

Genetic and Evolutionary Impacts of Forest Harvesting, Renewal Practices, and Forest Fires in White Spruce (*Picea glauca*)

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Theme: Tree Genetics

Status: Continuing

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Participants

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Background

White spruce (*Picea glauca*) is a predominant tree species in boreal forests; however, due to increased harvesting of this species and poor regeneration after clear-cutting, there are concerns about conservation of its genetic resources. The silviculture practices (clear- and partial-cuts and natural and artificial regeneration) can affect genetic diversity of the regenerated populations of white spruce. However, increased intensities of forest harvesting are expected to have an increased negative impact on genetic diversity. Therefore, there is a need to determine genetic diversity between pre- and post-harvest naturally regenerated populations and also to determine the genetic diversity impacts of varying intensities of experimental harvesting.

Objectives

1. Determining genetic diversity between pre- and post-harvest naturally-regenerated populations from conifer-dominated and mixed wood boreal forests of white spruce
2. Determining genetic diversity impacts of experimental harvesting intensities
3. Generating information for developing guidelines for genetically sustainable white spruce forest management

Key Results

High levels of genetic diversity were observed both in pre-harvest and post-harvest naturally re-generated populations and in CD and MW stands. Genetic diversity estimates for pre-harvest populations were almost similar between CD and MW stands. Similarly, genetic diversity impacts of harvesting intensities on CD and MW stands were similar. We expected that we would record significantly higher genetic diversity in pre-harvest natural population than post-harvest naturally re-generated young seedlings. However, contrary to our expectations, genetic diversity was almost similar between pre- and post-harvest naturally regenerated stands. Likewise there was no significant negative impact of increasing harvesting intensities on genetic diversity of the post-harvest naturally-regenerated populations. These results are based on our preliminary data analysis. The genotyping of missing samples and further data analysis is still in progress. Please note that Dr. Rajora provided the pre-harvest genetic variation data (see the paper, Om, I.K. Mann and Y.-X. Shi. 2005. Genetic diversity and population structure of boreal white spruce (*Picea glauca*) in pristine conifer-dominated and mixedwood forest stands. *Canadian Journal of Botany* 83: 1096-1105).

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