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FLORA OF ECOLOGICAL AREAS "RÓŻANY MŁYN" AND "WILCZY MŁYN" IN POZNAŃ

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ABSTRACT. The paper presents research results of flora inventory in two areas of special ecological values "Różany Młyn" and "Wilczy Młyn" in Poznań. In the studied objects, 476 vascular plant species were found making about 36.6% of the total Poznań flora, and 127 species of protected plants were recorded.

Key words: flora, "Różany Młyn", "Wilczy Młyn", ecological use, protected species, rare and endangered species

Introduction

Ecological areas, being a form of nature protection, are created in order to protect some fragments of natural or seminatural ecosystems which have been preserved on areas subject to economic use. This method of protection frequently includes areas whose agricultural use in not profitable because of geomorphology, soil humidity or soil type and where the natural values of the area are comparatively high due to biological diversity. In urban agglomerations, among the urbanized areas, ecological enclaves constitute niches of green terrain supplying at the same time refuges for numerous plant and animal species which are rare or even perishing on urban areas. In Poznań, 22 such objects have been created so far.

In the north-eastern part of Poznań, there are two ecological enclaves – "Różany Młyn" and "Wilczy Młyn". The first, a smaller one, occupying only 14 ha, protects some localities of European beaver and many rare marsh and meadow plant species. The other one, occupying a bigger area (108 ha), is very interesting from the floristic, faunistic as well as geomorphological aspects. It constitutes a secondary refuge for many rare species of stenothermal plants and rich xerothermic vegetation as well as for fragments of riverside forests with old natural stands (Projekt planu zagospodarowania... 1994).

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The ecological area "Różany Młyn" is included in the Nature and Landscape Complex "Morasko". So far, the flora of that complex has not been described and until 1996, only the protection and development plans of that object were made (**Janyszek** et **al.** 1996).On the area of the mentioned object, including also the area of "Różany Młyn", only the flora of sedges (**Szczepanik-Janyszek** 2003, **Janyszek** 2004) and lichens (**Janiak** 1952, **Kepel** 1999) were elaborated. Besides these descriptions, the object has no detailed floristic documentation so far. The same refers to the object "Wilczy Młyn". The area of both discussed objects was included in the work on the Poznań flora carried out by **Jackowiak** (1993), however, the author elaborated the distribution of the particular taxa in the form of cartograms covering one sq. km only. Therefore, his data permit only an approximated estimation of the flora of small natural oobjects whose borders do not overlap with the areas covered by the cartograms.

The objective of our present elaboration is an inventory of fauna found in the studied objects and a statistical characterization of the flora and its valorization.

Short chartacteristics of the studied objects

Ecological area "Różany Młyn", covering 14 ha, is located about one kilometre to the west from the Warta river-bed on the terrain lying between Bożywoja street in the west and Bożydara street in the north, and from the eastern side, it borders with the course of the Różany Potok. The southern border of the object consists of the skirt of an afforestation belt along the course of the Różany Potok including a segment of about 250 m of arable land, and trees and shrubs around fish ponds. About 50% of the object are occupied by riverside forests and shrubs along the stream and fish ponds with rush communities on their banks. The remaining part of the area is covered by fragments of meadow communities, an old extensively used orchard, gardens adjacent to homesteads and blackthorn scrub.

Ecological area "Wilczy Młyn" is situated on both sides of the Warta river in the section between Lechicka street and the housing estate Wilczy Młyn; its area covers 108 ha. This object includes a complex of meadows, rushes, grass on sand soil and riverside scrub on the left river bank of Warta between its present bed and the old river-bed. The western border of that area is formed by the upper edge of a steep slope below the Wilczy Młyn settlement and the area of Fort IVa adjacent to it from the west. On the eastern bank of the river, the area includes a 150-year-old pine stand surrounding a former riffle-range between Chemiczna street from the south and Gdyńska street from the east.

Material and methods

Floristic studies were carried out in the vegetation seasons of 2004 and 2005. They consisted in the listing of vascular plant species occurring in the ecological areas "Różany Młyn" and "Wilczy Młyn", and in the determination of the occurrence frequency of the particular species on the studied terrain. The frequency of the particular species has been defined in a 5-degree scale:

I – taxa occurring in single localities (up to 5 localities)
II – taxa rarely occurring (6-10 localities)
III – taxa frequently occurring (11-20 localities)
IV – common taxa (21-50 localities)
V – taxa occurring in mass amounts (more than 50 localities).

Under 'localities' one should understand species recorded in the particular floristic lists on the areas investigated in our studies. One can notice that in case of taxa counted to the frequency classes I to III, the particular localities were created by separate subpopulations of the particular species, while in case of common and mass-occurrence taxa, specimens belonging to the same subpopulation were most frequently recorded in several places.

Names of taxa are given according to **Mirek** et **al.** (2002). Sociological and ecological classification is according to **Matuszkiewicz** (2001) and **Zarzycki** (1984). Life form spectrum is accepted after **Kornaś** and **Medwecka-Kornaś** (1986), **Zarzycki** (1984) and **Jackowiak** (1993). Geographical and historical classification is elaborated according to **Kornaś** and **Medwecka-Kornaś** (1986) and accordidng to the modification by **Jackowiak** (1993). Categories of endangerment for vascular plants are accepted from the work of **Olaczek** (1985) and the list of endangered species for the Poznań area is accepted after **Jackowiak** (1993).

Results

"Różany Młyn"

On the area of "Różany Młyn", 282 vascular plant species were found. They belong to 189 genera and 63 families. In this number, six genera of pteridophytes belong to three families, 54 species of monocotyledonous plants belong to 12 families, 222 species of dicotyledonous plants belong to 48 families.

The families Asteraceae and Poaceae were most frequently represented (over 20 species) and over 10 species were recorded in the following families Rosaceae, Fabaceae, Lamiaceae, Brassicaceae, Polygonaceae, Apiaceae, Cyperaceae and Ranunculaceae. From the above mentioned families, 167 taxa originated making 59.2% of the total vascular plant flora of the studied area. From the remaining 53 families, as many as 24 plants were represented by one species only (Table 1).

Regarding the occurrence frequency of species, the most numerous group consisted of rarely encountered taxa (45%), on the other hand, the frequently occurring species were the least numerous (3.9% of the total flora). No mass-occurrence species were recorded (Table 1).

Species found in the studied area represented all Raunkiaer's life forms. The most numerous group included 108 species of hemicryptophytes making 38.3% of the total flora. There was also a significant percentage of therophytes (66 species). Further in the ranking, we found geophytes, megaphanerophytes and nanophanerophytes. The least numerous groups included lignified and green chamephytes (totally 12 species) making only 4.3% of the total flora (Table 1).

Table 1

Alphabetical list of vascular plants of ecological uses "Różany Młyn" and "Wilczy Młyn"
Alfabetyczny wykaz roślin naczyniowych użytków ekologicznych „Różany Młyn" i „Wilczy Młyn"

No Lp.	Species Gatunek	Plant family Rodzina	Frequency of occurrence Częstość występowania		Historically-geographical group Grupa historyczno-geograficzna	Raunkiaer's life forms Formy życiowe	Phytocoenological group Grupa socjol.-ekol.	Categories of threat Kategorie zagrożenia	
			Różany Młyn	Wilczy Młyn				Poznań	Wielkopolska
1	2	3	4	5	6	7	8	9	10
1	*Acer campestre* L.	Aceraceae	IV	III	Ap	M	1	-	R
2	*Acer negundo* L.	Aceraceae	III	IV	Kn	M	1	-	-
3	*Acer platanoides* L.	Aceraceae	II	III	Ap	M	1	-	-
4	*Acer pseudoplatanus* L.	Aceraceae	II	III	Ap	M	1	-	-
5	*Achillea millefolium* L. s.s.	Asteraceae	III	IV	Ap	T	16	-	-
6	*Achillea ptarmica* L.	Asteraceae	-	II	Sp	H	8	PR	-
7	*Achillea salicifolia* Besser	Asteraceae	-	II	Sp	H	12	V	-
8	*Acorus calamus* L.	Araceae	-	II	Kn	Hy	7	-	-
9	*Adoxa moschatellina* L.	Adoxaceae	I	II	Sp	G	1	P1	-
10	*Aegopodium podagraria* L.	Apiaceae	II	II	Ap	H	3	-	-
11	*Aesculus hippocastanum* L.	Hippocastanaceae	I	I	Kn	M	18	-	-
12	*Aethusa cynapium* L.	Apiaceae	I	I	Ap	T	15	-	-
13	*Agrimonia eupatoria* L.	Rosaceae	-	II	Ap	H	4	-	-
14	*Agrostis canina* L. s.s.	Poaceae	-	II	Sp	H	6	V	-
15	*Agrostis capillaris* L.	Poaceae	II	III	Ap	H	5	-	-
16	*Agrostis gigantea* Roth	Poaceae	II	III	Ap	H	8	-	-
17	*Agrostis stolonifera* L.	Poaceae	II	III	Ap	H	10	-	-
18	*Ajuga reptans* L.	Lamiaceae	-	I	Sp	H	1	P1	-
19	*Alisma plantago-aquatica* L.	Alismataceae	I	II	Ap	Hy	7	-	-
20	*Alliaria petiolata* (M. Bieb.) Cavara & Grande	Brassicaceae	IV	III	Ap	H	3	-	-
21	*Allium schoenoprasum* L.	Alliaceae	I	II	Kn	G	18	-	-
22	*Allium vineale* L.	Alliaceae	I	I	Ap	G	4	-	-
23	*Alnus glutinosa* (L.) Gaertn.	Betulaceae	IV	III	Ap	M	6	-	-
24	*Alopecurus aequalis* Sobol.	Poaceae	-	II	Sp	H	11	V	-
25	*Alopecurus geniculatus* L.	Poaceae	II	III	Ap	H	10	-	-
26	*Alopecurus pratensis* L.	Poaceae	-	III	Ap	H	9	-	-
27	*Amaranthus retroflexus* L.	Amaranthaceae	II	III	Kn	T	14	-	-
28	*Anagallis arvensis* L.	Primulaceae	II	I	Arch	T	15	-	-
29	*Anchusa officinalis* L.	Boraginaceae	II	II	Ap	H	13	-	-
30	*Anemone nemorosa* L.	Ranunculaceae	I	I	Sp	G	1	P1	-
31	*Anemone ranunculoides* L.	Ranunculaceae	I	I	Sp	G	1	P1	-

Tabela 1 – cont.

1	2	3	4	5	6	7	8	9	10
32	*Anemone sylvestris* L.	Ranunculaceae	-	I	Sp	G	1	P1	-
33	*Angelica sylvestris* L.	Apiaceae	-	II	Ap	H	1	P3	-
34	*Anthemis arvensis* L.	Asteraceae	-	I	Arch	T	16	-	-
35	*Anthoxanthum odoratum* L. s.s.	Poaceae	II	II	Ap	H	9	-	-
36	*Anthriscus sylvestris* (L.) Hoffm.	Apiaceae	II	III	Ap	H	3	-	-
37	*Apera spica-venti* (L.) P. Beauv.	Poaceae	I	-	Arch	T	16	-	-
38	*Arabidopsis thaliana* (L.) Heynh.	Brassicaceae	III	I	Ap	H, T	16	-	-
39	*Arctium tomentosum* Mill.	Asteraceae	III	III	Ap	H	12	-	-
40	*Arenaria serpyllifolia* L.	Caryophyllaceae	-	II	Ap	T	5	-	-
41	*Armeria maritima* (Mill.) Willd.	Plumbaginaceae	-	III	Ap	H	5	-	-
42	*Arrhenatherum elatius* (L.) P. Beauv. ex J. Presl & C. Presl	Poaceae	III	II	Ap	H	9	-	-
43	*Artemisia campestris* L.	Asteraceae	-	II	Ap	Ch	5	-	-
44	*Artemisia vulgaris* L.	Asteraceae	III	IV	Ap	Ch	12	-	-
45	*Asarum europaeum* L.	Aristolochiaceae	I	II	Sp	H	1	V	-
46	*Asparagus officinalis* L.	Asparagaceae	-	I	Ap	G	5	-	-
47	*Aster novae-angliae* L.	Asteraceae	I	II	Kn	H	12	-	-
48	*Astragalus glycyphyllos* L.	Fabaceae	-	II	Ap	H	2	-	-
49	*Athyrium filix-femina* (L.) Roth	Athyriaceae	-	II	Sp	H	1	V	-
50	*Atriplex patula* L.	Chenopodiaceae	III	III	Arch	T	14	-	-
51	*Ballota nigra* L.	Lamiaceae	III	III	Arch	C, H	13	-	-
52	*Barbarea vulgaris* R. Br.	Brassicaceae	I	II	Ap	H	10	PR	-
53	*Batrachium circinatum* (Sibth.) Fr.	Ranunculaceae	-	I	Sp	Hy	7	V	-
54	*Bellis perennis* L.	Asteraceae	I	II	Ap	H	9	-	-
55	*Berberis vulgaris* L.	Berberidaceae	-	I	Sp	N	1	V	-
56	*Berteroa incana* (L.) DC.	Brassicaceae	II	III	Ap	H, T	13	-	-
57	*Berula erecta* (Huds.) Coville	Apiaceae	II	II	Sp	Hy	7	P2	-
58	*Betula pendula* Roth	Betulaceae	II	III	Ap	M	2	-	-
59	*Bidens frondosa* L.	Asteraceae	-	I	Kn	T	11	-	-
60	*Bidens tripartita* L.	Asteraceae	I	II	Ap	T	11	-	-
61	*Blysmus compressus* (L.) Panz. ex Link	Cyperaceae	II	IV	Sp	G	6	P1	-
62	*Bolboschoenus maritimus* (L.) Palla	Cyperaceae	-	I	Sp	Hy, G	7	V	-
63	*Brachypodium sylvaticum* (Huds.) P. Beauv.	Poaceae	-	II	Sp	H	1	P1	-
64	*Bromus erectus* Huds.	Poaceae	I	II	Sp	H	4	V	-

Tabela 1 – cont.

1	2	3	4	5	6	7	8	9	10
65	*Bromus hordeaceus* L.	Poaceae	-	I	Ap	T	13	-	-
66	*Bromus inermis* Leyss.	Poaceae	III	III	Ap	H	4	-	-
67	*Bromus sterilis* L.	Poaceae	-	II	Arch	T	13	-	-
68	*Bromus tectorum* L.	Poaceae	-	I	Arch	T	14	-	-
69	*Bryonia alba* L.	Cucurbita-ceae	-	II	Kn	H	3	-	-
70	*Bunias orientalis* L.	Brassicaceae	-	II	Kn	H	13	-	-
71	*Butomus umbellatus* L.	Butomaceae	-	I	Ap	Hy	7	P1	-
72	*Calamagrostis arundinacea* (L.) Roth	Poaceae	-	II	Sp	H	2	V	-
73	*Calamagrostis canescens* (Weber) Roth	Poaceae	-	I	Sp	H	6	V	-
74	*Calamagrostis epigejos* (L.) Roth	Poaceae	I	I	Ap	G	2	-	-
75	*Calluna vulgaris* (L.) Hull	Ericaceae	-	II	Sp	Ch	2	P1	-
76	*Caltha palustris* L.	Ranuncula-ceae	III	II	Sp	H	8	P3	-
77	*Calystegia sepium* (L.) R. Br.	Convolvula-ceae	III	IV	Ap	G, H, li	12	-	-
78	*Campanula patula* L. s.s.	Campanula-ceae	-	II	Sp	H	9	V	-
79	*Campanula rapunculoides* L.	Campanula-ceae	-	I	Ap	H	4	-	-
80	*Capsella bursa-pastoris* (L.) Medik.	Brassicaceae	III	III	Arch	T	10	-	-
81	*Cardamine amara* L.	Brassicaceae	-	II	Sp	H	1	P1	-
82	*Cardamine pratensis* L. s.s.	Brassicaceae	-	II	Ap	H	9	P2	-
83	*Cardaminopsis arenosa* (L.) Hayek	Brassicaceae	-	III	Ap	H	9	-	-
84	*Carduus crispus* L.	Asteraceae	-	III	Ap	H	12	-	-
85	*Carex acutiformis* Ehrh.	Cyperaceae	II	IV	Sp	Hy, G	6	P2	-
86	*Carex flava* L.	Cyperaceae	-	I	Sp	H	6	V	-
87	*Carex gracilis* Curtis	Cyperaceae	II	IV	Sp	G, Hy	6	P2	-
88	*Carex hirta* L.	Cyperaceae	II	III	Ap	G	10	-	-
89	*Carex nigra* Reichard	Cyperaceae	-	II	Sp	G	6	P1	-
90	*Carex ovalis* Gooden.	Cyperaceae	-	II	Ap	H	6	-	-
91	*Carex pairae* F.W. Schultz	Cyperaceae	I	II	Sp	Ch	2	V	-
92	*Carex paniculata* L.	Cyperaceae	-	II	Sp	H	6	P1	-
93	*Carex pilulifera* L.	Cyperaceae	-	II	Sp	H	2	V	-
94	*Carex praecox* Schreb.	Cyperaceae	-	I	Ap	G, H	5	-	-
95	*Carex pseudocyperus* L.	Cyperaceae	II	III	Sp	Hy, H	6	V	-
96	*Carex remota* L.	Cyperaceae	I	I	Sp	H	1	E	-
97	*Carex riparia* Curtis	Cyperaceae	II	II	Sp	Hy, H	6	P1	-
98	*Carex spicata* Huds.	Cyperaceae	II	II	Ap	H	2	-	-
99	*Carex sylvatica* Huds.	Cyperaceae	I	I	Sp	H	1	E	-
100	*Carex vulpina* L.	Cyperaceae	-	II	Ap	H, G	6	-	-
101	*Carlina vulgaris* L.	Asteraceae	I	-	Ap	H, T	4	-	-

Tabela 1 – cont.

1	2	3	4	5	6	7	8	9	10
102	*Carpinus betulus* L.	Corylaceae	II	II	Sp	M	1	P2	-
103	*Carum carvi* L.	Apiaceae	-	II	Ap	H	9	-	-
104	*Centaurea cyanus* L.	Asteraceae	II	II	Arch	T	16	-	-
105	*Centaurea jacea* L.	Asteraceae	I	III	Ap	H	9	-	-
106	*Centaurea scabiosa* L.	Asteraceae	-	II	Ap	H	4	-	-
107	*Centaurea stoebe* L.	Asteraceae	III	III	Ap	H	4	-	-
108	*Cerastium arvense* L. s.s.	Caryophyllaceae	-	II	Ap	C	5	-	-
109	*Cerastium holosteoides* Fr. em. Hyl.	Caryophyllaceae	I	III	Ap	C	9	-	-
110	*Cerastium semidecandrum* L.	Caryophyllaceae	-	II	Ap	T, H	5	-	-
111	*Cerasus avium* (L.) Moench	Rosaceae	I	-	Kn	N, M	1	-	-
112	*Cerasus vulgaris* Mill.	Rosaceae	II	-	Ef	N, M	1	-	-
113	*Ceratophyllum demersum* L. s.s.	Ceratophyllaceae	II	II	Sp	Hy	7	P1	-
114	*Ceratophyllum submersum* L.	Ceratophyllaceae	I	-	Sp	Hy	7	PR	V
115	*Chaerophyllum aromaticum* L.	Apiaceae	-	II	Ap	H	1	P1	-
116	*Chaerophyllum bulbosum* L.	Apiaceae	I	II	Ap	T, G	12	-	-
117	*Chaerophyllum temulum* L.	Apiaceae	III	III	Ap	T, H	3	-	-
118	*Chamaenerion angustifolium* (L.) Scop.	Onagraceae	II	II	Ap	H	2	-	-
119	*Chamomilla recutita* (L.) Rauschert	Asteraceae	II	-	Arch	T	16	-	-
120	*Chamomilla suaveolens* (Pursh) Rydb.	Asteraceae	I	II	Kn	T	10	-	-
121	*Chelidonium majus* L.	Papaveraceae	III	III	Ap	H	3	-	-
122	*Chenopodium album* L.	Chenopodiaceae	II	III	Ap	T	15	-	-
123	*Chenopodium glaucum* L.	Chenopodiaceae	-	II	Ap	T	11	-	-
124	*Chenopodium rubrum* L.	Chenopodiaceae	-	III	Ap	T	11	-	-
125	*Chrysosplenium alternifolium* L.	Saxifragaceae	II	III	Sp	H	6	V	-
126	*Cichorium intybus* L.	Asteraceae	III	III	Arch	H	13	-	-
127	*Cirsium arvense* (L.) Scop.	Asteraceae	III	IV	Ap	G	12	-	-
128	*Cirsium oleraceum* (L.) Scop.	Asteraceae	II	III	Ap	H	8	P3	-
129	*Cirsium palustre* (L.) Scop.	Asteraceae	II	III	Sp	H	8	P2	-
130	*Cirsium vulgare* (Savi) Ten.	Asteraceae	II	III	Ap	H	12	-	-
131	*Clematis vitalba* L.	Ranunculaceae	-	II	Kn	N, li	3	-	-
132	*Consolida regalis* Gray	Ranunculaceae	I	II	Arch	T	16	-	-
133	*Convallaria majalis* L.	Convallariaceae	-	I	Sp	G	2	P1	-

Tabela 1 – cont.

1	2	3	4	5	6	7	8	9	10
134	*Convolvulus arvensis* L.	Convolvulaceae	II	III	Arch	G, H, li	13	-	-
135	*Conyza canadensis* (L.) Cronquist	Asteraceae	III	III	Kn	T, H	14	-	-
136	*Cornus sanguinea* L.	Cornaceae	III	III	Sp	N	1	P1	-
137	*Coronilla varia* L.	Fabaceae	II	III	Ap	H	4	-	-
138	*Corydalis cava* Schweigg. & Korte	Fumariaceae	-	I	Sp	G	1	E	-
139	*Corylus avellana* L.	Corylaceae	IV	III	Ap	N	1	-	-
140	*Corynephorus canescens* (L.) P. Beauv.	Poaceae	-	II	Ap	H	5	-	-
141	*Crataegus laevigata* (Poir.) DC.	Rosaceae	III	III	Sp	N, M	1	P1	-
142	*Crataegus monogyna* Jacq.	Rosaceae	II	III	Ap	N, M	1	-	-
143	*Crepis biennis* L.	Asteraceae	-	II	Ap	H	9	-	-
144	*Crepis paludosa* (L.) Moench	Asteraceae	I	-	Sp	H	8	P1	-
145	*Cuscuta europaea* L.	Cuscutaceae	-	III	Sp	T, p	12	V	-
146	*Cynoglossum officinale* L.	Boraginaceae	-	II	Ap	H	13	-	-
147	*Cyperus fuscus* L.	Cyperaceae	-	I	Ap	T	11	-	-
148	*Dactylis glomerata* L.	Poaceae	III	IV	Ap	H	9	-	-
149	*Dactylorhiza majalis* (Rchb.) P.F. Hunt & Summerh.	Orchidaceae	-	I	Sp	G	8	P1	V
150	*Daucus carota* L.	Apiaceae	III	III	Ap	H	9	-	-
151	*Deschampsia caespitosa* (L.) P. Beauv.	Poaceae	II	IV	Ap	H	8	-	-
152	*Descurainia sophia* (L.) Webb ex Prantl	Brassicaceae	II	II	Arch	T	14	-	-
153	*Dianthus carthusianorum* L.	Caryophyllaceae	-	III	Ap	C	5	-	-
154	*Dianthus deltoides* L.	Caryophyllaceae	-	II	Ap	C, H	5	-	-
155	*Digitaria sanguinalis* (L.) Scop.	Poaceae	II	-	Arch	T	15	-	-
156	*Dryopteris carthusiana* (Vill.) H.P. Fuchs	Aspidiaceae	II	II	Ap	H	1	-	-
157	*Dryopteris filix-mas* (L.) Schott	Aspidiaceae	II	III	Ap	H	1	-	-
158	*Echinochloa crus-galli* (L.) P. Beauv.	Poaceae	II	II	Arch	T	15	-	-
159	*Echinocystis lobata* (F. Michx.) Torr. & A. Gray	Cucurbitaceae	-	II	Ef	T	18	-	-
160	*Echium vulgare* L.	Boraginaceae	III	II	Ap	H	13	-	-
161	*Eleocharis palustris* (L.) Roem & Schult.	Cyperaceae	-	I	Ap	Hy	6	P2	-
162	*Eleocharis uniglumis* (Link) Schult.	Cyperaceae	-	I	Sp	Hy	6	V	-
163	*Elodea canadensis* Michx.	Hydrocharitaceae	II	I	Kn	Hy	7	-	-
164	*Elymus caninus* (L.) L.	Poaceae	-	I	Sp	H	1	V	-

Tabela 1 – cont.

1	2	3	4	5	6	7	8	9	10
165	*Elymus repens* (L.) Gould.	Poaceae	IV	IV	Ap	G	10	-	-
166	*Epilobium hirsutum* L.	Onagraceae	II	III	Ap	H	8	-	-
167	*Epilobium montanum* L.	Onagraceae	I	II	Sp	H	1	PR	-
168	*Epipactis helleborine* (L.) Crantz	Orchidaceae	-	I	Ap	G	1	-	-
169	*Equisetum arvense* L.	Equisetaceae	II	II	Ap	G	15	-	-
170	*Equisetum fluviatile* L.	Equisetaceae	I	-	Sp	Hy, G	7	P2	-
171	*Equisetum hyemale* L.	Equisetaceae	-	I	Ap	C	1	-	-
172	*Equisetum palustre* L.	Equisetaceae	I	-	Ap	G	8	-	-
173	*Equisetum pratense* Ehrh.	Equisetaceae	-	II	Sp	G	1	P1	-
174	*Equisetum sylvaticum* L.	Equisetaceae	-	I	Sp	G	1	Ex	-
175	*Eragrostis minor* Host.	Poaceae	I	-	Kn	T	14	-	-
176	*Erigeron acris* L.	Asteraceae	II	II	Ap	T, H	5	-	-
177	*Erodium cicutarium* (L.) L'Hér.	Geraniaceae	II	III	Ap	T, H	15	-	-
178	*Erophila verna* (L.) Chevall.	Brassicaceae	II	I	Ap	T	5	-	-
179	*Erysimum cheiranthoides* L.	Brassicaceae	-	III	Ap	T	12	-	-
180	*Euonymus europaea* L.	Celastraceae	II	III	Sp	N	1	P1	-
181	*Eupatorium cannabinum* L.	Asteraceae	II	III	Sp	H	7	P2	-
182	*Euphorbia cyparissias* L.	Euphorbiaceae	-	III	Ap	H, G	5	-	-
183	*Euphorbia esula* L.	Euphorbiaceae	I	III	Ap	H	4	-	-
184	*Euphorbia peplus* L.	Euphorbiaceae	II	-	Arch	T	15	-	-
185	*Fagus sylvatica* L.	Fagaceae	-	II	Kn	M	1	-	-
186	*Falcaria vulgaris* Bernh.	Apiaceae	-	I	Ap	H	13	-	-
187	*Fallopia convolvulus* (L.) Á. Löve	Polygonaceae	II	III	Arch	T	15	-	-
188	*Fallopia dumetorum* (L.) Holub	Polygonaceae	II	IV	Ap	T	12	-	-
189	*Festuca arundinacea* Schreb.	Poaceae	-	I	Ap	H	10	-	-
190	*Festuca gigantea* (L.) Vill.	Poaceae	III	II	Sp	H	1	P2	-
191	*Festuca ovina* L. s.s.	Poaceae	-	II	Ap	H	5	-	-
192	*Festuca pratensis* Huds.	Poaceae	-	III	Ap	H	9	-	-
193	*Festuca rubra* L. s.s.	Poaceae	II	IV	Ap	H	9	-	-
194	*Festuca trachyphylla* (Hack.) Krajina	Poaceae	-	II	Ap	H	5	-	-
195	*Ficaria verna* Huds.	Ranunculaceae	III	III	Ap	G	1	-	-
196	*Filipendula ulmaria* (L.) Maxim.	Rosaceae	II	III	Sp	H	8	P2	-
197	*Fragaria vesca* L.	Rosaceae	-	II	Ap	H	2	-	-
198	*Frangula alnus* Mill.	Rhamnaceae	II	III	Sp	N	6	P1	-
199	*Fraxinus excelsior* L.	Oleaceae	IV	III	Ap	M	1	-	-
200	*Fumaria officinalis* L.	Fumariaceae	-	II	Arch	T	15	-	-
201	*Gagea lutea* (L.) Ker. Gawl.	Liliaceae	I	III	Sp	G	1	V	-

Tabela 1 – cont.

1	2	3	4	5	6	7	8	9	10
202	*Gagea pratensis* (Pers.) Dumort.	Liliaceae	II	I	Ap	G	3	-	-
203	*Galanthus nivalis* L.	Amaryllida-ceae	-	I	Ef	G	18	-	I
204	*Galeobdolon luteum* Huds.	Lamiaceae	-	II	Sp	C	1	V	-
205	*Galeopsis bifida* Boenn.	Lamiaceae	II	II	Ap	T	2	-	-
206	*Galeopsis pubescens* Besser	Lamiaceae	II	I	Ap	T	1	-	-
207	*Galeopsis tetrahit* L.	Lamiaceae	I	II	Ap	T	2	-	-
208	*Galinsoga parviflora* Cav.	Asteraceae	III	II	Kn	T	15	-	-
209	*Galium aparine* L.	Rubiaceae	III	III	Ap	T	3	-	-
210	*Galium mollugo* L. s.s.	Rubiaceae	II	III	Ap	H	9	-	-
211	*Galium palustre* L.	Rubiaceae	-	II	Sp	H	6	P3	-
212	*Galium verum* L. s.s.	Rubiaceae	I	II	Ap	H	5	-	-
213	*Geranium pratense* L.	Geraniaceae	II	I	Ap	H	9	-	-
214	*Geranium robertianum* L.	Geraniaceae	II	III	Ap	T, H	3	-	-
215	*Geum rivale* L.	Rosaceae	III	II	Sp	H	8	P2	-
216	*Geum urbanum* L.	Rosaceae	IV	IV	Ap	H	3	-	-
217	*Glechoma hederacea* L.	Lamiaceae	III	III	Ap	G, H	3	-	-
218	*Glyceria fluitans* (L.) R. Br.	Poaceae	-	I	Sp	Hy	7	P2	-
219	*Glyceria maxima* (Hartm.) Holmb.	Poaceae	-	III	Sp	Hy	7	P1	-
220	*Hedera helix* L.	Araliaceae	-	I	Ap	Ch, N	1	-	-
221	*Helianthus tuberosus* L.	Asteraceae	I	II	Kn	G	12	-	-
222	*Helichrysum arenarium* (L.) Moench	Asteraceae	-	III	Ap	H	5	-	-
223	*Hepatica nobilis* Schreb.	Ranuncula-ceae	II	II	Sp	H	1	V	-
224	*Heracleum sphondylium* L. s.s.	Apiaceae	III	III	Ap	H	9	-	-
225	*Hieracium lachenalii* C.C. Gmel.	Asteraceae	-	I	Sp	H	2	V	-
226	*Hieracium murorum* L.	Asteraceae	-	II	Sp	H	2	V	-
227	*Hieracium pilosella* L.	Asteraceae	-	II	Ap	H	5	-	-
228	*Holcus lanatus* L.	Poaceae	III	IV	Ap	H	9	-	-
229	*Holcus mollis* L.	Poaceae	-	II	Ap	G, H	2	-	-
230	*Holosteum umbellatum* L.	Caryophylla-ceae	-	I	Ap	T	5	-	-
231	*Hordeum murinum* L.	Poaceae	-	I	Arch	T	14	-	-
232	*Humulus lupulus* L.	Cannabaceae	III	III	Ap	H	3	-	-
233	*Hypericum maculatum* Crantz	Hypericaceae	-	I	Ap	H	8	-	-
234	*Hypericum perforatum* L.	Hypericaceae	-	II	Ap	H	4	-	-
235	*Hypochoeris radicata* L.	Asteraceae	-	II	Ap	H	5	-	-
236	*Impatiens glandulifera* Royle	Balsaminace-ae	II	I	Ef	T	18	-	-
237	*Impatiens noli-tangere* L.	Balsamina-ceae	I	I	Sp	T	1	E	-
238	*Impatiens parviflora* DC.	Balsamina-ceae	IV	III	Kn	T	3	-	-

Tabela 1 – cont.

1	2	3	4	5	6	7	8	9	10
239	*Inula britannica* L.	Asteraceae	-	II	Ap	H	10	-	-
240	*Iris pseudacorus* L.	Iridaceae	I	III	Sp	Hy, G	6	P2	-
241	*Jasione montana* L.	Campanulaceae	-	II	Ap	H	5	-	-
242	*Juncus articulatus* L. em. K. Richt.	Juncaceae	I	-	Ap	H	8	-	-
243	*Juncus compressus* Jacq.	Juncaceae	-	II	Ap	G	10	-	-
244	*Juncus conglomeratus* L. em. Leers	Juncaceae	-	II	Ap	H	8	-	-
245	*Juncus effusus* L.	Juncaceae	-	II	Ap	H	8	-	-
246	*Lactuca serriola* L.	Asteraceae	I	III	Arch	H	14	-	-
247	*Lamium album* L.	Lamiaceae	II	III	Arch	H	3	-	-
248	*Lamium purpureum* L.	Lamiaceae	II	II	Arch	T, H	15	-	-
249	*Lapsana communis* L. s.s.	Asteraceae	-	II	Ap	H, T	1	-	-
250	*Lathyrus pratensis* L.	Fabaceae	-	III	Ap	H	9	-	-
251	*Lemna gibba* L.	Lemnaceae	-	I	Sp	Hy	7	E	-
252	*Lemna minor* L.	Lemnaceae	II	III	Ap	Hy	7	-	-
253	*Leontodon autumnalis* L.	Asteraceae	I	II	Ap	H	10	-	-
254	*Leonurus cardiaca* L.	Lamiaceae	-	II	Arch	H	12	-	-
255	*Lepidium ruderale* L.	Brassicaceae	-	I	Arch	T, H	14	-	-
256	*Ligustrum vulgare* L.	Oleaceae	I	II	Kn	N	1	-	-
257	*Linaria vulgaris* Mill.	Scrophulariaceae	II	III	Ap	G	13	-	-
258	*Lithospermum arvense* L.	Boraginaceae	II	-	Arch	T	16	-	-
259	*Lolium multiflorum* Lam.	Poaceae	I	-	Kn	H, T	14	-	-
260	*Lolium perenne* L.	Poaceae	III	III	Ap	H	10	-	-
261	*Lotus corniculatus* L.	Fabaceae	II	III	Ap	H	9	-	-
262	*Lupinus angustifolius* L.	Fabaceae	-	I	Kn	T	18	-	-
263	*Lupinus polyphyllus* Lindl.	Fabaceae	II	II	Kn	H	18	-	-
264	*Luzula campestris* (L.) DC.	Juncaceae	-	II	Sp	H	9	P2	-
265	*Luzula multiflora* (Retz.) Lej.	Juncaceae	-	I	Sp	H	2	P1	-
266	*Luzula pilosa* (L.) Willd.	Juncaceae	-	II	Sp	H	2	V	-
267	*Lychnis flos-cuculi* L.	Caryophyllaceae	I	III	Sp	H	8	P2	-
268	*Lycium barbarum* L.	Solanaceae	-	II	Kn	N	13	-	-
269	*Lycopersicon esculentum* Mill.	Solanaceae	-	I	Kn	T	18	-	-
270	*Lycopus europaeus* L.	Lamiaceae	II	III	Ap	H, Hy	7	-	-
271	*Lysimachia nummularia* L.	Primulaceae	II	III	Sp	C	6	P3	-
272	*Lysimachia thyrsiflora* L.	Primulaceae	-	II	Sp	H, Hy	6	V	-
273	*Lysimachia vulgaris* L.	Primulaceae	II	III	Sp	H	8	P3	-
274	*Lythrum salicaria* L.	Lythraceae	III	IV	Ap	H	8	-	-
275	*Mahonia aquifolia* (Pursh) Nutt.	Berberidaceae	-	I	Ef	N	18	-	-
276	*Maianthemum bifolium* (L.) F.W. Schmidt	Convallariaceae	II	II	Sp	G	1	P1	-
277	*Malva neglecta* Wallr.	Malvaceae	-	II	Arch	H, T	14	-	-

Tabela 1 – cont.

1	2	3	4	5	6	7	8	9	10
278	*Matricaria maritima* L.	Asteraceae	III	II	Arch	T, H	16	-	-
279	*Medicago falcata* L.	Fabaceae	-	II	Ap	H	4	-	-
280	*Medicago lupulina* L.	Fabaceae	-	II	Ap	T, H	13	-	-
281	*Medicago sativa* L. s.s.	Fabaceae	-	III	Kn	H	9	-	-
282	*Melandrium album* (Mill.) Garcke	Caryophyllaceae	III	III	Ap	T	13	-	-
283	*Melilotus alba* Medik.	Fabaceae	-	II	Ap	T	13	-	-
284	*Melilotus officinalis* (L.) Pall.	Fabaceae	-	II	Ap	T	13	-	-
285	*Mentha aquatica* L.	Lamiaceae	II	III	Sp	H, Hy	7	P2	-
286	*Mentha arvensis* L.	Lamiaceae	III	-	Ap	G, Hy	11	-	-
287	*Moehringia trinervia* (L.) Clairv.	Caryophyllaceae	II	II	Sp	T, H	1	P2	-
288	*Mycelis muralis* (L.) Dumort.	Asteraceae	-	II	Sp	H	1	P1	-
289	*Myosotis arvensis* (L.) Hill	Boraginaceae	II	II	Arch	T, H	16	-	-
290	*Myosotis palustris* (L.) L. em. Rchb.	Boraginaceae	-	II	Sp	H	7	P3	-
291	*Myosotis stricta* Link ex Roem. & Schult.	Boraginaceae	-	I	Ap	T	5	-	-
292	*Myosotis sylvatica* Ehrh. ex Hoffm.	Boraginaceae	I	II	Ap	H	1	-	-
293	*Myosoton aquaticum* (L.) Moench	Caryophyllaceae	II	II	Ap	G, H	7	-	-
294	*Myosurus minimus* L.	Ranunculaceae	I	I	Ap	T	11	PR	-
295	*Nasturtium officinale* R. Br.	Brassicaceae	II	II	Sp	Hy	7	E	-
296	*Oenanthe aquatica* (L.) Poir.	Apiaceae	-	III	Sp	Hy, H	7	P2	-
297	*Oenothera biennis* L. s.s.	Onagraceae	II	III	Ap	H	13	-	-
298	*Ononis spinosa* L.	Fabaceae	-	I	Ap	H	4	-	-
299	*Ornithogalum nutans* L.	Hyacinthaceae	I	I	Kn	CG	3	-	-
300	*Oxalis acetosella* L.	Oxalidaceae	I	II	Sp	G, H	1	V	-
301	*Padus avium* Mill.	Rosaceae	II	II	Sp	M	1	P2	-
302	*Padus serotina* (Ehrh.) Borkh.	Rosaceae	II	III	Kn	M	2	-	-
303	*Papaver rhoeas* L.	Papaveraceae	II	-	Arch	T	16	-	-
304	*Petrorhagia prolifera* (L.) P.W. Ball & Heywood	Caryophyllaceae	-	I	Ap	T	5	-	-
305	*Peucedanum palustre* (L.) Moench	Apiaceae	II	II	Sp	H	6	P1	-
306	*Phacelia tanacetifolia* Benth.	Hydrophyllaceae	-	I	Ef	T	18	-	-
307	*Phalaris arundinacea* L.	Poaceae	II	IV	Ap	G, H	7	-	-
308	*Phleum pratense* L.	Poaceae	-	II	Ap	H	9	-	-
309	*Phragmites australis* (Cav.) Trin. ex Steud.	Poaceae	-	III	Ap	G, Hy	7	-	-
310	*Picris hieracioides* L.	Asteraceae	II	II	Ap	H	13	-	-
311	*Pimpinella saxifraga* L.	Apiaceae	-	II	Ap	H	13	-	-
312	*Pinus sylvestris* L.	Pinaceae	-	IV	Sp	M	2	P2	-

Tabela 1 – cont.

1	2	3	4	5	6	7	8	9	10
313	*Plantago lanceolata* L.	Plantaginaceae	III	II	Ap	H	10	-	-
314	*Plantago major* L. s.s.	Plantaginaceae	II	II	Ap	H	10	-	-
315	*Plantago media* L.	Plantaginaceae	-	I	Ap	H	9	-	-
316	*Poa angustifolia* L.	Poaceae	-	II	Ap	H	4	-	-
317	*Poa annua* L.	Poaceae	II	II	Ap	T, H	10	-	-
318	*Poa compressa* L.	Poaceae	-	II	Ap	H	13	-	-
319	*Poa nemoralis* L.	Poaceae	II	II	Ap	H	1	-	-
320	*Poa palustris* L.	Poaceae	-	I	Ap	H	12	-	-
321	*Poa pratensis* L. s.s.	Poaceae	I	III	Ap	H	9	-	-
322	*Poa trivialis* L.	Poaceae	II	III	Ap	H	9	-	
323	*Polygonatum multiflorum* (L.) All.	Convallariaceae	II	II	Sp	G	1	V	-
324	*Polygonum amphibium* L.	Polygonaceae	I	I	Ap	G, Hy	10	-	-
325	*Polygonum aviculare* L.	Polygonaceae	III	III	Ap	T	10	-	-
326	*Polygonum bistorta* L.	Polygonaceae	-	II	Sp	G, H	8	P1	-
327	*Polygonum hydropiper* L.	Polygonaceae	-	II	Ap	T	11	-	-
328	*Polygonum lapathifolium* L.	Polygonaceae	II	III	Ap	T	15	-	-
329	*Polygonum persicaria* L.	Polygonaceae	I	II	Ap	T	15	-	-
330	*Populus alba* L.	Salicaceae	I	II	Ap	M	1	-	-
331	*Populus nigra* L.	Salicaceae	I	II	Ap	M	7	-	R
332	*Populus tremula* L.	Salicaceae	III	IV	Ap	M	2	-	-
333	*Potamogeton pectinatus* L.	Potamogetonaceae	-	I	Ap	Hy	7	-	-
334	*Potentilla arenaria* Borkh.	Rosaceae	II	II	Ap	H	5	-	-
335	*Potentilla argentea* L. s.s.	Rosaceae	II	III	Ap	H	5	-	-
336	*Potentilla erecta* (L.) Raeusch.	Rosaceae	-	II	Sp	H	8	P1	-
337	*Potentilla reptans* L.	Rosaceae	II	III	Ap	H	10	-	-
338	*Primula veris* L.	Primulaceae	-	I	Sp	H	4	V	-
339	*Prunella vulgaris* L.	Lamiaceae	III	III	Ap	H	9	-	-
340	*Prunus spinosa* L.	Rosaceae	III	IV	Ap	N	1	-	-
341	*Pteridium aquilinum* (L.) Kuhn.	Hypolepidaceae	III	II	Sp	G	2	V	-
342	*Puccinelia distans* (Jacq.) Parl.	Poaceae	I	-	Ap	H	10	-	-
343	*Pulicaria vulgaris* Gaertn.	Asteraceae	-	II	Ap	T	10	I	-
344	*Pyrus communis* L.	Rosaceae	I	I	Ap	M	1	-	-
345	*Quercus petraea* (Matt.) Liebl.	Fagaceae	III	III	Sp	M	2	V	-
346	*Quercus robur* L.	Fagaceae	II	III	Ap	M	1	-	-
347	*Quercus rubra* L.	Fagaceae	-	III	Kn	M	2	-	-
348	*Ranunculus acris* L. s.s.	Ranunculaceae	II	III	Ap	H	9	-	-
349	*Ranunculus lanuginosus* L.	Ranunculaceae	-	I	Sp	H	1	E	-
350	*Ranunculus repens* L.	Ranunculaceae	III	IV	Ap	H	10	-	-

Tabela 1 – cont.

1	2	3	4	5	6	7	8	9	10
351	*Ranunculus sceleratus* L.	Ranunculaceae	II	III	Ap	T	11	-	-
352	*Rhamnus cathartica* L.	Rhamnaceae	-	II	Sp	N	1	P1	-
353	*Rhus typhina* L.	Anacardiaceae	-	I	Ef	N	18	-	-
354	*Ribes nigrum* L.	Grossulariaceae	I	II	Sp	N	6	P1	-
355	*Ribes spicatum* E. Robson	Grossulariaceae	-	I	Sp	N	1	P1	-
356	*Ribes uva-crispa* L.	Grossulariaceae	-	I	Kn	N	1	-	-
357	*Robinia pseudoacacia* L.	Fabaceae	II	IV	Kn	M	3	-	-
358	*Rorippa amphibia* (L.) Besser	Brassicaceae	II	III	Ap	Hy, H	7	-	-
359	*Rosa canina* L.	Rosaceae	II	III	Ap	N	1	-	-
360	*Rosa rugosa* Thunb.	Rosaceae	-	I	Kn	N	18	-	-
361	*Rubus caesius* L.	Rosaceae	IV	III	Ap	Ch, N	12	-	-
362	*Rubus idaeus* L.	Rosaceae	III	II	Ap	N	1	-	-
363	*Rudbeckia laciniata* L.	Asteraceae	-	I	Kn	H	18	-	-
364	*Rumex acetosa* L.	Polygonaceae	III	IV	Ap	H	9	-	-
365	*Rumex acetosella* L.	Polygonaceae	III	III	Ap	G, H	5	-	-
366	*Rumex conglomeratus* Murray	Polygonaceae	I	II	Ap	H	10	-	-
367	*Rumex crispus* L.	Polygonaceae	III	III	Ap	H	10	-	-
368	*Rumex hydrolapathum* Huds.	Polygonaceae	II	III	Sp	Hy, H	7	P2	-
369	*Rumex maritimus* L.	Polygonaceae	I	II	Ap	T	11	-	-
370	*Rumex obtusifolius* L.	Polygonaceae	II	-	Ap	H	12	-	-
371	*Sagina nodosa* (L.) Fenzl	Caryophyllaceae	-	I	Sp	H, C	11	I	-
372	*Sagittaria sagittifolia* L.	Alismataceae	-	II	Sp	Hy	7	V	-
373	*Salix alba* L.	Salicaceae	I	II	Ap	M	7	-	-
374	*Salix caprea* L.	Salicaceae	I	I	Ap	N, M	3	-	-
375	*Salix cinerea* L.	Salicaceae	I	II	Ap	N	6	-	-
376	*Salix fragilis* L.	Salicaceae	II	III	Ap	M	7	-	-
377	*Salix pentandra* L.	Salicaceae	-	I	Sp	M, N	6	I	-
378	*Salix purpurea* L.	Salicaceae	-	IV	Ap	N	7	-	-
379	*Salix viminalis* L.	Salicaceae	-	II	Ap	N	7	-	-
380	*Salvia pratensis* L.	Lamiaceae	-	I	Sp	H	4	V	-
381	*Sambucus nigra* L.	Caprifoliaceae	IV	III	Ap	N	3	-	-
382	*Sambucus racemosa* L.	Caprifoliaceae	-	I	Kn	N	3	-	-
383	*Saponaria officinalis* L.	Caryophyllaceae	-	II	Ap	H	12	-	-
384	*Scabiosa ochroleuca* L.	Dipsacaceae	-	II	Ap	H	4	PR	-
385	*Scilla bifolia* L. s. str.	Hyacinthaceae	-	I	Ef	G	18	-	-
386	*Scirpus sylvaticus* L.	Cyperaceae	II	III	Sp	G	8	P2	-
387	*Scleranthus annuus* L.	Caryophyllaceae	-	III	Arch	T	16	-	-

Tabela 1 – cont.

1	2	3	4	5	6	7	8	9	10
388	*Scrophularia nodosa* L.	Scrophulariaceae	II	III	Sp	H	1	P2	-
389	*Scrophularia umbrosa* Dumort.	Scrophulariaceae	I	I	Sp	H, Hy	7	P1	
390	*Scutellaria galericulata* L.	Lamiaceae	II	III	Sp	H	6	P2	-
391	*Sedum acre* L.	Crassulaceae	-	II	Ap	C	5	-	-
392	*Sedum dasyphyllum* L.	Crassulaceae	-	II	Ef	C	18	-	-
393	*Sedum sexangulare* L.	Crassulaceae	-	III	Sp	C	5	V	-
394	*Senecio jacobaea* L.	Asteraceae	II	III	Ap	H	4	-	-
395	*Setaria viridis* (L.) P. Beauv.	Poaceae	II	I	Arch	T	15	-	-
396	*Sicyos angulata* L.	Cucurbitaceae	-	I	Ef	T	18	-	-
397	*Sinapis arvensis* L.	Brassicaceae	I	I	Arch	T	15	-	-
398	*Sisymbrium altissimum* L.	Brassicaceae	I	II	Kn	T, H	14	-	-
399	*Sisymbrium loeselii* L.	Brassicaceae	-	II	Kn	T, H	14	-	-
400	*Sisymbrium officinale* (L.) Scop.	Brassicaceae	I	I	Arch	T	13	-	-
401	*Sium latifolium* L.	Apiaceae	II	II	Sp	Hy, H	7	P1	-
402	*Solanum dulcamara* L.	Solanaceae	I	III	Ap	C, H, N	12	-	-
403	*Solidago canadensis* L.	Asteraceae	III	III	Kn	H, G	12	-	-
404	*Solidago gigantea* Aiton	Asteraceae	-	II	Kn	H, G	12	-	-
405	*Solidago virgaurea* L. s.s.	Asteraceae	-	II	Sp	H	2	P1	-
406	*Sonchus arvensis* L.	Asteraceae	I	I	Ap	G, H	15	-	-
407	*Sorbus aucuparia* L. em. Hedl.	Rosaceae	II	III	Ap	N, M	2	-	-
408	*Sparganium emersum* Rehmann	Sparganiaceae	-	I	Sp	Hy	7	V	-
409	*Sparganium erectum* L. em. Rchb. s.s.	Sparganiaceae	-	I	Sp	Hy	7	P1	-
410	*Spergula arvensis* L.	Caryophyllaceae	-	II	Arch	T	15	-	-
411	*Spergularia rubra* (L.) J. Presl & C. Presl	Caryophyllaceae	-	II	Ap	T, H	11	-	-
412	*Spirodela polyrhiza* (L.) Schleid.	Lemnaceae	-	II	Sp	Hy	7	V	-
413	*Stachys palustris* L.	Lamiaceae	I	II	Ap	G	8	-	-
414	*Stachys sylvatica* L.	Lamiaceae	I	II	Sp	H	1	P1	-
415	*Stelaria holostea* L.	Caryophyllaceae	-	II	Sp	C	1	V	-
416	*Stellaria media* (L.) Vill.	Caryophyllaceae	III	II	Ap	T	15	-	-
417	*Stellaria nemorum* L.	Caryophyllaceae	-	II	Sp	H	1	V	-
418	*Succisa pratensis* Moench	Dipsacaceae	-	I	Sp	H	8	P1	-
419	*Symphoricarpos albus* (L.) S.F. Blake	Caprifoliaceae	I	II	Kn	N	1	-	-
420	*Symphytum officinale* L.	Boraginaceae	-	III	Ap	G	9	-	-
421	*Syringa vulgaris* L.	Oleaceae	I	II	Kn	N	1	-	-

Tabela 1 – cont.

1	2	3	4	5	6	7	8	9	10
422	*Tanacetum vulgare* L.	Asteraceae	II	III	Kn	H	13	-	-
423	*Taraxacum officinale* F.H. Wigg.	Asteraceae	III	III	Ap	H	6	-	-
424	*Thalictrum flavum* L.	Ranuncula-ceae	-	II	Sp	H	8	P1	-
425	*Thlaspi arvense* L.	Brassicaceae	III	II	Arch	T	15	-	-
426	*Thymus serpyllum* L. em. Fr.	Lamiaceae	-	I	Ap	C	5	-	-
427	*Tilia cordata* Mill.	Tiliaceae	II	III	Ap	M	1	-	-
428	*Tilia platyphyllos* Scop.	Tiliaceae	-	I	Kn	M	1	-	-
429	*Torilis japonica* (Houtt.) DC.	Apiaceae	II	III	Ap	T, H	3	-	-
430	*Tragopogon dubius* Scop.	Asteraceae	-	I	Ap	H	13	-	-
431	*Tragopogon pratensis* L. s.s.	Asteraceae	I	-	Ap	H	9	-	-
432	*Trifolium alpestre* L.	Fabaceae	-	I	Sp	H	2	E	-
433	*Trifolium arvense* L.	Fabaceae	-	III	Ap	T	5	-	-
434	*Trifolium campestre* Schreb.	Fabaceae	II	-	Ap	T	5	-	-
435	*Trifolium dubium* Sibth.	Fabaceae	I	-	Ap	T	9	-	-
436	*Trifolium medium* L.	Fabaceae	-	II	Ap	H	4	-	-
437	*Trifolium pratense* L.	Fabaceae	I	III	Ap	H	9	-	-
438	*Trifolium repens* L.	Fabaceae	II	III	Ap	C, H	10	-	-
439	*Trollius europaeus* L. s.s.	Ranuncula-ceae	I	-	Sp	H	8	V	V
440	*Tussilago farfara* L.	Asteraceae	II	II	Ap	G	13	-	-
441	*Typha angustifolia* L.	Typhaceae	III	II	Ap	Hy, H	7	P1	-
442	*Typha latifolia* L.	Typhaceae	III	IV	Ap	Hy, H	7	P2	-
443	*Ulmus glabra* Huds.	Ulmaceae	-	I	Ap	M	1	-	-
444	*Ulmus laevis* Pall.	Ulmaceae	III	III	Ap	M	1	-	-
445	*Ulmus minor* Mill. em. Richens	Ulmaceae	I	II	Ap	M	1	-	-
446	*Urtica dioica* L.	Urticaceae	IV	IV	Ap	H	12	-	-
447	*Urtica urens* L.	Urticaceae	-	I	Arch	T	15	-	-
448	*Valeriana officinalis* L.	Valeriana-ceae	I	I	Sp	H	8	P1	-
449	*Verbascum densiflorum* Bertol.	Scrophularia-ceae	-	I	Ap	H	13	-	-
450	*Veronica anagallis-aquatica* L.	Scrophularia-ceae	I	I	Sp	H	7	P1	-
451	*Veronica beccabunga* L.	Scrophularia-ceae	I	I	Sp	C, Hy	7	V	-
452	*Veronica chamaedrys* L. s.s.	Scrophularia-ceae	III	IV	Ap	C	9	-	-
453	*Veronica hederifolia* L. s.s.	Scrophularia-ceae	I	II	Ap	T	3	-	-
454	*Veronica longifolia* L.	Scrophularia-ceae	-	I	Sp	H	8	P1	-
455	*Veronica officinalis* L.	Scrophularia-ceae	-	I	Sp	C	2	P1	-
456	*Veronica persica* Poir.	Scrophularia-ceae	III	-	Kn	T	16	-	-

Tabela 1 – cont.

1	2	3	4	5	6	7	8	9	10
457	*Veronica serpyllifolia* L.	Scrophulariaceae	-	I	Ap	H	10	PR	-
458	*Veronica triphyllos* L.	Scrophulariaceae	III	I	Arch	T	16	-	-
459	*Viburnum opulus* L.	Caprifoliaceae	IV	II	Sp	N	1	P1	-
460	*Vicia angustifolia* L.	Fabaceae	II	III	Arch	T	16	-	-
461	*Vicia cassubica* L.	Fabaceae	-	I	Ap	H	4	-	-
462	*Vicia cracca* L.	Fabaceae	II	III	Ap	H	9	-	-
463	*Vicia hirsuta* (L.) Gray	Fabaceae	II	II	Arch	T	16	-	-
464	*Vicia lathyroides* L.	Fabaceae	I	-	Ap	T, H	5	-	-
465	*Vicia sepium* L.	Fabaceae	II	II	Sp	H	1	P1	-
466	*Vicia tetrasperma* (L.) Schreb.	Fabaceae	II	-	Arch	T	16	-	-
467	*Vicia villosa* Roth	Fabaceae	-	II	Arch	T	16	-	-
468	*Vinca minor* L.	Apocynaceae	-	I	Kn	C	18	-	-
469	*Viola arvensis* Murray	Violaceae	III	II	Arch	T	16	-	-
470	*Viola hirta* L.	Violaceae	-	I	Sp	H	4	V	-
471	*Viola odorata* L.	Violaceae	II	II	Ap	H	3	-	-
472	*Viola reichenbachiana* Jord. ex Boreau	Violaceae	I	I	Sp	H	1	P1	-
473	*Viola riviniana* Rchb.	Violaceae	-	II	Sp	H	2	V	-
474	*Viola tricolor* L. s.s.	Violaceae	II	I	Ap	T	5	-	-
475	*Viscum album* L.	Loranthaceae	I	I	Ap	C, pp	1	-	-
476	*Xanthium albinum* (Widder) H. Scholz	Asteraceae	-	II	Kn	T	11	-	-

Explanation of abbreviations and signs:

M – megaphanerophyte, **N** – nanophanerophyte, **Ch** – wooden chamaephyte, **C** – herbaceous chamaephyte, **H** – hemicryptophyte, **G** – geophyte, **Hy** – hydro, helophyte, **T** – terophyte, **Sp** – spontaneophytes, **Ap** – apophytes, **Arch** – archeophytes, **Kn** – kenophytes, **Ef** – ergasiophytes, pp – semiparasite.

1 – *Fagetalia*, *Prunetalia*, **2** – *Quercion*, *Epilobion*, *Nardetalia*, **3** – *Sambuco-Salicion*, *Alliarion*, **4** – *Trifolio--Geranietea*, *Festuco-Brometea*, **5** – *Corynephoretea*, *Sedo-Scleranthetea*, **6** – *Alnion*, *Magnocaricion*, *Caricetalia fuscae*, *Sphagnion fusci*, **7** – *Salicion*, *Phragmition*, *Glycerio-Sparganion*, *Potamogetonea*, *Lemnetea*, *Utricularietea*, **8** – *Molinietalia*, **9** – *Arrhenatheretalia* and characteristic species of *Molinio-Arrhenatheretea*, **10** – *Plantaginetea* with *Agropyro-Rumicion crispi*, **11** – *Bidentetea*, *Nanocyperion*, **12** – *Arction*, *Convolvulion*, **13** – *Onopordion*, **14** – *Sisymbrion*, *Eragrostion*, **15** – *Polygono-Chenopodietalia*, **16** – *Aperetalia*, **17** – *Asplenietea*, **18** – native species or naturalized antropophytes of undetermined phytosociological status and ephemenophits.

Ex – extinct (missing), **E** – directly endangered species, **V** – badly vulnerable, **P (P1, P2, P3)** – potentially liable to danger, **PR** – potentially endangered, **I** – endangered – uncertain.

Frequency scale of occurence is explaining in the chapter "Material and methods".

Objaśnienia skrótów i znaków:

M – megafanerofity, **N** – nanofanerofity, **Ch** – chamefity zdrewniałe, **C** – chamefity zielne, **H** – hemikryptofity, **G** – geofity, **Hy** – hydrofity i helofity, **T** – terofity, **Sp** – spontaneofity półsynantropijne, **Ap** – spontaneofity synantropijne = apofity, **Arch** – archeofity, **Kn** – kenofity = neofity, **Ef** – diafity = efemerofity, pp – półpasożyty.

1 – *Fagetalia*, *Prunetalia*, **2** – *Quercion*, *Epilobion*, *Nardetalia*, **3** – *Sambuco-Salicion*, *Alliarion*, **4** – *Trifolio--Geranietea*, *Festuco-Brometea*, **5** – *Corynephoretea*, *Sedo-Scleranthetea*, **6** – *Alnion*, *Magnocaricion*, *Caricetalia fuscae*, *Sphagnion fusci*, **7** – *Salicion*, *Phragmition*, *Glycerio-Sparganion*, *Potamogetonea*, *Lemnetea*, *Utricularietea*, **8** – *Molinietalia*, **9** – *Arrhenatheretalia* i gatunki charakterystyczne dla klasy *Molinio-Arrhenatheretea*, **10** – *Plantaginetea* wraz z *Agropyro-Rumicion crispi*, **11** – *Bidentetea*, *Nanocyperion*, **12** – *Arction*, *Convolvulion*, **13** – *Onopordion*, **14** – *Sisymbrion*, *Eragrostion*, **15** – *Polygono-Chenopodietalia*, **16** – *Aperetalia*, **17** – *Asplenietea*, **18** – gatunki rodzime lub zadomowione antropofity o bliżej nieokreślonej przynależności fitosocjologicznej oraz efemerofity.

Ex – gatunki wymarłe (zaginione), **E** – gatunki bezpośrednio zagrożone, **V** – gatunki silnie zagrożone, **P (P1, P2, P3)** – potencjalnie narażone, **PR** – potencjalnie zagrożone, **I** – zagrożone niepewnie.

Skalę częstości występowania gatunków wyjaśniono w rozdziale „Materiał i metody".

In reference to historical and geographical classification, the most numerous group among the plants of the investigated area was created by native species – apophytes represented by 160 taxa (56.7% of all recorded species) and spontaneophytes (63 species making 22.3%). The least numerous ones were ephemerophytes – only two species making 0.7% of total taxa (Table 1).

Analysis of the participation of the particular sociological and ecological groups showed that as many as 53 plant species (18.8%) belonged to group l, i.e. to fertile deciduous forest communities and riverside shrub communities. A fairly numerous group was created by species growing in forest and riverside thicket communities, rush communities and water communities (group 7), in fresh and moderately fresh meadow communities (group 9) and in nitrophilous communities of flooded and trampled communities and in nitrophilous thicket and skirt communities (group 3). These groups were represented by 25, 23, and 21 species respectively making 8.7; 8.2 and 74% of the total studied flora. On the other hand. the least number of species (four in each group) belonged to groups 11 and 18 occurring in therophyte communities in wet and moist habitats, or in communities without any closer defined phytosociological affiliation. These species made only 1.4% each of the total species number. On the studied area, no species occurring in ruderal weed communities were found (Table 1).

Seven legally protected plants were identified and three among them are subject to strict protection: *Hepatica nobilis*, *Nasturtium officinale*, *Trollius europaeus*. Another four species of this group: *Asarum europaeum*, *Frangula alnus*, *Ribes nigrum* and *Viburnum opulus* are covered by partial protection.

On the ecological area "Różany Młyn", 68 species of plants endangered for Poznań were recorded (**Jackowiak** 1993). Four species in this number are on the list of directly endangered species occurring only in single localities, 13 are strongly threatened and four are in potential danger. The most numerous group consisted of 347 potentially threatened species making 16.7% of the total flora on the studied area. Furthermore, two species (*Populus nigra*, *Acer campestre*) were identified which had not been classified by **Jackowiak** (1993) to the group of endangered taxa on the area of the Poznań town, but they are regarded as threatened on the area of Wielkopolska (**Żukowski** and **Jackowiak** 1995).

"Wilczy Młyn"

On the ecological area "Wilczy Młyn", 450 vascular plant species were found. They belong to 277 genera and 87 families. The number included: eight species of pteridophytes belonging to four families, 12 species of gumnospermous plants, 102 species of unicotyledonous plants belonging to 19 families, 339 species of dicotyledonous plants belonging to 63 families.

The most numerously represented (over 20 species) were the following families: Asteraceae, Poaceae, Fabaceae and Cyperaceae, while over 10 species were recorded in the following families: Brassicaceae, Caryophyllaceae, Rosaceae, Lamiaceae, Apiaceae, Ranunculaceae, Poligonaceae and Scrophulariaceae. From the mentioned families, there originate as many as 281 species making 62.4% of the total vascular plant flora of the studied area. From the remaining 75 families, 32 ones were represented only by one species (Table 1).

The most frequently represented species made a group of rarely encountered species (40.9%), while the least represented were the frequently occurring species making 6% of the total flora. No mass-occurrence species were found (Table 1).

On the studied area, all Raunkiaer's life forms were represented. The most numerous group consisted of 194 hemicryptophytes making 43.1% of the total flora. Therophytes in the number of 91 species had also a significant share. In further sequence there were geophytes, hydrophytes, nanophanerophytes and megaphanerophytes. The least numerous were lignified chamephytes in the number of six specimens making 1.3% of the total flora (Table 1).

In reference to the historical and geographcal classification, the most numerous group was created by the native species – apophytes represented by 238 taxa making 52.9% of the total flora, and by spontaneophytes which included 126 species (28%). The least numerous group consisted of ephemerophytes including only nine species making 2% of all taxa found on the studied area (Table 1).

Analysis of the particular sociological and ecological groups showed that as many as 78 species (17.3%) belonged to group 1 occurring in fertile deciduous forest communities and shrub communities. A rather numerous group consisted of species growing in riverside forest and shrub communities, in rush and water communities (group 7), in fresh and moderately fresh meadow communities (group 9) and in grass communities on dry sand (group 5). These groups represented by 39, 34 and 32 species making 8.7, 7.6 and 7.1% of the total respectively. The least number of species (11) belonged to group 14 and it occurred in pioneer communities of ruderal plants. These species made only 2.4% each of their total number (Table 1).

On the studied terrain, 16 species of protected plants were found. Six of this number are subject to total protection, i.e. *Dactylorhiza majalis*, *Epipactis helleborine*, *Galanthus nivalis*, *Hepatica nobilis*, *Nasturtium officinale*, *Scilla bifolia*. 10 remaining species: *Asarum europaeum*, *Convallaria majalis*, *Frangula alnus*, *Hedera helix*, *Helichrysum arenarium*, *Ononis spinosa*, *Primula veris*, *Ribes nigrum*, *Vibarnum opulus* and *Vinca minor* are covered by partial protection.

On the ecological area "Wilczy Młyn", we found 139 speacies threatened on the area of the Poznań town (**Jackowiak** 1993) and four species which are regarded as endangered on the entire area of Wielkopolska (**Żukowski** and **Jackowiak** 1995). However, three among the latter group of taxa (*Populus nigra*, *Acer campestre*, *Galanthus nivalis*) are not threatened on the area of the Poznań town (**Jackowiak** 1993) Among the taxa endangered on the area of Poznań, one taxon (*Equisetum sylvaticum*) was found which had been regarded as an extinguished one; eight species (*Ranunculus lanugiosus*, *Nasturtium officinale*, *Corydalis cava*, *Impatiens noli-tangere*, *Trifolium alpestre*, *Carex remota*, *Carex sylvatica*, *Lemna gibba*) are on the list of directly endangered species occurring only in single localities. Forty-two other taxa are strongly threatened; six are in potential danger and three are in uncertain danger. The most numerous group (79) consisted of potentially endangered species making 17.6% of the flora in the studied object. It has to be stressed that *Galanthus nivalis* occurring on the studied area is one of the species listed in Annex V to the Habitat Directive of the European Union (Dyrektywa... 1992).

Recapitulation

On both ecological areas, a total of 476 vascular plant species were recorded making 36.6% of 1299 species occurring in Poznań (**Jackowiak** 2002). The number of taxa

found on the ecological area "Różany Młyn" makes 21.7%, while in "Wilczy Młyn", it makes 34.6% of the total flora in Poznań.

The found species belong to 87 families. Ten species in this number belong to four families of pteridophyta. From gymnospermous plants, only one species (*Pinus sylvestris*) was found. Unicotyledonous plants were represented by 108 species belonging to 19 families, and dicotyledonous plants included 357 species from 63 families. A similar distribution of species in plant families was found in the flora of the Wielkopolski National Park (**Żukowski** et **al.** 1995) and in the flora of Poland (Szata roślinna... 1977).

Among Raunkiaer's life forms, the most numerous group consisted of 202 hemicryptophytes making 42.4% of the total flora on the studied area. There was also a significant participation of therophytes (103 species). In further sequence, there were geophytes followed by hydrophytes, nanophanerophytes and megaphanerophytes. Lignified chamephytes were the least numerous ones, only six of them were found making 1.3% of the total flora of both studied areas.

According to the geographical and historical division, the most numerous group was created by native species – apophytes represented by 248 taxa making 50.1% of the total number, and spontaneophytes in the number of 130 species (27.3%). Ephemerophytes were the least numerous ones (10 species) making 2.1% of all found taxa.

Analysis of the particular sociological and ecological groups indicated that the greatest number of species (78 – 16.4%) belonged to group 1. Species from groups 7, 9 and 5 also were pretty numerous including 41, 37 and 34 species respectively making 8.6; 7.8 and 7.1% of the total flora. The least number of species (13) belonged to group 14 (2.7%).

On both studied ecological areas, 17 plant species are under legal protection (3.6% of the total flora). Seven species from this number are under total protection and 10 species are partially protected. One hundred and forty-four species were found on both areas and they are endangered (acc. to the criterion of **Jackowiak** 1993). Three species from this number are not endangered in Poznań but they are threatened on the entire area of Wielkopolska (**Żukowski** and **Jackowiak** 1995). In the total number, one species was found which had been regarded as an extinguished one, eight species are on the list of directly endangered species and they occur only in single localities. Further 43 species are strongly endangered, seven are potentially threatened and three are uncertainly endangered. 82 taxa make the most numerous group of potentially endangered species.

On both studied ecological areas, some species were found which had not been recorded earlier on the area of Poznań (**Jackowiak** 1993), they include, for example: *Anemone sylvestris*, *Cerasus avium*, *Cerasus vulgaris*, *Lupinus angustifolius*, *Mahonia aquifolia*, *Polygonum lapathifolium*, or *Sedan dasyphyllum*. Many found taxa were not reported by **Jackowiak** (1993) from that particular part of Poznań town and others were described as historical localities. This group includes among others: *Achillea ptarmica*, *A. salicifolia*, *Acorus calamus*, *Aesculus hippocastanum*, *Alisma plantago-aquatica*, *Allium schoenoprasum*, *Alopecurus aequalis*, *Anemone nemorosa*, *Aster novae-angliae*, *Athyrium filix-femina*, *Barbarea vulgaris*, *Batrachium circinatum*, *Bromus sterilis*, *Bryonia alba*, *Bunias orientalis*, *Campanula patula*, *Calamagrostis arundinacea*, *Carex flava*, *C. pairae*, *C. paniculata*, *C. pilulifera*, *C. pseudocyperus*, *C. remota*, *C. riparia*, *C. sylvatica*, *Carum carvi*, *Ceratophyllum submersum*, *Corydalis cava*, *Crepis biennis*, *Echinocystis lobata*, *Elodea canadensis*, *Eleocharis uniglumis*, *Epilobium montanum*, *Equisetum sylvaticum*, *Fagus sylvatica*, *Fumaria officinalis*, *Galanthus nivalis*, *Galeobdolon luteum*, *Hedera helix*, *Hepatica nobilis*, *Hieracium lachenalii*, *Hypericum macu-*

latum, *Impatiens glandulifera*, *I. noli-tangere*, *Lemna gibba*, *Leonurus cardiaca*, *Ligustrum vulgare*, *Lupinus polyphyllus*, *Luzula campestris*, *L. pilosa*, *Lysimachia thyrsiflora*, *Myosotis sylvatica*, *Myosurus minimus*, *Nasturtium officinale*, *Ornithogalum nutans*, *Oxalis acetosella*, *Polygonatum multiflorum*, *Quercus petraea*, *Q. rubra*, *Ranunculus lanuginosus*, *Rhus typhina*, *Ribes nigrum*, *Rosa rugosa*, *Rudbeckia laciniata*, *Sagina nodosa*, *Sagittaria sagittifolia*, *Salix pentandra*, *Sambucus racemosa*, *Scilla bifolia*, *Sedum sexangulare*, *Sicyos angulata*, *Sium latifolium*, *Solidago canadensis*, *Sparganium emersum*, *Spirodela polyrhiza*, *Stellaria holostea*, *S. nemorum*, *Syringa vulgaris*, *Tilia platyphyllos*, *Trifolium alpestre*, *Typha angustifolia*, *Ulmus minor*, *Veronica beccabunga*, *Vicia sepium*, *Viola odorata*, *V. reichenbachiana*, *V. riviniana* and *V. tricolor*.

Conclusions

1. The ecological areas of "Różany Młyn" and "Wilczy Młyn" cover totally 122 ha and they are characterized by a very rich flora represented by as many as 476 vascular plant species.

2. On both areas, we found 17 legally protected species (seven species are covered by total protection, and 10 species are partially protected), and 9 species which had been regarded so far as estinguished or perishing and endangered ones.

3. The greatest number of taxa found on the studied objects occurred in fertile deciduous forest and shrub communities. On both studied areas, there occurred native species – apophytes, and many Raunkiaer's life forms – hemicryptophytes making the most numerous group.

4. The discussed ecological areas represent well preserved enclaves of natural and seminatural vegetation fragments in the landscape of a big town, however, also here, the action of anthropopressure is strongly visible.

5. In order to limit the negative effect of human influence on the studied ecosystems, a detailed protection program should be elaborated and implemented.

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FLORA UŻYTKÓW EKOLOGICZNYCH „RÓŻANY MŁYN" I „WILCZY MŁYN" W POZNANIU

S t r e s z c z e n i e

Na obszarze położonych na terenie Poznania użytków ekologicznych „Różany Młyn" i „Wilczy Młyn" o powierzchni około 122 ha odnaleziono 476 gatunków roślin naczyniowych, co stanowi około 37% flory całego Poznania.

Na terenie obu użytków odnaleziono 17 gatunków roślin prawnie chronionych (siedem objętych ochroną całkowitą i 10 częściową) oraz dziewięć gatunków uważanych dotąd za zaginione bądź ginące i zagrożone. Największa liczba taksonów spotykanych na badanych obiektach występuje w zbiorowiskach żyznych lasów liściastych i zbiorowiskach krzewiastych. W obu użytkach dominują gatunki rodzime – apofity, a spośród form życiowych Raunkiaera – hemikryptofity. Omawiane użytki ekologiczne stanowią dobrze zachowane enklawy fragmentów roślinności naturalnej i seminaturalnej w krajobrazie dużego miasta, jednak także tutaj coraz silniej uwidacznia się wpływ antropopresji. W celu ograniczenia negatywnego oddziaływania człowieka na badane ekosystemy należy opracować i wdrożyć szczegółowe plany ich ochrony.

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