



## VERIFICATION OF A SURVEY OF THE MOST VALUABLE TREES IN THE CITY OF CZĘSTOCHOWA

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**ABSTRACT.** In the city of Częstochowa a total of 122 valuable trees of 25 species from 12 families were inventoried. The most numerous group comprises trees with circumferences of natural monuments (55), followed by already registered natural monuments (25), trees with circumferences comparable to those of natural monuments and impressive trees (18 specimens each) and the category of “other trees” (6). The status of natural monuments presently found in the city of Częstochowa was confirmed. Described trees are typically native deciduous species, of which the most numerous are *Acer platanoides* (18 trees) and *Tilia cordata* (16 trees). Approximately 60% of them have circumferences from 201 to 300 cm. The health condition of surveyed trees is usually very good (84%). A total of 45 trees were selected with circumferences of natural monuments and characterised by a very good health condition, which may be proposed as worthy of protection as natural monuments.

**KEY WORDS:** natural monuments, most valuable trees, dendrological survey, Częstochowa

### INTRODUCTION

As it was stated by KASPRZAK (2005, 2011), trees as natural monuments are not only a source of natural science knowledge, supplying valuable information e.g. on tree dieback, succession of organisms, dendrology or acclimation of alien species, but they are also of great value in the promotion of history of their towns and regions. By naming them (e.g. Edward, Lech) they directly refer to legends and tales or historical facts commemorating owners of estates, reminding us of distinguished people for the region or science, while thanks to their old age they remind us of ancient times. They are an important element of outstanding landscape, park and garden layouts, as well as religious and municipal green areas (e.g. Niepodległości Avenue in Poznań). They commemorate religious events or saints (e.g. trees in St. Wojciech

Square in Gniezno). In present time natural monuments are specimens of esthetic value, also serving social and scientific, as well as biocenotic roles as the habitat for many organisms not only during their lifetime, but also after they die (HARABIN 1996, BULIŃSKI 1999, GOŁĄBEK & ALEKSANDROWICZ 2004, GUTOWSKI et al. 2004).

In Poland the number of natural monuments in 2014 was 36 417, including 29 937 single trees, 3766 clusters of trees and 749 avenues (GUS... 2015). The greatest number of natural monuments is found in the Mazowieckie Province (4256), while it is lowest in the Opolskie Province (683). Over the years the numbers of tree clusters, boulders and avenues are increasing, while those of single trees and grottoes, rocks and caves are decreasing.

In the Śląskie province, where Częstochowa is located, there are 1539 natural monuments; nevertheless, in the city the number is only 19, including 18

single trees and one avenue (<http://www.czestochowa.pl...> b.d.). In comparison to other cities it is very little, e.g. in Warszawa there are 466 trees – natural monuments, in Kraków it is 274, while in Wrocław it is 109 (<http://stat.gov.pl...> b.d.).

Municipal green areas in Częstochowa, such as parks, squares, small green areas, street greens and other areas, cover an area of 296.2 ha, of which parks cover 143.7 ha, belts of street green – 111.1 ha, while squares, small green areas and currently neglected areas – 41.4 ha. In the city there are two groups of municipal green. One of them are managed green areas (e.g. parks, small green areas, squares, etc.), while the other comprises areas of natural green, which are remnants of former natural systems (KOWALEWSKI 1988, ZWOLIŃSKI 1997, DEDEK & PAWLIKOWSKI 1999, <http://www.czestochowa.pl...> b.d.).

A survey of the most valuable trees was conducted in the most interesting municipal green areas in Częstochowa. They are two parks: the Stanisław Staszic Park of 5.45 ha and the 3 Maja Park covering 6.39 ha, situated at the foot of an elevation, on top of which the Jasna Góra cloister is situated (KOWALEWSKI 1990). In the Stanisław Staszic Park we find a bower, an astronomical observatory, the Ore Mining Museum, a water reservoir and the monuments of Stanisław Staszic and Kazimierz Pułaski. There are approx. 1300 trees, mainly deciduous, which age is estimated at 100-150 years (KOWALEWSKI 1990, ZYGMUNT 2009). The 3. Maja Park has tennis courts, a playground and the monuments of Stanisław Moniuszko and Stefan Policiński. There are approx. 1600 trees in the park, primarily native deciduous species, of which some reached the age of over 130 years (KOWALEWSKI 1990, ZYGMUNT 2009). Another landmark is the monastery park of the Pauline order, surrounding the walls of the Jasna Góra monastery. It is composed of a southern and northern part, separated by the access road to the monastery. The park itself covers approx. 5 ha and is undulating with relatively large differences in elevation. The vegetation in the park comprises a rich tree stand, both broadleaf and coniferous, varying in height, habit and age. Apart from the old trees growing there since the time of park establishment, there are numerous young trees, either purposefully planted or self-sown. A vast majority are native species, although there are also specimens of alien provenance, e.g. *Zelkova serrata*. One of the most important elements in the park is connected with the Stations of the Cross, situated on the walls over their entire length (FURS 2012). The most valuable dendrological landmarks of the city include a birch avenue classified as a natural monument, situated in the city district of Częstochówka-Parkitka. It is approx. 2.5 km in length. The avenue comprises 385 *Betula pendula* trees, growing on both sides of the road pavement at Bialska Street. Some specimens

reach over 230 cm circumference, while the oldest trees are estimated at 60 years (ŚWIDEREK 2007).

The aim of this study was to verify the list of natural monuments in the city of Częstochowa, but also to find new, valuable trees growing in that city, which would meet the requirements imposed on natural monuments. The analyses were undertaken, since the number of trees – natural monuments is surprisingly low for such a large town, as it is only 19. The location, number, dimensions and health condition of surveyed trees were determined, while also verifying whether existing natural monuments are properly tended and new trees worthy protection as natural monuments may be found.

## STUDY AREA

Częstochowa is located on the Warta river, where three geographical mesoregions meet, i.e. the upland Wyżyna Częstochowska, the depression Obniżenie Górnej Warty and the upland Wyżyna Wieluńska. These mesoregions belong to the common subprovince of the upland Wyżyna Śląsko-Krakowska (KONDRACKI 2011). The city of Częstochowa is a capital of the Częstochowa county, which is found in the Śląsk province (<http://www.czestochowa.pl...> b.d.).

In terms of the covered area and the population it is the 13<sup>th</sup> city in Poland. Currently the area of Częstochowa is 160 km<sup>2</sup> and it is limited by the geographical coordinates, 19°14'E, 19°01'W; with the city population in 2014 amounting to approx. 231 thousand inhabitants (<http://stat.gov.pl...> b.d., <http://www.czestochowa.pl...> b.d.).

The city is surrounded by hills, Złota Góra from the east, the Kawie Góry from the north, Góra Bleszeńska from the south and Jasna Góra from the west (ZYGMUNT 2009). They are elevations of max. 300 m in height. The highest hill is Góra Ossona of 316.7 m a.s.l. Within the city limits absolute latitude is mostly 250–270 m a.s.l.; it is an area located at relatively low altitudes for an upland, containing numerous elements of the lowland landscape (AKTUALIZACJA... 2010).

Analyses were conducted in 13, frequently the most valuable green areas located in various parts of the city (Fig. 1). They were urban parks, cemeteries, green areas around churches and street green. The most valuable trees were recorded in the 3 Maja park, the Stanisław Staszic park, the Pauline order monastery park, the Gabriel Narutowicz park, in the Saint Roch, the Evangelical Church of Augsburg Confession and Kule cemeteries, at the Saint Barbara church, the Łukasiński, Sabinowska and Zbyszka streets, as well as the birch avenue considered to be a natural monument and located at Bialska street and at the Czesław Niemen Promenade.

Częstochowa is situated in the temperate climate zone at an altitude of 261 m a.s.l. The mean monthly

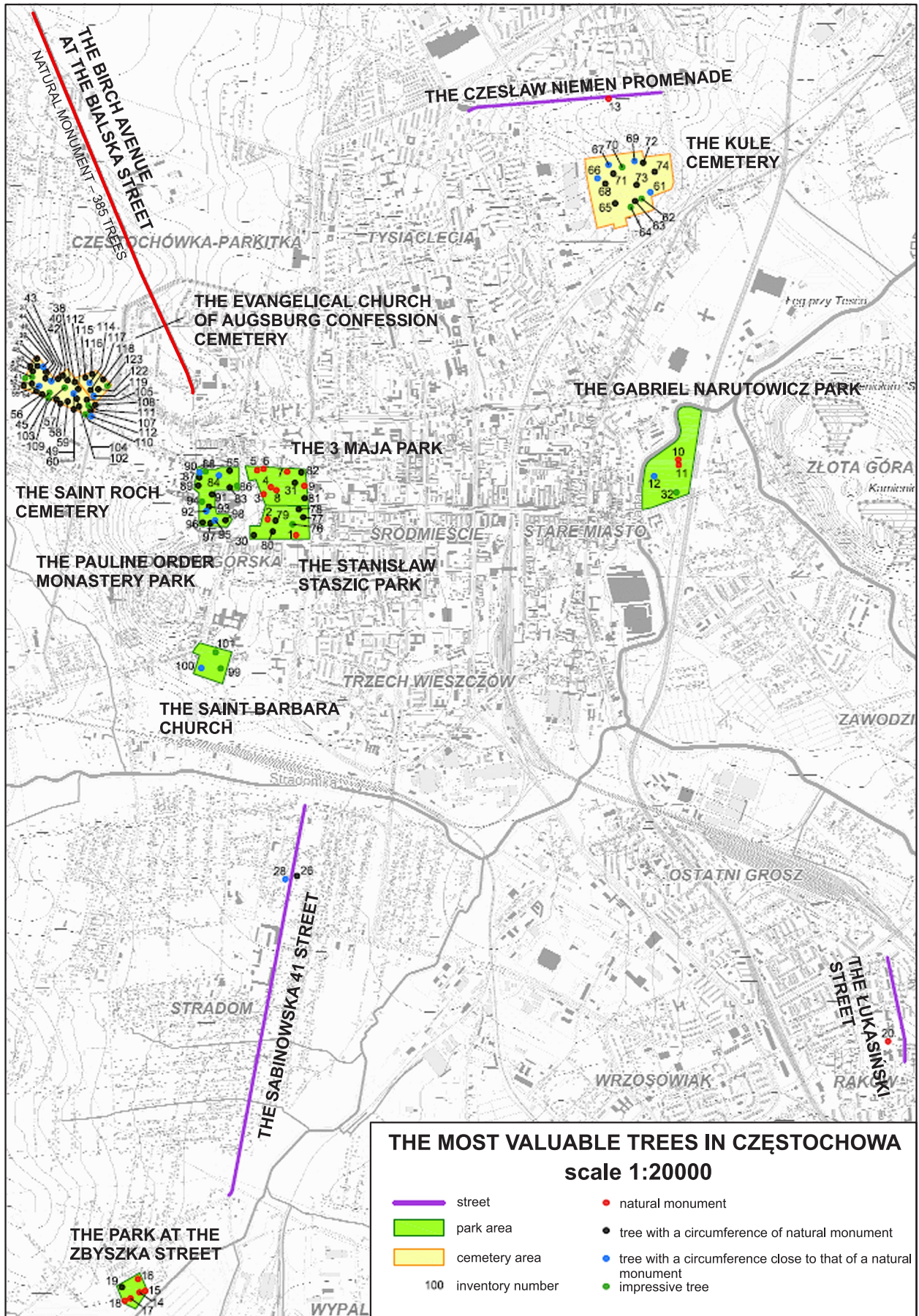


Fig 1. The most valuable trees in Częstochowa

air temperature is approx. 7.8°C, which is very close to the national mean. The annual amplitude of temperatures is approx. 21.8°C. January is the coldest month with a mean temperature of -3.4°C, while July is the warmest month with a mean temperature of 18.4°C. (<http://www.czestochowa.pl...> b.d.). The vegetation period is 221 days. The winter period typically begins around 20 November and lasts until the end of February. It is relatively long and with below zero temperatures. The mean period of snow cover is approx. 80 days. Precipitation with the annual mean total of approx. 600–700 mm to a limited degree exceed the national mean. There are few windless days in Częstochowa, with predominant westerly and south-westerly winds. Average annual wind velocity is 2.4 m/s (<http://www.czestochowa.pl...> b.d.).

## MATERIAL AND METHODS

The survey was conducted in the period from February to September 2015.

Data on the location of the most valuable trees were obtained from the register of natural monuments in Częstochowa and from studies describing the most valuable green areas in that city (KOWALEWSKI 1990, SĘTOWSKI 2005, 2006, ŚWIDEREK 2007, ZYGMUNT 2009, FURS 2012, REJESTR... 2016, <http://www.czestochowa.pl...> b.d.).

The scope of works included the determination of the geographical location (GPS) for each of the measured trees and recording of its survey number in order to prepare a map of the distribution of plants in the city of Częstochowa. The plants were identified to species. The nomenclature of taxa was adopted after SENETA & DOLATOWSKI (2011).

Works comprised measurements of tree circumferences at a height of 130 cm using a measuring tape accurate to 1 cm. Trees coalesced at the base and forking above the height of 130 cm were treated as one specimen. In turn, specimens coalesced and forked below 130 cm were treated as separate specimens. Circumferences of natural monuments were adopted after the classification of RUCIŃSKI (1998). Three groups of the most valuable trees were distinguished: natural monuments (with circumferences of natural monuments), close to natural monuments (with circumferences by 10% smaller than those of natural monuments) and impressive (with circumferences by 20% smaller than those of natural monuments). All the inventoried trees are listed in a table (Table 1).

The health condition of inventoried plants was determined using two scales: according to KAMIŃSKI & CZERNIAK (2000) and ŁAKOMY et al. (2008).

## RESULTS

Within the city limits of Częstochowa a total of 122 impressive trees of 25 species, 18 genera and 12 fam-

ilies were inventoried. They most frequently come from the families of *Aceraceae* (27%) and *Fagaceae* and *Tiliaceae* (with 19% each; Table 1). The distribution of these trees is presented in the enclosed map (Fig. 1).

The most valuable trees are primarily broad-leaved species (80% – 20 species), rarely conifers (20% – 5 species) – *Abies concolor*, *Larix decidua*, *Pinus nigra*, *Thuja plicata*, *T. occidentalis* (Table 1).

They are mostly native species – 15 (60%), mainly maples, linden and oak trees (Table 1). A total of 10 alien species were recorded (40%), with the largest number from North America – *Abies concolor*, *Acer saccharinum*, *Liriodendron tulipifera*, *Quercus rubra*, *Thuja plicata* and *T. occidentalis*, rarely from Europe – *Aesculus hippocastanum* and *Pinus nigra*, or Asia – *Zelkova serrata*. A common cultivar *Salix ×sepulcralis* ‘Chrysocoma’ was also recorded (Table 1).

Among the most valuable trees the most numerous was *Acer platanoides* (18 specimens), with only one maple being a natural monument. Relatively often *Tilia cordata* is found (16), of which two linden trees are currently natural monuments, and *Acer pseudoplatanus* and *Quercus robur* (with 12 trees each). Ten species are represented by only one specimen (Table 1).

Among 122 impressive trees, 25 (18 single trees and 1 avenue being a natural monument, in which 7 birches with the greatest circumferences have dimensions of natural monuments) are currently recorded as natural monuments. It was established that 55 trees have circumferences of natural monuments, while 36 have circumferences close to those of natural monuments. Moreover, six other trees needs to be mentioned here, as they have exceptionally beautiful habits, although their circumference do not meet the criteria for natural monuments (Table 1).

Existing natural monuments include *Betula pendula* (7 trees), *Quercus robur* (4), *Acer pseudoplatanus*, *A. saccharinum* and *Tilia cordata* (with 2 trees each). The other natural monuments are represented by one specimen of a given species – *Acer platanoides*, *Aesculus hippocastanum*, *Fraxinus excelsior*, *Larix decidua*, *Liriodendron tulipifera*, *Pyrus communis*, *Quercus rubra* and *Ulmus ×hollandica*. Trees with circumferences of natural monuments are most frequently representatives of *Acer platanoides* (13 trees), *Tilia cordata* (8) and *Larix decidua* and *Acer pseudoplatanus* (with 5 trees each). Among trees with circumferences close to those of natural monuments the most numerous are *Acer pseudoplatanus* (5) and *Acer platanoides* (3), while trees with impressive circumferences are most typically representatives of *Tilia cordata* (4 trees) and *Fagus sylvatica* (3 trees; Table 1).

Inventoried trees had circumferences ranging from 105 cm (*Thuja occidentalis* no. 42) to 426 cm (*Quercus robur* no. 17). Most of them (76 – 62.3%) have circumferences of 201–300 cm, by 50% fewer had circumferences of 301–400 cm (35 – 28.7%), while the smallest numbers were those of the thin-

Table 1. A list of the most valuable trees inventoried in Częstochowa

No	Inventory number	Species	Family	Circumference at the height of 1.3 m (cm)	Health condition	Locality	Status
1	17	<i>Quercus robur</i> L.	<i>Fagaceae</i>	426	5	the park at the Zbyszka street	PP
2	5	<i>Aesculus hippocastanum</i> L.	<i>Hippocastanaceae</i>	414	5	the 3 Maja park	PP
3	11	<i>Acer saccharinum</i> L.	<i>Aceraceae</i>	396	5	the Gabriel Narutowicz park	PP
4	3	<i>Fraxinus excelsior</i> L.	<i>Oleaceae</i>	384	5	the 3 Maja park	PP
5	13	<i>Ulmus ×hollandica</i> Mill.	<i>Ulmaceae</i>	380	5	the Czesław Niemen Promenade	PP
6	7	<i>Quercus rubra</i> L.	<i>Fagaceae</i>	364	5	the 3 Maja park	PP
7	18	<i>Quercus robur</i> L.	<i>Fagaceae</i>	361	4	the park at the Zbyszka street	PP
8	14	<i>Tilia cordata</i> Mill.	<i>Tiliaceae</i>	351	5	the park at the Zbyszka street	PP
9	9	<i>Acer pseudoplatanus</i> L.	<i>Aceraceae</i>	350	4	the 3 Maja park	PP
10	15	<i>Tilia cordata</i> Mill.	<i>Tiliaceae</i>	350/229	5	the park at the Zbyszka street	PP
11	4	<i>Quercus robur</i> L.	<i>Fagaceae</i>	348	5	the 3 Maja park	PP
12	16	<i>Quercus robur</i> L.	<i>Fagaceae</i>	348	5	the park at the Zbyszka street	PP
13	10	<i>Acer saccharinum</i> L.	<i>Aceraceae</i>	331	5	the Gabriel Narutowicz park	PP
14	8	<i>Larix decidua</i> Mill.	<i>Pinaceae</i>	326	4	the 3 Maja park	PP
15	6	<i>Acer platanoides</i> L.	<i>Aceraceae</i>	320	5	the 3 Maja park	PP
16	1	<i>Acer pseudoplatanus</i> L.	<i>Aceraceae</i>	255	5	the Stanisław Staszic park	PP
17	25	<i>Betula pendula</i> Roth	<i>Betulaceae</i>	255	5	the birch avenue at the Bialska street	PP
18	23	<i>Betula pendula</i> Roth	<i>Betulaceae</i>	240	5	the birch avenue at the Bialska street	PP
19	2	<i>Pyrus communis</i> L.	<i>Rosaceae</i>	238	5	the Stanisław Staszic park	PP
20	20	<i>Liriodendron tulipifera</i> L.	<i>Magnoliaceae</i>	236	1	the Łukasiński street	PP
21	33	<i>Betula pendula</i> Roth	<i>Betulaceae</i>	230	5	the birch avenue at the Bialska street	PP
22	35	<i>Betula pendula</i> Roth	<i>Betulaceae</i>	230	5	the birch avenue at the Bialska street	PP
23	24	<i>Betula pendula</i> Roth	<i>Betulaceae</i>	218	5	the birch avenue at the Bialska street	PP
24	22	<i>Betula pendula</i> Roth	<i>Betulaceae</i>	212	4	the birch avenue at the Bialska street	PP
25	34	<i>Betula pendula</i> Roth	<i>Betulaceae</i>	198	5	the birch avenue at the Bialska street	PP
26	56	<i>Tilia cordata</i> Mill.	<i>Tiliaceae</i>	405	3	the Saint Roch cemetery	P
27	54	<i>Tilia cordata</i> Mill.	<i>Tiliaceae</i>	395	5	the Saint Roch cemetery	P
28	73	<i>Quercus robur</i> L.	<i>Fagaceae</i>	391	5	the Kule cemetery	P
29	80	<i>Aesculus hippocastanum</i> L.	<i>Hippocastanaceae</i>	355	5	the Stanisław Staszic park	P
30	31	<i>Tilia cordata</i> Mill.	<i>Tiliaceae</i>	354	5	the 3 Maja park	P
31	115	<i>Tilia cordata</i> Mill.	<i>Tiliaceae</i>	350/269	5	the Evangelical Church of Augsburg Confession cemetery	P
32	58	<i>Acer pseudoplatanus</i> L.	<i>Aceraceae</i>	350	3	the Saint Roch cemetery	P
33	87	<i>Fagus sylvatica</i> L.	<i>Fagaceae</i>	350	5	the Pauline order monastery park	P
34	19	<i>Quercus robur</i> L.	<i>Fagaceae</i>	347	4	the park at the Zbyszka street	P
35	63	<i>Tilia cordata</i> Mill.	<i>Tiliaceae</i>	344	4	the Kule cemetery	P
36	57	<i>Quercus petraea</i> (Matt.) Liebl.	<i>Fagaceae</i>	336	5	the Saint Roch cemetery	P
37	77	<i>Quercus rubra</i> L.	<i>Fagaceae</i>	334	5	the Stanisław Staszic park	P
38	46	<i>Fraxinus excelsior</i> L.	<i>Oleaceae</i>	332	5	the Saint Roch cemetery	P
39	59	<i>Quercus robur</i> L.	<i>Fagaceae</i>	327	5	the Saint Roch cemetery	P
40	113	<i>Quercus rubra</i> L.	<i>Fagaceae</i>	327	5	the Saint Roch cemetery	P
41	30	<i>Quercus rubra</i> L.	<i>Fagaceae</i>	326	5	the Stanisław Staszic park	P
42	108	<i>Tilia cordata</i> Mill.	<i>Tiliaceae</i>	318	4	the Saint Roch cemetery	P
43	72	<i>Acer platanoides</i> L.	<i>Aceraceae</i>	312	5	the Kule cemetery	P
44	79	<i>Acer platanoides</i> L.	<i>Aceraceae</i>	310	5	the Stanisław Staszic park	P
45	102	<i>Quercus robur</i> L.	<i>Fagaceae</i>	305	5	the Saint Roch cemetery	P

Table 1 – cont.

No	Inventory number	Species	Family	Circumference at the height of 1.3 m (cm)	Health condition	Locality	Status
46	107	<i>Tilia cordata</i> Mill.	Tiliaceae	304/205	5	the Saint Roch cemetery	P
47	60	<i>Tilia cordata</i> Mill.	Tiliaceae	300	5	the Saint Roch cemetery	P
48	104	<i>Tilia platyphyllos</i> L.	Tiliaceae	295	5	the Saint Roch cemetery	P
49	97	<i>Zelkova serrata</i> (Thunb.) Makino	Ulmaceae	290/225	5	the Pauline order monastery park	P
50	68	<i>Acer platanoides</i> L.	Aceraceae	290	5	the Kule cemetery	P
51	91	<i>Pinus nigra</i> J.F. Arnold	Pinaceae	290	5	the Pauline order monastery park	P
52	96	<i>Acer pseudoplatanus</i> L.	Aceraceae	288	5	the Pauline order monastery park	P
53	122	<i>Larix decidua</i> Mill.	Pinaceae	280	4	the Evangelical Church of Augsburg Confession cemetery	P
54	71	<i>Larix decidua</i> Mill.	Pinaceae	279	5	the Kule cemetery	P
55	74	<i>Larix decidua</i> Mill.	Pinaceae	278	5	the Kule cemetery	P
56	98	<i>Larix decidua</i> Mill.	Pinaceae	277	5	the Pauline order monastery park	P
57	53	<i>Acer platanoides</i> L.	Aceraceae	275	5	the Saint Roch cemetery	P
58	78	<i>Acer pseudoplatanus</i> L.	Aceraceae	265	5	the Stanisław Staszic park	P
59	40	<i>Acer platanoides</i> L.	Aceraceae	265	4	the Saint Roch cemetery	P
60	83	<i>Acer pseudoplatanus</i> L.	Aceraceae	260	4	the Pauline order monastery park	P
61	82	<i>Fraxinus excelsior</i> L.	Oleaceae	257	5	the 3 Maja park	P
62	85	<i>Acer campestre</i> L.	Aceraceae	256	5	the Pauline order monastery park	P
63	81	<i>Fraxinus excelsior</i> L.	Oleaceae	255	5	the 3 Maja park	P
64	44	<i>Acer platanoides</i> L.	Aceraceae	252	5	the Saint Roch cemetery	P
65	93	<i>Larix decidua</i> Mill.	Pinaceae	250	5	the Pauline order monastery park	P
66	38	<i>Carpinus betulus</i> L.	Betulaceae	245	5	the Saint Roch cemetery	P
67	51	<i>Acer platanoides</i> L.	Aceraceae	241	5	the Saint Roch cemetery	P
68	105	<i>Acer pseudoplatanus</i> L.	Aceraceae	241	4	the Saint Roch cemetery	P
69	65	<i>Acer platanoides</i> L.	Aceraceae	238	5	the Kule cemetery	P
70	52	<i>Acer platanoides</i> L.	Aceraceae	233	5	the Saint Roch cemetery	P
71	43	<i>Acer platanoides</i> L.	Aceraceae	231	4	the Saint Roch cemetery	P
72	26	<i>Acer platanoides</i> L.	Aceraceae	231	5	the Sabinowska 41 street	P
73	50	<i>Acer platanoides</i> L.	Aceraceae	230	5	the Saint Roch cemetery	P
74	89	<i>Acer platanoides</i> L.	Aceraceae	228	5	the Pauline order monastery park	P
75	118	<i>Thuja plicata</i> Donn ex D. Don.	Cupressaceae	220	5	the Evangelical Church of Augsburg Confession cemetery	P
76	48	<i>Carpinus betulus</i> L.	Betulaceae	218	5	the Saint Roch cemetery	P
77	47	<i>Betula pendula</i> Roth	Betulaceae	215	5	the Saint Roch cemetery	P
78	117	<i>Thuja plicata</i> Donn ex D. Don.	Cupressaceae	175	5	the Evangelical Church of Augsburg Confession cemetery	P
79	116	<i>Thuja plicata</i> Donn ex D. Don.	Cupressaceae	168	5	the Evangelical Church of Augsburg Confession cemetery	P
80	42	<i>Thuja occidentalis</i> L.	Cupressaceae	105	5	the Saint Roch cemetery	P
81	119	<i>Aesculus hippocastanum</i> L.	Hippocastanaceae	295	5	the Evangelical Church of Augsburg Confession cemetery	Z
82	61	<i>Tilia cordata</i> Mill.	Tiliaceae	295	5	the Kule cemetery	Z
83	114	<i>Tilia platyphyllos</i> L.	Tiliaceae	291	5	the Evangelical Church of Augsburg Confession cemetery	Z
84	92	<i>Tilia platyphyllos</i> L.	Tiliaceae	290	5	the Pauline order monastery park	Z
85	55	<i>Tilia cordata</i> Mill.	Tiliaceae	287	5	the Saint Roch cemetery	Z
86	112	<i>Quercus robur</i> L.	Fagaceae	286	0	the Saint Roch cemetery	Z
87	84	<i>Fagus sylvatica</i> L.	Fagaceae	282	5	the Pauline order monastery park	Z

No	Inventory number	Species	Family	Circumference at the height of 1.3 m (cm)	Health condition	Locality	Status
88	69	<i>Aesculus hippocastanum</i> L.	Hippocastanaceae	279	5	the Kule cemetery	Z
89	12	<i>Salix</i> × <i>sepulcralis</i> 'Chryso-coma'	Salicaceae	273	4	the Gabriel Narutowicz park	Z
90	49	<i>Quercus robur</i> L.	Fagaceae	270	5	the Saint Roch cemetery	Z
91	95	<i>Acer pseudoplatanus</i> L.	Aceraceae	260	5	the Pauline order monastery park	Z
92	67	<i>Acer platanoides</i> L.	Aceraceae	222	5	the Kule cemetery	Z
93	90	<i>Acer pseudoplatanus</i> L.	Aceraceae	221	5	the Pauline order monastery park	Z
94	28	<i>Acer platanoides</i> L.	Aceraceae	220	5	the Sabinowska 41 street	Z
95	37	<i>Acer pseudoplatanus</i> L.	Aceraceae	218	5	the Saint Roch cemetery	Z
96	39	<i>Acer pseudoplatanus</i> L.	Aceraceae	215	4	the Saint Roch cemetery	Z
97	66	<i>Acer platanoides</i> L.	Aceraceae	215	5	the Kule cemetery	Z
98	100	<i>Acer pseudoplatanus</i> L.	Aceraceae	215	5	the Saint Barbara church	Z
99	94	<i>Fagus sylvatica</i> L.	Fagaceae	269	5	the Pauline order monastery park	O
100	45	<i>Aesculus hippocastanum</i> L.	Hippocastanaceae	267	5	the Saint Roch cemetery	O
101	111	<i>Quercus robur</i> L.	Fagaceae	266	5	the Saint Roch cemetery	O
102	64	<i>Tilia platyphyllos</i> L.	Tiliaceae	266	5	the Kule cemetery	O
103	88	<i>Fagus sylvatica</i> L.	Fagaceae	266	5	the Pauline order monastery park	O
104	110	<i>Tilia cordata</i> Mill.	Tiliaceae	265	5	the Saint Roch cemetery	O
105	86	<i>Fagus sylvatica</i> L.	Fagaceae	265	5	the Pauline order monastery park	O
106	76	<i>Quercus rubra</i> L.	Fagaceae	263	5	the Stanisław Staszic park	O
107	32	<i>Salix</i> × <i>sepulcralis</i> 'Chryso-coma'	Salicaceae	262	5	the Gabriel Narutowicz park	O
108	99	<i>Salix</i> × <i>sepulcralis</i> 'Chryso-coma'	Salicaceae	262	5	the Saint Barbara church	O
109	41	<i>Aesculus hippocastanum</i> L.	Hippocastanaceae	257	5	the Saint Roch cemetery	O
110	109	<i>Tilia cordata</i> Mill.	Tiliaceae	255	5	In the Saint Roch cemetery	O
111	62	<i>Tilia cordata</i> Mill.	Tiliaceae	251	5	the Kule cemetery	O
112	70	<i>Tilia cordata</i> Mill.	Tiliaceae	247	5	the Kule cemetery	O
113	103	<i>Tilia platyphyllos</i> L.	Tiliaceae	243	5	the Saint Roch cemetery	O
114	101	<i>Quercus robur</i> L.	Fagaceae	241	5	the Saint Barbara church	O
115	123	<i>Fraxinus excelsior</i> L.	Oleaceae	210	5	the Evangelical Church of Augsburg Confession cemetery	O
116	36	<i>Carpinus betulus</i> L.	Betulaceae	174	5	the Saint Roch cemetery	O
117	75	<i>Populus alba</i> L.	Salicaceae	303	5	the Kule cemetery	PZ
118	106	<i>Tilia platyphyllos</i> L.	Tiliaceae	230/226/206	5	the Saint Roch cemetery	PZ
119	124	<i>Tilia platyphyllos</i> L.	Tiliaceae	230	5	the Evangelical Church of Augsburg Confession cemetery	PZ
120	121	<i>Larix decidua</i> Mill.	Pinaceae	195	4	the Evangelical Church of Augsburg Confession cemetery	PZ
121	120	<i>Abies concolor</i> (Gordon et Glend.) Lindl. ex Hildebr.	Pinaceae	172	5	the Evangelical Church of Augsburg Confession cemetery	PZ
122	27	<i>Acer platanoides</i> L.	Aceraceae	164	5	the Sabinowska 41 street	PZ

Legend: PP – natural monument, P – tree with a circumference of a natural monument, Z – tree with a circumference close to that of a natural monument (–10%), O – impressive tree (–20%), PZ – other tree, shaded – natural monument candidates.

nest specimens with circumferences of 101–200 cm (8 – 6.6%) and the thickest of more than 401 cm in circumference (3 – 2.5%). The thickest trees were two natural monuments, i.e. *Quercus robur* no. 17 with a circumference of 426 cm and *Aesculus hippocastanum* no. 5 with a circumference of 414 cm, as well as one having the circumference of a natural monument (405 cm) – *Tilia cordata* no. 56 (Table 1).

Natural monuments (25 trees) have circumferences of 198–426 cm. Values of 301–400 cm were recorded for 13 trees, while those of 201–300 cm were recorded for nine, only one tree measured less than 200 cm (198 cm), whereas two specimens had circumferences of over 400 cm (Table 1).

The health condition of 122 inventoried trees is typically very good. As many as 103 of them (84.4%)

are absolutely healthy and do not require any tending operations, their crowns are appropriately developed with a slight share of dead branches. Observed trunk damage is small, sealing or already sealed, having no significant effect on the health condition of trees. As few as 15 specimens are in good condition and require only small tending interventions, consisting in the removal of dead branches. Trunk damage in those trees is of limited area, in the form of frost clefts or small hollows. Two *Tilia cordata* trees (nos. 56, 58) from the Saint Roch Cemetery are of moderately good condition, which is manifested in a greater degree of crown die-back, observable signs of trunk fungal infestation, insect feeding or larger hollows. *Liriodendron tulipifera* (no. 20) growing at Łukasiński Street is the only tree in a very bad health condition. This tree is dying, most of its crown (approx. 60%) is already dead, while in the butt end portion of the trunk numerous fruiting bodies of bracket fungi are observed. Although the tree poses no direct threat to the surrounding area, as it is growing at a considerable distance from the street, it should be properly protected. *Quercus robur* (no. 112) growing in Saint Roch Cemetery died for unspecified causes. It may have been trunk or root rot and in such a case an oak growing in the cemetery may constitute a serious hazard for people or a threat to property. It is necessary to obtain an expert assessment of the tree condition and make a decision on its removal (Table 1).

### CONCLUDING REMARKS

As a result of a detailed survey conducted in the city of Częstochowa a total of 122 valuable trees were recorded, belonging to 25 species, coming from 12 families.

These trees are mostly native species (15), less frequently alien plants (10). Broad-leaved trees predominate (20 species), mainly maples, linden and oak trees, much less frequently they are coniferous species (5). Most trees (84%) are in a very good health condition. However, it needs to be remembered that all natural monuments should be regularly monitored and tended, particularly those which are found in moderate or bad health condition (Table 1).

Inventoried trees have circumferences from 105 to 426 cm. Most of them (62.3%) measure from 201 to 300 cm.

Among inventoried trees we need to distinguish three thickest, beautiful natural monument trees, i.e. *Quercus robur*, *Aesculus hippocastanum* and *Acer saccharinum*, with circumferences of 426, 414 and 396 cm, respectively. Valuable and rare trees include *Zelkova serrata* coming from Asia, with trunk circumferences of 290 and 225 cm, as well as *Liriodendron tulipifera* measuring 236 cm, which unfortunately is in a bad health condition.

The largest number of trees are those with circumferences of natural monuments (55), with the lesser number of actual natural monuments (25) and trees with circumferences close to those of natural monuments and impressive trees (with 18 specimens each), while the lowest number comprises the so-called other trees (6).

This study confirmed the number of existing natural monuments reported in the register of natural monuments for the city of Częstochowa (REJESTR... 2016). Their population is currently 18 single trees and one birch avenue of 385 *Betula pendula* trees. The list of natural monuments in the form of single trees was supplemented with seven thickest birches with dimensions of natural monuments, growing in the natural monument avenue at Bialska Street.

Analysis of the presented results of this survey leads to a conclusion that at present the number of natural monuments in the city of Częstochowa is too small. For this purpose 45 single trees with circumferences of natural monuments and in a very good health condition were selected, which may be proposed to be protected as natural monuments (Table 1).

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### REFERENCES

- AKTUALIZACJA Programu Ochrony Środowiska dla Miasta Częstochowy z uwzględnieniem lat 2010–2014 z perspektywą do roku 2017. (2010). Urząd Miasta Częstochowa, Częstochowa.
- BULIŃSKI M. (1999): Pomnikowe drzewa i krzewy w nowoczesnej ochronie przyrody. Internetowy Magazyn Przyrodniczy Salamandra 10. <http://www.salamandra.org.pl/magazyn/b10a04.html> (access: 21.12.2016).
- DĘDEK J., PAWLIKOWSKI J. (1999): Częstochowa dla każdego. PP Oddział Prasa Śląska, Katowice–Częstochowa.
- FURS B. (2012): Jasnogórski park klasztorny: dzieje, kształt, znaczenie. Pro-Auto, Częstochowa.
- GOŁĄBEK E., ALEKSANDROWICZ M. (2004): Ocena wieku i stanu zdrowotnego drzew pomnikowych na Obszarze Chronionego Krajobrazu Bory Niemodlińskie. Studia i Monografie 350. Uniwersytet Opolski, Opole.
- GUS. Ochrona środowiska 2015. (2015). Informacje i Opracowania Statystyczne, Warszawa. <http://stat.gov.pl/obszary-tematyczne/srodowisko-energia/>



- srodowisko/ocrona-srodowiska-2015,1,16.html (access: 14.12.2016).
- GUTOWSKI J.M., BOBIEC A., PAWLACZYK P., ZUB K. (2004): Drugie życie drzewa. WWF Polska, Warszawa-Hajnówka.
- HARABIN Z. (1996): Ochrona drzew pomnikowych w Polsce. *Komunikaty Dendrologiczne* 2/24: 5–12. <http://www.czestochowa.pl/page/385,tereny-zieleni-miejskiej-w-czestochowie.html> (access: [http://stat.gov.pl/files/gfx/portalinformacyjny/pl/defaultaktualnosci/5484/1/15/1/ochrona\\_srodowiska\\_2015.pdf](http://stat.gov.pl/files/gfx/portalinformacyjny/pl/defaultaktualnosci/5484/1/15/1/ochrona_srodowiska_2015.pdf) (access: 9.12.2016)).
- KAMIŃSKI B., CZERNIAK A. (2000): Badanie drzewostanów oraz sporządzenie opinii naukowej kwalifikującej do stworzenia wykazu inwentaryzacyjnego starych, cennych drzew na terenie miasta Poznania. Typescript. Katedra Inżynierii Leśnej Uniwersytetu Przyrodniczego w Poznaniu.
- KASPRZAK K. (2005): Ochrona pomników przyrody. *Zasady postępowania administracyjnego*. Wydawnictwo Abrys, Poznań.
- KASPRZAK K. (2011): Drzewa – pomniki przyrody i pamiątki kultury. *Turystyka Kulturowa*, 4: 17–38. [www.turystykakulturowa.org](http://www.turystykakulturowa.org). (access: 14.12.2016).
- KONDRACKI J. (2011): *Geografia regionalna Polski*. Wydawnictwo Naukowe PWN, Warszawa.
- KOWALEWSKI L. (1988): *Parki, rezerваты i pomniki przyrody województwa częstochowskiego*. Wydawnictwo Naukowe Uniwersytetu im. Adama Mickiewicza, Poznań.
- KOWALEWSKI L. (1990): *Przyroda parków pałacowych i dworskich na obszarze województwa częstochowskiego*. Wyższa Szkoła Pedagogiczna w Częstochowie, Częstochowa.
- ŁAKOMY P., NOWIK K., GÓRAL J. (2008): Stan zdrowotny drzew pomnikowych na terenie Wrocławia. Katedra Fitopatologii Leśnej Uniwersytetu Przyrodniczego w Poznaniu.
- REJESTR Pomników Przyrody w województwie śląskim. (2016). Regionalna Dyrekcja Ochrony Środowiska. [bip.katowice.rdos.gov.pl/files/artykuly/22381/pp.xls](http://bip.katowice.rdos.gov.pl/files/artykuly/22381/pp.xls).
- RUCIŃSKI P. (1998): Motywy i kryteria uznawania tworów przyrody za pomniki. *Las Polski* 23: 7–10.
- SENETA W., DOLATOWSKI J. (2011): *Dendrologia*. Wydawnictwo Naukowe PWN, Warszawa.
- SĘTOWSKI J. (2005): *Cmentarz Kule w Częstochowie*. Wydawnictwo im. Stanisława Podobińskiego, Częstochowa.
- SĘTOWSKI J. (2006): *Cmentarz ewangelicko-augsburski w Częstochowie*. Muzeum Częstochowskie, Częstochowa.
- ŚWIDEREK G. (2007): *Parki i ogrody województwa śląskiego*. Ośrodek Działań Ekologicznych „Źródła”, Łódź.
- ZWOLIŃSKI M. (1997): *Przewodnik po Częstochowie*. PTTK Oddział przy Hucie „Częstochowa”, Częstochowa.
- ZYGMUNT J. (2009): *Przewodnik po parkach miejskich 3. Maja i Staszica w Częstochowie*. Urząd Miasta Częstochowy, Wydział Ochrony Środowiska, Rolnictwa i Leśnictwa, Częstochowa.
- For citation:** LECHOWICZ K., WROŃSKA-PILAREK D., PILAREK Z., JANYSZEK M. (2016): Verification of a survey of the most valuable trees in the city of Częstochowa. *Steciana* 20(4): 209–217. doi: 10.12657/steciana.020.022