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THE SEGETAL FLORA OF THE MAZOWIECKI LANDSCAPE PARK

ABSTRACT

The present state and characteristics of the segetal flora of the Mazowiecki Landscape Park and its buffer zone are described. Flora of the agrocenoses of the Park and its buffer zone is rich and includes 221 species. A large differentiation of habitats, A wide contact zone with natural communities and traditional methods of cultivation affect its biodiversity. Rare species constitute more than half of the total species recorded in the agrocenoses of the Park and its buffer zone. In total, 25 of them are included in various categories of threat (Zarzycki, Wojewoda, Heinrich 1992). Among the most endangered are such plants, as, *Helichrisum arenarium, Aphanes arvensis, Melandrium noctiflorum, Bromus secalinus, Agrostemma githago, Lathytus tuberosus, Kickxia elatine, Centunculus minimus, Hypericum humifusum, Peplis portula, Centaurium pulchellum, Radiola linoides* and *Myosurus minimus.* Apophytes (142 species) prevail over anthropophytes (76 species) in the studied flora. Species of meadow and waterside communities (93 species) predominate among apophytes, whereas in the group of anthropophytes, archaeophytes (59 species) are the most numerous. Analysis of persistence and biological types showed domination of short-lived species over perennials and therophytes over other life forms.

Key words: Mazowiecki Landscape Park, segetal flora, rare species.

INTRODUCTION

Mazowiecki Landscape Park was established in 1986 for protection of well preserved, almost natural forest complexes as well as traditional landscapes of the Masovia region with a mosaic of cultivated fields and meadows. A strong fragmentation of arable grounds, diversity of moisture and trophic conditions, a broad contact zone with natural communities and traditional cultivation methods resulted in maintenance of segetal communities abundant in numerous rare and endangered weed species.

Previous floristic-phytosociological studies from the area of the Park (Ciosek, Skrzyczyńska, 2003, Krzemiński, 2001) were usually focused on natural communities, mainly on forest ones.

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The aim of the studies was to estimate the richness of the segetal flora of the agrocenoses of Mazowiecki Landscape Park and its buffer zone. That would contribute to the enlargement of our knowledge on its vegetation.

AREA OF STUDY

The Mazowiecki Landscape Park is in the central part of the Masovia Province, in the borders of Celestynów and Drewnica forest inspectorate. In the physiographic division of Poland (Kondracki 2002) it is located in the borders of 3 mesoregions: Middle Vistula Valley, Wołomińska Plain and Garwolińska Plain, included to the Środkowomazowiecka Lowland macroregion. The Mazowiecki Landscape Park (area of 15710 ha) is surrounded by a discontinuous buffer zone (7992 ha). The Landscape Park is composed of two parts, divided by Otwock housing and Świder river valley. In the northern part are situated Lasy Wawerskie forests, bordering directly with Warsaw outskirts, whereas the southern part includes boggy-meadow complex of Torfowisko Całowanie peatbog aand well as Lasy Celestynowsko-Otwockie forests. The Vistula river valley form a natural, western border of the Park. Its eastern border is the Jagodzianka river (which flows into the Świder river).

Forest areas (75.5%) and agricultural lands (21.3%, in that arable grounds 53.2%) prevail in the Park's land use.

Forest soils dominate in the Landscape Park. They are usually podsol soils and rusty podsol soils. In local depressions, especially those with shallow ground water level, gley soils, black soils as well as peaty and boggy soils were noted. Cultivated soils are found as small enclaves and more frequently in the buffer zone of the Park. These are mainly poor, rusty podsol soils and brown soils, rarely black soils or boggy soils. A few plots of more fertile habitats occur mainly in the south-eastern part of the Park in the Regut village environs. They represent a good wheat soil complex. Large territories in the south-western part of the Park occupy low moor soils and boggy soils.

The Mazowiecki Landscape Park is situated in the eastern climatic district (Gumiński 1948). According to Okołowicz division (1995) it is part of Mazowiecko-Podlaski region. The characteristic climatic features of the area is large effect of continental air masses, relatively high annual amplitudes of air temperature, late and short spring season and relatively permanent snow cover. The vegetation season lasts 210-215 days. Field works usually starts in March and April.

Specific microclimate characteristics for the area of the Park (dry air, rich in pine ethereal oils) results from the occurrence of large complexes of pine forests. Therefore the Otwock environs are known for their therapeutic value.

MATERIAL AND METHODS

Studies on segetal flora of the Mazowiecki Landscape Park were carried out between 2003 and 2004 and in early spring 2005. The accurate investigations

were conducted in segetal habitats of 27 localities (Fig. 1). Floristic lists were compiled as well as 190 phytosociological relevés in cultivations (winter and spring cereals, root cultivations) and stubble fields were made. Identification of habitat type was made on the basis of soil-agricultural maps (scale 1:5000).

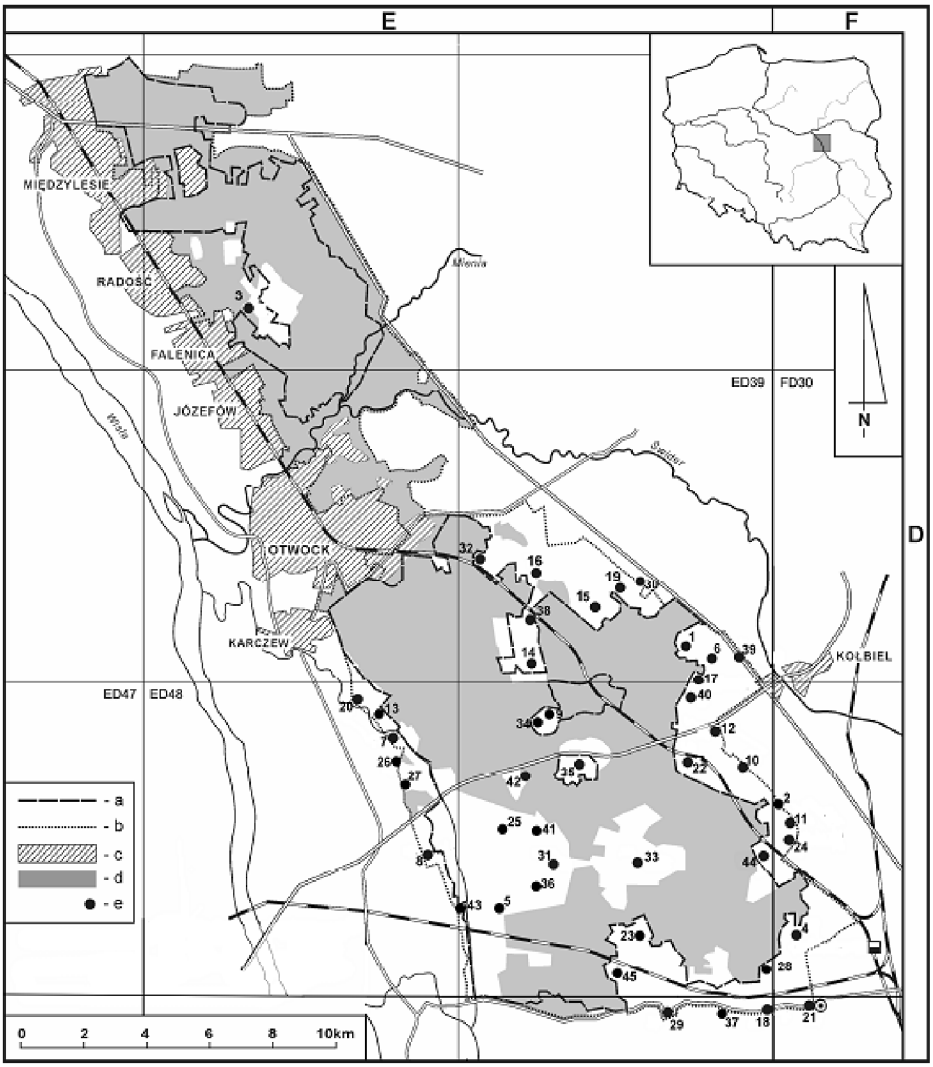

Fig. 1. Investigated area
a – borders of the Landscape Park, b – borders of the protected zone, c – building grounds, d – forest complexes, e – investigated areas. 1 –Anielinek, 2 – Antoninek, 3 – Aleksandrówka, 4 – Augustówka, 5 – Bąki, 6 – Bocian, 7 - Brzezinka, 8 – Całowanie, 9 - Celestynów, 10 – Chrosna, 11 – Chrząszczówka, 12 – Człekówka, 13 – Dąbrowa, 14 – Dąbrówka, 15 – Dyzin, 16 - Glina, 17 – Gózd, 18 – Grabianka, 19 – Jatne, 20 Janów, 21 – Jaźwiny, 22 – Karpiska, 23 – Kąciki, 24 – Kąty, 25 – Kominki, 26 - Kozłówka, 27 – Łukowiec, 28 – Ocznia, 29 – Osieck, 30 – Ostrowik, 31 – Podbiel, 32 – Pogorzel, 33 – Ponurzyca, 34 – Radzyń, 35 – Regut, 36 – Rosłańce, 37 – Rudnik, 38 – Stara Wieś, 39 – Stara Wieś II, 40 – Skorupy, 41 – Szatany, 42 – Tabor, 43 – Warszówka, 44 – Zabieżki, 45 – Zawada

Systematic arrangement of species was obtained from Rutkowski (1998), nomenclature of species after Mirek et al.. (2002). On the basis of papers by Kornaś 1968), Korniak (1992), Jackowiak (1990), Zając and Zając (1975), Zając (1979) characteristics of species were compiled (Table 1).

- persistence (K – short lived, W – perennials)
- life form according to Raunkiaer (1905) (Ch – chamaephytes, H- hemicryptophytes, G – geophytes, T – therophytes)
- geographic-historical group (A – apophytes: ł - meadow, nw – waterside, ps – psammmophilous sward, mk – xerothermic sward, l – forest, z – shrub; Ar – archaeophytes, Ep – epecophytes, Kn - kenophytes)
- occurrence frequency of species according to conventional frequency scale (1 - 2 localities – very rare, 3 - 7; localities – rare, 8 -17 – frequent, 18 - 27 – common)
- category of threat (Zarzycki, Wojewoda, Heinrich, 1992) (E – endangered extinction, V – vulnerable, R – rare, I – indeterminate category of threat).

RESULTS

In spite of the small area of arable fields (about 1780 ha), the segetal flora of the Mazowiecki Landscape Park and its buffer zone is rich and includes 221 vascular plant species (Table 1). They belong to 38 families and 137 botanical genera.

Table 1

List of species

S.n.	Species	Origin	Persistence	Life form	Frequency	Category of threat
1	2	3	4	5	6	7
	Equisetaceae					
1.	*Equisetum arvense* L.	Ał	W	G	common	
2.	*E. sylvaticum* L.	Ał	W	G	frequent	
	Urticaceae					
3.	*Urtica urens* L.	Ar	K	T	very rare	
	Polygonaceae					
4.	*Polygonum aviculare* L.	Anw	W	T	frequent	
5.	*P. hydropiper* L.	Anw	K	T	frequent	
6.	*P. persicaria* L.	Anw	K	T	frequent	
7.	*P. lapathifolium* L. subsp. *lapathifolium*	Anw	K	T	common	
8.	*P. lapathifolium* L. subsp. *pallidum* /With/Fr.	Anw	K	T	common	
9.	*P. amphibium* L.	Anw	W	G	rare	
10.	*Fallopia convolvulus* /L./ Á. Löve	Ar	K	T	common	
11.	*Rumex acetosella* L.	Aps	W	G	common	

Table 1

Continued

1	2	3	4	5	6	7
12.	*R. acetosa* L.	Ał	W	H	rare	
13.	*R. obtusifolius* L.	Al	W	G	rare	
14.	*R. crispus* L.	Az	W	G	frequent	
15.	*R. maritimus* L.	Ał	K	T	very rare	
	Chenopodiaceae					
16.	*Chenopodium hybridum* L.	Ar	K	T	very rare	
17.	*Ch. polyspermum* L.	Anw	K	T	rare	I
18.	*Ch. album* L.	Anw	K	T	common	
19.	*Atriplex patula* L.	Ar	K	T	very rare	
20.	*A. nitens* Schkuhr	Ar	K	T	very rare	
21.	*A. tatarica* L.	Ep	K	T	very rare	
	Amaranthaceae					
22.	*Amaranthus retroflexus* L.	Ep	K	T	rare	
	Caryophyllaceae					
23.	*Arenaria serpyllifolia* L.	Aps	K	T	frequent	
24.	*Stellaria media* /L./ Vill.	Ał	K	T	frequent	
25.	*S. graminea* L.	Ał	W	H	frequent	
26.	*Cerast. holosteoides* Fr. em. Hyl.	Ał	K	H	frequent	
27.	C. *arvense* L. s.s.	Aps	K	H	very rare	
28.	*Sagina procumbens* L.	Ał	W	H	rare	
29.	*Scleranthus annuus* L.	Ar	K	T	common	
30.	*Spergula arvensis* L.	Ar	K	T	common	
	Caryophyllaceae (continued)					
31.	*S. morisonii* Boreau	Aps	K	T	rare	
32.	*Sperg. rubra* /L./J. Presl et C. Presl	Anw	K	T	frequent	
33.	*Melandrium album* /Mill./ Garcke	Ał	K	T	common	
34.	*M. noctiflorum* /L./ Fr.	Ar	K	T	very rare	V
35.	*Agrostemma githago* L.	Ar	K	T	frequent	V
36.	*Silene vulgaris* /Moench/ Garcke	Amk	W	H	very rare	
37.	*Gypsophila muralis* L.	Anw	K	T	rare	
	Ranunculaceae					
38.	*Consolida regalis* Gray	Ar	K	T	very rare	I
39.	*Ranunculus flammula* L.	Anw	W	H	very rare	
40.	*R. repens* L.	Ał	W	H	common	
41.	*R. sardous* Crantz	Ał	W	H	very rare	R
42.	*Myosurus minimus* L.	Anw	K	T	frequent	
	Papaveraceae					
43.	*Papaver argemone* L.	Ar	K	T	rare	
44.	*P. dubium* L.	Ar	K	T	very rare	I
45.	*P. rhoeas* L.	Ar	K	T	very rare	I
	Brassicaceae					
46.	*Sisymbrium officinale* /L./ Scop.	Ar	K	T	rare	
47.	*S. loeselii* L.	Ep	K	H	very rare	
48.	*Desc. sophia* /L./ Webb. ex Prantl	Ar	K	T	rare	
49.	*Arabidopsis thaliana* /L./ Heynh.	Aps	K	T	common	
50.	*Erysimum cheiranthoides* L.	Ar	K	T	rare	

Table 1

Continued

1	2	3	4	5	6	7
51.	*Rorippa palustris* /L./ Besser	Anw	K	T	rare	
52.	*R. sylvestris* /L./ Besser	Anw	W	H	frequent	
53.	*R. austriaca* /Crantz/ Besser	Kn	W	H	rare	
54.	*R. amphibia* /L./ Besser	Anw	W	G	very rare	
55.	*Arm. rusticana* P.Gaertn., B. Mey. et Scherb.	Ar	W	G	very rare	
56.	*Card. arenosa* (L.) Hayek	Aps	K	T	very rare	
57.	*Berteroa incana* /L./ DC	Amk	K	T	rare	
58.	*Erophila verna* /L./ Chevall.	Aps	K	T	frequent	
59.	*Caps. bursa-pastoris* /L./ Medik.	Ar	K	T	common	
60.	*Teesdalea nudicaulis* /L./ R. Br.	Aps	K	T	frequent	
61.	*Thlaspi arvense* L.	Ar	K	T	rare	
62.	*Sinapis arvensis* L.	Ar	K	T	rare	I
63.	*Raphanus raphanistrum* L.	Ar	K	T	frequent	
	Crassulaceae					
64.	*Sedum maximum* /L./ Hoffm.	Amk	W	G	very rare	I
65.	*S. acre* L.	Amk	W	H	very rare	
	Rosaceae					
66.	*Rubus caesius* L.	Al	W	Ch	very rare	
67.	*Sanguisorba officinalis* L.	Ał	W	H	very rare	
68.	*Potentilla anserina* L.	Ał	W	H	frequent	
69.	*P. argentea* L.s.s	Amk	W	H	rare	
70.	*P. collina* Wibel s.s.	Anw	W	H	rare	
71.	*Aphanes arvensis* L.	Ar	K	T	rare	V
	Fabaceae					
72.	*Vicia sativa* L.	Ar	K	T	rare	
73.	*V. angustifolia* L.	Ar	K	T	frequent	
74.	*V. hirsuta* /L./ S. F. Gray.	Ar	K	T	common	
75.	*V. tetrasperma* /L./ Schreb.	Ar	K	T	common	
76.	*V. villosa* Roth	Ar	K	T	frequent	
77.	*V. cracca* L.	Ał	W	H	very rare	
78.	*Lathyrus pratensis* L.	Ał	W	H	rare	
79.	*L. tuberosus* L.	Ar	W	G	very rare	I
80.	*Medicago lupulina* L.	Amk	K	T	rare	
81.	*Trifolium dubium* Sibth.	Ał	K	T	rare	
82.	*T. repens* L.	Ał	W	H	frequent	
83.	*T. medium* L.	Az	W	H	very rare	
84.	*T. pratense* L.	Ał	K	T	rare	
85.	*T. arvense* L.	Aps	K	T	rare	
86.	*Lotus corniculatus* L.	Ał	K	H	very rare	
	Oxalidaceae					
87.	*Oxalis fontana* L.	Ep	W	H	rare	
	Geraniaceae					
88.	*Geranium pusillum* Burm. f. ex L.	Ar	K	T	frequent	
89.	*Erodium cicutarium* /L./ L Her.	Ar	K	T (H)	frequent	
	Linaceae					
90.	*Radiola linoides* Rothm.	Anw	K	T	very rare	
	Euphorbiaccae					
91.	*Euphorbia helioscopia* L.	Ar	K	T	rare	
92.	*E. esula* L.	Amk	K	H	very rare	
93.	*E. lucida* Waldst.& Kit.	Anw	W	H	very rare	
94.	*E. cyparissias* L.	Amk	W	G	rare	

Table 1

Continued

1	2	3	4	5	6	7
	Malvaceae					
95.	*Malva neglecta* Wallr.	Ar	K	H	rare	
	Clusiaceae					
96.	*Hypericum humifusum* L.	Aps	W	T (H)	rare	V
97.	*H. perforatum* L.	Ał	W	H	rare	
	Violaceae					
98.	*Viola tricolor* L.	Aps	K	T	very rare	
99.	*V. arvensis* Murray	Ar	K	T	common	
	Lythraceaea					
100.	*Peplis portula* L.	Anw	K	T	rare	V
	Onagraceae					
101.	*Epilobium roseum* Schreb.	Anw	W	H	rare	
	Apiaceae					
102.	*Pimpinella saxifraga* L.	Amk	W	H	very rare	
103.	*Aethusa cynapium* L.	Ar	K	T	very rare	I
104.	*Torilis japonica* (Houtt.) DC.	Az	K	T	very rare	
105.	*Daucus carota* L.	Ar	K	T	rare	
106.	*Anthriscus sylvestris* (L.) Hoffm.	Al	W	H	very rare	
107.	*Pastinaca sativa* L. s.s.	Ał	K	H	very rare	
108.	*Eryngium planum*	Aps	W	H	rare	
	Primulaceae					
109.	*Anagallis arvensis* L.	Ar	K	T	frequent	
110.	*Lysimachia nummularia* L.	Ał	W	G	very rare	
111.	*L. vulgaris* L.	Ał	W	G (H)	very rare	
112.	*Centunculus minimus* L.	Ar	K	T	rare	V
	Gentianaceae					
113.	*Centaurium pulchellum* /Sw./ Druce	Ał	K	T	very rare	R
	Rubiaceae					
114.	*Galium aparine* L.	Al	K	T	frequent	
115.	*G. verum* L.	Ał	W	G	very rare	
116.	*G. mollugo* L.	Ał	W	G	very rare	
	Convolvulaceae					
117.	*Convolvulus arvensis* L.	Amk	W	G	common	
	Boraginaceae					
118.	*Lithospermum arvense* L.	Ar	K	T	frequent	
119.	*Symphytum officinale* L.	Anw(ł)	W	G	rare	
120.	*Anchusa arvensis* /L./ M. Bieb.	Ar	K	T	rare	
121.	*Myosotis arvense* /L./ Hill.	Ar	K	T	common	
122.	*M. stricta* Link ex Roem. i Schult	Aps	K	T	common	
123.	*Cerinthe minor* L.	Amk	W	H	very rare	
	Lamiaceae					
124.	*Galeopsis ladanum* L.	Ar	K	T	frequent	
125.	*G. tetrahit* L.	Al	K	T	frequent	
126.	*G. pubescens* Besser	Al	K	T	rare	
127.	*G. bifida* Boenn.	Al	K	T	very rare	
128.	*Lamium amplexicaule* L.	Ar	K	T	frequent	
129.	*L. purpureum* L.	Ar	K	T	frequent	
130.	*Ballota nigra* L.	Ar	W	H	very rare	
131.	*Stachys palustris* L.	Anw	W	G	rare	
132.	*Glechoma hederacea* L.	Ał	W	H	very rare	

Table 1

Continued

1	2	3	4	5	6	7
133.	*Mentha arvensis* L.	Anw	W	H	frequent	
134.	*Prunella vulgaris* L.	Al	W	H	very rare	
	Solanaceae					
135.	*Solanum nigrum* L. em. Mill.	Ar	K	T	rare	
136.	*Datura stramonium* L.	Ep	K	T	very rare	
	Scrophulariaceae					
137.	*Scrophularia nodosa* L.	Al	W	H	very rare	
138.	*Veronica serpyllifolia* L.	Al	W	H	rare	
139.	*V. hederifolia* L. s.s.	Ar	K	T	rare	
140.	*V. persica* Poir.	Ep	K	T	frequent	
141.	*V. agrestis* L.	Ar	K	T	rare	
142.	*V. triphyllos* L.	Ar	K	T	frequent	
143.	*V. verna* L.	Amk	K	T	very rare	
144.	*V. dillenii* Cranz.	Aps	K	T	frequent	
145	*V. polita* Fr.	Ar	K	T	rare	I
146.	*V. opaca* Fr.	Ar	K	T	rare	R
147.	*V. arvensis* L.	Ar	K	T	common	
148.	*Kickxia elatine* /L./ Dumort.	Ar	K	T	very rare	E
149.	*Rhinanthus serotinus* /Schönh./ Oborný	Ar	K	T	common	
	Plantaginaceae					
150.	*Plantago major* L.	Al	W	H	frequent	
151.	*P. intermedia* Gilib.	Anw	W	H	frequent	
152.	*P. lanceolata* L.	Al	W	H	frequent	
	Dipsacaceae					
153.	*Knautia arvensis* /L./ J.M. Coult.	Al	W	H	very rare	
	Campanullaceae					
154.	*Jasione montana* L.	Aps	K	H	very rare	
	Asteraceae					
155.	*Solidago virgaurea* L.	Al	W	H	very rare	
156.	*S. canadensis* L.	Ep	W	H	very rare	
157.	*Conyza canadensis* /L./ Cronquist	Ep	K	T	common	
158.	*Erigeron acris* L.	Ep	K	H	very rare	
159.	*Filago minima* /Sm./ Pers.	Aps	K	T	very rare	
160.	*Gnaphalium sylvaticum* L.	Al	W	H	rare	
161.	*G. uliginosum* L.	Anw	K	T	frequent	
162.	*Helichrysum arenarium* /L./ Moench	Aps	W	H	very rare	E
163.	*Bidens tripartita* L.	Anw	K	T	frequent	
164.	*B. frondosa* L.	Kn	K	T	very rare	
165.	*Galinsoga parviflora* Cav.	Ep	K	T	frequent	
166.	*G. ciliata* /Raf./S.F. Blake	Ep	K	T	frequent	
167.	*Anthemis arvensis* L.	Ar	K	T	common	
168.	*Achillea millefolium* L.	Al	W	H	common	
169.	*Matricaria maritima* subsp *inodora* Schulc-Bip.	Ar	K	T	common	
170.	*Chamomilla suaveolens* /Pursh/ Rydb.	Ep	K	T	very rare	
171.	*Tanacetum vulgare* L.	Al(nw)	W	H	rare	
172.	*Artemisia absinthium* L.	Ar	W	H	very rare	
173.	*A. vulgaris* L.	Al(nw)	W	H	frequent	
174.	*Tussilago farfara* L.	Anw	W	G	very rare	
175.	*Senecio vulgaris* L.	Ar	K	T (H)	rare	
176.	*S. vernalis* Waldst. et Kit.	Ar	K	T (H)	very rare	
177.	*Arctium minus* /Hill/ Bernh.	Ar	K	H	very rare	

Table 1

Continued

1	2	3	4	5	6	7
178.	*Cirsium arvense* /L./ Scop.	Al	W	G	common	
179.	*Centaurea cyanus* L.	Ar	K	T	common	
180.	*C. jacea* L.	Ał	W	H	very rare	
181.	*C. scabiosa* L.	Amk	W	H	very rare	
182.	*Cichorium intybus* L.	Ar	W	G	very rare	
183.	*Arnoseris minima* /L./ Schweigg. & Körte	Aps	K	T	frequent	
184.	*Hypochoeris glabra* L.	Aps	K	T	rare	
185.	*H. radicata* L.	Ał	W	H	very rare	
186.	*Leontodon autumnalis* L.	Ał	W	H	rare	
187.	*Sonchus oleraceus* L.	Ar	K	T (H)	rare	
188.	*S. asper* /L./ Hill.	Ar	K	T	rare	
189.	*S. arvensis* L.	Anw	W	H	frequent	
190.	*Lactuca serriola* L.	Ar	K	H	very rare	
191.	*Tar. officinale* F.H. Wigg. coll.	Ał	W	H	frequent	
192.	*Lapsana communis* L.	Al	K	T (H)	rare	
193.	*Hieracium pilosella* L.	Aps	W	H	very rare	
	Liliaceae					
194.	*Allium vineale* L.	Amk	W	G	rare	
	Juncaceae					
195.	*Juncus capitatus* Weigel.	Anw	K	T	very rare	R
196.	*J. bufonius* L.	Anw	K	T	frequent	
197.	*Luzula campestris* /L./ DC.	Ał	W	H	very rare	
	Poaceae					
198.	*Festuca ovina* L.	Aps	W	H	very rare	
199.	*F. rubra* L. s.s	Ał	W	H	rare	
200.	*Poa annua* L.	Ał	K	T	frequent	
201.	*P. pratensis* L.	Ał	W	H	very rare	
202.	*Apera spica-venti* (L.) P. Beauv.	Ar	K	T	common	
203.	*Bromus hordeaceus* L.	Ał	W	H	very rare	
204.	*B. secalinus* L.	Ar	K	T	very rare	V
205.	*Elymus repens* /L./ Gould.	Anw	W	G	common	
206.	*Anthoxanthum aristatum* Boiss.	Ep	K	T	common	
207.	*Holcus lanatus* L.	Ał	W	H	very rare	
208.	*H. mollis* L.	Al	W	H	rare	
209.	*Agrostis gigantea* Roth.	Ał	W	H	rare	
210.	*A. stolonifera* L.	Anw	W	H	frequent	

Table 1

Continued

1	2	3	4	5	6	7
211.	*Phleum pratense* L.	Ał	W	H	rare	
212.	*Alopecurus geniculatus* L.	Anw	W	H	rare	
213.	*Phr. australis* /Cav./ Trin. ex Steud.	Anw	W	G	very rare	
214.	*Nardus stricta* L.	Aps	W	H	very rare	
215.	*Echinochloa crus-galli* (L.) P. Beauv.	Ar	K	T	frequent	
216.	*Digitaria ischaemum* (Scheb.) H. L. Mühl.	Ar	K	T	common	
217.	*Setaria pumila* (Poir) Roem.Schult.	Ar	K	T	frequent	
218.	*S. viridis* (L.) P. Beauv.	Ar	K	T	rare	
219.	*Avena strigosa* L.	Ar	K	T	rare	E
220.	*A. fatua* L.	Ar	K	T	rare	
	Cyperaceae					
221.	*Carex hirta* L.	Ał	W	G	rare	

Explanations: Ar – archaeophytes, Ep – epecophytes, Kn – kenophytes, Apophytes: ł – meadow, nw – waterside, ps – psammophilous sward, mk – xerothermic sward, l – forest, z – shrub; K – short-lived, W – perennials, T – therophytes, H – hemicryptophytes, G – geophytes, Ch - chamaephytes, E – endangered extinction, R – rare, V – vulnerable, I – taxa of indeterminate category of threat.

Such factors, as, habitat moisture and fertility, the area of plot and type of surrounding seminatural communities (e.g., meadows, psammophilous swards, shrubs) affect segetal flora biodiversity. The most floristically rich agrophytocenoses were found on fertile habitats in Regut village environs and in fields situated if the Polana Ponurzycka clearing. Nevertheless, domination of poor phytocenoses with a high share of acidophilus and oligothropic species was observed in the studied area.

Eurytopic plants (30 species), occurring commonly in all habitats, e.g., *Fallopia convolvulus, Chenopodium album, Viola arvensis, Cirsium arvense, Elymus repens Equisetum arvense* prevail in the segetal flora of the Park and its buffer zone. Rare and very rare species are the most frequent (142 taxa – 64,2%). a sporadic occurrence of some species (e.g., *Chenopodium polyspermum, Consolida regalis, Sonchus asper*) is a result of their adaptation to specific habitat types, sparse in the studied area. Others frequently occur in natural and seminatural habitats of the Mazowiecki Landscape Park but are sporadically noted in agrocenoses (e.g. *Sanguisorba officinalis, Rubus caesius, Eryngium planum*). Some rare plants occur on the borders of (or beyond) their geographical range, e.g., *Hypericum humifusum, Peplis portula, Juncus capitatus, Centaurium pulchellum, Radiola linoides, Centunculus minimus, Herniaria glabra, Aphanes arvensis*.

A large share of native species (134 – 60,6%) indicates the great effect of habitat conditions on segetal flora of the Park and its low agriculture level. Occurrence of a large group of apophytes is a result of farming on very poor habitat types, which are usually lying fallow or afforested in other regions of Poland. Among apophytes the most numerous are meadow (46 species) and waterside

(34 taxa). Such species, as, *Chenopodium album, Equisetum arvense, Elymus repens, Convolvulus arvensis, Veronica arvensis* were the most frequent, whereas *Ranunculus sardous, Hypericum humifusum, Peplis portula* and *Radiola linoides* are very rare apophytes.

Among species brought to Poland (87) archaeophytes are the most numerous (72). Some of them are common segetal weeds, e.g., *Apera spica-venti, Fallopia convolvulus, Viola arvensis, Anthemis arvensis*, while such species, as, *Herniaria glabra, Bromus secalinus, Kickxia elatine, Lathyrus tuberosus, Consolida regalis, Papaver dubium, P. rhoeas* and *Melandrium noctiflorum* are considered rare.

The group of epecophytes is 13 species. The mass occurrence of *Anthoxanthum aristatum* was observed in the Park. Such species, as, *Conyza canadensis, Galinsoga parviflora, G. ciliata, Veronica persica* were frequently noted, whereas, *Amaranthus retroflexus, Oxalis fontana, Chamomilla suaveolens, Sisymbrium loeseli* and *Datura stramonium* were rarely observed.

Short-lived species (130 – 58.8%) prevail over perennials in the studied segetal flora. Analysis of biological spectrum of species indicates the domination of therophytes (121 species – 54.7%) over hemicryptophytes (74 species – 33.5%) and remaining life forms (26 species – 11.8%).

In total, 24 species occurring in segetal communities of the Park are included in the Polish lists of rare and threatened species. They are: *Helichrysum arenarium, Aphanes arvensis, Melandrium noctiflorum, Bromus secalinus, Consolida regalis, Papaver dubium, P. rhoeas, Agrostemma githago, Chenopodium polyspermum, Lathyrus tuberosus, Kickxia elatine, Veronica opaca, V. polita, Avena strigosa, Centunculus minimus, Hypericum humifusum, Peplis portula, Centaurium pulchellum, Juncus capitatus, Ranunculus sardous, Radiola linoides, Myosurus minimus, Sinapis arvensis* and *Sedum maximum*.

CONCLUSIONS

1. In total, 221 species, belonging to 38 families and 137 botanical genera were recorded in the Mazowiecki Landscape Park.

2. Apophytes (134 – 60.6%) prevail over anthropophytes (87 – 39.4%) in the segetal flora. Meadow (46) and waterside (34) species prevail in the group of native plants, whereas among species brought to Poland, archaeophytes (72) are the most numerous.

3. Analysis of persistence and biological types of weeds revealed domination of short-lived species (130 taxa) over perennials (91 taxa) and therophytes (121 species) over remaining life forms (100 species).

4. The segetal flora of the Park includes 24 rare and risk of species.

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