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Fertilizing soils for intensive silviculture: good news for Norway spruce

The objective of intensive silviculture, or the cultivation of fast-growing species, is to maximize the production of forest biomass in a minimum of time. This sustainable forest management approach has worthwhile potential to protect Canada's forest heritage.

In collaboration with the Groupe de recherche en écologie forestière interuniversitaire[1], Canadian Forest Service researchers have studied the impact of intensive silviculture on soil fertility as well as recommendable practices.

Forest managers usually use soil texture and drainage categories to assess the quality of sites and rarely conduct analyses of the soil chemical composition. However, some indigenous tree species have very high nutritional requirements. The species with the highest requirements is trembling aspen, followed by white birch, white spruce, balsam fir, black spruce and jack pine. It is therefore easy to think that fast-growing species may be harder on soils than indigenous species.

The study however demonstrated that the greater uptake of nutrients for the growth of Norway spruce from superior parent lines planted in loamy and sandy loam soils did not deplete soil mineral reserves when compared with trees with low nutritional requirements. Sometimes the Norway spruce even helped to increase the reserves of available nutrients in the soil.

Norway spruces.
Photo: C. Coulombe (SCF)

Fertilization therefore does not seem to be essential for ensuring the healthy nutrition of trees with higher nutritional requirements than indigenous species. It is now important to identify soil conditions that are the most conducive to tree growth as well as plantation preparation and maintenance scenarios that will ensure the sustainability of sites intended for intensive silviculture.

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1 Interuniversity forest ecology research group (GREFi).

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