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Genetics of Five-Needle Pines and Rusts of Forest Trees Research: Challenges and Opportunities

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The international meeting on "Challenges and Opportunities in (1) Genetics of Five-Needle Pines and (2) Rusts of Forest Trees Research: Conservation, Evolution and Sustainable Management in a Changing Climate" took place from June 15-20, 2014, in Fort Collins, Colorado, USA.

The conference which brought together three groups: IUFRO 2.02.15 (Breeding and Genetic Resources of Five-Needle Pines), IUFRO 7.02.05 (Rusts of Forest Trees) and Strobusphere, was very successful. It featured talks and posters on advances in gene conservation, genomics, rust resistance, impacts of climate change, evolutionary dynamics and other related topics. The 105 participants included a mix of students, professionals, researchers, and emeritus scientists representing the following countries: Austria; Canada; China; Finland; France; Germany; India; Italy; Korea; Mexico; Portugal; Russia; Saudi Arabia; Sweden; U.S.A.; Vietnam.

Photo provided by Richard Sniezko

Species of 5-needle pines ('white pines') occur or are planted in many countries throughout the world. They are valued for their ecological, aesthetic and commercial value. All species of 5-needle pines are susceptible to white pine blister rust (WPBR), but those occurring in North America are highly susceptible (*Cronartium ribicola*, causative agent of WPBR, is a non-native invasive pathogen in North America). Genomic tools are rapidly developing for use in conifers and the genome of sugar pine (*P. lambertiana*) is now being sequenced. These factors made it a natural to bring together the three groups for this meeting.

There were some joint sessions as well as concurrent sessions organized by each respective group for topics of interest. Two days of indoor sessions, plus an evening poster session were followed by three days of fieldtrips.

Discussions focused on key issues and latest findings in the field:

a) Advances in genomics and genomic resources in forest trees and rusts of forest trees
b) Genetic resistance to white pine blister rust investigations underway in high elevation, non-commercial species
c) Gene conservation
d) Climate change impacts on five-needle pines

Until recently, the very large genomes of conifers have precluded use of genomic tools to help decipher the underlying genetic variation in 5-needle pines and other conifers. However, recent advances in technology now make it feasible to use these tools – and the genome of sugar pine (*P. lambertiana*) is now being sequenced; as has the genome for the white pine blister rust pathogen. The long-term programs to develop genetic resistance to white pine blister rust are some of the most advanced in forest trees and the products are being used for restoration and reforestation. Concerns about climate change and invasive pathogens such as blister rust fungus have raised added awareness for the needs for gene conservation.

Proceedings are planned (abstracts, extended abstracts and papers from the oral and poster presentations). Discussions for a special journal issue are also underway. A conference for the 2.02.15 Working Party may be held in Europe in 2017. IUFRO Working Parties 2.02.15 and 7.02.05 will also be sponsors of the 5th International Workshop on the Genetics of Host-Parasite Interactions in Forestry (2015, Orleans France).

Meeting website: *http://www.westernforestry.org/Events/conference/2014-five-needle-pine-genetics-conference/*

Host organization: USDA Forest Service
Sponsors: USDA Forest Service (Rocky Mountain Research Station; Pacific Northwest Research Station; Western Wildland Environmental Threat Assessment Center; Forest Health Protection; Rocky Mountain Region; Pacific Northwest Region; Southwestern Region); Dorena Genetic Resource Center; USDI Bureau of Land Management (Wyoming Branch); Whitebark Pine Ecosystem Foundation; Sierra Pacific Industries; American Forests.