FACTORS INFLUENCING WILD BOAR ROOTING IN A FOREST ENVIRONMENT

Jakub Špoula, Jakub Drimaj, Jiří Kamler, Ondřej Mikulka, Radim Plhal

Department of Forest Protection and Wildlife Management, Faculty of Forestry and Wood Technology,
Mendel University in Brno

INTRODUCTION

The wild boar (*Sus scrofa* L.) is a mammal native to Eurasia and is now widely distributed on all continents except Antarctic [1]. Populations of wild boar worldwide have significantly increased in recent decades [2]. Outside Eurasia is wild boar often considered as an invasive pest species. Equally in Europe is the wild boar mentioned primarily negatively as a pest to agriculture, vector for the transmission of various diseases of humans and livestock [3] and cause of traffic accidents. Furthermore, in areas of Central Europe with high density of wild boar, previously overlooked impacts of their feeding behavior on the forest regeneration and diversity and stability of ecosystems are also gaining importance (e.g. [4]). The aim of this research was to investigate the intensity of wild boar rooting in relation to: (i) forest stand characteristics (age, tree species, stocking and height); (ii) distance from streams, roads and feeding sites and (iii) ground vegetation.

METHODOLOGY

The study area was in the south-eastern part of the Czech Republic and covered an area of 976 ha. Monitoring of rooting was carried out in 2022 and 2023 in March/April. The study area was overlapped by 51 randomly generated sampling lines in 75 m grid. The lines were generated in QGIS Desktop 3.16.10 in a north-south direction. The total length of the sample lines was 129.8 km and average length of a line was 2.545 km varied depending on the boundary line (SD = 0.99 km). Observers with GPS unit walked the study area along the lines and monitor soil surface to the distance 3 m to the right and left of the line. Observer on the study plot determined the size of rooted area (m^2), the depth of rooting (cm), soil layers affected by rooting (organic layer or mineral topsoil) and vegetation cover of the plot (% coverage of grasses, dicots and bare soil). The data were evaluated in R using glmer and glm function.

RESULTS

Observers checked a total area of 74.5 ha and 74.2 ha in 2022 and 2023 resp. In the study area, 10.93 % and 7.95 % of the soil surface was damaged by wild boar rooting in 2022 and 2023 respectively. The GLMM (R^2 = 0.22, p < 0.001) indicated that the extent of rooting increased with the height of the main tree species, but it decreased with the stand age and stocking of the main tree species (Tab. 1).

The average distance (±SD) of rooted areas from forest track was 67.9±69.5, from road 786.9±535.8, from bike path 240.4±163.8, from feeding site 318.9±161.5 and from stream 448.2±358.3 m. The size of rooted area increased with distance from the roads and decreased with distance from streams and feeding sites (GLMM: R^2 = 0.223, p < 0.001; Fig. 1).

A significant relationship between the size of rooted area and vegetation cover was found by GLMM (R^2 = 0.206, p < 0.001). All the effects had a positive effect on size of rooted area. It seems that rooting is not influenced by the vegetation cover of the soil, as both bare soil and vegetation had the same effect on size of rooted area. Our findings show that the soil damage caused by rooting in a forest environment is not uniform and responds to various environmental factors.

Tab. 1: Results of a GLMM model describing the relationship between size of rooted area and fixed effect factors

Fixed Effects	Estimate	Std. Error	*t*	*p*
Intercept	2.345	0.08	29.181	<0.001
Stand age	-0.002	0.001	-3.674	<0.001
Conifer/deciduous stand	0.15	0.037	4.078	0.01
Stocking of main tree specie	-0.002	0.001	-3.039	<0.001
Height of main tree species	0.015	0.003	4.294	<0.001

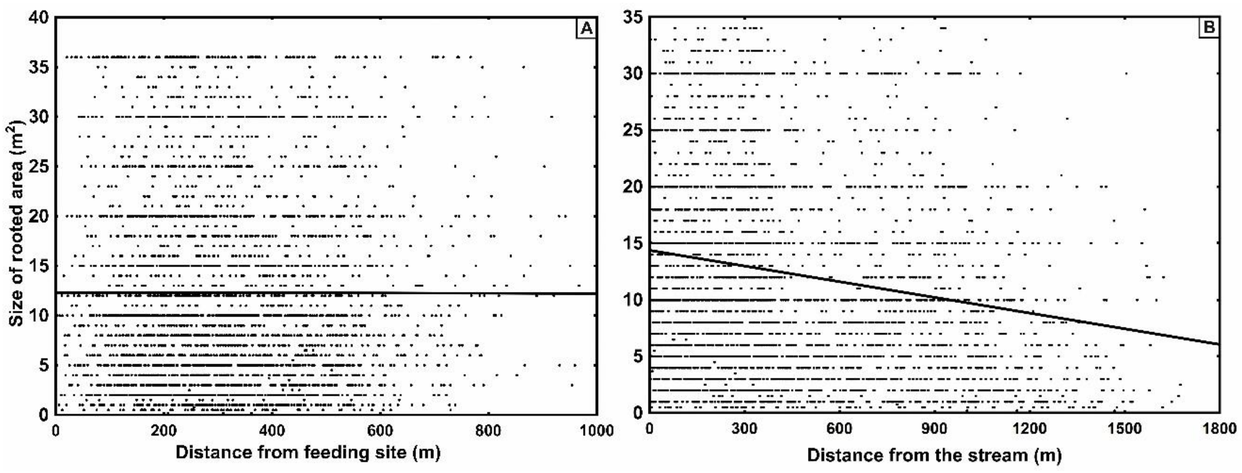

Fig. 1: Scatter plots showing relationships between size of rooted area and distances; solid line indicates regression line

ACKNOWLEDGEMENT

This study was supported with funding provided by the Internal Grant Agency (IGA) project ‘IGA-LDF-22-TP-006‘ of the Faculty of Forestry and Wood Technology, Mendel University in Brno.

REFERENCES

[1] Lewis, J.S. et al. 2017. Biotic and abiotic factors predicting the global distribution and population density of an invasive large mammal. *Scientific Reports* 7:44152.

[2] Lee, S.H., Park, C.M. 2022. The effect of hunter-wild boar interactions and landscape heterogeneity on wild boar population size: A simulation study. *Ecological Modelling* 464, 109847.

[3] Barrios-Garcia, M.N., Ballari, S.A. 2012. Impact of wild boar (*Sus scrofa*) in its introduced and native range: A review. *Biological Invasions* 14, 2283–2300.

[4] Kamler, J. et al. 2016. The impact of seed predation and browsing on natural sessile oak regeneration under different light conditions in an over-aged coppice stand. *iForest* 9: 569–576.

https://www.ldf.mendelu.cz/

MENDELU
Faculty of Forestry and Wood Technology