Number 9
2004

Branching out

from the Canadian Forest Service
Laurentian Forestry Centre

NORWAY SPRUCE: STEADY VALUE

Several million Norway spruce seedlings have been planted in private forests in Quebec over the past 30 years.

This species has been highly successful on account of its ability to adapt to conditions in Quebec, its rapid growth rate and its high productivity. However, the popularity of Norway spruce underwent a sharp decline when woodlot owners and forest managers discovered white pine weevil damage in plantations.

Studies done by researchers working at the Laurentian Forestry Centre of the Canadian Forest Service, in collaboration with the ministère des Ressources naturelles, de la Faune et des Parcs du Québec, have nonetheless shown that the white pine weevil has a relatively minor impact on the overall productivity and quality of Norway spruce (see box). This species has the ability to overcome deformities resulting from weevil attack and its impressive annual increment reduces the negative effects associated with this insect pest.

Experimental Norway spruce plantation infested by the white pine weevil and used to study lumber yield.
Photo: Daniel Plourde

To harness the natural advantages offered by Norway spruce and to reduce the proportion of deformities caused by the weevil, control measures need to be carried out every year in plantations between 3 and 12 years old[1]. Pruning the affected leaders eliminates the entire annual weevil generation[2].

In weevil-infested plantations, a selective thinning regime can be applied in order to maximize log quality over the long term. Thinning offers several key advantages:

- increases in diameter and volume growth (per tree);
- increases in the growth of the best stems (selective thinning);
- removal of the most damaged stems at a young age;
- slight increase in productivity (per hectare);
- improvement in the stability of plantations;
- increase in the economic value of plantations.

However, thinning must be carried out at a given competition threshold, which can be expressed with reference to the basal area of the plantation, for example, rather than at a specific age.

1 Not all plantations are affected and the degree of infestation can vary considerably among those that are.
2 This technique is explained and illustrated on the colour poster, "Simple steps for controlling the white pine weevil" available from the Laurentian Forestry Centre.

Natural Resources Canada
Canadian Forest Service
Ressources naturelles Canada
Service canadien des forêts
CANADA'S NATURAL RESOURCES NOW AND FOR THE FUTURE
www.nrcan.gc.ca
Canada

NORWAY SPRUCE: STEADY VALUE

The best timing for this operation depends on site quality, reforestation density, survival rate and production objectives.

It should be kept in mind that less fertile or poorly drained sites may be more vulnerable to weevil attack and that trees growing on such sites are likely to sustain more extensive damage. This points to the importance of planting Norway spruce on suitable sites.

Trees resulting from thinning carried out in the experimental plantation and used to study lumber yield.
Photo: Daniel Plourde

LUMBER YIELD OF NORWAY SPRUCE

In a detailed study (2002) aimed at assessing the lumber yield of Norway spruce compared with white spruce, 150 trees, including 40 white spruce, were cut down, measured and classified based on the extent of major weevil-caused defects.

The average results for all classes of Norway spruce taken together are as follows:

- the volume of wood delivered to the mill was 13% higher;
- the lumber volume was 19% higher;
- the lumber value[3] was 27% higher;
- the usable wood volume was 21% higher.

Despite its susceptibility to the weevil, Norway spruce is able to overcome many of the deformities caused by repeated attacks. Given its low level of tapering[4], this species also has excellent potential to produce high-quality wood.

USEFUL LINKS

Testing, Experimentation and Technology Transfer in Forestry Program (TETTF)
www.cfl.cfs.nrcan.gc.ca/CFL-LFC/what_we_do/tettf.html

Network of demonstration plantations for showing growth and quality gains in forest tree species achieved through breeding programs (TETTF Program)
www.cfl.cfs.nrcan.gc.ca/CFL-LFC/eettf/ficheprojets_eettf_e.asp?id=9001

Web site of the Genetic Gains Demonstration Network
www.cfl.cfs.nrcan.gc.ca/demonstration

Overview of lumber products obtained.
Photo: Daniel Plourde

FOR MORE INFORMATION, PLEASE CONTACT:

Gaëtan Daoust
Natural Resources Canada, Canadian Forest Service
Laurentian Forestry Centre
1055 du P.E.P.S., P.O. Box 3800, Sainte-Foy, Quebec G1V 4C7
Phone: **(418) 648-5830** • Fax: (418) 648-5849
E-mail: gaetan.daoust@nrcan.gc.ca • Web site: http://www.cfl.cfs.nrcan.gc.ca

PARTENARIAT INNOVATION FORÊT

3 According to market prices in 2001.
4 Tapering: a more or less progressive decrease in the thickness of a tree stem or log from the base upwards.

This document was produced as part of the **Forest Innovation Partnership**.