

# TREE INVENTORY IN THE HISTORICAL GARDEN OF TELEKI CASTLE USING THE TREE PLOTTER SOFTWARE

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**Abstract:** In order to create strategies for landscape protection, management and planning accurate data is needed. To develop the tree inventory for the historical garden of the Teleki Castle in Gornești, and establish a baseline for future monitoring, field data from around 618 trees was collected during the summer of 2019 and processed and analyzed using the Tree Plotter software. The information provided by the tree inventory can be used by the local administrator for better decision making regarding green space planning and management. This data also provides a basis for monitoring changes occurred in the garden over time.

**Keywords:** tree inventory, historical garden, green space, green registry, treeplotter

## INTRODUCTION

Several studies have shown the potential of trees and green spaces in providing important ecosystem services such as air and water purification, wind and noise filtering or microclimate stabilization. Moreover, green spaces provide social and psychological services (Sreetheran et al. 2011; Chiesura 2004).

The ratification of the European Landscape Convention in Romania implies the generation or adoption of appropriate tools for analyzing landscapes and their elements, which will be the basis for establishing policies for landscape protection, management and planning (Culescu, 2015).

The Romanian *Law 24/2007 regarding the regulation and administration of green spaces* stipulates that the authorities of the local public administration have the obligation to keep the records of the green spaces on the territory of the administrative units, by setting up the local green registries, which they have to update whenever changes occur. However, the Romanian local administrations fail to provide accurate data on the managed green areas.

Cities around the world are investing now in tools to help them better manage urban green space. An example is the New York City Street Tree Map which is the world's most accurate and detailed map of a city's street trees. An analysis of the urban forest in New York reveals that this city has an estimated 7.0 million trees with tree canopy that covers 21 % of the city (Nowak et al. 2018).

The New York City Street Tree Map shows the distribution and biodiversity of the city's street trees based on the most recent tree inventory. Moreover, the map

provides a record of planting history and is considered an important tool for planning (Hubley, 2015).

## MATERIALS AND METHODS

The study area is the historical garden of the Teleki Castle in Gornești, an architectural ensemble found in Mureș County, Romania.

To develop the tree inventory field data was collected during the summer of 2019 and processed and analyzed using the Tree Plotter software.

The data for the Teleki domain was collected in about 3 working days by a team of 7 professionals and students from the fields of landscape architecture, arboriculture, architecture and history.

Each tree was analyzed, and the information which was entered in the Tree Plotter software contained the following data: location, species, tree characteristics - trunk diameter at breast height (DBH).

Tree Plotter is a fully functioning tree inventory software to map and manage urban forest (new and established trees) and maintenance work history on public and private property, and was built by certified arborists and foresters (Hanou, 2014; TreePlotter, 2019).

## RESULTS AND DISCUSSIONS

The study conducted in the summer of 2019 on the trees found in the Teleki Castle's garden reveals that this green space has around 618 trees from 22 genus and 42 species (Fig. 1.). The most common genus is *Acer*, followed by *Fraxinus*, *Tilia*, *Picea*, *Populus*, *Juglans*, *Aesculus*, *Robinia* and *Salix* (Fig. 2.).



**Fig. 1. Tree Plotter inventory map for the historical garden of the Teleki Castle**

Most of the species are of average importance, forming the general vegetation volume, but without being of special historical importance. Of the total number of trees, only about 3% is represented by remarkable trees that have a special value. It should be noted here the presence on the site of a number of 7 specimens of

*Phellodendron amurense* - an extremely rare species found on the territory of Romania.

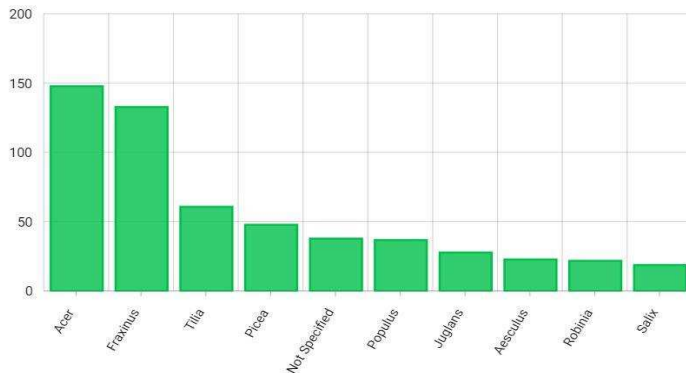


Fig. 2. Most common genus found in the historical garden of the Teleki Castle

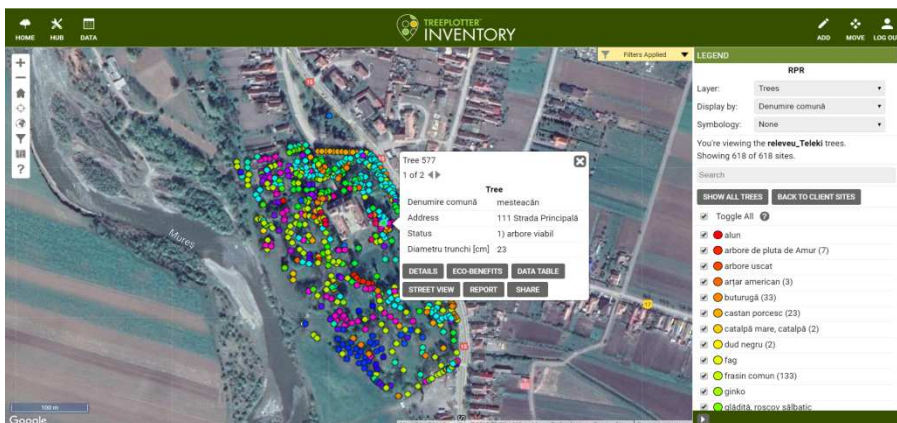


Fig. 3. Tree general data

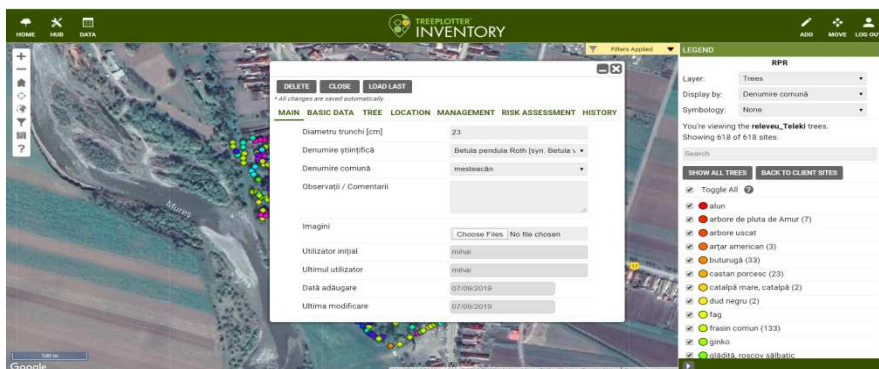
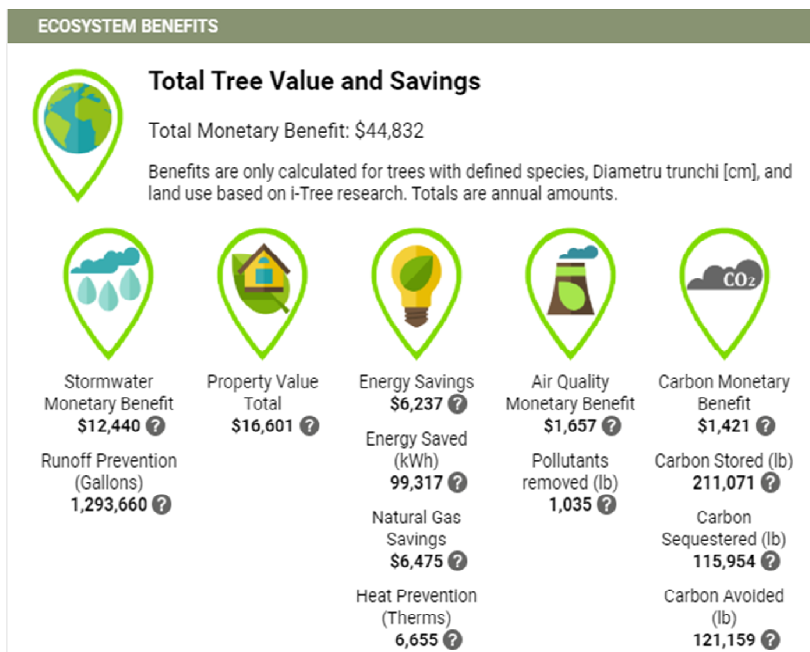


Fig. 4. Tree in depth data



**Fig. 5. Ecosystem benefits calculated for trees found in the historical garden of the Teleki Castle**

Another aspect that was noticeable is that more than half of the tree population (about 54%) is represented by large trees (size 1) while about 39% of the specimens have a medium size (size 2), thus the percentage of small trees (size 3) being very small.

In addition, during the inventory 1 dry tree and 33 logs were found, which indicate the presence of other historic trees that already disappeared from the garden.

Tree Plotter also provides a summary on the ecosystem benefits of the site, which shows that 618 trees bring around 40,000 euros annually to the community of Gornești. More eco benefits like stormwater, property value, energy savings, air quality and carbon monetary can be seen in Fig. 5.

**CONCLUSIONS**

The Teleki domain in Gornești benefits from a series of trees with special value that must be considered and valued in the future planning of the garden. Also, the site is in a favorable situation due to the presence of an important percentage of trees of average value. This aspect is giving a special malleability to the site because this part of the vegetation does not have a special historical importance, thus allowing the elimination of some specimens if this is necessary for a future design, but at the same time being able to generate the accent or infrastructure elements within a site organization solution.

Further analyzes based on the data collected in the tree inventory should be made to provide proper management and planning of the garden including: tree pruning, pest and disease control and irrigation.

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