

New Records of Terrestrial Gastropods (Gastropoda, Mollusca) from Strandzha Mts. (Bulgaria) and its Adjacent Coastal Area

Dilian Georgiev^{*1}, Ivaylo Dedov²

¹University of Plovdiv, Faculty of Biology, Department of Ecology and Environmental Conservation, 24 Tzar Assen Str., BG-4000 Plovdiv, BULGARIA

²Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, 2 Gagarin Street, 1113 Sofia, BULGARIA

*Corresponding author: diliangeorgiev@gmail.com

Abstract. We present a list with 131 terrestrial gastropod species considered to occur in the area with 18 species being new records. The new records are: *Carychium tridentatum* (Ellobiidae), *Vertigo antivertigo*, *V. pusilla* (Vertiginidae), *Vallonia costata*, *V. enniensis* (Valloniidae), *Cecilioides acicula* (Ferussaciidae), *Discus rotundatus* (Discidae), *Aegopinella* cf. *pura* (Gastrodontidae), *Oxychilus translucidus* (Oxychilidae), *Vitrea neglecta*, *V. vereae* (Pristilomatidae), *Deroceras* cf. *panormitanum*, *D.* cf. *reticulatum* (Agriolimacidae), *Tandonia budapestensis*, *T.* cf. *serbica* (Milacidae), *Fruticicola fruticum* (Bradybaenidae), and *Euomphalia strigella* (Hygromiidae). One species, *Paralaoma servilis* (Punctidae) is a new record for Bulgaria.

Key words: mollusks, distribution, species, diversity, Balkan Peninsula.

Introduction

Strandzha is a mountain in southeastern Bulgaria and the European part of Turkey. The highest point on Bulgarian territory is Golyamo Gradishte. The climate of the area is considerably influenced by the Black Sea and is predominantly humid continental in the mountains and humid subtropical at the coast. The biggest river in the area is Veleka (147 km), as well as the border river Rezovska (112 km) (Nature Park Strandzha, 2022).

The Strandzha Mountains have a rich and diverse flora and fauna, unique within Europe. One of the reasons for the high species richness (including terrestrial gastropods) is the area's location at a biogeographical crossroad between the

European and Asian continents (Damyanov & Liharev 1975). Land-ice never reached Strandzha during the ice-ages of the Pleistocene and the Holocene. This lack of glaciations helped create the circumstances in which flora characteristic for the Tertiary period on the European continent has been preserved in Strandzha (Kamburov, 2006).

The species list was constructed on the basis of a review of all the literature available, with an accent on the recent papers and synopses of Damyanov & Liharev (1975); Dedov & Subai (2012) and Irikov & Mollov (2015).

Material and Methods

The new collecting activities were performed in 17 localities presented in Table 1.

The species were hand-collected or by a standard soil-sampling procedure (Damyanov & Liharev 1975).

Abbreviations and symbols used in the text:

? – species found only as empty shells at the Black Sea coast or rivers' bank;

* and in bold - new record for the study

** and in bold - new record for Bulgaria

Table 1. The localities in the Strandzha Mts. and adjacent coastal areas where the new materials were collected.

No.	Coordinates	Date	Locality	leg.
1.	N42 25 06.5 E27 41 31.0	18.09.2007	north of Sozopol town, scrubs and grasses along the hills at the coast, at the sea level	D. Georgiev
2.	N42 24 30.8 E27 40 11.3	18.09.2007	deposits of a small river at Dyuni Resort, at the sea level	D. Georgiev
3.	N42 03 34.0 E27 46 35.2	08.09.2008	Strandzha Mts, Kosti village, deposits of Veleka River, 24 m a.s.l.	D. Georgiev
4.	N42 10 32.6 E27 50 22.9	02.06.2016	Tsarevo town, mixed broad leaf forest dominated by <i>Fraxinus</i> sp., 18 m a.s.l.	D. Georgiev
5.	N42 07 22.3 E27 47 05.5	03.06.2016	Izgrev village, <i>Quercus</i> sp. forest west of the village, in leaf detritus, 224 m a.s.l.	D. Georgiev
6.	coordinates not known	23-29.05.1993	Strandzha Mts., Sinemorets village	P. Mitov
7.	coordinates not known	26.04.1998	near the road between the villages of Gramatikovo and Mladezhko	N. Kodzhabashev
8.	UTM: NG45	08.05.2008	floating debris 6 km N of Malko Tarnovo	I. Dedov, P. Subai
9.	N42 10 20.2 E27 51 08.3	01.10.2015	Tsarevo town, park near the sea-shore, deciduous forest	I. Dedov, U. Schneppat, R. Cornu, I. Stoyanov
10.	N42 03 57.0 E27 58 19.0	01.10.2015	mouth of the river Veleka, near the fresh water, meadows, sparse deciduous forest	I. Dedov, U. Schneppat, R. Cornu, I. Stoyanov
11.	N41 59 00.6 E28 01 41.6	02.10.2015	Rezovo village, meadow with single trees	I. Dedov, U. Schneppat, R. Cornu, I. Stoyanov
12.	N41 58 58.3 E28 01 28.8	02.10.2015	Rezovo village, meadow	I. Dedov, U. Schneppat, R. Cornu, I. Stoyanov
13.	N42 01 22.2 E27 59 56.0	02.10.2015	protected area Silistar, near the river, deciduous forest, soil sample	I. Dedov, U. Schneppat, R. Cornu, I. Stoyanov
14.	N42 25 17.8 E27 41 38.6	30.10.2015	Sozopol town, near the sea, meadows with single trees and bushes	I. Dedov, U. Schneppat, R. Cornu, I. Stoyanov
15.	N42 18 18.1 E27 43 33.3	31.10.2015	near Ropotamo river, deciduous forest, <i>Ulmus</i> , <i>Salix</i> , under logs	I. Dedov, U. Schneppat, R. Cornu, I. Stoyanov
16.	N41 58 44.3 E27 31 23.5	03.11.2015	Malko Tarnovo town, in the town, open grassy terrains near the road	I. Dedov, U. Schneppat, R. Cornu, I. Stoyanov
17.	N42 09 24.4 E27 51 23.4	09.07.2022	Deposits of Nestinarska River, near Tsarevo town	D. Georgiev

Species list

(localities numbers correspond with those in Table 1.)

Pomatiidae

Pomatias elegans (O.F. Müller, 1774)

Pomatias rivularis (Eichwald, 1829)

Aciculidae

Platyla polita (Hartmann, 1840)

Platyla similis (Reinhardt, 1880)

Platyla orthostoma (Jackiewicz, 1979)

Ellobiidae

Carychium minimum Müller, 1774

****Carychium tridentatum* (Risso, 1826): 3, 17**

Pyramidulidae

Pyramidula cephalonica (Westerlund, 1898)

Vertiginidae

Vertigo angustior (Jeffreys, 1830)

****Vertigo antivertigo* (Draparnaud, 1801): 10**

****Vertigo pusilla* Müller, 1774: 8, 13**

Vertigo pygmaea (Draparnaud, 1801)

Truncatellina claustralis (Gredler, 1856)

Truncatellina costulata (Nilsson, 1822)

Truncatellina cylindrica (Ferussac, 1821)

Lauriidae

Lauria cylindracea (Da Costa, 1778)

Leiostyla schweigeri Götting, 1963

Agardhiellidae

Agardhiella parreyssii (Pfeiffer, 1848)

Orculidae

Orcula zilchi Urbański, 1960

Orculella ignorata Hausdorf, 1996

Sphyradium doliolum (Bruguiere, 1792)

Valloniidae

Acanthinula aculeata (Müller, 1774)

****Vallonia costata* (Müller, 1774): 4, 8, 17**

****Vallonia enniensis* (Gredler 1856): 10**

Vallonia pulchella (O. F. Müller, 1774)

Enidae

Chondrula microtragus (Rossmässler, 1839)

Chondrula tricuspidata (Küster, 1841)

Chondrula tridens (Müller, 1774)

? *Chondrus tournefortianus* (Férussac, 1821)

Ena montana (Draparnaud, 1801)

? *Ena nogeli* (Roth, 1850)

Eubrephulus bicallosus (L. Pfeiffer, 1847)

Mastus carneolus (Mousson, 1863)

Mastus etuberculatus (Frauenfeld, 1867)

? *Mastus ponticus* (Retowski, 1887)

Mastus rosmaessleri (L. Pfeiffer, 1846)

Merdigera obscura (O. F. Müller 1774)

Multidentula ovularis (Olivier, 1801)

Pseudochondrula seductilis (Rossmässler, 1846)

Zebrina detrita (O. F. Müller, 1774)

Zebrina kindermanni (L. Pfeiffer, 1850)

Zebrina varnensis (Pfeiffer, 1847): This species thrives at the North Black Sea coast, and is rare and with not so numerous populations at the south. We found it in low numbers at Nesebar (not in the study area) and Sozopol towns.

Cochlicopidae

Cochlicopa lubrica (O. F. Müller, 1774)

Cochlicopa lubricella (Rossmässler, 1835)

Clausiliidae

Alinda biplicata orientalis Nordsieck, 2008

Bulgarica denticulata thessalonica (Rossmässler, 1839)

Bulgarica varnensis (Pfeiffer, 1848)

Cochlodina laminata (Montagu, 1803)

Dobatia goettingi (Brandt, 1961)

? *Elia huebneri* (Pfeiffer, 1848)

Euxina circumdata (Pfeiffer, 1848)

Euxina persica (Boettger, 1879)

Euxina prompta (Schmidt, 1868)

Galeata schwerzenbachi (Pfeiffer 1848)

Laciniaria plicata (Draparnaud, 1801)

Mentissella rebeli (Sturany, 1897)

Serrulina serrulata (Pfeiffer, 1847)

Succineidae

Succinea oblonga Draparnaud, 1801

Oxyloma elegans (Risso, 1826)

Ferussaciidae

****Cecilioides acicula* (Müller, 1774): 17**

Cecilioides janii (De Betta & Martinati, 1855)

Punctidae

*****Paralaoma servilis* (Shuttleworth, 1852): 17** (Fig. 1) (widely distributed)

species in the Mediterranean, found in many localities close to Bulgaria (Welter-Schultes, 2012))

Punctum pygmaeum (Draparnaud, 1801)

Discidae

****Discus rotundatus* (Müller, 1774): 3, 16**

Arionidae

Arion subfuscus (Draparnaud, 1805)

Euconulidae

Euconulus fulvus (Müller, 1774)

Vitrinidae

Oligolimax annularis (S. Studer, 1820)

Vitrina pellucida (Müller, 1774)

Gastrododontidae

Aegopinella minor (Stabile, 1864)

****Aegopinella* cf. *pura* (Alder 1830): 8**

Zonitoides nitidus (O. F. Müller, 1774)

Oxychilidae

Carpathica bielawskii A. Riedel, 1963

Carpathica stussineri (A. J. Wagner, 1895)

Daudebardia brevipes (Draparnaud, 1805)

Daudebardia rufa (Draparnaud, 1805)

Libania wiktoria (Riedel, 1967): According Irikov & Mollov (2015) this species occurs only in Western Rhodopes and its finding in Strandzha Mts is doubtful. The report for the area of Ropotamo River by Körnig (1983) could be due to mixed labels of materials from Western Rhodopes (?).

Mediterranea depressa (Sterki, 1880)

Mediterranea hydatina (Rossmässler, 1838)

Mediterranea inopinata (Uličný, 1887)

Morlina glabra (Rossmässler, 1835)

Morlina urbanskii (Riedel, 1963)

Oxychilus deilus (Bourguignat, 1857)

Oxychilus investigatus Riedel, 1993

Oxychilus moussoni (Kobelt, 1878)

****Oxychilus translucidus* (Mortillet, 1853): 2**

Pristilomatidae

Vitrea contracta (Westerlund, 1871)

Vitrea diaphana (Studer, 1829)

****Vitrea neglecta* Damjanov et Pinter, 1969: 5**

Vitrea pygmaea (O. Boettger, 1880)

Vitrea riedeli Damjanov & Pinter, 1969

****Vitrea vereae* Irikov, Georgiev & Riedel, 2004: 3, 4**

Limacidae

Ambigolimax nyctelius (Bourguignat, 1861)

Limax cinereoniger Wolf, 1803

Limax graecus (Simroth, 1889)

Limax maximus Linnaeus, 1758

Limacus flavus Linnaeus, 1758

Limacus maculatus (Kaleniczenko, 1851)

Agriolimacidae

Deroceras agreste (Linnaeus, 1758)

****Deroceras* cf. *panormitanum* (Lessona & Pollonera 1882): 15**

****Deroceras* cf. *reticulatum* (Müller, 1774): 12**

Deroceras sturanyi (Simroth, 1894)

Deroceras thersites (Simroth, 1886)

Deroceras turcicum (Simroth, 1894)

Krynickyllus urbanskii (Wiktor, 1971)

Milacidae

Milax parvulus Wiktor, 1968

****Tandonia budapestensis* (Hazay, 1880): 1, 9, 11, 14**

Tandonia cristata (Kaleniczenko, 1851)

Tandonia kusceri (H. Wagner, 1931)

****Tandonia* cf. *serbica* (H. Wagner, 1931): 14**

Bradybaenidae

****Fruticicola fruticum* (Müller, 1774): 7**

Helicodontidae

Lindholmiola girva (Fivaldsky, 1835)

Hygromiidae

Cernuella cisalpina (Rossmässler, 1837)

Cernuella virgata (Da Costa, 1778)

****Euomphalia strigella* (Draparnaud, 1801): 6** (according Damjanov &

Liharev, 1975 this species is occurring all over the territory of Bulgaria)

- Helicopsis striata* (Müller, 1774)
Monacha carascaloides (Boutguignat, 1855)
Monacha cartusiana (Müller, 1774)
Monacha claustralis (Menke, 1828)
Monacha ocellata (Roth, 1839)
Monacha ovularis (Bourguignat, 1855)/*pilosa* Pintér & Pintér, 1970 - complex
Monacha solidior (Mousson, 1873)
Monacha venusta Pintér, 1968
Perforatella incarnata (O. F. Müller, 1774)
Trichia erjavecii (Brusina, 1870)
Xerolenta obvia (Menke, 1828)
? *Xerolenta pappi* (Schütt, 1962)
Xerolenta spiruloides (Wagner A., 1916)
Xeropicta derbentina (Krinicki, 1833)
Xeropicta krynickii (Krinicki, 1833)

Geomitridae

- Cochlicella acuta* (Müller, 1774)

Helicidae

- Caucasotachea vindobonensis* (Férussac, 1821)
Eobania vermiculata (Müller, 1774)
Helix figulina Rossmässler, 1839
Helix lucorum Linnaeus, 1758
Helix pomacella Mousson, 1854

Till now a total of 112 species of snails were known from Strandzha Mts, and additional 5 species were found only as empty shells at the Black Sea coast or rivers' bank in the region. After present study another 18 species were added to the list, and a total of 131 species are now known from the area (one of them a new record for Bulgaria). We were very careful about exclusions of species from the given list, knowing that it is very hard to prove that a species do not occur in a particular area.

The specific position of Strandzha Mountains at the bio-geographical crossroad between the European and Asian continents, lack of glaciation during the ice-age (Damyanov and Liharev 1975, Kamburov 2006), as well as the geographic proximity with

the southern Black sea seashores formed rich and unique gastropods' fauna in the region (some in situ photos of species from Strandzha Mountains could be seen on Fig. 2). One of the species-rich family in the region Enidae (17 species in our list) penetrate in Europe from Asia in Pliocene, when the Balkan peninsula has been steppingstone connected both continents (Damyanov and Liharev 1975). Some species from other well present in the region families (Clausiliidae, Oxychilidae) were formed in wet forests around Black sea during the Neogene. The Strandzha Mountains has primary importance for the terrestrial gastropods diversity of Bulgaria. Totally thirty-one species from our check-list could be classified as related with the Pontic region. In this number are included four species with doubtful occurrence in Bulgarian part of Strandzha Mountains (*Ch. tournefortianus*, *E. huebneri*, *E. nogeli*, *M. ponticus*). Some of the species have much wider distribution around the sea and adjacent areas, both in Bulgarian and other countries in Black sea region (*Mult. ovularis*, *M. solidior*, *M. urbanskii*, *O. deilus*, *O. moussoni*, *X. krynickii*, *X. spiruloides*, *Z. kindermanni*, *Z. varnensis*). Other species with much wider distribution in the Pontic region, in Bulgaria could be find mainly (*E. bicallosus*, *E. circumdata*, *G. schwerzenbachi*, *K. urbanskii*, *L. maculatus*, *M. rebeli*, *V. riedeli*) or only (*D. goettingi*, *E. persica*, *E. pronta*, *M. ocellata*, *L. schweigeri*, *O. zilchi*, *S. serrulata*) in Strandzha Mountains. Finally four species are endemic for the mountain: *C. bielawskii*, *Mon. ovularis*, *M. venusta*, *P. orthostoma*.

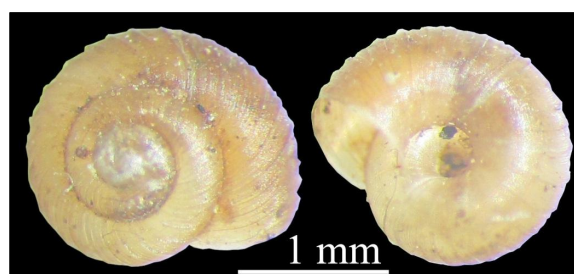


Fig. 1. Shell of *Paralaoma servilis* collected in the deposits of Nestinarska River near Tsarevo on 09.07.2022, a new record for Bulgaria.



Fig. 2. Terrestrial gastropods species from Strandzha Mountains, Bulgaria. A. *Krynickillus urbanskii*, Rezovo village; B. *Euxina persica* - terratological form, Beglik Tash; C. *Vitrea rieckli*, Rezovo; D. *Lauria cylindracea*, Malko Turnovo; E. *Limacus maculatus* in a resting position, Beglik Tash.

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