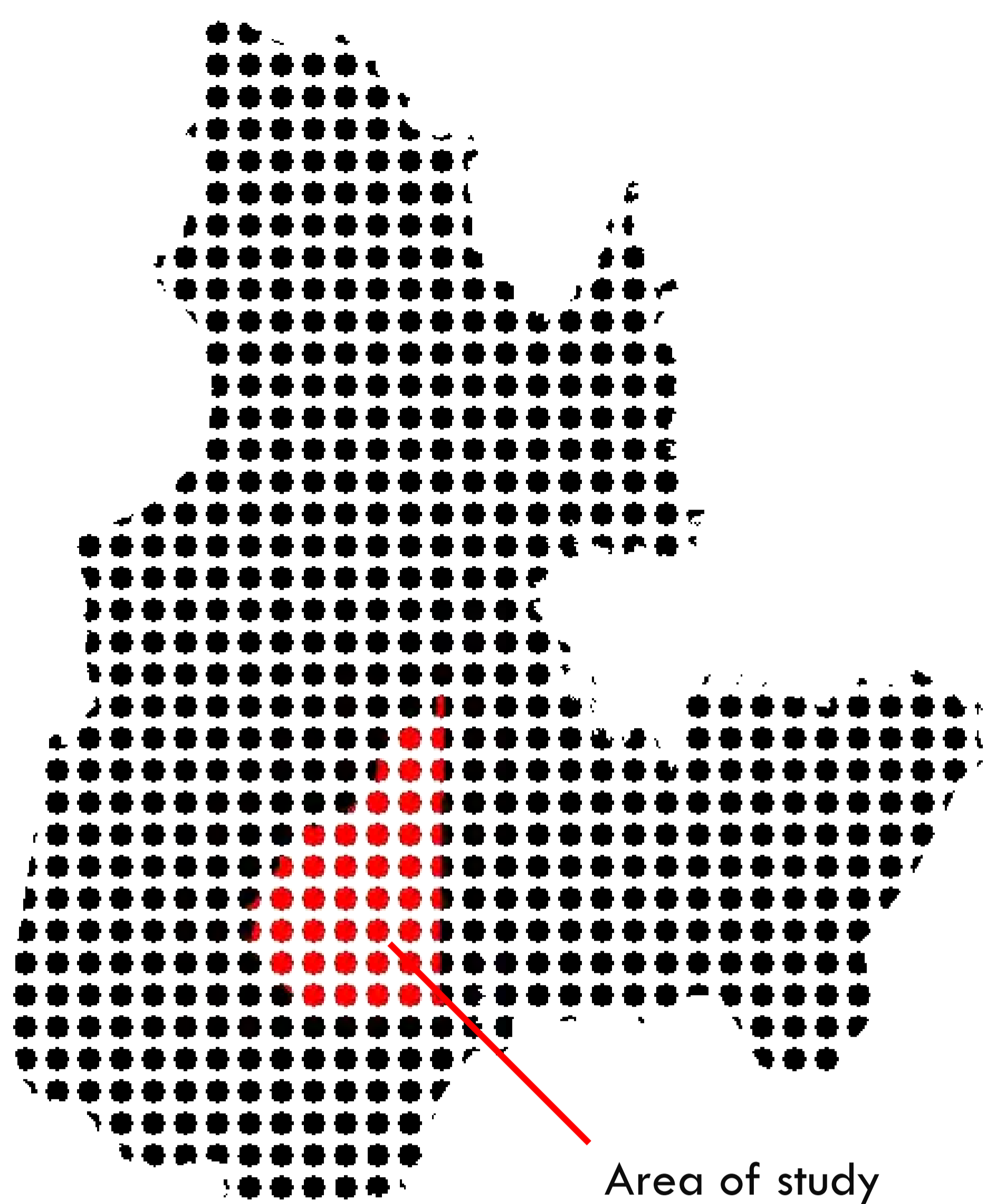


CONTEXT

Over millennia, boreal forest ecosystems have been subjected to various natural disturbances. Especially, the spruce budworm is currently the most destructive and widely distributed biological agent in the boreal forests of Eastern North America. The objective of this study is to evaluate the physiological properties and certain wood characteristics, based on duration and the severity of defoliation in black spruce and balsam fir.

METHODS

- Design**
 - Trees are selected from sites with 0 to 4 years of defoliation.
 - Each tree was classified in slightly, moderately et severely at different age brackets.
- Measurements**
 - Physiological properties: Water potential; Moisture content at 0.3m and 2/3 stem height.
 - Wood characteristics: Wood density, Growth, and Anatomy.
- Analysis**
 - Mixed models were performed in SAS to explain the differences in each parameter.



Area of study

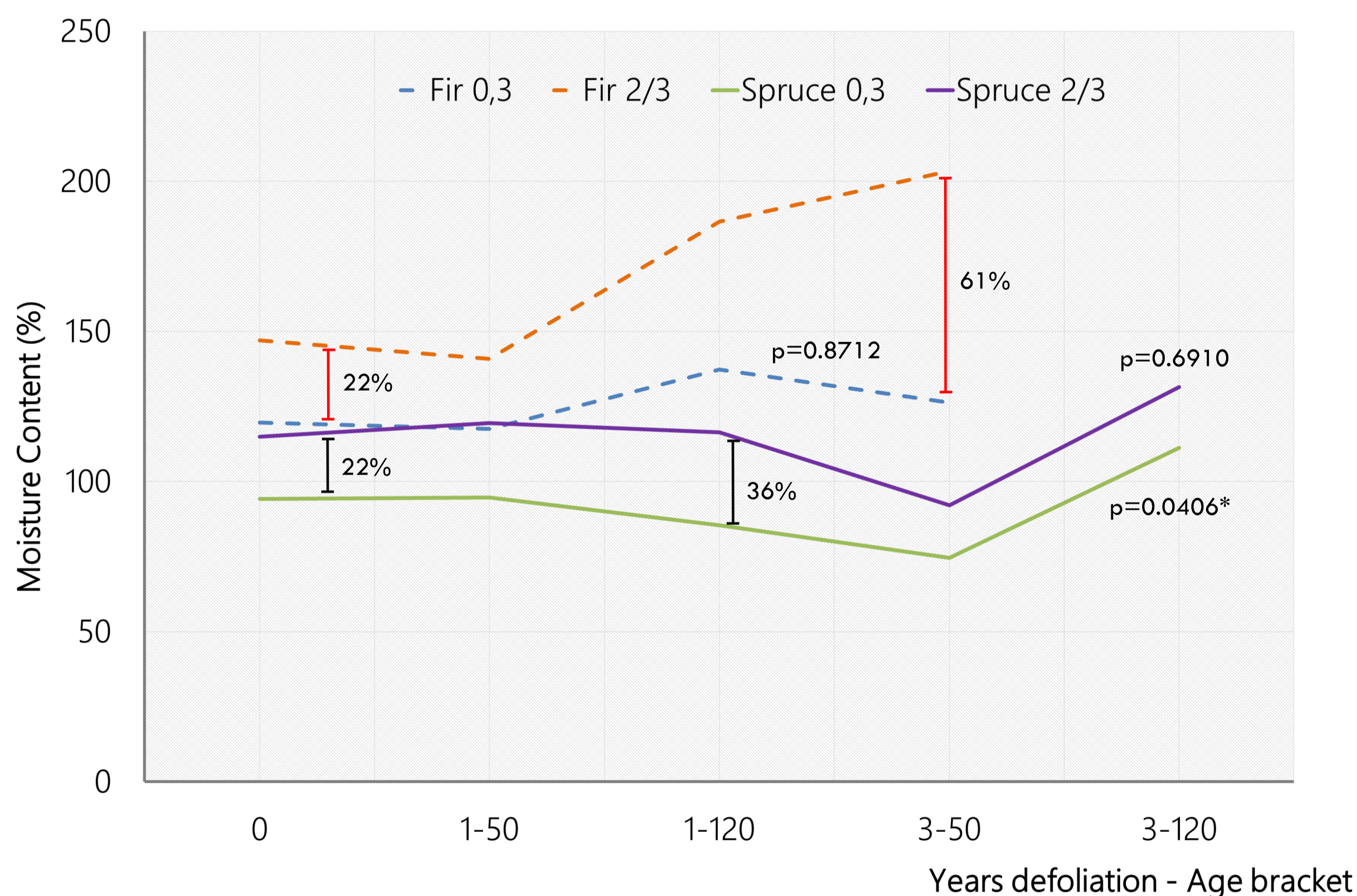
PRELIMINARY RESULTS

SPRUCE X FIR

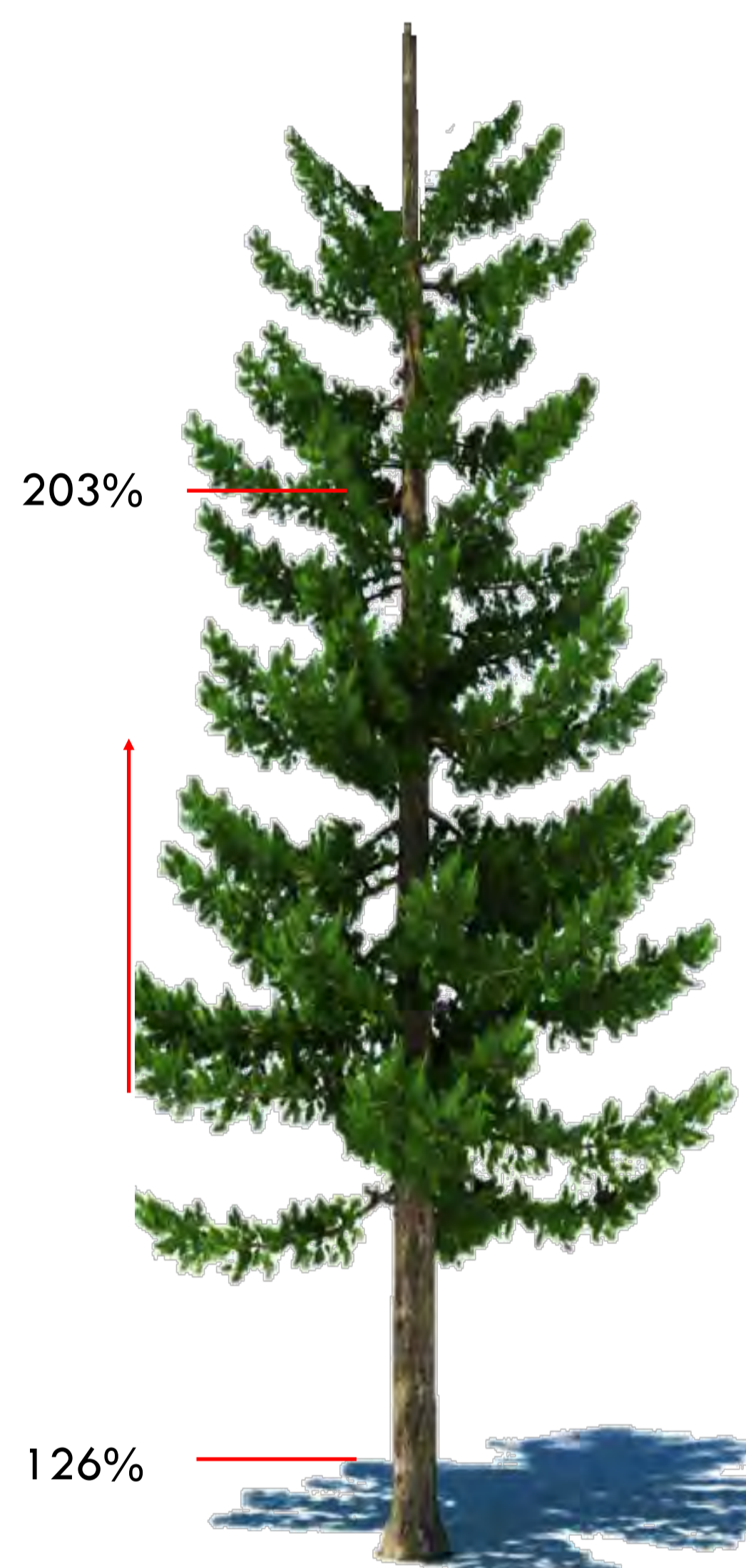
For all the analysis the balsam fir showed more differences due to defoliation than black spruce.

MOISTURE

Moisture Content increases with defoliation duration for Balsam fir sapwood at 2/3 stem height (from 150% to 203%).



MOISTURE CONTENT THROUGH THE BOLE WITH INCREASING DEFOLIATION



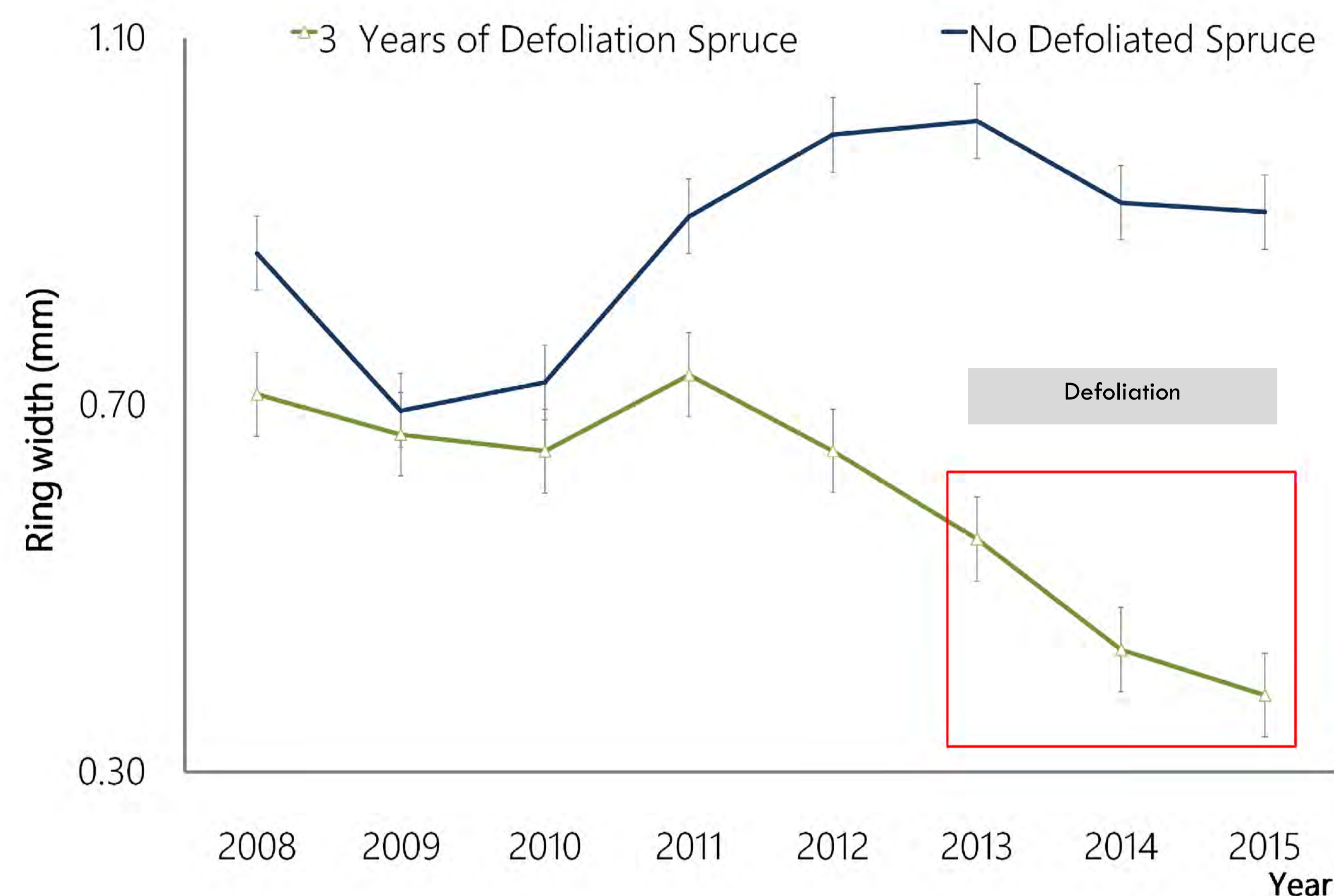
Moisture Content
3 years of Defoliation
Balsam Fir

STEM ROT

Wood rot was not observed in balsam fir and black spruce, even in the higher level of defoliation.

GROWTH

The trees infested by the Spruce Budworm presented radial growth decreases, both in balsam fir and black spruce.



RING WIDTH IN BLACK SPRUCE AT 0 AND 3 YEARS OF DEFOLIATION

CONCLUSION

- The two species do not respond similarly to defoliation.
- As balsam fir showed to be more variable individually, a higher number of trees per site need to be sampled.
- The sampling of more sites are needed, as well as, including sites with 2 and 4 years of defoliation.

WHY THIS IS IMPORTANT ?

- Currently, complete tree mortality can occur following three to five years of severe infestation by spruce budworm. Nevertheless, dead trees are still considerable available for harvesting ever three years of the death.
- However, this wood can be harder to process, withal changing major factors in wood properties, caused by a reduction in the moisture content of the wood.

This study is focused on understanding when the changes in the physiology can impact wood quality.



Acknowledgement

This research was supported by NSERC Research Chair named "Growth of black spruce, and the influence of spruce budworm on landscape variability in the boreal zone".



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Discover more!

Use the code QR to visualize the tutorial that describes in detail our Project and follow the advancement of the research.