

SPECTRAL-BASED TOOLS FOR DISEASE RESISTANCE PHENOTYPING IN TREES

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Plant specialized metabolites play important roles in tree responses to abiotic and biotic stressors, e.g., plant pathogens and insect pests. For this reason, individual metabolites or groups of metabolites may be useful as biological markers for identifying trees with desired traits, like disease resistance. Infrared spectroscopy is one approach for measuring the complex chemical make-up of tree tissues and has the potential to be used for rapid and high-throughput phenotyping when combined with multivariate statistical analysis or machine learning. Real-time analysis of tree tissues under field conditions is now possible thanks to advances in spectral technology and the availability of low-cost developmental sensor units. Case studies were presented that demonstrate how infrared spectroscopy can be used to distinguish between disease resistant and susceptible trees. Constraints and opportunities for applying spectral-based tools for tree improvement was discussed.