

## THE STATE OF DENDROFLORA PRESERVATION IN URBAN AND RURAL EX-MANOR PARK

Agnieszka Kułak, Joanna Sender

Department of Landscape Ecology and Nature Preservation, University of Life Sciences in Lublin  
Dobrzańskiego str. 37, 20-262 Lublin, a.k.ulak@wp.pl, joanna.sender@up.lublin.pl

**Summary.** The ex-manor parks have a special meaning in Polish landscape. They constitute concentration of high vegetation, created by artificial planting, as a result of adaptation of existing green areas, or remnants of ancient primeval forests. The aim of the study was to analyze a dendroflora species in two ex-manor parks varying of the present use. The study included an inventory and dendrochronological analysis of ex-manor parks located within a town and in the countryside. Investigations were conducted in 2008 and 2009. The study included measurements of crown diameter, circumference at a height of 1.3 meters, the approximate height as well as a description of health condition and age of trees. In total, 1120 trees occurred in the study area, involving 42 species of trees. The average density of trees in a Węglin park was 241 units per ha, while in a rural park in Gałęzów 99 units per ha. 676 trees occurred in the Węglin park and involved 33 species. Tree stand of park is created mostly by *Tilia cordata* and *Quercus robur*. Tree stand of the park is well preserved, however, large proportion of trees requires immediate treatment. 444 trees were inventorized in the ex-manor park in Gałęzów, which included 24 species. *Acer pseudoplatanu.*, *Tilia cordata* and *Carpinus betulus* were the most common group. Particularly valuable in that park are: *Larix decidua* and *Larix decidua subsp. polonica*. Relatively large share of fruit trees was in the rural park, but they showed a high degree of damage.

**Key words:** dendroflora, ex-manor park, state of preservation

### INTRODUCTION

Ex-manor parks have a special meaning in Polish landscape. There are established by the manors creating a unique character and charm. The rural seat of nobility are the most identical objects from Polish cultural landscape. Currently, they shape character of the village and create favorable place for rest and recreation [Janecki 1999].

Parks constitute places of high greenery concentration. They were created by artificial planting or by adapting existing greenery, as well as the remains of

the ancient forests. Often contain valuable natural, historic and cultural heritage. They play roles of educational, social, habitats creating and adding attractiveness to landscape. In these areas there are often the greatest number of nature monumental trees [Fabiańska 2004].

Modern ex-minor parks and their residues, are significant as a oasis of high greenery in open country landscape. First of all, they have a great biocenotic importance. They form a convenient place for the exchange of genes among ecosystems, reduce the strength of winds, persist a humidity during periods of prolonged drought, are a natural habitat for flora and fauna [Fijałkowski and Kseniak 1982].

The aim of this study was to evaluate a conservation status of two similarly used ex-manor parks. Parks differed current location – within the city and in rural areas. The basis for the above analysis was carried out in situ dendrological inventory.

#### AREA AND STUDY METHODS

The study included two complexes of ex-manor parks, which currently function in an urban area – the Węglin ex-manor park (Lublin) and in rural area – the Gałęzów ex-manor park, about 30 km from Lublin.

The Węglin ex-manor park is located about 10 km from the center of Lublin, originally it was a part of the assets of Konopnica village. After the war, the former owners were expropriated, and the manor was spent on council housing. The entire area is within the city of Lublin. In the 60's, in the devastated park many cleanup work was made, including planting new trees and shrubs. Up to the present time owners of the property were changed several times (Decision no. A/849). Currently the park is owned by a private owner. Its area is 2.8 hectares. The eastern part of the park was separated from old property and a church dedicated to Blessed Urszula Ledóchowska was built, as well as the residential blocks. From the north the park is limited by Kraśnicka avenue, which is onerous transit route. From the east church buildings are situated, which include the granary belonging to the former property. From the south to the park adjacent residential buildings, and from the west allotments. Despite significant transformation – blurring old boundaries the park by building of new facilities, the ongoing devastation of the court and vegetation, the Węglin park still retains a lot of values.

Gałęzów is an extensive village located in the southern part of the district of Lublin on Gielczewska Highland. Village is located about 2 km from Bychawa city in a southerly direction, near the road to Kraśnik. Light wavy landscape line dominates in this place is typical for upland landscape rising about 230–250 meters above sea level [Gawarecki *et al.* 1979, Dębowczyk and Pytlak 2003]. surroundings of ex-minor Gałęzów park is extremely rich in flora and fauna. This is due to mosaic habitats. This is due to lack of a vicinity of large cities. In

addition, there is a relatively close Krzczonowski Nature Park and numerous protected forms of landscape [Wilgat 1992]. Area of the park in Gałęzów is not protected by law. However, an effective system of ecological corridors such as river valleys and forests, causes that there are a rare species of fauna here [Kulak and Niewada 2008]. The park area is now 4.5 hectares. Historical boundaries of the park largely coincide with today. The ex-minor Gałęzów Park similarly Węglin park, in the history of its existence, subjected to numerous changes. From the seat of a noble then primary school, to the abandoned, neglected park. Now the property is privately owned and is slowly regaining its former glory.

The basis of research, conducted in the years 2008, 2009, was a detailed dendrological inventory. The study was conducted in situ in late spring and summer. A geodesic current map with the location marked trees was used. Trees missing (about 100) draws the rectangular spacing method.

As part of current research determined individual specimens belonging to the species and variety [Seneta and Dolatowski 2000]. Also carried out measurements: trunk circumference at a height of 1.3 meters, a diameter of crowns, approximate height. Estimated the health status of individual trees and proposes the necessary treatments or care. Measurements made during the dendrological inventory allowed to estimate the age of the stand. To determine the age of trees dendrochronological Majdecki method was used. The results of measurements of circuits and diameter of trunk, compared with the tables of age established for each species [Majdecki 1978].

Graphical part included analysis of the age, state of health and composition of dendroflora. Also shows the extent of the crown (measured at its widest point) of individual trees, and then applied them on the map [Kulak and Niewada 2008].

## RESULTS

Inside the ex-manor Węglin park occurred 676 trees including 33 species (Tab. 1). Analysis of species composition and species layout, clearly showed the existence of planned series, historical layouts in the park, as evidenced by the regular, not random plantings of individual specimens.

Linden tree (*Tilia cordata* L.) builds chiefly central and western part of the park tree stands, in other areas there are less numerous, giving way to the oak (*Quercus robur* L.). Linden trees forms interior walls, in which the manor is located. Borders of this interior are perfectly legible, indicating the desirability use of this species in the park composition. It also builds the interior, where probably was located owner of property brother's building. In the thicket of linden trees can be found something like a clearance, allowing for scenic and communication connection the eastern and western parts of the park. These trees also play an important role in shielding the park from the south-east.

Lindens also build a small shade-arbor, several meters in diameter, with a regular shape (ellipses, circles). They were planted not only within certain distances from each other, but also in picturesque groups (3–7). This kind of plantings are found almost exclusively in the east of the ownership border, while the shade-arbors occur in the whole park area.

Oak trees occupy mainly the eastern part of the park, range limits coincides with ownership borders, although also in the western part one can meet single representatives of this species. Trees of this species are growing close to the manor. They surrounded building as an arc from the south, creating a system similar to the hedge from the north. They also build the interior with chapel accent open to the south, now fenced off from the park by busy Kraśnicka avenue, but it is still visually connected with them. In addition, oaks, just as linden trees was also planted in regular layouts, of which three are still legible. They have circle and rectangle shapes. With the linden trees, oaks are building a hedge residue restrictive park from the west.

In the plantings of common maple (*Acer platanoides* L. and *Acer pseudo-platanus* L.), white chestnut (*Aesculus hippocastanum* L.) and european hornbeam (*Carpinus betulus* L.) it can be seen an exercise planting group and significantly higher concentrations of these species in the western side of the park.

The exception is an ash tree (*Fraxinus excelsior* L.), which occurs in a large agglomeration close to the manor and along the western border of the park.

Coniferous trees: common pine (*Pinus sylvestris* L.), black pine (*Pinus nigra* L.), european larch (*Larix deciduas* Mill.) and spruce (*Picea abies* L. Karst.) are gathered on the west side, indicating to a higher conservation degree of this part of the park. Three of the coniferous trees are growing close to the court, lying on the axis, determined by the pine, larch and spruce.

The historical park tree stand is preserved in a quite large extent, however, a significant proportion of trees requires immediate treatment. Especially impressive present constitute old aged oaks (*Quercus robur*), relics former forests of Lublin Highlands. The trees felling currently being developed, which grew spontaneously in the second half of the twentieth century, and interfere with the original park composition.

444 trees were inventoried in the ex-manor park in Gałęzów, which included 24 species. The largest group constitute Sycamore clones (*Acer pseudo-platanus* L.) (tab. 1). They formed an isolating layers along the land borders and separated the communication routes from the area interior. The next two big groups that alley tree species: small-leaved lindens (*Tilia cordata* L.) and European hornbeam (*Carpinus betulus* L.). Lime trees were planted near the border usually and they were marked ownership ranger. Whereas European hornbeam has been used, in this case on the pile hedge locking on the west side interior before the manor. In addition, part of hornbeam alley were located in the geometric garden and the picturesque specimens were located in the landscape part of the park. Poplars were an equally large group of trees (Tab. 1). Hybrids of this species were planted along the Bychawa-Wola Gałęzowska road. Unfortunately, their considerable,

Table 1. Species composition and mean values of particular features

No.	Species	Feature									
		Trees number, ind.		Mean brest height, cm		Mean height, m		The range of crown, m		Age, years	
		Park									
		Węglin	Gałęzów	Węglin	Gałęzów	Węglin	Gałęzów	Węglin	Gałęzów	Węglin	Gałęzów
1.	<i>Sambucus nigra</i>	6	-	50.8	-	17.3	-	8.7	-	60	-
2.	<i>Betula pubescens</i>	1	-	70.0	-	16.0	-	12.0	-	88	-
3.	<i>Betula pendula</i>	-	1	-	4.8	-	5	-	4	-	5
4.	<i>Prunus serotina</i>	4	-	33.9	-	14.5	-	6.5	-	45	-
5.	<i>Prunus padus</i>	1	7	36.0	20.1	26.3	11.2	8.0	7.3	70	30
6.	<i>Prunus avium</i>	13	3	46.4	11.6	13.5	5.7	7.8	5.0	70	80
7.	<i>Quercus robur</i>	115	3	72.1	86.3	46.8	18.7	14.7	17.2	83	120
8.	<i>Crataegus monogyna</i>	-	9	-	25.8	-	8.1	-	6.1	-	55
9.	<i>Carpinus betulus</i>	20	37	35.2	30.4	90.0	14.3	12.9	7.4	33	60
10.	<i>Pyrus pyraister</i>	1	2	34.7	47.0	50.0	15.0	16.0	10.7	26	55
11.	<i>Malus domestica</i>	1	33	39.8	43.8	60.0	7.5	10.0	7.7	30	55
12.	<i>Sorbus aucuparia</i>	20	-	64.2	-	15.2	-	10.7	-	70	-
13.	<i>Fraxinus pennsylvanica</i>	5	-	48.5	-	4.3	-	8.6	-	49	-
14.	<i>Fraxinus excelsior</i>	43	36	48.67	39.6	18.09	19.1	11.33	8.5	69	63
15.	<i>Aesculus hippocastanum</i>	8	11	57.7	62.8	10.2	15.0	7.7	8.7	53	70
16.	<i>Acer pseudoplatanus</i>	12	82	49.8	40.4	13.6	14.7	8.4	8.9	60	70
17.	<i>Acer negundo</i>	5	-	101.0	-	11.2	-	9.6	-	43	-
18.	<i>Acer platanoides</i>	27	14	45.1	26.2	20.6	11	10.3	7.4	61	50
19.	<i>Acer campestre</i>	1	-	57.0	-	19.0	-	8.0	-	70	-
20.	<i>Corylus avellana</i>	2	-	57.0	-	9.5	-	7.5	-	70	-

21.	<i>Tilia cordata</i>	303	46	49.8	57.1	34.9	13.4	11.1	9.1	54	70
22.	<i>Tilia euchlora</i>	3	-	23.9	-	6.3	-	5.0	-	20	-
23.	<i>Tilia tomentosa</i>	2	-	47.0	-	17.0	-	12.0	-	50	-
24.	<i>Tilia macrophylla</i>	7	-	34.0	-	10.4	-	9.6	-	45	-
25.	<i>Larix</i> subsp. <i>decidua</i>	16	6	27.6	79.5	7.2	20.3	5.5	10.6	38	120
26.	<i>Larix decidua</i> subsp. <i>polonica</i>	-	15	-	105.2	-	25.2	-	12.5	-	120
27.	<i>Juglans nigra</i>	-	4	-	63.5	-	22.0	-	11.0	-	60
28.	<i>Robinia pseudoacacia</i>	28	17	41.4	26.1	18.3	12.5	8.8	7.5	60	70
29.	<i>Pinus nigra</i>	2	-	57.5	-	9.8	-	4.8	-	50	-
30.	<i>Pinus strobus</i>	-	1	-	85.4	-	21.0	-	11.6	-	120
31.	<i>Pinus sylvestris</i>	5	-	41.6	-	14.3	-	8.4	-	63	-
32.	<i>Prunus cerasifera</i>	1	-	21.0	-	12.6	-	10.0	-	28	-
33.	<i>Prunus domestica</i>	-	7	-	13.1	-	7.2	-	6.7	-	10
34.	<i>Picea pungens</i>	4	16	-	13.4	5.4	7.0	6.6	3.8	-	22
35.	<i>Picea abies</i>	3	-	24.4	-	7.3	-	5.0	-	31	-
36.	<i>Populus alba</i>	3	20	41.8	38.0	14.1	16.8	9.7	8.1	30	25
37.	<i>Populus simonii</i>	3	-	63.7	-	8.7	-	9.5	-	27	-
38.	<i>Populus nigra</i>	6	-	77.3	-	21.6	-	8.0	-	26	-
39.	<i>Salix alba</i>	5	-	99.2	-	21.2	-	10.9	-	88	-
40.	<i>Populus</i> × <i>canadensis</i>	-	40	-	51.6	-	21.9	-	9.5	-	30
41.	<i>Ulmus minor</i>	-	33	-	28.0	-	14.4	-	7.0	-	40
42.	<i>Salix fragilis</i>	-	1	-	137.6	-	23.0	-	11.0	-	120

Table 2. Characteristic of tree stand health condition in investigated parks (percentage share %)

No	Species	Feature																				
		Nature mo- nument size		Healthy		Cavities pits		Chimney pits		Deadwood		Mechanical damage		Diseases		Crown asimetric		Suckers		To remove		
		Park																				
		W*	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	
1.	<i>Sambucus nigra</i>	20 4	63	50		17				17						17						
2.	<i>Betula pubescens</i>												50				50					
3.	<i>Betula pendula</i>				50																	50
4.	<i>Prunus serotina</i>				12		13		13				25				25		13			
5.	<i>Prunus padus</i>					38		12.5				37.5			100					12.5		
6.	<i>Prunus avium</i>				7	75	13		7		33		13	25			7					
7.	<i>Quercus robur</i>				34	13	11		2		15	13	10	6	7		15	6	3			
8.	<i>Crataegus monogyna</i>					64						27				9						
9.	<i>Carpinus betulus</i>					55	18	9	26		2	5	39	5	7		2	23	7	5		
10.	<i>Pyrus pyraeaster</i>						20						40	100	20				20			
11.	<i>Malus domestica</i>						6	100	8		6		38		28		5		8			2
12.	<i>Sorbus aucuparia</i>					33		4				33				8		21				
13.	<i>Fraxinus pensylvanica</i>					60										40						
14.	<i>Fraxinus excelsior</i>					46	31	7			2	20	32		8	2	2	17	18	7		8
15.	<i>Aesculus hippocastanum</i>						11	11	22		4		26		15	89	11		11			
16.	<i>Acer pseudoplatanus</i>				3	62	27		10			23	17		17			15	20		7	
17.	<i>Acer negundo</i>					60		20													20	
18.	<i>Acer platanoides</i>				1		34		5		1		25		18		4		9		1	

\* W – Węgliń, G – Gałęzów

19.	<i>Acer campestre</i>			46		8				27		5		5		5		3			
20.	<i>Corylus avellana</i>			67						33		0									
21.	<i>Tilia cordata</i>			31	22	6	5	3	7	19	22	10	17	14	4	6	9	9	11	1	1
22.	<i>Tilia euchlora</i>			67								33									
23.	<i>Tilia tomentosa</i>			100																	
24.	<i>Tilia macrophylla</i>			30		10		10		30								20			
25.	<i>Larix</i> subsp. <i>decidua</i>	25		76	25					5	13		6			19	31				
26.	<i>Larix decidua</i> subsp. <i>polonica</i>	18		73	27						27		24			27	4				
27.	<i>Juglans nigra</i>			33						44							22				
28.	<i>Robinia pseudoacacia</i>			38	29	8				14	36	14	14	3	4	16		3		5	18
29.	<i>Pinus nigra</i>			100																	
30.	<i>Pinus strobus</i>			25		13				38		13				13					
31.	<i>Pinus sylvestris</i>	25			25						25		25								
32.	<i>Prunus cerasifera</i>			100																	
33.	<i>Prunus domestica</i>				78						22										
34.	<i>Picea pungens</i>			100	10						20		30		30		3		3		3
35.	<i>Picea abies</i>			100																	
36.	<i>Populus alba</i>			100																	
37.	<i>Populus simonii</i>			33						33						33					
38.	<i>Populus nigra</i>			50				13		25		13									
39.	<i>Salix alba</i>			10	4					50	36	50	20		18		6		12		
40.	<i>Populus</i> × <i>canadensis</i>				10						32		14		25		13				6
41.	<i>Ulmus minor</i>			12							29		8		22		4				25
42.	<i>Salix fragilis</i>						33				33				33						



such as the species, age, and the fact that they are strongly attacked by mistletoe (*Viscum album L.*) make, that they should be removed as soon as possible.

A smaller group represented by fruit species is located in the garden and sporadically scattered around the park. Robin acacia, white chestnut and ash trees were planted in large quantity in the landscape park part. As an indigenous trees exert decorative effect during flowering, or as in the case ash and black nuts form the elements of the garden-bower, shade-arbor.

European and Polish larch planted close to the court are noteworthy, because it was built from the larch logs. Most of the preserved larch trees have monumental performance. They should be subject to adequate protection. During a field work a young larch tree sown by the wind was found, it may indicate that the species feel at home in the current habitat. In the analyzed parks area 42 trees species in total were occurred, including 1,120 of specimens. The average trees density in the city park on Węglin amounted 241 ind. per ha, while in the rural park in Gałęzów it amounted 99 ind. per ha.

Dendrochronological analysis allowed to identify six age groups of trees. The largest age group in Gałęzów accounted trees aged 41 to 70 years. Tree stand in this age was well preserved, mainly consisted of species such as: *Acer platanoides*, *Acer pseudoplatanus*, *Carpinus betulus*, *Populus alba*, *Robinia pseudoacacia* and *Fraxinus excelsior* [Kułak and Sender 2011]. In the Węglin park also predominated tree stand in the III age group, but there were large proportion of younger trees in groups I and II. These were mainly *Tilia cordata*, *Populus nigra* and *Robinia pseudoacacia*.

Trees older than 120 years are a testament of time and history. In Gałęzów park among this group of trees there is often the greatest number of nature monumental trees. Many of them were in excellent condition such as *Quercus robur* and majority of *Larix polonica*, and some *Acer platanoides*, *Tilia cordata* and *Pinus strobus*, which is one of the most interesting elements in the park.

The finest examples in this age group in the Węglin park are mainly *Quercus robur* examples, in a number 61 ind. The remaining specimens at the old age of 120 years, this are *Fraxinus excelsior* (8 ind.), *Tilia cordata* (6 ind.) and *Acer platanoides* (3 ind.). Unfortunately, a lot of valuable old specimens requires care treatments or even remove (Tab. 2).

## CONCLUSIONS

Comparing preservation of valuable dendroflora in urban and rural character ex-manor parks it falls slightly more preferably for the park in Gałęzów. Here occurred more numerous well-preserved trees with parameters of nature monumental trees.

However, the state of health and condition analyzed park trees in both cases can be described as bad. Many trees have bad abolished a long period of aban-

donment and lack of caring and conservation treatments. Tree stands negligence progressed gradually and successively. Destruction of war, followed several times function changed described property and the lack of appropriate use, had an impact on the current state of tree stands health. First of all, it is necessary to remove windblow and damage trees such as broken, hanging branches in the crown, posing a threat to human life. Equally important is crown cleanup from boughs and twigs deadwood and treatment of cavities and chimney pits, superficial wounds etc., especially in valuable historical specimens. In many cases, tree damage is so extensive that it will have to be cut-out. A part of wild growth and shrubs growing in dense at tree stands undergrowth should be also eliminated, in order to clarify the composition and provide space for recreation.

#### REFERENCES

- Decyzja o wpisaniu terenu zespołu dworsko-parkowego na Węglinie do rejestru zabytków województwa lubelskiego pod Nr A/849.
- Dębowczyk M., Pytlak U., 2003. Śladami Koźmianów, Przewłockich, Kowerskich. Bychawskie Tow. Regionalne Bychawa.
- Fabiańska A., 2004. Krajobraz i ogród wiejski. Wyd. KUL, Lublin.
- Fijałkowski D., Kseniak M., 1982. Parki wiejskie Lubelszczyzny. PWN, Warszawa.
- Gawarecki H., Marszałek J., Szczepanik T., Wójcikowski W., 1979. Lubelszczyzna, przewodnik Sport i Turystyka, Warszawa.
- Janecki J., 1999. Fizjonomia polskiej szaty roślinnej. Wyd. KUL, Lublin.
- Kulak A., Niewada A., 2008. Projekt rewaloryzacji założenia dworsko-parkowego w Gałęzowie. Praca magisterka przygotowana pod kier. prof. Janusza Janeckiego, KUL (mat. niepubl.).
- Kulak A., Sender J., 2011. Park and palace-complexes as biodiversity refuges on example Gałęzów ex-manor park. Tek. Kom. Ochr. Kszt. Środ. Przyr. 8, 73–85.
- Majdecki L., 1978. Ochrona i konserwacja zabytkowych założeń ogrodowych. PWN, Warszawa.
- Seneta W., Dolatowski J., 2000. Dendrologia. PWN, Warszawa.
- Wilgat T., 1992. System obszarów chronionych województwa lubelskiego. TWWP Lublin.
- Wytyczne konserwatorskie zawarte w Postanowieniu Lubelskiego Wojewódzkiego Konserwatora Zabytków z dnia 2 stycznia 2003 roku.

#### STAN ZACHOWANIA DRZEWOSTANU W PODWORSKICH PARKACH NA OBSZARACH MIEJSKICH I WIEJSKICH

**Streszczenie.** Parki podworskie mają specjalne znaczenie w polskim krajobrazie. Te głównie wiejskie siedziby szlacheckie, to obiekty najbardziej tożsame z polskim krajobrazem kulturowym. Obecnie nie tylko nadają charakter danej miejscowości, ale także stwarzają dogodne miejsca wypoczynku i rekreacji, stanowiąc jednocześnie miejsca cenne przyrodniczo. Celem prezentowanych badań była ocena stanu zachowania dwóch podobnie użytkowanych podworskich parków.

Badania obejmowały dwa kompleksy podworskich parków, które obecnie funkcjonują w obszarze miejskim – park dworski na Węglinie (Lublin) oraz wiejskim – park dworski w Gałęzowie, ok. 30 km od Lublina. Porównanie stanu zachowania cennej dendroflory w podworskim parku o charakterze miejskim i wiejskim wypada nieco korzystniej na rzecz parku w Gałęzowie. Liczniej reprezentowane były tu dobrze zachowane drzewa o parametrach drzew pomnikowych. Jednakże stan zdrowotny i kondycję opisywanego drzewostanu parkowego, w obu przypadkach można określić jako zły. Wiele drzew źle zniosło długi okres opuszczenia i braku zabiegów pielęgnacyjno-konserwatorskich.

**Słowa kluczowe:** drzewostan, podworski park, stan zachowania