

EFFECT OF DIFFERENT THINNING INTENSITIES ON BEECH TRAGET TREES IN PHENOLOGY, TRANSPIRATION AND GROWTH INCREENT (CASE STUDY AT TFE MASARK FOREST KŘTINY)

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PROJECT GOAL

The main objective of the project is to find the most appropriate number of target trees per hectare and with the most appropriate release intensity to support the water balance and recruitment of beech. For this purpose, it is necessary to focus on monitoring the different components of the water balance and beech growth variables in each of the selected options.

INTRODUCTION

Today we are very much faced with a changing climate. Specifically, droughts are plaguing forests all over the world [1]. Lack of water during the growing season causes a slowing down of life, reduced nutrient availability, reduced growth and eventually a complete failure of tree life. However, these dry periods alternate with torrential rains, which results in drastic soil erosion. After the dry period, the soil slowly becomes saturated and most of the water drains away. The beech is a relatively plastic tree, but in the lower altitudes stage it becomes more vulnerable to drought, which manifests itself in trunk dieback, withering of the primary crown structure from the top, etc. Therefore, when focusing on so-called high-value production, it is necessary to support the effective precipitation of the stand, especially of the target trees. The amount of the effective precipitation (i.e. stemflow and throughfall) depends on the age of the stand and the species composition of the stand [3]. The amount of the stemflow depends on the shape of the crown [2].



Fig.1 – Throughfall on the are in Masaryk Forest Křtiny (Photos: Kateřina Macháčková)

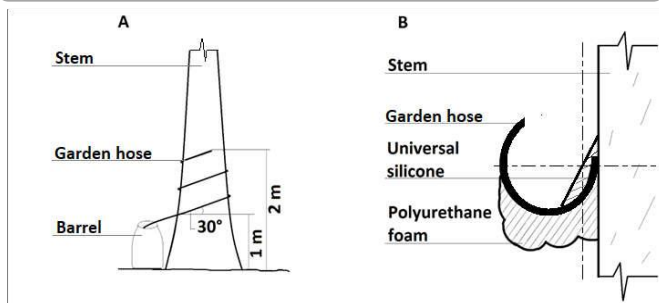


Fig. 2: The measuring of the stemflow. (A) Stemflow and (B) anchoring of the hose to the trunk (Novosadová et al., 2023)

MATERIAL AND METHODS

The area that was selected for our research was in the area of the School Forest Enterprise Masaryk Forest Křtiny. In this area, there were 8 plots where we carried out different interventions. The 1st plot where no BZS, which means that no intervention has been made in the stand, the 2nd was according to the static LHP, is the area where the intervention took place, according to the established forest management plan. In the 3rd we selected 50 target trees and removed 1-2 competitors, the 4th had 50 target trees and removed 3-4 competitors, the 5th had 80 target trees and removed 1-2 competitors, the 6th plot had 80 target trees and removed 3-4 competitors. We selected 110 target trees for the 7th and 8th plot where we removed 1-2 competitors and 3-4 competitors, respectively. We measured tree diameters at breast height (DBH) and crown projections here. We installed 3 troughs in all of the above plots and water was collected in barrels. The stemflow was conducted on 3-6 trees per plot. On these trees, a hose was wrapped around the circumference of the trunk at a 30° angle. From the bottom, the hose was secured with polyurethane foam. Then, the top part of the hose was cut off, leaving most of the hose on the outside to prevent possible spillage of water from the channel and the water flow down into barrels [2]. Each barrel was labeled and assigned to a plot. The amount of the stemflow and throughfall water was collected from barrels weekly. The stemflow and throughfall were recorded in litres.

RESULTS

The final amount of effective precipitation, we entered into the Figure 2. In the figure we can see the amount of water on each month and the calculated average per area. Here we can see that the greatest amount of the water of the whole year was in the plot where 80 target trees were selected and 1-2 competitors were removed. On the other hand, the least effective precipitation was in the area where 80 target trees were selected and 3-4 competitors were removed the greatest amount of effective precipitation fell in September (in this month, extensive flood swept throughout the country). The great amount of the precipitation also fell in June, and the amount of the effective precipitation was similarly (or even greater) than that in September.

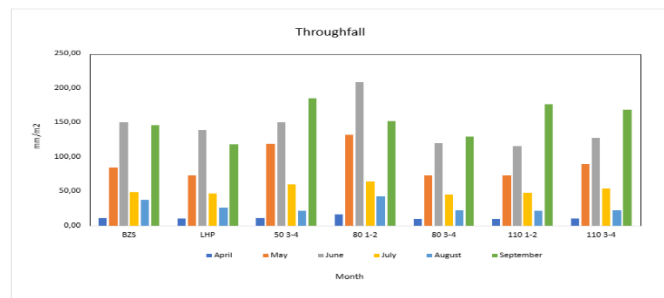


Fig. 3 – Effective precipitation from April do September.

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