

USE OF A RECIRCULATING IRRIGATION SYSTEM TO CONTAIN SOILBORNE PATHOGEN, *PHYTOPHTHORA CINNAMOMI*, IN OPERATIONAL DISEASE RESISTANCE TRIALS

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The Resistance Screening Center (RSC), operated by the Forest Health Protection unit of the USDA Forest Service, Southern Region, State and Private Forestry, has traditionally screened conifer and hardwood seedlings for disease resistance to various aerial pathogens. Recently, through a partnership with the American Chestnut Foundation, the RSC has begun screening chestnuts for disease resistance to the soilborne pathogen, *Phytophthora cinnamomi*. Intentionally bringing a generalist soilborne pathogen like *P. cinnamomi* into a container nursery setting, where multiple hosts reside, requires careful consideration, planning, and precaution. In an attempt to contain the pathogen, and prevent unwanted spread of the disease, a recirculating irrigation system was constructed in the greenhouse. Chestnuts are grown for 12 weeks before being inoculated with *P. cinnamomi*. Trays of seedlings are kept in hydroponic flood tables. Pre-inoculation, flood table drain valves are kept open and irrigation water is allowed to drain directly to the greenhouse floor. After the seedlings are inoculated, the irrigation water is considered contaminated. At this point, flood tables are connected to a contained and recirculating plumbing system. For the first two weeks post-inoculation, seedlings are watered overhead to create a favorable environment for infection. Irrigation runoff is pumped from the flood tables to a holding tank inside the greenhouse, where it is treated with sodium hypochlorite (bleach). Treated water is then held in an outside tank where the chlorine is allowed to dissipate before being released into a gravel field. After the initial overhead watering phase, seedlings are subirrigated to further reduce the risk of pathogen escape. Seedlings are flooded for four hours three times weekly. To counteract nutrient leaching, soluble fertilizer is added to the irrigation water. The containment system is designed to allow for water to be recirculated and used several times before being treated with chlorine. This creates a more nutrient rich environment and reduces the number of chlorine treatments needed. Seedlings are subirrigated for the remainder of the study, approximately 5 months. This system can be used as a model for screening other plant species for susceptibility/resistance to soilborne pathogens in a nursery setting.

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