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FLORISTIC DIVERSITY OF NAHUIEVYCHI STATE HISTORICAL AND CULTURAL RESERVE

Abstract. The article presents the floristic diversity and distribution of species within the territory of the State Historical and Cultural Reserve "Nahuievychi". The taxonomic composition of the studied area is defined, abundance is established, the ecological-coenotic structure is determined. The summary of flora is made and systematized by the families, classes, and departments. The life forms of plants by the nature of the recovery buds location relative to the earth's surface and snow cover are analyzed. In the spectrum of biomorphs, polycarpics predominate in terms of life cycle duration. Mesophytes predominate in relation to moisture (79.1%), heliophytes predominate in relation to light (51.2%). Ecological and coenotic analysis of the flora structure shows that the dominant species are meadow and forest florocenotypes. Plants subject to protection and listed in the Red Book of Ukraine and the list of plant species subject to special protection in the Lviv region were identified.

Key words: species, distribution, abundance, phytodiversity, structural analysis, reserve.

INTRODUCTION

Environmental protection is becoming more and more important every year. There is irreversible climate change due to excessive anthropogenic pressure, and this leads to changes in vegetation. Vegetation has undergone major changes, including the reduction of floristic composition, reduction of forest area, a massive spread of invasive species, etc. [2].

In recent decades, the anthropogenic transformation of flora is gaining momentum. Every year there are fewer and fewer natural areas not yet included in the sphere of human activity. Due to changes in environmental parameters, many species of plants and plant communities are threatened with extinction due to uncontrolled economic activities [4; 7].

Fragmentary observations of certain plant species categories are one of the areas of biodiversity conservation. Today It is extremely important to analyze the flora, as the inventory of phytodiversity is one of the important tasks of its conservation.

To develop conservation measures, it is necessary to study the structure of natural biocenoses of their phytodiversity. In this regard, the study of the phytodiversity of individual areas has not only scientific but also environmental significance.

The purpose of the work is to study and research floristic composition, the systematic structure of diversity on the territory of the state historical and cultural reserve "Nahuievychi".

MATERIALS AND METHODS

Field research was conducted during 2020-2021 according to the generally accepted method of floristic research. The method of route-diagnostic research was used. During the route the herbarium was collected, plants that were found along the way were recorded.

The abundance of plants, location, ecological conditions of growth was determined. The names of plant species were taken according to the determinant of plants [13], biomorphological analysis was performed according to the classification of K. Raunkier [8]. Abundance was determined by the O. Drude scale [5].

RESULTS AND DISCUSSION

During floristic research, the study of existing herbarium collections, and literary sources, we found the growth of 129 plant species in the Nahujevychi State Historical and Cultural Reserve, which are grouped into 119 genera and 53 families, 6 classes, and 5 divisions. Systematic analysis of species is given in Table 1.

Table 1. The systematic structure of the higher vascular plants flora at the Nahuievychi State Historical and Cultural Reserve

Department, class	Family		Species	
	Abs. No.	%	Abs. No.	%
Bryohyta	1	1.9	1	0.8
Equisetophyta	1	1.9	1	0.8
Polypodiophyta	1	1.9	1	0.8
Pinophyta	2	3.8	6	4.7
Magnoliophyta:	48	90.6	120	93.0
incl. *Magnoliopsida*	40	75.5	104	80.6
Liliopsida	8	15.1	16	12.4
Total:	**53**	**100**	**129**	**100**

The vast majority of flora species are represented by angiosperms plants, the share of which is 93.0% of the total number of species (120 species). Among the angiosperms, the class *Liliopsida* accounted for 15.1% of families, 12.4% of species, and class Magnoliopsida 75.5% of families, 80.6% of species. Vascular spore plants (0.8% of species; 1.9% of families) with Pinophyta (4.7% of species; 3.8% of families) play a minor role in the systematic composition of flora (table.1).

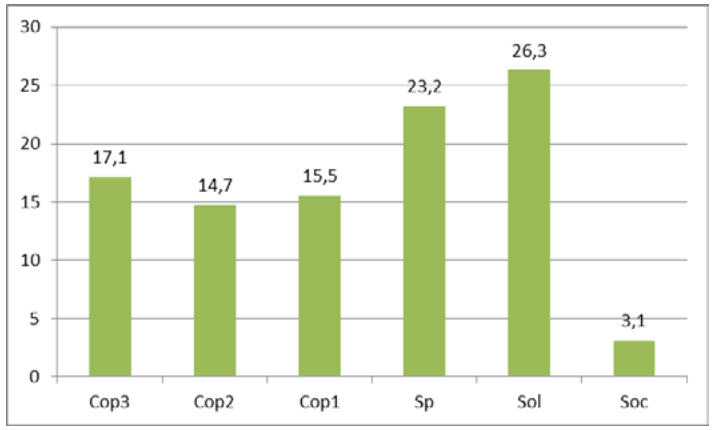

Fig. 1. The ratio of plant species abundance by the scale of O. Drude

On the territory of the historical and cultural nature reserve "Nahuievychi" (Cop3 on the Drude scale) 22 species of plants grow very abundant (17.1%): Impatiens parvifalora L., Fragaria vesca L., Ranunculus *repens* L., Glechoma hederaceae L. Abundantly **(**Cop2*)* is growing – 19 species (14.7%) Crataegus oxyacantha L., Lythrum salicaria L., Lysimachia vulgaris L.).Quite abundant (Cop1) – 20 species (15.5%) Potentilla anserina L., Galium aparine L. Anthoxanthum odoratum L., Salix alba L.), rarely (***Sp***) – 30 species (23.2%) Dentaria bulbifera *L.*, Sorbus aucuparia L. Corydalis cava *L.*, Rhinanthus major L.), occur singly Sol) – 34 species (26.3%) *Paris*

quadrifolia L., Verbascum densiflorum Bertol., and closed by overhead parts (***Soc***) – 4 species (3.1%) Hedera helix L., Asarum europaeum L., Vinca minor L.). Fig. 1 shows the abundance ratio in% by the O. Drude scale.

The leading part in the number of species of the family spectrum is formed by 23 families, each of which includes two or more species (Fig. 2).

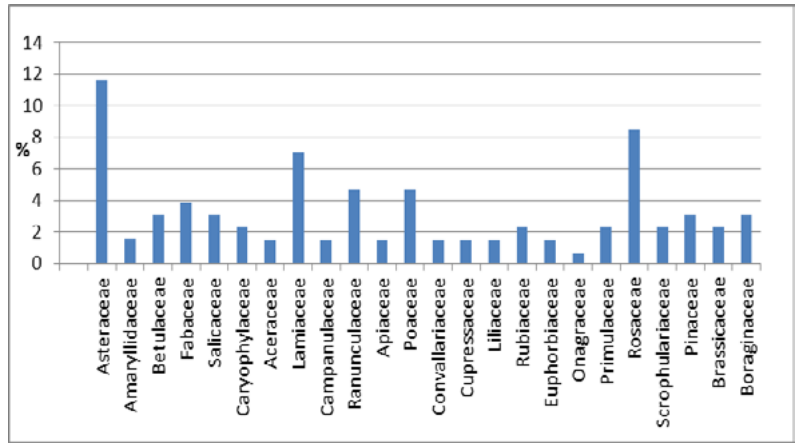

Fig. 2. The family spectrum of plants of the Nahuievychi Nature Reserve

Conducted biomorphological analysis of the flora at the Nahuievychi Nature Reserve showed that the most numerous types of life forms according to I.G. Serebryakov [8] is a group of terrestrial grasses, which includes – 98 species (75.9%). The group of polycarpic herbs consists of 81 species or 82.6% of the total number of plants: Sanguisorba officinalis L., Plantago lanceolata L.), Asperula graveolens L.), etc. The group of monocarpic grasses has a low share of 17 species (17.3%). These are Thlaspi arvense L., Geranium robertianum L., Galeopsis speciosa L., etc. Woody plants are represented by 20 species (15.5%). Among them large areas are possessed by Quercus robur L., Salix acutifolia Wild., Carpinus betulus L., *Acer negundo L*. Shrubs and shrubs have 11 species (8.5%). They are represented by the following species – Rubus caesius L., Crataegus oxyacantha *L.,* Rosa canina L., etc.

Analysis of the species distribution by life forms according to K. Raunkier [9] showed that the group of phanerophytes includes 27 species (20.9%), hamephytes include 4 species (3.1%). Hemicryptophytes include 57 species, which make up 44.2% of the total. Cryptophytes number 24 species (18.6%), the group of terrophyte plants has 17 species or 13.2% of higher vascular plants. The distribution of flora species on this basis is shown in Figure 3.

Our ecological and coenotic analysis in relation to moisture showed that the most numerous in the nature reserve are mesophytes – 102 species, which is 79.1% of the flora population. Plants of moderately moist habitats are – Veronica chamaedrys L., Betonica officinalis L., Sorbus aucuparia L., etc. The second place is occupied by hygrophytes, which share is 9.3% (12 species) of the total number of species. Frangula alnus Mill., Good rivals L., Salix caprea L.etc. belong to hygrophytes. There are 15 species of xerophytes (11.6%). This group is represented by the following species**:** Pinus sylvestris L., Antennaria dioica L. Euphorbia cyparissias L., Juniperus communis L. (Fig. 4)**.**

Heliophytes predominate in relation to light **–** 66 species (51.2%), which develop best in full light in the conditions of meadows, deforestation, agricultural lands. They are spread in open places and are light-loving. Linaria vulgaris Mill., Euphorbia cyparissias *L.,* Bellis perennis *L. etc.* are heliophytes.

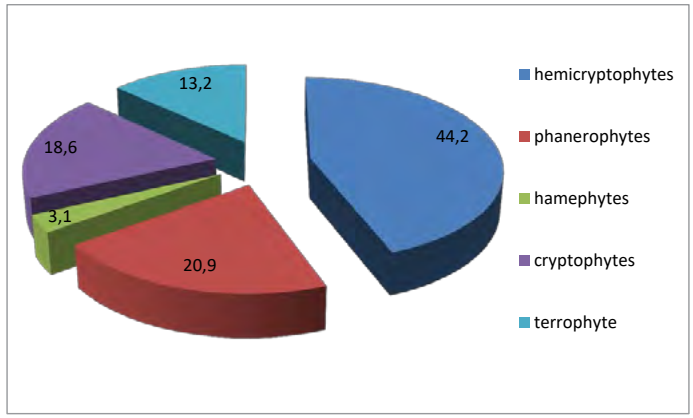

Fig. 3. Biomorphs of life forms according to Raunkier

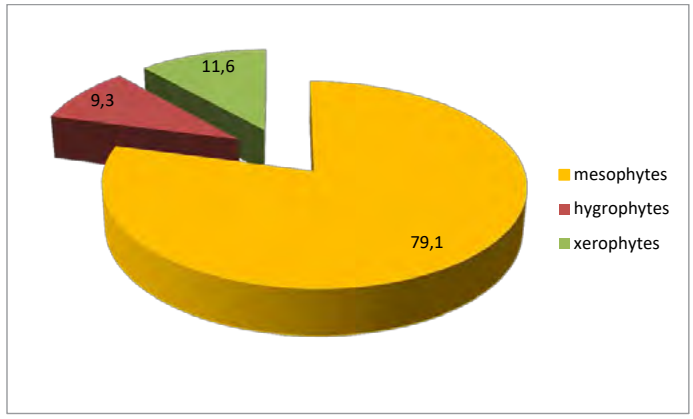

Fig. 4. Ecological groups of plants in relation to water

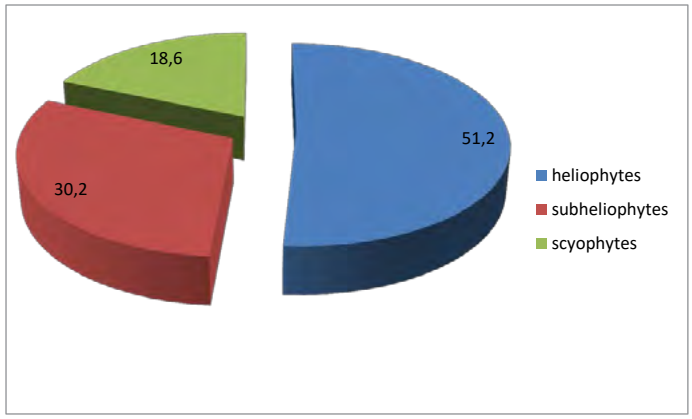

Fig. 5. Ecological groups of plants in relation to light

The plants that can withstand a little shading and can live in full sunlight are subheliophytes. They are almost twice less than heliophytes in the flora (39 species or 30.2%). They belong to this ecological group Primula veris L., Acer negundo L., Geranium robertianum L., etc.

Scyophytes have occupied the smallest part of the spectrum – shady plants that grow in shady places, mixed and deciduous forests with high closure of tree crowns.

The ecological group of sociophytes is (24 species or 18.6%) of the total number of species. Such species are Aegopodium podagraria L., Hedera helix L., Gagea lutea (L.)Ker Gawl. (Fig. 5).

The formation of the flora of the study area, we characterized by the results of coenotic analysis. We have identified florocenotypes in the studied area of the Nahuievychi Nature Reserve. Based on the conducted research it is established that the meadow ecological-coenotic group is the most numerous on the territory of the reserve in flora, which includes 41 species or 31.7%. Among them are the following species – Betonica officinalis L., Sanguisorba officinalis L., Potentilla anserina L., Lysimachia vulgaris L., etc. The deciduous forest group has 39 species or 30.2%. This group is represented by Sorbus aucuparia L., Dipsacus fullonum L., Lathyrus vernus (L.) Bernh.), Vinca minor L. etc. Coniferous-forest includes 4 species, which is 3.1%. These are Larix decidua L., Pinus sylvestris L. etc. The nodal group is represented by 15 species (11.6%). Typical representatives are Rubus caesius L., Crataegus oxyacantha L., Rosa canina L., Swida sanguinea *(COM*)L.) Opiz. The synanthropic ecological-coenotic group includes 14 species (10.8%). Synanthropic species associated with anthropogenically altered groups. The most common species of this group: Urtica dioica L., Chelidonium majus L., Melilotus officinalis L., etc. 11 species (8.5%) belong to the ecological-coenotic group of coastal-aquatic vegetation. They include Stachys sylvestris L., Salix acutifolia Wild., Good rivals L. etc. Montana group is represented by 5 species, which is 3.9% (Abies alba Mill., Alnus glutinosa L., Alchemilla glabra L.), etc.

Sociological analysis of the flora at the Nahuievychi State Nature Reserve showed the presence of 11 species in the flora, which have different protection statuses. The Red Book of Ukraine [14] includes 6 species*:* Galantus nivalis L., Leucojum vernum L., Orchis bifolia L., Allium ursinum L., Scilla bifolia L., Primula veris L.

The list of plant species subject to special protection in the Lviv region (official list of regionally rare plants protected by the decision of the Lviv Regional Council No.193 of December 2, 2003) includes 5 species [1]. Regionally rare species in the area are represented by species such as Hepatica nobilis L., Ficaria verna Huds., Primula veris L., Corydalis cava L., Anemone nemorosa L.

CONCLUSIONS

As a result of research conducted on the territory of the state historical and cultural nature reserve "Nahuievychi", the growth of 129 species belonging to 119 genera, 53 families, 6 classes, and 5 departments were revealed. 93.0% of their species are representatives of the department Magnoliophyt*a*. The leading place among the classes in the number of species is occupied by Magnoliopsida. They belong to the leading families Asters 11.6%, Pink 8.5%, Lamiacea*e* 7.0%.

Herbaceous plants predominate in terms of life form (98 species or 76.0%), and polycarpics in terms of life cycle duration (81 species or 82.6%). The most numerous are hemicryptophytes (57 species; 44.2%).

In relation to moisture, mesophytes predominate – 102 species, which is 79.1%. In relation to light heliophytes **(**66 species**;** 51.2%).

The results of the ecological and coenotic structure analysis of the flora showed that the dominant species are meadow and forest florocenotypes.

Species listed in the Red Book of Ukraine are among the identified plants. They are rare and endangered species on the territory of *the* nature reserve Orchis bifolia L., Leucojum vernum L., Primula veris L., Galantus nivalis L., Ficaria verna Huds., Hepatica nobilis L., Scilla bifolia L., Allium ursinum L., etc.

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АНОТАЦІЯ

ФЛОРИСТИЧНЕ РІЗНОМАНІТТЯ ДЕРЖАВНОГО ІСТОРИКО-КУЛЬТУРНОГО ЗАПОВІДНИКА «НАГУЄВИЧІ»

Охорона навколишнього середовища з кожним роком набуває все більшої актуальності. Спостерігаються незворотні зміни клімату через надмірне антропогенне навантаження, а це призводить до змін рослинного покриву. Рослинний покрив зазнав великих змін, зокрема це зменшення флористичного складу, скорочення площі лісів, масове поширення інвазійних видів.

Антропогенна трансформація флори набирає все більших обертів. З кожним роком залишається все менше природних районів, які ще не включені у сферу діяльності людини. Через зміни параметрів навколишнього середовища багато видів рослин опинилися під загрозою зникнення внаслідок неконтрольованої господарської діяльності.

На сьогодні надзвичайно актуальним є проведення аналізу флори, оскільки інвентаризація фіторізноманіття є одним з важливих завдань його збереження.

В статті представлено флористичне різноманіття та поширення видів на території державного історико-культурного заповідника «Нагуєвичі». Визначено таксономічний склад досліджуваної території, встановлено рясність, визначено еколого-ценотичну структуру. Складено конспект флори та систематизовано їх по родинах, класах, відділах. Проаналізовано життєві форми рослин за характером розташування бруньок відновлення щодо поверхні землі та снігового покриву.

У спектрі біоморф за тривалістю життєвого циклу переважають полікарпіки. За відношенням до вологи переважають мезофіти (79,1%), по відношенню до світла геліофіти – (51,2%). Еколого-ценотичний аналіз структури флори свідчить, що домінуючими є види лучного та лісового флороценотипів.

Виявлено рослини які підлягають охороні та занесені до Червоної книги України та до переліку видів рослин, що підлягають особливій охороні на території Львівської області.

Рідкісними та зникаючими видами, які зростають на території природного заповідника є *Orchis bifolia* L., *Leucojum vernum* L. *Primula veris* L., *Galantus nivalis* L., *Ficaria verna* Huds., *Hepatica nobilis* L., *Scilla bifolia* L., *Allium ursinum* L. тощо.

Ключові слова: вид, поширення, чисельність, фіторізноманіття, структурний аналіз, заповідник.