This paper presents a description of segetal communities in potato crops cultivated in the Masovian Landscape Park. The communities were analysed based on 64 phytosociological relevés made at 45 localities. 4 associations were found in the study area, that is, Digitarietum ischaemi, Echinochloa-Setarietum, Galinsogo-Setarietum, and Lamio-Veronicetum polita. Phytocenoses representing the associations Digitarietum ischaemi and Echinochloa-Setarietum were most varied floristically. Lower syntaxonomical units were determined within these associations, that is, subassociations and variants. These phytocenoses were frequently found; they occurred in various habitats characterized by different trophic and moisture conditions. Patches of the association Lamio-Veronicetum polita were rare and they occurred only on fertile soils and on small areas.

Key words: root crops, weed communities, biodiversity of weeds, Mazowiecki Landscape Park

INTRODUCTION

The area under potato has fallen considerably over the last decade from 1250.4 (in 2000) to 388.3 th (in 2010) (GUS, 2011). This has resulted from changes in the cropping structure, increased fallow area, an unfavourable economic situation, and in the case of land in the vicinity of urban areas, the allocation of land for building development. As far as the Masovian Landscape Park is concerned, there is an additional element, that is, the land use structure: 70% of the area is covered by forest, whereas 11.3% is ploughed land. All the aforementioned factors have influenced potato cultivation in the Masovian Landscape Park causing its continuous decline. The areas cropped to potato are small and yields harvested are mainly used to meet the needs of households.

This paper presents the next study on phytocenoses established in crop plants in this area (Skrajna et al. 2009; Skrajna and Ługowska, 2010). The objective of the study was to analyse communities in potato crops against the background of various habitats under conditions of extensive farming in the Masovian Landscape Park area.

RESEARCH METHODS AND AREA

Observations of segetal communities in the Masovian Landscape Park area were conducted in the years 2003–2008. 64 phytosociological relevés were made by the Braun-Blanquet method (Pawlowski, 1972) in 45 localities (Fig. 1) within the Park and its buffer zone. During the field study, agricultural soil maps at a scale of 1:5000 were used to select sites for examination and to determine soil conditions. The factual material collected was analysed phytosociologically based on the rules suggested by Matuszkiewicz (2007). Species nomenclature followed Mirek et al. (2002).
Figure 1. Study area

a – borders of the Landscape Park; b – borders of the buffer zone; c – built-up areas; d – forest complexes; e – localities, study sites.

1 – Anielinek, 2 – Antoninek, 3 – Aleksandrówka, 4 – Augustówka, 5 – Bąki, 6 – Bocian, 7 – Brzezinka, 8 – Calowanie, 9 – Celestynów, 10 – Chrosna, 11 – Chrząszczówka, 12 – Czlekówka, 13 – Dąbrówka, 14 – Dąbrówka, 15 – Dyzin, 16 – Glima, 17 – Gózd, 18 – Grabianka, 19 – Janów, 21 – Jaźwiny, 22 – Karpiska, 23 – Kątik, 24 – Kęty, 25 – Komink, 26 – Kozłówka, 27 – Łukowiec, 28 – Ocznia, 29 – Osieck, 30 – Ostrowik, 31 – Podbiel, 32 – Pogorz, 33 – Porzyca, 34 – Radzyń, 35 – Regut, 36 – Rosłaniec, 37 – Rudnik, 38 – Stara Wieś, 39 – Stara Wieś II, 40 – Skorupy, 41 – Szatyn, 42 – Tabor, 43 – Warszówka, 44 – Zabieżki, 45 – Zawada.
RESULTS

Ten different types of phytocenoses, represented by subassociations and variants of 4 associations, were recognised in the Masovian Landscape Park.

Systematics of distinguished root crops communities

Class: *Stellarietea mediae* Tx., Lohm. et Prst. 1950
Order: *Polygono-Chenopodietalia* (R.Tx. et Lohm. 1950) J. Tx. 1961
Alliance: *Panico-Setarion* Siss. 1946

1. Association: *Digitarietum ischaemi* R. Tx. et Prsg (1942) 1950
   a. typical variant
   b. variant with a share of ruderal species
   c. variant with a share of wet species
2. Association: *Echinochloo-Setarietum* Kru-sem. et Vlieg. (1939) 1940
   Subassociation: *Echinochloo-Setarietum sperguletosum*
   Subassociation: *Echinochloo-Setarietum typicum*
   a. typical variant
   b. variant with a share of wet species
   c. variant with *Amaranthus retroflexus*
   d. variant with *Veronica agrestis*

Alliance: *Polygono-Chenopodion* Siss. 1946
1. Association: *Galinsogo-Setarietum* (R. Tx et Beck. 1942) R. Tx. 1950
2. Association: *Lamio-Veronicetum politae* Korná 1950

*Digitarietum ischaemi* R.
Tx. Et Prsg (1942) 1950

The association, of Sub-Atlantic character, occurred in the Park and its buffer zone. It was described on the basis of 17 phytosociological relevés. Altogether, there were recorded 71 species in all the examined patches of land (Table 1). Due to the great floristic diversity within this association, apart from the typical form, there was found a form characterised by the presence of ruderal and wet species. The appearance of the community was dominated by the typical species Digitaria ischaemum, with its percentage exceeding 60% in some patches.

Typical patches of this community developed on dry and poor soils. 42 taxa were found that were the poorest phytocenoses in the potato fields. The nature of the analysed phytocenoses was influenced by the group of acidophilous species representing the association *Panico-Setarion* and which included Rumex acetosella, Spergula arvensis, Scleranthus annuus, Setaria pumila and Raphanus raphanistrum.

Patches of this variant including ruderal species formed in small areas cropped to potato located adjacent to fallow land. This variant was distinguished because the community was characterised by a considerable share of ruderal species compared with other agrophytocenoses. Frequent components of the flora of this community were as follows: Artemisia vulgaris, Erigeron acer, Lactuca serriola, Tanacetum vulgare, Malva neglecta, Sisymbrium officinale.

On light loamy sands, representing different soil types belonging to the cereal-fodder poor soil quality complex, phytocenoses formed that included moisture-loving species. The variant with these species was distinguished based on 5 plant patches. They were slightly richer phytocenoses than the previous ones as 44 weed species were found. The nature of this community was defined, apart from the typical species, by moisture-loving species with shallow roots, the most numerous and most frequent species being Spergula arvensis, Gnaphalium uliginosum, Juncus bufonius, Sagina procumbens, and Plantago intermedia.

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

The association *Echinochloo-Setarietum* was characterised on the basis of 26 phytosociological relevés which comprised 114 weed species (Table 2). These phytocenoses were most frequently found in the examined fields. The diversity of habitats where the phytocenoses of this association developed influenced the heterogeneity of individual patches. Within the association, 2 subassociations and 3 variants were found. The whole association was influenced by the mass presence of its typical species, Echinochloa crus-galli, which reached a very high cover index (D=2567). In turn, Raphanus raphanistrum was most frequently found in *Echinochloo-Setarietum* typicum, in the remaining communities being found in parts of the patches only. Moreover, the common species in the association were Setaria pumila, Matricaria maritima subsp. indora, Chenopodium album, Stellaria media, Viola arvensis, Polygonum aviculare, and Polygonum lapathifolium subsp. lapathifolium.

Relevés 1 to 5 revealed communities of the most acidophilous character which were included in *Echinochloo-Setarietum sperguletosum*. Patches of this subassociation developed on different types of soils representing the good and poor rye soil quality complex. It was the floristically poorest community in the association *Echinochloo-Setarietum*. Only 39 weed species were found in it. The nature of the association was defined by 3 acidophilous species:
Spergula arvensis, Rumex acetosella, Scleranthus annuus.

Typical patches of the association were found on leached brown soils belonging to the very good and good rye soil quality complex. The community comprised 54 weed species. Apart from the species typical of this association, Matricaria maritima subsp. indora was a regular component of these phytocenoses, whereas Chenopodium album was the most frequent component of the syntaxa of this association.

The association Echinochloa-Setario-Tum, with a high share of wet species, was found on light and strong loamy sands representing degraded chernozems and aluvial soils. These were the richest phytocenoses in this association, represented by 73 weed species. The following were the most frequent and numerous species: Plantago intermedia, Gnaphalium uliginosum, Mentha arvensis, Ranunculus repens, Polygonum hydropiper.

Some patches of the association Echinochloa-Setario-Tum were characterised by a substantial share of Amaranthus retroflexus, which made it possible to classify these phytocenoses as a variant including this species. The community developed on various soils and was floristically abundant, as 70 species were found in 5 relevés. Numerous Amaranthus retroflexus plants in the communities were accompanied by other species, such as Stellaria media, Polygonum lapathifolium subsp. lapathifolium, and Senecio vulgaris, which is indicative of high soil nitrogen content in these habitats. The analysed phytocenoses comprised a small number of wet species.

Communities representing Echinochloa-Setario-Tum with Veronica agrestis established on trophically rich and well-moistened fertile soils. The phytocenoses were characterised by a high share of species of the alliance Polygono-Chenopodion, of which Veronica persica, Lamium purpureum and Euphorbia helioscopia were regular components.

Galinsogo-Setario-Tum
(R. Tx et Beck. 1942) R. Tx. 1950

Patches of the association Galinsogo-Setario-Tum developed on leached brown soils which were well fertilised and in good tilth. These phytocenoses were most frequent in the Park’s buffer zone, mainly in the proximity of buildings. The association was described based on 10 phytosociological relevés which were floristically rich communities. There were found 76 species in all the examined patches, the average number of species per relevé being 25 (Table 3). The regular components of the phytocenoses were species typical of the association, of which Galinsoga parviflora had a very high cover index. The analysed patches were characterised by a high share of the alliance Polygono-Chenopodion species, the most frequent being Lamium purpureum, Veronica persica, Euphorbia helioscopia and Matricaria maritima subsp. inodora. Moreover, the nature of the phytocenoses was also influenced by species belonging to higher syntaxonomic units which locally reached higher cover, that is, Chenopodium album, Stellaria media, Setaria pumila, Viola arvensis, and Anthemis arvensis.

Lamio-Veronicetum politae
Kornaś 1950

Patches of the association developed on fertile CaCO₃-rich soils of the good wheat soil quality complex. The association is found both in the Park and in its buffer zone. The phytocenoses were floristically rich as 82 weed species were recorded in 10 patches, the average number of species per relevé being 26 (Table 4). Of the typical species, Lamium amplexicaule was the most common component of this association, Veronica agrestis was less frequent, whereas Veronica opaca and Veronica polita occurred only in some plant patches. There was found a considerable group of the Polygono-Chenopodion alliance species, of which the most numerous species that reached the highest cover were: Veronica persica, Lamium purpureum, Chenopodium polyspermum, Euphorbia helioscopia and Oxalis fontana. In turn, common species of higher syntaxonomic units in the association included: Chenopodium album, Stellaria media, Anagallis arvensis, Chaenorchinum minus, Echinochloa crus-galli, Polygonum lapathifolium subsp. pallidum, and Aethusa cynapium.
### Table 1

*Digitarietum ischaemi* R. Tx. et Prsg (1942) 1950

| Subassociation | typicum | with ruderal species | with wet species |
|----------------|---------|----------------------|------------------|
| **Variant**    |         |                      |                  |
| Relevé no. in table | 1 2 3 4 5 6 7 | 8 9 10 11 12 | 13 14 15 16 17 |
| Relevé no.in field | 135 157 139 193 141 154 145 | 130 197 180 149 159 | 151 148 156 136 137 |
| Date: month | 8 8 8 9 8 8 8 | 8 9 8 8 8 | 8 8 8 8 8 |
| | year | .06 .07 .06 .08 .06 .06 .06 | .05 .08 .08 .06 .07 | .06 .06 .06 .06 .06 |
| Locality | 3 21 9 42 11 18 13 | 1 44 37 16 22 | 16 12 19 3 7 |
| Crop cover in % | 60 zn zn zn zn zn zn | zn zn zn zn zn zn | zn zn zn zn zn zn |
| Weed cover in % | 40 70 75 75 70 55 75 | 65 55 65 50 60 | 60 55 75 55 75 |
| **Soil unit** |         |                      |                  |
|               | 7Bw pl 7Bw pl 6Bw ps 6Bw ps 7Bw pl | 9Fpl:pp 6M ps 6Angpl 6Bwp:gl 5Bwp:psl | 9Fpw:plp 9Fpw:pp 9Fpw:pl 9Fpw:gl 9Fpw:gl |
| **Number of species per relevé** | 16 15 15 13 16 15 | 19 18 22 21 19 | 22 25 19 23 21 19 |

I. Ch.D. *Digitarietum ischaemi*

*Digitaria ischaemum* (Schreb.) Mühlenbg.

| Artemisia vulgaris L. | + | 1 + 2 1 + 1 5 + | 1 III 24 |
| Solidago canadensis L. | + | 1 1 + 4 | II 71 |
| Erigeron acris L. | + | 1 + 1 1 3 + | 1 II 53 |
| Malva neglecta Wallr. | + | 1 + 3 | + 1 II 47 |
| Lactuca serriola L. | + | 1 + + + 4 + | 1 II 35 |
| Tanacetum vulgare L. | + | 1 + + + + 4 | II 29 |
| Sisymbrium officinale L. | + | 1 + + + + 3 | II 24 |

II. D var. with ruderal species

*Polygonum hydropiper* L. | + | + | 2 2 2 2 | II 218 |
*Plantago intermedia* Gilib. | + | + | 2 2 2 2 | II 218 |
*Spergularia rubra* (L.) J. Presl & C. Presl | 1 1 2 + 1 5 | II 197 |
*Gnaphalium alpinum* L. | 1 1 + 1 + 5 | II 159 |
*Juncus bufonius* L. | + 1 1 2 + 3 | II 144 |
*Sagina procumbens* L. | + + 2 + 4 | II 121 |
*Phragmites australis* (Cav.) Trin. et Steud. | + 1 + + + + 4 | II 29 |
*Bidens tripartita* L. | + + 2 + + | II 24 |
### IV. Ch.D. Panico-Setarion, Polygono-Chenopodietalia

| Species                          | S | D | zn | Phytosociological constancy | Coverage Index |
|---------------------------------|---|---|----|------------------------------|----------------|
| *Scleranthus annuus* L.         | 1 | + | 2  | 1  | 2  | 5  | +  | +  | +  | 3  | +  | +  | +  | 4  | IV | 312 |
| *Setaria panida* (Poir.) Roem. & Schult. | + | 1 | +  | 2  | 5  | 2  | +  | +  | 3  | +  | 1  | +  | 4  | IV | 312 |
| *Rumex acetosella* L.           | 1 | + | 1  | 2  | 1  | +  | 7  | 1  | +  | +  | 3  | +  | +  | 2  | IV | 141 |
| *Spergula arvensis* L.          | 2 | + | 2  | 2  | +  | 5  | +  | 1  | 2  | +  | +  | +  | 3  | III| 276 |
| *Chenopodium album* L.          | + | + | +  | +  | +  | 3  | +  | +  | +  | 3  | +  | +  | +  | 4  | III| 59  |
| *Raphanus raphanistrum* L.      | 1 | + | 1  | 3  | 2  | +  | 2  | +  | 1  | II | 179 |
| *Setaria viridis* (L.) P. Beav. | + | 1 | +  | 1  | +  | 1  | +  | 1  | II | 47  |
| *Echinochloa crus-galli* (L.) P. B. | + | + | 2  | +  | 1  | +  | 1  | +  | 1  | II | 24  |
| *Capsella bursa-pastoris* (L.) Med. | + | + | +  | 3  | +  | 1  | II | 24  |

### V. Ch. Stellarietea mediae

| Species                          | S | D | zn | Phytosociological constancy | Coverage Index |
|---------------------------------|---|---|----|------------------------------|----------------|
| *Viola arvensis* Murr.          | + | + | +  | 3  | +  | +  | 1  | 3  | +  | +  | +  | 3  | III| 76  |
| *Fallopia convolvulus* (L.) A. Löve | + | + | +  | 1  | +  | 6  | +  | +  | 2  | III| 65  |
| *Conyza canadensis* (L.) Cron.  | + | + | +  | 3  | 1  | +  | +  | 3  | +  | 1  | III| 65  |
| *Polygonum aviculare* L.        | + | + | +  | 3  | +  | +  | 2  | +  | +  | +  | +  | 5  | III| 59  |
| *Anthemis arvensis* L.          | + | + | +  | 4  | +  | +  | 3  | III| 41  |
| *Centaurea cyanus* L.           | + | + | 2  | +  | 1  | +  | +  | +  | 3  | II | 35  |
| *Arnoseris minima* (L.) Schweigg. & Körte | + | 1 | +  | +  | +  | 3  | II | 24  |
| *Myosotis arvensis* (L.) Hill.  | + | 1 | +  | +  | +  | 3  | II | 24  |

### VI. Companions

| Species                          | S | D | zn | Phytosociological constancy | Coverage Index |
|---------------------------------|---|---|----|------------------------------|----------------|
| *Achillea millefolium* L.       | + | + | +  | 3  | +  | 1  | 1  | 3  | +  | +  | 2  | III| 65  |
| *Convolvulus arvensis* L.       | + | + | +  | +  | +  | 7  | +  | +  | 2  | III| 53  |
| *Erodium cicutarium* (L.) L’hér. | + | + | +  | 4  | +  | +  | 2  | +  | +  | 3  | III| 53  |
| *Veronica arvensis* L.          | + | + | +  | 5  | +  | +  | 2  | III| 41  |
| *Polygonum lapathifolium* L. subsp. lapathifolia | 1 | 2  | 2  | +  | +  | 2  | II | 144 |
| *Gnaphalium sylvaticum* L.      | + | + | 1  | 1  | +  | 2  | II | 71  |
| *Elymus repens* (L.) Gould      | + | + | 2  | +  | +  | +  | 3  | II | 29  |
| *Agrostis stolonifera* L.       | + | + | +  | 2  | +  | +  | 2  | II | 24  |

Sporadic species: **II** – *Datura stramonium* L. 8(r), 10(+) 12(+) *Torylis japonica* (Houtt.) DC. 10(+), 11(+) *Descarainia sophia* (L.) Weeb 11(+) 12(+) **III** – *Stachys palustris* L. 13(+) 14(+) 15(+) *Bidens frondosa* L. 14(+) 16(+) *Polygonym amphibium* L. 17(+) *Potentilla anserina* Borkh. 10(+) **IV** – *Polygonym lapathifolium* L. subsp. pallidum 5(+) 17(+) *Geranym pusillum* Burm. f. ex L. 14(+) 16(+) **V** – *Anthoxanthym aristatum* Boiss. 2(+) 4(+) 10 (+) *Stellaria media* (L.) Vill. 4(+) 6(+) *Vicia hirsuta* (L.) S.F. Gray 1(+) *Matricaria maritima* subsp. inadora (L.) Dostal 4(+) **VI** – *Terraxacum officinale* Wigg. 2(+) 8(+) 17(+) *Galeopsis ladanum* L. 1(+) 3(+) *Plantago lanceolata* L. 1(+) 17(+) *Holcus mollis* L. 3(+) 17(+) *Poa annua* L. 14(+) 16(+) *Epilobium roseum* Schreb. 14(+) 16(+) *Equisetum arvense* L. 14(+) 16(+) *Gypsophila muralis* L. 14(+) 16(+) *Cerastium holostoeoides* Fr. em Hyl. 1(+) *Cirsium arvense* (L.) Scop. 1(+) *Leontodon autumnalis* L. 3(+) *Holcus lanatus* L. 9(+) *Daucus carota* L. 9(+) *Veronica dilleni* Cr. 10(+) *Lotus corniculatus* L. 12(+) *Chamomilla suaveolens* (Pursh) Rydb. 13(+) *Erophila verna* (L.) Chevall. 14(+) 

Comments: numbers after species inform about the relevé in the table. S - phytosociological constancy, D - coverage index, zn - withered top leaves
| Subassociation | sperguletosum | typicum | with wet species | with Amaranthus retroflexus | with Veronica agrestis |
|----------------|--------------|---------|------------------|-----------------------------|-----------------------|
| Variant        |              |         |                  |                             |                       |
| 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 24 25 26 |
| Relevé no. in field | 158 152 192 164 177 | 191 196 131 142 134 | 178 133 183 195 170 168 | 132 194 179 161 172 | 187 166 171 167 175 |
| 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 |
| year            | .07 .06 .08 .07 .08 | .08 .05 .60 .05 | .08 .08 .08 .07 .07 | .06 .08 .07 .08 | .08 .07 .07 .07 .08 |
| Locality        | 22 17 40 29 37 | 39 44 1 11 2 | 37 1 37 44 33 31 | 1 43 37 24 34 | 38 29 33 29 35 |
| Cereop cover in % | 60 zn zn zn zn | 10 zn zn zn zn | zn 20 40 zn zn zn | zn 70 zn 50 zn zn | zn 10 zn zn zn zn |
| Weed cover in % | 65 90 90 80 95 | 85 60 95 60 65 | 100 60 75 85 80 | 100 60 100 70 60 | 80 65 80 70 65 |
| Soil unit       | 6Bw pgl.pl 6M pgl.pl 9M pgl.pl 5A pgl.gl 5Bw pgl.gl | 5Bw pgl.gl 5Bw pgl.gl 5Bw pgl.gl 5Bw pgl.gl 5Bw pgl.gl | 9Bw pgl.pl 8Dz pgl.pl 8Dz pgl.pl 8Dz pgl.pl 9M pgl.pl | 9M pgl.gl 9Bw pgl.gl 9Bw pgl.gl 9Bw pgl.gl 9Bw pgl.gl | 5Bw pgl.gl 2Bw gl 2Bw gl 2Bw gl 2Bw gl |
| Number of species per relevé | 22 19 22 20 22 n 25 24 23 24 21 n 30 24 26 28 30 27 n 27 27 29 27 26 n 25 27 26 26 31 n | 25 |

**Table 2**

Echinochloa-Setarietum Krusem. et Vlieg. (1939) 1940

| Subassociation | with wet species | with Amaranthus retroflexus | with Veronica agrestis |
|----------------|------------------|-----------------------------|-----------------------|
| I. Ch. Echinochloa-Setarietum |              |                             |                       |
| Echinochloa crus-galli (L.) P. B. | 2 4 3 3 3 5 | 2 2 3 2 4 5 | 3 2 1 2 3 3 6 2 2 1 2 3 3 6 2 2 1 2 5 3 2 1 2 2 5 | 2567 |
| Raphanus raphanistrum L. | + 1 1 1 1 1 | + 1 4 4 4 4 | + + + 2 + + + 2 | III 119 |

| Subassociation | with wet species | with Amaranthus retroflexus | with Veronica agrestis |
|----------------|------------------|-----------------------------|-----------------------|
| II. Ch. Echinochloa-Setarietum spargleutosum |              |                             |                       |
| Spergula arvensis L. | 2 1 2 2 2 5 | + 1 | + 1 | II 296 |
| Rumex acetosella L. | + 1 1 1 1 4 | + + 2 | II 69 |
| Scleranthus annuus L. | + + 1 4 + + 2 | | II 38 |

| Subassociation | with wet species | with Amaranthus retroflexus | with Veronica agrestis |
|----------------|------------------|-----------------------------|-----------------------|
| III. D var. with Amaranthus retroflexus |              |                             |                       |
| Amaranthus retroflexus L. | + 1 | 3 2 3 2 2 5 | + 1 | II 490 |

| Subassociation | with wet species | with Amaranthus retroflexus | with Veronica agrestis |
|----------------|------------------|-----------------------------|-----------------------|
| IV. D var. with Veronica agrestis |              |                             |                       |
| Veronica agrestis L. | + + 2 + | 1 1 2 2 1 5 | II 252 |
### V. D. var. with wet species

| Species                                | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. |
|----------------------------------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|
| Plantago intermedia                    | +          | 2           | +          | 1           | 2          | +           | 3          | 2           | 5          | +           | 1          | +           | 4          | III         | 315        |
| Mentha arvensis L.                     |            |             |            | 2           | 1          | +           | 3          | +           | 1          | +           | 4          | II          | 102        |
| Stachys palustris L.                   |            |             |            | +           | 1          | +           | 2          | 1           | 3          | +           | 4          | II          | 102        |
| Gnaphalium uliginosum L.               |            |             |            | +           | 1          | 1           | +           | 4          | +           | 1          | +           | 1          | +           | 4          | II          | 81         |
| Polygonum hydropiper L.                |            |             |            | 1           | +           | 1           | 4          | +           | 1          | +           | 1          | +           | 3          | II          | 62         |
| Bidens tripartita L.                   | +          | +           | 1          | 3          | +           | +           | 1          | +           | 3          | +           | 3          | II          | 62         |
| Ranunculus repens L.                   |            |             |            | 1          | +           | +           | 5          | +           | 1          | +           | 4          | II          | 38         |
| Potentilla anserina L.                 |            |             |            | +           | 2          | +           | 2          | +           | +           | +           | 4          | II          | 31         |

### VI. Ch. D. Panico-Setarion

| Species                                | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. |
|----------------------------------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|
| Setaria pumila (Poir.) Roem.&Schult.   | 1          | 1           | 4          | +           | +           | +           | 4          | +           | +           | +           | 4          | +           | 1          | IV          | 127        |
| Setaria viridis(L.) P. B.              | +          | +           | 2          | +           | 1           | +           | 4          | +           | +           | +           | 3          | +           | 1          | II          | 46         |

### VII. Ch. D. Polygono-Chenopodion

| Species                                | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. |
|----------------------------------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|
| Matricaria maritima subsp.              | +          | +           | 2          | +           | 3          | +           | 5          | 2          | +           | +           | 2          | 1           | +           | 6          | +           | 1          | 2           | 1           | +           | 3          | IV          | 398        |
| inodora (L.) Dostal                    |            |             |            |            |            |             |            |            |             |             |            |             |            |             |            |             |             |             |             |             |             |             |             |
| Veronica persica Poir.                 |            | +           | 2          | +           | +           | +           | 2          | +           | +           | +           | 3          | 1           | 2          | 1           | 2          | 5           | III         | 204        |
| Lamium purpureum L.                    | +          | 1           | 2          | +           | 1           | +           | 2          | 1           | +           | 1           | 1           | 5           | II          | 100        |
| Euphorbia helioscopia L.               | +          | +           | 1          | 1           | +           | 1           | 1           | 1           | +           | 1           | 1           | 5           | II          | 77         |
| Sonchus oleraceus L.                   | +          | +           | 3          | +           | 1           | +           | +           | 2          | +           | +           | +           | 3           | II          | 35         |

### VIII. Ch. D. Polygono-Chenopodietalia

| Species                                | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. |
|----------------------------------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|
| Chenopodium album L.                    | 1          | 1           | 1          | 5           | 2           | 2           | +           | 2           | 5           | 1           | 2           | +           | 3           | +           | +           | 1           | 4           | 1           | 1           | 1           | 4           | V          | 458        |
| Stellaria media (L.) Vill.              |            |             |            | 1           | 1           | 1           | 4           | +           | +           | +           | 2           | 2           | 5           | +           | 1           | 1           | 2           | 4           | +           | 1           | 2           | IV         | 329        |
| Polygonum lapathifolium L. subsp.       | +          | 1           | 2           | 1           | +           | +           | 3           | 1           | +           | 1           | +           | 5           | +           | 1           | +           | +           | 2           | III         | 112        |
| palidum                                |            |             |            |             |            |             |            |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
| Sonchus arvensis L.                    | 1          | +           | +           | 3           | 1           | +           | +           | 3           | +           | +           | 1           | 1           | +           | 3           | +           | +           | 1           | +           | 1           | +           | 1           | +           | 2           | II         | 77         |
| Geranium pusillum Burm. f. ex L.        |            | +           | 1           | 3           | 1           | 1           | +           | +           | +           | 4           | +           | 1           | 1           | 1           | +           | 1           | 1           | 1           | II          | 77         |
| Capsella bursa-pastoris (L.) Med.       | +          | +           | 2           | +           | +           | +           | 3           | +           | +           | +           | 3           | +           | +           | 3           | +           | 1           | +           | 3           | IV          | 96         |
| Lapsana communis L.                    | +          | +           | 2           | +           | +           | 2           | 1           | 1           | +           | 3           | +           | +           | 1           | +           | 3           | +           | 1           | +           | 3           | IV          | 92         |

### IX. Ch. D. Stellarietea mediae

| Species                                | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. | V. D. var. | IV. D. var. |
|----------------------------------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|
| Viola arvensis Murr.                   | +          | +           | +           | 4           | 1           | +           | +           | 4           | +           | +           | 3           | +           | +           | 3           | +           | 1           | +           | 3           | IV          | 96         |
| Polygonum aviculare L.                 | +          | +           | +           | 4           | 1           | +           | +           | 4           | +           | +           | 3           | +           | +           | 3           | +           | 1           | +           | 3           | IV          | 92         |
Weed communities in potato crops of the Mazowiecki Landscape Park

**Sporadic species:** 
V – *Phragmites australis* (Cav.) Trin. et Steud. 13(+), 15(+), 16(1), 22(1), 24(+); *Polygonum amphibium* L. 12(+), 13(1), 15(+), 16(1); *Juncus bufonius* L. 11(+), 15(+), 23(+), 24(+); *Scirpus lacustris* L. 12(+), 15(+), 16(+); *Juncus bufonius* L. 11(+), 15(+), 23(+), 24(+); *Sagina procumbens* L. 12(+), 14(+); *Rorippa sylvestris* (L.) Besser 18(+), 20(+); *Rorippa crispata* (Crantz) Besser 16(+); *Rorippa nasturtium-aquaticum* (L.) B. & Körte 2(+), 4(+), 5(+); *Vicia tetrasperma* (L.) Schreb. 1(+), 7(+), 11(+), 17(+); *Anthoxanthum aristatum* Boiss. 1(+), 3(+), 5(+); *Arnoseris minima* (L.) Schweigg. 1(+), 6(+); *Anchusa arvensis* (L.) Bieb. 8(+), 26(+); *Chaenorchinum minus* (L.) Lange 12(+), 22(+); *Aethusa cynapium* L. 18(+), 26(+); *Melandrium album* (Mill.) Garcke 1(+), 4(+), 5(+), 21(+); *Silene vulgaris* (Moench) Garcke 17(1), 19(+), 21(+), 26(2); *Lotus corniculatus* L. 22(+); *Agrostis stolonifera* L. 16(1); *Lactuca serriola* L. 20(+); *Gypsophila muralis* L. 10(+), 14(+), 22(+); *Knautia arvensis* 3(+), 7(+), 8(+); *Galeopsis bfragile* Boenn. 19(+), 21(1); *Galeopsis pubescens* Bess. 20(1), 24(+); *Medicago lupulina* L. 24(+), 25(+); *Malva neglecta* Wallr. 6(+), 20(+); *Chamomilla suaveolens* (Pursh) Rydb. 7(+); *Sisymbrium officinale* L. 26(+); *Sorrel* (Rumex crispus) L. 16(+), 25(+), 26(+); *Lamium amplexicaule* L. 13(+), 18(1); *Sonchus asper* (L.) Hill 18(+), 24(+); *Solanum nigrum* L. 15(+), 23(1), 25(+); *Atriplex patula* L. 14(+), 15(+), 20(+); *Atriplex nitens* Schkuhr 26(+); *Bromus secalinus cynapium* L. 18(+), 26(+); *Trifolium pratense L.* 14(+), 15(+), 20(1); *Trifolium repens* L. 16(+), 25(+), 26(+); *Agrostis stolonifera* L. 16(+); *Lactuca serriola* L. 20(+); *Poa annua* L. 8(+), 11(+), 18(+), 26(+); *Symphytum nummularia* L. 14(1), 15(+); *Veronica arvensis* L. 9(+), 11(+), 21(+), 25(+), 26(6); *Galium aparine* L. 2(1), 14(+), 22(+), 26(+); *Plantago major* L. 7(+), 11(+), 15(+), 26(1); *Potentilla argentea* L. s.s. 17(+); *Lysimachia nummularia* L. 14(1), 15(+); *Veronica arvensis* L. 9(+), 11(+), 21(+), 25(+), 26(6); *Galium aparine* L. 2(1), 14(+), 22(+), 26(+); *Plantago major* L. 7(+), 11(+), 15(+), 26(1); *Poa annua* L. 8(+), 11(+), 18(+), 26(+); *Symphytum officinale* L. 14(+), 16(+), 23(+), 26(+); *Daucus carota* 7(1), 9(+), 11(+); *Plantago lanceolata* 1(+), 2(+), 3(1); *Kraussia arvensis* 5(1), 7(+), 8(1); *Gypsophila muralis* L. 10(+), 14(+), 22(+); *Avena strigosa* Schreb. 11(+), 19(1), 21(1); *Silene vulgaris* (Moench) Garcke 17(1), 19(+), 21(1), 26(2); *Lotus corniculatus* L. 22(+); *Agrostis stolonifera* L. 16(1); *Lactuca serriola* L. 20(1); *Galeopsis bfragile* Boenn. 19(+), 21(1); *Galeopsis pubescens* Bess. 20(1), 24(+); *Medicago lupulina* L. 24(+), 25(+); *Malva neglecta* Wallr. 6(+), 20(+); *Chamomilla suaveolens* (Pursh) Rydb. 7(+); *Sisymbrium officinale* L. 26(+); *Sorrel* (Rumex crispus) L. 16(+), 25(+), 26(+); *Lamium amplexicaule* L. 13(+), 18(+); *Sonchus asper* (L.) Hill 18(+), 24(+); *Solanum nigrum* L. 15(+), 23(1), 25(+); *Atriplex patula* L. 14(+), 15(+), 20(+); *Atriplex nitens* Schkuhr 26(+); *Galeopsis bifida* Boenn. 19(+), 21(1); *Galeopsis pubescens* Bess. 20(1), 24(+); *Medicago lupulina* L. 24(+), 25(+); *Malva neglecta* Wallr. 6(+), 20(+); *Chamomilla suaveolens* (Pursh) Rydb. 7(+); *Sisymbrium officinale* L. 26(+); *Sorrel* (Rumex crispus) L. 16(+), 25(+), 26(+); *Lamium amplexicaule* L. 13(+), 18(+); *Sonchus asper* (L.) Hill 18(+), 24(+); *Solanum nigrum* L. 15(+), 23(1), 25(+); *Atriplex patula* L. 14(+), 15(+), 20(+); *Atriplex nitens* Schkuhr 26(+); *Rhinanthus serotinus* (Schönbr.) Oborny 19(1).

Comments: numbers after species inform about the relevé in the table. S – phytosociological constancy, D – coverage index, zn – withered top leaves.
| Relevé no. in table | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---------------------|---|---|---|---|---|---|---|---|---|----|
| Relevé no. in field | 140 | 144 | 153 | 162 | 189 | 185 | 182 | 197 | 181 | 155 |
| Date: month         | 8 | 8 | 8 | 8 | 8 | 8 | 9 | 8 | 9 | 8 |
| year                | .06 | .06 | .06 | .07 | .08 | .08 | .08 | .08 | .08 | .06 |
| Locality            | 10 | 12 | 18 | 24 | 39 | 38 | 36 | 44 | 37 | 18 |
| Crop cover in %     | zn | zn | zn | zn | zn | zn | zn | zn | zn | 40 |
| Weed cover in %     | 55 | 70 | 80 | 70 | 85 | 65 | 50 | 80 | 95 | 70 |
| Soil unit           | 5 Bw pgl.gl | 2 Bw p.pl.gl | 5 Bw pgl.gl | 5 Bw pgl.gl | 2 Bw p.pl.gl | 4 Bw p.pl.gl | 4 Bw p.pl.gl | 2 Bw gl | 4 Bw p.gl | 5 Bw p.gl |
| Number of species per relevé | 25 | 23 | 28 | 27 | 24 | 25 | 28 | 26 | 22 | 25 |

**I. Ch. D. Galinsogo-Setarietum**

*Galinsoga parviflora* Cav.

|                | 2 | 2 | 3 | 3 | 3 | 3 | 1 | 2 | 3 | V | 2625 |

*Galinsoga ciliata* (Raf.) Blake

|                | 1 | 1 | 1 | + | + | + | + | 2 | 1 | 1 | V | 465 |

**II. Ch. D. Polygono-Chenopodion**

*Lamium purpureum* L.

|                | + | + | 2 | + | 2 | + | 1 | 2 | + | V | 625 |

*Euphorbia helioscopia* L.

|                | + | 1 | 1 | 1 | + | + | III | 230 |

*Veronica persica* Poir.

|                | 2 | 1 | 2 | 1 | 2 | 2 | III | 535 |

*Chenopodium polyspermum* L.

|                | + | + | + | + | + | 2 | III | 420 |

*Veronica agrestis* L.

|                | + | + | + | + | + | II | 30 |

*Matricaria maritima* subsp. *inodora* (L.) Dostal

|                | 1 | + | + | + | + | 1 | III | 130 |

*Sonchus oleraceus* L.

|                | + | + | + | + | + | III | 50 |

**III. Ch.D. Polygono-Chenopodietalia**

*Chenopodium album* L.

|                | + | 1 | + | + | 1 | + | 1 | 2 | + | V | 375 |

*Stellaria media* (L.) Vill.

|                | 2 | + | 1 | 2 | 1 | + | 1 | IV | 470 |

*Setaria pumila* (Poir.) Roem.&Schult.

|                | 1 | + | + | 1 | 1 | 1 | III | 220 |

*Echinochloa crus-galli* (L.) P. B.

|                | + | 1 | + | + | 1 | III | 130 |

*Polygonum lapathifolium* L. subsp. *pallidum*

|                | + | + | + | + | 1 | III | 90 |

*Setaria viridis* (L.) P. B.

|                | 1 | + | + | + | + | III | 90 |

*Sonchus arvensis* L.

|                | + | + | + | + | 1 | III | 90 |

*Capsella bursa-pastoris* (L.) Med.

|                | + | + | 1 | + | + | III | 90 |

*Geranium pusillum* Burm. f. ex L.

|                | + | + | + | + | + | III | 50 |

*Atriplex patula* L.

|                | + | + | + | + | II | 40 |
**IV. Ch. D. Stellarietea mediae**

| Species | S | D | zn | Remarks |
|---------|---|---|----|---------|
| Viola arvensis Murr. | + | + | + | 1 | 1 | + | + | 1 | + | V | 210 |
| Anthemis arvensis L. | + | + | + | + | 1 | + | III | 180 |
| Polygonum aviculare L. | + | + | + | + | 1 | + | III | 100 |
| Vicia hirsuta (L.) S.F. Gray | + | + | + | + | + | III | 50 |
| Fallopia convolvulus (L.) A. Löve | + | + | + | + | + | III | 50 |
| Myosotis arvensis (L.) Hill. | + | + | + | + | 1 | II | 80 |
| Conyza canadensis (L.) Cron. | + | + | + | + | + | II | 30 |
| Vicia angustifolia L. | + | + | + | + | + | I | 10 |
| Centaurea cyanus L. | + | + | + | III | 30 |
| Apera spica-venti (L.) P. Beauv. | + | + | + | + | + | II | 30 |
| Anagallis arvensis L. | + | + | + | + | + | II | 30 |

**V. Companions**

| Species | S | D | zn | Remarks |
|---------|---|---|----|---------|
| Erodium cicutarium (L.) L’hér. | + | + | + | + | + | III | 50 |
| Achillea millefolium L. | + | + | + | + | + | III | 50 |
| Galium aparine L. | + | + | + | + | III | 50 |
| Veronica arvensis L. | + | + | + | + | I | 70 |
| Erysimum cheiranthoides L. | + | + | I | 70 |
| Polygonum lapathifolium L. subsp. lapathifolia | + | + | + | + | II | 30 |
| Convolvulus arvensis L. | + | + | + | + | II | 30 |
| Galeopsis pubescens Bess. | + | + | + | II | 30 |
| Taraxacum officinale Wigg. | + | + | + | II | 30 |
| Artemisia vulgaris L. | + | + | + | II | 30 |

Sporadic species: **I** – Lapsana communis L. 5(+); **II** – Sonchus asper (L.) Hill 1(+), 7(+); Oxalis stricta L. 6(+), 8(+); Rumex crispus L. 10(+); **III** – Raphanus raphanistrum L. 1(+), 6(+); Solanum nigrum L. 2(+); **IV** – Vicia villosa Roth. 3(+), 7(+); Descurainia sophia (L.) Weeb 3(+), 7(+); Aethusa cynapium L. 7(+), 10(+); Lactuca serriola L. 2(+); Vicia tetrasperma (L.) Schreb. 3(+), 6(+); Anchusa arvensis (L.) Bieb. 7(+); Rumex acetosa L. 7(+); **V** – Elymus repens (L.) Gould 3(1), 4(1); Cirsiurn arvense (L.) Scop. 3(1), 5(1); Equisetum arvense L. 1(1), 8(1); Scrophularia nodosa L. 2(1), 8(1); Potentilla anserina L. 2(+), 7(+); Polygonum hydropiper L. 2(+), 9(+); Epilobium roseum Schreb. 3(+), 6(+); Gypsophila muralis L. 3(+), 10(+); Anamnthus retroflexus L. 6(+), 10(+); Melandrium album (Mill.) Garcke 7(+), 10(+); Agrostis stolonifera 8(+), 10(+); Polygonum persicaria L. 9(+), 10(1); Gnaphalium uliginosum L. 2(+); Medicago lupulina L. 4(1); Ranunculus repens L. 4(+); Prunella vulgaris L. 5(+); Veronica serpyllifolia L. 6(+); Leontodon autumnalis L. 6(+); Plantago major L. 7(+); Alopecurus geniculatus L. 8(+); Mentha arvensis L. 8(+); Ranunculus flammula L. 10(+); Rhinanthus serotinus (Schönh.) Oborný 4(r).

Comments: numbers after species inform about the relevé in the table. **S** – phytosociological constancy, **D** – coverage index, **zn** – withered top leaves
Table 4

Lamio-Veronicetum politae Kornaś 1950

| Relevé no. in table | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---------------------|---|---|---|---|---|---|---|---|---|----|
| Relevé no. in field | 165 | 186 | 138 | 129 | 147 | 188 | 169 | 150 | 160 | 163 |
| Date: month         | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| year                | .07 | .08 | .06 | .05 | .06 | .08 | .07 | .06 | .07 | .07 |
| Locality            | 29 | 38 | 8 | 1 | 12 | 39 | 33 | 17 | 22 | 24 |
| Crop cover in %     | 60 | zn | zn | zn | zn | zn | zn | 40 | zn | 60 |
| Weed cover in %     | 55 | 75 | 60 | 55 | 50 | 55 | 75 | 50 | 55 | 50 |
| Soil unit           | 2Bw gl | 2Bw pgm gl | 2Bw pg gl | 2Bw gl | 2F ph gl | 2Bw pg gl | 8Bw pg pl | 2Bw pl pg | 4Bw pl pg | 2Bw gl |

Number of species per relevé

| | 31 | 28 | 27 | 26 | 25 | 24 | 24 | 27 | 25 | 26 | 26 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| I. Ch. Lamio-Veronicetum | | | | | | | | | | | |
| Lamium amplexicaule L.          | 2 | 1 | + | 1 | 1 | 1 | 1 | 1 | 1 | V | 545 |
| Veronica agrestis L.            | 1 | 1 | 1 | + | + | + | + | 2 | IV | 355 |
| Veronica opaca Fr.              | 1 | + | 2 | + | II | 245 |
| Veronica polita Fr.             | + | 1 | + | + | II | 80 |
| II. Ch. Polygono-Chenopodion    | | | | | | | | | | | |
| Veronica persica Poir.          | + | + | 2 | 2 | 2 | 1 | 2 | + | + | 2 | V | 965 |
| Lamium purpureum L.             | 1 | 1 | + | + | + | + | + | 2 | 2 | + | V | 510 |
| Chenopodium polyspermum L.      | 1 | 1 | + | + | + | + | + | + | IV | 150 |
| Euphorbia helioscopia L.        | + | + | + | 2 | + | + | + | + | I | 295 |
| Oxalis fontana Bunge            | + | + | 1 | + | + | 1 | + | IV | 150 |
| Sonchus asper (L.) Hill         | 1 | + | + | + | 1 | + | + | III | 140 |
| Matricaria maritima subsp. inodora (L.) Dostal | + | + | + | + | + | + | + | III | 60 |
| Sonchus oleraceus L.            | + | + | 1 | + | + | III | 90 |
| Galinsoga parviflora Cav.       | + | + | + | + | + | III | 60 |
| Galinsoga ciliata (Raf.) Blake   | + | + | + | + | II | 50 |
| Lapsana communis L.             | 2 | 1 | 1 | 1 | II | 275 |
| III. Ch.D. Polygono-Chenopodietalia | | | | | | | | | | | |
| Chenopodium album L.            | 1 | + | + | + | + | + | + | + | V | 140 |
| Stellaria media (L.) Vill.      | + | + | 1 | + | 1 | 2 | + | 1 | + | V | 385 |
| Echinochloa crus-galli (L.) P. B. | + | + | + | + | + | + | + | IV | 80 |
| Polygonum lapathifolium L. subsp. pallidum | + | + | + | + | + | + | IV | 70 |
| Sonchus arvensis L.             | + | 3 | + | + | + | + | + | III | 435 |
| Capsella bursa-pastoris (L.) Med. | + | + | + | + | + | III | 50 |
| Solanum nigrum L.               | + | 1 | 2 | + | + | II | 255 |
or impoverished associations or alliances were found inside the associations. Although no intermediate or ruderal communities additionally influence the diversity of segetal communities. These factors have contributed considerably to the high diversity within and inside the associations. Although no intermediate or impoverished associations or alliances were found in the area of the Masovian Landscape Park, reports by other authors examining various areas in different parts of Poland, Wnuk (1976), S z o t k o w s k i (1981), S z m e j a (1989), A n i o l - K w i a t k o w s k a (1990), K o z a k (2002), S i c i ń s k i (2003), W ę g r z y n e k (2005), S k r a j n a and S k r z y c z y ń s k a (2008), R z y m o w s k a and S k r z y c z y ń s k a (2007), have shown that the floristic distinctiveness of agrophytocenoses is diminishing.

4 associations were found in fields cropped to potato in the study area, that is, Digitarietum ischaemum, Echinoclocho-Setarietum, Galinsogo-Setarietum and Lamio-Veronicetum politae, the first two associations being internally diverse. Due to its Sub-Atlantic character, Digitarietum ischaemum reaches the southeastern boundary of its occurrence in Poland. According to many authors ( A n i o l - K w i a t k o w s k a , 1990; K o z a k , 2002; W ę g r z y n e k , 2005), the association is disappearing from agrophytocenoses as the poorest habitats are excluded from cultivation, the production potential of these habitats increases, and they are allotted for construction or afforestation.

IV. Ch. D. Stellarietee mediae

| Species                      | Constancy | Coverage | Withered Top |
|------------------------------|-----------|----------|--------------|
| Ranunculus repens L.         | 1         | 1        |              |
| Plantago major L.             |           | 1        | 1            |
| Elymus repens (L.) Gould      |           |          |              |
| Cirsiurn arvensis (L.) Scop.  |           |          |              |

Sporadic species: II – Melandrium no clinorum (L.) Fr. 1(+); 2(+); III – Setaria viridis (L.) P. B. 4(+); 6(+); Atriplex patula 1(+); Geranium pusillum Burm. f. ex L. 7(+); Setaria pumila (Poir.) Roem.&Schult. 1(+); IV – Vicia angustifolia L. 1(+); 2(+); Polygonum aviculare L. 3(+); 7(+) Euphorbia exigua L. 1(+); Galeopsis tetrahit L. 2(+); Consolida regalis Gray 3(+) Thlaspi arvense L. 3(+); Descurainia sophia (L.) Weeb 5(+); Papaver rheas L. 5(+); Viola arvensis Murr. 7(+); Sisymbrium officinale (L.) Scop. 7(+); Agrostemma githago L. 8(+) Lactuca serriola L. 9(+) Centaurea cyanus L. 10 (+); V – Equisetum arvense L. 1(+); Polygonum lapathifolium L. subsp. lapathifolia 1(+) Trifolium medium L. 1(+) Polygonum amphibium L. 1(+); Symphytum officinale L. 1(+) Galium aparine L. 1(+) Epilobium roseum Schreb. 2(+); Convulvulus arvensis L. 2(+); Artemisia vulgaris L. 2(+); Stachys palustris L. 2(+) Melandrium album (Mill.) Garcke 3(+) Bidens tripartita L. 3(+) Ranunculus repens L. 3(+) Urtica urens L. 3(+) Veronica arvensis L. 4(+) Tanacetum vulgare L. 4(+) Polygonum hydropiper L. 4(+) Mentha arvensis L. 4(+) Gnaphalium uliginosum L. 5(+) Borago officinalis L. 5(+) Bidens frondosa L. 7(+) Phragmites australis (Cav.) Trin. et Steud. 8(+) Erysimum cheiranthoides L. 9(+) Juncus bufonius L. 10(+) Hieracium pilosella L. 10(+) Sagina procumbens L. 10(+) Medicago lupulina L. 10(+). Comments: numbers after species inform about the relevé in the table. S – phytosociological constancy, D – coverage index, zn – withered top leaves.

DISCUSSION

Intensification of modern agriculture leads to impoverishment of agroecosystems. Many weed species disappear irreversibly, while others spread at a high rate and change the composition and structure of communities. Many authors focus on biodiversity preservation in agriculturally utilised areas and suggest various forms of species conservation, thereby conserving shrinking segetal communities ( R a t y ń s k a and B o r a t y ń s k i 2000; D o s t a t n y , 2004; S i c i ń s k i and S i e r a d z k i , 2010). Such a role might also be fulfilled by landscape parks where the traditional farming system is maintained.

Soils of the Masovian Landscape Park have varied trophic and moisture conditions. Small areas under potato adjacent to fields cropped to cereals, meadows or ruderal communities additionally influence the diversity of segetal communities. These factors have contributed considerably to the high diversity within and inside the associations. Although no intermediate or impoverished associations or alliances were found...
What is interesting is the presence of phytocenoses with ruderal species in parts of the patches, which can result from small cropped areas and the proximity of buildings and fallow land. It is also indicative of partial ruderalisation of these communities. The process of infiltration of ruderal species into segetal communities in Poland has been reported by Kapeluszny (2000), Misiewicz et al. (2000), Kutyńa et al. (2010), and Trąba (2010).

Some Digitarietum ischaemi patches included a group of wet shallow-rooting species. Wet species are quite rare in this association. Similar phytocenoses with wet species in fields cropped to potato have been reported by Głązek and Kowalik (1983), Szmeja (1994), Skrajna and Skrzyczyńska (2008), Rzymowska and Skrzyczyńska (2007), and Ściński (2003).

Well-developed patches of Lamio-Veronicetum politae with a full range of the association’s diagnostic species established on fertile nutrient-rich soils. The analysed association found in some areas of Poland is usually mentioned in its impoverished form with a rare occurrence of Veronica sp. (Korczyński, 1998; Skrzynecki, 1989; Kozak, 2002; Węgrzynek, 2006). According to Wnuk (1987) and Aniol-Kwiatkowska (1990), Veronica polita, Veronica opaca and Veronica agrestis are the species that best characterise Lamio-Veronicetum politae.

**CONCLUSIONS**

1. Potato fields in the Masovian Landscape Park cover small areas and are more and more difficult to find.
2. Plant communities established in the investigated crops are diversified and floristically rich, which reflects substantial soil variability and extensive farming.
3. The type of farming in such areas is particularly important in preserving the segetal flora diversity of agricultural landscape.

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Zbiorowiska chwastów upraw ziemniaka (Solanum tuberosum L.) Mazowieckiego Parku Krajobrazowego

Streszczenie

Praca przedstawia charakterystykę zbiorowisk segetalnych wykształcających się w uprawach ziemniaka na terenie Mazowieckiego Parku Krajobrazowego. Do opracowania zbiorowisk wykorzystano 64 zdjęcia fitosociologiczne wykonane w 45 miejscowościach. Na badanym terenie w uprawach ziemniaka stwierdzono występowanie 4 zespołów: Digitarietum ischaemi, Echinochloo-Setarietum, Galinsogo-Setarietum, Lamio-Veronicetum politae.

Najbardziej zróżnicowane pod względem florystycznym były fitocenozy zakwalifikowane do zespołów Digitarietum ischaemi i Echinochloo-Setarietum. W ramach tych asocjacji wyróżniono niższe jednostki syntaksonomiczne w randze podzespółów i wariantów. Fitocenozy te były często spotykane, występowały w szerokim spektrum siedliskowym zarówno pod względem trofycznym, jak i wilgotnościowym. Na glebach żyznych zadrzewa i na niewielkich powierzchniach notowano płyty zespołu Lamio-Veronicetum politae. Charakteryzowały się one pełnym składem gatunków diagnostycznych dla tej asocjacji.
