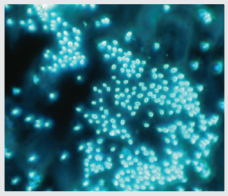
Natural Resources Canada | Ressources naturelles Canada

In Brief

from the Canadian Forest Service – Laurentian Forestry Centre

Number 1 – 2003






Is fertilizing necessary to assist reproduction of jack pine in seed orchards?

Photo: G. Daoust

Seed orchards are plantations of clones or seedlings from selected trees. They are developed for rapid and abundant production of improved seeds for reforestation.

Canadian Forest Service researchers, in collaboration with the Ontario Ministry of Natural Resources, Saskatchewan Pulp and Paper Ltd. and Weyerhauser Canada Ltd., looked more specifically at the production of seeds in jack pine seed orchards in Ontario and Saskatchewan. The aim of their research was to verify whether the use of nitrogenous fertilizers and growth hormones favoured seed production in these orchards.

The results helped to show that the nitrogen needs of male and female cones are not the same. In fact, when nitrogenous fertilizers are added to the soil to increase production of female cones, there is either no effect or a reduction in male cones.

Therefore, people in charge of orchards should take this effect into account before deciding whether to use nitrogenous fertilizers in their plantations to promote the production of female cones. Using fertilizer reduces the development of male cones, thereby reducing pollen production in selected trees, which could lead to reduced tree reproduction.

When used in the right conditions, growth hormones combined with nitrogenous fertilizers should help increase the development of female organs in jack pine. Research also revealed that combining growth hormones and nitrogenous fertilizers did not increase or decrease the effects of either.

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First mapping of the white spruce genome

White spruce grows all over Canada and is used in the lumber and pulp and paper industries. It is also the second most important species in terms of reforestation. In Canada, white spruce has a good genetic diversity, and through cross-breeding of the different families, significant gains can be obtained in terms of growth and wood quality.

However, usual selection methods are lengthy because silvicultural characteristics, such as wood quality, can only be assessed after about 20 years. Canadian Forest Service researchers, in collaboration with colleagues at Université Laval, have developed white spruce genome maps. The maps, which create a profile of all genes carried by the chromosomes, will help to locate the genes responsible for characteristics that are important to the industry, such as wood quality and rapidity of growth.

This will make it easier for breeders to determine whether the trees chosen have the right characteristics for genetic improvement. The maps will therefore help speed up the genetic selection process of white spruce.

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This publication is part of a series that presents popularized summaries of scientific articles written in whole or in part by Laurentian Forestry Centre researchers.

Canada

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Hybrid poplar: Reducing spacing to increase yield

Over the past 20 years, there has been significant progress in cultivation of hybrid poplars as a short rotation crop in North America and Europe. This practice makes it possible to reduce the costs of producing timber and bring the raw material closer to plants. Foresters increasingly count on this type of crop to increase biomass production.

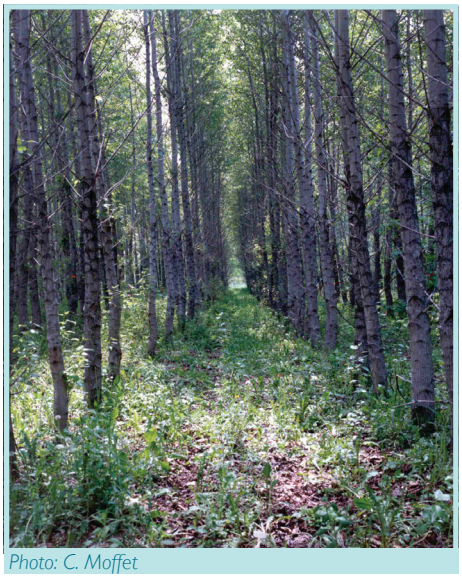

Photo: C. Moffet

Hybrid poplars can make a significant biomass contribution in the short term. Work conducted by a researcher at the Canadian Forest Service on hybrid poplar DN-74 revealed that slightly modifying the planting space between trees may increase biomass production per hectare.

For example, according to results obtained for a cutting cycle of less than five years, decreasing the space by less than a quarter of a metre (between 1 m and 0.75 m) could considerably increase biomass production. The results also show that there is greater competition for light at the crown level as the space between trees decreases, but poplar foliage becomes accustomed to the reduction in the amount of light. However, there was no significant difference in nutrient use.

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A new trap to monitor the Bruce spanworm

The Bruce spanworm is a pest of hardwood trees. It attacks sugar maple and trembling aspen foliage, and is found across Canada.

The usual method for measuring population variations to determine whether we are in an epidemic period is to use sticky bands, which are placed around tree trunks. Female spanworms, which do not have wings, walk on the strips and get stuck to them, making it possible to count them.

Although this method has been successfully used to count female Bruce spanworms when populations are low, the sticky bands are often full of males when populations are high.

Photo: L. St-Antoine

Canadian Forest Service researchers have developed a trap that makes it possible to gather Bruce spanworm eggs, and thus to assess its population. The trap is made of polyurethane foam placed on a post. This is a very simple and practical technique because the trap is almost entirely non-saturable. Researchers can set a large number of traps at the beginning of the season and retrieve them all at once at the end of the season, which makes sampling easier, allows for the involvement of maple stand owners and allows a larger area to be covered.

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A new site index?

Measuring the productivity of a site is an important aspect of forest management. The most commonly used method is the site index, which is based on the height and age of dominant trees that make up the stand.

Although measuring with this index is simple and is widely used and accepted, it cannot be applied to sites where there are no trees.

To get around this problem, Canadian Forest Service researchers have developed a new biophysical site index. This index uses the site's biophysical data (soil, temperature, etc.), rather than phytometric data (age and height of dominant trees). It can therefore be used on all types of site.

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