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GERANIO PRATENSI-CIRSIETUM CANI ASS. NOVA PÎNZARU, IONIȚA & JARDAN (*FILIPENDULION* SEGAL EX WESTHAFF ET DEN HELD 1969) IN THE REPUBLIC OF MOLDOVA

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Abstract: The phytocoenoses of *Cirsium canum* (L.) All. with *Geranium pratense* L., occurring on the Central Moldavian Plateau, are described in this article. Based on 26 relevés, the authors propose another association for science – *Geranio pratensi-Cirsietum cani* ass. nova Pînzaru, Ioniță et Jardan of the alliance *Filipendulion ulmariae* Segal ex Westhoff et Den Held 1969, order *Molinietalia caeruleae* Koch 1926, class MOLINIO-ARRHENATHERETEA Tx. 1937.

Keywords: *Geranio pratensi-Cirsietum cani* ass. nova, characteristics plant ofspecies, ecology, range, Republic of Moldova.

Introduction

Spear thistle or Queen Anne's thistle (*Cirsium canum* (L.) All., Figure 1) – a perennial species, geophyte, East-European, meso-hygrophilic, is characteristic of wet meadows from lowland to mountainous areas, included in the order *Molinietalia caeruleae* W. Koch 1926 [AESCHIMANN & al. 2004; SÂRBU & al. 2013]. The Central European plant communities with *Cirsium canum* are included in the associations: *Cirsio cani-Festucetum pratensis* Májovsky et Ruzicková 1973 of the alliance *Deschampsion cespitosae* Horvatić 1930 (= *Alopecurion pratensis* Passarge 1964), *Scirpo sylvatici- Cirsietum cani* Bálátová-Tulačová 1973 of the alliance *Calthion palustris* R.Tx. 1937, *Angelico sylvestris-Cirsietum cani* P. Burescu 1998 corr. Chifu et Zamfirescu 2014 of the alliance *Calthion palustris* R. Tx. 1937 [BĂDĂRĂU & ALEC-FARCAS, 2010; CHIFU & al. 2014; COLDEA & al. 2012; HÁJKOVÁ, 2010].

Figure 1. *Cirsium canum* (L.) All.

The vegetation of floodplain grasslands in the Republic of Moldova has been described in more detail in the monograph of the botanist Ștefan Lazu, where he has also mentioned an association with *Cirsium canum* (L.) All. – *Cirsietum cani* Tx. 1951, with a short characterization based on 4 relevés, grouped

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in the alliance *Agrostion stoloniferae* Soó 1933 [LAZU, 2014]. At that time, in 2014, the association *Cirsietum cani* R.Tx. et Preising 1951 was considered as a synonym of the association *Angelico sylvestris-Cirsietum cani* P. Burescu 1998 corr. Chifu et Zamfirescu 2014 of the alliance *Calthion palustris* R.Tx. 1937 [CHIFU & al. 2014]. The new classification of the vegetation in Europe [MUCINA & al. 2016] does not indicate the alliance *Agrostion stoloniferae* Soó (1933) 1971 [BĂDĂRĂU & ALEC-FARCAS, 2010], but only *Agrostion stoloniferae* Görs 1966, which is synonymous with the alliance *Potentillion anserinae* Tx. 1947.

The phytocoenoses of *Cirsium canum* (L.) All. with *Geranium pratense* L. recorded in the floodplains of rivers on the Central Moldavian Plateau are described in this article.

Materials and methods

The phytocoenological research was carried out in 2018-2019. The research methodology adopted is that of the better write "The Zürich-Montpellier School" founded by Braun-Blanquet [BRAUN-BLANQUET, 1964]. The area of a relevé was 100 m [CRISTEA, 2004]. The plant species nomenclature is presented in accordance with recent publications [PÎNZARU & SÎRBU, 2016]. Air temperature and atmospheric precipitation – according to the Atlas of Climate Resources of the Republic of Moldova [NEDEALCOV & al. 2013].

Results and discussions

The plant communities of *Cirsium canum*, *Geranium pratense*, *Inula helenium* and other accompanying species, which occur on slightly alkaline stratified alluvial soils, in the floodplains of rivers on the Central Moldavian Plateau, are tall (the upper layer is about 140-180 cm in height) and contain a group of species that is characteristic of the alliance *Filipendulion ulmariae* Segal ex Westhoff et Den Held 1969, which is the reason why we include them in this alliance.

The alliance *Filipendulion ulmariae* Segal ex Westhoff et Den Held 1969 consists of herbaceous, meso-hygrophilic, tall plants, which occur in river valleys and valleys between hills or between mountains, on alluvial soils, which are moist and rich in nutrients. The characteristic plant species of the alliance are: *Filipendula ulmaria*, *Geranium palustre*, *Valeriana officinalis*, *Calystegia sepium*, *Lysimachia vulgaris*, *Lythrum salicaria*, *Mentha longifolia*, *Euphorbia palustris*, *Epilobium hirsutum*, *E. parviflorum*, *Petasites hybridus Stachys palustris*, *Symphytum officinale*, *Poa palustris*, *Hypericum tetrapterum* [CHIFU & al. 2014; COLDEA & al. 2012; HÁJKOVÁ, 2010; PÎNZARU, 1996; SÂRBU & al. 2013].

The described associations, occurring in Moldova, *Petasitetum hybridi* (Dostal 1933) Soó 1940 [LAZU, 2014; PÎNZARU, 1996] and *Filipendulo-Geranietum palustris* W. Koch 1926 [LAZU, 2014], previously included in the alliance *Filipendulo-Petasition* Br.-Bl. 1947, are now grouped in the alliance *Filipendulion ulmariae* Segal ex Westhoff et Den Held 1969. The alliance *Filipendulo-Petasition* Br.-Bl. ex Duvigneaud 1949 contains a group of associations of the submontane-montane layer in Western and Central Europe [MUCINA, 2016]. In Romania it hasn't been detected [CHIFU & al. 2014; COLDEA & al. 2012].

The description of the association of *Cirsietum cani* Tx. 1951 made by LAZU (2014, tab. 20, 4 relevés) is incomplete. The constancy has to be calculated on the basis of at least 5 relevés [HÁJKOVÁ & al. 2010], but the author indicates the constancy of the species based on 4 relevés, and when describing the given association, he lists *Festuca pratensis*, *Poa*

pratensis, *Juncus articulatus*, *Symphytum officinale*, *Ranunculus acris* and *Lythrum salicaria* as frequent species, but, in fact, they are absent in the 4 described relevés. The phytocoenoses included by LAZU (2014) in the association *Cirsietum cani* Tx. 1951, we include in the new association *Geranio pratensi-Cisietum cani*, containing the following common species: *Cisium canum*, *Geranium pratense*, *Inula helenium*, *Filipendula ulmaria*, *Taraxacum camylodes* (= *T. officinale*), *Althaea officinalis*, *Lathyrus pratensis*, *Valeriana officinalis*, *Trifolium pratense*, *Angelica sylvestris*. Unfortunately, the localities from where these relevés were made are not indicated, being indicated only the Central Codrii area.

The new association is described below.

Ass. *Geranio pratensi-Cirsietum cani*

Pînzaru, Ioniţa et Jardan, ass. nova, h. l., Figure 2, 3, 4

Syn.: *Cirsietum cani* Tx. 1951: Lazu, 2014

Relevé type h. l.: Table 1, rel. 22.

Table synthetic h. l.: Table 1, 26 relevés

The total area of the association in the described locations is about 30 ha.

Locations: Altitude 135-150 m. Relief: Central Moldavian Plateau, in floodplains of rivers. Soils – alluvial, stratified, slightly alkaline. Climate – temperate-continental, the average annual temperature is 10.0-10.5 °C, the average annual precipitation varies between 650 mm and 700 mm.

Figure 2. Ass. *Geranio pratensi-Cirisetum cani* – 29 May 2018, Corneşti commune

Figure 3. *Geranio pratensi-Cirsietum cani* ass. nova (type) – 12 July 2019, "Codru" Scientific Reserve

Figure 4. Ass. *Geranio pratensi-Cirsietum cani* – 12 July 2019, "Codru" Scientific Reserve

Characteristic species: *Cirsium canum*, *Geranium pratense*, *Inula helenium*.

Constant species: *Valeriana officinalis*, *Symphytum officinale*, *Veronica longifolia*, *Thalictrum lucidum*, *Taraxacum camylodes*, *Lathyrus pratense*, *Achillea pannonica*.

Rare species: *Anacamptis palustris* (= *Orchis palustris*) [Endangered (EN)], included in the Red Book of R. Moldova, *Dactylorhiza incarnata* (= *D. majalis* auct.mold. non (Rchb.) P. F. Hunt et Summ.) [Critically Endangered (CR)], *Ophioglossum vulgatum* [Critically Endangered (CR)], included in the Red Book of R. Moldova, *Thelypteris confluens* (= *T. palustris*) [Endangered (EN)], included in the Red Book of R. Moldova, *Epipactis helleborine* [Vulnerable (VU)], *Ranunculus binatus* [Vulnerable (VU)], *Silene flos-cuculi* [Endangered (EN)], *Senecio sarracenicus* (= *S. fluviatilis*) [Critically Endangered (CR)], *Galium rivale* (Sibth. & Sm.) Giseb. [Critically Endangered (CR)] [12-14].

Structure: the herbaceous layer has 100 % coverage (Figure 2-4). Vertically, three layers are distinguished in phytocoenoses:

1. The upper layer, about 140-180 cm in height, consists of the species: *Cirsium canum*, *Inula helenium*, *Thalictrum lucidum*, *Lysimachia vulgaris*, *Heracleum sibiricum*, *Filipendula ulmaria*, *Veronica longifolia*, *Dactylis glomerata*, *Valeriana officinalis*, *Sium sisarum*, *Angelica sylvestris*, *Senecio erucifolius*, *Phleum pratense*, *Elymus repens*, *Festuca arundinacea*.
2. The second, middle layer, 35-110 cm in height, consists of *Geranium pratense*, *Serratula tinctoria*, *Lathyrus pratensis*, *Ranunculus acris*, *Carex riparia*, *Equisetum telmateia*, *Lythrum salicaria*, *Poa pratense*, *Symphytum officinale*, *Carex hirta*, *Bromus arvensis*, *Achillea pannonica*, *Vicia tenuifolia*, *Galium aparine*, *Erigeron annuus*.

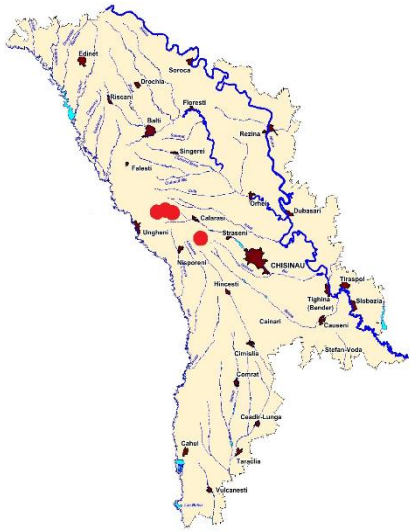

Figure 5. Locations of the ass. *Geranio pratensi - Cirsietum cani* in the Republic of Moldova

3. The third, lower layer, which reaches up to 30 cm in height, is represented by *Taraxacum camylodes*, *Ranunculus repens* L., *Potentilla reptans*, *Lysimachia nummularia*, *Glechoma hederacea*, *Veronica chamaedrys*, *Medicago lupulina*.

Range. The plant communities of *Cirsium canum* with *Geranium pratense* occur on the Central Moldavian Plateau in the districts: Ungheni (Pojarna, Cornești), Călărași (Sipoteni), Strășeni (Lozova) (Figure 5).

Territorial protection. The phytocoenoses of this association are protected in "Codru" Scientific Reserve.

Conservation value. The given association includes phytocenoses of great value and should be protected in all the identified locations.

Conclusions

The association *Geranio pratensi-Cirsietum cani* Pînzaru, Ioniţa et Jardan ass. nova includes phytocoenoses of tall herbaceous plants, meso-hygrophilic, which occur on slightly alkaline, stratified, alluvial soils, which are moist and rich in nutrients.

The association *Geranio pratensi-Cirsietum cani* Pînzaru, Ioniţa et Jardan ass. nova is included in the alliance *Filipendulion ulmariae* Segal ex Westhoff et Den Held 1969, ord. *Molinietalia caeruleae* Koch 1926, cl. MOLINIO-ARRHENATHERETEA Tx. 1937.

The phytocoenoses of the given association are particularly interesting from a botanical point of view. They include some very rare species in R. of Moldova, such as: *Anacamptis palustris* (Jacq.) R.M.Boteman, Pridegon & M. W. Chax, *Dactylorhiza incarnata* (L.) Soó, *Ophioglossum vulgatum* L., *Thelypteris confluens* (Thunb.) C. V. Morton, *Senecio sarracenicus* L., *Silene flos-cuculi* (L.) Clairv., and the species *Galium rivale* (Sibth. & Sm.) Giseb. and *Ranunculus binatus* Kit. ex Rchb. have been found only in these phytocoenoses.

We suggest to include the as. *Geranio pratensi-Cirisetum cani* in the List of Rare plant communities of the Republic of Moldova, with a high conservation status, and to include the sites near the communes Sipoteni (d. Călăraşi) and Cornești (d. Ungheni) in the network of protected areas of the Republic of Moldova.

Table 1. Ass. Geranio pratensi-Cirsietum cani ass. nov.

Relevé no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	*22	23	24	25	26	K
Altitude (m)	150	150	150	150	150	150	150	150	135	135	135	135	135	140	140	140	140	140	140	140	140	140	140	140	140	140	
General coverage (%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
Surface of relevé (m²)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
Number of species	21	24	34	32	47	52	38	25	27	47	27	23	25	33	25	28	27	43	40	37	32	27	37	34	29	33	
Characteristic species																											
Cirsium canum	3	3	1	2	3	2	4	4	2	3	1	3	2	3	3	2	2	2	1	1	2	3	3	2	4	4	V
Geranium pratense	2	2	1	1	2	3	3	2	2	2	3	2	1	2	+	+	1	2	2	2	2	3	2	2	3	3	V
Inula helenium	-	-	+	-	1	2	+	+	3	+	2	+	-	+	+	-	3	3	2	4	3	1	1	+	-	+	IV
Filipendulion																											
Valeriana officinalis	-	-	+	+	+	+	-	-	1	+	+	+	-	-	+	-	+	1	+	1	+	+	+	+	+	+	IV
Veronica longifolia	1	1	+	1	+	+	1	+	2	2	2	2	-	+	-	-	-	-	-	-	-	-	-	-	-	-	III
Thalictrum lucidum	-	-	+	+	+	+	1	+	-	+	+	+	-	+	-	-	-	+	-	+	-	+	-	-	-	1	III
Filipendula ulmaria	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	+	2	-	-	+	1	+	-	-	II
Lysimachia vulgaris	-	-	-	-	-	-	+	-	-	-	+	-	-	+	-	-	-	-	-	+	-	-	+	+	-	-	II
Lythrum salicaria	-	-	-	-	-	+	+	-	-	-	+	+	+	-	+	-	-	-	-	-	-	-	+	+	+	+	II
Equisetum telmateia	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	3	3	2	2	-	2	1	-	-	II
Eupatorium cannabinum	-	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	1	+	+	-	-	-	+	+	-	-	II
Mentha longifolia	-	-	-	-	-	1	-	-	+	-	-	-	+	-	+	+	+	1	+	-	+	+	1	-	1	1	II
Epilobium hirsutum	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Calystegia sepium	-	-	2	-	-	-	+	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Stachys palustris	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	I
Silene baccifera	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	+	-	-	-	I
Euphorbia lucida	-	-	-	-	-	+	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Epilobium tetragonum	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Elymus caninus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	I
Deschampsion caespitosae																											
Glechoma hederacea	2	2	-	1	-	-	-	-	-	2	-	-	-	-	2	2	-	-	-	-	-	-	-	-	-	-	II

Phleum pratense	-	-	1	-	1	-	-	-	1	1	2	-	1	-	-	-	-	-	-	2	1	-	-	1	1	-	II
Festuca arundinacea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	2	1	1	-	+	1	+	II
Alopecurus pratensis	-	-	-	-	-	-	-	-	1	-	-	1	1	-	-	-	-	-	-	-	1	+	-	-	-	-	1
Scutellarria hastifolia	-	-	-	1	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Lythrum virgatum	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	+	-	-	-	-	I
Agrostis stolonifera	-	-	-	-	-	-	-	2	-	-	2	-	1	-	-	-	-	-	-	+	-	-	-	1	-	-	I
Festuca pratensis	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	2	-	-	-	-	-	-	-	-	-	-	I
Molinion																											
Stachys officinalis	-	-	-	+	1	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	+	+	+	+	+	-	II
Serratula tinctoria	+	-	-	2	-	-	-	-	-	1	1	1	-	-	-	-	-	+	1	-	+	-	-	-	-	-	II
Anacamptis palustris	-	-	-	-	-	-	-	-	-	r	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Dactylorhiza incarnata	-	-	-	-	-	-	-	-	-	r	-	-	-	-	-	-	-	-	-	-	-	-	r	-	-	r	I
Ophioglossum vulgatum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	I
Molinietalia																											
Symphytum officinale	+	+	1	+	+	1	1	1	+	1	-	-	-	1	+	-	-	+	+	-	+	+	+	+	+	+	IV
Ranunculus repens	1	-	2	1	-	-	-	2	3	2	-	-	-	-	2	-	-	1	2	2	-	-	2	-	-	2	III
Angelica sylvestris	-	-	-	-	+	+	+	-	1	+	+	+	-	-	+	-	+	+	+	1	+	+	-	-	-	+	III
Silene flos-cuculi	-	+	3	2	-	-	-	-	-	1	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	I
Equisetum palustre	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	2	2	I
Juncus articulatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	I
Potentillo-Polygonetalia																											
Potentilla reptans	1	2	2	1	2	2	2	2	2	-	-	-	2	2	-	-	-	2	-	-	-	2	2	-	2	2	IV
Elymus repens	-	-	-	-	-	2	2	2	-	2	2	-	2	-	-	2	2	-	2	1	3	1	2	-	-	-	III
Althaea officinalis	-	-	-	-	+	+	-	+	-	+	-	-	-	-	-	-	-	r	-	-	-	-	-	-	+	+	II
Carex hirta	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	-	2	3	2	2	2	II
Rumex crispus	-	-	-	+	-	-	+	-	-	-	+	-	-	-	-	+	+	+	+	+	+	-	+	-	-	-	II
Dipsacus laciniatus	-	-	+	-	+	+	+	-	-	-	+	+	-	-	-	-	-	+	-	-	-	-	-	-	+	-	II
Potentilla anserina	-	-	-	-	-	1	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	1	-	2	2	I
Rorippa sylvestris	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	I

Mentha pulegium	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	I
Galega officinalis	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	-	-	+	-	-	-	-	-	-	-	-	I
Rumex conglomeratus	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	+	+	I
Senecio erucifolius	-	-	-	-	-	-	-	-	-	-	-	-	r	-	-	-	+	-	-	-	-	-	-	-	+	-	I
Trifolium elegans	-	-	-	-	2	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Juncus inflexus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	+	1	1	-	1	I
Cerastium dubium	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Arrhenatheretalia																											
Taraxacum campylodes	1	1	1	2	-	+	1	-	2	1	-	-	2	1	3	2	-	1	1	1	-	1	2	+	-	+	IV
Peucedanum carvifolia	+	+	+	1	-	-	+	+	1	+	-	-	2	1	1	+	-	+	-	-	-	+	-	-	-	-	III
Heracleum sibiricum	-	-	-	-	+	+	+	-	-	-	+	+	-	-	-	-	+	+	+	+	+	+	+	-	-	-	III
Dactylis glomerata	-	-	-	-	-	1	-	-	-	1	-	-	-	1	-	-	1	+	-	1	1	+	+	1	-	-	II
Veronica chamaedrys	-	-	+	+	-	-	-	-	-	-	-	-	-	1	1	1	-	-	+	+	-	1	-	-	-	-	II
Senecio jacobaea	-	-	-	-	-	-	+	+	-	+	+	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-	II
Galium mollugo	1	-	-	-	1	-	1	-	-	+	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	II
Carex polyphylla	-	-	1	-	-	2	-	-	-	-	-	-	-	1	-	+	-	-	+	-	-	-	-	-	1	+	II
Rumex obtusifolius	-	+	+	+	-	1	+	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	II
Carex tomentosa	-	-	2	-	-	2	2	-	-	2	-	-	-	-	-	-	-	-	2	-	-	-	2	2	-	-	II
Lotus corniculatus	-	-	-	-	+	-	1	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Vicia sepium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	+	+	-	-	+	-	-	I
Leontodon hispidus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	+	-	-	I
Equisetum arvense	-	-	-	-	-	-	-	-	-	-	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Medicago lupulina	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	1	-	-	-	+	-	+	-	-	-	-	I
Ononis spinosa	-	-	-	-	-	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	I
Pastinaca sativa var. sylvestris	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	+	+	+	-	-	-	-	I
Leucanthemum vulgare	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Rhinanthus alectorolophus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	I
Molinio-Arrhenatheretea																											
Lathyrus pratensis	1	2	-	1	2	2	2	2	1	2	-	-	-	2	2	-	2	2	1	1	2	2	-	2	-	2	IV

Achillea pannonica	1	1	-	-	1	-	1	-	-	-	1	+	-	1	1	1	1	1	1	1	1	1	1	+	1	1	IV
Ranunculus acris	+	2	-	2	-	1	2	3	1	-	1	-	1	3	1	1	2	-	+	-	-	-	-	-	-	-	III
Lysimachia nummularia	-	3	2	-	3	-	-	-	-	3	-	-	-	-	-	2	-	2	2	2	2	2	2	2	-	2	III
Centaurea jacea	-	-	-	-	+	+	+	-	-	+	-	-	-	-	-	-	1	1	1	-	1	1	-	+	-	+	III
Poa pratensis	-	-	2	2		2	-	-	-	-	-	-	-	2	-	-	-	-	2	-	-	-	2	-	-	-	II
Allium oleraceum	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	+	+	-	+	-	+	II
Prunella vulgaris	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	-	-	I
Trifolium pratense	-	-	-	-	-	-	2	-	-	-	-	-	+	-	-	-	-	-	-	-	+	-	1	1	-	-	I
Cerastium holosteoides	-	+	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-	-	I
Myosotis arvensis	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	I
Trifolium repens	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-	-	-	2	1	I
Ranunculus binatus	1	2	-	2	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	I
Ranunculus stevenii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	+	-	-	-	I
Phragmitetea																											
Iris pseudacorus	+	+	+	+	+	2	1	1	1	1	1	+	-	1	-	-	-	-	-	-	-	-	-	-	-	-	III
Carex riparia	-	-	2	1	2	2	-	2	2	+	2	2	-	-	-	-	3	2	2	2	-	-	-	-	1	2	III
Phalaris arundinacea	-	-	-	2	1	2	1	1	1	1	-	2	-	-	-	-	-	1	2	1	-	1	-	1	1	+	III
Sium sisarum	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+	+	-	+	1	III
Phragmites australis	-	-	-	1	-	-	-	-	-	+	-	-	-	+	-	-	-	1	-	-	-	-	2	-	-	-	I
Thelypteris confluens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	I
Lycopus exaltatus	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Senecio saracenicus	-	-	-	-	-	r	-	-	r	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Glyceria arundinacea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	I
Carduus crispus	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	I
Variae syntaxa																											
Erigeron annuus	-	-	+	-	-	+	+	-	+	-	+	+	-	-	+	-	-	+	+	+	-	-	-	+	+	-	III
Galium verum	-	1	-	+	1	+	-	+	1	+	+	-	+	-	-	+	-	+	-	-	-	-	-	1	-	-	III
Galium aparine	1	-	2	1	-	-	-	-	-	-	-	-	-	1	-	1	2	2	2	2	2	-	1	2	-	-	III
Daucus carota	-	-	+		+	-	+	+	+	+	-	-	+	-	-	-	-	+	-	-	+	+	-	-	+	-	II

Arctium tomentosum	-	-	-	+	+	+	+	-	+	-	-	-	-	+	-	-	-	-	+	-	-	-	-	-	+	-	II
Veronica arvensis	+	+	+	+	-	-	-	-	-	-	-	-	-	+	+	+	-	-	-	-	-	-	-	-	-	-	II
Lactuca serriola	-	-	+	-	-	+	-	-	-	-	+	-	-	-	-	-	+	+	-	-	+	-	-	-	-	-	II
Agrimonia eupatoria	-	-	-	-	+	+	+	-	-	+	-	-	+	-	-	-	-	-	-	-	-	+	-	+	-	-	II
Dipsacus fullonum	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Chaerophyllum aromaticum	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-	I
Chaerophyllum bulbosum	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	I
Torilis japonica	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	I
Ambrosia artemisiifolia	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	I
Inula germanica	-	-	-	-	2	-	+	1	-	+	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Xanthium strumarium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	I
Tripleurospermum inodorum	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	I
Senecio vernalis	-	-	-	-	-	-	-	-	-	-	-	-	r	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Cirsium vulgare	-	-	-	-	-	-	-	-	-	-	-	-	r	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Cirsium arvense	-	-	-	-	1	1	1	-	-	+	-	-	-	1	-	-	+	-	-	-	-	-	-	-	-	-	I
Picris hieracioides	-	-	-	-	-	-	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Tragopogon dubius	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	r	-	-	-	-	+	-	-	-	I
Cichorium intybus	-	-	-	-	-	-	+	-	-	1	-	-	-	-	-	-	-	r	r	-	-	-	-	-	-	-	I
Lactuca saligna	-	-	-	-	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Thlaspi perfoliatum	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	I
Capsella bursa-pastoris	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	I
Valerianella locusta	1	+	1	2	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	I
Humulus lupulus	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	I
Cerastium semidecandrum	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Convolvulus arvense	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Medicago sativa	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Melilotus albus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	I
Vicia sativa	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	I
Vicia hybrida	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	-	-	-	-	-	-	-	-	-	-	I

Vicia tetrasperma	-	-	-	-	-	-	-	-	-	1	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-	-	I
Vicia tenuifolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-	I
Lathyrus tuberosus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	I
Lathyrus sylvestris	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	I
Clinopodium vulgare	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	-	-	I
Lamium purpureum	1	+	-	+	-	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	I
Lamium amplexicaule	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Epilobium lamyi	-	-	-	-	+	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Plantago major	-	-	1	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	I
Veronica hederifolia	-	-	-	-	-	-	-	-	-	-	-	-	+	1	-	1	-	-	-	-	-	-	-	-	-	-	I
Veronica polita	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	I
Verbascum blattaria	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Linaria vulgaris	-	-	-	-	1	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Ficaria verna	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	I
Rosa canina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	r	-	-	-	-	-	-	I
Rubus caesius	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Filipendula vulgaris	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	I
Galium humifusum	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	I
Cruciata pedemontana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	I
Galium rivale	-	-	-	+	-	-	-	-	-	-	+	+	-	-	-	-	+	-	+	-	-	-	-	-	-	-	I
Urtica dioica	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	I
Epipactis helleborine	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	r	-	-	I
Carex praecox	-	2	-	-	2	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	I
Aristolochia clematitis	-	-	-	-	1	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I
Campanula trachelium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	r	-	-	-	-	-	-	-	I
Bromus arvensis	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	I

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