# SIGNIFICANT TREES WITH GREAT INFLUENCE FOR LANDSCAPE UTILIZATION IN POHANSKO DISTRICT

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**Abstract**
In Central Europe, trees are one of the basic units of the landscape structure and form an irreplaceable part of it. They also play a similar role in biodiversity maintenance. Biodiversity of an ecosystem is a very important property for both, the stability of the ecosystem and "the landscape utilization". NAKI II project (2018–2022; FFWT MENDELU) is focused on the evaluation of woody plants' importance for organisms associated with woody plants biodiversity in the Pohansko district, e.g. wood fungi and saproxylic insects. This part of the Czech Republic has a crucial effect on the biodiversity of the whole central Europe region and can be very important for recreation and tourism. The negative finding of the project is the very bad health status and reduced perspective of the most biological value trees. There have not been created conservation management or arboriculture care with no stabilization or prospective improvement of trees on locality. This fact strongly threatens the further biodiversity stability of this ecosystem and also significantly reduces the possibilities of this locality used by the general public. The project can be considered as a base of arboriculture management creation on solved locality, which can also implicate further higher attractiveness of Pohansko for tourism and recreation, not only biodiversity maintaining.

**Key words:** Biodiversity, magnificent Trees, South Moravia, ecological stability, saproxylic insects, NAKI II project, wood fungi, arboriculture management, recreation and tourism

## Introduction

In the conditions of Central Europe, tree species are one of the basic units of the landscape structure and form an irreplaceable part of it (Ritter 2011). They also play a similar role in biodiversity maintaining in the landscape (Siitonen and Thomas 2015, Jonsell 2012). From the beginning of their presence on the locality, specific habitats have been created on woody plants, where the activity and development of saproxylic organism, i.e. habitat or nutritionally bound species of organism on wood in various stages of decomposition, takes place. These animals have adapted so much to the development in these habitats that without their existence they cannot prosper or exist in the landscape (Zumr et al. 2021). These habitats are, for example, completely closed or partially closed cavities in branches, wood cracks, thicker stumps of dry branches with bark, dead wood mass on a still-living tree, dead root mass in the contact with soil substrate etc. (Jurc et al. 2008). It is clear that these habitats are most often found on old trees, which indeed have the most fundamental and irreplaceable role in maintaining of biodiversity. Therefore, it is important to maintain the optimal number of tree species in all stages of physiological age so that it is possible to count in optimal number of habitats, or with the optimal number of old trees in the longer time period (Miklín et al. 2017). One of the most important parts of the Czech Republic with the occurrence of mentioned types of trees and bound invertebrate and fungal fauna is the Pohansko area (see fig 1.), where selected trees were monitored intensively in one-time period with the aim to build an inventory of species and create a basis for processing of arboricultural care for the most biologically value trees (2018–2022; FFWT MENDELU). This arboristic management and the connected information will be supported the possibilities of developing both the maintenance of biodiversity in the most biologically valuable areas of the republic and the possibility of making this area more attractive to the public and thus increase rate for tourism and recreation.

## Materials and methods

From 2018 to 2022, the NAKI II project is solved at the FFWT MENDELU. This project is focused, among other things, on evaluation of the importance of these woody plants for the biodiversity of organisms associated with woody plants, such as wood fungi and saproxylic insects (insects attached to dead wood). As part of the terrain research, a visual survey of significant trees listed in the

database ArcGEO was carried out. A total of 781 trees were measured and observed during project research period (2018-2021). The survey period was selected individually according to the location of the tree and according to the taxon in order to conduct the survey in the best possible time in terms of the formation of wood fungi and the occurrence of saproxylic organisms.

**Results**

On average, from two to four permanent-bound organisms (wood fungi, saproxylic insects etc.) and two other occasional-bound organisms (date birds, airplanes etc.) were found on each of the observed trees. Compared to commonly occurring mature trees, these are very high numbers.

A less positive finding from our surveys is the very poor current health status of most trees and thus a significantly reduced tree perspective (see fig 2.). On investigated trees, there were no conservation management or arboricultural care with stabilization or perspective improvement objects observed. Thus, no attempt was made to prolong the existence of these trees in the habitat. Due to the absence of these managements, most trees are overgrown with fast-growing trees, dying and rapidly decaying. From 781 evaluated trees, almost half of the individuals were already dead (see fig 3.), a quarter were dying and only a quarter of the trees could be described as promising. At the same time, the absence of substitute tree species of similar dimensions, which could ensure the continuity of currently occurring species and habitats of organisms with a connection to trees were not presence.

**Discussion**

To put it very simply, bigger the tree has higher habitat presence potential, but also tree vitality, health status, tree taxon and the environment in which the tree grows play a crucial role in biodiversity significance (Buse et al. 2009). The species richness of insects and wood fungi as the best known and the most species rich groups of organisms with a strong bound to woody plants is influenced not only by the condition of woody plants, but also by their number and location in the observed area (Krása 2015, Miklín et al. 2017). The investigated locality belongs to the areas with the richest species biodiversity of insects, but also other groups of organisms (Miklín 2017). There are many reasons which maintain this fact, but the temperature and humidity conditions as well as the character of the woody complexes will be crucial - there are forests and non-forest complexes of very diverse vegetation with the local character of the original hard or soft floodplain. One of the important factors that contributes to the high species richness of common and specially protected organisms in the surveyed locality is clearly the presence of a large number of old oaks (Krása 2015). These woody plants (oaks (*Quercus*, L., 1753)) are usually of the greatest importance for diversity, mainly due to the quality of the wood and their longevity. Along with oaks, there are other tree taxon (*Salix* L., *Populus* L., *Tilia* L., *Acer* L., etc.), which can provide habitats for activity of large numbers of tree bounded species (Miklín et al. 2017). On the trees are among the fungi these represents *Inonotus* sp., *Phellinus* sp., *Trametes*, *Armillaria* sp., *Ganoderma* sp. etc. (Miklín et al. 2017). The insects were represented by the longhorn beetles (Cerambycidae), beauties (Buprestidae), woodpeck-ers (Elateridae), scarabs (Scarabaeidae) and others (Buse et al. 2009). The existing significant trees occurring at the confluence of the Morava and Dyje rivers are very valuable from the point of view of the biodiversity (the count of the bounded organisms) (Miklín et al. 2017). At the same time, however, these are trees that are currently dying out very quickly (see above). This can lead to a loss of diversity, especially in the case of specially protected organisms, which will not be able to find new habitats after the disintegration of tree habitats on today's large trees. One way, what we can mitigate the negative effects of the current situation is to start intensively caring for the surviving important trees in this area (Ritter 2011, Krása 2015). The stabilization of trees by arboricultural care (ties, supports, small local reductions, etc.) prevent their total disintegration and immediate degradation of most biologically valuable habitats. With arboristic care is possible to achieve a significant extension of biologically value trees existence in the locality and this gain the time needed to grow a new generation of trees, which can ensure the continuity of populations occurring in this area (Grove 2002).

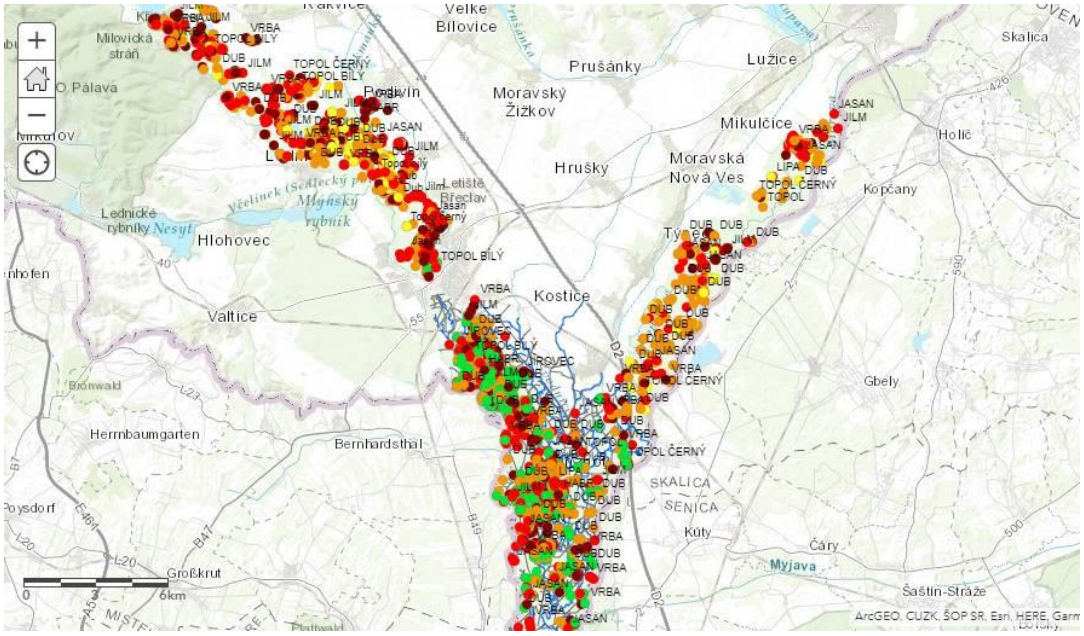

Fig. 1: Tree location map

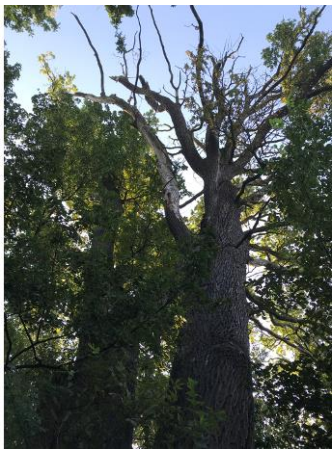
Fig. 2: Biologically valuable oak (*Quercus robur*) with a reduced perspective


Fig. 3: Dead large oak (*Quercus robur*) – the supply of habitats for saproxylic species will gradually decrease

**Conclusion**

The assumption that these are very important trees for biodiversity maintain was confirmed by our research. Despite the fact that the surveys were conducted only once in the concrete sea-son, a very high species diversity was found. The recognition of one of the forms of large-scale nature protection would certainly help the mentioned care and of course the tourism attractiveness. There is a long-standing discussion about the need to protect the local exceptional biodiversity, in which some

adjustments have already been made in the way of forest management. However, in the context of the drought of recent years and the deteriorating condition of old oaks, further measures need to be taken and, above all, action taken quickly. The situation could be helped by the current government's program statement approved at the beginning of January this year, which promises to expand the area of large-scale protected areas and specifically states the Soutok National Park announcement.

**References**

Buse J., Alexander, K. N. A., Ranius, T., Assmann T. (2009). Saproxylic Beetles - Their Role and Diversity in European Woodland and Tree Habitats. Sofia: Pensoft.

Grove, S. J. (2002). Saproxylic Insect Ecology and the Sustainable Management of Forests. Annual Review of Ecology and Systematics, 33, 1–23. http://www.jstor.org/stable/3069254

Jonsell, M. 2012: Old park trees as habitat for saproxylic beetle species. Biodivers Conserv 21, 619–642. https://doi.org/10.1007/s10531-011-0203-0

Jurc, M.. Ogris, N., PAVLIN, R., Borkovic, D. (2008). Forest as a habitat of saproxylic beetles on Natura 2000 sites in Slovenia. Revue d'écologie. 66. 53-66.

Krása, A. (2015). The protection of saproxylic beetle and management for their improvement. Metodology of AOPK ČR. Praha: Agentura ochrany přírody a krajiny České republiky, 2015. ISBN 978-80-87457-98-6 (in Czech).

Miklín, J., Hauck, D., Konvička, O., Čížek, L. (2017). Veteran trees and saproxylic insects in the floodplains of Lower Morava and Dyje rivers, Czech Republic, Journal of Maps, 13:2, 291-299, DOI: 10.1080/17445647.2017.1300785

Ritter, E. (2011). Forest Landscapes in Europe – Visual Characteristics and the Role of Arboriculture. 10.1007/978-94-007-1150-1_14.

Siitonen, J., Ranius, T. (2015). The importance of veteran trees for saproxylic insects. Europe's Changing Woods and Forests: From Wildwood to Managed Landscapes. 140-153. 10.1079/9781780643373.0140.

Zumr, V., Remeš, J., Pulkrab, K. (2021). How to Increase Biodiversity of Saproxylic Beetles in Commercial Stands through Integrated Forest Management in Central Europe. Forests 2021, 12, 814. https://doi.org/10.3390/f12060814

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**Souhrn**

Tento příspěvek popisuje výsledky terénního průzkumu mohutných a biotopově hodnotných stromů nacházejících se na území soutoku řek Moravy a Dyje. Tento průzkum probíhal v letech 2018 až 2022 a bylo v rámci něj prozkoumáno 781 významných dřevin nacházejících se v této oblasti. Na zkoumaných stromech byla potvrzena významně vyšší diverzita zvláště chráněných či ohrožených organismů s vazbou na dřeviny než u běžně se vyskytujících stromů. Zároveň byl ale pozorován velmi špatný zdravotní stav a perspektiva většiny stromů. Z velké části se jedná o odumírající či zcela odumřelé stormy.

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