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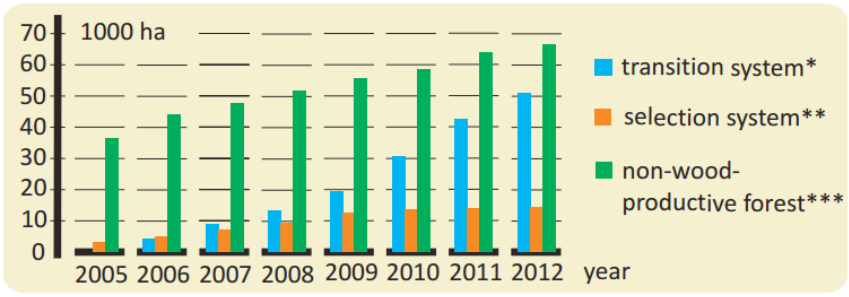
EXAMINATION OF STAND STRUCTURE IN AN OLD-ESTABLISHED EXPERIMENTAL PLACE (ИССЛЕДОВАНИЕ СТРУКТУРЫ ДРЕВОСТОЯ НА ИСТОРИЧЕСКОЙ ЭКСПЕРИМЕНТАЛЬНОЙ ПЛОЩАДИ)

The continuous forest cover does not mean selection cutting, but the selective cutting helps to provide it the most efficiently. As there were no extended selection forests in Hungary before, the selection cutting system is used to transform the previously even-aged forests treated by cutting system. The process of the transformation is very long and can take even centuries. The conversion in Sopron 182/B forest compartment started in 1937 and it is in its final stages. The diverse structured stand enables us to analyze the process in a real forest which may also help the practice. Our data processing is in the initial stage, after the correction of the positions we will have more options for geodesic software.

Защитные леса не подразумевают выборочных рубок, но выборочные рубки помогают поддерживать их наиболее эффективно. Так как раньше в Венгрии не было больших площадей регулируемых лесов, система выборочных рубок используется для перевода в эту категорию ранее одновозрастных лесов. Процесс трансформации очень длительный и может занять века. Трансформация лесного участка Sopron 182/B началась в 1937 г. и теперь находится на финальных стадиях. Разнообразно структурированный древостой позволяет нам анализировать процесс в реальном лесу, что может помочь на практике. Обработка данных пока на начальном этапе, и после корректировки позиций появится больше возможностей для применения ГИС-технологий.

Introduction

Nowadays close to nature forest management and continous cover forestry has became more and more widespread in Hungary. The law XXXVIII. 2009 (forest law) defines three silvicultural systems (non-wood productive, selection and transition systems) which all ensure continuous forest cover. The law enacts the increase of the territory of these systems. While the non-wood productive forests does not have notable economical function, the selectice cutting and the transition forests have to provide yield, social and protective functions as well. Hungarian forests are characteristic all even-aged stands, the conversion to selection forest has to be strictly controlled if the management objective is to create diverse and stable stands. The main question is how to make the conversion which has not enough scientific and practical background yet. Without previous domestical experiences circa 60.000 hectares of forests were forced into selection or transition systems (Fig. 1).



* The goal is to reach the selection system.
** Individual trees or groups are harvested periodically and frequently.
*** The aim is to let natural processes to take their course. Fellings are possible only for scientific, protection or regeneration purposes.

Source: National Forestry Database, data of 1st Jan. 2013

Figure 1. The change of territory of silvicultural systems ensuring continuous forest cover in Hungary

This paper is about the examination of stand structure of Sopron 182/B forest, which is an old-established experimental place (Fig. 2). The trial was started by Gyula Roth in 1937 since the stand is managed in his own conversion system. Gyula Roth is famous name in Hungarian forestry history. He was a professor at the University of Sopron (nowadays the University of West Hungary) for many years, and the president of IUFRO (International Union of Forest Research Organizations) in 1932. He led many researches and was especially interested in selection forests. The 19,4 hectare Sopron 182/B forest compartment was originally just a part of a more than 70 hectare research area managed in Roth Gyula's conversion system. Due to historical reasons (it was the part of the border area) only one compartment remained, which was managed in the same system during the past nearly 80 years. The stand structure of the spruce, sessile oak, hornbeam mixed submontane beech forest has been changed a lot since the trial was started.

Methods

Our main goal was to make a detailed database of the forest stand and a map with all of the crown projections and stem positions. We mapped every single tree has breast height diameter over 15 cm. The following data was collected: coordinates, tree species, height, height of living and dead crown, breast height diameter, stem quality, disease and other notes. Many of the trees has painted numbers on the bark. Those are from a previous data collecting, so we decided to note the numbers to be able later to compare some part of the twod atabases. For mapping and data collecting we used Field-Map system and a Vertex IV ultrasound technology clinometer. Since the Field-Map system does not have desirable accuracy for larger area mapping were measured our reference points with Sokkia Powerset 3000. Microsoft Excel and DigiTerra Map software were used for data processing.

Results

After more than a half year of fieldwork we registered 3435 trees and started to analyse the collected data. First we compared the stand structure to Prodan's theoretical selection forest model as a benchmark (Fig. 3). Prodan divided the categories by breast height diameter and decided how many trees belong to them. The results show that the stand structure is close enough to the theoretical model and the transformation is turning into its last stages.

The main tree species are beech (*Fagus sylvatica),* sessile oak (*Quercus petraea*), spruce (*Picea abies*) and hornbeam (*Carpinus betulus)*. If we look at different diameter categories we can see that some of the tree species (e.g. sessile oak) are just in the larger ones (Fig. 4). That means that number of sessile oak is decreasing in the process. We can draw as a conclusion that the used silviculture system does not subserve the regeneration of light-demanding tree species, beech was the only one spreading in the last decades.

We examined how the volume changed during the long period. We signed trees for the next cutting being careful about the whole conversion process and the forest health condition. Sadly diseases as beech bark disease and *Heterobasidion annosum* encumber the research. Nearly 60 % of beeches is suffering from beech bark disease.

The heterogeneity in structure, the more canopy layers gives more space for the crowns. The beech can adapt well to this situation and its crown can fill the gaps even in old erages. Those big crowned trees have mostly worst stem quality, and short branch free trunk. It seems that the stem quality in an

Figure 2. The Sopron 182/B forest compartment

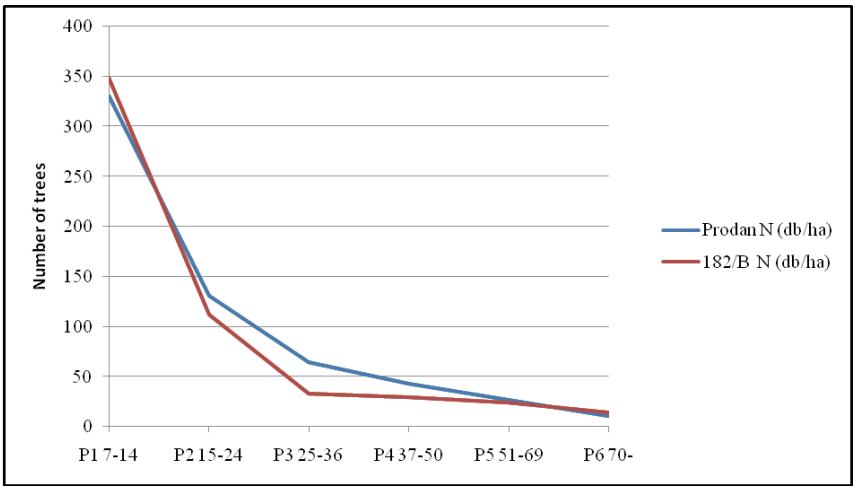


Figure 3. Stand structure compared to Prodan's theoretical selection forest model

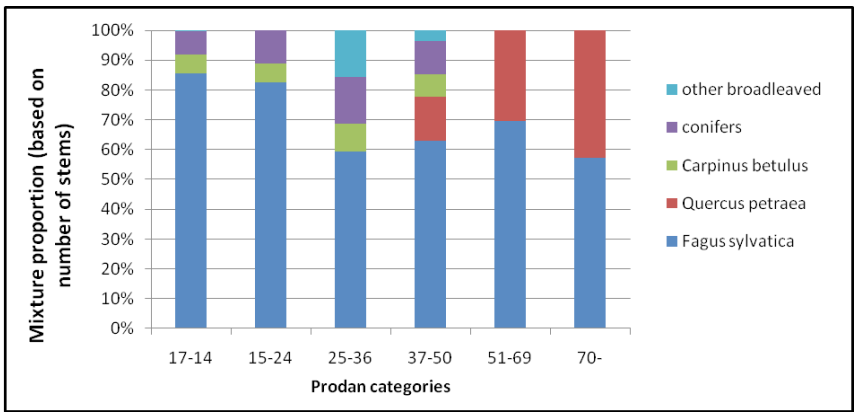


Figure 4. Mixture proportion (based on number of stems) of Prodan-diameter classes in the study area

even-aged forest is better than in a selection forest.

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