

FY08 Application for Nursery Research Funding
Washington State Department of Agriculture - Nursery License Surcharge

(Please use one application packet including the Progress Report page for each proposal. You must use our form - failure to do so may result in not funding your project.)

Project Title: Variation in the Sporulation of *Phytophthora ramorum* on Rhododendron

Project Leader: Gary Chastagner and Norm Dart

Institution (if any): Washington State University

Mailing Address: 7612 Pioneer Way East, Puyallup, WA 98371

Project Phone Number: (253) 445-4528 **FAX Number:** (253) 445-4621

Cellular or Pager Number: (253) 273-9530 **E-Mail:** chastag@wsu.edu

Note: Project leader or his/her designee must be available at above project phone number on March 2, 2007 between the hours of 10:00-12:00 and 1:00-3:00.

Amount Requested for (FY08) July 1, 2007 to June 30, 2008: \$11,000

Start Date: July 1, 2007 **Completion Date:** June 30, 2008

(Check One) New Project **Continuing**

If this is a multiple year project, please estimate and list the following information for each July 1 - June 30 period listed below through project completion:

Fiscal Years (FY)	July 1, 2008 to June 30, 2009	July 1, 2009 to June 30, 2010	July 1, 2010 to June 30, 2011	July 1, 2011 to June 30, 2012	July 1, 2012 to June 30, 2013
\$ Amount Needed					

If you are increasing the above amounts since your last application, please explain why:

Please list all other sources and amounts of funding for this project: (Please notify us by February 15 if other funding has been approved and from where.)

Source	\$ Amount Applied For	Approved	Pending Date of Notification

Total Amount Needed to Fund Project (Include all sources) \$11,000

If total amount from all sources is not granted, will you be able to complete the project? It will take longer.

Submit 15 copies of this proposal to: Tom Wessels, Plant Services Program Manager, P.O. Box 42560, Olympia, WA 98504-2560. All applications must be postmarked by December 31, 2006.

Please summarize the purpose of this research:

The occurrence of *Phytophthora ramorum* and the mandated plant destruction resulting from the implementation of the USDA-APHIS Confirmed Nursery Protocol (CNP) continues to be a serious problem for some Washington nurseries. A recent study at WSU Puyallup estimated that the value of plants destroyed between 2004 and 2005 at Washington nurseries as a result of the implementation of the CNP was about \$423,000. This estimate does not include other CNP-associated costs to nurseries, such as labor, fees for burning or burial of plants in a landfill, potential soil and/or water mitigation treatments, as well as the lost opportunity cost associated with placing plants on a minimum 90-day hold for further monitoring. Our study also highlighted the importance of *Rhododendron* species in this problem. *Rhododendron* (75%) and azalea (14%) account for almost 90% of the plants that were destroyed during this two-year period. *Rhododendron* species and hybrids are also the most important hosts of *P. ramorum* in Europe.

A limited number of studies have looked at variation in the susceptibility of *Rhododendron* to *P. ramorum*. In North America, Tooley et. al. (2004) found that *Rhododendron* cultivars were among the most susceptible Ericaceous species tested. These authors and Tjosvold et. al. (2005) also reported considerable variation in the susceptibility of *Rhododendron* cultivars and species to infection by this pathogen. Although they did not look at variation in the ability of the pathogen to produce sporangia, which are important in its plant-to-plant spread, Tooley et. al. did report that there was considerable variation in the ability of *P. ramorum* to produce chlamydospores on the different *Rhododendrons* they tested. A European study by Dobbelaere et. al. (2005) also reported significant differences in the susceptibility of *Rhododendron* species and hybrids to this pathogen.

While these studies indicate that there is potential variation in the susceptibility of *Rhododendron* cultivars and species to infection by this pathogen, additional studies are needed to better understand the variation in the ability of *P. ramorum* to produce sporangia on infected tissue. In the natural ecosystem in California, spread of *P. ramorum* is associated with the presence of certain hosts, like California bay laurel, that support the production of high levels of sporangia that are responsible for spread of the disease. We are proposing to determine the ability of *P. ramorum* to sporulate on a number of *Rhododendron* cultivars and species. This information should lead to the development of further management and control strategies to minimize the economic impact of this disease in WA nurseries by identifying species or cultivars that are most at risk of spreading this disease.

References

- I. De Dobbelaere, K. Heungens, and M. Maes. 2005. Susceptibility levels of *Rhododendron* species and hybrids to *Phytophthora ramorum*. Sudden Oak Death Science Symposium, Monterey, CA (<http://nature.berkeley.edu/comtf/pdf/Bibliography/15DeDobbelaere.pdf>)
- II. S. A. Tjosvold, S. T. Koike, J. M. Davidson, and D. M. Rizzo. 2002. Susceptibility of Azalea (*Rhododendron*) to *Phytophthora ramorum*. Sudden Oak Death Symposium, Monterey, CA (<http://danr.ucop.edu/ihrmp/sodsymp/poster/poster45.html>)
- III. P. W. Tooley, K. L. Kyde, and L. Englander. 2004. Susceptibility of selected Ericaceous ornamental host species to *Phytophthora ramorum*. *Plant Dis.* 88: 993-999.

Methods of research:

All of the proposed research will be conducted at the Washington State University Puyallup Research and Extension Center utilizing our new APHIS-approved biocontainment facility. Nurseries will be contacted to identify the most common *Rhododendron* cultivars and species grown and sold by Washington nurseries. Plant material will be obtained from various sources and maintained at WSU Puyallup. To determine differences in the ability of *P. ramorum* to sporulate on the foliage of these plants, we will use a detached leaf inoculation procedure that we developed to do fungicide tests. Detached leaves will be collected and placed with their lower surface up on moistened filter paper in a Petri dish. Three sites on either side of the midrib will be

inoculated by placing 10ul drops of a spore suspension obtained from a *Rhododendron* isolate of *P. ramorum* on the leaf surface. The leaf tissue beneath the drops on one side of the midrib will be wounded using a small needle. Inoculated leaves will then be incubated for a period of 7 days at 20 C. Photographs of each leaf will be taken and a computer based program (APS Assess) will be use to determine the size of the resulting lesions. The ability of *P. ramorum* to sporulate on infected tissue will be determined by using a paper punch to remove a disk of colonized leaf tissue from within the lesions. These will be incubated under conditions that promote the production of sporangia and the number of sporangia produced on each disk will be determined. These data, in conjunction with lesion size data, will be used to calculate the potential number of spores produced per lesion. This information will then be used to determine the ability of *P. ramorum* to sporulate on the different *Rhododendron* cultivars and species.

Expenditure Breakdown:

(Please include salaries, supplies, travel, etc.)

Wages & benefits	\$8,000
Supplies	2,500
Travel	<u>500</u>
Total	\$11,000

The information requested on this page will have a direct bearing on whether your research request is approved or denied. Letters of support by the industry are also encouraged.

Note: Funding is not available for general overhead cost.