CONTRIBUTIONS TO THE KNOWLEDGE OF BEETLES (INSECTA: COLEOPTERA) FROM ORHEI NATIONAL PARK

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Abstract. The work includes 131 species of coleoptera, which belong to 84 genera and 15 families. Of these, 71 species are associated with dead wood. One family (Biphyllidae), two genera (Biphyllus and Bothrideres) and 3 species (*Biphyllus lunatus* (Fabricius, 1792), *Bothrideres bipunctatus* (Gmelin, 1790) and *Mycetina cruciata* (Schaller, 1783)) are new records to the fauna of the Republic of Moldova, while 18 species are identified in the Orhei National Park for the first time. The work represents an inventory of edaphic and saproxylic coleoptera species collected from the forest ecosystems of the Orhei National Park between 2007-2020 and January-March 2023.

Keywords: Coleoptera; saproxylic species, new records, inventory, Republic of Moldova.

Rezumat. Contribuții la cunoașterea coleopterelor (Insecta: Coleoptera) din Parcul Național Orhei. Lucrarea include 131 de specii de coleoptere, care fac parte din 84 de genuri și aparțin la 15 familii. Dintre acestea 71 de specii sunt asociate lemnului mort. O familie (Biphyllidae), două genuri (*Biphyllus* și *Bothrideres*) și 3 specii (*Biphyllus lunatus* (Fabricius, 1792), *Bothrideres bipunctatus* (Gmelin, 1790) și *Mycetina cruciata* (Schaller, 1783)) sunt la prima semnalare pentru fauna Republicii Moldova, iar 18 specii de coleoptere sunt noi pentru Parcul Național Orhei. Lucrarea reprezintă o inventariere a speciilor de coleoptere edafice și saproxilice colectate din ecosistemele forestiere ale Parcului Național Orhei între anii 2007-2020 și ianuarie-martie 2023.

Cuvinte cheie: coleoptere, specii saproxilice, noi semnalări, inventariere, Republica Moldova.

INTRODUCTION

Coleoptera are among the dominant groups of insects in forest ecosystems, and saproxylic species represent an important component of forest biodiversity, having a special role in the recycling of dead wood. The development cycle of saproxylic beetles is dependent on the quality and quantity of decaying wood, often heavily affected by mycelium.

The first species of Coleoptera from the territory of the Republic of Moldova were part of the work of MILLER & ZUBOWSKY (1917), which included species from various families, including those collected from dead wood. Afterwards, MEDVEDEV & SHAPIRO (1957) completed the list, adding new species. The study of coleoptera from the Republic of Moldova was carried out over the years by GILIAROV (1963); PLUGARU (1963, 1970); STRIGANOVA (1968); APOSTOLOV (1970); TOPCIEV (1970); OSTAFICIUC (1970); NECULISEANU et al. (1992a, 1992b, 2002), ANDREEV et al. (2001) and VEREȘCEAGHIN et al. (2003). The first inventory of coleopteran species from the Republic of Moldova was published in 2013 by BACAL et al.

The Orhei National Park was founded in 2022 and represents a protected natural area, which contributes to stopping the degradation of forest ecosystems, meadows and contributes to the protection of the flora and fauna characteristic of the existing habitats in the area. The Orhei National Park occupies an area of 33.8 thousand, including 18.5 thousand ha of forest belonging to the Orhei and Călărași forestry enterprises. The area includes 18 localities from four districts - Orhei, Strășeni, Călăraşi and Criuleni.

The study of the coleopteran fauna and ecology from the current territory of the Orhei National Park was carried out by BACAL & MUNTEANU (2013) and several vulnerable coleopteran species are mentioned in the work of Munteanu et al. (2011). Rare coleopteran species from this area are mentioned in the Red Book of the Republic of Moldova (2015), while species from Cerambycidae family stored in the entomological collections of the Entomology Museum of the Institute of Zoology, the National Museum of Ethnography and Natural History, the Museum of the State University of Moldova and the collection of the Institute of Genetics, Physiology and Plant Protection were published separately (BACAL et al., 2020).

The aim of this study was to inventory all coleopteran species identified on the territory of the Orhei National Park. The newly identified species discussed in this paper are accompanied by taxonomic, ecological, zoogeographical information, including the number of specimens, collection data, biology etc.

MATERIALS AND METHODS

The entomological collections were carried out in the forest ecosystems of the Orhei National Park, during the winter-spring period of 2023. The coleopteran specimens were extracted from wood in different stages of decomposition from the natural oak forest in the locality Donici on January 21, 2023 (marked in table 1 as I), March 15, 2023 (III) and from the natural deciduous forest from the locality Brănești on February 21, 2023 (II).

From the forests of localities Peresecina and Brănești, the materials were collected using the Barber trap method in the spring-summer period of 2007 year.

The forest vegetation of the Orhei National Park consists of several oaks species (*Quercus petraea*, *Quercus robur*) located on the plateau and on the slopes with northern exposure. Sessile oak mixed with hornbeam (*Carpinus betulus*) are found on on the slopes with north-east and east exposure. Sessile oak with linden (*Tilia tomentosa*) and ash (*Fraxinus excelsior*) are found on the slopes with south and south-west exposure. At lower altitudes, oak forests with hornbeam and sessile with pedunculate oaks are found. Willow forests (*Salix* sp.) were formed in the meadows of the medium-sized rivers Ichel, Cula, Vatici and Răut (MUNTEANU et al., 2011). For the taxonomic identification of coleopteran species, the morphological method was used using several determination keys (KRYZHANOVSKIY, 1965, http://coleonet.de/coleo/html/start.htm, https://www.kaefer-der- world. de/).

The identified species, after the quarantine period, will be placed in the collection of the Entomology Museum of the Institute of Zoology, SUM.

RESULTS AND DISCUSSION

As a result of the study, 353 specimens of coleoptera were collected, of which 251 specimens were collected in 2007 by the Barber method from the forests of Peresecina and Brănești, and 102 specimens of coleoptera were collected from dead wood during the winter- spring period of 2023 from the forests of Brănești and Donici.

In 2007, 42 species belonging to 24 genera and 7 families were collected from Brănești and Peresecina. In 2023, 24 species from 22 genera and 12 families were collected from decaying logs. One family Biphyllidae, two genera *Biphyllus* and *Bothrideres* and three species of coleoptera are new to the fauna of the Republic of Moldova and to Orhei National Park. The species - *Biphyllus lunatus* (Fabricius, 1792), *Bothrideres bipunctatus* (Gmelin, 1790) were collected from Brănești, and *Mycetina cruciata* (Schaller, 1783) from Donici localities (Table 1). Two other species - *Oxypselaphus obscurus* (Herbst, 1784) and *Badister sodalis* (Duftschmid, 1812) are at the first mention for Orhei National Park.

The most numerous between revealed coleopteran species belonged to the family Carabidae with 4 species and 4 genera, followed by the families Tenebrionidae and Coccinellidae with 3 species and 3 genera each, Elateridae with 3 species and one genus. Three families – Staphylinidae, Lucanidae and Endomychidae were represented by 2 species and 2 genera each, and 5 families – Biphyllidae, Bothrideridae Mycetophagidae, Silphidae, Silvanidae by one species and genus each.

The list of beetles collected by the direct method in 2023 from the forests of Brănești and Donici was included in Table 1. The coleoptera species selected from previously published bibliographic sources with reference to the Orhei National Park (localities Peresecina, Brănești, Trebujeni and Ivancea) were inluded in Table 2.

Table 1. Saproxylic beetles collected from Orhei National Park in 2023.

Family	Species	Locality		
		I	II	III
		Specimens		
Carabidae Latreille, 1802	**Carabus cancellatus* (Illiger, 1798)	2	-	1
	**Limodromus assimilis* (Paykull, 1790)	1	-	13
	**Oxypselaphus obscurus* (Herbst, 1784)	6	-	-
	Badister sodalis (Duftschmid, 1812)	1	-	-
Silphidae Latreille, 1806	**Phosphuga atrata* (Linnaeus, 1758)	1	1	-
Staphylinidae Latreille, 1802	**Xantholinus decorus* Erichson, 1839	-	1	1
	**Sepedophilus immaculatus* (Stephens, 1832)	-	-	12
Lucanidae Latreille, 1804	**Dorcus parallelipipedus* (Linnaeus, 1758)	2	-	-
	**Lucanus cervus* (Linnaeus, 1758)	1 (elytra)	-	1 (mandibles)
Elateridae Leach, 1815	**Ampedus rufipennis* (Stephens, 1830)	3	-	
	**Ampedus pomorum* (Herbst, 1784)	-	-	5
	**Ampedus sanguineus* (Linnaeus, 1758)	-	-	3
Biphyllidae Le Conte, 1861	***Biphyllus lunatus* (Fabricius, 1792)**	-	1	-
Silvanidae Kirby, 1837	**Uleiota planata* (Linnaeus, 1761)	4	8	-
Bothrideridae Erichson, 1845	***Bothrideres bipunctatus* (Gmelin, 1790)**	-	2	-
Endomychidae Leach, 1815	***Mycetina cruciata* (Schaller, 1783)**	8	-	-
	**Endomychus coccineus* (Linnaeus, 1758)	-	-	1 adult, 9 larvae
Mycetophagidae Leach, 1815	**Mycetophagus fulvicollis* (Fabricius, 1792)	-	1	-
Coccinellidae Latreille, 1807	*Coccinella septempunctata* (Linnaeus, 1758)	-	1	-
	Psyllobora vigintiduopunctata (Linnaeus, 1758)	-	2	-
	Halyzia sedecimguttata (Linnaeus, 1758)	-	2	-
Tenebrionidae Latreille, 1802	**Scaphidema metallicum* (Fabricius, 1792)	-	-	2
	**Stenomax aeneus* (Scopoli, 1763)	-	-	1
	**Uloma culinaris* (Linnaeus, 1758)	-	8	6

Legend: The species of saproxylic coleoptera are marked with an asterisk (*), and the new identified species and families for the fauna of the Republic of Moldova highlighted in bold, localities I, II, III see in materials and methods.

As a result of the researches carried out and the analysis of the literature data, a total of 131 species of coleopteran species were mentioned in the Orhei National Park, which belong to 84 genera and 15 families. Most of the identified species are from the families Cerambycidae – 64 species and 39 genera, Carabidae – 34 species and 16 genera. The Scarabaeidae family was represented by 7 species and 5 genera, Elateridae – 5 species and 3 genera, Tenebrionidae – 4 species and 4

genera, Coccinellidae and Silphidae families – 3 species and 3 genera each. Three families Staphylinidae, Lucanidae and Endomychidae were represented by 2 species and 2 genera, and 5 families Trogidae, Biphyllidae, Silvanidae, Bothrideridae and Mycetophagidae were represented by one species and one genus each.

Out of the total number of 131 species of coleopterans identified in decaying wood, only 71 species from 55 genera and 13 families are saproxylic species.

Table 2. List of coleopteran species cited from Orhei National Park (localities Ivancea, Peresecina and Trebujeni) and bibliographic sources.

Family	Species	Bibliography
Carabidae Latreille, 1802	*Abax carinatus* (Duftschmid, 1812)	Bacal, Munteanu, 2013
	Abax parallelepipedus (Piller & Mitterpacher, 1783)	Bacal, Munteanu, 2013
	Abax parallelus (Duftschmid, 1812)	Bacal, Munteanu, 2013
	Amara aenea (DeGeer, 1774)	Bacal, Munteanu, 2013
	Amara familiaris (Duftschmid, 1812)	Bacal, Munteanu, 2013
	Amara municipalis (Duftschmid, 1812)	Bacal, Munteanu, 2013
	Amara ovata (Fabricius, 1792)	Bacal, Munteanu, 2013
	Aptinus bombarda (Illiger, 1800)	Bacal, Munteanu, 2013
	Badister bipustulatus (Fabricius, 1792)	Bacal, Munteanu, 2013
	Calathus fuscipes (Goeze, 1777)	Bacal, Munteanu, 2013
	Calosoma inquisitor (Linnaeus, 1758)	Bacal, Munteanu, 2013
	Calosoma sycophanta Linnaeus, 1758	Munteanu et al., 2011; Cartea Roşie, 2015
	**Carabus cancellatus* (Illiger, 1798)	Bacal, Munteanu, 2013
	Carabus clathratus Linnaeus, 1761	Munteanu et al., 2011; Cartea Roşie, 2015
	Carabus convexus Fabricius, 1775	Bacal, Munteanu, 2013
	Carabus coriaceus Linnaeus, 1758	Bacal, Munteanu, 2013
	Carabus excellens Fabricius, 1798	Bacal, Munteanu, 2013
	Carabus ulrichii Germar, 1823	Bacal, Munteanu, 2013; Cartea Roşie, 2015
	Cychrus caraboides (Linnaeus, 1758)	Bacal, Munteanu, 2013
	Cychrus semigranosus Palliardi, 1825	Bacal, Munteanu, 2013
	Harpalus atratus Latreille, 1804	Bacal, Munteanu, 2013
	Harpalus cephalotes Fairmaire & Laboulbène, 1854	Bacal, Munteanu, 2013
	Harpalus distinguendus (Duftschmid, 1812)	Bacal, Munteanu, 2013
	Harpalus rufipes (DeGeer, 1774)	Bacal, Munteanu, 2013
	Harpalus tardus (Panzer, 1796)	Bacal, Munteanu, 2013
	Harpalus sp.	Bacal, Munteanu, 2013
	Licinus depressus (Paykull, 1790)	Bacal, Munteanu, 2013
	Nebria brevicollis (Fabricius, 1792)	Bacal, Munteanu, 2013
	Ophonus azureus (Fabricius, 1775)	Bacal, Munteanu, 2013
	Ophonus rufibarbis (Fabricius, 1792)	Bacal, Munteanu, 2013
	Pterostichus melas (Creutzer, 1799)	Bacal, Munteanu, 2013
Silphidae Latreille, 1806	*Nicrophorus vespilloides* Herbst, 1783	Bacal, Munteanu, 2013
	Silpha obscura Linnaeus, 1758	Bacal, Munteanu, 2013
Trogidae MacLeay, 1819	*Trox sabulosus* (Linnaeus, 1758)	Bacal, Munteanu, 2013
Lucanidae Latreille, 1804	**Lucanus cervus* (Linnaeus, 1758)	Munteanu et al., 2011; Bacal, Munteanu, 2013; Cartea Roşie, 2015; Bacal et al., 2018
Scarabaeidae Latreille 180	*Aphodius fossor* (Linnaeus, 1758)	
	Aphodius prodromus (Brahm, 1790)	Bacal, Munteanu, 2013
	Aphodius sticticus Panzer, 1798	Bacal, Munteanu, 2013
	Cetonia aurata (Linnaeus, 1758)	Bacal, Munteanu, 2013
	Onthophagus coenobita (Herbst, 178)	Bacal, Munteanu, 2013
	Osmoderma barnabita Motschulsky, 1845	Bacal, Munteanu, 2013
	Oryctes nasicornis (Linnaeus, 1758)	Bacal, Munteanu, 2013
Elateridae Leach, 1815	**Porthmidius austriacus* Schrank, 1781	Cartea Roşie RM, 2015, Bacal et al., 2018
	**Isnoides sanguinicollis* Panzer, 1793	Cartea Roşie, 2015
Tenebrionidae Latreille, 1802	*Opatrum sabulosum* (Linnaeus, 1761)	Bacal, Munteanu, 2013
	**Stenomax aeneus* (Scopoli, 1863)	Bacal, Munteanu, 2013
Cerambycidae Latreille, 1802	**Aegosoma scabricorne* (Scopoli, 1763)	Bacal et al., 2020
	Agapanthia asphodeli (Latreille, 1804)	Bacal et al., 2020
	Agapanthia villosoviridescens (DeGeer, 1775)	Bacal et al., 2020
	Agapanthia violacea (Fabricius, 1775)	Bacal et al., 2020
	**Alosterna tabacicolor* (DeGeer, 1775)	Bacal et al., 2020
	**Anaglyptus mysticus* (Linnaeus, 1758)	Bacal et al., 2020
	**Aromia moschata* (Linnaeus, 1758)	Cartea Roşie, 2015; Bacal et al., 2020
	**Callidium violaceum* (Linnaeus, 1758)	Bacal et al., 2020
	**Cerambyx cerdo* (Linnaeus, 1758)	Munteanu et al., 2011; Cartea Roşie, 2015; Bacal et al., 2020
	**Cerambyx scopolii* (Fuessly, 1775)	Bacal et al., 2020
	**Chlorophorus figuratus* (Scopoli, 1763)	Bacal et al., 2020

	**Chlorophorus herbsti* (Brahm, 1790)	Bacal et al., 2020
	**Chlorophorus sartor* (Müller, 1766)	Bacal et al., 2020
	**Chlorophorus varius* (Müller, 1766)	Bacal et al., 2020
	**Dinoptera collaris* (Linnaeus, 1758)	Bacal et al., 2020
	Dorcadion caucasicum (Küster, 1847)	Bacal et al., 2020
	Dorcadion decipiens (Germar, 1824)	Bacal et al., 2020
	Dorcadion fulvum (Scopoli, 1763)	Bacal et al., 2020
	Dorcadion holosericeum (Krynicky, 1832)	Bacal et al., 2020
	Dorcadion pedestre (Poda, 1761)	Bacal et al., 2020
	Dorcadion tauricum (Waltl, 1838)	Bacal, Munteanu, 2013; Bacal et al., 2020
	**Exocentrus adspersus* (Mulsant, 1846)	Bacal et al., 2020
	**Exocentrus lusitanus* (Linnaeus, 1767)	Bacal et al., 2020
	**Hylotrupes bajulus* (Linnaeus, 1758)	Bacal et al., 2020
	**Isotomus speciosus* (Schneider, 1787)	Bacal et al., 2020
	**Leptura aurulenta* (Fabricius,1792)	Bacal et al., 2020
	**Leptura quadrifasciata* (Linnaeus, 1758)	Bacal et al., 2020
	**Mesosa curculionoides* (Linnaeus, 1761)	Bacal et al., 2020
	**Mesosa nebulosa* (Fabricius, 1781)	Bacal et al., 2020
	**Morimus asper funereus* (Mulsant, 1863)	Munteanu et al., 2011; Cartea Roșie, 2015; Bacal et al., 2020
	**Necydalis major* (Linnaeus, 1758)	Bacal et al., 2020
	Neodorcadion bilineatum (Germar, 1824)	Bacal et al., 2020
	**Obrium brunneum* (Fabricius, 1792)	Bacal et al., 2020
	**Obrium cantharinum* (Linnaeus, 1767)	Bacal et al., 2020
	**Pachytodes erraticus* (Dalman, 1817)	Bacal et al., 2020
	**Palaeocallidium coriaceum* (Paykull, 1800)	Bacal et al., 2020
	**Paraphymatodes fasciatus* (Villers, 1789)	Bacal et al., 2020
	Phytoecia caerulescens (Scopoli, 1763)	Bacal et al., 2020
	Phytoecia cylindrica (Linnaeus, 1758)	Bacal et al., 2020
	Phytoecia nigricornis (Fabricius, 1781)	Bacal et al., 2020
	Phytoecia virgula (Charpentier, 1825)	Bacal et al., 2020
	**Plagionotus arcuatus* (Linnaeus, 1758)	Bacal et al., 2020
	**Plagionotus detritus* (Linnaeus, 1758)	Bacal et al., 2020
	**Pogonocherus hispidulus* (Piller et Mitterpacher, 1783)	Bacal et al., 2020
	**Prionus coriarius* (Linnaeus, 1758)	Bacal et al., 2020
	Pseudovadonia livida (Fabricius, 1776)	Bacal et al., 2020
	**Purpuricenus kaehleri* (Linnaeus, 1758)	Bacal et al., 2020
	**Rhagium inquisitor* (Linnaeus, 1758)	Bacal et al., 2020
	**Rhagium sycophanta* (Schrank, 1781)	Bacal et al., 2020
	**Ropalopus clavipes* (Fabricius, 1775)	Bacal et al., 2020
	**Ropalopus macropus* (Germar, 1824)	Bacal et al., 2020
	**Rosalia alpina* (Linnaeus, 1758)	Cartea Roșie, 2015; Bacal et al., 2020
	**Rutpela maculata* (Poda, 1761)	Bacal et al., 2020
	**Saperda punctata* (Linnaeus, 1767)	Bacal et al., 2020
	**Stenocorus meridianus* (Linnaeus, 1758)	Bacal et al., 2020
	**Stenocorus quercus* (Götz, 1783)	Bacal et al., 2020
	**Stenurella bifasciata* (Müller, 1776)	Bacal et al., 2020
	**Stenurella melanura* (Linnaeus, 1758)	Bacal et al., 2020
	**Stenurella nigra* (Linnaeus, 1758)	Bacal et al., 2020
	**Stenurella septempunctata* (Fabricius, 1793)	Bacal et al., 2020
	**Strangalia attenuata* (Linnaeus, 1758)	Bacal et al., 2020
	**Tetropium fuscum* (Fabricius, 1787)	Bacal et al., 2020
	**Tetrops praeustus* (Linnaeus, 1758)	Bacal et al., 2020
	**Xylotrechus antilope* (Schönherr, 1817)	Bacal et al., 2020

Legend: Saproxylic coleoptera species are marked in the table 2 with an asterisk (*).

Description of new species for the fauna of the Republic of Moldova

Family Biphyllidae LeConte, 1861

Genus *Biphyllus* Dejean, 1821

Biphyllus lunatus (Fabricius, 1792) – 1 ex., 21.02.2023, Brănești (Photo 1).

Synonymy: *Dermestes lunatus* Fabricius, 1787

Ecology and biology: the species was collected from an ash trunk (*Fraxinus excelsior*) affected by the fungus *Daldinia concentrica*. It is a dendrophilous and mycetophagous species (***. https://www.ukbeetles.co.uk/).

Distribution: Austria, Belarus, Belgium, Great Britain, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, European Turkey, Finland, France, Germany, Greece, Hungary, Italy, North Africa, Norway, Lithuania, Russia, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Holland, Ukraine, Yugoslavia (***. https://fauna-eu.org/).

Family Bothrideridae Erichson, 1845
Genus *Bothrideres* Dejean, 1835
Bothrideres bipunctatus (Gmelin, 1790) – 2 ex., 21.02.2023, Brănești (Photo 2).
Synonymy: *Bothrideres contractus* (Fabricius, 1792)
Ecology and biology: relict species, in primary forests, with a wide distribution throughout Europe, in deciduous forests, very rare (***. https://coleonet.de/coleo/texte/bothrideres.htm).
Distribution: Austria, Belarus, Belgium, Great Britain, Bulgaria, Croatia, Czech Republic, Denmark, European Turkey, France, Germany, Greece, Hungary, Italy, Lithuania, Russia, Poland, Portugal, Romania, Spain, Switzerland, Ukraine, Yugoslavia (***. https://fauna-eu.org/).

Family Endomychidae Leach, 1815
Genus *Mycetina* Mulsant, 1846
Mycetina cruciata (Schaller, 1783) – 8 ex., 21.01.2023, Donici (Photo 3).
Synonymy: *Mycetina balanca* Csiki, 1900, *Mycetina binotata* Costa, 1854, *Mycetina fussi* Csiki, 1900, *Mycetina interrupta* Gredler, 1870, *Opatrum lithophila* Herbst, 1783, *Phaeomychus cruciata* (Schaller, 1783), *Chrysomela cruciata* Schaller, 1783.
Ecology and biology: species characteristic to deciduous forests, less often present in mixed ones. Adults live in damp linden wood, rotten and infested with mold and xylophagous fungi (KRYZHANOVSKIY, 1965).
Distribution: Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Holland, Ukraine, Yugoslavia (***. https://fauna-eu.org/).

The study made it possible to highlight 131 species of coleoptera belonging to 84 genera and 15 families identified so far in the current territory of the Orhei National Park. Among them, 71 species from 55 genera and 13 families are saproxylic species.

The Biphyllidae family, the Biphyllus genus and the *Biphyllus lunatus* species (Fabricius, 1792) are first mentioned both for the Orhei National Park and for the fauna of the Republic of Moldova.

The Bothrideridae family is represented in the fauna of the Republic of Moldova by 2 species. Both were recently collected. The first of them, *Oxylaemus cylindricus* (Creutzer in Panzer, 1796), was collected using the flight interception trap mounted on the trunk of a dry tree in the Plaiul Fagului Nature Reserve in 2022, when the *Bothrideres* genus and the *Bothrideres bipunctatus* species (Fabricius, 1792) were collected manually under the bark of a deciduous tree trunk in the Orhei National Park, being the first mention in the fauna of the Republic of Moldova.

The Endomychidae family is represented in the fauna of the Republic of Moldova by 5 species. Among the first, *Lycoperdina succincta* (Linnaeus, 1767) was collected in the municipality of Chișinău (MILLER & ZUBOWSKY, 1917), then taken over by MEDVEDEV & SHAPIRO (1957) and also mentioned in the Catalogue of the N. Zubowsky entomological collection (DERJANSCHI et al., 2016).

In 2016, two other species from this family were identified - *Endomychus armeniacus* Motschulsky, 1835 from the Pădurea Domnească Nature Reserve (BACAL & COCIRTA, 2015) and *Symbiotes gibberosus* (Lucas, 1846) from the Plaiul Fagului Nature Reserve (BACAL, 2016).

Specimens of *Endomychus coccineus* (Linnaeus, 1758) collected from Bularda in 1927 were included in the Catalogue of the N. Zubowsky entomological collection (DERJANSCHI et al., 2016).

The last species in this family - *Mycetina cruciata* (Schaller, 1783), was collected in 2023, from decaying ash wood in the Orhei National Park.

Even if *Mycetina cruciata* appears on the website https://fauna-eu.org/ as present in the fauna of the Republic of Moldova, the species was not mentioned in any faunal work in the country or abroad. Specimens of this species are not found in any existing entomological collections in the Republic of Moldova. The species is present in Romanian Moldova, a fact that could lead to possible confusion.

In the Red Book of the Republic of Moldova (2015) the following rare species are mentioned as being present on the territory of the Orhei National Park: *Calosoma sycophanta*, *Carabus clathratus*, *C. ullrichii*, *Lucanus cervus*, *Oryctes nasicornis*, *Osmoderma barnabita*, *Ischnodes sanguinicollis*, *Porthmidius austriacus*, *Aromia moschata*, *Cerambyx cerdo*, *Morimus asper funereus, Purpuricenus kaehleri* and *Rosalia alpina*. Among them, only five species *Calosoma sycophanta*, *Carabus clathratus*, *C. ullrichii*, *Lucanus cervus* and *Morimus asper funereus* were reconfirmed, the other species were not detected for a long time in the Orhei National Park due to climate change and anthropogenic impact.

CONCLUSIONS

Investigations carried out in 2023 allowed the identification of a family Biphyllidae Le Conte, 1861, two genera *Biphyllus* and *Bothrideres* and three species *Biphyllus lunatus*, *Bothrideres bipunctatus* and *Mycetina cruciata* associated with dead wood are new for Orhei National Park and for the fauna of the Republic of Moldova. Other 18 species were identified for the first time in the Orhei National Park.

The newly identified species confirm the fact that the Orhei National Park is an area of major importance, where numerous species, including rare ones for the Republic of Moldova, find favorable conditions for development, the area being of particular importance for the protection and restoration of biodiversity.

The study was carried out within the projects: 22.00208.7007.05/PD 1 "*Saproxylic beetles (Insecta) from the Republic of Moldova: taxonomy, ecology, zoogeography and importance*" and 20.80009.7007.02 "*Evolutionary changes of the economically important terrestrial fauna, of rare and protected species under the conditions of anthropogenic and climatic changes*".

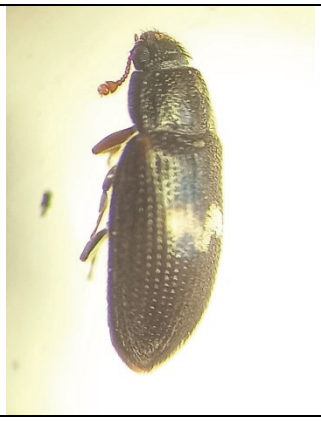

Photo 1. *Biphyllus lunatus* (original)

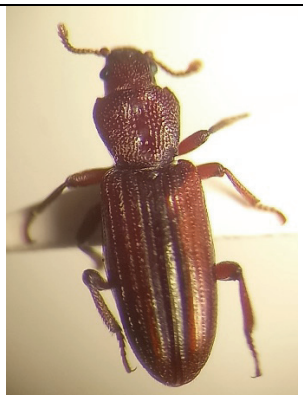

Photo 2. *Bothrideres bipunctatus* (original)

Photo 3. *Mycetina cruciata* adult and larvae (original)

REFERENCES

BACAL S., BURDUJA D., BUȘMACHIU G., CEBOTARI C. 2020. Longhorn beetle (Coleoptera: Cerambycidae) in the entomological collections of the Republic of Moldova. *Folia entomologica hungarica*. **81**: 43-72. DOI: 10.17112/FoliaEntHung.2020.81.43 (Accessed: January 10, 2023).

BACAL S., BABAN E., MIHAILOV I., VERINGĂ T. 2018. Fauna unor grupe de coleoptere din regiunea de dezvoltare centru a Republicii Moldova. *Biodiversitatea în contextul schimbărilor climatice*. Ediția a II-a. Materialele Conferinței științifice cu participare internațională. Edit. Biotehdesign. Chișinău: 8-11.

BACAL S. 2016. Contribuții la studiul coleopterelor din familia Endomychidae în Republica Moldova. In: *Ştiinţa în nordul Republicii Moldova: realizări, probleme, perspective: conf. naţ. cu participare intern. consacrată aniversărilor de 70 de ani de la constituirea Instituţiilor de Cercetare Ştiinţifică din Moldova, 55 de ani de la fondarea Academiei de Ştiinţe a Moldovei, 10 ani de la fondarea Filialei Bălţi a Academiei de Ştiinţe a Moldovei*, ed. a 2-a, (29-30 sept.). Edit. Foxtrot. Bălţi: 152-154.

BACAL S. & COCIRTA P. 2015. Data on the Coleoptera insects associated with dead wood in the Republic of Moldova. *Drobeta, Seria Ştiinţele Naturii*. Muzeul Regiunii Porţilor de Fier. Drobeta Turnu Severin. **25**: 76-86.

BACAL S. & MUNTEANU N. 2013. Coleoptere edafice din unele ecosisteme forestiere din Republica Moldova. *Conferința Științifică cu participare internațională, dedicată aniversării a 60 de ani de la fondarea IPAPS "N. Dimo" Cernoziomurile Moldovei – evoluția, protecția și restabilirea fertilității lor*. Edit. Reclama. Chișinău, Republica Moldova. 64-69.

BACAL S., MUNTEANU N., TODERAŞ I. 2013. Checklist of beetles (Insecta: Coleoptera) of the Republic of Moldova. *Brukenthal Acta Musei*. Sibiu. **8**(3): 415-450.

DERJANSCHI V., BABAN E., CALESTRU L., STAHI N., ŢUGULEA C. 2016. *Catalogue of the N. Zubowsky entomological collection*. Academy of Sciences of Moldova, National Museum of Ethnography and Natural History, Institute of Zoology. Edit. Bons Offices, Chișinău. 296 pp.

MEDVEDE S. & SHAPIRO D. 1957. To the knowledge of beetles fauna (Coleoptera) of the Moldavian Soviet Socialist Republic and the neighboring regions of Ukraine. In: *Scientific works oh the IBF*. Harikov. Ukarine. **30**: 173-206. (Медведев С. И., Шапиро Д. С. К познанию фауны жуков (Coleoptera) Молдавской ССР и сопредельных районов Украины // Учён. зап. Харьков. ун–та. — 1957. — Т. 90: Тр. НИИ биол. и биол. фак., Т. 30. — С. 173–206.).

MILLER E. & ZUBOWSKY N. 1917. Materials on the entomological fauna of Bessarabia. In. *Proceedings of the Bessarabian Society Naturalists and Life Science Amateurs*. Typography Bessarabian Provincial Board. Chișinău. **2**(1): 32-150.

MUNTEANU A., COVALI V., ŢÎCU L., DERJANSCHI V., ROTARU A. 2011. *Valori naturale ale Parcului Naţional Orhei*. https://www.undp.org/sites/g/files/zskgke326/files/migration/md/ORhei.pdf (Accessed at March 10, 2023).

NECULISEANU Z., DĂNILĂ A., BABAN E., NECULISEANU Z. (JUN.). 2002. *Nevertebratele saproxilice şi pădurile de importanţă internaţională din rezervaţiile ştiinţifice „Pădurea Domnească" şi „Plaiul Fagului"*. Edit. Reclama. Chişinău. 75 pp.

NECULISEANU Z., STRATAN V., VEREŞCIAGHIN B. 1992a. Insecte incluse în Cartea Roşie a Moldovei. În: *Ecologia şi protecţia mediului înconjurător în Republica Moldova*. Edit. Ştiinţa. Chişinău. 74 pp.

NECULISEANU Z., STRATAN V., VEREŞCIAGHIN B., OSTAFICIUC V. 1992b. *Insectele rare şi pe cale de dispariţie din Moldova*. Edit. Ştiinţa. Chişinău. 120 pp.

VEREȘCEAGHIN B., OSTAFICIUC V., POIRAS A. 2003. Cu privire la susținerea biodiversitâții entomofaunei din pădurile Moldovei. In: *Ecologia, evoluția și ocrotirea diversității regnului animal și vegetal.* Edit. Academia de Științe a Moldovei. Chișinău: 294-295.

ANDREEV A., GORBUNENKO P., TROMBITSKIY I., KOKA M., NEKULISYANU Z. 2001. Sokhraneniye biologicheskogo i landshaftnogo raznoobraziya. B: *Akademiku L.S. Bergu – 125 let*, *Sbornik nauchnykh statey*. Edit. Biotica. Bendery: 153-215.

APOSTOLOV A. 1970. Dendrofyl′naya éntomofauna herbovetskoho lesa. B: *Herbovetskyy les.* Edit. Kartya Moldovenyaske. Kyshynev: 213-223.

GILIAROV M. S. 1963. Pochvennaya fauna kak pokazatel' rasprostraneniya burozemov v Moldavskikh Kodrakh. B: *Zoological Journal*. Edit. the Russian Academy of Sciences (Moscow). **42**(8): 1135-1141.

OSTAFICIUC V. 1970. Osobennosti raspredeleniya zhukov-shchelkunov po landshaftnym zonam Moldavii. B: *Fauna Moldavii i yeyo okhrana*. Edit. Kartya Moldovenyaske. Kishinev: 103-104.

PLUGARU S. 1963. Nekotoryye rezul'taty izucheniya entomofauny duba v lesakh Moldavii. B: *Vrednaya entomofauna Moldavii i mery bor'by s nei*. Edit. Kartya Moldovenyaske. Kishinev: 17-25.

PLUGARU S. 1970. O zoogeograficheskikh elementakh v entomofaune duba Moldavii. B: *Fauna Moldavii i yeyo okhrana. Materialy dokladov pervoy respublikanskoy Mezhvuzovskoy nauchno-prakticheskoy konferentsii*. Edit. Kartya Moldovenyaske. Kishinev: 97-98.

STRIGANOVA A. 1968. Kompleksy pochvoobitayushchikh bespozvonochnykh v poyme srednego techeniya Dnestra. *B: Zool., zhurn*. Edit. Kartya Moldovenyaske. Kishinev. **47**(3): 360-368.

TOPCIEV A. T. 1970. Raspredeleniye pochvoobitayushchikh bespozvonochnykh v Gerbovetskom lesu. B: *Gerbovetskiy les*. Edit. Kartya Moldovenyaske. Kishinev: 243-254.

KRYZHANOVSKIJ O. L. 1965. Opredelitel' nasekomyh Evropejskoj chasti SSSR. *Zhestkokrylye i veerokrylye*. AN SSSR. Edit. "Nauka". Moskva-Leningrad. **2**: 668.

***. 2015. *Cartea Roșie a Republicii Moldova*. Edit. Știința. Chișinău. **3**. 492 pp.

***. http://coleonet.de/coleo/html/start.htm (Accessed: January 15, 2023).

***. https://fauna-eu.org/ (Accessed: January 24, 2023).

***. https://www.kaefer-der-welt. de/ (Accessed: January 15, 2023).

***. https://www.ukbeetles.co.uk/ (Accessed: January 15, 2023).

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