

**CONTRIBUTIONS TO THE KNOWLEDGE OF MOTHS
(LEPIDOPTERA: BOMBYCOIDEA, LASIOCAMPOIDEA,
HEPIALOIDEA, ZYGAENOIDEA, COSSOIDEA, THYRIDOIDEA,
DREPANOIDEA, PYRALOIDEA) FROM ORHEI NATIONAL
PARK**

**CONTRIBUȚII LA CUNOAȘTEREA FLUTURILOR NOCTURNI
(LEPIDOPTERA: BOMBYCOIDEA, LASIOCAMPOIDEA, HEPIALOIDEA,
ZYGAENOIDEA, COSSOIDEA, THYRIDOIDEA, DREPANOIDEA,
PYRALOIDEA) DIN PARCUL NAȚIONAL ORHEI**

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Sumar. *Lucrarea prezintă diversitatea faunistică a fluturilor nocturne (Lepidoptera: Bombycoidea, Lasiocampoidea, Hepialoidea, Zygaenoidea, Cossioidea, Thyridoidea, Drepanoidea, Pyraloidea) din Parcul Național Orhei. În rezultatul cercetărilor efectuate, în Parcul Național Orhei au fost identificate 78 de specii de fluturi nocturni ce aparțin la 13 familii: Hepialidae (3 specii), Limacoidae (2), Zygaenidae (12), Cossidae (5), Sesiidae (5), Thyrididae (1), Crambidae (2), Drepanidae (16), Lasiocampidae (11), Brahmaeidae (2), Endromidae (1), Saturniidae (1) și Sphingidae (17 specii). Șapte specii sunt rare și protejate de legislația Republicii Moldova: Saturnia pyri (Denis, Schiffermüller, 1775) din familia Saturniidae, Acherontia atropos (Linnaeus, 1758), Dolbina elegans A. Bang-Haas, 1912, Marumba quercus (Denis, Schiffermüller, 1775) și Proserpinus proserpina (Pallas, 1772) din familia Sphingidae, Callimorpha dominula (Linnaeus, 1758) și Euplagia quadripunctaria (Poda, 1761) din familia Erebidae. Cercetările au fost efectuate în diverse localități ale Parcului Național Orhei (Ivancea, Vatici, Trebujeni, Romanești, Țigănești, Peresecina, Butuceni, Bravicea și Seliște) în perioada de vegetație a anilor 2012-2025.*

Cuvinte-cheie: *diversitate, fluturi nocturni, Lepidoptera, Parcul Național Orhei.*

INTRODUCTION

In the fauna of the Republic of Moldova, over 1000 species of macrolepidoptera from various families have been recorded and published so far. Of these, over 140 species of diurnal butterflies and over 1000 species are represented by nocturnal lepidopteran species [1, p. 99].

The interest for the knowledge of Lepidoptera systematic group was manifested in Moldova from the beginning of the 20th century. The first catalogue for the Moldova

Lepidoptera was published by Miller and Zubowsky in the first number of the journal “*Works of the Bessarabian Society of Natural Scientists and Amateurs of Natural History*” in 1908. A great value for butterfly fauna is the work of Miller and Zubowsky, later joined by Ruscinski, who published a series of articles between 1908-1937, with a major impact on the study of butterflies, registering many species for the territory of Bessarabia and being the first and some of most valuable taxonomic works for this purpose [1, p. 99-106]. The study of diurnal butterflies in Orhei National Park reveals a significant number, 94 species, which represent 68% of the total number of diurnal butterfly species in the fauna of the Republic of Moldova [1, p. 99]. These are some of the few works where we can find mentions of some species reported on the territory of the park.

The science popularization brochure “*Valori naturale ale Parcului Național Orhei*” mentioned species included in the Red Book of the Republic of Moldova and various Red Lists at the European and world level, such as *Callimorpha quadripunctaria*, *Acherontia atropos*, *Saturnia pyri*, *Dolbina elegans*, *Iphiclides podalirius*, *Parnassius mnemosyne*, *Zerynthia polyxena*, *Parnassius mnemosyne* and *Zerynthia polyxena* and 3 species included in Annexes II and IV to the European Habitat Directive – *Callimorpha quadripunctaria*, *Parnassius mnemosyne*, *Zerynthia polyxena* [2].

The aim of this research was to inventory and study the species of moths identified on the territory of the Orhei National Park, especially the identification and study of rare and new species that require protection and conservation. This article is a continuation of a series of works dedicated to the study of lepidoptera in Orhei National Park. This article contributes to the understanding of the distribution of lepidopteran species in the Republic of Moldova and Europe.

MATERIAL AND METHODS

The Orhei National Park is located in the central area of the Republic of Moldova, with an area of 33,792.09 ha, constitutes about 1% of the area of the Republic of Moldova, including four districts: Orhei, Strășeni, Călărași and Criuleni and 18 localities. From the entire surface of the park, 18.5 thousand ha consists of forests belonging to the Orhei and Călărași forestry enterprises. The Orhei National Park is located in the Codrilor Plateau (90.7%) and in the silvosteppe region (9.3%). The slopes of the Codrii heights are characterized by a sandy relief, represented by narrow ridges, deep valleys and hills. The landscape of the park is hilly, partly covered with forest. The territory is crossed by valleys and the Răut River flows through the park. 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 [3, 4]. Even though the territory of Orhei National Park is located in the central part of the Republic of Moldova, an area with a rich natural heritage, the diversity of insect species in this area is insufficiently studied.

The forest vegetation of the Orhei National Park consists of several oak species (*Quercus petraea*, *Quercus robur*) located on the plateau and on the slopes with north-east exposure. Sessile oak mixed with hornbeam (*Carpinus betulus*) are found 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 [2].

The research was carried out during the vegetation period of 2012-2025. The entomological material was collected in different habitats of the Orhei National Park, like forests, forest edges, meadows and calcareous canyons from 9 localities on the territory of the Orhei National Park: Ivancea (Orhei district), Vatici (Orhei district), Trebujeni (Orhei district), Romanești (Strășeni district), Țigănești (Strășeni district), Peresecina (Orhei district), Butuceni (Orhei district), Bravicea (Călărași district) and Seliște (Orhei district).

The moths collections were carried out from March to November by the following methods: manual collection, with the entomological net, at the standard electric lamp (100 W), with the help of an illuminated white cloth and by installing ultraviolet and white light traps. The nomenclature and classification was given according to sources [5, 6, 7]. We have also made genitalia examination for species that are difficult to determine.

RESULTS AND DISCUSSION

The variety of landscapes, the favorable climatic conditions and the diverse spatial structure of the habitats have created optimal conditions for the existence and successful reproduction of butterfly populations on the territory of the Orhei National Park. As a result of the researches carried out, a total of 78 species of moths were identified in Orhei National Park, belonging to 13 families: Hepialidae (3 species), Limacoidae (2), Zygaenidae (12), Cossidae (5), Sesiidae (5), Thyrididae (1), Crambidae (2), Drepanidae (16), Lasiocampidae (11), Brahmeidae (2), Endromidae (1), Saturniidae (1) and Sphingidae (17 species) (table 1).

Table 1. The diversity of moth (Lepidoptera: Bombycoidea, Lasiocampoidea, Hepialoidea, Zygaenoidea, Cossioidea, Thyridoidea, Drepanoidea, Pyraloidea) from the Orhei National Park

No.	Species	Collection sites								
		Ivancea	Vatici	Trebujeni	Romanești	Țigănești	Peresecina	Butuceni	Bravicea	Seliște
SUPERFAMILY BOMBYCOIDEA LATREILLE, 1802										
Family Brahmaeidae Swinhoe, 1892										
1.	<i>Lemonia dumi</i> (Linnaeus, 1761)	+								
2.	<i>Lemonia taraxaci</i> (Denis, Schiffermüller, 1775)	+								
Family Endromidae Boisduval, 1828										
3.	<i>Endromis versicolora</i> (Linnaeus, 1758)	+								
Family Saturniidae Boisduval, 1837										
4.	<i>Saturnia pyri</i> (Denis, Schiffermüller, 1775)					+				+
Family Sphingidae Latreille, 1802										
5.	<i>Acherontia atropos</i> (Linnaeus, 1758)					+				
6.	<i>Agrius convolvuli</i> (Linnaeus, 1758)	+	+	+	+	+	+	+	+	+
7.	<i>Deilephila elpenor</i> (Linnaeus, 1758)	+	+			+				+
8.	<i>Deilephila porcellus</i> (Linnaeus, 1758)	+	+			+	+		+	+
9.	<i>Dolbina elegans</i> A. Bang-Haas, 1912					+				
10.	<i>Hemaris tityus</i> (Linnaeus, 1758)									+
11.	<i>Hyles gallii</i> (Rottemburg, 1775)									+
12.	<i>Hyles euphorbiae</i> (Linnaeus, 1758)	+								
13.	<i>Hyles livornica</i> (Esper, 1780)	+								
14.	<i>Laothoe populi</i> (Linnaeus, 1758)		+							
15.	<i>Macroglossum stellatarum</i> (Linnaeus, 1758)	+	+	+	+	+	+	+	+	+
16.	<i>Marumba quercus</i> (Denis, Schiffermüller, 1775)		+							
17.	<i>Mimas tiliae</i> (Linnaeus, 1758)					+				
18.	<i>Proserpinus proserpina</i> (Pallas, 1772)	+								
19.	<i>Smerinthus ocellatus</i> (Linnaeus, 1758)	+								

20.	<i>Sphinx ligustri</i> (Linnaeus, 1758)	+								
21.	<i>Sphinx pinastri</i> Linnaeus, 1758	+								
SUPERFAMILY LASIOCAMPOIDEA HARRIS, 1841										
Family Lasiocampidae Harris, 1841										
22.	<i>Cosmotriche lobulina</i> (Denis, Schiffermüller, 1775)	+								
23.	<i>Dendrolimus pini</i> (Linnaeus, 1758)									+
24.	<i>Gastropacha quercifolia</i> (Linnaeus, 1758)	+								
25.	<i>Lasiocampa quercus</i> (Linnaeus, 1758)	+								
26.	<i>Lasiocampa trifolii</i> (Denis, Schiffermüller, 1775)	+								
27.	<i>Macrothylacia rubi</i> (Linnaeus, 1758)	+								
28.	<i>Malacosoma neustria</i> (Linnaeus, 1758)	+								
29.	<i>Odonestis pruni</i> (Linnaeus, 1758)	+								
30.	<i>Phyllodesma tremulifolia</i> (Hübner, 1810)	+								
31.	<i>Poecilocampa populi</i> (Linnaeus, 1758)	+								
32.	<i>Trichiura crataegi</i> (Linnaeus, 1758)	+								
SUPERFAMILY HEPIALOIDEA STEPHENS, 1829										
Family Hepialidae Stephens, 1829										
33.	<i>Hepialus humuli</i> (Linnaeus, 1758)	+				+				
34.	<i>Korscheltellus lupulina</i> (Linnaeus, 1758)	+				+				
35.	<i>Triodia sylvina</i> (Linnaeus, 1761)	+					+			
SUPERFAMILY ZYGAENOIDEA LATREILLE, 1809										
Family Limacodidae Duponchel, 1845										
36.	<i>Apoda limacodes</i> (Hufnagel, 1766)	+	+						+	+
37.	<i>Heterogenea asella</i> (Denis, Schiffermüller, 1775)	+				+				
Family Zygaenidae Latreille, 1809										
38.	<i>Adscita statices</i> (Linnaeus, 1758)	+								
39.	<i>Jordanita globulariae</i> (Hübner, 1793)					+				+
40.	<i>Rhagades pruni</i> (Denis, Schiffermüller, 1775)									+
41.	<i>Zygaena angelicae</i> Ochsenheimer, 1808						+			

42.	<i>Zygaena carniolica</i> (Scopoli, 1763)		+			+				
43.	<i>Zygaena ephialtes</i> (Linnaeus, 1767)									+
44.	<i>Zygaena filipendulae</i> (Linnaeus, 1758)	+	+	+	+		+			+
45.	<i>Zygaena lonicerae</i> (Scheven, 1777)		+							
46.	<i>Zygaena loti</i> (Denis, Schiffermüller, 1775)	+		+		+				
47.	<i>Zygaena osterodensis</i> Reiss, 1921		+							
48.	<i>Zygaena purpuralis</i> (Brünnich, 1763)								+	
49.	<i>Zygaena viciae</i> (Denis, Schiffermüller, 1775)		+							
SUPERFAMILY COSSOIDEA LEACH, 1815										
Family Cossidae Leach, 1815										
50.	<i>Cossus cossus</i> (Linnaeus, 1758)	+	+			+				+
51.	<i>Dyspessa ulula</i> (Borkhausen, 1790)	+	+							
52.	<i>Parahypopta caestrum</i> (Hübner, 1808)	+					+			
53.	<i>Phragmataecia castaneae</i> (Hübner, 1790)	+	+			+				+
54.	<i>Zeuzera pyrina</i> (Linnaeus, 1761)	+							+	
Family Sesiidae Boisduval, 1828										
55.	<i>Sesia apiformis</i> (Clerck, 1759)		+							
56.	<i>Synanthedon conopiformis</i> (Esper, 1782)								+	
57.	<i>Synanthedon myopaeformis</i> (Borkhausen, 1789)	+					+			
58.	<i>Synanthedon tipuliformis</i> (Clerck, 1759)	+					+			
59.	<i>Synanthedon vespiformis</i> (Linnaeus, 1761)	+					+			
SUPERFAMILY THYRIDOIDEA HERRICH-SCHÄFFER, 1846										
Family Thyrididae Herrich-Schäffer, 1845										
60.	<i>Thyris fenestrella</i> (Scopoli, 1763)	+								
SUPERFAMILY DREPANOIDEA BOISDUVAL, 1828										
Family Drepanidae Boisduval, 1828										

61.	<i>Achlya flavicornis</i> (Linnaeus, 1758)	+							
62.	<i>Cilix glaucata</i> (Scopoli, 1763)								+
63.	<i>Cymatophorina diluta</i> (Denis, Schiffermüller, 1775)								+
64.	<i>Drepana curvatula</i> (Borkhausen, 1790)		+						
65.	<i>Drepana falcataria</i> (Linnaeus, 1758)	+							
66.	<i>Falcaria lacertinaria</i> (Linnaeus, 1758)					+			
67.	<i>Habrosyne pyritoides</i> (Hufnagel, 1766)	+							
68.	<i>Ochropacha duplaris</i> (Linnaeus, 1761)	+							
69.	<i>Polyploca ridens</i> (Fabricius, 1787)	+				+			
70.	<i>Sabra harpagula</i> (Esper, 1786)	+							
71.	<i>Tethea ocularis</i> (Linnaeus, 1767)	+				+			
72.	<i>Tethea or</i> (Denis, Schiffermüller, 1775)	+							
73.	<i>Tetheella fluctuosa</i> (Hübner, 1803)	+							
74.	<i>Thyatira batis</i> (Linnaeus, 1758)					+			
75.	<i>Watsonalla binaria</i> (Hufnagel, 1767)					+			
76.	<i>Watsonalla cultraria</i> (Fabricius, 1775)					+			
SUPERFAMILY PYRALOIDEA LATREILLE, 1809									
Family Crambidae Latreille, 1810									
77.	<i>Cydalima perspectalis</i> (Walker, 1859)					+		+	
78.	<i>Pyrausta purpuralis</i> (Linnaeus, 1758)	+							

The Drepanidae and Sphingidae families is the richest in species, recording to 16 species each. beind followed by the Zigaenidae family which includes 12 recorded species and the Lasiocampidae family with 11 species. The Thyrididae, Endromidae and Saturniidae families are represented by only one species each (Figure 1).

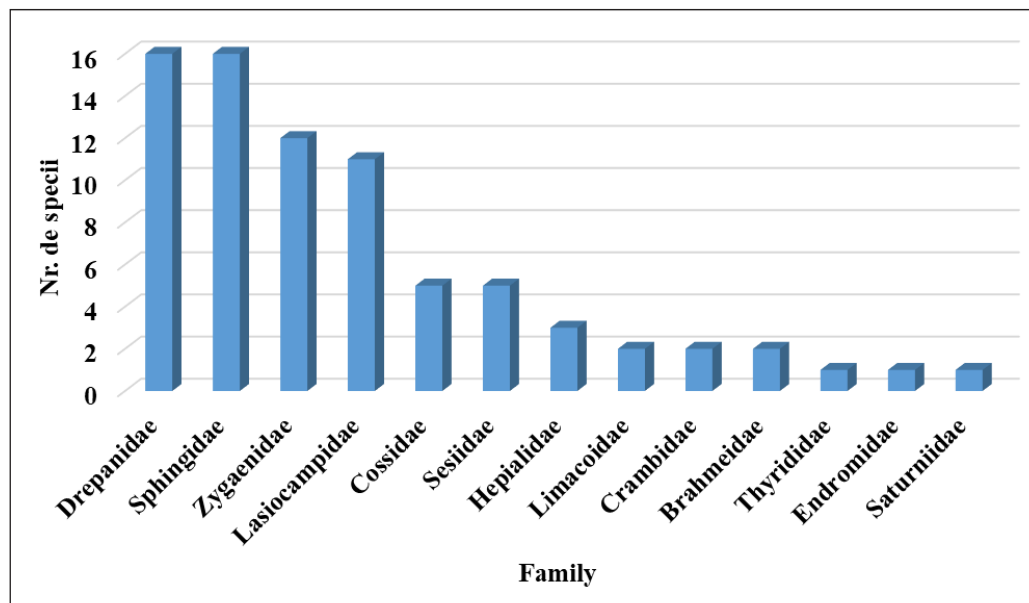


Figure 1. Repartition by families of the moths(Lepidoptera: Bombycoidea, Lasiocampoidea, Hepialoidea, Zygaenoidea, Cossoidea, Thyridoidea, Drepanoidea, Pyraloidea) from the Orhei Natural Park

Seven of reported species are rare and protected by legislation of Republica Moldova: *Saturnia pyri* (Denis, Schiffermüller, 1775) from Saturniidae family, *Acherontia atropos* (Linnaeus, 1758), *Dolbina elegans* A. Bang-Haas, 1912, *Marumba quercus* (Denis, Schiffermüller, 1775) and *Proserpinus proserpina* (Pallas, 1772) from Sphingidae family, *Callimorpha dominula* (Linnaeus, 1758) and *Euplagia quadripunctaria* (Poda, 1761) from Erebiidae family [8, p. 395-406]. Over 70 of the reported species are new to the fauna of Orhei National Park.

This study demonstrates that Orhei National Park has a rich and valuable lepidopteran fauna. The relatively large area of the reserve and the rich diversity of biotopes favour the presence of many lepidopteran species with various ecological preferences. The significant number of registered species, to which the large number of rare species for the fauna of the Republic of Moldova is added, proves that the Orhei National Park is an area of particular importance for the conservation of biological diversity.

Although a relatively large number of species have been identified on the territory of Orhei National Park, most are threatened with extinction, developing fragile populations and having numerous limiting factors. Habitat fragmentation, pollution, intensive agriculture, deforestation, mechanical mowing, overgrazing, fires are the main causes of population decline or even the disappearance of some diurnal butterfly species from the studied area [9, 10].

CONCLUSIONS

As a result of the researches carried out, a total of 78 species of moths were identified in Orhei National Park, belonging to 13 families: Hepialidae (3 species), Limacoidae (2), Zygaenidae (12), Cossidae (5), Sesiidae (5), Thyrididae (1), Crambidae (2), Drepanidae (16), Lasiocampidae (11), Brahmeidae (2), Endromidae (1), Saturniidae (1) and Sphingidae (17 species).

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