Flora of field plantings and parks and its origin

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Summary

The object of the studies presented in this paper was the flora of field plantings of different origin. The vascular flora of the plantings examined comprises 254 taxons, including 53 trees and shrubs, and 201 herbaceous vascular plants. The flora is rich and diverse. In 26.8% of taxons it is presents in all types of plantings. More than half of the registered species occurs once or twice only in all 23 planting groups studied.

A detailed analysis of the flora examined shows that field plantings in agricultural landscapes may, in a small number of cases, constitute a source of weeds diaspores propagating in fields.

Key words: field plantings, flora, diversity, synanthropization.

INTRODUCTION

Agricultural landscapes are components of various vegetation complexes. The following vegetation types predominate here: segetal vegetation with spatially scattered complexes of meadow and pasture vegetation, aquatic and rush vegetation of small ponds in fields, forest vegetation and shrubs characteristic of field plantings, ruderals that can be found on roadsides, in built-up areas, semi-natural sandy and xerothermic grass, natural communities which form ecotone zones with the above-mentioned ones. Each spatial unit of a landscape is characterized by certain distinguishing features, such as: the origin of those complexes, their vegetation, area and shape, distance between them, degree of isolation, internal biotopic, floral and phytosociological diversity, nature and intensity of man's economic activities.

From the agricultural perspective, it seems important to what degree the structure of vegetation complexes in a given landscape influences the species and quantitative composition of weeds in fields under cultivation, and vice versa. This paper constitutes an attempt to answer this question. It deals with vegetation complexes present in different types of field plantings in selected areas, compared with the segetal flora of North-Eastern Poland.

RESEARCH AREA AND MATERIAL

The paper is based on floral research conducted in the years 1996 - 1997 in object 'Wola' located in the Mrągowskie Lake District, in the zone of high relief characteristic of end moraine. A plan of anti-erosion landscape management was implemented in this area in the years 1966 - 1967 and 1975. This plan included tree planting according to the concept elaborated by N i e w i a d o m s k i and G r a b a r c z y k (1977) - Figure 1. Plantings constitute 11.8% (31.9 ha) of the total area (270.8 ha). 23 groups of plantings studied (the so called 'islands', clumps of trees, tree belts) were divided into 3 types, i.e. 'spontaneous' (natural) plantings - which are a result of natural succession (7 objects), trees planted in the years 1966 - 1967 and poplar plantations from 1975 (10 objects altogether), plantings in the form of parks (a park near a farm, an abandoned Evangelic park) and plantings located at the sites of deserted farms (6 objects altogether). The flora examined was subjected to an analysis based on various criteria, such as: geographical and historical origin - following the concept formulated by T h e l l u n g (1915 and 1918-1919) and modified by K o r n a ś (1968), origin of apophytes, characteristics of flora within the 3 types of plantings mentioned above, species structure of flora in the plantings studied, compared with the segetal flora of North-Eastern Poland (K o r n i a k 1992), the presence of basic life-forms according to R a u n k i a e r (1934) and modified by S z a f e r (1964).

The nomenclature used for vascular plants is based on the 'Vascular Plants of Poland - a Checklist' (M i r e k et al. 1995).

RESULTS AND DISCUSSION

The vascular flora of the plantings examined comprises 254 taxa, including 53 trees and shrubs (Table 1), and 201 herbaceous vascular plants (Table 2). Only part (17 taxa) of the rich dendroflora comes from plantings (H o ł d y ŋ s k i, F e n y k 1998). The remaining trees and shrubs enriched the plantings in a 'spontaneous', usually anemochoric, way. They could also be a component of spontaneously formed groups of shrubs or wet leafy trees (alders) and riverside plantings, situated mainly in depressions. Sometimes these are also trees and shrubs growing near farms, e.g. *Prunus domestica*, *Pyrus communis*, *Cerasus austera*, *Philadelphus coronarius*, *Rosa pimpinellifolia* and other.

The flora of herbaceous vascular plants found in the types of plantings studied and presented in Table 2 is characterized by numerous species and great diversity. In 26.8% of taxa it occurs in all types of plantings. More than half of the registered species occurs once or twice only in all planting groups studied.

The floral distinction is clearly characterized by the geographical and historical origin of the flora discussed, presented in Figures 2 and 3. Apophytes constitute the largest plant group (86.4) in all the plantings. Forest and shrub apophytes predominate here, meadow ones are less frequent (Figure 3). Similar proportions were noted by R a t y ń s k a and S z w e d (1998) in the Wielkopolska region. Despite the close vicinity of fields and small areas of tree clumps - which makes them all ecotone zones - archaeophytes are rare and sparse here (only 16 taxa were found: *Convolvulus arvensis*, *Vicia angustifolia*, *Vicia tetrasperma*, *Vicia hirsuta*, *Fallopia convolvulus*, *Lamium purpureum*, *Sonchus oleraceus* and other) - Figure 2.

The spectrum of plant life-forms in plantings is represented by all forms of plant adaptation to adverse environmental conditions (Figure 4). However, it is completely different from the spectrum characteristic of segetal communities (e.g. K o r n i a k 1992). Apart from dendroflora belonging to phanerophytes and chamaephytes, hemicryptophytes, geophytes and hydrophytes predominate among herbaceous plants. Annual seed plants (therophytes), which constitute over 60% - 70% of the other segetal communities in plantings are represented by 28 taxa (11.1%) only. This confirms the rule that the disappearance of therophytes is connected with the presence of community complexes which ecological structure is transformed to a lower and lower degree.

Assuming that the segetal flora of a given area includes taxa which are more or less frequently, or even sporadically, noted as weeds of production fields, the flora of examined plantings was compared with the segetal flora of North-Eastern Poland (K o r n i a k 1992). It turned out that 30.7%, i.e. 111 species, which were registered as segetal plants in North-Eastern Poland (Figure 5). Only 22 out of that segetal plant species noted in those plantings may be considered very common and common in fields. Those are archaeophytes which occur very sporadically in plantings (*Convolvulus arvensis*, *Viola arvensis*, *Vicia angustifolia*, *Vicia hirsuta*, *Lamium purpureum*, *Fallopia convolvulus* and *Sonchus oleraceus*). Due to their insignificant number, they practically do not constitute a source of field infestation with weeds. This group (22 taxa) also includes apophytes - more frequent in plantings - such as *Galium aparine*, *Stellaria media*, *Cirsium arvense*, *Agropyron repens*, *Artemisia vulgaris*, *Equisetum arvense*, and - sporadically - *Plantago major*, *Galeopsis tetrahit*, *Chenopodium album*, *Poa annua*, *Taraxacum officinale*, *Vicia villosa*, *Tussilago farfara*, *Rumex crispus*, *Melandrium album*. The other herbaceous species noted in the plantings discussed (90 taxa) are known as the so called non-synanthropic spontaneophytes. Forest species characteristic of dry-ground habitats, belonging to class *Quercio-Fagetæa*, predominate in this group (H o ł d y ń s k i, F e n y k 1998).

Taking into consideration the occurrence frequency of common segetal species in different types of plantings, they occur most often in trees planted by man (Figure 6). Their number was here by ca. 3 times higher than in 'spontaneous' plantings and anthropogenic plantings like parks, cemeteries, deserted habitats. This suggests that in the case of trees planted by man segetal species are the remains of the former system

of agricultural use of those habitats, while in that of 'spontaneous' (natural) plantings they are a symptom of synanthropization of those plant associations. Wasilowska (1998), who studied the problems connected with synanthropization of forest islands in the catchment basin of the Jorka river, reached similar conclusions.

CONCLUSIONS

The flora of field plantings, as a component of agricultural landscapes, may - in a small number of cases - constitute a source of weed diaspores propagating in fields. This is confirmed by very rare occurrence of synanthropic (segetal) therophytes and archaeophytes. Among the species considered apophytes in fields and present in the plantings examined, only some can disseminate in fields. These are: *Galium aparine*, *Stellaria media*, *Agropyron repens*, *Artemisia vulgaris*. The other apophytes occur only sporadically in fields or the plantings examined, so there is no possibility of their dissemination in agricultural ecosystems.

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Flora zadrzewień śródpolnych i parków oraz jej pochodzenie

Streszczenie

Przedmiotem badań niniejszego opracowania była flora zadrzewień śródpolnych różnego pochodzenia. Flora naczyniowa badanych zadrzewień liczy 254 taksony, w tym 53 stanowią drzewa i krzewy oraz 201 zielne rośliny naczyniowe. Bogata flora jest silnie zróżnicowana. Prawie 27,0% taksonów występuje we wszystkich typach zadrzewień. Ponad połowa zarejestrowanych taksonów występuje z częstością nie większą jak 1-2 krotnie we wszystkich 23 badanych zadrzewieniach.

Wnikliwa analiza badanej flory wykazała, że zadrzewienia śródpolne w krajobrazie rolniczym w nieznacznym stopniu mogą być źródłem diaspor chwastów przenikających na pola.

Table 1

Flora of trees and shrubs and the frequency of their occurrence in different types of field plantings

No	Species	Origin of plantings and the frequency of trees and shrubs occurrence			
		natural plantings	trees planted by man	parks and other types of plantings	occurrence stability
Number of research objects		7	10	6	100%
Trees					
1.	<i>Acer platanoides</i>	7	10	6	100,0
2.	<i>Quercus robur</i>	7	8	3	78,2
3.	<i>Sorbus aucuparia</i>	7	8	2	73,9
4.	<i>Betula pendula</i>	6	8	3	73,9
5.	<i>Picea abies</i>	3	8	2	56,5
6.	<i>Tilia cordata</i>	1	6	6	56,5
7.	<i>Salix caprea</i>	6	5	2	56,5
8.	<i>Alnus glutinosa</i>	6	5	1	52,1
9.	<i>Acer pseudoplatanus</i>	6	3	1	43,4
10.	<i>Fraxinus excelsior</i>	3	4	3	43,4
11.	<i>Populus tremula</i>	4	2	3	39,1
12.	<i>Carpinus betulus</i>	3	5	1	39,1
13.	<i>Malus domestica</i>	1	2	5	34,7
14.	<i>Pyrus communis</i>	1	3	3	30,4
15.	<i>Prunus insititia</i>	1	4	2	30,4
16.	<i>Fagus sylvatica</i>	3	2	1	26,0
17.	<i>Ulmus minor</i>	1	4	-	21,7
18.	<i>Padus avium</i>	1	1	-	8,5
19.	<i>Pinus sylvestris</i>	-	6	1	30,4
20.	<i>Prunus domestica</i>	-	1	3	17,4
21.	<i>Betula pubescens</i>	3	-	-	13,0
22.	<i>Salix fragilis</i>	1	-	-	4,3
23.	<i>Ulmus glabra</i>	1	-	-	4,3
24.	<i>Larix decidua</i>	-	7	-	30,4
25.	<i>Quercus rubra</i>	-	5	-	21,7
26.	<i>Populus x hybrid</i>	-	2	-	8,5

Shrubs					
27.	<i>Crataegus monogyna</i>	4	7	3	61,0
28.	<i>Sambucus nigra</i>	4	7	3	60,8
29.	<i>Corylus avellana</i>	3	4	1	34,7
30.	<i>Rosa canina</i>	1	3	1	21,7
31.	<i>Ribes nigrum</i>	7	2	-	39,1
32.	<i>Rosa sherardii</i>	1	2	-	13,0
33.	<i>Salix cinerea</i>	1	2	-	13,0
34.	<i>Symphoricarpos albus</i>	-	5	2	30,4
35.	<i>Cerasus austera</i>	-	1	5	26,0
36.	<i>Frangula alnus</i>	4	-	-	17,4
37.	<i>Sambucus racemosa</i>	4	-	-	17,4
38.	<i>Lonicera xylosteum</i>	1	-	-	4,3
39.	<i>Salix aurita</i>	3	-	-	13,0
40.	<i>Rosa villosa</i>	1	-	-	4,3
41.	<i>Euonymus europaea</i>	1	-	-	4,3
42.	<i>Chaenomeles lagenaria</i>	-	6	-	26,0
43.	<i>Rosa rugosa</i>	-	3	-	13,0
44.	<i>Spiraea salicifolia</i>	-	3	-	13,0
45.	<i>Caragana arborescens</i>	-	2	-	8,5
46.	<i>Prunus spinosa</i>	-	2	-	8,5
47.	<i>Rosa glauca</i>	-	2	-	8,5
48.	<i>Cornus sanguinea</i>	-	1	-	4,3
49.	<i>Daphne mezereum</i>	-	1	-	4,3
50.	<i>Hippophaë rhamnoides</i>	-	1	-	4,3
51.	<i>Viburnum opulus</i>	-	1	-	4,3
52.	<i>Philadelphus coronarius</i>	-	-	1	4,3
53.	<i>Rosa pimpinellifolia</i>	-	-	1	4,3

Table 2

Flora of herbaceous vascular plants and the frequency of their occurrence in different types of field plantings

No	Species	Origin of plantings and the frequency of herbaceous vascular plants occurrence			
		natural plantings	trees planted by man	parks and other types of plantings	occurrence stability
Number of research objects		7	10	6	100%
1.	<i>Urtica dioica</i>	7	10	6	100,0
2.	<i>Geum urbanum</i>	7	8	4	82,6
3.	<i>Dactylis glomerata</i>	3	9	6	78,2
4.	<i>Galium aparine</i>	7	8	3	78,2
5.	<i>Poa pratensis</i>	2	9	5	69,5
6.	<i>Mycelis muralis</i>	3	7	5	65,2
7.	<i>Poa nemoralis</i>	3	8	4	65,2
8.	<i>Impatiens parviflora</i>	7	6	2	65,2
9.	<i>Taraxacum officinale</i>	1	10	3	60,8
10.	<i>Fragaria vesca</i>	1	9	3	56,5
11.	<i>Hypericum perforatum</i>	2	7	3	52,1
12.	<i>Phleum pratense</i>	1	5	5	47,8
13.	<i>Glechoma hederacea</i>	4	5	2	47,8
14.	<i>Rumex acetosa</i>	2	4	4	43,4
15.	<i>Anemone nemorosa</i>	4	2	4	43,4

16.	<i>Alopecurus pratensis</i>	1	6	3	43,4
17.	<i>Rubus idaeus</i>	5	4	1	43,4
18.	<i>Arctium lappa</i>	3	3	3	39,1
19.	<i>Stellaria media</i>	2	5	2	39,1
20.	<i>Cirsium arvense</i>	3	4	2	39,1
21.	<i>Agropyron repens</i>	1	5	2	34,7
22.	<i>Leucanthemum vulgare</i>	1	5	2	34,7
23.	<i>Artemisia vulgaris</i>	2	4	2	34,7
24.	<i>Dryopteris filix-mas</i>	2	4	2	34,7
25.	<i>Ficaria verna</i>	4	2	2	34,7
26.	<i>Deschampsia caespitosa</i>	2	3	2	30,4
27.	<i>Potentilla anserina</i>	2	3	2	30,4
28.	<i>Lysimachia nummularia</i>	3	1	2	26,0
29.	<i>Oxalis acetosella</i>	3	1	2	26,0
30.	<i>Medicago lupulina</i>	1	4	1	26,0
31.	<i>Lupinus polyphyllus</i>	2	3	1	26,0
32.	<i>Stellaria graminea</i>	2	3	1	26,0
33.	<i>Tanacetum vulgare</i>	2	3	1	26,0
34.	<i>Veronica chamaedrys</i>	2	3	1	26,0
35.	<i>Equisetum sylvaticum</i>	3	2	1	26,0
36.	<i>Heracleum sibiricum</i>	3	2	1	26,0
37.	<i>Bromus inermis</i>	1	3	1	21,7
38.	<i>Chelidonium majus</i>	1	3	1	21,7
39.	<i>Equisetum arvense</i>	1	3	1	21,7
40.	<i>Vicia villosa</i>	1	3	1	21,7
41.	<i>Carex hirta</i>	2	2	1	21,7
42.	<i>Ranunculus acris</i>	2	2	1	21,7
43.	<i>Gagea lutea</i>	1	1	2	17,4
44.	<i>Tussilago farfara</i>	1	1	2	17,4
45.	<i>Agrimonia eupatoria</i>	1	2	1	17,4
46.	<i>Arrhenatherum elatius</i>	1	2	1	17,4
47.	<i>Galium verum</i>	1	2	1	17,4
48.	<i>Medicago sativa</i>	1	2	1	17,4
49.	<i>Plantago lanceolata</i>	1	2	1	17,4
50.	<i>Rumex obtusifolius</i>	2	1	1	17,4
51.	<i>Stellaria holostea</i>	2	1	1	17,4
52.	<i>Caltha palustris</i>	1	1	1	13,0
53.	<i>Carex pallescens</i>	1	1	1	13,0
54.	<i>Geum rivale</i>	1	1	1	13,0
55.	<i>Galium mollugo</i>	1	4	-	21,7
56.	<i>Fragaria moschata</i>	3	2	-	21,7
57.	<i>Chamaenerion angustifolium</i>	1	3	-	17,4
58.	<i>Equisetum pratense</i>	1	3	-	17,4
59.	<i>Bromus hordeaceus</i>	2	2	-	17,4
60.	<i>Lathyrus pratensis</i>	2	2	-	17,4
61.	<i>Iris pseudacorus</i>	3	1	-	17,4
62.	<i>Solanum dulcamara</i>	3	1	-	17,4
63.	<i>Epilobium montanum</i>	1	2	-	13,0
64.	<i>Galeopsis tetrahit</i>	1	2	-	13,0
65.	<i>Knautia arvensis</i>	1	2	-	13,0
66.	<i>Scirpus sylvaticus</i>	1	2	-	13,0
67.	<i>Achillea collina</i>	2	1	-	13,0
68.	<i>Aegopodium podagraria</i>	2	1	-	13,0
69.	<i>Alchemilla monticola</i>	2	1	-	13,0
70.	<i>Alyssum alyssoides</i>	1	1	-	8,5
71.	<i>Astragalus glycyphyllos</i>	1	1	-	8,5

72.	<i>Bidens cernua</i>	1	1	-	8,5
73.	<i>Carex vulpina</i>	1	1	-	8,5
74.	<i>Circaea lutetiana</i>	1	1	-	8,5
75.	<i>Cirsium oleraceum</i>	1	1	-	8,5
76.	<i>Dianthus deltoides</i>	1	1	-	8,5
77.	<i>Lathyrus tuberosus</i>	1	1	-	8,5
78.	<i>Linaria vulgaris</i>	1	1	-	8,5
79.	<i>Phalaris arundinacea</i>	1	1	-	8,5
80.	<i>Prunella vulgaris</i>	1	1	-	8,5
81.	<i>Senecio jacobaea</i>	1	1	-	8,5
82.	<i>Silene vulgaris</i>	1	1	-	8,5
83.	<i>Trifolium medium</i>	1	1	-	8,5
84.	<i>Vicia angustifolia</i>	1	1	-	8,5
85.	<i>Angelica sylvestris</i>	4	-	1	21,7
86.	<i>Ranunculus repens</i>	3	-	1	17,4
87.	<i>Solidago virgaurea</i>	1	-	2	13,0
88.	<i>Galeobdolon luteum</i>	2	-	1	13,0
89.	<i>Maianthemum bifolium</i>	2	-	1	13,0
90.	<i>Rubus caesius</i>	2	-	1	13,0
91.	<i>Actaea spicata</i>	1	-	1	8,5
92.	<i>Anemone ranunculoides</i>	1	-	1	8,5
93.	<i>Euphorbia cyparissias</i>	1	-	1	8,5
94.	<i>Lythrum salicaria</i>	1	-	1	8,5
95.	<i>Potentilla argentea</i>	1	-	1	8,5
96.	<i>Trifolium repens</i>	-	5	4	39,1
97.	<i>Anchusa officinalis</i>	-	5	1	26,0
98.	<i>Bellis perennis</i>	-	4	1	21,7
99.	<i>Campanula glomerata</i>	-	1	2	13,0
100.	<i>Trifolium campestre</i>	-	1	2	13,0
101.	<i>Hieracium pilosella</i>	-	2	1	13,0
102.	<i>Myosotis sylvatica</i>	-	2	1	13,0
103.	<i>Plantago major</i>	-	2	1	13,0
104.	<i>Campanula rotundifolia</i>	-	1	1	8,5
105.	<i>Chenopodium album</i>	-	1	1	8,5
106.	<i>Cichorium intybus</i>	-	1	1	8,5
107.	<i>Lathyrus pratensis</i>	-	1	1	8,5
108.	<i>Plantago media</i>	-	1	1	8,5
109.	<i>Veronica officinalis</i>	-	1	1	8,5
110.	<i>Galium palustre</i>	4	-	-	17,4
111.	<i>Myosoton aquaticum</i>	4	-	-	17,4
112.	<i>Alopecurus aequalis</i>	2	-	-	8,5
113.	<i>Athyrium filix-femina</i>	2	-	-	8,5
114.	<i>Dryopteris carthusiana</i>	2	-	-	8,5
115.	<i>Erigeron acris</i>	2	-	-	8,5
116.	<i>Galium odoratum</i>	2	-	-	8,5
117.	<i>Glyceria fluitans</i>	2	-	-	8,5
118.	<i>Impatiens noli-tangere</i>	2	-	-	8,5
119.	<i>Lamium purpureum</i>	2	-	-	8,5
120.	<i>Lysimachia vulgaris</i>	2	-	-	8,5
121.	<i>Phragmites communis</i>	2	-	-	8,5
122.	<i>Platanthera bifolia</i>	2	-	-	8,5
123.	<i>Polypodium vulgare</i>	2	-	-	8,5
124.	<i>Trifolium arvense</i>	2	-	-	8,5
125.	<i>Anthriscus sylvestris</i>	1	-	-	4,3
126.	<i>Carex pseudocyperus</i>	1	-	-	4,3
127.	<i>Carex spicata</i>	1	-	-	4,3

128.	<i>Chrysosplenium alternifolium</i>	1	-	-	4,3
129.	<i>Epilobium roseum</i>	1	-	-	4,3
130.	<i>Humulus lupulus</i>	1	-	-	4,3
131.	<i>Juncus conglomeratus</i>	1	-	-	4,3
132.	<i>Juncus effusus</i>	1	-	-	4,3
133.	<i>Lathyrus sylvestris</i>	1	-	-	4,3
134.	<i>Luzula pallescens</i>	1	-	-	4,3
135.	<i>Malva alcea</i>	1	-	-	4,3
136.	<i>Milium effusum</i>	1	-	-	4,3
137.	<i>Peucedanum palustre</i>	1	-	-	4,3
138.	<i>Pteridium aquilinum</i>	1	-	-	4,3
139.	<i>Ranunculus auricomus</i>	1	-	-	4,3
140.	<i>Scutellaria galericulata</i>	1	-	-	4,3
141.	<i>Urtica urens</i>	1	-	-	4,3
142.	<i>Veronica beccabunga</i>	1	-	-	4,3
143.	<i>Viola tricolor</i>	1	-	-	4,3
144.	<i>Thymus pulegioides</i>	-	5	-	21,7
145.	<i>Agrostis capillaris</i>	-	4	-	17,4
146.	<i>Echium vulgare</i>	-	3	-	13,0
147.	<i>Lolium perenne</i>	-	3	-	13,0
148.	<i>Myosotis stricta</i>	-	3	-	13,0
149.	<i>Polygala comosa</i>	-	3	-	13,0
150.	<i>Anthoxanthum odoratum</i>	-	2	-	8,5
151.	<i>Berteroa incana</i>	-	2	-	8,5
152.	<i>Calamagrostis epigejos</i>	-	2	-	8,5
153.	<i>Campanula patula</i>	-	2	-	8,5
154.	<i>Campanula persicifolia</i>	-	2	-	8,5
155.	<i>Centaurea scabiosa</i>	-	2	-	8,5
156.	<i>Convolvulus arvensis</i>	-	2	-	8,5
157.	<i>Festuca rubra</i>	-	2	-	8,5
158.	<i>Geranium columbinum</i>	-	2	-	8,5
159.	<i>Lotus corniculatus</i>	-	2	-	8,5
160.	<i>Melilotus alba</i>	-	2	-	8,5
161.	<i>Poa annua</i>	-	2	-	8,5
162.	<i>Ranunculus bulbosus</i>	-	2	-	8,5
163.	<i>Viola arvensis</i>	-	2	-	8,5
164.	<i>Viscum album</i>	-	2	-	8,5
165.	<i>Acinos arvensis</i>	-	1	-	4,3
166.	<i>Allium vineale</i>	-	1	-	4,3
167.	<i>Anthyllis vulneraria</i>	-	1	-	4,3
168.	<i>Conium maculatum</i>	-	1	-	4,3
169.	<i>Cynosurus cristatus</i>	-	1	-	4,3
170.	<i>Fallopia convolvulus</i>	-	1	-	4,3
171.	<i>Filipendula ulmaria</i>	-	1	-	4,3
172.	<i>Fragaria viridis</i>	-	1	-	4,3
173.	<i>Galeopsis speciosa</i>	-	1	-	4,3
174.	<i>Gnaphalium sylvaticum</i>	-	1	-	4,3
175.	<i>Helichrysum arenarium</i>	-	1	-	4,3
176.	<i>Hieracium lachenalii</i>	-	1	-	4,3
177.	<i>Hieracium piloselloides</i>	-	1	-	4,3
178.	<i>Holcus lanatus</i>	-	1	-	4,3
179.	<i>Lathyrus vernus</i>	-	1	-	4,3
180.	<i>Leontodon hispidus</i>	-	1	-	4,3
181.	<i>Melandrium album</i>	-	1	-	4,3
182.	<i>Picris hieracioides</i>	-	1	-	4,3
183.	<i>Polygonum persicaria</i>	-	1	-	4,3

184.	<i>Ranunculus cassubicus</i>	-	1	-	4,3
185.	<i>Rumex crispus</i>	-	1	-	4,3
186.	<i>Sedum acre</i>	-	1	-	4,3
187.	<i>Sedum maximum</i>	-	1	-	4,3
188.	<i>Sonchus oleraceus</i>	-	1	-	4,3
189.	<i>Trifolium montanum</i>	-	1	-	4,3
190.	<i>Trifolium pratense</i>	-	1	-	4,3
191.	<i>Vaccinium myrtillus</i>	-	1	-	4,3
192.	<i>Vicia hirsuta</i>	-	1	-	4,3
193.	<i>Vicia sepium</i>	-	1	-	4,3
194.	<i>Vicia tetrasperma</i>	-	1	-	4,3
195.	<i>Viscaria vulgaris</i>	-	1	-	4,3
196.	<i>Hepatica nobilis</i>	-	-	2	8,5
197.	<i>Hedera helix</i>	-	-	1	4,3
198.	<i>Hemerocallis fulva</i>	-	-	1	4,3
199.	<i>Lilium bulbiferum</i>	-	-	1	4,3
200.	<i>Narcissus poeticus</i>	-	-	1	4,3
201.	<i>Vinca minor</i>	-	-	1	4,3

Fig. 1. Location of the objects studied (original)

Fig. 2. Geographical analysis of flora in the objects studied

Fig. 3. Origin of apophytes in flora of plantings

Fig. 4. Life forms of plants

Fig. 5. Number of taxons presents in plantings compared with the segetal flora of North-Eastern Poland

Fig. 6. Global index of occurrence frequency of very common and common weeds in field plantings