Kershope Progeny Trial and Including Results in Sitka Spruce Timber Quality Model

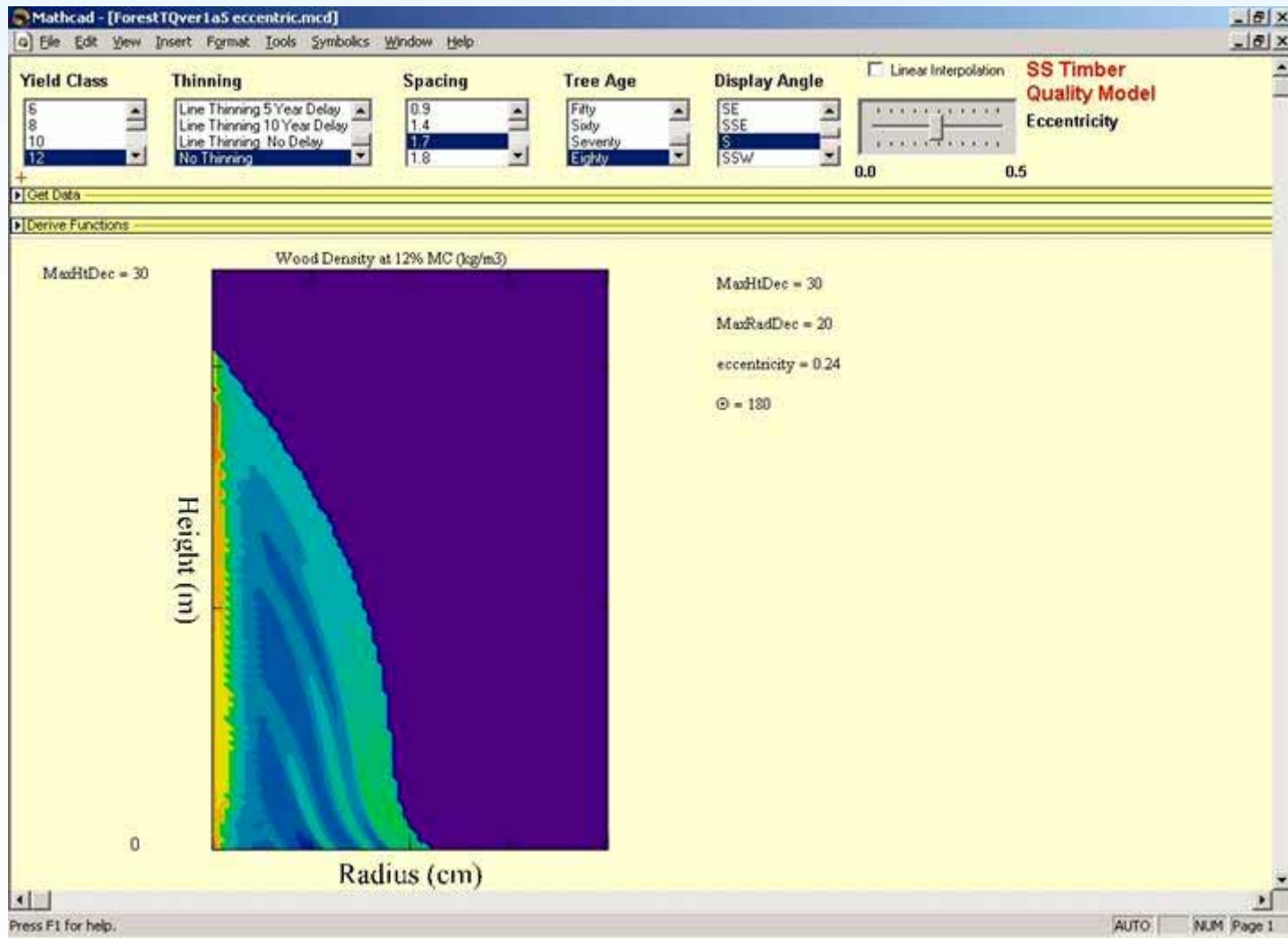Barry Gardiner and Steve Lee

Forest Research

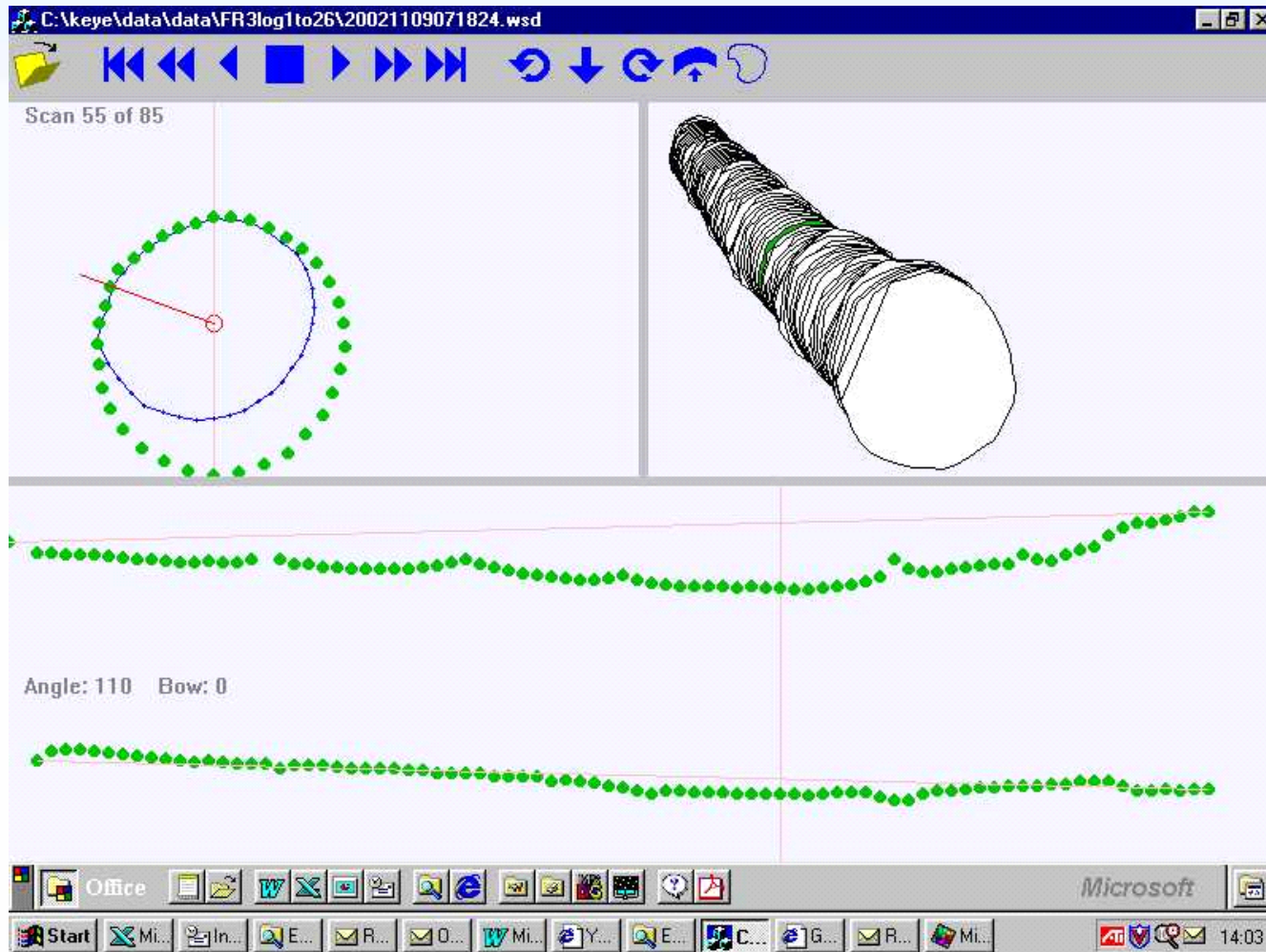# Research On Timber Properties of Improved Sitka Spruce

- Modelling Sitka spruce Timber Properties

- Linking Timber Quality Model with Batten Performance Model

- Kershope Progeny Trial Conversion Study
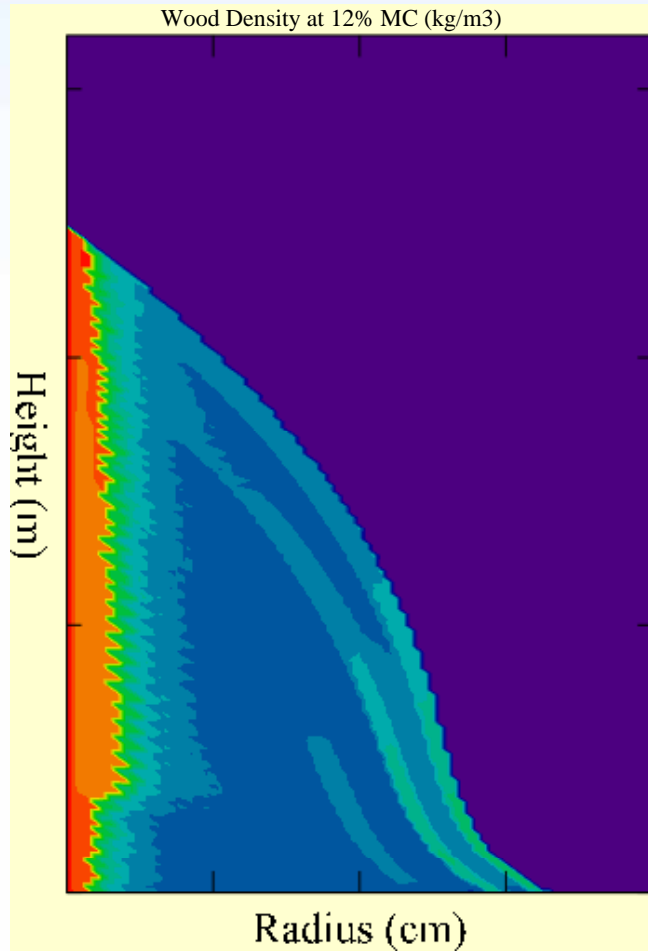
Sitka Spruce Timber Quality Model

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BRE Log Viewer Program

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Sitka: YC 20, 1.7 & 2.4m Spacing, 60 yrs

MaxHtDec = 40

Wood Density at 12% MC (kg/m3)

Height (m)

0

Radius (cm)

0

MaxRadDec = 20

MaxHtDec = 40

Wood Density at 12% MC (kg/m3)

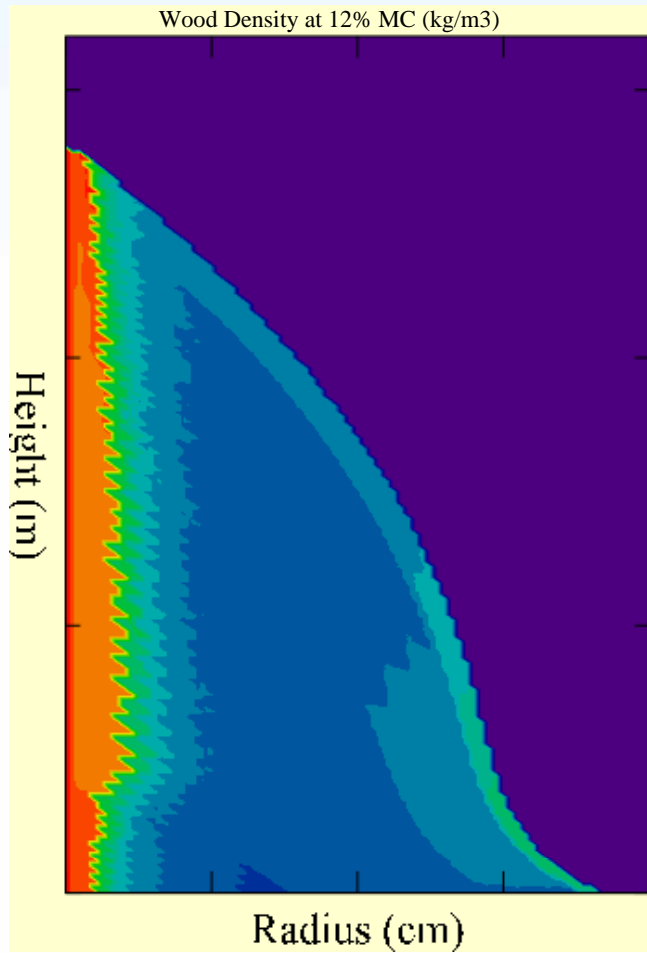Height (m)

0

Radius (cm)
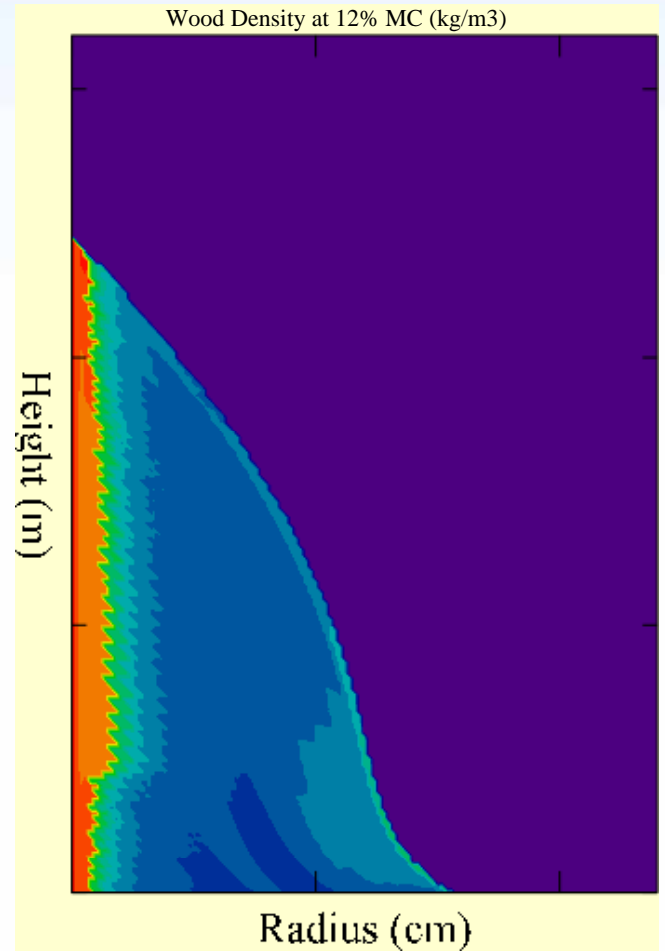
0

MaxRadDec = 30

Sitka: YC 24 & 12, 1.7m Spacing, 60 yrs

MaxHtDec = 40

Wood Density at 12% MC (kg/m3)

Height (m)

0

Radius (cm)

0

0

MaxRadDec = 20

MaxHtDec = 30

Wood Density at 12% MC (kg/m3)

Height (m)

0

Radius (cm)
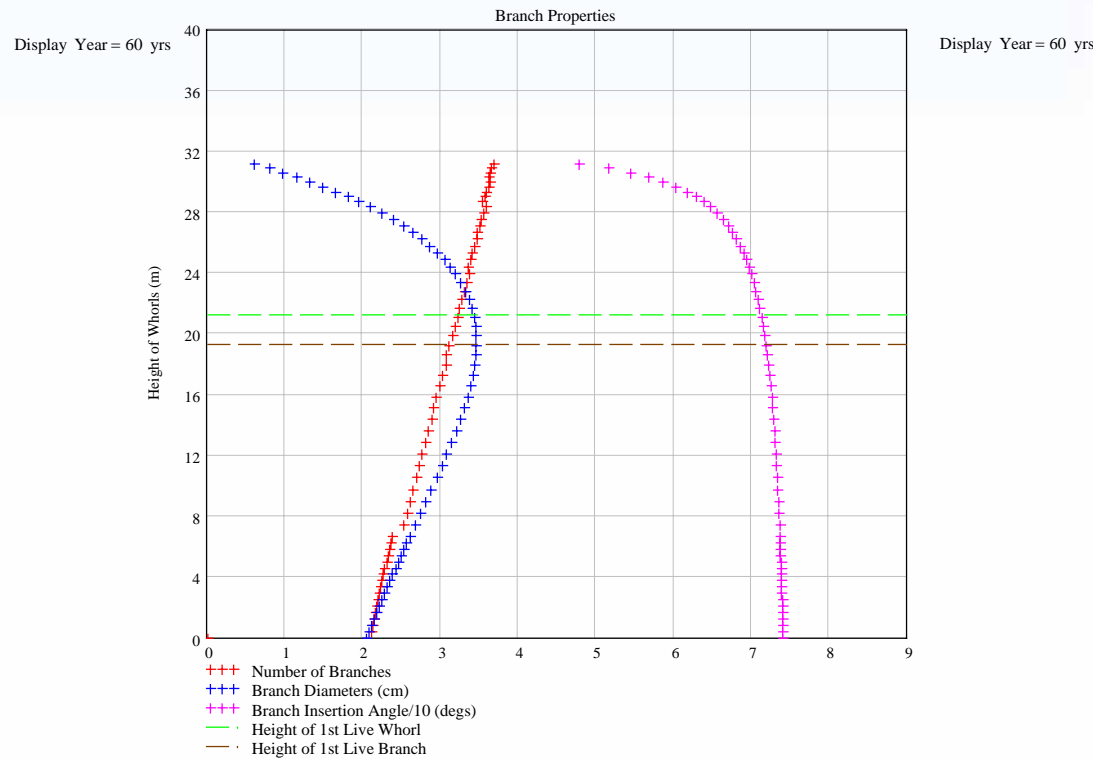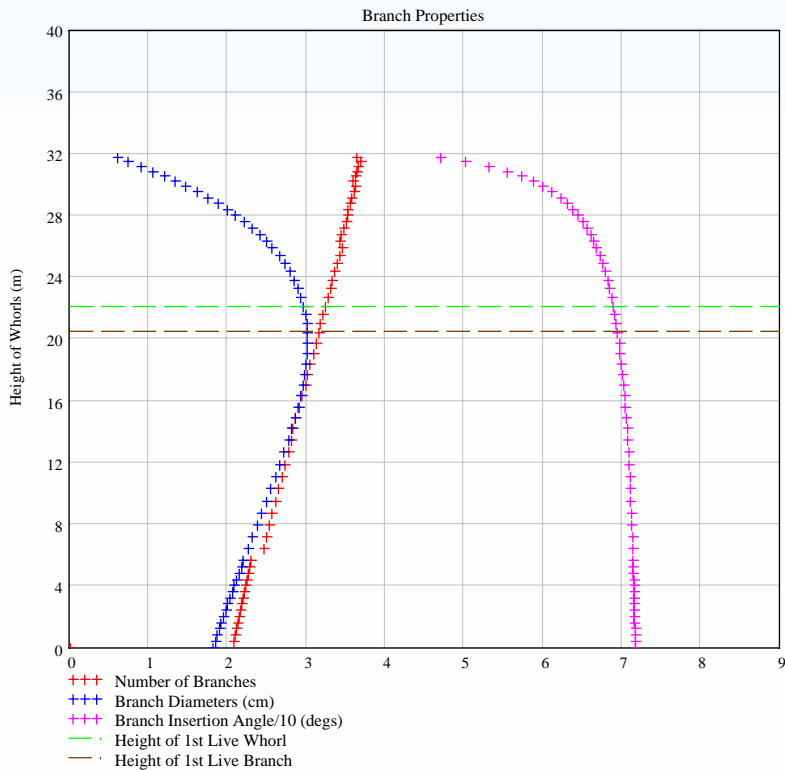
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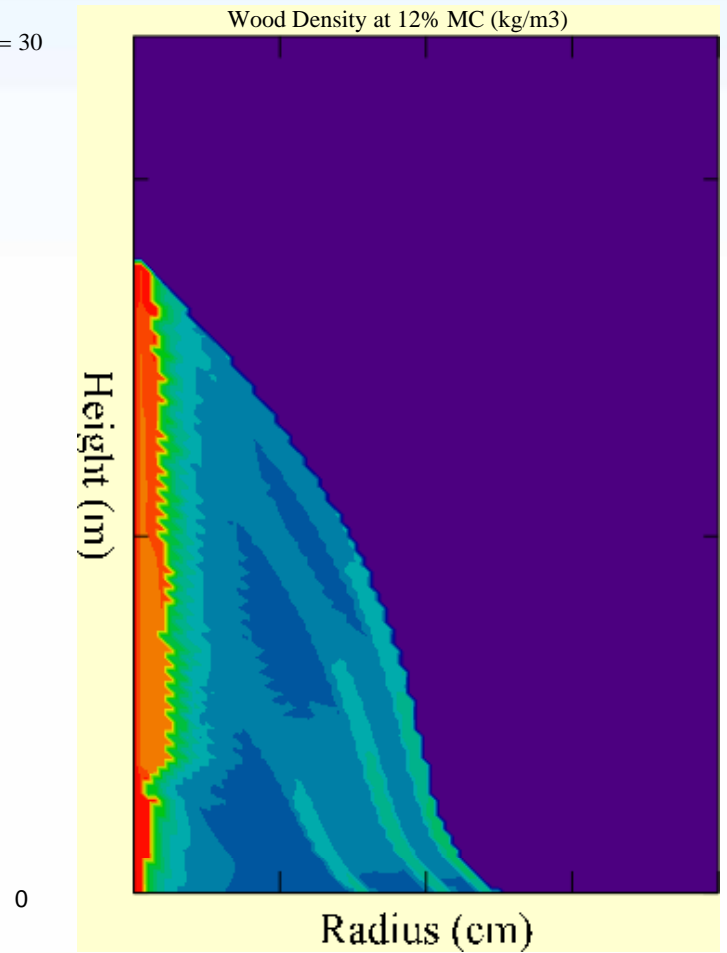
Sitka: YC 20, 1.7 & 2.4m Spacing, 60 yrs

Kershope 13 Progeny Experiment

- P68 Sitka spruce progeny trial in Kershope
- QCI and 3 improved progeny
  - 1: Much faster growing, lower density
  - 2: Faster growing, similar density, straighter, lighter branching
  - 3: Higher density, similar growth rate
- 144 for industrial evaluation (4 treatments x 3 replicates x 12 trees) and 48 for detailed laboratory evaluation and timber property modelling (4 treatments x 3 replicates x 4 trees).
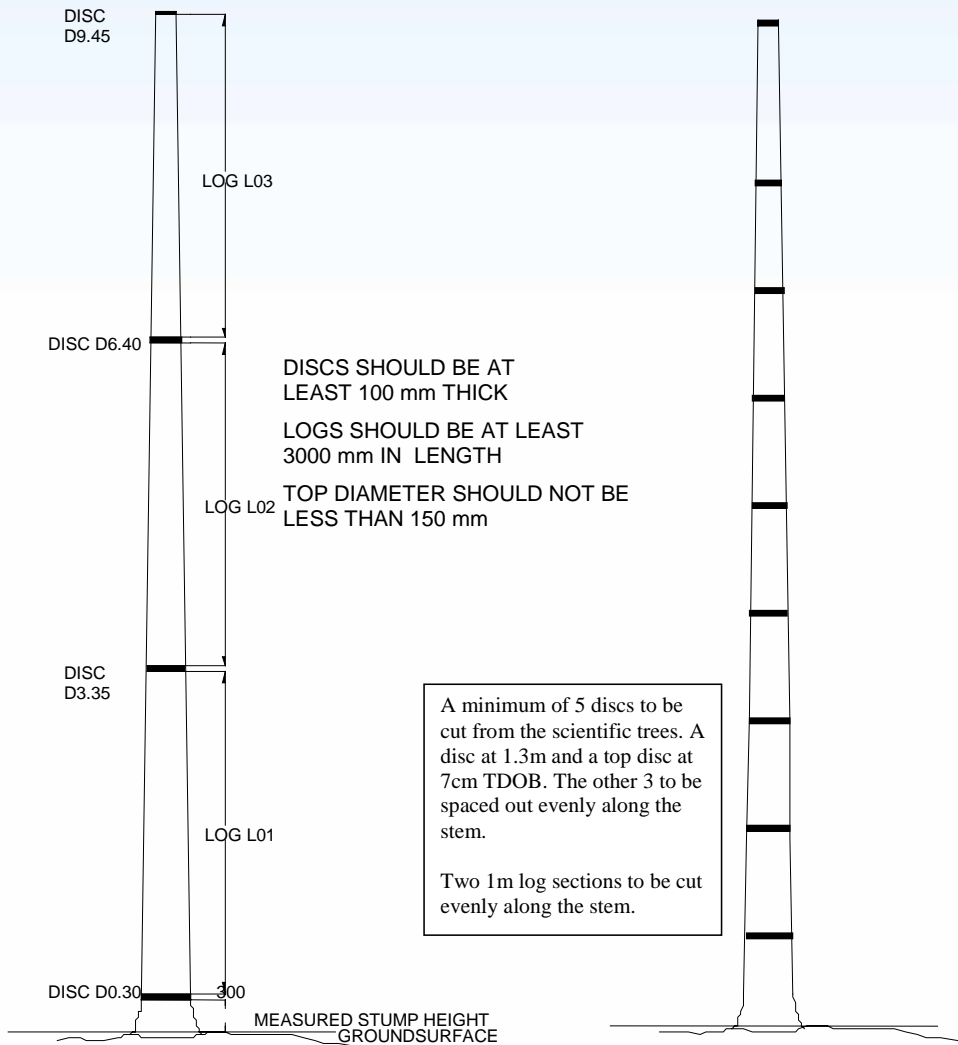
Kershope Progeny Trial Experimental Plan

Experiment 1	Experiment 1	Experiment 2	Experiment 3
Standing Tree Assessment	*Outturn*	*Timber Performance*	*Wood Properties*
TIB visual assessment	Taper measurements	Stress grading	Discs
Diameter	Volume assessment	Volume recovery of sawn timber	Small clear samples from battens
Straightness (both TIB and TQ methods)	Log class assessment (input from sawmiller on what would be expected from such a stand)	MoE and MoR	Samples measured for density, microfibril angle, fibre length (STFI SilviScan)[t]
Branching (TIB and TQ)		Batten measurements [*] (grain angle, CW, knots)	Density (CT scanning)
Spiral grain			
Density (Pilodyn)			

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Industrial Sample Tree **Scientific Sample Tree**

Kershope Progeny Trial Sampling

DISC D9.45

LOG L03

DISC D6.40

DISCS SHOULD BE AT LEAST 100 mm THICK

LOGS SHOULD BE AT LEAST 3000 mm IN LENGTH

TOP DIAMETER SHOULD NOT BE LESS THAN 150 mm

LOG L02

DISC D3.35

A minimum of 5 discs to be cut from the scientific trees. A disc at 1.3m and a top disc at 7cm TDOB. The other 3 to be spaced out evenly along the stem.

Two 1m log sections to be cut evenly along the stem.

LOG L01

DISC D0.30   300

MEASURED STUMP HEIGHT
GROUNDSURFACE

Forest Operations

Working in the forest

Scientific discs

Coding the timber throughout the process

Processing Kershope Logs
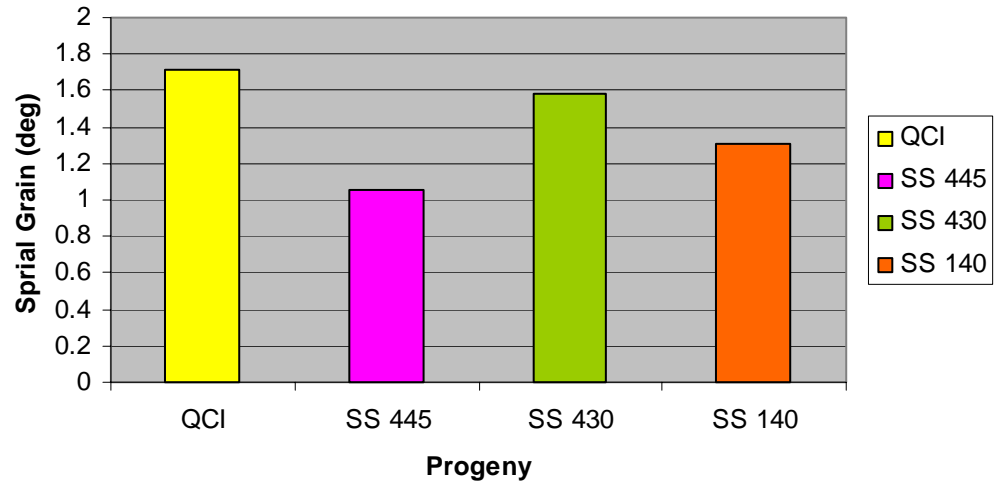
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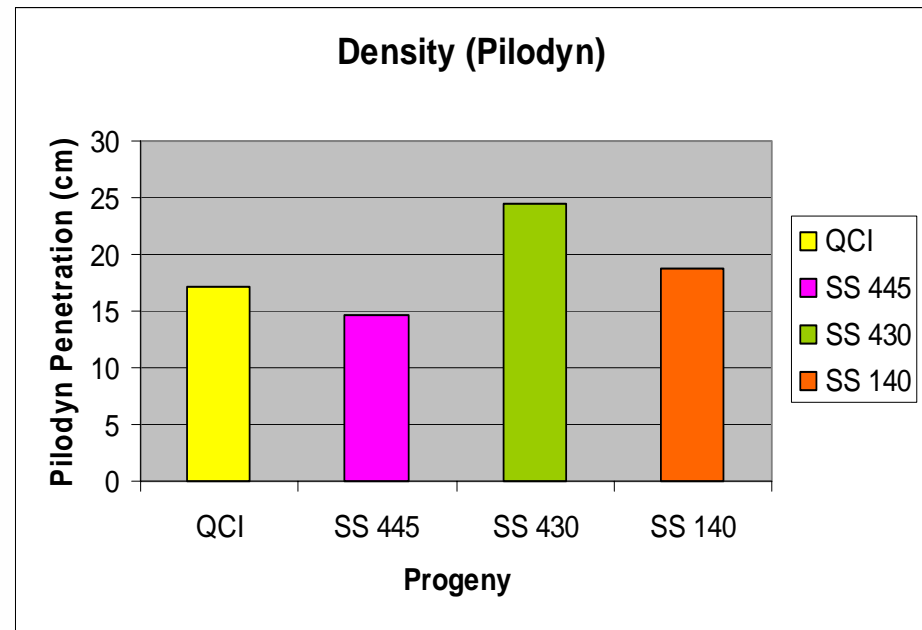
Straightness Scores and Grain Angle

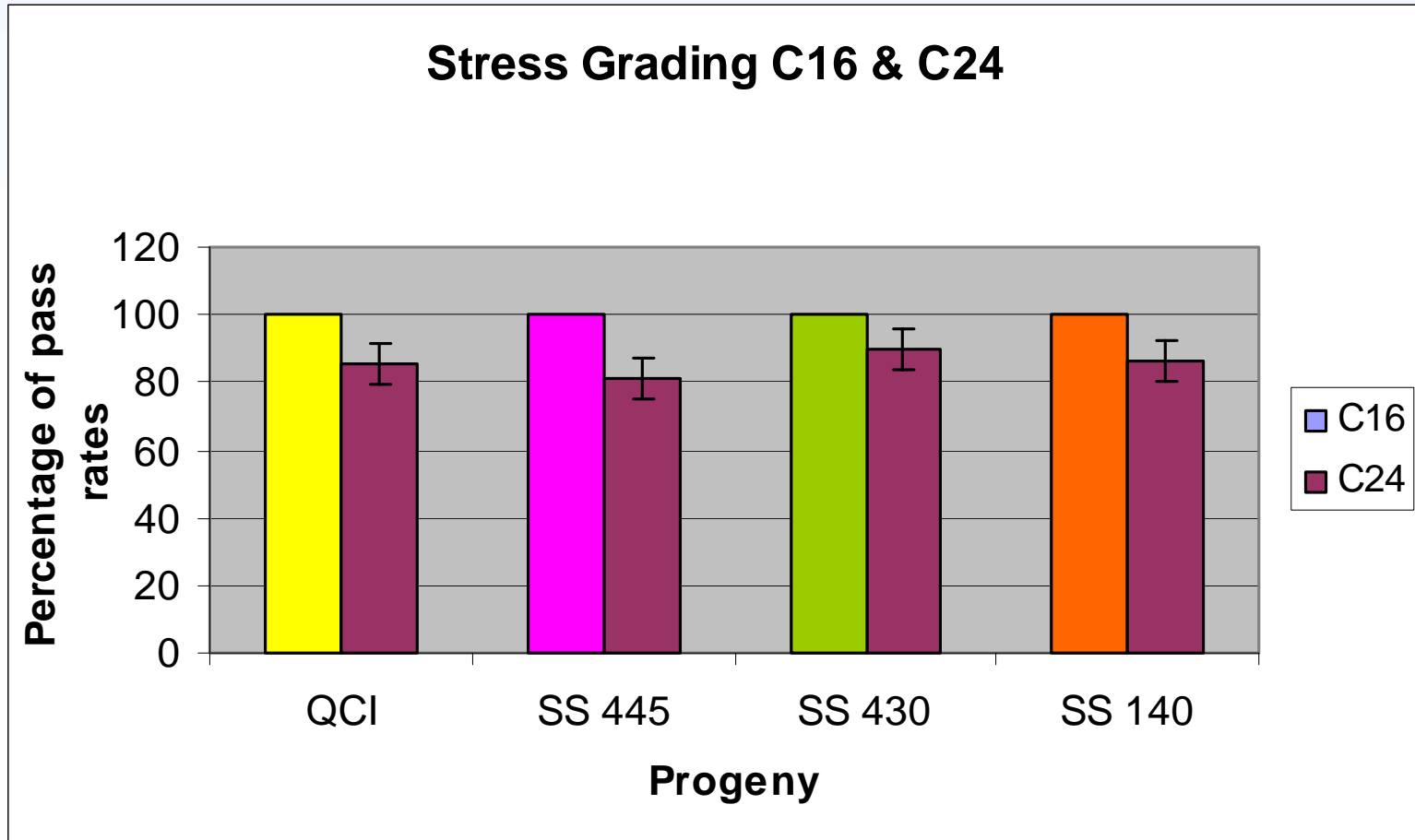**Median Straightness Scores**
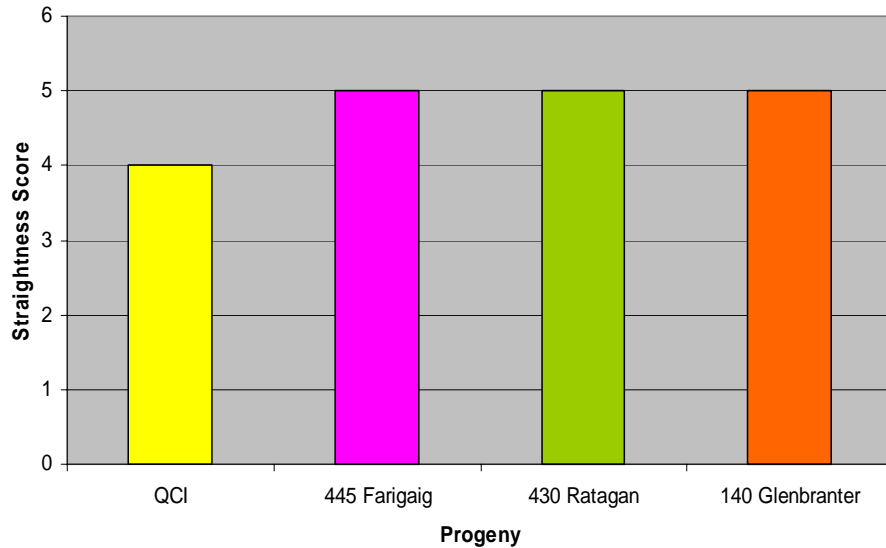
Spiral Grain
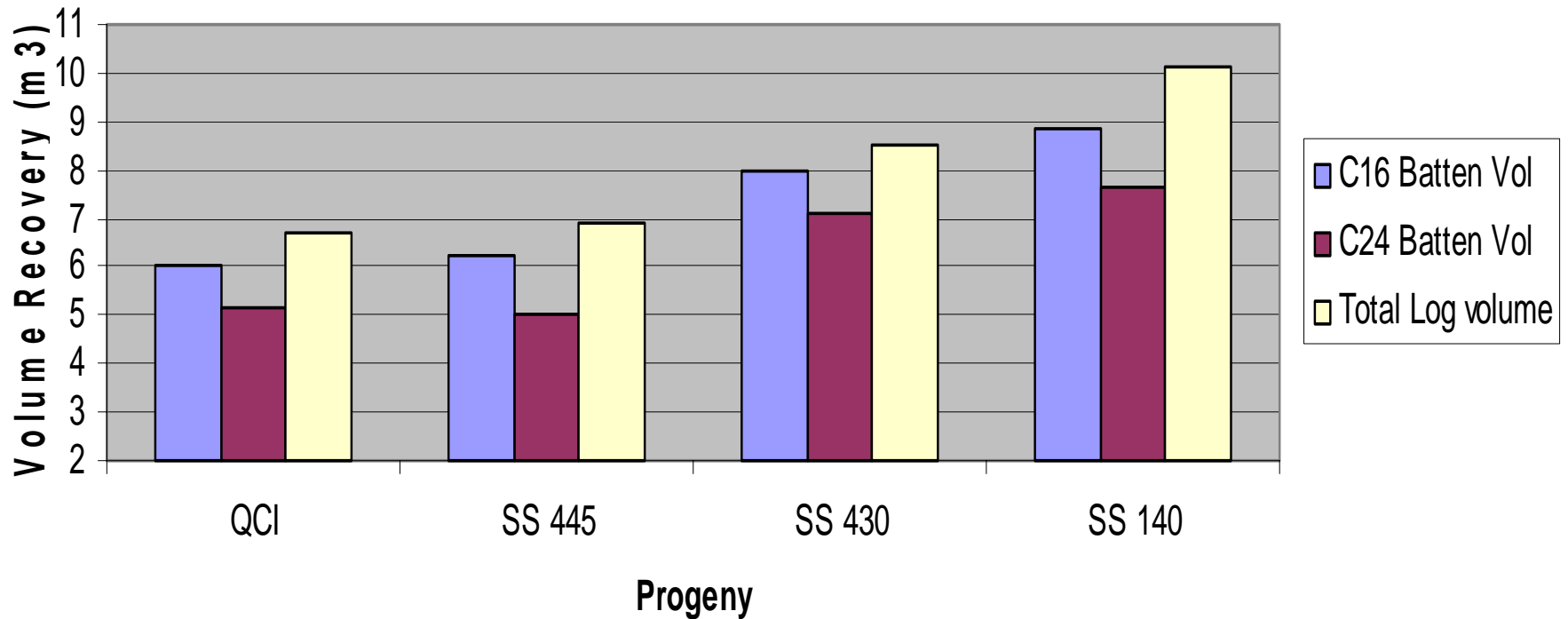
Green Log Recovery and Density

Percentage of Virtual Green Log recovery per ha

Density (Pilodyn)

Stress Grading

Stress Grading C16 & C24

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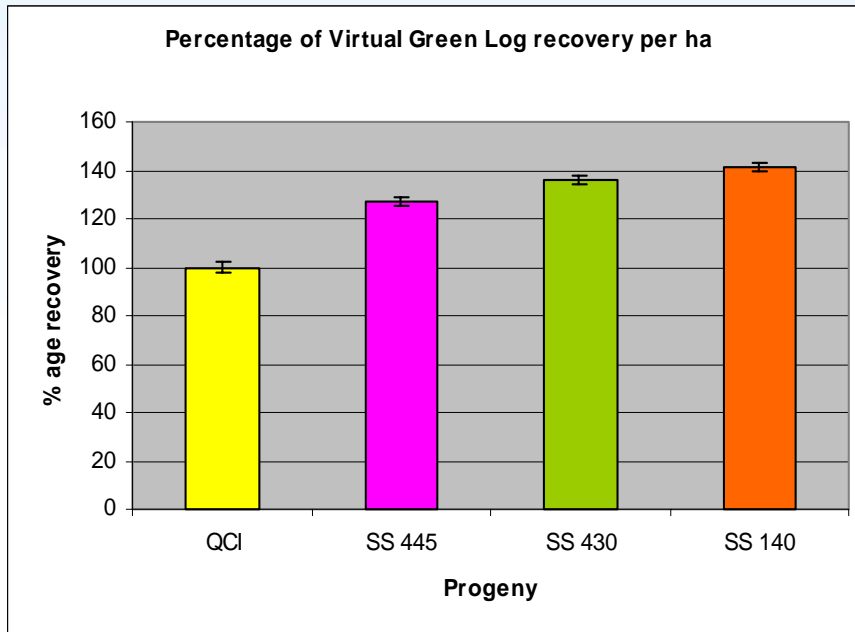
Volume Recovery by Grade

Family Values

Family	Diameter (cm)	Straight %	Pilodyn %	Vol to 16cm (m3)	Green Log Vol	C16 Pass %	C24 Pass % (Derived)	C24 Derived Vol
SS445	22.03 (-7%)	+25	+18	6.24(+3.3%)	6.88 (+2.52%)	100	-5.1%	5.05 (-1.8%)
SS430	25.07 (+6%)	+25	-29.4	7.95(+31.%)	8.51 (+26.8%)	100	+5.6%	7.11(+38.3%)
SS140	24.02(+1.6)	+25	-7.7	8.83(+46.%)	10.15(+51.2%)	100	+1.3%	7.62(+48.25%)
QCI	23.64(100%)	4	17.22cm	6.04	6.71	100	85.19%	5.14

Summary

- Have a timber properties model for QCI Sitka spruce

- Model currently predicts wood density, knot size & status. Models for grain angle and microfibril angle are being developed and will be added

- Timber properties model is being linked to BRE batten performance models

- Sawmill trials on improved Sitka spruce progeny have shown that it performs as well as QCI

- Linking timber properties and batten performance models together offers possibilities for assessing the impact of selection (for different characteristics) on final sawn timber performance