Conservation of Forest genetic resources in Finland

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Tea Huotari, the Finnish Forest Research Institute – Metla

Metla, MTT Agrifood Research Finland, the Finnish Game and Fisheries Research Institute and the statistical services of the Information Centre of the Ministry of Agriculture and Forestry are to be merged under a new entity called Natural Resources Institute Finland as of 1 January 2015
Forest genetic resources (FGR) in Finland

- **The National Plant Genetic Resources Programme**
  - prepared in 2001
  - internal program of The Ministry of Agriculture and Forestry
  - guided and supervised by the National Advisory Body for Genetic Resources
  - lists 15 native tree species included in the genetic conservation strategy
  - sets the main targets and measures for each species
Forest genetic conservation

• FGR form the base for adaptation of forest trees to future environmental conditions and societal demands
  – conservation of evolutionary potential to adaptation
    • wide gene pool, not the genotypes
    • collection of genes, not the best individuals
  – genetic composition often not known
Forest genetic conservation - *in situ*

• **Gene reserve forests**
  – common species (*Pinus sylvestris, Picea abies, Betula pendula, B. pubescens*)
  – continuous distribution & extensive gene flow
  – local origin as a requirement
    • naturally regenerated / regenerated artificially with the original local seed source

• **Ensure abundant regeneration and a wide gene pool**
  – management using normal forestry practices
  – natural regeneration / collecting seeds
  – even distribution of different age classes - stability
  – regular visits and planning of forestry practices
Forest genetic conservation - \textit{in situ}

- **Gene reserve forests**
  - Ideally located at state-owned land
    - state, companies, private person
    - at present 41 forests
  - Based on voluntary agreements
  - Possible threats
    - road construction, mining,
    - human errors, nature conservation
Forest genetic conservation - *in situ*

- **In situ** - conservation in nature conservation areas
  - forestry practices not allowed
  - difficulties to combine conservation of species and genetic resources
    - old forest species need old trees
    - gene reserve forests need abundant regeneration
  - in 2010 one gene reserve forest removed from the network over nature conservation
  - Niinisaari
    - nature conservation area and gene reserve forest of *Tilia cordata* - an exception
Networks of *in situ* - gene conservation units (GCU) on A) Norway spruce and B) Scots pine in Finland at 2014.
Forest genetic conservation - *ex situ*

- **Gene reserve collections**
  - rare species
  - small or mixed stands
  - fragmented distribution
  - gene pool maintained in living trees
    - dynamic conservation
  - material from several natural stands
    - e.g. noble hardwood species:
      - *Acer platanoides*, *Fraxinus excelsior*,
      - *Quercus robur*, *Tilia cordata*
The locations of gene reserve collections and source populations of a) *Juniperus communis* and b) *Acer platanoides*
Why *ex situ* -collections?

- **Not suitable for *in situ* -conservation**
  - small and rare stands, often within protected areas
  - located to Southern Finland - not within state owned land
- **Aim to have genetic resources conserved for sustainable use**
  - offer seeds to habitat restoration
  - regeneration or expansion of the small natural populations
    - climate change - marginal populations
    - seeds adapted to climate and light conditions of Southern Finland
Constraints and future needs for forest gene conservation in Finland

• **In situ** - conservation
  – completion of gene reserve forest networks
    • how to find suitable forest areas

• **Ex situ** - conservation
  – sustainable use of genetic resources
    • genetic evaluation of *ex situ* - collections

• LIFE - project proposal

• Nagoya Protocol
  – Extra importance for conservation of FGR in the future
Thank you
<table>
<thead>
<tr>
<th>Tree species</th>
<th>Nature conservation</th>
<th>Gene reserve forest</th>
<th>Collections</th>
<th>Breeding populations</th>
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<td><em>Pinus sylvestris</em></td>
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