



ALBERTA INNOVATES

AGRICULTURE AND ENVIRONMENT

ENVIRONMENTAL INNOVATION

LAND MANAGEMENT SOLUTIONS

FUNDING DETAILS

Characterizing the telial host breadth of *Cronartium ribicola* in western Canada and developing tools to generate genetic markers of virulence and resistance

Populations of limber pine (LP) and whitebark pine (WBP) in Alberta are in severe decline due to white pine blister rust (WPBR), which infects over 90% of monitored stands. WPBR is the leading cause of mortality, threatening both species with regional extirpation within decades. Their loss would destabilize subalpine ecosystems, reduce biodiversity, and diminish key functions like water retention and soil stabilization. These keystone species also support wildlife, recreation, and tourism. This project will identify alternate hosts, examine fungal virulence mechanisms, and develop genetic markers to guide restoration and disease management of these ecologically vital trees.



RECIPIENT:

University of Calgary



PARTNERS:

NSERC



TOTAL BUDGET:

\$413,500



AI FUNDING:

\$205,000



PROJECT DATES:

OCT 2025 –
OCT 2028



PROJECT TRL:

Start: N/A
End: N/A

APPLICATION

The work proposed in this project aims to improve conservation outcomes for limber pine and whitebark pine by identifying alternate host plant species for white pine blister rust (WPBR), determining the genetic and molecular factors underlying WPBR virulence in *Cronartium ribicola*, and developing genetic markers to track the spread of emerging fungal races.



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PROJECT GOALS

Objective 1: Survey naturally infected populations of limber pine and white bark pine in AB to identify the telial host breadth of *C. ribicola*.

Objective 2: Perform artificial inoculation experiments to test whether telial host breadth shifts between two *C. ribicola* races that differ in aecial host virulence.

Objective 3: Develop laser capture microdissection methodology to characterize *C. ribicola* gene expression across life stages and host plants.

BENEFITS TO ALBERTA

The loss of limber pine and whitebark pine poses a significant threat to the subalpine ecosystems where these tree species thrive. Their seeds serve as a key food source for at least 13 bird species and 8 mammal species—including Clark's nutcracker and grizzly bears. WBP and LP also function as pioneer species in harsh or disturbed environments, helping to establish other conifers and understory vegetation. Consequently, the loss of these trees could lead to a substantial decline in biodiversity. WBP and LP are vital in mitigating water runoff, preventing soil erosion, and maintaining snowpack stability. The proposed research project will result in positive environmental impacts, which support biodiversity, enhance forest carbon sequestration, protect critical wildlife habitat, and increase ecological resilience in Alberta's montane and subalpine ecosystems.



6 Practices/Policies Informed



11 Publications



6 Students Trained

CURRENT
STATUS

AUG 2026

Project is in progress.