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Abstract. Background: Laurel wilt disease has caused the extensive mortality of lauraceous species in the southeastern United States. The causal agent is an invasive fungus, *Raffaelea lauricola*, which is a symbiont of the beetle *Xyleborus glabratus* and causes a rapid, fatal vascular wilt. Early diagnosis of laurel wilt is imperative for efficient disease management. The current diagnostic process, however, is slow due to the lengthy laboratory procedures required to confirm pathogen presence. Methods: We tested the robustness and field-portability of a recently developed, species-specific, loop-mediated isothermal amplification (LAMP) assay for *R. lauricola*, with the overall goal of eliminating the need for a laboratory confirmation of the diagnosis. We tested the robustness of the assay using benchtop equipment with naturally infected samples. We then tested the assay directly in the field using a portable device. Results: The assay successfully detected *R. lauricola* directly from symptomatic wood tissue using crude DNA extracts. Furthermore, the assay readily allowed users to distinguish between symptoms caused by *R. lauricola* infection and similar symptoms caused by other agents. In-field, we assayed wood samples from symptomatic redbay (*Persea borbonia* [L.] Spreng) and sassafras (*Sassafras albidum* [Nutt.] Nees) across the Southeast and successfully detected *R. lauricola*-infected trees in less than an hour. Conclusion: Results of this study confirmed that the field-deployable LAMP assay is robust and can rapidly and accurately detect *R. lauricola* in infected trees directly on-site. LAMP technology is well suited for in-field implementation, and these results serve as an incentive for further development and use of this technology in the field of forest pathology.

Keywords. Crude DNA; Early Detection and Rapid Response; In-Field; Loop-Mediated Isothermal Amplification (LAMP); *Raffaelea lauricola*.

Abstract. Soil water potential can be used as a proxy for plant available water in irrigation scheduling. This study investigated the relationship between soil water potential and plant water status of pines (*Pinus sylvestris* L.) planted into two different substrates. Predawn leaf water potential as a well-established measure of the plant water status and soil water potential correlated very well. However, estimating the plant water status from individual sensor readings is subject to significant estimation errors. Furthermore, it was shown that heterogeneous soil/root ball combinations can lead to critical effects on the soil water balance, and that sensors installed outside of the root balls cannot estimate the plant water status without site-specific calibration.

Keywords. Irrigation Scheduling; Predawn Leaf Water Potential; Soil Moisture Sensor; Soil Water Potential.

Abstract. Pear rust is a foliar pathogen of ornamental and fruiting pear trees. Unmanaged, yield and aesthetic losses can be severe. Over-reliance on synthetic fungicides means novel means of pathogen management are required. Field trials were conducted using pear (*Pyrus* cv. Conference) to assess the efficacy of electrolysed oxidizing water (EO water) as a rust protective compound. A synthetic fungicide (boscalid + pyraclostrobin) spray program used for pear rust management was included for comparison. Each treatment was applied 4 times prior to the visible

appearance of rust (April through June, i.e., preventatively). Studies were conducted in 2017 and repeated in 2018. Efficacy of EO water as a rust protectant compound was confirmed (increased leaf chlorophyll content, reduced leaf rust incidence and severity). The degree of leaf rust severity protection conferred was not statistically different from a boscalid + pyraclostrobin spray program. Results suggest 4 spray applications of EO water provides a useful addition to existing methods of pear rust management under field conditions that may have applicability against other foliar pathogens.

Keywords. Fungicides; *Gymnosporangium*; Integrated Disease Management; Orchard Management; Pathogen Control; Plant Health Care; Urban Landscapes.

Abstract. Callery pear (*Pyrus calleryana*) is a tree notorious for poor branch union and breakage during storms. Structural pruning is a pruning technique that can be practiced on young trees to strengthen tree branch attachment. Callery pear (*Pyrus calleryana* 'Redspire') was structurally pruned and allowed to grow for 7 years and compared to an unpruned control. A breaking device was used to determine branch strength by providing a static load to simulate a snow or ice load. Branches from pruned and unpruned trees were pulled to failure to observe any difference from pruning. Regardless of the structural pruning treatment, trees that were unpruned were larger in diameter at breast height (DBH) and width at the end of the test. No differences were found in testing branch union strength for either pruned or unpruned trees, suggesting that more time is needed to determine the long-term benefits of structural pruning. Branch tissue moisture content was greater than trunk tissue both in immediate post-harvest testing and in samples over time. Also, branch moisture content observations suggested the time available for field testing branch union strength could be as much as 5 to 9 days after harvest.

Keywords. Branch Union; Callery Pear; Structural Pruning.