

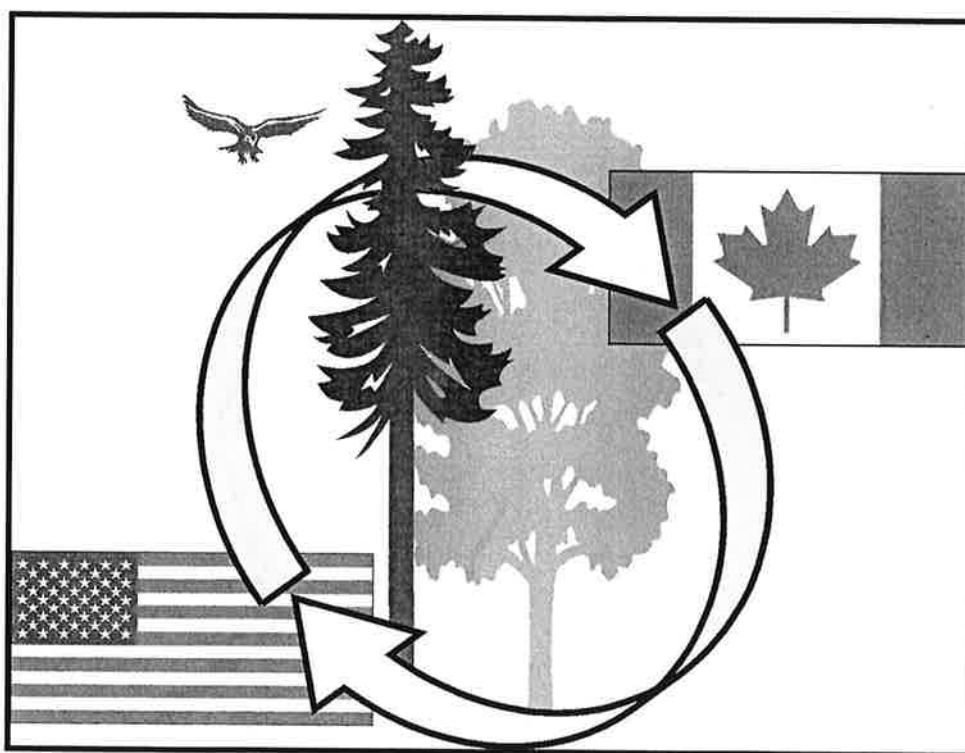
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Genetic variability in the root architecture of 2+0 white spruce seedlings

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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 $<30^\circ$, 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.

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Theme: Tree physiology, carbon and nutrient cycles and genetics
