DEVELOPMENT OF A TOOL FOR RAPID IDENTIFICATION OF RESISTANT TREES IN SPECIES AFFECTED BY ALIEN INVASIVE PATHOGENS

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Alien invasive pathogens continue to threaten the health of forests across the United States and globally. Identifying and breeding resistant trees is a viable strategy for disease management and may be used as part of efforts aimed at restoring disturbed habitats. However, identifying disease resistant trees requires artificial inoculation or natural infection with a pathogen, and time needed for symptoms to develop. This often comes after significant resources have already been invested in collecting seeds and growing seedlings. Therefore, the objective of our work is to develop a more rapid phenotyping method for disease resistance using Fourier transform infrared (FT-IR) and Raman spectroscopy combined with chemometrics. Currently, we are focusing our efforts on two forest pathosystems: root rot of Port-Orford-cedar (*Chamaecyparis lawsoniana*) caused by *Phytophthora lateralis* and white pine blister rust on whitebark pine (*Pinus albicaulis*) caused by *Cronartium ribicola*. In Port-Orford-cedar, we are analyzing material with origins across the geographical range of the species, while with whitebark pine our efforts are focused on populations of the Pacific Northwest. Our goals include evaluating whether the tool can be used to predict resistance within and between families, and the impact of geographical origin on model predictions. We ultimately aim to develop protocols for rapid, in-field analysis of intact plant materials that can be used to facilitate and expedite current breeding and restoration efforts.

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