

# Pilot Program (Proof of Concept) to Mitigate *Phytophthora ramorum* at an Infested Nursery Based On a Systems Approach<sup>1</sup>

Gary Chastagner<sup>2</sup> and Marianne Elliott<sup>2</sup>

## Abstract

The primary purpose of this program was to demonstrate proof of concept of certain mitigation approaches at a repeat *P. ramorum*-positive nursery site in Washington. Approaches included steam treatment of infested soil areas; creating a gravel “sandwich” above steam-treated and potentially infested soil surfaces; improving drainage systems; required sanitation of pots, flats, and other surfaces; monitoring host plants; and training of staff to identify potential problems and symptoms associated with the life cycle of *P. ramorum*. Various critical control points (CCPs) were sampled for *Phytophthora* spp. and the results shared with the nursery and regulatory agencies to demonstrate the effectiveness of their practices. The hypothesis was these specific mitigations will effectively prevent future infestations of nursery stock produced at this site.

The nursery was positive for *P. ramorum* in 2010, 2012, 2014, and 2015. In 2014, *P. ramorum* was detected on *Camellia sinensis* 'Sochi,' *Vaccinium ovatum*, and *Gaultheria shallon* during the spring inspection. After mitigations, the nursery was found positive again during the 2015 spring inspection for *P. ramorum*. Positive plants were all *Vaccinium parvifolium*. It is likely that *P. ramorum* moved onto some new plants from a holdover plant or from elsewhere in the nursery where mitigations were not performed. All isolates taken from plants, soil, leaf debris, and standing water in 2014 and 2015 were the NA2 genotype. This nursery is one of two nurseries in WA that has been positive for *P. ramorum* since 2011 and ships host material interstate, placing it under regulations in the revised USDA *P. ramorum* Federal Order.

The CCP team met with the owner and several employees to discuss a new set of mitigations to be implemented twice annually. The nursery voluntarily hired an employee whose responsibilities included ensuring that the standard operating procedures (SOPs) were being followed. Employee training sessions were also conducted to provide updated information and a "refresher course" on SOPs. Each year, the nursery was provided with an updated list of the *Phytophthora* species present at the nursery, where they were found, and their hosts. This helped personnel understand where practices could be improved as well as the risk to their plant material. Other data collected at the nursery included effectiveness of soil and pot steaming; monitoring of water flow beneath the gravel "sandwich" in production areas; and a comparison of *Phytophthoras* isolated from dirty pots, pots soaked in water, and disinfected pots. Collection of this data is beneficial to all parties since the nursery and regulatory agencies can see the impacts of specific practices, and this information can be included in a publication to be made available to a wider audience.

There has been a vast improvement in the practices of this nursery as a result of the required mitigations to continue interstate plant shipping. Having research results that show the effectiveness of their updated

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<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> Washington State University Puyallup Research and Extension Center, Puyallup, WA 98371.  
Corresponding author: [chastag@wsu.edu](mailto:chastag@wsu.edu).

SOP has also been very helpful. Much time, money, and resources were committed to this project in an effort to slow the spread of the *P. ramorum* NA2 lineage from WA to elsewhere in the US.