

## DENDROFLORA OF THE CITADEL PARK IN POZNAŃ

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**Abstract.** The dendroflora of the Citadel Park in Poznań comprises 167 taxons. The total of 22 900 trees were inventoried. The stands found in the park are dominated by species associated with the communities of fertile broad-leaved forests. The main tree species found in stands are *Acer platanoides* and *Robinia pseudoacacia* but *Acer pseudoplatanus*, *A. campestre* and *Tilia cordata* are also quite frequent. The total of 257 trees deriving from 29 taxons was recognised as valuable. Trees from *Acer platanoides*, *Pyrus communis*, *Aesculus hippocastanum* and *Ulmus laevis* attain considerable circumferences.

**Key words:** dendroflora, Citadel Park, Poznań

### INTRODUCTION

The present Citadel Park comprises the territory of the former Winiary Fortress, the biggest stronghold of the ring of fortifications which had surrounded the city of Poznań in the 19th century [Szkudlarek-Lipowy and Maj 2006, Wilkaniec 2007]. A detailed plan of Poznań fortification comes from 1828. The construction of the fortress began in 1829 and was completed in 1872 [Wojciechowski 1980, Polak et al. 1988]. The Poznań Citadel was utilized by armed forces until 1945; initially by the Prussian army, during the period between the First and Second World Wars – by the Polish Army and, finally, by the German occupational forces. The Winiary Fortress suffered heavy losses during the operation of taking the town of Poznań from the Germans Russian troops in 1945. However, the most serious damages were inflicted by the pulling down of parts of the fortress in 1950s. These operations resulted in the destruction of the majority of large buildings situated on the territory of the Citadel. The original structure and design of the fortress were finally totally obliterated by the realisation in 1960s of the project called ‘Monument Park of the Polish-Russian Friendship and Brotherhood in Arms’ [Wilkaniec 2004, 2007].

Prussian fortifications of Poznań exerted a strong influence on the spatial structure of the city of Poznań and, in addition, played a great role in the system of town green areas. Even before 1940s, areas neighbouring with the fortress were treated as walking

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promenades and recreational grounds and, at the same time, allowed to expose certain fortifications, such as the Citadel barracks [Czarnecki 1967, Karolczak 1993, Ostrowska-Kęmbłowska and Skuratowicz 1994].

After the Second World War, the area of the Citadel became part of the system of the city green areas. The Citadel Park constitutes a central piece, a 'headstone' of the system which unifies wedges of green areas and a ring of green belts which was established to replace a belt of the 19th century fortifications and by doing so, it ensures the continuity of the existing ecological corridors situated in this city. It is thanks to the Citadel that a spatial connection between all parts constituting this system became possible [Linette 1965, Czarnecki 1972, Fortyfikacje... 2006, Wilkaniec 2007].

At the present time, the Citadel is a resting and recreational part which makes it possible for thousands of people to practice recreation. War cemeteries as well as the old St. Adalbert cemetery situated here constitute municipal green areas of unique purpose and significance [Bączyk 1998, 1999, Suport 2002].

Due to its exceptional landscape, natural as well as cultural values and importance, the Winiary Fortress fully deserves to be protected and, acting on this premise, the Board of Municipal Green Areas submitted an application in 2002 to appropriate authorities to change the status of the Citadel into the area of protected landscape [Maj 2002, Szkudlarek-Lipowy and Maj 2006].

In recognition of the historical role of the Citadel, in 1966 it was entered onto the registry of monuments of the City of Poznań under number A6. Bearing in mind its considerable historical-commemorative value, perhaps recognising it as a cultural park would have been a more appropriate form of protection of the Citadel [Szkudlarek-Lipowy and Maj 2006]. The Parliamentary Bill on the protection and care of monuments provides legal basis which could allow the establishment of this form of protection more and more frequently proposed in the case of this kind of fortification complexes [Klupsz 1999, Ustawa... 2003].

The Citadel Park constitutes a very valuable natural area. All in all, the total of 31 lichen species, 383 species of vascular plants of which 52 are classified as very rare in Poznań were found to occur here. One nature monument (general Czujkow sessile oak) and several dozen trees with monumental circumference can be found in the Citadel Park which were not entered on the nature registry. The total of 44 plant communities were identified here, of which five are species endangered in this region. Also the fauna of this area is quite rich; 501 beetles as well as the following numbers of protected species of animals were identified: reptiles (2), amphibians (4), birds (12) and mammals (13) [Maj 1999, Walory... 2001, Walory przyrodnicze... 2002, Szkudlarek-Lipowy and Maj 2006]. According to hepterologs, the Citadel should be on the list of objects protected by the Natura 2000 system because nine species of bats live in what still remains from the fortification facilities [Walory... 2001].

The aim of the authors was to make an inventory of woody plants found in the Citadel Park with a special emphasis on the most valuable trees with splendid dimensions and later, on the basis of the obtained data to evaluate the condition of the dendroflora of this object.

## STUDY AREA

The Citadel Park is situated in the Old Town quarters, in the central part of the City of Poznań. Its boundaries run along Szelałowska and Winograpy Streets as well as Poznań Army Alley (Fig. 1). The entire object is administered by the Board of Municipal Green Areas in Poznań.

The Citadel Park together with the cemeteries and museum areas occupies the area of 97.2 ha. Saint Adalbert and orthodox cemeteries with the total area of 2 ha are also administered by the Board of Municipal Green Areas in Poznań, while the military cemeteries with their total area of 5.7 ha are the property of the State Treasury and are administered by the Voivodeship Governor.

## METHODS

The inventory of the existing dendroflora was conducted during the period from July to October 2007. Species names of plants are given after Mirek et al. [2002] and Seneta and Dolatowski [2007].

Twenty seven plots (I-XXVII) were marked off characterised by different areas (Fig. 1). The division and numbers of the plots were accepted following the recommendations of the Board of Municipal Green Areas in Poznań with only small modifications.

Within the framework of the performed inventory, all trees and bushes were assigned to a species and variety and numbers of individual plants were given to each plot and to each taxon.

Trees united at the base or separating at the height of over 1.3 m were treated as single trees, while those that forked at the height of less than 1.3 m were treated as separate trees and were measured and counted separately. The only exception comprised specimens of white mulberry which, due to the specificity of this species, were always treated as one tree irrespective of the number of branches.

The most valuable specimens of trees and bushes were identified for each plot and they were marked using a biodegradable spray (each plot has a different numeration) and all specimens were plotted on a map in 1:4000 scale. The circumference and height were given for each specimen and their health condition was assessed using the scale proposed by Kamiński and Czerniak [2000].

During the next stage of investigations, the most valuable trees and bushes were selected and they were assigned to the following groups: existing nature monuments, trees of monumental circumference [Instrukcja... 1996, Ruciński 1998], trees with circumferences close to the monumental (with circumferences up to 20% smaller than those determined in monumental trees) and splendid trees (irrespective of their circumferences but characterised by unusual form and other distinguished traits).

The group of species of "special concern" comprised those species, which are covered by legal protection [Rozporządzenie... 2004] as well as those which can be found on the so-called red lists in Wielkopolska and in Poznań [Żukowski and Jackowiak 1995, Jackowiak 1993].

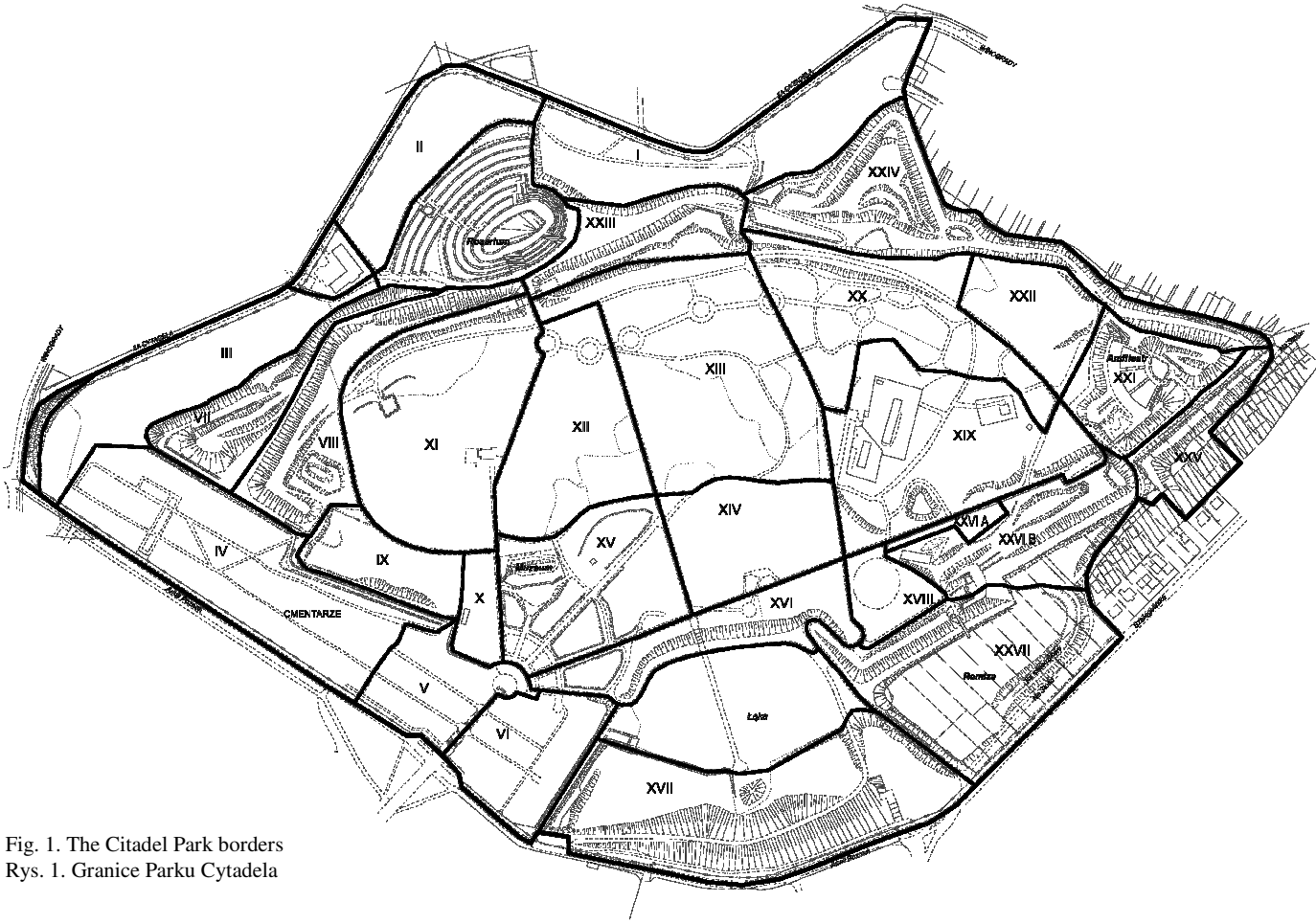


Fig. 1. The Citadel Park borders  
Rys. 1. Granice Parku Cytadela

## RESULTS

## The general characteristics of the dendroflora

The dendroflora of the Citadel Park comprises 167 taxons of arborescent plants. The above quantity includes 109 trees, 54 bushes and four climbing plants. Due to their form of growth, three species were classified both as trees and bushes (Table 1).

Table 1. The list of taxa of arborescent plants in the Citadel Park  
Tabela 1. Wykaz taksonów roślin drzewiastych Parku Cytadela

No. Lp.	Taxons name Nazwa taksonu	No. Lp.	Taxons name Nazwa taksonu
1	2	1	2
1	<i>Abies concolor</i> (Gordon et Glend.) Lindl. ex Hildebr	29	<i>Chamenomeles japonica</i> (Thunb.) Lindl. ex Spach
2	<i>Acer campestre</i> L.	30	<i>Clematis vitalba</i> L.
3	<i>Acer campestre</i> 'Pendula'	31	<i>Colutea arborescens</i> L.
4	<i>Acer negundo</i> L.	32	<i>Cornus sanguinea</i> L.
5	<i>Acer negundo</i> 'Flamingo'	33	<i>Cornus sericea</i> L.
6	<i>Acer platanoides</i> L.	34	<i>Corylus avellana</i> L.
7	<i>Acer pseudoplatanus</i> L.	35	<i>Corylus colurna</i> L.
8	<i>Acer pseudoplatanus</i> Grupa Purpureum	36	<i>Cotoneaster horizontalis</i> Decne.
9	<i>Acer saccharinum</i> L.	37	<i>Crataegus macrocarpa</i> Hegetschw.
10	<i>Acer tataricum</i> L.	38	<i>Crataegus media</i> Bechst.
11	<i>Acer tataricum</i> L. subsp. <i>ginnala</i> (Maxim.) Wesm	39	<i>Crataegus subsphaericea</i> Gand.
12	<i>Aesculus hippocastanum</i> L.	40	<i>Crataegus laevigata</i> (Poir.) DC.
13	<i>Ailanthus altissima</i> (Mill.) Swingle	41	<i>Crataegus monogyna</i> Jacq.
14	<i>Alnus glutinosa</i> (L.) Gaertn.	42	<i>Crataegus pedicellata</i> Sarg.
15	<i>Berberis vulgaris</i> L.	43	<i>Crataegus rhipidophylla</i> Gand.
16	<i>Berberis vulgaris</i> 'Atropurpurea'	44	<i>Elaeagnus angustifolia</i> L.
17	<i>Berberis</i> cfr. <i>wilsoniae</i> Hemsl. et E.H. Wilson	45	<i>Euonymus europaeus</i> L.
18	<i>Betula pendula</i> Roth	46	<i>Fagus sylvatica</i> L.
19	<i>Betula pendula</i> 'Youngii'	47	<i>Fagus sylvatica</i> 'Purpurea'
20	<i>Betula pubescens</i> Ehrh.	48	<i>Forsythia × intermedia</i> Zabel
21	<i>Buxus sempervirens</i> L.	49	<i>Fraxinus excelsior</i> L.
22	<i>Caragana arborescens</i> Lam.	50	<i>Fraxinus excelsior</i> 'Pendula'
23	<i>Carpinus betulus</i> L.	51	<i>Fraxinus pennsylvanica</i> Marshall
24	<i>Carpinus betulus</i> 'Fastigiata'	52	<i>Ginkgo biloba</i> L.
25	<i>Castanea sativa</i> Mill.	53	<i>Gleditsia triacanthos</i> L.
26	<i>Celtis occidentalis</i> L.	54	<i>Hedera helix</i> L.
27	<i>Chamaecyparis lawsoniana</i> (A. Murray bis) Parl.	55	<i>Hippophae rhamnoides</i> L.
28	<i>Chamaecyparis pisifera</i> (Siebold et. Zucc.) 'Squarrosa'	56	<i>Juglans cinerea</i> L.

Table 1 – cont.

1	2	1	2
57	<i>Juglans regia</i> L.	96	<i>Populus tremula</i> L.
58	<i>Juniperus communis</i> L.	97	<i>Potentilla fruticosa</i> L.
59	<i>Juniperus</i> cfr. <i>chinensis</i> L.	98	<i>Prunus avium</i> (L.) L.
60	<i>Juniperus</i> × <i>pfitzeriana</i> (L. Späth) P.A. Schmidt	99	<i>Prunus avium</i> ‘Pendula’
61	<i>Juniperus sabina</i> L.	100	<i>Prunus cerasifera</i> Ehrh.
62	<i>Juniperus</i> cfr. <i>squamata</i> Buch.-Ham. ex Lam.	101	<i>Prunus</i> cfr. <i>cerasifera</i> ‘Pissardii’
63	<i>Juniperus</i> cfr. <i>virginiana</i> L.	102	<i>Prunus domestica</i> L. subsp. <i>domestica</i>
64	<i>Laburnum anagyroides</i> Medik.	103	<i>Prunus domestica</i> L. subsp. <i>insititia</i> (L.) Bonnier et Layens
65	<i>Larix decidua</i> Mill.	104	<i>Prunus mahaleb</i> L.
66	<i>Larix xmarischlinsii</i> Coaz	105	<i>Prunus padus</i> L.
67	<i>Ligustrum vulgare</i> L.	106	<i>Prunus serotina</i> Ehrh.
68	<i>Lonicera maackii</i> (Rupr.) Herder	107	<i>Prunus spinosa</i> L.
69	<i>Lonicera</i> cfr. <i>tatarica</i> L.	108	<i>Pseudotsuga menziesii</i> (Mirb.) Franco
70	<i>Lycium barbarum</i> L.	109	<i>Pseudotsuga menziesii</i> var. <i>glauca</i> (Mayr) Franco
71	<i>Mahonia aquifolium</i> (Pursh) Nutt.	110	<i>Pyracantha</i> ‘Orange Glow’
72	<i>Malus</i> × <i>purpurea</i> (Barier et al.) Rehder	111	<i>Pyracantha</i> ‘Soleil d’Or’
73	<i>Malus domestica</i> Borkh.	112	<i>Pyrus communis</i> L.
74	<i>Morus alba</i> L.	113	<i>Quercus petraea</i> (Matt.) Liebl.
75	<i>Parthenocissus inserta</i> (A. Kern.) Fritsch	114	<i>Quercus robur</i> L.
76	<i>Philadelphus</i> sp.	115	<i>Quercus robur</i> ‘Fastigiata’
77	<i>Physocarpus opulifolius</i> (L.) Maxim.	116	<i>Quercus rubra</i> L.
78	<i>Picea abies</i> (L.) H. Karst.	117	<i>Rhamnus cathartica</i> L.
79	<i>Picea omorica</i> (Pančić) Purk	118	<i>Rhus typhina</i> L.
80	<i>Picea pungens</i> Engelm.	119	<i>Ribes alpinum</i> L.
81	<i>Picea pungens</i> ‘Glauca’	120	<i>Ribes spicatum</i> E. Robson
82	<i>Pinus xraetica</i> Brügger	121	<i>Ribes uva-crispa</i> L.
83	<i>Pinus mugo</i> Turra	122	<i>Robinia pseudoacacia</i> L.
84	<i>Pinus nigra</i> J.F. Arnold	123	<i>Robinia pseudoacacia</i> ‘Frisia’
85	<i>Pinus strobus</i> L.	124	<i>Rosa canina</i> L.
86	<i>Pinus sylvestris</i> L.	125	<i>Rosa</i> cfr. <i>multiflora</i> Thunb.
87	<i>Pinus uliginosa</i> Neumann ex Wimmer	126	<i>Rosa rugosa</i> Thunb.
88	<i>Platanus xhispanica</i> Mill. ex Münchh. ‘Acerifolia’	127	<i>Rubus caesius</i> L.
89	<i>Platycladus orientalis</i> (L.) Franco	128	<i>Salix alba</i> L.
90	<i>Populus alba</i> L.	129	<i>Salix fragilis</i> L.
91	<i>Populus xcanadensis</i> Moench	130	<i>Salix purpurea</i> L.
92	<i>Populus xcanescens</i> (Aiton) Sm.	131	<i>Salix xrubens</i> Schrank
93	<i>Populus nigra</i> L.	132	<i>Salix xsepulcralis</i> Simonk. ‘Chrysocoma’
94	<i>Populus nigra</i> ‘Italica’	133	<i>Salix viminalis</i> L.
95	<i>Populus simonii</i> Carrière	134	<i>Sambucus nigra</i> L.

Table 1 – cont.

1	2	1	2
135	<i>Sorbus aucuparia</i> L.	152	<i>Thuja plicata</i> Donn ex D. Don
136	<i>Sorbus aucuparia</i> 'Pendula'	153	<i>Thuja plicata</i> 'Zebrina'
137	<i>Sorbus hybrida</i> L.	154	<i>Tilia cordata</i> Mill.
138	<i>Sorbus intermedia</i> (Ehrh.) Pers.	155	<i>Tilia</i> 'Euchlora'
139	<i>Spiraea japonica</i> L.f. 'Golden Princess'	156	<i>Tilia</i> $\times$ europaea L.
140	<i>Symphoricarpos albus</i> (L.) S.F. Blake	157	<i>Tilia platyphyllos</i> Sciop.
141	<i>Syringa</i> cfr. <i>vulgaris</i>	158	<i>Tsuga canadensis</i> (L.) Carriere
142	<i>Tamarix</i> sp.	159	<i>Ulmus glabra</i> Huds.
143	<i>Taxus baccata</i> L.	160	<i>Ulmus</i> $\times$ hollandica Mill.
144	<i>Thuja</i> 'Aureospicata'	161	<i>Ulmus laevis</i> Pall.
145	<i>Thuja</i> Grupa Aureospicata	162	<i>Ulmus minor</i> Mill. emend. Richens
146	<i>Thuja occidentalis</i> L.	163	<i>Viburnum lantana</i> L.
147	<i>Thuja occidentalis</i> 'Aurescens'	164	<i>Viburnum opulus</i> L.
148	<i>Thuja occidentalis</i> 'Ellwangeriana'	165	<i>Vinca minor</i> L.
149	<i>Thuja occidentalis</i> 'Ellwangeriana Aurea'	166	<i>Viscum album</i> L.
150	<i>Thuja occidentalis</i> 'Fastigiata'	167	<i>Vitis</i> sp.
151	<i>Thuja occidentalis</i> 'Umbraculifera'		

Within the confines of the Park, approximately 22 900 trees were inventoried. The dominant species of the stands include: *Acer platanoides* (26.5%) and *Robinia pseudoacacia* (23%), whereas *Acer pseudoplatanus*, *A. campestre* and *Tilia cordata* occur less frequently (4.2-5.3%). The share of the remaining 104 taxons does not exceed 3%.

Bushes occupy the area of one to several hundred square metres with. *Syringa vulgaris*, *Taxus baccata*, *Symphoricarpos albus*, *Juniperus  $\times$ pfitzeriana*, *J. sabina*, *Hedera helix* and *Philadelphus* sp. being the most frequent species, although *Sambucus nigra*, *Ligustrum vulgare*, *Rosa canina*, *Prunus spinosa* and *Vinca minor* are also quite common.

Out of 167 taxons, 65 ones are indigenous – 38.9% (41 trees and 24 bushes), 62 taxons are foreign – 37.1% (38 trees and 24 bushes) and approximately 40 taxons – 24% are cultivars (27 trees and 13 bushes).

The above-mentioned high frequency of arborescent plants of foreign origin is the result, on the one hand, of planned activities of the administrators of this park, i.e. workers of the Board of Municipal Green Areas and, on the other, of natural 'expansiveness' of many of these species but also of their accidental introduction by pedestrians and cyclists penetrating this area. In this way, many 'dragged' species appeared in this dendroflora, 'absconders' from the nearby gardens.

The inventoried introduced species originate mainly from North America. The most popular among them include: *Robinia pseudoacacia*, *Prunus serotina*, *Quercus rubra*, *Acer negundo*, *Fraxinus pennsylvanica*, *Pseudotsuga menziesii*, *Abies concolor* and *Pinus strobus*, but there are also European and Asian species, such as *Aesculus hippocastanum*, *Juglans regia*, *Caragana arborescens*, *Castanea sativa*, *Ginkgo biloba*, *Acer tataricum*, as well as many others.

### Species of “special concern”

Four species covered by legal protection occur in the dendroflora of the Citadel Park; *Hedera helix* is under strict legal protection and *Taxus baccata*, *Viburnum opulus*, *Vinca minor* are under partial protection [Rozporządzenie... 2004]. In accordance with the above-quoted directive, legal protection covers widely growing species. With the exception of *Taxus baccata*, populations of the above-mentioned species fulfil this criterion since they have been growing in the wild for a long time and successfully proliferate spontaneously. Therefore, these sites fall under legal protection [Walory... 2001, Wrońska-Pilarek et al. 2007].

From among arborescent plants mentioned on the red list of threatened and disappearing species in Wielkopolska [Żukowski and Jackowiak 1995], the following seven species are recorded: *Acer campestre*, *Crataegus rhipidophylla*, *Hedera helix*, *Populus nigra*, *Taxus baccata*, *Viburnum opulus* and *Vinca minor*. Four of them are rare in Wielkopolska (*Acer campestre*, *Crataegus rhipidophylla*, *Populus nigra*, *Taxus baccata*), while the remaining ones are not endangered.

With regard to Jackowiak's [1993] list of the 'species of special concern' for the City of Poznań, the following plants were found to occur in the examined area: *Berberis vulgaris*, *Betula pubescens*, *Carpinus betulus*, *Cornus sanguinea*, *Crataegus laevigata*, *C. rhipidophylla*, *Euonymus europaeus*, *Juniperus communis*, *Pinus sylvestris*, *Prunus padus*, *Quercus petraea*, *Rhamnus cathartica*, *Ribes spicatum*, *Viburnum opulus*.

### Valuable trees

The total of 257 valuable trees from the following categories was inventoried in the Citadel Park: existing nature monuments, trees with monumental circumferences as well as trees with circumferences close to monumental and splendid trees.

The above-mentioned categories are represented by 29 taxons. The following species attain considerable circumferences: *Acer platanoides*, *Pyrus communis*, *Aesculus hippocastanum* and *Ulmus laevis* (Table 2).

Table 2. The participation and the range of circumference of the most valuable trees  
Tabela 2. Udział i zakresy obwodów osiągnięte przez drzewa najcenniejsze

No. Lp.	Taxon Takson	Participation, % Udział, %	Number of trees Liczba drzew	Range of the circumferences, cm Zakres obwodów, cm	
				minimum minimum	maximum maksimum
1	2	3	4	5	6
1	<i>Acer campestre</i> L.	2.7	7	172	253
2	<i>Acer platanoides</i> L.	31.4	81	182	337
3	<i>Acer pseudoplatanus</i> L.	4.7	12	123	337
4	<i>Aesculus hippocastanum</i> L.	10.5	27	237	490
5	<i>Ailanthus altissima</i> (Mill.) Swingle	0.8	2	269	314
6	<i>Carpinus betulus</i> L.	0.4	1	173	173
7	<i>Celtis occidentalis</i> L.	0.4	1	173	173



Table 2 – cont.

1	2	3	4	5	6
8	<i>Crataegus monogyna</i> Jacy.	0.4	1	146	146
9	<i>Fagus sylvatica</i> L.	1.2	3	347	410
10	<i>Fraxinus excelsior</i> L.	5.8	15	212	330
11	<i>Gleditsia triacanthos</i> L.	0.4	1	236	236
12	<i>Morus alba</i> L.	2.7	7	168	297
13	<i>Populus alba</i> L.	0.4	1	404	404
14	<i>Populus ×canadensis</i> Moench	2.3	6	383	488
15	<i>Populus nigra</i> L.	0.4	1	262	262
16	<i>Prunus avium</i> (L.) L.	0.4	1	170	170
17	<i>Prunus mahaleb</i> L.	0.4	1	127	127
18	<i>Pyrus communis</i> L.	13.2	34	150	264
19	<i>Quercus robur</i> L.	5.8	15	257	397
20	<i>Robinia pseudoacacia</i> L.	3.5	9	270	358
21	<i>Robinia pseudoacacia</i> 'Frisia'	0.4	1	262	262
22	<i>Salix alba</i> L.	0.4	1	118	118
23	<i>Salix ×rubens</i> Schrank	0.4	1	287	287
24	<i>Sambucus nigra</i> L.	0.4	1	70	70
25	<i>Sorbus aucuparia</i> L.	1.2	3	101	155
26	<i>Tilia cordata</i> Mill.	0.4	1	339	339
27	<i>Tilia platyphyllos</i> Sciop.	0.4	1	188	188
28	<i>Ulmus glabra</i> Huds.	0.4	1	164	164
29	<i>Ulmus laevis</i> Pall.	8.2	21	163	247

\* For the single specimens was noted the same circumference.

\* Dla okazów pojedynczych wpisano ten sam obwód.

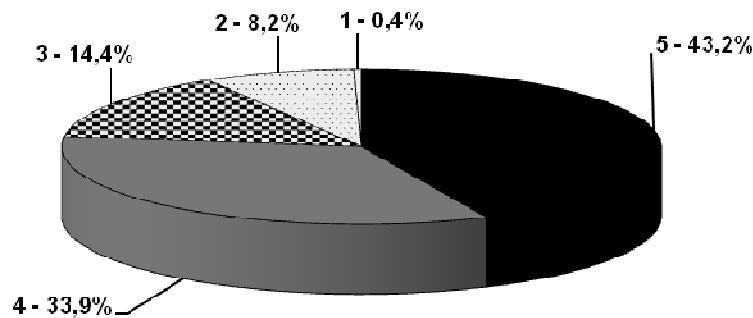


Fig. 2. Health condition of the most valuable trees: 5 – very good, 4 – good, 3 – average, 2 – bad, 1 – very bad

Rys. 2. Stan zdrowotny najcenniejszych drzew: 5 – bardzo dobry, 4 – dobry, 3 – średni, 2 – zły, 1 – bardzo zły

Circumferences of the assessed trees range from 70 cm (*Sambucus nigra*) to 490 cm (*Aesculus hippocastanum*, Table 2).

The smallest trees include *Morus alba* and *Sambucus nigra* with their height of 7 m, whereas the tallest tree was *Populus xcanadensis* measuring 28 m.

The health condition of the majority of magnificent trees is good indicating that the nursing operations are carried out properly. Out of the 257 most valuable trees, the health condition of 198 is very good or good (Fig. 2). It seems that from among 25 taxons of these trees 'candidates' should be selected to be covered by legal protection as nature monuments.

## CONCLUSIONS

Rich and valuable dendroflora of the Citadel Park comprises 167 taxons (109 trees, 54 bushes and four climbing plants).

The prevailing types of stands found in the park are dominated by species associated with the communities of fertile broad-leaved forests. Fragments of stands with species composition closest to that found in natural plant communities have been preserved in the south-east part of the object in the plots situated along Szelągowska Street.

The approximate number of all trees inventoried in the Citadel Park is 22 900 with *Acer platanoides* and *Robinia pseudoacacia* being the dominant stand species, although *A. pseudoplatanus*, *A. campestre* and *Tilia cordata* also fairly frequent.

Four species covered by legal protection as well as seven species from the red list of species endangered and disappearing in Wielkopolska and 14 species from the "special concern" list prepared for the City of Poznań were found to occur in the dendroflora of the examined area.

The total of 257 trees was recognised as valuable. These include the existing nature monuments, trees with monumental circumferences or circumferences close to monumental as well as splendid trees. The above mentioned categories are represented by 29 taxons. Considerable circumferences are attained by such species as: *Acer platanoides*, *Pyrus communis*, *Aesculus hippocastanum* and *Ulmus laevis*. From among the 257 most valuable trees, the health condition of 198 is very good or good. It is from these specimens that 'candidates' should be selected to be covered by legal protection as nature monuments.

## REFERENCES

- Bączyk J., 1998. Park Cytadela [The Citadel Park]. Wielk. Muzeum Walk Niepodl. Poznań [in Polish].
- Bączyk J., 1999. Cmentarze na stokach Cytadeli Poznańskiej [The cemeteries of slopes of the Citadel Park in Poznań]. Wielk. Muzeum Walk Niepodl. Poznań [in Polish].
- Czarnecki J., 1967. Opis planu miasta Poznania z r. 1896 i rozwoju przestrzennego miasta na przełomie XIX i XX w. [The description of plan of the Poznań City from the year 1896 and the development of a city at the turn of the 19th and 20th century]. Zesz. Nauk. P. Pozn. Bud. Łąd. 10, 29-54 [in Polish].

- Czarnecki J., 1972. Ewolucja systemu zieleni Poznania [The evolution of the green area system of the City of Poznań]. *Miasto 6* [in Polish].
- Fortyfikacje w przestrzeni miasta [The Poznań fortifications]. 2006. Ed. A. Wilkaniec. Wyd. AR Poznań [in Polish].
- Instrukcja sporządzania programu ochrony przyrody w nadleśnictwie [Instruction for the elaboration of a nature conservation project in a forest district]. 1996. Depart. Leśn. Minist. Ochr. Środ. Zasob. Natur. Leśn. Warszawa [in Polish].
- Jackowiak B., 1993. Atlas rozmieszczenia roślin naczyniowych w Poznaniu [Atlas of distribution of vascular plants in Poznań]. *Pr. Zakł. Taks. Rośl. UAM Pozn.* 2 [in Polish].
- Kamiński B., Czerniak A., 2000. Badanie drzewostanów oraz sporządzenie opinii naukowej kwalifikującej do stworzenia wykazu inwentaryzacyjnego starych, cennych drzew na terenie miasta Poznania – w ramach zadania. „Inwentaryzacja starych, cennych drzew na terenie miasta Poznania” [Investigations of stands and the preparation of a scientific opinion qualifying the establishment of the inventory list of old, valuable trees found in the city of Poznań]. *Kat. Inż. Leśn. AR Poznań* [mscr.; in Polish].
- Karolczak W., 1993. Parki publiczne, skwery i promenady dawnego Poznania [The parks, green and promenades of the old Poznań City]. *Kron. M. Pozn.* 3-4, 38-98 [in Polish].
- Klupsz L., 1999. Formy ochrony obszarowej metodą zachowania XIX i XX wiecznych zespołów pofortecznych [The forms of area protection, as a method of conservation of the 19th and 20th century fortifications]. *Fortyfikacja* 10, 217-226 [in Polish].
- Linette E., 1965. Cytadela w Poznaniu [The Citadel in Poznań]. *Pracow. Kons. Zab. Pracow. Dokum. Hist. Poznań* [mscr.; in Polish].
- Lucas G., Syngé H., 1978. *The IUCN Plant Red Data Book*. Wyd. IUCN, Morges.
- Maj A., 1999. Inwentaryzacja zieleni Parku Cytadela [The inventory of the green of the Citadel Park]. *Oddz. Kons. Ziel. Zarz. Lasów Komun. Wielk. Fund. Eduk. Ekol. Poznań* [mscr.; in Polish].
- Maj A., 2002. Park Cytadela, proponowana forma ochrony i jej uzasadnienie [The Citadel Park, the proposed protection form and its justification]. *Zarz. Ziel. Miejs. Poznań* [mscr.; in Polish].
- Mirek Z., Piękoś-Mirkowa H., Zajac A., Zajac M., 2003. Flowering plants and pteridiophytes of Poland. A checklist. *Inst. Bot. im. W. Szafera PAN Kraków*.
- Ostrowska-Kęmbłowska Z., Skuratowicz J., 1994. Architektura i budownictwo [Architecture and building]. *W: Dzieje Poznania. T. 2. Eds J. Topolski, L. Trzeciakowski. PWN Warszawa, 479-513* [in Polish].
- Polak B., Jakubiak T.A., Karolczak Z., Piechowiak P., Pilarczyk Z., Rezler M., 1988. Poznańskie fortyfikacje [The Poznań fortifications]. *Wyd. Poznańskie Poznań* [in Polish].
- Rozporządzenie Ministra Środowiska z dnia 9 lipca 2004 r. w sprawie gatunków dziko występujących roślin objętych ochroną [Regulation of the Minister of Environment from July, 9th 2004 concerning wild-growing plants under protection]. 2004. *Dz. U. nr 168, poz. 1764* [in Polish].
- Ruciński P., 1998. Motywy i kryteria uznawania tworów przyrody za pomniki [Motifs and criteria for the recognition of natural reations as monuments]. *Las Pol.* 23, 7-10 [in Polish].
- Seneta W., Dolatowski J., 2004. *Dendrologia* [Dendrology]. *Wyd. Nauk. PWN Warszawa* [in Polish].
- Suport A., 2002. Cytadela Poznańska i jej znaczenie dla miasta Poznania [The Poznań Citadel and its importance for the Poznań City]. *Tow. Miłośn. M. Pozn. Poznań* [in Polish].
- Szkudlarek-Lipowy A., Maj A., 2006. Projekt zagospodarowania Parku Cytadela w Poznaniu [The development plan of Park Citadel in Poznań City]. *Zarząd Ziel. Miej. Poznań* [mscr.; in Polish].
- Ustawa o ochronie zabytków i opiece nad zabytkami z 23 lipca 2003 r. [The act on the protection of monuments and historic sites, 23.07.2003]. 2003. *Dz. U. nr 162, poz. 1568* [in Polish].
- Walory przyrodnicze Cytadeli Poznańskiej [The natural values of the Citadel Park. Part 1]. 2001. *Red. A. Kepel, P. Śliwa. Oprac. Pol. Tow. Ochr. Przyr. „Salamandra” Poznań* [mscr.; in Polish].

- Walory przyrodnicze Cytadeli Poznańskiej [The natural values of the Citadel Park. Part 2]. 2002. Eds P. Wylegała, P. Śliwa. Pol. Tow. Ochr. Przym. „Salamandra” Poznań [mscr.; in Polish].
- Wilkaniec A., 2004. Zieleń zewnętrznego pierścienia fortów poznańskich [The green of the external ring of the Poznań fortifications]. Kat. Teren. Ziel. AR Poznań [mscr.; in Polish].
- Wojciechowski P., 1980. Pierwsze plany Twierdzy Poznań z XIX wieku [The 1st plans of the Poznań Citadel from 19th century; mscr.; in Polish].
- Wilkaniec A., 2007. Wstęp [Introduction]. In: Waloryzacja przyrodnicza Parku Cytadela. Wyd. Ochr. Środ. Urz. M. Pozn. Poznań [mscr.; in Polish].
- Wrońska-Pilarek D., Gornowicz R., Gałazka S., Janyszek S., Maliński T., Mizera T., Wilkaniec A., 2007. Waloryzacja przyrodnicza Parku Cytadela [The natural valorization of the Citadel Park]. Wyd. Ochr. Środ. Urz. M. Pozn. Poznań [mscr.; in Polish].
- Żukowski W., Jackowiak B., 1995. Ginące i zagrożone rośliny naczyniowe Pomorza Zachodniego i Wielkopolski [Endangered and threatened vascular plants of Western Pomerania and Wielkopolska]. Pr. Zakł. Taks. Roślin UAM 3 [in Polish].

## DENDROFLORA PARKU CYTADELA W POZNANIU

**Streszczenie.** Dendroflora Parku Cytadela liczy 167 taksonów. Zinventaryzowano około 22 900 drzew. Na obszarze parku dominują zadrzewienia z gatunkami związanymi ze zbiorowiskami żywnych lasów liściastych. W składzie gatunkowym drzewostanów najczęściej występują *Acer platanoides* oraz *Robinia pseudoacacia*, częste są także *Acer pseudoplatanus*, *A. campestre* oraz *Tilia cordata*. Za cenne uznano 257 drzew z 29 taksonów. Znaczne obwody najczęściej osiągają *Acer platanoides*, *Pyrus communis*, *Aesculus hippocastanum* oraz *Ulmus laevis*.

**Słowa kluczowe:** dendroflora, Park Cytadela, Poznań

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