

## PLANT COMMUNITIES OF CULTIVATED FIELDS OF THE PODLASKI PRZEŁOM BUGU MESOREGION PART VI. COMMUNITIES OF ROOT CROPS ON COMPACT SOILS

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### Abstract

Analysis of plant communities accompanying root crops on compact soils is presented in the paper. It is the next part of the review of plant communities of agrocenoses of the Podlaski Przełom Bugu (Podlasie Bug Gorge) mesoregion. The studied phytocoenoses were identified on the basis of 103 phytosociological relevés, made according to the Braun-Blanquet method. In the studied agrocenoses, plots of the associations *Lamio-Veronicetum politae*, *Galinsogo-Setarietum* and *Oxalido-Chenopodietum polyspermi* from the *Polygono-Chenopodion polyspermi* alliance were noted. Small patches of *Lamio-Veronicetum* and *Oxalido-Chenopodietum* were rarely noted in the studied area due to a small proportion of suitable habitats. In the area of Podlaski Przełom Bugu mesoregion, phytocoenoses of *Oxalido-Chenopodietum* developed in the river valleys on fertile muds and black soils. Typical plots of *Galinsogo-Setarietum* distinguishable by the mass occurrence of *Galinsoga parviflora* were only observed in the vicinity of farm buildings. Intermediate communities between *Panico-Setarion* and *Polygono-Chenopodion polyspermi* as well as phytocoenoses of *Echinochloo-Setarietum typicum* – subvariant with *Veronica persica* and *Echinochloo-Setarietum fumarietosum* – were also quite frequently noted in root crops on compact soils.

**Key words:** cultivated fields, root crop communities, compact soils, Podlaski Przełom Bugu mesoregion

### INTRODUCTION

The present paper is the next part of the review of plant communities of agrocenoses of the Podlaski Przełom Bugu mesoregion (Skrzyczyńska and Rzymowska, 2005; Rzymowska and Skrzyczyńska, 2006a; 2006b; 2006c; 2007). It concerns the analysis of communities developing in root crops on compact soils. The characteristics of the agrocenoses were made on the basis of

103 phytosociological relevés. The methodical principles, e.g., the list of localities with their numbering and the characteristics of the study area, were published in a paper by Skrzyczyńska and Rzymowska (2005).

### RESULTS

Systematics of the identified root crop communities:

Class: *Stellarietea mediae* R. Tx., Lohm. et Prsg, 1950

Order: *Polygono-Chenopodietalia* (R. Tx. et Lohm. 1950) J. Tx. 1961

Alliance: *Panico-Setarion* Siss. 1946

1. Association: *Echinochloo-Setarietum* Krus. et Vlieg. (1939) 1940

Subassociation: *Echinochloo-Setarietum typicum*

a. typical variant

– subvariant with *Veronica persica*

b. variant with *Mentha arvensis*

– subvariant with *Veronica persica*

Subassociation: *Echinochloo-Setarietum fumarietosum*

a. typical variant

b. variant with *Stachys palustris*

2. Intermediate community between *Panico-Setarion* and *Polygono-Chenopodion polyspermi*

a. typical form

b. form with participation of hygrophilous species

Alliance: *Polygono-Chenopodion* Siss. 1946

3. Association: *Lamio-Veronicetum politae* Kornaś 1950

a. typical variant

b. variant with *Mentha arvensis*

4. Association: *Oxalido-Chenopodietum polyspermi* Siss. 1950

5. Association: *Galinsogo-Setarietum* (R. Tx. et Beck. 1942) R. Tx. 1950

Phytocoenoses developing on compact soils in root crops in the area of the Podlaski Przełom Bugu mesoregion were diverse and floristically rich. The studied crops were dominated by fertile forms of *Echinochloo-Setarietum* (*Panico-Setarion* alliance) and communities from the *Polygono-Chenopodion* alliance: *Lamio-Veronicetum politae*, *Oxalido-Chenopodietum polyspermi* and *Galinsogo-Setarietum*.

***Echinochloo-Setarietum typicum* Krus. et Vlieg. (1939) 1940**

On compact soils, there were observed numerous plots of *Echinochloo-Setarietum typicum* - subvariant with *Veronica persica* and *Echinochloo-Setarietum fumarietosum*.

Plots of *Echinochloo-Setarietum typicum* with *Veronica persica* were usually noted on good wheat and very good rye soil complexes, developed from clay, light and strong clayey sands. They were identified on the basis of 20 phytosociological relevés (Table 1). Apart from the plants characteristic for the association, a numerous group of species from the *Polygono-Chenopodion* alliance and *Polygono-Chenopodietalia* order was recorded, of which *Veronica persica* was the most frequently noted. The species such as *Lamium purpureum*, *Veronica agrestis*, *Galinsoga ciliata*, *Sonchus asper* and *Euphorbia helioscopia* were less frequently observed. Moreover, a large share of nitrophilous plants from the class *Stellarietea mediae*, e.g., *Stellaria media*, *Chenopodium album* and *Matricaria maritima* ssp. *inodora*, was characteristic for this subvariant.

The variant with *Mentha arvensis* was distinguishable by the occurrence of species typical for excessively wet soil, e.g., *Mentha arvensis*, *Gnaphalium uliginosum*, *Juncus bufonius*, *Stachys palustris*, *Potentilla anserina* *Plantago intermedia*, *Rorippa sylvestris*.

In total, 99 species were noted in the analysed phytocoenoses (68 in typical plots and 88 in the variant with *Mentha arvensis*). Number of species in one relevé varied, respectively, from 14 to 29 (on average 21) and from 19 to 40 (on average 28).

***Echinochloo-Setarietum fumarietosum***

On the soils of very good and good rye, good wheat and strong cereal-fodder complexes, plots of *Echinochloo-Setarietum fumarietosum* developed. The subassociation was described on the basis of 20 phytosociological relevés (Table 2). The phytocoenoses were observed both on optimally and excessively wet soils, which was the reason for the division of the subassociation into two variants: typical and variant with *Stachys palustris*. In the typical and moist plots of the subassociation, a constant and large proportion

of *Echinochloa crus-galli* was observed. *Raphanus raphanistrum* was noted more rarely and less abundantly. A frequent occurrence of *Fumaria officinalis* was also characteristic for the subassociation. Other characteristic species of *Polygono-Chenopodion* (also distinguishable ones) were less frequently and abundantly noted, especially in the plots of the variant with *Stachys palustris*. They were as follows: *Euphorbia helioscopia*, *Neslia paniculata*, *Sonchus asper*, *Lamium purpureum*, *Lamium amplexicaule*, *Veronica persica*. In typical plots, a significant proportion of *Galinsoga parviflora* was observed. Moreover, in typical and moist plots, a mass occurrence of *Chenopodium album* and a slightly smaller proportion of *Stellaria media* were noted. The moist variant of the subassociation was distinguishable by a considerable share of hygrophilous species, e.g. *Stachys palustris*, *Gnaphalium uliginosum*, *Mentha arvensis*, *Juncus bufonius*, *Rorippa sylvestris*.

In total, 113 species were noted in the analysed phytocoenoses (79 in typical plots and 93 in plots with *Stachys palustris*). Number of species in one relevé varied, respectively, from 15 to 38 (on average 26) and from 20 to 45 (on average 31).

**The intermediate community between *Panico-Setarion* and *Polygono-Chenopodion polyspermi***

In root crops of the Podlaski Przełom Bugu mesoregion, intermediate phytocoenoses with the participation of species characteristic for the alliances *Panico-Setarion* and *Polygono-Chenopodion polyspermi* were also observed. Such plots were noted on various soil types, including rye (especially very good rye), wheat (especially good rye) and strong cereal-fodder complexes. The communities were identified on the basis of 20 phytosociological relevés (Table 3).

In these phytocoenoses, a numerous group of species characteristic for the *Polygono-Chenopodion* alliance was noted. Among them, there was observed a high proportion of *Euphorbia helioscopia*, *Sonchus asper*, *Veronica persica* and *Galinsoga parviflora* as well as *Veronica agrestis* in the typical variant. The characteristic species for *Panico-Setarion* were recorded less frequently and with little cover. The only exception was *Echinochloa crus-galli* occurring abundantly, especially in plots rich in hygrophilous species. A considerable proportion of plants with high nutrient demands testify to high habitat fertility. Apart from the species from the *Polygono-Chenopodion polyspermi* alliance, the following were found: *Chenopodium album*, *Stellaria media*, *Anagallis arvensis*, *Capsella bursa-pastoris*, *Galium aparine* and *Polygonum lapathifolium* ssp. *lapathifolium*.

A form of community with the participation of hygrophilous species was identified on the basis of the occurrence of such species, as, *Plantago intermedia*, *Gnaphalium uliginosum*, *Juncus bufonius*, *Ranunculus repens*, *Stachys palustris*.

In total, 103 species were noted in the analysed phytocoenoses (72 in typical form and 88 in plots with the participation of hygrophilous species). Number of species in one relevé varied, respectively, from 20 to 33 (on average 24) and from 26 to 45 (on average 34).

#### ***Lamio-Veronicetum politae* Kornaś 1950**

Small plots of *Lamio-Veronicetum politae* were rarely observed, usually on soils of good and weak wheat complexes and strong cereal-fodder complex. Diverse habitat conditions (especially soil moisture) are the reason for the division of the association into two variants: typical and variant with *Mentha arvensis*. The association was identified on the basis of 23 phytosociological relevés (13 – typical variant and 10 – moist variant) (Table 4).

Typical plots of *Lamio-Veronicetum politae* developed in potato and beet crops, on typical brown and black soils and muds of wheat soil complexes. The following species characteristic for the association: *Veronica polita*, *Euphorbia helioscopia*, *Veronica opaca*, *Lamium amplexicaule* and *Sonchus asper*, were recorded. From among the species characteristic for the alliance, the most frequently and abundantly were noted the following: *Veronica agrestis*, *Veronica persica*, *Lamium purpureum*, *Galinsoga parviflora* and *Lapsana communis*. *Stellaria media*, *Chenopodium album*, *Capsella bursa-pastoris*, *Anagallis arvensis* and *Galium aparine* were also recorded frequently and with high cover.

Plots with *Mentha arvensis* developed on clayey soils of good wheat and strong cereal-fodder soil complexes. These phytocoenoses were characterised by a high proportion of hygrophilous species, e.g. *Mentha arvensis*, *Plantago intermedia*, *Stachys palustris*, *Potentilla anserina*.

The associations were floristically rich. In total, 100 species were noted in them (80 in typical variant and 83 in variant with *Mentha arvensis*). Number of species in one relevé varied, respectively, from 19 to 31 (on average 23) and from 23 to 39 (on average 30).

#### ***Oxalido-Chenopodietum polyspermi* Siss. 1950**

Plots of the association *Oxalido-Chenopodietum polyspermi* were not frequently noted in root

crops of the investigated area. They developed in beet and potato plantations, in the vicinity of watercourses. The association was usually observed on black soils and muds, classified as strong cereal-fodder complex. The association was distinguished on the basis of 10 phytosociological relevés (Table 5). The species characteristic for the association, *Chenopodium polyspermum* and *Oxalis stricta*, were a constant component of the phytocoenoses and had high cover. Numerous distinguishable plants, e.g. *Plantago intermedia*, *Mentha arvensis*, *Galeopsis tetrahit* and more rarely *Symphytum officinale*, were also recorded. Moreover, a numerous group of hygrophilous plants, e.g., *Juncus bufonius*, *Gnaphalium uliginosum*, *Rorippa sylvestris*, *Polygonum amphibium*, as well as other plants characteristic for *Polygono-Chenopodion polyspermi* occurring in constancy classes III and II were observed in these phytocoenoses (quite often with a high degree of cover). A high proportion of nitrophilous plants, e.g. *Stellaria media*, *Chenopodium album* and *Matricaria maritima* ssp. *inodora*, was also characteristic for these communities. *Echinochloa crus-galli* and less frequently other species from the *Panico-Setarion* alliance were also a constant component of these phytocoenoses.

In total, the occurrence of 94 species was noted in the analysed plots of this association. Number of species in one relevé varied from 26 to 42 (on average 33).

#### ***Galinsogo-Setarietum* (R. Tx. et Beck. 1942) R. Tx. 1950**

On various soils, classified as rye and wheat complexes, usually in the vicinity of farms, there were observed plots of the association *Galinsogo-Setarietum*. The phytocoenoses were dominated by *Galinsoga parviflora*, whereas *Galinsoga ciliata* and *Setaria pumila* were noted less abundantly (Table 6). The proportion of other species characteristic for *Polygono-Chenopodion* was much lower, of which the most frequent and numerous was *Veronica persica*. Species such as, e.g. *Veronica agrestis*, *Lamium purpureum*, *Euphorbia helioscopia*, *Sonchus asper*, used to reach a lower degree of cover. Plots of the phytocoenoses with a mass occurrence of *Stellaria media* and *Chenopodium album* were also noted.

In spite of high weed cover, plots of *Galinsogo-Setarietum* were the floristically poorest phytocoenoses developing on compact soils of the study area. In total, 76 weed species were noted in them. Number of species in one relevé varied from 17 to 32 (on average 23).

Table 1.  
*Echinochloo-Setarietum* Krusem. et Vlieg. (1939) 1940

Subassociation	typicum																						
	typical					with <i>Mentha arvensis</i>																	
Variant																							
Subvariant	with <i>Veronica persica</i>																						
Relevé no. in table	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
Relevé no. in field	1020	983	907	925	2214	2213	2165	427	2120	1040	1016	1017	1027	906	1143	428	307	2030	2035	2132			
Date: month	8	8	8	8	9	9	9	8	9	8	8	8	8	8	8	8	8	8	8	8	9		
Year	96	96	96	96	94	94	94	95	97	96	96	96	96	96	96	95	95	97	97	97	97		
Location	26	25	101	50	22	22	27	54	48	29	26	26	25	101	71	54	58	78	79	107			
Soil unit	2Bw gl	2A pgm.gl	4A pgl.gl	4Bw pgl.gl	3A pgl.gc	2F pgm	2F pgm.pltz	2Dz gl:glp	4F plz.pgl	5 Dz pgl:pl	2Bw gl	2Bw gl	4A pgl.gl	4A pgl.gl	4A pgl:glp	2Dz gl:glp	5Fsp.pltz	4A pgl:glp	3B gl	8D pgm.gl			
Crop cover in %	75	90	65	65	10	75	80	60	80	60	35	80	35	30	85	35	90	55	30	50			
Weed cover in %	15	35	65	10	75	80	60	30	80	60	32	22	26	25	34	39	40	19	24	22	28		
Number of weeds per relevé	19	25	20	14	19	19	19	24	17	29	21	21	21	22	34	39	40	19	24	22	28		
I. Ch. <i>Echinochloo-Setarietum</i>											S	W	S	W									
<i>Echinochloa crus-galli</i>	+	1	1	1	2	2	2	1	1	1	V	835	1	2	2	3	1	1	1	1	V	1160	
<i>Raphanus raphanistrum</i>								+			II	80	+	+	+	+				II	40		
II. D. var. with <i>Mentha arvensis</i>											S	W	S	W									
<i>Mentha arvensis</i>											+	1	+	+	1	1	1	1	1	+	IV	230	
<i>Gnaphalium uliginosum</i>											+	+	1	1			+	1			III	180	
<i>Juncus bufonius</i>											+		1	+	1		+	1			III	180	
<i>Stachys palustris</i>															+	+	+				1	III	130
<i>Potentilla anserina</i>								+			I	10	1	1		+	+	+	+		III	130	
<i>Plantago intermedia</i>								+	+		I	20	1	+	+		+	+	+		III	100	





cd. Table 1

<i>Polygonum aviculare</i>		+	+		+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+			II	40			
<i>Vicia tetrasperma</i>		+	+		+	+																		+	+	+	+						II	30		
<i>Thlaspi arvense</i>		+				+																											II	40		
<i>Spergula arvensis</i>		+	+			+																											I	20		
<b>VI. Accompanying species</b>																																				
<i>Polygonum lapathifolium</i> ssp. <i>lapathifolium</i>			+	+		+																													IV	200
<i>Cirsium arvense</i>		+	+	+		+	+																											III	90	
<i>Polygonum persicaria</i>			+	+		+																												IV	110	
<i>Equisetum arvense</i>		+	+	1		+																												III	90	
<i>Veronica arvensis</i>		+	+	+		+																												III	50	
<i>Plantago major</i>						+																												III	50	
<i>Chamomilla suaveolens</i>			+																															III	50	
<i>Galium aparine</i>		1				+	2	1																										I	10	
<i>Agropyron repens</i>						+																												II	195	
<i>Erysimum cheiranthoides</i>						+	+																											II	110	
<i>Taraxacum officinale</i>						+																												I	20	
<i>Amaranthus retroflexus</i>						+	+																											I	20	
<i>Convolvulus arvensis</i>		+				+																												I	20	
<i>Artemisia vulgaris</i>							+																											I	10	
<i>Medicago lupulina</i>																																		II	30	

**Sporadic species:** II – *Polygonum amphibium* 17(1), 18(+); *Myosurus minimus* 14 (+); *Spergularia rubra* 15(+); *Ranunculus sardous* 16(+); *Polygonum hydropiper* 17(+); *Riccia* sp. 20(+); *Anthoceros punctatus* 20(+); IV – *Sonchus oleraceus* 5(+), 9(+), 13(+), 19(+); *Lapsana communis* 5(+), 6(1), 7(2); *Veronica polita* 3(+), 14(+); *Setaria pumila* 15(+), 18(+); *Solanum nigrum* 9(+); *Oxalis stricta* 16(+); *Chenopodium polyspermum* 17(+); V – *Sinapis arvensis* 2(1), 6(+), 14(+), 20(+); *Vicia hirsuta* 2(+), 17(+), 19(+); *Centaura cyanus* 3(+), 11(+), 18(+); *Galeopsis tetrahit* 9(+), 15(+), 17(+); *Rumex crispus* 8(+), 10(+), 16(+); *Vicia angustifolia* 10(+), 15(+), 18(+); *Chamomilla recutita* 4(+), 11(+); *Geranium pusillum* 10(+), 16(+); *Consolida regalis* 1(+); *Crepis tectorum* 2(+); *Anchusa arvensis* 8(+); *Vicia villosa* 10(+); *Papaver rhoeas* 14(+); *Aethusa cynapium* 16(+); *Melandrium noctiflorum* 17(+); VI – *Poa annua* 2(+), 9(+), 14(+), 16(+); *Erodium cicutarium* 3(+), 10(+), 14(+), 17(+); *Achillea millefolium* 2(+), 8(+), 16(+); *Sisymbrium officinale* 5(+), 16(+), 19(+); *Cardaminopsis arenosa* 7(+), 17(+), 18(+); *Arenaria serpyllifolia* 7(+), 17(+); *Galeopsis bifida* 10(+), 15(+); *Plantago lanceolata* 10(+), 16(+); *Melandrium album* 17(+), 19(+); *Rubus caesius* 4(+); *Urtica urens* 5(+); *Galium spurium* 6(+); *Malva neglecta* 10(+); *Poa pratensis* 10(+); *Cerastium holosteoides* 16(+); *Leontodon autumnalis* 16(+); *Malva sylvestris* 17(+); *Oenothera biennis* 17(+); *Lathyrus pratensis* 18(+); *Urtica dioica* 19(+).

Comments: numbers after species names inform about the relevé number in the table, z.n – withered top leaves

Table 2.  
*Echinochloo-Setarietum* Krusem. et Vlieg. (1939) 1940

Subassociation	<i>fumarietosum</i>																					
	typical						with <i>Stachys palustris</i>															
Relevé no. in table	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
Relevé no. in field	2105	2099	1979	927	297	268	356	1131	1842	1840	1981	2067	442	1042	961	976	970	1081	1076	1091		
Date: month	9	9	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8		
Year	97	97	97	96	95	95	95	96	97	97	97	97	95	96	96	96	96	96	96	96		
Location	65	65	2	39	60	17	32	68	87	87	2	14	53	29	39	41	41	3	3	30		
Soil unit	4Dz p̄m.p̄l:p̄l	5D p̄l:p̄l	2B p̄m.ēl	4A ēl:p̄l	5Bw p̄l:ēl	5F ps:p̄l	2D plz	5F plz:p̄l	5A p̄l:ēl	5A p̄l:ps	3B ēl	4F p̄m:p̄l	5F plz:p̄l	5Dz p̄l:p̄l	4F plz:ēsp:p̄l	8F p̄m:p̄l	5F p̄l:p̄l	8Bw p̄m:p̄l	5F p̄l:p̄l	5F p̄l:p̄l		
	z.n	z.n	z.n	z.n	z.n	z.n	z.n	z.n	z.n	z.n	z.n	z.n	z.n	z.n	z.n	z.n	z.n	z.n	z.n	z.n	z.n	
Crop cover in %	55	90	85	60	85	60	75	70	80	50	55	50	40	65	75	60	50	95	95	90		
Weed cover in %	21	15	22	24	30	32	18	38	32	27	20	21	33	26	30	39	35	36	29	45		
Number of weeds per relevé											26	26	26	26	26	26	26	26	29	31		
<b>I. Ch. <i>Echinochloo-Setarietum</i></b>																						
<i>Echinochloa crus-galli</i>	1	1	1	2	+	1	1	+	2	+	V	630	+	1	1	+	2	2	1	V	590	
<i>Raphanus raphanistrum</i>			2	+	+	+	+	+	+	+	III	225	+				1	1	2	I	335	
<b>II. D. <i>Echinochloo-Setarietum fumarietosum</i></b>																						
<i>Fumaria officinalis</i>	1	1	1	1	1	1	1	2	1	1	V	625	2	1	1	1	1	+	2	+	V	670
<i>Euphorbia helioscopia</i>			+	1	+			+			II	80							1	I	60	
<i>Neslia paniculata</i>			+			1			+		II	70	1							I	50	
<i>Sonchus asper</i>			+	1		+					II	70	+					+		I	20	
<b>III. D. var. with <i>Stachys palustris</i></b>																						





cd. Table 2

<i>Geranium pusillum</i>								II	30	+		I	10	
<b>VI. Ch. Stellarietea mediae</b>														
<i>Myosotis arvensis</i>	+	+	+	+	+	+	+	+	+	+	+	+	V	90
<i>Fallopia convolvulus</i>	2	+	+	1	+	1	+	+	+	+	+	+	IV	110
<i>Sinapis arvensis</i>	+	+	+					+	+	3	1	+	III	630
<i>Vicia tetrasperma</i>	+	+	+	+	+	+	+	+	+	+	+	+	IV	70
<i>Capsella bursa-pastoris</i>		+	+	+	+	+	+	+	+		1	+	III	90
<i>Viola arvensis</i>	+	+	+	+	+	+	+	+	+	+	+	+	III	50
<i>Anthemis arvensis</i>	+	+	+	+	+	+	+	+	+	+	+	+	II	30
<i>Vicia angustifolia</i>		+	+	+	+	+	+	+	+	+	+	+	III	60
<i>Galeopsis tetrahit</i>	+	+	+	+				+	+	+	+	+	II	40
<i>Centaurea cyanus</i>		+	+	+	+	+	+	+	+	+	+	+	II	40
<i>Vicia hirsuta</i>		+						+	+	+	+	+	III	50
<i>Thlaspi arvense</i>	1	+		+	+	1	+	+	+	+	+	+	II	40
<i>Polygonum aviculare</i>		+	+	+	+	+	+	+	+	+	+	+	II	30
<i>Anagallis arvensis</i>	+	+	+	+	+	+	+	+	+	+	+	+	I	20
<i>Arabidopsis thaliana</i>	+			+	+	+	+	+	+	+	+	+	II	30
<i>Vicia villosa</i>		+	+	+	+	+	+	+	+	+	+	+		
<i>Rumex crispus</i>								+	+	+	+	+	II	40
<b>VII. Accompanying species</b>														
<i>Polygonum lapathifolium</i> ssp. <i>lapathifolium</i>	+		2	+	1	1	+	+	+	+	+	+	I	525
<i>Veronica arvensis</i>	+		+	+	+	+	+	+	+	+	+	+	IV	110
<i>Erysimum cheiranthoides</i>	+							+	+	+	+	+	IV	190



Table 3. Intermediate community between *Panico-Setaria* and *Polygono-Chenopodion polyspermi*

Form	typical										with hygrophilous species										
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Relevé no. in table	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Relevé no. in field	2082	1862	1021	1029	894	2131	2212	2034	2037	2009	1008	1096	1106	1105	1110	426	299	2039	2150	2154	
Date: month	9	8	8	8	8	9	9	8	8	8	8	8	8	8	8	8	8	8	9	9	
Year	97	97	96	96	96	97	94	97	97	97	96	96	96	96	96	95	95	97	94	94	
Location	81	56	26	25	84	107	22	79	79	99	26	30	28	28	109	54	60	79	5	5	
Soil unit	4D pgm:pl:gl	5Bw pglp:ps:pl	4A pgl:gl	2A pgm:gl	2Bw pgm:gs	5D psp:pl	2F pgm:p	4A pgl:glp	2B gl	2B pgm:gl:gs	4D pgl:gl	5Fpz:pl	4A pgl:gl	8Dz pgm:gs	8A pgm:gs	2Dz gl:glp	6Dz psp:pl	3B gl	8F glp:pgl	8D pgm:p:ps	
Crop cover in %	z.n	z.n	z.n	z.n	90	z.n	z.n	85	80	z.n	80	z.n	z.n	z.n	z.n	z.n	z.n	z.n	z.n	z.n	90
Weed cover in %	45	60	50	30	60	15	55	35	20	55	35	55	60	80	60	80	70	50	70	40	40
Number of weeds per relevé	30	21	28	33	20	20	24	20	21	22	24	32	36	35	44	37	45	26	27	28	34
											S	W						S	W		
<b>I. Ch. Panico-Setaria</b>																					
<i>Echinochloa crus-galli</i>	1	1	1	1	1	1	1	1	1	2	V	585	2	1	1	1	1	2	2	1	V 1000
<i>Setaria viridis</i>	+	+	+	+	+	+	+	+	1	II 80	+	+	+	+	+	+	+	1		III 90	
<i>Setaria pumila</i>	+				+				II 20	+	+	+	+	+	+					II 30	
<i>Raphanus raphanistrum</i>					+				I 10	+	+	+	+	+	+					II 40	
<b>II. Ch. Polygono-Chenopodion polyspermi</b>																					
<i>Euphorbia helioscopia</i>	+				1	1	1	1	1	IV 360	1	1	1	+	+	+	1	1	1	+	V 300
<i>Sonchus asper</i>	1			+	+	+	+	+	+	IV 150	+	1	1	1	1	1	+	1	1	1	V 370
<i>Veronica agrestis</i>	+	+	+	+	1	+	+	+	1	V 220	+	+					1			+	II 80
<i>Veronica persica</i>	+	+	+	+	1	1	1	1	1	IV 240	+	+	+	+	+	+	+	1	1	1	IV 365
<i>Galinosa parviflora</i>	+	3	+	+	2	1	+	1		IV 680	+	1	1	1	1	3	1	+	+		III 545



cd. Table 3

<i>Sinapis arvensis</i>	+	+	+	+	II	30	+	+	I	+	II	70	
<i>Chenorchium minus</i>	I			+	I	50			I		II	70	
<i>Anthemis arvensis</i>		+	+		I	20		+	+		II	30	
<i>Rumex crispus</i>				+				+	+		II	40	
<b>VI. Accompanying species</b>													
<i>Cirsium arvense</i>		+	+	+	III	100	I	+	+	+	+	V	170
<i>Veronica arvensis</i>		+	+	+	III	60	+	+	+	+	+	V	90
<i>Galium aparine</i>	I	+	I	+	IV	190	+	+	I	+		III	140
<i>Polygonum lapathifolium</i> ssp. <i>lapathifolium</i>		+	+	+	III	90	+	+	+	+	I	IV	190
<i>Equisetum arvense</i>		I	+	+	II	70	+	+	I	+	+	IV	110
<i>Erysimum cheiranthoides</i>		+		+	II	30	I	I	+	+	+	III	130
<i>Erodium cicutarium</i>		+	+	+	III	50		+	+	+		II	30
<i>Taraxacum officinale</i>		+		+	II	70	+	+	+	+		III	50
<i>Polygonum persicaria</i>		+		+	I	20	+	+	+	+	+	III	60
<i>Plantago major</i>		+		+	I	20	+	+	+	+		III	50
<i>Amaranthus retroflexus</i>		+	+	2	II	245			I		I	II	150
<i>Agropyron repens</i>			+	I	I	60		+	+	+	I	II	80
<i>Convolvulus arvensis</i>		+	I		I	60		+	+	+		II	30
<i>Artemisia vulgaris</i>		+			I	10							
<i>Symphlytium officinale</i>							+		I	+		II	70

**Sporadic species:** II – *Oxalis stricta* 11(+), 16(+); *Chenopodium polyspermum* 1(+); *Fumaria officinalis* 15(+); III – *Bidens tripartita* 14(+); *Rorippa sylvestris* 13(+), 14(+), 19(1); *Potentilla anserina* 12(+), 14(+), 20(+); *Sagina procumbens* 13(+), 14(+); *Myosurus minimus* 13(+), 14(+); *Gypsophila muralis* 14(+); *Equisetum punctatum* 14(+); *Equisetum sylvaticum* 17(+); IV – *Polygonum lapathifolium* ssp. *pallidum* 5(+), 9(+), 16(+); *Solanum nigrum* 7(+), 13(+), 16(+); *Lapsana communis* 1(+), 7(+); *Geranium pusillum* 10(+); *Atriplex patula* 20(+); V – *Vicia hirsuta* 3(+), 4(+), 5(+), 14(+), 16(+); *Vicia tetrasperma* 4(+), 5(+), 13(+), 14(+), 15(+), 17(+); *Vicia angustifolia* 4(+), 5(+), 13(+), 16(+); *Papaver rhoeas* 1(2), 5(+), 16(+); *Melandrium noctiflorum* 1(+), 19(+), 20(+); *Spergularia arvensis* 14(+), 15(+); *Crepis tectorum* 14(+), 15(+); *Polygonum aviculare* 4(+), 12(+); *Galeopsis tetrahit* 12(+), 14(+); *Vicia villosa* 1(+), 5(+); *Avena fatua* 1(+); *Sisymbrium officinale* 3(+); *Galeopsis speciosa* 10(+); *Anchusa arvensis* 10(+); VI – *Medicago lupulina* 4(+), 5(+), 13(+), 14(+); *Poa annua* 6(+), 7(+), 11(+), 16(+); *Galium spurium* 7(+), 9(+), 19(+); *Arenaria serpyllifolia* 1(+), 20(+); *Malva sylvestris* 2(+), 10(+); *Trifolium repens* 11(+), 14(1); *Galeopsis bifida* 12(+), 15(+); *Chamomilla suaveolens* 12(+), 15(+); *Malva neglecta* 12(+), 17(+); *Datura stramonium* 2(+); *Armoracia rusticana* 2(1); *Chenopodium hybridum* 2(+); *Trifolium arvense* 3(+); *Melandrium album* 10(+); *Neslia paniculata* 11(+); *Cardaminopsis arenosa* 12(+); *Plantago lanceolata* 15(+); *Leontodon autumnalis* 15(+); *Trifolium campestre* 17(+); *Tussilago farfara* 19(+).

Comments: numbers after species names inform about the relevé number in the table, z.n – withered top leaves

Table 4.  
*Lamio-Veronicetum politae* Kornaś 1950

Subassociation	typicum																							S	W												
Variant	typical											with <i>Mentha arvensis</i>											S	W													
Relevé no. in table	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23														
Relevé no. in field	1884 1889 1868 1904 1853 2257 2010 1999 2206 2164 1901 1900 1890											1903 1905 1902 1869 999 904 2033 1984 1910 1909																									
Date: month	8 8 8 8 8 8 8 8 8 8 8 8 8											8 8 8 8 8 8 8 8 8 8 8 8 8																									
Year	97 97 97 97 97 97 97 97 97 94 94 97 97 97											97 97 97 97 97 96 96 97 97 97 97 97 97																									
Location	56 56 56 56 56 69 99 99 9 27 56 56 56											56 56 56 56 25 101 79 88 57 57																									
Soil unit	3B <sup>gl</sup> p	3B <sup>gl</sup> p	3B <sup>gl</sup>	3B <sup>gl</sup>	3B <sup>gl</sup>	5B <sup>w</sup> pgl <sup>p</sup>	4F <sup>plz</sup>	2B <sup>gl</sup> p m:gl:	2B <sup>gl</sup> p	2D <sup>gl</sup> p m:gl	2F <sup>gl</sup> p m:plz	2B <sup>w</sup> gl:gs	3B <sup>gl</sup>	2D <sup>gl</sup> p m:p	2B <sup>gl</sup>	3B <sup>gl</sup>	2B <sup>gl</sup> :gs	3B <sup>gl</sup>	3B <sup>gl</sup>	1D <sup>gl</sup>	4A <sup>gl</sup> p gl:gl	2B <sup>gl</sup>	2B <sup>gl</sup>	8D <sup>gl</sup> p	2B <sup>gl</sup> :gs	3B <sup>gl</sup>	2B <sup>gl</sup> :gs	3B <sup>gl</sup>	2B <sup>gl</sup> :gs	3B <sup>gl</sup>	8D <sup>gl</sup> p	2B <sup>gl</sup> :gs	8D <sup>gl</sup> p	Mean number of species per relevé			
Crop cover in %	zn	zn	75	85	zn	zn	90	90	80	zn	85	zn	zn	75	80	80	90	95	zn	80	4A <sup>gl</sup> p gl:gl	2B <sup>gl</sup>	2B <sup>gl</sup>	8D <sup>gl</sup> p	zn	zn	zn	zn	zn	zn	zn	zn	zn	zn	Mean number of species per relevé		
Weed cover in %	45	20	80	20	40	40	30	30	25	30	50	100	75	45	55	40	50	30	40	30	32	27	23	25	28	45	30										
Number of weeds per relevé	26	20	30	30	31	20	20	20	19	20	21	20	20	21	23	39	27	28	35	32	32	27	23	25	28	30											
<b>I. Ch. <i>Lamio-Veronicetum politae</i></b>																																					
<i>Veronica polita</i>	1	1	2	1	+	+	+	+	+	1	1	+	1	V	442	1	1	+	1	+	1	+	+	+	+	+	1	V	300								
<i>Euphorbia helioscopia</i>																																					
<i>Veronica opaca</i>	+	1		+	+	+	+	+	+	1		+	+	IV	138	+		+										II	80								
<i>Lamium amplexicaule</i>					2	1		1			1	+		III	335	1		1									III	260									
<i>Sonchus asper</i>					+	1	1	1	1	1	1		II	161	+											III	130										
<b>II. D. with <i>Mentha arvensis</i></b>																																					
<i>Mentha arvensis</i>					r									I	0		+	1	+	+	+	+	+	+	+	+	2	IV	315								
<i>Plantago intermedia</i>																											IV	150									
<i>Stachys palustris</i>																											III	140									
<i>Potentilla anserina</i>					+									I	8		+									III	90										
<i>Gnaphalium uliginosum</i>																											II	70									

cd. Table 4

<i>Juncus bifonius</i>																												
<b>III. Ch. Polygono-Chenopodion polyspermi</b>																												
<i>Veronica agrestis</i>	2	1	1	+	+	+	1	1	2	+	+	+	2	V	604	2	+	2	1	+	+	2	1	+	+	1	V	715
<i>Veronica persica</i>	+	+		+	+	1	+	2	+	+	+	+	+	IV	235	+		1	+	+	+	1	+	+	+	III	140	
<i>Lamium purpureum</i>	1	+	+	+	1	+	+	+	1	+	+	+	+	IV	177	1	+	+	1			1			+	+	III	180
<i>Galinsoga parviflora</i>		2	+	+	+		1		3	3	2	III	908	+		+								1	+	+	II	80
<i>Lapsana communis</i>	1	+	1	+		+		+	+	+	+	IV	123	1	+	1	+										II	120
<i>Fumaria officinalis</i>	1								1	1	1	II	154	1			+						1	1	1	II	160	
<i>Galinsoga ciliata</i>						+		+	+	+	+	II	23	+			1								+	+	II	70
<b>IV. Ch. Panico-Setarion, Polygono-Chenopodietalia</b>																												
<i>Stellaria media</i>	2	1	1	+	1	+	1	1	+	2	1	+	IV	531	1	1	+	1	+	1	+	2	+	+	+	1	V	415
<i>Chenopodium album</i>	+	1	+	1	+	+		+	+	+	1	IV	162	+	+	+	1	1	+			+	+	+	+	+	V	170
<i>Sonchus arvensis</i>		2	+	+	+	+	+	+	2	2	+	III	442	1	+	1	+	+	+	+	+	+	+	+	+	+	IV	160
<i>Matricaria maritima</i> ssp. <i>inodora</i>							1	+	1	+		II	92			+	+	1	+			+	+	+		III	90	
<i>Echinochloa crus-galli</i>	+		+	+	+	+				+	+	II	33	+								+	+	+		II	30	
<b>VI. Ch. Stellarietea mediae</b>																												
<i>Capsella bursa-pastoris</i>	+	+	1	+	+	+	+	+	+	+	1	IV	138			+	+	1	+			+	+	+	+	III	100	
<i>Anagallis arvensis</i>	+	+	+	+	1	+	+	+	+	+	+	IV	92	+		+		+				+	+	+		II	40	
<i>Myosotis arvensis</i>	+	+	+	+	+	+	1					III	77	+		+	+	+				+	+		1	1	III	50
<i>Viola arvensis</i>	+	+	+	+	+	+	+	+	+	+	+	II	54	+		+	+	+	+			+	+	+	+	III	60	
<i>Vicia tetrasperma</i>		+				+						I	15			+	+	+	+	+	+	+	+	+	+	III	50	
<i>Sinapis arvensis</i>							1		+	+		II	54	+	1	+										II	70	
<i>Melandrium noctiflorum</i>							+	+	1			II	54	+		+	+					+				II	40	
<i>Fallopia convolvulus</i>	+	+	+	+	+							II	31	+	+	+	+	+				+	+	+		II	40	
<i>Thlaspi arvense</i>					+	+	+	+	+			II	31		+	+	+					+	+			II	40	
<i>Vicia hirsuta</i>		+		+								I	15	+		+	+					+	+			II	40	
<i>Centaurea cyanus</i>		+		+								I	15		+	+	+					+	+			II	30	





Table 5.  
*Oxalido-Chenopodietum polyspermi* Siss. 1950

Relevé no. in table	1	2	3	4	5	6	7	8	9	10	Mean number of species per relevé	
Relevé no. in field	2022	2023	2032	1055	959	1090	1102	1082	2137	1068		
Date: month	8	8	8	8	8	8	8	8	9	8		
Year	97	97	97	96	96	96	96	96	97	96		
Location	78	78	78	52	40	30	30	3	107	3		
Soil unit	8Dz pgl:glp	8Dz pgl:glp	8Dz pgl:glp	8F pgmp	5F plz:pl	8F pgmp	8F plz	8F pgmp	8Dz pgm:gl	8F pgmp		
Crop cover in %	z.n	z.n	80	z.n	z.n	z.n	z.n	z.n	z.n	z.n		
Weed cover in %	60	60	60	60	70	80	70	80	70	50		
Number of weeds per relevé	32	26	28	34	37	42	29	33	29	36		33
<b>I. Ch. D. Oxalido-Chenopodietum polyspermi</b>												<b>S</b>
<i>Chenopodium polyspermum</i>	1	2	1	1	1	+	1	1	2	1	V	710
<i>Oxalis stricta</i>	1	+	1	2	+	1	1	1		+	V	455
<i>Plantago intermedia</i>	+	+	+	+	+		1	1	+	+	V	170
<i>Mentha arvensis</i>	+	+	1	2	+	+	+			1	IV	325
<i>Galeopsis tetrahit</i>	+	+		+		1	1	1			III	180
<i>Stachys palustris</i>					+	1		1	1		II	160
<i>Symphytum officinale</i>							+	1	+		II	70
<b>II. D. form with hygrophilous species</b>												
<i>Juncus bufonius</i>	1	+	+	+		1	+	+	+	1	V	210
<i>Gnaphalium uliginosum</i>	1	1	2	+		1	+	+			IV	355
<i>Rorippa sylvestris</i>	1	+		+	+					+	III	90
<i>Polygonum amphibium</i>			+	1		+	+			+	III	90
<i>Bidens tripartita</i>	1				1				+		II	110
<i>Anthoceros punctatus</i>	+	+		+					+		II	40
<i>Riccia sp.</i>	+	+		+					+		II	40
<i>Sagina procumbens</i>				+	+	+				+	II	40
<i>Gypsophila muralis</i>				+		+				+	II	30
<b>III. Ch. Polygono-Chenopodion polyspermi</b>												
<i>Galinsoga parviflora</i>				+	+		1	2	1	1	III	345
<i>Sonchus asper</i>				+			1	+	2	+	III	255
<i>Fumaria officinalis</i>					1	1		1			II	150
<i>Veronica persica</i>			1						1	+	II	110
<i>Euphorbia helioscopia</i>							1	+	+		II	70

cd. Table 5

<i>Lamium purpureum</i>						+		1		+	II	70	
<b>IV. Ch. D. Panico-Setarion, Polygono-Chenopodietalia</b>													
<i>Chenopodium album</i>		1	1	1	1	+	2		2	1	1	V	660
<i>Stellaria media</i>		+	+	1	2	1	1	1	1	+	1	V	505
<i>Echinochloa crus-galli</i>		+	1	+	+	+	1	1	+		+	V	210
<i>Matricaria maritima ssp. inodora</i>		2	2	2	+	+	+			+	+	IV	575
<i>Raphanus raphanistrum</i>								+	1		1	II	110
<i>Sonchus arvensis</i>				+		+			+		+	II	40
<b>V. Ch. Stellarietea mediae</b>													
<i>Myosotis arvensis</i>			1	+	+		+		+	+	+	IV	110
<i>Fallopia convolvulus</i>		+	+				+	1		+		III	90
<i>Vicia tetrasperma</i>		+		+	+		+		+			III	50
<i>Sinapis arvensis</i>					+	3	2		1			II	610
<i>Chaenorhinum minus</i>							+	1		+	+	II	80
<i>Viola arvensis</i>		+	+	+		+						II	40
<i>Vicia hirsuta</i>		+		+			+				+	II	40
<i>Capsella bursa-pastoris</i>						+			+	+	+	II	40
<i>Anagallis arvensis</i>				+		+				+	+	II	40
<i>Rumex crispus</i>		+					+		+			II	30
<i>Polygonum aviculare</i>				+					+		+	II	30
<b>VI. Accompanying species</b>													
<i>Erysimum cheiranthoides</i>		+	+		1	+	1	1	1	+	+	V	250
<i>Polygonum lapathifolium ssp. lapathifolium</i>		1	1	+		+	+	1	2		+	IV	365
<i>Artemisia vulgaris</i>		1	+			+	+	+	+	+		IV	110
<i>Plantago major</i>		+			+	+	+	+	+		+	IV	70
<i>Galeopsis bifida</i>		+			+			1	1	+	+	III	140
<i>Polygonum persicaria</i>					+	1	+	+	+		+	III	100
<i>Equisetum arvense</i>				1	+	+				+	+	III	90
<i>Veronica arvensis</i>		+	+	+	+			+	+			III	60
<i>Galium aparine</i>		+	+					+	+			II	40
<i>Cirsium arvense</i>		+	+					+		+		II	40
<i>Trifolium repens</i>		+	+							+		II	30
<i>Cardaminopsis arenosa</i>		+				+			+			II	30

**Sporadic species:** I – *Lapsana communis* 9(+); II – *Polygonum hydropiper* 1(1), 2(1); *Potentilla anserina* 5(1), 9(1); *Myosurus minimus* 4(+); *Rorippa palustris* 5(+); *Ranunculus repens* 5(+); *Cerastium holosteoides* 6(+); *Spergularia rubra* 9(+); III – *Veronica agrestis* 3(+), 9(+); *Veronica polita* 9(1); *Lamium amplexicaule* 6(+); *Sonchus oleraceus* 7(+); IV – *Atriplex patula* 5(1), 10(+); *Setaria viridis* 5(+), 6(+); *Setaria pumila* 6(+); *Solanum nigrum* 3(+); V – *Melandrium noctiflorum* 3(+), 4(+); *Thlaspi arvense* 3(+), 6(+); *Papaver argemone* 4(+), 6(+); *Anthemis arvensis* 5(+); *Vicia angustifolia* 6(+), 10(+); *Centaurea cyanus* 6(+); *Vicia villosa* 6(+); *Papaver dubium* 6(+); *Galeopsis speciosa* 7(+); VI – *Arenaria serpyllifolia* 1(+), 2(+); *Sinapis alba* 6(+), 10(+); *Agropyron repens* 6(+), 10(1); *Amaranthus retroflexus* 7(+), 9(2); *Urtica urens* 4(+); *Lythrum salicaria* 4(+); *Glechoma hederacea* 5(1); *Linaria vulgaris* 5(+); *Plantago lanceolata* 5(r); *Erodium cicutarium* 5(+); *Medicago lupulina* 5(+); *Chamomilla suaveolens* 7(+); *Galium spurium* 7(+); *Malva neglecta* 7(+); *Convolvulus arvensis* 9(+); *Taraxacum officinale* 9(+).

Comments: numbers after species names inform about the relevé number in the table, z.n – withered top leaves

Table 6  
*Galinsogo-Setarium* ( R.Tx. et Beck. 1942) R.Tx.1950

Subassociation	typicum												
Variant	typical												
Relevé no. in table	1	2	3	4	5	6	7	8	9	10			
Relevé no. in field	2134	2129	2205	982	1041	1893	1895	1865	1882	1857			
Date: month	9	9	9	8	8	8	8	8	8	8			
Year	97	97	94	96	96	97	97	97	97	97			
Location	107	107	9	25	29	56	56	56	56	56			
Soil unit	2Bw gl	4A pgm.gl	4A plz:gs	2Bw gl	5Dz pglp:pl	2Dd pgmp:glp	4Dd pgmp:ps	5Bw pglp:psp:pl	5Dd pglp:psp	5Bw pglp:psp:pl			
Crop cover in %	90	75	z.n	80	z.n	z.n	z.n	z.n	z.n	z.n			
Weed cover in %	35	35	70	30	100	70	35	40	50	50			
Number of weeds per relevé	26	20	20	17	28	23	20	19	32	24	23	S	W
<b>I. Ch. D. <i>Galinsogo-Setarium</i></b>													
<i>Galinsoga parviflora</i>	1	1	3	2	3	2	2	1	1	1	V	1525	
<i>Setaria pumila</i>	+		+	+		1	+		1	+	IV	150	
<i>Galinsoga ciliata</i>	1	2		1	+	1		+		+	IV	355	
<b>II. Ch. <i>Polygono-Chenopodion</i></b>													
<i>Veronica persica</i>	1	1	1			2	+	1	+	+	IV	405	
<i>Lamium purpureum</i>	+	+	+			1	+	+		1	IV	150	
<i>Veronica polita</i>	+	+					+		+	+	III	50	
<i>Euphorbia helioscopia</i>	1			1	1	+	+		+		III	180	
<i>Sonchus asper</i>	1	1							1		II	150	
<i>Lamium amplexicaule</i>							+	+		1	II	70	
<i>Veronica agrestis</i>		+		+		+	1	1	1	+	IV	190	
<i>Sonchus oleraceus</i>		+				+	1	+			II	80	
<i>Fumaria officinalis</i>							+	1	1		II	110	
<b>III. Ch.D. <i>Panico-Setarion</i>, <i>Polygono-Chenopodietalia</i></b>													
<i>Chenopodium album</i>	+	+	1	+	3	1	1	1	+	1	V	665	

cd. Table 6

<i>Lapsana communis</i>							+	+		1		II	70				
<i>Sonchus arvensis</i>										1	+	II	70				
<i>Setaria viridis</i>							+	+	+	+	+	III	100				
<b>IV. Ch. Stellarietea mediae</b>																	
<i>Stellaria media</i>							+	1	1	1	2	1	2	2	IV	735	
<i>Capsella bursa-pastoris</i>							+	+			+	+	+	+	IV	70	
<i>Myosotis arvensis</i>							+					+	+	+	III	50	
<i>Anagallis arvensis</i>							+		+			+	+		II	40	
<i>Fallopia convolvulus</i>											+	+	+	+	II	40	
<i>Anthemis arvensis</i>													+	+	II	30	
<i>Vicia tetrasperma</i>													+		II	30	
<i>Vicia hirsuta</i>													+		II	30	
<b>V. Accompanying species</b>																	
<i>Galium aparine</i>													1	+	II	110	
<i>Equisetum arvense</i>							+						+	1	+	III	90
<i>Erodium cicutarium</i>													+	+	II	30	
<i>Convolvulus arvensis</i>							+							1	III	255	
<i>Armoracia rusticana</i>														+	II	70	
<i>Polygonum lapathifolium ssp. lapathifolium</i>														+	II	70	
<i>Melandrium album</i>														+	II	30	
<i>Erysimum cheiranthoides</i>							+						1	+	1	III	170
<i>Cirsium arvense</i>							+	+	+					+	1	III	100
<i>Artemisia vulgaris</i>														+	1	II	80
<i>Polygonum persicaria</i>							+							+	II	30	
<i>Agropyron repens</i>														+	II	30	
<i>Amaranthus retroflexus</i>							+							1	II	110	

**Sporadic species:** **II** – *Chenopodium polyspermum* 1(1), 2(1); **III** – *Echinochloa crus-galli* 2(+), 4(+); *Raphanus raphanistrum* 5(+), 10(+); *Geranium pusillum* 3(+); *Polygonum lapathifolium ssp. pallidum* 4(+); *Matricaria maritima ssp. inodora* 4(+); **IV** – *Papaver rhoeas* 1(+), 4(+); *Viola arvensis* 1(+), 8(+); *Anchusa arvensis* 5(+), 9(+); *Sinapis arvensis* 1(+); *Melandrium noctiflorum* 5(+); *Vicia villosa* 5(+); *Conyza canadensis* 5(+); *Polygonum aviculare* 7(+); *Arabidopsis thaliana* 9(+); *Thlaspi arvense* 9(+); *Vicia angustifolia* 9(+); *Avena fatua* 9 (r); **V** – *Arenaria serpyllifolia* 1(+), 3(+); *Taraxacum officinale* 3(+), 5(+); *Veronica arvensis* 3(+), 8(+); *Medicago lupulina* 4(+), 6(+); *Galeopsis bifida* 5(1), 10(+); *Galium spurium* 6(+), 9(+); *Urtica urens* 1(+); *Leucanthemum vulgare* 1(+); *Tussilago farfara* 1(+); *Amaranthus hybridus* 2(1); *Trifolium repens* 2(+); *Poa annua* 2(+); *Rorippa sylvestris* 2(+); *Melilotus officinalis* 4(+); *Malva sylvestris* 5(+); *Malva neglecta* 5(+); *Potentilla anserina* 5(+); *Elsholzia ciliata* 6(+); *Mentha arvensis* 10(+); *Plantago major* 10(+); *Ballota nigra* 10(r).

Comments: numbers after species names inform about the relevé number in the table, z.n – withered top leaves

## DISCUSSION

In root crops, on compact soils of the Podlaski Przełom Bugu mesoregion, there were observed plots of communities classified as *Polygono-Chenopodium polyspermi*. This calciphilous alliance is represented by: *Lamio-Veronicetum politae*, *Oxalido-Chenopodietum polyspermi* and *Galinsogo-Setarietum*. Little plots of these phytocoenoses were rarely observed in the investigated area. It is a result of a little proportion of wheat soil complexes, abundant in nutrients and CaCO<sub>3</sub>, in that area. More often, plots of intermediate communities between *Panico-Setarion* and *Polygono-Chenopodium polyspermi* alliances as well as communities of the *Panico-Setarion* alliance are observed in root crops of the study area.

The thermophilous and calciphilous association *Lamio-Veronicetum politae* was usually noted on typical black and deluvial soils. These phytocoenoses are floristically rich, but poorer than similar associations reported in other regions of Poland, e.g. Kraków Jurassic area (Kornaś, 1950), Opole region (Michalak, 1972), Częstochowa Upland (Wnuk, 1989). The most characteristic species: *Veronica polita*, *Veronica agrestis* and *Veronica opaca*, are considered to be rare in many regions of Poland (Warcholińska, 1998; Szmeja, 1998; Korczyński, 1998). The first two mentioned species were relatively frequently noted in the Podlaski Przełom Bugu mesoregion, whereas *Veronica opaca* was more rarely observed. The identified phytocoenoses represent a northern Polish variety of the association, with a large proportion of *Veronica agrestis* and only a small participation of typical calciphilous species from the *Caucalidion lappulae* alliance (Wnuk, 1987). Only a few species from that group were recorded: *Melandrium noctiflorum*, *Avena fatua*, *Aethusa cynapium*. On the other hand, *Veronica polita* – a species typical for the south-central Polish variant – was noted frequently and abundantly.

Plots of *Oxalido-Chenopodietum polyspermi* were also rarely observed. Typical phytocoenoses of the association used to develop on fertile and wet alluvial soils along the large rivers (Anioł-Kwiatkowska, 1990; Wójcik, 1998, 2001; Matuszkiewicz, 2001). In the area of the Podlaski Przełom Bugu mesoregion, the association was also noted on black soils in the Bug river valley and along its tributaries. The phytocoenoses are floristically rich (on average 33 species), richer than those investigated by Wójcik (1998) in the Przemyśl Foothills and Węgrzynek (2006) in the Silesian Upland and poorer than the communities described by Wójcik (1980) from the middle Vistula river valley. The phytocoenoses recorded in the area of the Podlaski Przełom Bugu mesoregion are similar in floristic composition to the communities described by Wójcik (2001) from the Polish

Lowlands. A little proportion of species characteristic for *Panico-Setarion*, with the exception of *Echinochloa crus-galli*, is characteristic for them. *Symphytum officinale* – a distinguishable species for the association in the river valleys of the southern Poland – was also recorded rarely (Wójcik, 2001).

Typical plots of *Galinsogo-Setarietum* were noted only in the vicinity of farms in the area of the Podlaski Przełom Bugu mesoregion. They were floristically the poorest phytocoenoses on compact soils; however, cover weed was very high. These communities were species richer than those reported by Warcholińska (1987) and Anioł-Kwiatkowska (1990), but floristically poorer than the association distinguished in the Silesian Upland by Węgrzynek (2006). Similarly as in other regions of Poland, *Galinsoga parviflora* was the dominant species in the studied phytocoenoses. Due to a large similarity of these phytocoenoses to *Echinochloa-Setarietum*, a group of authors question the phytosociological distinctiveness of the association, including it in the ruderal variant of *Echinochloa-Setarietum* (Siciński, 2003).

Intermediate plots between *Panico-Setarion* and *Polygono-Chenopodium polyspermi* were frequently observed in the area of the Podlaski Przełom Bugu mesoregion. These phytocoenoses were distinguishable by the mass occurrence of *Echinochloa crus-galli* and the presence of a group of species characteristic for the *Polygono-Chenopodium polyspermi* alliance, e.g. *Euphorbia helioscopia*, *Sonchus asper*, *Veronica agrestis*. Intermediate phytocoenoses developing in root crops were rarely described, e.g. by Kornaś (1950) from the Kraków Jurassic area, Kozak (2002) from the Woźniki-Wieluń Upland, Skrajna and Skrzyczyńska (2008) from the Kałuszyn Upland. Phytocoenoses of *Echinochloa-Setarietum typicum* – subvariant with *Veronica persica* (*Panico-Setarion* alliance) with a large proportion of species characteristic for the *Polygono-Chenopodium polyspermi* alliance – were also frequently noted. In floristic composition, they were similar to *Echinochloa-Setarietum veronicetosum persicae* described from the Przemyśl Foothills by Wójcik (1998), however they differ in the absence of neutro- and basophilous species characteristic for cereal associations (*Lathyrus tuberosus*, *Avena fatua*, *Papaver rhoeas*), and numerous occurrence of *Lamium purpureum*.

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**Zbiorowiska roślinne  
pól uprawnych Podlaskiego Przełomu Bugu  
Cz. VI. Zbiorowiska upraw okopowych  
gleb ciężkich**

**Streszczenie**

Praca obejmuje analizę zbiorowisk upraw okopowych wykształcających się na glebach ciężkich. Jest to kolejna część charakterystyki zbiorowisk Podlaskiego Przełomu Bugu. Badane fitocenozy



wyróżniono na podstawie 103 zdjęć fitosocjologicznych wykonanych metodą Braun-Blanquet'a. W analizowanych siedliskach spotykano płaty zespołów ze związku *Polygono-Chenopodion polyspermi*: *Lamio-Veronicetum politae*, *Galinsogo-Setarietum* i *Oxalido-Chenopodietum polyspermi*. *Lamio-Veronicetum* i *Oxalido-Chenopodietum*. Są to zbiorowiska notowane rzadko i na niewielkich powierzchniach na badanym terenie ze względu na niewielki udział odpowiednich siedlisk. *Oxalido-Chenopodietum* na terenie Podlaskiego Przełomu Bugu wykształcał

się w dolinach cieków wodnych na żyznych madach i równie często na czarnych ziemiach. Typowe płaty *Galinsogo-Setarietum* z masowym występowaniem *Galinsoga parviflora* spotykano jedynie w pobliżu zabudowań wiejskich. Dość często natomiast w uprawach okopowych na glebach zwięzłych wykształcały się płaty zbiorowisk pośrednich między związkami *Panico-Setarion* i *Polygono-Chenopodion polyspermi* oraz *Echinochloo-Setarietum typicum* w podwariancie z *Veronica persica* i *Echinochloo-Setarietum fumarietosum*.

