

INFLUENCE OF CLIMATIC FACTORS ON THE GROWTH DYNAMICS OF STANDS WITH DIFFERENT STRUCTURE AND ITS EFFECT ON THE SOIL

Černý Jakub^{1,2}, Kománek Martin¹, Sýkora Petr¹, Horák Pavel¹, Vichta Tomáš¹, Holík Ladislav¹, Jablonická Petra¹, Volánek Jiří¹, Šenfeldr Martin¹, Žižková Eliška¹, Knott Robert¹

¹Mendel University in Brno / Faculty of Forestry and Wood Technology

²Forestry and Game Management Research Institute

e-mail: xkomanek@mendelu.cz

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PROJECT GOAL

The main objective of this project is to analyse and evaluate the resistance and sensitivity of monocultures, mixed even-aged and structurally differentiated stands and the impacts of these three types of stands on the carbon cycle.

INTRODUCTION

Forest ecosystems are threatened by non-living factors due to ongoing global climate change (GCC). GCC is characterized by increasing air temperatures and changes in the distribution of annual precipitation (Cavin et al. 2013). Currently, mixed stands appear to be a viable adaptive approach for sustainable management (Pretzsch and Schütze 2021; Pretzsch et al. 2021). Mixed stands have been shown to outperform monocultures in productivity (Jactel et al. 2018) and are more resource efficient (Forrester 2014). The productive superiority of mixed stands can be enhanced in drought (Dănescu et al. 2018). Spruce mixed with beech can take advantage of deeper rooting beech can improve water availability to shallower rooting spruce (Dawson, 1993).

MATERIAL AND METHODS

A total of seven triplets were established throughout the country (Polánky, Hradec Králové, Šumava, Beskydy, Křtiny), each with three different stand structures (A, B, C). The triplets are composed of all four main tree species of the Czech Republic (i.e. beech, spruce, pine and oak) depending on the altitude zones. Each triplet is larger than 0.5 ha and all three plots (A, B, C) occur in the same habitat (soil and climate). All trees in each plot were inventoried (DBH, tree height, crown base height, trunk position and crown projections).

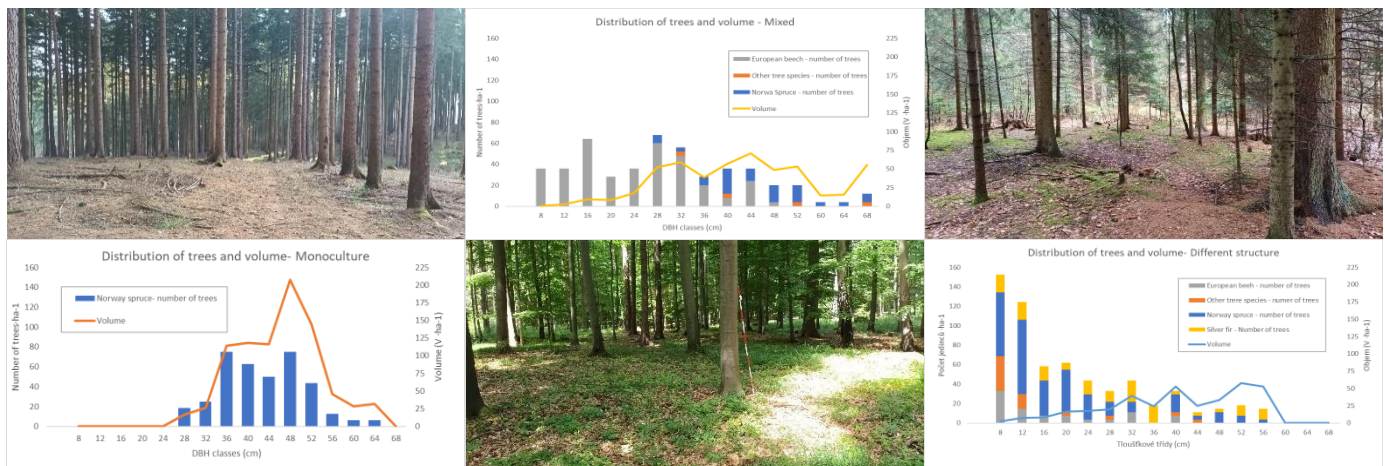


Fig. 1 – Triplet of Norway spruce in Training Forest enterprise Masaryk Forest Křtiny – From left side – Pure Spruce stand; mixed even aged stand of spruce and beech; structural rich stand of Norway spruce, European beech and Silver fir

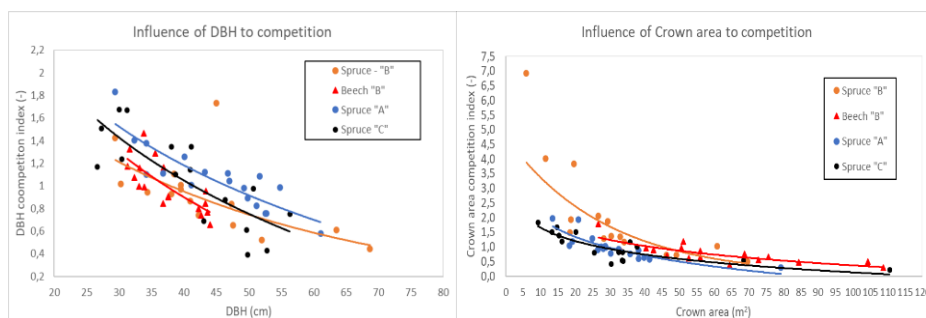


Fig. 2 – Influence of DBH (left) and crown area (right) to Norway spruce competition in different types of structure

RESULTS AND DISCUSSION

Interspecific competition has only a negligible effect on spruce production. In the case of crown competition, Norway spruce (B) shows higher competition indices due to better filling of the interspace with beech. In terms of forest production, biomass production is important, but in which Norway spruce (B) competes well with beech when comparing DBH complexity. In terms of production and thickness competition, spruce is also competitive when mixed with beech (Dawson, 1993).

CONCLUSION

The dynamics of interspecific competition through competition indices can provide valuable insights for forest management strategies. The negative influence of other tree species on spruce cannot be clearly seen from DBH competition. The influence of other tree species on Norway spruce will be shown in more detail by dendrochronological analysis.

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