

# SUBSTITUTION OF INSECTICIDES WITH WAX

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Changing from water spray containing  
chemicals to precisely applied coating

# EU financed WEEVILSTOP project

Forestry	Norges Skogeierforbund	no
	Skogsägarna Mellanskog	se
	Eesti Erametsaliit	ee
	Latvijas Meza Ipasnieku Biedriba	lv
	Confederation Europeenne des Proprietaires Forestiers ASBL	eu
RTD-performers	Teknologisk Institutt AS	no
	Labor S.R.L.	it
	Universitetet i Oslo	no
	Sveriges Lantbruksuniversitet	se
End users	Norsk Wax AS	no
	Electrozeta Snc	it
	Verdera OY	fi
	Fin Forelia OY	fi
	Bergvik Skog Plantor AB	se
	Plantex AS	ee



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# The multinational consortium



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The pine weevils are long distance fliers that easily locate fresh clearcuts in the forest



LARVA DEVELOPES IN ROOTS OF FRESH STUBS  
ADULTS FEED ON PLANTED SEEDLINGS



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# Importance of the insect problem

- More than 80 % of the seedlings die if no countermeasures are taken in southern Sweden
  - direct protection of seedlings necessary, still about 10-40 % mortality
- Normally 10-40 % of the seedlings in northern Sweden are killed (not insecticide-treated)
- This damage causes economical losses exceeding 100 million EUR per year in Europe



1010 million plants in EU  
40 % with insecticide



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## Alternatives to chemicals are physical protection by coating or sleeve

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# Variation in shape and size of bare rooted plants

## Wax is applied in the nursery





Container grown pine and spruce are more even in size  
Wax is applied in the nursery



**1 årig furu i pottebrett**



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**1 årig granplanter**

Machines have been developed to help the nurseries apply the wax on the seedlings correctly



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How thick a  
layer is needed

How high do we  
need to protect

How to secure  
plant vitality



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## TECH 1: Wax layer from 1 mm to 1,5 mm



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## Tech 2: Wax to the root neck



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## Tech 3: Cooling of the waxed plant



CONTROL

WAX  
COOL

WAX

2X WAX  
COOL

2X WAX



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# Defence at what cost ?



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# Cost elements per plant wax coated

- Wax: 2,2 € cent to 6,2 € cent (0,45 cent per gram wax)
- Machine: 1 € cent (Investment 250.000 €)
- Work: 1,8 € cent (Salary 16 € per hour)
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- Total cost approx.:

5 € cent	9 € cent
small plant	big plant



# How to do

- Verify locally that the wax method works
- Focus on correct practical procedures in the nursery
- Train the trainers





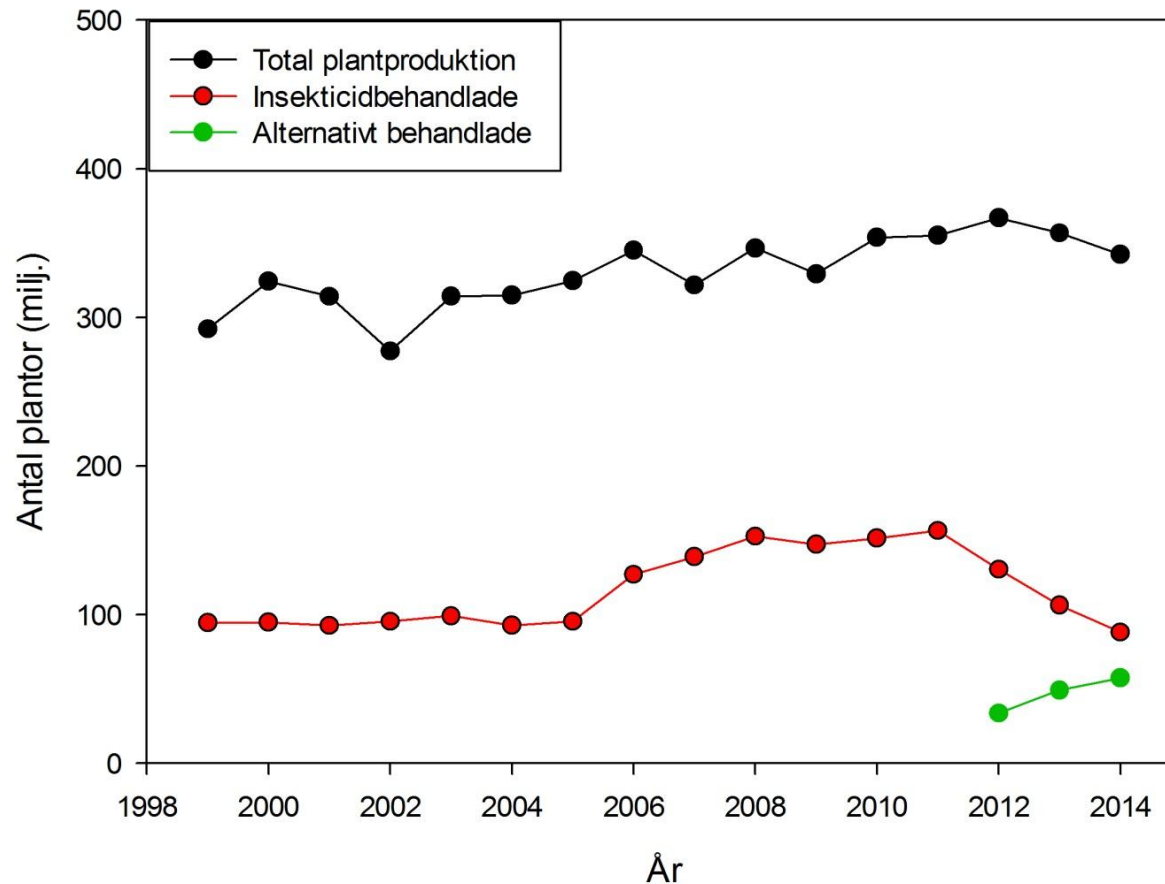
# Regions to develop for the wax technology

- Norway more production capacity
- Estonia/Baltic need protection for bare rooted seedlings
- Germany test in many regions. May need adjustment to wax formulation on some species
- Denmark will test on bare rooted seedlings
- UK production capacity and increased protection by additives
- Sweden market leader, 16 million seedlings waxed yearly
- Slovakia State forest use wax in the Tatra mountains



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## Plantproduktion och skyddsbehandlade plantor enligt PSK



**Source:** Based on unpublished data from The Plant Protection Committee of Swedish Forestry (figure by G. Nordlander and Niklas Björklund, SLU, [www.snytbagge.se](http://www.snytbagge.se) )

# Thank You for having this opportunity

