Testing Biological Control Agents for Suppression of *Phytophthora ramorum* in Potting Mixes in a Simulated Nursery Environment[1]

Marianne Elliott[2] and Gary Chastagner[2]

Abstract

The spread of *Phytophthora ramorum* from infested areas in nurseries and landscape sites is commonly associated with the movement of inoculum in water or from the movement of contaminated soils. It has been shown that *P. ramorum* can survive asymptomatically on roots of containerized plants and in potting media. The development and implementation of cost effective and environmentally acceptable best management practices (BMPs) to limit the spread of *P. ramorum* has been identified as a high priority need by the nursery and forestry industries as well as state and federal regulatory agencies.

Studies have shown that growing plants in suppressive composted bark or mulch is an effective way to reduce the likelihood of *Phytophthora* root rot development. The addition of inhibitory organisms to a potting mix that is conducive to their growth shows potential as a means of controlling *P. ramorum* and other diseases in the soil environment and will prevent the movement of inoculum in containerized plants. This study, at the National Ornamentals Research Site at Dominican University of California, examined whether commercially available suppressive organisms could be added to potting mixes to help suppress *P. ramorum* in a nursery setting, thus providing a BMP for nurseries and landscapers who are concerned about mitigating *P. ramorum* in soil. The effects of temperature and soil moisture on *P. ramorum* survival in containers were also examined.

There were no significant relationships between the number of times pots were positive for *P. ramorum* and biocontrol treatments or host plants. The results of both trials show that *P. ramorum* inoculum can increase in overwintering potted plants, irrespective of other treatments such as potting mix composition and treatment with biocontrol agents. Logistic regression analysis showed a significant relationship between the number of *P. ramorum* positives and potting mix type, which could be due to differences in soil moisture and maximum temperature among the treatments. Soil moisture and maximum soil temperature were negatively correlated during the warmer months, and there was a strong negative relationship between maximum daily ambient temperature and levels of *P. ramorum* in all treatments. The difference in *P. ramorum* colonization of pots among blocks in the experiment suggests that environmental factors, particularly temperature, are important to consider. The lack of control of *P. ramorum* in the soil by the biocontrol agents may be related to soil conditions such as temperature, moisture, and pH. It may also be related to the interactions with *P. ramorum* and other soil organisms under these conditions, despite their ability to control *P. ramorum* on foliage and *in vitro*.

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[2] Washington State University Puyallup Research and Extension Center, Puyallup, WA 98371.
Corresponding author: melliott2@wsu.edu.