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THE MOST VALUABLE TREES OF THE PARK-ARBORETUM OF THE FOREST CULTURE CENTRE IN GOŁUCHÓW

NAJCENNIJSZE DRZEWA PARKU-ARBORETUM
OŚRODKA KULTURY LEŚNEJ W GOŁUCHOWIE

Summary

A total of 426 trees of 61 taxa and 31 genera were inventoried in the park-arboretum in Gołuchów, of which 290 are trees of natural monument circumferences and 136 have circumferences close to the natural monument requirements. Alien species (62.3%) predominate over native species (37.7%). Species originating from North America and Asia are most numerous. *Thuja plicata* and *Quercus robur* predominate among trees of natural monument circumferences, while *Quercus robur*, *Alnus glutinosa* and *Acer platanoides* are most numerous among trees with circumferences close to the natural monument requirements. The most valuable trees typically have circumferences of 201 to 300 cm and range from 21 to 30 m in height. The thickest tree is *Populus ×canadensis* 'Marilandica' of 570 cm in circumference. In most cases (over 70%) the health condition of inventoried plants is very good. A total of 204 trees with natural monument circumferences and a very good health condition were selected, of which some may be proposed as candidates for protection as natural monuments.

Key words: natural monuments, dendrological inventory, park-arboretum, Gołuchów

Introduction

The castle and park in Gołuchów is one of the most valuable such complexes in Poland. The castle was erected in the years 1550–1560 for Rafał Leszczyński, at that time the starosta (an official administering crown lands) of Radziejów and the voivode (the governor) of the Brześć Kujawski province. In 1695 the Leszczyńskis sold Gołuchów to the Suszko family. Next the castle changed hands many times, being owned by representatives of the Górowski, Chlebowski, Swinarski and the Suchorzewski families. With time it fell into ruin. In 1856 it was bought by Tytus Działyński for his son Jan Kanty and his wife Izabella Działyńska, née Czartoryska. In the years 1875–1885 Izabella commissioned a complete reconstruction of the castle in the French Neo-Renaissance style according to the design by a French architect Maurice August Ouradou. The rebuilt castle is reminiscent of the famous châteaux of the Loire valley. Following the death of Izabella in 1899 the landed estate transformed into a fee tail estate was inherited by her nephew, Prince Witold Czartoryski. Gołuchów remained in the hands of the Czartoryski family until the outbreak of WWII. During the war the art collection was scattered and the castle was vandalised. After WWII the stolen exhibits were retrieved, but they were not returned to Gołuchów, being transferred to the National Museums in Warszawa and Poznań. In 1951 a branch of the National Museum in Poznań was opened in the castle, exhibiting historical interiors and works of art since then. At present also the Museum of Forestry is housed in the castle manor building along with a restaurant (Broda, 1990; Goetz, 1930; Gołuchów. Zamek...; Guerquin, 1984; Jakimowicz and Jastrząb-Marek, 1984; Kajzer et al., 2001; Kąsinowska, 2006; Król and Gostyńska-Jakuszczyńska, 2003; Marek, 1994; Mężyński, 1982; Region Wielkopolski...).

The castle is surrounded by a vast park designed in the English landscape style in the second half of the 19th century. It is an excellent example of a naturalist garden, enriched with dendrological collections. Izabella Działyńska, née Czartoryska and her husband, Jan Działyński were the immediate proponents of its creation (Jakimowicz and Jastrząb-Marek, 1984; Kościelny and Sękowski, 1963). In order to realise their concept for the formation of the park modelled on the best garden designs of Europe they hired a talented horticulturalist Adam Kubaszewski (Broda, 1990). The Działyńskis established in Gołuchów the largest arboretum in central Europe, which conducted experiments on acclimation of alien tree and shrub species. After WWII the manor land was parcelled out. Manor land was granted to peasants, while forests and the derelict park were administered by the State Forests. In 1951 the park was transferred to the care of the Higher School of Agriculture in Poznań in order to establish an experimental research station. At that time numerous plantings were introduced, not always consistent with the original concept of the park (Kluge, 2003). In 1974 the Gołuchów park together with a complex of historical buildings, except for the castle, were again transferred to the then Regional Directorate of the State Forests in Poznań. At present the park-arboretum is administered by the Forest Culture Centre in Gołuchów, which is operating within the framework of the State Forests National Forest Holding. The Centre in Gołuchów is involved in museum operations concerning forestry and forest culture in Poland, protection and restoration of architectural and natural monuments of the noble family estate, which is the seat of the centre, protection and breeding of a herd of wisent

and fallow deer in enclosures accessible to visitors, forest education activities, patronage over artistic activity of foresters and artists inspired by forests and forestry, cooperation with institutions and organisations promoting nature conservation and development of ecological culture in Poland and abroad (Roźmiarek, 2007). Today the park-arboretum combines teaching activity and recreation functions with preservation of its natural and esthetic value. It is a venue for various educational activities and research (Antonowicz, 2014; Gołuchów. Perła...; Miasteria.pl...). The value of the park-arboretum in Gołuchów has been justly appreciated and since 1965 it has been registered at no. 81/A in the historical monument register and since 1989 it has been protected under the regulations of the Act on nature conservation and as such it is incorporated in the Protected Landscape Area of the Ciemna River Valley of 3500 ha, established on 20 May 1990 (Biuletyn...).

The park dendroflora has been inventoried several times. In 1928 Józef Goetz listed 519 taxa of trees and shrubs in the park (Goetz, 1930). Next inventories were conducted in 1963 by Kościelny and Sękowski (1963) and in 1979 by Bugała and co-workers, who reported 607 taxa of trees and shrubs. In 1986 another inventory was prepared by Bureau of Forest Management and Geodesy – Branch in Poznań (BULiGL w Poznaniu, 1986), while in the years 1991–1996 a survey was conducted by Jakub Zemła and his team (Zemła and Lisowska, 1996; Zemła and Pape, 1991; Zemła et al., 1996). In turn, Pakalski and Nosowicz (2005) reported 596 taxa of trees and shrubs from 134 genera and 56 families. The latest inventory of the park-arboretum in Gołuchów covered only 1/3 of the park area (excluding forested areas from the survey) and as a result 6291 wooded plants were recorded, including 4856 trees and 1435 shrubs belonging to 385 taxa (Wrońska-Pilarek et al., 2015).

While at present the entire park-arboretum in Gołuchów is listed in the register of historical and natural monuments, for many years trees were not surveyed to verify whether they meet the requirements and may be granted the status of new natural monuments. The aim of the study was to conduct an up-to-date survey of the most valuable trees and identify their health status to facilitate planning of tending interventions.

Study area

The park-arboretum in Gołuchów is situated at the verge of the Wysoczyzna Kaliska upland, being a part of the Nizina Wielkopolska lowland and having the periglacial plain landscape (Kondracki, 2002). Within the classification of natural forest regions the park-arboretum is located in the 3rd Wielkopolska-Pomerania region, 8th Krotoszyn Province (Trampler et al., 1990).

The park-arboretum is located in Gołuchów (GPS: 51°50'58"N, 17°55'53"E) in the Gołuchów commune, the Pleszew county, the Wielkopolskie province at national road no. 12, linking Poznań and Łódź. The nearest towns are Pleszew (12 km) and Kalisz (15 km).

The valley of the Ciemna river, a tributary of the Prosna, was used as the primary axis for the layout of the park with an area of 158.05 ha. In the 3-km section of the river valley the views include clusters of trees and shrubs, meadows and glades. The area of

the park-arboretum is highly diverse in terms of the relief, habitat conditions, vegetation and floristic composition. At present depending on the served functions the park is divided into two parts: south-eastern (more decorative), mainly surrounding the castle, the manor service building and former manor farm buildings, composed of various tree plantings and park glades composed into vistas, and the north-western part (forested), in which plant communities are renaturalised. Educational activities as well as tourist and recreation services are also provided, since fragments of natural forest associations are preserved there. In the central part of the park there are two picturesque ponds with a total area of 5 ha (Jakimowicz and Jastrzab-Marek, 1984; Kluge, 2003; Kościelny and Sękowski, 1963; Król and Gostyńska-Jakuszevska, 2003; Majdecki, 1978; Pakalski and Nosowicz, 2005).

The climate of Gołuchów is similar to that of the entire Wielkopolska region (Plan..., 2012). Temperature amplitudes are smaller here than the national average. Springs and summers are early and long, while winters are mild and long with occasional snow cover. The vegetation period lasts for approx. 220 days. Mean monthly air temperature is 7.7°C. February is the coldest month with a mean temperature of -2.9°C, while July is the warmest with a mean temperature of 17.9°C. Precipitation at the annual mean of 506 mm is well below the national average. Approximately 60–65% precipitation total fall within the vegetation period. Characteristic features include low precipitation in the winter season, dry spells and droughts in May. The winter season and the beginning of the vegetation season typically do not receive the required precipitation volume. Westerly winds predominate in the Gołuchów commune. The annual share of the winds (NW-SW) is almost 50%. In the spring easterly winds are more common, while in the autumn and winter southerly winds are more frequent (Plan..., 2012).

Material and methods

The most valuable trees in terms of their dimensions and health status were inventoried in the park-arboretum in the period from October 2012 to May 2013 and in July and August 2015. The survey covered the entire park-arboretum, comprising compartments 1 to 31 (Fig. 1).

The plants were identified taxonomically (to genus, species or variety). The nomenclature of taxa was adopted after Seneta and Dolatowski (2011). Tree circumferences were also measured at a height of 130 cm using a tape accurate to 1 cm. In trees whose trunks coalesced below the height of 130 cm each trunk was measured separately, while those coalesced above that height were treated as one specimen. Tree height was measured using a Suunto hypsometer accurate to 1 m.

In order to prepare maps with the distribution of the most valuable trees in the analysed area their geographical position was determined using a GPS MobileMapper 10.

The health status of inventoried plants was evaluated based on a modified scale proposed by Kamiński and Czerniak (2000) and Łakomy et al. (2011). The following health status scale was adopted: class 4 – very good health condition: completely healthy trees, with very limited dieback connected with species-specific characteristics

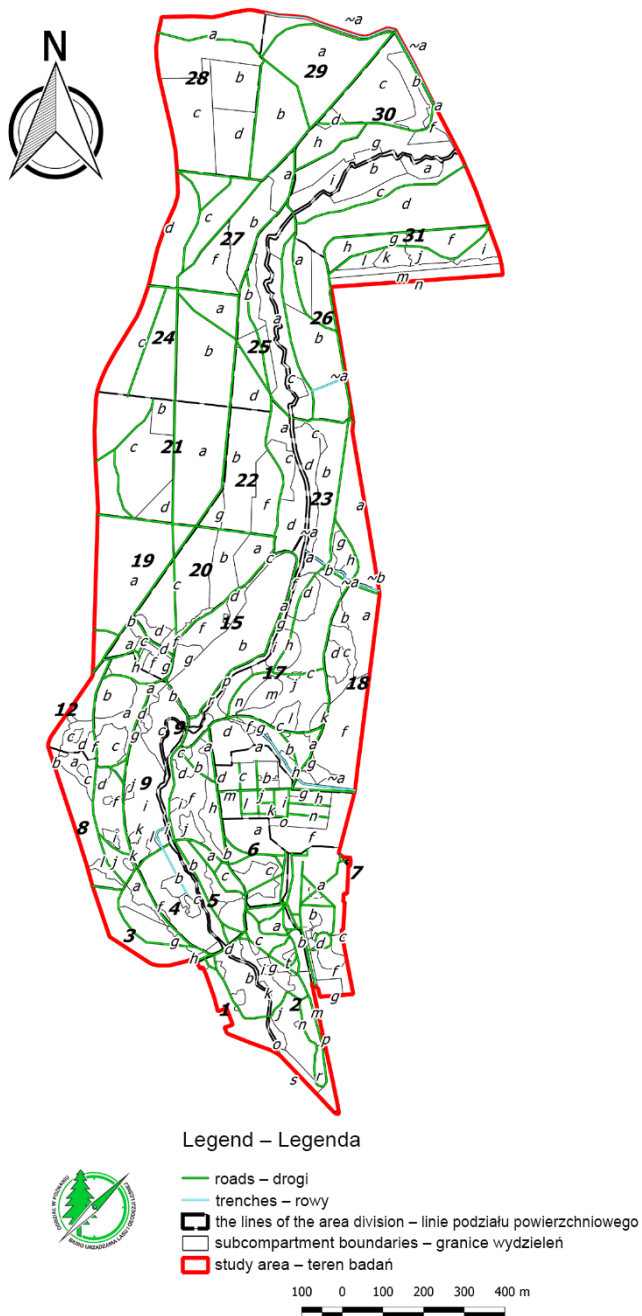


Fig. 1. The Gołuchów park-arboretum (drawn by P. Walczewski)
Rys. 1. Plan parku-arboretum w Gołuchowie (rys. P. Walczewski)

and age, max. 5% crown, proper tree habit, no need to perform tending interventions; point trunk damage only, sealed, having no significant effect on tree condition; class 3 – good condition: trees with max. 25% crown dieback, need to perform small pruning operations, crow typical to species, small necroses of the assimilating organ; trunk damage and sealed necroses of limited area, sealed frost cracks, small hollows, no fungal infestation; class 2 – moderate condition: trees with up to 35% crown dieback, broken branches, severe leaf necrosis, sometimes premature leaf abscission, extensive trunk damage (up to ½ circumference), deep and large hollows, outer bark and xylem necroses, frost cracks and lightning scars, symptoms of fungal infestation, visible fungal infection; severe insect feeding; necessary immediate extensive tending interventions; class 1 – poor condition: trees with over 35% crown dieback, severe leaf necrosis; trunk damage over ½ circumference, vast and deep hollows, necroses, mass fungal infestation; dying trees; class 0 – dead trees.

The most valuable trees were divided into three categories, i.e. trees with circumferences meeting natural monument limits, including registered natural monuments (according to the classification binding in the State Forests – Przykładowe wymiary...; unclassified species – after Ruciński, 1998), trees with dimensions close to the natural monument requirements (90% natural monument circumference), as well as legally protected species (Regulation of the Minister of the Environment of 9 October 2014 on plant species protection – Rozporządzenie..., 2014).

Maps presenting the distribution of inventoried woody plants may not be given here due to their size. They are found in studies by Bureau of Forest Management and Geodesy – Branch in Poznań (BULiGL w Poznaniu, 2015) and Mizerkiewicz (2013).

Results

A total of 426 valuable trees were inventoried in the Gołuchów park-arboretum, including 290 (68.1%) trees with monument dimensions and 136 (31.9%) trees with those close to the natural monument limits (Table 1). Inventoried plants belong to 61 taxa (49 species, 5 hybrids and 7 varieties) from 31 genera.

Alien taxa predominate, amounting to 38 (62.3%), while the other 23 (37.7%) are native species (Table 1). The most numerous plantings in Poland are those of North American tree species *Thuja plicata*, *Pseudotsuga menziesii*, *Chamaecyparis lawsoniana*, *Pinus strobus*, *Prunus serotina*, *Juglans nigra*, *Thuja occidentalis*, *Quercus rubra* or *Quercus palustris*. Trees originating from Asia are also common, e.g. *Chamaecyparis pisifera*, *Chamaecyparis nootkatensis*, *Ginkgo biloba*, *Larix kaempferi* or *Phellodendron amurense*. The most monumental trees in the park include also those with a beautiful habit, e.g. *Aesculus hippocastanum*, *Pinus nigra*, as well as ornamental varieties, such as *Fagus sylvatica* ‘Atropunicea’, *Prunus ×eminens* ‘Umbraculifera’, *Quercus robur* ‘Fastigiata’, *Salix ×sepulcralis* ‘Chrysocoma’ or *Ulmus pumila* ‘Pinnatoramosa’. Species favoured in collections, rarely found in Poland and confirming the importance of this arboretum include *Carya laciniata*, *Fraxinus americana*, *Phellodendron amurense*, *Quercus macranthera* and *Taxodium distichum*.

Table 1. The list of trees with circumferences of natural monuments and close to monument limits (shading – trees with monument circumferences and in a very good health condition, shading and bold – protected species; health condition classes: 4 – very good, 3 – good, 2 – moderate, 1 – poor)

Tabela 1. Wykaz drzew o obwodach pomnikowych i zbliżonych do pomnikowych (cieniowanie – drzewa o obwodach pomnikowych w bardzo dobrym stanie zdrowotnym, cieniowanie i pogrubienie – gatunki chronione; klasy stanu zdrowotnego: 4. – bardzo dobry, 3. – dobry, 2. – średni, 1. – zły)

No. Lp.	Taxon Takson	Height Wysokość (m)	Health condition Stan zdrowotny	Compartment Oddział	Subcompartment Wydzielenie	Circumference Obwód (cm)
1	2	3	4	5	6	7
1	<i>Acer campestre</i>	28	4	6	c	266
2	<i>Acer campestre</i>	21	4	2	d	227
3	<i>Acer campestre</i>	29	4	6	a	227
4	<i>Acer campestre</i>	18	4	6	c	207
5	<i>Acer campestre</i>	28	4	6	c	202
6	<i>Acer campestre</i>	22	4	16	g	198
7	<i>Acer campestre</i>	25	4	10	d	192
8	<i>Acer campestre</i>	20	4	16	d	192
9	<i>Acer campestre</i>	20	4	6	d	188
10	<i>Acer campestre</i>	25	4	10	d	186
11	<i>Acer campestre</i>	20	4	6	c	181
12	<i>Acer campestre</i>	20	3	16	g	181
13	<i>Acer campestre</i>	21	4	6	c	178
14	<i>Acer campestre</i>	21	4	2	a	176
15	<i>Acer campestre</i>	25	3	10	d	165
16	<i>Acer campestre</i>	19	4	16	d	163
17	<i>Acer campestre</i>	23	4	2	b	161
18	<i>Acer campestre</i>	21	4	16	d	161
19	<i>Acer campestre</i>	19	4	6	c	152
20	<i>Acer campestre</i>	24	4	10	d	148
21	<i>Acer campestre</i>	24	4	10	d	145
22	<i>Acer platanoides</i>	30	4	8	j	375
23	<i>Acer platanoides</i>	20	4	6	d	343
24	<i>Acer platanoides</i>	28	4	13	a	289

Table 1 – cont. / Tabela 1 – cd.

1	2	3	4	5	6	7
25	<i>Acer platanoides</i>	27	4	6	a	263
26	<i>Acer platanoides</i>	31	4	13	b	258
27	<i>Acer platanoides</i>	24	4	6	a	257
28	<i>Acer platanoides</i>	25	4	2	c	253
29	<i>Acer platanoides</i>	32	3	12	f	252
30	<i>Acer platanoides</i>	31	4	15	g	252
31	<i>Acer platanoides</i>	31	3	12	f	246
32	<i>Acer platanoides</i>	36	4	15	g	240
33	<i>Acer platanoides</i>	22	4	1	c	237
34	<i>Acer platanoides</i>	24	4	1	c	234
35	<i>Acer platanoides</i>	31	4	13	b	233
36	<i>Acer platanoides</i>	28	4	3	c	232
37	<i>Acer platanoides</i>	28	4	9	a	230
38	<i>Acer platanoides</i>	24	4	7	g	228
39	<i>Acer platanoides</i>	26	2	3	c	227
40	<i>Acer platanoides</i>	26	4	1	c	226
41	<i>Acer platanoides</i>	28	4	1	c	226
42	<i>Acer platanoides</i>	30	4	13	c	225
43	<i>Acer platanoides</i>	27	4	13	b	223
44	<i>Acer platanoides</i>	20	4	6	a	220
45	<i>Acer platanoides</i>	24	4	2	b	217
46	<i>Acer platanoides</i>	24	4	11	f	216
47	<i>Acer platanoides</i>	24	4	7	d	215
48	<i>Acer platanoides</i>	24	4	9	a	213
49	<i>Acer platanoides</i>	22	4	1	c	213
50	<i>Acer platanoides</i>	25	4	2	c	211
51	<i>Acer platanoides</i>	31	4	8	c	211
52	<i>Acer platanoides</i>	25	4	2	a	210
53	<i>Acer platanoides</i>	31	4	13	b	209
54	<i>Acer platanoides</i>	21	4	1	c	209
55	<i>Acer platanoides</i>	25	4	2	f	208
56	<i>Acer platanoides</i>	18	4	5	b	207

Table 1 – cont. / Tabela 1 – cd.

1	2	3	4	5	6	7
57	<i>Acer platanoides</i>	20	4	1	c	206
58	<i>Acer platanoides</i>	24	4	7	d	205
59	<i>Acer platanoides</i>	26	4	8	c	205
60	<i>Acer platanoides</i>	29	4	12	f	205
61	<i>Acer platanoides</i>	20	4	2	p	203
62	<i>Acer platanoides</i>	31	4	8	c	202
63	<i>Acer platanoides</i>	24	4	7	i	201
64	<i>Acer platanoides</i>	36	4	15	g	198
65	<i>Acer pseudoplatanus</i>	29	4	13	a	266
66	<i>Acer pseudoplatanus</i>	22	4	8	h	236
67	<i>Aesculus hippocastanum</i>	22	4	7	g	272
68	<i>Alnus glutinosa</i>	32	4	9	l	358
69	<i>Alnus glutinosa</i>	23	4	1	b	319
70	<i>Alnus glutinosa</i>	27	4	4	c	317
71	<i>Alnus glutinosa</i>	23	4	4	d	302
72	<i>Alnus glutinosa</i>	31	4	9	j	301
73	<i>Alnus glutinosa</i>	25	4	4	d	292
74	<i>Alnus glutinosa</i>	28	4	9	j	283
75	<i>Alnus glutinosa</i>	23	2	1	b	282
76	<i>Alnus glutinosa</i>	19	4	1	c	270
77	<i>Alnus glutinosa</i>	29	4	9	l	259
78	<i>Alnus glutinosa</i>	31	3	9	k	258
79	<i>Alnus glutinosa</i>	21	4	2	o	255
80	<i>Alnus glutinosa</i>	28	4	9	l	248
81	<i>Alnus glutinosa</i>	22	4	4	d	247
82	<i>Alnus glutinosa</i>	30	3	9	j	247
83	<i>Alnus glutinosa</i>	25	4	9	l	242
84	<i>Alnus glutinosa</i>	32	3	17	s	242
85	<i>Alnus glutinosa</i>	29	4	9	j	238
86	<i>Alnus glutinosa</i>	28	4	4	d	235
87	<i>Alnus glutinosa</i>	28	4	9	j	234
88	<i>Alnus glutinosa</i>	21	4	1	b	233

Table 1 – cont. / Tabela 1 – cd.

1	2	3	4	5	6	7
89	<i>Alnus glutinosa</i>	23	4	2	o	231
90	<i>Alnus glutinosa</i>	30	4	9	a	231
91	<i>Alnus glutinosa</i>	23	4	1	c	230
92	<i>Alnus glutinosa</i>	19	4	2	j	224
93	<i>Alnus glutinosa</i>	19	4	4	c	224
94	<i>Alnus glutinosa</i>	26	4	9	j	222
95	<i>Alnus glutinosa</i>	31	4	9	k	222
96	<i>Alnus glutinosa</i>	24	4	1	c	219
97	<i>Alnus glutinosa</i>	27	4	4	c	218
98	<i>Alnus glutinosa</i>	32	4	9	k	218
99	<i>Alnus glutinosa</i>	27	4	4	d	216
100	<i>Alnus glutinosa</i>	20	4	2	o	215
101	<i>Alnus glutinosa</i>	23	4	2	o	213
102	<i>Alnus glutinosa</i>	26	4	9	a	213
103	<i>Alnus glutinosa</i>	27	4	9	j	212
104	<i>Alnus glutinosa</i>	23	4	4	d	210
105	<i>Alnus glutinosa</i>	32	4	9	l	210
106	<i>Alnus glutinosa</i>	28	4	9	l	208
107	<i>Alnus glutinosa</i>	28	4	9	k	207
108	<i>Alnus glutinosa</i>	22	4	2	o	206
109	<i>Alnus glutinosa</i>	31	4	9	j	206
110	<i>Alnus glutinosa</i>	26	4	9	j	206
111	<i>Alnus glutinosa</i>	31	4	9	k	206
112	<i>Alnus glutinosa</i>	21	4	2	s	205
113	<i>Alnus glutinosa</i>	18	4	1	b	203
114	<i>Betula pendula</i>	26	4	7	i	211
115	<i>Betula pendula</i>	24	4	9	j	210
116	<i>Carpinus betulus</i>	20	1	5	f	386
117	<i>Carpinus betulus</i>	23	4	5	f	305
118	<i>Carpinus betulus</i>	18	2	5	f	295
119	<i>Carpinus betulus</i>	24	4	3	f	231
120	<i>Carpinus betulus</i>	22	4	8	h	210

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Table 1 – cont. / Tabela 1 – cd.

1	2	3	4	5	6	7
121	<i>Carpinus betulus</i>	27	3	17	c	201
122	<i>Carpinus betulus</i>	22	4	7	i	196
123	<i>Carpinus betulus</i>	17	4	2	b	194
124	<i>Carpinus betulus</i>	25	4	3	f	187
125	<i>Carpinus betulus</i>	21	1	2	a	185
126	<i>Carpinus betulus</i>	19	4	7	g	185
127	<i>Carpinus betulus</i>	24	4	7	i	184
128	<i>Carya laciniosa</i>	27	4	8	h	230
129	<i>Carya laciniosa</i>	31	4	10	c	220
130	<i>Chamaecyparis lawsoniana</i>	25	4	16	h	189
131	<i>Chamaecyparis lawsoniana</i>	19	3	3	b	112
132	<i>Chamaecyparis lawsoniana</i>	12	4	11	g	99
133	<i>Chamaecyparis lawsoniana</i>	14	4	2	g	98
134	<i>Chamaecyparis lawsoniana</i>	18	3	16	h	98
135	<i>Chamaecyparis lawsoniana</i>	15	3	11	a	93
136	<i>Chamaecyparis nootkatensis</i>	23	4	5	c	194
137	<i>Chamaecyparis pisifera</i>	23	1	6	a	121
138	<i>Chamaecyparis pisifera</i>	22	4	6	a	121
139	<i>Chamaecyparis pisifera</i>	25	3	31	h	112
140	<i>Chamaecyparis pisifera</i>	26	3	31	h	105
141	<i>Chamaecyparis pisifera</i>	12	4	2	a	102
142	<i>Chamaecyparis pisifera</i>	24	3	31	h	100
143	<i>Chamaecyparis pisifera</i> 'Plumosa'	19	4	31	h	105
144	<i>Chamaecyparis pisifera</i> 'Squarrosa'	19	4	31	h	102
145	<i>Chamaecyparis thyoides</i>	8	4	5	d	105
146	<i>Crataegus ×media</i>	12	4	5	d	96
147	<i>Crataegus monogyna</i>	10	4	2	a	97
148	<i>Crataegus pedicellata</i>	14	4	8	h	94
149	<i>Fagus sylvatica</i>	28	3	18	a	390
150	<i>Fagus sylvatica</i>	21	3	2	o	336
151	<i>Fagus sylvatica</i>	33	2	22	c	335
152	<i>Fagus sylvatica</i>	27	4	7	i	334

Table 1 – cont. / Tabela 1 – cd.

1	2	3	4	5	6	7
153	<i>Fagus sylvatica</i>	26	4	16	d	332
154	<i>Fagus sylvatica</i>	32	4	10	i	329
155	<i>Fagus sylvatica</i>	32	4	10	f	325
156	<i>Fagus sylvatica</i>	29	4	10	f	320
157	<i>Fagus sylvatica</i>	25	4	16	g	316
158	<i>Fagus sylvatica</i>	30	4	18	d	311
159	<i>Fagus sylvatica</i>	16	4	6	c	304
160	<i>Fagus sylvatica</i>	9	4	9	f	303
161	<i>Fagus sylvatica</i>	31	4	10	g	301
162	<i>Fagus sylvatica</i>	25	4	7	i	287
163	<i>Fagus sylvatica</i>	32	4	9	f	283
164	<i>Fagus sylvatica</i>	26	3	10	g	282
165	<i>Fagus sylvatica</i> ‘Atropunicea’	21	4	1	c	404
166	<i>Fagus sylvatica</i> ‘Atropunicea’	27	4	5	g	391
167	<i>Fraxinus americana</i>	23	4	8	h	230
168	<i>Fraxinus excelsior</i>	30	4	6	a	361
169	<i>Fraxinus excelsior</i>	28	4	2	f	350
170	<i>Fraxinus excelsior</i>	28	4	6	c	334
171	<i>Fraxinus excelsior</i>	31	3	31	c	310
172	<i>Fraxinus excelsior</i>	30	3	31	c	300
173	<i>Fraxinus excelsior</i>	27	4	2	a	300
174	<i>Fraxinus excelsior</i>	32	4	10	g	281
175	<i>Fraxinus excelsior</i>	30	3	23	f	280
176	<i>Fraxinus excelsior</i>	26	4	2	o	278
177	<i>Fraxinus excelsior</i>	22	4	1	b	278
178	<i>Fraxinus excelsior</i>	28	4	2	a	278
179	<i>Fraxinus excelsior</i>	28	4	2	o	272
180	<i>Fraxinus excelsior</i>	20	4	2	j	271
181	<i>Fraxinus excelsior</i>	27	3	8	h	248
182	<i>Fraxinus excelsior</i>	25	4	6	c	244
183	<i>Fraxinus excelsior</i>	28	4	2	a	242
184	<i>Fraxinus excelsior</i>	23	4	1	c	239

Table 1 – cont. / Tabela 1 – cd.

1	2	3	4	5	6	7
185	<i>Fraxinus excelsior</i>	27	4	2	m	237
186	<i>Fraxinus excelsior</i>	27	4	2	s	233
187	<i>Fraxinus excelsior</i>	28	4	2	a	232
188	<i>Ginkgo biloba</i>	12	4	5	g	206
189	<i>Ginkgo biloba</i>	20	4	2	a	179
190	<i>Ginkgo biloba</i>	14	4	5	g	168
191	<i>Juglans nigra</i>	27	4	8	h	236
192	<i>Juglans nigra</i>	30	4	12	d	189
193	<i>Juglans nigra</i>	25	4	8	h	180
194	<i>Juniperus</i> sp.	11	4	14	c	90
195	<i>Juniperus virginiana</i>	12	4	6	c	138
196	<i>Juniperus virginiana</i>	18	4	6	a	133
197	<i>Juniperus virginiana</i>	19	4	6	c	128
198	<i>Juniperus virginiana</i>	11	4	6	a	90
199	<i>Larix decidua</i>	32	4	31	f	253
200	<i>Larix decidua</i>	28	4	12	a	250
201	<i>Larix decidua</i>	27	4	6	a	237
202	<i>Larix decidua</i>	23	1	6	a	227
203	<i>Larix kaempferi</i>	29	4	31	h	245
204	<i>Malus domestica</i>	14	4	13	a	176
205	<i>Malus domestica</i>	10	4	12	f	113
206	<i>Malus purpurea</i>	10	4	11	f	91
207	<i>Malus</i> sp.	14	4	11	d	115
208	<i>Phellodendron amurense</i>	9	4	6	d	211
209	<i>Pinus nigra</i>	34	4	8	h	277
210	<i>Pinus nigra</i>	28	4	6	a	271
211	<i>Pinus nigra</i>	26	4	5	d	250
212	<i>Pinus nigra</i>	25	3	2	a	272
213	<i>Pinus strobus</i>	18	2	10	i	256
214	<i>Pinus sylvestris</i>	27	3	8	d	290
215	<i>Platanus ×hispanica</i> ‘Acerifolia’	22	4	1	b	402
216	<i>Platanus ×hispanica</i> ‘Acerifolia’	32	4	6	d	362

Table 1 – cont. / Tabela 1 – cd.

1	2	3	4	5	6	7
217	<i>Populus ×canadensis</i> ‘Marilandica’	35	4	15	h	570
218	<i>Prunus ×eminens</i> ‘Umbraculifera’	23	4	7	d	161
219	<i>Prunus padus</i>	18	4	16	g	99
220	<i>Prunus padus</i>	20	3	11	f	90
221	<i>Prunus serotina</i>	17	4	8	j	141
222	<i>Pseudotsuga menziesii</i>	26	4	16	d	339
223	<i>Pseudotsuga menziesii</i>	32	4	6	a	324
224	<i>Pseudotsuga menziesii</i>	32	4	6	a	300
225	<i>Pseudotsuga menziesii</i>	33	4	25	c	298
226	<i>Pseudotsuga menziesii</i>	29	3	25	c	280
227	<i>Pseudotsuga menziesii</i>	33	4	31	l	262
228	<i>Pseudotsuga menziesii</i>	33	4	13	c	255
229	<i>Pseudotsuga menziesii</i>	33	4	3	c	253
230	<i>Pseudotsuga menziesii</i>	33	4	6	a	252
231	<i>Pseudotsuga menziesii</i> var. <i>glauca</i>	38	4	10	d	255
232	<i>Pyrus communis</i>	20	4	16	g	212
233	<i>Quercus macranthera</i>	22	4	16	d	381
234	<i>Quercus palustris</i>	31	4	9	j	293
235	<i>Quercus petraea</i>	30	4	10	d	285
236	<i>Quercus petraea</i>	22	4	2	a	329
237	<i>Quercus petraea</i>	31	4	10	d	306
238	<i>Quercus robur</i>	28	3	30	g	565
239	<i>Quercus robur</i>	28	4	2	a	546
240	<i>Quercus robur</i>	30	4	5	b	534
241	<i>Quercus robur</i>	27	3	30	g	525
242	<i>Quercus robur</i>	27	3	30	g	513
243	<i>Quercus robur</i>	31	3	26	a	499
244	<i>Quercus robur</i>	31	3	17	s	495
245	<i>Quercus robur</i>	27	2	30	g	495
246	<i>Quercus robur</i>	31	4	5	h	493
247	<i>Quercus robur</i>	26	3	30	h	491
248	<i>Quercus robur</i>	28	4	25	a	476

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Table 1 – cont. / Tabela 1 – cd.

1	2	3	4	5	6	7
249	<i>Quercus robur</i>	25	3	2	c	467
250	<i>Quercus robur</i>	27	3	30	g	465
251	<i>Quercus robur</i>	28	3	30	g	461
252	<i>Quercus robur</i>	27	3	25	b	451
253	<i>Quercus robur</i>	28	3	25	c	442
254	<i>Quercus robur</i>	27	3	30	g	430
255	<i>Quercus robur</i>	32	3	18	f	428
256	<i>Quercus robur</i>	25	2	25	b	426
257	<i>Quercus robur</i>	20	3	30	a	425
258	<i>Quercus robur</i>	26	4	16	d	423
259	<i>Quercus robur</i>	33	2	23	a	420
260	<i>Quercus robur</i>	37	3	26	a	420
261	<i>Quercus robur</i>	23	3	16	d	419
262	<i>Quercus robur</i>	25	4	2	m	418
263	<i>Quercus robur</i>	28	4	25	b	416
264	<i>Quercus robur</i>	27	4	6	c	415
265	<i>Quercus robur</i>	30	3	26	a	415
266	<i>Quercus robur</i>	25	3	30	d	414
267	<i>Quercus robur</i>	33	3	26	a	413
268	<i>Quercus robur</i>	28	2	25	b	412
269	<i>Quercus robur</i>	22	4	2	p	409
270	<i>Quercus robur</i>	34	3	26	a	406
271	<i>Quercus robur</i>	31	4	10	h	405
272	<i>Quercus robur</i>	25	4	1	c	400
273	<i>Quercus robur</i>	23	4	16	d	395
274	<i>Quercus robur</i>	26	3	30	d	394
275	<i>Quercus robur</i>	32	3	17	i	393
276	<i>Quercus robur</i>	26	3	30	g	393
277	<i>Quercus robur</i>	23	4	6	b	392
278	<i>Quercus robur</i>	25	4	2	a	392
279	<i>Quercus robur</i>	25	2	16	d	390
280	<i>Quercus robur</i>	22	3	30	c	390

Table 1 – cont. / Tabela 1 – cd.

1	2	3	4	5	6	7
281	<i>Quercus robur</i>	31	4	6	c	389
282	<i>Quercus robur</i>	20	3	30	f	388
283	<i>Quercus robur</i>	28	1	25	b	386
284	<i>Quercus robur</i>	33	3	26	a	383
285	<i>Quercus robur</i>	25	3	30	c	381
286	<i>Quercus robur</i>	25	4	2	a	380
287	<i>Quercus robur</i>	34	3	19	a	380
288	<i>Quercus robur</i>	27	3	30	g	380
289	<i>Quercus robur</i>	29	4	5	g	379
290	<i>Quercus robur</i>	30	3	17	s	377
291	<i>Quercus robur</i>	25	2	29	b	377
292	<i>Quercus robur</i>	31	3	26	a	375
293	<i>Quercus robur</i>	28	4	6	b	373
294	<i>Quercus robur</i>	24	4	16	d	373
295	<i>Quercus robur</i>	26	4	16	g	371
296	<i>Quercus robur</i>	27	1	30	g	370
297	<i>Quercus robur</i>	27	2	30	g	369
298	<i>Quercus robur</i>	25	4	6	a	368
299	<i>Quercus robur</i>	28	1	26	a	368
300	<i>Quercus robur</i>	25	2	30	g	368
301	<i>Quercus robur</i>	26	2	27	a	367
302	<i>Quercus robur</i>	30	3	26	a	362
303	<i>Quercus robur</i>	23	4	2	p	361
304	<i>Quercus robur</i>	29	3	30	g	360
305	<i>Quercus robur</i>	25	2	30	c	358
306	<i>Quercus robur</i>	32	3	26	a	353
307	<i>Quercus robur</i>	31	1	10	j	352
308	<i>Quercus robur</i>	27	2	27	a	350
309	<i>Quercus robur</i>	27	4	27	a	350
310	<i>Quercus robur</i>	26	4	6	c	348
311	<i>Quercus robur</i>	29	3	26	a	342
312	<i>Quercus robur</i> 'Fastigiata'	15	1	4	a	369

Table 1 – cont. / Tabela 1 – cd.

1	2	3	4	5	6	7
313	<i>Quercus rubra</i>	30	3	8	h	373
314	<i>Quercus rubra</i>	27	4	13	a	362
315	<i>Quercus rubra</i>	27	3	22	f	339
316	<i>Quercus rubra</i>	30	4	17	m	305
317	<i>Quercus rubra</i>	32	4	16	a	302
318	<i>Quercus rubra</i>	26	3	22	f	301
319	<i>Quercus rubra</i>	17	4	1	c	294
320	<i>Quercus rubra</i>	28	4	8	h	276
321	<i>Quercus rubra</i>	29	4	16	a	270
322	<i>Salix alba</i>	16	4	4	c	313
323	<i>Salix alba</i>	25	1	11	f	320
324	<i>Salix fragilis</i>	19	4	2	s	451
325	<i>Salix ×rubens</i>	20	1	16	d	396
326	<i>Salix ×sepulcralis</i> ‘Chrysocoma’	14	1	2	j	377
327	<i>Salix ×sepulcralis</i> ‘Chrysocoma’	15	4	2	j	352
328	<i>Salix ×sepulcralis</i> ‘Chrysocoma’	13	2	2	s	291
329	<i>Syringa reticulata</i>	18	4	11	m	93
330	<i>Taxodium distichum</i>	22	4	16	d	326
331	<i>Taxus baccata</i>	12	2	2	a	99
332	<i>Thuja occidentalis</i>	32	4	31	h	192
333	<i>Thuja occidentalis</i>	16	4	9	l	184
334	<i>Thuja occidentalis</i>	20	4	2	a	174
335	<i>Thuja occidentalis</i>	18	4	2	a	128
336	<i>Thuja occidentalis</i>	13	4	4	a	127
337	<i>Thuja occidentalis</i>	14	3	2	a	114
338	<i>Thuja occidentalis</i>	17	4	4	a	112
339	<i>Thuja occidentalis</i>	13	4	10	g	112
340	<i>Thuja occidentalis</i>	18	4	2	a	107
341	<i>Thuja occidentalis</i>	9	4	11	f	90
342	<i>Thuja plicata</i>	21	4	2	a	363
343	<i>Thuja plicata</i>	25	4	10	g	265
344	<i>Thuja plicata</i>	26	4	6	a	248

Table 1 – cont. / Tabela 1 – cd.

1	2	3	4	5	6	7
345	<i>Thuja plicata</i>	28	3	31	c	244
346	<i>Thuja plicata</i>	22	4	2	a	235
347	<i>Thuja plicata</i>	22	4	16	d	232
348	<i>Thuja plicata</i>	22	4	4	d	213
349	<i>Thuja plicata</i>	27	4	6	c	212
350	<i>Thuja plicata</i>	27	4	8	h	210
351	<i>Thuja plicata</i>	23	4	8	h	206
352	<i>Thuja plicata</i>	23	4	2	a	205
353	<i>Thuja plicata</i>	14	1	6	a	203
354	<i>Thuja plicata</i>	22	4	16	b	203
355	<i>Thuja plicata</i>	20	4	16	d	203
356	<i>Thuja plicata</i>	29	4	8	h	200
357	<i>Thuja plicata</i>	25	4	9	l	197
358	<i>Thuja plicata</i>	20	4	16	d	195
359	<i>Thuja plicata</i>	8	1	6	c	192
360	<i>Thuja plicata</i>	24	4	6	a	185
361	<i>Thuja plicata</i>	20	4	10	g	182
362	<i>Thuja plicata</i>	23	4	2	a	180
363	<i>Thuja plicata</i>	25	4	6	c	174
364	<i>Thuja plicata</i>	16	4	2	a	171
365	<i>Thuja plicata</i>	28	4	6	c	171
366	<i>Thuja plicata</i>	20	4	16	d	171
367	<i>Thuja plicata</i>	26	3	31	c	166
368	<i>Thuja plicata</i>	20	4	2	a	165
369	<i>Thuja plicata</i>	27	4	6	a	162
370	<i>Thuja plicata</i>	22	4	11	f	162
371	<i>Thuja plicata</i>	17	4	5	b	155
372	<i>Thuja plicata</i>	26	4	6	a	153
373	<i>Thuja plicata</i>	26	3	31	c	152
374	<i>Thuja plicata</i>	27	4	6	a	148
375	<i>Thuja plicata</i>	20	4	4	c	145
376	<i>Thuja plicata</i>	22	4	6	a	145

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Table 1 – cont. / Tabela 1 – cd.

1	2	3	4	5	6	7
377	<i>Thuja plicata</i>	22	4	6	a	145
378	<i>Thuja plicata</i>	16	4	6	c	145
379	<i>Thuja plicata</i>	26	3	31	c	145
380	<i>Thuja plicata</i>	19	4	5	c	143
381	<i>Thuja plicata</i>	17	4	5	c	140
382	<i>Thuja plicata</i>	17	4	2	a	139
383	<i>Thuja plicata</i>	17	4	2	a	138
384	<i>Thuja plicata</i>	16	3	26	a	138
385	<i>Thuja plicata</i>	26	3	31	c	135
386	<i>Thuja plicata</i>	16	4	2	a	133
387	<i>Thuja plicata</i>	15	3	9	l	129
388	<i>Thuja plicata</i>	17	4	4	d	123
389	<i>Thuja plicata</i>	12	4	9	l	123
390	<i>Thuja plicata</i>	18	4	16	d	121
391	<i>Thuja plicata</i>	16	4	9	i	118
392	<i>Thuja plicata</i>	13	4	9	l	118
393	<i>Thuja plicata</i>	16	4	16	b	117
394	<i>Thuja plicata</i>	13	4	4	c	111
395	<i>Thuja plicata</i>	12	4	9	l	110
396	<i>Thuja plicata</i>	18	4	2	a	109
397	<i>Thuja plicata</i>	13	4	4	c	104
398	<i>Thuja plicata</i>	13	4	2	a	103
399	<i>Thuja plicata</i>	17	4	4	c	102
400	<i>Tilia cordata</i>	28	4	5	h	410
401	<i>Tilia cordata</i>	24	3	16	g	371
402	<i>Tilia cordata</i>	26	4	6	c	361
403	<i>Tilia cordata</i>	32	4	5	b	356
404	<i>Tilia cordata</i>	30	4	5	c	355
405	<i>Tilia cordata</i>	27	4	6	c	353
406	<i>Tilia cordata</i>	20	3	5	f	324
407	<i>Tilia cordata</i>	31	4	10	g	305
408	<i>Tilia cordata</i>	22	4	6	c	288

Table 1 – cont. / Tabela 1 – cd.

1	2	3	4	5	6	7
409	<i>Tilia cordata</i>	28	4	10	j	288
410	<i>Tilia cordata</i>	24	4	5	b	282
411	<i>Tilia cordata</i>	28	4	6	a	280
412	<i>Tilia platyphyllos</i>	21	4	2	a	357
413	<i>Ulmus laevis</i>	31	3	30	b	343
414	<i>Ulmus laevis</i>	32	4	13	b	271
415	<i>Ulmus laevis</i>	30	4	9	a	264
416	<i>Ulmus laevis</i>	26	4	4	d	249
417	<i>Ulmus laevis</i>	25	4	4	c	238
418	<i>Ulmus laevis</i>	30	4	13	b	235
419	<i>Ulmus laevis</i>	25	4	4	d	234
420	<i>Ulmus laevis</i>	31	4	8	h	220
421	<i>Ulmus laevis</i>	23	4	1	c	220
422	<i>Ulmus laevis</i>	32	3	18	d	220
423	<i>Ulmus laevis</i>	24	4	1	c	214
424	<i>Ulmus laevis</i>	22	4	6	a	202
425	<i>Ulmus pumila</i> 'Pinnatoramosa'	26	4	2	f	310
426	<i>Ulmus pumila</i> 'Pinnatoramosa'	24	3	2	c	204

Many of the native species have their natural localities in the park-arboretum. They are trees of fertile deciduous forests, mainly oak-hornbeam forests, flood plain forests and alder forests, which had been growing in the area before the park was established. Oak-hornbeam forests are represented by numerous *Quercus robur*, *Acer platanoides*, *Tilia cordata* and *Carpinus betulus*, with occasionally found *Quercus petraea*, *Acer campestre* or *Crataegus monogyna*. Species associated with flood plain forests and alder forests, e.g. *Alnus glutinosa*, *Fraxinus excelsior*, *Acer pseudoplatanus*, *Ulmus laevis*, *Prunus padus*, as well as scarce *Salix alba* and *Salix fragilis*, grow along the Ciemna river and around ponds. There are some pioneering species, e.g. *Betula pendula* and *Pinus sylvestris*, and planted native species, in this region being outside their natural range, e.g. *Fagus sylvatica*, *Larix decidua* or *Tilia platyphyllos*.

Trees with circumferences meeting the requirements for natural monuments represent 45 taxa (Table 1). Within this group the most numerous species include giant arborvitae (*Thuja plicata*) with 58 trees (20%) and English oak (*Quercus robur*) with 51 trees (17.6%). Black alder (*Alnus glutinosa*) is represented by relatively large numbers of specimens (24 trees – 8.3%), similarly as Norway maple (*Acer platanoides*) with 23 trees (7.9%) and field maple (*Acer campestre*) with 19 trees (6.6%).

Three species, i.e. common ash (*Fraxinus excelsior*), common beech (*Fagus sylvatica*) and European white elm (*Ulmus laevis*), are represented by 12 (4.1%) to 10 (3.4%) trees, while the others – by 1 to 9 specimens, whereas as many as 20 taxa are represented by only one tree. A total of 36 taxa are represented by trees with circumferences close to those of natural monuments. These are particularly English oak (*Quercus robur*) with 23 trees, black alder (*Alnus glutinosa*) with 22 trees and Norway maple (*Acer platanoides*) with 20 trees, represented by very similar shares: 16.9, 16.2 and 14.7%. The other taxa are represented by 1 to 7 trees, of which 18 taxa have only one representative.

In the Gołuchów park-arboretum there are 35 trees covered by legal protection as natural monuments (BULiGL w Poznaniu, 2015). These are 16 single trees and 7 clusters, composed of 2–4 specimens, in this case they were only oaks. Natural monuments are mainly English oaks (*Quercus robur*) – 31 trees with circumferences ranging from 335 to 544 cm. In their case due to the absence of permanent marks on site, no precise locations mapped and very similar circumferences of trees growing close to one another it was often very difficult to identify them definitely. Such a reliable identification was possible only for 9 trees labelled with nos. 234, 240, 246, 248, 263, 264, 265, 278 and 281 (Table 1). The other natural monuments included *Populus ×canadensis* ‘Marilandica’ (570 cm), *Tilia cordata* (371 cm), *Tilia platyphyllos* (357 cm) and *Quercus palustris* (219 cm).

As a result of this survey a total of 204 trees were selected, with circumferences meeting the natural monument requirements and being in a very good health condition. Their list is given in Table 1. The number of these trees is considerable; however, a large proportion, e.g. arborvitae or false cypresses, do not reach such large dimensions as oaks and lime trees, thus for species from these genera the circumference required to be classified as natural monuments is only 100 cm. For this reason only selected, most monumental trees from that group deserve to be protected as natural monuments.

Among 290 trees with circumferences within the natural monument limits the predominant groups are those of 201–300 cm (93 trees, i.e. 32.1%) and those of 101–200 cm (87 trees, 30%). A large group comprises also thicker trees with circumferences of 301–400 cm (68 trees, 23.4%). Impressive specimens with circumferences of 401–500 cm are less numerous (33 trees, i.e. 11.4%). The smallest number of the thinnest trees was recorded, having circumferences below 100 cm (3 trees, 1%), similarly as the thickest trees with circumferences of over 501 cm (6 trees, 2.1%). Among 40 thickest trees of 400–570 cm in circumference as many as 35 are English oaks (*Quercus robur*). The thickest trees in the Gołuchów park-arboretum include also a *Populus ×canadensis* ‘Marilandica’ of 570 cm in circumference, *Quercus robur* trees with circumferences of 400–565 cm, as well as *Salix fragilis* (451 cm), *Tilia cordata* (410 cm), *Fagus sylvatica* ‘Atropunicea’ (404 cm) and *Platanus ×hispanica* ‘Acerifolia’ (402 cm). More than a half (82 trees, 60.3%) of 136 trees with circumferences close to the natural monument limits have circumferences ranging from 201 to 300 cm. We need to stress here a numerous group of the thickest trees reaching 301–400 cm in circumference (29 trees, 21.3%). The number of specimens with the smallest circumferences of 101–200 cm (12 trees, 8.8%) and below 100 cm (13 trees, 9.6%) is very low.

Trees with circumferences of natural monuments ranged in height from 8 to 38 m (Table 1). Among those reaching over 30 m oaks, maples, alders and Douglas firs predominated. The tallest trees in the park include *Pseudotsuga menziesii* var. *glauca* (38 m), *Quercus robur* (37 m), *Acer platanoides* (36 m) and *Populus ×canadensis* 'Marilandica' (35 m). Trees measuring 21–30 m (170 specimens, 58.6%) predominated, while the number of those 11–20 m high (73 trees, 25.2%), as well as the tallest, reaching 31–38 m were less numerous (43 trees, 14.8%). Only several trees (1.4%) measured 8–10 m.

The height structure of trees with circumferences close to those of natural monuments was similar. Trees with heights of 21–30 m predominated (85 specimens, 62.5%). A similar share was recorded for trees with heights ranging from 11 to 20 m (25 specimens, 18.4%) as well as the tallest, reaching 31–37 m (22 trees, 16.2%). The share of 4 lowest trees (9–10 m) is also very small, amounting to 2.9%.

The health condition of trees with natural monument circumferences and those close to that limit in most cases is very good (class 4). Their numbers are 211 (72.8%) and 107 (78.7%), respectively. Trees with circumferences of natural monuments are in a slightly better health condition than those with circumferences close to the natural monument limits, which is manifested in a larger share of plants in a good health condition (class 3: 21.4%, i.e. 62 trees, 10.3% – 14 trees, respectively), while it is lower for those in a moderate or poor health condition (classes 2 and 1: 5.9%, i.e. 17 trees, 11% – 15 trees, respectively). Overall among trees with circumferences of natural monuments and close to those limits 18 trees are in a moderate health condition, while 14 – in a poor health condition (Table 1). These trees should be monitored and subjected to required tending operations.

Among the most valuable specimens the only tree covered by legal protection is common yew (*Taxus baccata*), a tree registered under no. 331, covered by partial protection, since its locality in the park may be considered natural (Regulation of the Minister of the Environment of 9 October 2014 on plant species protection – Rozporządzenie..., 2014; Table 1).

Concluding remarks

Results of a survey of the Gołuchów park-arboretum confirm that it is an object of great dendrological value, with 426 impressive trees, including 290 with circumferences of natural monuments, and 136 with circumferences close to the natural monument limits, belonging to 61 taxa and 31 genera (Table 1). At present there are 35 trees covered by legal protection as natural monuments. A total of 204 trees with natural monument dimensions in a very good health condition were selected, of which the most impressive may be proposed for protection in the form of natural monuments.

It is recommended to establish an electronic data base in the park-arboretum, containing information on valuable trees. Each tree should be catalogued specifying dimensions, health status and tending indications; they should also be marked on the map and on site under the same number. At least the most valuable trees of impressive dimensions (circumference and height) as well as specimens of value for botanical collections

need to have small permanent plaques bearing their numbers, attached at a height of approx. 2 m, from the side invisible to park visitors, which would correspond to numbers on maps of individual compartments. Thanks to that measure it would be possible to easily find these most valuable specimens on site, which would facilitate their adequate tending measures and cyclical monitoring of their health status.

It would be recommended to place plaques with basic information on a given taxon next to selected most valuable trees. Data presented in this paper may also be used to prepare an attractive didactic path for visitors, describing the most impressive trees.

In the case of localities with the so-called alien species, remnants of former collection plantings, it is recommended to adopt the principle of planting new specimens of the same species and variety under old trees. Common taxa should not be introduced to former collection plantings, choosing instead rare species of considerable value for the botanical collection (plants of known provenance, marked on site and on the map). However, it needs to be remembered that certain tree species reach large dimensions after several decades, thus planting various species, e.g. oaks, too close to one another will with time result either in their overgrowing or the necessity to remove some of them.

In historical avenues, i.e. a lime-hornbeam avenue planted in 1856, and a year older lime tree avenue planted with small-leaved limes (*Tilia cordata*), specimens of this species should be used to replace missing trees and not, as it was the case previously, broad-leaved lime (*Tilia platyphyllos*).

The most impressive park trees, e.g. oaks, lime trees or maples, may be propagated in a nursery and planted in the park, in this manner maintaining in the collection plants best adapted to the local habitat conditions.

The most valuable trees with dimensions of natural monuments as well as the other valuable specimens need to be protected by regularly performed necessary tending and sanitary interventions. It also needs to be considered whether to remove from the immediate vicinity of particularly valuable trees common species, which frequently have adjacent crowns or even overgrow them. This pertains particularly self-sown trees and shrubs. Such a measure would aim first of all at the exposure of these most valuable specimens, which would be both advantageous for their undisturbed growth and development, and would increase their landscape attractiveness.

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References

- Antonowicz, A. (2014). Park-arboretum. <http://www.okl.lasy.gov.pl/parki-i-arboretum>
Biuletyn Informacji Publicznej Regionalnej Dyrekcji Ochrony Środowiska w Poznaniu. http://bip.poznan.rdos.gov.pl/files/artykuly/15704/rejestr_ochk.xls
- Broda, J. (1990). Park gołuchowski w opisie Adama Kubaszewskiego z 1880 roku oraz we współczesnej ilustracji. *Stud. Mater. Ośr. Kult. Leśn.*, 2, 7–37.
- Bugała, W., Sękowski, S., Bojarczuk, K., Bojarczuk, T., Chałupka, W., Chodun, A., Zub-Robek, I., Wawrzyniak, M., Królikowski, Z. (1979). Inwentaryzacja dendrologiczna Arboretum w Gołuchowie. Manuscript. Poznań: Association of Scientific and Technical Engineers and Technicians of Horticulture.
- BULiGL w Poznaniu. (1986). Opracowanie inwentaryzacyjne Arboretum w Gołuchowie. Stan na dzień 1 stycznia 1986. Operat urządzeniowy. Manuscript. Poznań: Bureau of Forest Management and Geodesy – Branch in Poznań.
- BULiGL w Poznaniu. (2015). Operat konserwatorski – plan gospodarki drzewostanem z mapami rozmieszczenia zinventaryzowanych roślin drzewiastych wykonanymi w skali 1 : 500. Manuscript. Poznań: Bureau of Forest Management and Geodesy – Branch in Poznań.
- Goetz, J. (1930). Park w Gołuchowie. *Rocz. Pol. Tow. Dendrol.*, 3, 1–13.
- Gołuchów. Perła południowej Wielkopolski. Strona główna. Turystyka. Atrakcje. Park – arboretum. http://goluchow.pl/turystyka/atrakcje/atrakcja/91/park_arboretum
- Gołuchów. Zamek renesansowy Działyńskich. <http://www.zamkipolskie.com/goluc/goluc.html>
- Guerquin, B. (1984). Zamki w Polsce. Warszawa: Arkady.
- Jakimowicz, T., Jastrzab-Marek, D. (1984). Gołuchów. Warszawa: Arkady.
- Kajzer, L., Salm, J., Kołodziejski, S. (2001). Leksykon zamków w Polsce. Warszawa: Arkady.
- Kamiński, B., Czerniak, A. (2000). Badanie drzewostanów oraz sporządzenie opinii naukowej kwalifikującej do stworzenia wykazu inwentaryzacyjnego starych, cennych drzew na terenie miasta Poznania. Manuscript. Poznań: Department of Forest Engineering of Poznań University of Life Sciences.
- Kąsinowska, R. (2006). Gołuchów. Rezydencja magnacka w świetle źródeł. Gołuchów: OKL w Gołuchowie.
- Kluge, M. (2003). Projekt rewaloryzacji „Polany Zamkowej” na terenie Zespołu Rezydencjonalnego w Gołuchowie. Manuscript. Warsaw: Postgraduate Study of the Preservation and Conservation of Historical Gardens of Warsaw University of Life Sciences – SGGW.
- Kondracki, J. A. (2002). Geografia regionalna Polski. Warszawa: Wyd. Nauk. PWN.
- Kościelny, S., Sękowski, B. (1963). Przewodnik po Arboretum Gołuchowskim. Poznań: WSR.
- Król, S., Gostyńska-Jakuszczyńska, M. (2003). Zespoły roślinne parku-arboretum w Gołuchowie. Część II – zespoły łąkowe. *Stud. Mater. Ośr. Kult. Leśn.*, 5, 9–27.
- Łakomy, P., Nowik, K., Góral, J. (2011). Stan zdrowotny drzew pomnikowych na terenie Wrocławia. *Zesz. Probl. Post. Nauk Roln.*, 562, 117–125.
- Majdecki, L. (1978). Historia ogrodów. Warszawa: PWN.
- Marek, D. (1994). Ordynacja Gołuchowska Izabeli z Czartoryskich Działyńskiej (1830–1899). Poznań: Muzeum Narodowe w Poznaniu.
- Mężyński, A. (1982). Gołuchów Jana Działyńskiego 1853–1874. *Stud. Muz.*, 13, 74–87.
- Miasteria.pl. Park dendrologiczny w Gołuchowie. <http://miasteria.pl/miejsce/park-dendrologiczny-w-goluchowie.html>
- Mizerkiewicz, R. (2013). Drzewa pomnikowe parku Arboretum w Gołuchowie (województwo wielkopolskie). Manuscript. Poznań: Department of Forest Botany of Poznań University of Life Sciences.
- Pakalski, J., Nosowicz, J. (2005). Lasy Państwowe. Ośrodek Kultury Leśnej w Gołuchowie. Park – Arboretum wraz z przyległymi gruntami zadrzewionymi. Szczegółowa inwentaryzacja dendrologiczna. Manuscript. Gołuchów: Bureau of Forest Management and Geodesy – Branch in Poznań.

Wrońska-Pilarek, D., Maliński, T., Pilarek, Z., Czerniak, A., Cykowiak, Z., Mizerkiewicz, R. (2016). The most valuable trees of the park-arboretum of the Forest Culture Centre in Gołuchów. *Nauka Przyr. Technol.*, 10, 4, #40. DOI: <http://dx.doi.org/10.17306/J.NPT.2016.4.40>

- Plan odnowy miejscowości Gołuchów na lata 2012–2018. Gmina Gołuchów, powiat pleszewski, województwo wielkopolskie. (2012). Gołuchów. <http://docplayer.pl/13084788-Plan-odnowy-miejscowosci-goluchow.html>
- Przykładowe wymiary drzew, kwalifikujące je do ochrony, według propozycji sformułowanych dla wybranych kompleksów leśnych w Polsce. http://www.kp.org.pl/pdf/poradniki/drzewa_pomnikowe.htm
- Region Wielkopolska ...to warto zobaczyć. Park w Gołuchowie. <http://regionwielkopolska.pl/katalog-obiektow/park-w-goluchowie.html>
- Rozporządzenie Ministra Środowiska z dnia 9 października 2014 r. w sprawie ochrony gatunkowej roślin. (2014). Dz. U., item 1409.
- Roźniarek, B. (2007). Ośrodek Kultury Leśnej w Gołuchowie – stan obecny i przyszłość. *Stud. Mater. Ośr. Kult. Leśn.*, 6, 105–116.
- Ruciński, P. (1998). Motywy i kryteria uznawania tworów przyrody za pomniki. *Las Pol.*, 23, 7–10.
- Seneta, W., Dolatowski, J. (2011). *Dendrologia*. Warszawa: Wyd. Nauk. PWN.
- Trampler, T., Kliczkowska, A., Dmyterko, E., Sierpińska, A. (1990). *Regionalizacja przyrodniczo-leśna*. Warszawa: PWRiL.
- Wrońska-Pilarek, D., Maliński, T., Czerniak, A. (2015). Inwentaryzacja dendrologiczna Parku-Arboretum Ośrodka Kultury Leśnej w Gołuchowie. Manuscript. Gołuchów: Forest Culture Centre in Gołuchów.
- Zemła, J., Lisowska, M. (1996). Projekt rewitalizacji historycznego parku dendrologicznego w Gołuchowie. Koncepcja rewitalizacji. Manuscript. Warsaw: Author's Workshop of Landscape Architecture Jardin.
- Zemła, J., Lisowska, M., Zemła, J., Pape-Siliwończuk, D. (1996). Projekt rewitalizacji historycznego parku dendrologicznego w Gołuchowie. Analiza wartości drzew. Manuscript. Warsaw: Author's Workshop of Landscape Architecture Jardin.
- Zemła, J., Pape, D. (1991). Projekt rewitalizacji historycznego parku dendrologicznego w Gołuchowie. Inwentaryzacja ogólna terenu. Manuscript. Warsaw: Author's Workshop of Landscape Architecture Jardin.

NAJCENNIJSZE DRZEWIA PARKU-ARBORETUM OŚRODKA KULTURY LEŚNEJ W GOŁUCHOWIE

Streszczenie

W parku-arboretum w Gołuchowie zinwentaryzowano 426 drzew, w tym 290 o obwodach pomnikowych i 136 o obwodach zbliżonych do pomnikowych, należących do 61 taksonów i 31 rodzajów. Gatunki obcego pochodzenia (62,3%) przeważają nad krajowymi (37,7%). Najliczniej występują gatunki pochodzące z Ameryki Północnej i Azji. Wśród drzew o obwodach pomnikowych dominują *Thuja plicata* i *Quercus robur*, a wśród zbliżonych do pomnikowych – *Quercus robur*, *Alnus glutinosa* i *Acer platanoides*. Najcenniejsze drzewa mają najczęściej obwody od 201 do 300 cm, a wysokość od 21 do 30 m. Najgrubszym drzewem jest *Populus ×canadensis* 'Marilandica' o obwodzie 570 cm. Stan zdrowotny inwentaryzowanych roślin jest w większości (w ponad 70%) bardzo dobry. Wytypowano 204 drzewa o obwodach pomnikowych znajdujące się w bardzo dobrym stanie zdrowotnym, z których część można by zaproponować do ochrony w formie pomników przyrody.

Słowa kluczowe: pomniki przyrody, inwentaryzacja dendrologiczna, park-arboretum, Gołuchów

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