Mechanized Tree Planting

-status in Sweden

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Back Tomas Ersson- Quick presentation

Forestry Education

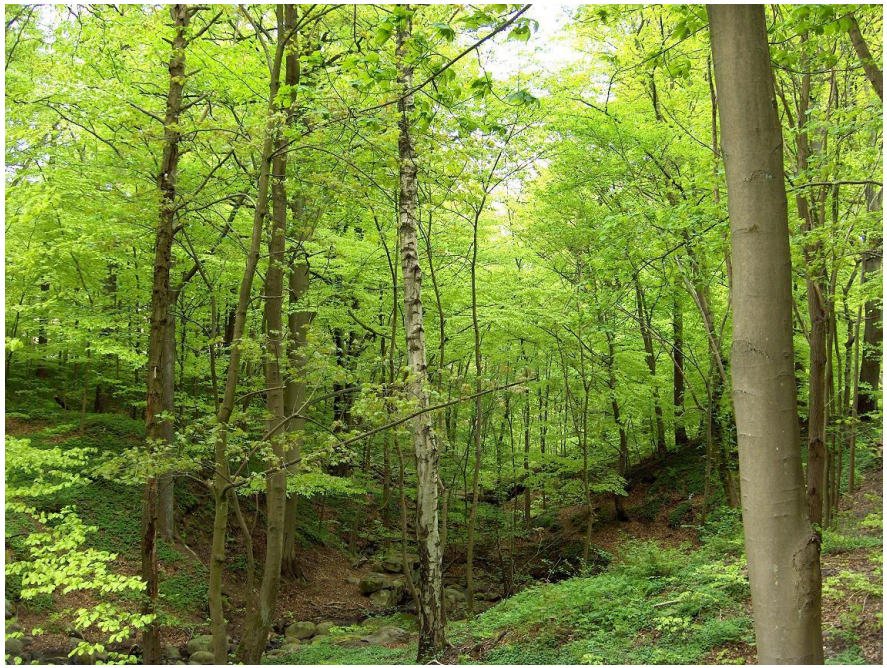
1997-1999	Forestry and Wildlife Technician, Selkirk College, BC 
2001-2006	Msc Forest Management, SLU, Umeå 
2004	Exchange Student, UkZN, Pietermaritzburg 
2009-2014	PhD Forest Management, SLU & Södra Skog 
2011	FEC, White River, ZA 

Forestry Work

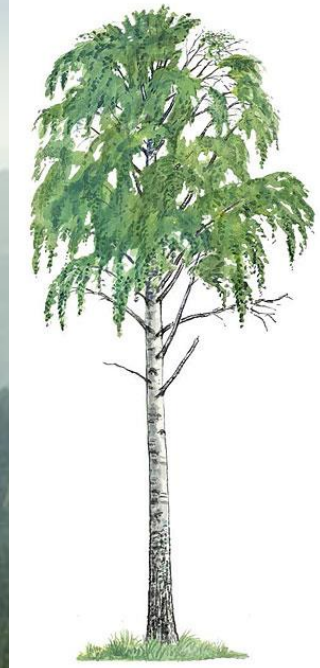
1995-1997	Brushing and tree planting, AB & BC 
1998-2000	Forest Firefighter, AB 
2005-2008	Cutblock layout, Stora Enso Skog 
2015-2016	Guest Scientist, FPInnovations, Qc 
2014-2021	Researcher & Lecturer, SLU, Umeå/Skinnskatteberg 

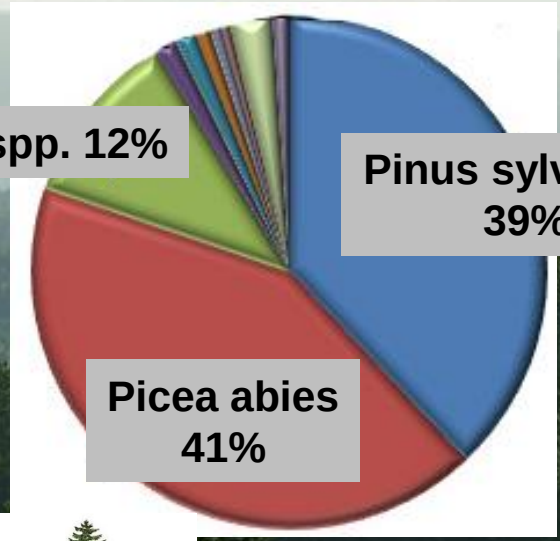
Sweden: Nemoral-Boreal forests

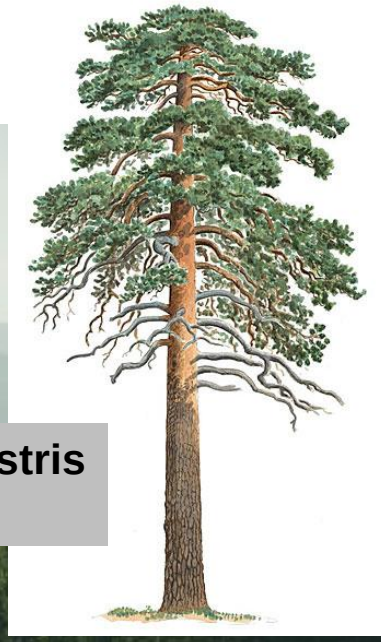
~60-100 year rotation periods



Swedish Forest Ecology







Pinus contorta

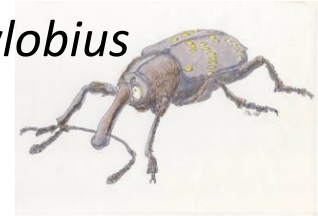
Swedish Forestry – Ecology

Northern Sweden

- Low site productivity (3 m^3/ha/year)
- Cold soils
- Reindeer husbandry

Southern Sweden

- High site productivity (8+ m^3/ha/year)
- No/shallow snow coverage
- Pervasive *Hylobius abietis* + browsing



Why is the Swedish forest industry interested in mechanized tree planting?

It improves:

1. Planting quality
2. Continuity among silvicutural workers

It reduces:

3. Threat of labour shortages
4. Regeneration costs

Other Advantages

- Reduces soil disturbance

~35-50 % soil area disturbance

~12-25 % soil area disturbance

- Requires fewer pl/ha (↓ Target Stocking Rate)
- Potential for technological improvements

Planting machine history

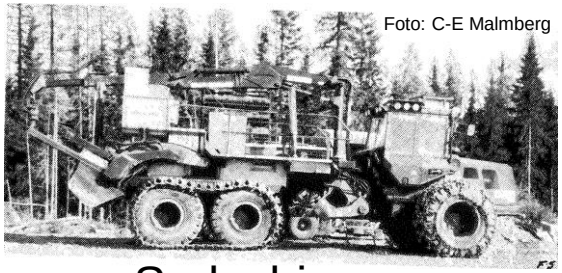
Hiko

Doppingen

Silviplant

EcoPlanter

Sweplant



Serlachius

2021: 4-5 pl.machines

Bracke Planter on tracked excavators

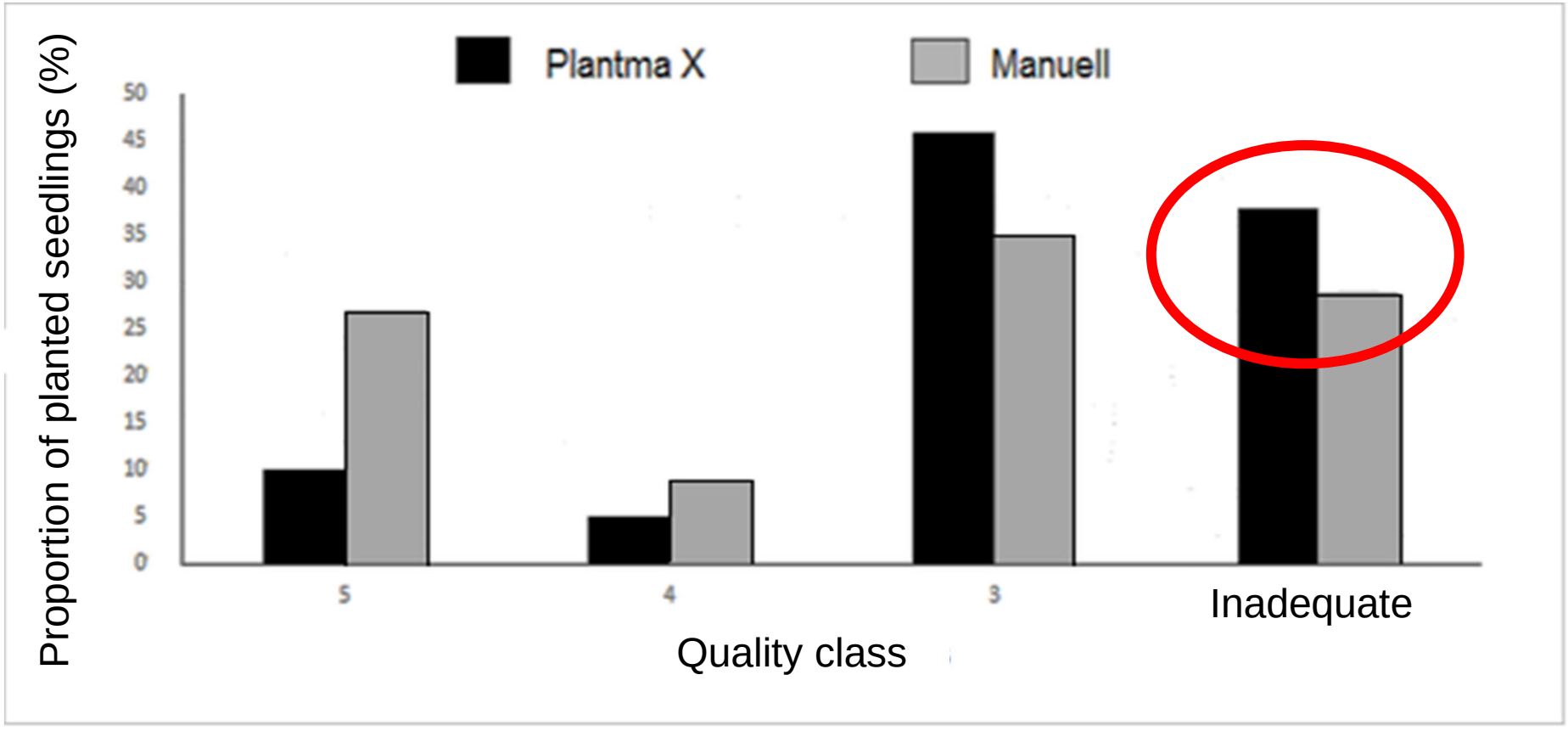
SVEASKOG

PlantmaX (modern Silva Nova)

SLU

PlantmaX planting quality

(ref: Tysklind 2021)

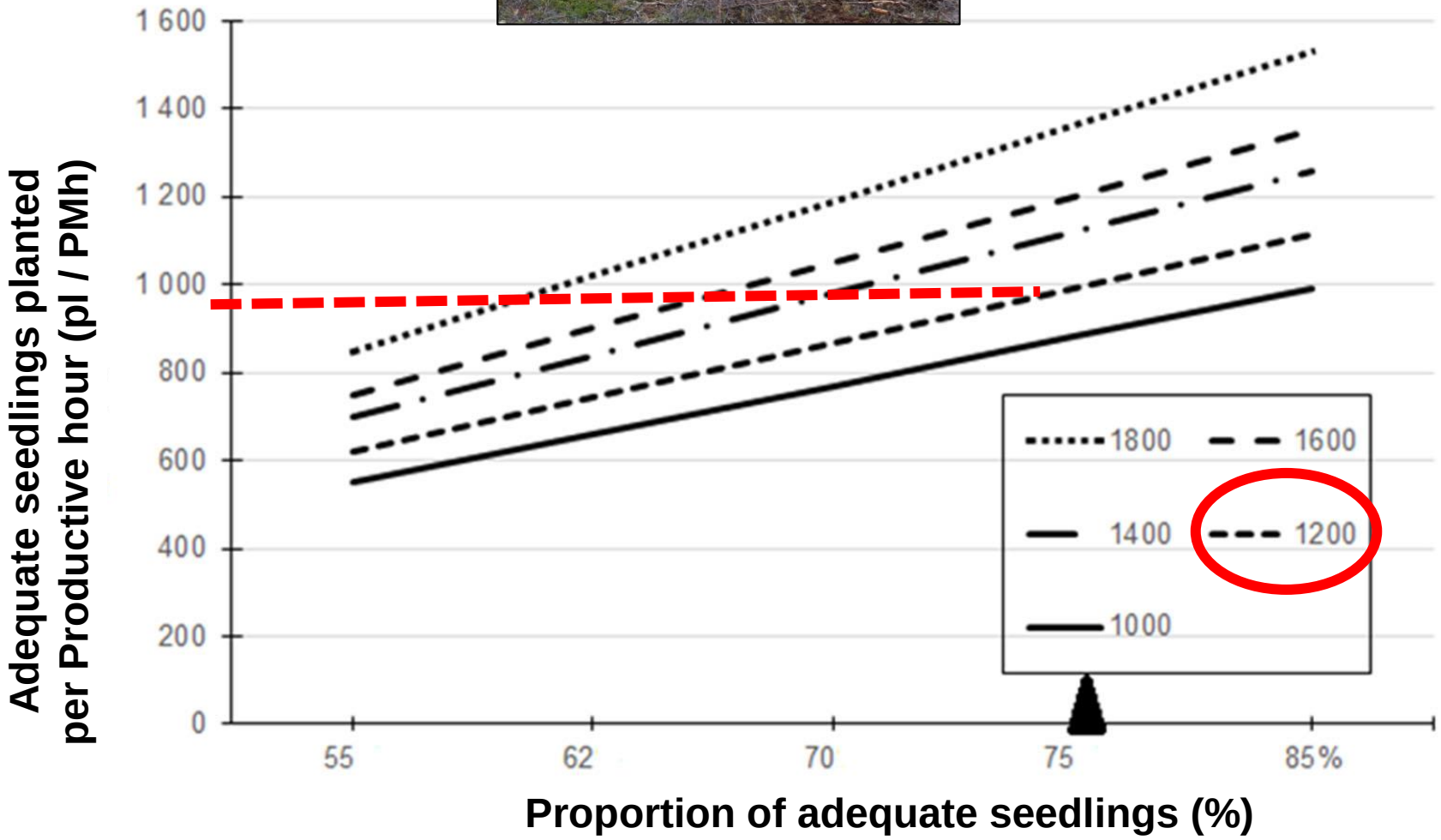


PlantmaX planting quality

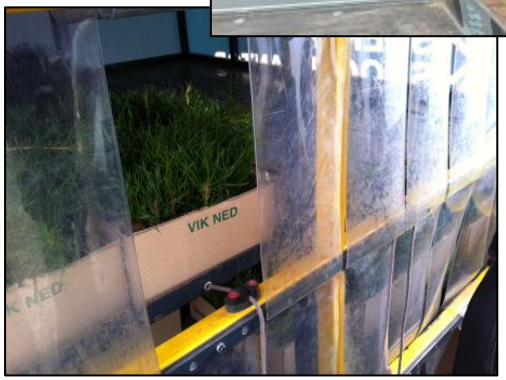
Tysklind, L. 2021. Mechanized tree planting with the Plantma X planting machine – the impact of terrain factors on planting quality. SLU, Dept. Forest Biomaterials & Technology. MSc Thesis. Report 2021:7.

PlantmaX productivity

(ref: Tysklind 2021)



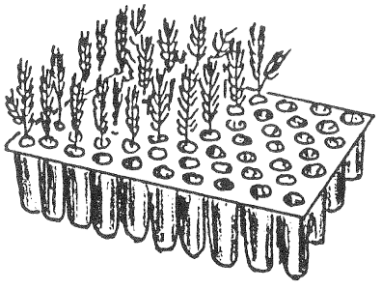
PlantmaX seedling handling



Future Development – Seedling packaging

Conventional

- Hiko cultivation trays
- Cardboard boxes



versus

Machine-specific Packaging

- MechBoxes
- Cardboard boxes with compressible paper grids for faster seedling reloading

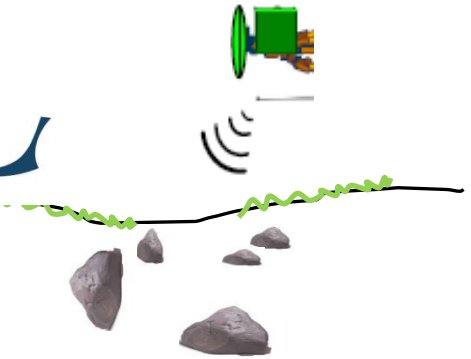
Shows some promise!

Ersson, B.T., Manner, J. & Sundblad, L-G. 2021. The Cost-efficiency of Seedling Supply Systems Adapted for Mechanized Tree Planting: a Southern Swedish Case Study. Submitted. Silva Fennica.

Future Development – Crane-mounted planting devices

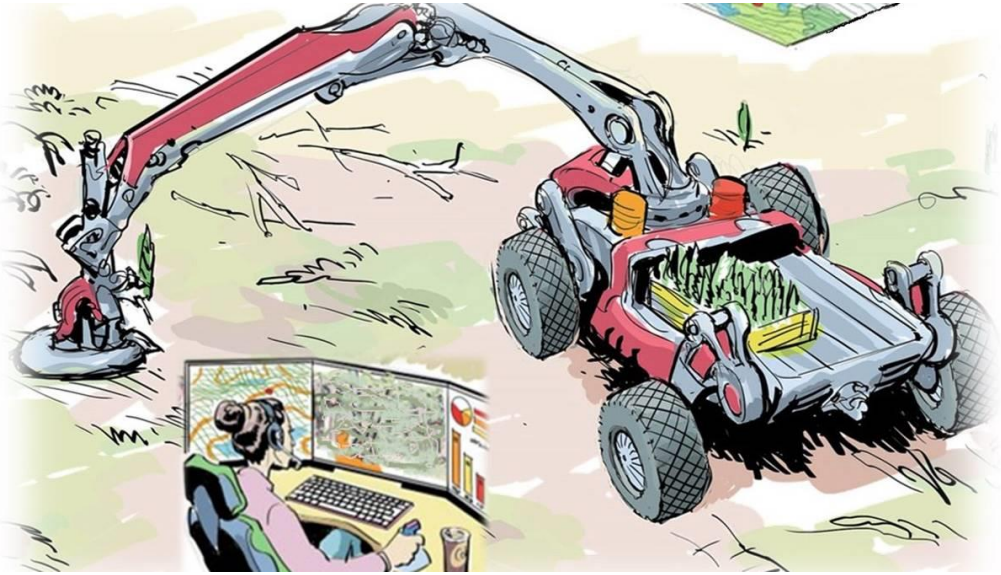
-Bracke Planter P12
-M-Planter M-320
-Risutec ASP

LULEÅ TEKNISKA UNIVERSITET



SLU

Mechanized tree planting projects started in Sweden during 2021!



BraSatt

skogforsk

AutoPlant

SÖDRA

SLU

Conclusions

1. Still many technical opportunities to ↑ productivity while ↓ cost of planting machines

2. Cost-efficient seedling supply is challenging.

3. Trend towards smaller machines
   (even planting-only machines)!

4. Labour for manual tree planting is becoming scarcer
   = ↑ interest in mechanized tree planting!

Thanks!

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