

Determining the genetic heritability of wood properties of Sitka spruce critical to timber strength.

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Improving timber quality

- Initially selected for stem straightness, vigour and density.
- There needs to be greater emphasis on timber quality.
- Aspects such as microfibril angle, branching characteristics, spiral grain and the proportion of juvenile wood need to be considered.

Objectives

- Determine the genetic heritabilities of wood properties critical to spruce timber quality and strength, to aid with future developments of the breeding programme.
- To compare direct measurements of density and MOE with more easily measured field techniques.
- To provide data for use in the Sitka spruce wood quality model being developed by Forest Research.

Speyside 2



Sampling

525 sample trees



33 families => 3 trees
randomly selected from
each of the 5 replicates

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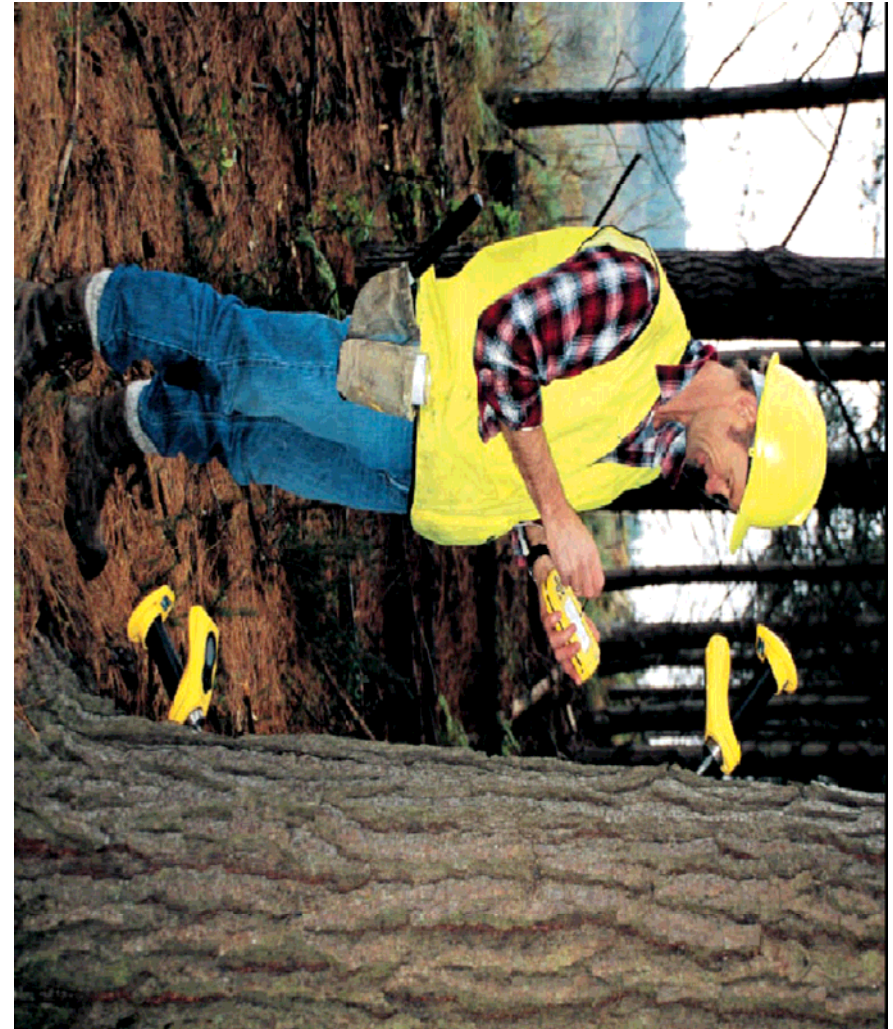
30 QCI control trees

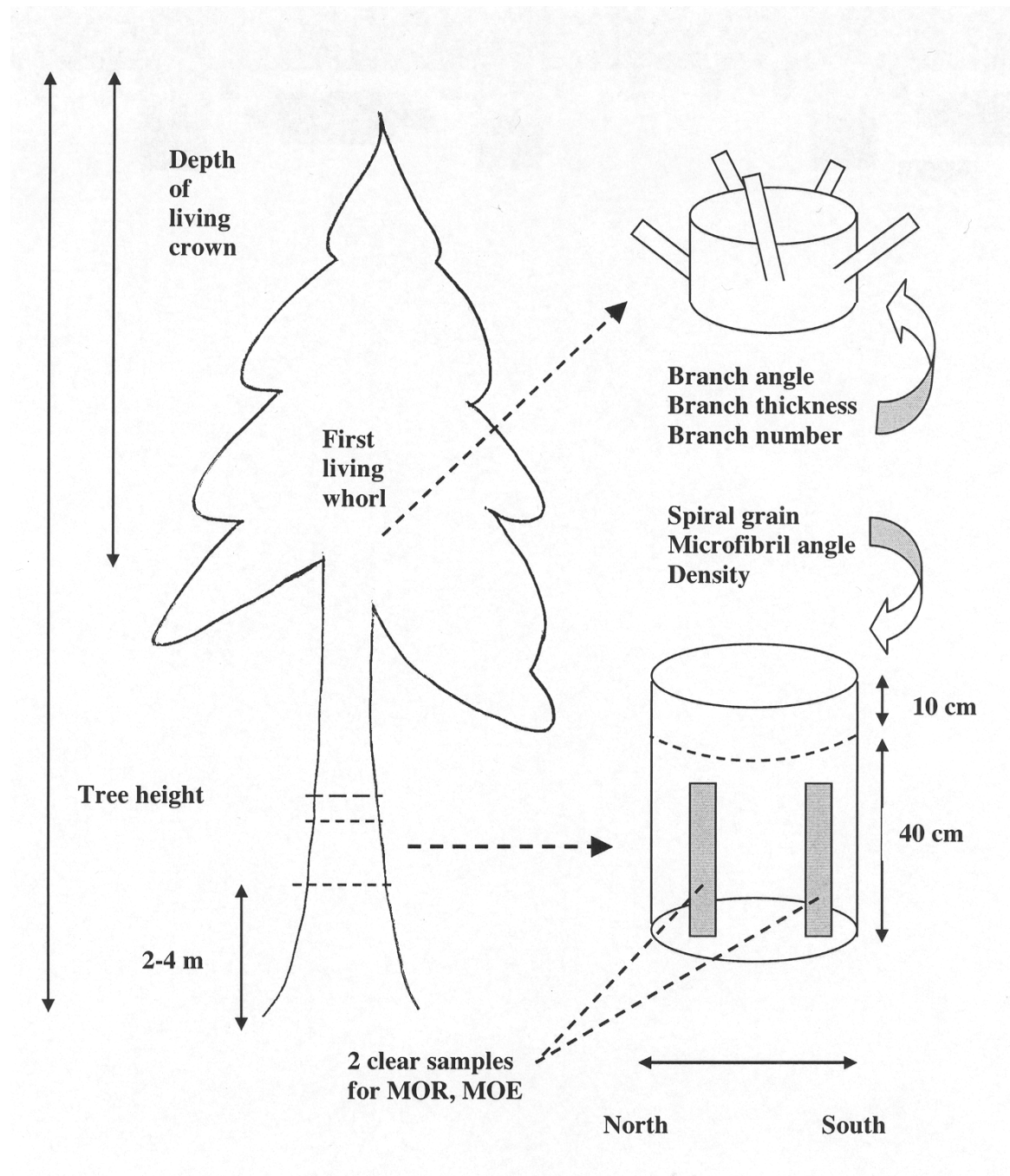
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|-----|-----|-----|-----|-----|
| | | | | |
| 99 | 98 | 97 | 96 | 95 |
| 116 | 117 | 118 | 119 | 120 |
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Acoustic measurements

- Method for measuring MOE of standing trees
- Dynamic MOE = $(p/g)v^2$
- Fast non destructive sampling

Picture from www.fibre-gen.com











Initial results

| | h^2_i | H^2_f | Control mean | Progeny mean |
|--------------|-------------|-------------|--------------|--------------|
| Branch No. | 0.20 | 0.39 | 5.13 (1.48) | 5.68 (1.65) |
| Spiral grain | 0.53 | 0.66 | 3.60 (0.28) | 3.55 (0.77) |
| Tree Diam. | 0.18 | 0.35 | 13.27 (0.42) | 13.84 (0.1) |
| Tree height | 0.38 | 0.50 | 12.68 (0.24) | 12.52 (0.06) |
| Crown depth | 0.48 | 0.63 | 7.71 (0.26) | 7.8 (0.09) |
| Velocity | 0.65 | 0.75 | 3.77 (0.26) | 3.78 (0.23) |

Clear wood battens

- Two clears cut from each tree centered on the 9th ring for strength testing.
- Cube from each clear used to measure density.
- Microfibril angle measured on the 9th ring of battens.

Acknowledgements

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- My supervisors are (at Aberdeen University) Dr Andrew Cameron and (at Forest Research) Dr Steve Lee
- This work is programmed to be completed in Dec 2008.