DURABILITY OF RESISTANCE AND "USEFUL RESISTANCE" IN FOREST TREES TO NON-NATIVE PATHOGENS

Richard A. Sniezko[1], Douglas P. Savin[1], Angelia Kegley[1], and Robert Danchok[1]

Many tree species are extremely susceptible to one or more non-native pathogens or insects. For some, the level of susceptibility can be so severe that they are essentially extirpated from many forest ecosystems, and their use for restoration, reforestation, or urban forestry is lost. Applied programs to find, enhance, and utilize genetic resistance in some tree species are well underway, and more are being considered. Some people equate genetic resistance with 100 percent immunity in planting stock, but in most forest situations this will not be the case. Resistance can also refer to having fewer, less severe, or incompatible infections, or being able to survive and reproduce, and it may be present in only a portion of the planting stock. Trees are long-lived organisms, and resistance has to be effective for decades (in managed plantations) to centuries (in native forests) to be utilitarian. Resistance must not only be durable and stable but also at a useful level, which may vary by species and application. A seedlot with 'useful resistance' (UR) is expected to meet management objectives for long-term deployment, often over many sites and for decades after planting. Field plantings provide the best knowledge of durability of resistance and its stability across a range of environments. We examine the durability, stability, and resistance levels of two white pine species (western white pine, *Pinus monticola* and sugar pine, *P. lambertiana*) from some of the oldest existing white pine blister rust (caused by the fungal pathogen *Cronartium ribicola*) resistance field trials. Genetic resistance will be key to retaining many prominent species in forest ecosystems as well as for use in reforestation and urban forestry. The examples provided here can provide guidance to managers on early expectations of resistance in application to a range of other non-native pathogens or insects in forest trees.

The full paper was published in *Plants, People, Planet*
https://nph.onlinelibrary.wiley.com/toc/25722611/2020/2/1

The reference for the published paper is:

Sniezko, R.A.; Johnson, J.S.; Savin, D.P. 2020. Assessing the durability, stability, and usability of genetic resistance to a non-native fungal pathogen in two pine species. Plants, People, Planet. 2(1): 57-68. DOI: https://doi.org/10.1002/ppp3.49.

[1] Dorena Genetic Resource Center, USDA Forest Service, Cottage Grove, OR 97424, (richard.sniezko@usda.gov).

Citation for proceedings: Nelson, C. Dana; Koch, Jennifer L.; Sniezko, Richard A., eds. 2020. Proceedings of the Sixth International Workshop on the Genetics of Host-Parasite Interactions in Forestry—Tree Resistance to Insects and Diseases: Putting Promise into Practice. e-Gen. Tech. Rep. SRS–252. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 170 p.