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2020 Nursery Research Preproposal: Survey for boxwood blight in Oregon nurseries

Background and justification: Oregon is the top supplier of boxwood in the United States, producing 18% ($23 M) of the nation's boxwood crop ($126 M). In 2011, boxwood blight, caused by *Calonectria pseudonaviculata*, was discovered for the first time in Oregon. Since then, the pathogen has spread to other nurseries in the state and has sometimes been shipped out-of-state on infected nursery stock. In 2019, the Weiland lab began surveying Oregon nurseries for boxwood blight in a research project developed with stakeholder input obtained from two meetings (Oct. 2018, Aug. 2019) cosponsored by the Oregon Association of Nurseries (OAN), the Oregon Department of Agriculture (ODA), and the Horticultural Research Institute (HRI). Our **goal** is to help the Oregon nursery industry understand how boxwood blight affects regional boxwood production and to assist the industry in being proactive in combating this disease.

Our objectives are to:

1. Determine how widespread boxwood blight is in the Oregon nursery industry.
2. Determine which cultivars are the most frequently and severely affected.
3. Evaluate whether latent infection is occurring.
4. Identify production risks that lead to the introduction, spread, and development of boxwood blight disease, then use that information to improve existing best management practices (BMPs).
5. Educate growers on research findings through onsite visits, trade magazine articles (Digger), conference talks (Farwest Show), stakeholder meetings, workshops (OktoberPest), and websites (PNW Plant Disease Handbook, OAN boxwood website).

In 2019, the Weiland lab surveyed eight Oregon nurseries, six of which have boxwood blight. We found boxwood blight on 20 cultivars. Some of the most frequently infected cultivars include Common boxwood, Dee Runk, Green Gem, Green Mountain, Green Velvet, and Winter Gem. Suffruticosa and Common boxwood were two of the most severely affected cultivars. Production risks that we found contributing to the development of severe blight include narrow spacing between plants (e.g., pot tight), and irrigation practices that lead to excess humidity or moisture on the leaves for long periods of time (watering at night, overwatering, and frequent irrigation in propagation greenhouses). We also documented very mild and/or infrequent boxwood blight symptoms in multiple production blocks, which can make detection of this disease very difficult. Extension activities in 2019 involved three stakeholder talks (Farwest show × 2, HRI conference call) and a workshop to educate growers about boxwood blight (Oregon State University's OktoberPest).

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Methods and timeline

This pre-proposal partially covers costs associated with surveying five additional nurseries for boxwood blight in 2020. Depending on weather, sampling will begin in March to May and continue through October or November. At each nursery, samples will be collected from each cultivar block in propagation, container, and field boxwood production areas. Plants in each block will be evaluated for disease incidence (how frequently boxwood blight is found within each block) and severity (average amount of plant canopy affected by disease) and approximately 25-50 g of symptomatic tissues will be collected. If no symptomatic tissues are present, asymptomatic (healthy-appearing) tissues will be collected to test for latent infection. Latent infection is defined as plants that are infected by *C. pseudonaviculata*, but are not yet showing symptoms of boxwood blight. Photographs will be taken to document differences in symptom severity (mild to severe) as well as any differences in symptom expression among cultivars or seasons. Production methods that are associated with severe infection will be noted and data will also be collected on whether blight hotspots are more likely to occur in the center of production blocks or along the perimeter. At the laboratory, all samples will be evaluated for the presence of *C. pseudonaviculata* using moist chambers and a subset (up to 48 per nursery) will be evaluated using DNA-based methods to confirm that healthy-appearing samples are free of infection by the pathogen. Data will be analyzed to determine the number of nurseries that have boxwood blight, the cultivars that are the most frequently and severely infected, and whether latent infections were detected. Photographs and notes on disease risks, any differences in symptoms among cultivars and seasons, and observations about where boxwood blight tends to develop (block interior versus perimeter) will be summarized and presented during extension activities (detailed in objectives).

Date in 2020	**Activity**
Mar-May	Begin sampling and processing samples
Oct-Nov	End sampling and processing samples

Budget summary

Sampling and detection supplies	$3,000
Travel to field sites and meetings	$1,000
Salary + benefits (0.15 OSU tech)	$15,362
Total	$19,362

Benefit to the nursery industry

The Oregon nursery industry will gain a better understanding of the status of boxwood blight in the state and of the production risks associated with the spread and development of the disease. Pictures taken during the survey will help growers, diagnosticians, and others to detect boxwood blight by showing the range of symptom severity that may occur and any differences in symptoms among cultivars and seasons. Problematic boxwood cultivars that are frequently and/or severely affected by boxwood blight will be identified, which will help growers better evaluate their risks in growing those cultivars. Detection tests from apparently healthy plant samples will help the industry better understand whether latent infection should be a concern in the movement of boxwood blight among nurseries and to other states. Together, information gathered during the survey will be used to improve existing BMPs for preventing the movement of *C. pseudonaviculata* in nursery trade and in better controlling boxwood blight in nurseries where it is found. Finally, individual nurseries participating in the survey will receive a report indicating where boxwood blight was found in their nursery, which cultivars were affected, and specific recommendations for improving disease control.