Management of Phytophthora ramorum at a Botanical Garden in Washington State, USA

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Abstract

Phytophthora ramorum was detected at the Bloedel Reserve, a 100-acre protected park facing Puget Sound. An initial treatment program was developed in 2014 to control the spread of P. ramorum at the Reserve. An IPM strategy was therefore modified to include the removal of non-host vegetation within the Reserve area. The objective of this study was to determine the effectiveness of the IPM strategy in reducing the rate of ELISA-positive samples in the Reserve since 2016.

Several treatments were employed, including removing host vegetation, management of surface water, soil management, and the use of Trichoderma spp. that can be used as biocontrol agents to reduce the amount of P. ramorum present. The Reserve was divided into three areas: the Reserve perimeter, a core area used for research, and a control area where no control treatments were applied.

The Reserve perimeter was treated with a combination of fungicides in three areas (Glen, Camellia, and Bloedel). The core area was treated with Trichoderma spp. (T. harzianum, T. virens, and T. hamatum) and the control area was untreated.

The Reserve perimeter had a lower rate of ELISA-positive samples compared to the core area and control area. This suggests that the IPM strategy implemented in 2016 was effective in reducing the rate of ELISA-positive samples in the Reserve.

The effectiveness of the IPM strategy was evaluated using a model that takes into account the number of ELISA-positive samples, the rate of change in the number of ELISA-positive samples, and the treatment area.

Results

The Reserve perimeter had a lower rate of ELISA-positive samples compared to the core area and control area. This suggests that the IPM strategy implemented in 2016 was effective in reducing the rate of ELISA-positive samples in the Reserve.

Summary

Continuing IPM practices include:

• Long term continual removal of native host plants in the Glen.

• Phytophthora-specific fungicide applications in the positive areas (Glen and Camellia Trail).

• Replication of Plant Helper (Trichoderma atroviride) at high risk areas.

• SOPs for reducing soil movement between areas such as signage and fencing for visitors, and sanitation for workers.

• Removal of prunings, fallen leaves, and other host material to prevent contamination of plantings.

Possible future IPM practices:

• Ground applied systemic fungicide in Glen and Camellia Trail (but test for interactions with Trichoderma first).

• Expand areas where Trichoderma and mulching treatments are applied.