CHANGES IN THE FLORISTIC COMPOSITION AND ECOLOGY OF RUDERAL FLORA OF THE TOWN OF KOSOVSKA MITROVICA, SERBIA FOR A PERIOD OF 20 YEARS

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Abstract. The paper is concerned with the results of the ruderal flora investigation carried out in the vicinity of the town of Kosovska Mitrovica (Serbia) and its surroundings, in different urban and suburban habitats, and is based on the copious floristic researches conducted between 1995 and 1996 and repeated in 2016. The total number of 444 taxa was reported in the course of 2016. Not only was reported the presence of 386 taxa in the same areas between 1995 and 1996, but also 58 new taxa were recorded in recent field explorations. The ruderal flora composition in Kosovska Mitrovica area has changed by 13.06% in the past 20 years. Detailed taxonomic, ecological, and phyto-geographical analyses were provided for the discovered synanthropic flora. Special attention was paid to the appearance of new invasive species unregistered 20 years ago, but which, due to the more intensive anthropogenic influence, have become more diverse in number and frequency in the investigated areas.
Keywords: *urban habitats, ruderal flora, ecological analysis, invasive plants, Kosovska Mitrovica*

Introduction

Urbanization has created new ecosystems that harbor specialized flora adapted to anthropogenic alterations (Neto et al., 2015). The ecological approach considers a city/town as an ecosystem. "Ruderal" biocenoses exist in all cities. The term "ruderata" (from Lat. rudus: rubble, ruins) refers to a specific habitat. The definition connects ruderal plants with their habitats: they grow in places (such as rubble) which are strongly disturbed by man, but not cultivated (Sukopp, 2002). The habitats with modified physical and chemical soil properties have lost their resemblance to primary land type and are located in the vicinity of settlements and around all types of urban buildings and infrastructures (Prodanović et al., 2008). Other terms used for the flora in human settlements are synanthropic, synurban and nitrophile flora (Pavlović-Muratspahić et al., 2010). Anthropogenic factors are of essential importance in the formation, survival, distribution, diversity and dynamics of this type of flora/vegetation (Jarić et al., 2011).

The flora of urban habitats has long been recognized as being rich in species (Stešević and Jovanović, 2008). Urbanization transforms floras through a series of filters that change: (i) habitat availability;(ii) the spatial arrangement of habitats; (iii) the pool of plant species; and (iv) evolutionary selection pressures on populations

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persisting in the urban environment. Habitat transformation and fragmentation are anthropogenic filters present in most ecosystems, while the strong influences of human preference and urban environmental conditions are unique to cities (Williams et al., 2008). The development and importance of this spontaneously developed plant cover are often underestimated in urban ecosystem by constant human efforts to destroy and curb it by giving way to cultivated plants. Ruderal plant species are often considered as invasive weeds; some have medicinal value while others have unknown utility. Regardless of its specific use, the ruderal flora grows rapidly and thus serves as study material for many botanical subareas and provides an opportunity to study the development of vegetation when most plants are annuals. The ecology of ruderal plants also reinforces the importance of these plants because they can vegetate, bloom, and fructify with high efficiency, allowing them to be used for the recovery of degraded areas (Neto et al., 2015).

Ruderal and synanthropic (synurban) floras, very young and dynamic floristic assemblages, as well as the corresponding vegetation units, have recently drawn attention of scientists throughout the world (Jovanović, 1997). The research of synanthropic flora of various urban areas (cities, towns and smaller settlements) has had a long tradition. The interest in urban floras can be attributed to the fact that cities are remarkably ample with species due to a high habitat diversity and abundance of alien species. Outside Europe, urbanization and its consequences have been intensively studied in North America (Celesti-Grapow et al., 2006). The first investigations in the field of urban ecology in Europe focused on single habitat types (old settlements, ruins, gardens, and parks), while comprehensive studies of urban ecosystems were started in the 1970′s (Sukopp, 2002). In Serbia, as a part of territory of former Yugoslavia, similarly to other European countries, such studies were conducted in the second half of the 19th century (Šajinović, 1968; Slavnić, 1951, 1960, 1961; Marković, 1964, 1978, 1984; Matvejeva, 1982; Jarić, 2000), while special interest in the urban/ruderal flora and vegetation appeared in works of Jovanović (1997), Jovanović and Mitrović (1998), Stankovic-Kalezić (2007), Stanković-Kalezić et al. (2008; 2009).

The floristic research of ruderal weed was conducted to determine accurate data about the qualitative composition of ruderal flora and the quantitative presence of certain species on ecologically diverse surfaces of urban and suburban areas of the town of Kosovska Mitrovica (Serbia). The purpose of the paper was to identify possible changes in the floristic composition of ruderal flora for a period of 20 years, which might provide data on the succession planting and fully introspect ecology of each individual plant species in the investigated area.

Materials and Methods

The investigation was carried out in the central area of the town of Kosovska Mitrovica (Serbia) and its surroundings, on various urban and suburban ruderal surfaces within more than 15 kilometers. During the growing season of 1995-1996, field researches were conducted on 28 randomly chosen sampling sites (trodden and nitrified ruderal places, nitrified ruderal non-trodden habitats, hygrophilic ruderal habitats, covered disposal areas). During 2016 the researches were continued in the majority of the previously investigated areas but it was virtually impossible to provide a detailed map of already studied probing areas because they had absolutely changed due to extreme anthropogenic influences (i.e. urbanization). Likewise, as the town had

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extended to new areas, another two probing surfaces were added during floristic investigations in 2016. The majority of collected plant material is kept in the Herbarium at the Institute of Botany and the Botanical Garden of Faculty of Biology, University of Belgrade (BEOU).

The collected plants were determined on the basis of modern floristic literature: The Flora of Serbia: Josifović, ed. 1970-1977; Sarić and Diklić, eds. 1989 and The Flora of Europe: Tutin, ed. 1964-1980. The nomenclature was adjusted to Euro+Med Plantbase (2006) and The Plant List (2013). The life forms of plants were determined by applying Ellenberg and Muller-Dambois method (1967), with Stevanović's supplements (1992) and elaborations based on the conditions in Serbia. Stevanović's (1992a) phyto-geographical classification was the starting point for determination and phyto analysis of floral elements. The prevalence was calculated by the number of sites where the target species occurred divided by the total number (30) of sampling sites.

Study area

The town of Kosovska Mitrovica, with its surroundings, lies between 42° 53' north latitude, 20° 52'east longitude, and 496-510 altitude, and stretches to the farthest northern point of Kosovo Valley (*Fig. 1).* It is situated in the alluvial area and on the terraces of the Ibar and Sitnica Rivers, with the volcanic cup of Zvečan dominating the city. The largest part of the territory is considered mountaineous. More than half of the city and its surroundings consists of brown shallow soil with poor fertility. It should be emphasized that, influenced by heavy industry, many types of soil have undergone degradation and "enrichment" with various waste products that reduced their fertility. The climate is marked as moderate-continental. Mitrovica is located among Kopaonik and Rogozna mountains, hence the annual precipitation is low (600 mm on average).

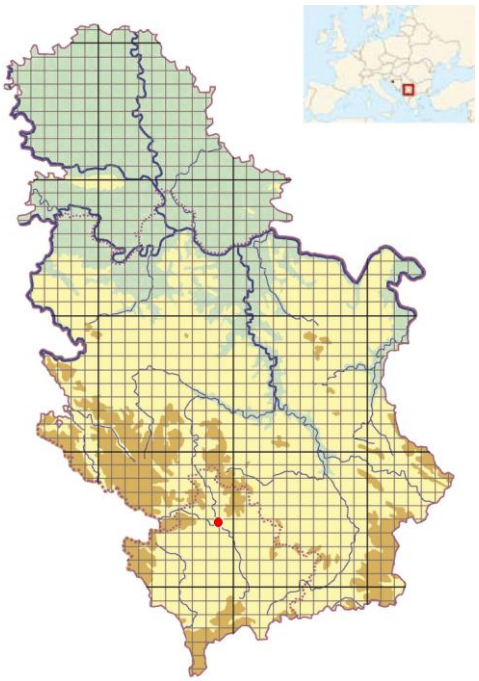

Figure 1. *Geographical position of investigated area (town of Kosovska Mitrovica) in Serbia (marked with red point)*

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Results and Discussion

Taxonomic spectrum of the ruderal flora in the town of Kosovska Mitrovica

Ruderal species are plants commony grown in urban areas and are best adapted to man-altered environments. Floristic researches in different types of ruderal habitats in the city proper of Kosovska Mitrovica and its surroundings, within the range of 15 kilometers, discovered 444 species of vascular plants representing 271 genera and 58 families (*Table 1*).

The study presents a continuation of the research, whose results were published in 2008 (Prodanović et al., 2008). The presence of 386 taxa was reported in the same areas between 1995 and 1996, and 58 new taxa were recorded in recent field explorations. It is important to emphasize that not all collected species are ruderal, even though they can be traced in various anthropogenic habitats. A certain number of species are found in habitats of primary or secondary forms of vegetation, such as forest, meadows or completely segetal (field) species. These species apperently present either the debris of the original primary communities that were prior to ruderal communities or they appeared afterwards.

Newly recorded taxa include: *Allium flavum* L., *Chaerophyllum bulbosum* L., *Vinca minor* L., *Hedera helix* L., *Asparagus tenuifolius* Lam., *Ambrosia artemisifolia* L., *Cota austriaca* (Jacq.) Sch. Bip, *Symphyotrichum novi-belgii* (L.) G.L.Nesom, *Symphyotrichum salignum* (Willd.) G.L.Nesom, *Calendula officinalis* L., *Echinops sphaerocephalus* L., *Filago germanica* (L.) Huds., *Helianthus tuberosus* L., *Lactuca muralis (L.) Gaertn*., *Lactuca perennis* L., *Solidago gigantea* Aiton, *Tanacetum corymbosum* (L.) Sch.Bip., *Catalpa bignonioides* Walter., *Anchusa azurea* Mill., *Cynoglossum creticum* Mill., *Nonnea pulla* DC., *Arabidopsis thaliana* (L.) Heynh., *Camelina sativa* (L.) Crantz., *Sisymbrium officinale* (L.) Scop., *Sisymbrium orientale* L., *Blitum bonus-henricus* (L.) Rchb., *Cuscuta europaea* L., *Echinocystis lobata* (Michx.) Torr.& A. Gray, *Carex panicea* L., *Shoenoplectus lacuster* (L.) Palla, *Euphorbia taurensis* All., *Amorpha fruticosa* L., *Trifolium arvense* L., *Vicia tenuifolia* Roth., *Vicia tetrasperma* (L.) Schreb., *Geranium columbinum* L., *Leonurus cardiaca* L., *Malva neglecta* Wallr., *Maclura pomifera* (Raf.) C.K. Schneid., *Fraxinus ornus* L., *Phytolacca americana* L., *Platanus orientalis* L., *Arrhenatherum elatius* (L.) J. Presl & C. Presl, *Bromus arvensis* L., *Poa trivialis* L., *Reseda phyteuma* L., *Sherardia arvensis* L., *Populus alba* L., *Populus nigra* L., *Salix alba* L., *Comandra umbellata* (L.) Nutt., *Acer negundo* L., *Acer pseudoplatanus* L., *Acer saccharinum* L., *Antirrhinum majus* L., *Veronica praecox* All., *Veronica serpyllifolia* L. and *Viola arvensis* Murray.

The taxonomic spectrum of the vascular flora in the city area of Kosovska Mitrovica includes 3 classes, 58 families, 271 genera and 444 species and subspecies. *Dicotyledones*, with 51 families, 231 genera (49,09%) and 384 taxa (86,03%), are richer in number than *Monocotyledones* which include 6 families (1,35 %), 41 genera (9,23%) and 60 taxa (13,51%), whereas horsetail *(Equisetinae)* is present only with two species of *Equisetaceae.* According to the researches of Pyšek et al. (2009) the most common families in the urban areas of Europe are: *Asteraceae, Poaceae, Rosaceae, Fabaceae* and *Brassicaceae,* which, along with ruderal species, comprise farming weed and invasive species; their number is positively related to the urbanization level (Pyšek, 1998).

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Table 1. *Overview of ruderal flora of Kosovska Mitrovica (Serbia) with its life forms, floristic elements and prevalence (%x100)*

Family/Species	**Life forms**	**Floristic element**	**Prevalence**
ALLICEAE			
Allium flavum L.	v-a Mes-Mac G bulb	apen(s)-ilir-balk-dac-pan	3,3%
Allium vineale L.	v-a Mes-Meg G bulb	med-subm-pan-atl-ce	6,6%
ADOXACEAE			
Sambucus ebulus L.	a Alt G rad scap/a H scap	se-med-subm-pont-j.sib-or-tur	10%
Sambucus nigra L.	fo dec Mi P scap	se-med-subm-pont-j.sib	10%
AMARANTHACEAE			
Amaranthus albus L.	a Meg T scap	adv (sam-sram)	6,6%
Amaranthus blitoides S. Watson	a Mes-Meg T rept	adv (sam)	10%
Amaranthus retroflexus L.	a Mes-Alt T scap	adv (sam)	30%
APIACEAE			
Aegopodium podagraria L.	a Meg-Alt G rhiz scap	se-med-subm-pont-j.c.sib	13,3%
Anthriscus caucalis M. Bieb.	a Mes-Meg T scap	subevr-az.	23,3%
Anthriscus cerefolium (L.) Hoffm. var. trichospermus Endl.	a Meg T scap	i.subm-pan-pont-tur	26,6%
Anthriscus sylvestris (L.) Hoffm.	a Meg-Alt H scap	se-med-subm-pont-j.sib-i.afr	23,3%
Bifora radians M.Bieb.	v-a Mes-Meg T scap	c.ev-c.i.med-subm-pont-or-tur	16,6%
Chaerophyllum bulbosum L.	a Mes-Alt H/T scap bienn	c.ev-med-subm-pont	16,6%
Conium maculatum L.	a Meg H scap bienn	se-med-subm-pont-j.sr-sib-or-tur-ca-i.j.afr	23,3%
Daucus carota L.	a Meg H scap/a T scap	se-med-pont-or-tur-i.afr	36,6%
Eryngium campestre L.	a Mes-Meg H scap	med-subm-pont	43,3%
Falcaria vulgaris Bernh.	a Mes-Meg T scap	se(z.ev-j.sarm)-pont-or-tur-ca	23,3%
Foeniculum vulgare Mill.	a Meg-Alt H scap	adv (med-or-tur)	10%
Heracleum sphondylium L.	a Meg-Alt H scap	se-ev (bor)-med-subm-pont-j.c.sib	36,6%
Orlaya grandiflora (L.) Hoffm.	a Meg T scap	c.ev-med-subm-pan-z.pont	30%
Pastinaca sativa L.	a Meg H scap bienn	se-med-pont-j.sib	30%
Scandix pecten-veneris L.	v Mes-Meg T scap	se-med-subm-or-tur-ca	43,3%
Torilis arvensis (Huds.) Link	a Meg T scap	kosm (ev-med)	16,6%
APOCYNACEAE			
Vinca minor L.	Mi-Mes Ch suff rept	adv (se, kult)	6,6%
ARALIACEAE			
Hedera helix L.	semp S lig	atl-se-med-subm (ev)	13,3%

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ARISTOLOCHIACEAE			
Aristolochia clematitis L.	a Mes-Meg G rad scap	subm-pont	23,3%
ASPARAGACEAE			
Asparagus tenuifolius Lam.	a Meg G rhiz caesp	c.subm-pan-z.pont	3,3%
ASTERACEAE			
Achillea millefolium L.	a Meg H scap	evr (bor-submerid)	60%
Ambrosia artemisifolia L.	Aut Meg T scap	adv(sam)	6,6%
Anthemis arvensis L.	a Mes-Meg T scap/a H scapp	med-subm	26,6%
Cota austriaca (Jacq.) Sch. Bip	a Mes-Meg T scap bienn	pont-pan	36,6%
Cota tinctoria (L.) J. Gay	a Meg H scap bienn	se-med-subm-or-pont	19%
Arctium lappa L.	aut Meg-Alt H scap bienn	evr (temp-submerid)	43,3%
Artemisia absinthium L.	Meg Ch suff caesp	evr (subbor-merid)	30%
Artemisia scoparia Waldst.& Kit.	aut Meg-Alt H scap bienn	evr (subbor-submerid)	36,6%
Artemisia vulgaris L.	aut Meg- Alt H scap	evr-sam (subbor-merid)	60%
Symphyotrichum novi-belgii (L.) G.L.Nesom	aut Meg-Alt H scap	adv (sam)	10%
Symphyotrichum salignum (Willd.) G.L.Nesom	aut Meg-Alt H scap	adv (sam)	10%
Bellis perennis L.	a Mes H ros	se-med-subm	60%
Bidens tripartitus L.	aut Mes-Alt T scap	evr (subbor-temp)	6,6%
Calendula officinalis L.	a Mes-Meg T scap	adv (med, kult)	10%
Carduus acanthoides L.	a Meg-Alt H scap bienn	se-med-subm-pont-j.c.sib-or-tur	23,3%
Carlina vulgaris L.	a Meg H scap	se-subm-pont-j.sib	3,3%
Centaurea jacea L.	a Meg-Alt H scap	evr (subbor-submerid)	40%
Centaurea orientalis L.	a Meg-Alt H scap	pan-z.pont	36,6%
Centaurea scabiosa L.	a Meg-Alt H scap	se-med-pont-j.c.sib-tur	36,6%
Centaurea solstitialis L.	a Meg T scap	med-subm-or-pont-j.sib-tur	50%
Centaurea stoebe L. subsp. australis (Pančić ex A.Kern.) Greuter	a Meg H scap	pan-z.pont	53,3%
Chondrilla juncea L.	a Meg-Alt H scap	med-subm-or-pont-j.sib-tur	10%
Cichorium intybus L.	a-aut Meg-Alt H scap	kosm (evr)	50%
Cirsium arvense (L.) Scop.	a Meg-Alt G rad scap	evr (subbor-merid)	46,6%
Cirsium candelabrum Griseb.	a Alt H scap bienn	balk. (end)	23,3%
Cirsium creticum (Lam.) d'Urv.	a Meg H scap bienn	med-subm	20%
Cirsium vulgare (Savi) Ten.	a Meg-Alt H scap bienn	evr (subbor-merid)	16,6%
Crepis biennis L.	a Meg-Alt H scap bienn	se-subm-pont	10%
Crepis nicaeensis Pers.	a Mes-Meg T scap/a H scap bienn	med-subm-or	10%

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Crepis rhoeadifolia M.B. Fiori et Paol.	a Meg-Alt H scap bienn	se-subm-pont	30%
Crepis sancta (L.) Bornm.	v-a Mes-Meg T ros/H ros	pont	20%
Crepis setosa Haller	a Mes-Meg T scap	c.i.med-subm-or-z.pont	20%
Cyanus segetum Hill.	a Mes-Meg T scap	kosm (med)	36,6%
Echinops sphaerocephalus L.	a Meg-Alt H scap	se-subm-pont-j.sib	23,3%
Erigeron acer L.	a Mes-Meg T scap	evr-az	50%
Erigeron canadensis L.	a Meg-Alt T scap	adv (sam)	53,3%
Eupatorium cannabinum L.	a Meg-Alt H scap	se-med-subm-pont-j.sib	16,6%
Filago germanica (L.) Huds.	a Mes T scap	se-med-subm-or-pont-j.sib-tur	10%
Galinsoga parviflora Cav.	a Mes-Meg T scap	adv (jam)	40%
Helianthus tuberosus L.	a Meg-Alt G bulb	adv (sram)	10%
Inula britannica L.	a Mes-Meg H scap	evr (temp-merid)	16,6%
Inula conyzae (Griess.) DC.	a Meg-Alt H scap bienn/a H scap	ev-z.az	16,6%
Lactuca muralis (L.) Gaertn.	a Mes-Meg H scap	evr (bor-submerid)	30%
Lactuca perennis L.	a Mes-Me H scap	subm	30%
Lactuca serriola L.	a Meg-Alt H scap bienn/a T scap	evr (subbor-merid)-i.afr (boreosubtrop)	66,6%
Lactuca viminea (L.) J Presl.& C.Presl.	a Meg-Alt H scap bienn	med-subm-pont-pan-ir (w)-boh-burgd.	16,6%
Lapsana communis L.	a Meg-Alt T scap	se-med-subm-pont-or-j.sib-ca	10%
Leontodon crispus DC, ex Nyman	a Mi-Mes H ros	med-i.subm-pont-j.sib	13,3%
Leucanthemum vulgare (Vaill.) Lam.	v-aut Mes-Meg H scap	evr (bor-merid)	30%
Matricaria chamomilla L.	a Mi-Mes T scap	kosm (subm)	56,6%
Onopordum acanthium L.	a Meg-Alt H scap bienn	evr (temp-merid)	16,6%
Petasites hybridus (L.) G.Gaertn., B.Mey &Schaerb	a Mes-Meg G rad	evr (bor-submerid)	16,6%
Picris hieracioides L.	a Meg-Alt H scap bienn/a H scap	evr (temp-merid)	23,3%
Pilosella bauhinii (Schult) Arv.-Touv.	a Mes H ros rept	c.ev.-sarm-pont-j.sr.sib	40%
Pilosella officinarum Vaill.	a Mi-Mac H ros	SJEP	40%
Podospermum laciniatum (L.) DC.	a Mi-Meg T scap bienn/H scap	pont-c.az.-subm	23,3%
Pulicaria dysenterica (L.) Bernh.	a Mes Meg H scap	se-med-subm-pont-or-tur	16,6%
Senecio leucanthemifolium subsp. vernalis (Waldst.& Kit.) Greuter	v Mes-Meg T scap	ev-med-subm-or-pont-j.sib	30%
Senecio vulgaris L.	v-aut Mi-Meg T scap	kosm (evr)	43,3%
Solidago gigantea Aiton	a Meg-Alt H scap	adv (sam)	10%
Solidago virgaurea L.	a Meg-Alt H scap	evr-sam (bor-temp)	10%
Sonchus arvensis L. var. arvensis	a Meg-Alt H scap	kosm (evr)	23,3%

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Sonchus arvensis L. subsp.. uliginosus (M.Bieb.) Nyman	a Meg-Alt H scap	kosm (evr)	8-26,6%
Sonchus asper (L.) Hill. subsp. asper	a Meg-Alt T scap/a H scap bienn	kosm (med-subm)	9-30%
Sonchus asper (L.) Hill. subsp. glaucescens (Jord.) Ball	a Meg-Alt H scap bienn	ev.-z.az	9-30%
Sonchus oleraceus L.	a Meg-Alt T scap/a H scap bienn	kosm (med-subm)	33,3%
Tanacetum corymbosum (L.) Sch.Bip.	a Meg-Alt H scap	se-med-subm-pont-j.sib	10%
Tanacetum vulgare L.	a Meg-Alt H scap	evr (temp-merid)	23,3%
Taraxacum officinale F.H.Wigg.	v-aut Mes H ros	kosm (evr)	76,6%
Tragopogon dubius Scop.	a Mes-Meg H scap bienn	se-subm-pont-or	50%
Tragopogon dubius Scop. subsp. major (Jacq.) Vollm.	a Mes-Meg H scap bienn		50%
Tragopogon pratensis L.	a Meg H scap	subm (ev) pont-j.c.sib-tur	63,3%
Tripleurospermum inodorum (L.) Sch.Bip	a-aut Meg T scap/ H scap bienn	kosm (med-subm)	50%
Tussilago farfara L.	v Mi-Mes G rhiz	se-med-subm-pont-j.sib-ca	23,3%
Xanthium orientale subsp. italicum (Moretti) Greuter	a Meg-Alt T scap	adv (sam)	26,6%
Xanthium spinosum L.	a Mes-Meg T scap	kosm (jam)	33,3%
Xeranthemum annuum L.	a Mes-Meg T scap	med-subm-or-z.pont	43,3%
BIGNONIACEAE			
Catalpa bignonioides Walter.	v-a Mes P scap	subm	3,3%
BORAGINACEAE			
Aegonychon purpurocaeruleum (L.) Holub	v Mes-Meg H scap	pont-subm	20%
Anchusa azurea Mill.	a Mes-Meg H scap	med-subm-pan-pont-or	16,6%
Anchusa officinalis L.	a Meg H scap bienn/a H scap	se-i.subm-pan-z.pont	46,6%
Asperugo procumbens L.	v Mes-meg T scap	evr (bor-submerid)-sam (sin.)	10%
Buglossoides arvensis (L.) I.M.Johnst.	v-a N-Meg T scap	evr (subbor-merid)	16,6%
Cerinthe minor L.	v-a Mes-Meg H scap bienn/T scap	(ev)-med-subm-z.pont	23,3%
Cynoglossum creticum Mill.	a Mes-Meg H scap bienn	atl-med-subm-tur	16,6%
Cynoglossum officinale L.	a Mes-Meg H scap bienn	se-med-subm-pont-sr.sib	26,6%
Echium italicum L.	a-aut Meg H scao bienn	med-subm	20%
Echium vulgare L.	a Mes-Alt H scap bienn/a H scap	se-med-subm-pont-j.sib	30%
Heliotropium europaeum L.	a Mes-Meg T scap	med-subm-pan-z.pont	10%
Myosotis arvensis (L.) Hill.	a Mes H scap bienn/a T scap	se-med-subm-pan-pont-or	16,6%
Myosotis sparsiflora Pohl	v-a Mes-Meg T scap	se-z.subm-pont-j.sib	23,3%

http://www.aloki.hu ● ISSN 1589 1623 (Print) ● ISSN 1785 0037 (Online)
DOI: http://dx.doi.org/10.15666/aeer/1504_863890

Nonnea pulla DC.	v-a Mes-Mac H/T scap bienn	subpont	16,6%
BRASSICACEAE			
Alliaria petiolata (M.Bieb.) Cavara & Grande	v-a Meg H scap bienn	ev-med-z.tur	30%
Alyssum alyssoides (L.) L.	v Mi-Mes T scap	med-subm-pont	16,6%
Alyssum margrafi O.E. Schulz ex Markgr.	a Mes-Meg H scap	balk (end)	3,3%
Alyssum turkestanicum Regel & Schmalh.	v Mi-Mes T scap	pan-pont-j.sib-or-tur	3,3%
Arabidopsis thaliana (L.) Heynh.	a Mi-Meg H ros bienn/a T ros-scap	ev-med-z.ca	13,3%
Armoracia rusticana P. Gaertn., B. Mey. & Scherb.	a meg-Alt G rad scap	adv (pont-kult)	3,3%
Barbarea vulgaris R. Br.	a Meg H scap	evr (subbor-merid)	16,6%
Berteroa incana (L.) DC.	a Mes H scap	se-pont-j.sib-tur	43,3%
Calepina irregularis (Asso) Thell.	a Mes-meg T scap	med-pont-tur	36,6%
Camelina sativa (L.) Crantz.	a Mes-Alt T scap	evr (temp-merid)	33,3%
Capsella bursa-pastoris (L.) Medik.	v-aut Mi-Meg T ros/H ros bienn	kosm (subm)	66,6%
Cardamine hirsuta L.	v-aut Mi-Mes T scap	kosm (evr)	33,3%
Cardaria draba (L.) Desv.	v-a Meg H scap	med-subm-pont-tur	63,3%
Conringia orientalis (L.) Dumort.	v-a Mes-meg T scap	i.med-i.subm-z.pont	30%
Coronopus squamatus (Forssk.) Asch.	v-a Mi-Mes T rept	kosm (med)	20%
Descurainia sophia (L.) Prantl	a Meg T scap/a H scap bienn	evr (temp-merid)	46,6%
Diplotaxis muralis (L.) DC.	v-a Mes T semiros/H semiros	se-subm	46,6%
Erophila verna (L.) Chevall.	v N-Mi T ros	med-pont-j.sib-tur	30%
Erysimum cuspidatum (M.Bieb..) DC.	a Meg T scap/a H scap bienn	i.subm-pan-z.pont-tur	36,6%
Erysimum diffusum Ehrh.	a Mes-Meg H scap bienn	pont-j.sib-tur	50%
Lepidium campestre (L.) W.T. Aiton	a Meg T scap/a H scap bienn	ev-subm-pont	6,6%
Lepidium ruderale L.	a Mes T scap	evr (temp-merid)	6,6%
Microthlaspi perfoliatum (L.) F. K. Mey.	v Mi-Mes T scap-semiros	med-subm-pont-tur	23,3%
Myagrum perfoliatum L.	v Mes T scap	i.subm-pont-tur	26,6%
Odontarrhena bertolonii subsp. scutarina (Nyár) Španiel, Al-Shehbaz, D.A. German & Marhold	a Mes-Meg H scap	balk (end)	30%
Raphanus raphanistrum L.	v-a Meg T scap	evr (temp-merid)	16,6%
Rorippa austriaca (Crantz) Besser	a Meg H scap	i.med-z.pont	30%
Rorippa pyrenaica (All.) Rchb.	a Mes H semiros-scap	subm (ev)	23,3%
Rorippa sylvestris subsp. kerneri (Menyh.) Soó	v-a Mi-Mes H scap bienn	panon	33,3%
Rorippa silvestris (L.) Besser	a Mi-Mes H scap	med-subm-pan-pont	43,3%
Sinapis alba L.	v-a Meg T scap	i.med-subm	46,6%
Sinapis arvensis L.	v-a Mes-Meg T scap	kosm (subm)	36,6%

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Sisymbrium loeselii L.	a Meg-Alt T scap	i.subm-pan-pont-tur	26,6%
Sisymbrium officinale (L.) Scop.	a Meg T scap	med-subm-pont-j.c.sib	46,6%
Sisymbrium orientale L.	a Meg T scap/ a H scap bienn	med-pont	40%
Thlaspi arvense L.	a Mes T scap	evr (temp-merid)	60%
CANNABACEAE			
Humulus lupulus L.	a SH herb	evr-sam (subbor-temp)	23,3%
CAPRIFOLIACEAE			
Dipsacus laciniatus L.	a Meg-Alt H scap bienn	c.ev-sarm-i.subm-pont-j.sib-or	16,6%
Knautia arvensis (L.) Coult	a Mes-Meg H scap/a H scap bienn	ev (boreo)-se-med-subm-pont-j.sib	16,6%
Scabiosa argentea L.	v-a Meg H scap bienn/H scap	i.subm-pan-z.pont	23,3%
Valerianella carinata Loisel.	v Mi-Mes T scap	atl-se-med-subm	33,3%
Valerianella locusta (L.) Laterr.	a Mes T scap	kosm (med)	26,6%
Valerianella turgida (Steven) Betcke	v Mes T scap	i.med-subm	23,3%
CARYOPHYLLACEAE			
Agrostemma githago L.	a Meg T scap	evr (temp-merid)	16,6%
Arenaria serpyllifolia L.	v-a Mi-mes T scap	ev-md-pont-tur	43,3%
Cerastium brachypetalum Pers.	a Mi-Mes T scap	ev-med-subm-z.pont	20%
Cerastium fontanum subsp. vulgare (Hartm.) Greuter & Burdet	v-a Mi-Mes H scap	kosm (evr)	13,3%
Cerastium glomeratum Thuill.	a Mi-Mes T scap	kosm (med)	23,3%
Herniaria glabra L.	v-a Mi-Mes T rept/H rept bienn	evr (subbor-submerid)	26,6%
Holosteum umbellatum L. var. umbellatum	v Mi-mes T scap	evr (temp-submerid)	40%
Moenchia mantica (L.) Bartl.	v-a Mes T scap	(ev)-c.i.med-c.i.subm-pan	20%
Myosoton aquaticum (L.) Moench.	a Mes-Meg H rept	evr (bor-subtemp)	13,3%
Petrorhagia saxifraga (L.) Link. f. cinerascens Th. Wolf.	a Mes H caesp	c.i.med-pan-z.pont	23,3%
Saponaria officinalis L.	a Meg H scap	se-med-pont-j.sib	16,6%
Scleranthus annuus L. subsp. polycarpos (Torn.) Thell.	v-aut Mi-Mes T scap/H bienn	evr (temp-submerid)	10%
Scleranthus perennis subsp. dichotomus (Schur) Nyman	v-aut Mi-Mes H scap	i.subm-pan	13,3%
Silene armeria L.	a Meg T scap/H scap bienn	evr-sam (temp-submerid)	20%
Silene conica L. subsp. conica Gusul.	v-a Mi-Mes T scap	evr (temp-submerid)	23,3%
Silene flos-cuculi (L.) Clairv.	a Meg H scap	se-ev (bor)-subm-pont-j.sib	13,3%

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Silene latifolia Poir.	a Meg H scap bienn/a H scap	evr (temp-submerid)	30%
Silene vulgaris (Moench) Garcke	a Meg H scap/a G rad	evr (bor-merid)	50%
Stellaria graminea L.	a Mes-Meg H scap	evr (bor-submerid)	20%
Stellaria media (L.) Cirillo	v-aut Mi T rept	kosm (med)	60%
CHENOPODIACEAE			
Atriplex patula L.	aut Meg-Alt T scap	evr-sam (subbor-merid)	10%
Atriplex rosea L.	a-aut Mes-Meg T scap	med-subm-pan-pont.j.sib-or	6,6%
Atriplex tatarica L.	a Meg-Alt T scap	evr (temp-merid)	13,3%
Bassia scoparia (L.) A.J. Scot	a Meg-Alt T scap	adv (ca)	3,3%
Blitum bonus-henricus (L.) Rchb.	a Mac H scap	ev-sam (bor-merid)	6,6%
Chenopodiastrum hybridum (L.) S. Fuentes & al.	a Mes-Meg T scap	evr (temp-merid)	13,3%
Chenopodiastrum murale (L.) S. Fuentes & al.	a Meg-Alt T scap	kosm (med)	23,3%
Chenopodium album L. var. album	a Meg-Alt T scap	evr (bor-merid)	60%
Chenopodium opulifolium W.D.J. Koch & Ziz	a Meg T scap	kosm (med)	43,3%
Chenopodium strictum Roth.	a Meg T scap	ev-z.az	33,3%
Chenopodium suecicum Murr var. viride (L.) Wahlenb	a Mes-Alt T scap	evr (temp-submerid)	26,6%
Dysphania botrys (L.) Mosyakin & Clemants	a Mes-Meg T scap	evr (temp-merid)	43,3%
Lipandra polysperma (L.) S. Fuentes & al.	a Meg T scap	evr	10%
Salsola tragus L. subsp. tragus	a Mes-Alt T scap	pan-pont-j.sib-tur-ca	3,3%
CISTACEAE			
Fumana procumbens (Dunal.) Gren.& Godr.	a Mes Ch suff rept	z.i.c.med-subm-se-z.pont-or	13,3%
CONVOLVULACEAE			
Calystegia sepium (L.) R.Br.	a SH herb	kosm (evr-sam)	16,6%
Convolvulus arvensis L.	a SG herb rhiz	kosm (med)	93,3%
Cuscuta epithymum (L.) L.	ST par	atl-se-med-subm-pan-pont-j.sib	23,3%
Cuscuta europaea L.	ST par	ev-az	30%
CRASSULACEAE			
Sedum acre L.	N-Mi Ch herb caesp succ	atl-se-med	6,6%
CUCURBITACEAE			
Bryonia alba L.	a SG tub herb	sarm-i.subm-pont-j.sib	13,3%
Echinocystis lobata (Michx.) Torr.& A. Gray	a St herb	adv (sam)	10%
CYPERACEAE			
Carex hirta L.	a Mes-Meg G rhiz caesp	ev-med-pont	23,3%

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Carex panicea L.	v-a Meg H caesp/rhiz	cirkumpolarni	20%
Carex vulpina L. f. nemorosa (Rebent.) Koch.	a Meg H caesp	evr (temp-submerid)	30%
Cyperus fuscus L.	a Mes emer Hyd T scap	evr (subbor-merid)	16,6%
Eleocharis palustris (L.) R.Br.	a Mes-Meg emer Hyd G rhiz	kosm (evr)	16,6%
Shoenoplectus lacuster (L.) Palla	a-aut Alt emer Hyd G rhiz	kosm	13,3%
EQUISETACEAE			
Equisetum arvense L.	a Mes-Meg G rhiz scap	evr-sam (bor-temp)	20%
Equisetum palustre L.	a Meg G rhiz	evr-sam (bor-temp)	13,3%
EUPHORBIACEAE			
Euphorbia cyparissias L.	a Mes-Meg H scap	atl-se-c.subm-pan-sarm	50%
Euphorbia taurensis All.	a Mes T scap	subm	33,3%
Euphorbia helioscopia L.	a Mi-Meg T scap	kosm (evr)	9-30%
Euphorbia seguieriana Neck. subsp. niciciana (Borbas ex Novak) Reich.	a Mes-Meg G rad caesp	evr (temp-submerid)	40%
Euphorbia stricta L.	v-a Mes-Meg T scap/H bienn	ev-z.az.	26,6%
FABACEAE			
Amorpha fruticosa L.	fo dec Mi P caesp	adv (s.amer)	6,6%
Anthyllis vulneraria L.	a Mes-Meg H scap	ev-med-subm-z.pont	3,3%
Astragalus cicer L. f. microphyllus (L.) Acherson et Graebn.	a Mes-Meg H scap	j.atl-subm-pont-sarm	6,6%
Astragalus glycyphyllos L.	a Mes-Meg H scap-rept	ev.i-subm-pont-j.sib-tur	13,3%
Astragalus hamosus L. f. multiflorus	v-a Mes-Meg T scap	med-subm-tur	3,3%
Dorycnium pentaphyllum subsp. herbaceum (Vill.) Bonnier & Layens	Mes Ch suff caesp	med (ap-balk) c.subm-pan-pont	23,3%
Galega officinalis L.	a Meg H scap	c.i.subm-pan-pont-or	13,3%
Genista tinctoria L.	Meg fo dec Ch suff caesp	se-sarm-subm-pont-j.c.sib	26,6%
Lathyrus aphaca L.	a Mes T scap/ST herb	med-subm-pont-j.tur	33,3%
Lathyrus sphaericus Retz.	a Mes-Meg T scap	med-subm	23,3%
Lathyrus tuberosus L.	a Meg G tub rept	se-subm-pont-j.sib-or-i.afr	36,6%
Lotus corniculatus L.	a Mes H scap	ev-med-pont-j.sib-or-i.afr	66,6%
Medicago arabica (L.) Huds.	a Meg T scap	med-subm-or-tur	56,6%
Medicago falcata L.	a Mes-Meg H scap	ev-med-subm-pont-j.sib	40%
Medicago lupulina L.	a Mes T scap/a H scap	evr (temp-merid)-i.afr	53,3%

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Medicago minima (L.) L.	a Mi-Mes T scap	evr (submerid-merid)-i.afr.	30%
Medicago orbicularis (L.) Bartal.	a Mes T scap	med-subm-or-tur	43,3%
Medicago rigidula (L.) All.	a Mi-Mes T scap	med-subm-or	46,6%
Medicago sativa L.	a Mes-Meg H scap	med-subm-or	33,3%
Melilotus albus Medik.	a Meg T scap/a H scap bienn	kosm (evr)	43,3%
Melilotus officinalis (L.) Lam.	a Meg-Alt H scap bienn	ev-subm-pont-j.sib-or-tur	60%
Onobrychis viciifolia Scop.	a Meg H scap	adv (med;kult)	16,6%
Ononis spinosa L.	fo dec Mes-Meg Ch suff caesp	atl-c.ev	23,3%
Ononis spinosa subsp. hircina (Jacq.) Gams	fo dec Mes Ch suff caesp	i.subm-pan-sarm-pont-j.sib	20%
Robinia pseudoacacia L.	fo dec Mes P scap	adv (sam)	13,3%
Securigera varia (L.) Lassen	a Meg H scap	se-med-subm-pont-or	30%
Trifolium arvense L.	a Mes T scap/a H scap bienn	ev-med-pont-j.sib	40%
Trifolium campestre Schreb.	a Mes T scap	ev-med-subm-z.pont-or-tur	50%
Trifolium dubium Sibth.	v-a Mi-Mes T scap	ev-z.az	70%
Trifolium fragiferum L.	a Mes H rept	ev-med-subm-pont-j.sib-or-tur	60%
Trifolium incarnatum L.	a Mes-Meg T scap	subatl-med-subm	40%
Trifolium patens Schreb.	a Mes-Meg T scap	(ev) med-subm	63,3%
Trifolium pratense L.	a Mes H scap	ev-med-subm-pont-j.sib	33,3%
Trifolium repens L.	a Mi H rept	kosm (evr)	50%
Trifolium resupinatum L.	a Mes T scap	med-subm-or-tur	36,6%
Vicia cracca L. var. linearis Petern	a Meg-Alt H scap/SH herb	evr (bor-merid)	53,3%
Vicia grandiflora Scop.	a Meg T scap/ST herb	i.subm-pan-z.pont	13,3%
Vicia hirsuta (L.) Gray f. fissa (Frol) Beck.	a Mes-Meg T scap/ST herb	ev-med-pont-j.sib	43,3%
Vicia lutea L.	v-a Mes-Meg T scap	z.c.med-subm-or-tur	40%
Vicia pannonica Crantz	a Mes-Meg T scap/ST herb	ev-med-subm-z.pont	43,3%
Vicia pannonica subsp. striata (M. Bieb.) Nyman	a Mes-Meg T scap	i.med-i.subm-or	43,3%
Vicia sativa L.	a Mes-Meg T scap/ST herb	kosm (med;kult)	50%
Vicia sativa subsp. nigra (L.) Ehrh.	v-a Mes-Meg T scap/H scap bienn	ev-z.az	36,6%
Vicia tenuifolia Roth.	a Mac-Alt H scap/SH herb	ev-med-z.az	30%
Vicia tetrasperma (L.) Schreb.	Mes ST herb	kosm (med)	26,6%
Vicia villosa Roth.	a Meg-Alt T scap/ST herb	c.i.subm-sarm-pont	63,3%
FUMARIACEAE			
Fumaria officinalis L.	a Mi-Mes T scap	ev-med-subm-pont-or	53,3%

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GERANIACEAE			
Erodium cicutarium (L.) L' Hér.	v-a Mi-Mes T semiros-scap	evr (submerid-merid)	50%
Geranium columbinum L.	a Mi-Meg T scap	atl.c.ev-med-subm-pan-or	40%
Geranium dissectum L.	a Mi-Meg T scap	atl-c.ev-med-subm-pan-or	46,6%
Geranium molle L.	a Mi-mes T scap/a H scap bienn	se-sarm-med-subm	50%
Geranium pyrenaicum Burm.	a Mes-Meg H scap	atl-c.ev-med-subm	36,6%
HYPERICACEAE			
Hypericum perforatum L.	a Mes-Meg H scap	se-med-pont-j.sr.sib-or-tur	23,3%
JUNCACEAE			
Juncus articulatus L. subsp.articulatus	a Mes-Meg G rhiz caesp	evr-sam (bor-merid)	20%
LAMIACEAE			
Ajuga genevensis L.	a Mi-Mes H semiros	se-subm-pont	50%
Ajuga reptans L.	a Mes H rept	se-med-subm	33,3%
Ballota nigra L.	a Meg H scap	se-med-subm-pont-or-tur	50%
Galeopsis ladanum L.	a Mes-Meg T scap	evr (temp-submerid)-sam (sin)	43,3%
Glechoma hederacea L.	a Mes-Meg H rept/Ch herb rept	evr (subor-submerid)	50%
Lamium amplexicaule L.	v Mi-Mes T scap	evr (temp-submerid)-i.afr	70%
Lamium maculatum (L.) L.	v-a Mes-Meg H scap	se-subm-z.pont	66,6%
Lamium purpureum L.	v Mi-Mes T scap	se-med-subm-pont	63,3%
Leonurus cardiaca L.	a Meg-Alt H scap	sarm-subm-pont-j.c.sir-or-tur	23,3%
Lycopus europaeus L.	a Mes-Meg H scap/emer Hyd G rhiz	evr (subbor-merid)	26,6%
Marrubium peregrinum L.	a Meg-Alt H scap	balk-pan-z.pont	23,3%
Mentha aquatica L.	a Mes-Meg H scap	evr (subbor-submerid)-afr(boreosubtrop)	6,6%
Mentha longifolia (L.) Huds.	a Mes-Meg H scap	evr (temp-merid)-afr (boreosubtrop)	6,6%
Prunella vulgaris L.	a Mi-Mes H scap-semiros	evr-sam (subbor-submerid)	20%
Salvia amplexicaulis Lam.	a Meg-Alt H scap	i.med-i.subm	36,6%
Salvia nemorosa L.	a Mes-Meg H scap	sarm-i.subm-pont-j.sib-or-tur	30%
Salvia pratensis L.	a Mes-Meg H scap	subm-pont-j.sib	43,3%
Salvia verticillata L.	a Mes-Meg H scap	se-subm-pont-j.sib	23,3%
Scutellaria galericulata L.	a Mi-Meg G rhiz scap	evr-sam (bor-temp)	16,6%
Stachys palustris L.	a Mes-Meg H scap	evr-sam (bor-submerid)	13,3%
Teucrium chamaedrys L.	Mes Ch suff caesp	med-subm-z.pont-or	20%
Thymus longicaulis C. Presl.	v-a Mi-Mes Ch herb rept	balk (end.)	16,6%

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LILIACEAE			
Ornithogalum umbellatum L.	v Mi G bulb scap	se-med-subm-pan-z.pont	13,3%
LINACEAE			
Linum austriacum L.	a Mi-Meg H scap	subm-pan-pont-(herc)	23,3%
LYTHRACEAE			
Lythrum salicaria L. var. tomentosum (Mill.) D	a Meg-Alt H scap	kosm (evr)	16,6%
MALVACEAE			13,3%
Althaea hirsuta L.	a Mes-Meg T scap	med-subm-pan-pont-or	10%
Alcea rosea L.	a Meg-Alt H scap	adv (kult)	10%
Malva neglecta Wallr.	a Mes-Meg T scap	med-pont-or-tur	20%
Malva pusilla Sm.	a-aut Mes-Meg T scap	evr (temp-submerid)	13,3%
Malva sylvestris L.	a Meg-Alt H scap bienn/a H scap	kosm (evr)	13,3%
MORACEAE			
Maclura pomifera (Raf.) C.K. Schneid.	fo dec Mes P scap	adv (sam, kult)	3,3%
ONAGRACEAE			
Epilobium angustifolium L.	a Meg-Alt H scap	evr-sam (bor-submerid)	10%
Epilobium hirsutum L.	a Mes-Meg H scap	evr (subbor-merid)-afr (boreo-austrosubtrop)	10%
OLEACEAE			
Fraxinus ornus L.	fo dec Mes P scap	c.med-i.subm	6,6%
Ligustrum vulgare L.	fo dec NP caesp	atl-se-med-subm-or	13,3%
OROBANCHACEAE			
Melampyrum arvense L.	a Mes-Meg T scap	evr (temp-submerid)	16,6%
Rhinanthus major L.	v-a Mes-Meg T scap	se	20%
PAPAVERACEAE			
Chelidonium majus L.	v-a Mes-Meg H semiros	evr (temp-submerid)	36,6%
Papaver dubium L.	a Meg T scap	atl-se-med-subm-z.pont-or-afr (boreosubtrop)	56,6%
Papaver rhoeas L.	a Meg t scap	ev-med-subm-pont-j.sib-or	46,6%
PHYTOLACCACEAE			
Phytolacca americana L.	a-aut Alt G rhiz scap	adv (sam)	3,3%
PLANTAGINACEAE			
Plantago lanceolata L.	a Mi-Meg H ros	evr (subbor-temp)	66,6%
Plantago major L.	a Mes-Meg H ros	kosm (evr-sam)	50%
Plantago media L.	a Mes-Meg H ros	evr (temp-submerid)	46,6%

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PLATANACEAE			
Platanus orientalis L.	fo dec Mes P scap	adv (?, kult)	6,6%
POACEAE			
Achnatherum calamagrostis (L.) P. Beauv.	a Meg-Alt H scap	JEP (južnoevropsko planinska)	23,3%
Aegilops cylindrica Host	a Mi-Mes T scap	i.med-subm-pont-or-tur	43,3%
Aegilops neglecta Bertol.	v-a Mes T caesp	med-subm-tur	40%
Alopecurus myosuroides Huds.	a Mes-Meg T caesp	atl-med-subm-or-tur	30%
Alopecurus pratensis L.	a Meg-Alt H caesp	evr (subbor-submerid)	23,3%
Anisantha sterilis (L.) Nevski	a Mes-Meg T caesp	se-sarm-med-subm-pont-or	53,3%
Anisantha tectorum (L.) Nevski	a Mes-Meg T scap	ev-med-subm-pont-j.sib-or-tur	40%
Anthoxanthum odoratum L.	a Mes-Meg H caesp	ev-med-subm-z.pont-sr.sib	23,3%
Apera spica-venti (L.) P. Beauv.	a Mes-Meg T scap	ev-subm-pont-j.sr.sib	26,6%
Arrhenatherum elatius (L.) J. Presl & C. Presl	a Meg-Alt H caesp	atl-se-subm-sarm	30%
Botriochloa ishaemum (L.) Keng.	a Mes H caesp	evr (temp-merid)	13,3%
Briza media L.	a Mes-Meg H caesp	evr (subbor-submerid)	20%
Bromus arvensis L.	a Mes-Meg T scap	subm-sarm-sr.sib	50%
Bromus commutatus Schrad.	a Meg T scap	subatl-se-c.subm	46,6%
Bromus hordeaceus L.			40%
Bromus inermis (Leyss.) Holub	a Meg-Alt H caesp	evr (subbor-temp)-sam(temp-submerid)	30%
Bromus racemosus L.	v-a Mes-Meg T scap	ev-z.az	43,3%
Bromus squarrosus L.	a Mes-Meg T scap	med-subm-pan-pont-j.sib-or-tur	53,3%
Cynodon dactylon (L.) Pers.	a Mes G rhiz rept-caesp	kosm (med-or-tur)	53,3%
Dactylis glomerata L.	a Meg H caesp	ev-med-subm-pont-j.sib-or-tur-ca	30%
Dasypyrum villosum (L.) P. Candargy	a Mes-Meg T scap	med-subm	33,3%
Digitaria sanguinalis (L.) Scop.	a Mes T caesp-rept	evr-sam (subbor-merid)	23,3%
Echinochloa crus-galli (L.) P. Beauv.	a Meg-Alt T caesp	kosm (subtrop-trop)	26,6%
Eragrostis pilosa (L.) P. Beauv.	a Mes-Meg T caesp	kosm (med)	20%
Elytrigia repens (L.) Nevski	a Mes-Meg G rhiz caesp	kosm (evr)	16,6%
Festuca rubra L. subsp. rubra	a Mes-Meg H caesp	evr-sam (bor-merid)	26,6%
Festuca valesiaca Gaudin	a Meg H caesp	ev-subm-pont-j.sib-ca	20%
Glyceria fluitans (L.) R.Br.	v-aut Meg-Alt Hyd G rhiz	evr (bor-submerid)-sam	13,3%
Holcus lanatus L.	a Meg H caesp	atl-med-se-sarm-z.pont	30%
Hordeum murinum L.	a Mes T caesp	med-subm-sarm-z.pont	60%
Hordeum murinum L.	a Mes T caesp	med-subm-sarm-z.pont	53,3%

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subsp. leporinum (Link) Arcang.			
Koeleria macrantha (Lebed.) Schult.	a Mes H scap	evr-sam (temp-submerid)	13,3%
Lolium perenne L.	a Mes H caesp	ev-med-subm	56,6%
Lolium remotum Schrank	a Mes-Alt T scap	evr (temp)	53,3%
Melica ciliata L.	a Mes-Meg H caesp	se-med-subm (ev)	16,6%
Ochlopoa annua (L.) H. Scholz.	v-aut N-Mes T caesp	kosm (evr-sam)	43,3%
Pennisetum glaucum (L.) R.Br.	a-aut Mes-Meg T caesp	kosm (evr-sam)	20%
Phragmites australis (Cav.)Trin ex Steud.	Alt emer Hyd G rhiz	kosm (evr-sam)	6,6%
Poa bulbosa L. subsp.. vivipara (Koeler) Arcang.	a Mes-Meg H scap	ev-med-subm-pont-j.sib-or-tur-ca	23,3%
Poa compressa L.	a Mes H caesp	kosm (evr)	26,6%
Poa nemoralis L.	a Mes-Alt H scap	evr-sam (bor-submerid)	53,3%
Poa angustifolia L.	a Mes-Meg H caesp	kosm (evr-sam)	36,6%
Poa trivialis L.	a Mes-Meg H caesp	kosm (evr)	50%
Schenodorus arundinaceus (Schreb.) Dumort	a Meg-Alt H caesp	subm-pont-j.sib-tur	26,6%
Schenodorus pratensis (Huds) P. Beauv.	a Meg H caesp	ev-subm-pont-j.sib-ca	30%
Sclerochloa dura (L.) P. Beauv.	v N-Mi T caesp	med-subm-pont-or-tur	40%
Setaria viridis (L.) P. Beauv.	a-aut Mes-Meg T caesp	kosm (evr-sam)	36,6%
Sorghum halepense (L.) Pers.	a-aut Meg-Alt G rhiz caesp	adv (paleotrop)	33,3%
Vulpia myurus (L.) C.C.Gmel.	a Mes-Meg T caesp	se-med-subm-z.pont-or-tur-ca	13,3%
POLYGONACEAE			
Fallopia convolvulus (L.) Á. Löve	a Mes-Meg T scap/SH herb	kosm (evr)	23,3%
Fallopia dumetorum (L.) Holub	a Meg T scap/SH herb	evr (temp-submerid)	13,3%
Persicaria lapathifolia (L.) Delarbre	a-aut Meg T scap	evr (bor-trop)-sam (subbor-boreotrop)	6,6%
Persicaria maculosa Gray	a-aut Meg T scap	evr (bor-merid)	6,6%
Polygonum aviculare L.	a-aut Mi-Meg T rept	kosm (trop)	53,3%
Rumex acetosella L.	a Mes-Meg H scap	evr-sam (bor-merid)	40%
Rumex crispus L.	a Meg-Alt H scap	kosm (evr)	30%
Rumex obtusifolius L.	a Meg H scap	se-subm-pont	20%
Rumex pulcher L.	v-a Mes-meg H scap/v-a T scap	med-subm-or	36,6%
PORTULACACEAE			
Portulaca oleracea L.	a Mes T scap	adv (az)	10%
PRIMULACEAE			
Anagallis arvensis L.	v-aut Mi T rept	kosm (med)	16,6%
Anagallis foemina Mill.	v-aut Mi T rept	se-med-subm-z.pont	6,6%

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RANUNCULACEAE			
Adonis flammea Jacq.	a Mes-Meg T scap	subm-se-pan-z.pont-or	23,3%
Clematis vitalba L.	a dec S lig	se-med-subm	33,3%
Consolida orientalis (J.Gay.)Schrödinger	a Meg T scap	med-or-tur-z.pont	30%
Consolida regalis Gray	a Mes-Meg T scap	se-subm-pont-j.sib	20%
Ficaria verna Huds.	v Mi-Mes G scap	evr (bor-submerid)	16,6%
Nigella damascena L.	a Mes T scap	med-subm-or	6,6%
Ranunculus arvensis L.	a Mes-Meg T scap-semiros	se-med-or-tur-ca	36,6%
Ranunculus millefoliatus Vahl	v-a Mes H scap/G tub	c.i.med-subm	20%
Ranunculus repens L.	a Mes-Meg H rept	evr (bor-submerid)	40%
Ranunculus sardous Crantz	a Mes-Meg T scap-semiros	se-med-subm	13,3%
Ranunculus sceleratus L.	a Mes-Meg emer Hyd T semiros	kosm (evr)	16,6%
Ranunculus serbicus Vis.	a Meg H scap/G rhiz	sr.balk.j.apen (subend)	13,3%
RESEDACEAE			
Reseda lutea L.	a Mes-Meg H scap/a T scap	se-med-subm-pont-or	23,3%
Reseda luteola L.	a Mes-Alt H scap bienn/T scap	atl-se-med-subm-or	26,6%
Reseda phyteuma L.	v-a Mes-Mac T scap/H scap	med-subm	6,6%
ROSACEAE			
Agrimonia eupatoria L.	a Meg H scap	ev-med-subm-or-pont-j.sib-tur	30%
Crataegus monogyna Jacq.	fo dec NP caesp	se-med-subm-pont	3,3%
Filipendula vulgaris Moench	a Meg H scap	evr (subbor-submerid)	10%
Fragaria vesca L.	a Mes H rept	evr (subbor-submerid)-sam (temp)	16,6%
Geum urbanum L.	a Meg H scap	se-pont-j.sr.sib-tur	23,3%
Potentilla argentea L.	a Mes-Meg H scap	evr (temp-submerid)	26,6%
Potentilla hirta L.	a Mes-Meg H scap	(ev) med-subm-z.pont	26,6%
Potentilla neglecta Baumg.	a Mes-Meg H scap	evr (temp-submerid)	16,6%
Potentilla reptans L.	a Mi-Mes H rept	kosm (evr)	43,3%
Rosa canina L.	fo dec NP caesp	ev-med-subm-pont-or-tur	33,3%
Rubus caesius L.	fo dec NP rept	evr (temp-submerid)	30%
Rubus ulmifolius Schott	fo dec NP rept	atl.z.c.med-subm	20%
Sanguisorba minor Scop.	a Mes-Meg H scap	evr (temp-submerid)	50%
RUBIACEAE			
Cruciata laevipes Opiz	v-a Mes-Meg H scap	evr (temp-submerid)	36,6%
Galium aparine L.	Mes-Meg ST herb	kosm (evr)	50%
Galium lucidum All.	a Mes-Meg H scap	med-subm-se	30%

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Galium mollugo L.	a Meg-Alt H scap	se-med-subm	40%
Galium verum L.	a Mes-Meg H scap	kosm (med)	23,3%
Sherardia arvensis L.	v-a Mi-Mes T scap	kosm (med)	16,6%
SALICACEAE			
Populus alba L.	fo dec Mes P scap	se-med-subm-pont-j.sib-tur	16,6%
Populus nigra L.	fo dec Mes P scap	se-med-subm-pont-j.sib	16,6%
Salix alba L.	fo dec Mes P scap	ev-med-subm-or-pont-j.c.sib-ca	16,6%
Salix triandra L.	fo dec Mes P caesp-scap	evr (bor-submerid)	16,6%
SANTALACEAE			
Comandra umbellata (L.) Nutt.	v-a Mes-Meg Ch frut/Ch suffr	subdac	3,3%
Thesium arvense Horv.	a Mes H scap/H bienn	evr (temp-submerid)	13,3%
SAPINDACEAE			
Acer negundo L.	fo dec Mes P scap	adv (sam)	10%
Acer pseudoplatanus L.	fo dec Mes P scap	adv (sam)	10%
Acer saccharinum L.	fo dec Mes P scap	se	10%
SCROPHULARIACEAE			
Antirrhinum majus L.	Mes-Meg Ch suff caesp	adv (med-subm, kult)	6,6%
Linaria genistifolia subsp. sofiana (Velen.) Chater & D.A.Webb	a Mes-Meg H scap	balk (end)	43,3%
Linaria vulgaris Mill.	a-aut Mes-Meg H scap	evr (subbor-submerid)	23,3%
Verbascum phlomoides L.	a Meg-Alt H ros bienn	se-med (ev)-subm (ev)-pan-z.pont	56,6%
Veronica anagallis-aquatica L.	a Mes-Meg H scap	kosm (evr)	16,6%
Veronica arvensis L.	v-a N-Mes T scap	kosm (med)	20%
Veronica beccabunga L.	v-a Mes-Meg H rept	evr (bor-submerid)	23,3%
Veronica chamaedrys L.	v-a Mi-Mes H scap	se-subm-pont-j.sib	43,3%
Veronica hederifolia L.	v Mi-Mes T scap	se-med-subm-pont	30%
Veronica persica Poir.	v-aut N-Mes T scap	kosm (med-subm)	26,6%
Veronica praecox All.	v-a Mi-Mes T scap bienn	pont-subm	36,6%
Veronica serpyllifolia L.	v-aut Mi-Mes H rept	kosm (evr)	46,6%
SOLANACEAE			
Datura stramonium L.	a-aut Meg-Alt T scap	kosm (evr-sam)	23,3%
Hyoscyamus niger L.	a-aut Mes-Meg T scap/H scap bienn	evr (temp-merid)	20%
Lycium barbarum L.	fo dec NP caesp	adv (med)	3,3%
Physalis alkekengi L.	a-aut Mes-Meg G rhiz rept	se-med-subm-z.pont	3,3%
Solanum dulcamara L.	a Meg-Alt S lig	evr (temp-submerid)	23,3%

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Solanum nigrum L.	v-aut Mes-Meg T scap	kosm (evr-sam)	26,6%
TYPHACEAE			
Typha angustifolia L.	Alt emer Hyd G rhiz	evr-sam (subbor-temp)	3,3%
URTICACEAE			
Urtica dioica L.	a Mes-Alt H scap	evr-sam (bor-temp)	66,6%
Urtica urens L.	a Mes-Meg T scap	evr-sam (bor-temp)	20%
VERBENACEAE			
Verbena officinalis L.	a Mes-Meg H scap	kosm (evr-s.afr)	36,6%
VIOLACEAE			
Viola arvensis Murray	v-aut Mi-Mes T scap/a H scap bienn	evr (subbor-merid)	33,3%
Viola tricolor L.	v-a Mes T scap	evr (temp-submerid)	36,6%

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According to the literature data on vascular flora of Serbia, the families with the greatest number of species are: *Asteraceae, Poaceae, Fabaceae, Caryophyllaceae, Brassicaceae, Lamiaceae, Scrophulariaceae, Apiaceae* (Stevanović et al., 1995). In the ruderal flora of Kosovska Mitrovica and its surroundings the largest families coincide with the most numerous families in the flora of entire Serbia (*Asteraceae*-77 species, *Poaceae*-49 species, *Fabaceae*- 46 species, *Brassicaceae*- 36, *Lamiaceae*- 22 species, *Caryophyllaceae*-20 species, *Apiaceae*-16 species, *Scrophulariaceae*-12 species). The result was anticipated because of the synanthropic character of a great number of representatives of these families.

The most profuse genera found within the taxonomic floral structure in Kosovska Mitrovica area were the following: *Vicia* (11 sp.), *Trifolium* (9 sp.), *Veronica* (8 sp.), *Medicago* (7 sp.), *Bromus* and *Ranunculus* (each with 6 sp.), *Centaurea*, *Crepis*, *Sonchus*, *Silene*, *Euphorbia*, *Poa*, (each with 5 sp.), *Cirsium, Rorippa*, *Geranium, Salvia* and *Rumex* (each with 4 sp.). These genera usually include a large number of ruderal and ruderal-segetal plants. The species comprising these genera show the anthropogenic character of diverse ruderal habitats indicating either their nitrification or their xerothermic features, or the presence of intensive treading, mowing, and other anthropogenic influences that make ruderal habitats highly dynamic and instable biotopes (Jovanović, 1994).

General life form spectrum

The flora of Central European cities is dominated by hemicryptophytic life forms (Sukopp, 1990), while therophitic life forms prevail in South European city flora (Stešević et al., 2014). The ecological analysis in Kosovska Mitrovica showed the hemicryptophitic type of ruderal flora (189 sp. 42,56 % of total) (*Fig. 2)*. The dominant role of hemicryptophytes is potentially even more emphasized by the fact that among the primary annual (one year old) plants (therophytes) there are 25 species that, under specific conditions, alternate as two years old forms. The hemicryptophyte life form is largely described by trunk (stem) shapes (H scap), with 111 species. The domination of hemicryptophytes in the biological spectrum of the ruderal flora of Kosovska Mitrovica corresponds to a dominant presence of these life forms in the whole flora of the Balkans (Turill, 1929). Repeated field researches, 20 years after, showed that the number of hemicryptophytes in the ecological spectrum of life forms had increased by 19 representatives. This may be confirmed by the fact that some surfaces where the floral material was collected have ecologically stabilized.

Therophytes participated less (179 sp., 40,31% of total), which classified them as second in the biological spectrum of Kosovska Mitrovica ruderal flora. As a rule, the higher the impact of anthropogenic factor in a ruderal habitat, the greater the participation of therophytes on account of one and two years old species, which leads to the biospectrum modification (Jovanović, 1994). The total number of the newly reported or discovered plants that belong to this life form is 16. Other life forms were present with a smaller number of representatives: geophytes (25 sp., 5,63%), phanerophytes (20 sp., 4,50%), chamaephytes and scandentophytes with equal number of species (12 sp., 2,70%), and hydrophytes with 7 sp., 1,57%.

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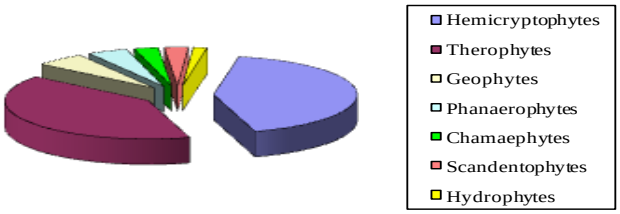

Figure 2. *Life form spectrum of ruderal flora of Kosovska Mitrovica (Serbia)*

Phytogeographical analysis of ruderal flora

Ruderal flora, as a specific plant category, is under the anthropogenic impact. It is unsuitable for the analysis whose aim is to determine floral and geographical belonging to certain area (Jovanović, 1985). This could be explained by the fact that ruderal flora encompasses species of vast areas whose diffusion was (directly or indirectly) influenced by man. There is also a fact that the composition and diversity /abundance of ruderal flora and vegetation of some area are proportional to the intensity of anthropogenic influences and may serve as an indicator of environmental quality and urbanization level. A detailed phytogeographic analysis of Kosovska Mitrovica ruderal flora corroborated the presence of 7 basic area types that incorporate 18 areal groups *(Fig. 3).*

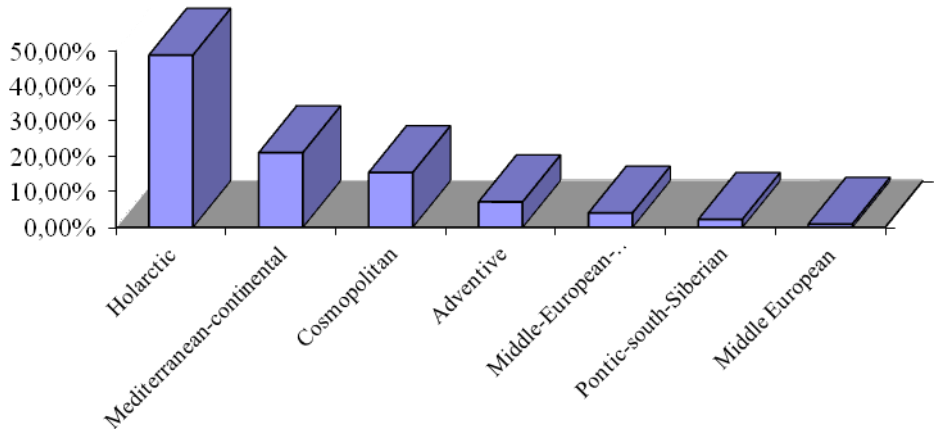

Figure 3. *Chorological spectrum, by basic area types, of the entire ruderal flora of Kosovska Mitrovica (Serbia)*

Most numerous species were of the Holarctic area type, presented with 217 species or 48,87%, within which the European, Western-Asian and Euroasian group of floristic elements dominated. According to its number, Mediterranean-continental type is

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second, with 94 taxa (21,17%) united in 4 different groups of area floral elements. The areal types of Cosmopolitan species are represented by 69 taxa (15,54%). The cosmopolits of Euroasian and Mediterranean origin are larger in number compared to the Cosmopolits of circumholarctic and tropical origin.

The presence of adventive plant species is relatively high (32 taxa or 7,21%). The increased number of adventive and cosmopolitan species shows the instability of urban and suburban habitats, because 19 new taxa have been reported in the past 20 years (from the total of 58 recently recorded) and they all belong to the given area type. The common representatives are: *Symphyotrichum novi-belgii* (L.) G.L.Nesom, *Symphyotrichum salignum* (Willd.) G.L.Nesom, *Calendula officinalis* L., *Helianthus tuberosus* L., *Solidago gigantea* Aiton, *Phytolacca americana* L., *Antirrhinum majus* L., etc. It could be noted that they are the species that man brings into the urban habitats, mostly as decorative and horticulture plants. Due to their pronounced biological potential they conquer new habitats and anthropogenically spread from urban areas to natural (uncultivated) surroundings, usually after removing the plant remnants in autumn and placing them in landfills /disposal sites. The least reported species in the ruderal flora of Kosovska Mitrovica is Middle-European-Mediterranean areal type (18 species), Ponto-South Siberian (10 species) and Middle European dispersion areal type (4 species).

Ecological analysis of ruderal flora

The contemporary way of life and urbanization (demolition and new construction, changes in land use, traffic, etc.) in the town have resulted in fragmentation of habitats or their complete loss. Rapid urbanisation in Kosovska Mitrovica over the last decade has caused a visible decrease in green areas, but also the change of floral composition of the ruderal flora. Following the dynamics of appearance of the found ruderal floras in certain localities, it is possible to ascertain their ecological (phenotypic) plasticity and their adaptability to various conditions that prevail on investigated surfaces. The most widespread species *Convolvulus arvensis* is the most prevailing species (93,3%) in 28 out of 30 researched areas. The given species inhabits sunny and open ruderal habitats where it vies with other species for nutrients and available humidity. It also may decrease habitat biodiversity. It is one of the most serious weeds of agricultural fields in temperate regions of the world.

According to its prevalence degree of 76,6% and phenotypic plasticity and adaptability, *Taraxacum officinale* occupies the second place and inhabits the most diverse ruderal habitats, which may be confirmed by the results of the comparative morpho-anatomical research of the species *T. officinale* whose samples originate from trodden and untrodden areas of Belgrade (Stevanović et al., 1988). From the ecoclimatic point of view, the trodden ruderal habitats along with the majority of other types of ruderal habitats, may be defined as xerothermic with a favourable regime but with weak soil aeration and severe water deficiency. *Taraxacum officinale* has very large leaves with mesomorphic structure on untrodden surfaces. The members of this species on trodden areas show a variety of xeromorphic features. This indicates a significant phenotypic plasticity of the species and their adaptability to the changed environments in different ruderal habitats.

Species that were found in more than 50% of the sampling sites were: *Plantago lanceolata, Capsella bursa-pastoris, Cardaria draba, Lactuca serriola, Lotus corniculatus* (prevalence= 66,66%), *Artemisia vulgaris, Stellaria media, Chenopodium*

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album, Melilotus officinalis, Achillea millefolium (prevalence=60%), *Polygonum aviculare, Medicago lupulina, Cynodon dactylon, Anisantha sterilis, Poa nemoralis, Hordeum murinum subsp. leporinum* (prevalence=53,3%). The group of eurivalent species with 50% of frequency includes: *Silene vulgaris, Tragopogon dubius, Trifolium repens, Tripleurospermum inodorum , Erodium cicutarium, Galium aparine, Cichorium intybus and Ballota nigra* . The species like *Convolvulus arvense, Taraxacum officinale, Polygonum aviculare, Cynodon dactylon* are prominent due to their exceptionally pioneering character and the ability to adapt to diverse, often extreme and difficult conditions of ruderal habitats.

Diametrically opposed to the group of highly frequent ruderal species is a number of species with a limited range-stenovalent plants (prevalence=6,6% or 3,3%), which , in accordance with their ecology, develop only in certain ruderal habitats. The group of stenovalent plants is represented by ruderal higrophile species that appear on nitrified, humid and periodically flooded river banks, such as: *Bidens tripartitus, Persicaria maculosa, Persicaria lapathifolia, Mentha aquatica, Mentha longifolia* etc. This group may also include species such as: *Comandra elegans, Asparagus tenuifolius* and they appear only in one investigated area, as the remains of the primary vegetation form. We assume that, as the anthropogenic influence grows and intensifies in the mentioned localities, some of these species will become extinct because the ruderal habitats do not suit them, i.e. they do not provide ecological optimum for their development.

Sukopp (1973) presents data that between 1850 – 1950 some European cities faced the loss of flora by 4-16%. Klotz (1987) and Landolt (2000) show that the number of species in the cities flora has remained approximately the same in the past 1-2 centuries, but the flora composition has changed by 30- 40% and provided an advantage for the adventive species (Stešević et al., 2014). Our analyses show that the ruderal flora composition in Kosovska Mitrovica area has changed by 13.06% in the past 20 years. It is also noted that there has not been a reduction in a total number of species. Autochthonous species were replaced by allochthonous-cosmopolitan species,which as more adaptable to homogenous and degraded urban habitats, are beginning to compete with natural species and are gradually ousting them.

The introduced species that might become invasive represent a special menace and may cause destruction of natural ecosystems and changes in their biodiversity. Newly introduced plants most frequently inhabit ruderal habitats that are temporarily or permanently under the anthropogenic influence. The most widely accepted definition of invasive species is the one advocated by the global environmental organisation IUCN (International Union for Conservation of Nature): ”*An invasive alien species (IAS) is a species that is established outside of its natural past or present distribution, whose introduction and/or spread threaten biological diversity*” Convention on Biological Diversity. Out of total number, 38 plant species from the weed ruderal flora of Kosovska Mitrovica and its surroundings, are labelled as invasive (*Acer negundo, Ambrosia artemisifolia, Symphyotrichum novi-belgii, Symphyotrichum salignum, Erigeron canadensis, Galinsoga parviflora, Helianthus tuberosus, Solidago gigantea, Xanthium orientale subsp. italicum, Xanthium spinosum, Centaurea solstitialis, Artemisia vulgaris, Cichorium intybus, Amaranthus albus, Amaranthus blitoides, Amaranthus retroflexus, Bifora radians, Armoracia rusticana, Coronopus squamatus, Echinocystis lobata, Chenopodium strictum, Amorpha fruticosa, Medicago sativa, Robinia pseudoacacia, Alceae rosea, Echiochloa crus-galli, Sorghum halepense, Dasypyrum villosum, Phytolacca americana, Polygonum aviculare, Portulaca*

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oleraceae, Consolida orientalis, Consolida regalis, Rubus caesius, Veronica persica, Datura stramonium, Lycium barbarum, Urtica dioica). The largest number of their representatives belong to *Asteraceae family* (12 species), followed by *Amaranthaceae, Fabaceae* and *Poaceae* (each with 3 species). The investigations show that there has been an increase of invasive species and they have become more frequent in every investigated locality over the past 20 years.

If we analyse the origin of invasive species within weed ruderal flora of Kosovska Mitrovica and its surroundings, we may come to the conclusion that the species originating from North American continent (19 of them-50%) prevail in number. These species were mostly introduced as decorative plants (*Robinia pseudoacacia, Acer negundo*), but they soon "escaped" to the wilderness attacking the natural ecosystems with detrimental effects and became invasive. It is interesting to mention the *Ambrosia artemisfolia* species unreported in Kosovska Mitrovica and its surroundings until 2012 has been randomly spotted on certain ruderal places in the city core ever since.

Currently, the larger part of the society perceive ruderal urban plants as common weeds and do not appreciate their stability and aesthetic value. Currently the aesthetic and ecological values of such plant communities are indiscernible and underestimated. However, colourful flowering plant communities in cities have a positive influence on human senses (Kazimierska et al., 2009). Except in the case of allergenic plants and their negative influence on human health, it can be generally stated that the flora and vegetation of man-made environments represent a significant, spontaneously developed phytohealing factor, the one which in such polluted conditions produces a whole series of positive effects so they deserve a better treatment (Stešević and Jovanović, 2008).

In an industrial city, such as Kosovska Mitrovica, a spontaneously developed plant cover has undoubtedly many positive effects (oxygen production, carbon-dioxide assimilation, soil overheating avoidance, soil erosion prevention, esthetic and health-hygienic protection of the unhygienic areas, decoration) so it should be "exploited" and adjusted to fit human needs (which implies prevention of undesirable species spreading, their blooming and fruiting) and organize a monitoring process over an extended period of time to evaluate the changes in habitat conditions, as well as in floristic composition.

Conclusion

Due to expected and intense anthropogenic activity on ruderal flora in Kosovska Mitrovica and its surroundings, there was a change in overall floral composition by 13,06%, over a period of 20 years (1996-2016). A total of 444 taxa of vascular plants classified into 271 genera and 58 families were found in various types of ruderal habitats; with 58 new taxa reported in recent field explorations. An analysis of life forms in the ruderal flora of Kosovska Mitrovica showed that after a period of 20 years, the investigated area still has hemicryptophyto-therophyte character, with domination of hemicryptophytes. Phytogeographic analysis revealed the presence of 7 basic area types that incorporate 18 areal groups. The most numerous species were of the Holarctic area type, presented with 217 species or 48,87%. The increased number of adventive and cosmopolitan species shows the instability of urban and suburban habitats, because 19 new taxa have been reported in the past 20 years (from the total of 58 recently recorded) and they all belong to the given area type. The most prevailing species are

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Convolvulus arvense and *Taraxacum officinale*. Out of total number of recorded species, 38 are labelled as invasive.

All botanical studies should definitely include monitoring biodiversity of urban flora and new short term researches. It is the only method to identify potential threats to autochtonous flora and to enable a timely anthropogenous action to curb spreading of invasive, potentially allergenic species as well as aggressive, competitive species that might have negative effects on human population and urban habitats.

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