

# Solarization of Reused Pots Is an Inexpensive and Efficient Method to Eliminate *Phytophthora cactorum* and Other Serious Soilborne *Phytophthora* spp. Found in Production Nurseries<sup>1</sup>

K. Suslow,<sup>2</sup> S. Sharma,<sup>2</sup> K. Kosta,<sup>3</sup> Kristina Weber,<sup>3</sup> and S. Rooney-Latham<sup>3</sup>

## Abstract

The reuse of plant pots by nursery growers has repeatedly been shown to be a method by which transfer of plant pathogens within a nursery will occur. More critically, this practice is an efficient pathway to infest landscape settings or habitat restoration sites by the out-planting of pre-symptomatic infected plant material. The transfer of water molds (oomycetes), such as plant pathogenic *Phytophthora* species, is a major threat to restoration projects and prevention of cross-contamination via pots should be a critical nursery operational control. Our research has established performance and efficacy criteria that demonstrate the risk can easily be managed by solarization of used pots.

In the summer of 2015, the National Ornamentals Research Site at Dominican University of CA (NORS-DUC) and the California Department of Food and Agriculture (CDFA) conducted two outdoor solarization experiments designed to verify lab-based studies of the time:temperature at which *Phytophthora cactorum*, a serious, commonly-found soilborne plant pathogen in the nursery industry, would be killed. In addition to its role as a disease agent, *P. cactorum* is also a useful surrogate for on-site validation studies of related serious pathogens, such as *P. ramorum* and *P. tentaculata*. Soil collected from each respective nursery and *P. cactorum*-infected leaf disks were combined and filled into sachets. Inoculum sachets were inserted into nested stacks of 1-gallon black pots, D-40 black tubes and Tubex tubes. In both of the outdoor experiments conducted in a hot and cool climate over the course of 3 weeks and 6 weeks, respectively, the pathogen was killed within the first week in the treatment pots (those wrapped in “clear” plastic which was purchased from a local hardware supply store). In the hot climate, the pathogen was also killed in the controls with no plastic wrapping, but in the cool climate, the pathogen was isolated weekly from the controls throughout the 6-week period. Mirror-control sachet samples of *P. cactorum*, mixed with each soil source, were maintained at the CDFA Plant Pest Diagnostic Laboratory and at NORS-DUC at ambient temperatures within a lidded container held in the dark. These controls were sampled weekly. All lab controls remained viable throughout the course of the experiment. Dataloggers recorded temperature every 30 minutes in the pots, placed at an interior position within the center stack of pots, as well as the ambient temperatures. Temperature data was correlated with the length of time required to kill the pathogen.

In the first week when *P. cactorum* was killed at both locations in the 1-gallon pot treatments, daytime high temperatures at the hot location ranged from 50-57 °C and ambient high temperatures ranged from 30-41 °C; daytime high temperatures at the cool location ranged from 39-45 °C and the ambient daytime

<sup>1</sup> A version of this paper was presented at the Sixth Sudden Oak Death Science Symposium, June 20-23, 2016, San Francisco, California.

<sup>2</sup> National Ornamentals Research Site at Dominican University of California, San Rafael, CA.

<sup>3</sup> California Department of Food and Agriculture, Sacramento, CA.

Corresponding author: [karen.suslow@dominican.edu](mailto:karen.suslow@dominican.edu).

highs ranged from 19-26 °C. Temperatures remained within those ranges on a daily basis for 4.5-6 hrs (hot) and 2-4 hrs (cool). *P. cactorum* was also killed in the control pots during the first week in the hot climate; temperatures in those pots ranged from 39-47 °C for 3-6 hrs on a daily basis.