

**Title:** Impacts of Tree Improvement Programs on Growth and Yield of White Spruce in the Canadian Boreal Forest

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**Project Description:**

In this project, we are quantifying the changes in growth and yield for the white spruce tree improvement program in the boreal forest of Canada. A meta-analytic approach was used to starting with a meta-database that covers a large spatial and temporal range of provenance trials. We are developing a climate-driven dominant height yield response model for selected white spruce (*Picea glauca* (Moench) Voss) and hybrid spruce (*Picea engelmannii* Parry ex Engelmann x *Picea glauca* (Moench) Voss) provenances and incorporating it into an existing growth and yield model. The result is a growth and yield model that estimates yield improvements for a wide spatial and temporal range of the Boreal Forest of Canada. In this project, we are also estimating selection gain and evaluating components of this measure through sensitivity analysis. To forecast selection gain over time in planting sites, we are developing a selection gain model via a random coefficients model. Finally, we are also applying and evaluating improved forecast techniques to predict height yield of hybrid spruce provenances using subject-specific estimates for each progeny trial and by using existing repeated measures for a particular provenance in the hemiboreal forests in Canada.

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