Bark beetle outbreak in Koli NP, eastern Finland

and environmental factors affecting it

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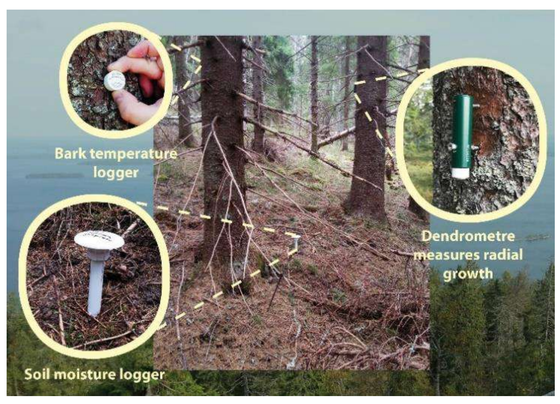
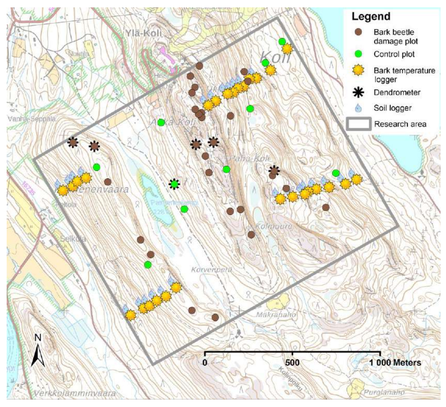
Introduction

The European spruce bark beetle *(Ips typographus* L.) (SBB) is a serious insect pest of Norway spruce *(Picea abies* Karst (L.)) in European forests. The SBB induced damage has strongly increased in the recent decades particularly in Central European forests but also in Finland. The increasing trend is linked to extreme weather events related to anthropogenic climate change.

Environmental factors are key components in shaping host susceptibility to SBB. Understanding the factors that predispose forests to SBB outbreaks makes early intervention easier and benefits forest management practitioners.

The aim of this study is to identify environmental factors (Figs. 1 & 2) affecting the SBB outbreak in Koli National Park (NP) (Fig. 3).





Figs. 1 & 2. Layout of the SBB monitoring area in Koli NP, and the plot-level set-up of the environmental factors measurements.

Research questions

- How do environmental factors (temperature, soil moisture, soil characteristics, and elevation) affect SBB host selection?
- How does spruce vitality vary spatially in a topographically complex landscape?
- How does SBB infestation affect tree growth in relation to environmental characteristics?

Study area & methods

- Snow damage in 2018 and 2022
- Followed by dry and warm summers
- The national park is a non-intervention zone

➢ Increased bark beetle activity since 2018

Fig. 3. Study area in Finland. Koli NP has high recreational value and cultural significance as one of Finland's national landscapes.

A multi-year analysis on the symptom development and abundance (Fig. 4) in relation to environmental factors will be performed using multivariate analysis.

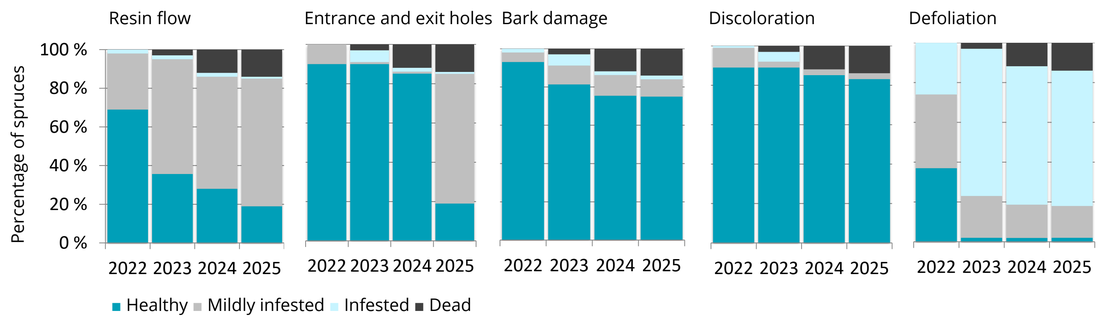


Fig. 4. SBB caused symptom develoment in spruces over the study period 2022–2025 in Koli NP.

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