WEED VEGETATION OF THE NORTHERN PART OF LJUBLJANSKO POLJE

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Abstract
Weed vegetation of northeren margins of Ljubljana was researched according to the standard Central-European phytosociological method. The following syntaxa were established: *Veronicetum trilobae-triphyllidi* Slavnić 1951 corr. Holzner 1973, *Alchemillo-Matricarietum* R. Tx. 1937, BC *Alchemilla arvensis*-[*Scleranthion annui*], *Panico-Chenopodietum* R. Tx. 1937, *Echinochloo-Setarietum* Felföldy 1942 corr. Mucina 1993.

Izvleček
Po standardni fitocenološki metodi smo raziskali plevelno vegetacijo severnega obrobja Ljubljane. Ugotovili smo sintaksone: *Veronicetum trilobae-triphyllidi* Slavnić 1951 corr. Holzner 1973, *Alchemillo-Matricarietum* R. Tx. 1937, TZ *Alchemilla arvensis*-[*Scleranthion annui*], *Panico-Chenopodietum* R. Tx. 1937, *Echinochloo-Setarietum* Felföldy 1942 corr. Mucina 1993.

Key words: weed vegetation, *Stellarietea mediae*, Slovenia
Ključne besede: plevelna vegetacija, *Stellarietea mediae*, Slovenija

1. INTRODUCTION

The weed and ruderal vegetation of Ljubljana, and above all of its northeastern margins, was studied by Zalokar (1937, 1939). In his manuscripts he newly described two, nowadays well-known associations (*Veronica hederifolia*-Ass., *Melilotus albus-Picris hieracioides*-Ass.). Although these descriptions are no longer valid, he is nevertheless considered as one of the pioneers of weed vegetation research. The research of weed vegetation was repeated in order to find out the changes in its composition in the last sixty years. The results are published in a separate article (Šilc & Čarni 2005). In this work the syntaxonomy of weed vegetation is presented.

2. THE STUDY AREA

Research in Ljubljansko polje was limited to the area of research conducted by Zalokar (1939). This is an area surrounded by the roads Medno-Ljubljana, Ljubljana- Zadvor-Sostro, by the Ljubljanica and the Sava rivers up to the ford at Dolsko, and by the road Dolsko-Beričevo-St. Jakob-Črnuče-Tacen-Vikrče, where the borderline goes across the Sava river back to Medno.

The plain has a moderately wet continental climate, which means that the mean annual temperature in Ljubljana is 9.5 °C and the central parts receive between 1400 to 1600 mm of rainfall.

The soils on younger gravel terraces and morains are 20 to 30 cm deep rendzinas, which are rather fertile and therefore often used as fields (Perko & Orožen Adamič 1998).

Phytogeographically, Ljubljansko polje is classified into the pre-Alpine phytogeographical region (Wraber 1969).

The majority of surfaces were deforested. Among forest communities two associations occur – *Vaccinio myrtilli-Pinetum sylvaticae* and *Helleboro nigrae-Carpinetum*; the rest are meadows (habitat Central-European moderately dry grasslands) and fields.

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3. METHODS

The vegetation was researched applying the standard Central-European method (Braun-Blanquet 1964, Westhoff & van der Maarel 1973). The phytosociological nomenclature is in accordance with Jarolímek et al. (1997), and the nomenclature of vascular plants follows Ehrendorfer et al. (1973), except for the species *Setaria pumila* (Poiret) Schultes in Schultes & Schultes fil.

4. RESULTS AND DISCUSSION

Stellarietea mediae R. Tx., Lohmeyer et Preising in R. Tx. ex von Rochow 1951

Violenea arvensis Hüppe et Hofmeister ex Jarolímek et al. 1997

Centaureetalia cyani R. Tx., Lohmeyer et Preising in R. Tx. ex von Rochow 1951

Veronico-Euphorbion Sissingh ex Passarge 1964

***Veronicetum trilobae-triphyllidi* Slavnić 1951 corr. Holzner 1973**

Atriplici-Chenopodietalia albi R. Tx. (1937) Nordhagen 1940

Scleranthion annui (Kruseman et Vlieger 1939) Sissingh in Westhoff et al. 1946

***Alchemillo-Matricarietum* R. Tx. 1937 BC *Alchemilla arvensis*-[*Scleranthion annui*]**

Spergulo-Oxalidion Görs in Oberd. et al. 1946

***Panico-Chenopodietum* R. Tx. 1937**

Panico-Setarion Sissingh in Westhoff et al. 1946

***Echinochloo-Setarietum* Felföldy 1942 corr. Mucina 1993**

1. *Veronicetum trilobae-triphyllidi* Slavnić 1951 corr. Holzner 1973
(Tab 1/1–15)

The spring stands with the species *Veronica hederifolia* are common and well developed. Some character and differential species determined by Jarolímek et al. (1997) (*Veronica triphyllos*, *Holosteum umbellatum*...) are missing, however. On account of the altered land management these species are rare, but the syntaxon is clearly defined also because of the development in the spring agroecophase**.** Seasonal dynamics is one of the most important factors influencing the floristic composition of weed stands (Lososová et al. 2004).

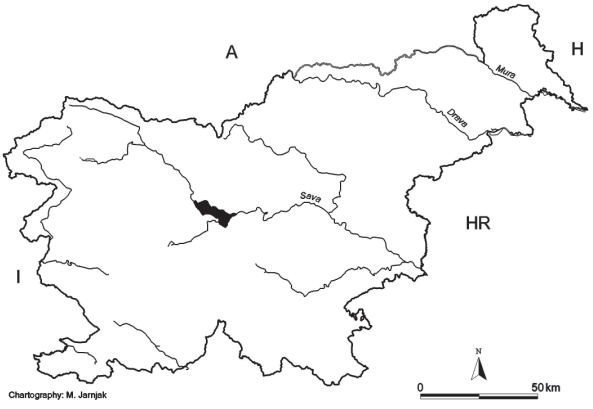

Figure 1: Resarch area.
Slika 1: Raziskovano območje.

2. *Alchemillo-Matricarietum* R. Tx. 1937 & BC *Alchemilla arvensis*-[*Scleranthion annui*]
(Tab 1/24–29 & 16–23)

In the study area, the most characteristic cereal association in Slovenia is only rarely developed with a complete diagnostic combination of species, which is the result of the altered agrotechnical measures. Most of the cereal fields are weedless (on account of the thick canopy and herbicides), but also common are the stands where the character species *Matricaria chamomilla* is missing – these are classified as a basal community. Chamomile was rare also in the stands studied by Zalokar (1939), who determined *Aphanes arvensis* as the main character species.

The stands in the entire study area are classified into the subassociation *legousietosum* Holzner 1973, which is charactaristic for the sites with a higher content of clayey particles, rich in nutrients and soil moisture.

3. *Panico-Chenopodietum* R. Tx. 1937
(Tab 1/30–52)

This is a characteristic hoe-field association on wetter fields or in places where rainfall water is retained for a longer period of time. The character species *Chenopodium polyspermum* characterizes the syntaxon, as do also some more hygrophilous species. Similar to this association is the facies with the species *Equisetum arvense*, already described by Zalokar (1939), which is characterized by the species *Calystegia sepium* and *Symphytum officianale*, nowadays characterizing the alliance *Spergulo-Oxalidion*.

4. *Echinochloo-Setarietum* Felföldy 1942 corr. Mucina 1993 (Tab 1/53–58)

The soil on gravel is dry due to water permeability, which is the reason why a more thermophilous asscociation *Echinochloo-Setarietum* developed there. However, the boundary of this association with *Polygono-Chenopodietum polyspermi* (Krippelová 1979, Šilc 2005) is blurred despite their classification into different alliances. The stands of the latter association are rarer.

5. APPENDIX

Other species:

Medicago sativa 8: +; *Trifolium* sp. 8: +; *Gnaphalium uliginosum* 9: r; *Knautia arvensis* 12: +; *Erophila verna* 15: 1; *Poa pratensis* 16: +; *Brassica oleracea* 17: +; *Sherardia arvensis* 20: +; *Agrostis gigantea* 21: +; *Odontites vernus* 25: +; *Trifolium campestre* 27: +; *Valerianella rimosa* 27: +; *Bromus hordeaceus* 28: +; *Festuca pratensis* 28: 1; *Vicia* sp. 29: +; *Carex hirta* 31: 1; *Cirsium vulgare* 31: +; *Dactylis glomerata* 31: +; *Hypericum humifusum* 31: +; *Scrophularia nodosa* 31: 1; *Verbascum* sp. 31: +; *Commelina communis* 34: +; *Centaurea jacea* 36: +; *Lathyrus pratensis* 36: +; *Hypericum perforatum* 37: +; *Acer pseudoplatanus* 41: +; *Mentha longifolia* 41: +; *Urtica dioica* 41: +; *Helianthus tuberosus* 42: +; *Salix alba* 42: +; *Polygonum mite* 42: 1; *Aegopodium podagraria* 47: +; *Galium mollugo* 47: +; *Picris hieracioides* 47: +; *Silene vulgaris* 47: +; *Galeopsis pubescens* 51: 1; *Lamium maculatum* 51: +; *Leucanthemum ircutianum* 51: +; *Tanacetum vulgare* 52: +; *Populus alba* 53: +.

Date (year/month/day), location, cultural plant and site description, latitude, longitude:

1. 2002/05/21, Sneberje, barley, 466894, 5103966; **2.** 2002/05/14, Roje, Nemška cesta, cereals, field margin, 461718, 5106782; **3**. 2002/05/14, Staneže, cereals, a field in the gravel pit, 457360, 5107339; **4**. 2002/05/14, Gunclje, barley, 457934, 5106989; **5**. 2002/05/14, Gunclje, cereals, 457878, 5106865; **6**. 2002/05/14, Zgornje Gameljne, cereals, a sparsely sown field margin, 460716, 5108879; **7**. 2002/05/14, Zgornje Gameljne, wheat, sparsely sown, very gravely soil, 461044, 5108912; **8**. 2002/05/14, Srednje Gameljne, wheat, 461198, 5108958; **9.** 2002/04/26, Bizovik, near the cemetery, a ploughed-up field, 466886, 5100030; **10.** 2002/04/26, Žale, wheat, 464457, 5103415; **11.** 2002/04/26, Sneberje, a ploughed-up field, 466826, 5103894; **12**. 2002/04/22, Roje, Nemška cesta, corn stubble, 461580, 5107166; **13**. 2002/04/22, Roje, Nemška cesta, chicory, 462295, 5106629; **14**. 2002/04/22, Roje, Nemška cesta, wheat, 462379, 5106619; **15**. 2002/04/22, Šentjakob, Jarški prod, an abandoned lettuce field, 466893, 5105331; **16**. 2002/07/02, Šentvid, Roje, wheat, 459901, 5107628; **17**. 2002/05/21, Sneberje, barley, 468363, 5104126; **18**. 2002/06/27, Dolsko, wheat, 468808, 5105660; **19**. 2002/06/27, Zalog, Sneberski prod, barley, 471028, 5103289; **20**. 2002/06/27, Zalog, Sneberski prod, wheat, 470808, 5102766; **21**. 2002/06/27, Sneberje, barley, 467559, 5104112; **22**. 2002/05/21, Jarški prod, barley, 467161, 5104777; **23**. 2002/06/04, Gameljne, wheat, 461020, 5108834; **24**. 2002/06/04, Gunclje, wheat, 457857, 5106851; **25**. 2002/06/04, Medno, Na Rojah, barley, 457235, 5108498; **26**. 2002/06/04, Medno, Na Rojah, barley, 457418, 5108172; **27**. 2002/06/04, Gameljne, barley, 461191, 5109016; **28**. 2002/06/10, Gameljne, barley, 461044, 5108940; **29**. 2002/07/02, Bizovik, wheat, 466981, 5099983; **30**. 2002/09/05, Zalog, Prod, a ploughed-up field, 471289, 5103249; **31**. 2002/09/16, Staneže, corn stubble, 457268, 5107702; **32**. 2002/09/16, Ježica, leek, kale, bean, turnip, 461495, 5106472; **33**. 2002/06/27, Šmartno ob Savi, lettuce, 466760, 5104071; **34**. 2002/09/05, Sneberje, a pile of gravel and sand, 466894, 5104155; **35**. 2002/09/05, Bizovik, a ploughed-up field, 466909, 5100013; **36**. 2002/09/06, Zg. Gameljne, turnip, 460230, 5108385; **37**. 2002/09/06, Savlje, fallow ground cereals, 461204, 5105096; **38**. 2002/09/06, Jarški prod, an abandoned ploughed-up field, 466560, 5104922; **39**. 2002/09/06, Gameljne, carrots, lettuce, turnip, 461151, 5108974; **40**. 2002/09/05, Zalog, Prod, turnip, 471469, 5103066; **41**. 2002/09/05, Zalog, Prod, carrots, 471803, 5103315; **42**. 2002/09/05, Sneberje, Šmartno, a ploughed-up field, onion, 466729, 5104255; **43**. 2002/09/05, Bizovik, cabbage, 466815, 5099792; **44**. 2002/09/05, Bizovik, a ploughed-up field, 466879, 5099991; **45**. 2002/ 09/06, Zg. Gameljne, lettuce, 460361, 5108389; **46**. 2002/09/16, Medno, 457172, 5108599; **47**. 2002/09/06, Jarški prod, cabbage, 466775, 5104800; **48**. 2002/09/06, Šentvid, Roje, cabbage, 462176, 5106740; **49**. 2002/09/06, Šentvid, Roje, an abandoned field, 462537, 5106556; **50**. 2002/06/27, Sneberje, onion, 467570, 5104122; **51**. 2002/09/06, Šentvid, Roje, cereal stubble, 459830, 5107648; **52**. 2002/09/06, Tacen, an abandoned garden, 460002, 5108392; **53**. 2002/09/05, Sneberje, carrots, kohlrabi, beets, 467908, 5104458; **54**. 2002/09/05, Hrastje, cereal stubble, unsprayed with a herbicide, 467168, 5103145; **55**. 2002/09/05, Hrastje, Šmartno, Jarše, bean, 466974, 5103021; **56**. 2002/09/05, Hrastje, Šmartno, Jarše, beets, 466728, 5102858; **57**. 2002/09/06, Jarški prod, an abandoned ploughed-up field, 466550, 5104906; **58**. 2002/09/06, Tacen, potatoes, 460071, 5108375.

Table 1: Weed vegetation of northeren Ljubljansko polje
Tabela 1: Plevelna vegetacija severnega dela Ljubljanskega polja

Table number	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	27	28	29
Relevé area (m^2)	10	30	10	40	25	10	50	10	50	20	50	100	50	15	50	100	20	50	50	40	70	50	50	100	150	50	40	50	50
Altitude (m)	280	295	320	320	320	300	310	310	268	296	286	302	300	298	279	302	280	280	275	282	310	318	305	270	273	300	310	302	290
Cover herb layer (%)	50	60	60	80	70	50	50	50	80	60	90	80	60	30	80	40	70	40	30	70	40	70	80	40	40	60	60	60	30
Number of sp.	12	21	12	18	23	18	28	26	26	14	26	21	22	18	25	27	22	16	19	30	26	30	43	28	35	22	33	29	24
Veronicetum trilobae-triphyllidi																													
Veronica hederifolia	1	3	3	3	2	1	1	1	3	3	2	2	3	2	3	.	+	.	.	.	.	.	.	.	.	.	.	+	.
Alchemillo-Matricarietum																													
Matricaria chamomilla	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	3	2	2	1	1	2	1	+	.	.	.	.	.	.
BC *Alchemilla arvensis-[Scleranthion annui]*																													
Aphanes arvensis	.	.	.	.	.	1	1	+	.	+	.	.	.	.	.	.	1	1	.	.	2	.	+	1	.	1	+	1	.
Legousia speculum-veneris	.	.	.	.	+	.	.	.	+	.	.	.	.	.	+	+	.	+	+	+	+	2	3	2	2	2	2	+	+
Panico-Chenopodietum																													
Chenopodium polyspermum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
Echinochloo-Setarietum																													
Fallopia convolvulus	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	1	1	.	1	.	.	.	2
Echinochloa crus-galli	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Galinsoga parviflora	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cirsium arvense	.	+	+	+	.	.	+	+	+	+	+	+	1	+	+	.	+	.	1	+	+	+	1	.	+	+	.	.	+
Chenopodium album	.	.	+	+	+	.	.	.	+	.	+	.	1	.	.	.	+	.	.	+	.	.	.	+	.	.	.	.	.
Amaranthus retroflexus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Setaria pumila	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Veronico-Euphorbion																													
Lamium purpureum	3	+	+	1	2	2	+	2	1	1	2	2	1	2	+	.	+	.	+	+	+	+	+	.	.	+	.	+	.
Geranium pusillum	.	r	.	.	.	.	.	.	.	.	+	+	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.
Centaureetalia cyani																													
Veronica persica	+	+	+	2	1	1	1	1	2	1	2	3	1	+	2	+	1	+	+	3	+	+	+	.	.	+	+	3	+
Scleranthion annui																													
Arabidopsis thaliana	1	1	.	.	.	+	2	+	+	.	.	2	+	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.
Centaurea cyanus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Matricaria discoidea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.
Spergulo-Oxalidion																													
Oxalis fontana	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	1	+	+	.	+	.	.
Bidens tripartita	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Calystegia sepium	.	.	+	.	+	.	+	.	.	.	.	.	.	.	.	+	.	+	+	+	+	+	+	1	+	1	.	1	+
Symphytum officinale	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	2	.	+	.	+	.	.	+	.
Atriplici-Chenopodietalia albi																													
Myosotis arvensis	.	.	.	+	+	.	.	1	+	.	.	.	.	+	.	+	.	.	.	+	+	1	+	+	1	1	+	.	1
Apera spica-venti	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	2	1	1	1	1	2	1	1	1	1	2	1
Violenea arvensis																													
Viola arvensis	.	+	1	2	1	2	+	2	+	+	.	.	+	.	+	1	1	1	+	.	1	2	2	1	1	1	2	1	2
Veronica arvensis	+	+	.	2	2	+	+	+	+	+	+	.	.	+	+	.	+	.	.	1	+	.	+	+	.	.	+	+	1
Sonchus asper	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Anthemis arvensis	.	+	.	.	+	+	r	.	.	.	.	.	.	.	.	+	1	.	.	.	+	1	2	+	.	+	2	2	1
Anagallis arvensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	+	1	1	.	.	.	.
Sonchus arvensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.
Raphanus raphanistrum	.	.	+	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Vicia hirsuta	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.
Vicia tetrasperma	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.

30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	Presence					Sum
50	100	100	100	15	100	50	100	15	100	100	100	200	50	50	50	50	200	100	100	50	200	25	100	100	200	100	150	100						
276	306	290	298	281	287	295	308	287	299	275	274	300	287	283	295	315	282	300	300	288	300	300	281	287	292	282	287	300						
100	60	90	70	90	80	90	90	60	50	100	80	60	60	100	80	90	70	60	100	80	80	100	80	90	80	70	60	70						
38	32	23	19	21	33	27	43	20	28	34	25	28	29	27	26	27	41	26	27	23	42	29	29	30	20	28	28	29	1	2	3	4	5	
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	15	1	1			17
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	2	8		1		11
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	4	4	4	1		13
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	7	6			16
2	2	2	2	1	1	1	1	1	+	+	+	+	+	+	+	+	+	+	+	+	+	.	.	.	.	.	.	.			1	23		24
.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	2	4	2	4		12
2	2	1	+	1	1	1	2	2	2	2	2	2	1	.	2	3	1	1	2	2	.	2	2	1	2	1	4	2				21	6	27
+	.	3	2	.	4	1	1	+	2	1	3	+	3	3	1	+	+	2	2	2	2	.	3	3	3	3	+	2				20	6	26
+	.	+	+	.	1	.	+	.	+	.	.	.	1	1	+	+	+	1	1	.	+	+	1	+	+	+	.	.	12	6	3	15	4	40
1	+	1	1	+	1	1	2	.	+	1	1	+	1	1	.	1	2	+	1	1	.	1	2	+	1	1	+	1	6	2	1	20	6	35
2	+	1	.	.	2	2	1	.	+	+	2	+	1	1	1	1	1	+	2	.	+	1	2	2	+	1	+	1				19	6	25
1	1	.	.	3	+	1	+	2	1	1	.	1	2	+	+	.	+	+	1	.	3	3	+	1	+	1	2	1				18	6	24
+	.	1	1	.	+	.	+	.	1	+	.	.	2	+	+	1	.	.	+	.	+	.	+	1	1	+	.	1	15	6	2	13	5	41
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+	+	.	.	+	+	.	1	.	+	.	.	.	1	+	+	+	.	+	1	+	+	+	+	2	1	+	.	+	15	8	4	15	5	47
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1	1	.	.	.	.	.	.	.	+	+	+	1	.	.	.	.	.	+	.	.	.	2	.	.	.	.	.	.	1	3	2	8		14
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Table number	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	27	28	29
Stellarietea mediae																													
Stellaria media	+	1	.	1	+	+	+	1	3	2	3	3	1	1	2	.	+	.	+	2	.	+	1	1	+	+	1	2	+
Capsella bursa-pastoris	1	+	.	+	+	+	+	+	1	1	2	+	+	+	1	.	1	.	+	2	+	+	+	+	.	+	1	+	.
Amaranthus powellii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Papaver rhoeas	.	+	1	+	+	.	.	.	+	1	+	+	+	+	+	.	+	+	1	.	+	+	+	+	2	+	+	1	+
Galinsoga ciliata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Polygonum persicaria	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.
Digitaria sanguinalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ssp. *sanguinalis*																													
Mentha arvensis	.	.	+	.	1	.	+	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	+	+	1	+	.	.	.
Euphorbia helioscopia	.	.	.	.	.	.	.	.	+	+	+	.	.	.	1	.	+	.	+	.	.	.	.	.	.	.	.	.	.
Digitaria sanguinalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ssp. *pectiniformis*																													
Panicum capillare	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Amaranthus lividus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Solanum nigrum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Veronica polita	.	.	.	.	.	+	+	.	.	.	.	+	+	+	2	.	.	.	+	.	.	.	.	.	.	.	.	+	.
Atriplex patula	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	1	.	.	+	.	.	.	.
Senecio vulgaris	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sonchus oleraceus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Tripleurospermum inodorum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Lactuca serriola	.	.	.	.	.	.	.	.	+	.	.	+	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	+
Portulaca oleracea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Vicia angustifolia	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Ranunculus arvensis	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.
Sinapis arvensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
Setaria viridis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Panicum miliaceum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Diplotaxis tenuifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Brassica napus	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Fumaria officinalis	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Mercurialis annua	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Brassica rapa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Vicia sativa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Armoracia rusticana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bromus hordeaceus	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Galeopsis tetrahit	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.
Eragrostis minor	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Aethusa cynapium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Fumaria vaillantii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sherardia arvensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
Avena sativa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Polygono-Poetea																													
Plantago major	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	2	.	.	+	.	.	.	+	.	.	.	+	.	.
Polygonum aviculare	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	1	.	+	.	.	+	.	.	.	1	.	.	.	.
Poa annua	+	.	.	.	.	.	.	.	.	.	.	+	.	.	+	+	2	.	.	1	.	.	.	.	.	.	.	.	.
Bidentetea																													
Polygonum lapathifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ssp. *lapathifolia*																													
Rorippa sylvestris	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	.	+	.	.	.	.	1	.	.
Polygonum lapathifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ssp. *incana*																													

30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	Presence					
1	.	1	2	.	1	1	2	.	2	1	2	1	2	1	1	.	2	2	1	1	2	1	1	2	2	2	+	+	14	5	6	19	6	50
+	.	+	+	.	+	+	+	+	+	+	.	+	+	+	+	.	1	.	+	+	+	.	+	.	1	+	+	+	14	6	4	17	5	46
1	.	3	2	+	1	+	1	+	.	3	1	1	2	2	+	2	2	2	2	2	1	1	1	1	3	2	1	+				21	6	27
+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	11	6	6	2		25
+	.	1	2	.	2	2	+	.	1	2	1	4	1	1	3	2	+	3	3	3	1	.	+	.	1	1	+	1				19	5	24
+	+	+	1	+	+	+	1	.	1	.	.	2	+	+	.	+	+	.	+	.	.	1	+	+	+	.	+	.		1	2	16	4	23
3	+	.	.	.	3	1	2	.	1	1	1	.	1	3	1	1	2	1	2	.	2	1	+	2	2	2	.	3				17	5	20
1	.	+	.	.	.	+	.	1	.	1	.	.	.	.	.	.	.	.	.	.	+	+	.	+	.	.	.	2	3	3	3	7	2	18
+	.	.	+	.	+	+	+	.	.	2	.	.	+	+	+	+	.	.	.	+	.	.	.	.	.	.	.	1	4	2		11	1	18
.	.	.	.	.	1	.	1	.	.	+	1	.	+	1	+	+	+	+	+	.	.	.	+	+	+	1	.	+				11	5	16
2	2	.	.	3	+	2	.	+	.	2	.	.	.	.	.	.	1	.	.	.	+	2	1	.	.	.	2	.				10	2	12
.	.	2	.	.	+	.	.	.	.	+	.	+	.	.	.	.	2	.	1	+	.	.	+	.	1	+	+	.				7	4	11
+	+	.	.	1	.	.	1	.	.	.	+	.	.	.	.	.	1	+	.	.	+	.	1	.	.	+	.	.				8	2	10
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1	+	+	+	.	.	+	+	1	1	1	+	+	.	.	.	.	+	.	+	+	+	.	.	+	+	1	1	+	1	3	1	15	5	25
.	.	.	.	+	+	.	+	.	+	.	.	+	.	+	+	+	.	.	+	+	2	+	+	+	+	+	+	+	2	3	1	12	6	24
.	.	.	1	.	.	.	+	+	.	.	+	1	.	.	.	.	.	+	1	1	1	.	.	.	.	.	.	.	3	3		9		15
2	1	2	.	.	+	1	1	2	.	2	.	.	+	1	+	1	1	2	+	.	.	+	1	.	.	.	1	.				16	2	18
+	.	.	+	.	.	+	.	.	+	.	1	2	.	.	.	.	1	.	.	.	.	.	+	+	.	.	+	+	1	3	1	7	4	16
.	.	1	.	.	+	.	+	.	.	1	.	.	.	+	.	1	.	1	.	.	.	.	.	.	.	.	.	.				7		7

Table number	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	27	28	29
Plantago major ssp. *intermedia*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	+	+	.	.	.	.
Chenopodium ficifolium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Myosoton aquaticum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sedo-Scleranthetea																													
Arenaria serpyllifolia	.	2	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	+	+	.	+	.	+
Valerianella locusta	.	1	.	.	1	.	+	1	.	.	.	.	+	.	1	.	.	.	.	1	.	+	+	.	.	.	+	.	.
Chaenarrhinum minus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
Saxifraga tridactylites	.	1	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cerastium tenoreanum	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Valerianella dentata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.
Artemisietea																													
Erigeron annuus	.	.	.	.	.	+	+	.	+	.	+	+	.	.	+	+	.	.	.	+	+	+	.	.	.	.	+	.	.
Agropyron repens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	+	+	1	+	.	.	+	.	.
Silene alba ssp. *alba*	.	+	.	+	.	.	+	.	.	.	+	.	+	.	.	.	.	.	.	.	.	+	+	+	.	.	1	2	.
Tussilago farfara	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Artemisia vulgaris	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	+	.
Conyza canadensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+
Daucus carota	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
Melilotus alba	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	1
Verbena officinalis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ambrosia artemisiifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Galio-Urticetea																													
Galium aparine	.	+	+	1	+	+	.	+	+	.	.	.	.	1	+	.	.	.	.	+	+	1	+	+	+	2	.	+	+
Glechoma hederacea	.	.	.	.	.	.	.	+	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
Solidago canadensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lapsana communis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Molinio-Arrhenatheretea																													
Taraxacum officinale agg.	.	.	.	.	.	.	.	+	+	.	+	+	+	.	+	+	.	+	+	+	+	.	+	+	.	.	+	+	+
Ranunculus repens	.	+	.	+	.	.	+	+	.	.	.	.	.	+	+	.	.	.	.	.	.	+	+	+	+	+	+	.	.
Poa trivialis	+	1	.	+	+	+	1	1	+	1	1	1	1	+	+	.	.	.	.	1	1	+	+	.	+	+	+	.	.
Rumex obtusifolius	.	.	.	.	.	.	.	.	.	.	+	+	+	+	+	.	.	.	+	.	.	.	+	.	.	+	.	.	.
Achillea millefolium	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	.	.	+	.	.	1	.	.	.	+	+	.
Trifolium repens	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	+	.
Lolium multiflorum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	+	+	.	+	+	.	.	+	1	.
Plantago lanceolata	.	.	.	.	.	.	.	+	+	.	.	.	.	.	+	.	.	.	.	.	.	.	+	.	+	.	.	.	.
Trifolium pratense	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	+	.	.	.	.	+
Potentilla reptans	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
Vicia cracca	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Pastinaca sativa	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.
Cerastium holosteoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	+	.	+	.	+
Stachys palustris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.
Medicago lupulina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
Lysimachia vulgaris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.
Lotus corniculatus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
Lolium perenne	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	.
Heracleum sphondylium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Arrhenatherum elatius	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.
Agrostis stolonifera	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Vicia sepium	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
Lysimachia nummularia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.

30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	Presence					
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.	+	.	+	+	+	.	1	.	+	.	.	.	+	.	.	+	+	+	+	.	+	.	+	+	.	1	.	+	6	6	4	12	4	32
+	+	.	.	1	.	+	.	1	+	+	.	.	.	.	.	.	.	+	.	.	+	+	+	.	.	.	.	.	6	2	4	10	1	23
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.	+	+	.	.	.	.	+	.	+	+	+	.	+	+	.	.	+	+	.	.	+	.	.	+	.	.	.	.	5	2	1	11	1	20
.	+	.	.	.	+	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	+	.	.	+	.	.	.	.	3	2	2	5	1	13
.	.	.	.	+	.	.	+	.	+	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	+	+	.	1		3	5	2	11
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Table number	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	27	28	29
Other																													
Convolvulus arvensis	+	1	.	.	.	.	1	+	+	.	+	.	+	r	.	1	+	1	.	.	+	+	+	1	+	+	1	+	1
Cerastium glomeratum	+	+	.	.	.	+	+	+	.	.	1	1	+	+	+	.	+	+	.	1	.	.	+	.	.	.	1	+	.
Equisetum arvense	.	.	.	.	.	.	+	+	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.
Matricaria sp.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cardamine hirsuta	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cirsium vulgare	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Centaurium pulchellum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.	.	.	.

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30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	Presence					
+	.	+	.	.	1	.	+	.	1	+	.	.	1	1	+	.	.	+	+	+	2	1	.	1	.	+	.	+	8	6	6	14	3	37
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