

Characterization of the stands damaged by *Ips typographus* in Finland

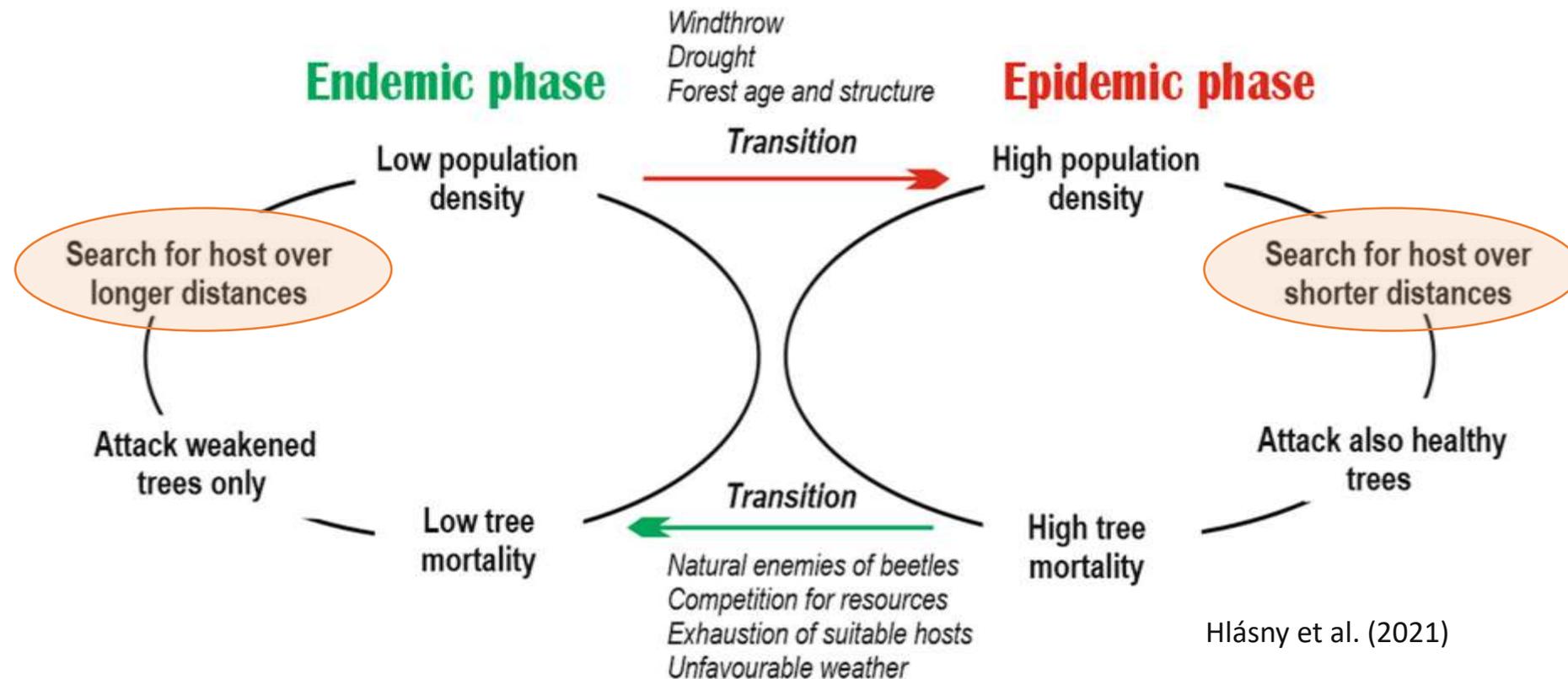
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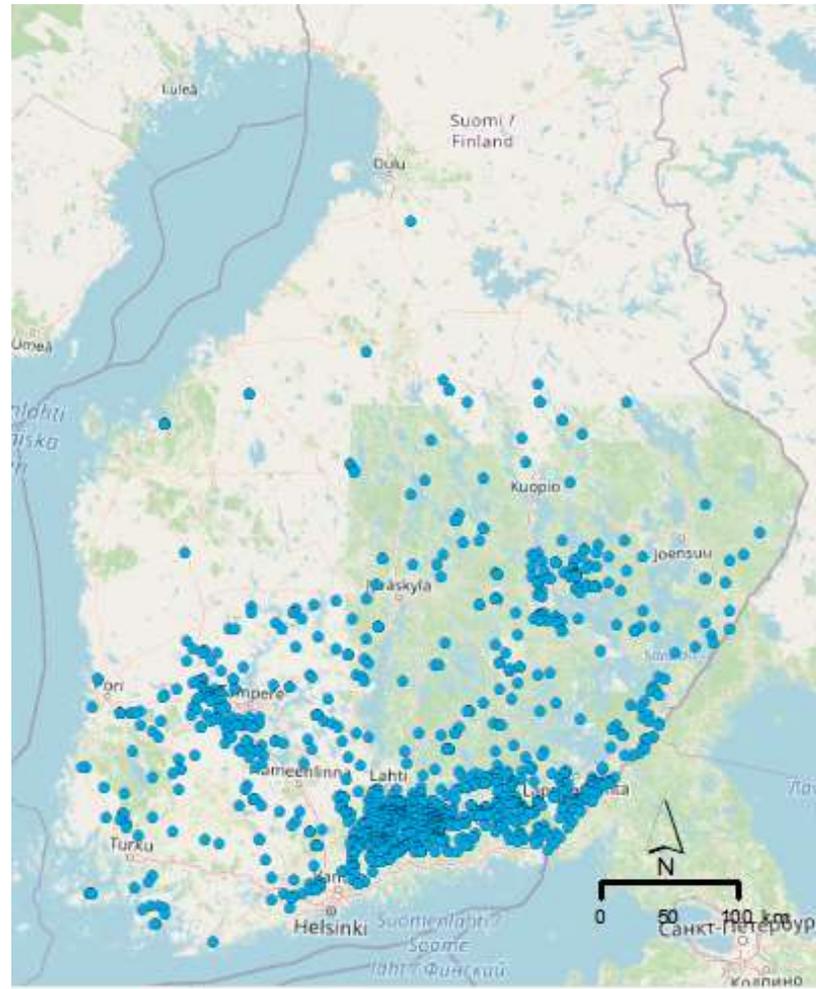
Spruce bark beetle (sbb)

- *Ips typographus* (L.) (Coleoptera, Curculionidae) (sbb) is one of the most important insect pest of *Picea abies* L. (Karst.)

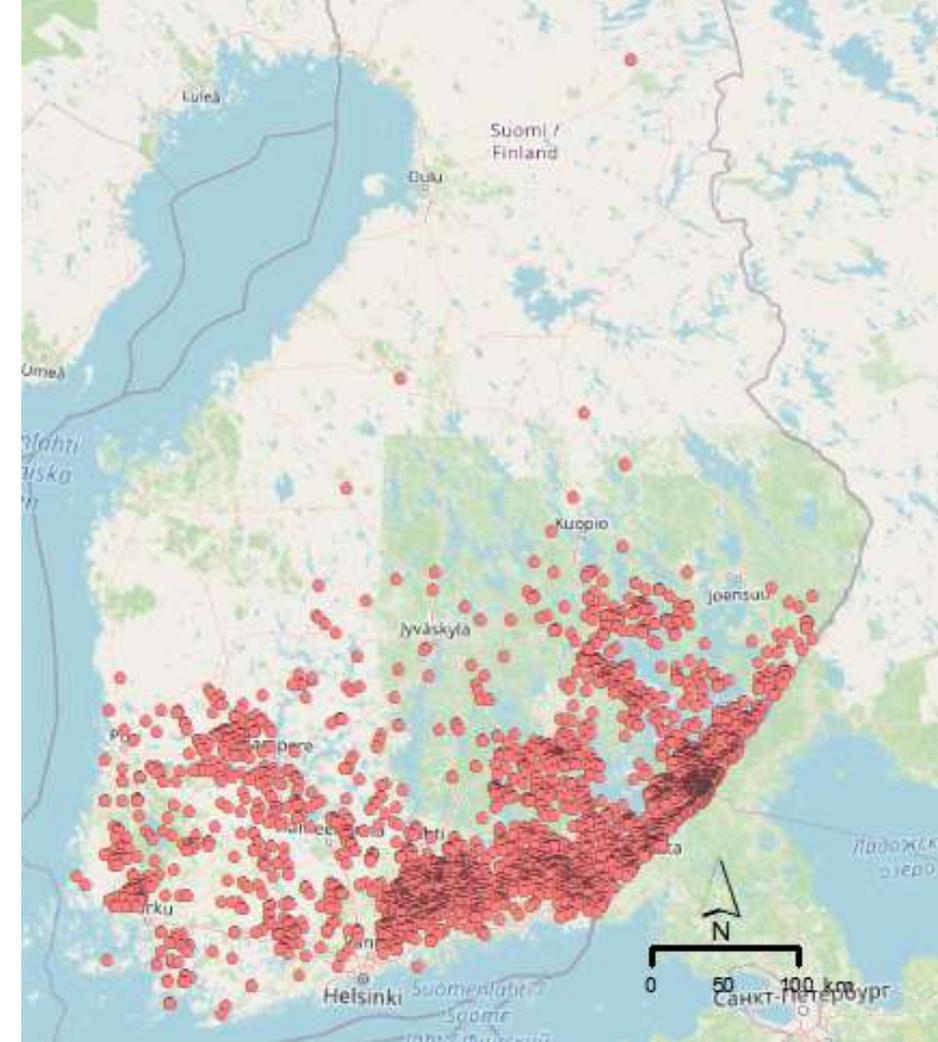




- Which are the characteristics that stands attacked by sbb have?
- Is sbb damage related to the distance to earlier wind damage or sbb damage?
- Is sbb damage related to the distance to young seedling stands?



Endemic years (5) 2012, 2017-2020



Epidemic years (4) 2013-2016

Methods

RStudio ver. 1.4.1717
Qgis ver. 3.16.14
ArcGis Desktop 10.5

Forest stock data (2021)

- Stands ≤ 4 years-old for 2012-2020 (young seedling stands map)
- Forest characteristics for selected area

Forest declaration use (2012- 2020)

- Repts of logging on *Picea abies* due to damages by:
- Sbb (including other insects)

- Distance from sbb damages to the closest previous year:
- Wind
 - Sbb

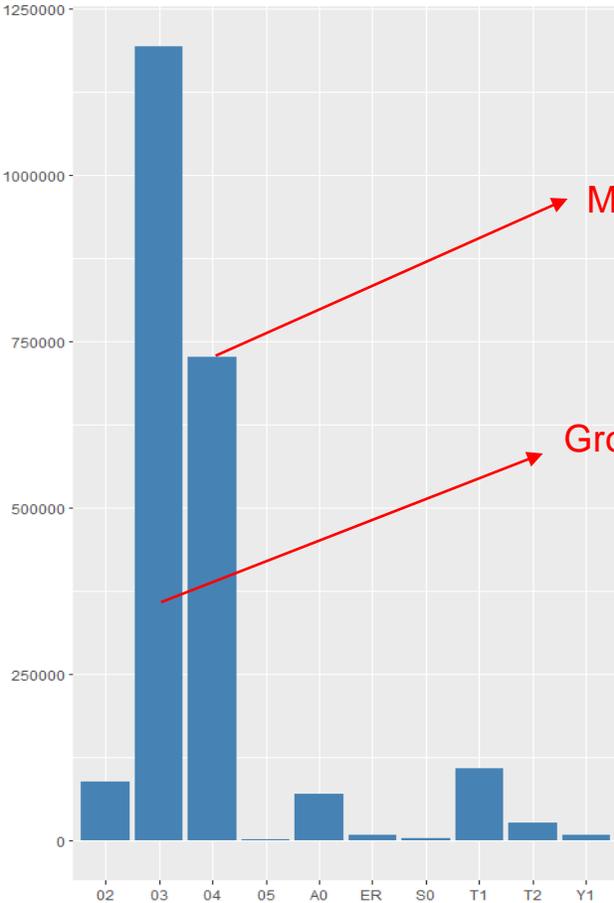
Distance to young seedling stands

Spatial joint for each selected damage by sbb

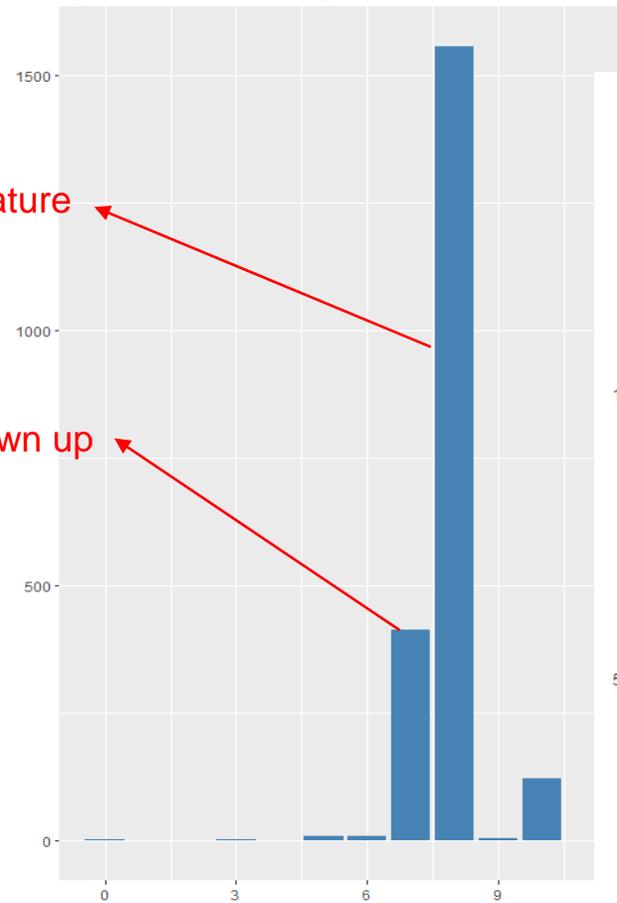
- Data base with information stands with sbb damage, distances, information on the stands
- Fertility class
 - Development class
 - Basal area
 - Mean diameter

Results

Number of Picea abies stands in Finland*

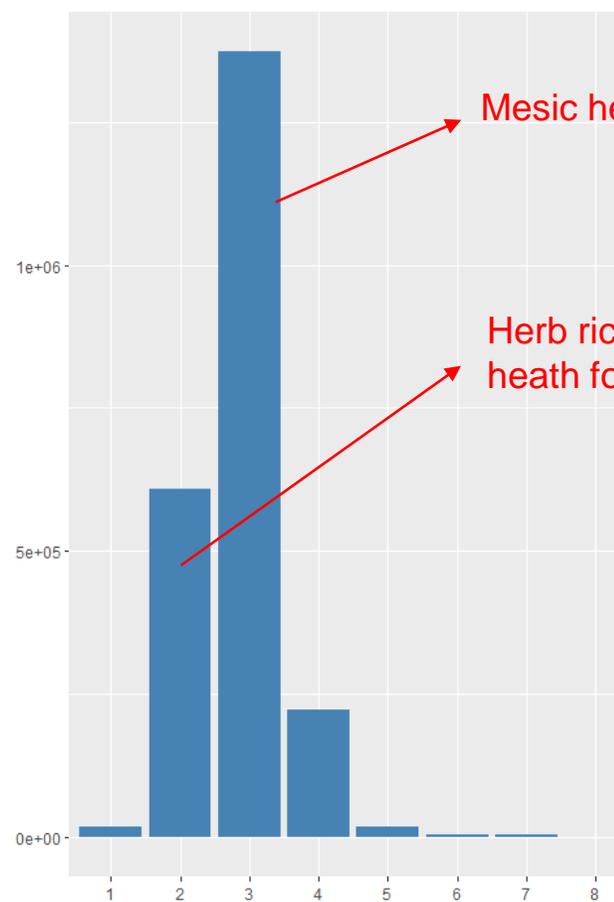


Number of Picea abies stands with spruce bark beetle damage

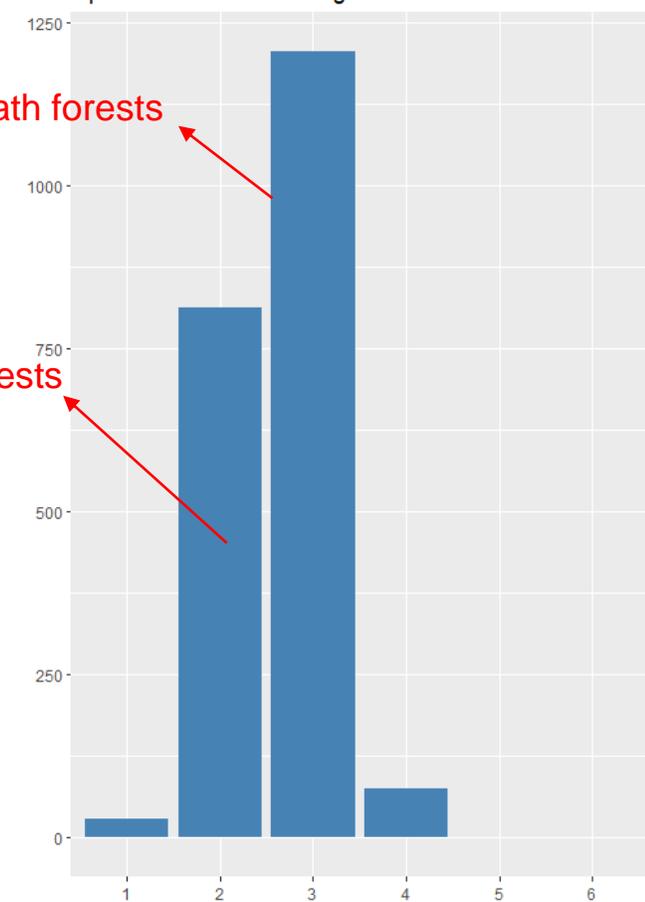


Development class (p-value <0.001)

Number of Picea abies stands in Finland*



Number of Picea abies stands with spruce bark beetle damage



Fertility class (p-value <0.001)

Mature

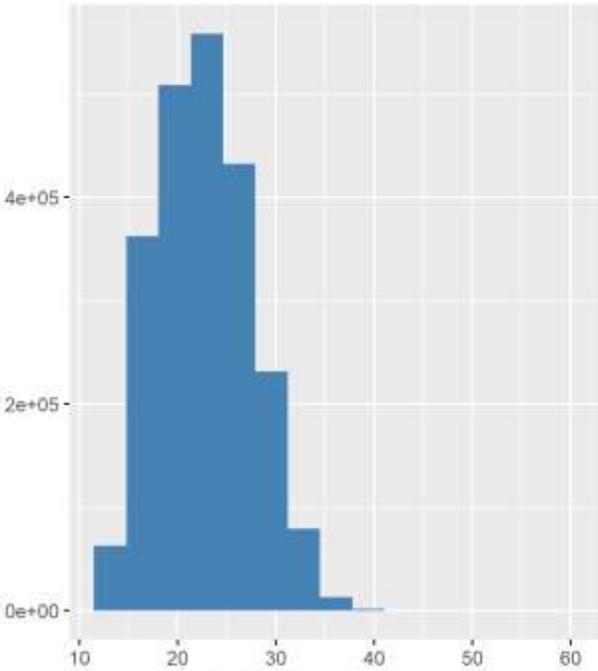
Grown up

Mesic heath forests

Herb rich heath forests

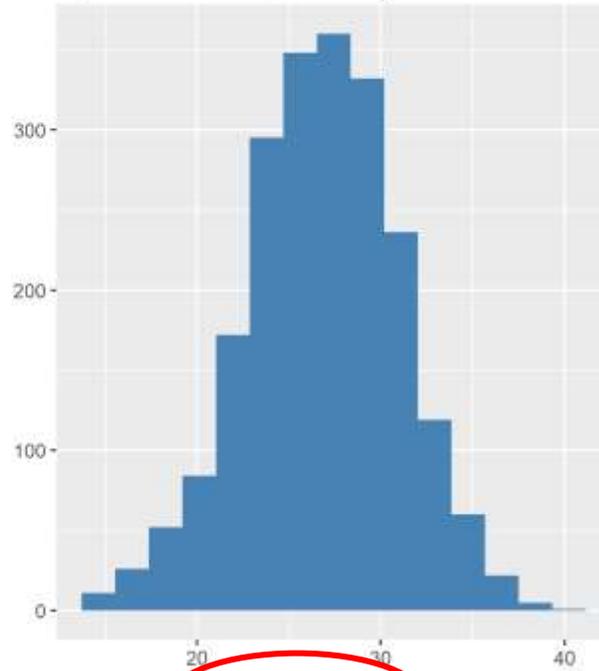
Results

Number of *Picea abies* stands in Finland*



22.6 cm

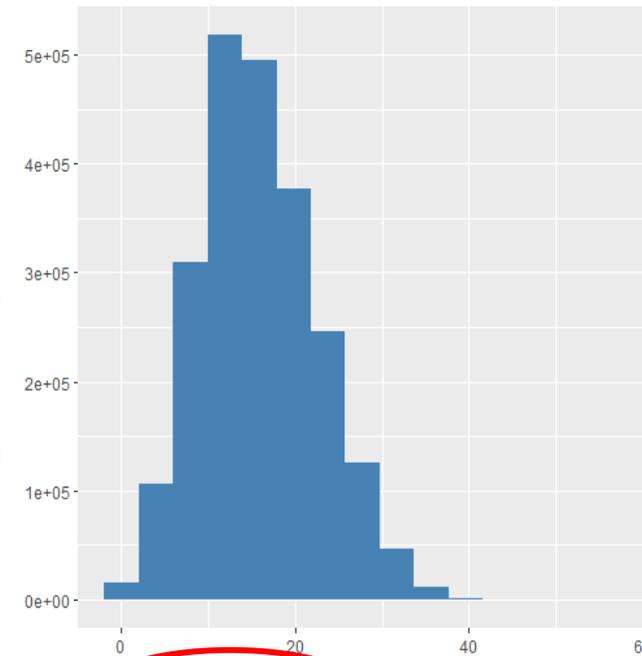
Number of *Picea abies* stands with spruce bark beetle damage



26.7 cm

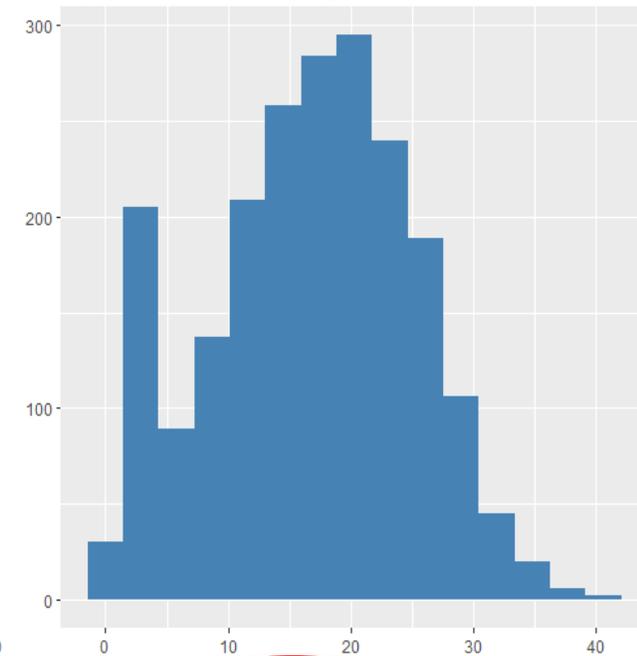
Mean diameter (p-value < 0.001)

Number of *Picea abies* stands in Finland*



15.8 m²

Number of *Picea abies* stands with spruce bark beetle damage

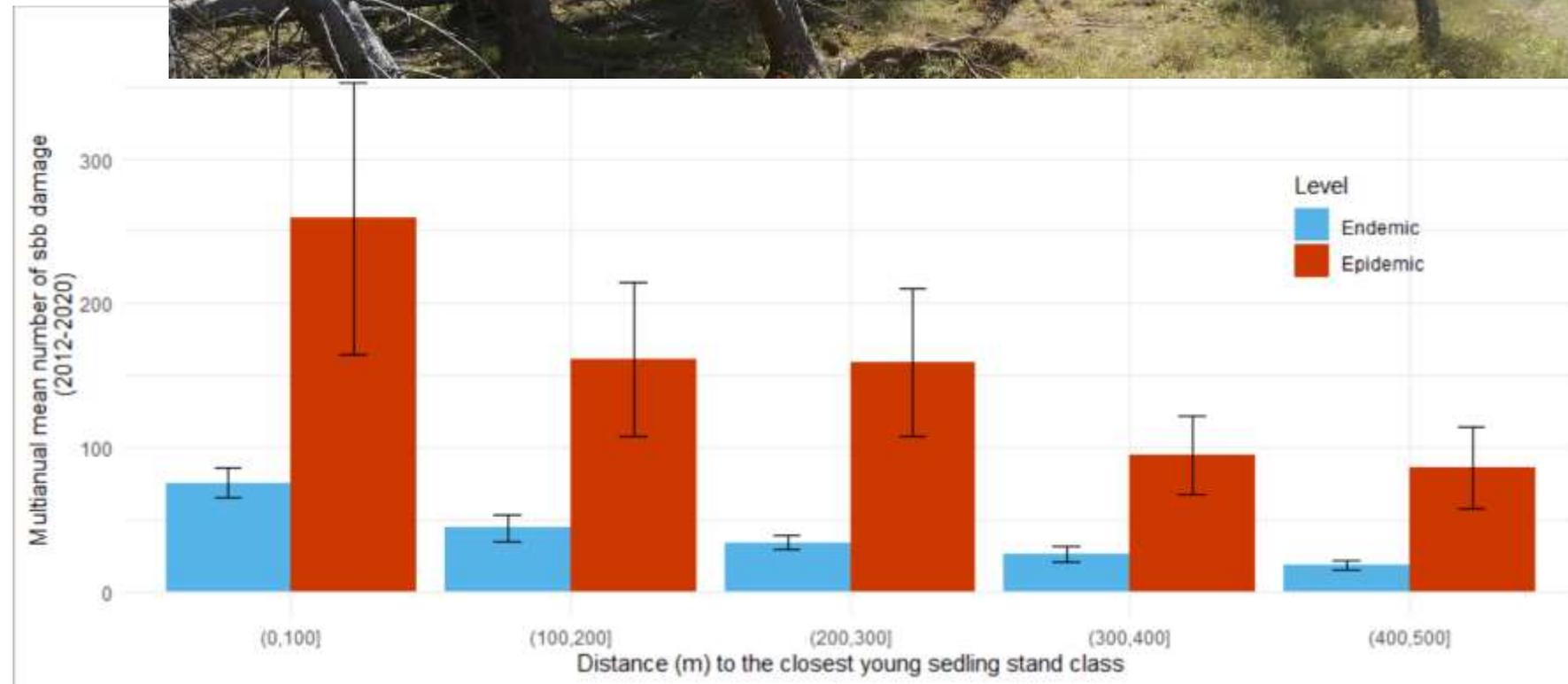


16.7 m²

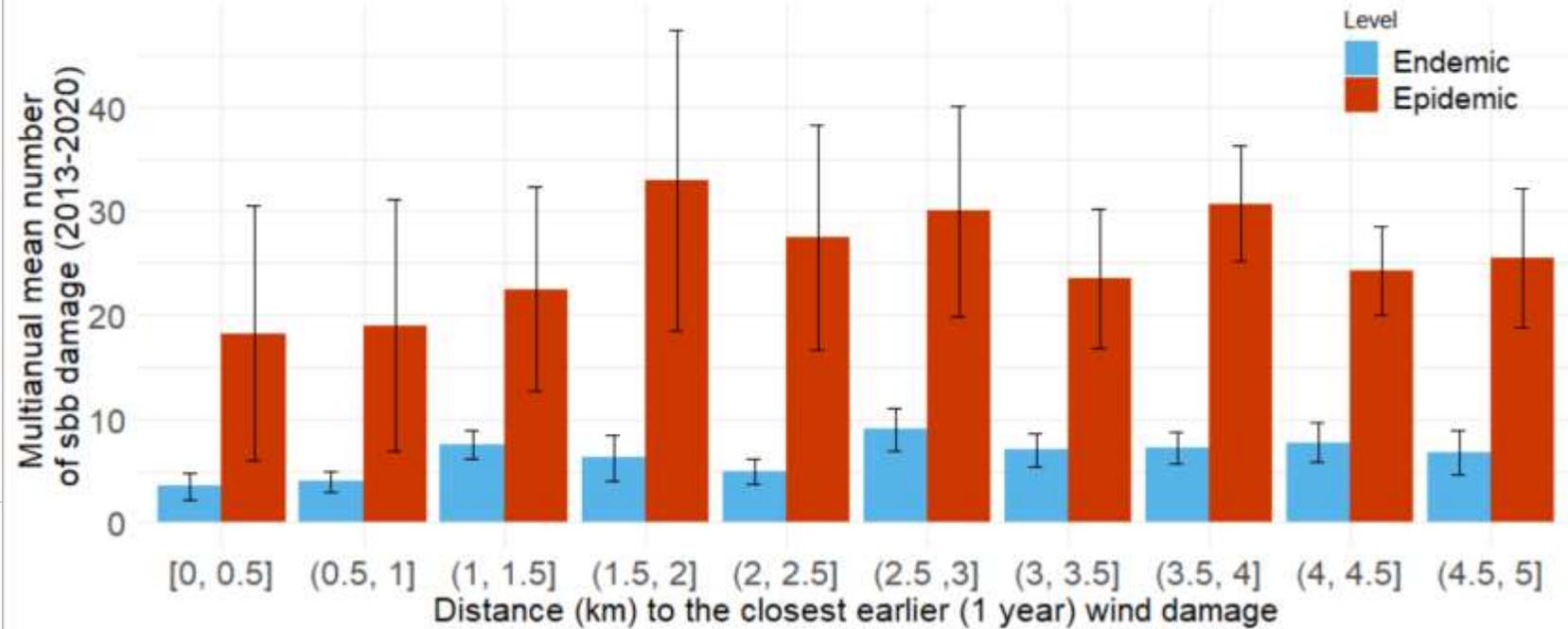
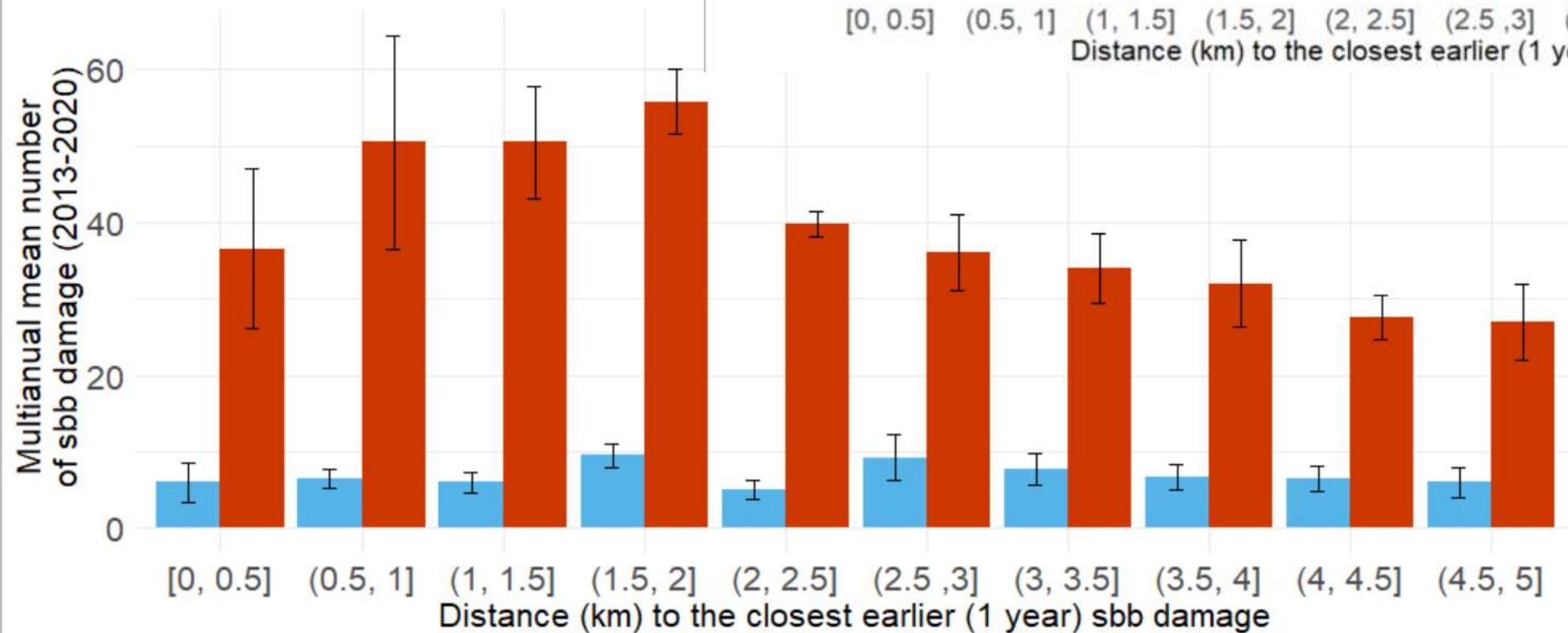
Basal area (p-value < 0.001)

Results

- Endemic years (5)
2012, 2017-2020
- Epidemic years (4)
2013-2016



Results



Conclusions

Ips typographus attacks show preference for some specific stand's characteristics: mature forest, mesic heath forests, bigger trees and more dense stands.

Distance to the closest young seedling stands shows relation to the number of sbb attacks.

Distance to previous year wind and sbb damages do not appear to be related to the number of sbb attacks.

More detailed modelling and thorough analysis of these and weather variables are needed to understand the degree of influence of several factors and their interactions. This analysis may help develop new management practices that could decrease risk of damage by *I. typographus*.

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- Kiitos!
 - Thank you!
 - Gracias!

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