

# DEVELOPMENT OF A NORWAY SPRUCE-DOMINATED STAND AFTER ALTERNATIVE TREATMENTS

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## INTRODUCTION AND METHODS

- Forest treatments can be divided into two main groups:
  - levelling out stand structure (stem distribution resembles a normal distribution or covers only very narrow range)
    - low thinning (**b** in Fig. 1), 12 plots
    - dimension cutting (**c**), 4 plots
  - diversifying stand structure (stem distribution resembles a reversed J)
    - single tree selection (**a**), 12 plots
    - untreated (**d**), 4 plots

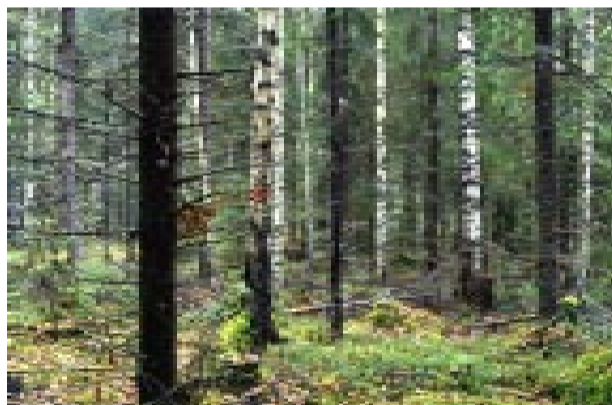
## History of the experimental stand:

- Norway spruce -dominated stand on fertile soil site in southern Finland
- Natural regeneration at 1940's
- Shelterwood cutting in 1945
- Seeding trees were removed in winter 1957-58
- Cleaning and thinning of the sapling stand was done in 1958
- Natural regeneration continued from the surrounding stands. Thus, the stand structure resembled a reversed J

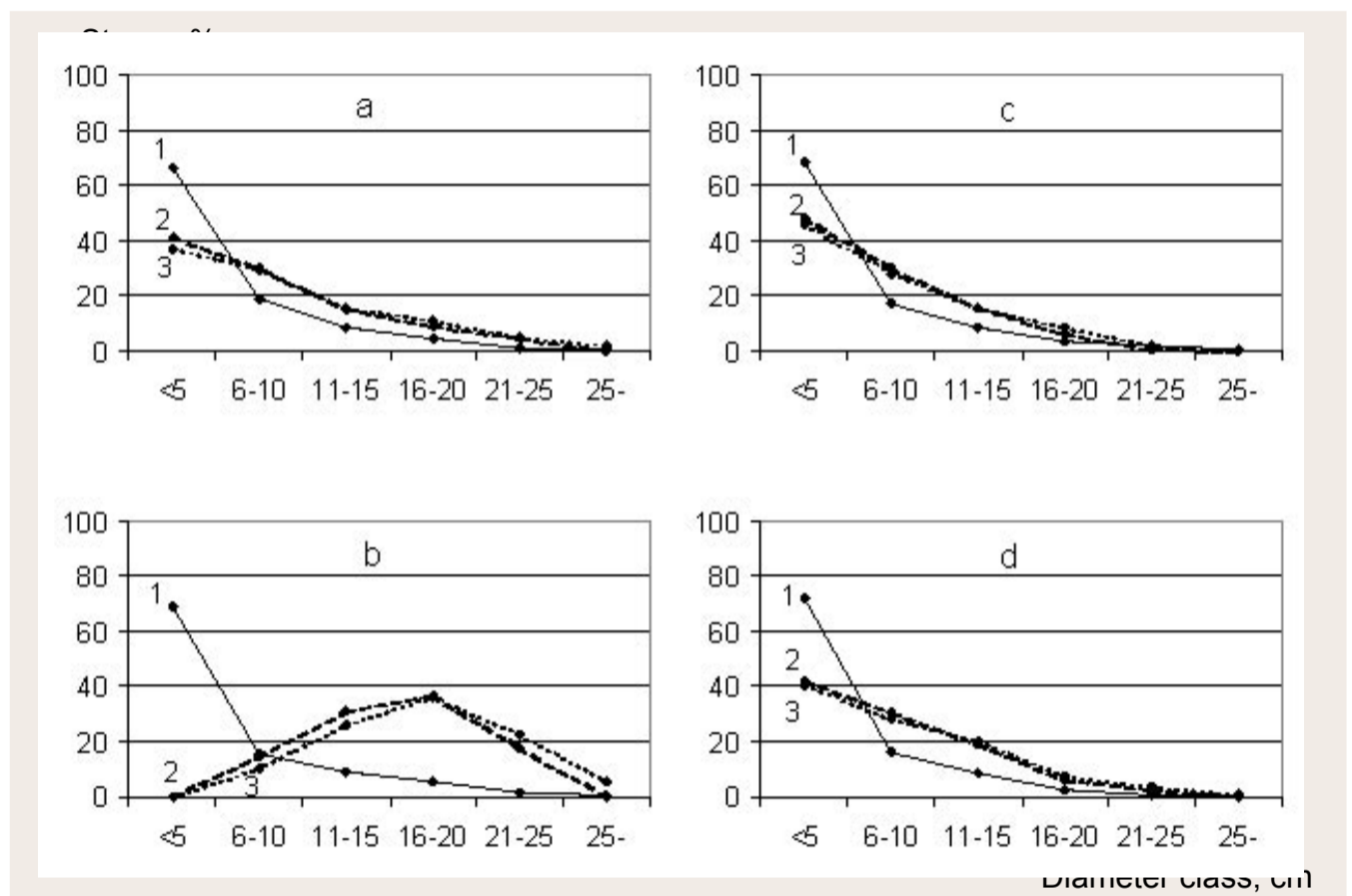
## RESULTS:



a. Single-tree selection



b. Low thinning



Stem distribution (percent) by dbh-class and treatment. 1 = Before treatment in 1986–87, 2 = After treatment in 1994, and 3 = After monitoring in 1999.

## CONCLUSIONS

It seems to be possible to use many silvicultural alternatives already in first commercial thinning. The decision depends on what kind of values are emphasised. If only short-term economy is important dimension cutting may be useful. If within-stand diversity with long-term economy is stressed single tree selection in various forms is a profitable option. Single tree selection also means relatively often repeated cuttings, thus changing only little natural structure of forest stands. Prevailing machinery logging is best suited to low thinning but disturbances in stand structure are obvious and thinning income is low.

Table. Stand parameters ( $\text{ha}^{-1}$ ), a= single tree selection, b= low thinning, c= dimension cutting, and d= untreated. CAI= current annual increment.

Treatment	Volume, $\text{m}^3$ after tr.	Removal, $\text{m}^3$	CAI, $\text{m}^3$
a	151	158	7.2
b	173	91	7.6
c	169	95	8.6
d	240	—	8.6

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