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Original paper

Floristic diversity of the central part of the South Bačka loess terrace (Vojvodina, Serbia)

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Summary: Three year-long botanical field investigations of the central part of the South Bačka loess terrace were conducted with the purpose to determine the floristic diversity of this primarily agricultural area. A total of 518 vascular plant taxa (504 species and 14 subspecies) were registered and classified into 102 families and 316 genera. The families with the most representatives were Asteraceae, Poaceae, Rosaceae, Fabaceae, Lamiaceae, and Brassicaceae, while the most species-rich genera were *Euphorbia*, *Prunus*, *Potentilla*, *Ranunculus*, and *Rumex*. Floral elements were grouped into eight areal types, dominated by the Eurasian areal type. Also, of the 54 noted adventive taxa, 41 had an invasive character. The biological spectrum was characterized by the domination of hemicryptophytes and therophytes. The presence of twenty protected plant species and six tertiary relicts was registered.

Keywords: areal type spectrum, biological spectrum, invasive plant species, loess, South Bačka, vascular flora.

INTRODUCTION

Loess (German *Löss*, meaning loose) is usually defined as terrestrial clastic sediment dominated by silt-sized particles formed by the accumulation of wind-blown dust (Pye 1995). It has been found over a significant fraction of the world (covering approximately 10% of the total land surface), and represents one of the most important pieces of evidence of long-term dust deposition (Marković et al. 2012; Muhs et al. 2014). Loess is predominantly found in the mid-latitude zone of Eurasia, with a maximum thickness of over 100 m recorded in the Loess Plateau of China (Dlussky 2009; Marković et al. 2012). It is also widespread in the Columbia Plateau and Mississippi basin (North America) and on the La Plata basin (South America). Non-typical loess varieties have been noted in some areas of Central Asia, northeastern Siberia, North Africa, Argentina and New Zealand (Dlussky 2009).

Loess deposits in Vojvodina are among the oldest (dated to the late Early Pleistocene) and best-preserved accumulations in Europe and recent studies have shown that these loess sequences can be directly correlated to the loess records of East Asia (Marković et al. 2012). In the Bačka region of Vojvodina, Bukurov (1975) recognized two types of loess deposits: plateaus (Bačka and Titel loess plateau) and terrace (South Bačka loess terrace). The main difference between these types of loess deposits is the absence of gray zones on loess terraces (Davidović 2005).

For the present study, the investigated area is located in the central part of the South Bačka loess terrace (Fig. 1). It covers the northern part of Bačka Palanka municipality (settlements of Despotovo, Gajdobra, Nova Gajdobra, Piv-

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nice, and Silbaš) and the eastern and central parts of Bački Petrovac municipality (settlements Bački Petrovac and Maglić). The central part of the terrace is composed of three loess types – terrestrial, redeposited, and swamp loess (Bukurov 1975). The majority of the investigated area is covered with chernozem-like calcareous meadow soil, with the less frequent presence of chernozem-like limeless meadow soil (Nejgebauer et al. 1972; Radanović 1972; Popov et al. 2016b). Saline soils solonchak (Nejgebauer et al. 1972) and solonetz (Vasin et al. 2010) were also recorded in this area. The main watercourse in this part of the South Bačka loess terrace is the Jegrička river (Bukurov 1975), while the canal network of the Danube-Tisa-Danube (DTD) hydrosystem is also of great importance (Stojanović et al. 2007). The climate is temperate continental with a maximum amount of precipitation in late spring and early summer, along with a secondary maximum in early autumn (Lalić et al. 2011). The indigenous native vegetation of the investigated region is represented by steppe (alliance *Festucion rupicolae* Soó 1940) and forest-steppe communities (alliance *Aceri tatarico-Quercion* Zolyomi et Jakucs 1957) (Stevanović et al. 1995a). Unfortunately, at present, due to the intensification of agriculture and other anthropogenic impacts, this autochthonous vegetation is almost completely devastated. Today only sparse fragments remain, which serve as refugia for steppe plant and animal species (Stevanović et al. 1995a).

Botanical investigations in the Bačka region over the last two and a half centuries have been mainly focused on the specific localities at Subotičko-horgoška sands, Bačka and Titel loess plateaus, salt marshes, and swamps. In contrast, areas that are geomorphologically homogenous, such as loess terraces, were less interesting to botanists, and therefore reduced to sporadic floristic records. The only comprehensive floristic investigation in this part of Bačka was conducted in the northern part of Bačka Palanka, during which 168 taxa of vascular flora were registered (Radonić 1979). In addition to this, individual floristic records were provided by Zorkoczy (1896) for Bačka Palanka, Kupcsok (1914), Prodán (1916), Šajinović (1968) and Anačkov (1997) for Bački Petrovac, whereas Budak (1998) provided an overview of the saline species in the surroundings of Bačka Palanka, Silbaš, and Despotovo. Malidža and Vrbničanin (2006), as well as Radanović et al. (2012) reported the presence of some invasive plant species in the vicinity of Despotovo and Maglić, while Konstantinović and Meseldžija (2004) and Popov et al. (2016a) performed phytocenological studies of the ruderal vegetation in the area of Gajdobra and Silbaš, respectively. Detailed floristic and phytocoenological investigations of the aquatic vegetation of the main canal network of the DTD hydrosystem were performed near Bački Petrovac, Nova Gajdobra and Despotovo (Stojanović et al. 2006; Stojanović et al. 2009; Džigurski et al. 2011), and also along the course of Jegrička river (Lazić et al. 2003; Lazić et al. 2004; Džigurski et al. 2010).

The main aim of the present study was to examine the floristic diversity of the central part of the South Bačka loess terrace and, based on data collected in the field, to perform taxonomic, phytogeographical, and ecological analyses. Additionally, protection and invasive status of some plants have been given.

MATERIALS AND METHODS

Plant material for the present study was collected from 36 localities over a period of three years (2014-2016) representing all vegetation seasons. Plants were herbarized using standard methods (Nikolić 1996) and deposited in the Herbarium collection of the University of Novi Sad (BUNS). Identification of plant material was performed using referent national and regional floras and iconographies (Tutin et al. 1968-1980; Josifović 1972-1977; Jávorka and Csapody 1975; Sarić 1986, 1992; Tutin et al. 1993; Király 2009; Stevanović 2012). Nomenclature was harmonized with reference databases (The Plant List 2013; IPNI 2020), and grouping of angiosperm, fern, horsetail and gymnosperm taxa into higher systematic categories was done in accordance with selected authors (Smith et al. 2006; Takhtajan 2009; Christenhusz et al. 2011). Floral elements were determined according to Gajić (1980) and then classified into defined areal types given by Stevanović (1992a) for the territory of Serbia. Cultivated and ornamental plants were not included in the phytogeographical analysis. Life forms were determined based on Raunkier (1934), modified according to Ellenberg and Mueller-Dumbois (1974) and further adapted for the Flora of Serbia by Stevanović (1992b). The protection and invasive status of collected plant taxa was determined in accordance with the "Rules on the protection of strictly protected and protected wild species of plants, animals, and fungi" in the Republic of Serbia (Anonymous 2010a) and according to referral check-lists (Lazarević et al. 2012; Anačkov et al. 2013), respectively.

RESULTS AND DISCUSSION

Floristic investigations of the central part of the South Bačka loess terrace revealed the presence of 518 plant taxa, of which, 504 were at the species and 14 at the subspecies level (Table 1).

Taxonomic analysis

Recorded plant taxa were classified into 315 genera, 102 families, 76 orders, six classes, and four phyla. The phylum

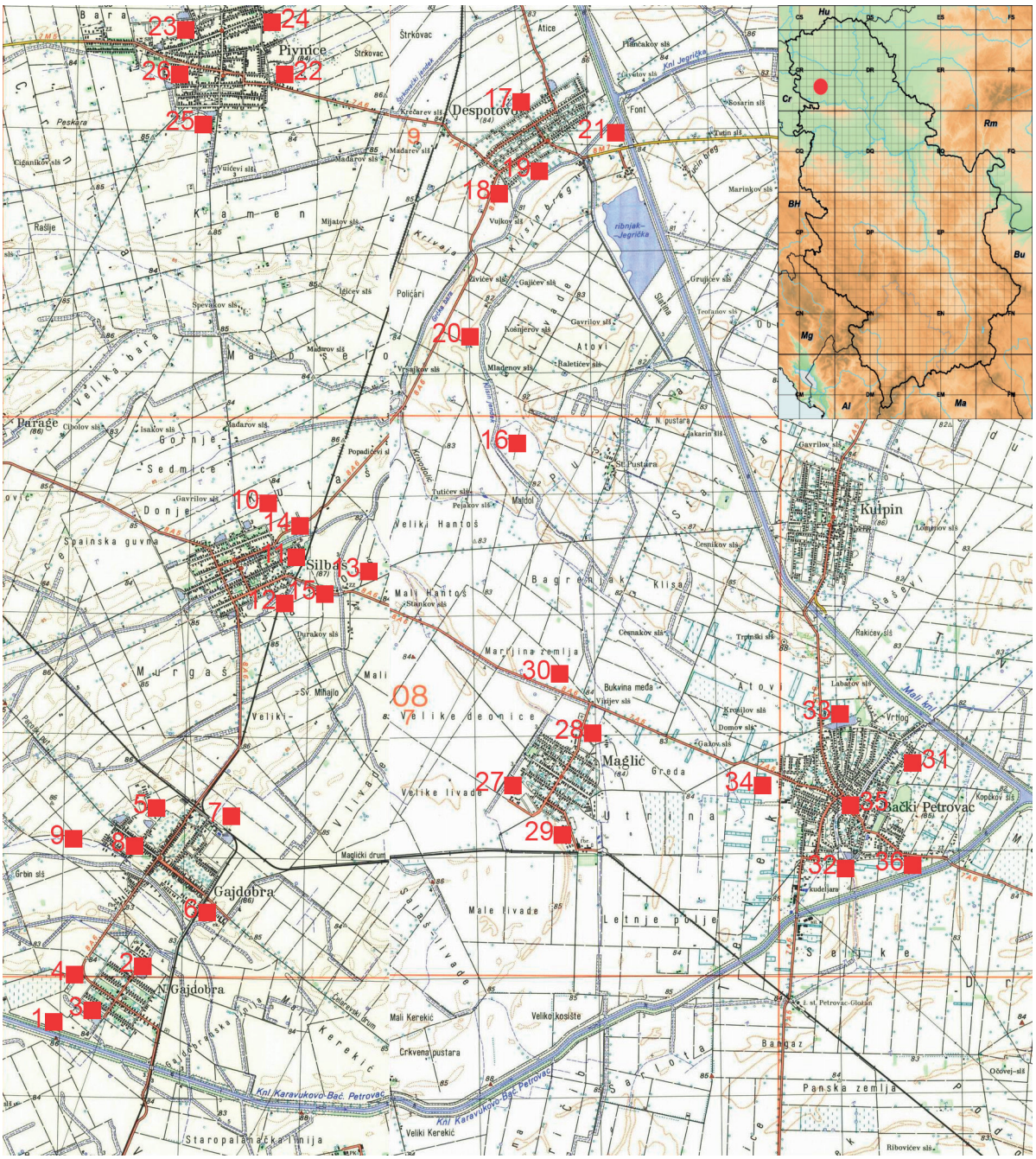

Fig. 1. Position and map of the investigated localities (Anonymous, 1983a, 1983b; modified).

Equisetophyta was represented by three species (0.58%), whereas Polypodiophyta contained only one species (0.20%) – *Salvinia natans*. The phylum Pinophyta included 10 species with ornamental character (1.93%) arranged into four families and eight genera. With 504 taxa at the species and subspecies level, comprising 97.30% of the total number of taxa, the phylum Magnoliophyta absolutely dominated the entire sample. Within this phylum, 418 taxa at the species and subspecies level were grouped into 252 genera: 78 families belonged to the class Magnoliopsida (80.69%), while the class Liliopsida was represented with 86 taxa (16.60%) grouped into 54 genera and 18 families.

Families with the largest number of taxa were Asteraceae (66), Poaceae (45), Rosaceae (35), Fabaceae (30), Lamiaceae (27), and Brassicaceae (23). Families Caryophyllaceae, Polygonaceae and Scrophulariaceae were represented with

14 taxa, and Apiaceae and Euphorbiaceae with 12 taxa, respectively. Boraginaceae, Cyperaceae, and Ranunculaceae had 11 taxa, while all other families were represented with less than 10 taxa. This taxonomic structure corresponds to the general family structure of the Serbian flora (Stevanović et al. 1995b). Although Asteraceae was the family with the largest number of representatives in the study area, it should be noted that a significant number of plant species from this family collected during field research belong to the group of non-native invasive species. However, even if we do not take into account these 16 invasive taxa in our analysis, Asteraceae family would still be the most diverse. The second most abundant family was Poaceae, which is as expected, considering that the investigated area is located in a steppe zone, and is under strong Pontic and Eurasian floristic influence. The Submediterranean floristic influence is emphasized by the presence of Fabaceae, Lamiaceae, and Caryophyllaceae, while a large number of species belonging to families Brassicaceae, Apiaceae, Cyperaceae, and Ranunculaceae indicate a strong Central European and Eurasian floristic impact (Stevanović et al. 1995b). Family Rosaceae was highly ranked among others, because a significant number of ornamental and cultivated plants, which were also collected during fieldwork, belong to this family.

The largest genus was *Euphorbia* (11 species), followed by *Prunus* (8 species) and other genera, which included seven (*Potentilla, Ranuculus* and *Rumex*) and five species (*Acer*, *Bromus, Carex, Epilobium*, and *Veronica*). This spectrum of genera was significantly different from that given for the flora of Serbia (Stevanović et al. 1995b). However, these differences in spectra, especialy the great number of species in the *Euphorbia* and *Rumex* genera recorded in the present study, can be explained by the fact that they flourish in places under significant and constant anthropogenic influence, which were the most common habitats in our research area. Many cultivated and ornamental plants from the genera *Prunus* and *Acer* were also collected during the present investigation. In addition, some species from these genera have the ability to spontaneously expand into natural habitats, and this, coupled with the above mentioned, are the main reasons why the representatives of these two genera were found in such numbers. *Carex*, *Ranunculus*, *Potentilla*, and *Veronica* are among the most species-rich genera in the flora of Serbia (Stevanović et al. 1995b), so their high number in the present research area is not surprising.

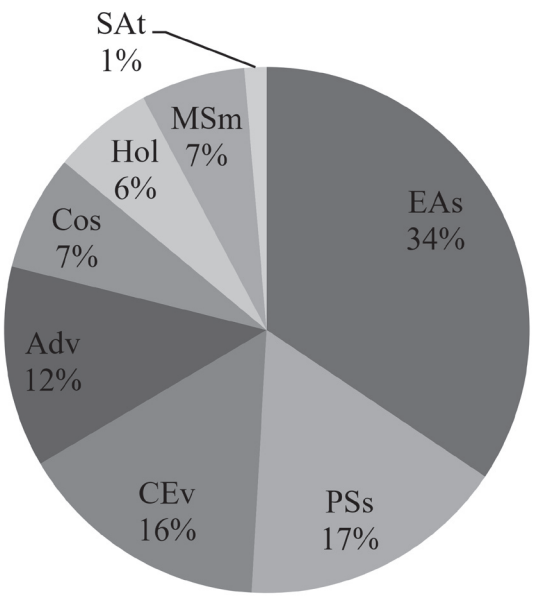

Fig. 2. Areal types spectrum of the flora of the central part of the South Bačka loess terrace. Legend: Adv - Adventitious, CEv - Central European, Cos - Cosmopolitan, EAs - Eurasian, Hol - Holarctic, MSm - Mediterranean-Submediterranean, PSs - Pontic-South Siberian, SAt - Subatlantic.

Phytogeographical analysis

Floral elements of analyzed plant taxa were grouped into eight areal types (Fig. 2). Results have shown that the largest number of taxa – 150 (34.17%) belong to the Eurasian areal type. The recorded percentage was higher than that noted by Gajić (1984) for this part of Serbia (24.32%), implying a strong Eurasian floristic influence on the flora of the research area. As a consequence of a wide ecological valence, species from this areal type are usually distributed across the broad area of the Eurasian continent. Considering that the South Bačka loess terrace is under intensive anthropogenic pressure and that many natural habitats have been severely degraded in the process of creating arable land, species with a wider ecological valence, like the above mentioned Eurasian species, certainly have a better chance of prevailing in these unfavorable conditions. In addition, Holarctic (6.19%) and cosmopolitan (7.11%) species were also noted and together with Eurasian species make up a total of 47.47% of all vascular plant species in the investigated area.

Given that the investigated area is located in a steppe zone, a significant number of taxa from the Pontic-South Siberian areal type were expected. A total of 72 taxa (16.51%) were noted, most of them belonging to the Subpontic-Submediterranean and Subpontic-Central Asian floral elements. This number would certainly have been higher if not for the centuries of constant negative anthropogenic pressure on these steppe habitats. The Mediterranean-Submediterranean areal type is represented only by Submediterranean floral elements, which comprised 29 species (6.65%). These species often occupy the same habitats as those from the Subpontic-Submediterranean floral element, and together support the xerophytic character of the study area (Gajić 1984). Also, 68 species belonging to the Central European areal type were

recorded (15.60%). Only two species were not classified as a sub-Central European floral element, which indicates that the Central European flora in this region is represented with less characteristic species for this areal type (Gajić 1984). Six recorded species (1.38%) were members of the Subatlantic areal type.

If we compare the results of our phytogeographical analysis with the results recorded for a geographically close region – Bačka loess plateau (Igić 1991), we notice that most areal types were almost equaly represented in both of the investigated areas. The biggest differences were observed in the representation of adventitious species, as well as those belonging to the Mediterranean-Submediterranean areal type. The dominant type of vegetation in the Bačka loess plateau are different associations with meadow-steppe character (Parabućski 1982) which are the dominant type of habitats for the species of the Mediterranean-Submediterranean areal type that can be found in this region (Gajić 1984). The absence of these types of habitats, or more precisely, their reduction to fragments of just several square meters in our investigated area, is the main reason for the large discrepancy between the share of Mediterranean-Submediterranean species in the Bačka loess plateau areal type spectrum – 16.48% (Igić 1991) and the one found in our study – 6.65%.

Comparing to the flora of the Bačka loess plateau, where 13 relicts was registred (Igić 1991), half as many relict species were noted in our research. Only six tertiary relicts, most of them primarily related to wet or aquatic habitats (*Butomus umbellatus, Hedera helix, Humulus lupulus, Hydrocharis morsus-ranae, Stratiotes aloides*, and *Trapa natans*), were observed in our investigation. The reason for such a large difference in the number of recorded relict species could be explained by the fact that all relicts registered in the study area are species with a wide geographical distribution. In contrast, relict species noted on the Bačka loess plateau have a Pontic-Pannonian, Pontic-Mediterranean, or Submediterranean distribution (Igić 1991), and in the area of Vojvodina inhabit only preserved steppe fragments, wet meadows or salt marshes, all habitats which were sparse in our investigated region.

It is also necessary to mention the adventive areal type, to which the non-native plants belong. In fact, this group represented a significant part of the areal type spectrum with 54 taxa (12.39%), of which 41 taxa had an invasive character (Lazarević et al. 2012; Anačkov et al. 2013). Also, nine more taxa that do not belong to the adventive areal type defined by Gajić (1984), could still be treated as invasive according to Anačkov et al. (2013). If we sum all of these species, we obtain a total of 50 taxa with an invasive character in the investigated area. There are many reasons that could explain such a high presence of invasive taxa. First and foremost is the strong human influence on the remaining fragments of natural and semi-natural habitats. Consequently, this human influence lead to the formation of potentially new favourable sites for the introduction of invasive plant species. Also, the fringe areas of arable fields are inhabited by a significant number of invasive plants and have been recognized as important centers for the colonization and dispersion of invasive plants (Anačkov et al. 2013), probably because these areas lack agro-technical measures (mechanical or chemical suppression of weeds). Secondly, the presence of a well-developed road and railway network, as well as the DTD hydrosystem and Jegrička river, also facilitate the spread of invasive species (Rat et al. 2017). In the end, poor awareness of the local community about the problem that invasive species pose, and the lack of a clear strategy for their suppression is one more reason for the rapid spread of alien species within the study area.

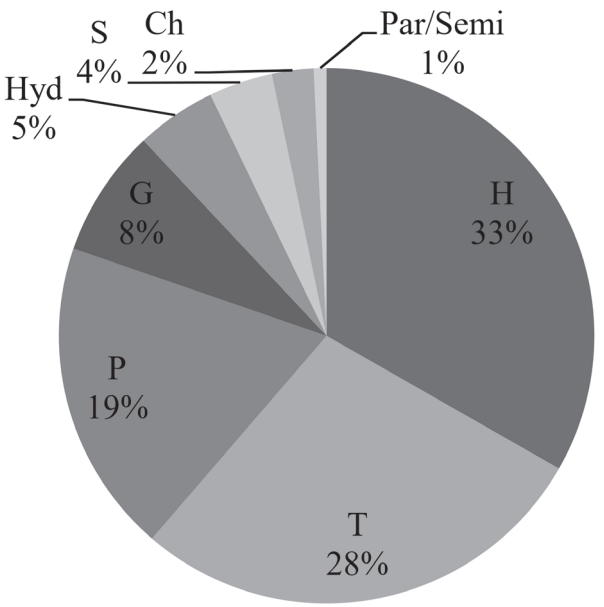

Fig. 3. Biological spectrum of the flora of the central part of the South Bačka loess terrace. Legend: Ch - Chamaephytes, G - Geophytes, H - Hemicryptophytes, P - Phanerophytes, S - Scandentophytes, Par/Semipar - Saprophytes/Semiparasitophytes, T - Therophytes.

As mentioned above, the share of adventitious species in the areal type spectrum recorded in our present research (12.39%) is much larger then that recorded by Igić (1991) for the flora of the Bačka loess plateau (4.15%). Except for the already mentioned reasons for the high presence of these taxa in our investigated area, one more reason for the significant difference in the share of adventive areal type could be found in the fact that a significant period of time (25 years) has

past since these two investigations were carried out. In this period the Bačka loesse plateau has also been under negative human-influence, which probably had effected the floristic composition of the plateau. Bearing this in mind, it is possible that today the difference in the share of the adventive areal type between the central part of the South Bačka loess terrace and the Bačka loess plateau is less pronounced than our current data indicate.

Biological spectrum

The biological spectrum of the flora is characterized by eight life forms (Fig. 3). Hemicryptophytes were represented by 172 taxa (33.20%), while 145 taxa (27.99%) were therophytes. Based on this, we can conclude that the flora has a hemicrypto-therophytic character. Although the biological spectrum of the investigated area and the flora of Serbia have the same bipolar hemicrypto-therophytic character (Diklić 1984), there is a difference in the contribution of particular life forms. Comparing to the flora of Serbia, a smaller share of hemicryptophytes (46.8% – flora of Serbia) and a larger share of therophytes (18.5% – flora of Serbia) in the biological spectrum of the study area was noted. Therophytes are defined as annual plants that are, among other habitats, often found growing alongside roads, on waste grounds, pastures or any ruderal habitats that possess favorable conditions for their development (Diklić 1984). The listed habitat types, which were often present in the study area, are quite unstable (ephemeral) and therefore not suitable for the development of most perennial plants (hemicryptophytes). Also, many noted therophyte species are weeds that typically occur in agricultural areas. As most of the recorded adventive plants were part of this group, a higher presence of therophytes in the biological spectrum was expected. Phanerophytes with 99 taxa or a 19.11% share occupied third place on the general biological spectrum. The indicated number was significantly higher than the one (7.4%) stated for the flora of Serbia (Diklić 1984). This difference could be explained by the high number of ornamental and cultivated species of trees and shrubs present in the research area. If we were to exclude these plants from our analyses, we would obtain a total of 24 taxa or just 5.42% of phanerophytes in the life form spectrum. Geophytes were represented with 7.72%, and were mostly noted on preserved steppe fragments, or more often on wetlands. Considering that our research also included aquatic habitats, 25 hydrophytes were registered (4.83%), which is 20% of the total diversity of aquatic plants in Serbia (Diklić 1984). Scandentophytes (3.86%) and chamaephytes (2.51%) together with parasitic and semiparasitic (0.77%) plants were also recorded, but in minor percentages.

Threatened status

Twenty protected plant species from the list of "Rules on the protection of strictly protected and protected wild species of plants, animals and fungi" in the Republic of Serbia (Anonymous 2010a) were registered, mainly in preserved parts of natural habitats. Of this number, 16 are protected under control of use and trade in the territory of Serbia (Anonymous 2010b).

CONCLUSIONS

To date, the area of the South Bačka loess terrace has not been the subject of detailed botanical research, and only individual floristic records from this territory have been reported. The main reason for this may be the fact that this is an almost exclusively agricultural area without large zones of natural vegetation, and is thus an "uninteresting" area for botanists. Considering the fact that there is a gap in the knowledge of the floristic diversity of this region, field research was conducted in the central part of the terrace over a period of three years. A total of 518 plant taxa were registered and, of this number, 504 taxa were at the species and 14 at the subspecies level. The most species abundant families were Asteraceae, Poaceae, Rosaceae, Fabaceae, Lamiaceae, and Brassicaceae, which on one hand implies a strong Pontic floristic influence and on the other hand a strong Central European and Eurasian floristic influence on the flora of the study area. These influences were confirmed by phytogeographical analysis, which support the dominance of taxa belonging to Eurasian, Central European, and Pontic-South Siberian areal types. Also, the presence of a significant number of adventive plants (12.39%) indicated a strong negative human impact on natural habitats. The predominant plant life forms were hemicryptophytes and therophytes with a notable contribution of phanerophytes in the biological spectrum. Despite the strong anthropogenic influence and extremely devastated habitats, the central part of the South Bačka loess terrace is still characterized by a relatively large number of plant species, which encourage further investigations of these neglected and floristically "less interesting" areas.

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Table 1. Vascular flora of the central part of the South Bačka loess terrace.

Taxa	Life form	Areal type
Equisetopsida C. Agardh 1825		
Equisetaceae A. Michaux ex Alph. de Candolle 1804		
Equisetum arvense L. 1753	a Mes-Meg G rhiz	Hol
Equisetum ramosissimum Desf. 1799	a Mac-Alt Ch herb scap	Cos
Equisetum telmateia Ehrh. 1783	a Meg-Alt G rhiz	Hol
Polypodiopsida Cronquist, Takht. & Zimmerm. 1966		
Salviniaceae Lestiboudois 1826		
Salvinia natans (L.) All. 1785	er nat HydT	Hol
Ginkgoopsida Engl. 1898		
Ginkgoaceae Engl. 1897		
Ginkgo biloba L. 1771	fo dec Mes P scap	Orn
Pinopsida Burnett 1835		
Pinaceae Spreng. ex F. Rudolphi 1830		
Larix decidua Mill. 1768	ac dec Mes P scap	Orn
Pinus nigra J.F.Arnold 1785	ac semp Mes P scap	Orn
Pinus sylvestris L. 1753	ac semp Mes P scap	Orn
Cupressaceae Gray 1822		
Chamaecyparis lawsoniana (A.Murray bis) Parl. 1864	ac semp Mes P scap	Orn
Juniperus horizontalis Moench 1794	ac semp N P caesp	Orn
Juniperus virginiana L. 1753	ac semp Mes P scap	Orn
Platycladus orientalis (L.) Franco 1949	ac semp Mes P scap	Orn
Thuja occidentalis L. 1753	ac semp Mes P scap	Orn
Taxaceae Gray 1822		
Taxus baccata L. 1753	ac semp Mi P caesp/Mes P scap	Orn
Magnoliopsida Brongn. 1843		
Ceratophyllaceae Gray 1822		
Ceratophyllum demersum L. 1753	rad sbm HydG	Cos
Ceratophyllum submersum L. 1763	rad sbm HydG	CEv
Platanaceae T. Lestib. 1826		
Platanus acerifolia (Aiton) Willd. 1797	fo dec Mes P scap	Orn
Platanus occidentalis L. 1753	fo dec Mes P scap	Orn
Berberidaceae Juss. 1789		
Berberis aquifolium Pursh 1813	fo semp N P caesp	Orn
Ranunculaceae Juss. 1789		
Clematis vitalba L. 1753	a Alt S lig	SAt
Consolida orientalis (J.Gay) Schrödinger 1909	v-a Meg-Alt T scap	PSs
Consolida regalis Gray 1821	a Mes-Meg T scap	CEv
Nigella arvensis L. 1753	a Mes T scap	PSs
Ranunculus acris L. 1753	a Meg H scap semiros	EAs

Taxa	Life form	Areal type
Ranunculus bulbosus L. 1753	a Mes-Meg H scap	CEv
Ranunculus polyanthemos L. 1753	a Meg H scap semiros	PSs
Ranunculus repens L. 1753	a Mes-Meg H rept	EAs
Ranunculus sardous Crantz 1763	v Mes T caesp	CEv
Ranunculus sceleratus L. 1753	v-a Mes-Mac T scap/H scap	Hol
Ranunculus trichophyllus Chaix ex Vill. 1786	rad subm HydT	Hol
Papaveraceae Juss. 1789		
Chelidonium majus L. 1753	v-a Mes-Meg H semiros	EAs
Papaver rhoeas L. 1753	a Meg T scap	EAs
Fumariaceae Marquis 1820		
Fumaria officinalis L. 1753	v-a Mes T scap	EAs
Paeoniaceae Raf. 1815		
Paeonia peregrina Mill. 1768	a Alt G tub	Orn
Buxaceae Dumort. 1822		
Buxus sempervirens L. 1753	fo semp N P caesp	Orn
Fagaceae Dumort. 1829		
Quercus robur L. 1753	fo dec Mes P scap	Orn
Betulaceae Gray 1822		
Betula pendula Roth 1788	fo dec Mes P scap	Orn
Corylaceae Mirbel 1815		
Corylus avellana L. 1753	fo dec Mi P caesp/Mi P scap	Orn
Corylus colurna L. 1753	fo dec Mes P scap	Orn
Corylus maxima Mill. 1768	fo dec Mi P caesp/Mi P scap	Orn
Juglandaceae DC. ex Perleb 1818		
Juglans nigra L. 1753	fo dec Mes P scap	Orn
Juglans regia L. 1753	fo dec Mes P scap	Orn
Phytolaccaceae R. Br. 1818		
Phytolacca americana L. 1753	a Alt H scap	Adv
Portulacaceae Juss. 1789		
Portulaca grandiflora Hook. 1829	a Mes H succ	Orn
Portulaca oleracea L. 1753	a Mes T succ	Cos
Caryophyllaceae Juss. 1789		
Cerastium dubium (Bastard) Guépin 1838	v-a Mes T scap	PSs
Cerastium fontanum Baumg. 1816 subsp. *vulgare* (Hartm.) Greuter & Burdet 1982	v-a Mes fo dec Ch herb scap rept	Cos
Dianthus barbatus L. 1753	v-a Mac H scap	MSm
Holosteum umbellatum L. 1753	v Mes T ros	EAs
Petrorhagia prolifera (L.) P.W.Ball & Heywood 1964	v-a Mac T scap	PSs
Sagina procumbens L. 1753	v-a Mi fo dec Ch herb scap rept	Hol
Saponaria officinalis L. 1753	a Meg H scap	EAs
Silene baccifera (L.) Roth 1788	a Mi-Mes T scap	EAs
Silene latifolia Poir. 1789	v-a Mes-Meg T scap/H scap bienn	EAs
Silene vulgaris (Moench) Garcke 1869	a Mes H scap/G rad	EAs
Stellaria aquatica (L.) Scop. 1771	a Mi-Meg H scap rept/T scap rept	EAs
Stellaria graminea L. 1753	a Mes-Meg H scap	EAs
Stellaria holostea L. 1753	v-a Mes fo dec Ch herb scap rept	EAs
Stellaria media (L.) Vill. 1789	v-aut Mi T rept	Cos
Amaranthaceae Juss. 1789		
Amaranthus blitoides S.Watson 1877	a Mes T rept	Adv
Amaranthus crispus (Lesp. & Thévenau) A.Terracc. 1890	a-aut Mes T rept	Adv
Amaranthus deflexus L. 1771	a Mes-Mac G rhiz	Adv

Taxa	Life form	Areal type
Amaranthus retroflexus L. 1753	a Mes-Alt T scap	Adv
Chenopodiaceae Ventenat 1799		
Atriplex prostrata Boucher ex DC. 1805	a-aut Mes-Meg T scap rept	Hol
Bassia scoparia (L.) A.J.Scott 1978	a-aut Alt T scap	Adv
Chenopodium album L. 1753	a Meg-Alt T scap	Cos
Chenopodium hybridum L. 1753	v-aut Meg T scap	Hol
Chenopodium vulvaria L. 1753	a Mac T rept	CEv
Polygonaceae Juss. 1789		
Falloipia convolvulus (L.) Á.Löve 1970	a-aut Meg-Alt ST herb	EAs
Fallopia dumetorum (L.) Holub 1971	a-aut Meg-Alt ST herb	EAs
Persicaria lapathifolia (L.) Delarbre 1800	a-aut Meg T scap	Hol
Persicaria maculosa Gray 1821	a-aut Mac-Meg T caesp/scap	EAs
Persicaria orientalis (L.) Spach 1841	a Meg-Alt T scap	Adv
Polygonum aviculare L. 1753	v-aut Mes-Mac T caesp/scap	Cos
Reynoutria japonica Houtt. 1777	a Alt G rhiz	Adv
Rumex conglomeratus Murray 1770	a Mac-Meg H scap	EAs
Rumex crispus L. 1753	a Meg H scap	EAs
Rumex hydrolapathum Huds. 1778	a Meg-Alt H scap	CEv
Rumex obtusifolius L. 1753	a Meg H scap	CEv
Rumex palustris Sm. 1800	a Mac T scap/H scap bienn	CEv
Rumex pulcher L. 1753	v-a Mes-Mac H ros	MSm
Rumex stenophyllus Ledeb. 1830	a Meg H scap	PSs
Tamaricaceae Link 1821		
Tamarix parviflora DC. 1828	fo dec Mi P caesp	Orn
Hypericaceae Juss. 1789		
Hypericum perforatum L. 1753	a Mes-Meg H scap	EAs
Primulaceae Batsch ex Borkh. 1797		
Anagallis arvensis L. 1753	v-aut Mi T rept scap	Cos
Anagallis arvensis L. 1753 subsp. *foemina* (Mill.) Schinz & Thell. 1907	v Mi T rept scap	Cos
Lysimachia nummularia L. 1753	v N-Mi fo dec Ch herb rept	CEv
Lysimachia vulgaris L. 1753	a Mac-Meg H scap	EAs
Salicaceae Mirb. 1815		
Populus alba L. 1753	fo dec Mes P scap	EAs
Populus deltoides Marshall 1785	fo dec Mes P scap	Orn
Populus nigra L. 1753	fo dec Mes P scap	Orn
Populus tremula L. 1753	fo dec Mes P scap	Orn
Salix alba L. 1753	fo dec Mes P scap	EAs
Salix babylonica L. 1753	fo dec Mes P scap	EAs
Salix cinerea L. 1753	fo dec Mi P caesp	EAs
Salix triandra L. 1753	fo dec Mi P caesp/Mes P scap	EAs
Violaceae Batsch 1802		
Viola arvensis Murray 1770	v-aut Mi-Mac T scap	EAs
Viola kitaibeliana Schult. 1819	v-a Mi-Mes T scap	PSs
Viola odorata L. 1753	v Mi-Mes H rept ros	SAt
Cucurbitaceae Juss. 1789		
Bryonia alba L. 1753	a Alt SH herb	PSs
Echinocystis lobata (Michx.) Torr. & A.Gray 1840	a Alt ST herb	Adv
Brassicaceae Burnett 1835		
Alliaria petiolata (M.Bieb.) Cavara & Grande 1913	v-a Meg H scap bienn	CEv
Arabidopsis thaliana (L.) Heynh. 1842	v Mes-Mac T ros/H ros bienn	EAs
Armoracia rusticana P. Gaertn., B. Mey. & Scherb. 1800	v-a Mes-Meg G rhiz	Adv

Taxa	Life form	Areal type
Brassica napus L. 1753	v Mac-Alt T scap/H scap bienn	Adv
Calepina irregularis (Asso) Thell. 1905	a Mes-Meg T scap	MSm
Camelina microcarpa Andrz. ex DC. 1821	v-a Mes-Mac T scap	EAs
Capsella bursa-pastoris (L.) Medik. 1792	v-aut Mi-Meg T ros/H ros bienn	Cos
Descurainia sophia (L.) Webb ex Prantl 1892	v-a Mes-Meg T scap	EAs
Diplotaxis muralis (L.) DC. 1821	v-a Mes-Mac T ros/H ros bienn	MSm
Erophila verna (L.) DC. 1821	v N-Mi T ros	Hol
Lepidium campestre (L.) R.Br. 1812	a Meg T scap/H scap bienn	CEv
Lepidium draba L. 1753	v-a Mes-Mac H scap	PSs
Lepidium perfoliatum L. 1753	v Mes-Mac T scap/H scap bienn	PSs
Myagrum perfoliatum L. 1753	v Mes-Mac T scap	MSm
Rorippa × *anceps* (Wahlenb.) Rchb. 1838	v-a Mac-Meg H scap/G rhiz	
Rorippa austriaca (Crantz) Spach 1838	v-a Mac-Meg H scap/G rhiz	PSs
Rorippa kerneri Menyh. 1877	v-a Mi-Mac H ros bienn	PSs
Sinapis arvensis L. 1753	v-a Mes-Meg T scap	EAs
Sisymbrium altissimum L. 1753	v-a Mes-Mac T scap/H scap bienn	PSs
Sisymbrium loeselii L. 1755	v-a Mes-Mac T scap/H scap bienn	PSs
Sisymbrium officinale (L.) Scop. 1772	a Meg T scap	EAs
Thlaspi arvense L. 1753	v-a Mes T scap	EAs
Thlaspi perfoliatum L. 1753	v-a Mes T ros	CEv
Resedaceae Martinov 1820		
Reseda lutea L. 1753	v-a Mac T scap/H scap	CEv
Tiliaceae A.L. de Jussieu 1789		
Tilia cordata Mill. 1768	fo dec Mes P scap	Orn
Tilia platyphyllos Scop. 1771	fo dec Mes P scap	Orn
Tilia tomentosa Moench 1785	fo dec Mes P scap	Orn
Malvaceae Juss. 1789		
Abutilon theophrasti Medic. 1787	a Mac-Alt T scap	Adv
Alcea rosea L. 1753	v-a Alt H scap	Adv
Althaea officinalis L. 1753	a-aut Mac-Alt H scap	PSs
Hibiscus syriacus L. 1753	fo dec Mi P caesp	Orn
Hibiscus trionum L. 1753	a Mes-Mac T scap	PSs
Malva neglecta Wallr. 1824	a Mes-Mac T scap/H scap	EAs
Malva sylvestris L. 1753	a Meg-Alt H scap bienn	EAs
Ulmaceae Mirb. 1815		
Celtis occidentalis L. 1753	fo dec Mes P scap	Orn
Ulmus glabra Huds. 1762	fo dec Mes P scap	CEv
Ulmus parvifolia Jacq. 1798	fo dec Mes P scap	Orn
Ulmus pumila L. 1753	fo dec Mes P scap	Orn
Zelkova carpinifolia (Pall.) K. Koch 1849	fo dec Mes P scap	Orn
Moraceae Gaudich. 1835		
Broussonetia papyrifera (L.) L'Hér. ex Vent. 1799	fo dec Mes P scap	Orn
Maclura pomifera (Raf.) C.K.Schneid. 1906	fo dec Mes P scap	Orn
Morus alba L. 1753	fo dec Mes P scap	Adv
Morus nigra L. 1753	fo dec Mes P scap	Adv
Cannabaceae Martinov 1820		
Humulus lupulus L. 1753	a Alt SH herb	EAs
Urticaceae Juss. 1789		
Urtica dioica L. 1753	a Meg-Alt H scap	EAs
Urtica urens L. 1753	a Mes-Mac T scap	EAs
Euphorbiaceae Juss. 1789		

Taxa	Life form	Areal type
Euphorbia cyparissias L. 1753	a Mes-Meg H scap	EAs
Euphorbia esula L. 1753	a Mac-Meg H scap	EAs
Euphorbia esula L. 1753 subsp. *tommasiniana* (Bertol.) Kuzmanov 1979	a Mac-Meg H scap	PSs
Euphorbia falcata L. 1753	a Mes T scap	PSs
Euphorbia helioscopia L. 1753	v-aut Mes T scap	EAs
Euphorbia illirica Lam. 1788	v-a Mac-Alt G rhiz	EAs
Euphorbia lathyris L. 1753	a Mes-Meg T scap/H scap bienn	Adv
Euphorbia maculata L. 1753	a Mi T rept	Adv
Euphorbia pannonica Host 1831	v-a Mes-Mac H scap	PSs
Euphorbia peplus L. 1753	a Mes T scap	EAs
Euphorbia platyphyllos L. 1753	a-aut Mes-Meg T scap	MSm
Ricinus communis L. 1753	a-aut Alt T scap	Adv
Crassulaceae J. St.-Hil. 1805		
Sedum album L. 1753	a Mi-Mes Ch herb scap succ	CEv
Haloragaceae R. Br. 1814		
Myriophyllum spicatum L. 1753	rhiz sbm HydG	Hol
Myriophyllum verticillatum L. 1753	rhiz sbm HydG	Hol
Saxifragaceae Juss. 1789		
Saxifraga tridactylites L. 1753	a-aut Mes T scap	CEv
Vitaceae Juss. 1789		
Parthenocissus quinquefolia (L.) Planch. 1887	a Alt S lig	Adv
Vitis vulpina L. 1753	a Alt S lig	Adv
Rosaceae Juss. 1789		
Agrimonia eupatoria L. 1753	a Meg H scap	EAs
Chaenomeles japonica (Thunb.) Lindl. ex Spach 1834	fo dec/semp N P caesp	Orn
Cotoneaster horizontalis Decne. 1877	fo dec/semp N P caesp	Orn
Cotoneaster integerrimus Medik. 1793	fo dec N P caesp	Orn
Crataegus monogyna Jacq. 1775	fo dec N-Mi P caesp/Mi P scap	CEv
Cydonia oblonga Mill. 1768	fo dec Mi P caesp/Mi-Mes P scap	Orn
Fragaria viridis Weston 1771	v Mes H ros/G rhiz	EAs
Geum urbanum L. 1753	a Meg H scap	EAs
Kerria japonica (L.) DC. 1818	fo dec N-Mi P caesp	Orn
Malus domestica Borkh. 1803	fo dec Mes P scap	Orn
Potentilla anserina L. 1753	v-a Mes-Meg H rept	Hol
Potentilla argentea L. 1753	a Mes-Meg H scap	PSs
Potentilla fruticosa L. 1753	v-a Mes fo dec Ch suffr caesp	Orn
Potentilla incana P. Gaertn., B.Mey. & Scherb. 1800	v Mi-Mes fo dec Ch herb caesp	PSs
Potentilla recta L. 1753	a Mes-Meg H scap	PSs
Potentilla reptans L. 1753	a Mi-Mes H rept	EAs
Potentilla supina L. 1753	a-aut Mes-Mac T rept/H rept	EAs
Prunus armeniaca L. 1753	fo dec Mi P caesp/Mi-Mes P scap	Orn
Prunus avium (L.) L. 1755	fo dec Mes P scap	Orn
Prunus cerasifera Ehrh. 1785	fo dec Mi P caesp/Mi-Mes P scap	EAs
Prunus cerasus L. 1753	fo dec Mi P caesp/Mi-Mes P scap	Orn
Prunus domestica L. 1753	fo dec Mi P caesp/Mi-Mes P scap	Orn
Prunus laurocerasus L. 1753	fo semp Mes P caesp/Mes P scap	Orn
Prunus persica (L.) Stokes 1812	fo dec Mi-Mes P scap	Orn
Prunus spinosa L. 1753	fo dec N P caesp	PSs
Pyracantha coccinea M.Roem. 1847	fo semp N-Mi P caesp	Orn
Pyrus communis L. 1753	fo dec Mes P scap	Orn
Pyrus communis L. 1753 subsp. *pyraster* (L.) Ehrh. 1780	fo dec Mes P scap	CEv

Taxa	Life form	Areal type
Rosa canina L. 1753	fo dec N P caesp	CEv
Rubus armeniacus Focke 1874	fo dec N/Mi P caesp	Adv
Rubus caesius L. 1753	fo dec N P caesp	EAs
Rubus caesius L. x *hirtus* W. et K.	fo dec N P caesp	
Sanguisorba minor Scop. 1771	a Mi-Mes H ros	EAs
Sorbus intermedia (Ehrh.) Pers. 1806	fo dec Mes P scap	Orn
Spiraea media Schmidt 1792	fo dec N P caesp	Orn
Lythraceae J. St.-Hil. 1805		
Lythrum tribracteatum Salzm. ex Spreng. 1827	v-a Mes T scap	PSs
Lythrum virgatum L. 1753	a Mac-Meg H scap/G rhiz	EAs
Trapaceae Dumortier 1829		
Trapa natans L. 1753	rad nat HydT	EAs
Onagraceae Juss. 1789		
Epilobium angustifolium L. 1753	a Mes-Alt H scap	Hol
Epilobium hirsutum L. 1753	a-aut Mac-Meg H scap/G rhiz	CEv
Epilobium hirsutum L. 1753 subsp. *lamyi* (F.W.Schultz) Nyman 1879	a Mac-Alt H scap/G rhiz	EAs
Epilobium parviflorum Schreb. 1771	a-aut Mes-Meg H scap	EAs
Epilobium tetragonum L. 1753	a-aut Mac-Meg H scap/G rhiz	EAs
Oenothera biennis L. 1753	a Meg-Alt H scap bienn	Adv
Fabaceae Lindl. 1836		
Albizia julibrissin Durazz. 1772	fo dec Mes P scap	Orn
Amorpha fruticosa L. 1753	fo dec Mi P caesp	Adv
Astragalus cicer L. 1753	a Mes-Mac H scap rept	PSs
Astragalus glycyphyllos L. 1753	a Mes-Meg H scap rept	PSs
Astragalus onobrychis L. 1753	a Mes-Mac H scap rept	PSs
Cercis siliquastrum L. 1753	fo dec Mes P caesp/P scap	Orn
Gleditsia triacanthos L. 1753	fo dec Mes P scap	Adv
Lathyrus hirsutus L. 1753	v-a Meg T scap	MSm
Lathyrus pratensis L. 1753	a Meg H scap	EAs
Lathyrus tuberosus L. 1753	a Meg G tub rept	EAs
Lotus corniculatus L. 1753	a Mes H scap	EAs
Lotus glaber Mill. 1768	a Mes H scap	CEv
Medicago falcata L. 1753	a Mes-Meg H scap	PSs
Medicago lupulina L. 1753	a Mes T scap/H scap	EAs
Medicago minima (L.) L. 1754	v Mac T scap rept	PSs
Medicago sativa L. 1753	a Mes-Meg H scap	Adv
Melilotus albus Medik. 1787	a Meg-Alt T scap/H scap bienn	CEv
Melilotus officinalis (L.) Pall. 1776	a Meg-Alt H scap bienn	EAs
Ononis spinosa L. 1753	a-aut Mes-Meg fo dec Ch suffr caesp	CEv
Robinia pseudoacacia L. 1753	fo dec Mes P scap	Adv
Securigera varia (L.) Lassen 1989	a Meg H scap	PSs
Styphnolobium japonicum (L.) Schott 1830	fo dec Mes P scap	Orn
Trifolium angustifolium L. 1753	a Mes T scap	MSm
Trifolium campestre Schreb. 1804	a Mes T scap	CEv
Trifolium pratense L. 1753	a Mes H scap	EAs
Trifolium repens L. 1753	a Mi H rept	EAs
Vicia cracca L. 1753	a Meg-Alt SH herb/H scap	EAs
Vicia grandiflora Scop. 1772	v Meg-Alt ST herb/T scap	PSs
Vicia hirsuta (L.) Gray 1821	a Mes-Meg ST herb/T scap	EAs
Vicia sativa L. 1753 subsp. *nigra* (L.) Ehrh. 1780	a Mes-Meg ST herb/T scap	CEv

Taxa	Life form	Areal type
Oxalidaceae R. Br. 1818		
Oxalis corniculata L. 1753	a Mes T/H rept/scap	MSm
Sapindaceae Juss. 1789		
Koelreuteria paniculata Laxm. 1772	fo dec Mes P scap	Orn
Hippocastanaceae A.P. de Candolle 1824		
Aesculus hippocastanum L. 1753	fo dec Mes P scap	Orn
Aceraceae Durande 1782		
Acer campestre L. 1753	fo dec Mes P scap	Orn
Acer negundo L. 1753	fo dec Mes P scap	Orn
Acer platanoides L. 1753	fo dec Mes P scap	Orn
Acer pseudoplatanus L. 1753	fo dec Mes P scap	Orn
Acer saccharinum L. 1753	fo dec Mes P scap	Orn
Rutaceae Juss. 1789		
Phellodendron amurense Rupr. 1857	fo dec Mes P scap	Orn
Simaroubaceae DC. 1811		
Ailanthus altissima (Mill.) Swingle 1916	fo dec Mes P scap	Adv
Anacardiaceae R. Br. 1818		
Rhus typhina L. 1756	fo dec Mi P caesp	Orn
Geraniaceae Juss. 1789		
Erodium cicutarium (L.) L'Hér. 1789	v-a Mes T scap/H scap bienn	EAs
Geranium dissectum L. 1755	v-a Mes-Mac T scap	EAs
Zygophyllaceae R. Br. 1814		
Tribulus terrestris L. 1753	aut Mes-Mac T rept	PSs
Linaceae DC. ex Perleb 1818		
Linum austriacum L. 1753	v-a Mac H scap	PSs
Celastraceae R. Br. 1814		
Euonymus europaeus L. 1753	fo dec Mi P caesp/Mes P scap	CEv
Santalaceae R. Br. 1810		
Thesium dollineri Murb. ex Velen. 1891	a Mes H caesp	MSm
Rhamnaceae Juss. 1789		
Rhamnus cathartica L. 1753	fo dec Mi P caesp/scap	Orn
Elaeagnaceae Juss. 1789		
Elaeagnus angustifolia L. 1753	fo dec Mes P scap	Orn
Hydrangeaceae Dumort. 1829		
Philadelphus coronarius L. 1753	fo dec N-Mi P caesp	Orn
Cornaceae Bercht. & J. Presl 1825		
Cornus sanguinea L. 1753	fo dec Mi P caesp	CEv
Viburnaceae Rafinesque 1820		
Viburnum opulus L. 1753	fo dec N-Mi P caesp	Orn
Sambucaceae Batsch ex Borckhausen 1797		
Sambucus ebulus L. 1753	a Alt G rad/H scap	PSs
Sambucus nigra L. 1753	fo dec Mi P caesp/Mi-Mes P scap	CEv
Valerianaceae Batsch 1802		
Valeriana officinalis L. 1753	a Meg-Alt H scap	EAs
Valerianella dentata (L.) Pollich 1776	v-a Mes-Mac T scap	PSs
Valerianella locusta (L.) Laterr. 1821	a Mes T scap	MSm
Dipsacaceae Juss. 1789		
Dipsacus fullonum L. 1753	a Meg-Alt H scap bienn	CEv
Dipsacus laciniatus L. 1753	a Meg-Alt H scap bienn	PSs
Knautia arvensis (L.) Coult. 1823	a Mes-Meg H scap bienn	CEv

Taxa	Life form	Areal type
Scabiosa ochroleuca L. 1753	a Meg H scap	PSs
Araliaceae Juss. 1789		
Hedera helix L. 1753	aut semp Alt S lig	SAt
Apiaceae Lindl. 1836		
Anethum graveolens L. 1753	a Mac-Meg T scap	Adv
Anthriscus cerefolium (L.) Hoffm. 1814	v-a Mac-Meg T scap	PSs
Conium maculatum L. 1753	v-a Mac-Alt T ros/H ros bienn	EAs
Daucus carota L. 1753	a Meg H scap/T scap	EAs
Eryngium campestre L. 1753	a Mes-Meg H scap	PSs
Falcaria vulgaris Bernh. 1800	a Mac-Meg T scap/H scap bienn	PSs
Oenanthe aquatica (L.) Poir. 1798	v-a Mes-Alt T scap/H scap bienn	CEv
Orlaya grandiflora (L.) Hoffm. 1814	v-a Mes-Mac T scap	MSm
Pastinaca sativa L. 1753	a Mac-Meg H scap	EAs
Pimpinella saxifraga L. 1753	a Mes-Mac H scap	EAs
Seseli annuum L. 1753	a Mes-Mac H scap bienn	PSs
Torilis arvensis (Huds.) Link 1821	a Mes T scap	EAs
Asteraceae Bercht. & J. Presl 1820		
Achillea millefolium L. 1753	a Meg H scap	EAs
Ambrosia artemisiifolia L. 1753	a-aut Mes-Alt T scap	Adv
Ambrosia trifida L. 1753	a-aut Mes-Alt T scap	Adv
Arctium lappa L. 1753	a Alt H scap bienn	EAs
Artemisia annua L. 1753	a-aut Mac-Alt T scap	EAs
Artemisia campestris L. 1753	a-aut Mac-Alt fo dec Ch herb scap/G rhiz	PSs
Artemisia vulgaris L. 1753	a-aut Meg-Alt H scap/G rhiz	Hol
Bellis perennis L. 1753	a Mes H ros	CEv
Bidens frondosa L. 1753	aut Mes-Alt T scap	Adv
Bidens tripartita L. 1753	aut Mes-Alt T scap	CEv
Carduus acanthoides L. 1753	a Meg-Alt H scap bienn	CEv
Carduus nutans L. 1753	v-a Mes-Meg H scap bienn/T scap	EAs
Carlina biebersteinii Bernh. ex Hornem. 1819 subsp. *brevibracteata* (Andrae) K.Werner 1994	a-aut Mes-Meg H scap bienn	EAs
Centaurea jacea L. 1753 subsp. *banatica* (Roch.) Hayek 1912	a Mac-Meg H scap	EAs
Centaurea jacea L. 1753	a Mac-Meg H scap	EAs
Centaurea stoebe Tausch 1829 subsp. *australis* (Pančić ex A.Kern.) Greuter 2003	a Mac-Meg H scap	PSs
Cichorium intybus L. 1753	a-aut Meg-Alt H scap	EAs
Cirsium arvense (L.) Scop. 1772	a Meg-Alt G rad	EAs
Cirsium eriophorum (L.) Scop. 1772	a Meg-Alt H scap bienn	CEv
Cirsium vulgare (Savi) Ten. 1835	a Meg-Alt H scap bienn	EAs
Cota austriaca (Jacq.) Sch.Bip. 1854	a Mes-Mac T scap/H scap bienn	PSs
Crepis biennis L. 1753	a Mes-Meg H scap bienn	CEv
Crepis foetida L. 1753 subsp. *rhoeadifolia* (M.Bieb.) Čelak. 1871	a Mes-Meg T scap/H scap bienn	PSs
Crepis pulchra L. 1753	v-a Mes-Meg T scap	MSm
Crepis setosa Haller 1797	v-a Mes-Meg T scap	MSm
Cyanus segetum Hill 1762	v-a Mes-Meg T scap	MSm
Erigeron annuus (L.) Pers. 1807	a Mes-Meg T scap/H scap bienn	Adv
Erigeron canadensis L. 1753	a Meg-Alt T scap	Adv
Eupatorium cannabinum L. 1753	a-aut Mac-Alt H scap	CEv
Galinsoga parviflora Cav. 1796	a Mes-Meg T scap	Adv
Helianthus annuus L. 1753	a-aut Mac-Alt T scap	Adv
Helminthotheca echioides (L.) Holub 1973	a Mes-Meg T scap	MSm

Taxa	Life form	Areal type
Inula britannica L. 1753	a Mes-Meg H scap	CEv
Inula helenium L. 1753	a Meg-Alt H scap/G rhiz	EAs
Iva xanthiifolia Nutt. 1818	a Alt T scap	Adv
Lactuca saligna L. 1753	a Mac-Meg T scap/H scap bienn	PSs
Lactuca serriola L. 1756	a Meg-Alt H scap bienn/T scap	PSs
Leontodon hispidus L. 1753	a Mes-Meg H ros	CEv
Leucanthemum ircutianum (Turcz.) Turcz. ex DC. 1838	v-aut Mes-Meg H scap	EAs
Matricaria chamomilla L. 1753	v-aut Mes-Mac T scap	EAs
Onopordum acanthium L. 1753	v-a Mac-Alt H scap bienn	PSs
Picris hieracioides L. 1753	a-aut Meg-Alt H scap bienn	PSs
Pilosella caespitosa (Dumort.) P.D.Sell & C.West 1967	v-a Mes-Mac H scap/G rhiz	EAs
Pilosella officinarum Vaill. 1754	a Mi-Mac H ros	CEv
Podospermum canum C.A.Mey. 1831	v Mi-Mac H scap/G rhiz	MSm
Pulicaria dysenterica (L.) Bernh. 1800	a Mes-Meg H scap	SAt
Rudbeckia hirta L. 1753	a Mac-Alt H scap bienn	Adv
Rudbeckia laciniata L. 1753	a-aut Mac-Alt G rhiz	Adv
Senecio erucifolius L. 1753	a Mac-Meg H scap/G rhiz	EAs
Senecio leucanthemifolius Poir. 1789 subsp. *vernalis* (Waldst. & Kit.) Greuter 2003	v Mi-Mac T scap	PSs
Senecio vulgaris L. 1753	v-aut Mi-Mes T scap/H scap bienn	EAs
Solidago gigantea Aiton 1789	a-aut Mac-Alt H scap	Adv
Sonchus arvensis L. 1753	a Mac-Alt H scap/G rhiz	EAs
Sonchus asper (L.) Hill 1769	a-aut Mac-Meg T scap	EAs
Sonchus oleraceus (L.) L. 1753	a Mac-Meg T scap	EAs
Symphyotrichum × *versicolor* (Willd.) G.L.Nesom 1995	a-aut Mac-Alt H scap	Adv
Symphyotrichum tradescantii (L.) G.L.Nesom 1995	a-aut Mac-Alt H scap/G rhiz	Adv
Taraxacum officinale Weber 1780	v-aut Mes H ros	EAs
Tanacetum vulgare L. 1753	a-aut Mac-Alt H scap	EAs
Tragopogon dubius Scop. 1772	v-a Mes-Mac H scap bienn	PSs
Tragopogon orientalis L. 1753	v-a Mes-Mac H scap bienn	EAs
Tripleurospermum inodorum (L.) Sch.Bip. 1844	v-a Mes-Mac T scap/H scap bienn	EAs
Tripolium pannonicum (Jacq.) Dobrocz. 1962	v-a Mi-Mes H scap bienn	PSs
Tussilago farfara L. 1753	v Mi-Mes G rhiz	EAs
Xanthium orientale L. 1763 subsp. *italicum* (Moretti) Greuter 2003	a Meg-Alt T scap	Adv
Xanthium spinosum L. 1753	a Mes-Mac T scap	Adv
Rubiaceae Juss. 1789		
Asperula cynanchica L. 1753	a Mes-Mac H caesp/G rhiz	PSs
Galium aparine L. 1753	v-a Mes-Meg ST herb	EAs
Galium constrictum Chaub.	v-a Mes-Mac H scap	MSm
Galium mollugo L. 1753	v-aut Mes-Meg SH herb	CEv
Galium verum L. 1753	a Mes-Meg H scap	EAs
Gentianaceae Juss. 1789		
Centaurium erythraea Rafn 1800	a Mi-Mes H bienn/T scap	CEv
Centaurium pulchellum (Sw.) Druce 1898	a Mi-Mes T scap/H scap bienn	EAs
Apocynaceae Juss. 1789		
Asclepias syriaca L. 1762	a Meg-Alt G rhiz	Adv
Vinca minor L. 1753	v Mes fo semp Ch suffr rept	CEv
Vincetoxicum hirundinaria Medik. 1790	a Mes-Meg H scap	PSs
Solanaceae Juss. 1789		
Datura stramonium L. 1753	a-aut Meg-Alt T scap	Cos
Hyoscyamus niger L. 1753	a Mes-Meg H scap bienn/T scap	EAs
Lycium barbarum L. 1753	fo dec N-Mi P caesp	Adv

Taxa	Life form	Areal type
Solanum americanum Mill. 1768	v-aut Mes-Meg T scap	Cos
Solanum dulcamara L. 1753	a Meg-Alt S lig	EAs
Convolvulaceae Juss. 1789		
Calystegia sepium (L.) R. Br. 1810	a Alt rhiz SG herb	EAs
Convolvulus arvensis L. 1753	a Alt rhiz SG herb	Cos
Cuscutaceae (Dumortier) Dumortier 1829		
Cuscuta campestris Yunck. 1932	v-aut Mes-Alt scand Par T	Adv
Cuscuta epithymum (L.) L. 1774	v-aut Mes-Alt scand Par T	EAs
Boraginaceae Juss. 1789		
Anchusa officinalis L. 1753	a Meg H scap bienn	CEv
Asperugo procumbens L. 1753	v Mac-Meg T scap	EAs
Buglossoides arvensis (L.) I.M.Johnst. 1954	v-a Mes T scap/H scap bienn	EAs
Cerinthe minor L. 1753	v Mac H scap bienn	PSs
Cynoglossum officinale L. 1753	v Mac H ros bienn	EAs
Echium vulgare L. 1753	a Mes-Meg H scap	CEv
Heliotropium europaeum L. 1753	a Mes H scap	PSs
Myosotis arvensis (L.) Hill 1764	a Mes H scap bienn	EAs
Myosotis discolor Pers. 1798	v-a Mi-Mes T scap	CEv
Nonea pulla (L.) DC. 1805	v-a Mes-Mac H scap bienn	PSs
Symphytum officinale L. 1753	a Mes-Meg H scap	CEv
Oleaceae Hoffmanns. & Link 1809		
Forsythia europaea Degen & Bald. 1898	fo dec Mi P caesp	Orn
Fraxinus angustifolia Vahl 1804 subsp. *oxycarpa* (Willd.) Franco & Rocha Afonso	fo dec Mes P scap	Orn
Fraxinus excelsior L. 1753	fo dec Mes P scap	Orn
Fraxinus pennsylvanica Marshall 1785	fo dec Mes P scap	Orn
Ligustrum vulgare L. 1753	fo dec Mi P caesp	Orn
Syringa vulgaris L. 1753	fo dec Mi P caesp	Orn
Scrophulariaceae Juss. 1789		
Chaenorhinum minus (L.) Lange 1870	a-aut Mi-Mes T scap	CEv
Cymbalaria muralis P.Gaertn., B.Mey. & Scherb. 1800	v-a Mes-Mac SH herb	MSm
Kickxia spuria (L.) Dumort. 1827	a Mes-Mac ST herb	SAt
Linaria vulgaris Mill. 1768	a-aut Mes-Meg H scap	CEv
Odontites vulgaris Moench 1794	v-aut Mes-Mac dec ep SemiparT scap	CEv
Orobanche lutea Baumg. 1816	v Mes-Mac Par G	PSs
Verbascum blattaria L. 1753	v-a Mac-Alt H scap semiros bienn/T scap semiros	EAs
Verbascum chaixii Vill. 1779	a Mac-Meg H scap semiros	MSm
Verbascum phlomoides L. 1753	a Mac-Alt H scap semiros bienn	PSs
Veronica anagallis-aquatica L. 1753	v-aut Mes-Meg H scap	Hol
Veronica arvensis L. 1753	v Mi-Mes T scap/H scap bienn	CEv
Veronica chamaedrys L. 1753	v-a Mi-Mes H scap	CEv
Veronica hederifolia L. 1753	v Mes T caesp	CEv
Veronica persica Poir. 1808	v-a Mes-Mac T caesp/H caesp bienn	Adv
Bignoniaceae Juss. 1789		
Catalpa bignonioides Walter 1788	fo dec Mes P scap	Orn
Plantaginaceae Juss. 1789		
Plantago altissima L. 1762	a-aut Mac-Meg H ros	MSm
Plantago lanceolata L. 1753	a Mi-Meg H ros	EAs
Plantago major L. 1753	a Mes-Meg H ros	EAs
Plantago media L. 1753	a Mes-Meg H ros	EAs
Verbenaceae J. St.-Hil. 1805		

Taxa	Life form	Areal type
Verbena officinalis L. 1753	a Mes-Meg H scap	Cos
Lamiaceae Martinov 1820		
Ajuga chamaepitys (L.) Schreb. 1774	v-a Mes T scap rept	SAt
Ajuga genevensis L. 1753	a Mi-Mes H semiros	EAs
Ajuga reptans L. 1753	a Mes H rept	CEv
Ballota nigra L. 1753	a Meg H scap	PSs
Clinopodium vulgare L. 1753	a Mes-Meg H scap	Hol
Glechoma hederacea L. 1753	v-a Mes-Mac H rept	EAs
Lamium amplexicaule L. 1753	v Mes T scap	EAs
Lamium purpureum L. 1753	v-aut Mes T scap	CEv
Leonurus cardiaca L. 1753	a Mac-Alt H scap/G rhiz	EAs
Lycopus europaeus L. 1753	a Mac-Alt H scap/G rhiz	EAs
Lycopus exaltatus L.f. 1782	a Mac-Alt H scap/G rhiz	EAs
Marrubium vulgare L. 1753	a Mac H scap	EAs
Mentha aquatica L. 1753	rhiz emer HydG	EAs
Mentha longifolia (L.) L. 1756	a Mes-Meg H scap	CEv
Mentha pulegium L. 1753	a Mi-Mes H scap	CEv
Mentha spicata L. 1753	a Mes-Meg H scap/G rhiz	CEv
Nepeta cataria L. 1753	a Mac-Meg H scap/G rhiz	PSs
Prunella vulgaris L. 1753	a Mi-Mes H scap semiros	EAs
Salvia glutinosa L. 1753	a-aut Mac-Meg H scap	CEv
Salvia nemorosa L. 1762	v-a Mes-Mac H scap/G rhiz	PSs
Salvia verticillata L. 1753	a Mes-Meg H scap	PSs
Scutellaria hastifolia L. 1753	v-a Mes H scap/G rhiz	PSs
Stachys annua (L.) L. 1763	a-aut Mes-Mac T scap	PSs
Stachys germanica L. 1753	a Meg H scap	PSs
Stachys palustris L. 1753	a Mac-Alt G rhiz	Hol
Teucrium chamaedrys L. 1753	v-a Mes-Mac fo dec Ch suffr rept	PSs
Thymus pulegioides L. 1753 subsp. *pannonicus* (All.) Kerguélen 1993	v-a Mes-Mac fo dec Ch herb caesp	CEv
Liliopsida Batsch 1802		
Butomaceae Mirb. 1804		
Butomus umbellatus L. 1753	v-a Alt G rhiz	EAs
Hydrocharitaceae Juss. 1789		
Elodea nuttallii (Planch.) H.St.John 1920	er sbm HydG	Adv
Hydrocharis morsus-ranae L. 1753	stl nat HydG	EAs
Stratiotes aloides L. 1753	stl sbm HydG	CEv
Alismataceae Vent. 1799		
Alisma plantago-aquatica L. 1753	rhiz emer HydG	Cos
Potamogetonaceae Bercht. & J. Presl 1823		
Potamogeton crispus L. 1753	rhiz sbm HydG	Cos
Potamogeton perfoliatus L. 1753	rhiz nat HydG	Cos
Lemnaceae Gray 1821		
Lemna gibba L. 1753	er nat HydT	Cos
Lemna minor L. 1753	er nat HydT	Cos
Lemna trisulca L. 1753	er sbm HydT	Cos
Spirodela polyrrhiza (L.) Schleid. 1839	er nat HydT	Cos
Liliaceae Juss. 1789		
Gagea pratensis (Pers.) Dumort. 1827	v Mi-Mes G bulb	CEv
Iridaceae Juss. 1789		
Iris × *germanica* L. 1753	v Mac-Meg G rhiz	MSm
Iris pseudacorus L. 1753	rhiz emer HydG	CEv

Taxa	Life form	Areal type
Hyacinthaceae Batsch ex Borkh. 1797		
Leopoldia comosa (L.) Parl. 1847	v-a Mes-Meg G bulb	MSm
Muscari neglectum Guss. ex Ten. 1842	v Mes G bulb	MSm
Ornithogalum refractum Kit. ex Schltdl. 1814	v Mi G bulb	PSs
Ornithogalum umbellatum L. 1753	v Mes G bulb	CEv
Agavaceae Dumort. 1829		
Yucca filamentosa L. 1753	fo semp N P scap	Orn
Alliaceae Borkh. 1797		
Allium scorodoprasum L. 1753	v-a Mac-Meg G bulb	CEv
Allium sphaerocephalum L. 1753	v-a Mac-Meg G bulb	PSs
Amaryllidaceae J. St.-Hil. 1805		
Narcissus pseudonarcissus L. 1753	v Mes G bulb	Adv
Asparagaceae Juss. 1789		
Asparagus officinalis L. 1753	v-a Mac-Alt G rhiz	PSs
Commelinaceae Mirb. 1804		
Commelina communis L. 1753	a Mes-Meg H rept	Adv
Juncaceae Juss. 1789		
Juncus articulatus L. 1753	a Mes-Meg H scap/G rhiz	Hol
Juncus compressus Jacq. 1762	v-a Mes G rhiz caesp	EAs
Juncus gerardii Loisel. 1809	v-a Mes G rhiz caesp	Hol
Cyperaceae Juss. 1789		
Bolboschoenus maritimus (L.) Palla 1905	rhiz emer HydG	Cos
Carex distans L. 1759	v-a Mes-Meg H caesp/G rhiz caesp	EAs
Carex divisa Huds. 1762	v-a Mes-Meg G rhiz	EAs
Carex hirta L. 1753	a Mes-Meg G rhiz caesp	EAs
Carex melanostachya M.Bieb. ex Willd. 1805	v-a Mac G rhiz	PSs
Carex praecox Schreb. 1771	v Mes G rhiz	EAs
Carex riparia Curtis 1783	v-a Mac-Alt G rhiz	Hol
Carex spicata Huds. 1762	v-a Mes-Meg H caesp	CEv
Carex vulpina L. 1753	v-a Mac-Meg H caesp	EAs
Cyperus fuscus L. 1753	a Mi-Mac T scap	EAs
Schoenoplectus lacustris (L.) Palla 1888	a-aut Meg-Alt G rhiz	Cos
Sparganiaceae Hanin 1811		
Sparganium erectum L. 1753	rhiz emer HydG	EAs
Typhaceae Juss. 1789		
Typha angustifolia L. 1753	rhiz emer HydG	Hol
Typha latifolia L. 1753	rhiz emer HydG	Cos
Poaceae Barnhart 1895		
Agrostis stolonifera L. 1753	a Mes-Alt G rhiz	EAs
Alopecurus aequalis Sobol. 1799	v-a Mes T caesp	EAs
Alopecurus pratensis L. 1753	v Mes-Mac G rhiz	EAs
Arrhenatherum elatius (L.) P.Beauv. ex J.Presl & C.Presl. 1819	a Mac-Alt H caesp	CEv
Avena fatua L. 1753	a Mac-Alt T scap	EAs
Avena sativa L. 1753	a Mac-Alt T scap	Orn
Bothriochloa ischaemum (L.) Keng 1936	a Mes-Mac H caesp	PSs
Brachypodium pinnatum (L.) P.Beauv. 1812	a Mac-Meg H scap	EAs
Bromus hordeaceus L. 1753	v-a Mac-Meg T caesp	MSm
Bromus inermis Leyss. 1761	a Mac-Alt H scap/G rhiz	EAs
Bromus squarrosus L. 1753	a Mes-Meg T scap	MSm
Bromus sterilis L. 1753	v-a Mac T caesp	EAs

Taxa	Life form	Areal type
Bromus tectorum L. 1753	v-a Mes-Meg T caesp	EAs
Calamagrostis epigejos (L.) Roth 1788	a Meg-Alt G rhiz	EAs
Cynodon dactylon (L.) Pers. 1805	a Mes-Mac G rhiz	Cos
Dactylis glomerata L. 1753	a Meg H caesp	EAs
Dasypyrum villosum (L.) Borbás 1896	v Mac-Meg T scap	Adv
Digitaria ciliaris (Retz.) Koeler 1802	a Mes T rept	Cos
Echinochloa crus-galli (L.) P.Beauv. 1812	a Meg-Alt T caesp	Cos
Echinochloa oryzoides (Ard.) Fritsch 1891	a Meg-Alt T scap	Adv
Elymus repens (L.) Gould 1947	v-a Mac-Alt G rhiz	EAs
Eragrostis minor Host 1827	v-a Mes-Mac T caesp	Hol
Festuca arundinacea Schreb. 1771	a Meg-Alt H caesp	EAs
Festuca ovina L. 1753	v-a Mes-Mac H caesp	EAs
Festuca pratensis Huds. 1762	a Meg-Alt H caesp	EAs
Glyceria maxima (Hartm.) Holmb. 1919	rhiz emer HydG	Hol
Hordeum distichon L. 1753	v-a Mac-Meg T scap	Orn
Hordeum murinum L. 1753	v-a Mes T caesp	MSm
Koeleria macrantha (Ledeb.) Schult. 1824	v-a Mes-Mac H caesp	Hol
Lolium multiflorum Lam. 1788	v-a Mac-Meg T caesp/H caesp bienn	MSm
Lolium perenne L. 1753	v-a Mac-Meg H caesp	CEv
Panicum capillare L. 1753	a Mac T caesp	Adv
Phalaris arundinacea L. 1753	a Meg-Alt G rhiz	Hol
Phragmites australis (Cav.) Trin. ex Steud. 1841	rhiz emer HydG	Cos
Poa annua L. 1753	v-aut Mi-Mes T caesp/H caesp bienn/G rhiz caesp	Cos
Poa bulbosa L. 1753	a Mes-Meg H caesp	EAs
Poa pratensis L. 1753	v-a Mes-Meg H caesp/G rhiz caesp	Hol
Poa trivialis L. 1753	a Mes-Meg H caesp	EAs
Puccinellia distans (Jacq.) Parl. 1850	a Mes-Meg H caesp	EAs
Sclerochloa dura (L.) P.Beauv. 1812	v-a Mi-Mes T caesp	MSm
Setaria pumila (Poir.) Roem. & Schult. 1817	a Mes-Mac T rept	EAs
Setaria verticillata (L.) P.Beauv. 1812	a Mac-Meg T scap	Cos
Setaria viridis (L.) P.Beauv. 1812	a Mes-Mac T rept	EAs
Sorghum halepense (L.) Pers. 1805	a Meg-Alt G rhiz	Cos
Triticum aestivum L. 1753	v-a Meg-Alt T scap	Adv

Legend: Life form: a - summerly, ac - needle-leaved, Alt - tall, aut - autumnal, bienn - biannual, bulb - bulbous, caesp - caespitose, Ch - Chamaephytes, dec - deciduous, emer - emerged, er (errantia) - non root-bud plant, fo - foliose, G - Geophytes, H - Hemicryptophytes, herb - herbaceous, Hyd - Hydrophytes, lig - ligneous, Mac (Macro) - big/tall/long, Meg (Mega) - big, large, Mes (Meso) - intermediate, Mi (Micro) - small/low, N (nano) - dwarf, nat - natant, floating, P - Phanerophytes, Par - parasitophytes, rad (radicantia) - root-bud plant, rept - reptant, rhiz - rhizomatous, ros - rosulate, S - Scandentophytes, sbm - submerged, scap - scapose, Semipar - Semiparasitophytes, semiros - semirosulate, semp - evergreen, stl - stoloniferous, suffr - suffruticose, succ - succulent, T - therophytes, tub - tuberous, v - vernal; Areal type: Adv - Adventitious, CEv - Central European, Cos - Cosmopolitan, EAs - Euroasian, Hol - Holarctic, MSm - Mediterranean-Submediterranean, Orn - Ornamental, PSs - Pontic-South Siberian, SAt - Subatlantic.