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DIFFERENTIATION OF SEGETAL COMMUNITIES IN THE AREA OF BOTANICAL GARDEN IN POWSIN

Zróżnicowanie zbiorowisk segetalnych na terenie Ogrodu Botanicznego PAN w Powsinie

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SUMMARY

The phytosociological classification and characteristics of communities accompanying collections of both ornamental plants and rye cultivations in Botanical Garden in Powsin are presented in the paper. The occurrence of two associations *Papaveretum argemones* and *Galinsogo-Setarietum* as well as impoverished community of *Polygono-Chenopodion* alliance was recorded. Trophy and humidity differentiation of habitats affects floristic diversity of communities, which were classified to lower syntaxonomic units. Three subassociations and two variants were distinguished within the *Papaveretum argemones* association. The impoverished community was divided into three forms.

INTRODUCTION

Changes in the vegetal cover of Poland, observed in the last years, also relate to segetal vegetation. A dynamic agriculture development, changes in structure of land use and methods of cultivation cause destabilisation of floristic composition of communities, their impoverishment and simultaneously, in some areas, their mass occurrence (Hołdyński 1991; Warcholińska 1998; Domańska, Wójcik 1974; Szotkowski 1989). Therefore more and more attention is paid to segetal communities (Korniak 1992, Kuźniewski 1996, Skrzyczyńska 1994, Siciński 2003, Warcholińska 1987, Węgrzynek 2005, Wójcik 2000, Trąba, Ziemińska-Smyk 2006). The species-richest segetal communities are found in areas where traditional (extensive) methods of cultivations are preferred. The list of endangered weed species was published by Warcholińska (1994). A numerous papers indicate the necessity of monitoring or protection of the most threatened species and segetal communities. Some suggestions for cultivation of species in botanical gardens and heritage parks (Ratyńska, Boratyński 2000) were also submitted.

The main aim of the paper is an attempt of phytosociological classification and characteristics of communities occurring in collections of Botanical Garden in Powsin.

MATERIAL AND METHODS

Studies on segetal vegetation were carried out between 2006 and 2007 in the area of Botanical Garden in Powsin. During investigations phytosociological records were made according to Braun-Blanquet method (Pawłowski 1972). A criterion for selection of studied areas was presence of well developed, homogeneous vegetation plots. Phytosociological records were completed twice – in early spring (early-spring aspect) and in full vegetation season.

The observations were made in the following collections of cultivated plants: bulbous, ornamental plants (tulips, narcisses), perennials, herbs, perennials and low ornamental bushes, roses, rye, *Aegilops*, vegetables. Rose seed-plots, field margins, one-year-old fallow lands and two-year-old apple-tree nursery was also taken into consideration (0,2 ha in total).

Collections of ornamental plants and herbs has remained at the same place for many years, whereas rye and vegetable cultivations were subjected to 2-3-year rotation period.

The total of 54 phytosociological records were made in the area of Botanical Garden. Phytosociological classification of phytocenoses was made according to Matuszkiewicz (2001), nomenclature of vascular plants was accepted after Mirek et. al. (2002).

RESULTS

The systematics of the distinguished associations and communities

Class: *Stellarietea mediae* R. Tx., Lohm. et Prsg. 1950
Order: *Centauretalia cyani* R. Tx. 1950
Alliance: *Aperion spicae-venti* R. Tx. Et J. Tx. 1960
1. Association: *Papaveretum argemones* (Lib. 1932) Krusem. et Vlieg. 1939
   Subassociation: *Papaveretum argemones sperguletosum*
   Subassociation: *Papaveretum argemones typicum*
   a) typical variant
   b) ruderal variant
   Subassociation: *Papaveretum argemones fumarietosum*
   Order: *Polygono-Chenopodietalia* (R. Tx. Et Lohm. 1950) J. Tx. 1961
   Alliance: *Polygono-Chenopodion* Siss. 1946
2. Association: *Galinsogo-Setarietum* (R. Tx. Et Beck. 1942) R. Tx. 1950
3. Impoverished communities of *Polygono-Chenopodion* alliance
   a) impoverished form
   b) form with *Papaver rhoeas*
   c) form with *Atriplex nitens*

A review and description of the distinguished associations and communities

Papaveretum argemones (Lib. 1932) Krusem. et Vlieg. 1939

The plots of the associations are frequently found in the area of Botanical Garden and are represented by 20 phytosociological records (tab.1). A well developed phytocenoses were recorded in the cultivations of winter rye, ornamental perennials, two-year-old apple-tree nursery and one-year-old fallow land. The association was observed on well-insolated areas, on sandy-clayey soils.

Plots of *Papaveretum argemones* are characteristic for their phenological separateness, clearly visible in the area of Botanical Garden. An early-spring aspect is easily distinguishable by presence of short-lived terophytes, e.g. commonly occurring *Arabidopsis thaliana* and frequently found *Veronica triphyllos* and *Veronica hederifolia* (fig. 1). A high occurrence constancy of *Erophila verna* is also observed. The presence of *Papaver argemone* is the most clearly visible in summer. A differentiation of habitat regarding soil fertility affects differences in floristic composition of the association, which was divided into few lower phytosociological units, *Papaveretum argemones sperguletosum, Papaveretum argemones typicum* typical variant and ruderal variant and *Papaveretum argemones fumarietosum*.

Fig. 1. *Papaveretum argemones fumarietosum* spring aspect
Ryc. 1. Aspekt wiosenny *Papaveretum argemones fumarietosum*

***Papaveretum argemones* (Libb. 1932) Krus.et Vlieg. 1939**																							Table 1.	
Subasocjacja	*sperguletosum*						*typicum*												*fumarietosum*					
Variant						Mean numbers of species within the picture	typowy					Mean numbers of species within the picture	ruderalny					Mean numbers of species within the picture						Mean numbers of species within the picture	Constancy in 20 pictures
No. of picture in table	1	2	3	4	5		6	7	8	9	10		11	12	13	14	15		16	17	18	19	20		
No. of picture in nature	9	7	31	32	12		28	3	42	44	10		15	26	13	24	33		30	1	6	14	46		
Date month	5	6	5	6	6		5	5	6	6	6		5	5	5	5	6		5	6	5	5	6		
Date year	2006	2006	2007	2007	2007		2006	2007	2007	2007	2007		2007	2007	2007	2007	2006		2006	2007	2007	2006	2006		
Range of cultivated plant over field in %	80	65	40	50	50		30	60	40	10	-		40	55	20	75	80		45	10	75	50	50		
Range of weeds over field in %	20	40	50	50	25		20	30	30	30	30		60	40	40	30	20		50	30	25	50	25		
Numbers of species within the picture	21	19	17	18	16	18	18	20	16	22	19	19	31	38	29	26	22	29	20	28	21	39	21	26	
Cultivated plants	narcisses	irys	rye	rye	Aegilops		lilie	tulips	rye	apple-tree nursery	narcisses		tulips	tulips	tulips	tulips	perennials		rye	apple-tree nursery	tulips	tulips	Aegilops		
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
						n						n						n						n	S
I. Ch. D. *Papaveretum argemones*																									
Papaver argemone	1	2	+	+	+	5	1	1	1	1	1	5	2	2	+	1	+	5	+	1	1	2	1	5	V
Arabidopsis thaliana	1	+	2	3	1	5	1	+	+		1	4	+	1	1	+		4	3		2	2	1	4	V
Veronica hederifolia	+				1	2	2	3	1		+	4	+	+	1	2		4	+		+	1	1	4	IV
Veronica triphyllos	+				1	2							+	+				2	1		1		1	3	II
II. D *P.a. sperguletosum*																									
Spergula arvensis	1	1	1	1	+	5																	+		II

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
Raphanus raphanistrum			1	+	+	3														+	+		+		II
Scleranthus annuus	+		+			1																			I
Rumex acetosella		+	+	+		2			+			1													I
III. D var. z *Descurainia sophia*																									
Descurainia sophia						1							2	2	1	1	1	5		+	+	+		3	III
Sisymbrium officinale						1							1	1				2				+			I
Aethusa cynapium													+	+	+	+		4		+	+	+			II
IV. Ch. D. *P. a. Fumarietosum*																									
Fumaria officinalis																			1	1	+	+	1		II
V. Ch. *Stellarietea mediae*																									
Stellaria media	1	2	+	+		4	1	2	1	1	3	5	2	1	2	1	1	5	2	1	1	1		4	V
Capsella bursa-pastoris			1	+		2	+	1	+	+	+	5	1	+		1		3	1	+	+	2		4	IV
Viola arvensis	+	+	+	+	+	5	+	+	+	+	+	5		1		+		2	+	+		+	+	4	IV
Chenopodium album				+		1	+	+		+	+	4	+	+		+	+	4		+	+	+	+	4	IV
Fallopia convolvulus		+	+	+		3				+	1	2	+	1				2	+	+		+		3	III
Lamium purpureum	+			+	+	3								+	+	+	+	4	1		1	+	+	3	III
Lamium amplexicaule			+		+	2					+	1	+		+		+	3	1	+		+	+	3	III
Vicia angustifolia	1	+				2				+		1	+	+		+	+	4		+	+			2	III
Papaver rhoeas													+	r				2		+	+	+			II
Vicia hirsuta	+					1			+			1				+	+	2				+			II
Geranium pusillum		+				1					1	1			+		+	2			+	+			II
Polygonum aviculare			+	+		2	+					1									+	+			II
Matricaria maritima sp. inodora			+			1								+		+		2	r			+			II
Conyza canadensis							+					1		+		+	+		r						II
Veronica persica				+		1				+		1	+		+					+					II
VI. Accompanying species																									

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
Poa annua	+	+	1		1	4	+	+	+	+		4	+	+	+		+	4	1	+	+	+	1	5	V
Veronica arvensis		+				1	+	+	+	+	+	5	+	+		+	+	4		+		+		2	III
Agropyron repens	+					1			1	+		2		+	+		+	3	+	+	+			3	III
Equisetum arvense		+				1	+	+				2			+			1				+		1	III
Arenaria serpyllifolia		+			+	2		+	+			2	1	+	+		+	4				+	+	2	III
Taraxacum officinale		+				1	+	+	+		+	4		+	+		+	3			+	+		2	III
Erophila verna	+	+			1	3	+	+				2		+	1	+		3			+	1	1	3	III
Convolvulus arvensis	+					1	+	+			+	3			+		+	2							III
Galium aparine								+				1	+	+	+					+		+			II
Myosotis stricta	+		1		+	3							1						1			+	+		II
Cerastium holosteoides	+				+	2					+	1		+	+		+		+				+		II
Erodium cicutarium			+	+	+	3																+	+		II
Oxalis stricta									+	+		2				+				+		+			II

Sporadic species: V - Sonchus oleraceus 9(+), 12(+), 17(+), 19(+); Solanum nigrum 9(+), 13(+), 17(+), 20(+); Sinapis arvensis 10(+), 12(+), 14(+), 16(+); Erysimum cheiranthoides 11(+), 12(1), 13(1); Myosotis arvensis 4(+), 8(+), 12(+); Anthemis arvensis 3(+), 19(+); Anagallis arvensis 9(+), 17(+); Euphorbia heliocsopia 9(+), 17(+); Sonchus arvensis 17(+), 19(+); Atriplex patula 11(+); Geranium dissectum 1(+); VI – Trifolium repens 1(+), 11(+), 14(+), 18(+); Juncus bufonius 3(+), 4(+), 15(1), 16(+); Chamomilla suaveolens 5(+), 11(+), 12(+), 20(+); Asperugo procumbens 6(+), 11(+), 12(+), 13(+); Melandrium album 2(+), 8(+), 17(+); Sagina procumbens 3(+), 5(+),20(+); Potentilla anserina 9(+), 10(+), 17(+); Plantago major 10(+), 12(+); Arctium lappa 9(+), 13(+), 17(+); Cirsium arvense 7(+), 12(+), 13(+); Chenopodium urbicum11(+), 12(+), 19(+); Chamomilla recutita 8(+), 12(+), 19(+); Senecio vulgaris 11(+), 15(+), 19(+); Carex hirta 2(+), 7(+); Polygonum persicaria 9(+), 17(+); Urtica urens 9(+),17(+); Agrostis vulgaris 5(+), 20(+); Leontodon autumnalis 11(+), 13(+); Trifolium dubium 11(+), 15(+); Lactuca serriola 14(+), 18(+); Cerastium arvense 13(+), 19(+); Cerastium semidecandrum 1(+); Holosteum umbellatum 6(+), 11(+); Artemisia campestris 12(+), 19(+); Rorippa sylvestris 15(+), 18(+); Alium vineale 2(+); Poa palustrisis 2(+); Gagea lutea 13 (1); Lathyrus tuberosus 6(+); Artemisia vulgaris 7(+); Euphorbia falcata 7(+); Lathyrus pratensis 7(+); Senecio vernalis 14(+); Daucus carota 10(+); Ranunculus repens 12(+); Arctium lappa 12(+); Trifolium arvense 14(+); Atriplex nitens 14(+); Galeopsis tetrahit 14(+); Bromus hordeaceus 15(+); Tragapogon pratensis 15(+); Myosurus minimus16(+); Lotus corniculatus19(+); Veronica verna 19(+); Arctium minus19(+):

Coments: numbers after of species inform about numbers of picture in the table: S- phitosocjological constancy, n – numbers of occurrences

Fig. 2. *Papaveretum argemones typicum* on field margin
Ryc. 2. *Papaveretum argemones typicum* na obrzeżu pola

Fig. 3. *Papaveretum argemones typicum* in rye collection
Ryc. 3. *Papaveretum argemones typicum* w kolekcji żyta

The association of *Papaveretum argemones sperguletosum* was usually observed in the rye and *Aegilops* cultivations. A frequent occurrence of acidophilus species, e.g. *Spergula arvensis, Raphanus raphanistrum, Rumex acetosella* and *Scleranthus annuus* was characteristic for that community. The association formed the species-poorest plots of the association. They were build of 47 species and the mean number of species per record was 18.

The association of *Papaveretum argemone typicum* was noted on slightly more fertile habitats and was distinguishable by higher cover of diagnostic species (Fig. 2,3). The phytocenoses of the typical variant were composed of 49 species, on average 19 species in one record. The richest floristically were the plots of the ruderal variant. They were build of 66 species, on average 29 species in one record. A characteristic feature of these plots was a significant share of ruderal species, e.g., *Descurainia sophia*, *Sisymbrium officinale* and *Aethusa cynapium.*

The association of *Papaveretum argemones fumarietosum* was observed at the most fertile habitats, and was distinguishable by large participation of *Fumaria officinalis*. These phytocenoses were floristically rich and were composed of 65 species, on average 26 in one plot. *Galinsogo-Setarietum* (R. Tx. Et Beck. 1942) R. Tx. 1950.

Plots of the association were recorded mainly in collections of vegetables (*Brassicaceae, Cucurbitaceae*) and in close proximity of these cultivations, on periodically lying fallow fields (tab. 2). They were developing on water-rich, very fertile habitats, sometimes fertilized with mineral fertilizer. From among species characteristic for the association *Galinsoga parviflora* was the most common. Moreover a large share of *Galinsoga ciliata* was observed, whilst *Euphorbia peplus* was noted less frequently. A large number of nitrophilous species, e.g., *Lamium amplexicaule*, *Lamium purpureum*, *Solanum nigrum*, *Chenopodium album*, *Stellaria media* and nitrophilous species, as, *Portulaca oleracea*, *Echinochloa crus-galli* and *Amaranthus retroflexus* reached high constancy and cover in plots of that association.

Plots of *Galinsogo-Setarietum* belong to most floristically rich phytocenoses found in the collections of Botanical Garden. Totally 66 weed species were found in 7 plots of the associations, on average 32 in one plot.

Galinsogo-Setarietum (R.Tx. et Beck. 1942) R. Tx. 1950								Table 2
No. of picture in table	1	2	3	4	5	6	7	Mean numbers of species within the picture
No. of picture in nature	48	49	50	51	53	52	54	
Date: month	7	8	7	9	7	7	7	
year	2007	2006	2007	2006	2007	2007	2007	
Range of cultivated plant over field in %	60	55	70	60	50	70	50	
Range of weeds over field in %	40	20	40	20	30	25	30	
Numbers of species within the picture	28	32	30	31	35	35	34	32
Cultivated plants	Peonia	Calandula	brasisa	dahlia	cucumis	roses	Peonia	
1	2	3	4	5	6	7	8	9
								S
I. Ch. *Galinsogo-Setarietum*								
Galinsoga parviflora	2	1	2	1	1	2	1	V
Galinsoga ciliata	1	+	1	1	+	1	+	V
Euphorbia peplus	+	+	+		+		+	IV

1	2	3	4	5	6	7	8	9
II. Ch. *Polygono-Chenopodietalia*								
Lamium purpureum	+	+	+		+	+	+	V
Echinochloa crus-galli	1	1	1		+		+	IV
Geranium pusillum	+			+	+	+	+	IV
Solanum nigrum	+			+	+	+	+	IV
Chenopodium album	1	+	+		1		1	IV
Lamium amplexicaule	+	+			+	+	+	IV
Fumaria officinalis				+		+	+	III
Descurainia sophia	+				+		+	III
Sonchus oleraceus		+		+		+		III
Chenopodium polyspermum		+		+		+	+	III
III. Ch. *Stellarietea mediae*								
Stellaria media	1	1	+	1	1	1	1	V
Portulaca oleracea		1	2	1	1	1	+	V
Capsella bursa-pastoris		+	1	+	+	+	+	V
Vicia angustifolia	+	+		+	+	+	+	V
Sonchus arvensis	+	+	+	+	+	+	+	V
Thlaspi arvense			+	+		+	+	III
Arabidopsis thaliana	+				+		+	III
Chaenorchinum minus			+	+		+		III
Vicia hirsuta	+				+	+	+	III
Veronica persica		+	+			+		III
Veronica arvensis	+		+		+		+	III
Matricaria maritima sp. inodora	+		+		+		+	III
Veronica persica			+	+		+		III
Sinapis arvensis			+	+		+		III
Sisymbrium loeselii	+	+			+		+	III
Conyza canadensis	+				+		+	III
Chenopodium glaucum		+		+		+		III
IV. Accompanying species								
Taraxacum officinale	+	+		+	+	+	+	V
Convolvulus arvensis	+	+		+	+	+	+	V
Juncus bufonius			+	+	+	+	+	IV
Poa annua	+	+	+		+		+	IV
Equisetum arvense	+			+	+	+	+	IV

1	2	3	4	5	6	7	8	9
Agropyron repens	1				1		1	III
Rorippa sylvestris		+		1		+		III
Myosotis stricta	+				+		+	III
Polygonum lapathifolium sp. lapathifolium	+		+		+		+	III
Chamomilla recutita		+	+	+		+		III
Lapsana communis	+	+			+		+	III
Hypochoeris radicata	+				+		+	III
Amaranthus retroflexus		1	+			+		III

Sporadic species: II – Atriplex patula 3(+), 6(+); Asperugo procumbens (5(+); Setaria pumila 5(+); Raphanus raphanistrum3(+); III – Euphorbia heliocsopia 2(+), 6(+); Viola arvensi 3(+), 6(+); Myosotis arvensis 4(+), 6(+); Descurainia sophia 4(+), 6(+); Erysimum cheiranthoides 4(+), 6(+); Anthemis arvensis 6(+); Veronica hederifolia 5(+); Veronica agrestis 3(+); Spergula arvensis 3(+); Fallopia convolvulus 2(+); Polygonum aviculare 5(+); IV – Galium aparine 2(+), 3(+); Trifolium repens2(+); Melandrium album3(+); Atriplex nitens 2(+); Senecio vernalis 2(+); Senecio vulgaris 2(+); Artemisia campestris 2(+); Daucus carota 2(+);
Comments – numbers after of species inform about numbers of picture in the table:
S – phitosocjological constancy

Fig. 4. Community with *Papaver rhoeas L.*
Ryc. 4. Zbiorowisko z *Papaver rhoeas L.*

Impoverished communities of *Polygono-Chenopodion* alliance Siss. 1946

A plots without species characteristic for field associations were quite frequently found at similar, moist and fertile habitats. The only diagnostic species were those characteristic for *Polygono-Chenopodion* alliance and higher phytosociological units (tab. 3). Simultaneously common weed species of a high trophy and humidity requirements, e.g., *Stellaria media*, *Chenopodium album*, *Lamium amplexicaule*, *Capsella bursa-pastoris*, were recorded constantly. The total of 27 phytosociological records, of which 10 represent impoverished form, 7 – form with *Papaver rhoeas* and 10 – form with *Atriplex nitens* were made in the area of Botanical Garden.

The impoverished plots were distinguishable by a very little share of diagnostic species of *Polygono-Chenopodion* alliance, which were noted with a little constancy and cover. The community was composed of 76 species, on average 23 in one record.

The form of community with *Papaver rhoeas* was developing in rose collections, two-year-old apple-tree nursery and its margins (tab. 4, fig. 4). The most characteristic feature of the community was *Papaver rhoeas*, reaching cover around 10%. The community was build up of 58 species, on average 25 species per record.

The ruderal form of community was distinguishable by presence of *Atriplex nitens* (cover 10-40% – tab. 5., fig. 5). A large share of *Descurainia sophia* and *Sisymbrium officinale* was also observed. The community was noted in ornamental perennials and rose collections. The phytocenoses were the most floristically rich among impoverished ones. They were composed of 87 species, on average 26 in one record.

Impoverished communities of *Polygono-Chenopodion* alliance											Table 3	
No. of picture in table	1	2	3	4	5	6	7	8	9	10	Mean number of species within the picture	
No. of picture in nature	37	8	11	16	19	17	18	47	40	41		
Date: month	6	5	5	5	5	5	5	7	5	7		
year	2007	2007	2007	2007	2007	2007	2007	2007	2007	2006		
Range of cultivated plant over field in %	60	55	70	40	70	65	65	40	15	50		
Range of weeds over field in %	30	30	25	30	30	20	20	25	60	15		
Numbers of species within the picture	25	18	20	25	27	24	19	24	28	17	23	
Cultivated plants	Irys	perenials	tulips	perenials	perenials	perenials	perenials	roses	roses	herbs		
1	2	3	4	5	6	7	8	9	10	11	12	13
											S	D
I. Ch. Polygono-Chenopodietalia												
Polygono-Chenopodion												
Chenopodium album			+		+	+	+	+	+	+	IV	70
Lamium amplexicaule				+				+	+	+	III	40
Lamium purpureum		+	+			+					II	30
Geranium pusillum	+	+					+				II	30
Fumaria officinalis					+			1	+		II	70
II.Ch.Stellarietea mediae												
Stellaria media	1	2	1	2	1	1	+	1	2	1	V	825

1	2	3	4	5	6	7	8	9	10	11	12	13
Veronica arvensis	+	+	+	+		+	+	+	1		IV	120
Viola arvensis	+	+	1	+	+	+	+	+			IV	120
Fallopia convolvulus	+	+	+	+		+	+	+	+		IV	80
Capsella bursa-pastoris	+		+	+	+	+	+	+			IV	70
Arabidopsis thaliana		+	+	2	2	1	1				III	420
Vicia angustifolia	+			+	+	+					III	40
Veronica hederifolia		+	+		1				+	+	III	90
Sonchus arvensis	+	+			+	+					II	40
Spergula arvensis		+				+				+	II	30
Euphorbia heliocsopia			+					+	+		II	30
Myosotis arvensis		+	+			r				+	II	20
Conyza canadensis	+		+	+			+				II	40
Chenopodium glaucum					r			+	+		II	20
III. Accompanying species												
Taraxacum officinale		+	+	+	+	+		+	+	+	IV	80
Poa annua	+		+	+	+	+	1	+		+	IV	120
Arenaria serpyllifolia	1			+	+	+	1			+	III	140
Agropyron repens	1				+	+	+		1		III	130
Rorippa sylvestris	+			r	+	+		+			III	40
Myosotis stricta				1	+	+	+		+		III	90
Erysimum cheiranthoides		+		r				+	1		III	70
Atriplex nitens					1			1	2		II	275
Erophila verna				2	1	+					II	225
Equisetum arvense	+	1		+			+				II	80
Cerastium vulgatum			1		+	+	+				II	80
Achillea millefolium	+				+	+		+			II	40
Galium aparine		+			+			+	+		II	40
Senecio vernalis		+			+	+					II	30

Gatunki sporadyczne: I – Descurainia sophia 5(+), 8(+); Atriplex patula 8(+), 9(+); Echinochloa crus-galli 1(+); Setaria glauca 1 (+); Solanum nigrum 3(+); Sonchus oleraceus 9(+); II – Polygonum aviculare 2(+), 4(+); Matricaria maritima sp. inodora 3(+), 10(+); Veronica persica 3(+), 9(+); Vicia hirsuta 4(+),7(+); Sinapis arvensis 8(+), 9(+); Anthemis arvensis 1(+); Veronica triphyllos 10(+); III – Rumex acetosella1 (1),10(+); Carex hirta 1(+),2(+); Lotus corniculatus 1(+), 4(+); Plantago major 3(+), 10(+); Convolvulus arvensis 1(+), 7(+); Cardaminopsis arenosa 5(+), 7(+); Linaria vulgaris 5(+), 6(+); Trifolium arvense 1(+); Polygonum amphibium 1(2); Trifolium dubium 1(+); Euphorbia falcata 3(+); Erigeron acris 3(+); Vicia cracca 4(r); Cerastium semidecandum 4(+); Senecio vulgaris 4(+); Lathyrus pratensis 4(+); Rumex acetosa 4(r); Asperugo procumbens 5(+); Gagea lutea 6(+); Juncus bufonius 8(+); Hypochoeris radicata 8(+); Echinocystys lobata 9(+); Agrostis vulgaris 9(+); Polygonum lapathifolium sp. lapathifolium 9(+); Bidens tripartita 9(+); Holosteum umbellatum 9(+); Chamomilla suaveolens10(+); Galeopsis pubescens10(+); Trifolium repens 10(+); Melandrium album 9(+);

Comments: numbers after of species inform about numbers of picture in the table:

S – phitosocjological constancy, D – coverage factor

Communities of *Papaver rhoeas*								Table 4
No. of picture in table	1	2	3	4	2	6	7	Mean numbers of species within the picture
No. of picture in nature	35	43	45	39	2	4	5	
Date: month	6	6	6	6	6	7	7	
year	2006	2007	2007	2007	2007	2007	2007	
Range of cultivated plant over field in %	50	10	55	65	10	-	-	
Range of weeds over field in %	50	40	35	30	30	20	25	
Numbers of species within the picture	22	24	32	24	26	22	24	25
Cultivated plants	roses	apple-tree nursery	roses	roses	apple-tree nursery	field margins	field margins	
1	2	3	4	5	6	7	8	9
								S
Papaver rhoeas	1	1	1	1	1	1	1	V
II. *Polygono-Chenopodietalia*								
Polygono-Chenopodion								
Chenopodium album	1	1	1	1	+	1	+	V
Lamium amplexicaule		1		+	+	+		III
Lamium purpureum		+		+	+			III
Chenopodium polyspermum	+			+		+		III
Fumaria officinalis	+		+	+				III
Galinsoga parviflora			1		+	+		III
Descurainia sophia	+			1			1	III
Matricaria maritima sp. inodora			+			+	+	III
II. Ch. *Stellarietea mediae*								
Stellaria media	1	1	1	1	1	+	+	V
Capsella bursa-pastoris	+	1	1	+	1	+	1	V
Anagallis arvensis	+	+	1		+	+	+	V
Viola arvensis		+	1	1	+		+	IV
Convolvulus arvensis	+	+			+	+	+	IV
Myosotis arvensis		+			+	+	+	III
Fallopia convolvulus		+		+	+	+		III
Thlaspi arvense		+		+	+		+	III
Lapsana communis		+			+		+	III
Vicia angustifolia			+			+	+	III
III. Accompanying species								
Poa annua	+	+	+		+	+	+	V

1	2	3	4	5	6	7	8	9
Cirsium arvense	+	+	+		+	+	+	V
Arenaria serpyllifolia		+		+	+	+	+	IV
Taraxacum officinale		+	+	+	+		+	IV
Lactuca serriola	+			+		+		III
Agropyron repens	+		+			+	1	III
Equisetum arvense	+	+		+	+			III
Chenopodium rubrum	+		+			+	+	III
Galium aparine			+			+	+	III
Ranunculus repens		+	+		+			III
Chenopodium urbicum	+		1	+				III
Urtica urens			+	+			+	III

Sporadic species: I – Atriplex patula 3(+), 5(+); Echinochloa crus-galli 1(+); Geranium pusillum 4(+); Sisymbrium officinale 3(+); 7(+); Sonchus oleraceus 1(1), 7(+); II –Vicia hirsuta 1(+), 6(+); Euphorbia helioscopia 4(+), 6(+); Sinapis arvensis 8(+), 9(+); III – Melandrium album 1(+), 7(+); Achillea millefolium 2(+), 5(+); Rorippa sylvestris 3(+), 5(+); Rumex acetosella 2(+), 5(+); Juncus bufonius 3(+), 5(+); Conyza canadensis 2(+), 5(+); Senecio vulgaris 3(+), 4(+); Chamomilla recutita 3(+), 7(+); Plantago major 3(+); Potentilla anserina 1(+); Arctium lappa 3(+); Oxalis stricta 4(+); Chenopodium glaucum 3(+), 4(+); Polygonum lapathifolium sp. lapathifolium 1(+), 3(+); Linaria vulgaris 1(+); Atriplex nitens 1(+); Amaranthus lividus 1(+), 3(+); Amaranthus retroflexus 3(1); Bunias orientalis 3(+); Malva alcea 3(+);
Comments: numbers after of species inform about numbers of picture in the table: n – number of occurrences, S – phitosocjological constancy

Fig. 5. Community with *Atriplex nitens* Schkuhr
Ryc. 5. Zbiorowisko z *Atriplex nitens* Schkuhr

Communities of *Atriplex nitens* Schkuhr.											Table 5	
No. of picture in table	1	2	3	4	5	6	7	8	9	10	Mean numbers of species within the picture	
No. of picture in nature	34	21	22	23	27	29	36	20	38	25		
Date: month	6	5	6	7	7	5	6	5	6	5		
year	2006	2007	2007	2006	2007	2007	2007	2007	2007	2007		
Range of cultivated plant over field in %	30	50	60	40	15	25	60	70	55	70		
Range of weeds over field in %	30	15	20	25	60	50	40	30	35	30		
Numbers of species within the picture	18	17	19	24	28	34	24	27	39	28	26	
Crop plant	roses	perennials	perennials	roses	roses	roses	perennials	perennials	roses	perennials		
1	2	3	4	5	6	7	8	9	10	11	12	13
											S	D
I. Communities of *Atriplex nitens*												
Atriplex nitens	1	1	1	1	3	2	1	1	1	1	V	950
Descurainia sophia	1	1	1	+	2	2		+		+	IV	540
Sisymbrium officinale					1		+		+		II	70
II. Ch. *Polygono-Chenopodietalia*												
Chenopodium album	+	+	1	+	+	+	2	+	1	+	V	345
Lamium amplexicaule	1	+	1	1	+		1	1	1	+	V	330
Lamium purpureum		+	1	+	+	+		+	+	+	IV	120
Fumaria officinalis			+	1	+	+		+	+		III	100
Geranium pusillum	+					+				+	III	30
Atriplex patula				+	1				1		II	110
Sonchus oleraceus					+	+			+	+	II	40
Chenopodium polyspermum								+	+	+	II	30
III. Ch.*Stellarietea mediae*												
Stellaria media	1	1	1	1	3	1	1	1	1	1	V	825
Capsella bursa-pastoris	+		+			+	1	+	1	+	IV	150
Chenopodium glaucum			+	+		1	+	+	+	+	IV	110
Fallopia convolvulus	+			+	+		+	+		+	III	60
Matricaria maritima sp. inodora	+	+					+	+	+	+	III	60
Vicia angustifolia	+					+		+	+	+	III	50
Sinapis arvensis				+	+		+	+		+	III	50

1	2	3	4	5	6	7	8	9	10	11	12	13
Sonchus arvensis						+		+	+	+	III	40
Veronica hederifolia			+			+		1		1	II	120
Viola arvensis	+			+					1		II	70
Anagallis arvensis								+	1	+	II	70
Veronica persica					+			+		+	II	30
IV. Accompanying species												
Erodium cicutarium				+	+	1	1	r	+	r	IV	130
Poa annua	+	+	+	+		1		+	+	+	IV	120
Erysimum cheiranthoides				+	1			+	+	+	III	90
Galium aparine			+	+	+	+		+	+	+	IV	70
Taraxacum officinale		+	+	+	+			+	+	+	IV	70
Rorippa sylvestris	+			+		1	+	+		+	III	100
Agropyron repens					1	+		+	+	+	III	90
Myosotis stricta	1				+	+		+		+	III	90
Veronica arvensis				+	1	+				+	II	80
Chamomilla recutita	1							+	+	+	II	80
Polygonum persicaria	1					+	+				II	70
Arctium lappa							+	+	+	+	II	40
Arenaria serpyllifolia	+	+						+		+	II	40
Asperugo procumbens			+				+	+		+	II	40
Senecio vernalis						+		+		+	II	30
Achillea millefolium				+				+		+	II	30
Polygonum lapathifolium sp. lapathifolium					+	+			+		II	30
Hypochoeris radicata	+			+			+				II	30
Melandrium album			r		+	+					II	20

Sporadic species: II – Galinsoga parviflora 7(+), 9(+); Raphanus raphanistrum 6(1); Solanum nigrum 3(+); III – Myosotis arvensis 2(+), 6(+); Arabidopsis thaliana 8(1), 10(1); Papaver rhoeas 9(r); Vicia hirsuta 3(1); Galeopsis tetrahit 1(+); Spergula arvensis 1(+), 2(+); Euphorbia heliocsopia 4(+), 5(+); Oxalis stricta7(+); IV – Plantago major 2(+), 9(+); Cerastium holosteoides 8(+), 9(+); Galium spurium 8(+), 9(+); Juncus bufonius 4(+), 7(+); Chamomila suaveolens 2(+), 6(+); Erophila verna 8(1), 10(1); Bidens tripartita 5(+); Aethusa cynapium 8(+), 10(+); Galeopsis pubescens 2(+), 6(+); Trifolium pratense 6(+), 8(+); Senecio vulgaris 6(+), 9(+); Linaris vulgaris 8(+), 10(+); Urtica urens 6(+), 9(+); Amaranthus retroflexus 7(1), 9(1); Hyoscyanus niger 6(+), 10(+); Erodium cicutarium 6(1); Chenopodium rubrum 9(+); Cirsium arvense 9(+); Convolvulus arvensis1(+); Trifolium repens 2(+); Equisetum arvense 6(+); Holosteum umbelatum 5(+); Rumex acetosella 2(+); Echinocystys lobata 5(+); Ranunculus repens 9(+); Conyza canadensis 7(+); Rumex acetosa 7(+); Agrostis vulgaris 5(+); Artemisia campestris 9(+); Arctium minus 9(+); Urtica dioica 6(+); Sisymbrium loeseli 7(+); Bunias orientalis 9(+); Malva alcea 9(+);
Comments: numbers after of species inform about numbers of picture in the table: S – phitosocjological constancy, D – coverage factor

DISCUSSION

The changes in agriculture, widely interpreted chemisation and control of seed material purity eliminate numerous weed species from agrocenoses (Szotkowski 1981). A specific cultivation conditions in the area of Botanical Garden, as, cultivation of inbred lines and local races of rye, characterised by sowing single caryopses eliminated typical speriochores, e.g., *Agrostemma githago*, *Vicia tetrasperma*, *Vicia villosa*, *Centaurea cyanus* and *Consolida regalis* from the floristic composition. That is why among identified syntaxons was not recorded the most common in Poland cereal association *Vicietum tetraspermae* (Warcholińska 1999). The plots of association *Papaveretum argemones* with abundant occurrence of characteristic species were noted quite frequently in the studied plots. The association is widely distributed in whole Poland on warm soils characterised by higher pH (Anioł-Kwiatkowska 1990; Kozak 2002; Skrzyczyńska 1994; Skrzyczyńska, Skrajna 2004; Szmeja 1994; Warcholińska 1998; Wójcik 2000; Wnuk 1989) however it was the most frequently recorded in southern and central part of our country (Anioł-Kwiatkowska 1990, Kutyna 1988). In the area of Botanical Garden its plots were observed (apart from rye cultivations) in untypical for the association places, e.g., among tulip cultivations and perennials. Also Ratyńska (2003) published untypical habitat for *Papaveretum argemones* along track-ways and communication routes. Floristically similar plots of *Papaveretum argemones* with participation of *Descurainia sophia* described Skrzyczyńska and Marciniuk from the agrocenoses of Siedlce city (2002) and Wnuk et. al. from Rzeszów (1989).

Collections of some vegetables (*Brassicaceae, Cucurbitaceae*) were accompanied by association *Galinsogo-Setarietum,* commonly found in back-yards (Matuszkiewicz 2001) and strongly related to well fertilised vegetable and root cultivations, situated in close proximity of buildings (also found in stubble fields). The association is distinguishable by mass occurrence of *Galinsoga parviflora* (Dobrzański 1996, Łabza 1996). In the area of studies the phytocenoses are distinguishable by large participation of *Portulaca oleracea*. There are numerous data on occurrence of association *Galinsogo-Setarietum* in other regions of Poland, e.g. from Lower Silesia (Anioł-Kwiatkowska 1974), from Trzebnickie Hills (Anioł-Kwiatkowska 1990), from Podlaski Przełom Bugu (Rzymowska 1999), from basin of middle Warta and Bzura rivers (Siciński 2003), from central Poland (Warcholińska 1987), from Silesian Upland (Węgrzynek 2005). Most fertile habitats in cultivations of perennials, roses, apple-tree nursery frequently occupy phytocenoses, that can by classified to *Polygono-Chenopodion* alliance only. Such impoverished segetal phytocenoses without characteristic species are found more and more frequently in field cultivations (Siciński 2003; Szotkowski 1981; Węgrzynek 2005; Wójcik 1980; Wnuk et. al. 1989).

STRESZCZENIE

W pracy przedstawiono klasyfikację fitosocjologiczną i charakterystykę zbiorowisk towarzyszących kolekcjom roślin ozdobnych i żyta w Ogrodzie Botanicznym w Powsinie. Stwierdzono występowanie dwóch zespołów: *Papaveretum argemones i Galinsogo- Setarietum* oraz zbiorowiska kadłubowego ze związku *Polygono-Chenopodion*. Zróżnicowanie troficzne i wilgotnościowe siedlisk obrazują zbiorowiska zróżnicowane florystycznie, które zakwalifikowano do niższych jednostek syntaksonomicznych. W obrębie *Papaveretum argemones* wyróżniono trzy podzespoły i dwa warianty, zbiorowisko kadłubowe zróżnicowano na trzy postacie.

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