Thinning trials in Sweden

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- ***First field trials in 2007, the short story…***

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Comparison of Boom-Corridor Thinning and Thinning From Below Harvesting Methods in Young Dense Scots Pine Stands

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At present, only a small proportion of the potential extractable bioenergy from young dense forests in Sweden is utilized. The conventional mechanized first thinning systems used in such stands suffer from low productivity, so the operation is only profitable in stands with bigger trees and high standing volumes. Conventional harvesters are used for this operation equipped with accumulating felling heads designed for handling several trees during each crane cycle. In thinning from below the felling and bunching work requires many time-consuming non-linear crane movements to avoid felling or damaging of future crop trees. However, higher productivity can be achieved when trees between strip roads are harvested in about 1 m-wide corridors with a length corresponding to the reach of the crane. We refer to this operation as boom-corridor thinning. The objective of this study was to compare felling and bunching productivity in young dense stands when employing thinning from below or boom-corridor thinning. Experiments were performed using a randomized block design involving between 4400 and 18 600 trees×ha^{-1} with a corresponding average tree size of 7.2 and 3.2 cm dbh, respectively. Based on the average tree being removed at a dbh of 5.7 cm, the productivity (ODt ×PW-hour^{-1}) was significant (almost 16%) higher for the boom-corridor thinning than for thinning from below treatment. At the same time, the time taken for the work element "Crane in-between" (the period between the loaded crane starting to move towards a tree and the felling head rapidly slowing down for positioning) was significantly reduced, by almost 17%. The positive results were achieved even though the operator was new to the method. To achieve a significantly higher efficiency during the felling and bunching operation, development of new harvesting equipment and operating techniques seems crucial.

Keywords bioenergy, comparative time studies, energy wood, geometric thinning, pre-commercial thinnings, systematic thinnings
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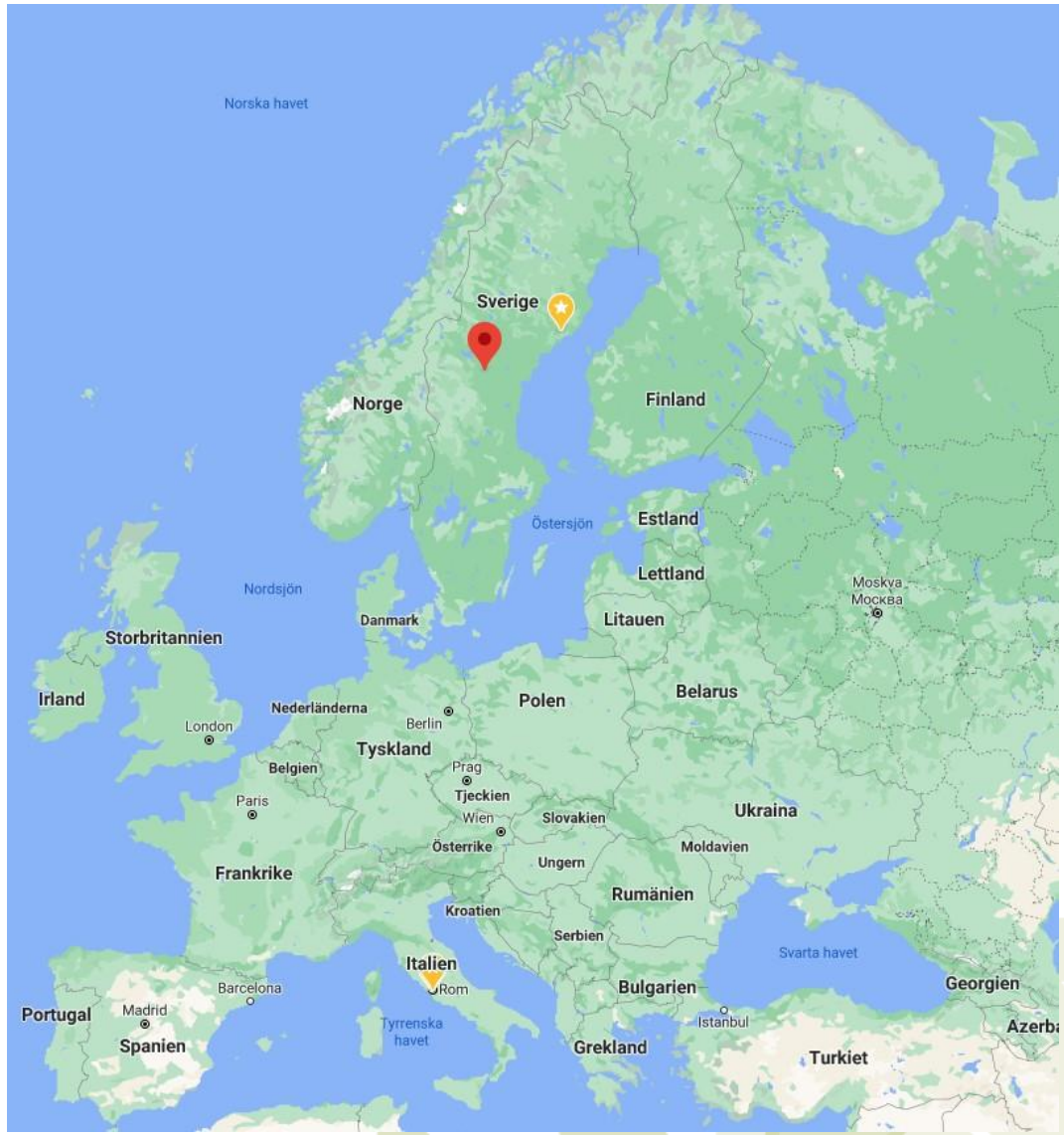
- ***The objective in SMALLWOOD was to repeat old trials with upgraded C16***
- ***and to perform trials in stands with tree sizes suitable for effective work with C16***

- ***Of practical reasons, we wanted to do trials close to Bracke Forest company (red dot on map)***
  - ***And so we did…***

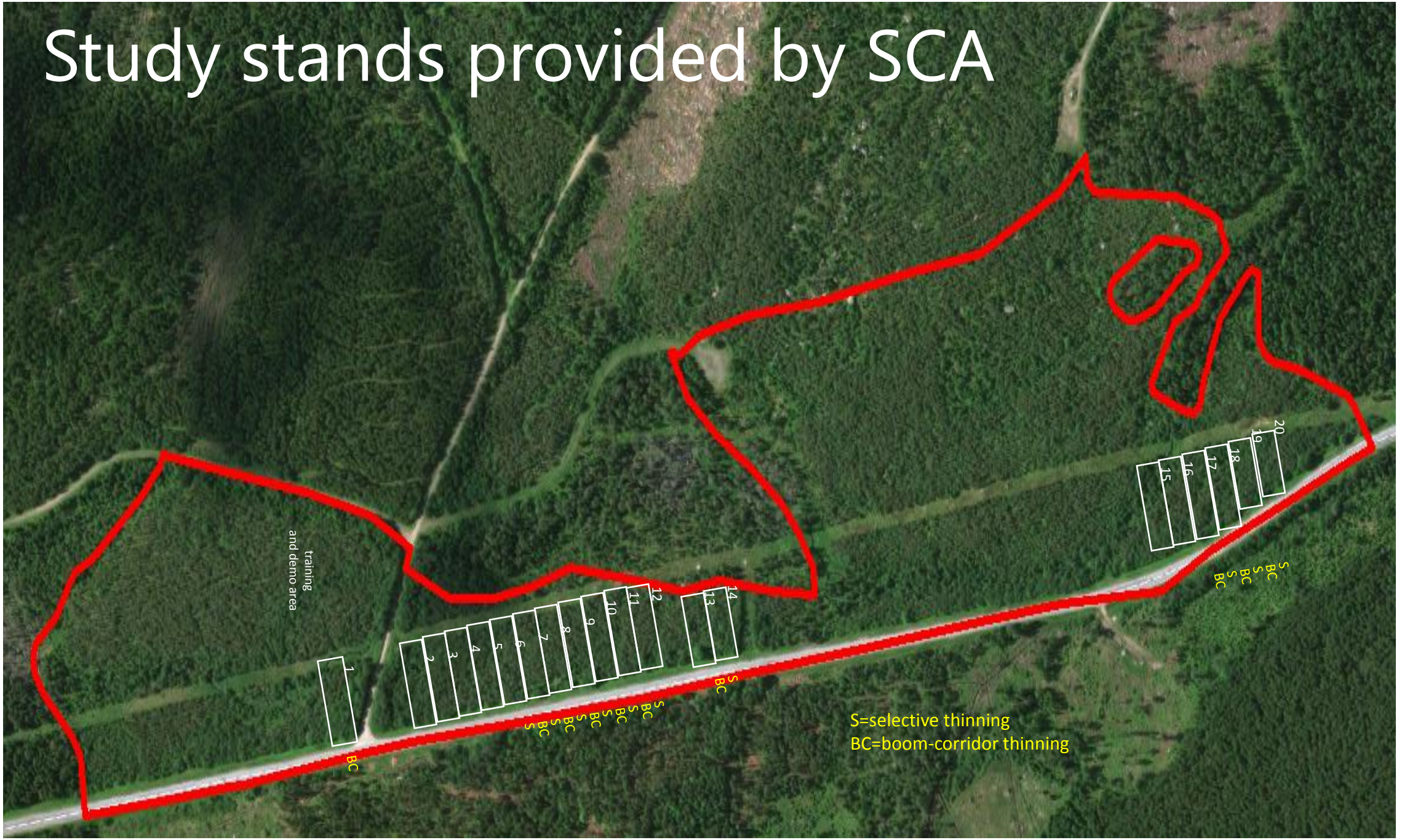


The study design

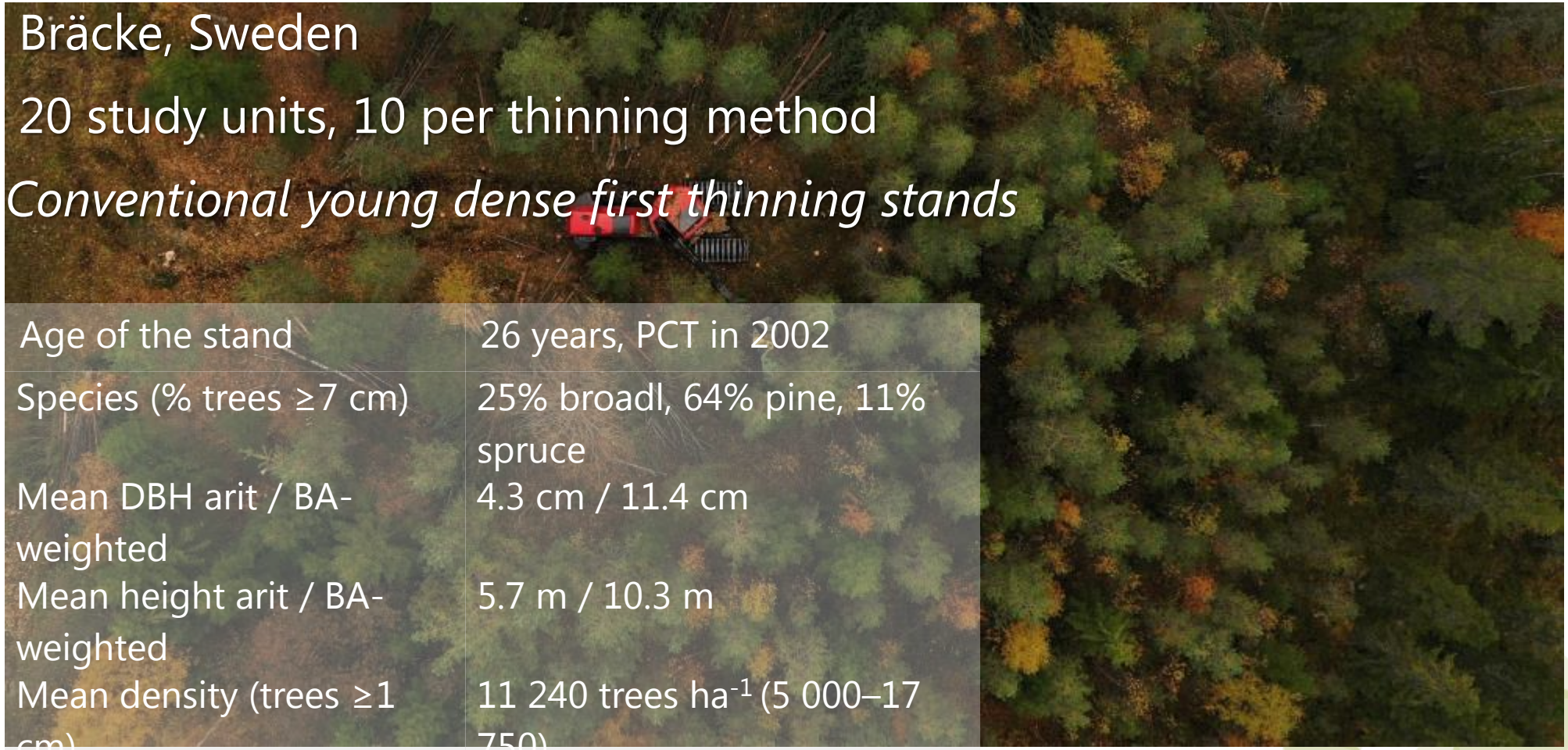
Comparative study

- Evaluate effects of thinning method
  - Various stand conditions
  - Repetitions
- 12-20 “blocks”, i.e. 6-10 study units per method
- At least 30min work time per parcel (1000m2)
- Randomization of treatments

Study stands provided by SCA



Stand characteristics



Bräcke, Sweden

20 study units, 10 per thinning method

Conventional young dense first thinning stands

Age of the stand	26 years, PCT in 2002
Species (% trees ≥7 cm)	25% broadl, 64% pine, 11% spruce
Mean DBH arit / BA-weighted	4.3 cm / 11.4 cm
Mean height arit / BA-weighted	5.7 m / 10.3 m
Mean density (trees ≥1 cm)	11 240 trees ha^{-1} (5 000–17 750)
Mean density (trees ≥4	3 538 trees ha^{-1} (2 100–6

Photo: C Höök (SLU)

Thanks,

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