



2BILLION TREES

2 BILLION TREES SCIENCE

Research in Support of Tree Planting

NOTE 21

Flying Forest Phenotyping: Assessing advanced remote-sensing tools to improve genetic selection for pathogen tolerance in a high-value coastal conifer

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CFS CENTER:

Canadian Wood Fibre
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PROJECT LOCATION:

Vancouver Island,
British Columbia

Project Drivers

Swiss Needle Cast (SNC) is a foliar disease of emerging concern for Douglas-fir, one of Canada's most valuable timber species and a key foundational conifer in British Columbia's temperate forests. SNC causes trees to shed their needles prematurely, causing significant losses in productivity – a concern for carbon sequestration, timber yield, ecological function and socio-cultural values. This research project, funded under the 2 Billion Trees (2BT) program, aims to increase forest tolerance of climatic extremes and diseases such as SNC. The project will do this by increasing resilience of newly planted seedlings through tree breeding and science-informed reforestation practices.

Project Approach

This study will assess the success of incorporating remote sensing data to accelerate tree breeding for reforestation and afforestation. Drone-based tools make capturing phenotypes for trees faster and easier than manual processes. Phenotyping is the process of assessing the observable traits expressed by an organism (produced through the combination of environmental and genetic factors), whereas genotyping is the process of assessing an organism's genetic make-up. The project will leverage existing tree genomics data and new phenotype data attained through advanced remote sensing tools. Linking these data will enable tree breeders to make better genetic selections, and consequently, establish forests that can better respond to climate change.

Anticipated Outputs and Impacts

This project will support the 2BT program by enhancing the selection of trees that are resilient to climatic extremes and diseases. Provincial tree breeders can use the results generated from the project to screen for trees that are high-yielding, climate resilient and SNC tolerant. Practically all of the 15 million Douglas-fir seedlings that are planted in BC every year are derived from tree selection programs. By partnering with provincial scientists and targeting their programs, results from this project will therefore lead to real-world deployment of seedlings that can cope with cumulative impacts under changing climates.

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aussi disponible en français sous le titre : *Phénotypage aérien : Évaluation d'outils de télédétection de pointe en vue d'améliorer la sélection génétique favorisant la tolérance aux pathogènes touchant les conifères côtiers de grande valeur.*