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# RESULTS OF THE STUDY OF LEPIDOPTERA (INSECTA, LEPIDOPTERA) FAUNA IN THE KUZEMYN SECTION OF THE GETMANSKYI NATIONAL NATURE PARK BASED ON THE 2024 EXPEDITION

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*In June 2024, a three-day scientific expedition was conducted in the Kuzemyn area of the Hetmanskyi National Nature Park, located in the floodplain of Vorskla river. The primary aim of the research was to study the fauna of butterflies (Insecta: Lepidoptera), focusing on species composition, abundance, ecological preferences and the environmental conditions that influence their distribution in this area. This site represents a valuable natural region characterized by rich biodiversity and a high degree of habitat heterogeneity, which plays a significant role in supporting diverse insect populations. The research employed an integrative approach combining nocturnal collection using light traps (mercury vapor lamps) and manual daytime sampling. This methodology made it possible to record 67 species belonging to 13 families, including Noctuidae, Geometridae, Erebidae, Sphingidae, Pyralidae, and others. The diversity observed reflects the ecological complexity of the floodplain mosaic, which consists of meadows, shrubs, tree stands, and riparian zones.*

*Some species identified are common to the forest-steppe zone of northeastern Ukraine, while others indicate specific microhabitats or rare environmental niches. Particular attention was paid to anthropogenic impacts such as livestock grazing, agricultural land use, illegal logging, and pollution of aquatic ecosystems. The potential influence of climate change on moth populations was also considered, especially regarding shifts in species activity patterns and phenology. All findings were processed and submitted to the Global Biodiversity Information Facility (GBIF), contributing to the global biodiversity database and enabling long-term biodiversity monitoring programs. The results confirm the ecological and conservation significance of the Kuzemyn sector and underscore the importance of ongoing multiseasonal surveys across different biotopes. The study provides valuable data for developing biodiversity conservation strategies, ecological education initiatives, and sustainable land management policies within the Hetmanskyi National Nature Park.*

**Key words:** Hetmanskyi National Nature Park, Lepidoptera, fauna, biodiversity, floodplain habitats, ecological monitoring, species diversity, Kuzemyn, Vorskla river.

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# РЕЗУЛЬТАТИ ДОСЛІДЖЕННЯ ФАУНИ ЛУСКОКРИЛИХ (INSECTA, LEPIDOPTERA) ТЕРИТОРІЇ КУЗЕМІНСЬКОЇ ДІЛЯНКИ ГЕТЬМАНСЬКОГО НАЦІОНАЛЬНОГО ПРИРОДНОГО ПАРКУ ЗА РЕЗУЛЬТАТАМИ ЕКСПЕДИЦІЇ У 2024 Р.

У червні 2024 р. дослідницькою групою було здійснено триденну експедицію до Куземинської ділянки Гетьманського національного природного парку, що розташована в заплаві лівобережної частини р. Ворскла. Основною метою роботи було вивчення фауни лускокрилих (Insecta: Lepidoptera), зокрема визначення видового складу, оцінка чисельності, аналіз біотичних та абіотичних факторів, що впливають на поширення видів у межах досліджуваної території. Ця ділянка відзначається високим ступенем збереженості природного середовища, що зумовлює багатство її ентомофауни. Завдяки застосуванню комплексного підходу до збору ентомологічного матеріалу (поєднання нічного збору зі світловими пастками та денного ручного збору) вдалося зафіксувати 67 видів лускокрилих із 13 родин. Частина виявлених видів є типовими для заплавної екосистем лісостепової зони України, тоді як деякі можуть свідчити про наявність локальних біотопів з особливими мікрокліматичними умовами.

Дослідження продемонструвало, що заплавна мозаїка луків, чагарників, деревних угруповань і прибережних зон створює сприятливе середовище для існування видів з різними екологічними потребами. Було виявлено як загальнопоширені, так і рідкісні або мало вивчені види, які не завжди зустрічаються на інших ділянках парку. Особливу увагу приділено аналізу впливу антропогенних факторів, таких як сільськогосподарська діяльність, випас худоби, локальне вирубування деревно-чагарникової рослинності, а також забруднення водою. Крім того, враховано потенційний вплив глобальних кліматичних змін, які можуть змінювати структуру ентомофауни регіону. Зібраний матеріал доповнив міжнародну базу GBIF, що є важливим етапом у створенні репрезентативного банку даних для подальшого екологічного моніторингу. Проведене дослідження підтвердило високий природоохоронний потенціал Куземинської ділянки, а також актуальність подальших багатосезонних спостережень для уточнення видового складу і виявлення нових для регіону таксонів. Одержані результати можуть стати основою для планування заходів зі збереження біорізноманіття, формування екопросвітницьких програм і сталого використання природних ресурсів Гетьманського НПП.

**Ключові слова:** Гетьманський національний природний парк, лускокрилі, Lepidoptera, фауна, біорізноманіття, заплавні біотопи, екологічний моніторинг, видове різноманіття, Куземин, р. Ворскла.

The study of regional faunas and the ecological characteristics of individual species is one of the key priorities of zoological research, which fully applies to Lepidoptera of northeastern Ukraine. Despite relatively comprehensive research on butterflies compared to other insect groups, the species composition of Lepidoptera in specific regions of Ukraine remains rather studied fragmentarily. This is also true for the Hetmanskyi National Nature Park, where the insect fauna has been unevenly investigated, and certain groups have not been studied at all.

Research on the species composition of Lepidoptera in the territory of Hetman National Nature Park began in 2012 [1]. Since 2014, park researcher O.V. Govorun,

together with colleagues, has been conducting expeditions studying the invertebrate fauna of the park. Various groups of Lepidoptera have primarily been studied, as reflected in a number of publications and biodiversity databases [2, 3].

In 2024, we carried out a three-day expeditionary survey of floodplain habitats on the left bank of the Vorskla River near the village of Kuzemyn. This area is a unique natural site with rich biodiversity, playing an important role in maintaining the region's ecological balance.

The aim of the study was to investigate the species composition, abundance, and biological characteristics of Lepidoptera in the floodplain zone of the Kuzemyn section. The obtained results allow us to assess the current status of these insect populations, identify potential threats to their survival, and develop measures to preserve biodiversity in the region.

Lepidoptera are one of the most numerous and diverse insect groups, playing a key role in the functioning of natural ecosystems. They perform important ecological functions, such as plant pollination, participating in food chains as a food source for predators and parasites, and serving as sensitive indicators of environmental conditions. Changes in the abundance or species composition of these insects often signal ecological shifts caused by anthropogenic or natural factors.

During the study, a significant number of Lepidoptera species were collected and identified, belonging to various ecological groups. The recorded species are closely associated with floodplain ecosystems, indicating a high degree of adaptation to local environmental conditions. An analysis of ecological parameters of habitats was conducted, including vegetation cover, humidity, soil structure, and the degree of anthropogenic impact. This made it possible to develop a comprehensive description of the living conditions of Lepidoptera and identify the main factors influencing their abundance.

The Kuzemyn section, which is part of regional nature conservation territories, possesses significant conservation potential due to its biodiversity and unique microclimatic conditions. However, the area is exposed to various anthropogenic influences, such as agricultural activities, livestock grazing, uncontrolled cutting of trees and shrubs, and pollution of river waters. In addition, climate change, manifested in extreme weather events, also affects the stability of local ecosystems.

This report presents detailed research results, including a list of recorded species, their ecological characteristics, and a discussion of prospects for long-term monitoring and conservation of biodiversity in this valuable natural area.

## **MATERIALS AND METHODS**

From June 19 to 21, 2024, an expedition was conducted in a meadow area near Kuzemyn village (50.145211330851374, 34.69425109495092).

Material for the study was collected mainly at night using a light trap and manually during the daytime. Night collecting was conducted using a Philips ML 250W E27 mercury-vapor arc lamp. The lamp was mounted 2–2.5 meters above the

ground in front of a white screen, which served as a background to attract insects. The lamp was powered by a gasoline generator. The light was turned on at dusk (from 19:30 to 21:30) and turned off after midnight (approximately 1:00–3:00 AM).

Butterflies attracted to the light were captured manually using nets and immediately placed in killing jars with ethyl acetate for further processing. After collection, the insects were mounted on entomological pins or stored in special containers until further identification in the laboratory.

Daytime collection was carried out manually. Butterflies were searched for in typical resting sites of adults: among vegetation, on tree trunks and stumps, fences, building walls, and storage facilities. This approach made it possible to find species that do not come to light and to collect material in areas where the use of light traps was not feasible due to technical or logistical constraints.

The manual method proved particularly effective for collecting rare or less active nocturnal species, as well as those that hide in shaded or hard-to-reach places. Notably, species exhibiting cryptic behavior or limited diurnal activity were recorded.

This comprehensive approach to material collection ensured high representativeness of the study and enabled a more complete picture of the butterfly species composition in the studied region.

Species identification was performed based on external morphological features, particularly wing patterns [6]. The list includes collection dates and, in brackets, the number of specimens recorded.

## RESULTS AND DISCUSSION

A total of 67 butterfly species from 13 families were recorded during this expedition.

### HESPERIIDAE

1. *Thymelicus lineola* (Ochsenheimer, 1808) 19-21.VI.2024 (1);

### LYCAENIDAE

2. *Polyommatus icarus* (Rottemburg, 1775) 19-21.VI.2024 (2);
3. *Plebeius idas* (Linnaeus, 1761) 19-21.VI.2024 (1);

### PAPILIONIDAE

4. *Iphiclides podalirius* Linnaeus, 1758 19-21.VI.2024 (1);

### PIERIDAE

5. *Pieris brassicae* (Linnaeus, 1758) 19-21.VI.2024 (1);
6. *Pieris rapae* (Linnaeus, 1758) 19-21.VI.2024 (4);
7. *Pieris napi* (Linnaeus, 1758) 19-21.VI.2024 (5);

### NOCTUIDAE

#### Rivulinae

8. *Colobochyla salicis* Denis & Schiffermüller, 1775 19-21.VI.2024 (1);

#### Pantheinae

9. *Colocasia coryli* (Linnaeus, 1758) 19-21.VI.2024 (1);

Acronictinae

10. *Acronicta megacephala* ([Denis & Schiffermüller], 1775) 19-21.VI.2024 (1);

Acontiinae

11. *Autographa gamma* (Linnaeus, 1758) 19-21.VI.2024 (2);
12. *Protodeltote pygarga* (Hufnagel, 1766) 19-21.VI.2024 (1);

**NYMPHALIDAE**

13. *Vanessa cardui* (Linnaeus, 1758) 19-21.VI.2024 (6);
14. *Inachis io* (Linnaeus, 1758) 19-21.VI.2024 (2);
15. *Polygonia c-album* (Linnaeus, 1758) 19-21.VI.2024 (4);

Ipimorphinae

16. *Trachea atriplicis* (Linnaeus, 1758) 19-21.VI.2024 (1);
17. *Amphipoea fucosa* (Freyer, 1830) 19-21.VI.2024 (2);
18. *Eucarta virgo* (Treitschke, 1835) 19-21.VI.2024 (1);
19. *Ipimorpha retusa* (Linnaeus, 1761) 19-21.VI.2024 (1);
20. *Leucapamea ophiogramma* (Esper, 1794) 19-21.VI.2024 (2);
21. *Mesapamea secalis* (Linnaeus, 1758) 19-21.VI.2024 (1);

Hadeninae

22. *Melanchra persicariae* (Linnaeus, 1761) 19-21.VI.2024 (1);
23. *Sideridis turbida* Esper, 1790 19-21.VI.2024 (2);
24. *Mythimna conigera* ([Denis & Schiffermüller], 1775) 19-21.VI.2024 (3);

Noctuinae

25. *Ochropleura plecta* (Linnaeus, 1761) 19-21.VI.2024 (1);
26. *Noctua fimbriata* (Schreber, 1759) 19-21.VI.2024 (1);
27. *Noctua janthina* (Denis & Schiffermüller, 1775) 19-21.VI.2024 (2);
28. *Noctua interposita* (Hübner, [1790]) 19-21.VI.2024 (1);
29. *Cryptocala chardinyi* (Boisduval, 1829) 19-21.VI.2024 (2);

**GEOMETRIDAE**

30. *Heterolocha laminaria* (Herrich-Schäffer, 1852) 19-21.VI.2024 (1);
31. *Angerona prunaria* (Linnaeus, 1758) 19-21.VI.2024 (2);
32. *Aplocera plagiata* (Linnaeus, 1758) 19-21.VI.2024 (2);
33. *Biston betularia* (Linnaeus, 1758) 19-21.VI.2024 (1);
34. *Bupalus piniaria* (Linnaeus, 1758) 19-21.VI.2024 (2);
35. *Campaea margaritaria* (Linnaeus, 1761) 19-21.VI.2024 (2);
36. *Catarhoe rubidata* (Denis & Schiffermüller, 1775) 19-21.VI.2024 (1);
37. *Chiasmia clathrata* (Linnaeus, 1758) 19-21.VI.2024 (2);
38. *Comibaena bajularia* (Denis & Schiffermüller, 1775) 19-21.VI.2024 (1);
39. *Ourapteryx sambucaria* (Linnaeus, 1758) 19-21.VI.2024 (2);

### EREBIDAE

40. *Amata phegea* (Linnaeus, 1758) 19-21.VI.2024 (12);
41. *Eilema complana* (Linnaeus, 1758) 19-21.VI.2024 (2);
42. *Laelia coenosa* (Hübner, 1808) 19-21.VI.2024 (1);
43. *Spilosoma lubricipeda* (Linnaeus, 1758) 19-21.VI.2024 (1);

### LASIOCAMPIDAE

44. *Apoda limacodes* (Hufnagel, 1766) 19-21.VI.2024 (2);
45. *Gastropacha populifolia* (Denis & Schiffermüller, 1775) 19-21.VI.2024 (2);

### DREPANIDAE

46. *Thyatira batis* (Linnaeus, 1758) 19-21.VI.2024 (1);
47. *Tethea ocularis* (Linnaeus, 1767) 19-21.VI.2024 (1);

### SPHINGIDAE

48. *Sphinx ligustri* (Linnaeus, 1758) 19-21.VI.2024 (1);
49. *Deilephila porcellus* (Linnaeus, 1758) 19-21.VI.2024 (8);
50. *Deilephila elpenor* (Linnaeus, 1758) 19-21.VI.2024 (2);
51. *Hyles gallii* (Rottemburg, 1775) 19-21.VI.2024 (1);
52. *Agrius convolvuli* (Linnaeus, 1758) 19-21.VI.2024 (1);

### COSSIDAE

53. *Cossus cossus* (Linnaeus, 1758) 19-21.VI.2024 (2);
54. *Phragmataecia castaneae* (Hübner, 1790) 19-21.VI.2024 (2);

### PYRALIDAE

#### Pyalinae

55. *Pyralis regalis* Denis & Schiffermüller, 1775 19-21.VI.2024 (1);

#### Phycitinae

56. *Paranephopterix adelphella* (Fischer v. Röslerstamm, 1836) 19-21.VI.2024 (1);

57. *Myelois circumvoluta* (Fourcroy, 1785) 19-21.VI.2024 (2);

#### Scopariinae

58. *Scoparia ingrata* (Zeller, 1846) 19-21.VI.2024 (1);

#### Crambinae

59. *Calamotropha paludella* (Hübner, 1824) 19-21.VI.2024 (7);
60. *Chrysoteuchia culmella* (Linnaeus, 1758) 19-21.VI.2024 (2);
61. *Agriphila inquinatella* (Denis & Schiffermüller, 1775) 19-21.VI.2024 (1);
62. *Platytes cerussella* (Denis & Schiffermüller, 1775) 19-21.VI.2024 (2);

#### Schoenobiinae

63. *Schoenobius gigantella* Hampson, 1896 19-21.VI.2024 (1);

#### Evergestinae

64. *Mutuuraia terrealis* (Treitschke, 1829) 19-21.VI.2024 (1);
65. *Sclerocona acutella* (Eversmann, 1842) 19-21.VI.2024 (1);

66. *Ostrinia nubilalis* (Hubner, 1796) 19-21.VI.2024 (5);
67. *Pleuroptya ruralis* (Scopoli, 1763) 19-21.VI.2024 (4).

Most of the species listed in this study are widely distributed in the northeastern forest-steppe zone of Ukraine, confirming the typical regional faunal diversity. Of particular interest is not only the presence of rare or relict species but also the overall diversity of butterflies, which is shaped by the mosaic structure of floodplain habitats within the park. These ecosystems provide favorable conditions for the existence of various Lepidoptera species, primarily due to the availability of host plants, specific microclimatic conditions, and a minimal level of anthropogenic disturbance.

The current state of knowledge regarding the Lepidoptera species composition in Hetman National Nature Park remains fragmented and uneven. Some areas have been studied in detail, while others have received little to no scientific attention. This situation underscores the need for further research to obtain a more complete and reliable picture of the park's butterfly fauna.

### CONCLUSIONS

Future field studies should encompass different seasons and habitat types, which will not only refine the current species list but also help discover new, potentially rare, or previously unrecorded species in this region.

Thus, the present understanding of the butterfly species composition in the park represents only an initial stage in the study of their diversity. The collected data offer a foundation for the development of systematic monitoring programs, which can serve as a basis for long-term biodiversity conservation efforts in this unique natural area.

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