Culture affects management of young Scots pine stands today – what is the result after 50 years?

Nuutti Kiljunen
Background

• Timing (and intensity) of PCT in Scots pine affects the quality of wood
  – Branch diameter in butt log
  – Proportion of juvenile wood and wood density
• Finland – Sweden- different culture in PCT and timber pricing
  • Sweden – pricing conforms with the end use value today but quality is poorly taken into account in PCT
  • In Finland – pine timber price lesser correlated with end use value, however, quality is a key issue in PCT
  • Is it somehow controversial? Is someone right or wrong, or does it matter?
Background II

- Wood processing industry
  - Development in sawmilling technology
  - Gluelam, fingerjoints and other tricks to tackle branch problems
- Is there over-quality today in the markets of Scots pine lumber?
“Hypothesis”

- Quality of Scots pine wood is affected by the PCT, but
  - Aiming for very good quality timber may be too expensive (costly PCT, and losses in wood production on stand level)
  - Stand establishment method may already make it unfavourable to reach best quality classes
  - Developing technology may decrease need for special quality lumber
  - There may be a risk for over-quality
  - Aiming at good branch quality is an investment with a 50 year long lifetime
What is known

• We have the trees now. PCT today – harvesting and wood processing after 50 years.
• We can forecast the stand development
  – Simulation
  – Stand experiments
• Development of technology can be forecast to some extent
• Markets after 50 years are completely unknown
Timing of PCT and costs, turn these to €’s yourself

Drawn from Bergstrand 1986

Fig. 2. The back-transformed and bias-corrected a priori estimates (LC cor.), and calculated values (LC) of labour consumption of Pre-Commercial Thinning (PCT) according to stand age and removal in stands which have previously had PCT. Uotila et al. 2014
Timing of PCT: Growth and yield

- Roberts (1999), near Umeå
  - PCT 5=>3m, stand yield + 2.5 – 16%, Tree volume +7-12%

- MOTTI, a Finnish stand simulator
  - PCT 6m => 4m, 3 m$^3$ more pulpwood in 1st thinning, rest of the rotation approx. equal

- Diameter increment in young stands is also related to proportion of juvenile wood and density of trees
  - Is it really important concerning timing of PCT?
Timing of PCT: Risk for damages

- Moose browsing may decrease at 3 m, small risk left at 4 m
- Risk of need for pre-cleaning at 1st thinning?
  - Long time between PCT and 1st thinning in any case – spruce undergrowth appears anyhow if it’s going to appear
Timing of PCT: Branch diameter

- If stand density is reasonable (over 2000), the quality of butt log is made before 6 m top height (Varmola & Salminen, 2004)
- From 3 to 6 metres thickest branch diameter increases 3 mm (same stand density). (V&S 2004, Fahlvik et al.)
- Change of density: 300 stems per ha => change of 1 mm in branch diameter
Sawmilling technology

• Sawmilling technology is developing for better value recovery
  – Component sawing improves value recovery markedly compared to traditional cant sawing

• Also pith-free options available already today
• Gluelam and other EWPs…
Conclusions etc.

- Markets of Scots pine products in 2065 are unknown
- Better value recovery from timber expected in the future due to improved sawmilling technology
- Long investment lifetime discounts value differences (50 y., 3% => disc. factor 0.22)
- The current Finnish guideline of PCT in 5-7m can be questioned, is the best quality most not necessary most profitable for the forest owner
- 6 m top height is end – everything over that is waste of money, at weak sites 4 should be enough
- Good PCT is important in any case
  - Enough production trees (2000+)
  - Quality of stems
  - Right choice of tree species
- Inverting as soil preparation to decrease the work difficulty in PCT? Some other means to enable only one brushcutting operation?
Site, geographical location

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Stand history

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Current stand - PCT decision phase

⇒ PCT cost, €

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1st thinning

⇒ Yield, (Stumpage from 1st thinning)

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Rest of the rotation, final cut

⇒ Yield
(stumpage)

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External tree characteristics

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Internal properties, knottiness etc.

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Lumber quality (bending strength, MOE, quality class distribution)