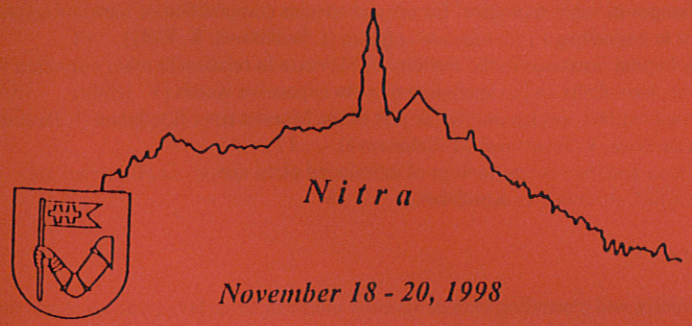
Slovak N. Committee for SCOPE
Slovak Botanical Society at SAS
Slovak Ekological Society at SAS
Slovak Entomological Society at SAS
Slovak Zoological Society at SAS
Slovak Ornithological Society
and
Faculty of Horticulture and Landscape Engineering SAU Nitra
Department of Ecology SAU Nitra

2nd scientific conference
on

invasions and invasive organisms

ABSTRACTS
and
programme



November 18 - 20, 1998

INVASIONS AND INVASIVE ORGANISMS

Nitra, November 18 - 20, 1998 Programme

WEDNESDAY - November 18, 1998

8:30 Registration
9:00 Conference opening
9:30 Global effect to control biotic invasions (P. Eliáš) 3
10:00 Vascular adventives signing changes in the global and local climate in Hungary (G. Facsar, L. Udvardy) 4
10:30 Invasion of *Mimosa pigra* in tropical Australia (J. Květ, N. Rea) 5
11:00 Hemerochores of the North American origin in the south-east of Ukraine (V.Tokhtar) 6
11:30 Invasive *Parthenocissus* species in the south - east of Ukraine (R. I. Burda) 7

12:00 Lunch

13:00 Comparison of nature and invasive *Lythrum salicaria*: A test of the EICA hypothesis (K. Edwards) 8
13:30 Adaptive potentialities of some species of the invasive genus *Oenothera* L. in the anthropogenous conditions (A. Z. Glukhov, I. N. Ostapko, V. K. Tokhtar) 9
14:00 Distribution of Tribulus terrestris L in settlements and in railway stations (A.Terpó)
14:30 A study of some population features on neophytic aster species in alluvium Morava river (E.Uherčíková)10

15:00 Break

15:30 Exogenous and endogenous factors of population density of beetles as an integral part of invasion (O. Majzlan)
16:00 The spreading of *Ostearius melanopygius* (Araneae, Linyphiidae) in Slovakia and Central Europe(Z. Krumpálová, A. Krajča) 11
16:30 The greenhouses as appropriate biotops for invasion of invertebrates (Evertebrata) (M.Krumpál,D.Cyprich) 12
17:00 Invasions of cormorants in Slovakia and Europe: How further? (A. Krištín) 13

THURSDAY - November 19, 1998

8:30 Changes in some ecological factors and species composition of meadow communities due to expanding *Calamagrosis epigejos* (I. Sedláková, K. Fiala) 14
9:00 Biological invasions in the territory of Slovakia in relation to main migration routes of adventive plants and to spreading of alien expansive weeds (V. Jehlík) 15, 16
9:30 Invasive plant species on Slovak part of the Morava river floodplain (I. Jarolímek, H. Oťaheľová, V. Banásová, M. Zaliberová) 17
10:00 Spread and invasive behaviour of introduced plant species in Nitra river area (P. Eliáš, A. Fehér, L. Končeková) 18

10:30 Break

11:00 Invasive and expanding taxa of vascular plants in Bratislava (with emphasis on protected areas (V. Feráková) 19
11:30 Distribution of some invasive plant species in region of central Slovakia (A. Cvachová) 20
12:00 Notes to the distribution of some invasive plant species in Slovakia (A. Cvachová, E. Gojdičová)

12:30 Lunch

13:30 History of distribution and occurance of *Echinocystis lobata* (F. MICHx.) Torr. et A. Gray in Slovakia (H.Šípošová,O.Ťavoda,M.Zaliberová,I.Jarolímek,I.Töröková) 21
14:00 *Heuchera americana*, a naturalized hemiagriophyt in Botanical Garden of UPJŠ, Košice (eastern Slovakia) (V. Mikoláš) 22
14:30 *Senecio inequidens* and *Atriplex heterosperma* - new invasive plants in Slovakia (V. Jehlík) 23

15:00 Break

15:30 Invasive and expansive woody plants in Slovakia (T. Baranec, P. Eliáš, ju.) 24
16:00 Invasive dendrotaxa of Arboretum Mlyňany (I. Tomaško) 25

Posters

1. Comparison between invasive and non - invasive populations of *Lythrum salicaria* L. under experimental conditions (D. Hanzélyová) 26
2. Proposal of the list of invasive and expansive plant species of Slovakia (A. Cvachová, E. Gojdičová, E. Karasová) 27
3. Alien invading plant species in Tatras (Western Carpathians) (P. Eliáš) 28
4. Spreading reconstruction of invasive species of *Fallopia* genus in Požitavská pahorkatina region in Slovakia (A. Fehér) 29
5. The genus *Chenopodium* in Slovakia (T. Schwarzová) 30
6. Invasive spreading of *Fallopia sachalinensis* (F. Schmidt, Ronse Decr.) in Slovakia (H. Šípošová, K. Goliášová)
7. Is the spider *Dictyna civica* (Lucas,1850) a synanthropic species? (Z. Krumpálová) 31

FRIDAY - November 20, 1998

8:30 The invasive plant species in CHKO Kysuce (Z. Kuderavá) 32
9:00 Monitoring non - indigenous species as a part of the integrated management of invasions and invasive organisms (P. Eliáš) 33
9:30 Possibilities of biological control of invasive plant species on the example of *Heracleum mantegazzianum* (Ľ. Cagáň, W. Nentwig) 34
10:00 Information about activities of the gestor group for invasive plant species (A. Cvachová, E. Gojdičová) 35

10:30 Break

10:45 General discusion
11:30 Acceptance of the conference conclusions
12:00 Closing of the conference

12:00 Lunch

GLOBAL EFFORT TO CONTROL BIOTIC INVASIONS
(Global Strategy on Invasive Species)

Pavol ELIÁŠ

Dept. of Ecology, Faculty of Horticulture and Landscape Engineering, SAU Nitra, Mariánska 10, SK - 949 01 Nitra

Invasive species are considered as the second of the most important threats of biological diversity. They are, therefore, in a centre of global interests.

Research programs, scientific meetings, proceedings and monographs document progress in knowledge of invasive process and invasive behaviour of species. SCOPE, Scientific Committee on Problems of the Environment, initiated a project on global strategy of invasive species. Convention on Biological Diversity (Art. 8h) asked „to prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species". IUCN, World Conservation Union, established Invasive Species Working Group, internet network „Aliens" and a newsletter Invader.

New Global Invasive Species Programme (GISP) focuses effort on preventing the introduction and spread of harmfull invasive species that damage the ecosystems into which they are introduced. It is coordinated by SCOPE, in conjuction with IUCN, CAB International and UNEP. It will represent interdisciplinary, proactive approach to prevention and management, focused on practical, comprehensive strategy against harmfull invasive species worldwide. The main goals of the GISP will be following: (1) to assemble the best information and approaches for prevention and management, (2) to disseminate them in the form of databases, manuals and capacity-building training programs to governments and communities, and (3) to lay the groundwork for new tools in science, infformation management, education, and policy that must be developed through collaborative international action.

VASCULAR ADVENTIVES SIGNING CHANGES IN THE GLOBAL AND LOCAL CLIMATE IN HUNGARY

Lázsló UDVARDY, Géza FACSAR

University of Horticulture and Food Industry, Department of Botany, 41118 Budapest, Hungary

Among adventive plants, signing slight warming of the global climate, most species have already been introduced into Hungary long ago and some of these wildspread; few have appeared subspontaneously nowadays. The former sign warming up with their growing quantity, the later with local appearance and spreading.

We have observes local spreading of *Albizia julibrissin*, *Diospyros lotus* and *Smilax excelsa*, temporerily only within the Arboretum of the UHFI in Budapest, subspomtaneous seedlings of *Albizia j.* have also been found in Gödöllő, and that of *Diospyros l.* in Szombathely. Seedlings of *Laurocerasus officinalis* and *Buxus sempervirens* appear sometimes in large quantities in relatively moister places, the former in irrigated gardens (SCHMIDT 1990)., the latter e.g. in cemeteries. Seedlings of *Buddleja davidii* and *Paulownia tomentosa* appear with increasing amounts in gaps of walls and pavements of moist microclimate.

In relatively dry habitats warming up of the global climate is signed by increading presence of some formely introduced adventive species, the folloving list contains the first data of observing the plant in Hungary by PRIZSTER 1997: *Tythymalus lathyris*: 1774, *Chamaesyce maculata*: 1906, *Eleusine indica*: 1914, *Amaranthus deflexus* var. *deflexus*: 1941. Among ornamental shrubs and trees spreading of *Pyracantha coccinea*, *Cercis siliquastrum*, *Corylus colurna*, *Prunus cerasifera*, *Catalpa bignonioides* and *Broussonetia papyrifera* are worthy of mention.

Can a native species be a invader? We consideryes, e.g. in case of Cleistogenes serotina - a characteristic codominant grass of Transdanubian slope turfs and forms a facies in many kinds of rock turfs - which has appeared on sandy areas at Kiskunság National Park in the late 1970's, and now covers there 15 % of the seed area of UNESCO Biosphere Reserve (BAGI 1997).

References

BAGI, I., 1997: Átalakuló vegetáció a Duna - Tizsa közén. Kitaibelia II: 2. pp. 253-264

FACZAR, G., 1998: A kertészeti gyakorlat növényhasznosításának következményei természetvédelmi nézõpontból; In: Az elö trrmészet védelme és a természetvédelem oktatása. Magyar Biológiai Társaság, Budapest 1998. 07. 09-10. Előadások összefoglalói. p. 7

PRIZSTER, Sz., 1997: A magyar adventívflóra kutatása. Botanikai Közlemények Supplementum (In press; mscr.: 14 pp.)

SCHMIDT, G., 1990: Díszfák és kertek képekben. Botanika Reklám és Kiadó Kft., Sopron. 96 pp.

INVASION OF *MIMOSA PIGRA* L. IN TROPICAL AUSTRALIA

Jan KVĚT

Institute of Botany, Academy of Sciences of the Czech Rep., CZ-37982 Třeboň, and Faculty of Biological Sciences, University of S. Bohemia, CZ-37005 České Budějovice, Czech Republic

Naomi REA

C.S.I.R.O., Division of Entomology, PMB 44, Winnellie, NT 0821, Darwin, Australia

Mimosa pigra L., a prickly shrub native to tropical America, has invaded several other tropical regions, among them also the Northern Territories of Australia. This environmental weed grows best in seasonally flooded areas which have been disturbed, e.g., by past grazing by water buffaloes. The plant has a high seed production and germination rate, its seeds are tolerant even of a light fire. Established *M. pigra* seedlings as well as mature plants can tolerate relatively long periods both of inundation or waterlogging and drought. This feature facilitates their adaptation to the seasonal climate of northern Australia. The plants of *M. pigra* possess an enormous capacity for regeneration after any kind of mechanical damage or after a light fire.

At present, *M. pigra* is regarded as one of the most troublesome environmental weeds in Australia. Most research on its control has been done in Australia and Thailand. Various experiments and field trials with mechanical, chemical, biological and fire control, each technique being applied separately, have mostly been unsuccessful. Ecologically acceptable integrated control methods are now therefore being developed and tested. Biological control by imported and released (after careful screening) insects is an essential component of the integrated control of *M. pigra.* This approach to its control is promising, but sites on which it has been suppressed can easily be invaded by (an)other environmental weed(s). The response of the whole ecosystem to the control measures must thus be taken into consideration.

The talk presented at this Conference discusses the assumption that matching the life history of the target plant, which is *M. pigra* in this case, with the life histories of the control agents can make the control more effective. The next assumption is that the control effect can be enhanced by other treatments applied at strategically advantageous periods of the target plant´s life history, when the plant´s physiology is relatively more sensitive to the stress induced by the combined control treatments.

HEMEROCHORES OF THE NORTH AMERICAN ORIGIN IN THE SOUTH - EAST OF UKRAINE

Valeri K. TOKHTAR

Donetsk Botanical Gardens, Illich´s Avenue, 110, Donetsk 340059 Ukraine

All the invasive plants may be divided into mono - oligo - and - polyhemerochores according to a number of ways they spread. The first group of plants spreads only in one way with loads (for example, a specialized rice weed Echinochloa oryzoides (Ard.) Fritsch., the second one distributes in some ways, one of which is dominant. Plants of the third group migrate with different types of loads in many ways, of which two are dominant. The study of 241 quarantine certificates for imported loads and main sources of invasive species drift allowed us to determine that in the south - east of Ukraine among invasive North American species 28 ones belong to monohemerochores, 25 - to oligogemerochores and 8 ones are polyhemerochores. It should be noted that these groups practically completely coincide quantitatively and quanlitatively with groups of plants according to naturalization extent, that is correspondingly: ephemerophytes - 30, epecophytes - 26, agryophytes - 4. Obviously a number of ways by which North American species are spread is directly connected with possibilities of plants naturalization, though this correlation is not absolute. The use of categories mono - oligo - and hemerochores for definition of possibilities for further species spread is more informative than of plants categories according to a degree of naturalization, the definition of which requires time.

Prognostication of biological pollution of regions calls for study of monohemerochores categories (especially those the emergence of which is only being expected) and oligohemerochorous species which may gradually change a life strategy and are potential polyhemerochores. Ambrosia trifida L., Euphorbia dentata Michx., Ipomoea hederacea (L.) Jacq., Oenothera biennis L., Bidens frondosa L. belong to mono - oligohemerochores, which have been lately brought in most imtensively. The majority of them has been already found by us.

Thus, as a result of our investigations it has been established that despeialization of distribution ways in some North American oligohemerochorous species and expansion of their diversity spectrum bring to gradual transition of plants into the rank of polyhemerochores, which in some cases are capable of autonomous distribution.

INVASIVE PARTHENOCISSUS SPECIES IN THE SOUTH - EAST OF UKRAINE

R. I. BURDA

Donetsk Botanical Gardens, Illich's Avenue, 110, Donetsk 340059 Ukraine

Out of 10 species from the genus Parthenocissus Planchon (Vitaceae), grown in the North America, Eastern Asia and the Hymalayas P. quinquifolia (L.) Planchon, P. tricuspidata Sieb. et Zucc. (Dobrochaeva, 1955, Dobichina, 1967) are mentioned as cultivated ones in the floristic reports for Ukraine, in the dendrological ones P. inserta (Kern.) Fritsch. (Golovach, 1973, Orlov, 1986, Shulgina, 1958) is also given. The authors of the both publications do not inform about species ability to naturalize in Ukraine. It is strange, for in the Western and Central Europe P. quinquifolia got locally naturalized and P. inserta - partially (Webb, 1968, Lohmeyer, Sukopp, 1992). According to our observations in the south - east of Ukraine the Parthenocissus species run easly wild. Our purpose is to establish naturalized localities of species, to specify taxonomic belonging, time, a way of invasion and an extent of naturalization and to investigate their ability for invasion.

The cultivation of these North American species in our region began in the middle of the last century. V. M. Chernyaev (1859) does not make casual mention of Parthenocissus in the first fundamental report on flora of Slobodskaya Ukraine, concerning "wild and cultivated plants". I. Ph. Shmalghausen (1897) cites Vitis hederaceae L. as sometimes grown in the gardens without mentioning it's running wild. In the list of Ekaterinoslav flora V. Sidorov (1897) describes P. quinquefolia or the Velikoanadolsky forest with a foot - note "became wild and formed big thickets".

At present these both species and their numerous hybrids are widely spread in cultivation and got naturalized. Most often Parthenocissus runs wild in towns and other settlements, near summer cottages, cementries where there is constant replenishment of plants from places of their cultivation. Rather frequently it's species occur in the industrial wastes, near rubbish heaps, along railways and motor roads. But the most vigorous and long - lived localities are formed by the species of the genus under the canopy of forest trees of different age, composition and destination. Under these conditions thickets of two habits are formed: common, climbing trees and shrubs, reaching the sunlight, blossoming and bearing fruit or procumbent, making a peculiar "grass cover" with vigorous leaves on long petioles, they never flower. The both forms are rather vegetatively mobile, besides the first one is spread by birds, pecking it's fruit. At least, there are three such localities in centennial forest plantations: National natural park "Svyaty Gory", an above mentioned nature reserve "Velikoanadolsky" and "Azovskaya dacha" which serve as invasive sources.

COMPARISON OF NATURE AND INVASIVE *LYTHRUM SALICARIA*: A TEST OF THE EICA HYPOTHESIS

Keith EDWARDS

Institute of Botany , Academy of Science of the Czech Rep., CZ-37982 ,Třeboň, Czech Republic (present address)

A common feature of successful invasive plant species is the greater height and stature of plants in these invasive populations, compared to plants in populations of the same species growing in their native range. These differences in growth may arise from the invasive populations evolving into more competitive genotypes, due to the prolonged lack of natural control agents in the species' area of secondary distribution; this is the prediction of the evolution of increased competitive ability (EICA) hypothesis. According to the EICA hypothesis, invasive plants should allocate more dry weight biomass to stem growth or reproduction, and less to defense, and should be more susceptible to herbivory, than native plants of the same species.

As a test of the EICA hypothesis, a common garden experiment, using plants from native and invasive populations of Lythrum salicaria, was conducted over one growing season (1994) at Trebon, Czech Republic. Lythrum salicaria is an herbaceous perennial species of temperate wetlands, which is native to Europe, but has successfully invaded temperate wetlands in North America. After one growing season, few differences in biomass allocation patterns were found between plants from an invasive U.S. population (northern Indiana) and from four native European populations (central Europe). There were significant differences in biomass allocation patterns among the European populations, however; plants from populations growing in more nutrient-rich habitats allocated more biomass to root weight and less to reproduction than plants from populations growing in less productive habitats. The U.S. plants flowered two weeks later than the plants from the European populations. Also, the U.S plants were not better competitors than the European populations, based on a diallele experiment.

A second common garden experiment was conducted at Trebon, Czech Republic, starting in the 1996 growing season. This longer-term experiment was designed to determine whether the patterns observed in the preliminary experiment continued over several growing seasons. Biomass allocation patterns and competitive ability were compared between plants of the same invasive U.S. population of L. salicaria and two of the native European populations, one from a nutrient-rich habitat and the other from a less rich habitat. Plants were grown in three different nutrient and two water level conditions, using a factorial design. Competition was measured using a replacement series. The experiment was harvested after the 1998 growing season.

ADAPTIVE POTENTIALITIES OF SOME SPECIEC OF THE INVASIVE GENUS OENOTHERA L. IN THE ANTHROPOGENOUS CONDITIONS

Alexander Z. Glukhov, Irene N. Ostapko, Valeri K. Tokhtar

Donetsk Botanical Gardens, Illich's Avenue, 110, Donetsk 340059 Ukraine

Adaptive potentialities of three species of the invasive genus Oenothera L. in different anthropogenic ecotopes have been studied according to the content of Fe, Mn, Zn, Cu in the overground mass of Oenothera biennis L. (6 populations), Oe. rubricaulis Kleb. (3 populations), Oe. salicifolia Desf. ex G. Don (1 population).

The mostvariable characteristic for topopopulations of different oenothera's species in the south - east of Ukraine is the iron content from 578,9 (Oe. salicifolia 1, an anthropogenous ecotope) to 2274, 8 mg/kg of dry mass (Oe. rubricaulis, an anthropogenous ecotope). The content of the rest elements (Mn, Zn, Cu) varies slightly under different ecological conditions.

The accumulation degree of all the analysed heavy metals in populations of oenotheras from different ecotopes was decreasing in a row: railway embankments - highways - natural localities. This, apparently testifies to different extent of these ecotopes transformation.

The accumulation of the investigated heavy metals in the populations of oenotheras is weakly species - specific. This is confirmed with the analysis of heavy metals content in mixed populations of different species of oenotheras, growing under absolutely identical conditions. Moreover, various populations of Oe. biennis from the same locality differed between themselves more than some species from different habitats.

A STUDY OF SOME POPULATION FEATURES ON NEOPHYTIC ASTER SPECIES IN ALLUVIUM MORAVA RIVER

Eva UHERČÍKOVÁ

Institute of Zoology SAS, Dúbravská cesta 9, 842 06 Bratislava

In present, problems with taxonomical determination of neophytic Aster-group, growing on Morava and Danube alluvium, are persist. According to personal determining it may be Aster lanceolatus aggregate group. Presented experiences were obtained in alluvium of Morava river near the village Vysoká pri Morave in the years 1996 to 1998.

Population density of aster was estimated on four permanent reseach plots (PRP) in floodplain forest. The least mean value 33 shoot/m^2 (futher s/m^2) was found on PRP4 in ash-elm forest ass. Fraxino pannonicae - Ulmetum. Canopy of tree layer was 70%, shrub layer 20% (26.6.97). The highest mean density 211 s/m^2 was on PRP5 (the same date). It is the same forest area 400 m away, situated closer to Morava bed. The tree layer was less dense, 55%, shrubs 35%. High mean density 203 s/ m^2 was found in willow forest ass. Salici - Populetum on PRP7 transect, situated cleosest to Morava bed. The tree layer covered only 40%, shrubs were absent. In 1998, mean population density have decreased on the most plots. This may be due to severe flood in July 1997 (Uherčíková, Hajdúk,1997).

In relation to aster density the species diversity (number of species) was estimated. The highest diversity 10,6 was on a plot with least aster density (33 s/m^2), the lowest 4,2 - 4,6 with 132,4-211 s/m^2 aster density. This support a tendency of decreasing species diversity with increasing aster density.

Size structure of population in research plots was estimated during lateral branch initiation (the 2-nd August decade), flower bud initiation (the 2-nd to 3-rd August decade) and during flowering (th 3-rd Septembre to 1-st Octobre decade). The first flowers occur in the late summer. Mean height of population during branching on PRP7 was 81-90 cm, in stage of buds emerging 100-120 cm, maximum 160 cm (20.8.98). In 1996 mean height of plants with buds on the same PRP was higher (120 -130 cm). On PRP6, with higher canopy tree and shrub layer, the mean hight of flowering population was lower (90-100 cm). The mean hight of flowering population was 81,3 cm (13.10.98, PRP5). This represent 14,8% of the population. During flowering a rosettes are formed from rhizomes. Aster survives winter in this dormant rosette stage. In late August, white films on the leaves have occured, caused by phytopathogene micromycethes family Erysiphaceae (Bacigálová, pers.info). This powdery mildew occurs on cucurbits (Zlochová, 1990).

A permanent experimental plots 1x1 m (PEP) in ash-elm forest PRP5 were established, where all the plants were removed (May and June 1997). This experiment aimed to detect an aster re-establishment after harvesting and succesion of vegetation on the plots. On three PEP all the roots were removed by digging the soil out in the depth of 20 cm, on three other PEP the plants were cut near the ground only. New plants/ stems have occured on 2/3 of dug plots after 11 untill 19 weeks. On the plots, where the plants were cut, bolting started 14 weeks after and on spring next year occured in all the cut plots. In autumn 1998 there were some flowering plants too.

The spreading of *Ostearius melanopygius* (Araneae, Linyphiidae) in Slovakia and Central Europe.

Zuzana Krumpálová & Andrej Krajča

Ústav zoológie SAV, Dúbravská cesta 9, SK-842 06 Bratislava, Slovenská republika

The spider *Ostaerius melanopygius* (O. P. Cambridge, 1879) was described from New Zealand. *O. melanopygius* has probably have an origin in South Amerika (LEHTINEN, 1996) and it belongs to the relict fauna of Gondwana (MILLIDGE, 1985). *O. melanopygius* has been living in Europe since 1906, there was imported by shipment from New Zealand [as a gastropod *Potamopyrgus antipodarum* (ČEJKA, 1997)]. The spider was for the first time recorded in England (1906) and Atlantic islands (Madeira, Azores). In 1937 it was found in Portuguese, in 1944 on western coast of France. In 1957 the spider was recorded in Germany (near Hamburg), the next record were made in Belgium (1963). In the 1970´s it had been finding in Czech Republik, Poland and Austria, in the 1980´s in Switzerland and finaly in 1990´s in Slovakia. The spider occurs in a wide variety of biotops, often in association with human activities, such as rubbish heaps, fields, gardens, on compost-heaps, in greenhouses, however, in the protected areas. The spider has been progressing through Europe eastwards at a rate of approximately 30 km annualy. The spreading may be passive and caused by the prevailing wind direction from west to east, according to RŮŽIČKA (1995). The present spreading of species from south hemisphere and mixing of individual populations (that not exibit symptoms of isolation) is probably possible. Findings of wind-blown specimens in the Alps at altitudes over 2,000 m is evidence of the enormous ability of *O. melanopygius* to spread (THALER, 1978). The ways of its dispersal, biology and ecology are discussed. The spider´s adaptability is distinct.

THE GREENHOUSES AS APPROPRIATE BIOTOPS FOR INVASION OF INVERTEBRATES (EVERTEBRATA)

Miroslav KRUMPÁL, Dušan CYPRICH

Katedra Zoológie PRIF Univerzity Komenského, Mlynská dolina B – 1, 842 15 Bratislava, e-mail: krumpal@fns.uniba.sk

Biotops have to keep certain conditions that are able to let invasive species to entry. First of all there are the appropriate abiotic conditions. Among others instability and change of environment caused by man (ELIÁŠ, 1997) or absence of mortality-causing factors (KRIŠTÍN, 1997), etc. Realising fact that almost every well-known invertebrate invasion to Slovakia is connected with human activity (e.g. by molluscs, ŠTEFFEK, 1997), we can say all the large heating greenhouses with whole year regular temperature keep the acceptable conditions, e.g. in botanical gardens. During process of establishing if it is invasive species we meet a lot of problems of clear and easy taxon determination and reliable data in the former literature, resp. database. It is not possible in cause of several taxa (Nematoda, Thysanoptera, Aphidoidea, etc.), so we can hardly appreciate the taxon´s status of invasion. Species living in greenhouses examples are mentioned and can be considered as invasive ones.

INVASIONS OF CORMORANTS (*PHALACROCORAX CARBO*) IN SLOVAKIA AND EUROPE: HOW FURTHER?

Anton KRIŠTÍN

Institute of Forest Ecology of Slovak Academy of Sciences, Zvolen, Štúrova 2, SK-960 53

Cormorant (*Phalacrocorax carbo*) belong to more bird species in Europe, having so called invasion type of occurrence, relating with overabundance of food, resp. nesting possibilities and with consequential quick breeding expansion. After a period of severe human persecution in 1950-1960, the populations started to rise from about 1980 onwards, parallel to the rise in the western breeding range. There were found breeding population increase not only in area of western and northern Europe, but also in Central and Eastern Europe. Mean annual growth rates ranged from 14% in Poland to 27% in Sweden (Lindell et al. 1995). Systematic disturbances of newly established settlements in northern Europe have locally lowered the overall growth rate, but may have been responsible for further eastward expansion of the breeding range. Paralell to the population increase in Denmark , The Netherlands and further N and NW european countries, numbers of breeding as well as non-breeding birds have . recently started to rise in Slovakia and Czech Republic, what caused in fishing management and some fishing grounds very complicated problems.

Invasion occurrence of cormorants was recorded in Slovakia mainly in autumn, winter and spring period, when appeared populations breeding in northern and NW Europe. Swarms (comprising more hundreds up to 1000 individuals are seeking in these periods mostly bigger runs of rivers (Dunaj, Hron, Váh, Nitra), but also water bodies and fish ponds, when not frozen. These short period (some days) but frequently repeated invasions have been found from 1990. Cormorants started also to breed in Slovakia in this year (again after 28 years from 1962, out of one breeding record in 1977, Matoušek, in litt.). In this year uprised breeding colony comprising 11 nests in NPR Senné (Eastern Slovakia) and till 1995-1996 rised to 210-220 nests in two small islands of this Nature reserve. This population development caused the problems not only for fishing management but also for rare waterfowls protection (Danko 1997). In 1996-1998 appeared also several smaller breeding colonies in Danube and Morava river area.

Invasions (swarms of 100-1000 individuals) were recorded mainly in non-breeding populations in overnight and hunting plots, in riparian poplar-willow growths in middle run of Hron river (Hronský Beňadik -Podbrezová) mainly in October - March 1994 - 1998. Mass occurrence of swarms hunting fishes in this period documents indirectly also higher water quality in rivers and better food supply of fishes.

In this paper were discussed also spatial relationships of cormorants in overnight plots, influence on further bird species. Possibilities of some important fishing grounds protection and solving damages caused by cormorants are analysed in coherency with legislative norms.

References:

DANKO, Š., 1997: Kormorán veľký (*Phalacrocorax carbo*) v NPR Senné rybníky a napriľahlej rybničnej sústave Iňačovce - Senné. Tichodroma 10: 7-35. (on Slovak).

LINDELL, L., MELLIN, M., MUSIL, P., PRZYBYSZ, J., ZIMMERMANN, H., 1995: Status and population development of breeding cormorants Phalacrocorax carbo sinensis of the central european flyway. Ardea 83: 81-92.

Changes in some ecological factors and species composition of meadow communities due to expanding *Calamagrostis epigejos*

Iva Sedláková[1, 2], Karel Fiala[2]

[1] *Department of Systematic Botany and Geobotany, Masaryk University, Kotlářská 2, 611 37 Brno, the Czech Republic*

[2] *Institute of Botany, Department of Ecology, Academy of Sciences of the Czech Republic, Poříčí 3b, 603 00 Brno, the Czech Republic*

During the last years, an increase of the grass *Calamagrostis epigejos* has been recorded in meadow communities in the alluvium of the Dyje River (South Moravia, the Czech Republic). The regular flooding of this area was eliminated and the water-table depth was lowered due to water-management measures. The traditional agricultural practise of regular and frequent cutting of meadows has stopped in many cases here. The effects of *C. epigejos* expansion on species richness and changes in environmental conditions of meadow community were the object of the present study. The experimental site was located in the forest tract near Lednice. Studied meadow community belongs to the *Cnidion venosi* alliance (dominated by *Cirsium canum, Deschampsia caespitosa, Carex gracilis, Cnidium dubium, Alopecurus pratensis*). *Calamagrostis epigejos* spreads vegetatively to form distinct polycormons. Data were collected on the cover, height and shoot density of *C. epigejos*, as well as the presence of other species, in 1 m^2 quadrats placed along radial transects within and outside of the selected polycormons. Ten quadrats in outside, edge, inner, and central part of the polycormons were examined. In addition soil temperature, soil moisture content and changes in radiation regimes were studied. Polycormon expansion was accompanied by an increase in *C. epigejos* cover, height and shoot density, and a corresponding decrease in species richness. Shoot density, shoot length and percentage cover increased from the inner edge to the central part of expanding polycormons. Shoot density ranged from 20 shoots per m^2 at the edge, to a high of 677 shoots per m^2 in the centre of *C. epigejos* polycormons. Cover of *C. epigejos* varied from less than 6% at the edge to 85% in the centre. Length of flowering shoots of *C. epigejos* ranged from 80 cm (average value) in edge quadrats to a maximum of 124 cm in the central quadrats. Thermal regime if the soil was characterized by lower soil temperature in the dense *C. epigejos* polycormon (on the average by 2.5 °C at soil depth of 5 cm at the beginning of August, in an afternoon under clear sky) where soil moisture content was usually higher. Radiation at the soil surface in the polycormon center represented only about 16% of that recorded in meadow stands without *C. epigejos*. The largest decrease in the number of species was found when cover of *C. epigejos* exceeded 70%. On the average, species richness decreased from 34 vascular plants species in outside quadrates to 20 species recorded in the centre of polycormons. There were three different patterns in the frequencies of other plant species along a transect into *C. epigejos* polycormons: no change (*Euphorbia lucida, Lysimachia vulgaris, Rumex acetosa, Silaum silaus*) a gradual decrease in frequency or cover degree (*Cirsium canum, Plantago lanceolata, Potentilla anserina, Ranunculus repens*), and a sharp decrease in frequency or absence in the polycormon centre (*Cardamine matthioli, Leontodon autumnalis, Linum catharticum, Lotus tennuis, Luzula campestris, Potentilla reptans, Prunella vulgaris*). In the absence of proper management of meadows, the expansion of *C. epigejos* could bring about the degradation of the last remnants of various types of meadow communities and the disappearance of rare plant species in this region. This study was supported by the grant 206/98/0216 from the Grant Agency of the Czech Republic.

Biological invasions in the territory of Slovakia in relation to main migration routes of adventive plants and to spreading of alien expansive weeds

Vladimír Jehlík

Research Institute of Crop Production, Division of Agroecology
Drnvská 507, 161 06 Praha 6 – Ruzyně, Czech Republic

Nowadays not only the landscape and environment change conspicuously, but there occur also gradual considerable quantitative and qualitative changes in biota garnitures. These changes happen in conspicuously shorter time than it was in former civilization periods and are connected with an intensive development of settlements, industry, agriculture and transport, and related negative phenomena which affect the nature as a whole, and thus the whole our environment. Some species of hemerophobic plants become to be more and more rare or they become extinct, other – on the other hand – are supported in their development and spreading – so called hemerophilous or „culture-demanding" plants. At present in some developmentally progressive genera of higher plants, rich in species (e.g. *Chenopodium* L., *Atriplex* L., *Oenothera* L., *Senecio* L., *Xanthium* L., *Bromus* L. and many other – a lot of them belong to considerably hemerophilous genera) due to anthropogenous press occur an actual acceleration and intensification of speciation process, which leads to arising of a greater number of new taxons (starting with varieties and ending with „good" species) not having been known in older time of modern times. Distances between continents became substantially shorter due to the transport; the exchange of diaspores through permanent import of their sources from geographically more distant regions, possibly from other continents, enabled formerly impossible meeting of genetically related, morphologically and chorologically rather different morphotypes. It is one of the basic conditions for further speciation, however, provided that morphotypes have also good biological and ecophysiological features (instead of former isolation, there are considered hybridization, introgression, rise of new hybridogenous species, and mutations). This generalization is valid in a greater extend just for alien expansive weeds, formerly often called „quarantine weeds", and nearly always also for invasive species.

In the territory of former Czechoslovakia, Jehlík et Hejný 1974 (Folia Geobot. Phytotax. 9, Praha) distinguished 3 actual migration routes of adventive plants, and so partly also invasive plants: the Eastern route, the Elbe (Labe) route , and the Pannonian route (cf. also Jehlík et al., 1998: Alien expansive weeds of the Czech Republic and the Slovak Republic, Academia, Praha, 506 p. – more times. How do the phenomena of particular migration routes show up in Slovakia at present?

The eastern route significantly works mainly in eastern Slovakia. Except of formerly found species (cf. Jehlík et al. 1998: 50–51, 55, 66–67, 97 etc.), in recent time also *Atriplex heterosperma* Bunge (Dobrá u Čierne nad Tisou 1998, V. Jehlík) was recorded. The phenomenon of the Pannonian route shows up in the Danubian lowland, and in surrounding hilly country in the whole southern and southeastern Slovakia (cf. Jehlík et al. 1998: 54, 56, 57, 96). In the southern part of Slovakia in lowlands and the lower parts of hilly country also the area of distribution of actual and potential occurrence of the vast majority of thermophilous ruderal and segetal species from the Hungarian lowland, the Balkans, and southeastern Europe ends.

The phenomenon of the Elbe (Labe) route of adventive plants, it means

transcontinental migration through water routes (in Slovakia, especially in future, the Danube), has expressed only rarely till now (especially in Bratislava – mainly introduction with overseas oilseeds, or very rarely with grain, cf. Jehlík et al. 1998: 66, 72, 95 – only a smaller part of the given species).

Jehlík et al. (1998: 15–16, 64–65, 104–105) distinguished on the territory of the Czech Republic and the Slovak Republic forty species of alien expansive weeds. For their spreading in the Czech Republic and the Slovak Republic (and already also in neighbouring countries), the theory and the praxis of the main migration routes are valid, verified by the field research. The migration routes are comprehended in a phytogeographical, not florogenetical way, which means that their single components (alien species) present the particular geoelements on basis of their actual distribution. Thus, often there are subcosmopolitan or (nearly) cosmopolitan species (the both sensu Jehlík 1986: 43–46, in Vegetace ČSSR, Praha, ser. A, 14: The vegetation of railways, or Jehlík 1986: 100–101, in Tuexenia, 6, Göttingen). The vast majority of alien thermophilous weeds naturalize after their introduction, or they expand as weeds of cultivated fields at localities in the area of the maize production type (cf. Hamerník et Rosůlek 1966 in Atlas Čs. Socialist. Rep., Praha, Mapa 41.1), it means mainly in lowlands, and sometimes in following up areas of the beet production type. The Carpathian mountain massif is for thermophilous alien weeds during their „travel" to northern Slovakia an invincible natural barrier. These plants can only sporadically reach there from south to north through narrow corridors which represent (from west to east) the Morava Basin (from Záhorská lowland), the Váh Basin (from the Podunajská lowland), or more shorter enclaves from Východoslovenská lowland. Because of the given reasons, during monitoring and regulation of spreading of alien expansive weds in Slovakia, it is necessary to pay main attention to this territory in southern area of the republic.

After 1945 (more strictly from 1947 – the date of putting the railway transfer station Čierna nad Tisou into service), eastern Slovakia involuntary obtained a „new gate" for penetration of alien weeds from east which connected 3 main geographical ways according to the most frequent provenance of diaspore sources which were cereals, particularly consumption wheat (mainly in 1947–1979): the southern Ukraine, southeastern Russia, Central Asia. The importance of this „gate" exceeds the boundary of the Slovak Republic. Fortunately, Slovakia is self-sufficient in production of basic cereals.

INVASIVE PLANT SPECIES ON SLOVAK PART OF THE MORAVA RIVER FLOODPLAIN

Ivan JAROLÍMEK, Helena OŤAHEĽOVÁ, Viera BANÁSOVÁ, Mária ZALIBEROVÁ

Institute of Botany of S.A.S., Dúbravská cesta 14, 842 23 Bratislava, Slovakia

Invasive plant species were studied during long time complex research of flora and vegetation of the Morava river floodplain between left side dam and the river flow. New knowledge on invasion on regional level was one of the aim of the research. Distribution of neophytes and their penetration into plant communities were studied above all.

540 plant species were found in the alluvium, 143 were allochtonous species. Following Feráková (1994) there were 80 archeophytes and 63 neophytes. The most of archeophytes were integrated into autochtonous flora. On the contrary, the strange character of the most of neophytes in the local nature persisting. The "behaviour" of neophytes in the studied territory is various and majority of them - typical ruderal and segetal species - are non-invasive species in inundation zone. That is in harmony with biotope structure of the alluvium. Meadows, wetlands, and forest prevail, ruderal biotopes - mainly trampled habitats - are sparse, and fields are sporadic. If we classify within invasive species that ones which expansively penetrate into natural and seminatural plant communities, so invasive character have neoindigenophytes. *Aster novi-belgii* s.l., *Echinocystis lobata, Impatiens glandulifera, Helianthus tuberosus* s.l., *Bidens frondosa, Xanthium albinum, Negundo aceroides, Impatiens parviflora, and Erigeron canadensis* are the most frequent neoindigenophytes in the studied territory.

The analysis of penetration of neoindigenophytes into various plant communities showed the river bank plant communities are the most damaged. All above mentioned neoindigenophytes occur in the communities of the alliances *Senecion fluviatilis* and *Bidention tripartiti*, some of them even as dominants of stands. Shade more tolerant invasive species are relatively frequent in poplar and ash-tree plantations. A few of them occur in water, wetland, and seminatural forest communities. Regularly moved meadows seem to be the most invasion-resistant.

Literature:

Feráková, V., 1994: Floristic remarks on the lowest part of the Morava river floodplain area with special attention to naturalization of neophytes. Ekológia Bratislava, Suppl. 1:29-36.

DISTRIBUTION AND INVASIVE BEHAVIOUR OF ALIEN PLANT SPECIES IN THE NITRA RIVER CATCHMENT AREA

Pavol ELIÁŠ, Alexander FEHÉR, Lýdia KONČEKOVÁ

Department of Ecology, Faculty of Horticulture and Landscape Engineering, Slovak Agricultural University, Maránska 10, SK-949 01 Nitra

Regulated rivers are important corridors for spreading of alien plant species in a region (ELIÁŠ, 1997), therefore they are model objects for research of invasions and invasive behavior of species.

Distribution and invasive behaviour of alien and introduced plant species in the Nitra river catchment area, particularly along the main stream between towns Partizánske/Topoľčany and Nové Zámky were examined.

Contemporaneous distribution of *Helianthus tuberosus* agg., *Impatiens glandulifera, Impatiens parviflora, Fallopia japonica, Fallopia x bohemica, Solidago gigantea, Aster novi-belgii agg., Negundo aceroides* and *Robinia pseudoacacia* is presented on maps. The work hypothesis on abundance of invasive populations was confirmed by field research. The significantly less naumber of the populations was found at original (not regulated) flow of Nitra river with partly preserved riparian wood communities in comparison with the regulated flow was confirmed by field research. In the other case the invasive plant populations have occupied the places of native plant species communities and they, mainly *Helianthus tuberosus*, form dense stands. Several invasive plants in some localities occur together.

Invasive behaviour of introduced species is represented in rapid spreading, in competitive successfulness, especially fast, particularly vegetative reproduction (clonal species), with ability of regeneration etc.

Deseases and natural pests (aphides, fungi) of invasive species in the region have not signification in regulation of local populations.

Limitation of species distribution is minimal in the region, their stands are mowed locally. On the other hand often planting and the following escaping contribute to the contemporaneous spreading of species in this region.

Reference:

ELIÁŠ, P., 1997: Landscape structure effects on expansion and invasive behavior of alien plants species in a region. In: HALADA, Ľ., (ed.), 11th International Symposium on Problems of Landscape Ecological Research, Abstracts, November 12-16, 1997, Nitra, p. 49

INVASIVE AND EXPANDING TAXA OF VASCULAR PLANTS IN BRATISLAVA

(with emphasis on protected areas)

Viera FERÁKOVÁ

Department of Botany, Faculty of Natural Sciences, Comenius University, Révová 39, 811O2 Bratislava, Slovak Republic

The aim of the present paper is to give a survey of invasive and selected expanding species of vascular plants occurring in the town of Bratislava and its surroundings (an area of 368 km^2). Over 70 taxa of phanerogams are considered as invasive for Slovakia (Marhold et Hindák, eds. 1998). More than 90 % of them were recorded in Bratislava but not all behave invasively at present. The high percentage of aliens is caused with a number of factors, among which the size of this urban agglomeration, its climatic conditions, habitat diversity, a high proportion of specifically non - saturated seminatural communities along the rivers Danube and Morava and a variety of migration routes seem most important.

A preliminary list of invasive higher plants is provided. For each taxon data on its origin, an estimate of the present occurrence and tendency of spread are given. More than two thirds of the invasive species are of American origin. To the most successful invaders in the flora of Bratislava belong: *Ailanthus altissima, Ambrosia artemisiifolia, Aster novi-belgii, Fallopia japonica, Helianthus tuberosus,Impatiens glandulifera, I. parviflora, Negundo aceroides, Parthenocissus quinquefolia, Solidago gigantea.* As retreating aliens can be classified e.g. *Amaranthus albus, A. blitoides, A. crispus, Chenopodium ambrosioides, Erechtites hieraciifolius.*

As potential invaders the recently recorded hydrophytes *Egeria nuttallii* and *Lemna minuta* are worth mentioning.

Some notes on the classification of adventive species in the Checklist of vascular and non - vascular plants of Slovakia as well as on their behaviour in the flora of Bratislava are added.

To conclude with, an information on the proportion of anthropophytes penetrating into natural and semi- natural communities in the small-scale nature reserves of Bratislava and its suroundings is presented (part of Ramsar site floodplain of the Morava river 11.7 % of neophytes, NNM Devin castle rock 7.6 %, NNR Devinska Kobyla 7 %, approximately 3 % of them are of invasive character.

DISTRIBUTION OF SOME INVASIVE PLANT SPECIES IN REGION OF CENTRAL SLOVAKIA

Alžbeta CVACHOVÁ

Slovak Enviromental Agency, Centre for Protection Nature and the Landscape, Lazovna 10, SK-974 01 Banska Bystrica

The contribution presents results of mapping of occurrence of invasive and other alien plant species in southern part of central Slovakia, region Banska Bystrica.

The review of distribution of invasive and expansive plant species is given in alphabet order according to phytogeographic districts since Pannonic until Western Carpathian ones. Chronology regards the order of data obtained by several botanists and author has revised that data in field and habitats.

The data on the occurrence concern following 8 species e.g.; *Acorus calamus, Bidens frondosa, Fallopia japonica, Impatiens glandulifera, Impatiens parviflora, Helianthus tuberosus, Mimulus guttatus, Rudbeckia laciniata* during 1997 and 1998 years. Some accessoric data were obtained during floristic evaluation of protected and worthy to be so habitats, or were received from other authors.

The distribution of species mentionedwith an exception of *Acorus calamus, Bidens frondosa* - is shown on small maps of Slovakia as published by ELIÁŠ (1997) and completed by author of this report.

Among species monitored are the most common and invasive *Fallopia japonica* (92 sites of occurrence registered) and *Impatiens parviflora* (83 ones).Then follow *Impatiens glandulifera* (35 ones) and *Helianthus tuberosus* (38 ones). Less common appear *Acorus calamus, Bidens frondosa* and *Mimulus guttatus.*

Nevertheless there is evident a considerable harm to native plant communities coused by invasive alien species. It is apparent in sites with dominant and mass occurrence of that species on an area excceding 0,5 hectare.

References:

CVACHOVÁ, A., 1982: Floristic survey to territorial protection of State Nature Reserve „Rohoznianska jelšina". KSŠPSOP, B.Bystrica, [Depon in SAŽP- COPK B.Bystrica]

CVACHOVÁ, A., HALONOVÁ, A., 1982: Notes to the vegetation of Urpín.Msc.B.Bystrica.

ELIÁŠ, P., 1997: Invasion and invasive organisms. Report fom scientic conference in Nitra, November 19.-20.- th 1996. SNKS, SES Nitra

FUTÁK , J., 1984: Phytogeografic zonation of Slovakia. In Bertová et al.1984: Vegetation of Slovakia IV/1, VEDA Bratislava.

HINDÁK, F., MARHOLD, K., 1998: Checklist of non vascular and vascular plants of Slovakia. Veda Bratislava, s.687

HRIVNÁK, R., CVACHOVÁ, A., 1997: The occurrence of some alien plant species in southern part of central Slovakia. In „Invasion and invasive organisms". SNKS, SES Slovak Acad.Sci., Nitra, p. 136-147

Translated by: RNDr. Ján Keinert,CSc.

HISTORY OF DISTRIBUTION AND OCCURANCE OF ECHINOCYSTIS LOBATA (F. MICHX) TORR. ET A. GRAY (CUCURBITACEAE) IN SLOVAKIA

ŤAVODA O., ŠÍPOŠOVÁ H., ZALIBEROVÁ M., JAROLÍMEK I., TOROKOVÁ Y.

Botanický ústav SAV, Dúbravská cesta 14, 842 23 Bratislava, Slovenská republika

This report deals with the occurance of American weed Echinocystis lobata. This taxon occurs in the inundation of the streams and rivers, wet places in the vicinity of transportation routes and urban centres in natural and near - natural communities. We try to make reconstruction of its distribution and estimation and speed of spreading of it on territory of Slovakia.

Literatúra:

Meusel, H., Jager, E. J. et al., 1992: Vergleichende Chorologie der zentraleuropäischen Flora III. Gustav Fische verlag, Jena - Stuttgart - New York.

Slavík, B., Lhotská, M., 1967: Chorologie und Verbreitungs - biologie von Echinocystis lobata (MICHX) Torr. et Gray mit besonderer Berucksichtingung ihrers Vorkommens in der Tschechoslowakei. - Folia Geobot. Phytotax. 3: s. 255 - 282

Heuchera americana, a naturalized hemiagriophyt in Botanical Garden of UPJŠ, Košice (eastern Sovakia)

Vlastimil M i k o l á š

Botanical Garden of UPJŠ, Mánesova Str., 23, SK - 043 52 KOŠICE, Slovakia, e.mail: mikolas@kosice.upjs.sk

Heuchera L. is the largest herbaceous genus of the *Saxifragaceae* family occurring exclusively in Northern America. *H. americana* L. is the type species of the genus and belongs to the section and subsection *Heuchera*. In the present time GLEASON and CRONQUIST (1991) give in all 35 species growing in area from southern Mexico to Hudson bay and Beringian sea (ROSENDAHL et al., 1936). Together with *H. richardsonii* R. Brown as only species of the genus invaded to earlier glaciated areas. The extensive area of the species distribution includes the eastern part of Northern America, excluding the southernmost areas and extending to Canada. The species grows here in floristically rich, dry woods, frequently on basic substrates, drainaged soils, in protected slopes or on outcrops of basic rocks, as the case may be also in shaded roadsides. The extensive area of the species distribution reflects in the variability of the species. WELLS (1984) distinguishes three varieties of the species.

The willd species has been found in the in the second half of 80th in the Botanical Garden of UPJŠ in Košice at a great distance from the cultivation place. It grows in secondary forest coenoses with locust-tree (*Robinia pseudoacacia*) and *Ailanthus altissima* with impoverished herb coverage. Dominating species are nitrophytes *Urtica dioica*, *Geum urbanum* and *Anthriscus sylvestris*. Shrub ground consists of especially *Ailanthus altissima*, *Rubus caesius* and *Sambucus nigra*. The species here grows on mild steep slope, on the clay and stone soils, close to place, where the plant rubbish has been carried away. With the material the species has been probably brought on the place.

17 tufts with ca. 44 plants, reproducing by rhizome growth was found in the 1988. The species reproduces here probably also generativelly. The seeds germinating to certain range are produced in some years. The species grows here on locality of the later acidophilous oak forests and is evidently safely naturalized. There is not known naturalized occurrence of the species in adjacent countries.

GLEASON,H.A., CRONQUIST,A. 1991: Manual of Vascular Plants of Northeastern United States and Adjacent Canada. 2nd ed. The New York Botanical Garden, 910 pp.

ROSENDAHL,C.O., BUTTERS,F.K.,LAKELA,O, 1936: A Monograph of the Genus Heuchera. Minnesota Stud.Pl.Sci., 2, pp. 1-180.

WELLS,E.F.,1984: A revision of the genus Heuchera in eastern Northern America. Syst.Bot.Monogr., 3, pp. 45-121.

Senecio inaequidens and *Atriplex heterosperma* – new invasive plants in Slovakia

Vladimír JEHLÍK

Research Institute of Crop Production, Division of Agroecology, Drnovská 507, 161 06 Praha 6 - Ruzyně, Czech Republic

1. *Senecio inaequidens* DC.

Southern Slovakia: Komárno, more mostly flowering individuals, in the Danube river harbor; 112 m a.s.l., 15–16 October, 1998 (leg. V. Jehlík, Herb. Jehlík). – Plants simple to branched, mostly 60-70 cm, exceptionally up to 90 cm high. Description and diagnostic characters are given in Flora Europaea 4 (1976): 195, or in Clapham, Tutin et Moore (1987): Flora of British Isles, ed. 3: 456–457. *S. inaequidens* grows in the pioneer vegetation of the alliances *Sisymbrion officinalis* or *Dauco-Melilotion*; its occurrence probably is of a rather enduring character. The way of introduction is unknown. The species is native to South Africa (Cape Province), to Europe it is probably introduced with wool – first findings: 1889, 1896 (both in Germany: near Hannover and Bremen), then in Belgium, Great Britain, France, the Netherlands, Italy, Austria, Switzerland, the Czech Republic (1 individual as an ephemerophyte, 1997, leg. V. Jehlík, Herb. Jehlík), sporadically in the Balkan states, Poland and Slovakia (one recent locality only). In Europe it occurs mainly as a ruderal plant (along roads, railways, in railway stations, harbors, in town streets etc.), in Southern Europe sometimes as a weed (in vineyards, meadows, alfalfa fields), similarly as in fields of its native land – South Africa. Its morphotypes demand further taxonomical studies (for example, in the Cape Province Harwey et Sonder, 1864–1865: Flora Capensis, London, knew 177 species of the genus *Senecio* L.); the introduction of closely related species to Europe is not impossible. In Europe, *S. inaequidens* at present still behaves like a thermophilous synanthropic plant preferring the maritimely influenced territories. Its further spreading is to be expected in the future.

2. *Atriplex heterosperma* Bunge (= *A. micrantha* C.A. Meyer)

Southeastern Slovakia: Dobrá, more fertile individuals on the ruderal substrate at the grain silo near the western end of the transshipment station Čierna nad Tisou; 100 m a.s.l.; 19 October, 1998 (leg. V. Jehlík, Herb. Jehlík). At this locality it grows up to 170 cm high. It grows there together with *Cannabis ruderalis* Janish. Both species were introduced there 2 years ago with Ukrainian grain. Description and distinctive characters are given in Květena České republiky 2 (1990): 268, 274, 276, or in Flora SSSR 6 (1936): 93, or in Aellen´s elaboration of the family *Chenopodiaceae* (Hegi, 1959-1979: Ill. Flora von Mitteleuropa III/2, ed. 2: 690-691). The stands forms a community that belongs to the alliance *Sisymbrion officinalis*; its occurrence probably is of a rather enduring character. *A. heterosperma* is native to the Southern Ukraine, in the southeast of European Russia – there it grows on saline soils or as field weed around the Caspian Sea, in Central Asia and in western Siberia. To Europe it is introduced most frequently with wool. In the Czech Republic it occurs only as an ephemerophyte since 1967. It is known also from North America. In Slovakia, the further spreading in lowlands and its expansion on arable soils is to be expected in the future.

INVASIVE AND EXPANSIVE WOODY PLANTS IN SLOVAKIA

Tibor BARANEC, Pavol ELIÁŠ, ml.

Katedra botaniky, AF SPU, Tr. A. Hlinku 2, 949 76 Nitra, Slovensko

Biotic invasions as results of introduction of organisms can be endangered the biodiversity or have in many cases caused disruption of ecological systems (ELIÁŠ, 1997). The woody plants , as a long living organisms, in the opposite to herbaceous plants have a higest invasibility and produced many diaspores every year. The new generations under generative origins have a good possibility to adaptation on local ecological conditions. For example *Robinia pseudoacacia* about 250 years after introduction to central part of Carpathians - Pannonian phytogeographical region have his distribution about 1 km per year to the Carpathians walleys. This species invading to the xerophytic phytocenoses and destroyed some populations of more xerophytic species in theirs natural habitats. Very similar type of invasians have the two species, *Ailanthus altissima* and *Rhus typhina* as invading species in the territory of urban vegetation and outstandings parts. On some parts of the Danube river sites a strong invasive species are *Amorpha fruticosa* and *Negundo aceroides*.

In opposite to the invasive species, the expansive species belong to the autochtonous species only (BARANEC, 1997), having some similar negative influence on the native flora and ecosystemes. In many causes in the territory of Slovakia disruption of populations of endangered and threatened species by some expansive native species have been recorded.

To the expansive alien woody species belong *Populus tremula*, *Betula pendula*, *Pinus* x *rhaetica*, *Prunus spinosa*, *Prunus dasyphylla*, *Clematis vitalba*, *Sambucus nigra*.

Similar observations are published with other autors (JURKO, 1963; LOHMAYER et SUKOPP, 1992), too.

A list of invasive and expansive woody species in Slovak flora is prepared on base of literature, herbarium records and our field observations. This list can by used for nature protection in Slovakia (ELIÁŠ. 1997).

References

BARANEC, T., 1997: Invázie a expanzie z aspektu ohrozenosti druhov našej flóry. In: Eliáš, P. (ed.), Invázie a invázne organizmy. SNK SCOPE & SEKOS, Nitra, s. 190-196.

ELIÁŠ, P., 1997: Biologické invázie ako celosvetový problém. In: Eliáš, P. (ed.), Invázie a invázne organizmy. SNK SCOPE & SEKOS, Nitra, s. 9-28.

ELIÁŠ, P., 1997: Invázne druhy rastlín na Slovensku. In: Eliáš, P. (ed.), Invázie a invázne organizmy. SNK SCOPE & SEKOS, Nitra, s.91-118.

JURKO, A., 1963: Zmena pôvodných lesných fytocenóz introdukciou agáta. Čsl. ochrana prírody, 1: s. 56- 75.

LOHMEYER, W., SUKOPP, H., 1992: Agriophyten in der Vegetation Miteleuropas. Schr. Reihe Vegetationskunde, 25: s. 1-185.

INVASIVE DENDROTAXA OF ARBORETUM MLYNANY

Ivan TOMAŠKO

Arboretum Mlynany Slovak Academy of Sciences, 951 52 Slepcany, Slovak Republic

Special introduction and naturalization centers are botanical gardens and arboreta. The richess of the plant material presented and the nature of collections wake the Arboretum Mlyňany a specific working place. Since the time of its foundation in 1892, the Arboretum has fulfilled important theoretical and practical missions in the sphere of introduction and acclimatisation of woody plants. Many theoretical questions began to be solved of biological questions of woody plants, including naturalization and invading. At the present there exist 2 350 woody plant taxa concentiated on the area of 67 ha. On the whole 93 families, 295 genera, 1 497 species, 6 subsp., 75 various, 25 form and 727 cultivars are incoporated in the collection of the Arboretum.

Conclusions of the theory of invading were applied as an example on chose allochthonous taxa from Arboretum Mlyňany in the neighbourint forest environment. The present knowledge of invading helps to formulate a conclusion that the ecological stableness is not threatened because the neophytes have influence on the specific diversity and they fill up the space left empty as a reaction to the changing conditions of the biotope under the influence of anthropogenic activity as well as in consequence of macroclimatic and microclimatic changes.

In the last few yers in Slovakia the spontaneu increase of alien species can be seen, among which the most conspicuons is the spreading of woody species. During the horticultural application of alien species no effort have been made to investigate, how these plants influence the natural vegetation and the cultivated environment.

Biotic invasions are defined as a spontaneous (fast) spread of abien (introduced) species of organiseus in new territories and their (massive) entrence into original and /or natural communities (ELIÁŠ, 1993). Invase species were identified as a serious global threat to biological diversity thery threaten the natural and productive systems which they invade and have in many cases cansed disruption of ecological systems.

References:

ELIÁŠ, P., 1993: Invasive behaviour of alien annuals. In: Int. Workshop on plant invasions - theory and applications. Sept. 16 - 19, 1993, Kostelec n. Č.L. Abstracts, p. 7.

TERPÓ, A., 1992: Invading species of original and synanthropic biotops in Hungary. In: ELIÁŠ, P. (ed.), Invázie a invázne organizmy. SNK SCOPE and SEKOS, Nitra, p. 81-90.

TÁBOR, I. - TOMAŠKO, I., 1992: Genofond and dendroexpositions of Arboretum Mlynany. Polygrafia SAV, Bratislava, p. 118.

COMPARISON BETWEEN INVASIVE AND NON – INVASIVE POPULATIONS OF *LYTHRUM SALICARIA L.* UNDER EXPERIMENTAL CONDITIONS

Dáša Hanzélyová

University of South Bohemia, Faculty of Biological Sciences, Branišonská 31, 370 05 České Budějovice

Plants of three native and three non-native populations of *Lythrum salicaria* were planted in the greenhouse. All plants grew under the same light, temperature and nutrient conditions. The height of the plants, dry weight of roots, shoots, inflorescence, dry weight and number of lateral branches, and number of internodes below the inflorescence were assessed in ten day intervals during the growing season. The onset of flowering was recorded for each plant each day during the growing season too.

There were found apparent differences between native and non-native populations of *L. s.* plants in experimental conditions. The plants of invasive populations of *L. s.* grew taller than native plants and produced two times more shoot, leaf and lateral branch dry biomass on average than native populations. The number of internodes produced below the inflorescence was higher for invasive populations too. The native and invasive plants had a different growth pattern connected with difference in flowering phenology. Invasive plants flowered two weeks later in the same conditions than native plants. This shift in phenology is connected with different growth strategies of native and invasive plants, which may be a consequence of ecological and/or geographical differences in the primary and secondary area.

PROPOSAL OF THE LIST OF INVASIVE AND EXPANSIVE PLANT SPECIES OF SLOVAKIA (First Version)

Alžbeta CVACHOVÁ[1], Ema GOJDIČOVÁ[2], Emília KARASOVÁ[3]

[1]*Slovak Environmetal Agency Centre for Nature and Landscape Conservation, Lazovná 10, Banská Bystrica*
[2]*Slovak Environmetal Agency Centre for Nature and Landscape Conservation,, Hlavná 93, Prešov*
[3]*Slovak Environmetal Agency Centre for Nature and Landscape Conservation CHKO BR Slovenský kras, Biely Kaštieľ, Brzotín*

List of invasive and expansive plant species of Slovakia is based on the work by Dostál & Červenka (1991-1992) and on published volumes of Flóra Slovenska /Flora of Slovakia/ (Futák,1966, Futák & Bertová, 1982, Bertová, 1984-1992,Bertová & Goliášová, 1993, Goliášová, 1997). Among other important sources should be mentioned: Agriophyten in der Vegetation Mitteleuropas (Lohmeyer & Sukopp, 1992), Archeofyty flóry Slovenska – predbežný zoznam /Archeophytes in the Flora of Slovakia – a preliminary list/ (Halada ,1997), Pracovný zoznam inváznych druhov v oblasti Devínskej Kobyly /Preliminary List of Invasive Species in the Rregion of Devínska Kobyla/ (Feráková , 1998). As a good source also served works by Marhold & Hindák and Jehlík published in 1998 or work by Hejný published in 1973.

Selected species are devided into 9 categories:
1.invasive plant species, 2. potentially (regionally) invasive plant species, 3. often escaping species, 4. occasionally escaping species, 5. introduced species, 6. naturalized species, 7. not ranged species, 8.expansive species, 9. species not occurring in Slovakia.

The list has been compiled for needs of nature conservation – for filling one of the tasks „Maping of invasive plant species in protected areas of Slovakia". This list has been drafted too widely and maybe it is not very practical for maping of invasive and expansive plant species. Based on the other notes and recommendation the list can be modified and for maping only some categories can be used, e.g. category 1,2,8.

We would like to thank you in advance for any your recommendation and notes to this list.

References:

Dostál, J., Červenka, M., 1991-1992: Veľký kľúč na určovanie vyšších rastlín flóry Slovenska. SPN, Bratislava, 1561 pp.
Feráková, V., 1998: Pracovný zoznam inváznych druhov oblasti Devínskej Kobyly. –Msc. Prírodovedecká fakulta UK Bratislava.
Halada, Ľ., 1997: Archeofyty flóry Slovenska – predbežný zoznam. -Bull. Slov. Bot. Spoločn., 19:129-136.
Hejný, S. et al.., 1973: Karanténní plevele Československa. -Studie ČSAV č.8. Academia, Praha, 160 pp.
Lohmeyer, W., Sukopp, H., 1992: Agriophyten in der Vegetation Mitteleuropas. –Schr. Reihe Vegetationskde 25, Bonn-Bád-Godezberg, 184 pp.
Marhold, K., Hindák, F. (eds.), 1998: Zoznam nižších a vyšších rastlín Slovenska (Checklist of non-vascular and vascular plants of Slovakia). –Veda, Bratislava, p. 333-687.
Jehlík, V. (ed.), 1998: Cizí expanzivní plevele České republiky a Slovenské republiky. – Academia, Praha, 506 pp.

ALIEN INVADING PLANT SPECIES IN TATRAS (WESTERN CARPATHIANS)

Pavol ELIÁŠ

Department of Ecology, Faculty of Horticulture and Landscape Engineering, SAU Nitra, Mariánska 10, 949 01 Nitra

Distribution, spread and invasive behaviour of alien, introduced and/or other non-native species in the Tatras region, in both Slovakia and Poland territory was studied. The invasive behaviour aliens is demonstrated for *Impatiens parviflora DC., Heracleum mantegazzianum Sonn. et Lev., Fallopia japonica (Houutt) Ronse Decr., Impatiens bohemica, Impatiens glandulifera, Fallopia sachalineusis, Lupinus polyphyllus Lindl., Telekia speciosa (Schreb.) Baumg.*.

The species were cultivated, escaped and recently they spread along roads and railways, invading forests parks and forests. Management of the invading species is unsifficient and it does not stop the spread (expansion) of the species.

References:

ELIÁŠ, P., 1998: Changes in flora and vegetation of high mountains - invásions of alien species. In: JANIGA, M. (Ed.), Postavenie slovenského ekologického výskumu vysokých pohorí v Európe a vo svete. Zborník referátov z vedeckej konferencie, 14.-16. apríl 1998, Stará Lesná.

SPREADING RECONSTRUCTION OF INVASIVE SPECIES OF *FALLOPIA* GENUS IN POŽITAVSKÁ PAHORKATINA REGION IN SLOVAKIA

Alexander FEHÉR

Department of Ecology, Faculty of Horticulture and Landscape Engineering, Slovak Agricultural University, Mariánska 10, SK - 949 01 Nitra

The reconstruction of spreading of knotweed invasive species populations of both *Fallopia x bohemica* and *Fallopia japonica* in Požitavská pahorkatina region, east from Nitra was made on the basis of field research in 1998. 69 populations in 16 villages were evaluated (95.7 % *F. x bohemica*, 4.3 % *Fallopia japonica*). Polycentric way of *Fallopia* species spreading was verified. Ten or more populations were found in three villages with historical parks where *Fallopia x bohemica* occurs: in Malý Lapáš and Pohranice (there is a park in the small settlement Jáger between them) and in Klasov (there is a park around a castle). There were from 0 to 6 populations in the other 13 villages.

During a detailed research we have been found that there are some new secondary epicentres of spreading of a later origin (e.g. area of kindergarten in Hosťová, park near a reservoir in Malé Chyndice etc.).

Number of knoweed populations is in correlation with their introduction. There are more populations in the villages with earlier introduction (1963: Klasov – 10 pop., 1968: Pohranice – 12 pop., 1968: Malý Lapáš – 11 pop., 1973: Hosťová – 6 populácií, 1978: Malé Chyndice – 5 pop., 1980: Kolíňany – 6 pop., 1987: Dolné Obdokovce – 1 pop. etc.).

The *Fallopia* species spread by two manners in this region: 1. planting for ornamental purposes; 2. bringing out the rhizomes with garden waste in new areas (mainly on illegal dumps) where they escape. There were 58.0 % of populations cultivated and 42,0 % of populations wild. The average size of populations was 27.5 m^2 (min. 0.25 m^2, max. 550 m^2). Female populations were dominant (39.4 %), male populations less represented (7.2 %) (53.5 % of population were ceased blooming).

Reevidence of knotweed populations would be repeated in regular intervals (once a 5 or 10 years period) to achieve comparable data about further spreading of *F..x bohemica* and *F. japonica*.

THE GENUS CHENOPODIUM IN SLOVAKIA

Terézia SCHWARZOVÁ

Department of Botany, Faculty of Natural Sciences, Comenius University, Bratislava

In Slovakia the genus *Chenopodium* L. is presented by five autochthonous species: *C. album* L., *C. rubrum* L., *C. suecicum* Murr, *C. chenopodioides* (L.) Aellen and *C. foliosum* Asch. The first two species occur in the whole territory, while *C. suecicum* is absent in the southern regions of Slovakia and the halophyte *C. chenopodioides* is extinct. The mountain species *C. foliosum* is threatened.

From the allochthonous species 11 are archaeophytes: *C. bonus-henricus* L., *C. glaucum* L., *C. hybridum* L., *C. polyspermum* L., *C. murale* L., *C. vulvaria* L., *C. urbicum* L., *C. ficifolium* Sm., *C. strictum* Roth, *C. opulifolium* Schrad., *C. pedunculare* Bertol. These species behave mostly as epoecophytes, often as segetal weeds. *C. vulvaria* is significantly retreating, and a slight decline of *C. urbicum* and *C. murale* has been noticed as well.

C. integrifolium Vorosch. and *C. schraderianum* Schult. are considered as very rare neophytic species on anthropogenic habitats. A decrease of the spreading tendency has been found also in further aromatic species - neophytes *C. ambrosioides* L., *C. botrys* L. and *C. pumilio* R. Br. In southwestern Slovakia an invasive spread of the neophytes *C. probstii* Aellen, *C. missouriense* Aellen and *C. striatiforme* Murr has been observed. A numerous adventive taxa of *C. album* agg., determination of which is very problematic, can be considered as invading and expanding plants in the whole territory. In Bratislava an ephemeric occurrence of the neophyte of Asiatic origin *C. giganteum* D. Don has been recorded.

Is the spider *Dictyna civica* (Lucas, 1850) (Araneae, Dictynidae) a synanthrophic species?

Zuzana KRUMPÁLOVÁ

Ústav zoológie SAV, Dúbravská cesta 9, SK-842 06 Bratislava, Slovenská republika

The mediteranean spider *Dictyna civica* (Lucas, 1850) comes from north Africa and Atlantic islands. It has been spreading to european continent by west direction in the first half of this century. For the first time it was recorded in France (1910), and its ecology was still unknown. Then species was found on the building walls in Germany. In Central Europe it was noticed later and in Slovakia in 1981. Spider is known from a few localities in Slovakia, however, only one record is from free nature (Plešivecká planina, SVATOŇ, 1988). All other records are from settlements (GAJDOŠ ET ALL., 1992, SVATOŇ, 1981, FRANC & HÁNILOVÁ, 1995). *D. civica* is xerophilous, eusynanthrophic species, regionaly strictly connected with the human settlements, according to VALEŠOVÁ-ŽĎÁRKOVÁ (1966). Although it was primarily typical for rock holes, in Europe species spreads only building walls. It lives in colonies outside on the plaster of buildings. The author has not founf the preference of the plaster type (color and structure). The species needs only small holes, approximately 5 mm size. Its net is about 35 cm^2 , in diameter. There can be from 10 to 50 nets per 1 m^2 connected together. The question is, if there is an invasion or colonization to the disturbed sites, the niche or an area without competitive pressure. Is it an ireversible change or temporary phase?

THE INVASIVE PLANT SPECIES IN CHKO KYSUCE

Zuzana KUDERAVÁ

Správa CHKO Kysuce, Kysucká cesta 9, 022 01 Čadca

This article is about some invasive plant species with occurrence in Protected landscape area of Kysuce – *Heracleum mantegazzianum*, *Reynoutria japonica*, *Impatiens glandulifera*. These species have typical reproduction strategy, which is known in many invasive plants. Its spreading cause retreation of primary species and in some examples it endangered health of man.

Heracleum mantegazzianum creates very numerous populations in CHKO Kysuce, it is 0,5 ha area of one locality with it. It is often situated along rivers, drives but on the open areas too. It was brought from Kaukaz and from Czech republic as a decorative plant. It has strategy, which is advantage on the competition with our primary species. It flowered from July to August, it can be flowered till to coming frost. When we cut flowers, it creates new. It creates many seeds, one individual can creates about 20 thousand seeds. They are in seed bank about 10 years and then they may to create bud. It has a vegetative reproduction too. It is often on the area with disturbance bank of the rivers, forests on the bank of the rivers. Spreading of this species changes species comunities and liquid primary comunities. Only a few plant species can grow with this. On one locality is spreading to the forest with *Picea abies*. It was liquid mechanical in CHKO Kysuce, but it creates very numerous populations and then it need chemical liquidation in the future – ROUNDUP. It cause problems with health – burns, alergy. Despite of this it is often cultivates.

Reynoutria japonica is the most spreading invasive plant in CHKO Kysuce. It is situated on the disturbance bank forest, near drives and railways and on the open areas. This doublehome plant flowered from July to October. It is spreading mainly vegetative. Generative reproduction is rarely in our conditions, but it often creates seeds in CHKO Kysuce. It often occupies large areas. It liquids primary vegetations and then can not grow bank forests along river. It has a big regeneration after cutting shoots and fragments from stem. It resists after damage bimas, liquidation by mowing is not effective.

Impatiens glandulifera has big reproduction capacity and its spreading along rivers, ruderal areas and on the wet forest borders in CHKO Kysuce. It is often cultivates as a decorative plant. It flowered from July to September, one individuous creates 800 seeds. It can creates roots from knots on the stemp after floods. The seeds are distribute about 6,5 m from mother plant and it can bud about 6 years after. It has two localities of numerous populations in CHKO Kysuce. The first example is on the border of mixed forest and the second is bank river without vegetation.

There are some possibilities how we can limit spreading of invasive species. The first is to limit cultivation invasive plants on the country and the second is to prohibit disturbance of bank vegetation, mainly along rivers, which are main drives of spreading in many invasive plant species. Liquidation is expansive and exacting and it is not always effective.

MONITORING ALIEN SPECIES AS A PART OF INTEGRATED MANAGEMENT OF INVASIONS AND INVASIVE ORGANISMS

Pavol ELIÁŠ

Department of Ecology, Faculty of Horticulture and Landscape Engineering, SAU Nitra, Mariánska 10, SK-949 01 Nitra

Control of the populations of invading species, after establishment, expansion and naturalization, is very weak and problematic one in face of very high costs. Integrated management is based on monitoring and control of invading species during all phases of invasion process, including introduction. Prevention of introductions of harmfull alien species is considered the most effective and the cheapest way of the control. Monitoring of introductions („arrivals") and invasive behaviour of species at entrance points of terrestrial (railways, transfer places) and water ways is necessary. Databases of invading species, including information on invasive behaviour of species in surrounding countries and in other world, are an important source for external quarantine.

In Slovakia the monitoring of invasions/invading species is not part of monitoring programmes (ELIÁŠ, 1993, 1996) and invasions of aliens are more interested problems for botanical and zoological research (ELIÁŠ, 1997). It will be necessary to monitor all introduced non-native species of organisms invading Slovakia, their escapes from cultivated areas and their naturalization. And on this basis the timing control measures, including destroying of invading population. The competent monitoring will be supported by legislative measures.

Monitoring of imports (goods) will be focused on new, non-indigenous species and it will form a part of early warning system.

References:

ELIÁŠ, P., 1993: Monitoring bioty na území Slovenskej republiky. Abstrakty, SEKOS, Bratislava, 120 s.

ELIÁŠ, P., 1996: Monitorovanie invázií a inváznych organizmov v kultúrnej krajine. In: Húska, D. (Ed.), ENVIRO Nitra, Zbornik príspevkov, p. 30-31.

ELIÁŠ, P., 1996: Monitorovanie bioty na území Slovenskej republiky. SEKOS, Bratislava, 202 s.

ELIÁŠ, P., 1997 (ed.): Invázie a inv̆azne organizmy. Príspevky z vedeckej konferencie, november 1996, Nitra, p. 213.

POSSIBILITIES OF BIOLOGICAL CONTROL OF INVASIVE PLANT SPECIES ON THE EXAMPLE OF *HERACLEUM MANTEGAZZIANUM*

Ľudovít Cagáň[1], Wolfgang Nentwig[2]

[1]*Slovak Agricultural University in Nitra, Department of Plant Protection, A. Hlinku 2, 94976 Nitra, Slovakia*
[2]*Zoological Institute, Univerzity of Bern, Switzerland*

Giant hogweed (*Heracleum mantegazzianum* Somm. et Levier), introduced in the 19th century from the western Caucassus to western and central Europe is becoming a serious threat to the landscape in European countries like Sweden, Ireland, England, Scotland, Germany and the Czech Republic. Biological control could be considered as an appropriate alternative of long-term strategy against invasion of *H. mantegazzianum*. A biocontrol programme involve 1/ the assessment the impact of native fauna in invaded area and 2/ the introduction of species from host´s native country.

In 1997, the first step of such programme was supported by Swiss National Fundation. Slovak Agricultural University in Nitra and University of Bern were involved in cooperation.

53 insect species were recorded on *H. mantegazzianum* in Slovakia in 1997. Feeding tests showed that some of them consumed the leaves of *H. mantegazzainum* and were able to develop to adults. Nine species from the family Chrysomelidae were observed on giant hogweed plants, and they were never found on *Heracleum* spp. until now. From 13 species from the family Curculionidae only three species were already recorded on *Heracleum* spp. - *Liophloeus tessulatus, Liparus glabrirostris* and *Lixis iridis*. Also the most abundant curculionid species *Liophloeus lentus* was not observed on *Heracleum* spp. until now. This species was very abundant and in laboratory fed high amount of giant hogweed leaf matter. Is seems that many herbivorous curculionids which fed the giant hogweed leaves, were connected to *Petasites* (*L. lentus, Liparus glabrirostris, Donus oxadilis, Donus ovalis*). Lepidoptera species, which were found on the *H.mantegazzianum* leaves (as new species for *Heracleum* spp.) are polyphagous. Original result is that the larvae from the family Tipulidae sp. were feeding on leaves of *H. mantegazzianum*, and these larvae developed to imagoes. Leaf miners more specialised to umbellifers were usually found on *H.* mantegazzianum, but they were not able to influence the development of plants. In Slovakian conditions were not found the *H. mantegazzianum* plants really destroyed by insect feeding.

In 1998 (research supported by Slovak Science Grant Agency VEGA), another four insect species belonged to the orders Lepidoptera and Diptera were found in Slovakia. The larvae of *Depressaria* sp. fed on flower heads and migrated towards the primary umbell. The larvae fed and spinning the seed head together forming silken tunnels between umbel rays. Larvae of Agromyzidae species were stem borers on *H. mantegazzianum*.

Next step of biological control programme included the visit of researchers in country of invasive plant origin. In Russian literature were found the data from areas of target plant origin (western Caucassus) and the first visit was arranged at the end of June 1998. During the visit the locations with target weed were found. Preliminary study of potential biological control agents showed that *Depressaria* species were common on plants located at altitude of 1200-1500, and agromyzid species were more often in higher altitude.

In 1999 the study will continue both in central Europe and in Caucassus and scientists from three universities will be involved in the study (Slovak Agricultural University in Nitra, Slovakia, University of Bern, Switzerland, and State Agricultural University in Krasnodar, Russia).

INFORMATION ABOUT ACTIVITIES OF THE GESTOR GROUP FOR INVASIVE PLANT SPECIES

Alžbeta CVACHOVÁ[1], Ema GOJDIČOVÁ[2]

[1]*Slovak Environmetal Agency Centre for Nature and Landscape Conservation, Lazovná 10, Banská Bystrica*
[2]*Slovak Environmetal Agency Centre for Nature and Landscape Conservation,, Hlavná 93, Prešov*

The gestor group was established by the Slovak Environmental Agency Centre for Nature and Landscape Conservation in 1997. The main goal of work of the group is to pay better attention to allien plant species and threateness that they cause to the natural environment.

To this day the gestor group consists of 15 regular members and 6 associates, which are working in the Slovak Academy of Sciences, universities and museums.

The main activities of the gestor group are as follows:
- file and documentation of distribution of invasive plant species
- threat of invasive plant species to the protected areas as well as to the rest of the landscape
- management
- biology and ecology of invasive plant species
- propagation and education
- legislation

Within the framework of file and documentation during two years the members of the group filed 497 localities with 20 invasive plant species (*Acorus calamus, Aster lanceolatus, Aster novi-belgii, Bidens frondosa, Echinocystis lobata, Impatiens glandulifera, Impatiens parviflora, Fallopia bohemica, Fallopia japonica, Fallopia sachalinensis, Galinsoga parviflora, Heracleum mantegazzianum, Helianthus tuberosus, Mimulus guttatus, Negundo aceroides, Solidago canadensis, Solidago gigantea, Rudbeckia hirta, Rudbeckia laciniata, Rhus typhina, Xanthium albinum*).

Threat of invasive plant species is observed both in the areas without special protection and protected areas especially in the areas with the fourth and fifth level of protection.

Management is carried out in the relation to *Heracleum mantegazzianum* and besides methodical regulation it includes practical measures which some members of the group personally realize participating in eradication of the species. Some sporadic practical measures have been done in management of *Fallopia japonica* which means more serious problems for countryside than *Heracleum mantegazzianum.*

In the future the gestor group wants to make more effective its activities connected with propagation of the problem with invasive plant species, e.g. edition of the series of brochures and and a poster with this topic.

Besides some concrete management measures the gestor group sees effectiveness of arrangements against uncontrolled distribution of invasive plant species also in preparing legislative norm that will prevent deliberate distribution and cultivation of invasive plant species in the natural environment.

Authors index:

Title: **Invasions and invasive organisms II. . Abstracts and programme.**
Edited by: P. Eliáš
Published by: Slovak N. Committee for SCOPE and Department of Ecology
FHLE SAU Nitra
Town: Nitra
In year: 1998
Number of pager: 37