

FII Project Number: R02-27

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Project Title: Investigation of ecological and host-pathogen interactions of *Phellinus weirii* - a forest health and natural disturbance agent in second-growth forests.

Abstract

The research conducted in 2002/2003 represents an annual module of a longer-term project that has a goal to provide Douglas-fir that is resistant to the fungal pathogen *Phellinus weirii*. Research conducted in 2002/03 focussed on providing interim deliverables from the following six principal tasks: 1) field trials with selected Fdc families and natural Fdc, 2) characterization of PR proteins and defense-related genes in Fdc, 3) characterization of terpenoid defenses in Fdc, 4) investigation of the virulence, diversity and distribution of *P. weirii*, 5) investigation of interactions between *P. weirii* and other species in 2nd growth forests, and 6) extension of research results. General results to date include the following:

- Identification of two full-sib families of coastal Douglas-fir (Fdc) with consistent susceptibility ranking to *P. weirii*;
- Documentation of the early stages of *P. weirii* infection through bark tissues of Fdc;
- Further identification and characterization of pathogenesis-related (PR) proteins up-regulated in *P. weirii*-infected Fdc roots;
- Creation of cDNA libraries from *P. weirii*-infected Fdc tissues;
- Isolation of five new Fdc terpene synthase genes identified to contribute to Fdc defensive resin composition;
- Evidence that the traumatic resin response can be induced in Fdc roots by pretreatment with methyl jasmonate;
- PCR-based analysis of ~40 *P. weirii* isolates from British Columbia which reveal polymorphisms between isolates;
- Extension of research results by way of presentations and publication in referred journals.