NATIONAL ACADEMY OF SCIENCES OF UKRAINE
MINISTRY OF EDUCATION AND SCIENCES OF UKRAINE
MINISTRY OF ENVIRONMENTAL PROTECTION

M.G. Kholodny Institute of Botany
Ivan Ogiyenko Kamyanets-Podilskiy National University
Yuriy Fedkovych Chernivtsi National University
National Nature Park „Podilski Tovtry", Ukraine

IX INTERNATIONAL CONFERENCE

ON ANTHROPIZATION AND ENVIRONMENT

OF RURAL SETTLEMENTS.

FLORA AND VEGETATION

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IX International Conference
"Anthropization and Environment of Rural Settlements. Flora and Vegetation"

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Program, Proceedings and Excursion

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Authors are responsible for the scientific content and linguistic correctness of the abstracts. The abstract book has been reviewed. All contributions are published as presented by the authors, with the exception of some minor correction.

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M.G. Kholodny Institute of Botany, NAS of Ukraine

The IX International Conference Anthropization and Environment of Rural Settlements: Flora and Vegetation, *held in Ukraine for the second time, is evidence of the continuous and ever-growing interest to the topic. Botanists and ecologists from Hungary, Slovakia, Poland, Ukraine traditionally participate in these forums. With each new conference the circle of participants extends, now also involving scientists from Bulgaria, Byelarus, Canada, Kingdom of Saudi Arabia, Romania, Turkey. The range of issues discussed is becoming even wider. The problems of anthropization of the flora and vegetation have become important issues in global conservational concerns, in forming the immediate environment of humans. It is therefore time to unite and strengthen our efforts.*

Members of the Organizing Committee are happy to welcome all participants and guests of the conference in the beautiful and hospitable land of Podillya and Bukovyna. We are grateful to all participants and, of course, to all institutions and individuals who supported our conference.

We wish you a very productive work, interesting and fascinating discussions, meetings with old friends, new scientific and personal contacts, unforgettable impressions of field trips and the charming nature of Podillya and Bukovyna.

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CONFERENCE PROGRAM

Tuesday **Ivan Ogiyenko Kamyanets-Podilskiy National University,**
29.06.2010 **Kamyanets-Podilskiy, Ogiyenka Street, 61**
Day 1

07.30-10.00. REGISTRATION University Lobby
10.00-11.00. OPENING CEREMONY University Conference Hall
Welcome address from hosts and greetings of delegations

11.00-11.20 Coffee break

11.20-13.00 PLENARY SESSION University Conference Hall

11.20-11.40 **Barbara TOKARSKA-GUZIK, Andrzej URBISZ, Alina URBISZ, Beata WĘGRZYNEK, Teresa NOWAK and Katarzyna BZDĘGA**
Alien vascular plants in the Silesian Uplands of Poland: distribution pattern, impact and threat

11.40-12.00 **Jana MÁJEKOVÁ, Marica ZALIBEROVÁ**
Recent study on the segetal vegetation of Slovakia

12.00-12.20 **Vira PROTOPOPOVA, Myroslav SHEVERA**
Participation of apophytes in urban floras in different botanical and geographical zones of Ukraine: a preliminary assessment

12.20-13.00 Discussion

13.00-14.00 LUNCH

14.00-17.00 EXCURSION: Old Kamyanets
-17.45 Coffee break in Head Office of NNP Podilski Tovtry

18.30-19.30 **TRANSPORTATION TO BOYANY**
to Sonyachna Dolyna (Sunny Valley) Recreation Centre, Boyany vill., Chernivtsi Region

20.00-21.00 DINNER

Wednesday
30.06.2010 Boyany, Sonyachna Dolyna
Day 2

08.00-09.00 BREAKFAST

09.00-13.00. SESSION

09.00-09.15 **Oksana ABDULOYEVA, Natalya KARPENKO**
Alien plant invasiveness criteria as a basis for invasion risk assessment

09.15-09.30 **Raisa BURDA**
The frequency of invasive plants in anthropogenic ecosystems of flatland Ukraine according to the latitudinal gradient

09.30-09.45 **Yunus DOGAN, Ilker UGULU, Teoman KESERCIOGLU**
The vascular plants of Buca Faculty of Education Campus (Izmir): contribution to educational practices

09.45-10.00 **Dmitriy V. IEPIKHIN**
Spontaneous flora and vegetation of Simferopol

10.00-10.15 **Ivan KHOMYAK**
Influence of expansion of invasive species on the size of indexes hemeroby ecosystems

10.15-10.30 **Olga GRYGORIEVA, Svitlana KLYMENKO**
The cultivars of cornelian cherry (*Cornus mas* L.) in Ukraine

10.30-10.45 **Anna BOMANOWSKA**, **Wojciech ADAMOWSKI**
Fire break in Białowieża National Park as a refuge of segetal flora

10.45-11.00 **Edyta SIERKA, Gabriela WOŻNIAK**
Does the forest management influence on the biodiversity of forest herb layer by enhancing the spread of clonal plants?

11.00-11.20 **Coffee break**

11.20-11.35 **Ewa SZCZĘŚNIAK**
Galeopsis angustifolia (Ehrh.) Hoffm. in South-Western Poland: origin, expansion and disappearance

11.35-11.50 **Justyna WILAND-SZYMAŃSKA**
The influence of agriculture on the distribution of the genus *Hypoxis* (*Hypoxidaceae*) in the tropical East Africa

11.50-12.05 **Jana MEDVECKÁ, Ivan JAROLÍMEK**
Level of invasion across habitats of Slovakia

12.05-12.20 **Mariya KAZEMIRSKA, Illia CHORNEY**
Fritillaria montana Hoppe in synanthropic forest communities in the area between the Prut and the Dniester rivers (Chernivtsi region)

12.20-12.35 **Gabriela WOZNIAK, Damian CHMURA, Edyta SIERKA**
What can we learn about community ecology from vegetation development on post industrial sites

12.35-12.45 **Tatiana DEREVENKO**
The rare species collection role to conservation biodiversity

12.45-12.55 **Oleksandr ORLOV**
Anthropization of plant cover of Zhytomyr Region

12.55-13.05 **Pavlo PENYAK**
Ukrainian folk traditions and Ukrainian natural habits

13.05-13.30 **Discussion**

13.30-14.30. LUNCH

14.30-17.00 **POSTER SESSION**
(Authors will be invited to give a 5-minute presentation)

ADAMOWSKI Wojciech
Viola odorata L. as a relict of former culture in the Białowieża forest region

AL-YAHYA Mohammed
Ruderal Vegetation of Saudi Arabia: Their therapeutic Benefits

ANDRIK Eva, DANYLYK Ivan, KISH Roman, TOKARYUK Alla, SHEVERA Myroslav
Rudbeckia laciniata L., an emergin invader in oak forest habitats (hardwood floodplain forests) in Transcarpathia (Ukraine)

ANIOŁ-KWIATKOWSKA Jadwiga, KĄCKI Zygmunt, DAJDOK Zygmunt, ŚLIWIŃSKI Michał
Distribution patterns of alien plant species in large river valleys in Poland

BABCZYŃSKA-SENDEK Beata, BARĆ Alicja, RUTKOWSKA Monika
Ancient woodland species in the area of former exploitation of zinc and lead ores in the vicinity of Ujejsce (the Dąbrowa Górnicza town, the Silesian Upland, S. Poland)

BAGRIKOVA Natalya
On the alien flora of the Crimean Peninsula (Ukraine)

BŁAŻYCA Barbara
Vascular plant flora in the north part of Zbrosławice commune (Silesian Upland)

BOGDANOWICZ Agnieszka M., LEMBICZ Marlena, CHMIEL Julian, ŻUKOWSKI Waldemar
Life history traits as a key to understanding population dynamics of a species: the case of *Carex secalina* (Cyperaceae)

BOMANOWSKA Anna, WITOSŁAWSKI Piotr
Anthropogenic diversity of arable weed flora in landscape parks in Central Poland

CELKA Zbigniew, DRAPIKOWSKA Maria, LEMBICZ Marlena, SZKUDLARZ Piotr, TALAGA Katarzyna, WYDRA Klaudia
Population of Lavatera thuringiaca on a Medieval fortified town site: from reproduction to distribution

CHMIEL Julian
Prospects for survival of plant species considered threatened in NE Wielkopolska (Poland)

CHMIELEWSKI Piotr, CWENER Anna
Distribution and the condition of *Adonis vernalis* L. population in the Lublin province

CHORNEY Illia, TOKARYUK Alla, BUDZHAK Vasyl
Grindelia squarrosa (Pursh) Dunal (*Asteraceae*), a new alien species in the flora of Chernivtsi Region

DRAPIKOWSKA Maria, CELKA Zbigniew, SZKUDLARZ Piotr, JACKOWIAK Bogdan
Morphological variation in populations of *Anthoxanthum aristatum* Boiss. from different habitats

DUBYNA Dmytro V., DZIUBA Tatiana P., YEMELIANOVA Svitlana M.
Synanthropization of the coastal coenoflora of Ukraine

FOMINA Olga V., TOKHTAR Valery K.
Ergasiophytes in the urban flora of Belgorod (Russia)

GUBAR Lyubov
The urban flora of Shepetovka: taxonomic, biomorphological, and ecological analysis

JACKOWIAK Bogdan
Urban Flora of a Central European database: the source of information and the tool of analysis

JACKOWIAK Bogdan, CELKA Zbigniew, CHMIEL Julian, LATOWSKI Karol, ŻUKOWSKI Waldemar
Vascular plant flora of Wielkopolska: 200 years of research and anthropogenic transformations

KAGALO Alexander, SKIBITSKA Nataliya
Some "new" invasion species in the urban flora of Kamyanets-Podilskiy

KIEDRZYŃSKI Marcin, STEFANIAK Agnieszka
Occurrence of the *Epipactis helleborine* group and *E. atrorubens* in anthropogenic habitats in the Pilica Primeval Forest of Central Poland

KIRPLUK Izabela
Relicts of segetal species in the flora of abandoned villages of Kampinoski National Park

KOLODIY Valentyna, KAGALO Alexander
Schivereckia podolica (Bess.) Andrz. ex DC. in the condition of anthropogenic stress

KORNIYENKO Olga M., MOSYAKIN Andriy S.
North American alien taxa of Asteraceae in Ukraine: invasions of genera phylogenetically distant from natives

KOROTCHENKO Iryna A.
Synantropization of the steppe vegetation in the forest-steppe zone of Ukraine

KRICSFALUSY Vladimir
Invasion success of *Cynanchum rossicum* (Kleopow) Borhidi: do habitat affinities and species traits matter?

KUCHER Oksana
Alien fraction of Starobilsk grass-meadow steppe zone: a preliminary data

KUCHEREVSKY Vasiliy, PROVOZHENKO Tat'yana
Estimation of transformation degree of feather-grass associations of Right-bank steppe Pridneprov'ya

LATOWSKI Karol, SZWARC Katarzyna
Characteristic of vascular flora of a local railway line in West Poland

LEMBICZ Marlena, JACKOWIAK Bogdan, ŻUKOWSKI Waldemar
Ecological and genetic effects of colonization in man-made habitats: the case of *Puccinellia distans*

LORENS Bogdan
Changes of non forest vegetation in Wieprz River valley (Roztocze National Park)

MARYUSHKINA Valentyna Ya.
Invasive plants in the forest flora of Kiyv suburbs

MELNIK Ruslana
Apophytization of Mykolayiv urban flora

MIKOLÁŠ Vlastimil
Notes on taxonomy and eco-coenology of *Stellaria pallida* in the town of Košice [Eastern Slovakia]

MOSYAKIN Andriy
Biological control as a tool to manage plant invasions: some case studies from Ukraine

MOVCHAN Iaroslav, LYTVYNIUK Anna, IAKYMCHUK Oksana, MUZYCHUK Halyna
Eeconet as instrument of eco-optimisation of cities

MOYSIYENKO Ivan, SUDNIK-WÓJCIKOWSKA Barbara, ROWIŃSKA A.
Floristic values, and past and present threats to kurgans in Ukraine

NEDELCHEVA Anely
Pavement plants on old walls as part of urban flora in Southwestern Bulgaria

ÖLLERER Kinga
Transport routes and land abandonment – the neobiota of traditional landscapes from Saxon Transylvania, Romania

OPTASYUK Olga, KOROTCHENKO Iryna
Ecological and coenotic pecularities of synantropic species of genus *Linum* L. Ukranian flora

PODBEREZKO Irina
Ecological aspects and results of *Ambrosia artemisiifolia* L. monitoring in terrain of Ukraine

PYLYPENKO Liliya, YAROSHENKO Lyubov
The field edges as source of biodiversity

ROSTAŃSKI Adam
Spontaneous flora of heavy metal polluted waste heaps in the agricultural landscape of the Upper Silesian Industrial Region (S-Poland)

RYSIAK Anna
Patterns of the distribution of selected species of vascular plants in area of Lublin city

SKOWRONEK Izabela, KLOCZKOWSKA Agata
The Skawica river valley (Beskid Żywiecki Mts.) as the transitional zone between the geographical ranges of the *Petasites kablikianus* Tausch ex Bercht. and *P. hybridus* (L.) P.Gaertn., B.Mey. & Scherb. Species

TARŁOWSKA Sabina, TOKARSKA-GUZIK Barbara
Morphological variation in the invasive hybrid *Fallopia x bohemica*

TOKARSKA-GUZIK Barbara, PUSTELNIK Magdalena, KOSZELA Katarzyna and ŻABINSKA Izabela
Ivasive alien plants in the Soła river floodplain (Polish Carpathians): implications for nature conservation and river management

TOKARYUK Alla, KORZHAN Ksenia
Oxybaphus nyctagineus (Michx.) Sweet (*Nictaginaceae*) – the new species of Carpathian region

VELYCHKO Mykola V.
Alien species in the flora of the Chyvchynskyi' mountains

VOLUTSA Olena
Alien species of Northern Bessarabia's flora

WOLSKI Grzegorz J., STEFANIAK Agnieszka
Mosses of the Experimental and Teaching Garden of the Faculty of Biology and Environmental Protection, University of Lodz (Poland)

WRZESIEŃ Małgorzata
Invasive vascular plants species on the railway areas in the Central-Eastern part of Poland

YENA Andriy
Irresolute conquistadors: behavior of some invasive plants in the Crimea

YUGLICHEK Liliya
Phalacroloma annuum (L.) Dumort. invasion in Khmelnytskiy urban system

ZAVYALOVA Liudmyla
Apophytes in urban flora of Chernihiv (Forest Zone of Ukraine)

ZHADKO Svetlana
The structure of the urban flora of Gomel (Republic of Belarus)

ZVYAGINTSEVA Karina
Invasive species in the Kharkiv urban flora

17.00-17.20 **Coffee break**

17.20-18.20 Discussion and conclusion
Closing Ceremony
18.20-19.30 Excursion on Sonyachna Dolyna vicinity

20.00 GALA DINNER

Thursday
01.07.2010 Boyany, Sonyachna Dolyna
Day 3

07.00-08.00 BREAKFAST

08.30 -13.30 Excursion: Chernivtsi (Old Town), Khotyn Castle (Chernivtsi Region)

13.30 -14.30 LUNCH

14.30 -18.30 Excursion to NNP Podilski Tovtry: Chotyry Kavalery, Karmelyukova Hora

18.30- 19.00 Return to Kamyanets-Podilskiy (and optionally to Boyany)

LECTURES AND POSTERS

(listed alphabetically by last names of the first authors)

ALIEN PLANT INVASIVENESS CRITERIA AS A BASIS FOR INVASION RISK ASSESSMENT

Oksana Abduloyeva, Natalya Karpenko

Taras Schevchenko National University of Kyiv, Botany Department
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Based on analysis of life biology and population ecology characteristics of especially dangerous and other invasive alien plant species in Ukraine, the states of several characters are chosen as the *invasiveness criteria*. Invasiveness criteria display a high invasion risk level or level of anxiety of the given alien plant species in the second, derivative areal. The invasiveness criteria are proposed by 13 characters: primary areal and habitats; degree of cognation to the regional native flora; phenotype plasticity properties – morphological, biomorphological and reproductive ones; properties of ecological universality; adaptations to proof area retaining; presence of self-seeding; ability to disturb ecological homoeostasis in communities; absence of population growth biotic constraints in the second, derivative areal; lag-time.

Values of Invasiveness Integral Parameter (IIP) may be divided into 4 invasion status classes. After preliminary estimates, IIP of expansive invasive alien plants is in an interval of 80-100% (dangerous, or of high risk level species with the proven high invasiveness and threat – *Acer negundo* L., *Robinia pseudoacacia* L.); IIP = 40-80% in anxious alien species (like *Fraxinus pennsylvanica* Marsch., *Mahonia aquifolium* Nutt., *Oenothera* L. species, *Phytolacca americana* L., *Quercus borealis* Michx.). IIP values below 40% meet at species of low risk level or unknown invasion status (examples – *Abutilon theophrastii* Medik., *Silphium perfoliatum* L., *Artemisia biennis* Willd., *Artemisia dracunculus* L., *Rhus typhina* L., *Rudbeckia hirta L.*).

VIOLA ODORATA AS A RELICT OF FORMER CULTURE IN THE BIAŁOWIEŻA FOREST REGION

Wojciech Adamowski

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Viola odorata L. is a species of uncertain status in Poland. It is certainly native in Mediterrenean region and parts of SW Europe. It has long history of cultivation, starting at least in ancient Roma. The species is also very variable, sporting numerous color forms. According to literature, the species is rare in Białowieża Forest and whole NE Poland. It was present in Manor Park in Białowieża in the end of 19th century. Recent observations show that the species is much more common in the Białowieża Forest region and should be treated as relict of former culture, as it is rarely cultivated today. Most localities are in parks, cemeteries, at roadsides, waste places, along fences and under canopy of trees close to human settlements. Sweet violet is most common in two biggest settlements: Hajnówka and Białowieża. Despite its long history in Białowieża Forest, *Viola odorata* rarely enters well preserved forests, as it prefers more open habitats. Author found four different color forms, of which violet and

purple are most common. Two other forms, white and lilac, were found only in Narewka village, close to cultivated individuals.

RUDERAL VEGETATION OF SAUDI ARABIA: THEIR THERAPEUTIC BENEFITS

Mohammed A. Al-Yahya

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The flora of Saudi Arabia is one of the richest biodiversity areas in the Arabian Peninsula and comprises very important genetic resources of crop and medicinal plants. In addition to its large number of endemic species, the components of the flora are the admixture of the elements of Asia, Africa, and the Mediterranean region. The greatest species diversity has been observed in Asir and Hijaz, the Western mountainous area of the Kingdom, which borders the Red Sea. Medicinal plants represent an important health and economic component of biodiversity. The Arabian Peninsula is the birth place of herbal drugs, and the use of folk medicine has existed there since time immemorial. The Kingdom of Saudi Arabia is gifted with a wide range of flora, consisting of a large number of medicinal herbs, shrubs and trees. It is, however, estimated that the flora of Saudi Arabia has a great medicinal species diversity, which is expected to be more than 1200 (over 50%) out of its 2250 species. Indigenous knowledge of uses of plants of Saudi Arabia for the cure of ailments is ancient and still available among the tribal and local people and folkloric healers. Currently, of the one-quarter to one-half of all pharmaceuticals dispensed in the United States having higher-plant origin which indicates the importance of medicinal plants for the beneficial of human health. In a preliminary survey on the medicinal plant diversity in the flora of the Kingdom of Saudi Arabia has been made with seven families: *Amaranthacae*, *Apocyanaceae*, Capparaceae, *Euphorbiaceae*, *Lamiaceae*, *Polygonaceae*, and Solanaceae. These families are represented in the flora by 254 species (i.e. 12% of the total species). The plant species of these families along with their Arabic nomenclature and medicinal uses attributed to them will be presented.

RUDBECKIA LACINIATA L. IN FLOODPLAIN FORESTS OF TRANSCARPATHIA (UKRAINE)

[1]Eva Andrik, [2] Ivan Danylyk, [1]Roman Kish, [3]Alla Tokaryuk, [4] Myroslav Shevera

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Rudbeckia laciniata is an invading species of North American origin, distributed in many countries of the EPPO region, where it is mainly associated with riparian cenoses, and usually forms monodominant communities. The question of entering the species the EPPO Alert List has not been settled yet, taking into account the modern rate of its distribution,

localization of invading populations, etc. *R. laciniata* is native in Eastern part of the USA, where it grows in open floodplain forests, moist meadow in wooded areas, woodland borders, moist thickets, sloughs in partially shaded areas, calcareous seeps, and pastures (Hilty, 2004-2010). At present *R. laciniata* as a naturalized species has been noted mainly in the western regions of Ukraine – in riparian strips of canals and rivers, in ruderal places, cemeteries, along the railways. It was found in the plain areas of Hungary and Romania near their borders with Transcarpathia (Simon, 1950; Karacsonyi, 1995). In Transcarpathia *R. laciniata* was noted first at the beginning of the 20th century in the plain along brooks in the Comitats of Bereg and Ung (Magocsy-Dietz, 1908), in meadows in Mukachevo District and along the railway near the town of Chop (Margittai, 1933). Today its largest site can be found on the boundary of Uzhgorod and Mukachevo Districts in the floodplain of the Latoritsa River and its canalled right confluents (the rivers Velya, Stara et al.), and the species is spreading intensively along their coasts. Its band-like populations form patches of almost monodominant riparian communities (the projective cover of the species is up to 50-70%) of order *Convolvuletalia sepium*, class *Galio-Urticetea*. The species also occurs sporadically in the bordering with them meadow cenoses of class *Molinio-Arrhenatheretea*. Inclusions of *R. laciniata* in ruderalized riparian communities are generally characteristic of its secondary European area. That is why of particular danger is the penetration of the species into the natural forest communities of the Latoritsa floodplain, not far away from the abovementioned sites. Here *R. laciniata* was found in a floodplain oak-ash forest (*Fraxino pannonicae-Ulmetum* associations of class *Querco-Fagetea*) in the landmark of Kozuptovo in the environs of Draghynya village, Mukachevo District. The forest forms a rare riparian oak-elm-ash type of habitat (91FO) of the priority protection which entered the European Habitats Directive, so it is protected within the "Prytisyansky" regional landscape park. In the forest *R. laciniata* grows in sunlit grounds with well-developed grass cover (the projective cover is up to 70-80%) formed mainly by high grass stand with *Rubus caesius*, *Phalaroides arundinacea, Filipendula denudata, Urtica galeopsifolia, Carex riparia* et al. There the species forms light thickets with the projective cover from 1 to 20%. However, even within the natural forest cenosis, we can observe association of *R. laciniata* with ecotone (partly damaged) plots – forest edges, glades, clearings, abandoned trails located not far away from water currents. Appearance of the species within the primary communities of floodplain forest means that it invades one more ecological niche of its primary area in a newly occupied territory.

DISTRIBUTION PATTERNS OF ALIEN PLANT SPECIES IN LARGE RIVER VALLEYS IN POLAND

Jadwiga Anioł-Kwiatkowska, Zygmunt Kącki, Zygmunt Dajdok, Michał Śliwiński

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River valleys are significant routes of migration for plants, animals and people. They also create habitat for many plant species and communities. These areas undergo particularly intensive changes owing to natural processes in river valleys as well as to human activity. Both factors cause that river valleys have become prone to colonisation by alien species.

Distribution and occupancy in river valleys by native and alien species is not uniform considering the frequency, abundance and occurrence in particular sections of a valley. However, investigations conducted by the authors have revealed some schemes in distribution of alien species that may be presented as two basic patterns: a linear and a point ones. Linear

patterns of distribution are typical for majority of alien species and depend on a valley's character, they can be classified as linear-continuous, linear-polar, linear-interrupted and linear-dispersed ones. The point pattern of distribution refers to species recorded as quite recently appeared in river valleys. The remaining patterns are characteristic for naturalized species.

Different patterns of alien species distribution depend on a stage of invasion. Also, neophytes show tendencies to change a pattern that may be caused by progressive degradation of the valleys environment. Simultaneously, a distinct relation between occurrence and invasion of some alien species and a type and degree of anthropogenic transformation of various river sections is perceptible. The greatest observed number of neophytes, penetrating natural or semi-natural ecosystems, occurs in sections with the highest degree of transformation of the riverine environment.

ANCIENT WOODLAND SPECIES IN THE AREA OF FORMER EXPLOITATION OF ZINC AND LEAD ORES IN THE VICINITY OF UJEJSCE (DĄBROWA GÓRNICZA TOWN, SILESIAN UPLAND, S POLAND)

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The presence of ancient woodland species at forest flora gives the evidence of long-lasting persistence of forest at the area given. Numerous group of these species (53) was found at post-mining area on the hills built of the Triassic limestones and dolomites, north-east of Ujejsce (the district of Dąbrowa Górnicza), the Silesian Upland. Zn and Pb ores deposited at the Middle-Triassic dolomites were intensively exploited there. Initially these were lead ores and then, up to the 18th century, zinc ores. The consequence of open-pit activity was undoubtedly deforestation of large areas. Nowadays, the entire area is covered with the forest at different age, in significant part a beech wood formed in a way of natural regeneration.

The analysis evidenced that hemicryptophytes and geophytes prevail (88% in total) among the ancient woodland species of the area mentioned. Regarding the types of dispersal, anemochores are dominants (39%) but myrmecochores (24%) and endozoochores (21%) are also significant participants. In relation to habitat demands, defined by Ellenberg's indicator values (L, F, R, N) plants which prefer habitats between shade and half shade (37%), soils of average dampness (37%) and weakly acid to weakly basic reaction value (30%) prevail. Nitrogen requirements are more diversified. The most numerous group (21%) consists of species more often found on nitrogen-deficient soils then on richer ones.

Development of forest communities, rich in the ancient woodland species, was possible here due to the calcium-rich bed-rock which causes that heavy metals in majority occur as non-available compounds.

ON THE ALIEN FLORA OF THE CRIMEAN PENINSULA (UKRAINE)

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The Crimean Peninsula is characterised by the specific environment which is formed by its geographical position, edaphic, climatic factors, and ancient links with the neighbourindg regions. Besides, the Crimea was developed for a long time by the humans. The vegetation constantly suffered from the influence of natural and anthropogenous factors. Therefore we received the list of synantropic, including alien, species, on the basis of the analysis of references, herbarium samples, and original studies. The first most careful analysis of the alien flora of the Crimea was done by S.K. Kozhevnikova and N.I. Rubtsov (1971). The alien fraction included 165 species of the vascular plants. 31 species of them were defined as doubtful since once there were only separate data according to references or individual herbarium collections of the end of the 19th – beginning of 20th centuries. V.V. Protopopova (1991) listed 444 alien species, V.N. Golubev in his "Biological flora of the Crimea" (1996) presented only 217 alien species for the Crimea. It is possible to explain such considerable discrepancies in data by insufficient depth of critical and systematical researches of alien species and their distribution in various communities, on the one hand. On the other hand, the taxon abundance values constantly changed because new alien species were introduced. Based on results of studies during the last 5 years, it is possible to add 3 species more: *Caulinia graminea* (Delile) Tzvelev, *Elatine triandra* Schkuchr, and *Fumaria capreolata* L.

Now the alien flora of the Crimea is represented by 363 species of 237 genera and 74 families, including 78 archaeophytes and 285 kenophytes. The alien elements constitutes 13.2% of the total number of vascular plants of the peninsula. The flora is represented by the following groups according of the degree of naturalization: agriophytes (43 sp.), epoecophytes (137), ergasiophytes (98), ephemerophytes (80), hemiepoecophytes (5). The ratio of native synanthropic and alien species is 2.67. This index confirms the conclusion that in the process of advancement to the south the quantity of alien species decreases in comparison with more northern regions. On the one hand, there are many species of the native flora of the Crimea which are alien in other parts of Ukraine. On the other hand, there are many species which cultivated on the territory of the peninsula as ornamental or useful plants, actively extends in natural and seminatural communities (for example, *Ailanthus altissima* (Mill.) Swingle, *Aquilegia vulgaris* L., *Bupleurum fruticosum* L., *Daphne laureola* L., *Elaeagnus angustifolius* L., *Fraxinus ornus* L., *Opuntia humifusa* Raf., *Senecio bicolor* (Willd.) Tod., and others.

The alien flora is very mobile, therefore the given analysis is preliminary and the studies of alien species of the Crimea need to be continued.

VASCULAR PLANT FLORA IN THE NORTH PART OF ZBROSŁAWICE COMMUNE (SILESIAN UPLAND)

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This study concerns a floristic examination carried out in Tarnowskie Góry Ringe (Silesian Upland) in north part of Zbrosławice commune (80 km^2). The main aim of this study is to present floristic resources of this area. The floristic investigation revealed the presence of 586 species. This group includes native (65%) and alien species (25%), protected and endangered (42 species) and for the area interesting taxa.

LIFE HISTORY TRAITS AS A KEY TO UNDERSTANDING POPULATION DYNAMICS OF A SPECIES: THE CASE OF *CAREX SECALINA* (*CYPERACEAE*)

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Life history theory analyses how variation in life history traits leads to variation in fitness among individuals. Natural selection works on life history traits which lead to reproductive success of individuals. We studied plasticity in life history traits and correlations between them during long-term experiment in uniform garden conditions in order to explain population dynamics of the perennial sedge *Carex secalina*[*]. This species is ranked as critically endangered in several countries of Europe. In Poland it was considered extinct until 2000.

For four years we observed 100 individuals of this species originating from seeds from three natural populations. Every year we estimated reproduction, size of individuals, seeds and seedlings, germination. We demonstrated (1) decrease in reproduction of individuals from every population, (2) changes in seed and seedling size with mother plant age, (3) different germination patterns of each population. These results allowed to understand fluctuations in *Carex secalina* number in Polish populations, colonisation of new anthropogenic habitats by this sedge and will help to prepare its conservation strategy.

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FIRE BREAK IN BIAŁOWIEŻA NATIONAL PARK AS A REFUGE OF SEGETAL FLORA

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Due to the mass abandonment of agriculture in recent decades, many segetal plants have become rare or even extinct in the Białowieża Forest region. Due to the exclusion of the driest and wettest plots of ground from cultivation, the internal differentiation of segetal communities into humidity degrees has disappeared almost entirely.

In 2009 the authors found surprisingly rich flora (>130 species on a <1 ha plot) with many segetal plants (31 species characteristic of, or specifically of, the *Stellarietea mediae* class and its lower syntaxa, plus 70 other species in common with the segetal flora of Białowieża Clearing) on a fire break in Białowieża National Park, managed by yearly autumn ploughing. We observed the mass occurrence of: *Juncus bufonius*, *Polygonum hydropiper* and *Scleranthus annuus*. Amongst the most interesting plants found were: *Peplis portula* and *Ranunculus sardous*, formerly growing in wet furrows and not found recently on arable fields, and *Chamomilla recutita*, very rare in the whole of NE Poland. Amongst accompanying species in common with the segetal flora of Białowieża Clearing, plants characteristic for *Molinio-Arrhenatheretea*, *Isoëto-Nanojuncetea* and *Bidentetea tripartiti* classes are prevalent, formerly growing in wet variants of segetal communities and in furrows.

Our results show that the flora of ploughed plots is similar to the flora of arable fields, and that such plots could be at least partial refuges for segetal flora.

ANTHROPOGENIC DIVERSITY OF ARABLE WEED FLORA IN LANDSCAPE PARKS IN CENTRAL POLAND

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In Poland, as well as in many regions of Europe, arable fields have been recently subjected to violent changes due to intensive human activity in the agroecosystems, which results from the methods applied in modern agriculture. This process is accompanied by the effect of recession of many weeds and has produced monotonous agricultural landscapes that show increasing biodiversity losses. Landscape parks could be relevant for the preservation of arable weeds diversity due to the preference for the traditional and extensive agriculture.

The aim of the study is to determine the taxonomical and geographical-historical diversity of segetal floras of landscape parks (LP) in central Poland: Bolimowski, Międzyrzecza Warty i Widawki, Przedborski, Spalski, Sulejowski, Załęczański and Łódź Heights.

Total weed flora of analysed objects encompass 502 vascular plant species. The highest number of species was recorded in Spalski LP (340 species), while the lowest – in Załęczański LP (102). Investigated flora is characterised by average uniformity (16.1% weeds occur in all parks). The most uniform flora is that of apophytes (51.8%), followed by those of

archaeophytes (42.0%). Similarity analysis performed for total segetal flora and separately for geographical-historical groups in individual landscape parks has led in each case to the separation of Załęczański LP. For the other parks the internal similarity relationships are shaped divergently depending on which geographical-historical group or the total flora is being considered in the analysis.

The total segetal flora of landscape parks is representative for the regional weed flora in 83.1%. The highest degree of implementation of the regional species pool reaches archaeophytes – 89.4%. In the floras of the compared parks 61 of rare and threatened weeds were found, which represents 92.4% of all endangered segetal species in the central Poland. The highest number of endangered species was recorded in Sulejowski (53 species) and in Przedborski (52) landscape parks.

The obtained results show that arable fields within landscape parks could be refuges for segetal flora, especially for rare and endangered weeds.

THE FREQUENCY OF INVASIVE PLANTS IN ANTRHROPOGENIC ECOSYSTEMS OF FLATLAND UKRAINE ACCORDING TO LATITUDINAL GRADIENT

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The naturally-anthropogenic phenomenon – distribution of alien plants within the limits of flat Ukraine – is studied on six test areas. On a meridian they are located thus: Ovruch, Zhitomir District – Polissya; Ruzhin, Zhitomir District, Shargorod, Teplik, Vinnitsya District – Forest-steppe, Muzykovka and Krugloozerka, Kherson District – Dry Steppe. The area of each test site was about 30 km^2; they represented areas of specific economies of agricultural nature use. Within the limits of all of test areas, the field, pascual and haying, felling area (except for two dry steppe areas), rural settlements, and also road-linear ecosystems were determined in nature. One hundred descriptions were conducted in these areas (cutting area – 7, pascual and haying – 33, field – 52, rural settlements – 6, road-linear – 2).

A general number of anthropophyte species on six test areas is 185, namely: Ovruch-147, Ruzhin – 155, Shargorod – 157, Teplik – 162, Muzykovka – 110, and Krugloozerka - 108. Participation of anthropophytes is as follows: Ovruch – 39%, Ruzhin – 33%, Shargorod – 32%, Teplik – 37%, Muzykovka – 50%, Krugloozerka – 39%. High quantity of common for six areas species – 72 or 66% from the least rich in anthropophytes flora of Krugloozerka, and 44% - from the richest among them – the flora of Teplik. Fractions of anthropophytes Muzykovka and Krugloozerka almost appearance, except for two - *Hibiscus trionum* L. and *Solanum cornutum* Lam. Four alien species met only in Ruzhine, near a railway, demonstrating the way of migration via railroads (*Anchusa azurea* Mill., *Impatiens parviflora* L., *Oxybaphus nyctagineus* (Michx.) Sweet, *Senecio viscosus* L.); only in Shargorod – *Rhinanthus apterus* (Fr.) Ostenf. The Jaccard coefficient demonstrated high similarity of composition of anthropophytes. Two pleiades are clearly expressed: Muzykovka and Krugloozerka - *Cj=0.90,* excellent with other *Cj=0.49*. Forest-steppe and Polissya areas form a single pleiad with the similarity level Cj=0.89 - *Cj=0.74.* The found out the phenomena of development faction of anthropophytes confirm the critical condition of the ecosystems of the plain part of Ukraine.

POPULATION OF *LAVATERA THURINGIACA* ON A MEDIEVAL FORTIFIED TOWN SITE: FROM REPRODUCTION TO DISTRIBUTION

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Lavatera thuringiaca is found in a wide belt extending from the Adriatic Sea to central Siberia. Localities of this species, separated from the compact range, are reported in central Europe and southern Scandinavia. The southern range limit is based on the coast of the Black Sea, the Caucasus, the Caspian Sea and the Aral Sea, while the northern limit is located at approx. 55° north latitude.

L. thuringiaca in central Europe is considered to be a relic of former cultivation, as in the past it was used as a medicinal plant and as a plant material in everyday life. In Poland it is connected with remnants of medieval settlements. It is found most frequently in xerothermic grassland with *Festuco-Brometea* and thermophilous ruderal communities with *Onopordion acanthii.* It has characteristics of rhizophytes and rhizocaulophytes. It produces a large root with numerous lateral roots, which may lead to vegetative division of plants as a result of it dying out in the centre as the plant is aging.

In the years 2000-2004, using standard methods applied in population ecology, population size and reproduction of specimens were evaluated on the permanent sample plot. Additionally variation of selected traits was analyzed on seeds produced by specimens comprising the population. These analyses were conducted within a model experimental object, i.e. a medieval fortified town in Bnin. Results concerning the biology of individual specimens, their reproduction and the *L. thuringiaca* population size are used in the discussion aiming at the clarification of the distribution and persistence of this species in the medieval fortified town site.

PROSPECTS FOR SURVIVAL OF PLANT SPECIES CONSIDERED THREATENED IN NE WIELKOPOLSKA (POLAND)

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In the NE part of the Wielkopolska region, which comprises entire or parts of such counties as: Gniezno, Inowrocław, Konin, Mogilno, Słupca, Szubin, Września and Żnin, during 170 years of geobotanical studies, 270 taxa (44.9%) out of 601 have been presently recognized as threatened in the whole Wielkopolska. The group of particularly valuable species includes 30 taxons, among others: *Aldrovanda vesiculosa, Apium repens, Aster tripolium, Betula humilis, Botrychium multifidum, Campanula sibirica, Carex atherodes, C. chordorrhiza, C. secalina, Corydalis pumila, Draba nemorosa, Equisetum variegatum, Gagea spathacea, Orobanche purpurea, Ostericum palustre, Salix myrtilloides* and *Scolochloa festucacea*. According to the current state of knowledge, it is NE Wielkopolska where main

resources of these species are concentrated, and in some cases, their only known localities for the whole region have been recorded.

Do these very rare elements of the flora of Wielkopolska have favorable growth conditions in the region and what are the prospects for their survival?

On the basis of long-standing observations of various populations conditions, some optimistic predictions concerning the survival of such species as, among others, *Aster tripolium, Campanula sibirica, Carex atherodes, Corydalis pumila, Draba nemorosa, Gagea spathacea, Ostericum palustre Scolochloa festucacea* can be made. The present ways of the area usage are the best methods of protection of their resources. The chances for survival of the remaining species depend on the implementation of active protection measures.

Decidedly, the worst situation concerns the resources of *Aldrovanda vesiculosa* and *Apium repens*. Possibly, in the nearest future, formerly numerous localities of these very valuable species will be of only the historic value in this part of the region.

DISTRIBUTION AND THE CONDITION OF *ADONIS VERNALIS* L. POPULATION IN THE LUBLIN PROVINCE

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Adonis vernalis, which belongs to the family *Ranunculaceae*, is a pontic and subpannonic species protected by law in Poland. It is also placed in the "Red list of vascular plants in Poland" and the "Red list of vascular plants of the Lublin region" as vulnerable. In Europe it occurs from the SE part of the continent to the Ural mountains.

Adonis vernalis is a perennial plant growing up to 50 cm, most often in clusters. Considerably sized yellow flowers appear from April until the end of May.

In Poland it is encountered mostly in the Wyżyna Małopolska, Wyżyna Lubelska uplands and in the Vistula river valley. Dry grasslands of *Festuco-Brometea* are its main habitat. Sometimes it can be observed in the forest margin communities of *Trifolio-Geranietea sanguinei.*

In the Lublin Province *Adonis vernalis* grows on limestone hills and slopes. Most of the localities are found in the Wyżyna Lubelska, Wyżyna Zachodniowołyńska uplands and in the middle Vistula river valley. *Adonis vernalis* was reported from over 30 localities. 17 of them were protected as nature reserves and spatial monuments of nature.

The main goal of this paper is to present the actual distribution of *Adonis vernalis* in the Lublin Province and the condition of its population based on the field research conducted between 2006 and 2009.

GRINDELIA SQUARROSA (PURSH) DUNAL (*ASTERACEAE*), A NEW ALIEN SPECIES IN THE FLORA OF CHERNIVTSI REGION

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Grindelia squarrosa (Pursh) Dunal is a species of North American origin, an agrio-epoecophyte. It was first found in Chernivtsi Region by us on the territory of the former beet-collecting station located at the railway station of Nepolokivtsi Kitsman' district (CHER: 11.09.2009, I.I. Chorney, V.V. Budzhak, A.I. Tokaryuk). The species grows in the composition of the community, which belongs to the association of *Convolvulo-Agropyretum repentis* Gors 1966, union *Convolvulo-Agropyrion repentis* Gors 1966, order *Agropyretalia repentis* Oberd., Th.Mull. et Gors in Oberd. et al. 1967, class *Artemisietea vulgaris* Lohm., Prsg. et al. ex von Rochow 1951, which can be found on the gravel-clay embankment along a dirt road. The general projective cover of the cenosis is 100 %. Nineteen species were found in its composition, the following diagnostic species of the association prevail: *Elytrigia repens* (L.) Nevski (60-70 %) and *Poa compressa* L. (10-15 %).

Taking into account the wide ecological and cenotic amplitude of these species and the presence of the suitable habitats, *Grindelia squarrosa* should be included into the group of model species with the purpose of further introduction of population and cenosis monitoring studies.

THE ROLE OF *EX SITU* COLLECTIONS OF RARE PLANT SPECIES FOR CONSERVATION OF BIODIVERSITY

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There are 38% of rare vascular plant species of the flora of Bukovina represented in Chernivtsi National University Botanic Garden collection funds; here 85 rare, endemic and endangered species of Ukraine's flora are cultivated, the majority being native in the flora of Bukovina and the Ukrainian Carpathians. The "Rare, endangered and endemic species" collection was established in 1974, and today it is a source of planting material for endangered species recovery in natural habitat. There are 25 species formed are self-reproduction introductional population during cultivation at the Garden. According to the tasks of the Global Strategy for Plant Conservation (GSPC), which emphasizes the need of inclusion of at least 10% of endangered species in recovery programs in natural habitats, we started developing the field banks of 8 species listed in the 3rd edition of the Red Data Book of Ukraine, including 2 listed as Extinct in the Wild (*Dianthus gratianopolitanus* Vill., *Primula farinosa* L.) and regionally rare species – *Iris brandzae* Prodan. The Botanic Garden employees gained experience in successful recovery in natural habitat of species such as *Leontopodium alpinum* Cass., *Taxus baccata* L., *Euonymus nana* M.Bieb., *Staphylea pinnata* L., *Scopolia carniolica* Jacq. over 15 years. A necessary condition for the success of this work is to develop within the GSPC the programs of rare species repatriation and regional inventory data.

THE VASCULAR PLANTS OF BUCA FACULTY OF EDUCATION CAMPUS (IZMIR): CONTRIBUTION TO EDUCATIONAL PRACTICES

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Increasing urbanization, especially anthropogenic influences on the environment, have caused adverse changes in natural ecosystems; such as decreased of biodiversity, simplified the structure, and lowered the productivity. As a result, green campuses, especially those in large cities, have become rare places where characteristics of flora of the area can be observed. When one considers that these places are educational institutions, the active use of floral richness of these areas in the education of flora, taxonomy, physiology and ecology becomes a significant advantage. As a result of literature review performed, it was found that campus flora identification studies constitute an important part of urban habitat studies. In this context, the aim of the present study is to identify the floral richness (vascular plants) of the campus of Buca Faculty of Education, an important floristic area within the city of Izmir, and to clarify how this richness is used in educational processes. A total of ninety eight plant taxa belonging to forty nine families were identified in the campus area. Further study of families showed that the family *Rosaceae* is represented by highest number of taxa by eleven, followed by *Fabaceae* and *Oleaceae* represented by six and five taxa, respectively. In addition to that, five teaching staff in study areas of taxonomy, physiology, ecology, and biology education were interviewed and different ways of the use of such plants in training were identified and discussed.

MORPHOLOGICAL VARIATION IN POPULATIONS OF *ANTHOXANTHUM ARISTATUM* BOISS. FROM DIFFERENT HABITATS

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Anthoxanthum aristatum is a species which natural range covered the western part of the Mediterranean region. In Poland *A. aristatum* is found in the phase of chorological expansion and it has been ascribed the status of an epecophyte, i.e. an alien species occupying solely habitats created and remaining under strong and constant anthropopressure. In contrast to many model expansive plants, *Anthoxanthum aristatum* is characterized by a narrow ecological scale, occupying first of all oligotrophic segetal habitats, less frequently sandy roadsides.

The aim of this study was to analyze the scope of morphological variation in lowland populations of *A. aristatum* in relation to the occupied habitats and to determine whether there are hybrid population of *A. aristatum* x *A. odoratum*.

Plant material was collected during the flowering of analyzed grass species in the Wielkopolska regions from the following habitats: *A. odoratum* (forest, meadow and synanthropic) and *A. aristatum* from three ruderal, segetal and grassland localities.

Results of biometric measurements were analyzed statistically. All applied characteristics differentiated statistically significantly the populations of *A. odoratum* and *A.*

aristatum. In turn, only some characteristics proved suitable for the analysis of morphological variation between populations of *A. aristatum* growing in different habitats, i.e. they included characters of panicle habit - panicle length, number of nodes in a panicle, length of the first internode, length of the second internode, length of the third internode, length of the fourth internode, length of the fifth internode, and the number of spikelets on the middle branching. Based on the analysis of variance it was found that one of the populations from the Notecka Forest (no. 16) collected on a cropped field differed statistically significantly from the other populations. This was also confirmed by Principal Components Analysis (PCA).

SYNANTHROPIZATION OF THE COASTAL COENOFLORA OF UKRAINE

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There is a considerable specific share of synanthropic species in the structure of coastal vegetation of Ukraine. It is caused by the fact that coastal plant communities are not distinguished by coenotically saturated. The optimal ecological conditions (alluvial ecotopes, moistening etc.) and anthropogenic factors also promote this. It prioritizes the elaboration of a system of measures, including conservation ones, aimed at minimizing the influence of synanthropization on this unique type of vegetation.

The coastal coenoflora of Ukraine numbers 884 species of higher vascular plants belonging to 3 divisions, 4 classes, 86 families, and 350 genera. Its synanthropic fraction is formed by 328 species of 64 families and 212 genera. The general index of synanthropization equals 37.1%. It is the highest value as compared to coenofloras of other vegetation types. The apophytic fraction is represented by 185 species of vascular plants from 34 families and 117 genera. Hemiapophytes, which comprise 40% of species, are prevailing. There are 32.4% euapophytes and 17.6% accidental apophytes in the coastal coenoflora. The alien fraction numbers 143 species which belong to 95 genera and 30 families. By the time of immigration, kenophytes prevail – 52.4% species of fraction, archeophytes – 47.6%. By the level of naturalization among alien species, epecophytes predominate – 76.9%, then followed by ephemerophytes – 7%, hemiapophytes and ergasiophytes – 5.6%, and agriophytes – 4.9%. By the origin, Mediterranean species prevail (53.8%). Species originated from floristical centers are distributed as follows: Asian– 27.3%, European – 6.3%, American – 7.7%. The origin of 4 species is still unknown. There are 35 species with high invasive ability registered in the structure of coastal coenoflora of Ukraine. Among them *Ambrosia artemisiifolia, Amorpha fruticosa, Bidens frondosa, Bromus tectorum, Centaurea diffusa, Conyza canadensis, Elaeagnus angustifolia, Xanthium albinum* are transformer species. They are especially dangerous because of their ability to naturalize on the phytocoenotic level.

The strategy of minimizing of the coastal vegetation's synanthropization consists in increasing of protected areas and implementation of sozotechnical (conservational) measures. The successful solution of these tasks could be secured only through profound research of synanthropization of the coastal vegetation.

A NEW ASSOCIATION *PHRAGMITO AUSTRALIS-AMORPHETUM FRUTICOSAE* ASS. NOVA PROV. ON THE SOUTH OF UKRAINE

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The alien invasive species *Amorpha fruticosa* is actively spreading nowadays in the South of Ukraine within the limits of the Steppe zone. It forms mainly floodplain plant communities. In the course of years after its introduction, this species became capable of creation of associations and subassociations, being promoted by anthropogenic influence. Our recent geobotanical researches made possible to distinguish the new association *Phragmito australis-Amorphetum fruticosae* ass. nova prov. and two subassociations with participation of this species. They belong to alliance *Rubo caesii-Amorphion fruticosae* Shevchyk et V. Solomakha 1996 and order *Salicetalia purpureae* Moor 1958 of class *Salicetea purpureae* Moor 1958.

The association *Phragmito australis-Amorphetum fruticosae* occupies the ridges near beds of rivers and periodically flooded territories on boggy, meadow-bog clayey and sandy soils. Its range is now confined to the Steppe zone. The diagnostic species of the association are *Amorpha fruticosa* and *Phragmites australis*. Density of the shrub layer is 0.6-1.0, its height – 2.5-2.8 (4) m. The layer is formed by *Amorpha fruticosa* with participation of *Elaeagnus angustifolia, Salix alba* and *Populus nigra*. The herb layer is dense, with coverage from 40-50% to 60-70%. The herb layer is formed by *Phragmites australis* (5 to 25%) with participation of *Conyza canadensis* (up to 10%), *Poa angustifolia* (to 10%), *Ambrosia artemisiifolia* (to 10%), *Xanthium strumarium* (to 10%), which have a high degree of constancy.

Floristically these communities are poor. The coenoflora of the association consists of 112 species of vascular plants (from 4-8 to 27-32 species in some communities). The representatives of disturbed ecotopes of classes *Stellarietea mediae* and *Artemisietea vulgaris* predominate. The species of zonal vegetation also take part in the coenoflora of *Phragmito australis-Amorphetum fruticosae.* Among them are *Verbascum chaixii* subsp. *austriacum, Medicago falcata* (cl. *Festuco-Brometea*), *Atriplex tatarica, A. prostrata* (cl. *Cakiletea maritimae*), *Eryngium maritimum, Leymus racemosus* subsp. *sabulosus* (cl. *Ammophiletea*), *Jacobaea borysthenica* (*Senecio borysthenicus,* cl. *Festucetea vaginatae*), *Achillea asplenifolia* (*Festuco-Puccinellietea*) etc.

The extention of areas occupied by communities with *Amorpha fruticosa* is a result of its considerable ecological amplitude. The necessity of monitoring this plant communities and measures for limitation of *Amorpha fruticosa* expansion in natural phytocoenoses is obviously the task for the future.

NEW DATA OF LOCALITIES FOR SOME SYNANTHROPIC SPECIES IN THE UKRAINIAN FLORA (BASED ON MATERIALS OF J.K. BOYKO HERBARIUM COLLECTION)

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Recently the influence of synanthropic species on formation and transformation of natural flora increases. Due to this the significance of investigations on all peculiarities of these species distribution in time and space increases. J.K.Boyko was enthusiast amateur scientist, director of Nogaisk Real College, teacher of geography, history, and philology; he collected herbarium in 1895-1933 on the territory of the North Azov Sea Lowland (South of Ukraine). As a result of studying his herbarium collection, which account 2355 specimens, 1192 species, belonging to 449 genera, 95 families, 30 orders, 5 classes, we have discovered interesting information about distribution of some synanthropic species:

Anisantha madritensis (L.) Nevski: „Nogajsk (now Primorsk, Primorsky rajon, Zaporozhskaja oblast). Korneev Lobok. Leg. J.K. Boyko. 1923. Det. A.V. Shumilova. 20.12.2002." European – West Asian – North American species. Distribution in Ukraine: Crimea. Euapophyte.

Gagea pratensis (Pers.) Dumort: "Nogajsk. Glebovska roshcha. Leg., Det. J.K.Boyko. 20.03.1916." European-Mediterranean-Siberian species. Distribution in Ukraine: Prikarpatje, Rigthbech Steppe – rarely. Archaeophyte, epoecophyte.

Saponaria ocymoides L.: "Nogajsk. Leg. J.K.Boyko without exact date (1903-1933). Det. A.V.Shumilova. 26.04.2006." South European species. For the first time on the territory of Ukraine it was noted by A.Beketov (1886): "Novopokrovsky povit, Ekaterinoslav. gubernia (now Dnepropetrowska oblast) along the river Volchia." Author gave explanation: "Maybe it was dropped in occasionally or had run wild from gardens". I.F.Schmalgauzen (1895) included Saponaria ocymoides into the list of flora of the Middle and South Russia, Crimea and North Caucasus, perhaps, he took into account data of A. Beketov (1886), but made a note: "It was marked for Ekaterinosl., perhaps erroneously". Collection of J.K. Boiko refuted this statement and confirmed locality of this alien species for the territory of Ukraine. Kenophyte.

Alchemilla cymatophylla Juz.: "Razumovskoje (Primorsky rajon, Zaporozhskaja oblast) Leg. J.K.Boyko. 1906. Det. A.V. Shumilova. 2.04.2008". Middle European species. Distribution in Ukraine: western part of Ukraine (Lvivska oblast). Apophyte.

Dorycnium herbaceum Vill. "Nogajsk. Garden of the Real college. Leg., Det. J.K.Boyko.30.04.1921". Middle European – Caucasian – Mediterranean – Minor Asian species. Distribution in Ukraine: the Crimean Mountains, Eupatoria town. Probably an apophyte.

Lathyrus cicera L. „Nogajsk. Leg., Det. J.K.Boyko without exact date. Notae criticae A.V.Shumilova.30.10.2008. Lathyrus sativus L." Mediterranean – Middle Asian species. Distribution in Ukraine: Crimea. Kenophyte.

Dracocephalum moldavica L. "Novaja Alexadria.(Priazovsky rajon, Zaporozhskaja oblast) Leg., Det. J.K.Boyko. 27.06.1905." Origin – East Asia. Cultivated (essential-oil, honey-bearing plant). Escaped from cultivation. Distribution in Ukraine: Polissya, Forest-steppe.

Xanthoxalis stricta (L.) Small. "Novaya Alexandrija. Leg., Det. J.K.Boyko. 27.06.1905". Origin – North America. Distribution in Ukraine: Crimea, Forest-steppe. Kenophyte, epoekophyte.

Lamium album L. ”Mariupol. Najdenova roshcha. Leg., Det. J.K.Boyko. (-).04-05.1905.” Eurasian species. Distribution in Ukraine: all regions except the South Steppe and Crimea. Archaeophyte, epoekophyte.

Kickxia caucasica (Muss.-Puschk. ex Spreng.) Kuprian.: ”Between Nogajsk and Berdiansk. Leg., Det. J.K.Boyko. 25.07.1920”. Det. J.K.Boyko as *Linaria elatine* Mill. Notae criticae A.V.Shumilova. 26.03.2008. *Kickxia caucasica* (Muss.-Puschk. ex Spreng. Kuprian.” Crimean-Caucasian species. For the first time collected on territory of the North Azov Sea Lowland. Distribution in Ukraine: Crimea. Probably an apophyte.

Rinanthus minor L.: “Novaja Alexandria. Meadow.Leg., Det.. J.K.Boyko 27.06.1905”. European-Siberian species. Distribution in Ukraine: anywhere, except the South Steppe . Hemiapophyte.

Bellis perennis L. Two specimens: 1). “Nogajsk. Preslavskaya farm. Leg., Det. J.K. Boyko. 1905. 2) Rasumovskoye. Leg., Det. J.K. Boyko 1906.” European-Caucasian-Mediterranean-Asian species. Distribution in Ukraine: in forest and forest-steppe zones. Apophyte.

ERGASIOPHYTES IN THE URBAN FLORA OF BELGOROD (RUSSIA)

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Having been reinforced recently economic links between regions create conditions for the emerging of the role of the adventive element of the synanthropic flora. Active introduction of different species of plants made by city residents in the yards, garden-plots, garden patches and grave yards contributes to it as well as the activities of various municipal forestry firms and botanic garden, which is situated in Belgorod.

In 60-s some collective farms of the Belgorod region tried to cultivate *Heracleum sosnowskyi* Manden. as a silage plant. Soon it was noticed wild. In Belgorod area this species can be often met in forest parks, on the slopes and along road sides. It has an obvious tendency for spreading. A source of the alien flora is still city flower beds. Urbanoflora of Belgorod has been enriched with such decorative “refugees”, which have grown wild, as *Pyrethrum corymbosum* (L.) Willd., *Aquilegia vulgaris* L., *Calendula officinalis* L., *Cosmos bipinnatus* L., *Rudbeckia laciniata* L., *Symphytum caucasicum* M.Bieb., *Aster salignus* Willd., *Solidago canadensis* L., *Saponaria officinalis* L., *Asclepias syriaca* L., *Portulaca oleracea* L., *Reynoutria sachalinensis* Fr. Schmidt and so on. Among them is also *Lupinus polyphyllus* Lindl. – perennial root plant, which spreads easily with seeds. *Avena sativa* L., *Hordeum distichon* L., *Triticum aestivum* L. grow wild along railways and motorways, in weedy places and near milling and bakery works in Belgorod. Feeding and honeyed plants *Phacelia tanacetifolia* Benth., *Medicago sativa* L., *Onobrychis arenaria* (Kit.) DC. can be often met along transport routs. Many species such as *Helianthus tuberosus* L., *Symphytum caucasicum* Bieb., *Reynoutria sachalinensis* Fr. Schmidt, *Aster salignus* Willd., *Solidago canadensis* L., *Armoracia rusticana* Gaertn., Mey. et Scherb., *Saponaria officinalis* L., *Asclepias syriaca* L., spread only in vegetative way because regeneration by seeds of many of them is rather difficult in our climate.

At present many of above-mentioned species can be considered fully naturalized because they demonstrate high competitiveness in natural phytocenosis. Their spread continues almost without any man’s help. Mainly the plants are met in places, where they were planted or nearby – in deserted front gardens, forest belts, grave yards and places where

houses have been pulled down. However the representatives of such species can often be noticed in secondary habitat – along motorways, on railway banks, dumps – and even penetrate natural phytocenosis. Increased scales of introduction activities and developing commercial and economical relations of different world regions require essential observation of the dynamics of ergasiofits spreading and changes of the contents and structure of phytocenosis which were caused by ergasiofits.

DIRECTIONS OF ANTROPOGENIC TRANSFORMATION OF BRYOFLORA AND MOSS COVER OF FOREST-STEPPE ZONE OF UKRAINE

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The directions of antropogenic transformation of bryoflora and moss cover of forest-steppe zone of Ukraine were given.

The forest-steppe zone of Ukraine refers to the regions with significant antropogenic transformation. That is why flora and vegetation of this zone are characterized by significant, often irreversible changes. It is concerned of moss-likes too. The research of flora and moss cover of forest-steppe zone of Ukraine enables to clarify the main directions of their transformation. The most important from them is general impoverishment of bryoflora species, probably disappearance of some species (for example, *Scapania nemorea*, *Trichocolea tomentella*, *Sphagnum majus*, *S. inundatum, Fissidens adianthoides* and others). There is a narrowing of spread area for a number of species within the region (*Homalia trichomanoides, Neckera complanata, Sciuro-hypnum populeum, Pterigynandrum filiforme, Isothecium alopecuroides* – in connection with the cutting of indigenous broadleaf forests; *Acaulon triguetrum, Weissia controversa, W. condensa* – with the plowing of steppe areas). There is a violation of structure in the moss cover (loss of vulnerable species from associations, for example *Neckera complanata* from association *Anomodonto viticulosi-Leucodontetum sciuroidis* Marst. 1998). There is a general impoverishment of associations and transforming them into associations without ranks (for example, *Eurhynchietum swartzii* Waldh. ex Wilm. 1966 into associations *Eurhynchium hians – Comm.*). As opposed to negative antropogenic changes there is observed the increasing of frequency occurred of synantropic species and expansion of moss cover by its development in urban ecosystems, rural social ecosystem, artificial ecosystem (on favorable for this newly human ecotopes). There is also formation of new stable bryophyte communities in such ecosystems from synantropic species (for example, *Syntrichia ruralis* – Comm., *Bryum argenteum* – Comm., *Ceratodon purpureus* – Comm. and others). The general processes of antropogenic impact on flora and vegetation of the region lead on the one hand to the impoverishment of variety of mosses, significant changes in structure of moss cover and on the other hand they contribute to the emergence and spread of synantropic, cosmopolitic, ruderal species of bryophytes and formation of synantropic bryophyte communities.

THE URBAN FLORA OF SHEPETOVKA: TAXONOMIC, BIOMORPHOLOGICAL, AND ECOLOGICAL ANALYSIS

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Recently the study of city floras in Ukraine increased, but floristic studies of smaller towns were few, and our studies are in fact the first research of that topic. The object of the special study was the urban flora of Shepetovka (Khmelnyts'ky Region). The study was performed using the semistationary method during 2001-2007. We used original floristic data, generalized and analyzed literature data, and materials of the KW herbarium.

The urban flora of Shepetovka contains 550 species of 328 genera and 92 families. The species composition resembles that of other small towns. First three places among the leading families are occupied by *Asteraceae* (76/13.8 %), *Poaceae* (50/9.1 %) and *Fabaceae* (30/5.4 %), as well as in the flora of Ukraine. Higher positions of *Lamiaceae* and *Scrophulariaceae* are observed, which is more typical for Mediterranean floras; it is determined by city's location and presence of large areas of xerophytic meadows. A high position of *Brassicaceae* is a result of the anthropic transformation. Due to that, *Cyperaceae* shifted to the 9th position, and *Ranunculaceae* came out of 10 leading families.

As a result of our research, the species composition of the urban flora was established; mesophytes and herbaceous polycarpic plants prevail, which is typical for others urban floras of the forest zone.

SPONTANEOUS FLORA AND VEGETATION OF SIMFEROPOL

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The spontaneous flora of Simferopol (Ukraine) comprises 731 species of higher vascular plants, which belong to 412 genera, 102 families, 6 classes, and 4 divisions.

Results of a structural analysis showed that the taxonomic structure and the areal (range) groups in the urban flora of Simferopol were similar to the floras of temperate latitudes of the Holarctic, i.e. close to the flora of the Ancient Mediterranean. The Simferopol flora is transforming through the increased role of woody species (trees), herbaceous perennials, biennials and annuals monocarpic plants, wide-range species, as well as reduction of percentage of narrow-range ones, and significant adventization. The flora of the city is replenished by 144 species of plants. The spectrum of the alien fraction revealed an increase in anthropogenic transformation processes.

The territory of the city includes some spontaneous vegetation groups classified according to ecological-floristic classification into 10 classes, 15 orders, 15 alliances, 20 associations, and 1 derivate community.

Also, the species from international lists of endangered plants were identified, including the European Red List (6) and the IUCN Red List (4), the Red Data Book of Ukraine (20), as well as certain species recommended for inclusion in the Red Data Book of Crimea (25). The endemic floristic component is well represented (13% of all endemic species of Crimea).

URBAN FLORA OF A CENTRAL EUROPEAN DATABASE: THE SOURCE OF INFORMATION AND THE TOOL OF ANALYSIS

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Vascular plant flora of European cities has been the subject of systematic studies since at least 200 years. These studies have been particularly intensive in central, mid-west and mid-east parts of the Old Continent. As a result, longstanding observations delivered a huge amount of data on the occurrence of both native and alien species. On this basis, many cities of Germany, Austria, Switzerland, Belgium, the Netherlands, Poland, Czech Republic, Slovakia or Ukraine have been characterized from the biogeographic and ecological perspective. Both the studies of individual cases as well as numerous comparative analyses provide the basis of modern knowledge about the influence of urbanization on local and regional flora. This allowed developing many interesting hypotheses and principles of, more or less, universal character.

It seems that we are still far from a full explanation of the transformation mechanisms of the Central European flora, which are the result of urbanization. One of the more important barriers restricting further progress in this area is lack of a common, complete and widely available database on plant species occurring in European cities. Meanwhile, experiences from other fields of biology indicate that such "bank of data" opens totally new analytic and comparative possibilities.

The aim of the presently conducted work is preparation of the Urban Flora of Central European database [UFCE] and making it available to specialists and other interested people. It will be not only the source of information on vascular plants occurring in large cities of this region but also the tool for analysis and presentation of floristic phenomena and processes.

In the first place, the UFCE will contain data from big and medium-sized cities of Poland, in which floristic studies have already been conducted. This will be completed with a special monograph or atlas of species distribution. Introducing information into the database is preceded by the detailed taxonomic and nomenclatural verification and a critical analysis of biological, ecological and geographic and historical diagnoses.

The subject of this presentation are general principles of the created database and its structure.

VASCULAR PLANT FLORA OF WIELKOPOLSKA: 200 YEARS OF RESEARCH AND ANTHROPOGENIC TRANSFORMATIONS

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Wielkopolska (western Poland) has been the area of systematic floristic studies since the beginning of the 19th century. In meantime, in the consecutive historical periods, numerous synthetic lists of species showing the diversification of the region's vascular plant flora were compiled. The most important ones were published in 1850, 1861, 1896, 1908 and 1951. These works are not only of historical significance but provide also the basis for a retrospective analysis oriented at the estimation of man-made changes in the flora of Wielkopolska over the 19th and 20th century.

The second half of the 20th century was a period of very intensive studies, concluded with local monographs and atlases of distribution of all recorded species. They involved both natural habitats (forest, peatbog, grassland, aquatic and waterside) and anthropogenic ones (crop fields, railway grounds and cities and towns of various size).

The aim of this presentation is to emphasize the processes taking place in the region's flora. In many respects, these processes may be recognized as representative for the Central European Lowland. Both the current state of the flora and the directions and pace of its transformation are shown. The presented results of an analysis include, in particular, the basic features of the flora, such as species richness, taxonomic, biological and synecological diversity, geographic and historic differentiation, as well as its dynamics, including the participation of threaten and endangered species and a role of expansive taxa.

The analysis has been based on the first, in the nearly 60 years, list of vascular plant flora of Wielkopolska, that took into account the results of long-standing studies by a large group of botanists from various research centers of Poland. There was performed a critical evaluation of both published and unpublished data, mainly these which have been documented with herbarium material.

SOME "NEW" INVASIVE SPECIES IN THE URBAN FLORA OF KAMYANETS-PODILSKIY

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As is known, the urbanized territories are the most active sources new invasion species and play an essential role in their distribution. However, it is far from being all species with significant invasion potential realize it equally in the urbanized environment of city. There are species, which already for a long time naturalized in the natural types of ecotopes and which biological danger for regional phytobiota any more is not conditional, for example, *Echinocystic lobata* (Michx.) Torr. et Gray, *Sicios angulata* L., *Thladiantha dubia* Bunge, etc. However, in the urbanized environment they have no advantages as compared to other species, which differ by wider amplitudes of stability and ecological valency, for example,

Ambrosia artemisifolia L., *Erigeron canadensis* L., *Stenactis annua* (L.) Nees, species of *Chenopodium*, *Atriplex*, etc.

For expansion species of the first group require available specific ecotopes, which conditions correspond to their biological peculiarities. As a rule, such types of ecotopes is limited enough are represented in urbanized territories. These are ecotopes with sufficient humidity, features of a mode insolation, etc.

At the same time, if in the territory of a city the great diversity of types of ecotopes are represented and if urban flora is characterized by a high level of a diversity, there is a danger of invasion of species which under other conditions would not have advantages in comparison to more tolerant synanthropic species.

Such "danger" exists under conditions of Kamyanets-Podilskiy; peculiarities of formation of that urban flora the authors discussed earlier (Kagalo, Skibitska, 2000, 2001, 2002, 2003; Kagalo et al., 2004).

The presence of advanced canyon valleys of the Smotrch River in which fragments of natural vegetation of floodplain and near floodplain sites were kept on rather large areas, promotes development of populations quite "exotic" for other cities of the region of invasion of species. Last years (2000-2009) in the structure of communities *Salicion albae* which occupy rather large areas in the canyon, not only *Echinocystis lobata* (Michx.). Torr. et Gray, which is typical for all river valleys of the western regions of Ukraine, are intensively spreading. In these conditions the invasive populations are actively formed by such species as *Silphium perfoliatum* L., *Rudbekia laciniata* L., *Heliopsis scabra* Dun. Dispersal of these species is promoted by expansion of the areas broken by civil work territories in the floodplain part of the canyon. Further the control for localities of them invasion with the purpose of the prevention potential degradation of fragments of natural vegetation of the canyon is necessary because it plays an important role for formation of the favorable vital environment of the city.

FRITILLARIA MONTANA HOPPE IN SYNANTHROPIC FOREST COMMUNITIES IN THE AREA BETWEEN THE PRUT AND THE DNIESTER RIVERS (CHERNIVTSI REGION)

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Fritillaria montana Hoppe an endangered species listed in the Red Data Book of Ukraine (1996, 2009) and Appendix I of the Bern Convention. The general natural range of the species covers Central and Southern Europe; in Ukraine it occurs in the northeastern limit of its natural range, and is reported in Khmel'nickiy, Chernivtsi and Odessa regions.

In Chernivtsi Region there are 8 habitats (sites) of *F. montana*, which can be found mainly in communities of *Querco-Fagetea* Br.-Bl. et Vlieg. in Vlieg. 1937, *Molinio-Arrhenatheretea* Tx. 1937 and *Trifolio-Geranietea sanguinei* Th. Mull. 1962 classes.

It should be mentioned that in the outskirts of the village of Zelena (Kel'meneckyy District) *F. montana* grows in the communities of environmental plantations strongly influenced by the anthropogenic factor. The plantation of trees includes many species; however, there are areas, where *Robinia pseudoacacia* L. forms monodominant communities. *Sambucus nigra* L. (15-30 %) prevails in the understory, *Swida sanguinea* (L.) Opiz (5-10 %), *Euonymus europaea* L. (2-5 %) and *E. verrucosa* Scop. can be also found there. The community is poor in species. *Urtica dioica* L. prevails in the herbaceous cover and *Galium*

aparine L., *Geum urbanum* L., *Ballota nigra* L., *Leonurus cardiaca* L. can be also found there. According to flora classification the community belongs to the union of *Chelidonio-Robinion* Hadac et Sofron 1980 the order of *Chelidonio-Robinietalia* Jurko ex Hadac et Sofron 1980 the class of *Robinietea* Jurko ex Hadac et Sofron 1980.

INFLUENCE OF EXPANSION OF INVASIVE SPECIES ON THE SIZE OF INDEXES HEMEROBY ECOSYSTEMS

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Hemeroby of ecosystems is a characteristic of their anthropogenic transformation degree (landscape development by Jalas 1955). There are two possible approaches to hemeroby determination: phytoindicative and subjective. The method of hemeroby determination that we suggest uses 12 indications of the most characteristic kinds of human activity, which are estimated on an 18 point scale by the formula:

He=Σ(k(1-12))\12,

where He is a hemeroby degree expressed in points, k (1-12) is a hemeroby in points for each kind of activity (Didukh, Khomyak, 2007). According to the suggested scale human introduction of new types in ecosystem is characterized by 7-12 points of hemeroby. Thus planting typical species for investigated ecotope is estimated at 7-8 points, atypical incapable of invasion - 9-10, atypical invasive - 11-12 points.

Our understanding of invasiveness correlates with its analog in the works of Reichard and Burda (Reichard, 1999; Richardson et al., 2000; Burda, 2001 a, b; Burda, 2006). If we add to five invasiveness categories of the above-mentioned authors an indication of typicalness of species for the investigated ecosystem we will get a 6 points scale as in the previous approach but the basis of putting points changes. As typical types we take such types that correspond to an ecotope, its geographical location and succession stage of development. Diagnostic indication is not a correlation of transformed and not transformed areas (according to the three subspecies of activity) but the essence of the changes made by species in an ecosystem. The distribution of points is as follows: 7 points - typical or atypical species that exist without a reproduction for one vegetation season (low capacity for invasiveness by Burda, 2006), 8 points - species that do not spread and sometimes are capable for reproduction without stable populations (random by Burda, 2006), 9 points - species that create a new econiche without visible breaking the existence of typical species (naturalized by Burda, 2006). 10 points - species that take typical species econiche displacing it from an ecosystem (invasive Burda, 2006), 11 points - species change the group of econiche (consortium) (between invasive and transformed by Burda, 2006), 12 points - species that completely change the system of econiche, forming a new ecosystem (transformers by Burda, 2006). This approach brings us to transition to phytoindicative valuation of hemeroby according to human activity indication described above.

OCCURRENCE OF THE *EPIPACTIS HELLEBORINE* GROUP AND *E. ATRORUBENS* IN ANTHROPOGENIC HABITATS IN THE PILICA PRIMEVAL FOREST OF CENTRAL POLAND

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The process of apophytism or spreading native species to human-made habitats is one of the main elements in the creation of plant cover in anthropogenic areas. Lately an increase of anthropogenic localities with valuable flora (rare and legally protected species) has been observed. Apophytes are also members of the *Orchidaceae* family, especially from the genus *Epipactis*.

The aim of this study was to investigate anthropogenic localities of the *Epipactis* species in forested landscapes and quite near the natural source of its diaspors.The investigation will take place in order to find which anthropogenic habitats have the most numerous populations of this native orchid.

In the Pilica Primeval Forest, species forming the *E. helleborine* group occur most often (above 20 confirmed localities) in the subcontinental *Tilio-Carpinetum* forests. *Epipactis atrorubens* was found in only 3 localities (currently not confirmed) in thermophilous oak and oak-hornbeam forests.

Recently 25 new anthropogenic localities of *E. helleborine* and 1 of *E. atrorubens* were fond. These are synanthropic habitats, for example: pine and aspen plantations, forest borders, road and railway embankments, man-made banks, mines, quarries, and vicinities of old abandoned buildings. Investigated populations count from 1 to over 100 individuals. In most of the localities there were flowering or fruiting plants. The auto gamy was also observed.

RELICTS OF SEGETAL SPECIES IN THE FLORA OF ABANDONED VILLAGES OF KAMPINOSKI NATIONAL PARK

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Floristic surveys in 15 abandoned villages of Kampinos National Park were conducted in the years 1992-95 and 2004-2007. This paper presents the results of the survey in specific segetal sites and describes some interesting segetal species which still occur in the villages. A total of 101 plant species were found in the 'field margin', which was dominated by apophytes (50%) and numerous archaeophytes (36%). The flora of the surveyed villages contained a group of 27 endangered segetal taxa and 13 plant species rarely encountered in segetal sites. The paper questions whether such abandoned villages may be of potential value as a propagule reservoir for segetal species and whether such sites are potentially valuable for preserving floristic diversity and existence of segetal flora. Due to restrained and later halted land use by man, a decrease in the number of segetal species is observed in the natural habitats (agricultural field). In the surveyed villages most of the endangered segetal plant species were found solely in ruderal sites. Progressive secondary succession leads to higher

floristic diversity in the abandoned villages in Kampinos and seems to be unfavourable for the preservation of the local segetal flora.

THE CULTIVARS OF CORNELIAN CHERRY (*CORNUS MAS* L.) IN UKRAINE

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Cornelian Cherry is the culture meeting the standards of the time. It is valuable fruit, medicinal, ornamental plant. Plants practically are not damaged by vermin and illnesses, and don't need pest-killers treatment.

Until recently natural resources of the cornelian cherry were the source of the fruits. As soon as their natural habitats, as well as productivity, were significantly reduced the demand in fruits are not met. Besides, the forest forms of cornelian cherry don't bear fruits regularly enough, yield small dry fruits, especially in draughty years. The crop makes up 2.8–4.8 kg per bush; under sufficient light and moistening crop capacity grows considerably and makes 5–10 kg per bush. According to literature data and our research cornelian cherry yields abundant and stable crop in culture, and bares large juicy fruits, while not demanding thorough care, its cultivation is very paying.

Inspection of natural resources, cultural plantations, collection of forms and their utilization in selection for creation of new cultivars of cornelian cherry. The genetic pool we have collected is diverse by its biological and economic characteristics.

Cornelian cherry is considered to be a southern plant. Many authors have expressed an opinion concerning natural and ancient forests in this region with cornelian cherry participation; the above authors consider *Cornus mas* along with other tertiary elements of these forests to be relic of late Pliocene, i.e. the species, which survived the cold spell of the quaternary in situ.

Regular selection of the cornelian cherry has not been carried out for a while. Information concerning its cultivation abroad is rather scant. These are 14 officially registered (1987, 1999, 2001) cultivars of Cornelian Cherry, and substantial cross-bred fund, acquired as a result of selection. The further selection within the *Cornus mas* L. species depends on replenishment and preservation of its genetic pool, which will always be needed for creation of new stable productive sorts in accordance with the demand of industrial production and amateur horticulture. It can be used in new selection programs as well.

SCHIVERECKIA PODOLICA (BESS.) ANDRZ. EX DC. IN THE CONDITION OF ANTHROPOGENIC STRESS

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Schivereckia podolica Andrz. is the relict species, chamaephyte, heliophyte, xeromesophyte, calciphilous species, which is included in the IUCN Red List, European Red Data List, Red Data Books of Ukraine (1980, 1996, 2009). In the natural habitats it grows on the limestone, gypsum, and chalky rocks and taluses.

The consequences of anthropogenic influence on *Sch. podolica* are analyzed. It was realized in the connection with the fact that S. V. Zelinka, N.V. Mshanets'ka and others assume that because of great anthropogenic pressure the researched species disappeared on the territory of Kremenets'ki Mountains in Ternopil Region.

For research three test areas – places of *Sch. podolica* growing on the territory of Khmelnitski Region had determined: the first one – Smotrich Canyon within the Kamyanets-Podilskiy town, the second one – the old lime quarry near Vilhivtsi village of Chemerivtsi District, the third – the right bank of the Zbruch River not far from Kudrynetskiy gypsum quarry in Kamyanets-Podilskiy District. All those test areas are within the territory of National Nature Park "Podilski Tovtry".

On the territory of the first test area, the depression of *Sch. podolica* is noted as a result of non-regulated recreation and recurrent burning. In those conditions *Sch. podolica* under the influence of fire the plantlets of investigated species become weakly competitive and perish on swarding plots. The growing point, buds, inflorescences and fruits become damaged and that decreases seed production of plants. Though B.M. Kozo-Pol'anskiy indicated that burning of the grass favors the growth of this species.

On the territory of the second test area *Sch. podolica* actively invades the secondary biotope, forming completed and prospering population. Such populations should be used as definite indicators of demutation processes, and their structural-functional parameters may be as biological marker of ecosystem condition and, to a specific extent, the degree of phytosystem renaturalisation.

On the territory of the third test area the condition of population *Sch. podolica* in comparison with the previous areas is not satisfactory because the condition of ecotope changes. Especially the recurrent demolition works on the territory of gypsum quarry causes the current erosive processes such as landslips and formation of large-grained breakstone. Plants often tear off from the substrate and dry up.

Thus, the data affirm that in consequence of anthropogenic influence (burning out, trampling, mining activity) the condition of *Sch. podolica* populations retrogresses because of viability degression of plants in this ecotopes, but in the condition of old quarries the completed populations may be are formed.

NORTH AMERICAN ALIEN TAXA OF *ASTERACEAE* IN UKRAINE: INVASIONS OF GENERA PHYLOGENETICALLY DISTANT FROM NATIVES

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It is widely accepted that local ecological conditions of many continental floras favor invasions of alien species belonging to lineages and genera phylogenetically distant from those of native taxa. In other words, "*it should be easier for an alien species to invade a community in which native species that are closely related to the alien species are absent than a community in which native species that are closely related to the alien species are present*" (Rejmánek et al., 2005). This assumption was first formulated by Charles Darwin and is often referred to as "Darwin's naturalization hypothesis" (see A. Mosyakin, 2009). However, this rather simple concept is often insufficient for explaining many cases of plant invasion, and because of that several case studies were performed recently to test this hypothesis (Mitchell & Power 2003; Duncan & Williams 2002; Ricciardi & Mottiar, 2006, etc.), with results often contradictory. However, model study of phylogenetic patterns among native and alien *Poaceae* species occurring in California (Strauss et al., 2006) provided additional support to the Darwin's naturalization hypothesis.

We made an assessment of alien species of *Asteraceae* native to North America and occurring in Ukraine, based on available literature data on local floras of Ukraine (multiple sources) and data on native ranges of North American species (FNA online, www.efloras.org), plus updated information on phylogenetic relationships within *Asteraceae* at the generic level (Funk et al., 2009, www.compositae.org). The phylogenetic positions of *Asteraceae* genera native and alien in Ukraine were marked on the phylogenetic metatree, and then compared in terms of relatedness and phylogenetic distance between taxa considered.

Our preliminary results indicate that genera of composits containing the most invasive taxa in Ukraine, such as *Ambrosia*, *Cyclachaena* (*Iva* s.l.), *Galinsoga*, *Grindelia*, *Helianthus*, *Symphyotrichum* (formerly placed in *Aster* s.l.), *Xanthium*, are indeed phylogenetically distant from our native taxa, and in many cases are native to North America (or the Americas). Moreover, the predominantly North American clade in *Astereae* supplied to Ukraine many invasive taxa belonging to *Symphyotrichum* (North American "asters"), the group of *Erigeron* (incl. *Phalacroloma*, e.g. *P. annuum* s.l.) and *Conyza* (e.g., *C. canadensis*), *Solidago* and *Euthamia* (formerly placed in *Solidago*, in part). Another clade of mainly American origin, *Coreopsideae*, added to the Ukrainian flora several taxa of poly- or paraphyletic genera *Coreopsis* and *Bidens*, plus cultivated and escaped *Cosmos*. Tribe *Heliantheae* supplied alien members of such North American genera as *Ambrosia, Xanthium*, *Helianthus*, *Rudbeckia.* Other invasive composits in Ukraine mostly represent congeners of species present in the native flora of Ukraine, or at least are native to the adjacent areas, such as the Ancient Mediterranean region. It is worth mentioning that the Eurasian taxa of *Asteraceae* considered most invasive in North America also mostly belong to such widespread genera as *Carduus, Centaurea* s.l.*, Cirsium, Hieracium, Tanacetum*, etc.

Thus, these preliminary results indicate some support of the classical version of Darwin's naturalization hypothesis, but this conclusion should be critically and quantitatively tested with more data involved. It should be also remembered that biotic invasions are too diverse and complicated to be explained by just one naturalization hypothesis, and phylogenetic parameters are just one set among several other possible explanations.

SYNANTROPIZATION OF THE STEPPE VEGETATION IN THE FOREST-STEPPE ZONE OF UKRAINE

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Steppe vegetation is the zonal type of vegetation for the Forest-Steppe zone of Ukraine; it is represented by communities of the class *Festuco-Brometea* Br.-Bl. et R.Tx. 1943, order *Festucetalia valesiacae* Br.-Bl. et R.Tx. 1943; however, intensive farming, particularly plowing, caused loss of the majority of plakor steppe plots. Due to the excess human impact, the steppe landscapes underwent considerable changes, not only physiognomic, but as well functional ones. Currently for the whole territory of the Forest-Steppe zone of Ukraine, the tendency to mesophytization of the steppe vegetation and penetration of synanthropic species into its composition is observed. In the course of these processes, derivative communities of the union *Festucion valesiacae* Klika 1931, are formed; they represent various stages of pasture degradation. They occupy considerable areas in the contemporary vegetative cover of the forest-steppe zone of Ukraine and are characterized by high coenotic diversity. These communities are represented by 14 associations and 7 subassociations: Ass. *Festuco valesiacae-Caricetum humilis* Klika (1931) 1936; Ass. *Carici humilis-Stipetum capillatae* Tkachenko, Movchan et V.Sl. 1987; Ass. *Festuco valesiacae-Stipetum capillatae* Sillinger 1931, (Sass. *F.v.-S.c. caricetosum praecocis* subass. Korotchenko, Fitsailo 2003; Ass. *Melico transsilvanici-Stipetum capillatae* Korotchenko, Fitsailo 2003; Ass. *Salvio nemorasae-Festucetum valesiacae* Korotchenko, Didukh, 1997, (Sass. *S.n.-F.v. botriochloetosum ischaemii* Korotchenko, Fitsailo 2003); Ass. *Festucetum valesiacae* Solodkova et al., 1986, (Sass. *F.v. Festucetosum ovinae* Korotchenko, Fitsailo 2003); Ass. *Festucetum rupicolae* Soo 1940; Ass. *Botriochloetum ischaemti* (Krist. 1937) I.Pop 1977; Ass. *Stipetum capillatae* Dziubaltowski 1925, (Sass. *S. c. stipetosum pulcherrimae* Kukovitza, Diduch, Shelyag-Sosonko, Abduloeva 1998, Sass. *S. c. allietosum montani* Kukovitza, Diduch, Shelyag-Sosonko, Abduloeva 1998, Sass. *S. c. stipetosum pennetae* Kukovitza, Diduch, Shelyag-Sosonko, Abduloeva 1998, Sass. *S. C. typicum* Kukovitza, Diduch, Shelyag-Sosonko, Abduloeva 1998); Ass. *Lembotropio nigricans-Potentillietum arenariae* (Kukovitsa et al. 1994) Kukovitsa in V.SI. 1995; Ass. *Jurineo calcareae-Stipetum capillatae* (Kukovitsa et al. 1994) Kukovitsa in V.SI. 1995; Ass. *Plantagini stepposae-Stipetum pulcherrimae* V.SI. 1995; Ass. *Koelerio-Festucetum sulcatae* Kornas 1952; Ass. *Achilleo setaceae-Poetum angustifoliae* Marjuschkina et V.SI. 1986. The floristic composition of these communities is impoverished as compared to the typical meadow-steppe conenoses. The number of species resistant to moderate anthropogenic pressure (*Artemisia austriaca* Jacq., *Verbascum lychnitis* L., *Echium vulgare* L., *Nonea pulla* DC., *Medicago minima* (L.) Bartal., *Achillea submillefolium* Klokov & Krytzka, *Centaurea stoebe* L., *Securigera varia* (L.) Lassen and others) increases in the floristic composition. In the process of the derivative steppe communities' formation, synantropic species penetrate in the composition of the natural steppe conenoses, sometimes even supplanting typical meadow-steppe species.

INVASION SUCCESS OF *CYNANCHUM ROSSICUM* (KLEOPOW) BORHIDI: DO HABITAT AFFINITIES AND SPECIES TRAITS MATTER?

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Invasive alien species are increasingly being considered as a major threat to biodiversity and ecosystem services (Vitousek et al. 1996; Parker et al. 1999; Mack et al. 2000; etc.). However, only recently have researchers started to analyse possible relationships between invasive alien plant distribution, species traits (Richardson, Pyšek 2006; Pyšek et al. 2009) and habitats (Hejda et al. 2009) in native ranges and new invaded regions. Comparison of plant ecology in a species' home and introduced ranges may reveal their strategies in response to the environment, illuminate the factors limiting species spread and help to elaborate effective methods of control.

Our complex studies examine the taxonomy, distribution, population biology, community ecology and habitat affinities of invasive plant species *Cynanchum rossicum* (Kleopow) Borhidi (syn. *Vincetoxicum rossicum* (Kleopow) Barbarich) at the global, regional and local scales (Kricsfalusy, Miller 2008, 2010). The species was introduced over 100 years ago from Eastern Europe and successfully naturalized in eastern North America. *C. rossicum* is currently expanding its invaded range at an alarming rate, threatening primarily natural and semi-natural forested habitats as well as semi-open communities. We have assessed patterns of distribution and geographic range parameters of *C. rossicum* in Eastern Europe and eastern North America. The rate of spread and colonization success of *C. rossicum* in the Toronto region (Ontario, Canada) were estimated given that this species is one of the most severe threats to native biodiversity there (Kricsfalusy, Miller 2008). *C. rossicum* habitat preferences, ecology and the structure of communities were analysed as well as the intensity of infestation of vegetation cover by this species was assessed (Kricsfalusy, Miller 2010).

The main goal of these complex studies is to provide additional data on *C. rossicum* in introduced range to explain invasion success of this species and help with development of effective methods for its control. The importance of *C. rossicum* habitat affinities and biological traits in native range will be further rigorously tested to answer the question: what is the correspondence between habitats occupied by species in its home and introduced ranges?

ALIEN FRACTION OF THE FLORA OF STAROBILSK GRASS–MEADOW STEPPE

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According to our previous data which are based on the critical examination of the herbarium collections of M.G. Kholodny Botany Institute of the National Academy of Sciences of Ukraine (KW), Donetsk Botanical Garden of the National Academy of Science of Ukraine (DNZ), our own field researches (2009–2010) and analysis of literature, we found out that the alien fraction of the Starobilsk Grass-Meadow Steppe flora is represented by 359

species of vascular plants, which belong to 215 genera and 60 families. This index is lower than the same one in contiguous floras: the South-Eastern region of Ukraine, where there are 431 species (Ostapko et al., 2009), and Voronezh Region of the Russian Federation – 453 (Grigor'evska et al., 2004).

As a result of structural analysis of the investigated flora it was discovered that, according to the time of immigration, kenophytes prevail (232 sp.), archaeophytes are far fewer (109); according to the degree of naturalization, epoecophytes prevail (195), then followed by ergaziophytes (71), agriophytes (20) and ephemerophytes (23).

In the spectrum of leading families of the Starobilsk Grass-Meadow Steppe flora faction the first places are occupied by families *Brassicaceae* and *Asteraceae*, which have almost the same number of species (accordingly 49 and 50), and *Poaceae* – 33; so the first three groups are the same families that in the alien fraction of the Ukrainian flora. Following positions are occupied by families *Chenopodiaceae*, *Fabaceae*, *Apiaceae, Lamiaceae*, which is characteristic of the flora of the Ukrainian steppe area.

In the genera spectrum, the leading are those characteristic of droughty areas, for example, *Chenopodium, Amaranthus, Artemisia*. The next is *Xanthium*, which is spread in a region on the flood plains of the rivers. The percent of one species genera is quite high (144), exactly 66% from the general amount of genera. So we can say that there is the high degree of anthropisation of the regional flora.

Among life-forms, annual (monocarpic) plants (201) prevail; their number is almost the third from the general amount of species. Following positions are occupied by polycarpic herbaceous plants (56), and biennials (36). Among the alien plants of region the trees (16) and bushes (7) are far fewer. According to the structure of rootage in alien fraction of Starobilsk cereal-meadow steppe flora core-root plants (247) considerably prevail, the next position is occupied by brush-root plants (37). The groups of rhizome (6) and tuber-root (1) plants are far fewer. According to the classification of life-forms of K. Raunkiaer, therophytes prevail considerably (140). The hemicryptophytes are found out half as much (56). The amount of phanerophytes (13) and geophytes (11) is almost equally. There are quite few chamaephytes (4) and only one hydrophyte. Such distribution of life-forms is also characteristic of adventive fraction of the whole country.

According to the geographical origin, species native to the Mediterranean region prevail (74). The next position is occupied by the plants of the American origin (64). In this group, the North American species prevail (47). The group of species of the Asiatic origin is also widely represented (63). The species of Mediterranean-Irano-Turanian (36) and Irano-Turanian (23) regions origin are widespread far fewer. The Euro-Siberian group is presented by 11 species. 7 species are of the anthropogenic origin. The Caucasian group is presented by 3 species. Both the African and hybrid groups are represented by 2 species. The origin of 9 species has not been revealed.

ESTIMATION OF TRANSFORMATION DEGREE OF FEATHER-GRASS ASSOCIATIONS OF RIGHT-BANK STEPPE PRIDNEPROV'YA

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The purpose of work is estimation of transformation degree of feathergrass associations under the action of anthropogenic influence. For an analysis were taken by sight the least anthropogenic transformed steppe ecosystems of Right-bank steppe Pridneprov'ya

(RSP) with *Stipa* species prevailing. Geobotanical descriptions were conducted in the formations *Stipeta asperellae, S. capillatae, S. lessingianae, S. graniticolae, S. pulcherrimae, S. tirsae, S. ucrainicae*. In general, 366 species from 189 genus and 43 families were registered in the feathergrass formations of RSP. Were used the synantropization, adventization and apophytization indexes. The synantropization degree of the studied flora is represented by the species spectrum on the categories of anthropotolerance: 49.5% (181 species) it is taken to apophytes, 10.1% (37 species) – to anthropophytes, and other – indegenophytes. Gemiaptophytes prevail among apophytes – 76.2% (138 species), there is 83% of spontaneophytes (15 species) and 15.5% (28 species) of evapophytes. The ratio apophytes/anthropophytes is 4.9/1, and spontaneophytes/evapophytes – 0.5/1. Synantropization indexes for the studied flora are 59.6%; adventization – 10.1%; apophytization – 49.5%. Apparently, this floras synantropization takes a place, mainly, due to apophytes and, in less degree, due to anthropophytes. It is possible to expect that with the increase of the anthropogenic pressure the apophytes number, and among them spontaneophytes, will diminish, and the number of evapophytes and anthropophytes will increase.

OLD UKRAINIAN PARKS AS A SYNTHESIS OF THE NATURAL ENVIRONMENT AND THE CULTURAL LEGACY IN ITS CONNECTION WITH THE PROBLEM OF THOSE PARKS' REVIVAL

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Old parks sceneries and memorial farmsteads excels mostly by greenery. But greenery's role is no less important in other historical places. Old Slavonic gardens appeared at the time of Kievan Rus in monasteries, than gardens tended to surround town's people and villager's houses. Later Ukrainian gardens were created with regular planning in old estates. They show their features the brightest way in the landscape parks that are often famous far beyond Ukraine.

During the period from the second half of the 17th century to the beginning of the 20th century many parks were established in the Ukraine. One of the scholars studying them, O. L. Lypa, notes that they numbered over 250. They all had magnificent histories and important cultural values. Presently, of the 88 parks - monuments of park and gardening art, 68 have documented historical origins. A large percentage of historical parks is present among the 411 complexes of local significance. As the result of their improper use, some of the parks have either been degraded in their values, or have had their areas substantially reduced. Almost all of them have suffered varying degrees of degradation, which was inflicted upon them over many decades.

When analysing the palace and park complexes, we observe a number of aspects of their degradation. First of all, in many of them, the architectural components have been destroyed. Secondly, the area occupied by a large number of parks has been substantially reduced. Thirdly, practically in all of them, new buildings have been elected. This has also contributed to the modifications of the layout of access ways within such complexes and has been detrimental for their plant compositions. The latter have also been transformed by natural processes. As the result of improper treatment and insufficiently careful cultivation, the degradation of the park plantings may be categorised according to the following aspects: landscape, taxonomy, phytocoenosis (as described in this paper).

The problem of renewal of the plantings in historical parks is not only a matter of biological and landscape-arhitectural nature, but also an organisational one.

CHARACTERISTIC OF VASCULAR FLORA OF A LOCAL RAILWAY LINE IN WEST POLAND

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The floristic studies comprise a part of railway track from Czempiń-Mieszków, along the 23 km stretch between Czempiń and Śrem, situated in the Wielkopolska region (W part of Poland). The place of the research was the railway track with adjacent on both sides 1-2 m wide strips of land, also terrains of 6 railway and halt stations. Studies were carried out between 2003 and 2004, and complementary works in summer of 2009.

The area of the studies was divided into 37 research sections (localities) every about 600 m long. Collection of floristic data was based on the lists of all spontaneously occurring species in each locality and their numerical force described in a three-degree scale.

The synanthropic vascular flora consists of 331 species and there are represented all main taxonomic group except form club-mosses (*Lycopsida*). Characteristic for his flora are some regularities.

Asteraceae, Poaceae, Rosaceae, Fabaceae, Brassicaceae, Apiaceae, Caryophyllaceae, Lamiaceae and Scrophulariaceae belong the richest in species families. The biggest is the number of very rare elements of the studied flora, second place have a medium frequency and the least is the number of common species. According to the number of occupied localities these are successively: *Artemisia vulgaris, Silene vulgaris, Arrhenatherum elatius, Artemisia campestris, Hypericum perforatum, Rubus caesius, Sedum acre, Coronilla varia, Dactylis glomerata, Galium verum, Galium mollugo, Poa compressa* and *Pimpinella nigra.*

In the flora considerable role play native species – apophytes – 65%. The alien species (antropophytes) constitute about 35%.

The studied have indicated great inclination of some species to the occurrence on the railway track. These are among others: *Salsola kali* subsp. *ruthenica*, *Sisymbrium volgense, Erysimum hieraciifolium, Lepidium campestre, L. densiflorum, L. virginicum, Reseda lutea, Saxifraga tridactylites, Sanguisorba minor, Medicago ×varia, Geranium robertianum, Falcaria vulgaris, Pimpinella nigra, Puccinellia distans, Bromus japonius.*

ECOLOGICAL AND GENETIC EFFECTS OF COLONIZATION IN MAN-MADE HABITATS: THE CASE OF *PUCCINELLIA DISTANS*

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Since the 1960s *Puccinelia distans* has colonised anthropogenic habitats in Central Europe. In the beginning the grass was observed on municipal waste grounds, along roads and

railroads and then in the vicinity of industrial plants. The habitats it colonised were always salinated and rich in nitrogen compounds.

As indicated by the results of the isozyme variation study, the grass populations on man-made habitats were genetically highly monomorphous. In road shoulder populations none of 15 examined enzyme systems was polymorphic; in all infected populations only 2 enzymes were polymorphic. Among the 18 populations of *P. distans* studied, populations from salt mine areas and from natural salines appeared to be differentiated by relatively high values of genetic distances, whereas populations occurring on the road shoulders and the populations occurring in the vicinity of the Soda Producing Plant were genetically very similar.

These observations are consistent with a presumed founder effect. One or few invasive plant genotypes may have reclaimed the polluted area in recent times by spreading very rapidly over the new habitat. Common garden experiments revealed substantial differences in the life history traits of uninfected *P. distans* plants from man-made compared to those from natural habitats. Individuals from polluted localities produced more generative shoots, their inflorescences were larger, seeds were smaller and their germination rate was higher than in those from natural habitats. All these traits are often associated with successful colonisation and long-distance spreading of plants.

CHANGES OF NON FOREST VEGETATION IN WIEPRZ RIVER VALLEY (ROZTOCZE NATIONAL PARK)

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The width of the Wieprz River valley in Roztocze National Park varies from 80 to 350 m. Within the floodplain, there are meadows of total area about 35 ha. Stidies on differentiation of meadow vegetation were carried out twice in 20 years interval. The first investigation covered years 1983-1985, the second 2000-2003. In each of them maps of current vegetation were prepared and approximately 90 phytosociological relevés were made according to Braun-Blanquet method. The analysis of the vegetation changes during 20 years time covered a comparison of the inventory and area of phytocoenoses of individual plan associations and their ecological spectra. On the basis of species composition of distinguished plant communities analysis of changes in mean value of Ellenberg's humidity indicator was carried out.

The number of recorded plant communities in the Wieprz River valley in comparison with the state from twenty years ago has not changed markedly (previously it was 20, now 21 syntaxa) whereas significant changes were to be observed in the proportions of coverage of particular associations, negative from the perspective of biocenotic and species diversity conservation. One of the most noticeable symptoms of these changes is the expansion of high sedge rush, represented mainly by the community of *Caricetum gracilis*. Phytocenoses of this association have almost doubled their area (up to over 15 ha), whereas previously dominant meadow *Poo-Festucetum rubrae* remained limited (about 2 ha). As a consequence of ceasing the mow of meadows also other associations of high sedges have significantly increased their coverage, for instance *Caricetum acutiformis* and *Caricetum vesicariae.* Sedge rushes have almost entirely driven out some other associations, such e.g. with *Calamagrostis canescens*, associations *Caricetum elatae* and *Carici Agrostietum-caninae.* Other community from this group of peat bogs - *Caricetum diandrae* has disappeared completely. Ecological spectra of

individual associations have changed insignificantly, whereas in majority of them mean value of Ellenberg's humidity indicator has increased.

The main reason of the observed changes is the quitting of rural activity on meadows and the progress of secondary succession expressed by the expansion of shrub anf forest vegetation.

HYSSOPUS OFFICINALIS L. AND *COLUTEA ARBORESCENS* L. – INVASIVE SPECIES IN NATIONAL NATURE PARK PODILSKI TOVTRY

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The flora of NNP Podilski Tovtry includes 335 alien species. Among them there are some plants that appeared in the area owing to monks. On the acres of the park there is Bakota Monastery, where monks stayed during four centuries (XII-XV). On the territory of the monastery the native species grow, but there are also invasive ones, in particular *Colutea arborescens* L. bushes reaching up to 1.2 m in height. The period of their immigration is difficult to define, but the territory was not available for travelers since the XVth century. The species grow along the pathway on the soddy-carbonate soil. The population occupies more than 1.5 hectare. It is represented by multiple-aged specimen. The seed production is low. The self-seeding in the warm humid years is very rich. The virginal and generative plants dominate. In the droughty years the chits and immature species wither and perish. Every year it blooms, fructifies and revives with the help of seeds. On the territory of monastery the group *Querco-Fagetea* Br.-Bl. et Vlieger 1937 (*Fagetalia sylvaticae* Pawi. 1928, *Carpinion betuli* Issler 1931 em. Mayer 1937, *Carici digitatae-Carpinetum* (Kramarets et al., 1992) Kramarets et V.Sl. 1995 in V.Sl. 1995) has formed, where studied species occur. In the neighboring villages this species is not found.

Hyssopus officinalis L. grows on the chalky hills near Kytayhorod village. In the past the trade path from the Europe to Asia run, and in the XIX century the monastery was founded. Therefore the first appearance of medicinal plant is also very difficult to establish. The species is not found on farmlands. The plant grows on the chalky hills and reaches 35-60 cm in high, blooms, fructifies, revives with the help of seeds, which emerges in great quantity. It forms the population of multiple-aged specimen on the territory of 3 hectares. In the population the virginal and generative plants dominate, separately senile ones appear. Close with it grow: The plant spread in groups *Festuco-Brometea* Br.-Bl. et R.Tx. (*Festucetalia valesiacae* Br.-Bl. et R.Tx. 1943, *Festucenion valesiacae* Kolbek in Moravec et al. 1983, 1943, *Festuco valesiacae-Stipetum capillatae* Sill. 1937, *Salvio nemorosae-Festucetum valesiacae* Korotchenko et Didukh).

The species described above adapt to the new territory very slowly, but they need more precise populational studies.

ECENT STUDY ON THE SEGETAL VEGETATION OF SLOVAKIA

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The subject of the study was to evaluate present state of segetal vegetation in Slovakia, because all the published data about this topic were at least 20 years old and they covered only small part of Slovakia. The study was based on the results of own field research and on the consecutive analysis of the obtained data. Phytosociological relevés were made according to the methodology of the Zürich-Montpellier school. We have focused on all field types – cereals, root crops, perennial fodder crops, stubbles and young fallows, but most of the relevés were made in the cereal fields. In total, 508 relevés were collected from different parts of Slovakia in altitude 98-928 m a.s.l. during the years 2002-2008. According to the results of cluster analysis obtained in the software SYN-TAX, we have identified 13 segetal communities from the class *Stellarietea mediae*; 11 from the subclass *Violenea arvensis* (*Lathyro tuberosi-Adonidetum aestivalis*, *Consolido-Anthemidetum austriacae*, *Euphorbio exigue-Melandrietum noctiflori*, *Kickxietum spuriae*, *Veronicetum trilobae-triphyllidi*, *Lamio amplexicauli-Thlaspietum arvensis*, *Taraxacum* sect. *Ruderalia* community, *Spergulo arvensis-Scleranthetum annui*, *Myosotido-Sonchetum arvensis*, *Echinochloo-Setarietum pumilae* and *Galinsogo-Setarietum*) and 2 belonged to the subclass *Sisymbrienea* (*Portulacetum oleraceae* and *Setario viridis-Erigeronetum canadensis*). The associations differed not only in the floristic composition, but also in agroecophases, crop types and climatic conditions connected with altitude.

Together we have found 407 plant taxa; 381 taxa belonged to vascular plants and 26 to bryophytes. Crops were represented by 19 species. Non-native species prevailed over native ones and therophytes were the dominant life form in the segetal communities. Only 32 species of rare and endangered vascular plants and 4 species of bryophytes were recorded in the communities.

INVASIVE PLANTS IN THE FOREST FLORA OF KVIY SUBURBS

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For last 20 years the forest flora of Kiev suburbs has strongly changed. In many places more and more than a place in structure of wood phytocenosis occupy groupings invasive species of plants. Pair decades back these species met only separate exemplars or small monodominant groupings on edges of forests or in the territories adjoining to them. Now their distribution has accepted character of disaster. It is some principal causes of transformation of vegetation and change of a landscape. It is huge scale introduction of plants both botanical gardens and dendropark, and private persons, spontaneous delivery foreign species and their subsequent distribution, anthropogenous influence on a landscape. The last consists that the natural vegetative cover is destroyed, and also there is a set of not authorized garbage dumps where these species settle.

Object of our research - a pine forest near to railway station Maljutinka (region of Vasilkov town). On its edges and in the form of a underbrush there are deciduous breeds: *Quercus robur L.*, *Sorbus aucuparia* L., *Padus avium* Mill., *Malus domestica* Borh., *Pirus communis* L., etc.

But last years more and more these species are replaced with the following, aggressive enough: *Padus serotina* (Ehrh.) Ag., *Robinia pseudoacacia L., Acer negundo* L. The grassy cover has strongly suffered also: have disappeared *Pulsatilla latifolia* Rupr., *Lycopodium clavatum* L. Disappear *Anthericum ramosum* L., *Polygonatum multiflorum* (L.) All. Under threat of disappearance *Convalaria majalis* L. instead of them on spontaneous garbage dumps in forests and about them monoprepotent thrickets invasive species increase: *Helianthus tuberosus* L., *Solidago canadensis* L., *S. gigantea* L., *Echinocystis lobata* (Michx.) Torr. et Gray, etc. Thus the tendency of degradation and decrease a biodiversity was outlined in forests in of Kiev suburbs.

LEVEL OF INVASION ACROSS HABITATS OF SLOVAKIA

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Level of invasion, i.e. proportion of allochthonous species, across habitats from lowlands to alpine belt was analysed using the geographically stratified database from the Slovak Republic, consisting of 18 872 phytocoenological relevés. The relevés were divided into 39 habitat types, based on the EUNIS classification (http://eunis.eea.europa.eu/habitats.jsp). The data set contained 142 (6.7%) neophytes and 217 (10.3%) archeophytes. One half (50.05%) of the relevés contained at least one alien species. Non-native species, in average, represented 11.16% of the total number of species per relevé.

Highest proportion of archeophytes (over 50%) contained anthropogenic herb stands of annual species and vegetation of arable lands. Trampled habitats, anthropogenic herb stands of perennials and seminatural and ruderal mesophilous fringes contained up to 25% of archeophytes. Neophytes were most represented in the anthropogenic herb stands of annual species, highly artificial broadleaved deciduous forests, seminatural and ruderal mesophilous fringes and trampled habitats.

On the contrary, the least invaded were bogs, mires, subalpine and alpine shrubs and grasslands, and some types of forest vegetation, especially broadleaved swamp woodlands on acid peat and boreal bog conifer woodlands.

APOPHYTIZATION OF THE MYKOLAYIV URBAN FLORA

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Anthropogenization of natural landscape, in particular industrial form of manage are a powerful factor of change of cover within the limits of city and suburban areas. In the process

of building of the city, the landscape of his territory changes most. Exactly the urbanized landscape is the main factor which determines the structure and features of the city flora.

The urban flora of Mykolayiv is consisting of 909 species of vascular plants containing 338 apophytes: 145 hemiapophytes, 99 evantapophytes and 94 evapophytes. The index of apophytization reflects the level of conversion of aborigenophyte plants from indigenophytes into anthropogenic ecotopes. Compared with other cities in southern Ukraine, Mykolayiv has the largest index of apophytization (IAp = 37.2) of its urban flora in general. The index apophytization native element (IAps = 50.1) yields only to 0.2 Kherson (IAps = 50.3), indicating a major role in the apophytization process in synanthropization of the flora compared with other cities. For the urban flora of Mykolayiv, unlike other towns, tended apophytization prevails over antropophytization in the process synanthropization of flora. Taking into account that all cities are taken by us for comparison they are in the forest area (Warsaw, Krakow, Uzhgorod), but Mukolayiv is in the steppe and we can talk about different synanthropization strategies of flora. Synanthropisation of the flora in cities located in the forest area is mainly due to alien species, while in the steppe is mainly due to apophytes.

Apophytes bring in a considerably contribution to the process synantropization flora compared with alien species. In the process of apophytization of the flora of Mikolayiv, the large part is played by psammophytes and litorantes. In our opinion, this is because the city is located in the deltas of two great rivers (the Southern Bugh and the Ingul). In particular, first as sinantropic species are marked by us such psammophytes as *Achillea micrantha* Willd., *Astragalus varius* S.G. Gmel., *Carex ligerica* J.Gay, *Centaurea borysthenica* Grun., *Helichrysum arenarium* (L.) Moench, *Senecio borysthenicus* (DC.) Andrz., *Tragopogon borysthenicus* Artemcz. and others. Most psammophytes are obligate weeds which meet mainly on sandy and subsandy anthropogenic substrates (sandy embankments of railways, sandy inwash, construction sites). Among litorantes in Mikolayiv discovered *Astrodaucus littoralis (*Bieb.) Drude, *Crambe pontica* Stev. ex Rupr., *Lagedium tataricum* (L.) Soják, *Leymus sabulosus (*Bieb.) Tzvel., *Salsola kali* subs. *pontica* (Pall.) Mosyakin, *Trachomitum sarmatiense* Woodson and others. Most litorantes get to the city in the rail.

NOTES ON TAXONOMY AND ECO-COENOLOGY OF *STELLARIA PALLIDA* IN THE TOWN OF KOŠICE (EASTERN SLOVAKIA)

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Stellaria pallida [Dumort.]Crép. is a member of *Stellaria media* agg. This species is a spring ephemerophyte with occurrence in warm regions of central, western, eastern Europe and in southern Europe. The species was studied in some localities found by the author in Košice town in eastern Slovakia.

Taxonomically, very different populations were discovered. In a greater part of populations, plants had no petals at all, however, populations with petals reaching 2/3 to 4/5 of length of sepals were also found. These populations are require another analyses. Anthers are firstly yellowish white, later reddish brown with black margins and after rupturing of anthers grayish black. Their number is usually 2-3, however in a single population plants with up to 5-6 anthers were discovered. Again these plants call for another research. Stigmas with styles are 1-1.5-[2.5] mm long, usually 3 styles are frequently [however not always] curved down. Plants are typically yellow-green coloured.

Eco-coenologically, *Stellaria pallida* grows on dry, sunny, sandy habitats, with only partial coverage, because little plants of the species are only poor competitors. Frequently

plants develop monodominant coenoses with species of *Sedo-Scleranthetea*, *Molinio-Arrhenetheretea*, *Stellarietea medieae* classes, *Sisymbrion* alliance and accidental ones.

In the town of Košice, the species is growing especially together with *Plantago lanceolata*, *Poa pratensis* agg., *Capsella bursa-pastoris*, *Veronica polita*, *Taraxacum* sect. *Ruderalia* spp., *Lamium amplexicaule, Silene pratensis, Medicago lupulina, Geranium pusillum, Senecio vulgaris, Trifolium repens* and rarely with another species. The coenoses are difficult to incorporate into certain association. They are irregularly composed of species from the above mentioned classes and alliance and in this way these coenoses are derivated ones. They are sometimes named also as e.g., *Stellaria pallida-Veronica arvensis* community. Careful research of coenology and ecology of the species is necessary. The occurrence of the species is limited in Košice town to secondary habitats. The species grows naturally in Slovakia only in the southernomost sand localities and in the rest of Slovakia it behaves as an apophyte.

BIOLOGICAL CONTROL AS A TOOL TO MANAGE PLANT INVASIONS: SOME CASE STUDIES FROM UKRAINE

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Nowadays invasive alien species are clearly considered to be among the major ecological problems such as destruction of natural habitats, pollution, global warming etc. The role of invasive alien plants or "environmental weeds" in the transformation of local plant communities, ecosystems and even landscapes worldwide is essential. The invasive plants often cause biodiversity loss by suppressing and overcompeting the local plant species. There are different hypotheses explaining the causes of such plant invasiveness, such as "Natural enemies" "Evolution of invasiveness", "Novel weapons", "Empty niche" and many others. The "Natural enemies" hypothesis was effectively implemented in practice by means of the approach known as biological control (biocontrol). This method uses inoculative release, establishment and subsequent monitoring of invasive species' natural enemy (biocontrol agent). Theoretically the biocontrol agents for plant invasions could be of various nature (bacteria, fungi, arthropods). However, in terms of practical efficiency and species specificity, the most appropriate agents are definitely insects.

During the international workshops in the scientific centre CABI Europe-Switzerland in 2007 and 2010 I took participated in research projects on of two plant species, *Tanacetum vulgare* L. and *Vincetoxicum hirundinaria* Medic., both native to Europe and invasive in North America and some other regions. Experiments with different biocontrol agents were carried out in order to test their species specificity before the release on target invaded areas in North America. As for *Tanacetum vulgare*, the focus was mainly on *Cassida stigmatica* beetle (*Chrisomelidae* family) and *Isophrictis striatella* moth (*Gelechiidae* family). And as for the *Vincetoxicum* project, the chrysomelid beetle *Eumolpus asclepiadeus* and tephritid *Eupranta connexa* were tested for specificity and other parameters. The tests where performed on different European and North American plants phylogeneticly related to target species or just present in typical plant communities of the secondary range. Obtained results where quite positive, confirming that the host range of the listed potential biocontrol agents of *T.vulgare* and *Vincetoxicum* sp. is rather narrow; however, for some agent species (like *C. stigmatica*) it includes some non-target plants. The results clearly demonstrate positive prospects on testing biocontrol enemies from the primary range of weeds within ecoclimatically matching regions.

FLORISTIC VALUES, AND PAST AND PRESENT THREATS TO KURGANS IN UKRAINE

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Kurgans, a characteristic element of the Ukrainian landscape, were built as burial sites by many cultures, from Neolithic times to the early Middle Ages. Although kurgans were explored by archaeologists for nearly 250 years, they were not of special interest to botanists. Our floristic studies were carried out on kurgans in southern and central Ukraine (32000 km^2) in the 3 steppe zones and forest-steppe zone. Among the 450 kurgans surveyed, only 106 barrows, having the proper size and well-preserved plant cover, were selected for further study. A total of 721 species were recorded, among them 69 species included in the Red Data Books. Three plant communities found on kurgans were listed in "Green data book of Ukraine". Originally there were some 500000 kurgans in Ukraine. Today, however, only 50000-100000 kurgans remain. During the 20th century kurgans were under particular threat when they posed a serious problem for large-scale agriculture. Archaeologists have also contributed to the destruction of some of them. At present archaeological exploration of the kurgans are conducted within the "rescue program" in areas designated for various development purposes. However, botanical expertise should precede archaeological field investigations. Appropriate legal regulations should, therefore, be implemented to ensure more effective protection of the kurgans.

ECONET AS AN INSTRUMENT OF ECO-OPTIMISATION OF CITIES

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The conceptual working of innovative approaches is actual in the solving of ecoproblem of cities, in that number optimization of urboinfrastructure based on the ecosystem approach.

Cities are examined as complex urbosystems, which need spatial and functional optimizations of parameters of environmental sphere. Such optimization is carried out on the basis of rule-making in relation to the reducing of indexes of the environmental contamination above all things physical and chemical. A key optimization factor examines the ecosystem making healthy bridge and improvement of their climatic descriptions on the basis of reloading noises, forming of urboeconet, application of biotechnologies and ecobiomonitoring researchers, establishment of introduction of innovative approaches in a sphere energy- and resources savings. By a positive alternative modern Ukrainian urbodevelopment can be also embodiment of conception of econet. Forming of econet connected with the recovery of environment, enriching and stabilizing of resources, renewal of traditional trades and

connections, culture and values, support of geobiocenoses. These multifunctional properties of econet are predefined by base status of vegetable components of environment in a biogeocenotic cover: mastering of energy of a sun and construction of organic matter, oxygenation, forming of climate (zonal and local), and actually natural environment, with its landscapes features, aesthetics, colors and forms. Noises, dust, radiation, vibrations, are thus taken in, there is transformation of energy, matter and information, vitally-important biogeochemical connection is provided with a landscape and the system of eco-niches is formed.

The elements of scientific principles and methodology of city infrastructure optimization are grounded in the context of environmental impact assessment with application of technologies of evaluation of the state and prognosis of development of urbo-situation, design of scenarios of forming of urboinfrastructure, perfection of educationally-on-line tutorials for forming of eco- awareness, decline of indexes of physical and chemical contamination, development of recommendations in relation to making urboenvironment healthier.

PAVEMENT PLANTS ON OLD WALLS AS PART OF URBAN FLORA IN SOUTHWESTERN BULGARIA

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The main focus of this study is to determine the plant diversity of pavement flora in the base and surrounding areas of old walls in Southwestern Bulgaria during the period 2007-2009. The base of walls and their adjacent areas are man-made typical and unique horizontal microhabitats (pavement, sidewalk, path and asphalt). There is concentrated large quantity of sediment material and exposed to strong anthropogenic influence. Total 76 species were recorded belonging to families Fabaceae (20%), Poaceae (18%), Asteraceae (9%), Caryophyllaceae (6%), Brassicaceae (4%), etc. These are mainly herbaceous annuals with poorly developed root system or perennial herbaceous plants with shallow roots: *Alopecurus myosuroides*, *Bellis perennis, Bromus sterilis, Chenopodium opulifolium, Crepis sancta, Cruciata laevipes, Elymus repens, Galium aparine, Geum urbanum, Hordeum leporinum, Poligonum patulum, Stellaria media, Vilpia myuros*. Thoroughly developed species are *Capsella bursa-pastoris, Lolium perenne, Medicago minima, Oxalis fontana*, *Plantago lanceolata*, *P. major, P. media, Poa annua, Polygonum aviculare, Sagina procumbens, Taraxacum officinale, Trifolium pratense, T. repens.*, etc. Ferns as *Asplenium ruta-muraria* and *Asplenium trichomanes* were scattered found. Moss flora was represented by *Syntrichia ruralis* and *Dicranella heteromalla*. The dominant floristic elements are Eur–Med–Orient, Eur–Med–Orient–Tur and Eur–Med–Orient–Cauc, wich shows similarity to European and Mediterranean wall floras.

Some plants on pavements (weeds) in urban areas are unwanted mainly because they cause an untidy appearance or sometimes structural damage some of them are additional ornamental element. The study showed the difficulties in plant management in pavement areas and how knowledge about pavement flora can contribute to the complete preserving of architectural and historical objects.

TRANSPORT ROUTES AND LAND ABANDONMENT – THE NEOBIOTA OF TRADITIONAL LANDSCAPES FROM SAXON TRANSYLVANIA, ROMANIA

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Worldwide, land-use changes are influencing various ecosystems, shaping and determining the dynamics of natural, modified or completely artificial areas, often conducting to irreversible modifications. In the traditional landscapes new habitats have been created and maintained by human use, evolving into species-rich areas, nowadays considered as one of the most important natural heritages of Europe. The major land-use-related threat affecting the characteristic biodiversity of these landscapes, besides the general land-use change affecting all ecosystems around the world, is the modification of the traditional practices that led to their appearance and development, as a result of disrupting habitat continuity.

Wood-pastures, bearers of a characteristic biodiversity and living documents of land-use- and cultural history, represented once an important landscape element in Transylvania, but are nowadays affected by the abandonment of traditional practices (grazing and hand scything), favoring shrub encroachment and the appearance of several non-native and ruderal species. The aim of this paper is to present the situation of the Breite wood-pasture and its surroundings, and the conservation strategies applied towards the maintenance of the conservation interest and general character of the area. The nature reserve is currently affected by the appearance of the following species: *Acer negundo, Asclepias syriaca, Chamomilla suaveolens, Conyza canadensis, Erechtites hieracifolia, Erigeron annuus annuus, Erigeron annuus strigosus, Galinsoga parviflora, Juncus tenuis, Oxalis dilenii, O. stricta, Rudbeckia laciniata, Solidago canadensis* and *Solidago gigantea serotina*.

ECOLOGICAL-COENOTIC FEATURES OF THE SYNANTHROPIC SPECIES OF THE GENUS *LINUM* L. IN THE FLORA OF UKRAINE

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The genus *Linum* L. of the flora of Ukraine numbers 23 species; five of them are synanthropic. *L. trigynum* and *L. bienne* are hemiapophytes; *L. nodiflorum, L. corymbulosum* are spontaneophytes. *L. usitatissimum* belongs to the group of anthropophiles, it is an ergasiophyte escaping cultivation. The plants occur on fallow fields, abandoned vineyards, gardens, along roadsides, field edges, waste places and are weeds of agroceonoses.

The ecological analysis of the studied species has demonstrated that after the soil humidity all these species are hemistenotopic submesophytes, after the variation of moisture content – hemieurytopic hemihydrocontrasophiles, after acidity – hemistenotopic neutrophiles, after air drainage of soil – stenotopic subaerophiles. After the soil salinity *L. nodiflorum, L. corymbulosum,* and *L. usitatissimum* are hemistenotopic, and *L. bienne* – hemieurytopic eutrophs, *L. trigynum* is hemistenotopic semieutroph. According to the content of carbonates in soil *L. usitatissimum* is eurytopic, *L. corymbulosum* – hemistenotopic, and *L. trigynum* – hemieurytopic acarbonatophiles, *L. nodiflorum* is hemieurytopic

hemicarbonatophile, *L. bienne* is hemistenotopic hemicarbonatophile.

Coenotically the studied species are asektators of the plant communities. *L. corymbulosum* and *L. nodiflorum* are confined to phytocoenoses of the annual savanna type communities of the Mediterranean on disturbed ecotopes (Cl. *Thero-Brachypodietea* Br.-Bl. 1947, Ord. *Thero-Brachypodietalia* Br.-Bl. 1936, All. *Diantho humilis-Velesion* Korzh. 1990). They develop on clay products resulting from rotting of calcareous earth materials, and *L. corymbulosum* – sometimes even on acalcareous or semicalcareous clay slates. *L. corymbulosum* belongs to Cl. *Quercetea Pubescenti-Petraeae* Jakucs (1960) 1961, Ord. *Orno-Cotinetalia* Jakucs (1960) 1961, All. *Jasmino-Juniperion excelsae* Didukh, Vakarenko et Shel.-Sos. 1986.; it is confined to Submediterranean deciduous and conifer forests and open woods of the lower Crimean belts.

Linum usitatissimum is an ergasiophyte confined to grassy communities which develop under the excessive influence of anthropogenous factor. It is a member of segetal communities in farmlands, occurs on ashen-gray, gray wooded soils and podzolic blacksoils of sufficient moisture content (Cl. *Secalietea* Br.-Bl. 1951, Ord. *Secalietalia* Br.-Bl. 1951, All. *Chenopodio albi-Descuranion sophiae* V. et T.Sl. et Shelyag in V.Sl. 1988, *Anthemo ruthenicae-Sisymbrion orientale* V. Sl. 1988, *Caucalidion lappae* R.Tx. 1950). It also occurs in the communities of pioneer succession stages along with annual ruderal species on disturbed habitats, in mixed segetal-ruderal communities of orchard margins, in gardens and vineyards Cl. *Chenopodietea* Br.-Bl. 1951 em. Lohm., J. et R. Tx. 1961 ex Matsz., Ord. *Eragrostietalia* J. Tx. in Poli 1966, All. *Eragrostion* (R. Tx. 1950) Oberd. 1954, where *L. trigynum* and *L. bienne* also occur. The two latter species also occur sparsely in ruderal communities of the pioneer stages in dry ecotopes (Cl. *Artemisietea vulgaris* Lohm., Prsg. et R. Tx. in R. Tx. 1950, Ord. *Meliloto-Artemisietalia absinthii* Eliaś 1979).

ANTHROPIZATION OF THE PLANT COVER OF ZHYTOMYR REGION

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This report generalizes results of long-year studies of the flora of vascular plants of administrative Zhytomyr Region which includs two natural zones – the Forest zone (Central Polissya) – approximately 80% of the region area, and the Forest-Steppe zone – about 20% of the area. The total number of vascular plant species (spontaneophytes and anthropophytes) was calculated for Zhytomyr Region and separately for the urban flora of Zhytomyr. It has been shown that this number was 1626 and 1112 species, accordingly. The main attention was paid to apophyte and anthropophyte (archeophyte + kenophyte) fractions of the flora of investigated administrative units.

The analysis of phytoinvasions in Zhytomyr Region was made on the basis of calculation of well known indexes (Sukopp, 1969; Kornas, 1968, 1977; Jackowiak, 1990; Protopopova, Shevera, Mosyakin, 2006). For Zhytomyr Region values of these indexes were: index of apophytization (Iap) – 15.8%; index of anthropophyzation (Ian) – 24.9%; index of archeophytization (Iarch) – 7.4%; index of kenophytization (Iken) – 17.5%; index of synanthropization (Isyn) – 40.7%; index of modernization of flora (Imod) – 70.1%; index of instability of flora (Iin) – 15.6%. Comparative analysis of the same indexes calculated for the urban flora of Zhytomyr allows us to maintain that it is much anthropized that the flora of the

region as a whole, and the mentioned indexes were: Iap – 23.1%; Ian – 31.5%; Iarch – 9.6%; Iken – 21.9%; Isyn –54.6%; Imod – 64.9%; Iin – 16.4%.

Findings of some exotic invasive species were reported: *Eichornia crassipes* (Martius) Solms-Laubach, *Thunbergia alata* Bojer ex Sims, *Macleaya cordata* (Willd.) R.Br., *Oenothera missouriensis* Sims as well as another interesting invasive species – *Eragrostis pectinacea* (Michx.) Nees, *Hierochloë australis* (Schrad.) Roem. & Schult., *Panicum capillare* L., *Hordeum jubatum* L., *Ceratochloa cathartica* (M. Vahl.) Herter, *Oenothera glazioviana* Micheli, *O. fruticosa* L., *Hibiscus trionum* L., *Brachyactis ciliata* (Ledeb.) Ledeb., *Amaranthus deflexus* L., *A. powellii* S. Watson, *Bassia sedoides* (Pall.) Asch. etc.

Also a data of the first findings of some important invasive species in the region were elucidated: *Ambrosia artemisiifolia* L. – 1995; *Grindelia squarrosa* (Pursh) Dunal – 1995 etc.

UKRAINIAN FOLK TRADITIONS AND UKRAINIAN NATURAL HABITS

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It is obvious that the surrounding us vegetable kingdom and plants are our lifelong companions. So many of them have found their use in different fields of economy, be it farming or industrial production. Some of the plants are in fact indispensable foodstuffs satisfying our most basic requirements while others provide raw material for production of health-restoring medicines.

Besides the above mentioned utilitarian application, plants are in appreciable degree present in the systems of traditional beliefs, customs and superstitions. The rites within the frame of irrational beliefs associated with trees, grass, various herbs and flowers were in fact an echo of pagan conceptions of the natural environment based on real or imaginary properties of plants. With arrival and expansion of Christianise, the religious faith more often than not upheld these conceptions.

The rituals associated with plants, or actually involving them, played an important part during religious feasts celebrated on schedules prescribed by the church. The rites performed are inspired with the purpose of ensuring health, prosperity, happy family life, fertility of the land and livestock, safeguarding their households against misfortunes and calamities of all kinds.

On traditional family rituals special place was and somewhat even today is reserved for plants-symbols. As a demonstrable instance, in the traditional wedding rites in the Ukraine the snow-boll tree and periwinkle are used to decorate the traditional round loaf of bread and the garland crowning the bride. Vegetable motifs, ornaments and images are also well represented in the Ukrainian folklore. Plant symbolism is widely used in almost all genres of vocal traditional folk art.

PARTICIPATION OF APOPHYTES IN URBAN FLORAS IN DIFFERENT BOTANICAL AND GEOGRAPHICAL ZONES OF UKRAINE: A PRELIMINARY ASSESSMENT

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The results of comparative investigation of participation of the apophytes group in various urban floras (Uzhgorod, Kamyanets-Podilskiy, Lutsk, Chernihiv, Kryvyi Rig, Mykolayiv, Mariupol, Donetsk, Kharkiv, Lugansk) of different botanical and geographical zones of Ukraine (Forest, Forest-Steppe and Steppe zones of Ukraine) are presented.

The general list of apophytes of the studied urban floras of different zones of Ukraine includes 1702 species of vascular plants.

Hemicryptophytes, mesoxerophytes and xeromesophytes, in the Forest and Forest-Steppe regions – meadow, in the Steppe – petro-stepants, and psammo-petrophantes species prevail among apophytes in the biomorphological and ecological spectra, respectively.

The structural peculiarities of species of these groups, degree of participation in urban floras, and participation in plant cover of urbanized ecotopes are analyzed.

THE FIELD EDGES AS A SOURCE OF BIODIVERSITY

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The basis of stability and existence of the biosphere is biodiversity, which, indeed, is life, and man – an integral part of it.

There are several types of field edges in Ukraine: field roads, forest belts, etc. These zones are not only a significant reservation of biotic wealth in the agricultural landscape, but also constitute a potential source of biodiversity. They affect the dynamics of metapopulations, fulfill agroecosystems resource allocation, may serve as corridors for living organisms' migration, support natural enemies of agricultural pests and protect fields from wind and water erosion. Therefore field edges are an important object of modern agroecology studies, which are targeted not only on the theoretical aspects of boundary effects of these agro-ecosystems, but focused on applied issues regarding field edges maintenance and protection.

But such understanding is not the case for Ukraine, where ecological role the fields edges is still underestimated and largely ignored by science and practice. The filed edges surveys for five grain agrocenosis situated in Forest Steppe Zone of Ukraine (around towns Glevakha and Bila Tserkva, Kiev region) were conducted in 2007 – 2009, during which herbarium of different species were collected. Geobotanical analysis was made following standard methods after Ramenskiy. The results obtained show the tendency of invasive species *Solidago canadensis* L. to rapid spread and dominancy in semi - natural habitats. *Solidago canadensis (Asteraceae)* - is an herbaceous perennial plant native to North America, which was introduced as a garden plant in Central Europe. It allocates large amounts of energy to sexual reproduction and produces many seeds, which helps to spread out for long

distances, and also good capacity to reproduce asexually via underground rhizomes and nodes on the stem base.

Analysis of filed edges plants composition showed that among perennials *Elytrigia repens* (L.) Nevski was the most resistant to *Solidago canadensis* invasion, as well as *Convolvulus arvenis* L. and *Artemisia vulgaris* L. In spite of the *Solidago canadensis* invasion *Elytrigia repens* stayed as dominant species, while the other two were not dominant, indicating the threat to these native species from the invasive species mentioned above. This was a significant marker of disbalance in semi-natural habitats investigated providing the evidence of the necessity to develop phytocenological methods of *Solidago canadensis* control. Such methods allow utilize the buffer properties of agroecosystems by restoration of native vegetation in the field edges, which finally helps to increase natural enemies of insect pests' biodiversity prompting reduction of pesticide use and improvement in crops quality. Since Ukraine is a significant source of floristic diversity in Europe, representing 40% of European botanical heritage, even small foci on natural flora and vegetation is very important.

ECOLOGICAL ASPECTS AND RESULTS OF *AMBROSIA ARTEMISIIFOLIA* L. MONITORING IN UKRAINE

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Changes of a geographic range of quarantine weed *Ambrosia artemisiifolia* L. in terrain of Ukraine for 35 years is parsed. The sharp accretion of the weeded areas for last years is installed. The analysis of phenology of this species has shown that the phases of its development occur earlier, and fructification a little bit later, than 53-55 years ago. Such changes in approach phenophases are a consequence, on the one hand - getting warmer and softening of a climate of Ukraine, with another - processes of acclimatization of the given species. It together with a poor control of number of a weed results in augmentation of a geographic range. Projections showed that the entire territory of Ukraine and Belarus South suitable for the growth of *A. artemisiifolia*. Nevertheless, state on 01.01.09, weeded of ragweed ground 6.27% from square of Ukraine compound only. Taking into account its bioecological peculiarities and high injuriousness of a weed, and also according to the official data, it is possible to state insignificant square of contamination ground arias, that the question on removal it from quarantine is premature.

SPONTANEOUS FLORA OF HEAVY METAL POLLUTED WASTE HEAPS IN THE AGRICULTURAL LANDSCAPE OF THE UPPER SILESIAN INDUSTRIAL REGION (S-POLAND)

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Mining industry causes changes of the land surface. Some parts of post-industrial landscape such as mining waste heaps, steelworks heaps and others remain unmanaged for

years. On those sites spontaneous plant cover start to develop since the establishment of the site.

Results of biological investigation on the spontaneous flora of the heavy metal polluted wastes is the object of presented paper. The observed flora is rich in species.

While the heliophilous, meadow and grassland species are the most often groups present. Heavy metal polluted post-industrial sites are often secondary habitats for rare and endangered plants. Some plants endangered in the regional scale are represented in flora of this sites. Investigated flora are different from flora present in the surrounding, agriculture land.

Post-industrial lands can be:

- a refugium for indigenous, rare species within disturbed and urbanised surroundings;
- a place of occurrence of regionally endangered plant species;
- a place of formation of new plant associations and other specific ecological processes;
- a place of a cultural and landscape value as well as a monument of industrial heritage.

Without our attention, care and protection the most precious post-industrial objects can disappear forever from our landscape within forthcoming years.

PATTERNS OF THE DISTRIBUTION OF SELECTED SPECIES OF VASCULAR PLANTS IN AREA OF LUBLIN CITY

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The aim of the present work is to analyse local ranges of vascular plants in the area of the city of Lublin and to assign them to specific general patterns. This made it possible to connect them with the spatial distribution of specific abiotic factors.

The local ranges of species were characterized in the area of Lublin (E Poland) by means of the following features: the number of stations, distribution (concentration or dispersion) and the topography of stations. Two methods of the spatial analysis of the data were applied in order to obtain patterns of the distribution of the local flora: a visual-comparative method and spatial classification. The former involves comparison of the natural distribution of species, which facilitates classification of the plant among the specific type of the pattern of dispersion of stations. The next stage of this method is association of species groups with a similar type of distribution with the spatial diversity of abiotic phenomena. The other method employs a statistical analysis of the similarity structure and a correlation diagram of the shortest connections. It was graphically presented on total, synthetic, quantitative cartograms.

The contemporary vascular plant flora of Lublin includes 1061 species. The visual-comparative method was applied with regard to 772 species. However, species distribution, with the number of stations ranging from 19 to 93, were analysed applying spatial classification with statistical methods.

The application of the visual-comparative method allowed recognition of six patterns of local plant distribution in the area of Lublin city. Interpretation of this type of distribution depends on affiliation of species with the geographical element and geographical-historical status.

Twelve types were distinguished in the area of Lublin after application of the method of statistical analysis of spatial classification of selected species.

ALIEN FRACTION OF THE FLORA OF THE BIOSPHERE RESERVAT "PRIBUZHSKOE POLESJE"

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The area of biosphere reservat "Pribuzhskoe Polesje" is 48024 hectares. It is situated in the south-west part of Belarus in the basin of the West Bug River. It is the first biosphere reservat on the territory of Polesje which has the diploma of the UNESCO. There are 30 towns and countries on the territory of the reservat and the population is more than 8000 people. There is a very good system of roads (auto and railway) on the territory of "Pribuzhskoe Polesje". There are also the gas pipeline, telephone lines and the lines of networks. There are situated 2 frontier centres with Poland and Ukraine. More than fourth part of the area (28, 6%) is related to the ground, which was changed by people and by their economic works. All these factors are well influenced on the alien fraction of the flora of biosphere reservat.

According to our given facts the alien fraction of the flora "Pribuzhskoe Polesje" is represented by 401 species of vascular plants (36, 2%). There are 5 plant species in every family in average. The head families are *Asteraceae* (14.7%), *Rosaceae* (9.9%), *Brassicaceae* (8.2%), *Poaceae* (5.7%), *Fabaceae* (5.7%), *Lamiaceae* (4.2%), *Chenopodiaceae* (3.0%), *Liliaceae* (2.2%), *Solanaceae* (2.2%), *Onagraceae* (2.2%). 10 head families have 58.2 % and the firs 3 families have 32.8%. The typical peculiarity of the spector of alien fraction is the high position of *Chenopodiaceae, Solanaceae* and *Onagraceae* families. These factors draw together this alien fraction with the alien flora of Ukraine and Voronezh region. According to the type of primary natural habitat in this fraction dominate representatives of North America, Europe, the Mediterranean, West and East Asia. According to the time of immigration dominate kenophytes (329 species), and according to the way of drift – ergasiophytes (242 kinds). According to the naturalization alien fraction "Pribuzhskoe Polesje" is represented by epoecophytes (35%), colonophytes (24%), agriophytes (22%) and ephemerophytes (19%). And the rarest alien species are *Carex melanostachya* Bieb. ex Willd., *Falcaria vulgaris* Bernh., *Isolepis setacea* (L.) R. Br., *Sisyrinchium septentrionale* Bicknell, *Vicia striata* Bieb. as for this region and for Belarus too.

DOES THE FOREST MANAGEMENT INFLUENCE ON THE BIODIVERSITY OF FOREST HERB LAYER BY ENHANCING THE SPREAD OF CLONAL PLANTS?

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The massive occurrence of expansive, polycormonal species e.g. in forests is a common phenomenon noted for several decades in many regions of Europe. Therefore, the aim of presented researches is the analysis of influence of polycormonal species (a model-sort was *Carex brizoides*) on the structure of the management of oak-hornbeam forests, where was localized on postindustrial areas with introduced *Pinus sylvestris*.

The fieldworks were conducted in 2005-2008 in the area of the Silesia Upland in Poland. In two groups of patches of management forest communities 1) with and 2) without *Carex brizoides* were studied. In both types of study area the following feature were analyzed: species composition; condition of the habitat and participation of functional groups of species.

The obtained results revealed that: the herb layer dominated by polycormonal species was poor in species; the communities with model-short polycormonal species had the lower biodiversity value (Shannon index), the habitat conditions were similar in both types of forest patches, but pH was higher in patches with the analysed polycormonal species; the average cover of species was 3 times greater than in forests without it.

Generally the polycormonal species substantially influence the final specific composition of the species of the management forests.

THE SKAWICA RIVER VALLEY (BESKID ŻYWIECKI MTS.) AS THE TRANSITIONAL ZONE BETWEEN THE GEOGRAPHICAL RANGES OF THE *P. KABLIKIANUS* AND *P. HYBRIDUS* SPECIES

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P. kablikianus and *P. hybridus* are the species which are corresponding altitudinally on the territory of Poland. *P. kablikianus* has a typical mountain range, *P. hybridus* replaces it on the analogical sites in the lowlands. The Skawica river valley in the altitudinal zone between 360-590m a.s.l. constitutes the transitional zone between the geographical ranges of these species, with *P. kablikianus* characteristic of *Petasitetum kablikiani* and *P. hybridus* a natural component of tall herb phytocoenoses in the lowlands. Therefore both *P. kablikianus* and

P. hybridus can be observed in the same patches of the study area. However, phytocoenoses dominated by *P. kablikianus* and the ones with the predominance of *P. hybridus* can be found among a group of tall herb in the Skawica river valley.

The affiliation of phytocoenoses with the predominance of *P.kablikianus* to the communities of *Petasitetum kablikiani* of the class *Betulo-Adenostyletea* is questionable. These phytocoenoses cannot be classified as *Petasitetum kablikiani* whose patches are often found in the altitudinal zone between 1400 – 1650m a.s.l. Despite the predominance of

P.kablikianus the floristic composition of these patches is significantly different from *Petasitetum kablikiani* found in other altitudinal zones of Babia Góra Mt. as well as observed in other sites in the Carpathian Mountains.

A number of differences in the floristic composition of the patches with the predominance of *P. kablikianus* and *P. hybridus* were analyzed. The vascular plant species which often occur in the patches with the predominance of the particular Butterbur species were analyzed in terms of their habitat requirements. The Ellenberg indicator values for light (L), moisture (F), soil reaction (R) and nitrogen (trophy) (N) were taken into account.

GALEOPSIS ANGUSTIFOLIA (EHRH.) HOFFM. IN SOUTH-WESTERN POLAND: ORIGIN, EXPANSION AND DISAPPEARANCE

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Galeopsis angustifolia is sub-Mediterranean European annual plant occurring in lowlands and lower mountain areas. It is similar to *G. ladanum* and differs by narrow linear leaves and corolla 3 x longer than calyx. In Central Europe, *G. angustifolia* is a character species of the *Stipion calamagrostis* alliance; it was observed in plant associations of the *Caucalidion lappulae* alliance and occurs in anthropogenic communities of stony habitats (roadsides, railways etc.).

Status of *Galeopsis angustifolia* in Poland is uncertain. It was not included into lists of archeophytes and kenophytes. Rutkowski (2006) reported it as archeophyte or kenophyte from anthropogenic habitats (railways, roadsides, gravel-pits) and notified that it is not native only in northern part of Poland. According to Hulten & Fries (1986), *G. angustifolia* is mainly distributed in western and south western Poland, and it is suggested to be a part of its native range, however its detailed distribution is not known. In ATPOL (Zając & Zając 2001), it is synonymized with *G. ladanum* and presented in one diagram.

Research of *G. angustifolia* distribution, association with plant communities, origin of colonized habitats and occurrence in pioneer plant communities of natural outcrops were taken in Lower Silesia (SW Poland) to determine status of the species. Results of detailed studies improved that nowadays the species not occurs in native plant communities developed on natural or anthropogenic outcrops. Its distribution is limited to secondary stands and seems to be correlated with railways. It is probably not native element of Polish flora. The species was rather common in south-western part of Poland, but in last 20 years number of its stands declined dramatically due to destruction of old railways or herbicides usage on still exploited lines.

MORPHOLOGICAL VARIATION IN THE INVASIVE HYBRID *FALLOPIA X BOHEMICA*

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The invasive alien knotweeds, *Fallopia* spp. (Polygonaceae), are some of the most troublesome invasive species in Europe and North America. Hybridization of the widespread *F. japonica* var. *japonica* with *F. sachalinensis* resulted in hybrid, *F. x bohemica*. In the past, the hybrid taxon was often mistaken, and still is, by botanists for the first or second parent species, especially for *F. japonica*. Therefore, a revision of morphological data of the three plant species is necessary.

We investigated local populations of hybrid and its parents *F. japonica* and *F. sachalinensis* from different habitats. The main aim of the study was to examine the pattern of morphological variation of the hybrid. Study sites were located in southern Poland, which is considered as the most invaded region. For assessing the phenotypic variability within and among groups of *Fallopia* and determining morphological characters that readily discriminate among them, 13 morphological characters were measured. In this study, we used the morphological characters most often used in the literature to identify *Fallopia* species. The morphometric data were subjected to a principal component analysis (PCA) to assess the level of phenotypic varaiability. The statistical analyses indicated several characters that could be used to distinguish between the *Fallopia* taxa and their hybrids.

INVASIVE ALIEN PLANTS IN THE SOŁA RIVER FLOODPLAIN (POLISH CARPATHIANS):IMPLICATIONS FOR NATURE CONSERVATION AND RIVER MANAGEMENT

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Particular habitat such as watersides are the most endangered and are most easily invaded by invasive alien plants and then play a role as a transmitter into other habitats such as bushes and woodland. This fact may have an important role in planning management for river banks and river valleys.

The some 50-kilometre long section of the Soła river, situated in Polish Carpathians (southern Poland), preserved in many parts its natural state, represents a unique fragment of dynamic river. The processes shaping this river have created extremely rich mosaics of microhabitats, providing refuge to many rare and endangered plant and animal species. In some sections of the river bank, the spontaneous succession of plant communities is hampered by the invasion of plants of alien origin, chiefly: *Fallopia japonica* and *F.* x *bohemica, Galinsoga ciliata* and *G. parviflora, Impatiens glandulifera* and *I. parviflora, Rudbeckia laciniata, Solidago canadensis* and *S. gigantea*.

The main idea of the study was to investigate distribution pattern of selected invasive alien plants along the Soła river and the estimation of type and scope of threat posed by alien

plant species with regard to the native biological diversity, especially in view of the fact that these problems have hitherto been rarely addressed in Poland.

The presented project will allow for the protection of valuable elements of nature and landscape of this dynamic river. The implementation of the project will provide protection for rare and endangered natural habitats and associated species of plant and animals.

ALIEN VASCULAR PLANTS IN THE SILESIAN UPLANDS OF POLAND: DISTRIBUTION PATTERN, IMPACT AND THREAT

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Among the symptoms of anthropogenic changes of the flora are the processes of extinction of some species and spread of other ones. These tendencies have increased in magnitude in recent centuries and they contribute to diminishing biodiversity on a regional, national and continental scale. The main idea behind the project presented is to investigate diversity of alien vascular flora at the regional scale and to update the list of invasive alien species for the Silesian Uplands. The aim for this study is also to provide a synthesis of the knowledge accumulated to date on the conditions for their occurrence, their distribution patterns and possible threat.

A list of alien vascular plant species present in the Silesian Upland is provided in relation to their historical-geographical groups. The distribution of particular species at the regional scale has been investigated by using the method of mapping the species on a grid of equal basic fields: squares with a side of 2 kilometre (the Atlas of the distribution of vascular plants in the Silesian Uplands – ATPOL *Silesia*).

Only few species (e.g. *Chamomilla suaveolens, Conyza canadensis Galinsoga parviflora, Amaranthus retroflexus, Oxalis stricta* or *G. ciliata*) are common (occurring in 60-90% of 2 x 2 km squares), others are abundant (occurring in 20-60% of squares), locally abundant (occurring in 3-20% of squares) and rare. The distribution data for some species still needs to be verified. Alien species which are considered – on the background of selected criteria -troublesome weeds posing a threat to numerous crops and also penetrating natural sites, have also been included in a list of invasive species which require combating or control measures (e.g. species from *Reynoutria, Heracleum* genus). Many invasive alien species occurring in the Silesian Upland have stations distributed throughout the whole region and thus they do not represent any particular type of range. Some species show certain patterns of distribution associated with local habitat conditions.

OXYBAPHUS NYCTAGINEUS (MICHX.) SWEET (*NICTAGINACEAE*) – THE NEW SPECIES OF CARPATHIAN REGION

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Wild four-o'clock (*Oxybaphus nyctagineus* (Michx.) Sweet) is a kenophyte native to North America, epoecophyte.

It was introduced on the territory of Europe as an ornamental plant. According to the data of the DAISIE project, it is known from several European countries: Austria, Czech Republic, Hungary, Italy, Lithuania, Moldova, Poland, Romania, Slovakia, and Ukraine.

Oxybaphus nyctagineus as an alien plant in Ukraine was found in 1952, but the expansion of this species started in 1976 and lasts to presently.

From Ukraine it is known in Kiev, Rivne, Sumy regions, and some areas in the South of Ukraine.

Oxybaphus nyctagineus was found in Chernivtsi in 2009 in the anthropogenic transformed communities along a railway. It was determined that it is a component of communities from two associations *Berteroetum incanae* Siss. et Tidem. ex Siss. 1950 and *Echio-Melilotetum albae* R.Tx. 1942, which are belong to the union *Dauco-Melilotion albi* Gors em Elias 1980 from the order *Onopordetalia acanthii* Br.-Bl. et Tx. ex Klika et Hadač 1944 class *Artemisietea vulgaris* Lohm., Prsg. et al. ex von Rochow 1951.

It should be noted that in the studied communities of *O. nyctagineus* do not form dense populations, the species occurs by single individuals, and it is needed to perform the coenotic and population monitoring to determine and control the spread of species.

MONITORING OF SOME GENERA OF THE FAMILY *ROSACEAE* IN FLORA OF THE BLACK SEA BIOSPHERE RESERVE

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Researches were carried out in natural communities of the Black Sea Biosphere Reserve of the National Academy of Science of Ukraine (Kherson Region, Ukraine) on the area of 14 thousand hectares. The object of monitoring was the species composition of the family *Rosaceae*. The duration of this observation was about 30 years.

We analyzed diversity of adventive species in the Black Sea Reserve, and we have revealed the active dissemination of representatives of the family *Rosaceae* on all protected areas of arenas, Primorsko-steppe and islands in recent years.

For the genus *Rosa* we established the greatest mobility of the species composition. We have recorded the emergence of 6 species during the observation period, and 3 of these species have disappeared in this period. Also for the first time we observed a spontaneous introduction and growth of cultivated representatives of the family *Rosaceae*, such as *Cydonia oblonga* Mill., *Armeniaca vulgaris* Lam., *Malus domestica* Borkh., *Prunus divaricata* Ledeb., *Cerasus avium* (L.) Moench and one species of *Rubus* on the territory of the Black Sea

Biosphere Reserve. Besides, we have noted the spontaneous emergence of *Cerasus magaleb* (L.) Mill. in the region (until the outside areas of the Reserve). At the same time the number of natural species reduced. So the endemic species *Crataegus helenolae* Grynj et Klokov disappeared from the species composition of the genus *Crataegus*. Also *Malus sylvestris* Mill. is not recorded anymore in the territory of protected areas on arenas. Climate changes are the most probable reasons of this processes.

It is necessary to know that genetically modified plants of family *Rosaceae* are one of the most dangerous. It is important for an estimation of distribution of a transgene flows (East, Sweet, 2002). There is a probability that genetically modified individuals of plants with a disrupted barrier of the natural incompatibility can penetrate into the Reserves. It can lead to irreversible changes in the genotype of natural species in family *Rosaceae*. Therefore, our study must take into account for determination the regime of protected areas Reserves.

REGULATORY OF SOUTH BESSARABIA PLANT COVER ANTHROPIZATION

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Plant's cover evolution is clarified itself by many factors. Between them man's activity play not the last role. The motion of evolution' processes on every part of Earth may be original. But there are the common regulatory. Consider them on the example of South Bessarabia – region, which from ancient times was used by man. Naturally, that one from active elements of influence is climate, which defines prevalence some and other species in different years. Certain role play relief (in our case- plain), soil composition (chernozem) etc. But especially in last decades the first place occupy deliberate and unintentional human influence. In the first case influence may be different: building, plugging of different parts of ground, uncontrolled pasture of cattle, using fertilizers and chemical weed- and pest-killers, growing agricultural plants without taking into account the necessity of crops' rotation, pour on the unsuitable water (as in environs of Lake Sasyk) etc. In another case it is dropping in with the sowing material alien plants with the great allelopathic activity and plasticity as *Euphorbia dentata*, *Sorghum halepense* and other, which naturalized in this conditions. In both cases original flora experiences the press, which is found to be excessive toil, changes its composition and structure and became unificated. In modern level of economic and absence of strict legislative base the quantity of ground and water aboriginal plants, which need protection, may enlarge in many times.

ALIEN SPECIES IN THE FLORA OF THE CHYVCHYNSKYI' MOUNTAINS

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The Chyvchynskyi (Czywzcyn) Mountains are among the most remote mountain chains, and because of deterioration of mountain valley economy and stopping of logging, is the least anthropogenic transformed region of the Ukrainian Carpathians. According to our investigations during 2003-2009, 18 alien species of plants were found there. Five of them are agriophytes, 12 – epoecophytes, and 1 is an ergasiophyte.

The low level of transformation of the plants cover is confirmed by functional indices of the synantropic flora of the Chyvchynskyi Mountains. The specifically index of synanthropization – 13, index of modernization – 1.25, index of instability – 1, the relativity equilibrium of instable element – 0.009. Such indices are lower than in other regions and in the Ukrainian Carpathians in general.

ALIEN SPECIES OF NORTHERN BESSARABIA'S FLORA

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Alien flora of Northern Bessarabia is represented by 274 species from 56 families. While analyzing nonnative species of the flora, it was determined that 117 of them are archaeophytes and 157 – kenophytes. Our analysis by the degree of naturalization has shown that 8 species are agriophytes, 10 – hemiagriophytes, 25 – ephemerophytes, 43 – ergasiophytes, and 188 epoecophytes. The leading role is played by alien species of Mediterranean (57 species or 20.8%), Mediterranean-Irano-Turanian (37 species or 13.5%) and North American (28 species or 10.2%) origin.

It was established that 81 of taxa are new records for the territory of Northern Bessarabia (*Asclepias syriaca* L., *Artemisia verlotiorum* Lamotte, *Brachyactis ciliata* (Ledeb.) Ledeb., *Silphium perfoliatum* L., *Chorispora tenella* (Pall.) DC., *Ipomoea hederacea* (L.) Jacq., *Elsholtzia ciliata* (Thunb.) Hyl., *Ailanthus altissima* (Mill.) Swingle, *Consolida orientalis* (J. Gay) Schröding., *Ranunculus arvensis* L., *Reynoutria japonica* Houtt., *R. sachalinensis* (F.Schmidt ex Maxim.) Nakai, *Typha laxmanni* Lepech., *Tribulus terrestris* L. etc.), 6 species are new from Chernivtsy region: *Datura tatula* L., *Kickxia spuria* (L.) Dumort., *Hesperis pycnotricha* Borbás & Degen, *Ricinus communis* L., *Perilla nankinensis* (Lour.) Decne, *Portulaca grandiflora* Hook., *Coreopsis tinctoria* Nutt.

The most invasive plant species in this flora are *Acer negundo* L., *Ambrosia artemisiifolia* L., *Solidago canadensis* L., *Conyza canadensis* (L.) Cronq., and *Robinia pseudoacacia* L.

THE INFLUENCE OF AGRICULTURE ON THE DISTRIBUTION OF THE GENUS *HYPOXIS* (*HYPOXIDACEAE*) IN THE TROPICAL EAST AFRICA

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The human impact on the vegetation of the Tropical East Africa (Uganda, Kenya, Tanzania) is profound. It manifests itself especially in a process of deforestation and fire dependant grasslands promotion. Because of significance of rising cattle in the rural areas, there is a great influence of their herbivory on the environment. The genus *Hypoxis* L., which belongs to a monocot family *Hypoxidaceae* R. Br. is represented in Africa by 55 species. They frequently grow in both primary and secondary grassland ecosystems of this continent. During a research on distribution of the genus *Hypoxis* in the Tropical East Africa it was found that nine of twenty species present in these countries are also found on pastures and three in shambas (small local fields) and fallows. From the pasture species three are grazed upon, whereas the rest is rather avoided by animals, probably because of large number of schlerenchyma fibers in their leaves. Three species can survive in the fallows or extensive cultivation of sun loving crops. Intensive cultivation as well as shady plantations contribute to elimination of *Hypoxis* from the ecosystem.

MOSSES OF THE EXPERIMENTAL AND TEACHING GARDEN OF THE FACULTY OF BIOLOGY AND ENVIRONMENTAL PROTECTION, UNIVERSITY OF LODZ (POLAND)

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The research objectives were to determine the species composition of moss flora and identify the taxonomic and ecological diversity of mosses in Experimental and Teaching Garden of the Faculty of Biology and Environmental Protection, University of Lodz, Poland.

The Experimental and Teaching Garden of the Faculty of Biology and Environmental Protection of the University of Lodz is located in the center of Lodz (19°28'58.98"E 51°46'36.44"N). The Garden has been in existence since 1985 and occupies 1.02 ha. It provides a scientific and didactic base for the students and employees of the University.

The study was conducted in 2009 and 2010. Bryological material was collected from all microhabitats and substrates.

The results showed 42 species of bryophytes (41 mosses and one liverwort) belonging to 16 moss families. The *Brachytheciaceae* moss family consisted of eight species and was the most abundant. There were five types of habitats: epigeic, epiphytic, epilithic, epixylic and aquatic habitats. Most species were found in epigeic habitats, the least were found in aquatic.

The garden bryoflora is high in species abundance and in species diversity despite the fact that the garden is small and is located in the center of a big city – Lodz.

WHAT CAN WE LEARN ABOUT COMMUNITY ECOLOGY FROM VEGETATION DEVELOPMENT ON POST INDUSTRIAL SITES

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The heavily industrialized and urbanized areas serve a vast variety of post industrial sites. The Upper Silesia region in southern Poland is one example of such area in Europe. The most common post industrial sites in Upper Silesia are the post coal mining heaps. Majority of those heaps remain not reclaimed and is, since the moment of establishment, colonized by plants and other life organisms. For a long time the study was focused on characteristics of flora and vegetation of different heaps.

While the fact that the coal mine heaps are different in age, landscape in the surrounding, the way of heaping and termal activity provide an unique opportunity of observation of spatiotemporal patterns of vegetation development. However there is a lot of papers characterizing the changes of vegetation composition in time in natural and semi natural habitats. The preliminary study on diversity and record from time series suggests that some aspects the vegetation dynamics on post industrial sites proceed in different way. There is a chance that detailed record of vegetation development on post industrial sites can enriched our knowledge about community ecology.

INVASIVE VASCULAR PLANTS SPECIES ON THE RAILWAY AREAS IN THE CENTRAL-EASTERN PART OF POLAND

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Natural and man-made wildlife corridors, i.e. river valleys, railways and communication routes, are believed to play a significant role in the spreading of anthropophytes. A wide range of ecological conditions prevailing in different types of railway track habitat permits the penetration and spreading of species that demonstrate a high degree of tolerance to the anthropogenic factor. They become a permanent or transitional element of their vegetation cover. Out of the 950 species that form the spontaneous flora of railway grounds in central-eastern Poland (the Lublin Upland, Roztocze and Polesie) 276 are anthropophytes. Some of them are classified as invasive species which, apart from fragmenting and degrading natural communities, are a serious threat to the biological variety considered on both a regional and global scale. The highest threat to the native flora is caused by the following species: *Acer negundo, Echinocystis lobata, Epilobium ciliatum, Impatiens parviflora, Lupinus polyphyllus, Padus serotina, Geranium sybiricum, Robinia pseudocacia, Reynoutria japonica, Solidago gigantea, Vicia grandiflora.* In group of species that penetrate to agrocoenoses are: *Aegilops cylindrica, Bromus carinatus, B. japonicus, Amarantus retroflexus, Galinsoga parviflora, G. ciliata, Setaria pumila, S. viridis, Viola arvensis.* Species such as: *Ambrosia artemisiifolia, Asclepias syriaca, Atriplex tatarica, B. sterilis, Bunias orientalis, Sisymbrium altissimum, S. wolgense, Rumex confertus, Parthenocissus*

inserta, Iva xantiifolia, Heracleum sosnovskyi, Eragrostis albensis, Erysimum marschalianum migrate to ruderal habitats.

IRRESOLUTE CONQUISTADORS: BEHAVIOR OF SOME INVASIVE PLANTS IN THE CRIMEA

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Being recognized separately from the rest of Ukraine by florists, the Crimea shows not only a specific aboriginal flora but also specific behavior of some alien plants. As a rule, invaders reached the Crimean Peninsula long after they had conquered the mainland. For the first time in the Crimea, *Erigeron annuus* (L.) Desf. was found in 2001, *Impatiens parviflora* DC. in 2004, *Bidens frondosa* L. in 2006. These species has revealed no tendency to wider distribution here since then. During the decade, the number of *Erigeron annuus'* localities in Simferopol sity decreased from 4 to 1. There are only few dozen individuals of *Bidens frondosa* along the Salgir River. The only population of *Impatiens parviflora* in Slavyanka valley bottom collapsed from 200 to just 10 individuals. It is remarkable that *Impatiens glandulifera* Royle is still absent in the Crimea.

All species mentioned above were first reported from continental Ukraine in the 1950s and belong to mesophytic plants which experience lack of water supply in the Crimea. These invaders will unlikely adapt to the comparatively arid regional climate. The history of *Heracleum mantegazzianum* Sommier et Levier in the Crimea counts in favor of this hypothesis. The assumption exists that it is the founder of the Nikitsky Botanical Garden in Yalta C. Steven who planted this plant here. Being a typical high-mountain mesophyte in the Caucasus, *H. mantegazzianum* remained confined to a single plot of a few square meters for nearly 200 years. Its depleted population surrounded with ornamental plants was recently extirpated by workers who finally took *H. mantegazzianum* for a noxious weed. In addition, in the early 1980s, the species was introduced in two other places of the Nikitsky garden, the xeric Martyan Cape and the mesic Chortova gully, and at least in the second locality it still survives.

PHALACROLOMA ANNUUM (L.) DUMORT. INVASION IN KHMELNYTSKIY URBAN SYSTEM

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Phalacroloma annuum (L.) Dumort invasion is a serious threat to biological diversity of the Khmelnytskiy urban system. Origin of this plant is North America. Areal is European-Caucasian-North American. This is a xenophyte (1895), agro-epecophyte. As a result of our research of Khmelnytskiy urban system an increase of *Ph. annuum* on all the streets of the city was found. There were found individual specimens as well as brushwoods. On 32 streets of the city the plant created rather large spots (up to 4 square meters on Chornovil, Dachna,

Zarichanska streets, 10 square meters on Kurchatov, Proskuriv Pidpillya streets and Lviv highway, 12 square meters on Vokzalna street). The biggest areas of the species are in Hrechany, Ruzhychna and South-Western microdistricts. The plant is most spread on affected ecotopes i. e. open cast mines, embankments, road sides, railways, dumps. In suburbs Ph. annuum occupies much larger areas, they stretch in long lines (2-4 meters wide) along the roads. The spreading of the species happens in linear diffuse manner. From the roads it spreads to kitchen gardens, gardens and also can be seen in parks and squares. The plant has high adaptive possibilities. Usually it grows in well-lit open areas. Although roadside ecotopes are characterized by dry substrate, significant chemical pollution of soils and air, Ph. annuum adapted to it well. Seed productivity is high. Valid seeds give sprouts of 2 and 3 branching order. In long term preservation (6 years and more) seeds loose ability to sprout. Agricultural herbivorous animals do not eat *Ph. annuum*. It has no natural enemies AND spreads uncontrollably. This plant has naturalized and broke barriers of biotic and abiotic factors: geographical, reproductive and phytocenotic; and is spread in different ecosystems. Each year its areas increase. Having high invasive potential, *Ph. annuum* is a species-transformer. It changes the city ecosystems by rooting massively into vegetable cover and blocking renewal of local species, forces them out, decreases biodiversity hence its stability. It is necessary to control the expansion of the plant.

APOPHYTES IN THE URBAN FLORA OF CHERNIHIV (FOREST ZONE OF UKRAINE)

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Chernihiv is one of the oldest cities in Ukraine, founded in the VII-VIII century A.D. It is located in the forest zone in the northeastern part of Ukraine on the right bank of the Desna River. As a result of special studies of the Chernihiv urban flora, 1050 plant species spontaneously occurring within the administrative borders of the city were registered. Apophytes comprise almost ¼ of the total species number. Our analysis of this group of the citie's flora is based on field work, data from literature, and herbarium collections (mostly KW and Chernihiv Pedagogical University).

The apophytes, as a component of the Chernihiv urban flora, include 239 species belonging to 151 genera and 41 families, which constitutes 22.76 % of the total number of vascular plant species of the studied flora. There are 3 groups in this component: euapophytes (69 species), hemiapophytes (90), and occasional apophytes (80). The taxonomic spectrum of 10 leading positions among apophytes includes 11 families; they are arranged by the number of species in decreasing order: *Asteraceae* (44 species), *Fabaceae* (20), *Rosaceae* (18), *Lamiaceae* (15), *Caryophyllaceae* (14), *Poaceae* (14), *Apiaceae* (13), *Scrophulariaceae* s.l. (12), *Polygonaceae* (11), *Boraginaceae* (8), *Brassicaceae* (8). Eleven leading families comprise 177 plant species. For the analysis of the biomorphological structure in the apophytic fraction, the following life forms of plants occur: therophytes (65), hemicryptophytes (132), phanerophytes (11), geophytes (25), helophytes (2), chamaephytes (3), and hydrophytes (1). The geographical analysis of apophytes according to the zonal type resulted in the following series: boreal-submeridional (45), boreal-meridional (48), temperate-submeridional (42), temperate-meridional (41) range types; by the regional type – Eurasian (71), European–Western Asian (68), European, (48), and Circumpolar (34).

Nine ecological-coenotic groups with apophytes in their composition are segregated within the territory of Chernihiv. According to the received results, most apophytes occur in ruderal (159 species), meadow (92), forest (81), meadow-steppe (38) and forest margin (32) ecological-coenotic groups. After the ecological analysis, 80.33 % (192 species) of the apophytes are submesophytes and mesophytes, 90.3 % (216 species) are heliophytes.

Thus, as a result of our studies, the apophytic group of the Chernihiv urban flora has been analyzed. This is the most dynamic component in the fraction of indigenous species. It is also worth noting that the number of indigenous species occuring in anthropogenic habitats increases, because 29 of 239 apophytes were registered in anthropogenic habitats of the forest zone for the first time.

THE STRUCTURE OF URBAN FLORA OF GOMEL (REPUBLIC OF BELARUS)

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The city of Gomel based in 1142, is located in a southeastern part of Belarus. It occupies the space nearby 121 km^2 within city line, the population is 470 thousand persons. The city of Gomel is the second large industrial centre in Belarus. The natural soil cover in the city is strongly changed, on personal plots is cultivated.

The flora of the higher vascular plants of a city includes 746 species, 614 (82.3 %) from them grow spontaneously and 131 (17.6 %) are cultivated. These species concern to 445 genuses, 110 families and 4 divisions. 96.5 % of all species concern to *Magnoliophyta*, 80.0 % from them grow spontaneously. Class *Magnoliopsida* includes 79.6 % of species, independently growing species prevail - 82.9 %. 10 most numerous families of urban flora include 53.8 % of species, in spontaneous flora - 58.1 %, in cultivated - 43.5 %. The order of these families on flora in whole and in a spontaneous component differs only on 1 position (*Asteraceae*, *Poaceae*, *Rosaceae*, *Brassicaceae*, *Fabaceae*, *Lamiaceae*, *Caryophyllaceae*, *Apiaceae*, *Scrophulariaceae*, *Polygonaceae*), and in cultivated flora - is unique (*Rosaceae*, *Liliaceae*, *Brassicaceae*, *Solanaceae*, *Caprifoliaceae*, *Grossulariaceae*, *Ranunculaceae*, *Pinaceae*, *Alliaceae*, *Cupresaceae*).

Perennial plants are dominates in urban flora of Gomel (69.2 %), their number increases in cultivated flora to 72.5 %. The cultivated flora differs by high variety of trees and bushes - 31.3 %, whereas their quantity in a city as a whole is 17.5 %.

Quantity of annual plants on structural elements of urban flora the similar: a spontaneous component - 26.2 %, cultivated - 23.7 %, as a whole - 25.7 %.

The quantity noted alien plants is 34.0 % of all species, 19.7 % of them is the contribution of cultivated flora. At the same time, participation of alien species differs not considerably in elements of urban flora: spontaneous - 33.2 %, cultivated - 38.2 %.

INVASIVE SPECIES IN THE KHARKIV URBAN FLORA

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The studied alien flora contains 105 species (25 %) in a preliminary list of the urban flora of Kharkiv, includins 14 species (4 archaeophytes and 10 kenophytes) witch are considered highly invasive in Kharkiv.

By the degree of naturalization there are 10 epoecophytes (*Ambrosia artemisifolia* L., *Amaranthus retroflexus* L., *Anisantha tectorum* (L.) Nevski., *Galinsoga parviflora* Cav., *Grindelia squarrosa* (Pursh) Dunal., *Iva xanthifolia* Nutt., *Cardaria draba* (L.) Desv., *Robinia pseudoacacia* L., *Solidago canadensis* L., *Ulmus pumila* L.), and agrio-epoecophytes (*Acer negundo* L., *Capsella bursa-pastoris* (L.) Medic., *Malva pusilla* Smith., *Xanthium albinum* (Widder) H.Scholz.). The ecological analysis (by Tsyganow, 1983) showed that the dominance of submesotherms by temperature conditions – 8 species (*Grindelia squarrosa*, *Solidago canadensis*, *Ulmus pumila*, *Amaranthus retroflexus*, *Galinsoga parviflora, Cardaria draba*, *Malva pusilla, Polygonum aviculare*), 3 sp. – mesotherms (*Acer negundo, Anisantha tectorum*., *Xanthium albinum*), 2 sp. evortotherms (*Ambrosia artemisifolia*, *Robinia pseudoacacia*), 2 sp. submicrotherms (*Capsella bursa-pastoris, Iva xanthifolia*); in terms of salt regime – 8 mesomegatrophs (*Amaranthus retroflexus, Cardaria draba, Malva pusilla, Capsella bursa-pastoris, Xanthium albinum, Robinia pseudoacacia, Ulmus pumila, Acer negundo*), 5 sp. mesotrophs (*Ambrosia artemisifolia, Galinsoga parviflora, Grindelia squarrosa, Iva xanthifolia, Solidago canadensis*), 1 sp. – halaglycotrophs (*Anisantha tectorum*); in terms of hydrological condition dominatis species are mesophylling. It is a group with a xeric type of moistening: 5 species are xeromesophytes (*Malva pusilla*., *Robinia pseudoacacia*, *Ulmus pumila*, *Grindelia squarrosa, Amaranthus retroflexus*), 5 mesoxerophytes (*Xanthium albinum*, *Iva xanthifolia, Capsella bursa-pastoris, Anisantha tectorum, Cardaria draba*); 3 mesophytes (*Acer negundo, Ambrosia artemisifolia*, *Galinsoga parviflora*), and 1 mesopoliphyte – *Solidago canadensis*.; in terms of shading a lot of species constitute 10 species heliophytes, 3 sp. – hypoheliophytes (*Xanthium albinum*, *Ulmus pumila*, *Robinia pseudoacacia*), 1 sp. – hemisylvants (*Acer negundo*) and 1 sp. – sciosylvants (*Iva xanthifolia*) constitute 1 species each respectively. Analysis of coenomorphis showed the dominance of ruderal species (*Galinsoga parviflora*, *Iva xanthifolia*, *Ambrosia artemisifolia, Amaranthus retroflexus, Malva pusilla*, *Anisantha tectorum, Acer negundo, Robinia pseudoacacia*), pratants-ruderants (*Xanthium albinum*, *Solidago canadensis, Capsella bursa-pastoris*), and stepants-ruderants (*Grindelia squarrosa*, *Cardaria draba, Ulmus pumila*).

The research indicates that invasive species in the Kharkiv urban floras prefer anthropogenic transformation habitats, with rich mineral resources of soil and xeric conditions; most of them constitute epoecophytes and ruderants.

EXCURSIONS

Chernivtsi

The city of Chernivtsi stretches for 12 kilometres along both banks of the picturesque Prut River. The climate is mild. Chernivtsi has a population of about 400 thousand people.

The name "Chernivtsi" was mentioned for the first time in the feudal charter by the ruler of the Moldovian State Alexander Dobry (Alexander the Kind) on October 8, 1408. However, the town itself appeared much earlier, during the times of Kyivan Rus, when Prince Yaroslav Osmomysl ordered to build a fortress on the left bank of the Prut River in the second half of the 12th century. In the mid-13th century the fortress was ruined. Some historians claim that it was burned down in 1259, after Tatar military leader Burundai demanded Prince Danilo Romanovich to destroy all military fortifications in Galician Rus. The inhabitants of the fortress crossed the river and founded the town on its opposite bank where the centre of current Chernivtsi is located.

Over the centuries the town witnessed times of flourishing and decay. It was plundered and burnt many times by Turkish, Tatar and Polish invaders. All those misfortunes hampered development of the town, and because of that Chernivtsi in the early 18th century hardly differed from an ordinary village.

The architectural image of contemporary Chernivtsi began being formed in the 19th century, when the wide-scale construction of brick buildings began. A number of apartment houses, imposing edifices, which lend beauty to the city, the residence of Bukovynian metropolitans, the Cathedral, the railway station and the theatre, were built. As the time passed, Chernivtsi were gradually transformed into a well-planned city.

The city's railway station is the venue of many meetings and farewells, of romantic confessions, of long-awaited reunions and dreams. The architectural ensemble is a masterpiece of construction. Today the station is the most important gateway to the city.

As we turn into University Street, a unique architectural ensemble meets the eye. This is the most beautiful building in the city, the former residence of the Bishop of Bukovyna. Today it is the main building of Chernivtsi National University. It was constructed in 1864-1878, and consists of three parts. Nowadays the students of the Geographical Department, the Philological Faculty and the Department of Roman-Germanic Philology study here. Behind the main buildings stands a monument to the well-known Chech architect and scientist, the author of the architectural plan, Joseph Glavka (1831-1908).

Passing the University assembly hall, we come to Theatre Square. The edifice of the Chernivtsi Olga Kobylianska Ukrainian Theatre of Music and Drama was built in 1905. It was planned by the Viennese architects F. Felkner and H. Helmer, the authors of the Odessa and Vienna Opera Houses. The facade

is ornamented with sculptures from Greek mythology. The interior is mainly in the Baroque style. The talented company working in this theatre is famous far beyond our city. Theatre Square is a favorite meeting spot for inhabitants of Chernivtsi.

Chernivtsi is one of the most beautiful cities of Ukraine, attracting many tourists. Different architectural styles characteristic of past centuries blend well with one another. Many buildings are complete with bay windows, loggias, weather vane towers, sculptural relieves, and Baroque stucco molding. These architectural devices, so characteristic of the 17th century, add inimitability to the city.

Chernivtsi has been the home for many outstanding authors and artists. Ukrainian classical writers Yuri Fedkovich and Olga Kobylianska lived and worked for some time here. The most beautiful street in the city centre and the Music and Drama Theatre has been named after Olga Kobylianska.

This beautiful city with wonderful architecture, museums, shady alleys in its parks and gardens, summer cafes which can be found round every corner attracts tourists from all over the country and abroad. They come to admire the past and the present, which blend so harmoniously together.

The flora of Chernivtsy, now a subject of special studies, is represented by ca. 1200 species of vascular plants reflecting the regional floristic peculiarities of Bukovyna. Many rare plants are still present in this area, including 39 species listed in the Red Data Book of Ukraine: *Taxus baccata* L., *Cypripedium calceolus* L., *Dactylorhiza fuchsii* (Druce) Soó, *Gymnadenia conopsea* (L.) R.Br., *Gladiolus imbricatus* L., *Fritillaria meleagris* L., *Pulsatilla grandis* Wender., etc. At least 274 taxa are alien (such as *Ambrosia artemisiifolia* L., *Brachyactis ciliata* (Ledeb.) Ledeb., *Phalacroloma annuum* (L.) Dumort., *Solidago canadensis* L., *Impatiens glandulifera* Royle, *Echinocystis lobata* (Michx.) Torr. & A.Gray), and that number is constantly growing due to continued introduction and invasions.

Khotyn

Khotyn is one of the most ancient towns in Ukraine, which is 1000 years old. Khotyn occupies a unique place in the history of Ukraine. The State Historical and Cultural Reserve "Khotyns'ka Fortress" was established in 2000 to preserve the historical heritage. Its name originates from the verb ‘hotity’ (to want), as a lot of people wanted to live in this beautiful and rich place. This ancient Kievan Rus settlement changed hands frequently over the course of several hundred years – occupied at various times by the Kingdom of Hungary, Moldavia, Polish-Lithuanian Commonwealth, Russian Empire, Austria and Romania, before reverting to the USSR in 1940 (interrupted briefly by the

occupation of Nazi Germany from 1941 to 1944), and eventually the newly independent Ukraine. In terms of its historical significance, Khotyn was the scene of a famous battle in 1621, in which a large Ottoman force was resisted by the Commonwealth hetman Jan Chodkiewicz. Three centuries later, the town was part of the territory annexed by Romania in 1919, an act that was opposed by the town's ethnic Ukrainians. Khotyn is especially famous for its castle, towering over the Dniester River. In the beginning it was a small wooden structure. After the conquest of Rus by the Mongol-Tatars in the 13th century the construction of stone fortifications began by the orders of Prince Danylo Galitsky.

Today, Khotyn is one of the largest towns of Chernivtsi Region, an important tourist and cultural center of the Bukovina region.

Kamyanets-Podilskiy

Modern Kamyanets-Podilskiy was first mentioned in chronicles in 1062 as a town of the Kievan Rus' medieval state. In 1241, it was destroyed by the Mongol-Tatar invaders. In 1352, it was annexed by the Polish King Casimir III, and became the capital of Podole Voivodship and the seat of local civil and military administration. The ancient castle was reconstructed and substantially expanded by the Polish kings to defend Poland from the southwest against Ottoman and Tatar invasions.

During the Khmelnytsky uprising (1648–1658), the Jewish community there suffered much from Chmielnicki's Cossacks on the one hand, and from the attacks of the Crimean Tatars (their main object being the extortion of ransoms) on the other.

After the Treaty of Buczacz of 1672, it was briefly part of the Ottoman Empire and capital of Podolya Eyalet. To counter the Turkish threat to the Polish-Lithuanian Commonwealth, King Jan III Sobieski built a fortress nearby, Okopy Świętej Trójcy ("Entrenchments of the Holy Trinity"). In 1699, the city was given back to Poland under King Augustus II the Strong according to the Treaty of Karlowitz. The fortress was continually enlarged and was regarded as the strongest fortification in the Polish-Lithuanian Commonwealth. The preserved ruins of the fortress still contain the iron cannon balls stuck in them from various sieges.

After the Second Partition of Poland in 1793, the city belonged to the Russian Empire, where it was the capital of Podolskaya Guberniya. The Russian Tsar Peter the Great, who visited the fortress twice, was impressed by its fortifications. One of the towers was used as a prison cell for Ustym Karmeliuk, a prominent peasant rebel leader of the early 19th century, who managed to escape from it three times.

During the World War I, the city was occupied by Austro-Hungarian Monarchy in 1915. With the collapse of the Russian Empire in 1917, the city was briefly incorporated into several short-lived Ukrainian states: the Ukrainian People's Republic, the Hetmanate, and the Directoriya (Directorate), and ended up as part of the Ukrainian SSR when Ukraine fell under Bolshevik power. During the Directorate period, the city was chosen as de-facto capital of Ukraine after the Russian Communist forces occupied Kiev. During the Polish-Soviet War, the city was captured by the Polish Army, but it was later ceded to Soviet Russia in the 1921. Treaty of Riga determined the future of the area for the next seven decades as part of the Ukrainian SSR.

The different peoples and cultures that lived in the city have each brought their own culture and architecture. Examples include the Polish, Ukrainian and Armenian markets. Famous tourist attractions include the ancient castle and the numerous architectural attractions in the city's center, including the St. Peter and St. Paul Cathedral, the City Hall building, and numerous fortifications.

Ballooning activities in the Canyon of the Smotrych River also brought tourists. Since the late 1990s, the city has grown into one of the chief tourist centers of western Ukraine. Annual Cossack Games (Kozatski Zabavy) and festivals, which include the open ballooning championship of Ukraine, car racing and various music, art and drama activities, attract an estimated 140 000 tourists and stimulate local economy.

The city is the site of the largest in Ukraine and second largest in Europe National Nature Park Podilski Tovtry. It also has the picturesque Smotrych Canyon Nature Monument, protecting various rare and endangered species of plants. The flora of the city comprises 1069 species of vascular plants, including at least 33 species listed in the Red Data Book of Ukraine.

National Nature Park Podilski Tovtry

National Nature Park Podilski Tovtry is a nature conservational, recreational, cultural, educational and scientific institution of the national significance. It was established by the Presidential Decree No. 476\96 of 06/27/96 with the purpose of conservation, restoration and sustainable use of natural landscapes of Podillya and its unique historical and cultural complexes. These landscapes and complexes have esthetic, scientific, conservational, recreational, medicinal and environmental value.

NNP Podilsky Tovtry is located within three administrative districts of Khmelnitsky Region: Kamyanets-Podilsky, Chemerovetsky, and Gorodotsky; it covers 261 316 hectares (12.5% of the area of Khmelnitsky Region).

The name *tovtry* probably originated from the Thracian word *terdos,* or Latin *Tutrur mons*, meaning an edge, or mountain peak; in various Slavic languages it acquired pronunciation *tatry* or *tovtry*. During the times of the Tortonian and Sarmatian seas, ca. 25-15 million years ago, the ridge was formed

by coral reefs, and partially algae, mollusks, and bryophytes. Today low ridges (humps, tovtry) are covered with forest or steppe vegetation; sometimes nearly barren rock outcrops house vegetation of mosses, lichens, algae and calciphylic vascular plants.

The Tovtry itself is the rocky bow-shaped ridge, with altitudes within NNP reaching 400 meters above sea level, showing the remnants of coastal reefs extending along the ancient coastline. These reefs were formed during the Middle and Upper Miocene. The microclimate of the Kamyanets Dnestr region (*Kamyanetske Prysnistrovya* in Ukrainian) is affected by the Tovtry Ridge and canyons of the Dnestr (Dnister) and it tributaries; due to that, special conditions for preservation of rare and relict plants are present here. The flora of NNP Podilsky Tovtry includes over 1300 species of vascular plants, 61 species of which are listed in the Red Data Book of Ukraine. The fauna totals about 350 species of vertebrate animals, with 30 species listed in the Red Data Book.

The local flora is rather rich in relict (60) and endemic (35) species. Relict species (some probably being survivors since the Pliocene and Pleistocene) survived in broadleaf forests and rocky steppes of Podilsky Tovtry. Relicts are probably also present among some aquatic plants and components of mixed forests.

Within the park there are many nature protection areas and units. The ***Smotrych Canyon*** is considered as a nature monument of national significance, with the total area of ca. 80 hectares. It stretches from the village of Goloskiv, passes through the city of Kamyanets-Podilsky, and ends in the settlement of Tsibulivka. It is characterized by rocky outcrops of the Vendian (Late Precambrian) and Silurian strata, and is also a paleontological and geomorphological nature monument.

In the Smotrych Canyon there are several species included in the Red Data Book of Ukraine, such as *Astragalus monspessulanus* L., *Cephalanthera damasonium* (Mill.) Druce, *Chamaecytisus albus* (Hacq.) Rothm., *Epipactis helleborine* (L.) Crantz, *E. purpurata* Smith, *Galanthus nivalis* L., *Lilium martagon* L., *Listera ovata* (L.) R. Br., *Neottia nidus-avis* (L.) Rich., *Platanthera bifolia* (L.) Rich., *P. chlorantha* (Cust.) Rchb., *Staphylea pinnata* L., *Stipa capillata* L.

The national-level nature monument is ***Kytaygorodske Vidslonennya*** showing a worldwide reference section of the Silurian layers. It is settled down a slope in the valley of the Ternava, in the vicinities of Kytaygorod village, Kamyanets-Podilsky District. Here there are unique natural forest, steppe, and rocky habitats with species protected by the Bern Convention, the IUCN Red List, and the Red Data Book of Ukraine: *Astragalus monspessulanus* L., *Chamaecytisus albus* (Hacq.) Rothm., *Poa versicolor* Bess., *Pulsatilla pratensis* s.l. (*P. nigricans* Störck), *Schivereckia podolica* Andrz. ex DC., *Stipa capillata* L., *S. grafiana* Stev., *S. pennata* L.

The ***Kniazhpilsky Landscape Preserve*** is located not far from Kniazhpil near Kamyanets-Podilsky. The total area of the preserve is 821hectares. Here occur such noteworthy species as *Cephalanthera damasonium* (Mill.) Druce,

Epipactis helleborine (L.) Crantz, *E. purpurata* Smith, *Galanthus nivalis* L., *Lilium martagon* L., *Listera ovata* (L.) R. Br., *Neottia nidus-avis* (L.) Rich, *Platanthera bifolia* (L.) Rich, *P. chlorantha* (Cust.) Rchb.

The ***Karmalyukova Gora*** (Karmalyuk Mountain) ***Landscape Preserve*** is a wooded part of the Tovtry Ridge. The total area of the preserve is 765 hectares. It is located near Privorotia and Kamyanets-Podilsky. Here we can find *Cephalanthera damasonium* (Mill.) Druce, *Allium ursinum* L., *Epipactis atrorubens* (Hoffm. ex Bernh.) Schult., *E. purpurata* Smith, *E. helleborine* (L.) Crantz, *Lilium martagon* L., *Listera ovata* (L.) R. Br., *Neottia nidus-avis* (L.) Rich., *Platanthera bifolia* (L.) Rich., *P. chlorantha* (Cust.) Rchb., *Staphylea pinnata* L.

The ***Verbetski Tovtri Botanical Preserve*** is located close to the village of Gumentsi of Kamyanets-Podilsky District. It occupies 9.3 hectares. The terrain shows picturesque peaked hills extending perpendicularly to the main Tovtry Ridge. Among the rare plants species occurring here are *Astragalus monspessulanus* L., *Chamaecytisus albus* (Hacq.) Rothm., *Pulsatilla pratensis* s.l. (*P. nigricans* Störck), *Stipa capillata* L., *S. pennata* L.

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