Characterization of *Phytophthora* Species in Recycled Irrigation Water at a Container Nursery in Southwestern Virginia

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(ABSTRACT)

The potential of increasing disease problems through the use of recycled irrigation water in horticultural operations is a serious concern, yet basic research on waterborne plant pathogens in Virginia is lacking. In this work seasonal fluctuations and locations of Pythiaceae in a recycled water irrigation system at a container nursery were determined. *Pythium* spp. were recovered more frequently and in greater numbers than *Phytophthora* spp. Species of *Phytophthora* recovered in filtering assays were identified as *P. capsici, P. citricola, P. citrophthora, P. cryptogea, P. drechsleri,* and *P. nicotianae*. *P. cryptogea* and *P. drechsleri* were the only *Phytophthora* spp. recovered from baits placed on the surface of the irrigation reservoir, whereas a greater diversity of species was recovered from baits placed at depths. Hymexazol-amended medium was found to have limitations in recovery of *Phytophthora* spp. In pathogenicity tests, *P. cactorum, P. capsici, P. citrophthora,* and *P. nicotianae* caused significant mortality of *Salvia officinalis* and *P. cactorum* showed limited pathogenicity on *Gerbera jamesonii.* Asymptomatic (aboveground) plants were found to harbor inoculum long after *Phytophthora*-inoculation. Fresh weight analyses of roots and shoots of asymptomatic plants demonstrated that *Phytophthora* inoculation may either reduce or stimulate plant shoot growth, but little effect is apparent on

roots. Irrigation with naturally infested irrigation water reduced plant growth. This research provides data for prioritizing development of detection technology and management practices for plant pathogens in irrigation water. The results may also lead to improvements in conventional water assay protocols for plant pathogens.

DEDICATION

This work is dedicated to my husband, John,

who has shown unwavering support and encouragement

during the pursuit of my education.

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