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Research Article

Application of pitfall traps for studying the terrestrial mollusk fauna (Mollusca: Gastropoda)

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Abstract

Various methods are employed to survey the terrestrial mollusk fauna. One of the commonly used collection techniques involves pitfall traps, which are often equipped with specialized baits. In this study, we present the results of using pitfall traps without bait to investigate the Gastropoda fauna. The research was conducted between 2022 and 2024, covering a total of 150 pitfall trap lines across eight regions of European Russia. The total processed material comprised 508 specimens representing 22 species. The most abundant mollusks in the traps were slugs from the families Arionidae and Agriolimacidae, accounting for 67% of the collected specimens. Among them, *Arion fuscus* made up 39%, *Arion fasciatus* – 9%, *Deroceras sp.* – 8%, *Deroceras agreste* – 4%, and *Deroceras leave* – 3%. Additionally, *Fruticicola fruticum*, a common inhabitant of moist environments, and the hygrophilous species *Pseudotrichia rubiginosa* were relatively frequent, constituting 5% of the total sample. All mollusk species collected during the study period are typical for the European part of Russia. The invertebrates captured using pitfall traps can serve as indicators of the investigated habitats in these regions.

Keywords: biodiversity, Gastropoda, species biology, abundance, habitats

Introduction

Biodiversity assessment relies on the application of appropriate methods for obtaining primary data. Among these methods, various invertebrate trapping techniques are used to encompass the widest possible range of ecosystems within a study region (Turner, Trexler, 1997; McCravy, 2018; Dvořák et al., 2023). The efficiency of sample collection is a key component in the development of regional biodiversity inventories (Ward et al., 2001). It is evident that no single sampling method can be universally applied to study all taxa. However, pitfall traps are among

the most commonly used techniques for capturing ground-dwelling invertebrates (Spence, Niemelä, 1994; Woodcock, 2005; Dedyukhin, 2024). This method is applicable across a wide range of habitats and ecosystems, including forest ecosystems, agroecosystems, areas near water bodies and wetland margins, as well as grasslands, pastures, and other open environments (Lang, 2000; McCravy, 2018; Dedyukhin, 2023).

At the same time, pitfall trapping has several potential limitations that may influence invertebrate capture efficiency. These factors include trap diameter, placement and construction materials, use of preservatives and baits, disturbances and depletion effects, presence of cover above traps, spacing between individual traps, and other methodological aspects (Luff, 1975; Ward et al., 2001; Koivula et al., 2003; Woodcock, 2005). Nevertheless, when properly implemented, pitfall traps can yield valuable insights into invertebrate fauna composition and diversity. Gastropoda is the most diverse class within the Mollusca, accounting for nearly three-quarters of the approximately 110,000 known mollusk species. More than 50,000 of these species belong to the primarily marine and freshwater Caenogastropoda, while an additional 20,000 species fall under the subclass Pulmonata, the majority of which are terrestrial (Brown, Lydeard, 2010; Vorobjeva, Chertoprud, 2023).

Common terrestrial mollusk species often serve as a food source for other animals, particularly vertebrates (Laporta-Ferreira, Salomão, 2004; Rosin et al., 2011). They play essential roles as herbivores, fungivores, and detritivores in various ecosystems (Wolters, Ekschmitt, 1997; López-Rojas et al., 2023). Some slugs are significant agricultural pests, requiring special attention in environmental management (Wilson et al., 2015; Kumar, 2020). Additionally, many terrestrial mollusk species act as intermediate hosts for helminths affecting both humans and animals, making them important for epidemiological monitoring (Grewal et al., 2003; Chikhlyaev et al., 2016; Chikhlyaev, Ruchin, 2021). At the same time, a number of rare species face extinction threats in their natural habitats (Robinson et al., 2009; Taybi et al., 2023).

Pitfall traps have been effectively used in Canada to assess slug diversity and abundance in post-fire environments with varying burn intensities (Moss, Hermanutz, 2010), as well as to study the impact of roads on ground-dwelling mollusk populations (Luce, Crowe, 2001). In Australia, pitfall trap studies revealed that habitat structure significantly influences trapping efficiency for terrestrial slugs (Melbourne et al., 1997). In Belgium, researchers investigated the activity patterns and sensitivity of the invasive slug *Arion lusitanicus* to various stimuli using pitfall traps (Kappes et al., 2012). Similar methods were applied to study species diversity, abundance, and distribution of terrestrial mollusks in Cefa Nature Park, Romania (Amza et al., 2011). In Finland, pitfall traps were used to examine mollusk fauna and distribution in areas with and without reindeer grazing (Suominen, 1999). These studies demonstrate that pitfall traps are a suitable and

effective method for investigating the fauna, abundance, and distribution of terrestrial Gastropoda in both forested and non-forested ecosystems (Pearce et al., 2005; Oberprieler et al., 2019).

Materials and methods

Study area

The research material was collected during the field seasons of 2022–2024 across several regions of European Russia, including the Republic of Mordovia, as well as the Vladimir Region, Nizhny Novgorod Region, Voronezh Region, Lipetsk Region, Ryazan Region, Samara Region, Tambov Region, and Ulyanovsk Region. Sampling also included areas within the Sursky State Nature Sanctuary. The collection and recording of mollusks during 2022–2024 were conducted in these specified regions of European Russia.

Table 1. Collection localities of material in 2022–2024 (point numbers correspond to those in Fig. 1)

№	Locality	Biotope	Coordinates
	Vladimir Region		
1	Vyazniki district: Vyazniki City, Novo vill.	pine forest	56.2926°N, 42.3349°E
2	Vyazniki district: Vyazniki City, 1,1 km W of Novo vill.	oak grove	56.2933°N, 42.2977°E
	Nizhniy Novgorod Region		
3	Perevoz district: 1 km E of Ichalki vill.	floodplain meadow	55.4411°N, 44.5277°E
4	Perevoz district: 3 km E of Ichalki vill.	pineland	55.4380°N, 44.5489°E
5	Perevoz district: Krasnaya Gorka settl.	birch forest	55.4404°N, 44.5855°E
6	Perevoz district: 1 km W of Krasnaya Gorka settl.	deciduous forest	55.4375°N, 44.5837°E
7	Krasnooktyabrskiy district: 3 km W of Zagarino vill.	deciduous forest	55.1893°N, 45.4747°E
8	Bolshoe Boldino district: 1 km NW of Novaya Sloboda vill.	birch forest	54.9203°N, 45.1611°E
9	Buturlino distric: 2 km SE of Krutets vill.	deciduous forest	55.6219°N, 45.1746°E
10	Gagino district: 2 km SW of Kakino vill.	mixed forest	55.1655°N, 44.8586°E
11	Vyksa City district: Dalnepesotchnaya vill.	deciduous forest	55.1434°N, 42.7061°E
12	Pochinki district: 2 km N of Zhuravlikha vill.	floodplain deciduous forest	54.8149°N, 44.9634°E
13	Arzamas City district: 4 km N of Rozhdestvenskiy Maydan vill.	mixed forest	55.6723°N, 43.9858°E
14	Dalnee Konstantinovo district: 2 km N of Rumstikha vill.	spruce forest	55.7281°N, 43.9934°E
15	Voznesensk district: Voznesensk City	mixed forest	54.8832°N, 42.7644°E
16	Ardatov district: Razmazley vill.	pine forest	55.3230°N, 43.1298°E
	Ryazan Region		
17	Shatsk district: Bolshoe Agishevo vill.	deciduous forest	54.1413°N, 41.7415°E
18	Ermish district: Vysokoe vill.	deciduous forest	54.3562°N, 44.0610°E

19	Kadom district: 1 km W of Sumerki vill.	NA	54.5805°N, 42.5514°E
20	Kadom district: 6.5 km N of Chermnye vill.	NA	54.4903°N, 42.4832°E
21	Kasimov district: Chimur vill.	NA	54.8115°N, 41.3642°E
22	Miloslavskoe district: 1 km S of Arkhangelskoe vill.	NA	53.4037°N, 39.2959°E
23	Ryazhsk district: 2 km SE of Nagornoe vill.	deciduous forest edge, deciduous forest, meadow	53.6907°N, 39.9536°E
24	Sarai district: 1 km S of Nikolsky settl.	deciduous forest	53.7513°N, 40.8691°E
25	Sasovo district: Voskhod vill.	deciduous forest	54.3402°N, 42.3246°E
26	Sasovo district: Novye Vyselki vill.	deciduous forest	54.3526°N, 42.1546°E
27	Sasovo district: 1 km S of Krutoe vill.	mixed forest	54.1006°N, 42.3637°E
	Republic of Mordovia		
28	Ardatov district: 0,5 km SW of Zharenki vill.	windbreak	54.7113°N, 46.2351°E
29	Atyashevo district: 2 km N of Selischi vill.	steppe slope	54.6745°N, 46.2349°E
30	Atyashevo district: 2,5 km SW of Alasheevka vill.	windbreak	54.6158°N, 46.1806°E
31	Atyashevo district: 1 km NW of Dady vill.	windbreak	54.6318°N, 46.0306°E
32	Bolshie Berezniki district: 9 km S of Simkino vill.	deciduous forest	54.1733°N; 46.1740°E
33	Bolshie Berezniki district: 1,6 km NE of Russkie Naimany vill.	windbreak	54.2476°N, 46.0695°E
34	Bolshie Berezniki district: Simkino vill.	steppe slope	54.2548°N, 46.1941°E
35	Bolshie Berezniki district: 7 km S of Simkino vill.	mixed forest	54.1885°N, 46.1727°E
36	Kochkurovo district: 5,3 km N of Podlesnaya Tavla	deciduous forest	54.1505°N, 45.4977°E
37	Lyambir district: 0,7 km W of Pavlovka vill.	deciduous forest	54.1650°N, 45.5258°E
38	Romodanovo district: Romodanovo settl.	windbreak	54.4252°N, 45.3140°E
39	Romodanovo district: 1,5 km S of Romodanovo settl.	deciduous forest	54.3899°N, 45.3561°E
40	Romodanovo district: 1,3 km S of Romodanovo settl.	windbreak	54.4006°N, 45.3730°E
41	Saransk City district: 6 km NE of Makarovka vill.	deciduous forest	54.1938°N, 45.3690°E
42	Saransk City: Tani Bibinoy street, b. 9/3	deciduous forest	54.2002°N, 45.2565°E
43	Chamzinka district: Chamzinka settl.	mixed forest	54.3911°N, 45.7846°E
44	Chamzinka district: 1,7 km N of Komsomolskiy settl.	windbreak	54.4575°N, 45.8051°E
45	Chamzinka district: 2,3 km NW of Kalinovka vill.	deciduous forest	54.3952°N, 45.8813°E
46	Chamzinka district: Mokshaley vill.	NA	54.2651°N, 45.6391°E,
47	Chamzinka district: Gorbunovka vill.	windbreak	54.5197°N, 45.8166°E
48	Bolshie Berezniki district: 9 km S of Simkino vill.	bank of a forest stream	54.1747°N, 46.1657°E

49	Staroe Shaigovo district: 3 km NW of Bogdanovka vill.	NA	54.3178°N, 44.3267°E
50	Staroe Shaigovo district: Lemdyay vill.	NA	54.3339°N, 44.6740°E
51	Temnikov district: Mordovia State Nature Reserve, Pushta settl.	mixed forest	54.7189°N, 43.2223°E
52	Temnikov district: Temnikov City, Moksha River	River	54.617°N, 43.199°E
53	Temnikov district: Mordovia State Nature Reserve, quart. 360	pine forest	54.7729°N, 43.2331°E
54	Temnikov district: Mordovia State Nature Reserve, Pushta settl.	pine forest	54.714°N, 43.225°E
55	Temnikov district: Karaevo vill.	pine forest	54.7055°N; 43.2235°E
56	Tengushevo district: 3 km NE of Vedenyapino vill.	mixed forest	54.7544°N, 43.0025°E
57	Zubova Polyana district: 9 km N of Svezhenkaya settl.	forest clearing	54.0877°N, 42.3812°E
58	Zubova Polyana district: 9 km N of Svezhenkaya settl.	mixed forest	54.0889°N, 42.3799°E
59	Ichalki district: National Park "Smolny", Kemlya forestry, quart. 65	mixed forest	54.7716°N, 45.3679°E
60	Ichalki district: National Park "Smolny", Kemlya forestry, quart. 65	Marsh	54.7703°N, 45.3697°E
61	Ichalki district: National Park "Smolny", Kemlya forestry, quart. 92, near sanatorium "Alatyr"	NA	54.7383°N, 45.3816°E
62	Ichalki district: National Park "Smolny", Kemlya forestry, quart. 92, near sanatorium "Alatyr"	NA	54.7358°N, 45.3778°E
63	Ichalki district: National Park "Smolny", Kemlya forestry, quart. 92, near sanatorium "Alatyr"	flood meadow	54.7348°N, 45.3766°E
64	Ichalki district: National Park "Smolny", Kemlya forestry, quart. 92, near sanatorium "Alatyr"	NA	54.7377°N, 45.3803°E
65	Ichalki district: National Park "Smolny", Kemlya forestry, quart. 92, near sanatorium "Alatyr"	flooded shore of a temporary reservoir	54.7372°N, 45.3727°E
66	Ichalki district: National Park "Smolny", Kemlya forestry, quart. 94, near sanatorium "Alatyr"	mixed forest	54.7400°N, 45.4080°E
67	Ichalki district: National Park "Smolny", Kemlya forestry, quart. 94, near sanatorium "Alatyr"	mixed forest	54.7510°N, 45.4052°E
68	Ichalki district: National Park "Smolny", Kemlya forestry, quart. 94, near sanatorium "Alatyr", Kalysha River	sand river shore	54.7433°N, 45.4141°E
69	Tengushevo district: Kulikovo vill.	deciduous forest	54.7703°N, 45.3697°E
70	Tengushevo district: Kulikovo vill.	deciduous forest	54.7247°N, 42.5953°E
71	Tengushevo district: Dachniy vill.	pine forest (specially protected natural area)	54.5517°N, 42.6453°E
	Lipetsk Region		
72	Zadonsk district: 3 km S of Donskoe vill.	deciduous forest	52.5807°N, 38.9686°E
	Tambov Region		
73	Inzhavino District: Nikitino vill.	NA	52.4417°N, 42.4418°E
74	Inzhavino District: Nikitino vill.	deciduous forest	52.4283°N, 42.4557°E
75	Inzhavino District: 1 km E of Alekseevka vill.	NA	52.4121°N, 42.4890°E
76	Inzhavino District: 1,5 km NW of Olkhovka vill.	NA	52.4611°N, 42.5209°E

77	Inzhavino District: 1,5 km NW of Karai-Saltykovo vill.	deciduous forest, floodplain oak grove, floodplain, aspen grove, young oak grove, oak grove, pine forest	52.3669°N, 42.6058°E
78	Petrovskoe District: Tynkovo vill.	NA	52.5393°N, 40.2956°E
79	Rasskazovo District: 2 km N of Kotovsk Town	mixed forest	52.6349°N, 41.5278°E
	Voronezh Region		
80	Novokhopyorskiy district: 3 km SSE of Varvarino vill., Khopyor Nature Reserve	floodplain oak forest & dry pine forest	51.2539°N, 41.7390°E
	Ulyanovsk Region		
81	Sengiley District: National Park «Sengileevskie Gory», 5 km SW of Shilovka vill.	linden forest	54.0095°N, 48.5975°E
82	Sengiley District: National Park «Sengileevskie Gory», 2 km S of Shilovka vill.	steppe slope	54.0297°N, 48.6642°E
83	Sengiley District: National Park «Sengileevskie Gory», 6 km S of Shilovka vill.	deciduous forest	54.0002°N, 48.6449°E
84	Sengiley District: National Park «Sengileevskie Gory», 6 km S of Shilovka vill.	linden forest	53.9965°N, 48.6472°E
85	Sengiley District: National Park «Sengileevskie Gory», 6 km NW of Golovka settl	birch forest	53.8378°N, 48.6160°E
86	Sengiley District: National Park «Sengileevskie Gory», 6 km NW of Golovka settl	birch forest	53.8334°N, 48.6097°E
87	Sengiley District: 5 km NW of Golovka settl	Meadow	53.8099°N, 48.6128°E
88	Sengiley District: National Park «Sengileevskie Gory», 5 km NW of Karanino vill.	deciduous forest	53.9693°N, 48.6602°E
89	Sengiley District: National Park «Sengileevskie Gory», 4 km NW of Karanino vill.	linden forest	53.9740°N, 48.6440°E
90	Sengiley District: National Park «Sengileevskie Gory», 6 km NE of Karanino vill.	birch forest	53.9733°N, 48.7178°E
91	Sengiley District: 1 km NE of Nikolskoe vill.	pine forest	53.8395°N, 48.5017°E
92	Sengiley District: 1 km E of Nikolskoe vill.	alder grove on the river bank	53.8359°N, 48.4986°E
93	Sengiley District: National Park «Sengileevskie Gory», 5 km E of Tushna vill.	mixed forest	54.0114°N, 48.6032°E
94	Sengiley District: National Park «Sengileevskie Gory», 4 km E of Tushna vill.	birch forest	54.0053°N, 48.5749°E;
95	Sengiley District: National Park «Sengileevskie Gory», 4 km E of Tushna vill.	deciduous forest	54.0103°N, 48.5753°E
96	Sengiley District: National Park «Sengileevskie Gory», 1,5 km SSE of Shilovka vill., «Shilovskaya lesostep'»	steppe slope	54.0309°N, 48.6612°E
97	Sengiley District: National Park «Sengileevskie Gory», 2,3 km S of Shilovka vill.	pine forest edge	54.0221°N, 48.6570°E
98	Sengiley District: National Park «Sengileevskie Gory», 4 km NE of Artyushkino vill.	aspen forest	53.9849°N, 48.4869°E
99	Sengiley District: National Park «Sengileevskie Gory», 4 km NE of Artyushkino vill.	oak grove	53.9849°N, 48.4858°E
100	Sengiley District: National Park «Sengileevskie Gory», 3 km NE of Artyushkino vill.	pine forest	53.9781°N, 48.4821°E
101	Sengiley District: National Park «Sengileevskie Gory», 2 km NE of Artyushkino vill.	oak grove	53.9668°N, 48.4736°E
102	Sengiley District: National Park «Sengileevskie Gory», 1 km SW of Lesnoy settl.	aspen forest	53.9013°N, 48.6940°E;
103	Surskoe District: Sursky State Nature sanctuary	mixed forest	54.5115°N, 46.8908°E;
104	Surskoe District: Sursky State Nature sanctuary	mixed forest	54.5141°N, 46.8982°E;

105	Surskoe District: Sursky State Nature sanctuary	mixed forest	54.5199°N, 46.8953°E
106	Surskoe District: Sursky State Nature sanctuary	mixed forest	54.5600°N, 46.8700°E;
107	Surskoe District: Sursky State Nature sanctuary	mixed forest	54.5553°N, 46.8836°E
	Samara Region		
108	Volzhsky District: Zhiguli Nature Reserve, Churokaika cordon,	NA	53.3240°N, 49.8160°E
109	Volzhsky District: Zhiguli Nature Reserve, Churokaika cordon,	steppe slope with *Chamaecytisus*	53.3251°N, 49.8277°E
110	Volzhsky District: Zhiguli Nature Reserve, Churokaika cordon	steppe slope with *Chamaecytisus*, south deciduous forest edge	53.3334°N, 49.8286°E,
111	Stavropolsky District: Zhiguli Nature Reserve, Strelnaya Mountain,	steppe slope	53.4328°N, 49.7599°E

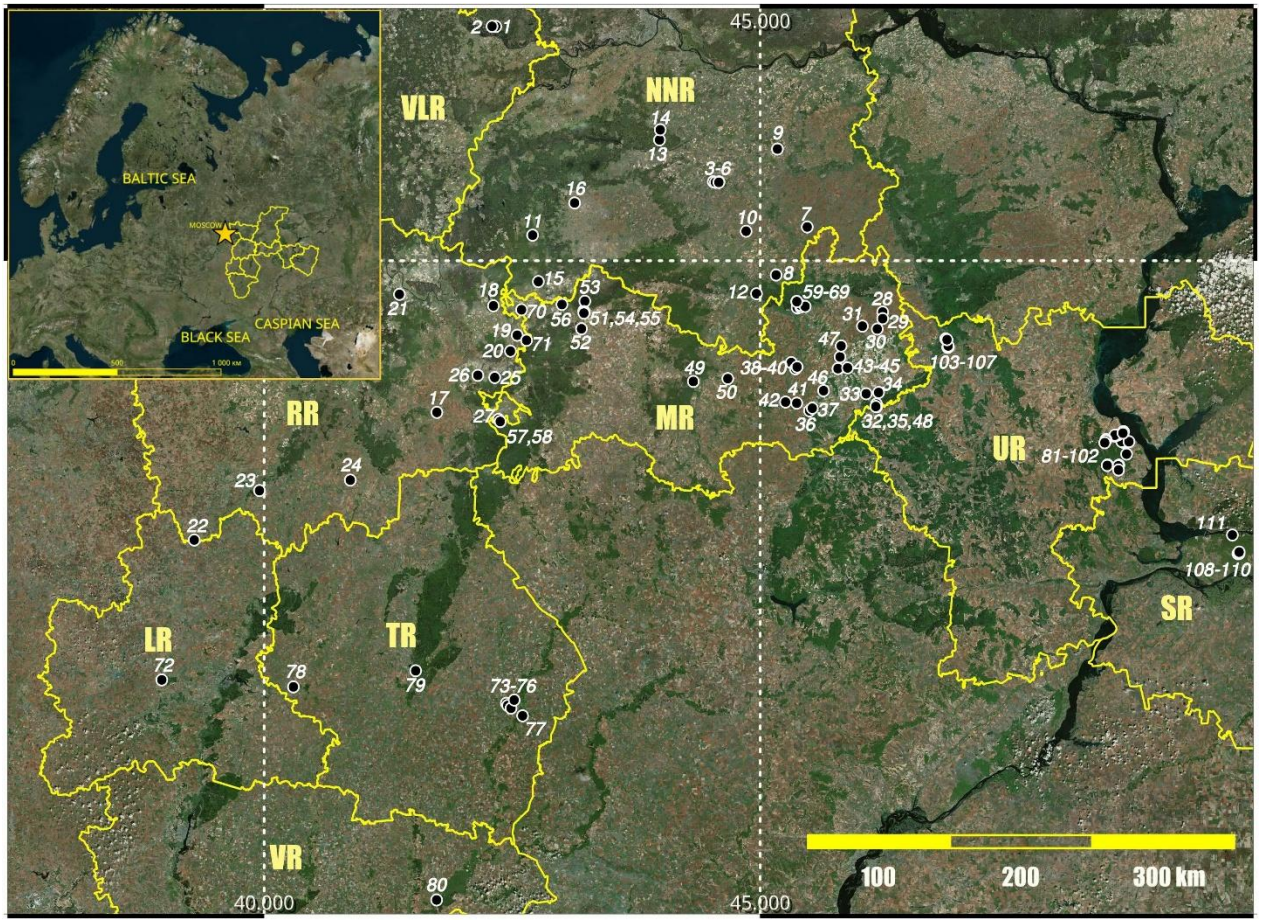

Figure 1. Collection sites from 2022 to 2024 (point numbers correspond to the localities listed in Table 1.). VLR – Vladimir Region, NNR – Nizhny Novgorod Region, RR – Ryazan Region, MR – Republic of Mordovia, LR – Lipetsk Region, VR – Voronezh Region, SR – Samara Region, TR – Tambov Region, UR – Ulyanovsk Region

For mollusk collection, Barber soil traps were used. The traps, consisting of five-liter plastic containers, were placed in various biotopes, including pine forests, mixed and deciduous forests, forest belts, and post-fire areas. The collected material was retrieved approximately every 7–15 days and preserved in alcohol for further analysis. Species identification was based on shell

coloration, size, and morphological characteristics. For shelled species, measurements included shell proportions and the structure of the aperture (Stojko, Bulavkina, 2010; Shikov, 2023). Since the coloration of slugs could not always be determined after prolonged fixation in alcohol, additional examinations of their reproductive system were conducted (Likharev, Wiktor, 1980). Special attention was given to distinguishing *Arion fuscus* from *Arion subfuscus*, as the latter species is restricted to Western Europe and does not occur in Russia. Identification relied on morphological features of the digestive and reproductive systems (Pinceel et al., 2004; Jordaens et al., 2010; Udaloi, Lukyantsev, 2019). According to these studies, *A. fuscus* possesses a small, dark-colored gonad (hermaphroditic gland), which is only visible after removing part of the digestive gland. In contrast, *A. subfuscus* has a larger, light-colored gonad that is openly positioned on the surface of the digestive gland.

Some collected mollusks were either damaged or in juvenile stages where taxonomically significant features were not yet fully developed; these specimens were identified only to the genus level. The definition of the collected material was carried out by T.G. Stojko, the collection of the material was carried out by the co-authors. The following abbreviations are used in the text and in the table: RM – Republic of Mordovia, VlR – Vladimir Region, VrR – Voronezh Region, LR – Lipetsk Region, NR – Nizhny Novgorod Region, RR – Ryazan Region, SR – Samara Region, TR – Tambov Region, UR – Ulyanovsk region. In the Appendix, for each species indicates the place and date of collection, the number of collected specimens, as well as the initials of the collector: (ME) – M.N. Esin, (GS) – G.B. Semishin, (DB) – D. Buinov, (EL) – E.A. Lobachev, (SL) – S.V. Lukyanov, (MM) – M. Maresev, (AN) – A.M. Nikolaeva, (MR) – M.K. Ryzhov, (AR) – A.B. Ruchin, (KT) – K.P. Tomkovich.

Results and Discussion

A total of 150 pitfall trap lines were surveyed, yielding 508 specimens. A species list of the collected mollusks is provided (Table 2), along with descriptions of their biological and ecological characteristics.

Table 2. Taxonomic and Quantitative Composition of Mollusks Collected in 2022–2024

Species	RM	VlR	VrR	LR	NR	RR	SR	TR	UR	Total
Succinea putris	5	–	–	–	–	–	–	–	–	**5**
Cochlicopa nitens	1	–	–	–	–	–	–	–	–	**1**
Cochlicopa lubricella	10	–	–	–	–	–	4	–	1	**15**
Vallonia costata	1	–	–	–	–	–	–	–	–	**1**
Vertigo antivertigo	1	–	–	–	–	–	–	–	–	**1**
Vertigo sp.	–	–	–	–	–	2	–	–	–	**2**

Columella edentula	3	–	–	–	–	1	–	–	–	**4**
Chondrula tridens	–	–	–	–	–	–	24	–	2	**26**
Cochlodina laminata	5	–	–	–	–	–	–	–	–	**5**
Bulgarica cana	1	–	–	–	–	–	–	–	–	**1**
Punctum pygmaeum	2	–	–	–	–	1	–	–	–	**3**
Discus ruderatus	3	–	–	–	–	–	–	–	5	**8**
Perpolita petronella	1	–	–	–	–	–	–	–	–	**1**
Zonitoides nitidus	1	–	–	–	–	–	–	–	–	**1**
Deroceras sp.	38	–	1	1	–	1	–	–	2	**43**
Deroceras agreste	17	–	–	–	1	–	–	1	–	**19**
Deroceras laeve	13	–	–	–	–	–	–	3	–	**16**
Limax juvenus	2	–	–	–	1	2	–	–	–	**5**
Limax cinereoniger	–	–	–	–	3	–	–	–	4	**7**
Arion sp.	3	–	–	–	2	3	–	1	1	**10**
Arion fuscus	58	4	10	1	39	15	1	19	61	**208**
Arion fasciatus	11	–	–	–	–	12	3	5	12	**32**
Fruticicola fruticum	33	2	–	–	11	2	–	–	5	**53**
Pseudotrichia rubiginosa	14	6	–	–	5	1	1	–	–	**27**
Eumphalia strigella	8	–	–	–	–	–	1	–	5	**14**
Total of specimens	**231**	**12**	**11**	**2**	**62**	**40**	**34**	**29**	**87**	**508**
Total of species	**22**	**3**	**2**	**2**	**7**	**10**	**6**	**5**	**10**	**25**

Succinea putris (Linnaeus, 1758)

The shell of *Succinea putris* is variable in shape, elongated-oval, and moderately glossy. Its coloration ranges from light horn-colored, amber, and yellow to grayish. The shell height reaches up to 24 mm, with a width of up to 12 mm. This species is commonly found in wet meadows, shrubs, and various types of forests (Kuznik-Kowalska et al., 2013).

Cochlicopa lubricella (Porro, 1838)

The shell of *Cochlicopa lubricella* is elongately oval-conical, with a smoothly rounded apex. It is moderately glossy and translucent. The coloration is pale horn-colored or light brown. The shell height ranges from 3.8 to 5.2 mm, with a width of 1.8 to 2 mm. This species inhabits moderately moist and dry environments, such as meadows, steppes, sparse forests, and shrublands at the edge of steppes, as well as dry oak woodlands. It is most commonly found in turf bedding, the upper soil layers, or in grass at the roots (Armbruster, 1997; Skujiene, 2002).

Cochlicopa nitens Gallenstein, 1852

The shell of *Cochlicopa nitens* is oval-conical, slightly inflated, and very glossy, with a wide and smoothly rounded apex. It is translucent and relatively thin-walled. The shell height ranges from 6.8 to 7.5 mm, with a width of 2.8 to 3.1 mm. This species prefers moist areas of forests and ravines, found in grass and leaf litter, along the banks of small rivers and streams on damp soils (Skujiene, 2002; Bezina, Borisova, 2021).

Vallonia costata (Müller, 1774)

The shell of *Vallonia costata* is low-conical, appearing almost round from above, with large radial leathery ribs, finely striated between them. The shell height is 1.35 mm, and the width ranges from 2.5 to 2.7 mm. This species inhabits moderately moist areas, among herbaceous plants and moss, under the bark of fallen trees and in decaying stumps. In addition to mixed forests, it can be found in shrubs, meadows, and steppe areas (Kuznik-Kowalska, Prockov, 2013; Nicolai, Forsyth, 2019).

Vertigo sp.

All species of the *Vertigo* genus are small snails that inhabit the litter layer. In this case, the identification of the samples was challenging.

Vertigo antivertigo (Draparnaud, 1801)

The shell of *Vertigo antivertigo* is oval, thin-walled, translucent, and glossy, with a slightly pointed apex. The shell coloration is chestnut, sometimes with a cherry hue, with the upper whorls typically lighter than the lower ones. The aperture contains 7–10 teeth. The shell height ranges from 2 to 2.2 mm, and the width is 1.2–1.3 mm. This species inhabits wet meadows with tall grass and also lives in the litter layer of deciduous and mixed forests, particularly in ravines and depressions where the soil is always moist. During wet weather, it climbs on grass stems and shrub branches (Hornung et al., 2003; Roszkowska, Książkiewicz, 2022).

Columella edentula (Draparnaud, 1805)

The shell of *Columella edentula* is from high-domed to short-cylindrical in shape, with even cylindrical shells showing a noticeable increase in the whorl width from top to bottom. It is thin-walled, fragile, glossy, with a well-rounded apex. The aperture has no teeth. The shell height ranges from 2.2 to 2.7 mm, and the width is 1.2–1.4 mm. This species lives in deciduous forests (aspen, linden, and ash-oak woodlands). It is most often found on plant leaves, but can also be encountered on dead parts of trees and, less frequently, in leaf litter (Majoor, 2012; Książkiewicz-Parulska, 2020).

Chondrula tridens (Müller, 1774)

The shell of *Chondrula tridens* is elongated-oval, moderately hard, slightly translucent, matte, with a narrow, smooth apex. The most complete set of aperture armature consists of 5 teeth (though fewer teeth may be present). The size is highly variable, typically falling within the following range: shell height 8–25 mm, width 3–9 mm. This species inhabits steppe meadows and steppe areas of the forest-steppe zone in the Volga region, living in the turf or soil. It can be found in steppe shrublands and sparse dry deciduous forests, as well as in the litter layer (Sverlova, 2006; Kuznecova, Skujienė, 2013).

Cochlodina laminata (Montagu, 1803)

Cochlodina laminata (Montagu, 1803)

The shell of *Cochlodina laminata* is fusiform, swollen, thick-walled, very finely and irregularly striated, with the lower whorls nearly smooth and glossy. Its color ranges from light horn to reddish-brown. The shell height is 14–18 mm, and the width is 3.8–4.2 mm. Among all the species of this family, it is the most common one in our region. It primarily inhabits old deciduous and mixed forests, where it can be found on tree stumps and trunks, often in decaying wood (Neckheim, 2012; Adamova, Ukrainskiy, 2024).

Bulgarica cana (Held, 1836)

The shell of *Bulgarica cana* is fusiform, thick-walled, robust, densely ribbed, slightly translucent, with a faint gloss. It is dark brown or brownish-horn, with frequent white streaks. The shell height ranges from 15 to 18 mm, and the width is 3.5 to 3.8 mm. This species inhabits mixed forests, old stumps, litter, forest slope ravines, and dendrological parks (Marzec, 2018).

Punctum pygmaeum (Draparnaud, 1801)

The shell of *Punctum pygmaeum* is low-conical, almost disk-shaped, with a slightly convex whorl. It is finely and densely ribbed, with a silky sheen, and light or dark horn in color. The shell height ranges from 0.6 to 0.8 mm, and the width is 1.3 to 1.6 mm. This species is eurybiotic and can be found almost everywhere, in leaf litter, decaying wood, soil among herbaceous plants, in forests, meadows, and ravines (Wallbrink et al., 2001; Horsák, Meng, 2018).

Discus ruderatus (Férussac, 1821)

The shell of *Discus ruderatus* ranges from low-conical to depressed-conical in shape. Its surface is strongly and evenly ribbed, with a horn or reddish-brown coloration. The shell height ranges from 2 to 3.5 mm, and the width is 5 to 7 mm. This species inhabits leaf litter, among fallen branches, under the bark of old stumps, in the soil, and among herbaceous plants. It is found in forests, ravines, and near streams (Kuznik-Kowalska, 2006; Bichain et al., 2023).

Perpolita petronella (L. Pfeiffer, 1853)

The shell of *Perpolita petronella* is low-conical, glossy, semi-transparent, and finely radially striated. Its color is whitish or greenish-white. The shell height ranges from 2.1 to 2.3 mm, and the width is 4 to 4.6 mm. This species inhabits deciduous and mixed forests, in leaf litter, and occasionally in meadows, ravines, and on slopes (Dvořák, 2008; Stojko, Bulavkina, 2010; Udaloi, 2014; Schikov, 2023).

Zonitoides nitidus (Müller, 1774)

The shell of *Zonitoides nitidus* is low-conical, with a rather sharp whorl, where the height is greater than half the height of the aperture. It is very glossy, almost transparent, and vaguely cross-striated, without spiral lines. The coloration is reddish-horn. The shell height ranges from

3.5 to 4 mm, and the width is 6 to 7 mm. This species is widely distributed and found in floodplain meadows, marshy areas in deciduous and mixed forests, and ravines. It is commonly found along the banks of small rivers and streams in moist soil (Kuzniak-Kowalska, 2010; Amza et al., 2011).

Deroceras sp.

The species *D. agreste* and *D. reticulatum*, which are common in the studied region, are found in meadows, forest edges, and alder forests, but never deep inside the forests. They can coexist with *D. reticulatum* in gardens, and at times, they are difficult to distinguish from each other. The identification of the samples was challenging in this case.

Deroceras agreste (Linnaeus, 1758)

The body of *Deroceras agreste* is bulkier than that of *D. laeve*. Its coloration ranges from almost white to cream, without any dark markings. This species inhabits open areas such as meadows and fields, and is less frequently found in gardens and orchards (Gittenberger, 1974; Prozorova, 2010).

Deroceras laeve (Müller, 1774)

The coloration of *Deroceras laeve* is nearly uniform, usually ranging from reddish-brown to almost black. When preserved, dark spots—melanophores—become visible, especially abundant on the mantle. A characteristic feature of this species is the presence of individuals with fully developed male reproductive organs (euphally), as well as those with partially reduced ones (aphallic and hemiphallic forms). This species is highly mobile and widely distributed, preferring humid environments. It inhabits riverbanks, streams, lowland swamps, wet meadows, and damp forests (Prozorova, 2010; Bhat, 2020).

Limax cinereoniger Wolf, 1803

The body of *Limax cinereoniger* is long and slender, tapering towards the tail, with a distinct keel covering approximately half of its back length. The skin is thick and rough, with elongated and narrow wrinkles. The coloration is typically black or dark gray, except for the keel and the central portion of the foot, which are always lighter. The mantle is usually uniform in color, sometimes featuring small light spots along the edges. In some individuals, longitudinal stripes—either continuous or broken into separate spots—may run along the back.

In adult individuals, the middle portion of the foot is significantly lighter than the lateral parts, making identification easier. However, coloration varies greatly with age: juveniles are usually light, creamy, or brown, with a faint or absent pattern. Initially, their foot is light-colored, but as they mature, the lateral portions gradually darken.

This species reaches a body length of 150–200 mm and inhabits mixed and deciduous forests. It is most active during humid weather, in the evening, morning, and nighttime. Under unfavorable

conditions, it hides in leaf litter, under bark, or fallen logs. *Limax cinereoniger* has an omnivorous diet, consuming both plant matter and carrion (Stojko, Bezina, 2017; Bodon et al., 2019; Schilthuizen et al., 2022).

In the forest-steppe regions of European Russia, it is widely distributed but occurs at low population densities. As a result, it is often included in regional Red Data Books.

Arion fuscus (Müller, 1774)

Arion fuscus is the most common slug species in the study area. All references in the literature to *Arion subfuscus* actually pertain to *A. fuscus*, as *A. subfuscus* is restricted to Western Europe, whereas only *A. fuscus* is present in Russia. The coloration of this species is highly variable, even within a single population and throughout an individual's life cycle. The background color ranges from brown to orange, with rust or grayish-brown being the most frequent shades. Juveniles exhibit distinct dorsal stripes and a lyre-shaped pattern on the mantle. In adults, coloration occurs in two primary forms: one with less pronounced but still well-defined stripes on the back and mantle (*f. typica*), and another with a dark back and no lateral stripes (*f. brunnea*). In striped individuals, a wedge-shaped extension from the nearest stripe partially surrounds the pneumostome, a highly characteristic feature of this species. The mucus is orange or yellow in striped individuals, whereas it is either colorless or only faintly pigmented in unstriped forms.

Adult *A. fuscus* measures between 35 and 80 mm in length, while contracted individuals range from 6.5 to 9 mm. The species inhabits deciduous, mixed, and coniferous forests and is commonly found in forest clearings and shrubs. During the daytime, it shelters under deadwood, decaying stumps, stones, and within leaf litter (Kappes et al., 2012; Udaloi, Lukyantsev, 2019)

Arion fasciatus (Nilsson, 1823)

The body of *Arion fasciatus* is almost always pale, appearing somewhat faded. The background coloration varies from ashen to yellowish-ashen, with the midline of the back and mantle slightly darker but devoid of any spots. The lateral stripes are dark ashen, with sharply defined upper and lower borders. The species can reach a length of up to 50 mm. *A. fasciatus* is a common species in urban environments, inhabiting gardens, vegetable plots, and vacant lots. In natural habitats, it occurs in broadleaf forests and alder groves with broadleaf elements (Backeljau, De Bruyn, 1988; Shikov, 2023).

Fruticicola fruticum (Müller, 1774)

Fruticicola fruticum is one of the most common land snails. Its shell is globular with a rounded spire, whose height is equal to or slightly greater than that of the aperture. The shell is moderately thin-walled, translucent, and exhibits weak radial striations interspersed with occasional, more pronounced wrinkles, as well as dense and very fine spiral lines. Shell coloration is variable, ranging from grayish-white to reddish-brown. In some individuals, a narrow brown band runs

along the periphery of the last whorl and is positioned above the suture on one or two preceding whorls. The shell dimensions typically range from 16–17 mm in height to 18–20 mm in width. The species inhabits mixed and deciduous forests, shrubs, gardens, and humid, shaded environments, where it is often found on bushes and herbaceous plants such as nettle (*Urtica*) and coltsfoot (*Tussilago farfara*) (Gheoca, 2007; Sulikowska-Drozd, 2007).

Pseudotrichia rubiginosa (A. Schmidt, 1853)

The shell of *Pseudotrichia rubiginosa* exhibits a shape intermediate between broad-conical and compressed-conical, with a dome-shaped spire whose height is approximately equal to that of the aperture. The shell is translucent, with a coloration ranging from horn-like to dark horn-like, sometimes brown, and may feature a faint light band along the periphery. The shell surface is irregularly, finely, and sharply striated and densely covered with brittle, straight, and curved hairs. Shell dimensions range from 4.3–6.5 mm in height to 6–9 mm in width. This species is commonly found in humid habitats, including mixed forests, wet steppe environments, ravines, slopes, and along the banks of small rivers and streams. It inhabits leaf litter, moss-covered tree trunks, and moist soil (Čejka et al., 2008; Alexandrowicz, 2013; Stojko, Bulavkina, 2010; Schikov, 2023).

Euomphalia strigella (Draparnaud, 1801)

The shell of *Euomphalia strigella* is low-turbinate, sometimes slightly flattened, with a solid structure in adult specimens. It has a sharp, slightly dome-shaped spire, whose height is typically approximately equal to that of the aperture. The shell coloration varies from yellowish to reddish-gray and features a light (sometimes milky-white) peripheral band. Juvenile specimens often possess a surface covered with sparse, fine hairs, leading to frequent misidentification as *Pseudotrichia rubiginosa* (see above). This species inhabits broadleaf and spruce-broadleaf forests, as well as shrublands. It is widely distributed and relatively common. Shell dimensions range from 9–12 mm in height to 13–19 mm in width. It occurs in dry environments, often on hillsides and ravines, within plantations and mixed forests, in shrublands among grass, as well as in humid locations within leaf litter, on moss-covered trunks, and in floodplains near water bodies (Dörge et al., 1999; Irikov, 2008; Alexandrowicz, 2013; Stojko, Bulavkina, 2010; Schikov, 2023).

The most abundant organisms captured in pitfall traps were slugs from the families *Arionidae* and *Agriolimacidae*, comprising 67% of the total catch. Among them, the dark slug *Arion fuscus* accounted for 39%, *Arion fasciatus* for 9%, *Deroceras* spp. for 8%, *D. agreste* for 4%, and *D. laeve* for 3%. Species from these families are often considered agricultural pests, and the use of pitfall traps for fauna assessment and population density analysis is a common practice in agronomy (Kappes et al., 2012; Crowe et al., 2020; Scaccini et al., 2020).

In the Republic of Mordovia and Ulyanovsk Oblast, a larger number of pitfall trap transects were analyzed (62 and 32, respectively) compared to other regions. The most abundant species, *A. fuscus*, was predominantly recorded in traps from these regions, with 196 and 44 individuals captured, respectively (Fig. 2).

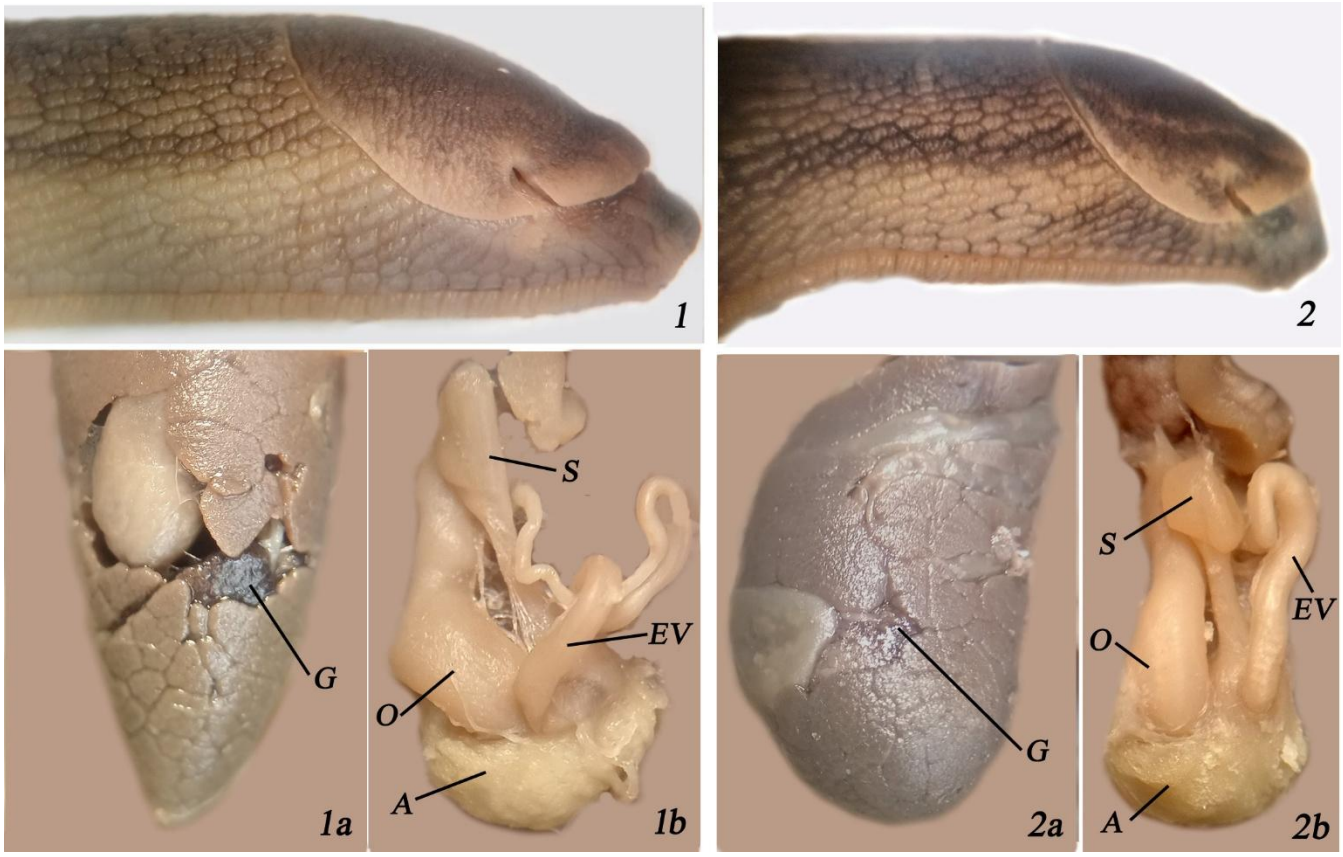

Figure 2. External view and anatomy of the slugs *Arion fuscus* from the village of Kotovsk, Rasskazovo district, Tambov region: 1, 2 – anterior part of the body; 1a, 2a, – arrangement of the gonad (G); 1b, 2b – distal parts of reproductive system (A – genital atrium, O – oviduct, EV – epiphallus, S – spermatheca)

Another significant observation concerns *A. fuscus*: melanistic forms were recorded in several locations, including RM – Tengushevo district, Kulikovo village (Fig. 3); VO – Novokhopersk district, Varvarino village; NO – Vyksa district, Dalnaya Pesochnaya village, TO – Inzhavino district, Olkhovka village; UO – Sengileevo district, Tushna village and Artyushkino village. It is noteworthy that almost everywhere the habitats of such slugs are oak forests.

The species *Arion fasciatus* was also frequently detected in soil pitfall traps (Fig. 4). This slug is generally considered to be associated with anthropogenic habitats (Likharev, Wiktor, 1980; Bába, 1983; Udaloi, Lukyantsev, 2019). However, reports also indicate the presence of *A. fasciatus* in natural habitats across various regions (Shikov, 1982, 1984; Udaloi, Lukyantsev, 2019; Shikov, 2023). The species inhabits natural floodplain meadows along the Volga River and has been recorded in patches of grey alder (*Alnus incana*) forests and broadleaf woodlands. Additionally, *A. fasciatus* has been found near the city of Tomsk (Udaloi, Novikov, 2003).

Figure 3. External view of the slugs *Arion fuscus* from the vicinity of the village of Kulikovo, Tengushevo district, Republic of Mordovia (1–5) and distal parts of reproductive system of specimen 5 (A – genital atrium, O – oviduct, EV – epiphallus, S – spermatheca).

Specimens of *A. fasciatus* were captured in pitfall traps at 12 locations (Appendix). Some individuals were recorded near agroecosystems, particularly in shelterbelts, while others were found in natural habitats, including broadleaf forests, grey alder stands with broadleaf elements, and open wet habitats near small rivers and streams.

Several other species were relatively frequently recorded in the samples. One of the most common inhabitants of moist environments, *Fruticicola fruticum*, accounted for 10% of the specimens, while the hygrophilous *Pseudotrichia rubiginosa* constituted 5%. In the habitats of two regions, Samara and Ulyanovsk Oblasts, the steppe-dwelling species *Chondrula tridens* was also relatively abundant (5%).

Two clausiliid species, *Cochlodina laminata* and *Bulgarica cana*, were found exclusively in pitfall traps from the Republic of Mordovia. These species are known to inhabit primarily old-growth deciduous and mixed forests, where they occur on decaying wood, tree trunks, and in decomposing plant matter (Neckheim, 2012; Marzec, 2018; Adamova, Ukrainskiy, 2024). Their presence in Mordovia suggests the preservation of undisturbed forest ecosystems in the surveyed area.

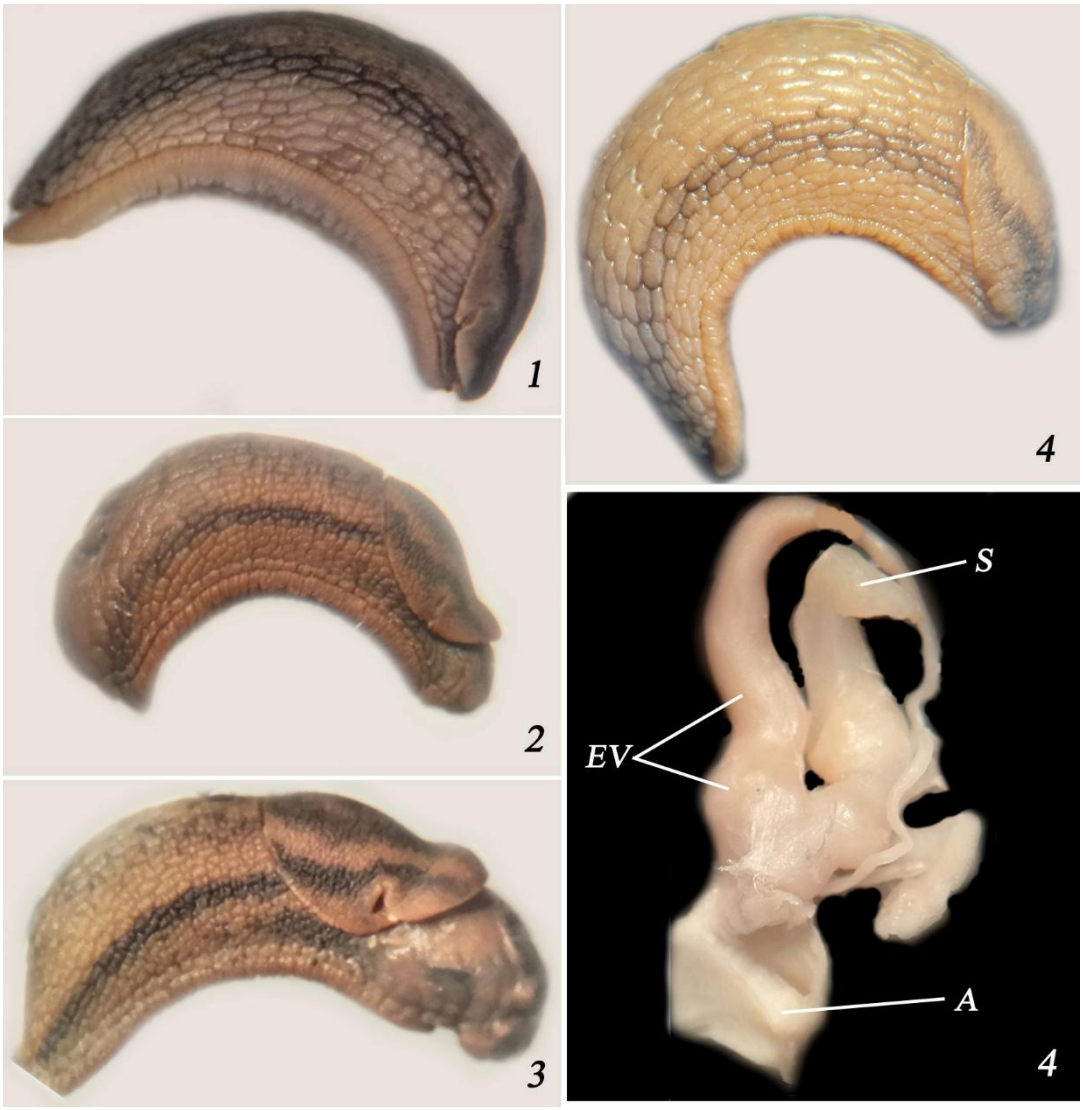

Figure 4. *Arion fasciatus* from the vicinity of the village of Nikitino, Inzhavino District, Tambov Region (1); the village of Dachny, Tengushevo District (2, 3), the village of Romodanovo, Romodanovo District, Republic of Mordovia (4). Distal sections of the reproductive system of individual 4 (A – genital atrium, EV – epiphallus, S – spermatheca)

The slug *Limax cinereoniger* is frequently included in regional Red Data Books in the European part of Russia. Specimens of this species were detected in pitfall traps in four regions: Nizhny Novgorod, Ryazan, and Ulyanovsk Oblasts, as well as the Republic of Mordovia. In Nizhny Novgorod Oblast, three adult slugs were recorded near the villages of Krasnaya Gorka (Perevozsky District) and Kakino (Gaginsky District), while in Ulyanovsk Oblast, four adult specimens were found in traps near the villages of Shilovka and Tushna (Sengiley District). A juvenile individual was captured in a deciduous forest near the village of Dalnyaya Pesochnaya (Vyksa District, Nizhny Novgorod Oblast), while two juveniles were recorded near the village of Krutoe (Sasovsky District, Ryazan Oblast), and two others near the village of Zharenki (Ardatovsky District, Republic of Mordovia).

Overall, *L. cinereoniger* appears to occur in similar numbers to many other slug species. This suggests that, in suitable habitats, the species may not be as rare as previously assumed (Stoiko, Bezina, 2017; Aleksanov, 2021). All the mollusk species collected during the study are common in the European part of Russia. These invertebrates from the traps can be used as indicators of the studied habitats in the regions. The dominance of slugs among the mollusks found in the traps confirms their higher mobility, which allows them to find shelter more quickly when facing threats such as overheating, desiccation, or predators.

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References

Adamova, V. V., & Ukrainskiy, P. A. (2024). Modeling the Spatial Distribution of the European Land Snail *Cochlodina laminata* (Gastropoda, Pulmonata, Clausiliidae) in the Eastern Part of the Range. Moscow University Biological Sciences Bulletin, 79(1), 43–51.

Aleksanov, V. V. (2021). *Limax cinereoniger* in the Kaluga region: distribution, habitats, environmental assessment. Cadaster and monitoring studies of biological diversity in the Kaluga region, 9, 56–71.

Alexandrowicz, W. P. (2013). The malacofauna of the castle ruins in Melsztyn near Tarnow (Roznow Foothills, Southern Poland). Folia Malacologica, 21(1), 9–18.

Amza, M. C., Petrovici, M., & Gheoca, V. (2011). Preliminary study of the terrestrial gastropods diversity (Gastropoda: Stylomatophora) from Cefa Nature Park (NW of Romania). Advances in Environmental Sciences, 3(1), 17–22.

Armbruster, G. (1997). Evaluations of RAPD markers and allozyme patterns: evidence for morphological convergence in the morphotype of *Cochlicopa lubricella* (Gastropoda: Pulmonata: Cochlicopidae). Journal of Molluscan Studies, 63(3), 379–388.

Bába, K. (1983). History of the investigation of the terrestrial snails of the Great Hungarian Plain and its present situation. II. Tiscia, 18, 83–95.

Backeljau, T., & De Bruyn, L. (1988). Notes on *Arion hortensis* s.l. and *A. fasciatus* s.l. in Denmark (Gastropoda: Pulmonata). Apex, 4(3), 41–48.

Bhat, D. M. (2020). First report of *Deroceras* sp. (Gastropoda, Pulmonata, Agriolimacinae) as pest of agricultural crops in Kashmir valley (India). Uttar Pradesh Journal of Zoology, 41(6), 24–28.

Bezina, O. V., & Borisova, N. V. (2021). New finds of the terrestrial mollusks (Gastropoda, Pulmonata) in the Chuvash Republic. Scientific works of the Prisursky State Nature Reserve, 36, 36–38.

Bichain, J. M., Hommay, G., & Lamand, F. (2023). Liste de référence annotée et actualisée des mollusques continentaux du Grand Est (France). Bulletin de la Société d'Histoire naturelle et d'Ethnographie de Colmar, 79(3), 13–41.

Bodon, M., Nardi, G., Cianfanelli, S., Birindelli, S., & Niero, I. (2019). Is *Limax cinereoniger* Wolf, 1803, present in Italy? An anatomical approach to the study of Italian Limax (Gastropoda: Pulmonata: Limacidae). Journal of Conchology, 43, 223–244.

Brown, K. M., & Lydeard, C. (2010). Mollusca: gastropoda. In J. H. Thorp & A. P. Covich (Eds.), Ecology and classification of North American freshwater invertebrates (pp. 277–306). Academic Press.

Čejka, T., Horsák, M., & Némethová, D. (2008). The composition and richness of Danubian floodplain forest land snail faunas in relation to forest type and flood frequency. Journal of Molluscan Studies, 74(1), 37–45.

Chikhlyaev, I. V., & Ruchin, A. B. (2021). An overview of the helminths of moor frog *Rana arvalis* Nilsson, 1842 (Amphibia: Anura) in the Volga Basin. Diversity, 13(2), 61. https://doi.org/10.3390/d13020061

Chikhlyaev, I. V., Ruchin, A. B., & Fayzulin, A. I. (2016). The helminth fauna study of European common toad in the Volga Basin. Nature, Environment and Pollution Technology, 15(3), 1103–1109.

Crowe, A., Gormally, M. J., & O'Hanlon, A. (2020). Differential response of terrestrial gastropod and ground beetle communities to habitat change suggests an ecological association. Journal of Molluscan Studies, 86(4), 431–434. https://doi.org/10.1093/mollus/eyaa025

Dedyukhin, S. V. (2023). Fauna and biotopic distribution of Chrysomelidae (Coleoptera) in the Zhiguli State Nature Reserve, Russia. Nature Conservation Research, 8(3), 61–74. https://dx.doi.org/10.24189/ncr.2023.025

Dedyukhin, S. V. (2024). Fauna and biotopic distribution of Chrysomelidae (Coleoptera) in the Shaitan-Tau State Nature Reserve, Russia. Nature Conservation Research, 9(4), 47–65. https://dx.doi.org/10.24189/ncr.2024.031

Dörge, N., Walther, C., Beinlich, B., & Plachter, H. (1999). The significance of passive transport for dispersal in terrestrial snails (Gastropoda, Pulmonata). Zeitschrift für Ökologie und Naturschutz, 8(1), 10.

Dvořák, L. (2008). Malakofauna Přírodní rezervace Údolí Teplé (západní Čechy). Malacologica Bohemoslovaca, 7, 1–8.

Dvořák, L., Ruchin, A. B., Egorov, L. V., Aleksanov, V. V., Alekseev, S. K., Shulaev, N. V., & Zakharova E. Yu. (2023). Distribution of species from the genus *Panorpa* (Mecoptera, Panorpidae) in European Russia except the Caucasus. Nature Conservation Research, 8(1), 24–33. https://dx.doi.org/10.24189/ncr.2023.001

Gheoca, V. (2007). Aspects regarding the terrestrial malacofauna of the Saxon Villages area of Southern Transylvania (Romania). Transylvanian Review of Systematical and Ecological Research, (4), 127.

Gittenberger, E. (1974). *Deroceras agreste* (Linnaeus, 1758) in den Niederlanden nie nachgewiesen. Basteria, 38(5/6), 92–92.

Grewal, P. S., Grewal, S. K., Tan, L., & Adams, B. (2003). Parasitism of molluscs by nematodes: types of associations and evolutionary trends. Journal of nematology, 35(2), 146.

Gural-Sverlova, N. V., & Gural, R. I. (2016). New records of *Arion distinctus* and *Arion circumscriptus* (Arionidae) on the territory of Ukraine. Ruthenica, 26(1), 17–23.

Horsák, M., & Meng, S. (2018). *Punctum lozeki* n. sp. – a new minute land-snail species (Gastropoda: Punctidae) from Siberia and Alaska. Malacologia, 62(1), 11–20.

Hornung, E., Majoros, G., Fehér, Z., & Varga, A. (2003). An overview of the *Vertigo* species in Hungary: their distribution and habitat preferences. Heldia, 5, 51–57.

Jordaens, K., Pinceel, J., Van Houtte, N., Breugelmans, K., & Backeljau, T. (2010). *Arion transsylvanus* (Mollusca, Pulmonata, Arionidae): rediscovery of a cryptic species. Zoologica Scripta, 39, 343–362.

Irikov, A. (2008). An updated and annotated checklist of Bulgarian terrestrial gastropods (Mollusca: Gastropoda). Folia malacologica, 16(4), 197–205.

Kappes, H., Stoll, S., & Haase, P. (2012). Differences in field behavior between native gastropods and the fastspreading invader *Arion lusitanicus* auct. non Mabille. Belgian Journal Zoology, 142, 49–58.

Koivula, M., Kotze, J., Hiisivuori, L., & Rita, H. (2003). Pitfall trap efficiency: do trap size, collecting fluid and vegetation structure matter? Entomologica Fennica, 14(1), 1–14.

Książkiewicz-Parulska, Z. (2020). Notes on a population of *Columella edentula* (Gastropoda: Pulmonata: Truncatellinidae) at a sedge meadow in Western Poland. Biologia, 75(4), 585–590.

Kumar, P. (2020). A review – on molluscs as an agricultural pest and their control. International Journal of Food science and agriculture, 4(4), 383–389.

Kuznecova, V., & Skujienė, G. (2013). Is *Chondrula tridens* (Müller, 1774) an invasive snail species in Lithuania? Ekologija, 59(2), 111-121.

Kuznik-Kowalska, E. (2006). Life cycle of *Discus ruderatus* (Férussac, 1821) (Gastropoda: Pulmonata: Endodontidae). Folia Malacologica, 14(1), 35–46.

Kuzniak-Kowalska, E. (2010). Selected aspects of reproductive biology of *Zonitoides nitidus* (OF Muller, 1774) (Gastropods: Pumonata: Gastrodontidae). Folia Malacologica, 18(3), 123–125.

Kuznik-Kowalska, E., Pokryszko, B. M., Prockow, M., & Oczkowska, M. (2013). On the population dynamics, reproductive biology and growth of *Succinea putris* (Linnaeus 1758) (Gastropoda: Pulmonata: Succineidae). Folia Malacologica, 21(4), 215–224.

Kuznik-Kowalska, E., & Prockov, M. (2013). Life cycle of *Vallonia costata* (OF Muller, 1774) (Gastropoda, Pulmonata, Vallonidae) in the laboratory. Folia Malacologica, 21(3), 183–203.

Lang, A. (2000). The pitfalls of pitfalls: a comparison of pitfall trap catches and absolute density estimates of epigeal invertebrate predators in arable land. Journal Pest Science, 73, 99–106.

Laporta-Ferreira, I. L., & Salomão, M. D. G. (2004). Reptilian predators of terrestrial gastropods. In G. M. Barker (Ed.), Natural enemies of terrestrial molluscs (pp. 427–481). Wallingford UK: CABI publishing.

Likharev, I. M., & Wiktor, A. (1980). The fauna of slugs of the USSR and adjacent countries (Gastropoda terrestria nuda). Fauna of the USSR, 3(5), 17-440.

López-Rojas, V. I., Torreblanca-Ramírez, C., Padilla-Serrato, J. G., Flores-Rodríguez, P., & Flores-Garza, R. (2023). The bivalves (Mollusca) from Priority Marine Regions in the centre-south of the Mexican Transitional Pacific, associated with the rocky intertidal zone. Nature Conservation Research, 8(4), 36–47. https://dx.doi.org/10.24189/ncr.2023.029

Luce, A., & Crowe, M. (2001). Invertebrate terrestrial diversity along a gravel road on Barrie Island, Ontario, Canada. The Great Lakes Entomologist, 34(1), 8.

Luff, M. L. (1975). Some features influencing the efficiency of pitfall traps. Oecologia, 19(4), 345–357.

Majoor, G. (2012). Twee habitats van de Tandloze korfslak *Columella edentula* (Draparnaud, 1805) in Limburg. Spirula, 384, 13–17.

Marzec, M. (2018). Life cycle and growth of *Bulgarica cana* (Held, 1836) under laboratory and natural conditions. Journal of Conchology, 43, 149–166.

McCravy, K. W. (2018). A review of sampling and monitoring methods for beneficial arthropods in agroecosystems. Insects, 9(4), 170.

Melbourne, B. A., Gullan, P. J., & Su, Y. N. (1997). Interpreting data from pitfall-trap surveys: Crickets and slugs in exotic and native grasslands of the Australian Capital Territory. Memoirs of the Museum of Victoria, 56(2), 361–367.

Moss, M., Hermanutz, L. (2010). Monitoring the small and slimy — protected areas should be monitoring native and non-native slugs (Mollusca: Gastropoda). Natural Areas Journal, 30(3), 322–327.

Neckheim, C. M. (2012). De Gladde clausilia *Cochlodina laminata* (Montagu, 1803) aangetroffen bij Winterswijk: een onverwachte vindplaats in Nederland. Spirula, 384, 11–13.

Nicolai, A., & Forsyth, R. (2019). First record of *Vallonia costata* (OF Müller, 1774) (Gastropoda, Eupulmonata, Valloniidae) from British Columbia, Canada, confirmed by partial-COI gene sequence. Check List, 15(2), 287–293.

Oberprieler, S. K., Andersen, A. N. & Braby, M. F. (2019). Invertebrate by-catch from vertebrate pitfall traps can be useful for documenting patterns of invertebrate diversity. Journal of Insect Conservation, 23, 547–554. https://doi.org/10.1007/s10841-019-00143-z

Pearce, J. L., Schuurman, D., Barber, K. N., Larrivée, M., Venier, L. A., McKee, J., & McKenney, D. (2005). Pitfall trap designs to maximize invertebrate captures and minimize captures of nontarget vertebrates. The Canadian Entomologist, 137(2), 233–250.

Pinceel, J., Jordaens, K., Van Houtte, N., De Winter, A.J., & Backeljau, T. (2004). Molecular and morphological data reveal cryptic taxonomic diversity in the terrestrial slug complex *Arion subfuscus*/*fuscus* (Mollusca, Pulmonata, Arionidae) in continental north-west Europe. Biological Journal of the Linnean Society, 83(1), 23–38.

Prozorova, L. A. (2010). Slugs of the genus *Deroceras* Rafinesque, 1820 on the Northern Russian Far East. Ruthenica, Russian Malacological Journal, 20(1), 35–39.

Robinson, D. G., Hovestadt, A., Fields, A., & Breure, A. (2009). The land Mollusca of Dominica (Lesser Antilles), with notes on some enigmatic or rare species. Zoologische Mededelingen, 83(13), 615–650.

Rosin, Z. M., Olborska, P., Surmacki, A., Tryjanowski, P. (2011). Differences in predatory pressure on terrestrial snails by birds and mammals. Journal of Biosciences, 36, 691–699.

Roszkowska, M., & Książkiewicz, Z. (2022). Blown with the wind – The role of wind in passive dispersion of two land snails: *Vertigo moulinsiana* and *Vertigo antivertigo*. Canadian Journal of Zoology, 101(2), 75–80.

Scaccini, D., Panini, M., Chiesa, O., Nicoli Aldini, R., Tabaglio, V., & Mazzoni, E. (2020). Slug Monitoring and Impacts on the Ground Beetle Community in the Frame of Sustainable Pest Control in Conventional and Conservation Agroecosystems. Insects, 11(6), 380. https://doi.org/10.3390/insects11060380

Schilthuizen, M., Thompson, C. G., de Vries, R., van Peursen, A. D., Paterno, M., Maestri, S., Marcolongo L., Esposti, C. D., Delledonne, M., & Njunjić, I. (2022). A new giant keelback

slug of the genus *Limax* from the Balkans, described by citizen scientists. Biodiversity Data Journal, 10, e69685. https://doi.org/10.3897/BDJ.10.e69685

Shikov, E.V. (1982). Fauna of terrestrial mollusks of natural and anthropogenic landscapes of the Valdai upland and adjacent territories. In Wildlife of the center of the forest zone of the European part of the USSR (pp. 138–156). Kalinin.

Shikov, E.V. (1984). Effects of land use changes on the central portion of the Russian plain. In A. Solem & A. C. van Bruggen (Eds.), World-wide Snails: Biogeographical Studies on Non-marine Mollusca (pp. 237–248). Leiden: E. J. Brill.

Shikov, E. V. (2023). Snails and slugs. A naturalist's guide. Tver.

Skujiene, G. (2002). An overview of the data on the terrestrial molluscs in Lithuania. Folia malacologica, 10(1), 1–7.

Spence, J. R., & Niemelä, J. K. (1994). Sampling carabid assemblages with pitfall traps: the madness and the method. The Canadian Entomologist, 126(3), 881–894.

Stojko, T. G., & Bulavkina, O. V. (2010). Guide of terrestrial mollusks of the forest-steppe of the Right-bank Volga region. Moscow: KMK Publ.

Stojko, T. G., & Bezina, O. V. (2017). Distribution and biology of the terrestrial mollusk *Limax cinereoniger* (Wolf, 1803) on the Volga upland. In Current Issues of Modern Malacology (pp. 93–97). Belgorod.

Sulikowska-Drozd, A. (2007). Malacofauna of a city park-turnover and persistence of species through 40 years. Folia Malacologica, 15(2), 75–81.

Suominen, O. (1999). Impact of cervid browsing and grazing on the terrestrial gastropod fauna in the boreal forests of Fennoscandia. Ecography, 22(6), 651–658.

Sverlova, N. V. (2006). On the distribution of some species of land molluscs on the territory of Ukraine. Ruthenica, Russian Malacological Journal, 16(1-2), 119–139.

Taybi, A. F., Glöer, P., & Mabrouki, Y. (2023). A new genus and new species of springsnails (Gastropoda, Hydrobiidae) from North-East Morocco. Nature Conservation Research, 8(3), 99–105. https://dx.doi.org/10.24189/ncr.2023.022

Turner, A. M., & Trexler, J. C. (1997). Sampling aquatic invertebrates from marshes: evaluating the options. Journal of the North American Benthological Society, 16(3), 694–709.

Udaloi, A.V. (2014). On the biotopic occurrence of the snail *Perpolita petronella* (Charpentier in L. Pfeiffer, 1853) in the south of Western Siberia. Modern problems of evolution and ecology, 28, 444–449.

Udaloi, A. V., & Lukyantsev, S. V. (2019). Distribution of slugs of the genus *Arion* Férussac 1819 (Pulmonata, Arionidae) in Western Siberia. Biology Bulletin, 46, 1052–1058.

Udaloi, A.V., & Novikov, E.A. (2003). To the fauna of slugs (Gastropoda, Pulmonata, Geophila) in the south of Western Siberia. Bulletin of Tomsk State University. Series "Biological Sciences", Appendix No. 8, 213–214.

Vorobjeva, L. V., & Chertoprud, E. S. (2023). General patterns of macrozoobenthos distribution in two rivers basins of the Khabarovsky Krai (Far East of Russia). Nature Conservation Research, 8(4), 21–35. https://dx.doi.org/10.24189/ncr.2023.028

Wallbrink, H., De Bruyne, R. H., & Eikenboom, J. C. A. (2001). Een nieuwe landslak voor Nederland: *Paralaoma servilis* (Shuttleworth, 1852) (Gastropoda, Pulmonata, Endodontidae). Basteria, 65(1/3), 89–92.

Ward, D. F., New, T. R. & Yen, A.L. (2001). Effects of pitfall trap spacing on the abundance, richness and composition of invertebrate catches. Journal of Insect Conservation, 5, 47–53. https://doi.org/10.1023/A:1011317423622

Wilson, M. J., Digweed, A. J., Brown, J., Ivanonva, E. S., & Hapca, S. H. (2015). Invasive slug pests and their parasites – temperature responses and potential implications of climate change. Biology and Fertility of Soils, 51, 739–748.

Woodcock, B. A. (2005). Pitfall trapping in ecological studies. In S. R. Leather (Ed.), Insect sampling in forest ecosystems (pp. 37–57). Blackwell Science Ltd.

Wolters, V., & Ekschmitt, K. (1997). Gastropods, isopods, diplopods, and chilopods: neglected groups of the decomposer food web. In G. Benckiser (Ed.), Fauna in soil ecosystems (pp. 279–320). CRC Press.

Appendix. List of mollusks collected in pitfall traps in 2022-2024

Succinea putris (Linnaeus, 1758) – **RM**: Romodanovo district, 1,3 km SE of Romodanovo settl., 13.06–11.07.2022, 1 (EL); Temnikov district, Mordovia State Nature Reserve, 01–20.08.2023, 4 (KT).

Cochlicopa nitens Gallenstein, 1852 – **RM**: Staroe Shaigovo district, 3 km NW of Bogdanovka vill., 17–22.07.2023, 1 (ME).

Cochlicopa lubricella (Porro, 1838) – **RM:** Atyashevo district, 2,5 km SW of Alasheevka vill., 16.07–16.08.2022, 4 (SL); 1 km NW of Dady vill., 16.07–16.08.2022, 6 (SL); **SR:** Stavropolsky district, Zhiguli Nature Reserve, Strelnaya Mountain, 20.05.2023, 1 (KT); Volzhsky district, Zhiguli Nature Reserve, Churokaika cordon, 20.5.2023, 1; 28.05.2023, 3 (KT); **UR:** Sengiley district, 1 km E of Nikolskoe vill., 08.08–17.09.2023, 1 (SL, EL).

Vallonia costata (Müller, 1774) – **RM:** Temnikov district, Mordovia State Nature Reserve, quarter 360, 14–18.06.2023, 1 (ME).

Vertigo antivertigo (Draparnaud, 1801) – **RM:** Temnikov district, Mordovia State Nature Reserve, (23–27.06.2023), 1 (ME).

Vertigo sp. – **RR:** Ermish district, Vysokoe vill, 05–14.07.2023, 2 (ME).

Columella edentula (Draparnaud, 1805) – **RM:** Temnikov district, Mordovia State Nature Reserve, (23–27.06.2023), 3 (ME); **RR:** Kadom district, 6.5 km N of Chermnye vill., 18–24.07.2023, 1 (AR).

Chondrula tridens (Müller, 1774) – **SR:** Stavropolsky district, Zhiguli Nature Reserve, Strelnaya Mountain, 20.05.2023, 14 (KT); Volzhsky district, Zhiguli Nature Reserve, Churokaika cordon, 20.05.2023, 5, 28.05.2023, 5 (KT); **UR:** Sengiley district, National Park «Sengileevskie Gory»: 2 km S of Shilovka vill., 08.05–10.06.2023, 1 (SL, EL); 1,5 km SSE of Shilovka vill., «Shilovskaya lesostep'», (23–27.06.2023), 1 (AN).

Cochlodina laminata (Montagu, 1803) – **RM:** Chamzinka district, 1,7 km of Komsomolskiy settl., 21.07–26.08.2022, 1 (MR); Temnikov district, Mordovia State Nature Reserve, Pushta settl., 23–27.06.2023, 3 (KT); Mordovia State Nature Reserve, (23–27.06.2023), 1 (ME);

Bulgarica cana (Held, 1836) – **RM:** Temnikov district, Mordovia State Nature Reserve, (23–27.06.2023), 1 (ME).

Punctum pygmaeum (Draparnaud, 1801) – **RM:** Tengushevo district, 3 km NE of Vedenyapino vill., 05–14.07.2023, 2 (ME); **RR:** Ermish district, Vysokoe vill., 05–14.07.2023, 1 (ME).

Discus ruderatus (Férussac, 1821) – **RM:** Atyashevo district, 1 km NW of Dady vill., 16.07–16.08.2022, 2 (SL); Romodanovo district, 1,5 km S of Romodanovo settl., 11.07–13.08.2022, 1 (EL).

Perpolita petronella (L. Pfeiffer, 1853) – **RM:** Romodanovo district, 1,5 km S of Romodanovo settl., 11.07–13.08.2022, 1 (EL).

Zonitoides nitidus (Müller, 1774) – **RM:** Temnikov district, Mordovia State Nature Reserve, Pushta settl., 23–27.06.2023, 1 (KT).

Deroceras sp. – **RM:** Saransk City district, 6 km NE of Makarovka vill., 24.06–25.07.2022, 2 (SL, EL); Lyambir' district, 0,7 km W of Pavlovka vill., 25.07–19.08.2022, 15 (SL, EL); Zubova Polyana district, 9 km N of Svezhenkaya settl., 07.06–11.07.2024, 11.07–11.08.2024, 14.08–19.09.2024, 23 (SL); VR**:** Novokhopyorsk district, Khopyor Nature Reserve, 3-4 km SSE of Varvarino settl., 18.04–18.05.2023, 1 (ME); **RR:** Kadom district, 6.5 km N of Chermnye, 18–24.07.2023, 1 (AR).

Deroceras agreste – **RM**: Atyashevo district, 2,5 km SW of Alasheevka vill., 16.07–16.08.2022, 2 (SL); Ichalki district, National Park "Smolny": Kemlya forestry, quarter 92, 13.07–13.08.2024, 13.08–09.10.2024, 11 (GS); quarter 92, near sanatorium "Alatyr", 14.08–09.10.2024, 2 (GS); Lyambir' district, 0,7 km W of Pavlovka vill., 24.06–25.07.2022, 2 (SL, EL); **LR:** Zadonsk district, 3 km S of Donskoe vill., 26.05–21.06.2023, 1 (ME); **NR**: Perevoz district, 1 km E of Ichalki vill., 19.08–21.09.2024, 1 (SL, EL); **TR:** Inzhavino district, Nikitino vill., 18.05–20.06.2023, 1 (ME); **UR:** Sengiley district, National Park «Sengileevskie Gory», 1 km SW of Lesnoy settl., 15.07–07.08.2023, 2 (SL, EL).

Deroceras leave – **RM:** Saransk City district, 6 km NE of Makarovka vill., 24.06–25.07.2022, 2 (SL, EL); Bolshie Berezniki district, 1,6 km NE of Russkie Naimany vill., 19.07–19.08.2022, 2 (SL, EL); Ichalki district, National Park "Smolny": Kemlya forestry, quarter 65, 22.06–14.07.2024, 13.08–11.10.2024, 2; quarter 92, near sanatorium "Alatyr", 29.04–29.05.2024, 21.06–13.07.2024, 5; quarter 94, Kalysha River, 07–19.06.2024, 2 (GS); **TR:** Petrovskoe district, Tynkovo vill., 27.05–20.06.2023, 2 (ME); Inzhavino district, 1 km E of Alekseevka vill., 19.07–21.08.2023, 1 (ME).

Limax (молодой) – **NR**: Vyksa City district, Dalnepesochnaya vill., 10.06–15.07.2024, 1 (SL, EL); **RM:** Ardatov district, 0,5 km SW Zharenki vill., 16.07–16.08.2022, 2 (SL); **RR**: Sasovo district, 1 km S of Krutoe vill., 06–12.07.2024, 2 (SL).

Limax cinereoniger Wolf, 1803 – **NR**: Perevoz district, 1 km W of Krasnaya Gorka settl., 13.05–16.06.2024, 1; Gagino district, 2 km SW of Kakino vill., 16.07–18.08.2024, 2 (SL, EL); **UR:** Sengiley district, National Park «Sengileevskie Gory»: 6 km S of Shilovka vill., 09.08–16.09.2023, 3; 4 km E of Tushna vill., 16.09–22.10.2023, 1 (SL, EL).

Arion sp. – **RM:** Bolshie Berezniki district, 9 km of Simkino vill., 25.06–18.07.2023, 1 (MM); Chamzinka district, Mokshaley vill., 15.05–11.07.2023, 1 (MR); Tengushevo district, Dachny settl., 27.05–18.06.2024, 1 (AR); **NR**: Perevoz district, 1 km W of Krasnaya Gorka settl., 16.07–19.08.2024, 1; 1 km E of Ichalki vill., 19.08–21.09.2024, 1 (SL, EL); **RR:** Sasovo district, Novye Vyselki vill., 18–24.07.2023, 1 (AR), 1 km S of Krutoe vill., 06.06–12.07.2024, 2 (SL); **TR:** Inzhavino district, 1,5 km NW of Karai-Saltykovo vill., 19.07–22.08.2023, 1 (ME); **UR:** Sengiley district, National Park «Sengileevskie Gory», 6 km NW of Golovka settl., 15.07–08.08.2023, 1 (SL, EL).

Arion fuscus (Müller, 1774) – **RM:** Saransk City district, 6 km NE of Makarovka vill., 17.05–25.07.2022, 4 (SL, EL); Kochkurovo district, 5,3 km N of Podlesnaya Tavla, 17.05–24.06.2022, 2 (SL, EL); Lyambir district, 0,7 km W of Pavlovka vill., 25.07–19.08.2022, 2 (SL, EL); Romodanovo district, 1,3 km of Romodanovo settl., 13.06–11.07.2022, 11.07–13.08.2022, 4 (EL); Bolshie Berezniki district, 7 km S of Simkino vill., 04.07–11.07.2022, 3 (SL); 9 km S of Simkino vill., 04.07–11.07.2022, 2 (SL); Temnikov district, Mordovia State Nature Reserve, Pushta settl., 23–27.06.2023, 1; 01–20.08.2023, 2 (KT); Chamzinka district, Gorbunovka vill., 10.07–25.08.2023, 12 (MR); Zubova Polyana district, 9 km N of Svezhenkaya settl., 07.06–11.07.2024, 2 (SL); Ichalki district, National Park "Smolny": Kemlya forestry, quart. 94, 24.04–24.05.2024, 2; 14.07–14.08.2024, 2; Kalysha River, 28.04.–18.05.2024, 1; 14.08.–11.10.2024, 1; quarter 65, Vasilyevskoye swamp, 27.05–22.06.2024, 1 (GS); Tengushevo district, Kulikovo vill, 25.04–27.05.2024, 5 (AR); Dachny settl., 25.04–27.05.2024, 8; 27.05–18.06.2024, 4 (AR); **VlR**: Vyazniki district, 1 km W of Novo vill., 02–29.06.2024, 2 (ME); **VR:** Novokhopyorsk district, Khopyor Nature Reserve, 4 km SSE of Varvarino settl., 18.04–18.05.2023, 21.06.–20.07.2023, 10 (ME); **LR:** Zadonsk district, 3 km S of Donskoe vill., 21.06–21.07.2023, 1 (ME); **NR:** Arsamas district, 4 km N of Rozhdestvensky Maidan vill., 16.07–19.08.2024, 1; Bolshoe Boldino district, 1 km NW of Novaya Sloboda vill., 14.05–16.06.2024, 5; Buturlino district, 2 km SE of Krutets, 16.06–16.07.2024, 5; Vyksa district, Dalnepesochnaya vill., 17.05–10.06.2024, 4; Gagino district, 2 km SW of Kakino vill., 16.07–18.08.2024, 1; Dalnee Konstantinovo district, 2 km N of Rumstikha vill., 16.07–19.08.2024, 2; Krasnooktyabrsky district: 3 km W of Zakharino vill., 14.05–15.06.2024, 1; Perevoz district, 3 km E of Ichalki vill., 13.05–16.06.2024, 19.08.–21.09.2024, 8; Krasnaya Gorka settl., 13.06–16.06.2024, 8; Pochinki district, 2 km N of Zhuravlikha, 18.06–21.09.2024, 1 (SL, EL); Ardatov district, Razmazley vill., 10.06.2024, 1; Voznesensk district, Voznesensk City, 10.06–08.07.2024, 2 (AR). **RR:** Sasovo district, Voskhod vill., 18–24.07.2023, 2 (AR); Kadom district, 6.5 km N of Chermnye, 18–24.07.2023, 1 (AR); Kasimov district, Chimur vill., 13.06.2023, 1 (AR); Miloslavskoe district, 1 km S of Arkhangelskoe vill., 26.05–21.06.2023, 2 (ME); Ryazhsk district, 2 km SE of Nagornoe

vill., 21.06–21.07.2023, 9 (ME); **SR:** Volzhsky District, Zhiguli Nature Reserve, Churokaika cordon, 02–08.05.2023, 1 (KT); **TR:** Petrovskoe District, Tynkovo vill., 27.05–20.06.2023, 2; Rasskazovo District, 2 km N of Kotovsk Town, 20.06–20.07.2023, 3; Inzhavino district, Nikitino vill., 18.05–20.06.2023, 19.07–21.08.2023, 8; 1,5 km NW of Olkhovka vill., 18.05–20.06.2023, 3; 1,5 km NW of Karai-Saltykovo vill., 19.05–20.06.2023, 19.07–22.08.2023, 3 (ME); **UR:** Sengiley district, 1 km NE of Nikolskoe vill., 08.08–17.09.2023, 1; National Park «Sengileevskie Gory»: 6 km S of Shilovka vill., 09.08–16.09.2023, 1; 6 km NW of Golovka settl., 09.05–15.07.2023, 6; 5 km N of Golovka settl., 11.06–15.07.2023, 9; 3 km NW of Karanino vill., 12.06–16.07.2023, 8; 4 km NW of Karanino vill., 12.06–16.07.2023, 1; 6 km NE of Karanino vill., 10.06–15.07.2023, 2; 4 km E of Tushna vill., 16.09–22.10.2023, 15; 4 km NE of Artyushkino vill., 12.06–14.07.2023, 1; 3 km NE of Artyushkino vill., 14.07–07.08.2023, 7; National Park «Sengileevskie Gory», 1 km SW of Lesnoy settl., 15.07–07.08.2023, 2 (SL, EL); Surskoe district, Sursky State Nature sanctuary, 27.06–29.08.2023, 6 (GS).

Arion fasciatus (Nilsson, 1823) – **RM:** Atyashevo district, 2 km N of Selischi vill., 12.06–16.07.2022, 1 (SL); Romodanovo district, Romodanovo settl., 10.05–13.06.2022, 1 (EL); Chamzinka district, 2,3 km NW of Kalinovka vill., 17.05–19.06.2022, 2 (MR), Chamzinka district, Mokshaley vill., 17.06–11.07.2023, 1 (MR); Temnikov district, Mordovia State Nature Reserve, Pushta settl., 23–27.06.2023, 5 (KT); Saransk City, 06.11.2023, 1 (DB); **RR:** Kadom district, 1 km W of Sumerki vill., 26–31.05.2023, 1; Sarai district, 1 km S of Nikolsky settl., 26.05–21.06.2023, 1; Ryazhsk district, 2 km SE of Nagornoe vill., 21.06.–21.07.2023, 10 (ME); **SR:** Volzhsky District, Zhiguli Nature Reserve, Churokaika cordon, 02–08.05.2023, 3 (KT); **TR:** Inzhavino district, Nikitino vill., 17.04–18.05.2023, 5 (ME); **UR:** Sengiley district, National Park «Sengileevskie Gory», 6 km NW of Golovka settl., 11.06–15.07.2023, 1 (SL, EL).

Fruticicola fruticum (Müller, 1774) – **RM:** Saransk City district, 6 km NE of Makarovka vill., 17.05–25.07.2022, 9 (SL, EL); Lyambir' district, 0,7 km W of Pavlovka vill., 24.06–25.07.2022, 2 (SL, EL); Bolshie Berezniki district, Simkino vill., 22.06–19.07.2022, 1 (SL, EL); Romodanovo district, 1,5 km S of Romodanovo settl., 11.07–13.08.2022, 5 (EL); Chamzinka district, Chamzinka settl., 22.07–27.08.2022, 1 (MR); Temnikov district, Mordovia State Nature Reserve: date?, 1 (ME); Pushta settl., 23–27.06.2023, 3 (KT), 01–20.08.2023, 8 (ME); Staroe Shaigovo district, Lemdyay vill., 05–14.07.2023, 3 (ME); **RR:** Shatsk district, Bolshoe Agishevo vill., 28.07–01.08.2023, 2 (AR); **UR:** Sengiley district, National Park «Sengileevskie Gory»: 6 km NW of Golovka settl., 11-22.07.2023, 1; 3 km NW of Karanino vill., 12.06–16.07.2023, 1; 5 km E of Tushna vill., 08.05–11.06.2023, 1; 1 km SW of Lesnoy settl., 15.07–07.08.2023, 1; 5 km SW of Shilovka vill., 09.08–16.09.2023, 1 (SL, EL).

Pseudotrichia rubiginosa (A. Schmidt, 1853) – **RM:** Saransk City district, 6 km NE of Makarovka vill., 17.05–25.07.2022, 5, (SL, EL); Romodanovo district, 1,5 km S of Romodanovo settl., 11.07–13.08.2022, 1 (EL); Temnikov district, Temnikov City, Moksha River, 23.08.2023, 1 (KT); Mordovia State Nature Reserve, Pushta settl., 01–08.08.2023, 4; 16–20.08.2023, 2 (KT); **RR:** Ermish district, Vysokoe vill., 05–14.07.2023, 1 (ME); **SR:** Volzhsky District, Zhiguli Nature Reserve, Churokaika cordon, 02–08.05.2023, 1 (KT).

Eumphalia strigella (Draparnaud, 1801) – **RM:** Saransk City district, 6 km NE of Makarovka vill., 17.05–24.06.2022, 25.07–19.08.2022, 5 (SL, EL); Chamzinka district, 2,3 km NW of Kalinovka vill., 19.06–26.08.2022, 2 (MR); Temnikov district, Mordovia State Nature Reserve, Pushta settl., 23–27.06.2023 (KT); **SR:** Volzhsky District, Zhiguli Nature Reserve, Churokaika cordon, 28.05.2023, 1 (KT); **UR:** Sengiley district, 1 km E of Nikolskoe vill., 08.08–17.09.2023, 2 (SL, EL); National Park «Sengileevskie Gory»: 5 km SW of Shilovka vill., 16.09–22.10.2023, 1; 6 km NW of Golovka settl., 09.05–11.06.2023, 1 (SL, EL); 1,5 km SSE of Shilovka vill., «Shilovskaya lesostep'», 1 (AN).