Colloque Eastern CANUSA
Les sciences forestières au-delà des frontières

Eastern CANUSA Conference
Forest Science across the Borders

19-21 octobre 2006 / October 19-21, 2006
Université Laval, Pavillon Alphonse-Desjardins
Québec (Québec) / Quebec, QC
Canada

Manuel de conférence
Conference handbook
Genetic variability in the root architecture of 2+0 white spruce seedlings

Stowe, Debbie¹, Sylvie Carles², Julie Carignan³, Mohammed Lamhamedi³, Jean Beaulieu⁴ and Hank Margolis⁵

To reduce the quantity of seedlings that fail to meet morphophysiological criteria at delivery and quantify the genetic variability of root system morphology, containerized white spruce seedlings from 75 open-pollinated families were evaluated after two growing seasons under nursery conditions. During their first year of growth, the seedlings had been subjected to two different fertilization regimes: optimal and sub-optimal. The following traits were investigated: colonization of the root plug, length and orientation of the primary root as well as the number, growing angle, distribution and reorientation of lateral roots. Family had a significant effect on only one of the variables studied: growing angle of first order lateral roots in the upper 25% of the container cavity. A profile analysis showed that the majority of the families had lateral roots growing out of the primary root at an angle of <30°, whereas six families had an elevated number of roots growing at angles of between 30° and 50°. Detailed analysis and observations showed that the greater growing angle was only evident in seedlings that had been subjected to the sub-optimal fertilization regime during their first growing season. This characteristic may be an attempt to exploit the nutrient reserves in a larger volume of the root plug. Our results confirm the sensitivity of white spruce root systems to differences in substrate fertility and indicate that not all families exhibit the same type of adaptation to nutrient stress.

¹Faculté de foresterie et de géomatique, Pavillon Abitibi-Price, Université Laval, Québec, QC, G1K 7P4, Canada. debbie.christiansen@sbfl.ulaval.ca.
²Faculté de foresterie et de géomatique, Pavillon Abitibi-Price, Université Laval, Québec, QC, G1K 7P4, Canada.
³Direction de la recherche forestière, Forêt Québec, ministère des Ressources naturelles et de la Faune, 2700 rue Einstein, Québec, QC, G1P 3W8, Canada.
⁴Natural Resources Canada, Canadian Forest Service, Fibre Centre, 1055 du PEPS, P.O. Box 10380, Stn. Sainte-Foy, Quebec, QC, G1V 4C7, Canada.

Theme: Tree physiology, carbon and nutrient cycles and genetics
Poster board: 39