



COST E42 - Growing Valuable  
Broadleaved Tree Species Meeting &  
Workshop:

Production and utilization of high  
quality birch

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# CURLY BIRCH (*Betula pendula* var. *carelica*) AND ITS MANAGEMENT IN FINLAND

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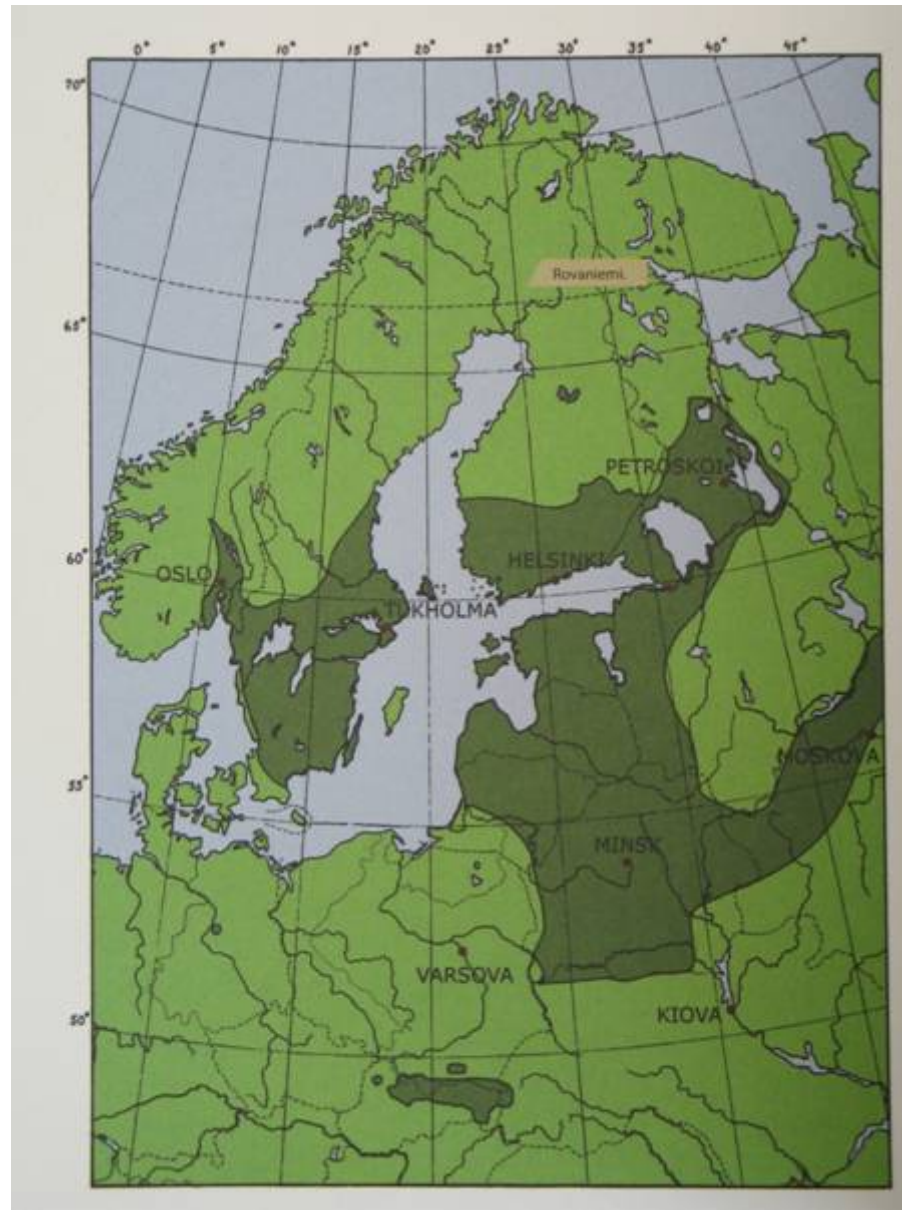
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- A genetic variety of silver birch, caused by a mutation in one or a few genes
- Heritable: up to 60-70 % of offspring can have this curliness and related traits' complex in seed orchard origins
- Very decorative wood has curled grain and is figured with brown stripes and dots. At its best it looks like wooden marble
- Very rare in natural forests: grows sporadically only in northern and eastern Europe



# NATURAL DISTRIBUTION



# WHY TO GROW CURLY BIRCH ?

## ■ SOFT VALUES

- Beautiful as all birches
- Different than other trees, a value as such
- Interesting in its huge variability, creates new biodiversity
- A new hobby even for urbanised forest owners, easy to "get hooked"



## ■ HARD VALUES

- Very profitable (but risky !!) forestry with present and much lower wood prices

# LONG TRADITIONS IN RESEARCH IN FINLAND

- T. J. Hintikka 1910-40
- Olli Heikinheimo 1920-50
- Sakari Saarnijoki 1930-60
- Risto Sarvas 1950-60
- Reino Saarnio 1970-80
- Kullervo Etholén 1960-70
- Jyrki Raulo 1970-80
- Pirkko Velling 1980 -
- Risto Hagqvist 1980 -
- L. and M. Rynänen 1980 's
- Tuomas Hintikka 2000 -

# PRESENT RESEARCH AT METLA

**New methods in growing curly birch and high quality veneer birch (NR 7173), 2004-2007, Risto Hagqvist**

## **Seven research themes:**

- Wood quality in earlier pruned curly birch plantations
  - Defects caused by branch pruning
- Developing old and new pruning methods for silver (sb) and curly birch (cb)
  - Proper season and equipment (sb, cb)
  - Effect of branch size and quality on defects (sb, cb)
  - Decay caused by topping of branches (cb)
  - How to select branches to be pruned ? (cb)
- Genetics and breeding of curly birch

- Profitability of growing curly birch
  - Different sites, wood price levels and genetic levels
- New mixed strategies for stand establishment
  - New field trials
- Curliness and figured wood in other native tree species
  - Alders, rowan, aspen, pine, spruce
- Writing a textbook " Management and use of curly birch" in Finnish
  - Together with The Finnish Curly Birch Society



# LONG TRADITIONS IN CULTIVATION

- First cultivated stands for Metla in 1930's, 20 ha
- Also some private experiments at that time
- Between 1940-1980 very random and small areas compared to present
  - Low technical success and low curly formation % as main problems
- Since late 1980's cultivation increased till early 2000's
  - Seed orchard seed and cloned plants became available
  - New plant protection and cultivation methods (vole shields, herbicides)
  - Increased moose population a new main problem
- At present 300-400 ha per year
- Some 5000 ha have been planted since 1980's



# STAND ESTABLISHMENT ALTERNATIVES

## A) SEEDLINGS ONLY

- Normally 1600 plants / ha
- Sometimes up to 2000 plants if lower survival expected

## B) CLONED MATERIAL

- From 800 down to 400 due to higher plant price

## C) COMBINATION OF A) AND B)

- 400 micropropagated plantlets + 1200 seedlings / ha

## D) DIRECT SEEDING

- On forest land growing earlier mainly spruce



- Plant protection
  - Plastic vole shields on agric. land and fertile forest sites close to fields
  - Weed control: Chemical on agric. land, mainly before planting; also mechanical
  - Moose control by site selection and chemical repellents
- Site preparation
  - Normal methods
  - Soil water control important with birch, ditching often necessary





# GENETIC IMPROVEMENT AND PROPAGATION



- Genetic variation larger than with any other native tree in Finland -> very good possibilities for genetic gains
- Often looks like an apple tree, best plus trees are like big silver birches
- Best plus trees utilized in seed orchards and commercial micropropagation
- Genetic gains in wood production (both in quantity and quality) are very big with cloned material, but we don't have an estimate of them (method and experiments are young)



- 3rd seed orchard established 2006, 2nd in production
- Micropopagation has continued in practical scale for 15 years
- Seed orchard origins give curly formation to 60-70 % of offspring, best full-sib families give close to 80 % in progeny trials
- Cloned material is expected to give 100 % curly formation

# CROWN MANAGEMENT

- Pruning of living branches is essential
- Pruning must be started 2 years after planting
- Competing top shoots and lower forks must be removed or topped
- Branches should be removed when smaller than 1.5 cm in diameter, never bigger than 2 cm
- → Branches must be selected in order of the diameter, biggest ones first
- → Pruning must be repeated every or every other year







- Pruning is continued up to 2.3 - 5 m depending on resources (quite laborous after 3.5 m) always maintaining 50 % of living crown
- Bypassing garden pruners and pruners with shaft (eg. 1.5 m or 3 m or telescopic) recommended, not pruning saws
- Proper season is July in Finland
- Topping (= shortening) of young double tops is used for apical control
- Minimum log length is 70 - 80 cm; such lengths can be pruned later inside the crown with a telescopic pruner

# THINNINGS AND ROTATION AGE

- First thinning very important in stands established with seedlings:
  - Trees with no clear curly formation (25-30%) are removed when they are 7-9 m (10-13 years)
  - Otherwise they will suppress curly forming individuals
- 2nd thinning after 3-5 years
  - Trees with only slight curly formation, bushy stem form, many forks or health problems are removed
- Later thinnings with 5-10 years' intervals
  - Same principles than in 2nd thinning
- Rotation age 40-50 years
  - After that stem decay increases rapidly, negative value growth starts



# PROFITABILITY AND MARKET ASPECTS

- Curly birch wood has been highly valued for centuries:
  - Taxes have been paid by this wood
  - Russian tsar Alexander I donated a set of furniture made of curly birch to Napoleon
- Today it is sold by fresh kilograms: 3-5 e for knotless timber (4500 e / m<sup>3</sup>), 0.5-1 e for wood with knots and/or smaller dimensions (500 e / m<sup>3</sup>). It is clearly our most valuable forest tree



- **Logs** are sold to Germany and Switzerland. Veneer is used all over the world for furnishing e.g. banks, offices, luxury homes, ships and expensive cars
- **Wood with knots and/or smaller dimensions** is used especially in Nordic countries by carpenters and industry for gifts, souvenirs, tools (eg. knife handles), furniture etc. highly valued products

Biggest producers to the world market are Finland, Belarus and Sweden

- Wood comes mainly from natural forests, but also from some old Finnish cultivated stands
- Wood prices are high due to the properties of the wood (“looks valuable”) and continuous shortage, especially logs
- We don't, however, know much of the world market
  - “How much can the market use curly birch, if supply is not limiting?”
  - “How much will the consumption be increased in the case of full supply and with somewhat lower prices?”
  - These are the key questions determining the price level in the future

- According to our recent calculations Finland will supply 30 times more curly birch wood after 30 years than is produced now in our country
- More intensive marketing to other continents (North America, Japan, China, Russia etc.) becomes necessary if demand and satisfactory prices are to be guaranteed
- The Finnish Curly Birch Society is considering this to be the biggest challenge of the future and has plans for this



THANK YOU  
for your interest !!

**Photographs by :**  
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