*БОТАНИЧЕСКИЙ ЖУРНАЛ, 2021, том 106, № 4, с. 336–352*

**СООБЩЕНИЯ**

# SYNANTHROPIC FLORA OF THE DESNA PLATEAU (SUMY REGION, UKRAINE)

**© 2021 г. L. V. Koval[1,*] and L. M. Horshkova[1]**

[1] *Olexandr Dovzhenko Hlukhiv National Pedagogical University*
*Tereshchenkiv Str., 47-b, Hlukhiv, 41400, Ukraine*
**e-mail: flos_kl@ukr.net*

Received March 25, 2020; Revised December 13, 2020; Accepted December 22, 2020

It is known that by the end of the 20th century invasions of alien plants were widely realized as one of major global threats for phytodiversity. The article presents the results of the comprehensive analysis of the synanthropic flora and the condition of anthropogenic transformation phytodiversity of the Desna Plateau. The synanthropic flora of the Desna Plateau (Krolevets-Hlukhiv geobotanical district) is represented with the 337 species belonging to the 220 genera and 51 families. The composition of the spectrum of leading families: Asteraceae, Brassicaceae, Poaceae, Fabaceae, Lamiaceae, Apiaceae, Chenopodiaceae, Boraginaceae, Caryophyllaceae, Rosaceae indicates that the synanthropic flora of region is close to Mediterranean floras. In the spectrum of the biomorphological structure in the studied flora the most of plants is herbaceous with almost equal proportions of monocarpic and polycarpic species. The summer-green plants dominate in the synanthropic flora of the Desna Plateau. Ecological analysis of the synanthropic flora according to humidity revealed the dominance of species confined to the habitats of medium humidity. According to ecocoenotic analysis the number of semi-natural ecotope species is almost equal to the number of anthropogenic ecotope species. Among the synanthropic flora of the region the alien component includes 179 species which constitutes 19.4% of the total number of vascular plant species of the Desna Plateau flora, and 52.3% of synanthropic flora, the native component of which consists of 158 species (46.8%). The index of synanthropization of the studied flora is 36.6%. The degree of naturalization among alien species of the Desna Plateau is dominated by epecophytes.

According to the geographical origin the largest number of species originates from Ancient Mediterranean and from the American continent. According to the time of immigration kenophytes predominate among alien species. Their impact is significant as they include species that destroy natural vegetation cover. Among them the transformer species part is considerable: *Acer negundo* L., *Phalacroloma annuum* (L.) Dumort., *Impatiens parviflora* DC., *I. glandulifera* Royle, *Xanthium albinum* (Widd.) H. Scholz, *Echinocystis lobata* (Michx.) Torr. et A. Grey, *Bidens frondosa* L., *Iva xanthiifolia* Nutt., *Galingsoga parviflora* Cav., *Chenopodium suecicum* J. Murr. and the quarantine *Ambrosia artemisiifolia* L.

*Keywords:* anthropogenic transformation, Desna Plateau, synanthropic flora, structural analysis, alien species

10.31857/S0006813621040098

Climate change towards warming is nowadays accompanied by changes in living conditions within natural habitats and, accordingly, changes in the structure of biological communities. Together with the globalization of anthropogenic activity, these phenomena contribute to the processes of synthantropization and adventization of the natural flora (Bellard et al., 2016, 2018; Seebens et al., 2017). The introduction of plant species on a mass scale leads to the naturalization of introduced species, their distribution and the displacement of natural species (Banks, Paini, Bayliss, Hodda, 2015). There are gradual processes of unification of the floras and the loss of their specificity (Morozova, 2020). Invasive alien species have been identified as threatening to ecosystems, habitats, communities or species (Convention on Biological Diversity, 2014; Shackleton et al., 2020). The Global Naturalized Alien Flora (GloNaF) database has now been established and the regions with the highest number of invasive naturalized alien species have been identified (Pyšek et al., 2017).

It is established that close situated regions with resembling physical and geographical conditions are equally vulnerable to invasion of alien species. Regional studies of the degree of anthropogenic transformation of the flora of certain territory help to establish general patterns of distribution of alien invasive species, to trace their habitats in order to implement timely measures for the conservation of natural flora (Early et al., 2016; van Kleunen, 2016; van Kleunen et al., 2019). In Ukraine also actively investigates the processes of synanthropization and adventization of the

**Table 1.** Comparison of spectra of leading families of the Desna Plateau flora with those of synanthropic flora of the Desna Plateau and its apophytic and alien fractions

| Leading families | Desna Plateau flora | | Synanthropic flora | | Apophyte fraction | | Alien fraction | |
|---|---|---|---|---|---|---|---|---|
| | rank | Number of species | rank | Number of species | rank | Number of species | rank | Number of species |
| Asteraceae | 1 | 120 | 1 | 69 | 1 | 34 | 1 | 35 |
| Poaceae | 2 | 79 | 3 | 24 | 8 | 7 | 3 | 17 |
| Cyperaceae | 3 | 43 | – | – | – | – | – | – |
| Fabaceae | 4 | 43 | 4 | 24 | 2 | 12 | 4 | 12 |
| Rosaceae | 5 | 41 | 10 | 11 | 10 | 6 | 9 | 5 |
| Lamiaceae | 6 | 40 | 5 | 20 | 3 | 12 | 6 | 8 |
| Caryophyllaceae | 7 | 40 | 9 | 12 | 7 | 9 | – | 3 |
| Brassicaceae | 8 | 39 | 2 | 31 | 5 | 11 | 2 | 20 |
| Apiaceae | 9 | 38 | 6 | 18 | 4 | 12 | 8 | 6 |
| Scrophulariaceae | 10 | 35 | (11) | 10 | 6 | 10 | – | – |
| Ranunculaceae | (11) | – | (12) | 8 | (11) | 5 | – | 3 |
| Chenopodiaceae | – | – | 7 | 16 | (12) | 5 | 5 | 11 |
| Boraginaceae | – | – | 8 | 13 | (13) | 5 | 7 | 8 |
| Amaranthaceae | – | – | – | 5 | – | – | 10 | 5 |
| Polygonaceae | – | – | – | – | 9 | 7 | – | 1 |

flora, both nation-wide (Protopopova, 1978; Protopopova et al, 2002; Shevera et al, 2018; Burda, Koniakin, 2019) and in selected regions (Protopopova et al., 2015).

Therefore, studies of the extent of anthropogenic transformation of regional flora are extremely relevant and require, among other things, the publication of lists of synanthropic and alien plant species (Garcı´a-de-Lomas, Vila`, 2015; Essl et al, 2019).

The comprehensive floristic research including synanthropic component of the territory of the Desna Plateau was carried out in 2002–2006 (Koval, 2005; 2006; Koval et al, 2018; Koval, Horshkova, 2019). The purpose of this article is to provide information on the state of anthropogenic transformation of the flora of the Desna Plateau and to publish an annotated list of species of synanthropic flora of the region.

## MATERIAL AND METHODS

The geographical position of the Desna Plateau is N 51° 21'–51°55', E 33°10'–34°15'. It's territory situated in the north east part of Ukraine at the border line of Novgorod-Siverske Polissya (the forest-covered territory) and Sumy Lisostep (forest-steppes physical and geographical zones). The western spurs of the Central Russian Upland contribute to the manifestation of the elevated landforms of the region. Cretaceous sediments come to the surface in places. The river Seim and tributaries are proceeding by the research territory.

According to administrative zoning the studied territory belongs to Hlukhiv, Krolevets, Putyvl districts of the Sumy region of Ukraine (Marynych et al., 1988). According to geobotanical zoning area of research is within Krolevet's-Hlukhiv geobotanical district (Andrienko et al., 1977). The area under study consists of about 4 thousand square kilometers.

Ancient cities Hlukhiv, Krolevets, Putyvl have thousand-year history of its existence, associated with crafts and agriculture. Now there are no large industrial enterprises in the region. Agriculture and transport are developing here.

The climate of the region is temperate-continental with average temperatures +19.5°C in July and –7.5°C in January. Precipitation is 550–600 mm/year. The soils are mainly gray and dark gray forest, sod-podzolic under broadleaf oak-maple-linden forests; sandy soils under pineries. Rivers of the region belong to the Dnipro basin: Desna, Seim, Kleven.

Floristic research was executed with the field research method and the complex of accepted methods of synanthropic floras study. We define the synanthropic flora as a set of spontaneously growing elements of natural transformed flora, alien elements of various geographical origin, elements of anthropogenic origin, which was formed under the human activity

and exists for a long time within certain territories (Protopopova, 1991). The list of synanthropic species of vascular plants includes all species spontaneously growing in anthropogenic and semi-natural ecotopes of the region: within settlements, in roadside thickets along roads, highways, railway embankments, in fields and vegetable gardens. Other sources of data were also additionally used: literature and herbarium materials (KW), we consulted with Prof. Sergei L. Mosyakin, Prof. Viera V. Protopopova, Prof. Mycola M. Fedoronchuk, Dr. Myroslav V. Shevera. We identified two fractions as parts of the synanthropic flora. To the apophytic fraction of synanthropic flora we included species of natural flora with different degrees of occurrence in the composition of anthropogenic and semi-natural ecotopes of the study region. Alien component of the flora (alien fraction) is a set of species that are not characteristic of natural flora, the introduction of which into the territory is not associated with the natural process of florogenesis, but is the result of direct or indirect human activity (Protopopova, 1991).

Taxonomic structure of the studied flora has been analyzed (Tolmachev, 1974). We used the linear system of life forms (Holubev, 1978) and the system of Raunkiaer's biotypes (Raunkiaer, 1934) for the study of biomorphological structure. Species were divided into the ecological groups according to the relation of humidity for ecological analysis (Didukh et al., 2000).

Ecocoenotic groups are given according to the "Ecoflora of Ukraine" (Didukh et al., 2000). The geographical analysis is based on the regionalization identified by Takhtajan A.L. (Takhtajan, 1978).

Non-native plants were analyzed according to conventional classification by Kornaš J. (Kornaš, 1968). Floristic analysis also included the calculation of selected indexes of anthropogenic transformation of the studied flora (Jackowiak, 1990):

Index of synanthropization – determines the percentage of synanthropic plant species from the total number of species (Is):

$$Is = S/F \times 100\%$$

Index of apophytization – determines the percentage of apophytes from the total number of species (IAp):

$$IAp = Ap/(Sp + An) \times 100\%$$

I Index of anthropophytization – determines the percentage of alien species (anthropophytes) from the total number of species (IAn)

$$IAn = An/F \times 100\%$$

where

S – number of synanthropic species

F – total number of the Desna Plateau flora

Ap – number of apophytes

An – number of anthropophytes (alien species)

Sp – number of spontaneophytes (native species)

**Table 2.** Leading genera of the synanthropic flora of the Desna Plateau, Ukraine and its selected regions

| Leading genera | Desna Plateau, number of species | Ukraine, rank | R. Ros, rank | Donbas, rank | Mykolaiv, rank |
|---|---|---|---|---|---|
| *Chenopodium* | 7 | 1 | 2 | | 3 |
| *Atriplex* | 6 | | | | |
| *Vicia* | 6 | 4 | 4 | | 9 |
| *Artemisia* | 5 | 11 | 5 | 8 | |
| *Amaranthus* | 5 | 12 | | | 10 |
| *Helianthus* | 4 | | | | |
| *Bidens* | 4 | | | | |
| *Trifolium* | 4 | | 8 | | |
| *Plantago* | 4 | | | | |
| *Rumex* | 4 | 9 | | | 5 |
| *Ranunculus* | 4 | | | | |
| *Bromus* | 4 | | | | |
| *Potentilla* | 3 | | | 6 | 4 |
| *Salvia* | 3 | 13 | | | |
| *Centaurea* | 3 | | | 2 | |
| *Veronica* | 3 | | 3 | 1 | 2 |
| *Verbascum* | 3 | 6 | | | |

Species names are given according to "Vascular plants of Ukraine. A nomenclatural checklist" (Mosyakin, Fedoronchuk, 1999) which complies with the International Code of Botanical Nomenclature.

## RESULTS AND DISCUSSION

**Taxonomical analysis.** The stated species composition of the Desna Plateau flora includes 920 species of vascular plants, which are related to 464 genera, 112 families, 6 classes, and 5 divisions (Koval, 2005; 2006). The synanthropic flora of studied region includes 337 species of vascular plants belonging to 220 genera, 51 families. The floristic indexes of taxonomic diversity of synanthropic flora are: genus/family = 4.3; species/family = 6.6; species/genus = 1.5.

The index of synanthropization of the studied flora is

$$\mathbf{Is} = S/F \times 100\% = 337/920 \times 100\% = 36.6\%$$

Thus, generally the index of synanthropization of the Desna Plateau flora according to our data is characterized by larger scale than synanthropic flora of Ukraine (the index of synanthropization is 22.5%).

Taxonomic spectrum of 10 leading places from the synanthropic flora includes Asteraceae (41 genera,

69 species), Brassicaceae (22 genera, 31 species), Poaceae – 16; 24, Fabaceae – 12; 24, Lamiaceae – 13; 20, Apiaceae – 14; 18, Chenopodiaceae – 4; 16, Boraginaceae – 12; 13, Caryophyllaceae – 10; 12, Rosaceae – 9; 11.

A slight shift in the ranks of leading families is observed in Poaceae, Fabaceae, Lamiaceae. The sharp shift of Brassicaceae from the 8th rank in the flora of the Desna Plateau to the 5th rank in the apophytic fraction and the 2nd rank in the synanthropic flora of the Desna Plateau and its alien fraction attracts attention. Obviously, this testifies to the arid nature of some anthropogenic ecotopes of the region.

Enhancing the role of the Chenopodiaceae family shows a high level of anthropogenic transformation of this territory. Thus composition of the spectrum of leading families of the synanthropic flora of region is close to Mediterranean floras.

The biggest after the amount of species is genus *Chenopodium* (7 species), genera *Atriplex* and *Vicia*, which have 6 species each; *Artemisia* and *Amaranthus* which have 5 species each; *Helianthus*, *Bidens*, *Trifolium*, *Plantago*, *Ranunculus*, *Bromus*, *Rumex* have 4 species each, 18 genera have 3 species, 35 genera have 2, the rest 156 genera are monotypic. When comparing with the spectra of the leading genera of the synanthropic flora of Ukraine and its selected regions, it is obvious that the most common genera are *Chenopodium*, *Vicia*, *Amaranthus*, *Rumex*, *Veronica*. This indicates a fairly typical generic composition of the Desna Plateau synanthropic flora (Protopopova, 1991).

**Biomorphological analysis**. In the spectrum of the biomorphological structure in the studied flora the most of plants is herbaceous – 320 (94.94%). Among them the herbaceous polycarps make up 125 (37.09%), monocarps – 133 (39.46%), biennial monocarps – 34 (10.08%), mono-biennial – 28 (8.3%). The share of woody polycarps together account for 17 (5.04%) and consist of the following forms: trees – 5 (1.48%), shrubs – 12 (3.56%).

The presence of a significant number of mono-biennial plants indicates the danger of functional homogenization of the flora (Morozova, Zhmylev, 2020).

According to Raunkiaer's forms in the synanthropic flora of the Desna Plateau hemicryptophytes prevail – 156 (46.29%). Therophytes take the second position – 138 (40.94%). The other forms are: phanerophytes – 16 (4.74%), chamaephytes – 2 (0.59%), cryptophytes (geophytes) – 22 (6.52%), helophytes – 2 (0.89%), hydrophytes – 1 (0.39%).

Such a ratio of species according to the duration of a large life cycle of plants is typical for the synanthropic flora of Ukraine as a whole, as well as for the synanthropic flora of other regions.

The summer-green plants dominate in the synanthropic flora of the Desna Plateau – 312 (92.58%). The number of summer-winter-green plants make up fewer species – 22 (6.52%). The number of ephemerals and ephemeroids – 3 (0.89%) is insignificant. This is due to the boreal climate of the region: a long winter period.

According to the types of root system, dominating among synanthropic species are ones with the taproot system – 228 species (67.65%). There are much fewer species with fibrous root system – 93 (27.6%). 15 (4.45%) species have mixed root structure, 1 species is rootless (0.29%).

The results of the analysis of the biomorphological structure of the synanthropic flora of the Desna Plateau by the type of structure of underground shoots revealed the predominance of plant species without rhizome – 198 (58.75%). On the second position there are species with rhizomes – 63 (18.7%). 55 (16.32%) species are with caudexes. Caudex-rhizomatous plants are 15 (4.44%). Species with other types of structure of underground shoots are: bulbous – 4 (1.18%), tuberous – 2 (0.6%).

**Ecological and ecocoenotical analysis.** Ecological analysis of the synanthropic flora of the Desna Plateau according to humidity revealed the dominance of species confined to the habitats of medium humidity – 152 (45.01%). This does not correspond to the general character of the synanthropic flora of Ukraine, where the group of xeromesophytes is dominant and indicates the specific nature of the studied flora associated with the favorable hydrological regime of the region. A considerable proportion of xeromesophytes – 80 (23.73%), mesoxerophytes – 46 (13.64%), xerophytes – 22 (6.52%) testifies a significant number of arid ruderal habitats with compacted soil. Species of wetlands are represented in smaller numbers: hygrophytes – 16 (4.74%), hygromesophytes – 13 (3.85%), mesohygrophytes – 5 (1.48%), hydrophytes – 2 (0.59%), hydatophytes – 1 (0.3%).

It is known that anthropogenic and semi-natural ecotopes are characterized by an increased level of dynamic processes and a mosaic type of habitats unlike natural ecotopes.

The number of semi-natural ecotope species – 173 (51.34%) is almost equal to the number of anthropogenic ecotope species – 164 (48.66%). Among the semi-natural ecotopes, the most widely represented groups are: meadow – 54 (16.02%) species, thickets – 33 (9.79%), deciduous forest – 24 (7.12%), steppe – 19 (5.63%) mainly due to apophytes.

The groups of coastal-aquatic habitats are also represented in the synanthropic flora. These are mainly coastal and aquatic species of semi-natural habitats – 24 (7.12%), among them apophytes predominate – 17 (5.04%), the proportion of alien species – 6 (1.78%). The participation of psamophytes is quite significant – 19 (5.63%).

Ruderal species account for 109 (32.34%). These are species that grow on a compacted substrate along highways, near dwellings, suburban areas, pastures,

landfills: *Lepidium ruderale* L., *Iva xanthiifolia* Nutt., *Atriplex tatarica* L., *Elsholtzia ciliata* (Thunb.) Hyl.

Ruderal-segetal species occur within the ecotopes with disturbed substrate – at the borders of fields and orchards, near suburban areas: *Matricaria recutita* L., *Brassica campestris* L., *Amaranthus retroflexus* L., etc. Their number is 37 (10.98%).

The segetal species are characteristic of arable land – 18 (5.34%) species. These are species such as *Echinochloa crus-galli* (L.) P. Beauv., *Centaurea cyanus* L., *Rhaphanus raphanistrum* L. and others.

Therefore, according to the quantitative characteristics of the differentiation of the synanthropic flora of the Desna Plateau, its transitional character between natural and anthropogenic types of ecotopes.

In the course of researches the fractional analysis of synanthropic flora of the region is carried out. According to our data the total number of species of the apophytic fraction is 158, genera – 113, families – 29. Ratio: families: genera: species – 1:3.9:5.4. The index of apophytization of the flora of the region:

$$\mathrm{IAp} = \frac{\mathrm{Ap}}{\mathrm{Sp} + \mathrm{An}} \times 100\% = \frac{158}{741 + 179} \times 100\% = 17.17\%$$

The spectrum of the leading families of the apophytic fraction of the synanthropic flora of the Desna Plateau is generally similar to the similar spectrum of the synanthropic flora of Ukraine in the composition of the leading families (Protopopova, 1991). However, there are peculiarities in the ranking of families. Leading families of the apophytic fraction: Asteraceae, Fabaceae, Lamiaceae, Apiaceae, Brassicaceae, Scrophulariaceae, Caryophyllaceae, Poaceae, Polygonaceae, Rosaceae. Among the leading genera: *Rumex* (4 species), *Arctium*, *Artemisia*, *Bidens*, *Plantago*, *Potentilla*, *Trifolium*, *Ranunculus*, *Verbascum*, *Veronica* have 3 species each.

Thus, the systematic structure of the apophytic fraction has an intermediate character, combining features of the Mediterranean and temperate Holarctic flora. Boreal features generally disappear with the preservation of typical moisture-loving species in comparison with the flora of the Desna Plateau. That indicates thermophilic-mesophilic features of apophytes.

A classification of the species of natural flora found in semi-natural and anthropogenic ecotopes was carried out in order to identify the degree of transformation of the flora of the Desna Plateau under the influence of anthropogenic factors. According to relation to antropopression we have identified three main groups of plant species of the apophytic fraction: unstable apophytes (eventapophytes) – species that are rarely found within anthropogenic ecotops; hemiapophytes – species that are equally common in anthropogenic and natural ecotopes; evapophytes – species that prefer anthropogenic ecotopes (Appendix A). Among them, the most numerous are hemiapophytes – 58 species (6.3%). The second rank is taken by evapophytes – 54 (5.86%). Eventapophytes are the least represented – 46 (5%). This distribution, obviously, indicates that the processes of apophytization of the Desna Plateau flora are quite active.

The alien component includes 179 species which constitutes 19.4% of the total number of vascular plant species of the studied flora, and 52.3% of synanthropic flora. Ratio: families: genera: species – 1:3.3:4.47. The indexes of anthropophytization:

$$\mathrm{IAn} = \frac{\mathrm{An}}{\mathrm{F}} \times 100\% = \frac{179}{920} \times 100\% = 19.45\%$$

It is known that the proportion of both fractions is an important indicator of the flora characteristics. The Desna Plateau has the ratio of apophytes and alien fractions of synanthropic flora 1:1.13 in favor of alien species.

Leading families of the alien fraction: Asteraceae, Brassicaceae, Poaceae, Fabaceae, Chenopodiaceae, Boraginaceae, Lamiaceae, Apiaceae, Rosaceae, Amaranthaceae. The high rank of anthropophilic Brassicaceae and Chenopodiaceae families is obvious when compared with the spectrum of the leading families of the apophytic fraction. In general, along with the appearance in the spectrum of the leading families of the subcosmopolitan families Boraginaceae and Amaranthaceae, this indicates the plura-regional nature of the alien fraction and its links with the Ancient Mediterranean. Among the leading genera: *Chenopodium* (5 species), *Amaranthus* (5 species), *Helianthus*, *Bromus*, *Vicia* have 4 species each; *Atriplex*, *Sonchus*, *Sisimbrium*, *Setaria*, *Malva* have 3 species each.

According to the time of immigration the non-native flora of the Desna Plateau is divided into archeophytes (migrated before the XV century) – 80 (44.7%), kenophytes – (migrated during the XVI–XIX centuries) 64 (35.75%) and eukenophytes (migrated during XX–XXI centuries) – 35 (19.55%) (appendix A).

The revealed temporal patterns of penetration of alien species characterize the process of formation of the synanthropic flora of the region. It is known that the ratio of archaeophytes: kenophytes is especially indicative. In order to identify this pattern, we combined groups of kenophytes and eukenophytes. In the conditions of the Desna Plateau the ratio has the form: 80:99 = 1:1.23 in favor of kenophytes. This ratio of archaeophytes: kenophytes correspond to the zonal floras within Ukraine. The ratio of archaeophytes: kenophytes for the Ukrainian Polissya and Forest-steppe is: 1: 1.13. (Protopopova, 1978; Protopopova, et al, 2002; Protopopova, Shevera, 2008), other studied areas, for

example, for the park "Kremenchug floodplains" – 1:1.15 (Galchenko, 2004).

An important characteristic of alien species within flora is the degree of its naturalization.

Following Y. Kornaš, V.V. Protopopova (Kornaš, 1977; Protopopova, 1991) the next groups were allocated. Agriophytes – fully naturalized species in natural and semi-natural ecotops, are capable of forming stable populations. Hemiagriophytes – species that have become a mass component in several types of anthropogenic ecotops and have a pronounced tendency to further spread and consolidate under natural conditions natural habitats. Colonophytes – capable of forming colonies in separate localities, but do not show tendencies to spread. Epecophytes – permanent and stable components of anthropogenic ecotops. Ephemerophytes – unstable components of anthropogenic ecotops. The degree of naturalization among alien species of the Desna Plateau is dominated by epecophytes – 96 species (53.63%), second place by ephemerophytes 45 (25.1%), third position by colonophytes and agriophytes – by 13 (7.26%) species, hemiagriophytes are 12 species (6.7%).

The analysis of the geographycal origin of the alien plant species showed their diversity. The largest number of species originates from Ancient Mediterranean – 47 (26.25%), Mediterranean-Irano-Turanian – 27 (15.8%), Irano-Turanian – 10 (5.58%). An alien plants from the American continent are in the second position: North American species make up 29 (16.2%), South American – 5 (2.79%), Americans – 2 (1.1%). The alien species of Asian origin: Southeast Asian – 6 (3.35%), Asian – 20 (11.2%), European-Asian – 2 (1.1%). Types of European origin in the smallest number: Central European – 4 (2.23%), Western European – 4 (2.23%), Southern European– 6 (3.35%), Central-Caucasian – 1, anthropogenic origin – 5 (2.79%), unknown – 7 (3.9%) (Appendix A).

We fixed cases of becoming wild of some cultural plants:

*Rosa rugosa* Thunb., *Sorbaria sorbifolia* A. Br., *Symphoricarpos albus* (L.) S. F. Blake s.l., *Lupinus polyphyllus* Lindl.

Some alien species in the region are recorded for the first time: *Impatiens glandulifera* Royle, *Heracleum mantegazzianum* Sommier et Levier, *Echinocystis lobata* (Michx) Torr. et A. Gray., *Thladiantha dubia* Bunge. (Koval, 2005).

As a result of researches we distinguished the group of invasive species that present a danger for natural ecosystems in case of further distribution: *Acer negundo* L., *Phalacroloma annuum* (L.) Dumort., *Impatiens parviflora* DC., *I. glandulifera* Royle, *Xanthium albinum* (Widd.) H. Scholz, *Echinocystis lobata* (Michx.) Torr. et A. Grey, *Bidens frondosa* L., *Iva xanthiifolia* Nutt., *Galingsoga parviflora* Cav.; *Sonchus arvensis* L., *S. oleraceus* L., *Chenopodium suecicum* J. Murr. and the quarantine *Ambrosia artemisiifolia* L.

Using the recently created Global Naturalized Alien Flora (GloNAF) database, containing data on the distribution of naturalized alien plants in different regions of the world, we found that among the 11 most common cosmopolitan species within the Desna Plateau are spread *Stellaria media*, *Capsella bursa-pastoris*, *Sonchus oleraceus*, *Chenopodium album*, *Echinohloa crus-galli*, *Portulaca oleracea*. Among the most naturalized genera of cosmopolitans within the territory of the Desna Plateau are represented genera: *Rosa*, *Atriplex*, *Oenothera*, *Artemisia*, *Vicia*, *Galium* (Pyšek, et al., 2017). This indicates the need for further monitoring studies of the synanthropic flora in the region and cooperation in order to prevent the spread of invasions.

## CONCLUSION

The high index of synanthropization (36.6) indicate that the studied flora is under considerable anthropogenic pressure. The spectrum of leading families specifies that the synanthropic flora of region is close to Mediterranean floras.

The biomorphological analysis of the synanthropic flora reflects its intermediate character: high rates of hemicryptophytes are combined with significant numbers of terophytes. Generally, the obtained data indicate that the anthropogenic ecotopes of the region are actively populated by grassy summer green monocarpics – migrants of the arid regions, some of which are early blooming.

The favorable hydrological regime of the region is manifested in the almost uniform distribution of species of mesophytic and xerophytic groups of synanthropic flora. This tendency is also preserved in the ecocoenotic differentiation of flora which consists of almost the same number of species of semi-natural and anthropogenic ecoflorocenocomplexes.

Generally, alien species comprise 52.3% and predominate among synanthropic species. The chronoelements are dominated by kenophytes. The overwhelming number of alien species is originated from the Ancient Mediterranean and North America. Comprehensive analysis of the alien component makes it possible to assess the state of anthropogenic pollution of the territory. In particular, quarantine (1) and invasive (12) species have been identified. The spread of these species threatens the natural species in the region.

Further monitoring studies of the synanthropization processes of the regional flora will make it possible to predict changes in the natural vegetation cover of the region.

**Appendix A**
**An annotated list of synanthropic species of the Desna Plateau flora**

| 1 | | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| *Equisetum* | *arvense* L. | A | Co | | | | Eu | Pr |
| *Acer* | *negundo* L. | Ad | Co | Cen | Agr | NAm | | Ru |
| *Amaranthus* | *albus* L. | Ad | Sp | Eu-c | Epec | NAm | | Ru |
| *Amaranthus* | *blitoides* S. Wats. | Ad | Sp | Eu-c | Epec | NAm | | Ru-Se |
| *Amaranthus* | *blitum* L. | Ad | Sr | Cen | Eph | CSAm | | Ru |
| *Amaranthus* | *cruentus* L. | Ad | Sp | Eu-c | Eph | CSAm | | Ru |
| *Amaranthus* | *retroflexus* L. | Ad | Co | Cen | Epec | NAm | | Ru-Se |
| *Aegopodium* | *podagraria* L. | A | Co | | | | Ap | S |
| *Aethusa* | *cynapium* L. | Ad | Co | Arch | Epec | MdEu | | Hh |
| *Anthriscus* | *sylvestris* L. | A | Co | | | | Ap | S |
| *Carum* | *carvi* L. | Ad | Co | Cen | Eph | n\|a | | Z |
| *Chaerophyllum* | *bulbosum* L. | A | Sp | | | | Ap | S |
| *Chaerophyllum* | *temulum* L. | A | Co | | | | Hap | S |
| *Conium* | *maculatum* L. | Ad | Co | Arch | Epec | Med-ir-tur | | Ru |
| *Daucus* | *carota* L. | A | Co | | | | Eu | Pr |
| *Eryngium* | *campestre* L. | A | Sp | | | | Ap | St |
| *Eryngium* | *planum* L. | A | Sp | | | | Ap | Ps |
| *Falcaria* | *vulgaris* Bernh. | A | Sr | | | | Hap | St |
| *Heracleum* | *mantegazzianum* Sommier et Levier | Ad | Sr | Eu-c | Col | Cs | | Ru |
| *Heracleum* | *sibiricum* L. | A | Co | | | | Hap | Pr |
| *Levisticum* | *officinalis* Koch. | Ad | Sp | Arch | Eph | Ir | | Ru |
| *Pastinaca* | *sativa* L. | Ad | Co | Cen | Col | Med-CAs | | Ru |
| *Pastinaca* | *sylvestris* L. | A | Co | | | | Hap | Pr |
| *Pimpinella* | *saxifraga* L. | A | Sp | | | | Hap | Pr |
| *Torilis* | *japonica* (Houtt.) DC. | A | Sr | | | | Ap | S |
| *Vinca* | *minor* L. | Ad | Sr | Cen | Eph | Med | | Ru |
| *Achillea* | *millefolium* L. s.l. | A | Co | | | | Hap | Pr |
| *Ambrosia* | *artemisiifolia* L. | Ad | Sr | Eu-c | Col | NAm | | Ru |
| *Anthemis* | *cotula* L. | Ad | Sp | Arch | Epec | Med | | Ru |
| *Anthemis* | *subtinctoria* Dobrocz. | A | Sp | | | | Ap | St |
| *Arctium* | *lappa* L. | A | Co | | | | Eu | Ru |
| *Arctium* | *minus* (Hill.) Bernh. | A | Co | | | | Eu | Ru |
| *Arctium* | *tomentosum* Mill. | A | Co | | | | Eu | Ru |
| *Artemisia* | *absinthium* L. | Ad | Co | Arch | Epec | Ir-tur | | Ru |
| *Artemisia* | *annua* L. | Ad | Co | Cen | Epec | EAs | | Ps |
| *Artemisia* | *austriaca* Jacq. | A | Co | | | | Hap | St |
| *Artemisia* | *scoparia* Waldst. et Kit | A | Co | | | | Eu | Ru |
| *Artemisia* | *vulgaris* L. | A | Co | | | | Eu | Ru |
| *Aster* | *nova-angliae* L. | Ad | Sp | Cen | Eph | NAm | | Ru |
| *Aster* | *salignus* Willd. | Ad | Sp | Cen | Eph | NAm | | Ru |
| *Bidens* | *cernua* L. | A | Co | | | | Ap | Hh |

| 1 | | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| *Bidens* | *frondosa* L. | Ad | Co | Cen | Agr | NAm | | Ru |
| *Bidens* | *radiata* Thuill. | A | Co | | | | Ap | Hh |
| *Bidens* | *tripartita* L. | A | Co | | | | Hap | Hh |
| *Calendula* | *officinalis* L. | Ad | Sp | Cen | Eph | Med | | Ru |
| *Carduus* | *acanthoides* L. | Ad | Co | Arch | Epec | Med | | Ru |
| *Carduus* | *crispus* L. | A | Co | | | | Hap | Ru |
| *Carduus* | *thoermeri* Weinm. | A | Sr | | | | Hap | St |
| *Centaurea* | *cyanus* L. | Ad | Co | Arch | Epec | Med | | Se |
| *Centaurea* | *diffusa* Lam. | Ad | Sr | Eu-c | Epec | Med-ir-tur | | St |
| *Centaurea* | *pseudomaculosa* Dobrocz. | A | Sr | | | | Hap | St |
| *Chamomilla* | *suaveolens* (Pursh) Rydb. | Ad | Co | Cen | Epec | NAm | | Pr |
| *Chondrilla* | *graminea* M. Bieb. | A | Sr | | | | Ap | Ps |
| *Cichorium* | *intybus* L. | Ad | Co | Arch | Hagr | Med-ir-tur | | Ru |
| *Cirsium* | *setosum* (Willd.) Bess. | A | Co | | | | Eu | Ru-Se |
| *Cirsium* | *vulgare* (Savi) Ten. | A | Co | | | | Eu | Ru |
| *Conyza* | *canadensis* (L.) Cronq. | Ad | Co | Cen | Epec | NAm | | Ru-Se |
| *Crepis* | *biennis* L. | A | Sp | | | | Hap | Pr |
| *Crepis* | *tectorum* L. | A | Co | | | | Eu | Ru-Se |
| *Erigeron* | *acris* L. s.l. | A | Co | | | | Hap | Pr |
| *Eupatorium* | *cannabinum* L. | A | Co | | | | Eu | Hh |
| *Filago* | *arvensis* L | A | Co | | | | Hap | Ps |
| *Galinsoga* | *parviflora* Cav. | Ad | Co | Cen | Epec | SAm | | Ru-Se |
| *Gnaphalium* | *uliginosum* L. | A | Sp | | | | Hap | Hh |
| *Helianthus* | *annuus* L. | Ad | Sp | Cen | Eph | NAm | | Ru |
| *Helianthus* | *laetiflorus* Pers. | Ad | Co | Eu-c | Eph | NAm | | Ru |
| *Helianthus* | *subcanescens* (A. Gray) E.E. Wats. | Ad | Co | Eu-c | Col | NAm | | Ru |
| *Helianthus* | *tuberosus* L. | Ad | Sp | Cen | Eph | NAm | | Ru |
| *Inula* | *britannica* L. | A | Co | | | | Hap | Pr |
| *Inula* | *helenium* L. | Ad | Sp | Eu-c | Eph | n\|a | | Ru |
| *Iva* | *xanthiifolia* Nutt. | Ad | Co | Cen | Epec | NAm | | Ru |
| *Lactuca* | *serriola* L. | Ad | Co | Arch | Epec | Med-ir-tur | | Ru-Se |
| *Lapsana* | *communis* L. | A | Co | | | | Ap | Z |
| *Leontodon* | *autumnalis* L. | A | Co | | | | Hap | Pr |
| *Matricaria* | *recutita* L. | Ad | Sp | Arch | Epec | WEu | | Ru-Se |
| *Onopordum* | *acanthium* L. | Ad | Co | Arch | Epec | Med | | Ru |
| *Picris* | *hieracioides* L. | A | Co | | | | Hap | Z |
| *Phalacroloma* | *annuum* (L.) Dumort. | Ad | Co | Cen | Agr | NAm | | Ru-Se |
| *Pulicaria* | *vulgaris* Gaertn. | A | Co | | | | Ap | Hh |
| *Pyrethrum* | *parthenium* (L.) Smith | Ad | Sp | Eu-c | Eph | WEu | | Ru |
| *Senecio* | *jacobaea* L. | A | Co | | | | Hap | Z |
| *Senecio* | *vernalis* Waldst. & Kit. | A | Co | | | | Eu | Ru-Se |
| *Senecio* | *vulgaris* L. | Ad | Co | Arch | Epec | As | | Ru |

| 1 | | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| *Solidago* | *canadensis* L. | Ad | Sp | Cen | Col | NAm | | Ru |
| *Sonchus* | *arvensis* L. | Ad | Co | Arch | Epec | Med | | Ru-Se |
| *Sonchus* | *asper* (L.) Hill | Ad | Co | Arch | Epec | Med | | Ru |
| *Sonchus* | *oleraceus* L. | Ad | Co | Arch | Epec | Med | | Ru-Se |
| *Tanacetum* | *vulgare* L. | A | Co | | | | Ap | Pr |
| *Taraxacum* | *klokovii* Litvinenko | Ad | Sr | Cen | Hagr | SEu | | St |
| *Taraxacum* | *obliquum* (Fr.) Dahlst. | A | Co | | | | Hap | Pr |
| *Taraxacum* | *officinale* Wigg. aggr. | A | Co | | | | Eu | Pr |
| *Tripleurospermum* | *inodorum* (L.) Sch. Bip. | Ad | Co | Arch | Epec | WAs | | Ru-Se |
| *Tussilago* | *farfara* L. | A | Co | | | | Hap | Pr |
| *Xanthium* | *albinum* (Widd.) H. Scholz. | Ad | Co | Eu-c | Epec | MdEu | | Ru |
| *Xanthium* | *spinosum* L. | Ad | Sr | Cen | Epec | SAm | | Ru |
| *Impatiens* | *glandulifera* Royle | Ad | Sp | Eu-c | Col | SEAs | | Ru |
| *Impatiens* | *parviflora* DC. | Ad | Co | Cen | Agr | CAs | | Z |
| *Anchusa* | *offinalis* L. | Ad | Sp | Arch | Epec | Med | | Ru |
| *Asperugo* | *procumbens* L. | A | Sp | | | | Eu | Ru |
| *Borago* | *officinalis* L. | Ad | Sp | Cen | Eph | Med | | Ru |
| *Buglossoides* | *arvensis* (L.) I.M. Johnst. | Ad | Co | Arch | Epec | Med-ir-tur | | Ru |
| *Cynoglossum* | *officinale* L. | Ad | Co | Arch | Epec | Med | | Ru-Se |
| *Echium* | *vulgare* L. | A | Co | | | | Eu | St |
| *Lappula* | *squarrosa* (Retz.) Dumort. | Ad | Co | Arch | Epec | Med-ir-tur | | Ru |
| *Lithospermum* | *officinale* L. | A | Co | | | | Hap | Z |
| *Lycopsis* | *arvensis* L. | Ad | Co | Arch | Epec | Med | | Ru |
| *Myosotis* | *arvensis* (L.) Hill. | Ad | Co | Arch | Epec | Med-ir-tur | | Pr |
| *Myosotis* | *sparsiflora* J.C. Mikan ex Pohl | A | Co | | | | Ap | S |
| *Nonea* | *pulla* DC. | A | Co | | | | Hap | Ru |
| *Symphytum* | *asperum* Lepech. | Ad | Sp | Cen | Agr | Med | Ers | Ru |
| *Alliaria* | *petiolata* (M. Bieb.) Cavara & Grande | A | Co | | | | Eu | S |
| *Alyssum* | *calycinum* L. | A | Sr | | | | Hap | St |
| *Arabidopsis* | *thaliana* (L.) Heynh. | Ad | Co | Cen | Epec | Med-ir-tur | Xn | Ru |
| *Armoracia* | *rusticana* P. Gaertn., Mey. et Scherb. | Ad | Co | Arch | Eph | Ir-tur | | Ru |
| *Barbarea* | *arcuata* (Opiz ex Presl) Hayek | A | Co | | | | Hap | Pr |
| *Barbarea* | *vulgaris* R.Br. | A | Co | | | | Hap | Ru |
| *Berteroa* | *incana* (L.) DC. | A | Co | | | | Hap | Ru |
| *Brassica* | *campestris* L. | Ad | Co | Arch | Epec | CAs | | Ru-Se |
| *Bunias* | *orientalis* L. | Ad | Sp | Cen | Epec | Med | | Ru |
| *Camelina* | *alyssum* (Mill.) Thell. | Ad | Co | Arch | Epec | Atlant | | Se |
| *Camelina* | *sativa* (L.) Crantz | Ad | Sp | Arch | Eph | Anthrop | | Ru |
| *Capsella* | *bursa-pastoris* (L.) Med. | Ad | Co | Arch | Epec | n\|a | | Ru |
| *Cardaria* | *draba* (L.) Desv. | Ad | Sp | Cen | Col | SEu-As | | Ru |
| *Descurainia* | *sophia* (L.) Webb ex Prantl | Ad | Co | Arch | Epec | Ir-tur | | Ru |
| *Diplotaxis* | *muralis* (L.) DC. | Ad | Co | Cen | Epec | SEu | | Ru |

| 1 | | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| *Draba* | *nemorosa* L. | A | Co | | | | Ap | Z |
| *Erophila* | *verna* (L.) Besser | A | Co | | | | Hap | Ps |
| *Erysimum* | *cheiranthoides* L. | Ad | Co | Arch | Epec | n\|a | | Ru |
| *Hesperis* | *matronalis* L. | Ad | Sr | Cen | Eph | As | | Ru |
| *Lepidium* | *densiflorum* Schrad. | Ad | Sp | Cen | Epec | NAm | | Ru |
| *Lepidium* | *latifolium* L. | A | Sp | | | | Eu | Pr |
| *Lepidium* | *ruderale* L. | Ad | Co | Arch | Epec | Ir-Tur | | Ru |
| *Raphanus* | *raphanistrum* L. | Ad | Co | Arch | Epec | Med | | Se |
| *Rorippa* | *amphibia* (L.) Besser | A | Co | | | | Ap | Hh |
| *Rorippa* | *brachycarpa* (C.A. Mey.) Hayek | A | Sp | | | | Hap | Hh |
| *Rorippa* | *sylvestris* (L.) Besser | A | Sp | | | | Ap | Hh |
| *Sinapis* | *arvensis* L. | Ad | Co | Arch | Epec | Med | | Se |
| *Sisymbrium* | *altissimum* L. | Ad | Co | Cen | Epec | Med-ir-tur | | Ru-Se |
| *Sisymbrium* | *loeselii* L. | Ad | Sp | Cen | Epec | Med-As | | Ru |
| *Sisymbrium* | *officinale* L. | Ad | Co | Arch | Epec | Med-As | | Ru |
| *Thlaspi* | *arvense* L. | Ad | Co | Arch | Epec | Ir-tur | | Ru-Se |
| *Campanula* | *rapunculoides* L. | A | Co | | | | Ap | S |
| *Campanula* | *rapunculus* L. | A | Co | | | | Hap | Z |
| *Cannabis* | *ruderalis* Janisch. | Ad | Sp | Arch | Epec | MdAs | | Ru-Se |
| *Humulus* | *lupulus* L. | A | Co | | | | Hap | Hh |
| *Lonicera* | *tatarica* L. | Ad | Sp | Eu-c | Col | MdAs | | S |
| *Sambucus* | *nigra* L. | A | Co | | | | Ap | S |
| *Symphoricarpus* | *albus* (L.) S.F. Blake | Ad | Sp | Eu-c | Eph | NAm | | Ru |
| *Agrostemma* | *githago* L. | Ad | Sp | Arch | Eph | Anthrop | | Se |
| *Cerastium* | *arvense* L. | A | Sp | | | | Ap | Ps |
| *Gypsophilla* | *paniculata* L. | A | Sp | | | | Ap | St |
| *Herniaria* | *glabra* L. | A | Co | | | | Eu | Ps |
| *Herniaria* | *polygama* J. Gay | A | Sp | | | | Hap | Ps |
| *Melandrium* | *album* (Mill.) Garcke | A | Sp | | | | Hap | Pr |
| *Psammofiliella* | *muralis* (L.) Ikonn. | A | Co | | | | Hap | Hh |
| *Saponaria* | *officinalis* L. | Ad | Co | Cen | Col | Med | | Ru |
| *Spergula* | *arvensis* L. | Ad | Sp | Arch | Epec | Med | | Ps |
| *Spergularia* | *rubra* (L.) J. Presl et C. Presl | A | Co | | | | Eu | Ps |
| *Stellaria* | *graminea* L. | A | Co | | | | Eu | Pr |
| *Stellaria* | *media* (L.) Vill. | A | Co | | | | Eu | Pr |
| *Atriplex* | *hortensis* L. | Ad | Sp | Cen | Eph | As | | Ru-Se |
| *Atriplex* | *oblongifolia* Waldst. et Kit. | A | Co | | | | Eu | Ru-Se |
| *Atriplex* | *patula* L. | A | Co | | | | Eu | Ru -Se |
| *Atriplex* | *prostrata* Boucher ex DC. | Ad | Sp | Arch | Epec | Med-ir-tur | | Ru |
| *Atriplex* | *tatarica* L. | Ad | Sp | Cen | Epec | Med-ir-tur | | Ru |
| *Atriplex* | *sagittata* Borkh. | Ad | Sp | Arch | Epec | Ir-tur | | Ru |
| *Chenopodium* | *album* L. s.l. | A | Co | | | | Eu | Ru |

| 1 | | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| *Chenopodium* | *botrys* L. | Ad | Sp | Eu-c | Epec | Med-ir-tur | | Ru |
| *Chenopodium* | *glaucum* L. | A | Sp | | | | Hap | Ru-Se |
| *Chenopodium* | *hybridum* L. | Ad | Co | Arch | Epec | Med | | Ru |
| *Chenopodium* | *opulifolium* Schrad. ex DC. | Ad | Sp | Arch | Epec | Med | | Ru-Se |
| *Chenopodium* | *polyspermum* L. | Ad | Sp | Arch | Epec | Med | | Ps |
| *Chenopodium* | *suecicum* J. Murr | Ad | Co | Cen | Epec | n\|a | | Ru-Se |
| *Kochia* | *laniflora* (S.G. Gmel.) Borbas | Ad | Sp | Cen | Epec | Med | | Ps |
| *Kochia* | *scoparia* (L.) Schrad. | Ad | Sp | Cen | Eph | Ir-tur | | Ru |
| *Polycnemum* | *majus* A.Br. | A | Sp | | | | Hap | Ps |
| *Convolvulus* | *arvensis* L. | A | Co | | | | Eu | Ru-Se |
| *Ipomaea* | *purpurea* (L.) Roth | Ad | Sp | Eu-c | Eph | SAm | | Ru |
| *Bryonia* | *alba* L. | Ad | Sr | Cen | Epec | Med-ir-tur | | Ru |
| *Echinocystis* | *lobata* (Michx.) Torr. et Gray | Ad | Co | Eu-c | Agr | NAm | | Hh |
| *Thladiantha* | *dubia* Bunge | Ad | Sr | Eu-c | Col | SEAs | | Ru |
| *Cuscuta* | *epilinum* Weihe | Ad | Sp | Arch | Epec | Anthrop | | Se |
| *Cuscuta* | *europaea* L. | A | Sp | | | | Eu | Se |
| *Dipsacus* | *strigosus* Willd. ex Roem. et Schult. | A | Sp | | | | Ap | Z |
| *Knautia* | *arvensis* (L.) Coult. | A | Sp | | | | Hap | Pr |
| *Hippophae* | *rhamnoides* L. | Ad | Sr | Cen | Eph | Anthrop | | Z |
| *Euphorbia* | *cyparissias* L. | A | Sp | | | | Hap | S |
| *Euphorbia* | *peplus* L. | Ad | Sp | Arch | Epec | Med | | Ru-Se |
| *Astragalus* | *cicer* L. | A | Sr | | | | Ap | St |
| *Caragana* | *arborescens* Lam. | Ad | Co | Eu-c | Eph | Sib | | Z |
| *Coronilla* | *varia* L. | A | Sp | | | | Ap | Pr |
| *Lathyrus* | *pratensis* L. | A | Co | | | | Ap | Z |
| *Lathyrus* | *sativus* L. | Ad | Sp | Eu-c | Eph | Med | | Ru |
| *Lotus* | *corniculatus* L. | A | Co | | | | Hap | Pr |
| *Lupinus* | *polyphyllus* Lindl. | Ad | Co | Eu-c | Col | WMed | | Z |
| *Medicago* | *lupulina* L. | A | Co | | | | Eu | Z |
| *Medicago* | *sativa* L. | Ad | Sp | Cen | Epec | FAs | | Ru |
| *Melilotus* | *albus* Medik | A | Co | | | | Eu | Z |
| *Melilotus* | *officinalis* (L.) Pall. | A | Co | | | | Eu | Z |
| *Onobrychis* | *arenaria* (Kit.) DC. | Ad | Sr | Cen | Eph | WEu | | Z |
| *Onobrychis* | *vicifolia* Scop. | Ad | Sr | Cen | Eph | SEu | | Ru-Se |
| *Robinia* | *pseudoacacia* L. | Ad | Co | Eu-c | Eph | Am | | Ru |
| *Trifolium* | *arvense* L. | A | Co | | | | Ap | Pr |
| *Trifolium* | *campestre* Schred. | A | Co | | | | Hap | Pr |
| *Trifolium* | *hybridum* L. | Ad | Co | Eu-c | Eph | Med | | Pr |
| *Trifolium* | *repens* L. | A | Co | | | | Eu | Pr |
| *Vicia* | *angustifolia* Reichard | Ad | Sp | Cen | Agr | Med-ir-tur | | Se |
| *Vicia* | *cracca* L. | A | Co | | | | Hap | Pr |
| *Vicia* | *hirsuta* (L.) S.F. Gray. | Ad | Sp | Arch | Epec | WMed | | S |

| 1 | | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| *Vicia* | *sepium* L. | A | Co | | | | Hap | Z |
| *Vicia* | *tetrasperma* (L.) Schreb. | Ad | Sp | Arch | Epec | Med | | Se |
| *Vicia* | *villosa* Roth | Ad | Sr | Arch | Agr | Med | | Se |
| *Quercus* | *rubra* L. | Ad | Co | Eu-c | Hagr | NAm | | S |
| *Fumaria* | *officinalis* L. | Ad | Sr | Arch | Epec | Med | | Ru |
| *Erodium* | *cicutarium* (L.) L' Her. | A | Co | | | | Hap | S |
| *Geranium* | *pratense* L. | A | Co | | | | Ap | Pr |
| *Geranium* | *pusillum* L. | Ad | Co | Arch | Epec | Ir-tur | | Ru-Se |
| *Acinos* | *arvensis* (Lam.) Dandy | A | Sp | | | | Ap | St |
| *Ballota* | *nigra* L. | Ad | Co | Arch | Epec | Med-ir-tur | | Ru |
| *Elsholzia* | *ciliata* (Thunb.) Hyl. | Ad | Co | Eu-c | Epec | EAs | | Ru |
| *Galeopsis* | *bifida* Boenn. | A | Sp | | | | Eu | Ru-Se |
| *Galeopsis* | *ladanum* L. | Ad | Co | Arch | Epec | NMed | | Se |
| *Galeopsis* | *speciosa* Mill. | A | Sp | | | | Hap | Se |
| *Glechoma* | *hederacea* L. | A | Co | | | | Ap | Z |
| *Lamium* | *maculatum* (L.) L. | A | Sp | | | | Hap | Z |
| *Lamium* | *purpureum* L. | Ad | Co | Arch | Epec | Med | | Ru-Se |
| *Leonurus* | *villosus* Desf. ex D'Urv. | A | Co | | | | Eu | Ru |
| *Lycopus* | *exaltatus* L. f. | A | Co | | | | Ap | Hh |
| *Lycopus* | *europaeus* L. | A | Co | | | | Ap | Hh |
| *Mentha* | *arvensis* L. | A | Co | | | | Ap | Hh |
| *Mentha* | *spicata* L. | Ad | Sp | Cen | Eph | Med | | Ru |
| *Nepeta* | *cataria* L. | Ad | Sr | Arch | Epec | EMed | | Z |
| *Prunella* | *vulgaris* L. | A | Co | | | | Ap | Pr |
| *Salvia* | *nemorosa* L. aggr. | A | Sr | | | | Hap | Pr |
| *Salvia* | *verticillata* L. | Ad | Sr | Cen | Epec | SEu-FAs | | Ru |
| *Salvia* | *viridis* L. | Ad | Sr | Cen | Epec | Med-MAs | | Ru |
| *Stachys* | *palustris* L. | A | Sp | | | | Hap | Pr |
| *Althaea* | *officinalis* L. | Ad | Sr | Arch | Agr | Ir-tur | | Hh |
| *Lavathera* | *thuringiaca* L. | A | Co | | | | Hap | Z |
| *Malva* | *neglecta* Wallr. | Ad | Co | Arch | Epec | Ir-tur | | Ru |
| *Malva* | *pusilla* Smith. | Ad | Co | Arch | Epec | As | | Ru-Se |
| *Malva* | *sylvestris* L. | Ad | Co | Arch | Hagr | Med | | Ru |
| *Syringa* | *vulgaris* L. | Ad | Co | Cen | Eph | SEu | | Ru |
| *Oenothera* | *biennis* L. | Ad | Co | Cen | Epec | NAm | | Ru |
| *Oenothera* | *rubricaulis* Klebahn. | Ad | Co | Eu-c | Hagr | NAm | | Ru |
| *Phelipanche* | *ramosa* ( L.) Pomel | Ad | Sp | Cen | Eph | Med-CAs | | Ru-Se |
| *Xanthoxalis* | *stricta* (L.) Small | Ad | Co | Cen | Hagr | NAm | | S |
| *Chelidonium* | *majus* L. | A | Co | | | | Eu | Z |
| *Papaver* | *somniferum* L. | Ad | Sr | Cen | Eph | Med | | Ru |
| *Plantago* | *arenaria* Waldst. & Kit. | Ad | Sp | Eu-c | Epec | Med | | Ps |
| *Plantago* | *lanceolata* L. | A | Co | | | | Hap | Pr |

| 1 | | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| *Plantago* | *major* L. | A | Co | | | | Eu | Ru |
| *Plantago* | *media* L. | A | Co | | | | Eu | Pr |
| *Fallopia* | *convulvulus* (L.) A. Love | Ad | Co | Arch | Epec | As | | Se |
| *Fallopia* | *dumetorum* (L.) Holub | A | Sp | | | | Eu | Ru |
| *Persicaria* | *hydropiper* (L.) Delambre | A | Co | | | | Eu | Hh |
| *Polygonum* | *aviculare* L. s.l. | A | Co | | | | Eu | Ru |
| *Rumex* | *acetosella* L. | A | Co | | | | Eu | Z |
| *Rumex* | *confertus* Willd. | A | Co | | | | Hap | Pr |
| *Rumex* | *crispus* L. | A | Co | | | | Eu | Pr |
| *Rumex* | *obtusifolius* L. | A | Co | | | | Hap | S |
| *Portulaca* | *oleracea* L. | Ad | Sr | Arch | Epec | Med-ir-tur | | Se |
| *Anagallis* | *arvensis* L. | Ad | Sr | Arch | Epec | Med-ir-tur | | Ru-Se |
| *Aquilegia* | *vulgaris* L. | Ad | Sr | Cen | Eph | WEu | | S |
| *Consolida* | *regalis* S.F. Gray | Ad | Co | Arch | Epec | Med-ir-tur | | Se |
| *Myosurus* | *minimus* L. | A | Sp | | | | Ap | Ps |
| *Ranunculus* | *acris* L. | Ad | Co | Arch | Epec | Med-ir-tur | | Z |
| *Ranunculus* | *polyanthemos* L. | A | Sr | | | | Ap | Z |
| *Ranunculus* | *repens* L. | A | Co | | | | Eu | Pr |
| *Ranunculus* | *sceleratus* L. | A | Sp | | | | Ap | Hh |
| *Thalictrum* | *minus* L. | A | Sr | | | | Ap | St |
| *Agrimonia* | eupatoria L. | A | Co | | | | Hap | Z |
| *Amelanchier* | *canadensis* (L.) Medik. | Ad | Sp | Eu-c | Eph | NAm | | Ru |
| *Geum* | *urbanum* L. | A | Co | | | | Hap | S |
| *Physocarpus* | *opulifolius* (L.) Maxim. | Ad | Co | Eu-c | Eph | NAm | | Ru |
| *Potentilla* | *anserina* L. | A | Co | | | | Hap | Hh |
| *Potentilla* | *argentea* L. s.l. | A | Co | | | | Eu | Pr |
| *Potentilla* | *supina* L. | A | Sp | | | | Eu | Hh |
| *Poterium* | *polygamum* Waldst. ex Kit. | Ad | Sr | Eu-c | Col | SEu | | Ru |
| *Rosa* | *rugosa* Thunb. | Ad | Sp | Eu-c | Eph | Eu-As | | Ru |
| *Sanquisorba* | *officinalis* L. | A | Sp | | | | Hap | Pr |
| *Sorbaria* | *sorbifolia* (L.) A.Br. | Ad | Sr | Eu-c | Eph | E-As | | Ru |
| *Galium* | *aparine* L. | A | Co | | | | Eu | Ru |
| *Galium* | *rivale* (Sibth. & Smith) Griseb. | A | Sp | | | | Ap | S |
| *Populus* | *deltoides* Marsh. | Ad | Sp | Eu-c | Col | NAm | | Ru |
| *Salix* | *fragilis* L. | Ad | Sp | Arch | Agr | Med-CAs | | Hh |
| *Linaria* | *vulgaris* Mill. | A | Co | | | | Eu | Z |
| *Odontites* | *vulgaris* Moench | A | Sp | | | | Ap | Pr |
| *Rhinanthus* | *aestivalis* (W. Zinger) Schischk. & Serg. | A | Sp | | | | Hap | Pr |
| *Rhinanthus* | *vernalis* (N. Zinger) Schischk. & Serg. | A | Co | | | | Hap | Pr |
| *Verbascum* | *lychnitis* L. | A | Sp | | | | Eu | Z |
| *Verbascum* | *nigrum* L. | A | Sr | | | | Hap | St |
| *Verbascum* | *phlomoides* L. | A | Co | | | | | Ps |
| *Veronica* | *dilenii* Crantz | A | Sp | | | | Eu | Ps |

| 1 | | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| *Veronica* | *serpyllifolia* L. | A | Co | | | | Ap | Pr |
| *Veronica* | *verna* L. | A | Sp | | | | Eu | Ps |
| *Datura* | *stramonium* L. | Ad | Sr | Cen | Epec | SEAs | | Ru |
| *Hyoscyamus* | *niger* L. | Ad | Sr | Cen | Epec | Med-ir-tur | | Ru |
| *Lycium* | *barbarum* L. | Ad | Sp | Arch | Epec | EAs | | Ru |
| *Physalis* | *alkekengi* L. | Ad | Sr | Eu-c | Eph | Med-ir-tur | | Z |
| *Solanum* | *nigrum* L. | Ad | Co | Arch | Epec | Med | | Ru |
| *Urtica* | *dioica* L. | A | Co | | | | Ap | Z |
| *Urtica* | *urens* L. | Ad | Co | Arch | Epec | Med | | Ru |
| *Viola* | *arvensis* Murray | Ad | Co | Arch | Agr | Med | | S |
| *Parthenocissus* | *quinguefolia* (L.) Planch. | Ad | Co | Eu-c | Eph | NAm | | S |
| *Allium* | *oleraceum* L. | A | Sp | | | | Ap | St |
| *Allium* | *schoenoprasum* L. | Ad | Sr | Cen | Eph | MdEu | | S |
| *Galanthus* | *nivalis* L. | Ad | R | Eu-c | Eph | WMdEu | | S |
| *Acorus* | *calamus* L. | Ad | Co | Arch | Agr | SEAs | | Hh |
| *Elodea* | *canadensis* Michx. | Ad | Co | Cen | Agr | Am | | Hh |
| *Juncus* | *tenuis* Willd. | Ad | Sr | Cen | Hagr | NAm | | Pr |
| *Gagea* | *minima* (L.) Ker. Gawl. | A | Sr | | | | Ap | S |
| *Agrostis* | *gigantea* Roth | A | Co | | | | Eu | Pr |
| *Anisantha* | *tectorum* (L.) Nevski | Ad | Sp | Arch | Hagr | Med-Etur | | St |
| *Apera* | *spica-venti* (L.) P. Beauv. | Ad | Co | Arch | Epec | n\|a | | Pr |
| *Avena* | *sativa* L. | Ad | Sp | Arch | Eph | SEu | | Ru-Se |
| *Bromus* | *arvensis* L. | Ad | Co | Arch | Epec | Med | | Pr |
| *Bromus* | *hordaceus* L. | Ad | Co | Arch | Hagr | NMed | | Pr |
| *Bromus* | *japonicus* Thunb. | Ad | Sr | Cen | Epec | Med | | St |
| *Bromus* | *squarrosus* L. | Ad | Sp | Cen | Epec | Med-ir-tur | | Z |
| *Dactylis* | *glomerata* L. | A | Co | | | | Ap | Pr |
| *Digitaria* | *ischaemum* (Schreb.) Muehl. | Ad | Sr | Arch | Hagr | Med | | Pr |
| *Digitaria* | *sanguinalis* (L.) Scop. | Ad | Sr | Arch | Epec | SEAs | | Ps |
| *Echinochloa* | *crus-galli* (L.) P. Beauv. | Ad | Co | Arch | Epec | As | | Se |
| *Elytrigia* | *repens* (L.) Nevski | A | Co | | | | Eu | Pr |
| *Eragrostis* | *minor* Host | Ad | Sp | Cen | Hagr | SEu | | Se |
| *Eragrostis* | *pilosa* (L.) P. Beauv. | Ad | Sp | Cen | Hagr | Med | | Se |
| *Hordeum* | *vulgare* L. | Ad | Sp | Cen | Eph | As | | Ru |
| *Lolium* | *perenne* L. | A | Co | | | | Eu | Pr |
| *Panicum* | *miliaceum* L. | Ad | Sp | Cen | Eph | SEAs | | Ru |
| *Poa* | *annua* L. | A | Co | | | | Eu | Pr |
| *Poa* | *bulbosa* L. | A | Sp | | | | Eu | St |
| *Poa* | *compressa* L. | A | Co | | | | Ap | Z |
| *Secale* | *cereale* L. | Ad | Sp | Arch | Eph | FAs | | Ru |
| *Setaria* | *glauca* (L.) Beauv. | Ad | Sp | Arch | Epec | SAs | | Ru-Se |
| *Setaria* | *verticillata* L. | Ad | Sr | Arch | Epec | SAs | | Ru-Se |
| *Setaria* | *viridis* (L.) P. Beauv. | Ad | Sp | Arch | Epec | Med-ir-tur | | Ru-Se |

**Explanations**

**1. Species**

**2. Status in the region:**

A – native

Ad – alien

**3. Frequency of occurrence:**

Co – common (more than 50 localities)

Sp – sporadically (21–50 localities)

Sr – sparse (6–20 localities)

R – rare (1–5 localities)

**4. Time of immigration**

Arch – archeophytes

Cen – kenophytes

Eu-c – eukenophytes

**5. Degree of naturalization**

Agr – agriophytes

Hagr – hemiagriophytes

Epec – epecophytes

Eph – ephemerophytes

Col – colonophytes

**6. Geographical origin**

Anthrop –anthropogenic origin

n|a – unknown

Eu, eu – Europe

Am – American

As – Asian

Med – Mediterranean

AMed – ancient Mediterranean

Ir- tur – Irano-Turanian

Med-ir-tur – Mediterranean- Irano-Turanian

N – north

S – south

E – earth

W – west

Md – middle

C – central

Pont – Pontic

Sarm – Sarmatic

FAs – Front Asian

MAs – Minor Asian

Cs – Caucasian

Cr – Crimea

Balk – Balkanian

Sib – Siberian

Atlant – Atlantic

**7. Relation to anthropopression**

**Ap** – eventapophytes (unstable apophytes), species that are occasionally found in the composition of anthropogenic ecotopes

**Hap** – hemiapophytes, species that are equally common in anthropogenic and natural ecotopes

**Eu** – euapophytes, species that prefer anthropogenic ecotopes

**8. Ecocoenotical groups:**

**S** – forest

**Pr** – meadow

**St** – steppe

**Z** – thickets

**Hh** – coastal-aquatic

**Ps** – psamophytic

**Ru** – ruderal

**Se** – segetal

**Ru-Se** – ruderal-segetal.

## REFERENSES

Andrienko T.L., Bilyk G.I., Bradis E.M., Barbarych A.I. 1977. Geobotanichne raionuvannia Ukrainskoyi RSR [Geobotanical zonning of Ukrainian RSR]. Kyiv. 302 p. (In Ukr.).

Banks N.C., Paini D.R., Bayliss K.L., Hodda M. 2015. The role of global trade and transport network topology in the human-mediated dispersal of alien species. – Ecol. Lett. 18 (2): 188–99. https://doi.org/10.1111/ele.12397

Bellard C., Leroy B., Thuiller W., Rysman J.-F., Courchamp F. 2016. Major drivers of invasions risks throughout the world. – Ecosphere. 7:e01241. https://doi.org/10.1002/ecs2.1241

Bellard C., Jeschke J., Leroy B., Mace G.M. 2018. Insights from modelling studies on how climate change affects invasive alien species geography. – Ecol. Evol. 8: 5688–5700. https://doi.org/:10.1002/ece3.4098

Burda, R.I., Koniakin S.N. 2019. The non-native woody species of the flora of Ukraine: Introduction, naturalization and invasion. – Biosystems Diversity. 27 (3): 276–290. https://doi.org/10.15421/011937

Convention on Biological Diversity 2014. Text of the Convention. Cited: April, 07, 2014. http://www.cbd.int/convention/convention.shtml.

Convention on the Conservation of European Wildlife and Natural Habitats. 2013. Standing Committee, 33rd Meeting Strasbourg, 3–6 December 2013. List of Decisions and Adopted Texts. Final Memorandum of the Secretariat established by the Directorate of Democratic Governance. 118 p. http://www.coe.int/t/dg4/cultureheritage/nature/bern/institutions/Documents/2013/Misc_2013_33rdSC_E_final_7.pdf.

Didukh Ya.P., Pliuta P.H., Protopopova V.V., Ermolenko V.M., Korotchenko I.A., Karkutsiev H.M., Burda R.I. 2000. Ekoflora Ukrainy [Ecoflora of Ukraine]. Kyiv. 284 p. (In Ukr.).

Early R., Bradley B.A., Dukes J.S., Lawler J.J., Olden J.D., Blumenthal D.M., Tatem A.J. 2016. Global threats from invasive alien species in the twenty-first century

and national response capacities. – Nature Communications. 7: 12485.
https://doi.org/10.1038/ncomms12485

Essl F., Nehring S., Klingenstein F., Milasowszky N., Nowack C., Rabitsch W. 2011. Review of risk assessment systems of IAS in Europe and introducing the German-Austrian black list information system (GABLIS) . – J. Nat. Conserv. 19: 339–350. 13 NNSS 2011. GB Non-native Species Secretariat. Risk and action plants.
https://doi.org/10.1016/j.jnc.2011.08.005

Essl F., Dullinger S., Genovesi P. *et al.* 2019. A Conceptual Framework for Range-Expanding Species that Track Human-Induced Environmental Change. – BioScience. 69 (11): 908–919.
https://doi.org/10.1093/biosci/biz101

European Strategy on Invasive Alien Species. Piero Genovesi and Clare Shine Convention on the Conservation of European Wildlife and Habitats (Bern Convention). Council of Europe Publishing F-67075 Strasbourg Codex ISBN 92-871-5488-0, June 2004. – Nature and Environment. 137: 68.
http://www.cbd.int/doc/external/cop-09/bern-01-en.pdf.

European Guidelines on Protected areas and IAS. 2013. Report prepared by Mr Andrea Monaco, Mr Piero Genovesi on behalf of the Bern Convention. Strasbourg, 10 June 2013 TPVS/Inf (2013) 22. [inf22e_2013.doc] Final Version, June 2013. http://www.coe.int/t/dg4/cultureheritage/nature/econetworks/Documents/2013/AndreaMonaco_Guidelines-PA&IAS.pdf.

Heywood V.H., Sharrock S. 2013. European Code of Conduct for Botanic Gardens on Invasive Alien Species. Council of Europe, Strasbourg, Botanic Gardens Conservation International, Richmond. Council of Europe Publishing, F-67075 Strasbourg. 60 p.
www.coe.int/Biodiversity.

Holubev V.N. 1972. Printsypy postroyeniya i soderzhaniya lineynoy sistemy zhyznennykh form pokrytosemennykh rasteniy [Principles of construction and contents of the linear system of life forms of angiosperms]. – Byul. Mosk. obshestva ispyt. prirody. Otd. Boil. 7 (6): 72–80. (In Russ.).

Jackowiak B. 1990. Antropogeniczne przemiany flory roslin nacszyniowich Poznania Poznan: Wyd. Un-tu im. A. Mickiewicza. 232 p.

Jackowiak B. 1990. Atlas roslin naszyniowich w Poznaniu. Poznan. 409 p.

Koval L.V., Horshkova L.M. 2019. Flora of the Desna Plateau: comprehensive analysis and genesis. – Botanicheskiy zhurnal. 104 (10): 1528–1541.
https://doi.org/10.1134/S0006813619100089

Koval L.V. 2005. Systematychnyy analiz flory Prydesnyans'koho plato (Sums'ka obl., Ukrayina) [The taxonomic analysis of the flora of the Desna Plateau (Sumy region, Ukraine)]. – Ukrainian Botanical Journal. 62 (6): 837–845. (In Ukr.).

Koval L.V., Horshkova L.M., Kuzmenko L.O., Mehem O.M., Burchak L.V., Polyakova A.S. 2018. Sozological peculiarities of the flora of the Desna Plateau (Ukraine). – Biosystems Diversity. 26 (1): 37–45.
https://doi.org/10.15421/011806

Koval L.V. 2005. Novi znakhidky adventyvnykh vydiv sudynnykh roslyn na Prydesnianskomu plato (Sumska obl., Ukraina) [New findings of alien species of vascular plants on the Desna Plateau (Sumy region, Ukraine)]. – Ukrainian Botanical Journal. 62 (2): 243–248 (In Ukr.).

Kornaś J. Analiza flor synantropijnych. 1977. Wiad. Bot. 21: 85–91.

Kornaś J. 1968. A geographical-historical classification of synanthropic plants. – Mater. Zakl. Fitosoc. Stos. 25: 33–41.

Kornaś J. 1978. Remarks on the analysis of synanthropic flora. – Acta Bot. slovaca A. 3: 385–394.

Marynych O.M., Babychev F.S., Belyaev V.I., Doroguntsov S.I. 1988. Heohrafichna entsyklopediia Ukrainy [Geographical encyclopaedia of Ukraine]. – Kyiv. 277 p. (In Ukr.).

Morozova O.V., Zhmylev P.Y. 2020 Taxonomic differentiation and functional homogenization of flora in the middle part of European Russia as a result of naturalization of alien species. – Vestnik of Saint Petersburg University. Earth Sciences. 65 (2): 284–302.
https://doi.org/10.21638/spbu07.2020.204

Mosyakin S.L., Fedoronchuk N.M. 1999. Vascular plants of Ukraine. – A nomenclatural checklist. M.G. Kholodny Institute of Botany. Kiev. xxiii + 345 p.

Plant Invasions in Protected Areas Patterns, Problems and Challenges Invading Nature. 2013. Springer Series in Invasion Ecology. 7: 656. + [I–XXII].
https://doi.org/10.1007/978-94-007-7750-7

Protopopova V.V. 1978. Adventiv flora of the flat of the Ukraine. – Act. bot. slov. Acad. Sci. slov. Ser. A 3: 71.

Protopopova V.V. 1991. Synanthropic flora of Ukraine and ways of its development. Kiev. 202 p.

Protopopova V.V., Mosyakin S.L., Shevera M.V. 2002. Plant invasions of Ukraine as a threat to biodiversity: the present situation and tasks for the future. Kyiv. M.G. Kholodny Institute of Botany, NAS of Ukraine. 32 p.

Protopopova V., Shevera M., Orlov O., Panchenko S. 2015. The transformer species of the Ukrainian Polissya. – Biodiversity: Research and Conservation. 39: 7–18.
https://doi.org/10.1515/biorc-2015-0020

Protopopova V., Shevera M. 2008. Participation of archaeophytes in urban floras in different botanical and geographical zones of Ukraine: a preliminary assessment, Thaiszia. – J. Bot. (Košice). 18 (1): 89–104.

Pyšek P., Pergl J., Essl F., Lenzner B., Dawson W., Kreft H., Weigelt P., Winter M., Kartesz J., Nishino M., Antonova L.A., Barcelona J.F., Cabezas F.J., Cárdenas D., Cárdenas-Toro J., Castańo N., Chacón E., Chatelain C., Dullinger S., Ebel A.L., Figueiredo E., Fuentes N., Genovesi P., Groom Q.J., Henderson L., Inderjit, Kupriyanov A., Masciadri S., Maurel N., Meerman J., Morozova O., Moser D., Nickrent D., Nowak P.M., Pagad S., Patzelt A., Pelser P.B., Seebens H., Shu W., Thomas J., Velayos M., Weber E., Wieringa J.J., Bap-

tiste M.P., van Kleunen M. 2017. Naturalized alien flora of the world: species diversity, taxonomic and phylogenetic patterns, geographic distribution and global hotspots of plant invasion. – Preslia. 89: 203–274. https://doi.org/10.1002/ecy.2542

Raunkiaer C. 1934. The life of plants. Oxford. 632 p.

Roberts W., Harrod O., Mitterdorfer B., Pheloung P. 2011. Regulating invasive plants and uses of weed risk. Current Opinion in Environmental Sustainability. 3: 60–65. https://doi.org/10.1016/j.cosust.2010.11.007

Seebens H., Blackburn T., Essl F. 2017. No saturation in the accumulation of alien species worldwide. – Nat. Commun. 8: 14435. . https://doi.org/10.1038/ncomms14435

Shackleton R.T., Foxcroft L.C., Pyšek P., Wood L.E. 2020. Assessing biological invasions in protected areas after 30 years: Revisiting nature reserves targeted by the 1980s SCOPE programme. – Biological Conservation. 243: 108–424. https://doi.org/10.1016/j.biocon.2020.108424

Shevera M.V., Protopopova V.V, Burda R.I., Zavialova L.V., Kucher O.O., Korniyenko O.M. 2018. Historical overview of the studies of alien flora of Ukraine. – Acta Horti Bot. Bucurest. 45: 5–32.

Takhtajan A.L. 1978. Floristicheskie oblasti Zemli [The Floristic Regions of the Earth]. Leningrad. 248 p. (In Russ.).

van Kleunen M., Petr P., Wayne D. et al. 2019. The global naturalized alien flora (GLONAF) database. – Ecology. 100 (1). https://doi.org/10.1002/ecy.2542

# СИНАНТРОПНАЯ ФЛОРА ПРИДЕСНЯНСКОГО ПЛАТО

**Л. В. Коваль[a,#], Л. М. Горшкова[a]**

[a] *Глуховский национальный педагогический университет им. Александра Довженко ул. Терещенко, 47-б, Глухов, 41400, Украина*

[#] *e-mail: flos_kl@ukr.net*

Приведены результаты структурного анализа синантропной флоры Придеснянского плато, которая включает спонтанно произрастающие рудеральные, сегетальные, интродуцированные виды растений в пределах рудеральных, сегетальных и природных местообитаний. На основе индексов синантропизации, адвентизации, модернизации (Б. Яцковьяк) показано состояние антропогенной трансформации флоры региона. Выделены адвентивная и апофитная фракции синантропной флоры Придеснянского плато, представлен анализ географического происхождения, периодов занесения, степени натурализации адвентивных видов. Указаны виды с высокой степенью инвазивности. К статье прилагается аннотированный список синантропных видов Придеснянского плато.

*Ключевые слова:* антропогенная трансформация, Придеснянское плато, синантропная флора, структурный анализ, инвазивные виды