Forest Genetics 2025

Wednesday, August 13, 2025, 3:30 - 4:50 p.m.

Session 7: Assisted population migration

Moderator Aron Fazekas

A seed selection tool to support climate-informed reforestation in Canada

Genevieve Dorrell*, Nicholas Boyce, Zach Zimmermann & Andreas Hamann

Abstract: Climate change adaption in forestry will need climate-informed seed transfer strategies to improve resilience, preserve genetic diversity and ensure long-term productivity, especially in northern Canada. Therefore, we developed an on-line decision support tool to help researchers and forest managers to make climate-informed selections of tree species and seeds sources for reforestation. These recommendations include cross-border transfers and also can include introducing new species, but most reforestation needs can be met by matching planting sites with climate adapted seed sources from within the species' range.

For the climate informed seed sourcing recommendations, we used the 1960s (1951–1980) historic climate as a proxy for the seed source's adapted climate. We then calculated the multivariate Euclidean climatic distance of 12 bioclimatic variables of the seed source's historic 1960s climate to the target plating site's projected future climates (2020s, 2050s and 2080s) and used the climatically closest historic climates as the geographic seed source recommendations at the ecosystem level and when possible, at the seed zone level. To aid in species selection, we created tables of species' expected prevalence under the plating site's projected future climates, using species distribution models based on forest inventory data.

Based on this analysis, we created a web tool to support species and seed source selection for forest management areas of participating forest companies and government stakeholders across Canada (*http://tinyurl.com/DIVERSE-SST*), as well as a beta-version that supports assisted migration across the North American continent (*http://tinyurl.com/NA-SST*). The presentation will demonstrate the tool's applications in Canadian forest management and discuss planned improvements, including enhanced uncertainty quantification, integration of more provincial seed zones, and the consideration of orchard seed sources to support interprovincial and international seed transfer strategies.

Keywords: Climate-informed seed transfer, assisted migration, forest genetics, Canada, North America