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ASSESSMENT OF THE STATE OF ENTOMOFAUNA BIODIVERSITY ON THE SANITARY PROTECTION ZONE OF THE POULTRY FARM KYIVSKA

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Abstract. *Biodiversity ensures the functioning of ecosystems that provides oxygen, clean air and water, plant pollination, pest control, wastewater treatment and many ecosystem services. Recreational resources rely on our unique biodiversity, such as bird watching, hiking, camping, fishing etc. But it is known that anthropogenic load leads to degradation or destruction of natural landscapes. One of the manifestations of degradation is the fragmentation and division of solid forests or steppes into separate territories. As a result, they are transformed into small islands of nature surrounded by arable land, settlements, roads and railways. The leading ecologists think that a significant influence on the level of biodiversity has been identified (According to National report on the state of the environment in Ukraine in 2020). It was a result of anthropogenic pressure on the environment.*

Therefore, determining the level of entomofauna biodiversity in different stations is relevant. During the research, the condition of entomofauna on the natural, semi-natural stations and sanitary protection zone (SPZ) of the Poultry Farm Kyivska was assessed. As a result of analytical and faunal studies, constant-dominant orders were revealed in research areas: Coleoptera, Lepidoptera and Diptera. These orders include more than 80% of species and others only about 20% of insect species.

The low number of species of entomofauna of dendrobionts is established due to excessive anthropogenic load and the depleted species diversity of trees and shrubs. Preservation of the ecological stability of landscapes by reproduction and maintenance of biodiversity requires the additional creation of protective forest plantations with high species richness of plants.

Keywords: *biodiversity, dendrobiont insects, natural, semi-natural stations, sanitary protection zone*

Introduction.

Biodiversity is the national wealth of Ukraine. Its preservation and inexhaustible use are recognized as one of the priorities of state policy in the field of nature management, ecological safety and environmental protection, an integral condition for improving its state and ecologically balanced socio-economic development (Lambert et al. 2014).

The scientific literature states the irreversible processes of the global impoverishment of biodiversity. Today biodiversity is lost during construction, land plowing, land reclamation, reservoir construction, the creation of transport infrastructure networks and other economic activities. Areas occupied by natural vegetation are reducing. It leads to the danger of losing genofund and cenofund. Biodiversity is the result of centuries-old evolution, so we must transmit it to future generations in the best possible condition (Dogan et al. 2016).

Cataloguing of entomofauna of agro landscapes of Ukraine has not been carried out so far despite the powerful domestic scientific school. Now it is not known how many species of insects live in agricultural landscapes. Now it is not known how many species of insects live in agricultural landscapes. The first step in solving the problem of the conservation and sustainable use of entomological diversity should be the compilation of registers of the diversity of the entomofauna of the agricultural sphere and the study of its current state (Sozinov, 2005).

As a European country, Ukraine takes an active part in the formation of the Pan European Ecological Network (including the Emerald Network) and aims to attract the integration of the national ecological network into the EU Directive, including issues of design formation and management of the ecological network.

The projects' development of the structural elements of the ecological network is an important aspect that can be proposed to solve conservation issues. The ecological network provides spatial interconnection of isolated areas of the natural ecosystem and increases their total area, migration and free expansion of biological species, conservation and renewal of biological diversity in the long run.

In addition to house plants, animals in the place where insects live are the most internal genetic exchanges in large areas. Genetic exchange in exceptional, isolated from other populations is impossible. But in that case, the negative role begins to reproduce inbreeding, random gene drift and some other genetic processes that affect the reproductive capacity of living factors. It will contribute to major abnormalities and genetic damage.

Thereby, the work aimed to determine the state of the entomofauna of dendrobionts on the sanitary protection zone of the Kyiv Poultry Farm.

Research methods.

The research was conducted in the area of SPZ OJSC "Poultry Farm Kyivska". It's an agricultural enterprise that specializes in the production of eating eggs, poultry meat for further processing and sale. OAO "Poultry Farm Kyivska" is located in the Desnyansky district. There are 115 hectares of agricultural land, a greenhouse of 0.2 hectares and an orchard of 23 hectares in the village Kalynivka, Brovary district. The research was carried out on three research fields: RF 1 - biogeocenosis located near the administrative building adjacent to the orchard, RF 2 - biogeocenosis located in the sanitary zone adjacent to the forest plantations, RF 3 - natural biogeocenosis.

Faunal analysis was carried out during the growing season of 2020 once every ten days. For this recommended methods of accounting for the entomofauna were used (David Dent, 2017). The most common method of collecting insects is mowing with an entomological net. Exhauster was also used. Some large insects were collected by hand (beetles, grasshoppers, cockroaches) or with a wide flask. Caterpillars, pupae, and eggs were collected by hand. Species richness and abundance of populations of different species were analyzed (Lesovoy et al. 2020). The taxonomic affiliation of biological collections was determined using entomological determinants.

Research results and discussion.

As a result of field research and analysis of entomological collections, the state of species biodiversity of dendrobiont insects, which dominated, was determined (Figure 1).

In general, it is possible to summarize the number of dendrobionts species in the research fields (Fig.2).

As can be seen from the figure, the largest number of dendrobiont insects species was found in the research field 3 - 200 species, research field 1 had 154 species and search field 2 had the smallest number - 102 species. It was the result of anthropogenic pressure, particularly deforestation.

Similarly, a result of analytical and faunal studies in the research fields revealed constant-dominant orders: Coleoptera, Lepidoptera and Diptera. In taxonomic terms, the diversity of entomofauna-dendrobionts by several families were distributed as follows: RF 1 contained Coleoptera - 13, Lepidoptera – 11 also Diptera – 5. Research field 2 contained Coleoptera - 13, Lepidoptera – 10 and Diptera – 8. Research field 3 contained Coleoptera - 13, Lepidoptera – 16, Diptera – 3. (Fig.3).

This analysis of the state of biodiversity of entomofauna of dendrobionts shows that insects from the orders Coleoptera, Lepidoptera and Diptera are constantly dominant. These orders include more than 80% of species, and others only about 20% of species of dendrobiont insects. There are significant changes due to the

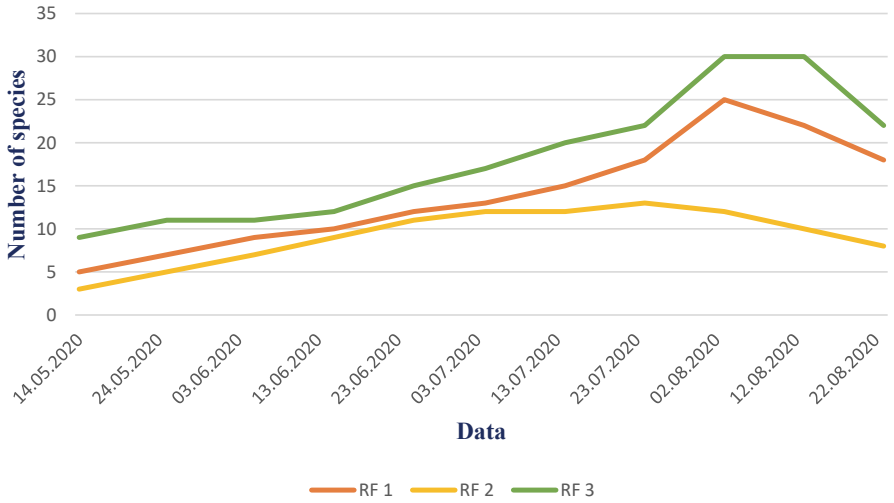

Figure 1. The dynamics of species biodiversity of dendrobiont species in terms of families

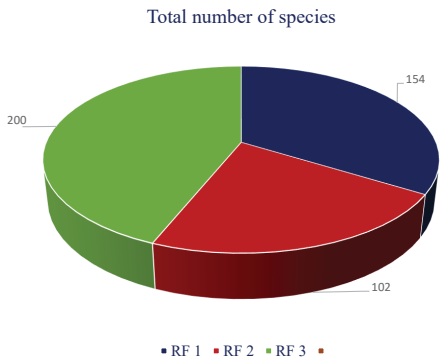

Figure 2. Total number of dendrobiont-species in the research fields

influence of climate variation and due to adverse environmental factors in the entomofauna. That's why the number of dendrobiont insects has decreased significantly. Its diversity is exhausted. The obtained data do not make it possible to state unambiguously that the not detected during the faunal studies species have disappeared.

However, there is a low number of species due to excessive anthropogenic pressure, ecological features of the species (low visual visibility in nature, etc.). Many species are found in too small numbers (single specimens).

In the context of the above study, they concerned the substantiation of the role of dendrobiont insects within tree and shrub plantations. Studies have shown that the wide range of nutrition of dendrobiont insects is due to their close connection with tree and shrub species of wild species from different families, as well as fruit and berry plantations, vegetables, crops and wild cereals. Dendrobiont insects are related to most biotopes of agricultural landscapes, which determines the patterns of their polytopic distribution. Thereby, dendrobiont insects are an important ecological group of agrobiodiversity.

The results of the analysis of trophic relationships of the identified tree species with the entomofauna of dendrobionts

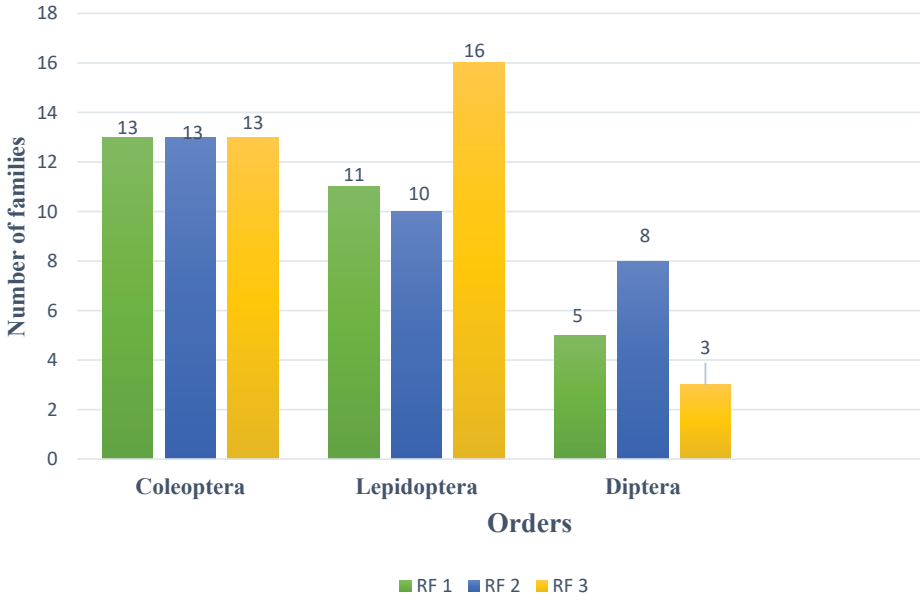

Figure 3. Quantitative distribution of the constant-dominant entomofauna of dendrobionts in the context of families

show that the existing diversity of tree species is not able to fully provide the species of agrobiodiversity with habitat and trophic resources. This is a very low number based on agro landscapes which we can talk about the necessary melioration not only to preserve biodiversity and prevent further deprivation but also to its regeneration. Forest belts will be able to fully ensure the existence, development and migration of agricultural biodiversity if their species composition is brought to the maximum possible diversity of trees and shrubs and if we combine them into a single system for biodiversity and landscaping, migration, metabolism and energy between different territories (Vagaliuk, 2021).

It means that it is necessary to develop a project of a structural element of the ecological network which can be proposed to solve the problem of conservation of agrobiodiversity at the local level in experimental farms.

Conclusions and prospects.

Based on the results of field research and analysis of entomological collections, it was established that the available entomofauna of dendrobionts on research field 3 had the largest number of species - 200, research field 1 had 154 species and research field 2 had the smallest number - 102 species, respectively.

It is determined that taxonomically the diversity of entomofauna of dendrobionts by the number of families is distributed as follows: RF 1 contained Coleoptera - 13, Lepidoptera – 11 also Diptera – 5. Research field 2 contained Coleoptera - 13, Lepidoptera – 10 and Diptera – 8. Research field 3 contained Coleoptera - 13, Lepidoptera – 16, Diptera – 3.

Consequently, there are significant changes due to the influence of climate variation and due to adverse environmental factors in the entomofauna. That's why the number of dendrobiont insects has decreased significantly. The low number of species of entomofauna of dendrobionts is established due to excessive anthropogenic load and the depleted species diversity of trees and shrubs. Preservation of the ecological stability of landscapes by reproduction and maintenance of biodiversity requires the additional creation of protective forest plantations with high species richness of plants.

It's necessary to develop a project of a structural element of the ecological network which can be proposed to solve the problem of conservation of agrobiodiversity at the local level in experimental farms.

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Анотація. *Біорізноманіття забезпечує функціонування екосистем, які забезпечують киснем, чистим повітрям і водою, запилення рослин, боротьбу з шкідниками, очищення стічних вод та багато екосистемних послуг. Рекреаційні ресурси спираються на наше унікальне біорізноманіття, таке як спостереження за птахами, піші прогулянки, кемпінг та риболовля та ін. Але відомо, що антропогенне навантаження призводить до деградації або повного знищення природних ландшафтів. Одним із проявів цього є фрагментація та поділ суцільних лісів чи степів на окремі території. В результаті вони перетворюються на невеликі природні острови, які оточені орними землями, населеними пунктами, дорогами та залізницями. На думку, провідних екологів визначено суттєвий вплив на рівень біорізноманіття у результаті антропогеннного навантаження на навколишнє природнє середовище.*

Тому визначення рівня біорізноманіття ентомофауни в різних стаціях є актуальним. Так, під час досліджень було проведено оцінку стану ентомофауни дендробіонтів в природних, напівприродних стаціях, а також на території санітарно захисної зони Київської птахофабрики. У результаті аналітичних та фауністичних досліджень на дослідних ділянках виявили константно-домінантні ряди: Coleoptera, Lepidoptera та Diptera. Ці ряди включають понад 80% видів, а інші тільки близько 20% видів комах.

Встановлено, низьку чисельність видів ентомофауни дендробіонтів, що обумовлена надмірним антропогенним навантаженням, а також збідненим видовим різноманіттям деревних та чагарникових насаджень. Збереження екологічної стабільності ландшафтів шляхом відтворення та збереження біорізноманіття вимагає додаткового створення захисних лісових насаджень з високим видовим багатством рослин.

Ключові слова: *біорізноманіття, комахи-дендробіонти, природні, напівприродні стації, санітарно-захисна зона.*