PHYTOVARIETY AND INTERSPECIFIC CONNECTING IN ECOSYSTEMS OF STEPPE PRIDNIPROV'YA

Lisovets Olena
Cand. biol. Sciences, Associate Professor
Oles Honchar Dnipro National University
Dnipro, Ukraine

The relevance of monitoring studies of natural ecosystems is due to the need to monitor their changes under the influence of anthropogenic factors, as well as forecasting development.

On the basis of the Prysamarsky International Biospheric Observation Station of the Oles Honchar Dnipro National University, comprehensive researches of phytodiversity of the steppe Pridniprov'ya are carried out [1]. The object of our research is the grass cover of typical zonal, intrazonal and azonal ecosystems of the steppe Pridniprov'ya: on the right bank of the Samara – steppe and meadow phytocenoses, near-wall linden-ash oakery, riparian forests, on the left bank – in the floodplain, linden-ash oakery in the central floodplain and meadow phytocenoses on the border of the floodplain and the arena. The material was collected using route and stationary geobotanical methods on the laid stationary test areas of 10 × 10 m. Floristic research was carried out using general botanical methods of collection, herbarium and species identification.

During the observations (1999–2020), 118 species of vascular plants belonging to 33 families were registered in the steppe and meadow groups on the right-bank steppe trial areas. The most numerous are members of the families Asteraceae (25%), Poaceae (13%), Lamiaceae (10%). Floristic diversity is characterized by high rates in the steppes in plakorny habitats: from 57 to 70 species per 100 m^2; it is slightly lower in steppe groups on washed-out slopes: 43–48 species; this indicator was the lowest in the meadow phytocenosis – 32 species. The greatest phytodiversity is characteristic of plakor steppe phytocenoses – on average 64 species per 100 m^2. On the slopes of the steep bank with washed-out soils, it decreases by about a third, in the meadow study group – almost twice.

In floodplain meadows, the floristic list includes 53 species from 22 families, of which the most numerous are Fabaceae (21%), Asteraceae (13%), Poaceae (11%).

Quantitative ratio and distribution of species on the area of phytocenosis are determined by biological and autecological features of plants, as well as the relationship between them. The relationships between plant species can be characterized by connectivity, which is understood as the correlation of qualitative traits. Based on the study of connections between species in the natural environment, it is possible to make sound recommendations for the use of economically valuable plants in the creation of sustainable phytocenoses in the steppe Pridniprov'ya.

In this work, the indicator of their occurrence was used to account for plants. The research was carried out in steppe plant groups on the plateau and the steep bank of the Samara River. On test plots (TP) of 10 × 10 m^2 in a checkerboard pattern were laid 5 plots of 2 × 2 m^2, which, in turn, were divided into 16 adjacent squares with a side of 0.5 m. Thus, the location of individual species in the phytocenosis was studied. To identify the correlation between species (connectivity) used the chi-square method, the direction of dependence (positive or negative) was calculated using the coefficient Yula [2].

In the steppe groups on the plateau, where the humidification conditions are characterized by a medium-steppe hygrotop (according to the scale of L. Ramensky [3]), the soils are represented by common low-humus chernozem, the vegetation was dominated by *Festuca valesiaca* Gaud. (L.) Pers. (TP 1), *Botriochloa ischaemum* (L.) Keng and *Cleistogenes bulgarica* (Bornm.) Keng (TP 2), *Plantago media* L. (TP 6). These areas were characterized by a fairly high floristic diversity – they numbered from 52 to 61 species of plants, the total projective coverage of green plants averaged 70%.

The study found that in all test plots the number of cases of positive connections exceeds the number of negative ones. Dominants in different research sites do not have the same contribution to the formation of interspecific connections. For example, on TP 2 beard ordinary forms 6 negative connections with other species, on TP 6 plantain forms 2 positive connections.

In the studied areas, a positive connection was found between *Poa compressa* L. and *Astragalus ucrainicus* M. Pop. et Klok., *Bromopsis riparia* (Rehm.) Holub and *Medicago romanica* Prod., *Festuca valesiaca* and *Medicago romanica* Prod., *Linum hirsutum* L. and *Poa angustifolia* L., *Poa angustifolia* and *Achillea submillefolium* Klok. et Krytzka, *Botriochloa ischaemum* and *Medicago romanica*, *Festuca valesiaca* and *Lotus ucrainicus*, *Medicago romanica* and *Festuca pseudovina* Hack. ex Wiesb. Species of gens *Poa, Bromopsis , Festuca, Astragalus, Lotus, Medicago* – are valuable in terms of fodder plants. Therefore, it is advisable to use appropriate pairs of plants when creating artificial forage lands. *Linum hirsutum* – an ornamental plant, *Poa angustifolia* – valuable lawn grass. These species can be recommended to use together when creating lawns. *Botriochloa ischaemum* is used to fix the soil on the slopes and as fodder grass, so the identified patterns should be taken into account when creating crop phytocenoses for fodder phytocenoses and soil protection.

Negative connections were else found between *Achillea submillefolium* and *Linum czerniaevii* Klok., *Botriochloa ischaemum* and *Poa compressa*. *Achillea submillefolium* is used as a ground cover plant, *Linum czerniaevii* – as an ornamental, *Botriochloa ischaemum* and *Poa compressa* – fodder and soil protection plants. Such pairs of plants are not recommended for use in creating phytocenoses.

Studying of perennial changes in the combinations of species growing in the experimental areas can be used to study the dynamics of the structural organization of herbaceous phytocenoses in the steppe Pridniprov'ya.

List of references:

1. Горбань В.А., Лісовець О.І. Екосистемні моніторингові дослідження в Присамар'ї (Дніпропетровська область, Україна) // Моніторинг та охорона біорізноманіття в Україні : Рослинний світ та гриби. Серія «Conservation Biology in Ukraine»: Матеріали Всеукраїнської науково-практичної конференції «Захист та охорона біорізноманіття України» (м. Київ, 27 березня 2020). – Вип. 16. – Т. 1. Київ; – Чернівці : Друк Арт, 2020. – С. 61–65.
2. Руденко В. М. Математична статистика. Навч. посіб. – К.: Центр учбової літератури, 2012. – 304 с.
3. Раменский Л. Г., Цаценкин И. А., Чижиков О. Н., Антипин Н. А. Экологическая оценка кормовых угодий. по растительному покрову. – М. : Сельхозгиз, 1956. – 472 с.