

GENETIC RESISTANCE TO BLISTER RUST IN DECLINING LIMBER PINE (*PINUS FLEXILIS*) IN ALBERTA—THE PATH TO RESTORATION?

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Limber pine (*Pinus flexilis*) is a long-lived conifer native to western North America. The northernmost populations of limber pine are in Canada, of which over 90 percent are in Alberta. These populations are heavily infected by white pine blister rust (WPBR), caused by the non-native pathogen *Cronartium ribicola*. Many natural populations are more than 70 percent infected, with some areas having > 95 percent infection. Limber pine is listed as endangered in Alberta and has been recommended as endangered by the Committee on the Status of Wildlife in Canada. Efforts to restore the species are underway, such as finding a diverse complement of genetically resistant parent trees and assembling seed collections for genetic conservation and restoration. Two small tests of Alberta parent tree progeny at the USDA Forest Service's Dorena Genetic Resource Center (DGRC) detected complete resistance to WPBR major gene resistance (MGR). Only low levels of partial resistance have been detected to date. Currently, Alberta Agriculture and Forestry and Waterton Lakes National Park are working with DGRC to greatly expand the number of seedling families being screened for resistance, using progeny of putatively resistant field selections. Sixty half-sib families were inoculated with WPBR spores in fall 2017, 50 additional families inoculated in 2018, and additional families are scheduled for inoculation in 2019 and 2020. Resistant seedlings from the first MGR tests at DGRC were included in restoration plantings in 2018. These seedlings and their parent trees will serve as sentinels to monitor changes in the rust fungus or environmental conditions that may affect the durability or stability of resistance. Within 5 years we anticipate having an increased knowledge of the frequency, type, and level of genetic resistance in northern Canadian populations, as well as establishment of more restoration plantings.

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