

THE INFLUENCE OF HISTORICAL AND MODERN FOREST MANAGERMENTS ON THE CONDITION OF COPPICE – RESULTS IN 2020

Adamec Zdeněk¹, Balková Marie¹, Dařenová Eva², Friedl Michal¹, Kadavý Jan¹, Kikal Jan¹, Kneifl Michal¹, Knott Robert¹, Kománek Martin¹, Kučera Aleš¹, Uchytlová Tereza², Uherková Barbora¹, Vichta Tomáš¹

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

²CzechGlobe – Global Change Research Institute CAS

E-mail: xvichta@mendelu.cz

Keywords: grazing * litter raking * thinning * standards * sessile oak

PROJECT GOAL The main goal of this project is to assess the positive and negative impacts by different types of silvicultural treatments – coppicing, livestock grazing, litter raking, thinning, reduced throughfall – on the forest ecosystem in terms of soil, diversity and species composition of plants and tree species growth.

INTRODUCTION Data collection was performed on the two research plots of the Training Forest Enterprise Masaryk Forest Křtiny. The first plot Ušákov was established in 2008 according to the design in treatments coppicing, thinning, reduced throughfall and combinations (Uherková et al., 2018). We measured growth of standards and sprouts and soil water content. Second plot Hradisko was established in 2017 according to the design in treatments coppicing, grazing, litter raking, control and combinations (Fig 2.). We measured growth of standards and sprouts, understory vegetation composition and density, feed quality, soil functional diversity, CO₂ efflux and fine root production (Balková, 2018). However, the aim of the poster is to present only measurements of standards growth and root production, performed in the plot Hradisko in 2020, in relation to the treatments.

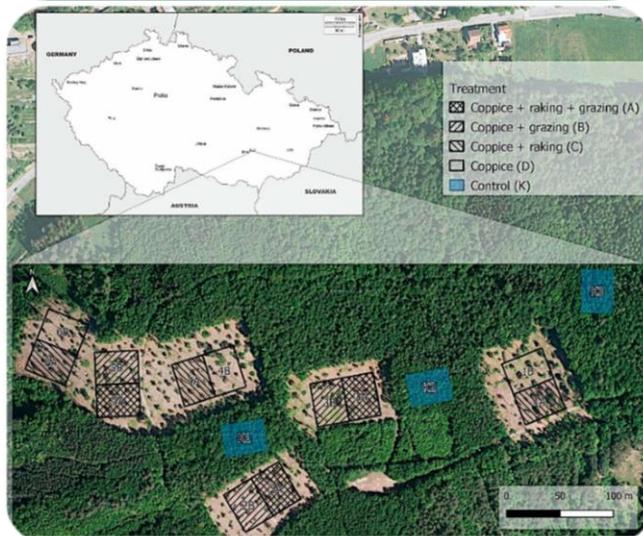


Fig. 2: Design of research plot Hradisko (Kadavý et al., 2019)

RESULTS AND DISCUSSION Root biomass of weeds was positive influenced by opening of canopy mature stands. Currently, we have just few preliminary results of root responds to different management treatments. As expected, it is obvious that in forest stand with no intervention (control plots) is a minimum of roots of weed plants compared with coppice with standards. Control treatment biometrically differs from others, average RGR is the lowest (Fig. 3). The result for the year 2020 is the different in comparison with other years. Results of the ANOVA and multiple comparison test showed that growth of standards in year 2020 was statistically differ from growth of standards in all previous years. It was mainly due to higher precipitation during the summer period 2020.

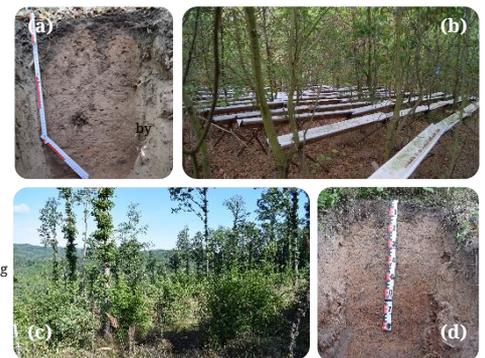
Fig. 1 a; b; c; d,

(a) Chromic Cambisol – research plot Ušákov;

(b) Reduced throughfall constructing drainage channels – research plot Ušákov;

(c) Coppice-with-standards – research plot Hradisko;

(d) Eutric Cambisols altering with Stagnic Luvisols – research plot Hradisko



MATERIAL AND METHODS The last litter raking in the plot Hradisko was performed in April 2019. Free-grazing of sheep was performed from June to September 2020 in 3 cycles. Dendrometry was focused on *Quercus petraea* agg. (Matt.) Liebl. and *Carpinus betulus* L. on standards, then the obtained diameter and height increments were transformed into relative growth rates (RGR in %). We compared circumference RGR between all tested treatments and between all four years. Fine root production was measured by thebroot scanner (CID Bio-Science, 2013) through the transparent observation tubes.

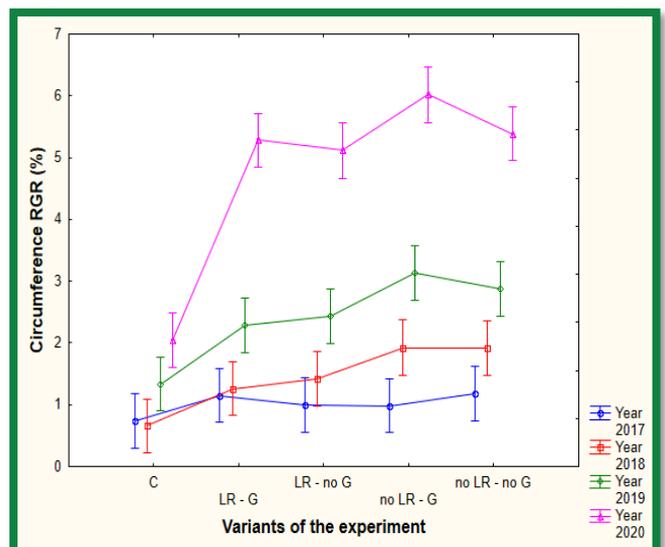


Fig. 3: Comparison of mean values (with 95 % confidence intervals) of circumference relative growth ratio in years 2017-2020 in different treatments. (Circumference RGR (%) – circumference relative growth ratio of standards, C – control, LR – litter raking, G – grazing)

CONCLUSION In 2020 the most significant increase in relative growth rates was clearly recorded by treatment with grazing and no litter raking. The lowest intensity of roots growth was remarked in the control treatment without understory vegetation.

ACKNOWLEDGEMENT

The contribution was founded by Internal Grant Agency MENDELU, LDF_TP_2020005.

REFERENCES

- BALKOVÁ, M. – DAŘENOVÁ, E. – FRIEDL, M. – HLOUCALOVÁ, P. – KADAVÝ, J. – KNEIFL, M. – KNOTT, R. – KUČERA, A. – SLACH, T. – SKLÁDANKA, J. – UCHYTLVÁ, T. – UHERKOVÁ, B. – VICHTA, T. – VOLÁŘÍK, D. The influence of traditional ways of management on the state of coppice – results in 2018. In *SilvaNet – WoodNet 2018: Proceedings Abstracts of Student Scientific Conference*. 1. vyd. Brno: Mendelova univerzita v Brně, 2018, s. 21–22. ISBN 978-80-7509-593-0.
- CID Bio-Science. In-Situ Root Imager ©400 Instruction Manual. Camak, 2013. 125x46 p.
- KADAVÝ, J. – ADAMEC, Z. – UHERKOVÁ, B. – KNEIFL, M. – KNOTT, R. – KUČERA, A. – FRIEDL, M. – DAŘENOVÁ, E. – SKLÁDANKA, J. – DRÁPELA, K. Growth Response of Sessile Oak and European Hornbeam to Traditional Coppice-with-Standards Management. *Forests*, 2019, sv. 10, č. 6, ISSN 1999-4907.
- UHERKOVÁ, B. – KADAVÝ, J. – ADAMEC, Z. – KNOTT, R. – KUČERA, A. – KNEIFL, M. – DRÁPELA, K. – INUBERGARRO, R. O. Effect of thinning and reduced throughfall in young coppice dominated by *Quercus petraea* (Matt.) Liebl. *Carpinus betulus* L. *Austrian Journal of Forest Science*, 2018, sv. 135, č. 1, s. 1–17. ISSN 0379-5292.