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The geographic analysis of the flora of Biloozersky National Nature Park (Ukraine)

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Abstract: The results of the geographic study of the flora of Biloozersky National Nature Park after Meusel (MEUSEL et al. 1965; 1992) has shown that the temperate-submeridional species (26.3 %) prevail in the latitudinal spectrum of its chorological groups. It is typical for flatland temperate latitudinal floras of the Holarctic region. The species of the Eurasian group, European and circumpolar species, which are distributed mostly in the temperate and boreal zones, are predominant in the spectrum of the regional chorological groups of the flora. Cosmopolite species are minor in the studied flora. The species of Euryoceanic and indifferent groups are predominant regarding oceanicity-continentality. In general, the correlation between oceanic and continental climate types of ranges, confirms the intermediate character of the flora of the park. Thus, the division of the areographic groups of the flora evidents its forest-steppes character of the Central European floras.

Keywords: Biloozersky National Park, Ukraine, flora, geographic structure, species, area.

Introduction

The left bank part of the Middle Dnipro region (Ukraine) belonged until recently to the regions that were not represented in protected areas of the highest categorical rank. To improve this situation, in 2009, the Decree of the President of Ukraine № 1048/2009 "On creation of the National Park "Biloozersky" was issues. It was to comprise the lands of the State Forestry "Biloozersky" located in

Pereyaslav-Khmelnitsky district of Kyiv region and Kaniv district of Cherkassy region, with the total area of 7014.44 ha.

The creation of the national park "Biloozersky" is substantiated by the need [is necessary] to preserve and protect the flora and vegetation of upland terraces of the Dnipro River, which are remarkable for their richness, variety and sozological value (FEDORONCHUK et al. 2004).

The inventory of the flora and its analysis is one of the major tasks in the study of the flora of any region. We analyzed the geographical structure of the flora of the park.

The geographical structure is thought as the spectrum of geographical elements (areographic groups) of an area. These groups are established by combining of the species with ranges similarity as to the spatial and geographical terms. Arrangement and analysis of the areographic groups allows identifying of the flora's features, its geographical ties, and, to a certain extent, the history of its formation (DIDUKH 2007, TOLMACHEV 1974).

The modern plant geography has no single unified classification of the geographical elements. Depending on the purpose of the study, various classification schemes are used, the choice is determined by the specifics of the floristic studies (DIDUKH 2007).

Material and Methods

The basis of the presented geographic analysis of the flora is the scheme of the botanical-geographical regions of the Earth developed by MEUSEL et al. (1965, 1992). This scheme allows analyzing the distribution of species in latitudinal (zonal), altitudinal (oceanic-continental belts) and regional aspects and using of areographic formulas for allocation of the ranges' types. Currently, the flora of the park counts 512 species of vascular plants, of which only wild ones have been investigated as we did not include the cultivated ones in the geographic analysis.

Results and Discussion

Allocating the species of the NNP "Biloozersky' by the zonal characteristics, we have distinguished 16 types (Fig. 1).

In the latitudinal spectrum of the chorologic groups, the temperate-submeridional species prevail; they make up the 26.4% of the flora, which is typical for flatland temperate floras. This group includes *Aristolochia clematitis* L., *Geum urbanum* L., *Rubus caesius* L. and others.

Quite a large part of the species have temperate-meridional (77 species, 14.9%: *Acer negundo* L., *Amorpha fruticosa* L., *Ballota nigra* L., *Betonica officinalis* L., etc.) and boreal-meridional (69 species, 13.5% of: *Elytrigia repens* (L.) Nevski, *Oenothera biennis* L., *Dactylis glomerata* L., etc.) ranges.

Relatively equal numbers of species belong to the boreal-submeridional group (67, 13.1%: *Sedum acre* L., *Stellaria graminea* L., and others) and the temperate group (61, 11.9%: *Poa compressa* L., *Populus nigra* L., *Quercus robur* L. and others).

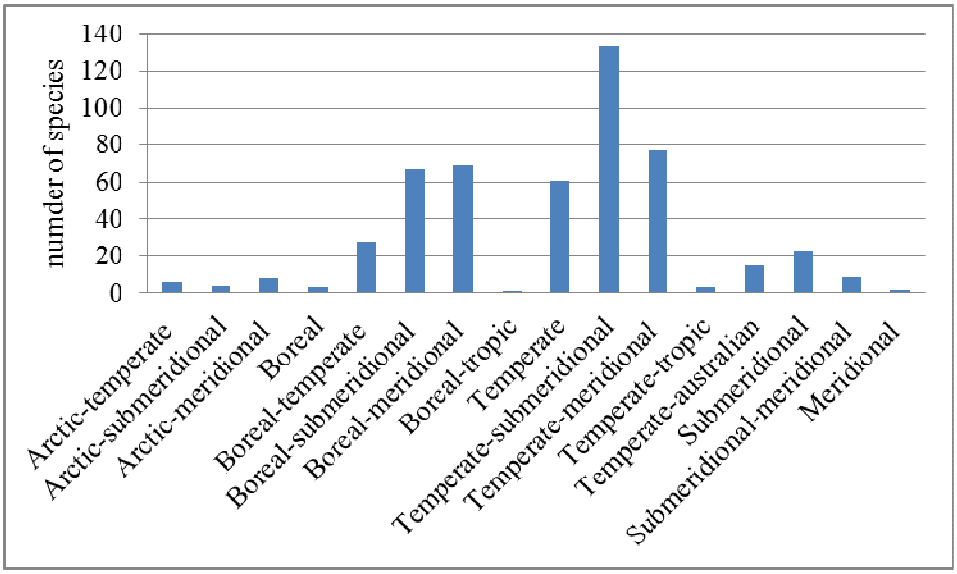

Fig. 1. The distribution of species of the park's flora by zonal types of ranges

There is a few species with a wide range, advancing to the north, namely 8 species (1.6%) with arctic-meridional range, 4 species (0.8%) – arctic-submeridional and 6 species (1.2%) – arctic-temperate range.

18 species (3.6% of the flora of the park) occur in the arctic zone; 174 species (33.8%) occur in the boreal zone. In the temperate zone 288 species (55.9%) occur, which represents the majority of the total number of species.

In the spectrum of the regional chorological groups of the flora, the majority is constituted by the species of the Eurasian group 206 (40.0%), which includes 116 (22.6%) European-West Asian species (*Asparagus officinalis* L., *Artemisia austriaca* Jacq., *Helichrysum arenarium* (L.) Moench, *Tilia cordata* Mill. and others). Wide Eurasian range is in 81 species (15.8%: *Glechoma hederacea* L., *Pinus sylvestris* L., *Viscum album* L., *Populus tremula* L., *Chelidonium majus* L. and others). Eurasian species with other types of ranges are rather rare in the studied area, 5 species (0.9%: *Convallaria majalis* L., *Epipactis helleborine* (L.) Crantz and others) belong to the European-East Asian range. The following groups are represented by single species each: European-Southwest Asian (*Elytrigia intermedia* (Host) Nevski) and Minor Asian (*Impatiens parviflora* DC.).

The species with the European range make up quite a large group, comprising 136 species with wide European ranges (26.5%: *Carex hirta* L., *Carpinus betulus* L., *Quercus robur* L., *Campanula persicifolia* L., *Vinca minor* L. etc.), and 2 species with the Eastern European (0.4%: *Senecio borysthenicus* (DC.) Andrz. ex Czern., *Otites chersonensis* (Zapał.) Klokov).

The groups somewhat inferior in the number of species to the first two are the circumpolar species (75 species, 14.6%: *Urtica dioica* L., *Veronica serpyllifolia*

L., *Pyrola minor* L., *Poa nemoralis* L., *Digitaria sanguinalis* (L.) Scop. etc.) and the species of Euro-Siberian range (56 species, 10.9%). The majority of the latest group is comprised by the European-Western Siberian (43, 8.4%) species (*Betula pendula* Roth., *Agrostis capillaris* L., *Festuca beckeri* (Hack.) Trautv., *Pilosella officinarum* F.Schult. et Sch. Bip., *Coccyganthe flos-cuculi* (L.) Fourr etc.). The species with the wide Euro-Siberian range represent 1.8% (*Carex acuta* L., *Angelica sylvestris* L., *Filipendula ulmaria* (L.) Maxim., *Betula pubescens* Ehrh., etc.), European-Western Asian-Siberian – 0.8% (*Stellaria graminea* L., *Plantago media* L. etc.). The European-Western Asian- Western Siberian group is represented on the territory with only one species (*Otites borysthenicus* (Grun.) Klokov).

There is quite peculiar European-American chorological group, which includes 25 species (4.9%). It is represented by the following types of ranges: wide European-American, which includes 13 species (2.5%: *Parthenocissus quinquefolia* (L.) Planch., *Bidens frondosa* L., *Amorpha fruticosa* L., *Acer negundo* L., *Juncus tenuis* Willd. etc..), European-Eastern American - 8 species (1.6%: *Stellaria alsine* Grimm., *Conyza canadensis* (L.) Cronq, *Asclepias syriaca* L., *Robinia pseudoacacia* L. etc.), few in number Eurasian- Eastern American (*Milium effusum* L.), North American (*Quercus rubra* L.), European-West Siberian-American (*Campanula rotundifolia* L.), European –Siberian – Eastern American (*Galium palustre* L.).

The minor role in formation of the studied flora belongs to the cosmopolitan species, which count 14 species (2.7%), including *Eleocharis palustris* (L.) Roem. Et Schult., *Lemna minor* L., *Spirodella polyrrhiza* (L.) Schleid. and others.

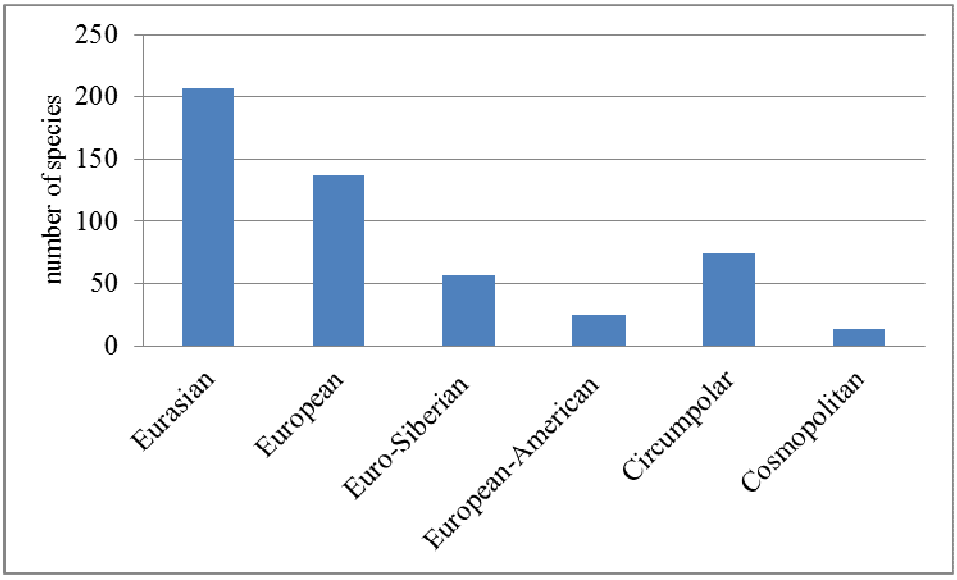

Fig. 2. Distribution of species of the park's flora by the regional types of ranges

The features of the range are influenced not only by the zoning, but also the coefficient of oceanicity – continentality of the climate. It is manifested through the formation of ranges of different configurations according to climatic particularities.

Some researchers (MEUSEL et al. 1965, 1978; MEUSEL & JAGER 1992) suggested for areographic diagnoses to consider the signs of affinity of the species' ranges to the belts of oceanicity and continentality of the climate.

As regards oceanicity-continentality (Fig. 3), the species of the euryoceanic group prevail (including the species of suboceanic and euryoceanic types of ranges), which number 290 species (56.4%), including, in particular, *Genista tinctoria* L., *Trifolium arvense* L., *Anthericum ramosum* L., *Quercus robur* L. etc.). Second largest number of species belong to the group indifferent to oceanicity and continentality, which includes 120 species (23.4%: *Eleocharis palustris* (L.) Roem. et Schult., *Equisetum palustre* L., *Vicia cracca* L. etc.).

Significant role in formation of the studied flora belongs to eurycontinental group that includes the species with subcontinental types of ranges, it has 65 species (12.7 %: *Anisantha tectorum* (L.) Nevski, *Lavathera thuringiaca* L., *Calamagrostis epigeios* (L.) Roth, et al.). The eucontinental group is not numerous and consists of the eucontinental and eucontinental-subcontinental types; it is represented by 17 species (3.3%: *Salvia nemorosa* L., *Hylotelephium maximum* (L.) Holub, *Jurinea cyanoides* (L.) Rchb. s.l., etc.).

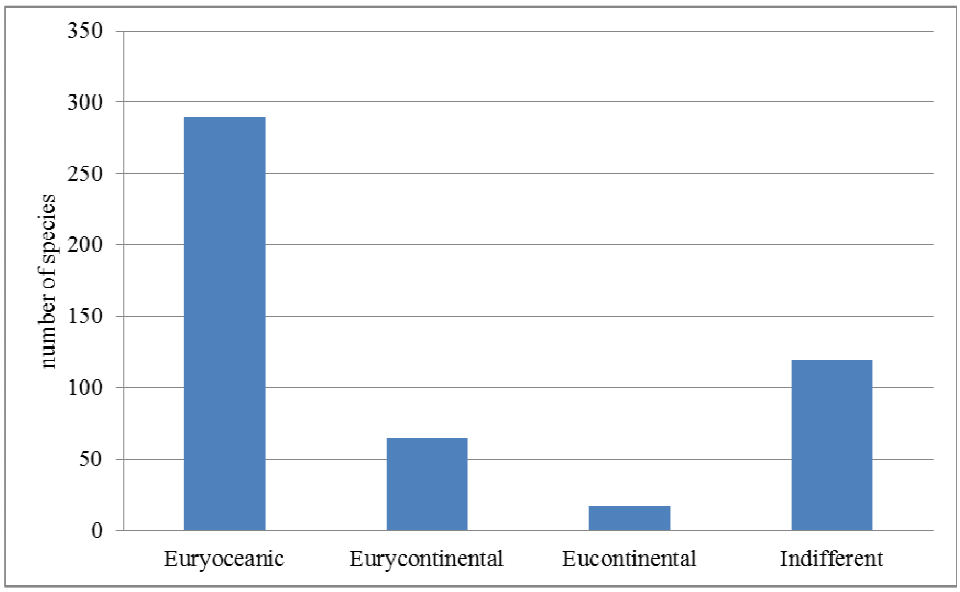

Fig. 3. The distribution of species of the park's flora by climatic types of ranges

Conclusions

Thus, the accomplished geographical analysis of the flora of the "Biloozersky" NPP showed that the latitudinal spectrum of chorological groups is dominated by temperate-submeridional species that make up the 26.4% of the flora, which is typical for flatland temperate floras.

In the spectrum of the regional chorological groups of the flora, the majority belongs to species of the Eurasian group, the species with European and circumpolar ranges, distributed mainly in the temperate and boreal zones. The cosmopolitan species are of minor importance for the formation of the studied flora.

In respect to oceanicity-continentality, the species of the euryoceanic and the indifferent to oceanicity-continentality groups prevail.

Thus, according to the distribution of its areographic groups, the studied flora displays chorologically the general features of the structure of the Central European forest-steppe floras with the majority of Holarctic, European and Central European range types.

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