EFFECTS OF SILVER FIR (*ABIES ALBA* MILL.) REINTRODUCTION ON SOILS AFTER NORWAY SPRUCE (*PICEA ABIES* L. KARST) MONOCULTURES

Petr Zapletal, Aleš Kučera

Mendel University in Brno, Faculty of Forestry and Wood Technology, Brno, Czech Republic

INTRODUCTION

Small-scale clearcuts are an efficient way to reintroduce silver fir into Norway spruce monocultures (**Poleno et al., 2009**). By diversifying large monotonous stands, their resistance and resilience to climate change is being increased (**Gulev et al., 2021**). This research focuses on the topsoil of such stands as an interface between plants, animals, and microorganisms, providing an environment for organic matter decomposition and nutrient flows (**Ponge, 2003**).

OBJECTIVES

The main objective was to assess the accumulation of organic matter and the quantity of soil microbial taxa in the studied stands. Additionally, the research aimed to classify the humus forms in the stands.

MATERIAL AND METHODOLOGY

DESIGN

Three mature Norway spruce monocultures and two young silver fir stands planted on small-scale Norway spruce clearcuts were selected. The selected stands grow in the 5th forest vegetation zone (*Abies–Fagus*) (**NLI, 2023**) as an optimal zone for silver fir. See **Fig. 1** for the detailed sampling design.

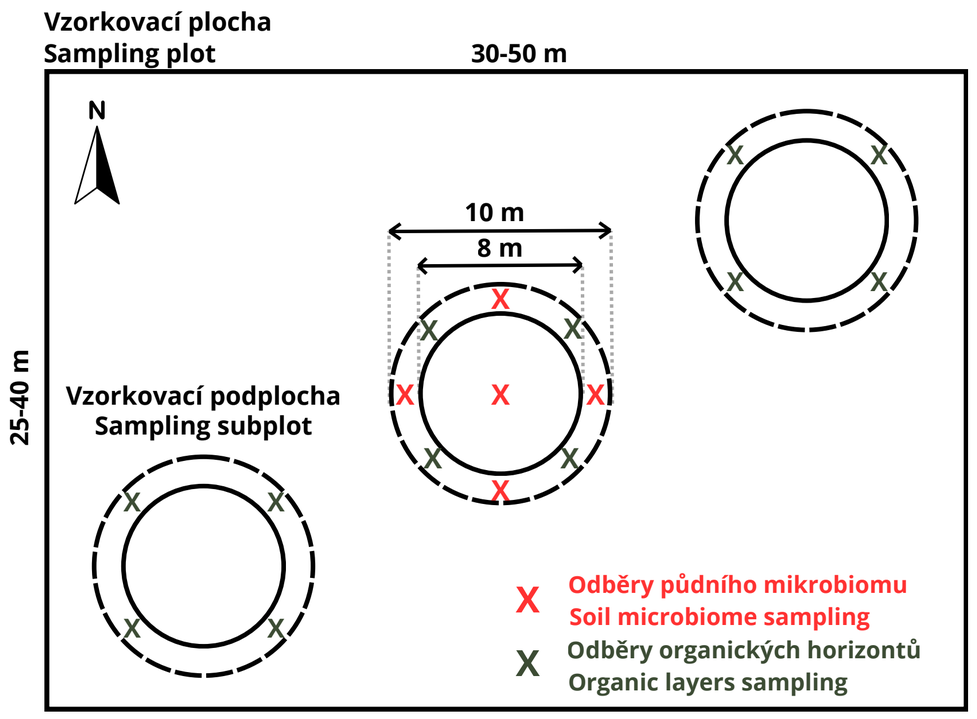

Fig. 1: Sampling design of the study

SAMPLING AND ANALYSIS

The organic layers were sampled using a circle of a known area (**Fig. 2**) for subsequent quantification. L, F, and H horizons were collected separately, then a shallow soil pit was dug up in each sampling point for humus form classification. Samples of the corresponding horizons were then mixed across the subplots for later analyses. Samples for microbiome analyses were collected from 0–10 cm depth using sampling tubes. As a next step, a mixed sample was created from each plot (**Fig. 3**). The microbial DNA was then quantified using Qubit Fluorometric Quantification.

Fig. 2: Forest floor sampling

Fig. 3: Microbiome sample

Fig. 4: Norway spruce stand

Fig. 5: Young silver fir stand

PRELIMINARY RESULTS

FOREST FLOOR

Spruce stands show higher organic layers' accumulation accompanied by mor being classified in every spruce sampling point and moder being the most common form in fir stands.

MICROBIOME

Higher soil microbiome diversity was found in silver fir stands. Both fungal and bacterial communities are richer in the fir stands.

Fig. 6: Soil pit for humus form classification

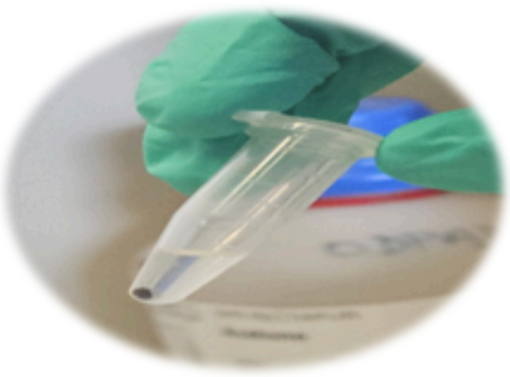

Fig. 7: Extracted soil microbiome DNA

CONCLUSIONS

The young silver fir stands show lesser forest floor accumulation but richer microbiome communities, suggesting improved humus conditions by silver fir implementation.

To fully support this claim, the research will be extended by chemical analysis focusing on nutrient availability and humus quality evaluation. Furthermore, monitoring the soil water regime could provide valuable insights into the research area.

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