Finland

Jyrki Hytönen, Jenny Mills and Peter Buckley

Facts and Figures

Jyrki Hytönen

Definitions

Woodland that has been regenerated from shoots formed at the stumps of the previous crop trees, root suckers, or both, i.e., by vegetative means. Normally grown on a short rotation for small material, but sometimes, to a substantial size.

Vesametsä. Kanto- tai juurivesoista vegetatiivisesti syntynyt metsä. Vesametsiä kasvatetaan tavallisesti lyhyellä kiertoajalla mutta joskus tavoitteena voi olla myös ainespuun tuotanto.

Typology

Simple coppice	Not practised (however, birches of stump sprout origin are accepted in regeneration areas to fill in the plantation)
Coppice with standards	Not practised
Pollarding	Only in gardens and parks
Short rotation coppice	Mainly small scale plantations with *Salix, Alnus incana, P. tremula x tremuloides, Betula pubescens*

Images

Examples of Short Rotation Coppice

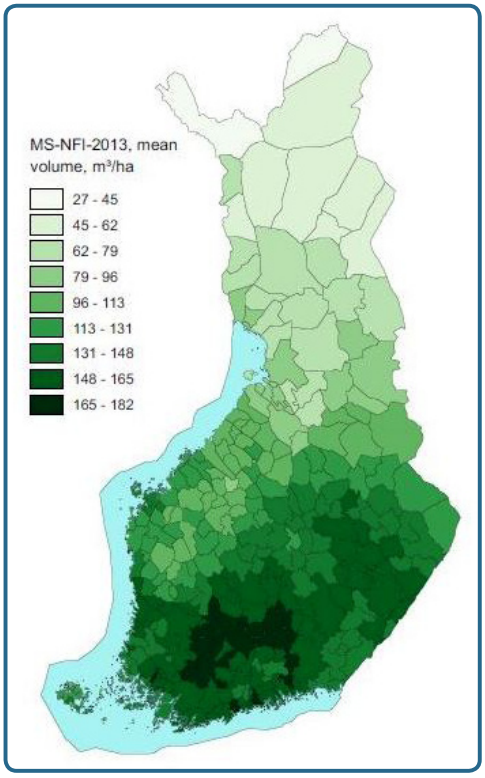
One-year-old hybrid aspen

Grey alder in Central Finland

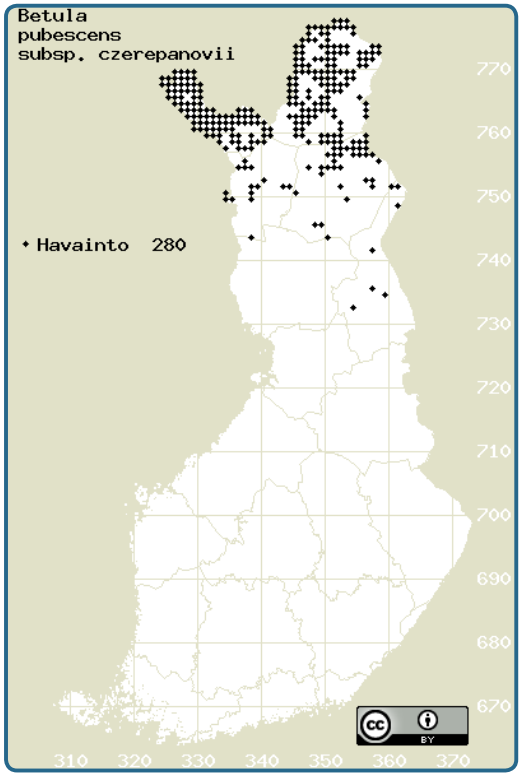
Downy birch in Lapland

Maps

Jyrki Hytönen



The mean volume of growing stock on forest and less productive forest land by municipalities in Finland (Mäkisara et al. 2016)



Mountain birch is most common in Finland's three northernmost municipalities; this species was coppiced in the past (Lampinen and Lahti 2017)

Mäkisara, K. Katila, M., Peräsaari, J. & Tomppo, E. 2016. *The Multi-Source National Forest Inventory of Finland – methods and results 2013*. Natural resources and bioeconomy studies 10/2016. http://urn.fi/URN:ISBN:978-952-326-186-0

Lampinen, R. & Lahti, T. 2017: *Kasviatlas 2016*. University of Helsinki, Finnish Museum of Natural History, Helsinki. http://www.luomus.fi/kasviatlas.

Description

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Forests are Finland

Finland is the most extensively forested country in Europe. Finland's forests are mostly northern boreal. Wooded land occupies 26 million ha or 86% of the land area of Finland. This is divided into forest (66% of the land area), scrub and waste land. Of the growing stock volume (2357 million m^3), 50% consists of Scots pine (*Pinus sylvestris*), 30% Norway spruce (*Picea abies*), 16% birch (*Betula pendula* and *B. pubescens*) and 4% other broadleaves.

Traditional coppice forests

Even though coppicing is a traditional silvicultural management system, widely used in Central and Southern Europe, its application in Finland has been very limited. Most of our native deciduous tree species are not considered very suitable for coppice management. In some special cases, such as mountain birch (*Betula pubescens* spp. *tortuosa*) stands in Lapland, there have been recommendations to coppice for firewood. Historically, hazel (*Corylus*

avellana) and linden (*Tilia cordata*) were grown as coppice for timber and other products in the south of the country. Pollarding was used in small areas to produce fodder for cattle.

Today, traditionally managed coppice forests do not exist in Finland. However, in normal forests there are trees of coppice origin, especially birches, but also other species such as rowans. Growing coppiced trees is not encouraged but they may fill up the stand.

Short rotation forests

The use of bioenergy is increasing rapidly due to the need to reduce greenhouse gas emissions. Wood-based fuels are playing a leading role in Finland in attempts to reach national and European Union targets to increase the use of renewable energy. The National Climate and Energy Strategy aims to increase annual woodchip production in Finland to 13.5 million m^3 by the year 2020. Even though woody biomass is mainly harvested from existing forests (small sized trees, slash and stumps), growing 'energy forests' may become economically viable in the future. Energy plantations based on fast growing deciduous tree species, grown in dense stands and renewed by coppicing, have been studied in Finland, with a focus on short-rotation willow. This research was begun in Finland in the late 1970s with extensive studies of cultivation methods. However, due to the combination of falling oil prices and high production costs of willow energy, this practice has not been widely adopted. Currently there are only around 200 ha of willow plantations in Finland. This may increase with the growing demand for energy and increasing prices of other fuel sources.

Due to Finland's northern location, other native deciduous tree species have been the subject of short-rotation coppice (SRC) research. The rotation for coppicing native birches, alders and aspens is between 20 and 30 years, which

Figure 1. One-year growth of energy willow in south Finland (left) and four years old downy birch coppice in northern Finland (right)

is considerably longer than for willow. Downy birch (*Betula pubescens*) growing on peatlands (of which there are 572,000 ha) is receiving increasing interest. The grey alder (*Alnus incana*) also has several good qualities, such as a capacity for binding atmospheric nitrogen, good coppicing ability and fast growth. These characteristics are appreciated as they directly affect the economics of biomass production. A further advantage of alder is that it is not susceptible to insect damage and is not as palatable to mammals (vole, moose, hare) as birches, willows, aspen and poplar. Aspen (*Populus tremula*) and hybrid aspen are also subject for research for SRC potential.

Future challenges

The future expansion of wood biomass production systems has many challenges and depends on economical, ecological and policy matters. As well as producing bioenergy cost-effectively and in an environmentally sustainable way, SRC is also expected to provide employment opportunities and support the cultural landscape. Research and development investment is needed to promote the expansion of new renewable energy systems.

Forestry Regulations

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About 20% of the total growing stock volume in Finland (2 357 mill. m^3) is of broadleaved species, the other 80% is composed of Norway spruce and Scots pine. Birches (silver birch and downy birch) constitute 83% of the growing stock of broadleaved species. There are no traditionally-managed coppice forests in Finland today, although coppicing was historically carried out on a very small scale in the south of the country. However, some trees of coppice origin can still be found in normal forests.

New forest legislation to ensure sustainable forestry came into force in 2014 including amendments to the 1996 **Forest Act** (metsälaki) and provisions for protected forests in the **Nature Conservation Act** (luonnonsuojelulaki). The amendments to the Forest Act aim to increase the freedom of choice of forest owners in managing their own forest property, to improve the profitability of forestry and operating conditions of the forest industry, and to enhance the biodiversity of forests. One important objective in the reform was to have less detailed regulation on the treatment of forests and to clarify the legislation. The most important changes include allowing uneven-aged forest stands, abolition of age and diameter limits in regeneration, a more diverse range of tree species, and an increase in habitats of special importance. Notification of the establishment of seedling stands is no longer required and supervision is targeted at the results of regeneration, for which new minimum limits have been specified.

The **Finnish Forest Centre** (Suomen metsäkeskus), a state-funded organisation, enforces forestry legislation. It also promotes forestry and related livelihoods, advises landowners on how to care for and benefit from their forests and ecosystems, and collects and shares data related to Finland's forests. The Finnish Forest Centre operates under the guidance of the Ministry of Agriculture and Forestry (Maa-ja metsätalousministeriö).

The Ministry of Agriculture and Forestry prepares a **National Forest Programme**, the objective of which is to promote diverse use of forests in line with the principle of sustainable development. The Forestry Centre prepares a **Regional Forest Programme** in its own territory and monitors its implementation. The programme contains objectives for sustainable forest management, objectives to be set for measures referred to in the legislation on the financing of sustainable forestry and general objectives for the development of forestry in the region. Both processes are participatory and a wide range of interest groups are involved in them.

Some regulations of the Forest Act:

- When intending to carry out felling, the landowner should send a forest use declaration (Metsänkäyttöilmoitus) to the Forestry Centre no later than 10 days, but no sooner than 3 years, prior to the date on which felling or other operations are due to start.
- A forest use declaration is not needed for subsistence felling for household use, for small-sized trees of a mean diameter of up to 13 cm or if they are in the marginal zones of power lines and railways or felling for a ditch, water pipe or sewer line, small areas of road, electricity or other similar lines, unless the fellings are in a habitat of special importance.
- There are seven types of habitats of special importance for biodiversity mentioned in the Forest Act, but which are small in area. Forests in these habitats must be managed and utilised cautiously so that the characteristic features of

the habitats are preserved or reinforced. Among others, these include habitats near streams and ponds, various mire, fen and flooded habitats, herb-rich forest patches, which include natural or semi-natural tree and shrub stands, and heath-land forest located in undrained peatlands or peatlands where the natural water economy has for the most part remained unchanged. Actions that must not be taken in habitats of special importance include regeneration felling, forest road construction, treatment of the soil surface that may damage vegetation characteristic of the site, ditch drainage, cleaning of brooks and rivulets and use of chemical pesticides.

- In habitats of special importance, cautious fellings can take place by choosing individual trees that preserve the stand in its natural or semi-natural state so that the natural or semi-natural water economy of the habitat does not change. No wood harvesting may be done in steep bluffs and the forest lying directly underneath. In sandy soils, exposed bedrock and boulder fields, cautious fellings can take place by choosing individual trees so that old, as well as dead and decaying trees, are preserved.
- Intermediate felling for the purpose of growing the remaining tree stand or that promotes the creation of new seedling material shall be done such a way that after the intermediate felling a sufficient and evenly distributed stand with growth potential is left in the treatment area. Matters to be taken into account in assessing the sufficiency of the stand to be left include the geographical location of the treatment area, site, method of implementing the intermediate felling and dominating height, which means the arithmetic mean of the one hundred thickest trees within a hectare. Intermediate felling involves a forest regeneration obligation if the volume and status of the remaining stand is not sufficient to create a new stand.
- Regeneration felling resulting in an open area except for the retention of seed or shelter trees to produce a new tree stand, involves a forest regeneration obligation if the exposed area exceeds 0.3 hectares. In forest regeneration, a seedling stand may be established with seedlings or seed of pine, spruce, silver birch, aspen, Siberian larch, maple, common alder, oak, European white elm, Scotch elm, small-leaved linden, ash and hybrid aspen of suitable provenance. According to the Decree on Sustainable Management and Use of Forests (1234/2010), regeneration of aspen and hybrid aspen by sprouting is also allowed. A seedling stand may be established with seedlings or seed of downy birch only in peatland, paludified sections of mineral soils and compact soils dominated by clay or silt. In other sites downy birch may be used as a supplementary tree species depending on its site and the geographical location of the area.

The Forestry Act is not applicable in, among other places, protected areas established under the Nature Conservation Act, areas purchased by the State for nature protection purposes, or other State-owned areas managed in accordance with a protection decision of the state forest administration, Metsähallitus, or other authority administering State lands, or in areas referred to in the Act on Wilderness Reserves other than the seven habitats of special importance mentioned above. The majority of nature reserves are located on state-owned land and maintained by Metsähallitus.

The **Ministry of the Environment** (Ympäristöministeriö) guides and monitors nature conservation in Finland. It prepares legislation to maintain biodiversity and is responsible for the general monitoring of the implementation of this legislation. The Ministry also prepares nature conservation programmes and establishes nature reserves under these programmes.

Furthermore, it approves the management and use plans of major nature reserves. The **Finnish Environment Institute** (Suomen ympäristökeskus) researches and assesses biodiversity, serving various public bodies and agencies, businesses and communities. It assesses the endangered status of organisms and habitats, conducts research on the management and restoration of different habitats, and on the importance of ecosystem services and their interaction with biodiversity.

Centres for Economic Development, Transport and the Environment

(Elinkeino-, liikenne- ja ympäristökeskukset - ELY Centres) promote and supervise nature conservation and landscape protection in their respective regions. They safeguard biodiversity, for example, by establishing nature reserves on privately owned land, acquiring areas for the state, for the purpose of nature conservation, approving proposals for protected areas and management and use plans for these areas, safeguarding natural values in land use planning and planning the management and use of Natura 2000 areas. If a felling operation is to be carried out in a Natura 2000 site, or in its vicinity, which could significantly damage the natural value of the area, a declaration must be made to the area's ELY Centre.

About 18% of Finland's forestry land is **protected** or under restricted forestry use. The share of strictly protected forests is almost 14%. About 95% of commercial forests are PEFC **certified**.

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