

Effect of water stress on northern red oak constitutive defenses and disease resistance to *Phytophthora cinnamomi*

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Phytophthora species such as *P. cinnamomi*, which causes root rot, and dieback, and *P. ramorum*, the casual agent of sudden oak death, are major threats to some oak species. In northern red oak (NRO), *Phytophthora spp.* mainly infect phloem tissue, leading to necrotic lesions and bleeding cankers. In general, water stress (too much or too little water) plays an important role in disease severity, affecting a plant's resistance to infection. Plant specialized metabolites, such as phenolics, and hydrogen peroxide (a reactive oxygen species) are part of a plant's defense mechanisms, and may be altered by water stress, making plants more susceptible to pathogen attack.

In this study we hypothesized that water stress would increase susceptibility of NRO to *P. cinnamomi*, and hydrogen peroxide and phenolic production would be greater in non-water stressed trees. To test this hypothesis, thirty NROs were separated into three water treatments: flooded, no water, and regular watering. After four weeks, all trees started receiving regular watering, and pre-inoculation (constitutive) defenses were assessed. Fifteen additional trees were inoculated with *P. cinnamomi* to assess the impact of water stress on disease severity. The results of this study will be discussed at the CFAES 2014 Undergraduate Research Forum.