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Health state of tree monuments in the Province of Opole
I. Single trees

Stan zdrowotny drzew pomnikowych w województwie opolskim
I. Pojedyncze drzewa

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ABSTRACT: The aim of the article was the analysis of health state regarding individual tree monuments in the Province of Opole, taking into consideration territorial (district) and species factors.
222 trees representing 25 species were analysed, estimations were based on the health state of the trees. This was calculated using the five-degree scale worked out by Pacyniak and Smólski.
It demonstrated the following:

- health state of individual tree monuments in the Province of Opole is good;
- the highest proportion (37 %) of totally healthy trees was broken down in the Olesno District. In the Namysłów, Kędzierzyn, and Prudnik Districts there were no similar trees registered. The highest percentage of heritage trees in very bad condition was in the Nysa District (14 %) and the Namysłów District (13 %), however there were no trees of similar condition to be found in 5 other districts;
- attention was paid to 2 Districts: Kędzierzyn where there were only trees in the 3rd and 4th degrees of health state and Prudnik with trees in the 2nd and 3rd state;
- the highest percentage of totally healthy trees registered among *Taxus baccata* (40 %). Unfortunately, there was not a single example of *Ginkgo biloba* in the degree 1 - the highest health condition. Only among *Quercus robur* (11 %) and *Fagus sylvatica* (5 %) were the trees in very bad health;
- attention was paid to very good health condition of three out of four representatives of *Gymnospermae* - *Larix decidua*, *Ginkgo biloba* and *Taxus baccata*, among which there were only examples of 1st and 2nd degree conditions registered.

KEY WORDS: tree, nature monument, health state, species, district, the Province of Opole.

Introduction

Impressive trees have long aroused interest and in several countries they have been under legal protection for many years. In Poland these trees are protected as items of National Heritage, under the Nature Conservation Bill of 16th April 2004, Dz. U. nr 92, poz. 880.

Monumental trees grow in a variety of places; forests, parks, fields, roadside verges and open spaces. They have always been of great importance to human life. Part of this was of cultural significance, nowadays aesthetic values as well as biocenotic and scientific roles are noticed.

Poland is one of the few European countries where the majority of old trees are preserved (Pacyniak 1992). These are mainly *Quercus robur* (more seldom *Quercus petraea*), *Tilia cordata* (more seldom *Tilia platyphyllos*) and *Fagus sylvatica* (Kuźniewski 1996, Olaczek i in. 1996, Pacyniak 1988, Siewniak 1988). Coniferous trees comprise only 10 % of trees catagorised as Heritage items (Pacyniak 1988).

According to statistics, on 31/12/01, there were 33781 nature monuments in Poland. The most numerous group constituted individual trees - 26636; groups of trees - 4535; erratic boulders - 1053; avenues - 786 and lastly rocks, grottos, caves and other miscellanious sites - 771. In the Province of Opole, 300 individual trees, 82 groups, 19 avenues, 10 erratic boulders, 2 rocks, grottos and miscellanious sites were registered. (GUS 2002).

Pacyniak and Smólski claim that the health condition of old Polish trees is generally catastrophic (Pacyniak 1988, 1992, Pacyniak, Smólski 1973). Harabin (1996) observes that destructive phenomena cause the plant world visible destruction, especially the elimination of old trees. People themselves reduce the resources by the thoughtless felling of trees and their native habitats.

However, there is no authoratative work on the health condition of heritage trees in Poland.

There are many causes of bad health conditions in heritage trees.

Research carried out by the authors of this article - as well as analysis of the available published material - make it possible to state that these trees are in danger because of the following factors:

- pollution,
- fluctuation of underground water levels,
- fungi and invasive insects,
- groundworks and man-made surfaces in close proximity to the trees,
- the burning of grass and tree stumps,
- a sudden change in atmospheric climate.

Apart from the factors mentioned above, bad conditions of these precious trees is also influenced by:

- high cost of preservation work and unprofessionalism,
- the lack of information signs and fences surrounding heritage sites,
- a shortage of caretakers/guardians living close to the sites,

- little sensibility to beauty of Nature and lack of knowledge about the function of old tree in the environment.

Methodology

The analysis concerned individual trees in the Province of Opole which were put under protection as nature monuments by the provincial government on 21/01/00. Database updates showed that some of these trees did not exist any more or had no necessary documentation, there were 19 examples of these. Eventually, 222 trees representing 25 species were analysed. The analysis was based on the health condition 5 degree scale shown below.

1. a totally healthy tree with no defects or pests;
2. evidence of partial branch atrophy in upper parts of the tree head and the existence of other plant or animal pests;
3. 50 % atrophy of the tree head and log or bolt. Attacked by pests to a large extent;
4. 70 % atrophy of the tree head and log or bolt and large xylem loss;
5. evidence of more than 70% of tree head atrophy and log or bolt, with numerous hollows. Also includes dead trees.

Territorial (district) and species factors were taken into consideration.

The documentation of Nature Conservation Officer of Opole (collected since the end of the '90's) was also used in this analysis.

Results

Among the analysed trees there were:
30 examples of degree 1 health state
88 examples of degree 2 health state
61 examples of degree 3 health state
29 examples of degree 4 health state
14 examples of degree 5 health state

Among these trees, (fig. 1) the biggest group (40 %) comprised trees in good health condition. A numerous group of 27 % comprised trees in health condition 3. 14 % of all trees were classified as degree 1 (totally healthy) without any defects or pests. The heritage trees of poor and very poor health condition (degrees 4 and 5) comprised 13 % and 6 % repectively.

It can be stated that health condition of individual trees the Province of Opole is good.

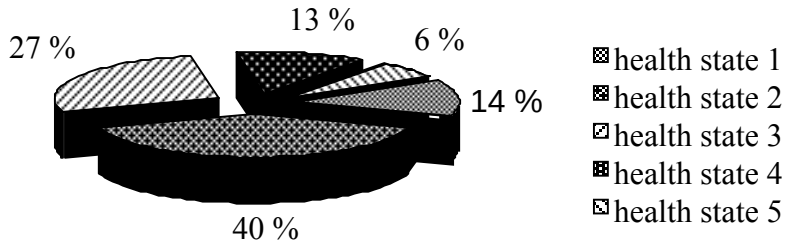

Fig. 1. Health state of single tree monuments in the Province of Opole

Tab. 1. Health state of single tree monuments in particular districts of Opole

District	Health state (according to Pacyniak)				
	1	**2**	**3**	**4**	**5**
Opolski	17 %	45 %	23 %	9 %	6 %
Strzelecki	24 %	43 %	18 %	9 %	6 %
Krapkowicki	4 %	52 %	30 %	7 %	7 %
Nyski	10 %	42 %	24 %	10 %	14 %
Namysłowski	-	33 %	41 %	13 %	13 %
Oleski	37 %	21 %	21 %	21 %	-
Kluczborski	7 %	20 %	27 %	39 %	7 %
Brzeski	10 %	30 %	40 %	20 %	-
Kędzierzyński	-	-	75 %	25 %	-
Głubczycki	17 %	49 %	17 %	17 %	-
Prudnicki	-	60 %	40 %	-	-

According to the data in table 1, the Olesno District represents the highest proportion of totally healthy trees (37 %) and in 3 districts Namysłów, Kędzierzyn and Prudnik there were no such trees registered. The highest percentage of heritage trees in very bad condition was in the Nysa District (14 %) and the Namysłów District (13 %), however there were no trees of similar condition to be found in 5 other districts.
Special attention should be paid to 2 Districts: Kędzierzyn where there were only trees in the 3rd and 4th degrees of health state and Prudnik with trees in the 2nd and 3rd state.

25 tree species were distinguished among the analysed trees.
Figure 2 shows that the most frequently represented species was *Quercus robur* (52 %), *Tilia cordata* and *Fagus sylvatica* (10 %) each, *Pinus sylvestris* (5 %), *Larix decidua*,

Ginkgo biloba, *Taxus baccata* each registering 2 %. Other species comprised 17 % of the analysed group of trees.

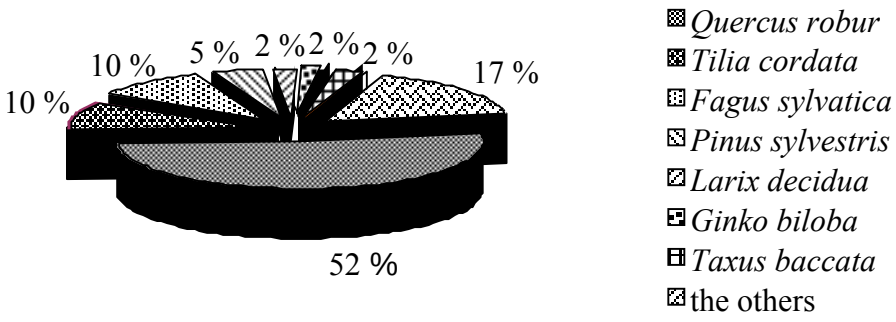

Fig. 2. Species composition of single tree monuments in the Province of Opole

Tab. 2. Health state of single tree monuments in the Province of Opole according to species

Species	**Health state (accoring to Pacyniak)**				
	1	**2**	**3**	**4**	**5**
Quercus robur	6 %	33 %	34 %	16 %	11 %
Tilia cordata	24 %	28 %	29 %	19 %	-
Fagus sylvatica	14 %	40 %	32 %	9 %	5 %
Pinus sylvestris	10 %	60 %	20 %	10 %	-
Larix decidua	20 %	80 %	-	-	-
Ginkgo biloba	-	100 %	-	-	-
Taxus baccata	40 %	60 %	-	-	-

Table 2 represents data referring to health state of single tree monuments in the Province of Opole according to species. Only 7 species are taken into consideration as the others were represented by single examples only.
The biggest share of totally healthy trees was registered among *Taxus baccata* (40 %), unfortunately there were no examples of *Ginkgo biloba* in the highest health condition. Heritage trees of very poor health condition occured only in *Quercus robur* (11 %) and *Fagus sylvatica* (5 %).

Attention was also paid to very good health condition of three out of four representatives of *Gymnospermae* - *Larix decidua*, *Ginkgo biloba* and *Taxus baccata*, among which there were only examples of 1st and 2nd degree conditions registered.

Conclusions

1. Health state of individual tree monuments in the Province of Opole is good.
2. The highest proportion (37 %) of totally healthy trees was broken down in the Olesno District. In the Namysłów, Kędzierzyn, and Prudnik Districts there were no similar trees registered. The highest percentage of heritage trees in very bad condition was in the Nysa District (14 %) and the Namysłów District (13 %), however there were no trees of similar condition to be found in 5 other districts.
3. Attention was paid to 2 Districts: Kędzierzyn where there were only trees in the 3rd and 4th degrees of health state and Prudnik with trees in the 2nd and 3rd state.
4. The highest percentage of totally healthy trees registered among *Taxus baccata* (40 %). Unfortunately, there was not a single example of *Ginkgo biloba* in the degree 1 - the highest health condition. Only among *Quercus robur* (11 %) and *Fagus sylvatica* (5 %) were the trees in very bad health.
5. Attention was paid to very good health condition of three out of four representatives of *Gymnospermae* - *Larix decidua*, *Ginkgo biloba* and *Taxus baccata*, among which there were only examples of 1st and 2nd degree conditions registered.

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