Wood biological aspects of compression wood in larch

Michael Grabner[1], Burgi Gierlinger[2], Eva Sykacek[1], Rupert Wimmer[1]

[1] Department of Material Sciences and Process Engineering, BOKU University of Natural Resources and Applied Life Sciences Vienna, Vienna, Austria (Michael.Grabner@boku.ac.at)
[2]Max-Planck-Institute of Colloids and Interfaces, Department of Biomaterials, Potsdam, Germany

The genus Larix encompasses ten species that are widely distributed across the cooler regions of the northern hemisphere. In Europe, the natural habitat of European larch is scattered and represented in various geographic races (subspecies) and ecotypes, which exhibit marked differences in growth rates and other tree characteristics. Larch wood is usually valued for its good mechanical properties, its appealing colour and texture and also for the high natural durability of its heartwood. Because of the intensive heartwood formation compression wood is difficult to recognize. This work shows a classification of mild and severe compression wood of larch grown at different sites in Europe. In addition the interaction between microfibril angles and compression wood across growth sites / proveniences are shown. The normally negative relationship between microfibril angles and tracheid length is obsolete if compression wood is not properly classified.

Wood biological aspects of compression wood in larch

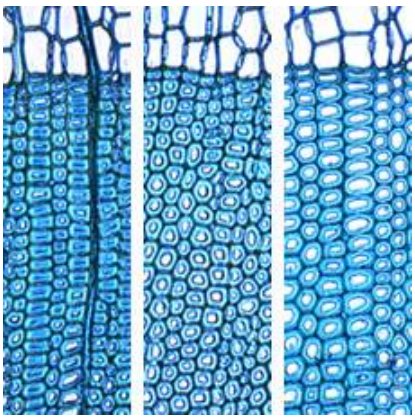
Michael Grabner[1], Burgi Gierlinger[2], Eva Sykacek[1], Rupert Wimmer[1]

Universität für Bodenkultur Wien
Department für Materialwissenschaften
und Prozesstechnik

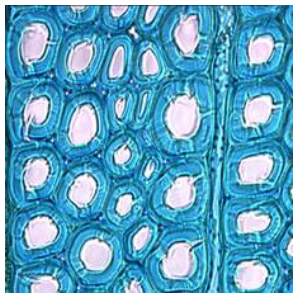
Introduction

Larch wood is usually valued for its good mechanical properties, its appealing colour and texture and also for the high natural durability of its heartwood. Because of the intensive heartwood formation compression wood (cw) is difficult to recognize. This work shows a classification of mild and severe cw of larch grown at different sites in Europe. In addition the interaction between microfibril angles and cw across growth sites / proveniences are shown.

Classification of compression wood



normal mild severe cw



compression wood (higher magnification)

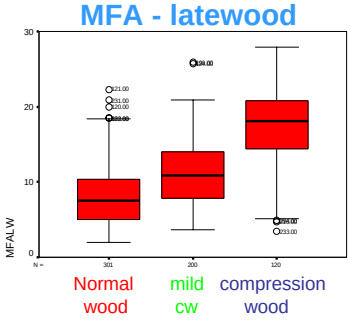
Material and methods

- 13 sites: European, Japanese, Hybrid larch; grown on natural sites and plantation across Europe; 300 trees)
- MFA-measurements at the cross-field pittings
- tracheid length (macerated)
- visual classification of cw by evaluating the roundness of the tracheids (also fissures, intercellular spaces)

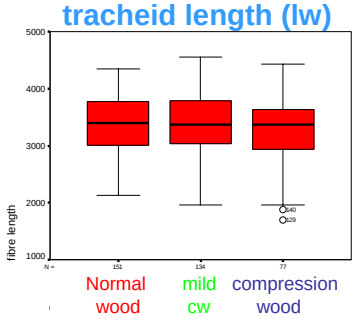
Results

- Larch cw is not properly identified at the macroscopic level
- Higher MFA for mild and severe cw
- sites with generally lower MFA, also showed less in cw
- no difference for tracheid length between the three groups
- MFA-tracheid length relationship: stronger for normal wood

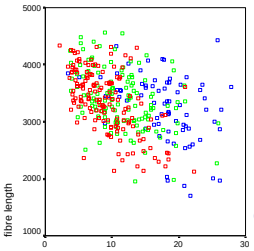
MFA - latewood



tracheid length (lw)



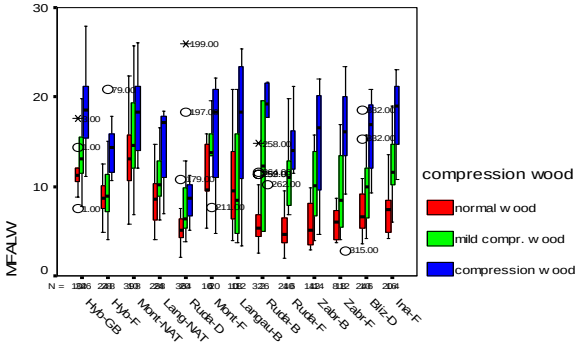
MFA – tracheid length



MFALW

Pearson Correlations		all samples	only normal wood
		fibre length	**fibre length**
	MFA	-0.430	-0.60
	Sig. (2-tailed)	0.000	0.00
	N	360	151
**	Correlation is significant at the 0.01 level (2-tailed).		

MFA – latewood: Comparison of sites



Sites

Funded by EU FAIR 98-3354 and the Austrian Science Fund FWF P1903

[1] Department of Material Sciences and Process Engineering, BOKU University of Natural Resources and Applied Life Sciences Vienna, Vienna, Austria (Michael.Grabner@boku.ac.at)
[2] Max-Planck-Institute of Colloids and Interfaces, Department of Biomaterials, Potsdam, Germany

University of Natural Resources and Applied Life Sciences, Vienna
Department of Material Sciences and Process Engineering