

ORIGINAL ARTICLE

The present state of biodiversity and fauna of daytime butterflies (Lepidoptera, Diurna) in the vicinity of the Kaniv district

I.Ya. Truskavetska

Pereiaslav-Khmelnytskyi Hryhorii Skovoroda State Pedagogical University, Sukhomlyns'koho 34 Street, Pereiaslav-Khmelnytskyi 08400, Pereiaslav-Khmelnytskyi, Ukraine.

E-mail: iringa-truskaveckaya@ukr.net

Received: 09.11.2018. Accepted: 22.11.2018

By playing a significant role in ecosystems, like consumers-phytophages and pollinators, daytime luskokryli (Diurna) is one of the most notable in nature of insect groups and has a scientific-cognitive and aesthetic value. In our work, we investigated the present state of biodiversity and the species composition of the daytime butterflies of the Kaniv district, in particular, the village of Buchak. The basis of our study was the refinement of taxonomic species, the establishment of relative numbers, as well as the period of the flight of adults and the number of generations per year, which in the future will enable the development of effective ecologically sound methods for controlling the number of species of pests and optimizing the number of rare beneficial species.

Buchak is one of the few villages spread out in the middle of the forests on the hills of the Dnipro, on the right bank of the lower water area of the Kaniv reservoir, twenty kilometers from the city of Kanev, Cherkassy region of Ukraine. The distribution of the fauna of daytime butterflies and the peculiarities of their existence in different biotopes, among which are identified 5 main types: open lowland meadows, mixed forests, forest-steppe areas, right bank of the river Dnipro and lake Buchak, agrobiocenoses. The quality of representativeness of the species diversity of the fauna of the day luskokrylykh has been estimated by calculating their index of domination and the distribution index in the main biotopes of the studied territory. Twenty five species of daytime luskokrylykh from 6 families (Papilionidae, Pieridae, Nymphalidae, Lycaenidae, Syntomidae, Hesperidae) were caught. The most rich in species composition of daytime butterflies of the studied area are forest-steppe areas, and the least numerous are areas on the right bank of the river Dnipro and lake Buchak.

Keywords: Lipidopterology; village Buchak; variety; biotopes; forests; meadows; agrocenoses

Introduction

Saving the diversity of invertebrates can be achieved by protecting their habitats. In this case, the expediency and effectiveness of certain protective measures can be adequately assessed by monitoring the status of groups of certain indicator taxonomic groups (Holoborodko, 2004).

The Daytime Butterflies (Lepidoptera, Diurna) in this respect is ideal the indicator group, maintaining the diversity of invertebrates because they inherent considerable taxonomic diversity, they occupy almost all major types of terrestrial habitats are well studied in a systematic and environmental terms, exhibit much higher requirements for habitat compared to their feed plants and many other species of invertebrates, as well as visible in nature.

The study of daytime butterflies and their peculiarities in different biotopes, as well as the development of measures aimed at preserving their diversity and the protection of rare and endangered species, is currently an issue, since the total number of species associated with agro-countryside and their harmfulness under the influence of abiotic and anthropogenic factors are constantly changing, which requires constant monitoring and clarification of the species composition of insects.

The level of research Lepidoptero-fauna in different countries and in different natural areas is very uneven. This also applies to the territory of Ukraine, where only some regions are fully researched.

The analysis of literary sources shows that in Ukraine the study of the Diurna fauna began in 1860, and the environment until 1939 did not occur at all. In the modern world, more than 140,000 species are described from 107 families, of which 84 are in Europe. In the fauna of Ukraine more than 5000 species of butterflies, Lionspep zone - 43 species, and in Cherkassy region- 27 species of day-old butterflies (Bashchenko, 2010).

The first researcher of the butterfly fauna of Ukraine should be considered one of the founders of the lepidopterology of Jacob Gubner (Yakhontov, 1939). Information on the fauna of the daytime butterflies, nowadays in Kyiv, Cherkasy, Poltava regions contains scientific works by M. Sila-Novitsky, C.G. Popova, K.A. Efetova, N.G. Kolomyets, A.E. Shtandel and others. For

the most part, they all preferred the study of forest-steppe areas, which were characterized by special biodiversity and specific entomophonus. Among the most interesting finds worth mentioning dove (*Polymmatas dorylas*, *P. admetus*, *P. damon*) (Tsaryk & Kanarskyi, 2005). In the first half of the twentieth century. The faunal research on this territory was carried out by A. Ksenjopolsky, resulting in a monographic work, in which 155 species of day-old butterflies are presented (Udra, 1996). Special studies devoted to inventory, and in the subsequent knowledge of the biology of day-to-day scalded Cherkasy region, began to appear in the late 1970's. At the beginning of the XXI century. A summary list of the creeping bastards studied by K. Goloborod'k with a landscape-biotopic analysis of 111 species is obtained (Holoborodko, 2004). On the basis of several carried out expeditions, during 1933-36 Y. Kremki published a generalized work on the lepidopterofauna of the Forest-steppe zone of the right-bank Ukraine "Badania nad fauna motyli Podola Polskiego", which, in particular, brought 659 species of scallops.

An intensive study of scallops in the first half of the twentieth century. Foreign lepidopterologists also engaged in: Lajos Vári, Martin Krüger, J.B. Ball and others. Scientists have highlighted their findings in the monograph "Lepidopterology in Southern Africa: Past, Present and Future" that describe the South African butterfly fauna (including all the countries south of the Zambezi-Kunena rivers), which is about 8,125 butterflies, dominated by the Noctuidae and Geometridae families (Ball, 2012). Lajos Vari has identified the taxonomic current state of the known South African lupine, which is about 8300 species. All representatives are classified by family and alphabetically (LajosVári, 1986).

From the second half of the twentieth century, the study of butterflies was continued by Coetzer J.A, which in its research has described another 395 new taxa for South Africa (Krüger, 2009). Braby M. F. from 2000, he studied biology and identification of Australian butterflies, the result was his scientific work "Butterflies of Australia: Their Identification, Biology and Distribution" in which the author described the classification, the morphology of 400 species of butterflies (Braby, 2000). By A. Heath, G.E. Tite, T. B. Larsen, J.K. Smith, A.B. Brown in their achievements revealed the peculiarities of biology and the distribution of certain species of scallops (Smith, & Miller, 1991).

Buchak is a unique natural complex that has a great biogeographic, ecological, nature conservation and recreational value. The territory of the studied area is located between the forest-steppe and steppe climatic zones on the right bank of the Dnieper River. Geomorphologically, the area has a narrow-wavy, valley-bay terrain, the soil cover is quite diverse, the salty and solonchakous and sometimes chernozem soils are widespread. The climate is temperate continental. Virtually the whole territory is part of the regional trafford park "Trakhtemirov".

The classification of biotopes according to the ecological-floristic approach was proposed by G. Ebert. According to her, the types of biotopes are identified with individual syntaxes (or groups of syntaxons) of the phyto-sociological system Brown-Blanca, neglecting thus the pathological and morphological characteristics (Tsaryk, & Kanarskyi, 2005). The Czech scientists J. Benes and M. Konvichka (Bashchenko & Honchar, 2010) developed the version of the ecological classification of day-to-day flukes, singling out 6 "formations" and 5 subformations: ubikvista; U; mesophilus: mesophilic-1-meadow (mezofil-1; M1), mesophilia-2 - meadows (mezofil-2, M2), mesophilic-3-forest (mesophil-3, M3), xerothermophils: xerothermophils-1-meadow-steppe (xerothermofil; X1), xerothermophils-2 - forest steppe and shrub (xerothermofil; X2), hygrophiles (hygrofil; H), typhophylls (tyrfofil; T) and alpine species (alpinsky; A) (Beneš & Konvička, 2002).

The purpose of the work is to clarify and supplement the information about the specific composition of the villages of the village of Buchak and its environs, their environmental coherence, trophic links, distribution of the main habitats and numbers, etc.

Materials and methods

The material for the study of daytime butterflies of the forest-steppe zone served as its own collection and observation during the growing season of 2016-2018. Stationary researches were carried out in the vicinity of the village of Buchak, covering the tract of Babina Gora and Rozhena wells. Observations and surveys carried out during route surveys of agro-cenozes and adjoining forest bands, nodules, on the sections of the right bank of the Dnipro River and Lake Buchak, in mixed forests and low meadows. Counted butterflies throughout the entire vegetation period. Information about the lobsters was collected by the method of individual collection, mowing in the entomological sarchom and by observation in natural conditions.

In the study of the biotope distribution of daylipes, the following groups of biotopes were identified, including 12 samples for registered species:

- meadows-an open area on the right bank of the Dnieper River, among which vegetation was dominated by dicotyledons;
- mixed forests (hornbeam-tract of Rozhena well), pine-hornbeam, oak-hornbeam and alder formations, beams and ravines on the right bank of the Dnieper River);
- forest-steppe areas-an open area, among which vegetation is dominated by grassy species on the right bank of the Dnipro River (tract Babina Gora, forest glades, woodlands);
- banks of reservoirs (sections of the right bank of the river Dnipro and Lake Buchak);
- agrocenoses-all landscapes transformed by man (field, garden, gardens).

$$ID=ni/N \times 100\%$$

where: ni-number of species;

N-total number of individuals in biocenosis.

$$DI=n/N \times 100\%$$

where: n-samples in which the species is found; N-total number of samples.

To determine the relative characteristics of the species of day-to-day butterflies, the index of dominance (ID) and the distribution index (DI) in natural biotopes by the formulas have been calculated.

The distribution index (DI) allowed us to find out the most populated biotopes with species diversity of daybreak. In the area under study, the distribution of daytime butterflies can be divided into the following groups: widespread DI-60-99%, widespread DI-59-40% and poorly distributed DI-39 and less%.

Results

As a result of research, analysis of literary sources and collection materials in the vicinity of the village of Buchak, Kaniv district, 25 species of daytime butterflies from 6 families (Figure 1) were caught, representing 92% of the fauna of Cherkasy region and 58% of the fauna of the Forest-steppe zone of Ukraine. The largest number of species (12) has a family of *Nymphalidae*, and the smallest (in 1 species)-the family *Syntomidae* and *Hesperiidae* (Nekrutenko & Chykolovets, 2005).

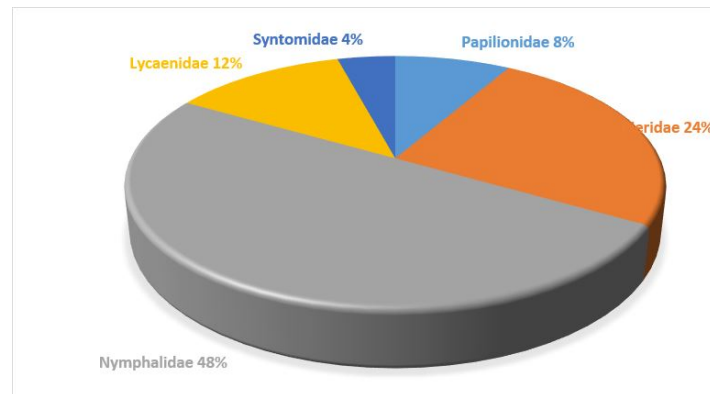


Figure 1. Ratio of families in the structure of the fauna of daytime butterflies the outskirts of the Kaniv district.

Table 1. Biotope distribution of everyday losochirilohlytsy with Buchakom, Kaniv district during 2016-2018.

No	Species	Biotopes				
		Field	Mesophilous deciduous forests	Forest-steppe areas	Coast of the reservoirs	Agrocenosis (field, garden, backyard)
Family (Papilionidae) Latreille, 1802						
1	<i>Papilio machaon</i> (Linnaeus, 1758)	-	-	+++	++	+
2	<i>Iphiclides podalirius</i> (Linnaeus, 1758)	++	-	++	+++	++
Family (Pieridae) Duponchel, 1835						
3	<i>Aporia crataegi</i> (Linnaeus, 1758)	-	++++	++	+++	+++
4	<i>Pieris brassicae</i> (Linnaeus, 1758)	++++	++	++	++	++++
5	<i>Pieris rapae</i> (Linnaeus, 1758)	++++	+++	++++	++	++++
6	<i>Colias crocea</i> (Geoffroy in Fourcroy, 1785)	++++	+++	+++	-	++
7	<i>Gonepteryx rhamni</i> (Linnaeus, 1758)	++	-	-	++	+++
8	<i>Rhodocera rhamn</i> (Linnaeus, 1758)	+++	-	-	++	++
Family (Nymphalidae) Swainson, 1827						
9	<i>Apatura ilia</i> (Denis & Schiffermüller, 1775)	-	+	++++	-	+++
10	<i>Apatura iris</i> (Linnaeus, 1758)	-	+++	+++	-	+
11	<i>Limenitis camilla</i> (Linné, 1764)	-	+++	+++	++	+++
12	<i>Aglais urticae</i> (Linnaeus, 1758)	++++	-	-	-	++++

13	<i>Inachis io</i> (Linnaeus, 1758)	++	-	+++	-	+++
14	<i>Vanessa atalanta</i> (Linnaeus, 1758)	+	+++	++++	++	++++
15	<i>Araschnia levana</i> (Linnaeus, 1758)	++	+++	+++	-	+++
16	<i>Issoria Lathonia</i> (Linnaeus, 1758)	++++	+++	++++	-	++++
17	<i>Aphantopus hyperantus</i> (Linnaeus, 1758)	+++	-	+++	-	+++
18	<i>Erebia medusa</i> (Denis & Schiffr Müller, 1775)	-	+	++	-	+
19	<i>Argynnis paphia</i> (Linnaeus, 1758)	-	+++	++++	++	-
20	<i>Melitaea didyma</i> (Esper, 1779)	++	-	+++	-	++
Family (Lycaenidae) Leach, 1815						
21	<i>Polyommatus icarus</i> (Rottemburg, 1775)	+++	+++	++++	+++	+++
22	<i>Lycaena tityrus</i> (Poda, 1761)	+++	+++	+++	-	-
23	<i>Polyommatus coridon</i> (Poda, 1761)	+	-	+++	-	-
Family (Syntomidae) Latreille, 1809						
24	<i>Syntomis phegea</i> (Linnaeus, 1758)	+++	++++	++++	++	++++
Family (Hesperiidae) Latreille, 1809						
25	<i>Thymelicus sylvestris</i> (Poda, 1761)	-	+++	+++	++	-

Note: "+" is very rare (1-2 people for many years); "++" - rare (1-2 singles/year); "+++"-normal (3-9 per year); "++++" - dominant (more than 10 per year)

As can be seen from the results of Table 1, the most rich in species of day-to-day butterflies in forest-steppe plots recorded (23 species), of which 5 species are dominant *Syntomis phegea*, *Polyommatus icarus*, *Argynnis paphia*, *Apatura ilia*, *Pieris rapae* and 3 species are listed in the Red Book of Ukraine (*Papilio machaon*, *Iphiclides podalirius*, *Apatura iris*). By species diversity and population density second place after the forest-steppe areas occupy agrocenoses. In agrocenoses, we registered 21 species of day-old butterflies, representing 84% of their species richness in the study area. We did not find species that would occur only in anthropogenic altered areas-common bay inhabitants (11 species) and 5 species recorded in all studied biotopes. These are, first of all, hortophilous species, the caterpillars of which feed on the ruderal species of crosses (Pieridae), legumes (Lycaenidae, namely *Polyommatus icarus*). In addition, in the studied sites, there were populations of rare species of two families, namely *Papilio machaon*, *Iphiclides podalirius* and *Apatura iris*, which were listed in the Red Book of Ukraine (Shcherbak, 1994).

In the forest biocenoses, 16 species are concentrated, representing 64% of the species richness of day-to-day butterflies in the study area, but the basis of diversity of forests is, first of all, the widespread species of scallops (*Aporia crataegi*, *Colias crocea*, *Vanessa atalanta*, *Syntomis phegea*, *Inachis io*). The rest of the species are noted in other biotopes, in particular in meadow areas, agrocenoses, roadside and right bank of the Dnieper.

The smallest species diversity is the fauna of day-to-day butterflies of the group on the banks of the reservoirs (13 species). We have not seen any kind of butterflies, which would live only in this group of biotopes. Some of the species here are flying and casual, and therefore - very rare. Among them should be noted *Papilio Machaon*.

In the area of Buchak met more often (more than 60%) (*Pieris rapae*, *Syntomis phegea*, *Polyommatus icarus*) widespread (DI-58,3- 41,6%)-*Argynnis paphia*, *Apatura ilia*, *Araschnia levana*, *Vanessa atalanta*, *Inachis io*, *Gonepteryx rhamni*, *Issoria lathonia*, *Pieris brassicae*, *Aglais urticae*), less common (DI-33,3% and less) -*Thymelicus sylvestris*, *Melitaea didyma*, *Polyommatus coridon*, *Argynnis paphia*, *Erebia medusa*, *Apatura iris*, *Aphantopus hyperantus*, *Limenitis camilla*, *Rhodocera rhamn*, *Aporia crataegi*, *Iphiclides podalirius*, *Lycaena tityrus*, *Papilio machaon* (Table 2).

Table 2. Indicators of the index of domination and the index of day-to-day lipidopterofauna transmission suburbs with Buchak, Kaniv district.

S No.	Species	Number of individuals	ID%	Number of samples	D1%
1	<i>Papilio machaon</i> (Linnaeus, 1758)	9	1.4	4	33.3
2	<i>Iphiclides podalirius</i> (Linnaeus, 1758)	4	0.6	3	25
3	<i>Aporia crataegi</i> (Linnaeus, 1758)	31	5.06	4	33.3
4	<i>Pieris brassicae</i> (Linnaeus, 1758)	55	8.98	6	50
5	<i>Pieris rapae</i> (Linnaeus, 1758)	51	8.33	8	66.6
6	<i>Colias crocea</i> (Geoffroy in Fourcroy, 1785)	33	5.39	4	33.3
7	<i>Gonepteryx rhamni</i> (Linnaeus, 1758)	8	1.3	5	41.6
8	<i>Rhodocera rhamn</i> (Linnaeus, 1758)	17	2.7	3	25
9	<i>Apatura ilia</i> (Denis & Schiffr Müller, 1775)	16	2.6	6	50

10	<i>Apatura iris</i> (Linnaeus, 1758)	12	1.96	3	25
11	<i>Limenitis camilla</i> (Linné, 1764)	28	4.57	4	33.3
12	<i>Aglais urticae</i> (Linnaeus, 1758)	30	4.9	6	50
13	<i>Inachis io</i> (Linnaeus, 1758)	10	1.63	5	41.6
14	<i>Vanessa atalanta</i> (Linnaeus, 1758)	36	5.88	7	58.3
15	<i>Araschnia levana</i> (Linnaeus, 1758)	22	3.59	6	50
16	<i>Issoria Lathonia</i> (Linnaeus, 1758)	41	6.69	7	58.3
17	<i>Aphantopus hyperantus</i> (Linnaeus, 1758)	12	1.96	4	33.3
18	<i>Erebia medusa</i> (Denis & Schiffmüller, 1775)	4	0.65	3	25
19	<i>Argynnis paphia</i> (Linnaeus, 1758)	28	4.57	5	41.6
20	<i>Melitaea didyma</i> (Esper, 1779)	13	2.12	4	33.3
21	<i>Polyommatus icarus</i> (Rottemburg, 1775)	49	8	8	66.6
22	<i>Lycaena tityrus</i> (Poda, 1761)	23	3.75	4	33.3
23	<i>Polyommatus coridon</i> (Poda, 1761)	6	0.9	2	16.6
24	<i>Syntomis phegea</i> (Linnaeus, 1758)	59	9.6	9	75
25	<i>Thymelicus sylvestris</i> (Poda, 1761)	19	3.1	3	25

The largest number, according to our data, is in wild biotopes among daytime butterflies with *Syntomis phegea* (ID-8.4%), *Colias crocea*, *Issoria lathonia* (ID by 7.5%) (Table 3). Thus, these species are dominant here and they set up almost half the size (28%) of all forest scallops. Fairly low, relative numbers are *Erebia medusa* (ID-0.8%) and *Papilio machaon*, *Aporia crataegi* (ID-1.6% for each species), of which 2 species (*Papilio machaon*, *Iphiclides podalirius*) are listed in the Red Data Book of Ukraine (Table 2). In our opinion, the forest is not a typical biotope for the existence of these species with a low ID, since only isolated specimens of these species are marked here, and their number in other biotopes reaches values higher and higher.

Table 3. Relative number of scalper in the biotopes of the village Buchak and its suburbs for (2016-2018),%.

No	Species	Biotopes				
		Field	Mesophilous deciduous forests	Forest lawns	Coast of the reservoirs	Agrocenosis (field, garden, backyard)
Family (Papilionidae) Latreille, 1802						
1	<i>Papilio machaon</i> (Linnaeus, 1758)	-	1.6	2.1	3.9	0.6
2	<i>Iphiclides podalirius</i> (Linnaeus, 1758)	1.8	-	0.5	3.9	0.6
Family (Pieridae) Duponchel, 1835						
3	<i>Aporia crataegi</i> (Linnaeus, 1758)	-	6	1.06	9.6	10.2
4	<i>Pieris brassicae</i> (Linnaeus, 1758)	13.8	1.6	4.2	17.6	11.1
5	<i>Pieris rapae</i> (Linnaeus, 1758)	11.1	5.8	7.4	3.9	11.1
6	<i>Colias crocea</i> (Geoffroy in Fourcroy, 1785)	10.1	7.5	4.2	-	2.7
7	<i>Gonepteryx rhamni</i> (Linnaeus, 1758)	1.8	-	-	1.9	3.4
8	<i>Rhodocera rhamn</i> (Linnaeus, 1758)	6.4	-	-	3.9	4.1
Family (Nymphalidae) Swainson, 1827						
9	<i>Apatura ilia</i> (Denis & Schiffmüller, 1775)	1.8	-	4.7	-	3.4
10	<i>Apatura iris</i> (Linnaeus, 1758)	-	5	2.6	-	0.6
11	<i>Limenitis camilla</i> (Linné, 1764)	-	6.7	4.7	3.9	6.25
12	<i>Aglais urticae</i> (Linnaeus, 1758)	9.25	-	4.2	-	8.3
13	<i>Inachis io</i> (Linnaeus, 1758)	1.8	-	2.1	-	2.7
14	<i>Vanessa atalanta</i> (Linnaeus, 1758)	0.9	6.7	6.3	3.9	9.7
15	<i>Araschnia levana</i> (Linnaeus, 1758)	1.8	6.7	3.1	-	4.1
16	<i>Issoria Lathonia</i> (Linnaeus, 1758)	10.1	7.5	5.3	-	8.3
17	<i>Aphantopus hyperantus</i> (Linnaeus, 1758)	4.6	-	2.1	-	2

18	<i>Erebia medusa</i> (Denis & Schiffermüller, 1775)	-	0.8	1.06	-	0.6
19	<i>Argynnis paphia</i> (Linnaeus, 1758)	-	6.7	9.5	3.9	-
20	<i>Melitaea didyma</i> (Esper, 1779)	1.8	-	4.7	-	0.7
Family (Lycaenidae) Leach, 1815						
21	<i>Polyommatus icarus</i> (Rottemburg, 1775)	7.4	6.7	7.4	17.6	6.25
22	<i>Lycaena tityrus</i> (Poda, 1761)	7.4	5.04	4.7	-	-
23	<i>Polyommatus coridon</i> (Poda, 1761)	0.9	-	2.6	-	-
Family (Syntomidae) Latreille, 1809						
24	<i>Syntomis phegea</i>	7.4	8.4	9.5	17.6	6.9
Family (Hesperiidae) Latreille, 1809						
25	<i>Thymelicus sylvestris</i>	-	6.7	4.7	3.9	-

On the meadows, we have noted 17 species, which make up 68% of the species richness of scallops. Buchach and its environs (Table 1). The highest number, according to our data, is in the meadow biotopes with *Pieris brassicae* (13.8%), *Pieris rapae*, *Colias crocea* (11.1%) and *Argynnis paphia* (ID-10.1%). These species are dominant here and form the core of the population. Relatively numerous are *Aglais urticae* (ID-9.2%), *Polyommatus icarus*, *Lycaena tityrus* (ID-7.4%). The relatively low numbers are *Gonepteryx rhamni*, *Apatura ilia*, *Inachis io*, *Araschnia levana*, *Melitaea didyma* (ID-by 1.8%), *Vanessa atalanta*, *Polyommatus coridon* (ID-by 0.9%) (Table 3).

In our opinion, the meadows are not characteristic of the habitat for the existence of *Papilio machaon*, *Iphiclides podalirius*, *Apatura iris*, *Limenitis camilla*, *Erebia medusa*, *Argynnis paphia*, since there are no specimens of these species, and their number in agroecosystems, on the banks of reservoirs and forest groves is an order of magnitude or even more.

Massive, according to our data, agroecosystems from daytime butterflies are representatives of the family Pieridae (ID-11.1%) (Table 3). Numerous in this biotope are also *Aporia crataegi* (ID-10.2%) and *Vanessa atalanta* (ID-9.7%), *Aglais urticae*, *Argynnis paphia* (ID-8.3%), *Syntomis phegea* (ID-6.9%) and *Polyommatus icarus* (ID-6.25%). Relatively low relative numbers are *Papilio machaon*, *Iphiclides podalirius*, *Apatura iris*, *Erebia medusa* (ID-0.6%), *Melitaea didyma* (ID-0.7%) (Nekrutenko and Chykolovets, 2005). We believe that agroecosystems are not characteristic of the existence of these species, because here are only isolated instances, with their number in the forest glades reaches the values of the highest roughly an order of magnitude.

The smallest number of species diversity of daytime butterflies is noted on the right bank of the Dnieper River, the outskirts of the Kaniv reservoir. We have registered 13 species, among which the dominant are *Syntomis phegea*, *Polyommatus icarus* (ID of-17.6%), *Pieris brassicae* (ID-17%), *Aporia crataegi* (ID-15.6%).

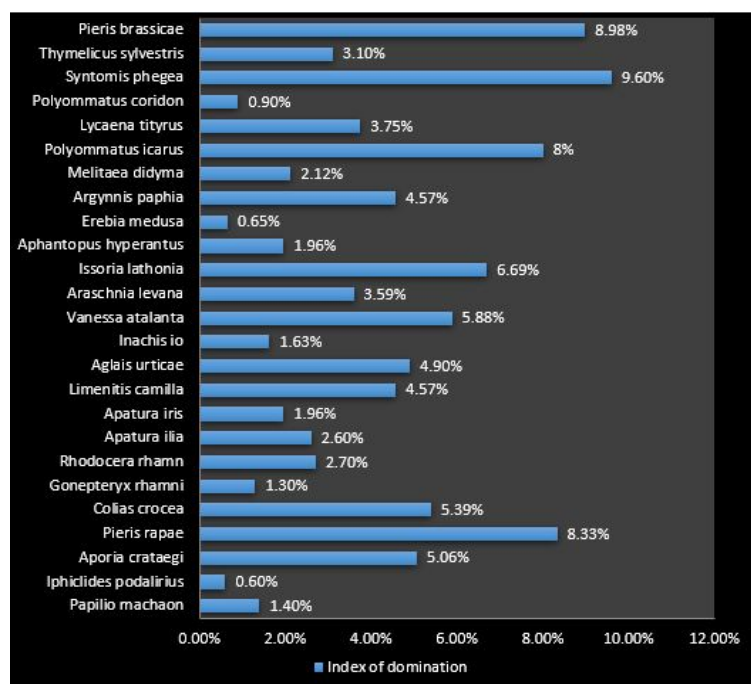


Figure 2. The index of domination of daytime butterflies in the vicinity of Buchak, Kaniv district.

Regarding the total number of luskokrylyh in the Kaniv region, namely the outskirts of the village of Buchak, it should be noted that the massive *Syntomis phegea* (ID-9.6%), dominant-*Pieris brassicae* (ID-8.98%) and *Pieris rapae* (ID-8.34%). The sub-dominant ones were 7 species: the *Aporia crataegi* (ID-5.1%), *Colias crocea* (ID-5.39%), *Issoria lathonia* (ID-6.69%), *Vanessa*

atalanta (ID-5.88%), *Aglais urticae* (4.9%), *Limenitis camilla* and *Argynnis paphia* (ID-4.57%), and 5 species of luskokrylykh are not numerous in the biotopes of the studied area: *Apatura iris* (ID-1.96%), *Inachis io* (ID-1.63%), *Papilio machaon* (ID-1.4%), *Gonepteryx rhamni* (ID-1.3%), 3 species were rare: *Iphiclides podalirius*, *Erebia medusa* (ID by 0.65%) and *Polyommatus coridon* (ID-0.9%) (Nekrutenko & Chykolovets, 2005), the remaining 7 species are common in the vicinity of the investigated area (Figure 2).

Discussion

The vegetation cover of the studied territory is made up of broad-leaved forests, although there are conifers, which were planted already in the XX century. Due to the diverse physical and geographical conditions, the area under study is rich in habitats, which is reflected in a large number of species of animals, including fauna of day-old flies.

The forests are mainly oak-pine, hornbeam and pine-hornbeam, and in the lowlands-hornbeam-oak and alder formations. Considerable distribution in the forests of the Kaniv district was given to such wild fruit trees as walnut, wild pear, cherry, rowanberry, apple and mulberry. Among the well-known shrubs, the common wood is common, which often creates thick foliage under the clothes of the forest, as well as three types of elder (black, red and herbaceous), in the forest edges dominated by shrubs, hips and sea buckthorns (Bashchenko, 2010).

Meadows are characterized by the presence of herbs and turf, which are usually used as pasture for livestock, and the fields are planted with cereal crops, in particular corn, soybean and sunflower. Herbaceous vegetation is represented by a large number of flowering species, the most common of them are: alchemist, camomile, clover, cobbler, hoof, lupine, podermannik, blueberry and many others. In the composition of the bright vegetation, the sedge, yellow (creeping, caustic) and ordinary flax predominate (Barbarych, 1965).

Flight of adult specimens of blavovusyh of luskokrylykh takes place from March to mid-September. The largest number of species can be observed in the third decade of June, and in April-May there are mainly species that hibernate at the stage of the imago (*Aglais urticae*), at the end of June - the beginning of July, butterflies that overwinter at the stage of the pupae are joined by them. In June, the number of flying species increases to a maximum. From July to the second decade of August there is a gradual decrease in the fly nymphalid. In the third decade of August there is a slight rise of the fly due to the appearance of species that hibernate in the stage of the imago and have 2-3 generations. In September, the number of flying species is reduced again. In this period, the species that hibernate at the stage of the imago dominate. Most of the pearl butterflies give two generations a year. One generation is observed only in the admiral, and in the white of rapeseed from 1 to 5 generations (Nekrutenko & Chykolovets, 2005).

Butterflies of the investigated area, along with other insects, were very sensitive to environmental changes. In the presence or absence of certain types of daily butterflies, you can analyze the state of the environment. This indicative role (Tsaryk, 2005) and explains their importance for monitoring the state of the environment. The changes in the natural environment are the main reason for the decline in the number or total disappearance of many invertebrates, in particular luskokrylykh, so the basic measures for the protection of endangered species should be directed at the protection of landscapes and habitats of insects-biotopes. Measures to protect luskokrylykh also include carrying out educational work among the general population in order to stop the uncontrolled insect catch (Zhydova, 2014). In order to draw attention to the need to protect daytime butterflies, those endangered species need to be included in the Red Book different levels.

Conclusion

Species diversity of daytime luskokrylykh as a structural element of natural habitats in the vicinity of the village of Buchak are closely related to the ecotopic and ecological and flora characteristics of these ecosystems. Changes in the indicators of their structural organization reflect the general tendencies of transformation processes that occur in the biotic block of ecosystems under the influence of anthropogenic load.

In the territory of the village of Buchak and within its outskirts, five main types of habitats are identified, where 25 species of blavovusyh butterflies are registered, including luskokryli, which are characterized by daytime activity from the family Syntomidae.

Comparison of groups of day-to-day butterflies in the village of Buchak and its environs using the index of domination and distribution index showed that the most similarity is characteristic of groups of biotopes, such as forest-steppe areas and mixed forests.

By the population of biotopes, the most species diversity is represented in forest steppe plots (23 species, which is 92% of all investigated individuals) and agrocenoses (21 kind)-84%. A small number of species is visited by shrubs, ravines, beams and roadside roads (64% for the forest and 68% for the bay, 52% for the reservoirs), although by species richness we did not find any significant differences (forests are 16, meadows-17, banks of reservoirs-13 kinds). In wet regions, in particular, only some species inhabit the banks of reservoirs.

Among the representatives of the luskokrylykh, the most numerous are the following species-*Syntomis phegea*, *Pieris brassicae*, *Pieris rapae* and *Polyommatus icarus*. Specified species for years of research have always had a stable high number. Locally there are species listed in the Red Data Book of Ukraine, in particular *Papilio machaon*, *Iphiclides podalirius* and *Apatura iris*.

Most species are winter (14) at the stage of the larvae. The adult flying is observed from mid-March to mid-September. Daytime luskokryli of natural habitats are potential consumers-phytophagas of vascular plants, as well as potential pollinators of flowering plants. Pests of crops in the larvae phase are *P. brassicae* and *P. rapae*.

References

- Ball, J. B. (2012). Lepidopterology in Southern Africa: Past, Present and Future. Insect Conservation: Past, Present and Prospects. Springer, Dordrecht, p. 342.
- Bashchenko, M. I. & Honchar, O. F. (2010). Bioresignation of Cherkassy region ecosystems and optimization of bottom-up spin-offs: monograph. Cherkasy. Cherkaskyi institute of APF monograph, p. 185.
- Blab, J., & Kudrna, O. (1982). Hilfsprogramm für Schmetterlinge: Ökologie und Schutz von Tagfaltern und Widderchen (No. 6). Kilda-Verlag.
- Benes, J., Konvicka, M., Dvorak, J., Fric, Z., Havelda, Z., Pavlicko, A., Vrabec, V. & Weidenhoffer, Z. (2002). Butterflies of the Czech Republic: distribution and conservation I, II. SOM, Prague.
- knyha Ukrainy, C. (1994). Tvarynnyi svit. Pid red, Scherbaka, MM K, Ukrainska Entsyklopediia.
- Heath, B. A. (1995). Notes on the early stages of *argyrocupha malagrida maryae* (wallengren) (lepidoptera, lycaenidae). *Metamorphosis*, 6(4), 167-173.
- Holoborodko, K. K. (2004). Phenolonic structure of Lycaenidae (Lepidoptera) of the steppe zone of Ukraine. // Nutrition of Bioinduction and Ecology. Zaporozhye: ZDU, 9(2), 182-190.
- Kremky, J. (1937). Research on the fauna of Podolia Polskie butterflies. *Fragmenta Fauna Museum Zoological Poloniae*, 3(11), 81-21.
- Lajos, Vári. (1986). Southern African Lepidoptera. A series of cross-referenced indices, pp: 243-276.
- Larsen, T. B. (1982). *Gegenes pumilio* (Hoffmannsegg, 1804); a review with cytological evidence that two species are involved. *Nota lepidopterologica*, pp: 103-110.
- Michael, F. B. (2000). Butterflies of Australia: Their Identification, Biology and Distribution. Csiro Publishing, Clayton, Australia, p. 1004.
- Nekrutenko, Y. & Chykolovets, V. (2005). *Denni metelyky Ukrainy*. Kyiv: Vydavnytstvo Raievskoho, p. 232.
- Smith, J. K., & Miller, F. C. (1991). Migratory patterns of Pieridae in southern Africa. In: Black (Eds.) *Butterfly Behaviour*, Bushveld Press, Pretoria. 234-256.
- Tite, G. E. (1973). The Genus *Aloeides* and Allied Genera (Lepidoptera: Lycaenidae). *Bulletin of the British Museum of Natural History (Entomology)*, 225-280.
- Tsaryk, I. & Kanarskyi, Y. (2005). *Denni metelyky- indicators of the transformation of xerophytic biotopes*. Lviv : Nauka, pp: 96-102.
- Udra, I. Kh. (1996). Bioherophic interpretation of the nature of the yoicho housings in the West. *Ukrainskyi heohrafichnyi zhurnal*, 3, 11-18.
- Vyznachnyk Roslyn Ukrainy. (1965). *Pid zah. Red. A.Barbarych*. Kyiv: Urozhai, p. 877.
- Yakhontov, A. A. (1939). *Denni metelyky. monohrafiia*. K.: Radianska Shkola, p. 185.
- Zhydova, K. O. (2014). Ecolon-faunistic analysis of the day dawns of the Rivne Nature Reserve. *Bioluchichny dosledzhennya: Zbirnik naukovih Prats*. In the All-Ukrainian science-practical conference of young scientists and students. Zhytomyr: Vyd-vo Zhdu im. I.Franka, pp: 138-141.

Citation: Truskavetska, I.Y. (2018). The present state of biodiversity and fauna of daytime butterflies (Lepidoptera, Diurna) in the vicinity of the Kaniv district. *Ukrainian Journal of Ecology*, 8(4), 129-136.



This work is licensed under a Creative Commons Attribution 4.0. License
