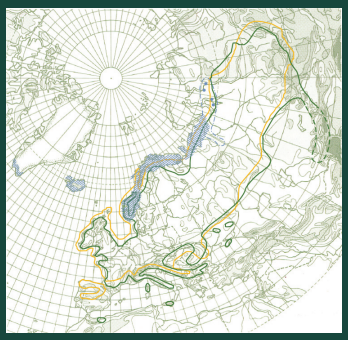
ECOLOGY AND SILVICULTURE OF SILVER BIRCH (*Betula pendula* ROTH.)

K. Mielikäinen[1], J. Hynynen[1], P. Niemistö[1], A.Viherä-Aarnio[1], A. Brunner[2] and S. Hein[3]
[1] Finnish Forest Research Institute, Finland
[2] Norwegian University of Life Sciences, Norway
[3] Forest Research Institute of Baden-Württenberg & University of Applied Forest Siences, Germany

Introduction

In Europe, two commercially important, treelike birch species occur naturally: silver birch (*Betula pendula* Roth) and downy birch (*B. pubescens* Ehrh.). Both species have a wide natural distribution area on the Eurasian continent, ranging from the Atlantic to eastern Siberia. Although birches occur throughout almost the whole of Europe, the most abundant birch resources are in the temperate and boreal forests of Northern Europe.



Source: Hulten, E. & Fries, M. 1986. Atlas of North European vascular plants: north of the tropic of Cancer. I. Introduction, Taxonomic Index to the Maps 1-996. Koelz Scientific Books, Königstein. 498 p.

Site requirements

Silver birch occurs most frequently on fertile forest site types and on afforested fields. The most important soil characteristics for silver birch are fertility, moisture and air content of the soil. The root system of silver birch is deep and intensive.

Regeneration

Birches are monoecious wind- and cross-pollinating species. Birch regenerates abundantly naturally if seed sources are available. Natural regeneration of birch is successful on many kinds of sites, whenever a gap in the canopy is made by man or by natural causes. Nevertheless, planting is the preferred method if production of high quality timber in pure stands is the goal.

Growth pattern

Birch is a typical pioneer tree species with rapid early growth. The culmination of height growth occurs at stand ages of 10–20 years, and that of volume growth five years later. On the best sites the dominant height of silver birch can exceed 30 metres in 50 years. The vitality of birch starts to decline before the age of 100 years.

Mixtures

Silver birch can grow either in pure or mixed stands. Most of the birch resources of Europe occur in mixed stands dominated by coniferous species. Natural birch in mixed stands is mainly harvested for pulp- or fuelwood. However, silver birch stems can develop into valuable high quality saw timber in mixed stands, if birch is favoured in the management practices.

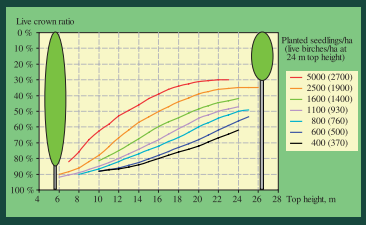
Silviculture

Being a shade-intolerant tree species, stem growth of silver birch is retarded when growing at high densities. Intensive thinnings are required for the production of saw timber. In even-aged birch stands, up to 1600 trees can reach the merchantable stem size. Therefore, precommercial thinning is recommended in young birch stands with high densities. The first commercial thinning is usually carried out at the dominant height of 13–15 m to a density of 700 trees per hectare, and the second commercial thinning ca 15 years after the first thinning to the stem number of 350–400 trees per hectare. The typical rotation in silver birch plantations varies between 40 to 60 years depending on the site productivity.

Management of birch for top-quality timber

The stem form of silver birch is often relatively straight and slender. Due to the self-pruning of branches, silver birch stems are usually free of living branches up to 5–7 meters height by the time of first commercial thinning. Thus high pruning is not always necessary in order to produce high quality saw timber.

However, if the goal is to produce top quality timber then pruning is recommended. Trees should be pruned for the first time at the height of 6–7 meters up to a pruning height of 2.5–3 meters. The number of pruned trees is 600–700 stems per hectare. The second pruning takes place when the stand height exceeds 10 meters. Then 400–500 birch trees per hectare are recommended to be pruned, with a pruning height of 5–6 meters.



Growing Valuable Broadleaved Tree Species

This poster was prepared under the COST action E42 "Growing Valuable Broadleaved species (ValBro)".
This poster is a summary of "Title of the full paper", freely available on www.valbro.uni-freiburg.de