

CHANGES IN WOOD CHARACTERISTICS OF PINE AND BIRCH DEPENDING ON CAMBIAL AGE

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Introduction

Rationalising the resources and widening the use of wood materials in construction and the living environment corresponds to the climate-neutral economy goals. Wood resources that mainly consist of juvenile or core wood (JW) are small-sized wood obtained during thinning operations that make up about 20-30 % of the total harvested m³ of wood. Currently, these wood resources are often used for energy recovery by incineration, increasing CO₂ emissions. However, there is a potential to use them in higher-added value products that ensure carbon storage. The formation of JW, anatomical and physical characteristics have been extensively studied for certain wood species, while much less information is available for other species, including *Betula pendula*, which is of high interest for our region. It has been established that JW can differ substantially from the mature wood (MJ). However, these differences may be irrelevant for certain products, in which case JW would be appropriate and even encouraged for use. The present study is a part of a project Forest4LV, that aims to enhance innovative forest management and new forest services, products, and technologies in Latvia. The objective of the study was to assess the demarcation cambial age of juvenile and mature wood in pine and birch, and to characterize the wood properties of the two zones.

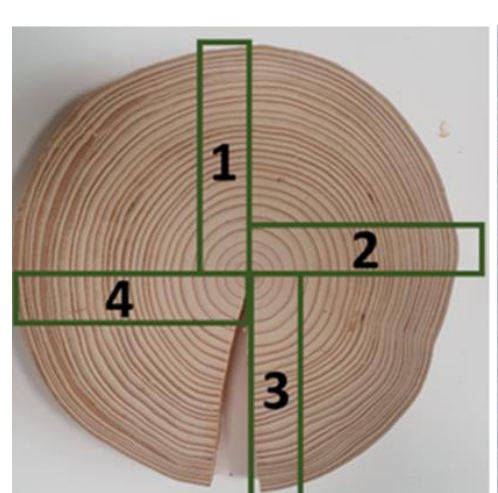
Experimental

MATERIAL

Pine (*Pinus sylvestris* L.)

Birch (*Betula pendula* Roth.)

ANATOMICAL STRUCTURE



- Annual growth
- Dimensions of fibers
- Proportion of anatomical elements



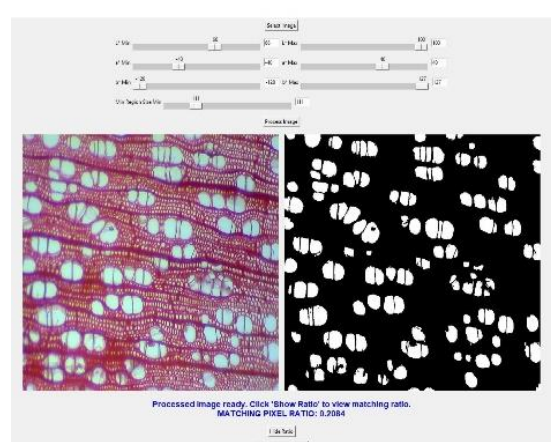
Fiber tester



Optical microscope



Software



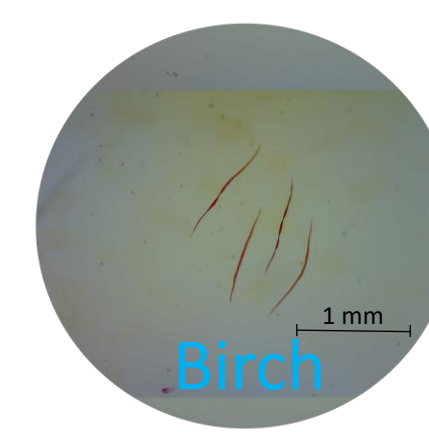
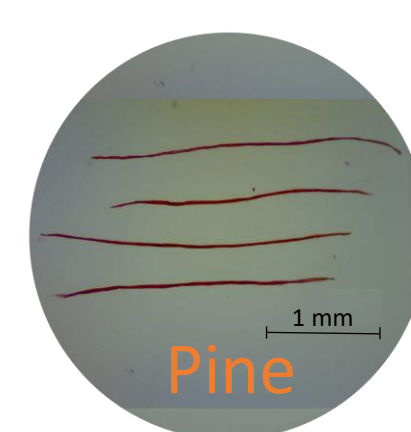
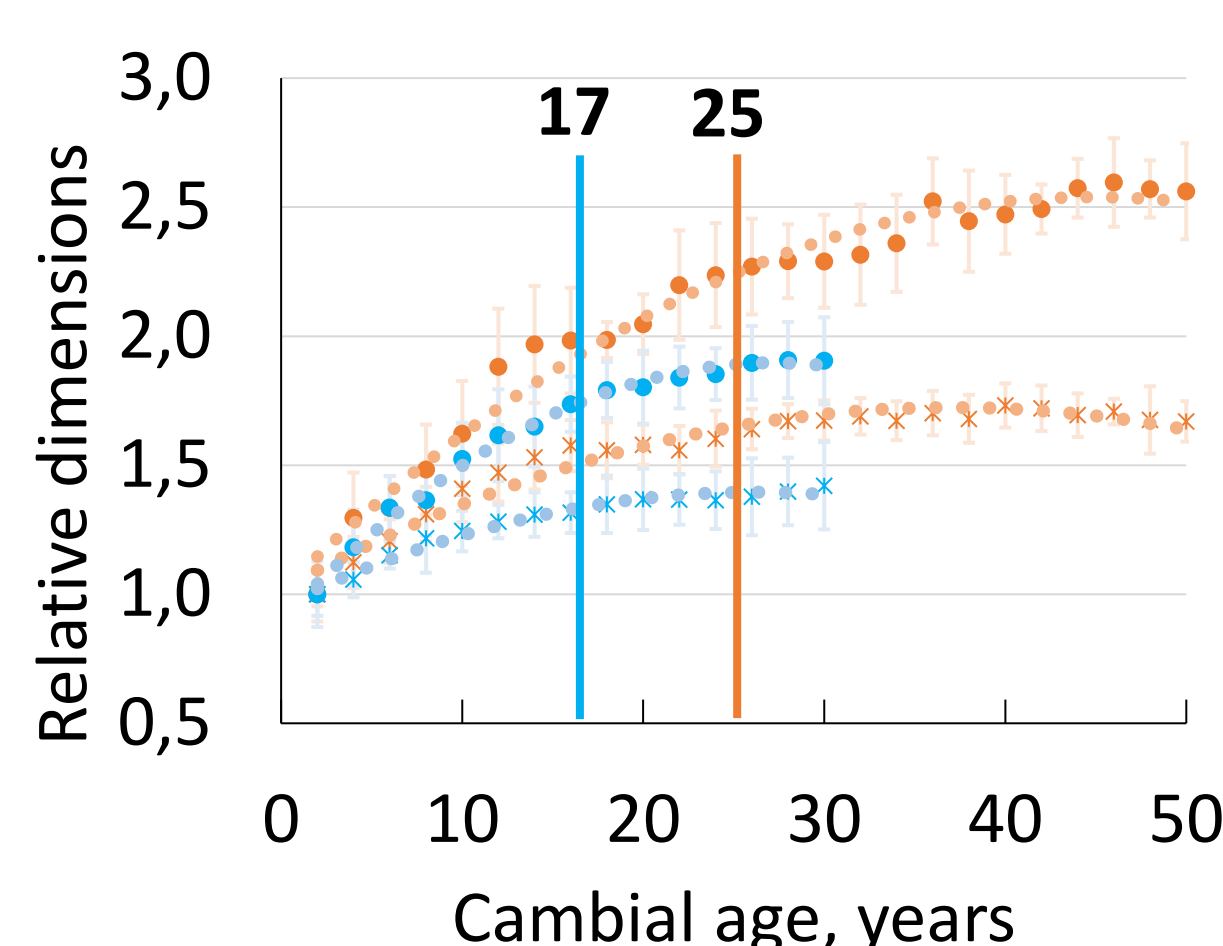
PHYSICAL PROPERTIES

- Anisotropy (Tg/Rad) (swelling: Dry – Saturated)
- Dry density
- EMC (20°C/65% RH)
- Penetration (CA measurements)



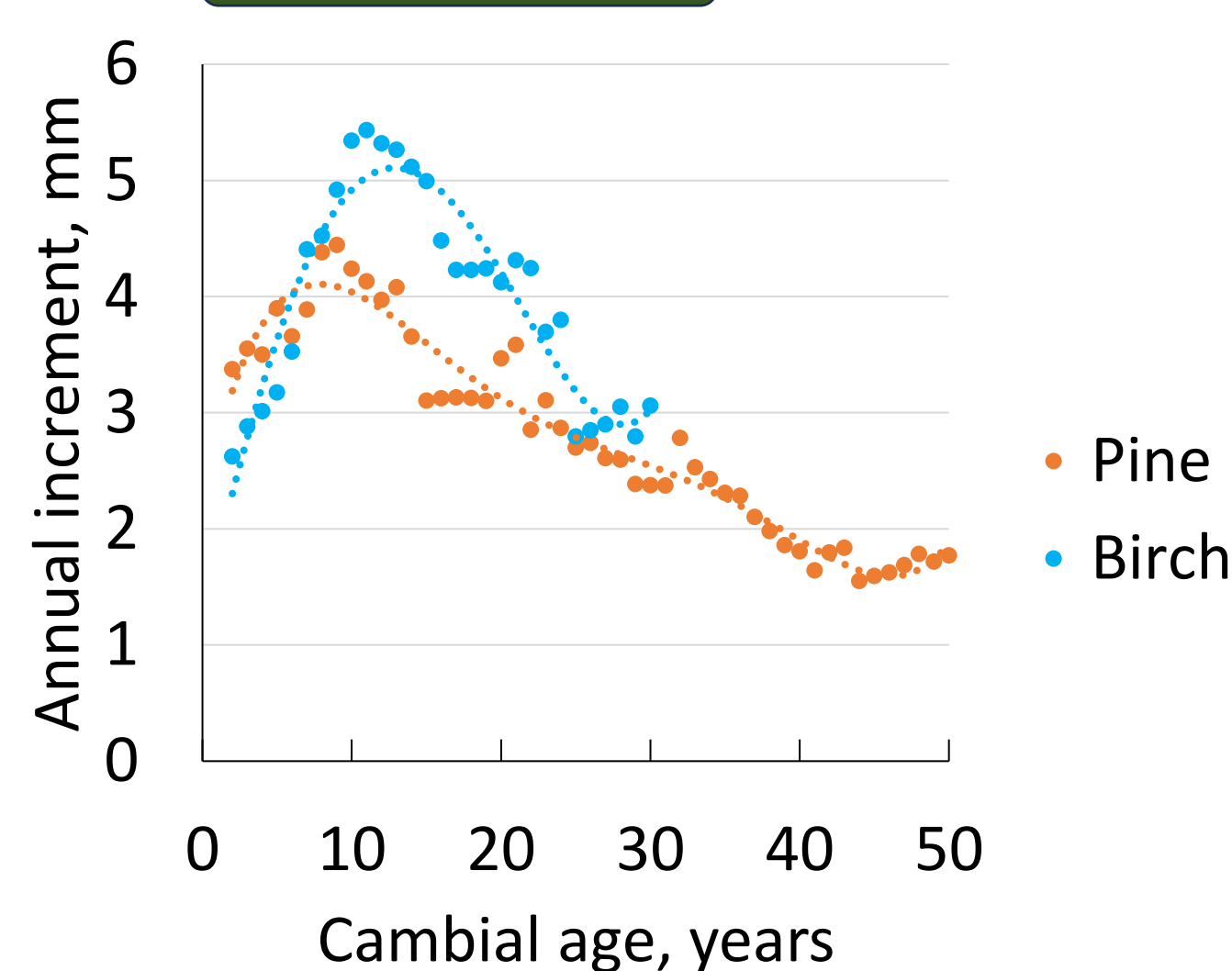
Results

DIMENSIONS OF FIBERS

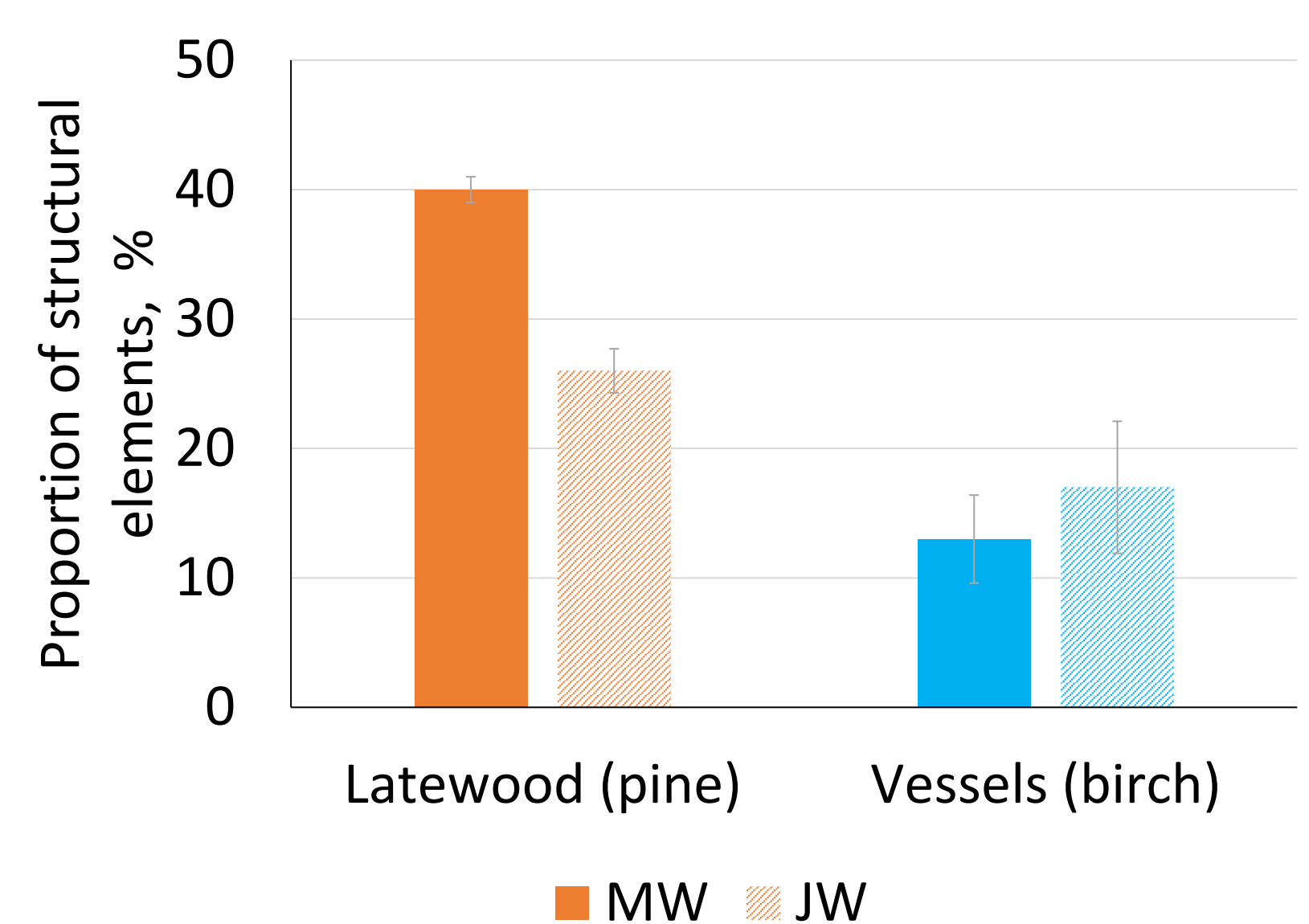


JW – juvenile wood
MW – mature wood

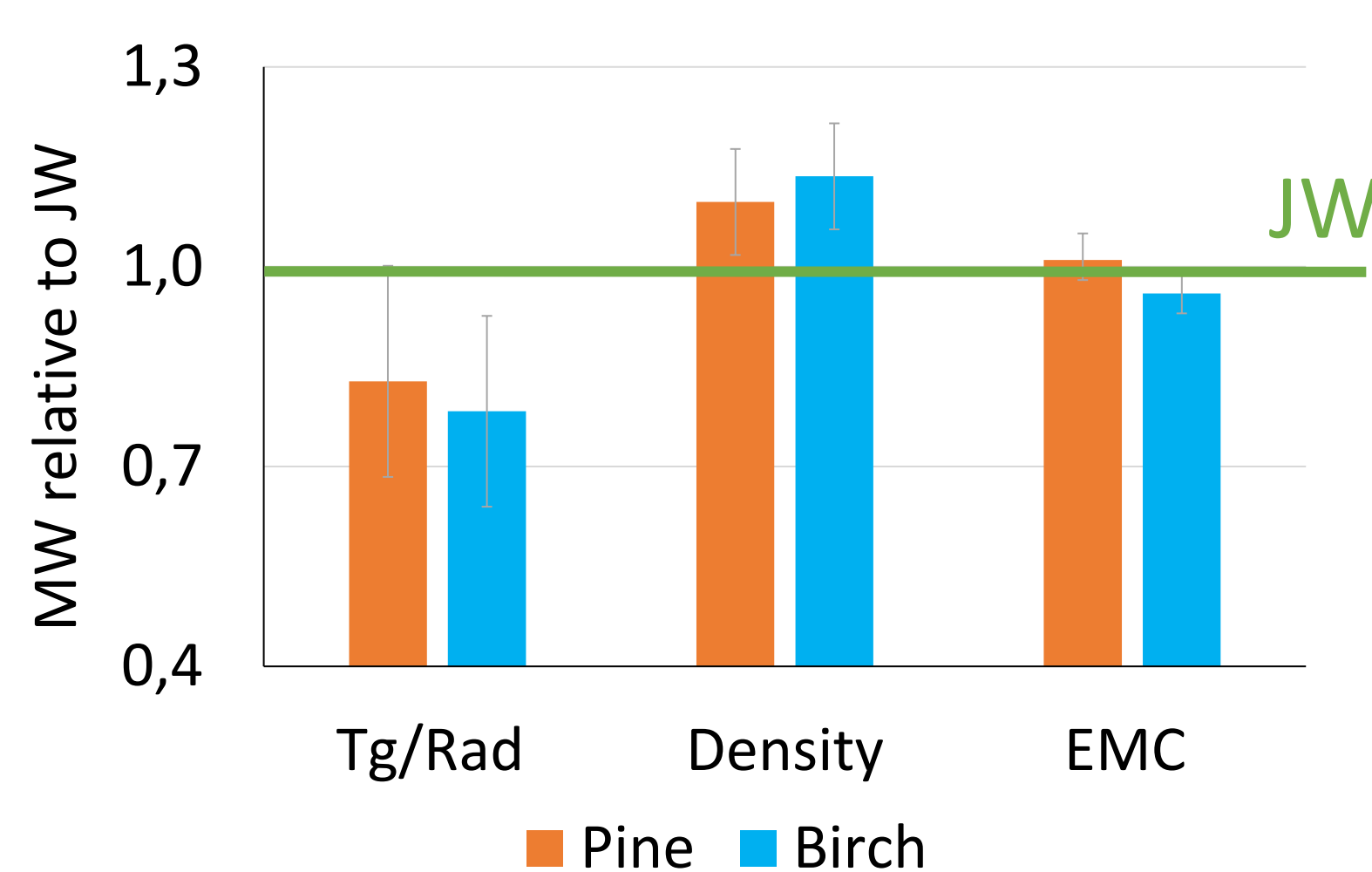
ANNUAL GROWTH



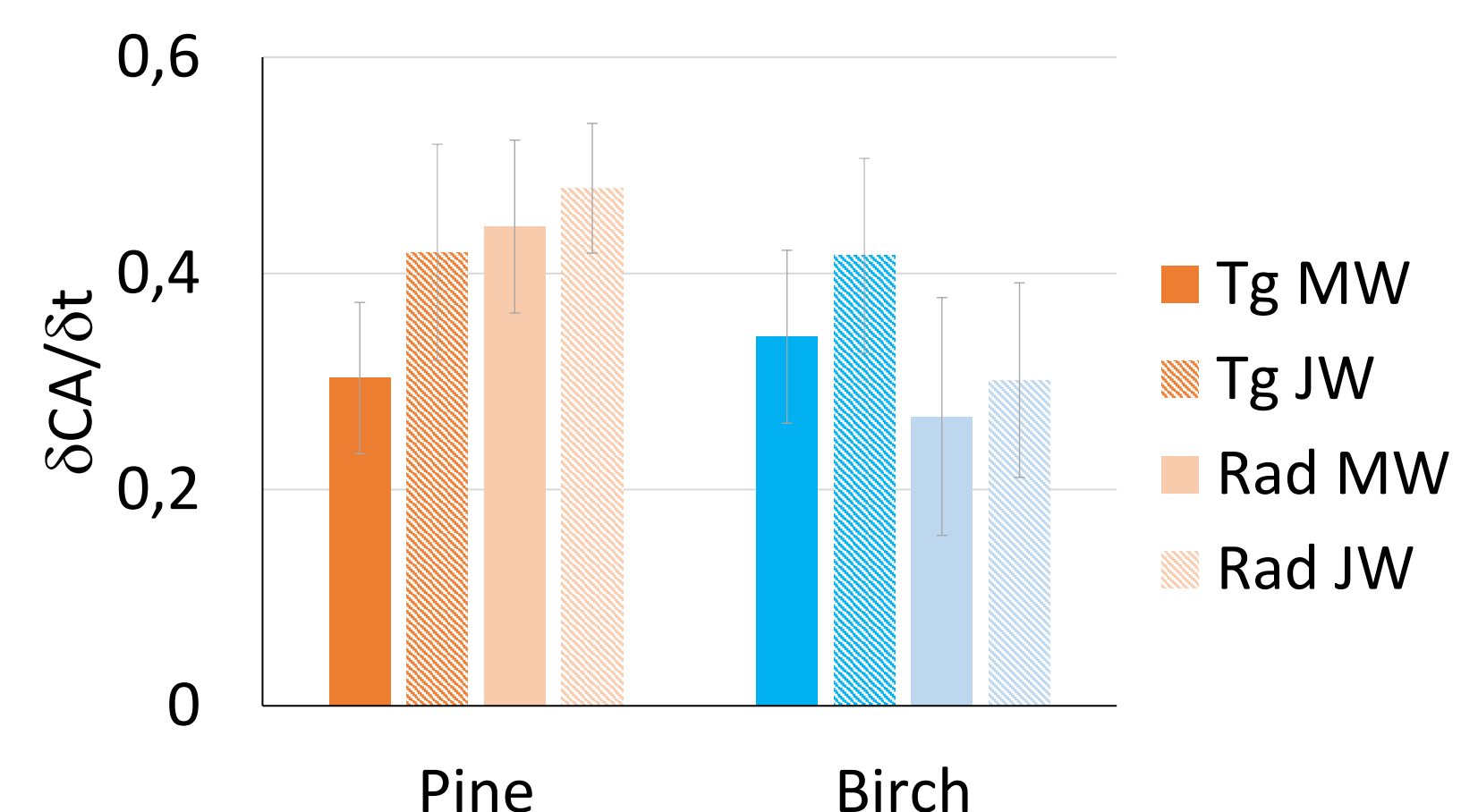
ANATOMICAL FEATURES



ANISOTROPY, DENSITY, EMC



PENETRATION



Conclusions

The results showed that fewer differences in anatomical structure can be observed for birch, and the transformation from JW to MW takes place at a younger cambial age compared to pine. By contrast, slightly larger differences in the tested physical properties were observed between mature and juvenile birch wood. For both species, the juvenile wood structure promotes penetration through radial and tangential surfaces.

Acknowledgment

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