

Effect of Fungicides and Biocontrol Agents on Inoculum Production and Persistence of *Phytophthora ramorum* on Nursery Hosts¹

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Abstract

Once *Phytophthora ramorum* is introduced into a nursery on a host, its local spread and establishment is primarily dependent on sporangia and zoospore production. Nursery operators commonly use fungicides to prevent the establishment of *Phytophthora* –caused diseases, although current research only supports the use of fungicides for preventing infection. It is still unknown, however, what effect fungicide treatments have on sporulation, spread, and persistence of the pathogen on established infections. With this additional knowledge, fungicide treatments could be more effectively used to prevent the spread and establishment of the pathogen in nursery operations. The goal of this study was to evaluate the activity of foliar applied fungicides and biocontrol agents to inhibit sporulation and reduce pathogen persistence in ornamental hosts.

The experiment was established at the National Ornamentals Research Site at Dominican University of California, San Rafael, California on November 3, 2010 and at Felton, California on November 23, 2010. Nursery stock of camellia and rhododendron were inoculated at both research sites. Each plant in 4 blocks of each species was inoculated with 10 inoculum plugs with a locally derived isolate of *P. ramorum*. Treatments were applied approximately 4 weeks after inoculation, and included: *Bacillus subtilis* (Cease[®]), mandipropamid (Micora[®]), *Trichoderma atroviride* (Plant Helper[®]), *Reynoutria sachalinensis* extract (Regalia[®] SC), mefenoxam (Subdue Maxx[®]), dimethomorph (Stature[®] SC), mancozeb (Dithane[®] 75DF), fluopicolide (Adorn[®]), pyraclostrobin (Insignia[®]), mono- and di-potassium salts of phosphorus acid (Alude[®]), and cyazofamid (Segway[®]).

Phytophthora ramorum sporulation in the field and in flooded disk assays was evaluated from December 2010 to April 2011. Pathogen viability and persistence in leaf lesions was evaluated from December 2010 to June 2011. The lesions in the Felton experiment failed to sporulate at detectable levels, and *P. ramorum* was not recoverable from the majority of the lesions in culture, possibly because a low-viability isolate was used for inoculations. In the San Rafael experiment, the fungicides cyazofamid and mefenoxam reduced sporulation in the first few weeks of lesion development. Pathogen persistence (measured by colony growth in semi-selective media from lesion isolations) was also similarly affected.

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