

Stem form and internal wood quality of selected willow clones

Potential of wood colour measurements as a tool for early selection of genetically related willow clones

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OUTLINE

- Introduction – Willow in Belgium
- Case studies
 - “Early assessment”
 - Stem form and internal wood quality
 - Form of standing tree
 - Stem disc analysis
 - Veneer trial “natural willow forest” versus selected clones
 - Durability - duraminisation
- Future challenges and conclusions

INTRODUCTION



Willow in Belgium:

- Very limited large dimension trees
- Experimental plantations or “accidents”
- Large genetic indigenous pool !



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INTRODUCTION



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Case study “Early assessment”

- Selected 100 clones
 - *Salix alba*
 - *Salix fragilis*
 - *Salix x rubens*
- Evaluated properties
 - Biological features (tension wood, false colored heartwood, color)
 - Physical parameters (density, dimensional stability)
 - Mechanical parameters (MOE, MOR in bending)



Case study “Early assessment”



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Case study “Early assessment”

		annual growth north			annual growth south		
		mean	max	min	mean	max	min
S alba	mean	4.87	8.01	1.45	4.65	7.64	1.53
	stdev	3.15	5.02	1.51	3.03	4.82	1.58
S x rubens	mean	6.32	10.62	1.39	5.95	10.20	1.38
	stdev	1.86	2.80	0.73	1.72	2.69	0.66
S fragilis	mean	3.68	6.19	1.20	3.66	6.05	1.23
	stdev	2.77	4.66	1.38	2.88	4.66	1.40

		tension wood %	shrinkage 90-60 %RH		Shrinkage 60-0 %RH		Moisture content	
			R	T	R	T	90% RH	60% RH
S alba	mean	80.26	1.34	3.13	1.16	2.87	23.07	12.50
	stdev	14.22	0.44	0.81	0.36	0.41	1.96	0.91
S x rubens	mean	78.02	1.39	3.41	1.10	2.97	23.55	12.60
	stdev	13.08	0.50	1.11	0.27	0.29	1.70	0.91
S fragilis	mean	78.36	1.38	3.21	1.41	3.23	23.44	12.42
	stdev	14.33	0.46	0.62	0.35	0.60	1.51	0.60

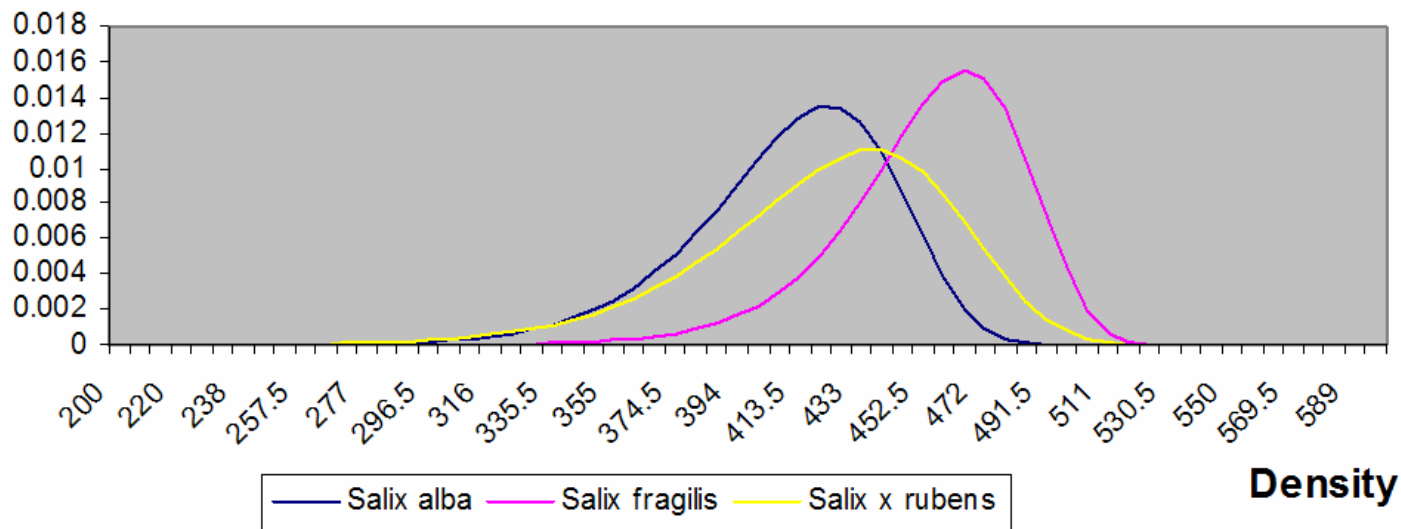
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Case study “Early assessment”

		Density	MOE	MOR	specific strength
S alba	mean	385.17	6225.49	57.17	16.2
	stdev	25.31	1027.12	7.14	
S x rubens	mean	395.24	6046.80	56.10	15.2
	stdev	32.79	902.34	6.62	
S fragilis	mean	434.10	7216.11	60.45	16.6
	stdev	25.79	883.70	7.01	



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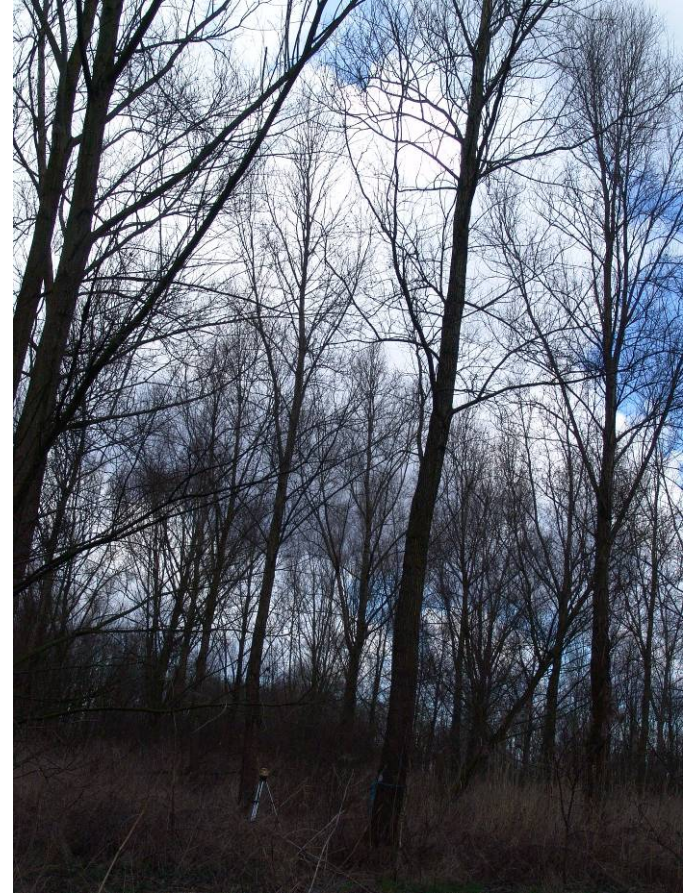
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Case study “Stem form and wood quality”

- Most processors are opposing the irregular stem form
- No large industrial trials were done – “hear say”
- Evaluation of selected willow clones
 - Standing trees by photographs
 - Subdividing and evaluating stem discs for correcting information and further simulation.

Case study “Stem form and wood quality”



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Case study “Stem form and wood quality”



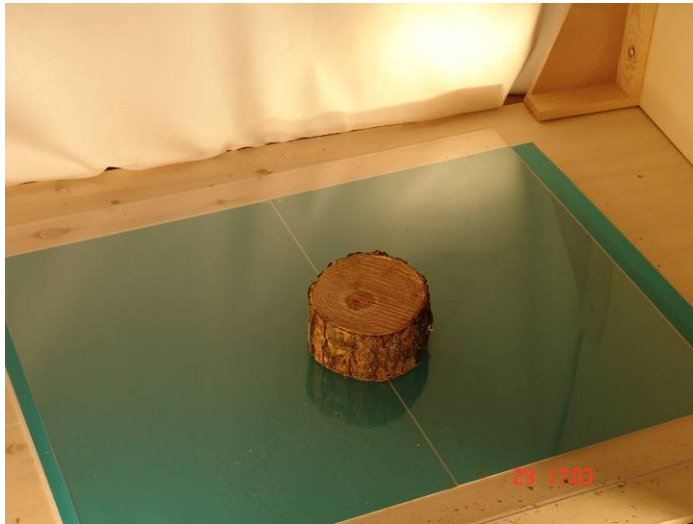
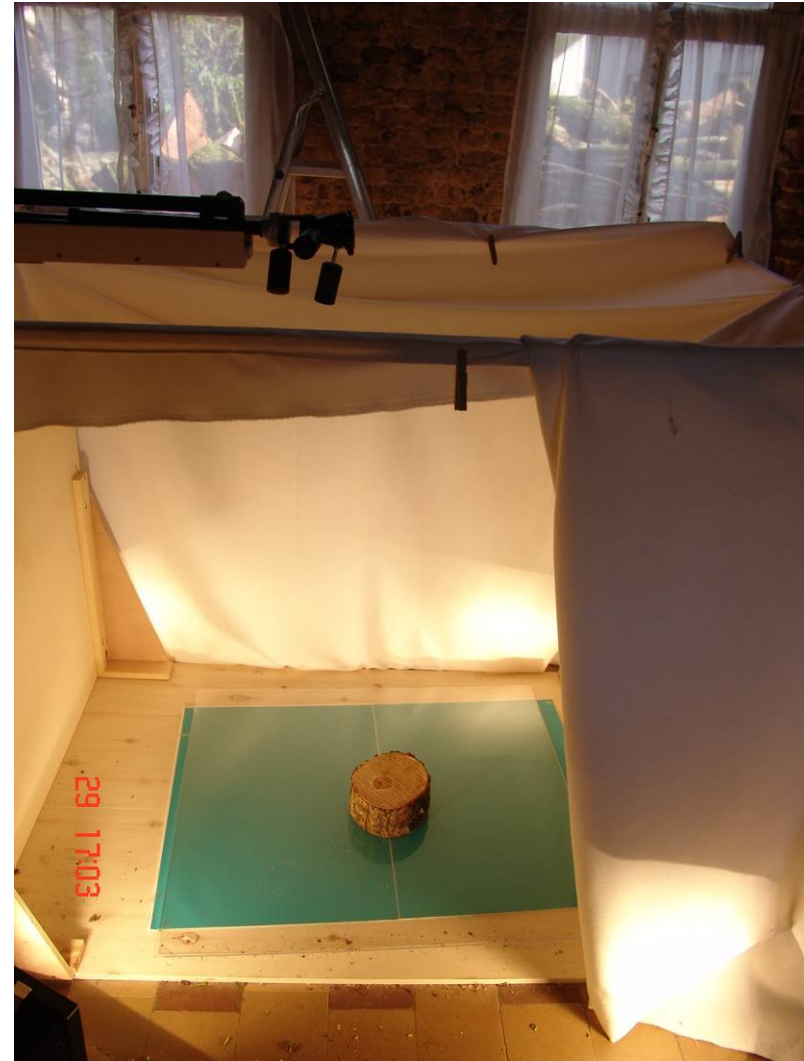
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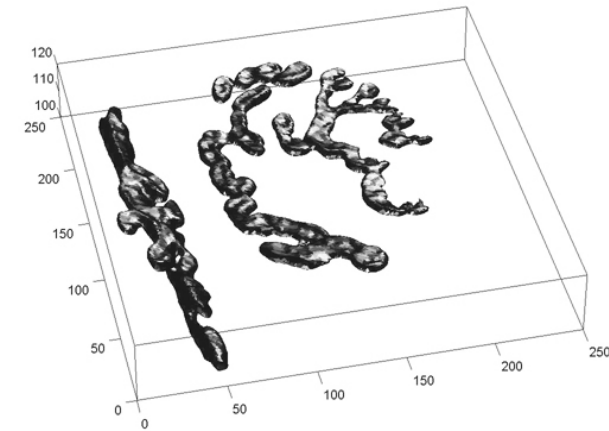
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Case study “Stem form and wood quality”



Have a 3-D image of:

- Stem form (bark, sapwood, heartwood)
- Defects (knots, disease, ...)

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Case study “Veneer trial”



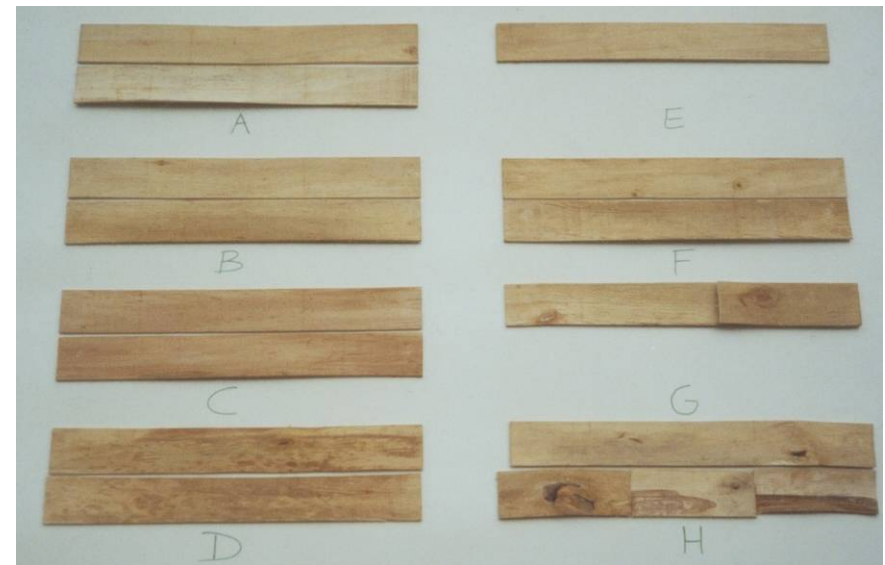
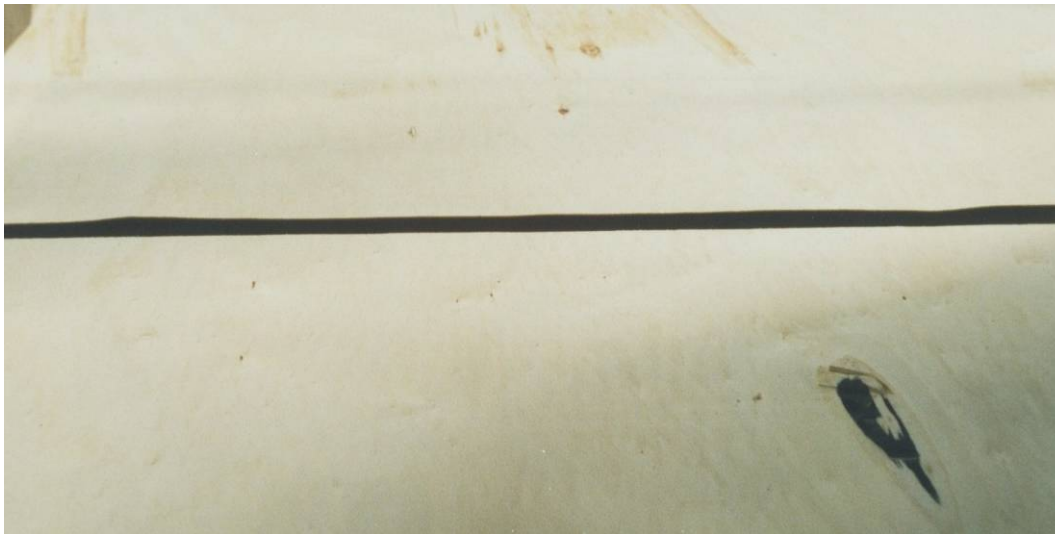
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Case study “Veneer trial”



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Case study “Veneer trial”



Willow with promising wood quality in regard veneer production.



High variability in natural regenerated stands !

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Case study “Veneer trial”

clone	Nombre d'échantillon	Coffre de fruit (%)	contreplaqué (%)
V86093	384	48,7	81,8
V86106	215	12,6	81,4
V86077	181	40,9	83,4
V86059	371	7,5	73,0
V86052	496	7,3	62,3
V86103	285	30,9	83,2
V86090	311	26,7	74,6
V86008	238	30,3	75,2
V86082	749	22,2	77,4
V86099	558	7,3	65,4

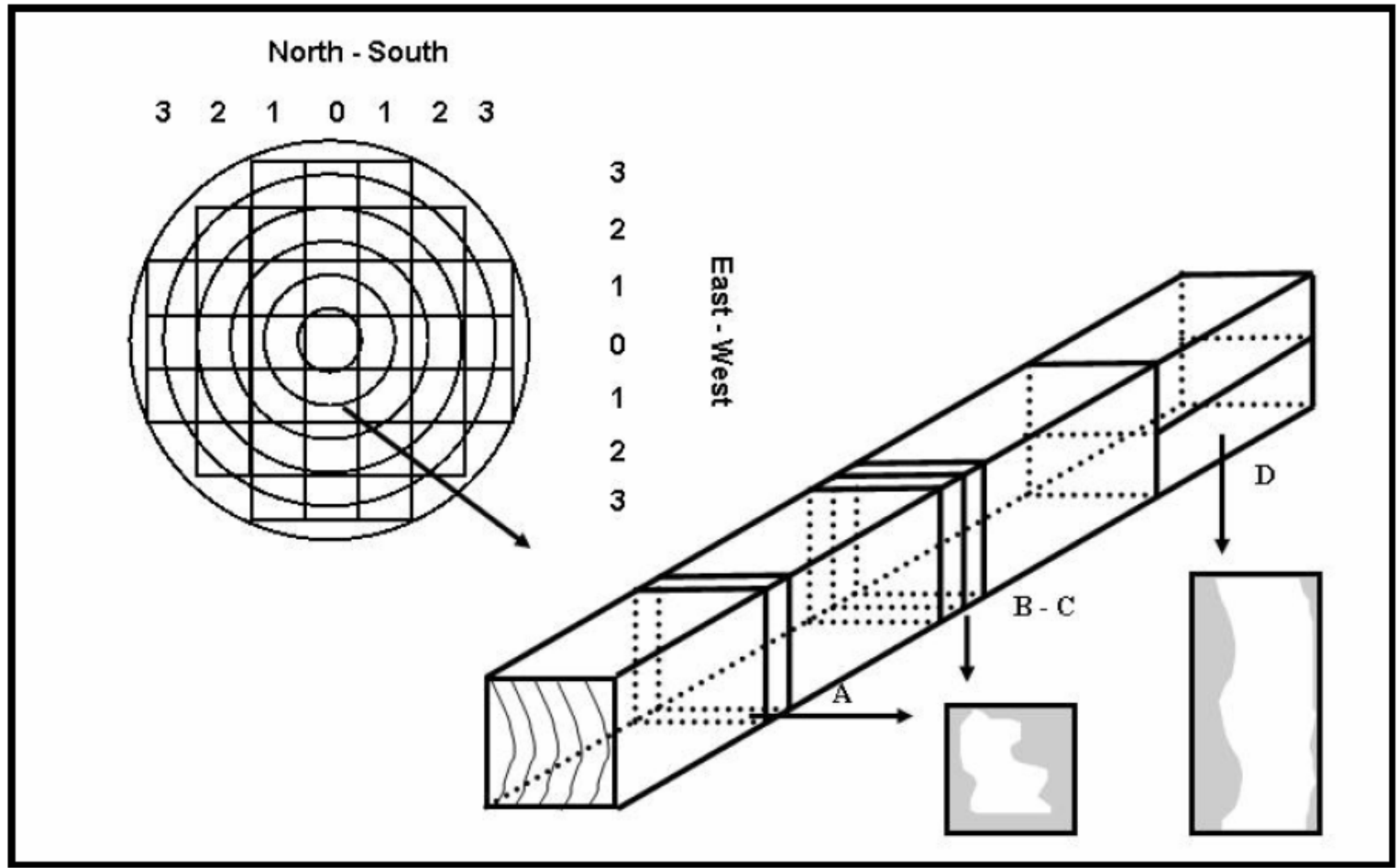
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Case study “Durability - treatability”



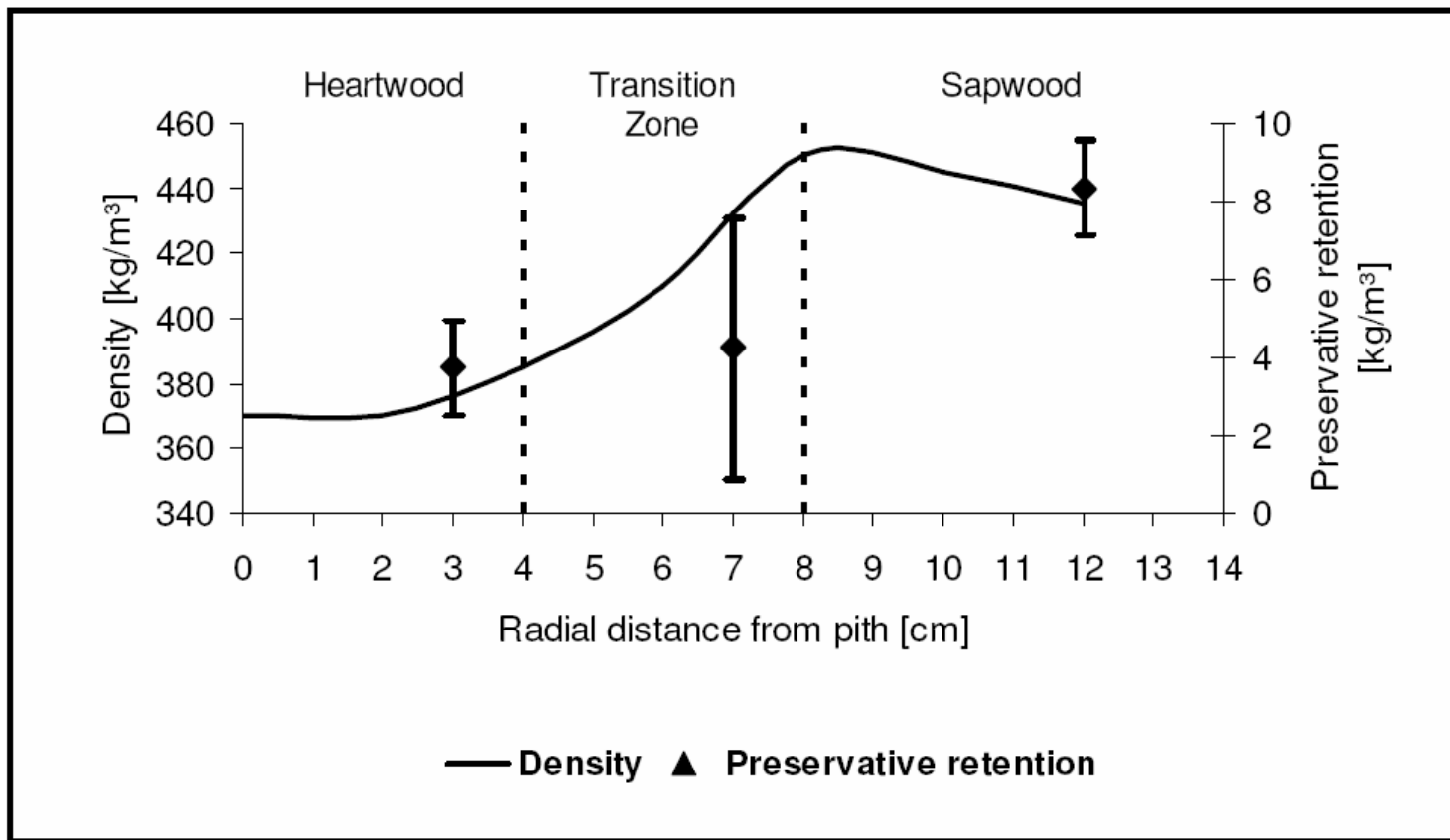
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CHALLENGES - CONCLUSIONS

- Promotion of willow as an ad-on material
- Already potential is shown in present clones
- Further research on wood quality
 - Early selection (high through put analysis)
 - Genetic background of wood quality
 - Relation towards watermark disease
 - Attention to fiber length (strength related)
- Engineered wood products
 - Technical plywood (color ?!)
 - Laminated beams
 - Boards, ...

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THANK YOU

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