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## **ECOLOGICAL COMPONENT OF ADVENTIVE ELEMENT OF KHARKIV URBAN FLORA (UKRAINE)**

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Adventive plant species cause changes in all structures of urban flora, including ecological. The expansion of the range of habitats and the strengthening of the role of adventive plants in the structure of plant communities indicates an increase of invasive potential of introduced species over the years.

The ecological analysis of adventive fraction of Kharkiv urban flora was processed using the classifications of R. Wittig et al. (degree of

urbanization) [6, p. 265–282] and J. Jalas (degree of hemerobia) [4, p. 1–15]. Analysis of distribution of adventive plant species in the vegetation classes was performed by processing geobotanical descriptions of urban vegetation in the programs Turboveg 2.91 [3, 78 p.] and Juice 7.0.127 [5, 98 p.]. The obtained phytocenones have been identified by Prodrome of The Vegetation of Ukraine [2, 784 p.], habitat types – by National Habitat Catalogue of Ukraine [1, 442 p.].

After analyzing the adventive plant species by distribution, we have found that 136 species (39.7%) occur sporadically throughout the city and represent a stable component of transformed habitats. The distribution of other species of adventive plants is as follows: 69 plant species (20%) grow locally in some parts of the city, 62 plantspecies (17.9%) are widespread in the city, 78 plant species (22.3%) was accidentally found (from 2 to 5 localities).

The distribution of adventive plant species according to the city zoning shows the predominance of plants of urban and suburban zones (208 species; 60.6%). We have found 94 plant species (27%) of urban zone that grow exclusively in synanthropic ecotopes. Other 43 plant species (12.4%) have been found in the city outskirts with a decrease in the degree of urbanization. Thus, we note an increase in number of adventive plants from the periphery to the city center, where the main centers of introduction are located.

According to the analysis of vegetation we have established the distribution of plant communities of *Balloto nigrae-Robinion pseudoacaciae* Hadač et Sofron 1980, *Chelidonio majoris-Robinion pseudoacaciae* Hadač et Sofron ex Vitková in Chytrý 2013, *Chelidonio-Acerion negundi* L. Ishbirdina et al. invalid. (art. 3o, 5), *Geo-Acerion platanoidis* L. Ishbirdina et al. invalid. (art. 3o, 5) associated with anthropogenic broad-leaved forests habitats. Vegetation of nutrient-demanding ruderal herbaceous habitats is represented by *Convolvulo arvensis-Agro-pyrrion repentis* Görs 1967, *Arction lappae* Tx. 1937 communities. Plant communities of *Sisymbrium officinalis* Tx. et al. ex von Rochow 1951, *Panico-Setarion* Sissingh in Westhoff et al. 1946 form nutrient-demanding ruderal annual and biennial species habitats, *Onopordion acanthii* Br.-Bl. et al. 1936 –habitats of ruderal annual and biennial species on nutrient-poor soil. Plant communities of nitrophilous annual vegetation of muddy river banks are represented by *Senecionion fluviatilis* Tx. ex Moor 1958, *Bidention tripartitae* Nordhagen ex Klika et Hadač 1944, *Chenopodion rubri* (Tx. in Poli et J. Tx. 1960) Hilbig et Jage 1972.

To determine the participation of species by the degree of hemerobia [2, p. 1–15], all non-native species were divided according to their occurrence in anthropogenic ecosystems. The majority of species (106; 30.6%) belong to the group of meso-, eugemeres ( *Alcea rosea* L.,

*Amaranthus albus* L. etc.). They are the components of flora with a high degree of anthropogenic load. Euhemerobes (87 species; 25%) and mesohemerobes (82; 23.8%) associate with transformed ecosystems and culture phytocenoses (*Bryonia alba* L., *Fraxinus pennsylvanica* Marshall, *Aristolochia clematitis* L., *Fumaria schleicheri* Soy.-Willem., *Ligustrum vulgare* L., *Rosa rugosa* Thunb. etc.). The areas of the city with human activity as a limiting factor are centers of expansion of adventive plant species or formation of synanthropic plant communities. Such species are part of meso-, eu-, polyhemerobes (30; 8.8%) and polyhemerobes (15; 4.4%) groups. They grow on anthropogenically transformed ecotopes in the urban zone (*Acer negundo* L., *Parthenocissus inserta* (A. Kern.) R. M. Fritsch, *Consolida regalis* S.F. Gray, *Cannabis ruderalis* Janisch. etc.). In areas within significant human impact on ecosystem, we found few adventive plant species (*Oenothera rubricaulis* Klebahn., *Vicia villosa* Roth etc.). The explanation may be increase of oligohemerobes (12; 3.5%) in the city's suburban zone. Other groups are oligo-, mesohemerobes (11 species; 3.2%), eu-, polyhemerobes (1 species; 0.3%) and meso-, oligohemerobes (1 species; 0.3%). The conducted research of degree of hemerobicity of the adventive fraction of urban flora confirmed the high level of transformation and urbanization of the city's flora. All groups of hemerobia are typical for ecosystems with active or weak human activity. In particular, this is confirmed by the absence of stenotic group of ahemerobes, which represents only natural ecosystems.

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