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TYPOLOGY OF THE ENTOMOLOGICAL COMPLEX OF DENDROBINOTS IN NATURAL AND SEMI-NATURAL BIOCOENOSIS OF CHERNIHIV REGION

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This article is devoted to study typology of the entomological complex in natural and semi-natural natural biocensosis of Chernihiv region. Nowadays, the threat of significant reduction of biodiversity as a result of some types of human activity has led to recognition not only of the concept of «biodiversity», but also as a global object of protection. This led to the formation of a new approach to nature conservation, which, in turn, requires the development of plans and strategies for the conservation of biological diversity. In this regard, the methods of studying biodiversity, in particular its quantitative evaluation, have become particularly important.

The issue of biodiversity conservation today has a high relevance to society, it affects socio-cultural, economic factors and factors of the environment. A rapid increase in the population of the planet dictates its laws, so it is necessary to comprehensively consider all possible options for increasing food production. All domesticated crops and animals are derived from the human management of biodiversity, which consistently responds to the peculiarities of agricultural production. It is biodiversity that provides natural management of pests, reducing the use of pesticides, obtaining high yields of cereal crops due to natural pollinators. Domestic and wild varieties of animals and plants are mandatory sources of genetic variability to respond to abiotic and biotic factors through population-genetic adaptation.

In this article was established that the main cause of impoverishment of biodiversity is anthropogenic impact of the environment and intensive consumption of natural resources. It is substantiated that to solve the problems associated with preservation. Biodiversity, in particular, the species diversity of insects, is necessary first of all to solve the problem of preservation and protection of habitats of their existence (skirt, lawns, roadsides, slopes of beams, ravines, fallow, etc.). However, the optimal size of these semi-natural biotopes is not sufficiently researched so it is extremely important to implement conservation measures for agrobiodiversity. Exhausting use of natural resources is today the main form of their use in agriculture. Therefore, the issue of conservation, non-exhaustive use and reproduction of biodiversity is attracting increasing attention and is absolutely topical.

The purpose of the work was to study the typology and dynamics of species entomological biodiversity in the natural and semi-natural biocenoses of the Chirniv region.

Keywords: *typology, insects-dendrobionts, natural biocenoses, semi-natural biocenoses.*

Formulation of the problem. Natural resources in the fields of agro-industrial complex are extremely ineffective. Resources, especially water and land, cause irreparable damage, which leads to catastrophic losses of land from water and wind erosion, pollution, sequestration for non-agricultural use, dehumidification of soils from mineralization, and other factors. Under flooding and land degradation as a result of water reclamation, salinization of irrigated land, which it is impossible to avoid in the soil-climatic conditions of Ukraine, together with the country's cultivation and application of technologies that accelerate the degradation of land and water objects, in the near future can lead to complete desertification significant territories and the loss of Ukraine of the most expensive natural resource — fertile land. The introduction of scientifically substantiated norms of nature use and environmental protection in agriculture is in its infancy, especially with regard to land use; control of compliance with the requirements and standards covered only a tenth of the farms.

Analysis of recent research and publications. The ecological function, the level of the biodiversity of the planet, its evolutionary changes were studied by such prominent ecologists as R. McArthur, E. Wilson, J. Valentine, E. Wings, N. Stork, R. Poole, E. Odum, L. Tangley, V. Morell [1–5].

Domestic prominent scientists — ecologists such as: I. Yemelyanov, O. Sozinov, R. Burda, O. Tarariko, V. Prydatko, V. Stovbchaty and others investigate the role of biodiversity in modern

agriculture, as well as the global dynamics of natural processes in Ukraine.

Statement of the problem. Understanding that biodiversity is the most important and necessary component for the well-being and sustainable development of mankind, is gradually becoming one of the priorities of the state policy of many countries of the world, as well as an actual subject for discussion at international conferences. The key is the Convention on Biological Diversity (CBD), adopted in Rio de Janeiro [6].

Thus, the Convention on Biological Diversity itself has been the main role in implementing the UN resolutions on the conservation and sustainable use of biodiversity at the global and regional levels. Ukraine has been a Party to the CBD since 1994, and has also joined a number of other international treaties in the field of the conservation of wild fauna and flora with their specific goals and objectives (Bonn, Bern, Ramsar, Carpathian Convention, CITES, etc.). The threat of a significant reduction in biodiversity as a result of various types of human activities has led to the recognition of the concept of «biodiversity» as a global object of protection. This led to the formation of a new approach in nature conservation, which, in turn, requires the development of new measures and strategies for the protection of biological diversity. In this regard, the methods of studying biodiversity, in particular its quantitative evaluation, have become especially important [7].

In Ukraine, agricultural landscapes occupy the bulk of the territory and have a dominant influence both on the overall ecological situation and on the efficiency and sustainability of agrarian production. Scientists are concerned that the lists of «red-book species» are overcrowded, once again by common species, and have realized the irreversibility of loss of biodiversity. Thus, according to estimates available in the scientific literature, the fauna of insects of Ukraine for the twentieth century has counted from 25 to 35 thousand species. The number of insect species living in agrocenoses is unknown, which makes it difficult to determine the actual state of biodiversity for the environmental justification of the measures envisaged by the UN convention. Such a powerful wave of change, reinforced by the risks of extinction of certain species, the phenomena of biological invasions and global climate change, prompted more attention to the composition of the biota, changes in this composition, with the fact that not much space, how much in time, and not only in the short-lived (for example seasonal dynamics), but also for a long time (disappearance and invasion of certain species, non-cyclical changes in the composition of groups, reserve-induced successions, synanthropy, etc.). Therefore, in accordance with the provisions of the Convention on Biological Diversity (Article 7), each of the parties to the agreement must monitor the components of biodiversity, paying particular attention to those requiring the implementation of immediate conservation measures, as well as those that open up the greatest potential for non-exhaustive use; to identify the processes and categories of activities that have or can have a significant adverse effect on the conservation and non-exhaustive use of biodiversity and monitor their effects by selecting samples and other techniques; collect and systematize data obtained as a result of identification and monitoring activities.

In view of this, the purpose of the work was to study the typology and dynamics of species entomological biodiversity in the natural and semi-natural biocenoses of the Chernihiv region.

Methods. The study of the typology of the entomological complex in natural and semi-natural biocenoses was carried out in the landscapes of the Chernihiv region with different biocenoses during the growing season of 2017. Landscapes of the Nosiv district of the Chernihiv region were selected for research. In natural biocenoses, natural areas of the forest and ecotones were investigated, and in semi-natural gardens and field-protective forest bands, which bordered with winter wheat agrocenosis. The study of the entomological diversity of agro-landscapes was conducted on the life forms of insects of permanent and dominant species. Proven and recommended methods were used for field and laboratory research. The collection of entomofaunas was carried out according to the recommended methods once every 7-10 days in stationary areas. One of the most common methods of collecting insects is mowing with an entomological slash, and for catching small insects (for example, aphids and other phytophiles) used exhaust or suction. The species richness and abundance of populations of different species were analyzed. Taxonomic membership of biological meetings was determined using entomological determinants [8–10].

Main material. The state of any population can fluctuate under the influence of environmental factors. After all, insects relate to poikilothermic animals (organisms that are unable to maintain a body temperature at a stable level), so their number and distribution depend heavily on the hydrothermal conditions of the growing season. In order to estimate the state of biodiversity of the entomophage in different states, it is necessary to know the ecological features

of different types of insects, the regularities of dynamics of the number of different populations of the entomological community. This makes it possible to identify one or another type of insect during research, which in turn affects biodiversity performance. The number and distribution of insects are significantly dependent on the hydrothermal conditions of the season of vegetation. Such a link, in turn, determines the probability of detecting one or another type of insect during the survey, which affects the indicators of biodiversity. Regarding the structure of the grouping of insects on the traffic lights, it was established that after the removal of arable land from cultivation, skirt is converted into the main reserves of the entomofauna of grain cereal crops, which is characteristic of this agro-ecological zone. So, the season of growing in 2017 was characterized as warm (within the limits of the norm) and arid. An analysis of the Hydrometeocenter of Ukraine shows that the average air temperature exceeded 100C in the first decade of April, and the September temperature was also extremely warm — the average temperature exceeded 170C. During the vegetation season, the temperature was above the norm of 1.5–1.7°C, and the rainfall did not reach 50% of the norm. The highest average air temperature (24,40C) was observed in the third decade of June, and the highest precipitation (23 mm) in the second decade of June. The natural course of temperature and precipitation indicates the absence of noticeable adverse effects of weather conditions on the number of insect populations. An analysis of the entomological fees for the 2017 growing season has given us the opportunity to explore the current level of insect dendrobionts and horsebionts diversity. After all, natural and semi-natural biocenoses are represented by woody vegetation, and also characterized by dense grass cover, which in turn allows to identify insects of several life forms. It has been established that the biodiversity of insects on the studied biocenoses includes about species belonging to 6 rows and 56 families. Of the total number of species of detected insect dendrobionts and hortobionts, the largest number of families has the rows of Coleoptera, Lepidoptera, Diptera and Hymenoptera (Table 1).

The structure of modern entomological diversity by insect dendrobionts and hortobionts is depicted in Figure 1.

As shown in Figure 1, the largest number of species has a number of Coleoptera 65 insect species, Lepidoptera — 44 and Diptera — 20. Rows such as Homoptera, Hemiptera and Hymenoptera did not have a significant number of species.

Research of the typology of entomophones in natural biocenoses is presented in Table 2.

Table 1

The structure of the current state of entomological diversity of insect dendrobionts

Ряд	Families	
	Numerosity	%
Homoptera	3	5,4
Hemiptera	5	8,9
Coleoptera	17	30,4
Lepidoptera	12	21,4
Hymenoptera	7	12,5
Diptera	12	21,4
Of all:	56	≈100

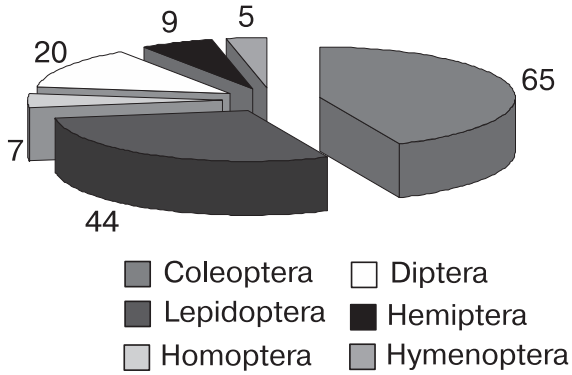

Fig. 1. *The state of entomological diversity by species in the landscapes of the Chernihiv region*

Analyzing the given data, one can distinguish the dominant entomofauna, both by families and by species.

Thus, the largest number of families and species were Coleoptera, Lepodoptera and Diptera. The entomological structure in the semi-natural biocenoses is given in Table 3.

As can be seen from the data given, there are three continuum-dominant continents with the highest number of Lepidoptera-22 species, Coleoptera-19 and Diptera-12 species of insects, respectively. Analyzing the results of entomological studies during the growing season of 2017, found constant dominant species of insects in natural and semi-natural biocenoses. Figure 2 shows the species diversity of the entomophon in the studied biocenoses.

From the given data it is clear that the species diversity of the entomophases studied in biocenoses varies among themselves. Thus, in natural biocenoses, the species diversity of insects is higher than in semi-natural ones. Almost

Table 2

Structure of entomological diversity in natural

Number	Family		Species	
	Numerosity	(%)	Numerosity	(%)
Coleoptera	12	36,3	30	32,6
Lepidoptera	9	27,3	23	25,5
Diptera	7	21,2	15	16,3
Hymenoptera	2	6,1	8	8,7
Homoptera	2	6,1	7	7,6
Hemiptera	1	3,03	9	9,8
Of all:	33	≈100	92	≈100

Table 3

Structure of entomological diversity in semi-natural biocenoses

Number	Family		Species	
	Numerosity	(%)	Numerosity	(%)
Coleoptera	8	34,8	19	32,6
Lepidoptera	7	30,4	22	25,5
Diptera	4	17,4	12	16,3
Hymenoptera	2	8,7	5	8,7
Homoptera	1	4,3	2	7,6
Hemiptera	1	4,3	2	9,8
Of all:	23	≈100	62	≈100

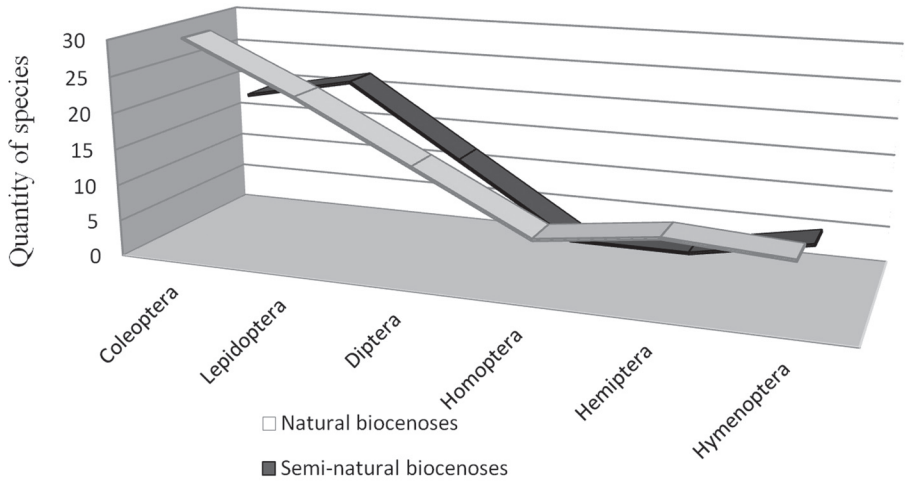

Fig. 2. *Species diversity of entomofaunas in the studied biocenoses (2017)*

identical indices of diversity in natural biocenoses have constant-dominant rows of Coleoptera, Lepidoptera and Diptera. In semi-natural biocenoses, these figures are slightly changed, the largest number of species has a number of Lepidoptera, and the other dominant rows remain almost equal. This is explained by the fact that in natural biocenoses there are processes

of self-regulation and natural selection, as well as the inherent high level of biological diversity, especially when they occupy large areas and are sufficiently stable over long periods of time. For example, the phenomenon of ecotonic effect, that is, an increase in the species saturation due to the overlapping of the ecological amplitudes of species of different ecological and systematic groups.

Conclusions. It was established that the main cause of impoverishment of biodiversity is anthropogenic impact of the environment and intensive consumption of natural resources. It is substantiated that in order to solve problems related to the protectio of biodiversity, in particular, the species diversity of insects, it is necessary first of all to solve the problem of conservation and protection of their habitats (edges, lawns, roadsides, slopes of beams, ravines, fallow, etc.). However, the optimal size of these semi-natural biotopes has not been investigated because the implementation of agrobiodiversity protection measures is extremely important.

As a result of faunal researches, it has been established that the biodiversity of insects on the investigated biocenoses includes about 150 species belonging to 6 rows and 56 families. Of the total number of species of detected insect dendrobionts, the largest number of families have rows of Coleoptera, Lepidoptera, Diptera and Hymenoptera. The largest number of species has a number of Coleoptera 65 insect species, Lepidoptera — 44 and Diptera — 20. Rows such as Homoptera, Hemiptera and Hymenoptera did not have a significant number of species.

The degree of domination of different taxa and indicators of entomological biodiversity varies considerably over the years due to the influence of weather factors, as well as the peculiarities of the multi-year dynamics of the population of different insect species. Thus, in natural biocenoses, the species diversity of insects is higher than in semi-natural ones. Almost identical indices of diversity in natural biocenoses have constant-dominant rows of Coleoptera, Lepidoptera and Diptera. In semi-natural biocenoses, these figures are slightly changed, the largest number of species has a number of Lepidoptera, and the other dominant rows remain almost equal.

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ТИПОЛОГІЯ ЕНТОМОКОМПЛЕКСУ ДЕНДРОБІОНТІВ У ПРИРОДНИХ ТА НАПІВПРИРОДНИХ БІОЦЕНОЗАХ ЧЕРНІГІВСЬКОЇ ОБЛАСТІ

Ця стаття присвячена вивченню типології ентомологічного комплексу природного та напівприродного біоценозу Чернігівської області. Загроза суттєвого скорочення біорізноманіття

в результаті деяких видів людської діяльності змусила визнати не лише саме поняття «біорізноманіття», але і як глобальний об'єкт охорони. Це призвело до формування нового підходу у природоохоронній діяльності, який вимагає, в свою чергу, розробки планів і стратегій щодо збереження біологічного різноманіття. В зв'язку з цим методи вивчення біорізноманіття, зокрема його кількісного оцінювання, набули особливого значення.

Питання збереження біорізноманіття на сьогодні має велику актуальність для суспільства, воно зачіпає соціокультурні, економічні чинники та фактори зовнішнього середовища. Швидке збільшення населення планети диктує свої закони, тому необхідно всебічно розглядати всі можливі варіанти збільшення виробництва продовольства. Усі одомашнені зернові культури та тварини отримані завдяки людському керівництву біорізноманіттям, яке постійно відповідає на особливості виробництва сільськогосподарської продукції. Саме біорізноманіття дає можливості для природного управління шкідниками, зменшення використання пестицидів, отримання високих урожаїв злакових культур завдяки природним запилювачам. Одомашнені та дикі різновидності тварин та рослин — обов'язкові джерела генетичної мінливості для відповіді на абіотичні та біотичні чинники через популяційно-генетичну адаптацію.

У цій статті було встановлено, що основною причиною збіднення біорізноманіття полягає в антропогенному впливі довкілля й інтенсивному споживанні природних ресурсів. Обґрунтовано, що для вирішення проблем, пов'язаних із збереженням біорізноманіття, зокрема, видового різноманіття комах, необхідно в першу чергу вирішити проблему збереження та захисту середовища їх існування (узлісся, галявини, обочини доріг, схили балок, ярів, перелоги та ін.) Однак, оптимальні розміри цих напівприродних біотопів не досліджено тому, надзвичайно актуально впровадження заходів із збереження агробіорізноманіття. Виснажливе використання природних ресурсів сьогодні є основною формою їх використання в сільському господарстві. Тому питання збереження, невичерпного використання та відтворення біорізноманіття привертає все більшу увагу і є абсолютно актуальним.

Метою роботи було дослідженні типології та динаміки видового ентомологічного біорізноманіття у природних та напівприродних біоценозах Чірнігівської області.

Ключові слова: *типологія, комахи-дендробіонти, природні біоценози, напівприродні біоценози.*

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