Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

Growth and carbon implications of even-aged and continuous-cover forestry

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PhD 1989 – Uneven-aged forestry
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Main theme for research – Uneven-aged forestry

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A comparison of long-term growth levels between different silvicultural systems

Outline

Define silvicultural systems

Growth dynamics of different systems

How do we compare systems?

Results from comparisons

Potential occurrence of uneven-aged forestry

The future?

Define silvicultural systems

Defining silvicultural systems

Criteria?

Visible in the forest

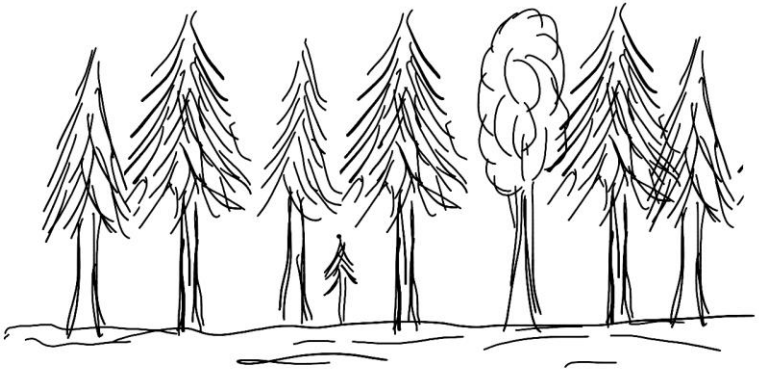
Stable over time

Defining criteria – **stand structure**

Silvicultural systems

Rotation-forestry system
(trakthyggesbruk)

Selection system
(blädningsbruk)

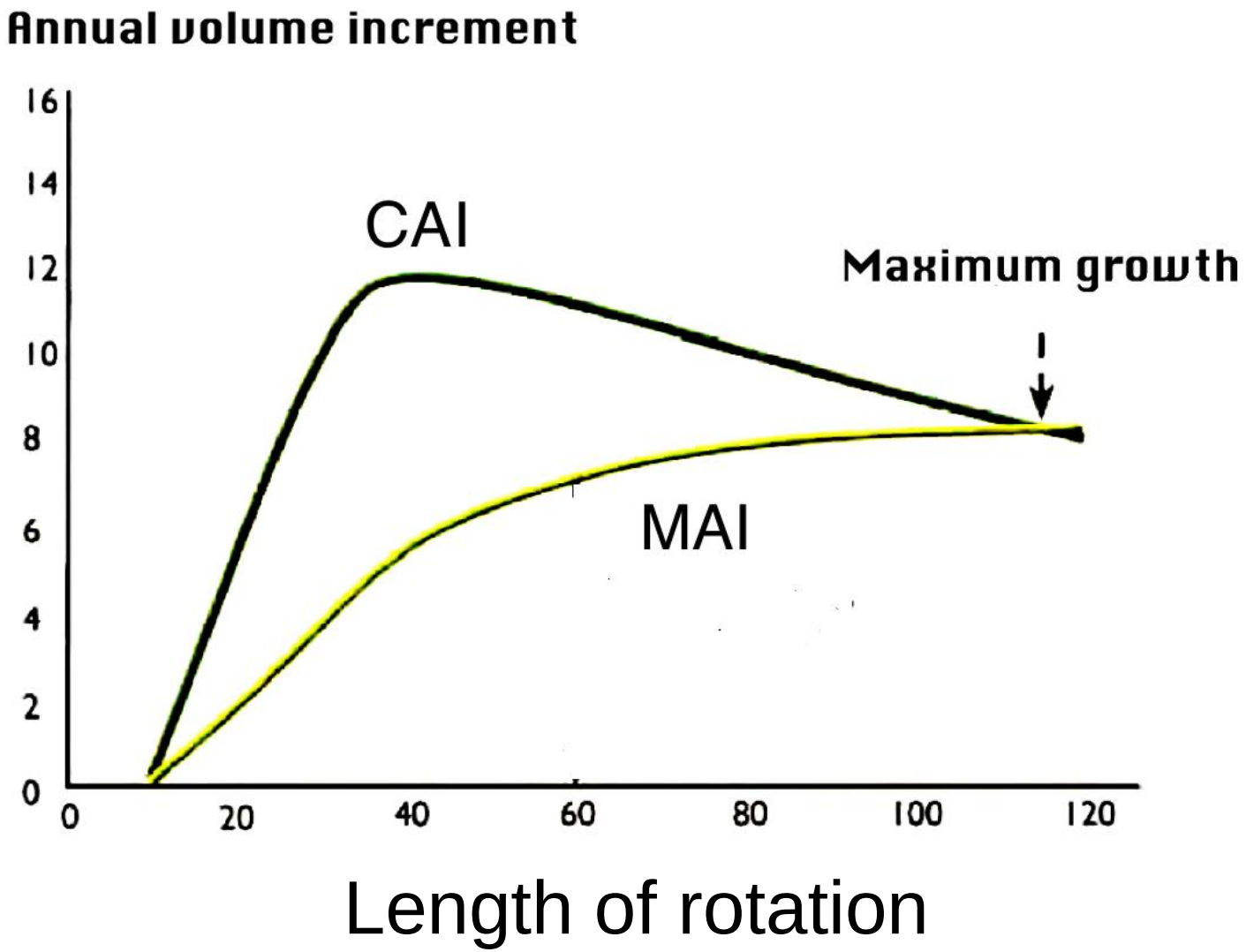


Single-storied

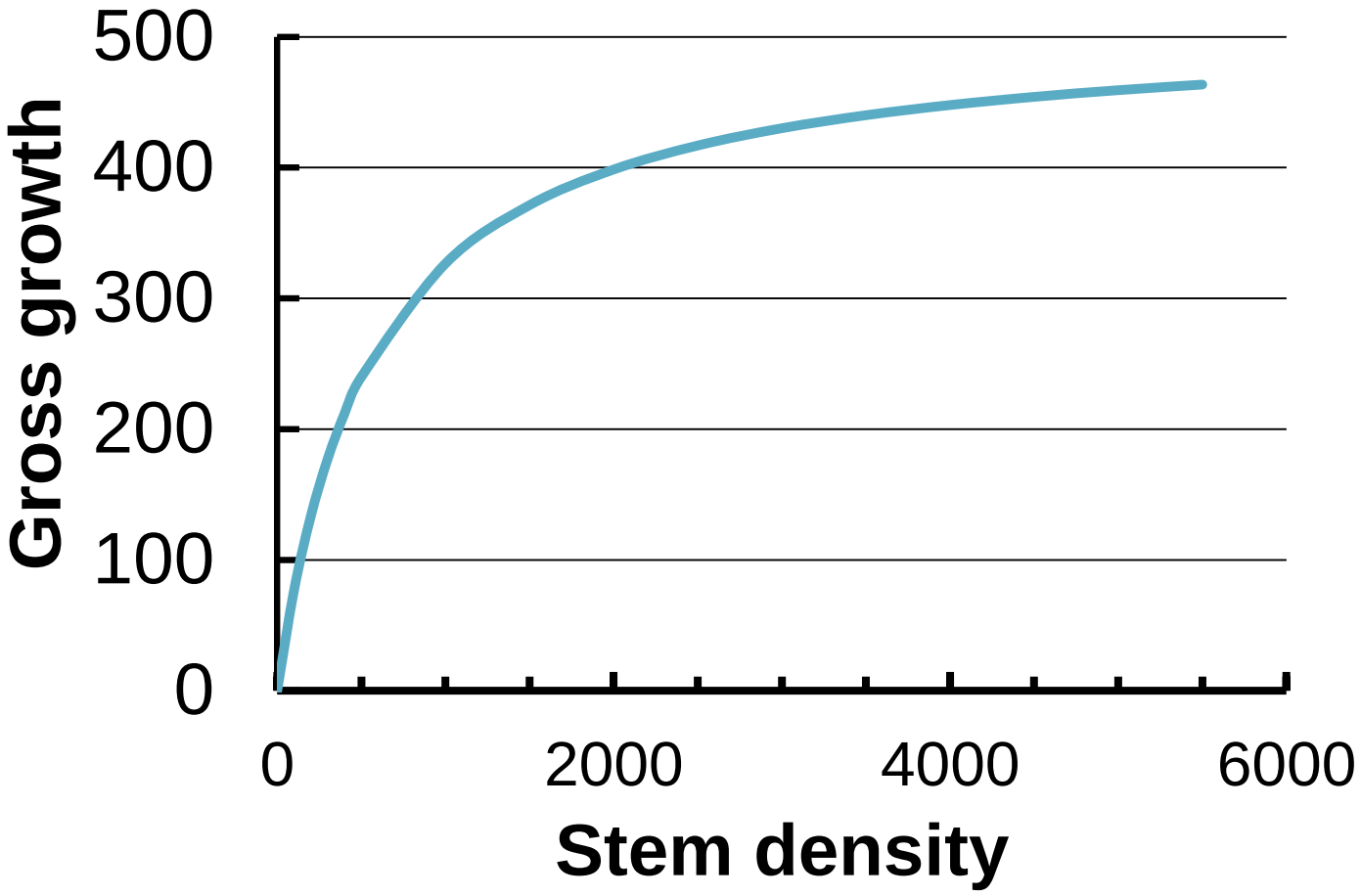
Full-storied

Growth dynamics

Rotation-forestry system



Rotation-forestry system

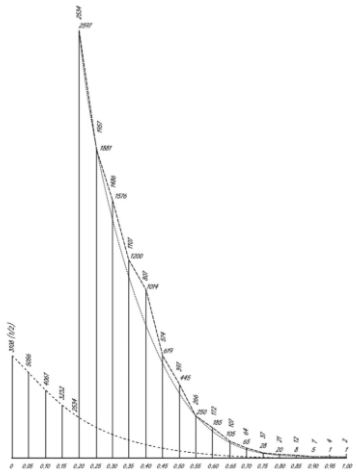


Selection system

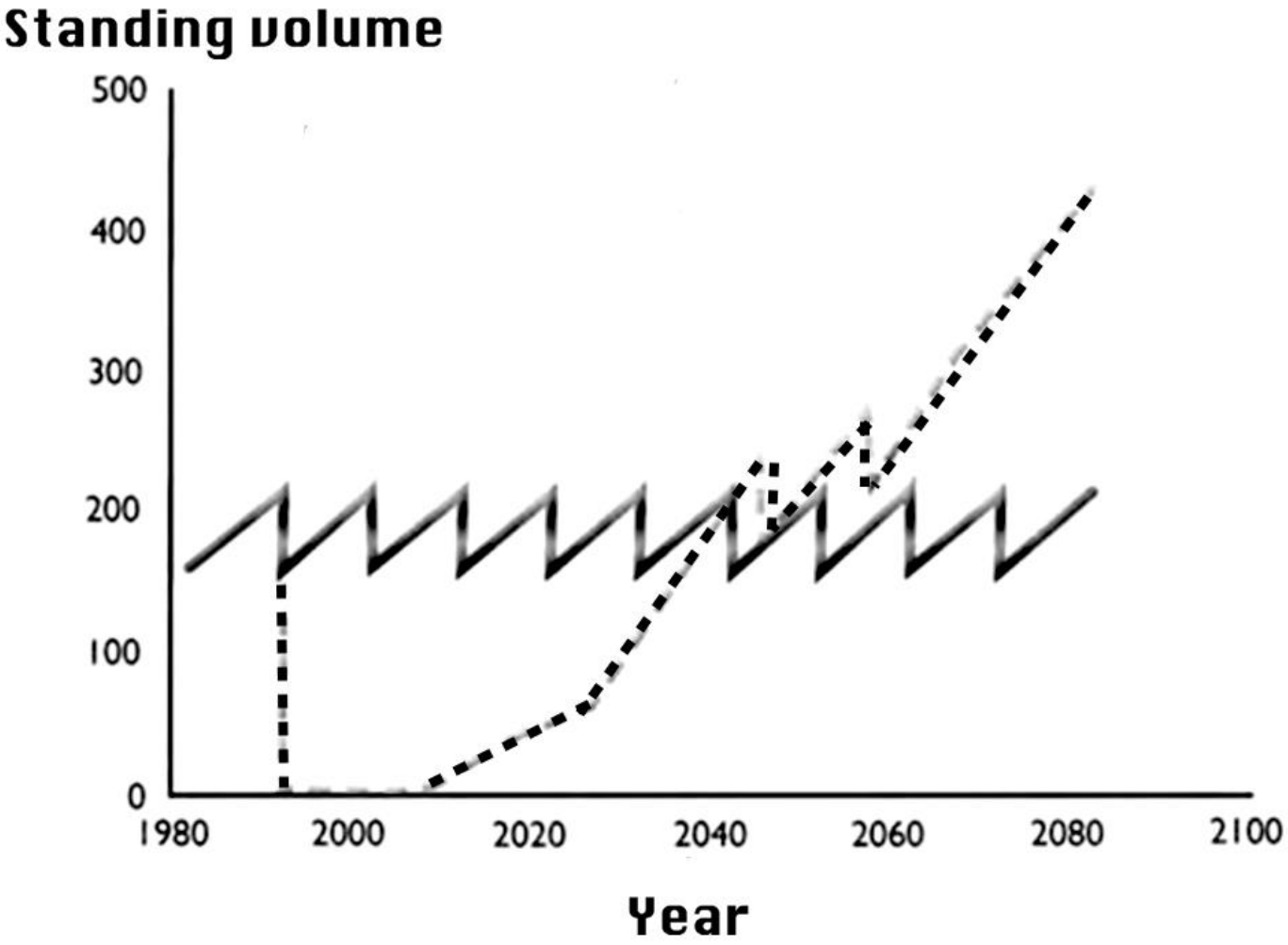
Requires: Norway spruce (Picea abies)

Full-storied stands

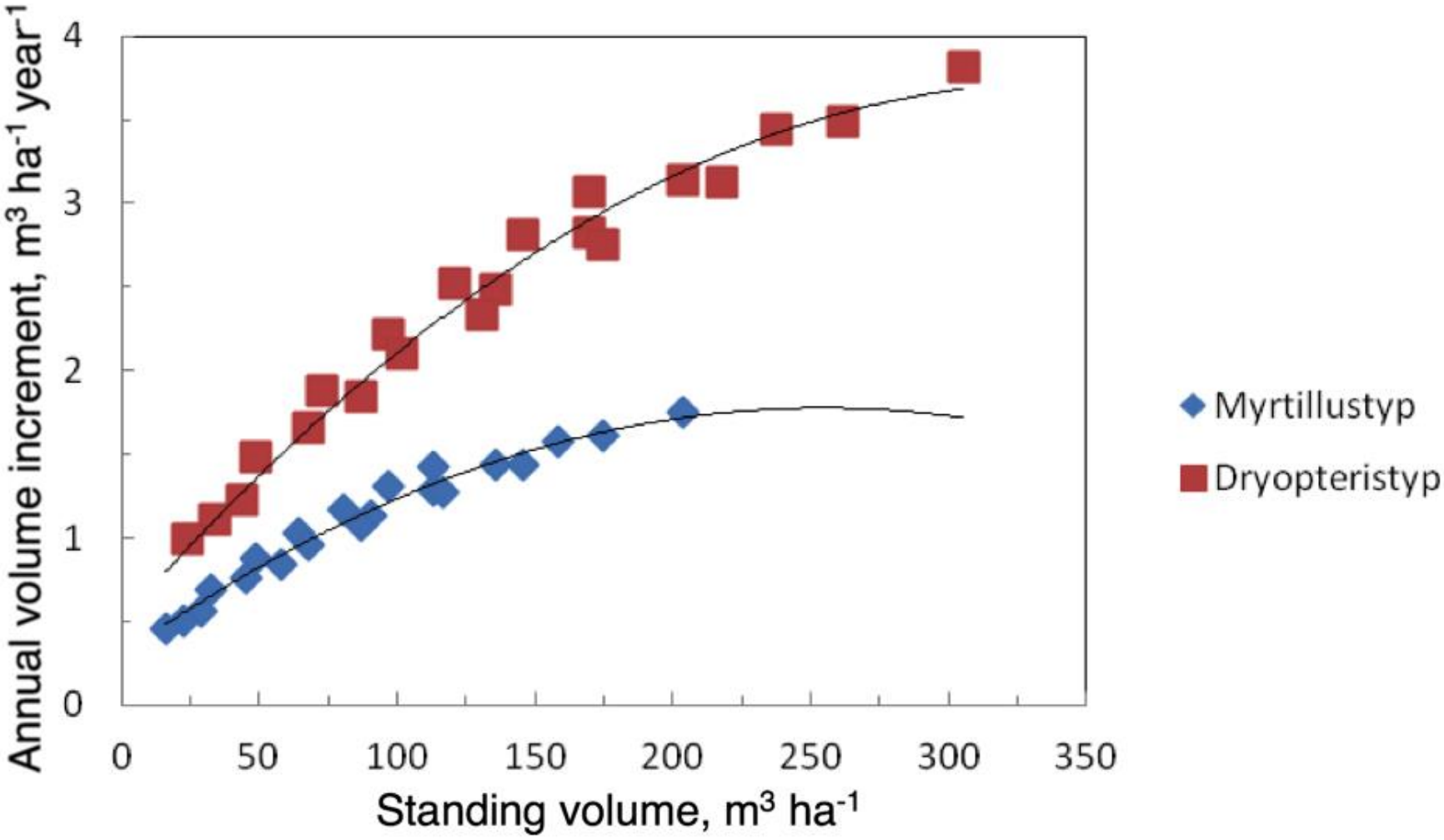
NOT possible with Scots pine (Pinus sylvestris)



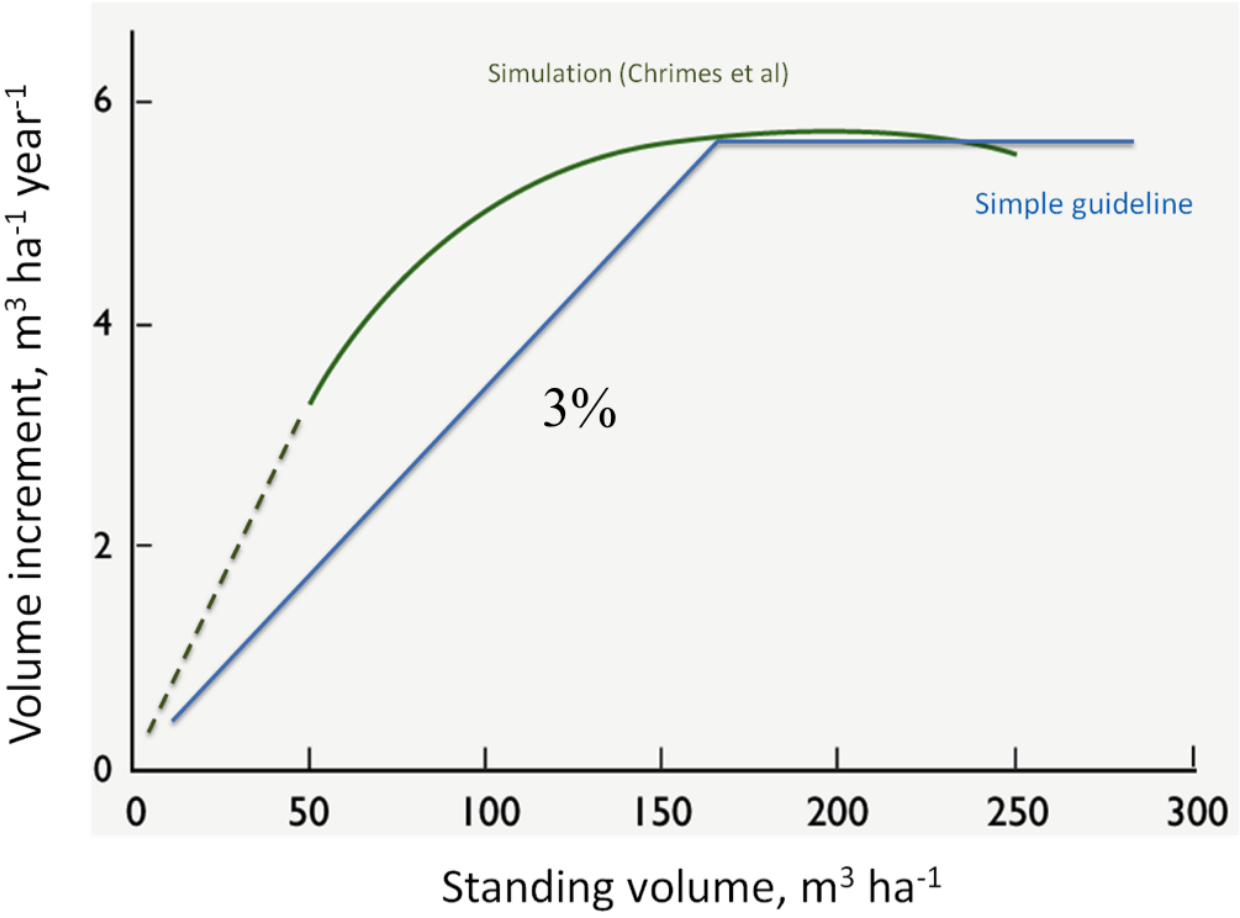
Selection system



Selection system



Selection system

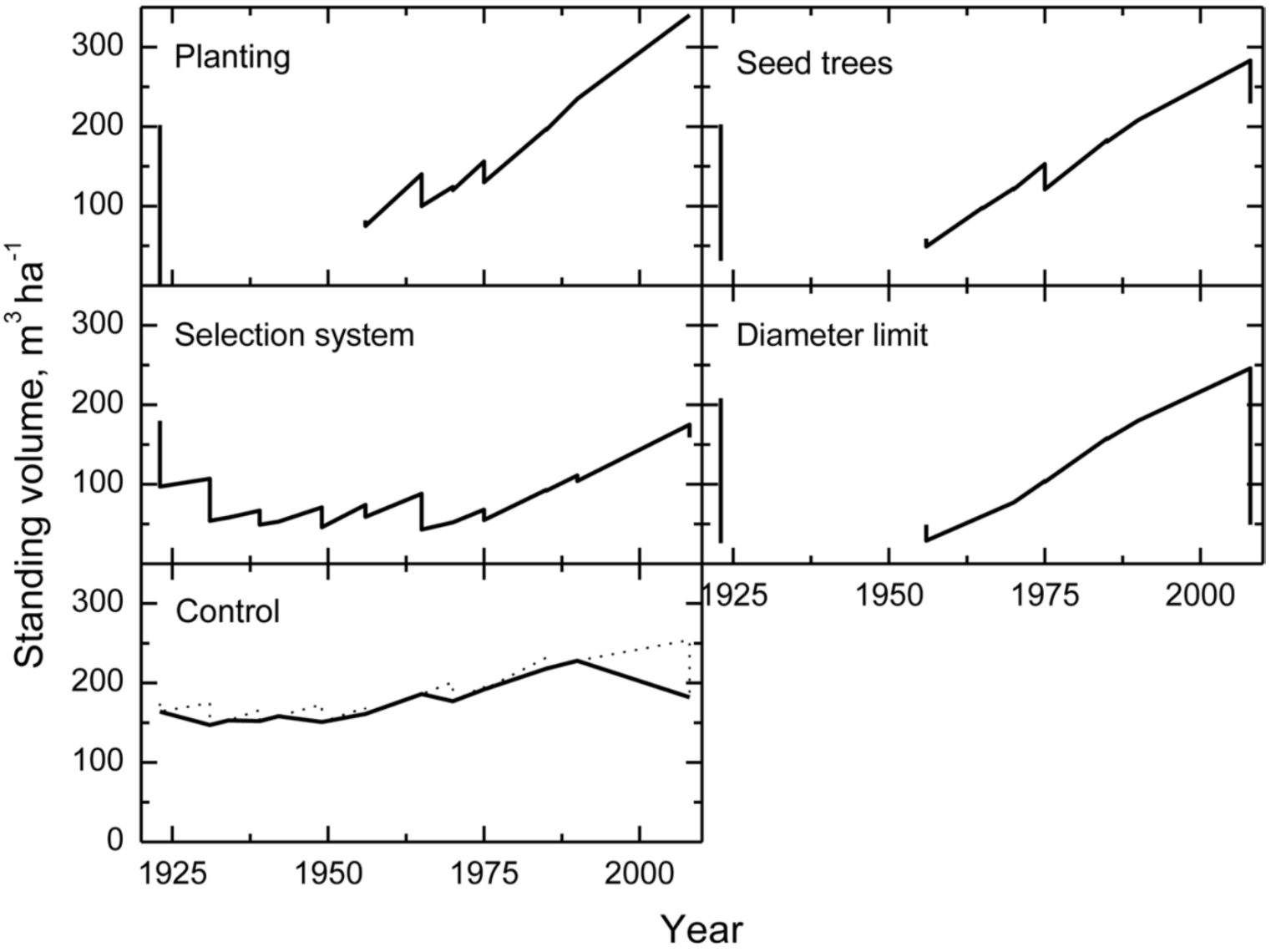


Comparing systems

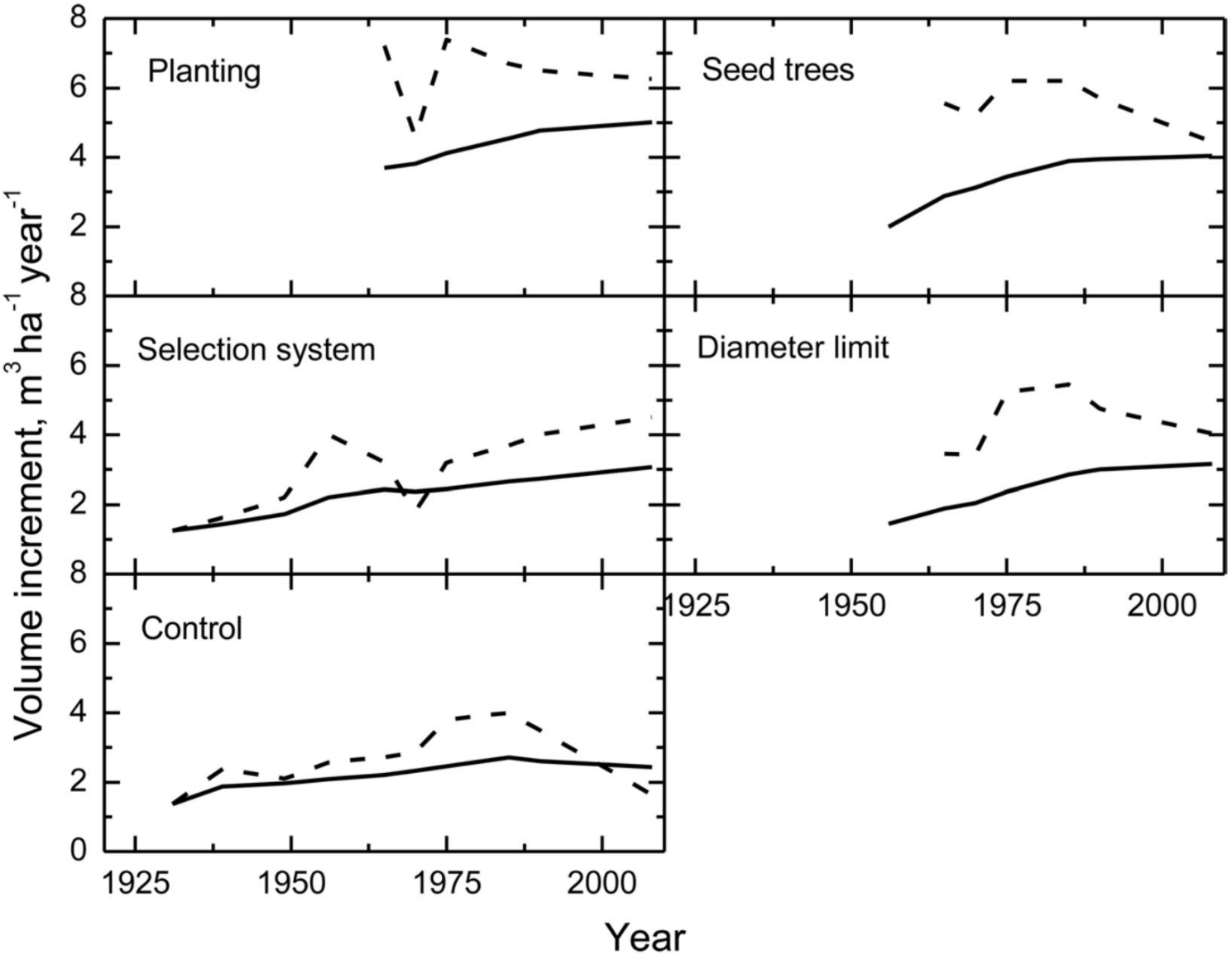
How do we compare systems?

- Long-term field experiments
- Models
- Compare with SI or SP

Long-term field experiment



Long-term field experiment



Models

Compare with Site Productivity

Only 2 studies:

- Lundqvist (1989)
- Andreassen (1994)

Full-storied stands
– about 80-90%
of single-storied

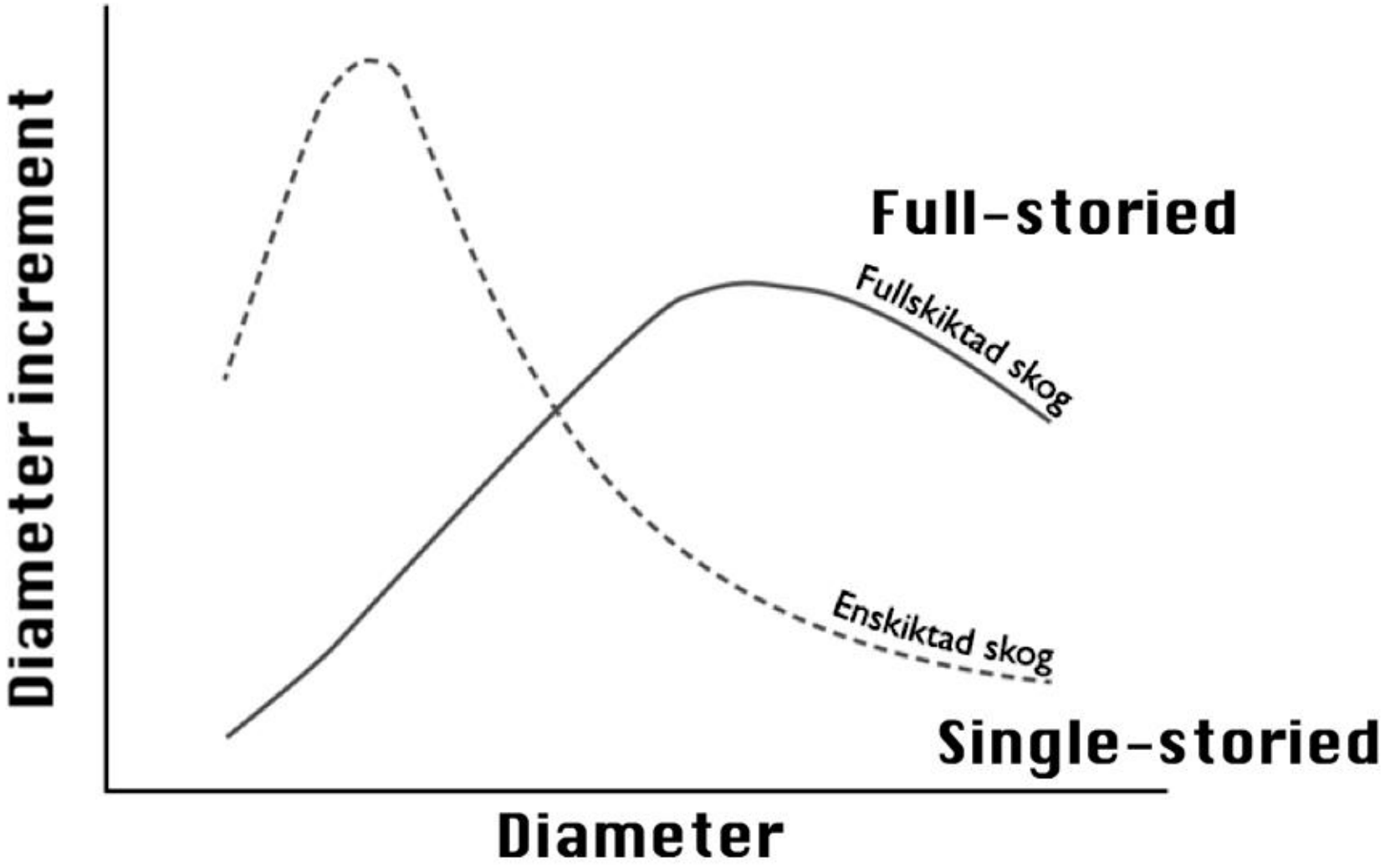
Another alternative…

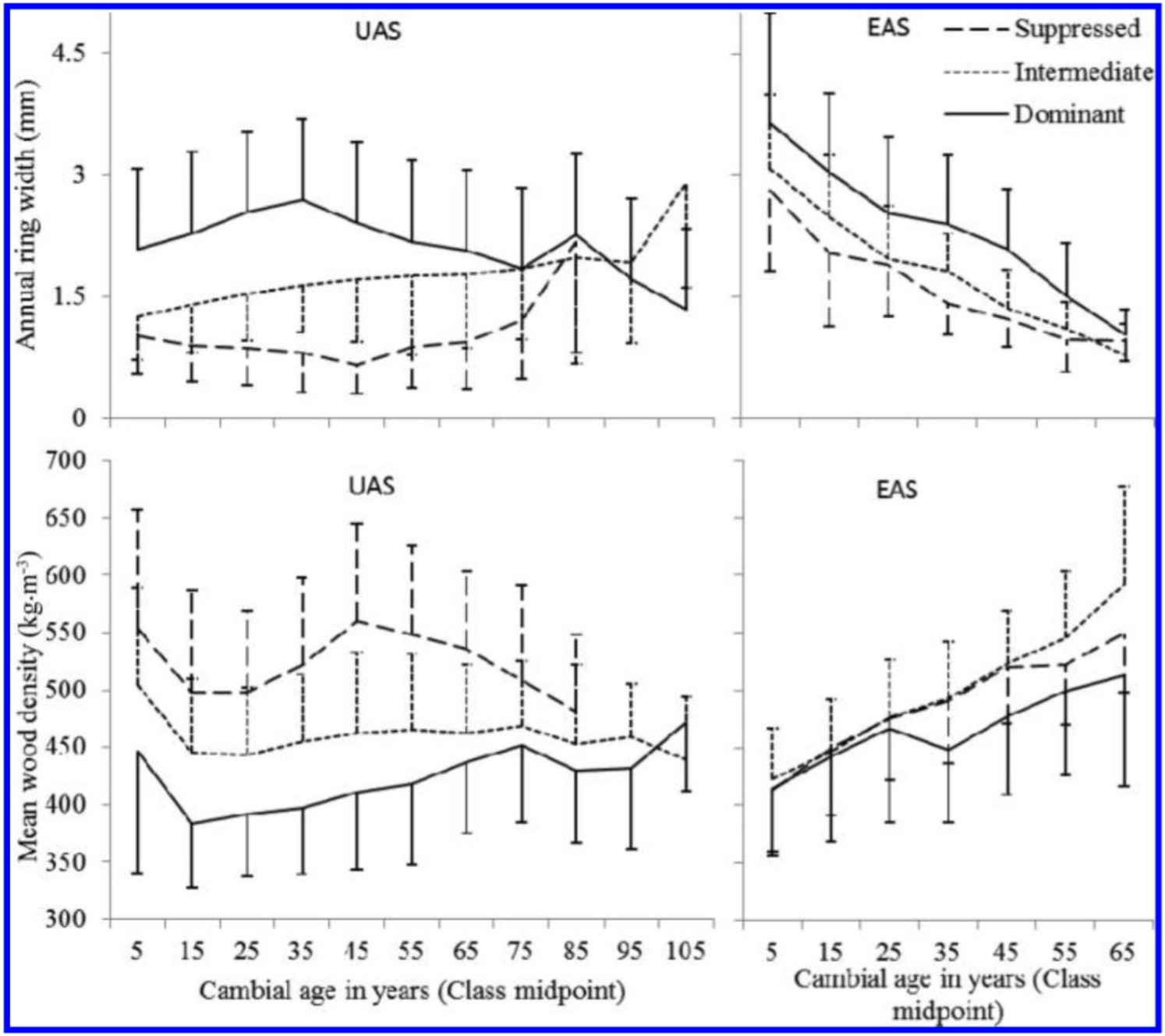
Compare differences in mechanisms controlling growth

Total needle mass

Light use efficiency

Allocation patterns


Diameter increment
Full-storied
Fullskiktad skog
Enskiktad skog
Single-storied
Diameter


UAS
EAS
Suppressed
Intermediate
Dominant
Annual ring width (mm)
4.5
3
1.5
0
UAS
EAS
Mean wood density (kg·m-3)
700
650
600
550
500
450
400
350
300
5 15 25 35 45 55 65 75 85 95 105
Cambial age in years (Class midpoint)
5 15 25 35 45 55 65
Cambial age in years (Class midpoint)

Occurrence of full-storied forests

Area full-storied spruce forest

0,5 – 1 million ha

Summary

Growth dynamics – limited knowledge

Growth levels – probably 10-20% lower

Possible occurrence – 2-4% of productive area

The future

Questions…

Interaction volume – structure – growth

Transformation – consequences of creating full-storied stands

Thank you!