

# Effects of spruce microbiota on the attraction of *Ips typographus*: initial results from a field study in the Beskids

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## Introduction:

- ***Picea abies*** forests cover approximately 47 million hectares in Europe, representing 29% of the continent’s forest area. However, large-scale outbreaks of the bark beetle ***Ips typographus***—exacerbated by climate change and windthrow—are threatening their ecological and economic value, especially in Slovakia.
- Emerging evidence suggests that **fungal communities**, particularly those associated with **bark** and **roots**, may play a key but underexplored role in mediating spruce susceptibility through **volatile organic compounds (VOCs)**, **water status**, and **mineral nutrition**.
- Despite **laboratory evidence** linking VOCs and beetle behaviour, their role under **natural field conditions** is poorly understood. Additionally, the influence of mycorrhizal fungi on tree resistance to bark beetles has not yet been thoroughly investigated.

This study aims to fill these gaps by examining how bark- and root-associated fungi affect beetle attraction and spruce resilience during active outbreak phases in the field.

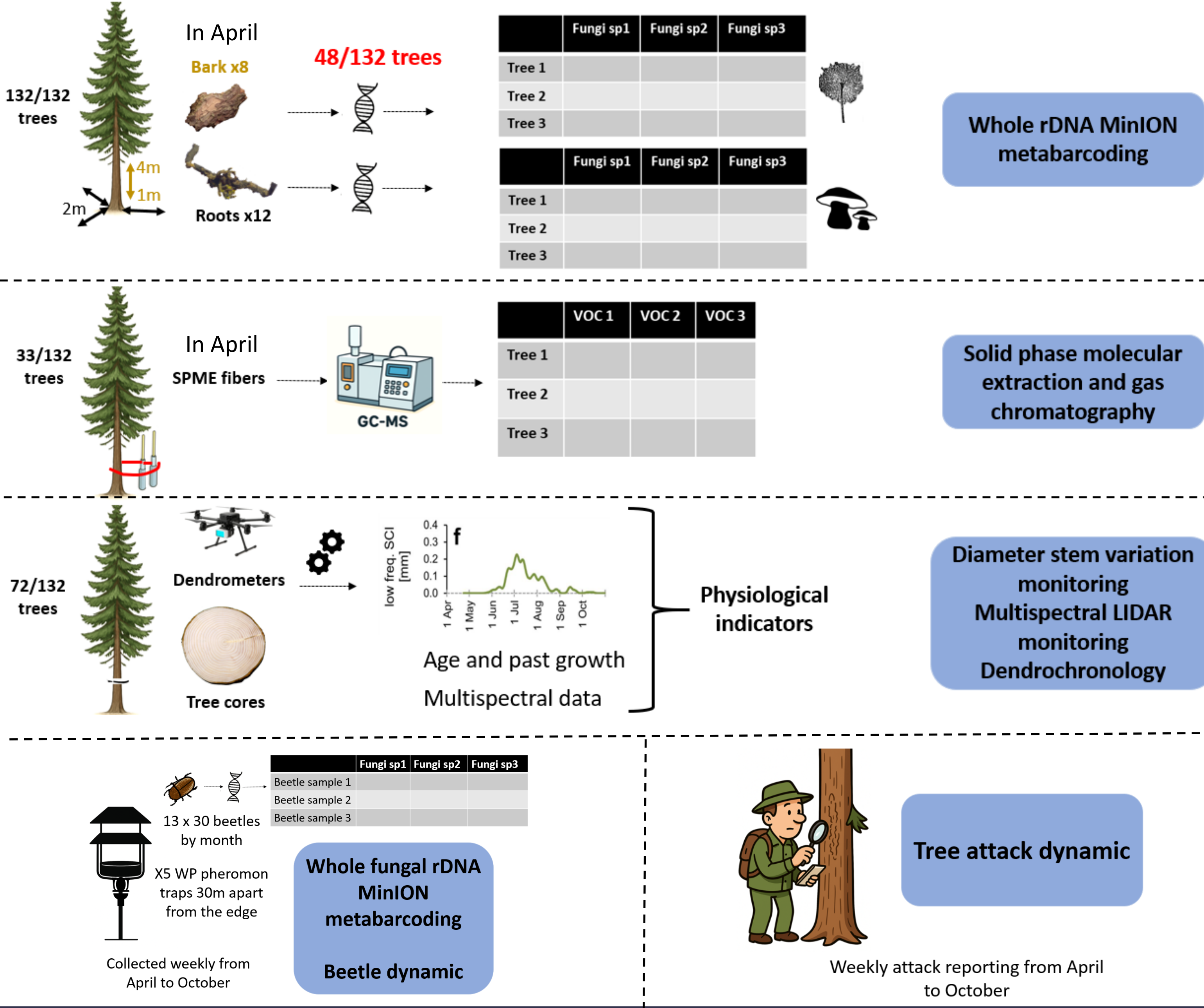
## Hypothesis:

- H1: Fungal communities (both bark and root **sampled before attack**) differ in composition between attacked and non-attacked trees.
- H2: VOC emissions before attack correlate with bark fungi communities’ composition.
- H3: VOC emissions before attack are different between attacked trees and non-attacked trees
- H4: Root fungi communities correlate with tree stress indicators.

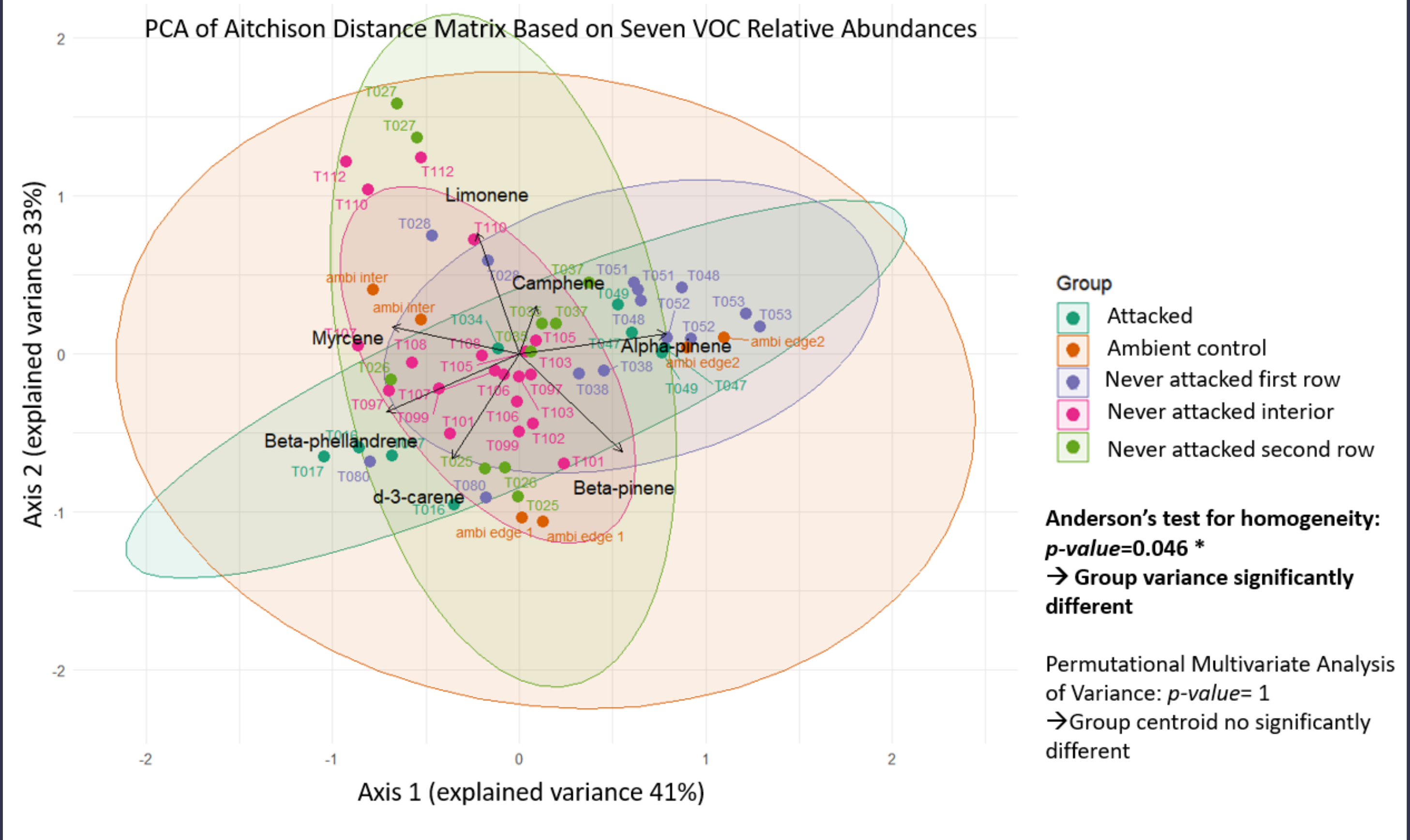


## Material and method:

132 trees were monitored in the first row from the southeast (S–E) edge and in the interior (control) of the stand.



## First results for VOC emissions:



## First conclusions and next steps:

- Trees VOC emission variability in April was significantly different between groups
- Ambient air could have a strong influence on result. Further study should isolate SPME fibers from it.
- Need to replicate the analysis considering separately attack and tree position factor
- Other Retention time need to be assigned to VOC and add to the analysis
- Fungal metabarcoding will be done during the winter to test H1, H2 and H4