Estimated Economic Losses Associated With the Destruction of Plants Owing to *Phytophthora ramorum* Quarantine Efforts in Washington State[1]

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Abstract

The number and retail value of plants destroyed in Washington state nurseries due to *Phytophthora ramorum* quarantine efforts was estimated using Emergency Action Notification forms (EANs) issued by the United States Department of Agriculture Animal and Plant Health Inspection Service between 2004 and 2005. Data collected from EANs indicate that during this period 17,266 containerized nursery plants were destroyed at 32 nurseries, worth an estimated $423,043. The mean loss per nursery was estimated at $11,188 in 2004, $11,798 in 2005, and at $13,220 per nursery over the two-year period.

Key words*: Phytophthora ramorum,* sudden oak death, ramorum blight, economics, quarantine.

Introduction

The quarantined plant pathogen *Phytophthora ramorum* Werres, De Cock & Man in't Veld was first detected in a Washington state nursery in the summer of 2003 during a trace forward survey conducted by the Washington State Department of Agriculture (WSDA). Infected plants were detected at a total of two nurseries in 2003 and WSDA nursery inspections detected *P. ramorum* in 25 nurseries in Washington during 2004 (Jennifer Falacy, personal communication). During late 2004, the United States Department of Agriculture-Animal Plant Health Inspection Service (USDA-APHIS) issued an Emergency Federal Order requiring all nurseries that sell host plant materials in Washington, Oregon and California that ship plants interstate enter a compliance agreement and be inspected for *P. ramorum* starting January 10, 2005 (USDA APHIS 2004)). In 2005 16 nurseries tested positive during certification, recertification or post eradication surveys (Jennifer Falacy, personal communication). Nine of these had tested positive for *P. ramorum* in 2004.

When *P. ramorum* is detected in a Washington nursery, WSDA implements the USDA-APHIS mandated Confirmed Nursery Protocol for *P. ramorum* (USDA APHIS 2006). As part of this protocol an Emergency Action Notification form (EAN) is issued to all nurseries that test positive for *P. ramorum*, notifying the nursery management of the required action(s), and the number and species of plants

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that are subject to the action(s). Depending on the specific circumstances, an EAN will require that plants are destroyed or held for 90 days for additional monitoring.

The economic impact that *P. ramorum* has had on Washington state nurseries is unknown. Although it is difficult to obtain reliable information on losses associated with the disruption of sales and some USDA-APHIS required mitigation actions, information on the number, size, and species of containerized nursery plants destroyed in Washington during 2004 and 2005 is included on EAN documentation. Using EANs and information provided by WSDA, our objective was to estimate the losses experienced by Washington state nurseries due to plant destruction relating to *P. ramorum* mitigation efforts during 2004 and 2005.

Estimating Number and Retail Value of Plants Destroyed Using EANs

Copies of EANs issued in Washington in 2004 and 2005 were obtained from USDA-APHIS. Each nursery was assigned an alpha-numeric code (WA-1 through WA-32) to allow reference to specific nurseries while protecting their identity. The number, species, variety and size of plants destroyed were entered into spreadsheets and sorted by year, nursery code, and species. We calculated the total and mean number of plants destroyed per nursery, as well as the number of plants that were destroyed by species over the 2 year period.

The retail dollar value of the plants that were destroyed was estimated using recommended retail values obtained from a Washington landscape consultant based on size, species, and variety. This information was cross referenced with list prices online and in the field at several retail nurseries in western Washington to confirm the accuracy of the prices in the market place. These values were then used to estimate the total value of the destroyed plants at all nurseries during 2004 and 2005 and the mean loss per nursery.

Numbers and Retail Value of Destroyed Plants

EAN forms indicated that containerized nursery plants were destroyed at 32 different retail nursery sites in Washington in an effort to eradicate *P. ramorum*. EANs documented plant destruction at 22 nurseries in 2004, and 15 nurseries in 2005. The documents indicated that 5 nurseries destroyed plants two consecutive years due to repeat detections by WSDA. Based on WSDA information and EAN documentation, 17,266 containerized nursery plants were destroyed in Washington State between 2004 and 2005. Of these plants, 12,000 were destroyed in 2004 and 5,266 were destroyed in 2005. The mean number of plants destroyed per nursery was 545 in 2004, 341 in 2005, and 540 over the two-year period.

The most commonly destroyed genera of containerized nursery stock in 2004 and 2005 included *Rhododendron* (89 percent), *Calluna* (4 percent), and *Camellia* (4 percent). The total retail value of plants destroyed over the two-year period was estimated at $423,043. The total retail value of plants destroyed in 2004 and 2005 were estimated at $246,144, and $176,899, respectively. The mean loss per retail nursery was estimated at $11,188 in 2004, $11,798 in 2005, and at $13,220 per

nursery over the 2 year period. Five of the 32 retail nurseries that were issued EANs requiring plant destruction accounted for 94 percent of the total estimated value of plants destroyed in 2004 and 2005. These included WA-1 (30 percent), WA-6 (53 percent), WA-8 (2 percent), WA-15 (2 percent), and WA-20 (7 percent). Of these five nurseries, WA-6 was the only one that tested positive in both 2004 and 2005.

Other Costs Associated With *P. ramorum* Quarantine Efforts

We have not attempted to estimate other costs to nurseries associated with implementing the USDA-APHIS confirmed nursery protocol 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. The owners of a nursery (WA-14) that had to destroy 109 plants between 2004 and 2005, accounting for roughly 1 percent of the total retail value of the losses experienced in Washington reported during a phone interview that in addition to the value of the destroyed plants, they spent $30,000 for labor, disposal fees, and mitigation measures at their nursery (undisclosed nursery owner, personal communication). This suggests that the economic impacts of *P. ramorum* on Washington state nurseries are much greater than just the value of the plants that are destroyed.

Literature Cited

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