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Branching Out

from the Canadian Forest Service - Laurentian Forestry Centre

Establishing Plantations for Bioenergy Production

The high demand for plantations of fast-growing tree species is on the rise in Canada. Often established on uncultivated or marginal farmlands, these plantations most often consist of hybrid poplar, trembling aspen or willow. In collaboration with academic partners, researchers from the Canadian Forest Service's Laurentian Forestry Centre and Canadian Wood Fibre Centre have developed a methodology to accelerate the selection process of the most productive clones. While the traditional clone selection method normally requires several years of field testing, the new method reduces the selection period.

Photo: NRCan

Getting closer to increase productivity

The choice of tree spacing in a plantation impacts productivity and crown morphological traits. In the case of fast-growing poplars and willows, the researchers observed that reducing the space between trees from 60 to 20 cm reduces leaf area by 50%. However, aboveground biomass per tree remained relatively unchanged. The reason for this is that tree height increases per unit of leaf area when spacing is decreased. Indeed, under competition, trees allocate more resources to height growth, to the detriment of their diameter. The researchers reported that the most productive clones had a greater leaf area per unit of biomass and a lower root/stem ratio than the least productive clones.

Identifying the right clone

In order to meet profitability objectives, plantations established for bioenergy production must optimize their yield while reducing maintenance costs, which includes site preparation and fertilization. Therefore, clone selection has a direct impact on the profitability of these plantations. This work helped develop a method that can shorten by several years the selection process of the most productive clones per unit area for the production of bioenergy.

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