Results and experiences from the Central Swedish Clonal Forestry Program

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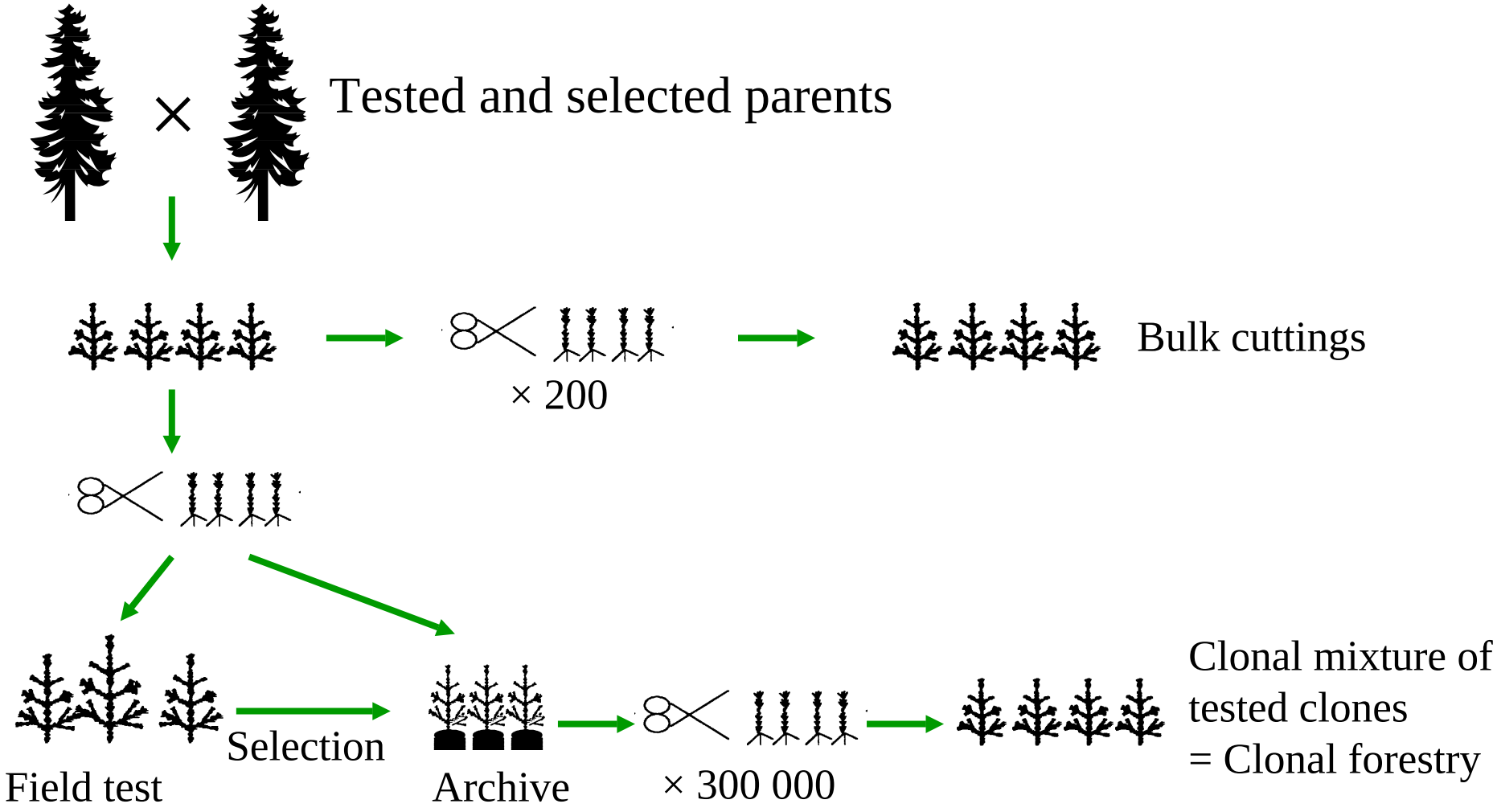
Clonal forestry or bulk cuttings



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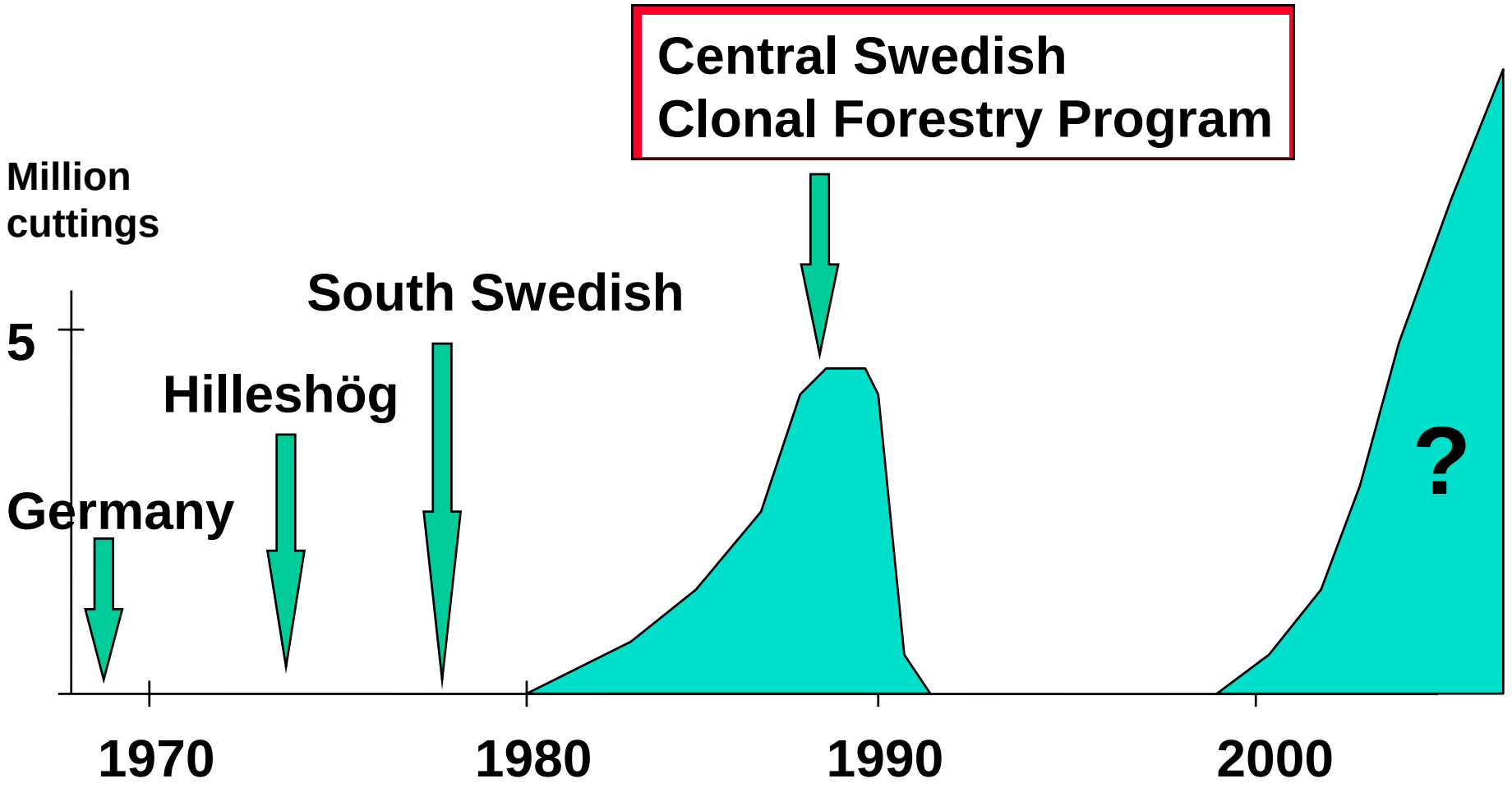
Swedish cutting history



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Central Swedish Clonal Forestry Program

- Members: StoraEnso, Korsnäs, Sveaskog, Holmen
- Started 1989
- Administration, testing and selection by SkogForsk
- Dimensioned for 9 million cuttings per year

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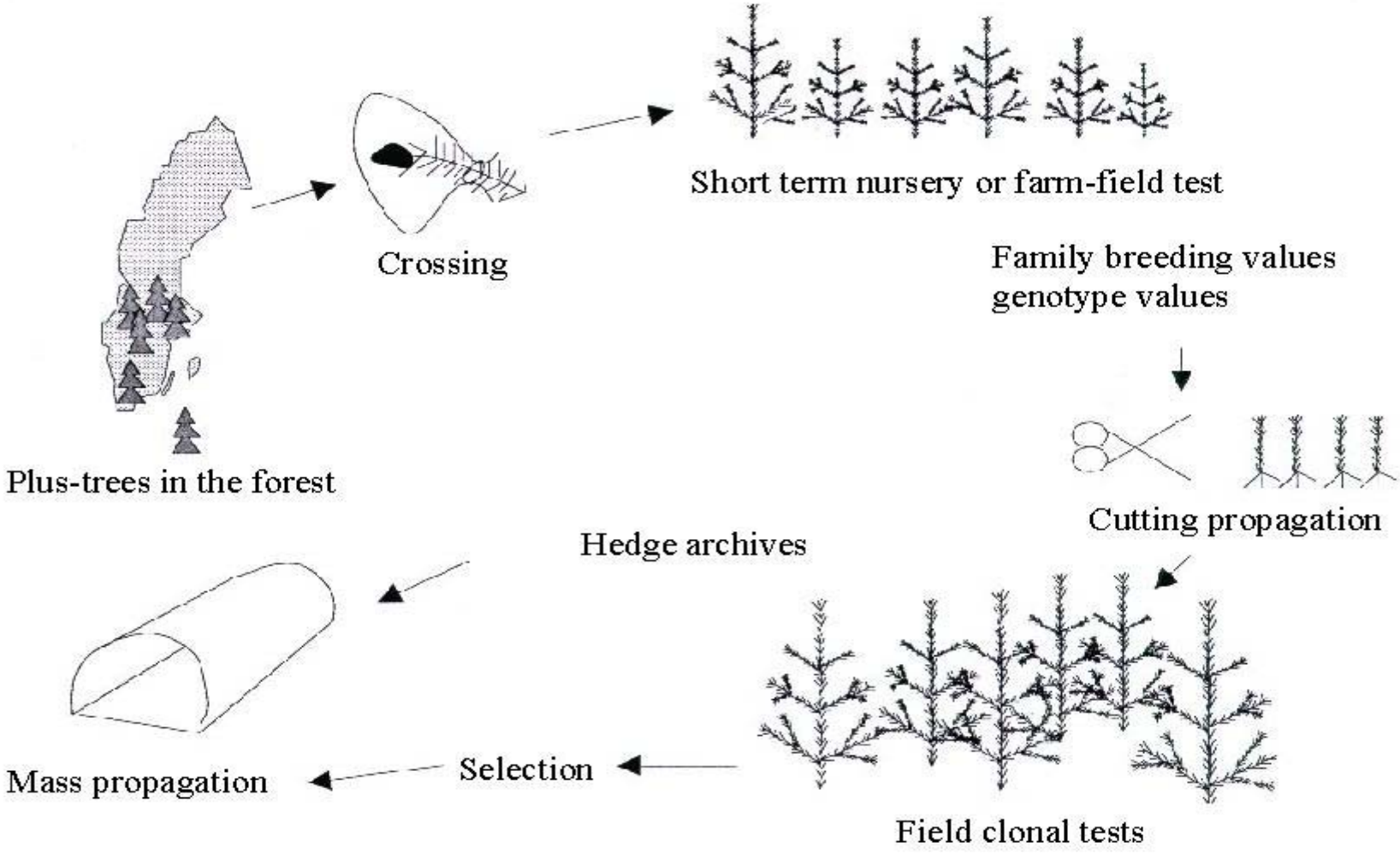
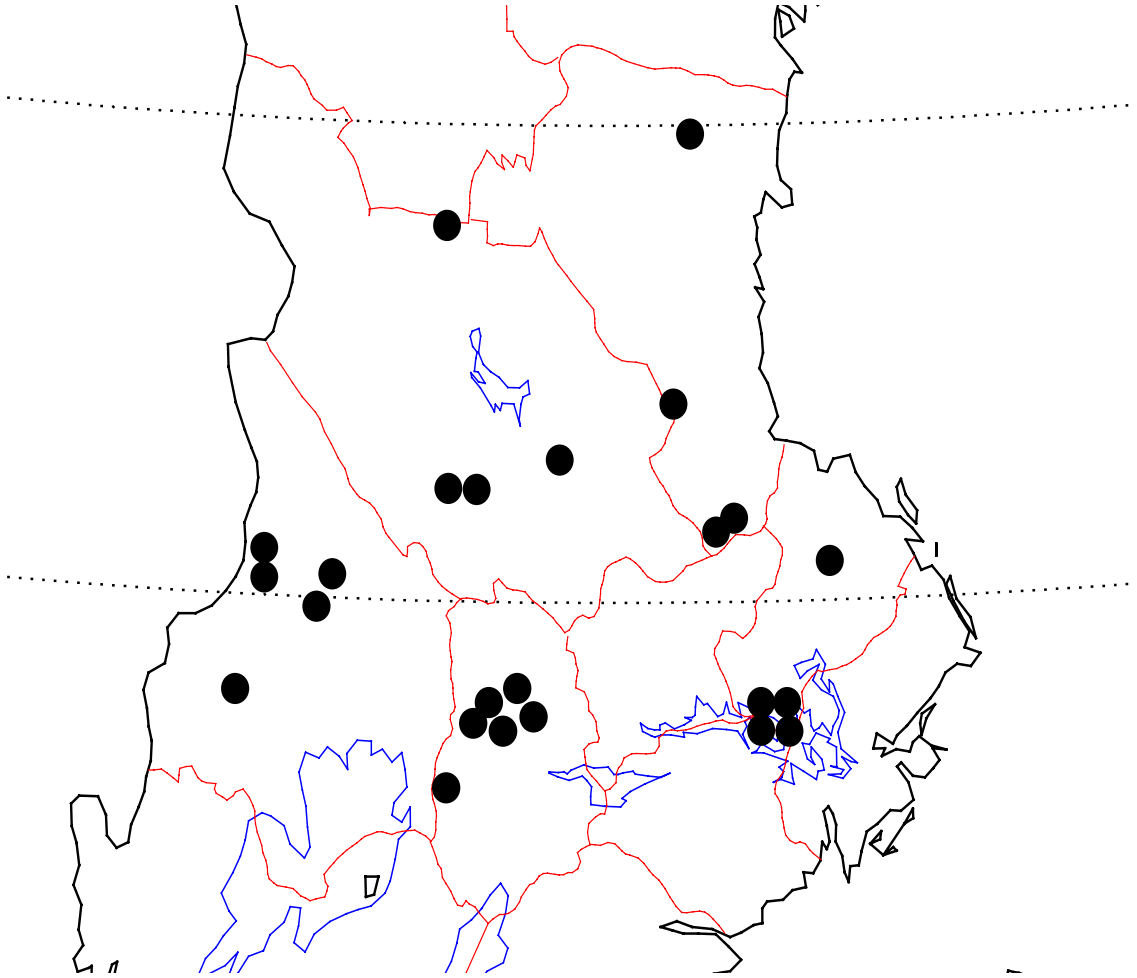
Objectives

- To identify Norway spruce clones with high stem-wood production and survival with maintained or improved wood quality
- To create a base for propagation of 9 million cuttings per year after 2000
- To use the information about tested clones and families in the long-term breeding program


Short term nursery or farm-field test
Crossing
Family breeding values
genotype values
Plus-trees in the forest
Cutting propagation
Hedge archives
Mass propagation
Selection
Field clonal tests

Field trials in the Central Swedish Clonal Forestry Program



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Field clonal test

Hedged donor plants

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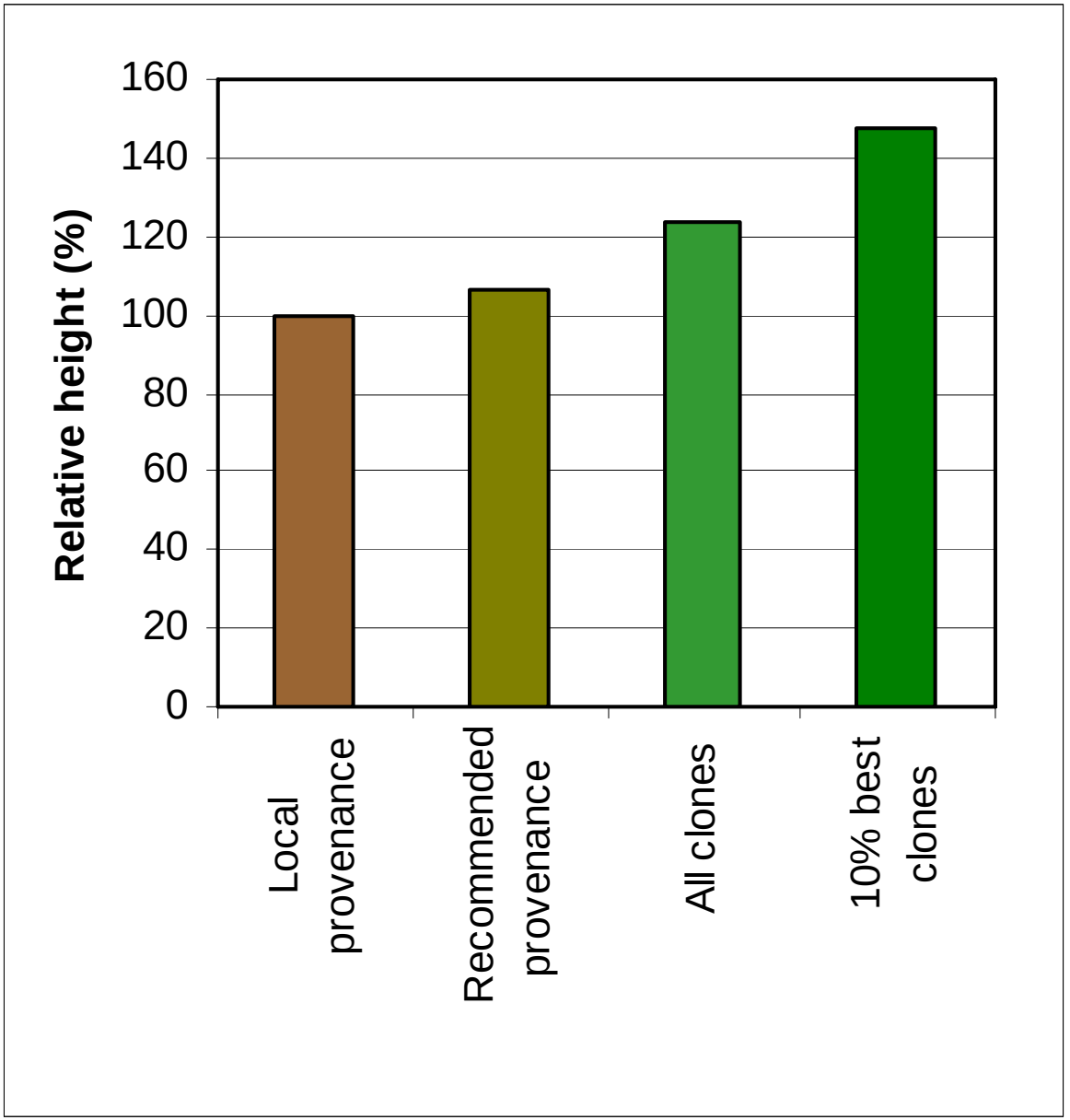
Height after six years in the field. Pooled genotype values from 24 trials.



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Production of rooted cuttings

Delivered:

450 000 Mixtures of tested clones

320 000 Bulk cuttings from full-sib families

In production:

330 000 Mixtures of tested clones (StoraEnso)

600 000 Bulk cuttings (StoraEnso, Odlarna)

Why so few?

- Problem with clone ageing –poor rooting – two years in nursey
- Expensive management of donor plants
- Manual operations difficult to mechanise
- Legal restictions

Bulk cuttings?

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Morphological differences

Tested clone Family bulk

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Costs for clone testing

Activity	Euro per tested clone
Administration	32:-
Testing and selection	133:-
Short term hedge archive	124:-
Total	289:-

Plant prices

Large container seedling	0.20 Euro
Equal size bulk cutting	0.32 Euro
Equal size clonal cutting	0.40 Euro

Nässja farm field test

- 84 000 seedlings from 151 OP-families from 1:st generation plus trees
- After two years; selection of random clones and primary selection to 13 000 seedlings
- Years 3 and 4, assessements of growth and bud phenology on the 13 000 seedlings
- Secondary selection of 2 500 seedlings based on family and individual breeding values
- The 2 500 clones were cutting propagated and established in three field trials
- After six years in the field the trials where assessed and selections made

Secondary selection classes

- **RAN** Random selection
- **OCU** Ocular selection for growth and vigour
- **GROW** Breeding value selection for growth only
- **LATE** Breeding value selection for growth with truncation for late budburst
- **G6**, **G5** and **G4**
- Breeding value selection for growth with phenology truncation for god adaptedness to climate in seed zones G6, G5 and G4 respectively

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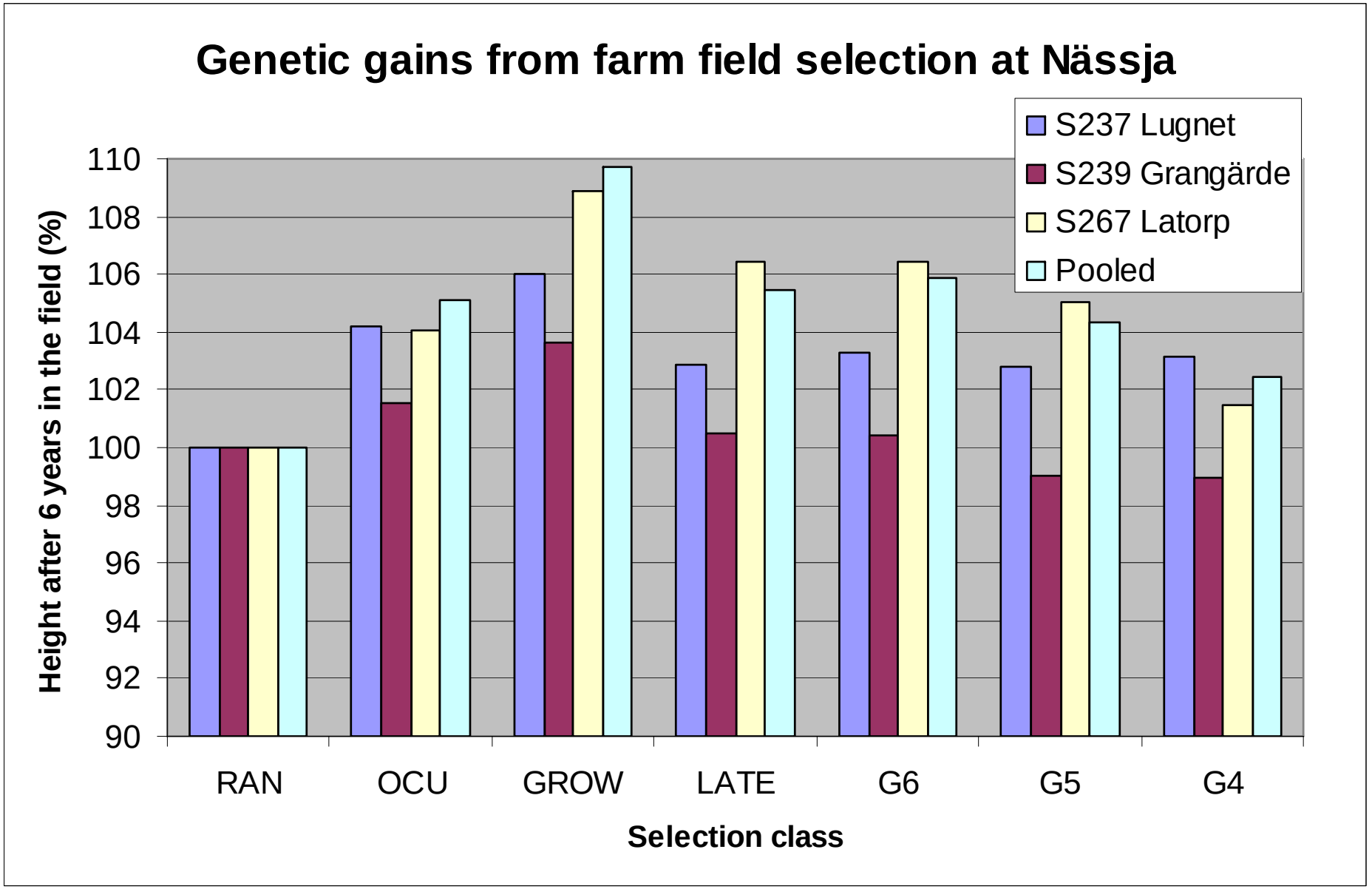
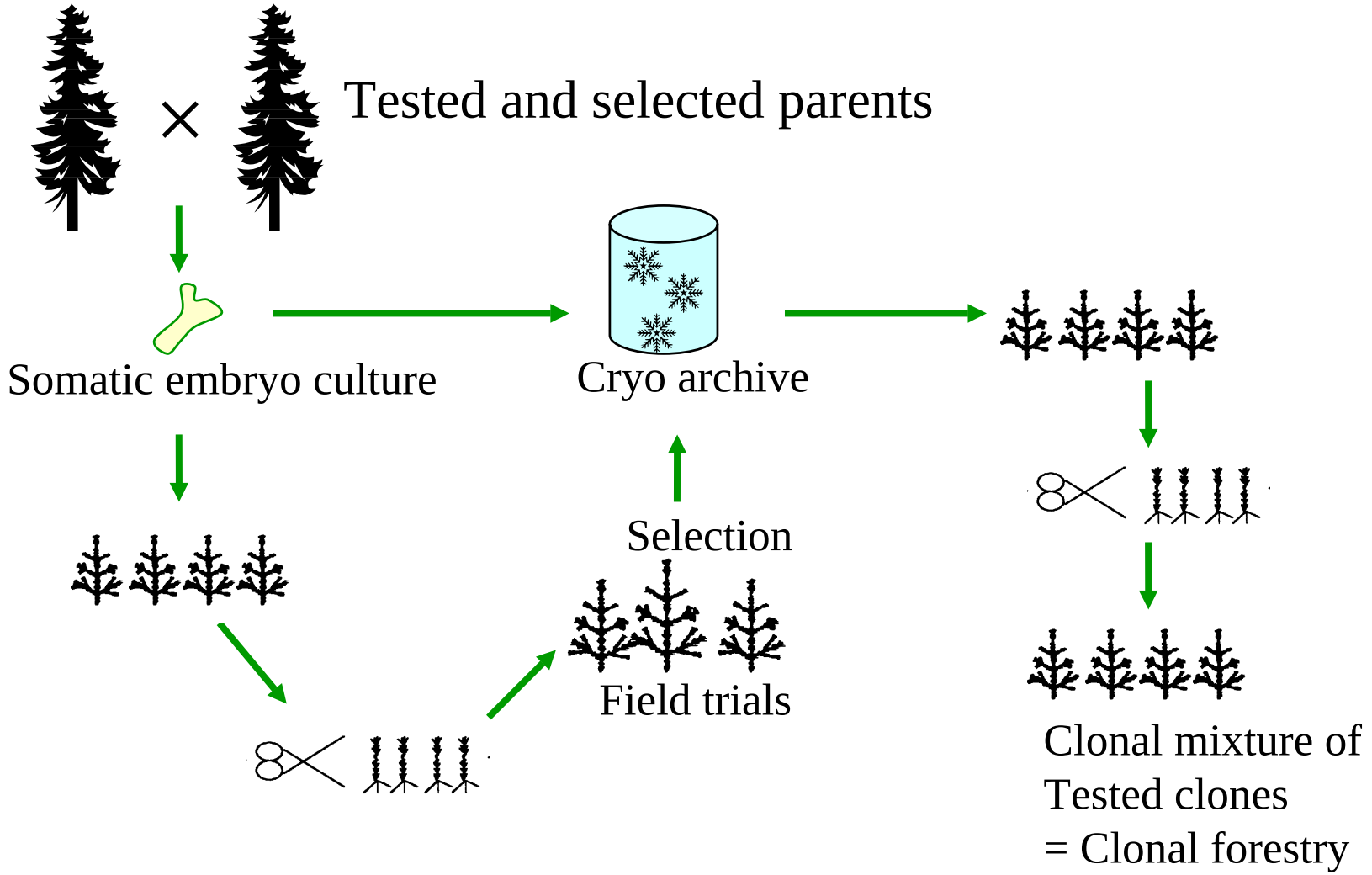

Genetic gains from farm field selection at Nässja
S237 Lugnet
S239 Grangärde
S267 Latorp
Pooled
Height after 6 years in the field (%)
110
108
106
104
102
100
98
96
94
92
90
RAN
OCU
GROW
LATE
G6
G5
G4
Selection class

Possible uses for the tested clones

- Cutting propagation to clonal mixtures
- Ordinary clonal seed orchards
- Indoor seed orchards
- Swedish breeding program

Future clonal forestry



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