaud, 1801): DG, 2, 14, 15, 17, 18

Arionidae
Arion subfuscus (Draparnaud ,1805): I&G
Arion silvaticus Lohmander, 1937: D&L

Euconulidae
***Euconulus fulvus* (O. F. Müller, 1774)**: 2, 12

Vitrinidae
Vitrina pellucida (O. F. Muller, 1774): DG

Gastrodontidae
Zonitoides nitidus (O. F. Müller, 1774): I&G, 2, 15, 18
Aegopinella minor (Stabile, 1864): DG

Oxychilidae
Daudebardia rufa (Draparnaud, 1805): DG, I&G, 2
***Mediterranea depressa* (Sterki, 1880):** 6
***Mediterranea hydatinus* (Rossmässler, 1838):** 4
Mediterranea inopinata (Uličný, 1887): D&L, DG, I&G
Morlina glabra (Rossmässler, 1835): DG, I&G
Morlina urbanskii (Riedel, 1963): D&L

Pristilomatidae
Vitrea neglecta Damjanov et Pinter, 1969: DG
Vitrea pygmaea (O. Boettger, 1880): D&L, DG, 2, 14
Vitrea riedeli Damjanov et Pinter, 1969: DG
Vitrea vereae Irikov, Georgiev et Riedel, 2004: DG

Limacidae
Limax graecus (Simroth, 1889): D&L, 3, 13 (Fig. 1 A)
Limax maximus Linnaeus, 1758: I&G
Limacus flavus Linnaeus, 1758: I&G
Limacus maculatus (Kaleniczenko, 1851): I&G

Agriolimacidae
***Deroceras* cf. *pageti* Grossu, 1972:** 17 (Fig. 1 B)
Deroceras sturanyi (Simroth, 1894): DG
Deroceras thersites (Simroth, 1886): D&L, I&G
Deroceras turcicum (Simroth, 1894): DG, I&G, 3

Milacidae
Tandonia budapestensis (Hazay, 1881): I&G
Tandonia cristata (Kaleniczenko, 1851): D&L, I&G
Tandonia kusceri (H. Wagner, 1931): DG, I&G

Helicodontidae
Lindholmiola girva (Fivaldsky, 1835): DG, I&G, 5, 7, 13, 16, 19

Hygromiidae
Cernuella virgata (Da Costa, 1778): I&G
Euomphalia strigella (Draparnaud, 1801): I&G
Helicopsis striata (O. F. Müller, 1774): I&G
Monacha carascaloides (Boutguignat, 1855): DG
Monacha cartusiana (O. F. Muller, 1774): DG, 3
Monacha claustralis (Menke, 1828): I&G
Monacha ovularis (Bourguignat, 1855): DG, I&G, 2, 14
Monacha sp.: I&G (reported as *Monacha liebegottae*? Hausdorf, 2000)
Monachoides incarnatus (O. F. Müller, 1774): I&G
***Pseudotrichia rubiginosa* (Rossmässler, 1838):** 20 (Fig. 1 C)
Xerolenta obvia (Menke, 1828): DG, I&G, 11, 13, 14
Xeropicta derbentina (Krinicki, 1833): DG
Xeropicta krynickii (Krinicki, 1833): I&G

Helicidae
Caucasotachea vindobonensis (Férussac, 1821): DG, I&G, 14

Helix figulina Rossmässler, 1839: DG, I&G, 9, 11
Helix lucorum Linnaeus, 1758: DG, I&G, 3, 10, 12

Bivalvia

Unionidae
Anodonta cygnaea (Linnaeus, 1758): DG, I&G
Anodonta anatina (Linnaeus, 1758): I&G
Unio bruguierianus Bourguignat, 1853: DG, I&G (reported as *Unio crassus* Retzius, 1783), 2
Unio pictorum (Linnaeus, 1758): DG, I&G
Unio tumidus Retzius, 1788: I&G

Sphaeriidae
Euglesa casertana (Poli, 1791): DG
Euglesa nitida (Jenyns, 1832): DG, I&G
***Odhneripisidium tenuilineatum* (Stelfox, 1918)**: 2
Pisidium amnicum (O. F. Müller, 1774): DG

The original distribution of *Deroceras pageti* is Greece (Wiktor, 1983). In the same work, the author, referring to a single specimen from the area of Dolen Chiflik village (NE Bulgaria), suggests that *Deroceras pageti* could also occur in Bulgaria. The species is characterized by a narrow penis with a bent posterior part forming a deep pocket and an undivided penial gland with large papillae (Wiktor, 1983). The specimen collected by us has a similar (but not identical) penis and penial gland structure (Fig. 1B). According to Wiktor (1983), the variability of this slug is unknown, so it is also possible that it represents an undescribed species from the region.

Although studies on the malacofauna of the Sakar Mts are limited, the recording of nearly 100 species of mollusks - both bivalves and snails – could provide a basis for some conclusions. No endemics or species exceptionally rare in Bulgaria have been identified in the region. However, mollusks such as the bivalve *Pisidium tenuilineatum* have been found for the second time in the country, and the land snail *Vitrea vereae* is likely a Bulgarian or at least an East Balkan endemic. Areas with high species diversity (both freshwater and terrestrial) include the limestone and karst regions of the mountains. Notable examples are the border areas rich in marine fossils, such as the surroundings of the villages of Shtit and Sradun, as well as the cave regions around Ustrem. Undoubtedly, much more can be learned about the molluscan fauna of Sakar, and our study can serve as a solid foundation for more detailed future research.

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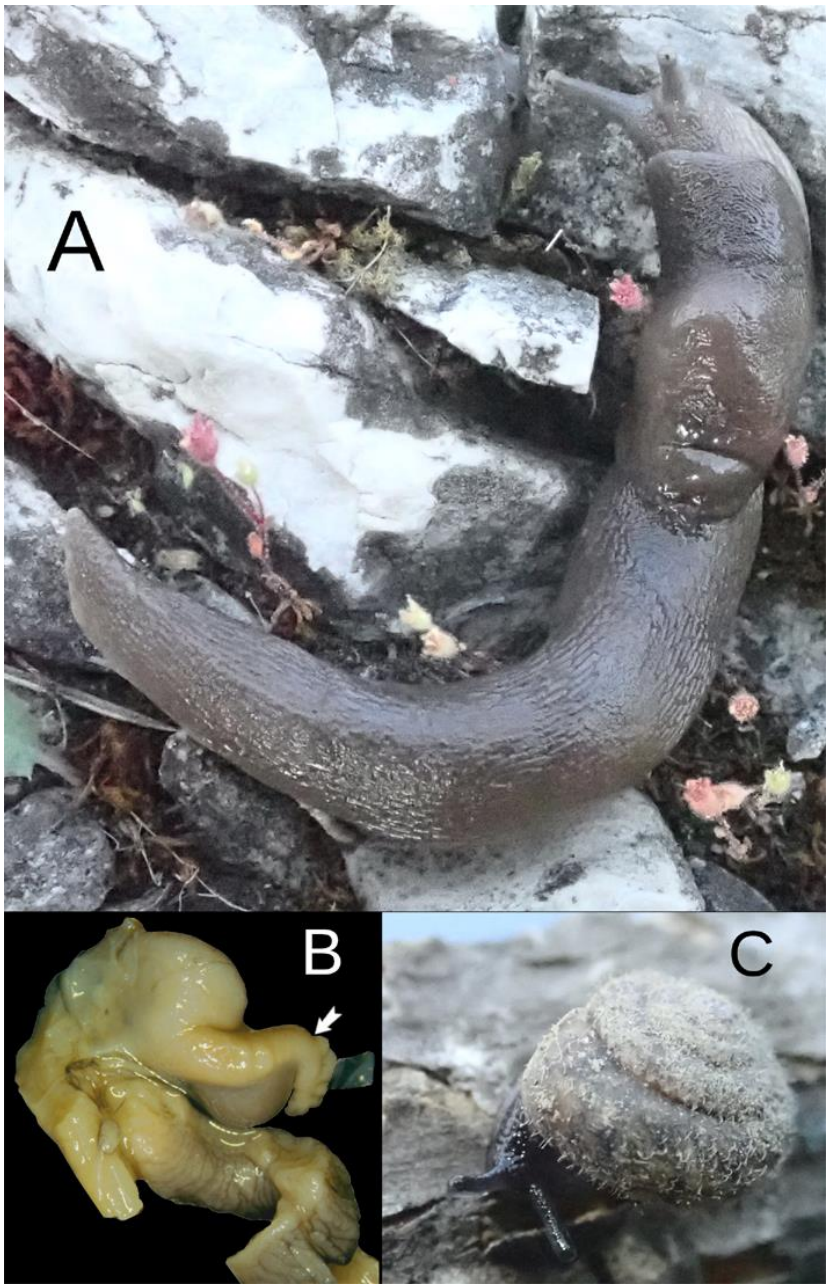

Fig. 1. Gastropods' species from Sakar Mts: A - *Limax graecus*, Topolovgrad district; B - *Deroceras* cf. *pageti*, structure of the penis and penial gland (indicated), Eastern of Ravna Gora village; C - *Pseudotrichia rubiginosa*, Harmanli district, area of Maritsa River (Photo: I. Dedov).

References

Araujo, R., Buckley, D., Nagel, K.-O., García-Jim´enez, R., Machordom, A., (2018) Species boundaries, geographic distribution and evolutionary history of the Western Palaearctic freshwater mussels Unio (Bivalvia: Unionidae). *Zoological Journal of the Linnaean Society*, 182: 275-299.

Damyanov, S. & Liharev, I. (1975) *Gastropoda terrestria*. Fauna Bulgarica, 4, Marin Drinov Publishing House, Sofia, 425 pp. (in Bulgarian).

Dedov, I. K. & Antonova, V. (2015) Methodology for monitoring of small terrestrial snails, Stylommatophora (1). Executive Environment Agency. Project "Field studies for

species distribution / assessment of the coincidence of species and habitats for the territory of the whole country – Phase I", Contract № 2601 / 30. 07. 2013. (In Bulgarian)http://eea.government.bg/bg/bio/opos/activities-results/Stylommatophora1_Metodika_monitoring.pdf

Georgiev, D. (2005) The mollusks (Mollusca: Gastropoda et Bivalvia) of Sakar Mountain (Southern Bulgaria): A Faunal Research. *Scientific Studies of the University of Plovdiv, Biology*, Animalia, 41: 5-12.

Georgiev, D. & Stoycheva, S. (2013) First records of *Cecilioides tumulorum* (Gastropoda: Ferussaciidae) in Bulgaria. *ZooNotes*, 46: 1-6.

Irikov, A. & Gerdzhikov, G. (2016) Molluscs (Mollusca) (Terrestrial Gastropods and Freshwater Gastropods et Bivalvia) in Sakar Mountain (Bulgaria). *Historia Naturalis Bulgarica*, 23: 195-206.

MolluscaBase eds. (2022) MolluscaBase. Available at https://www.molluscabase.org on 2022-05-07.

Wiktor, A. (1983) The slugs of Bulgaria (Arionidae, Limacidae, Agriolimacidae and Milacidae). Annales Zoologici, Warsaw 37 (3): 71-206.