

From Forest Nursery Notes, Summer 2009

159. Winning the fight against leaf blight. Griesbach, J. OAN Digger 53(4):45-46, 48, 50-51. 2009.

Winning the fight against leaf blight

These healthy rhododendron plants and others like them have benefited from successful efforts to reverse the spread of *Phytophthora ramorum*, but the pathogen has resisted efforts to eradicate it completely.

RECENT DEVELOPMENTS IN THE FIGHT TO ELIMINATE *P. RAMORUM* AND MANAGE RISK IN NURSERIES

By Dr. John Griesbach

Phytophthora ramorum – the exotic plant pathogen that causes ramorum leaf blight, ramorum shoot dieback and sudden oak death – still remains a serious issue for nurseries that produce and ship host plants.

As the federally required testing and inspection program enters its fifth year, the overall numbers of infected plants on the West Coast have dropped dramatically.

Nonetheless, the plant pathogen has proven to be very difficult to eradicate in some areas, and survey data indicate the pathogen may be on the upswing in Western Canada, Europe and the Southeastern United States.

The good news is that no new wholesale nurseries in Oregon were found with ramorum leaf blight in 2008. This is the first time in six years that a previously uninfected whole-

sale nursery has not been found with *P. ramorum* in Oregon, the largest exporter of nursery stock.

This may indicate that changing cultural practices and a good inspection and sampling program are paying dividends.

Inspection and eradication requirements still in effect

The USDA's Animal and Plant Health Inspection Service (APHIS) is still actively regulating *P. ramorum* in interstate commerce.

"All nurseries in Oregon, Washington and California that ship out-of-state must be inspected annually for the presence of the pathogen and all nurseries that ship *P. ramorum* host plants interstate must be inspected, tested and found free of the pathogen," said Gary McAninch, manager of the Oregon Department of Agriculture's Nursery and Christmas Tree Program. "Our survey crews visit high-risk nurseries twice a year to add an additional level of assurance."

Nurseries are deemed high risk if they grow and ship the plants that most commonly host this pathogen.



OREGON STATE UNIVERSITY

Symptoms of *Phytophthora nemorosa* leaf spot on camellia leaves.

USDA APHIS also prohibits any nursery infected with *P. ramorum* from shipping host material interstate until it is cleaned up by regulatory officials and found to be free from the pathogen. During this process, such nurseries are locked down for 7-21 days while samples are collected and tested.

The Oregon Department of Agriculture (ODA) puts a high priority on these samples, but the process largely depends on the size of the nursery and amount of symptomatic plants. Areas found to be infected remain under a quarantine hold for a minimum of three months while infected material is identified, collected and removed, and the site is disinfected or fumigated and resurveyed several times until it is found free from *P. ramorum*. This three-month period will be extended if more *P. ramorum* is detected in follow-up surveys.

A grower can choose to avoid the quarantine hold period if they elect to destroy all material in the infected block(s) and a buffer area and take other remedial actions. Nurseries where the pathogen is detected more than once a year may be subject to additional regulatory requirements, including pre-shipment notification, additional sanitation practices, limited access to infested areas, and worker training on pathogen management (For a complete list of all USDA APHIS program requirements, visit www.aphis.usda.gov/plant_health/plant_pest_info/pram/index.shtml.)

The ODA has continued to find a few infected nurseries in Oregon during the past few years; three sites in 2007 and five sites in 2008. However, some of these positives are likely to be repeat positives from previous years.

Understanding how
P. ramorum persists
at a nursery and then
conducting proper and
sufficient mitigation
are keys to eradication
efforts and confidence
in the regulatory
program.

Spore longevity and mitigation

Initially, *P. ramorum* was thought to persist only on the aboveground portion of plants. Scientists believed that it did not have an active soil phase.


Researchers have now learned that resistant spores can persist for at least three years in soil and gravel substrates and can give rise to new infections when host material is placed back on these beds.


Because of this persistence, APHIS is considering requiring that growers fumigate or asphalt any positive nursery beds to prevent re-infestation.

Another potential action is to keep the area free of any host genera for at least five years.

Understanding how *P. ramorum* persists at a nursery and then conducting proper and sufficient mitigation are keys to eradication efforts and confidence in the regulatory program. Some states, such as Oregon, have a very high rate of success with their eradication efforts, approaching 90 percent. Other states have closer to a 50 percent success rate, while a few states are unable to eradicate infestations after many years and repeated efforts.

TREES FOR LIFE



 • Proven Performers of Shade, Ornamental & Conifer Trees
• 1 3/4" to 8" caliper B&B stock
• Expertise from Years of Growing on 450 Contiguous Acres
• Knowledgeable, Efficient, Friendly Customer Service

EF NURSERY INC.
503-357-5141 • 1-800-574-5141
www.efnursery.com

Providing Landscape Professionals with Superior Quality,
Exceptional Service, & Consistent Availability.



ODA Horticulturist Christy Brown collects *Camellia* leaves showing signs of a *P. ramorum* infection.

DRESNER / OREGON STATE UNIVERSITY

Oregon officials believe that cooperation with growers is key to keeping losses to a minimum. Early detection, thorough delimitation surveys and rapid cleanup and mitigation, contributes to the high success rate of eradications in the state.

Origin and movement of ramorum blight

Researchers have still not identified the area of origin of *P. ramorum*, but they have identified three main lineages that have evolved from one common ancestor. One of these is common in Europe (EU1) and another is common in North America (NA1). The third lineage (NA2) and EU1 are also found in Western North America at lower levels.

USDA Agricultural Research Service (ARS) scientist Nik Grunwald is looking at the genetic diversity of different isolates of the pathogen at his Corvallis, Ore. lab.

“We are investigating four questions in these genetic studies,” he

said. “Are there new lineages occurring in nurseries? Is there sexual reproduction taking place, which would lead to new and possibly more aggressive strains? Are we able to fingerprint the sources of infection and trace them back to the originating nursery? Is this movement of *P. ramorum* in nurseries unidirectional or bi-directional?”

Grunwald is also cooperating with researchers in Canada and Belgium to study the global genetic diversity of *P. ramorum* to help understand how the pathogen is moving between and within countries.

“We hope to have this research completed within the next year,” Grunwald said. With this information, it may be possible to further reduce the risk of movement of *P. ramorum* in international trade.

Managing risk

In February of 2002, when the initial federal rule on *P. ramorum*

was published, only 15 plant species from 13 genera were regulated by the USDA. Now, approximately 1,000 species from more than 70 genera are regulated, including many plants widely grown in the trade. Ten new host species were regulated in 2008 (see Table 2). However, just five genera comprise the bulk of the infections and risk of spread.

“*Camellia*, *Rhododendron*, *Pieris*, *Viburnum* and *Kalmia* are still the most problematic genera, but we need to remain vigilant for other new genera that may become important sources of spread,” said Jonathan Jones, the USDA national program manager for *P. ramorum*.

Jones recently visited Oregon to review a new education, mitigation and auditing program being piloted by 12 nurseries and the ODA. “I am very impressed with Oregon’s efforts to create this new approach to lower risks of *P. ramorum*,” Jones said. “It may be a way for states to become deregulated if the program works well.”

This new program, called the Grower Assisted Inspection Program (GAIP), teaches growers to identify potential sources of *Phytophthora* in their facilities, helps growers mitigate risks, monitor the effectiveness of their efforts and follows up with official audits and GAIP certification if the nursery is clean.

The goals of GAIP are threefold:

- Prevent the introduction and spread of *Phytophthora ramorum* on high-risk host plants, such as *Rhododendron* and *Camellia*;
- Meet or exceed USDA APHIS standards for shipping host material; and
- Assure all exported high risk plants are free from non-regulated aerial *Phytophthora* species.

For a complete description of the program, visit www.oregon.gov/ODA/PLANT/NURSERY/gaip.shtml.

Recent research by Jennifer Parke and Carrie Lewis at Oregon State University and Nik Grunwald, ARS, was key to the development of this effort (see the December 2008 *Digger* story, "Tracing the path of pathogens").

Their research identified significant pathways that *Phytophthora* uses to infect plant material.

A corollary set of best cultural practices (BCPs), developed by a large team of industry, scientific

and regulatory experts, make up the tool box that growers can use to reduce risk by mitigating the pathogens at these key pathways and thereby lower or eliminate losses to *Phytophthora*. To participate in GAIP, growers first take web-based training courses developed by OSU, ARS and ODA experts.

"We wanted to reach the largest possible audience with this information, with free on-line versions in both English and Spanish," Parke said.

The training consists of three modules that cover *Phytophthora* biology, symptoms, best cultural practices and specific issues dealing with *P. ramorum*. The online course takes about three hours to complete. It's available at <http://oregonstate.edu/instruct/dce/Phytophthora/>.

The GAIP program requires that at least one person at each participating nursery take the online exam to demonstrate their proficiency with the subject matter and earn a certificate of mastery from OSU's Ecampus. The Ecampus charges a \$100 fee to take the exam.

After participants pass the online test, they then conduct a risk analysis of their nursery and pick mitigation methods specific to their nursery using best cultural practices (BCPs) outlined in the online course. The specific BCPs picked are documented in a mitigation manual and auditable records of mitigation practices are kept on file. ODA approves the manuals, usually with minor modifications, audits the records and awards a GAIP certification if all is in order.

ODA will assess the effectiveness of the program through their annual inspection and testing program by comparing previous year's test results to the new GAIP-mitigated plant material.

The pilot program will be conducted through the winter of 2010 and is funded by a federal grant obtained by the ODA. The grant covers the cost of auditing the mitigation manual and

TABLE 2.
New Hosts of *P. ramorum* Reported by APHIS in 2008

<i>Cercis chinensis</i>	Chinese redbud
<i>Cornus kousa</i>	Kousa dogwood
<i>Corylopsis spicata</i>	Spike winter-hazel
<i>Magnolia denudata</i> × <i>salicifolia</i>	'Wada's Snow White' magnolia
<i>Magnolia figo</i>	Banana magnolia
<i>Magnolia kobus</i>	Kobus magnolia
<i>Magnolia liliifolia</i>	Lily-flowered magnolia
<i>Magnolia salicifolia</i>	Anise magnolia
<i>Magnolia</i> × <i>thompsoniana</i>	Thompson magnolia
<i>Physocarpus opulifolius</i>	Ninebark

Source: APHIS *P. ramorum* program 2008 Year-end Summary

THE SCIENCE FOR SPECIMEN
SHADE & FLOWERING TREES

JB
Instant Lawn
& Nursery

www.jbinstantlawn.net

FOR DETAILED INFORMATION, PLEASE CONTACT
BRAD VEIBELL AT 800-527-1439 x254

nursery records. Annual certification testing, which will be used to evaluate the pilot, is covered by APHIS. ODA currently is seeking participation by additional nurseries and interested parties are encouraged to contact the program's auditor, Mel Lujan, at 503-510-5529.

Conclusion

P. ramorum is still a relatively new challenge for the industry and we will undoubtedly learn more as we go forward. We can easily predict that the host list will continue to grow and we will learn more about the genetics and distribution of the pathogen and how to better eradicate the pathogen from production nurseries.

GAIP and other programs are currently evaluating risk management tools, and growers are now taking an active role in risk assessment and mitigations that are specific to their facilities. These tools will have a positive impact not only on *Phytophthora*, but many other pathogens that cause losses in the production process.

The GAIP program is a new way to deal with an old problem, namely, using a "systems approach" to mitigation pest and disease issues.

"The systems approach employs two or more different controls that work independently, with cumulative effect, as part of an integrated approach, to prevent or manage current or potential pest and disease problems within a nursery," OAN Executive Director John Aguirre said. "We hope to access Farm Bill funds to help develop, evaluate and promote programs like GAIP, to reduce the risk from a broad array of pests and diseases." ©

Dr. John A. Griesbach is a plant pathologist and phytosanitary consultant to the OAN and Northwest nurseries. John consults on quarantine and trade issues and systems approaches for the production of pest and disease-free nursery stock.

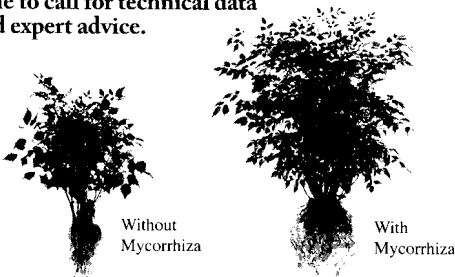
SOIL MOIST GETS TO THE ROOT OF WATER MANAGEMENT

Soil Moist Water Management Polymers and Mycorrhizal Products put you in control: to reduce water maintenance and plant stress, increase growth rates, improve soil porosity and do more with less... beautifully.

Available in the forms, formulas and custom blends you need, eco-safe Soil Moist granules, disks, tabs and spikes absorb water, then release it gradually as the soil dries.

Whether it's original Soil Moist, Soil Moist Mycorrhizal for stronger root development, or Soil Moist Plus nutrient blends, each watering lasts up to 50% longer for 3-5 years.

Soil-Moist. There's never been a better time to call for technical data and expert advice.



DISTRIBUTED BY:

Horizon Bellevue, WA
Jensen Distributing Spokane, WA
Wilbur-Ellis Co. Auburn, WA
Cascade Seed Spokane, WA

The Best Way To Grow On Earth™

Soil Moist™

JRM Chemical, Inc.

4881 NEO Parkway, Cleveland, OH 44128
1-800-926-4010 • 216-475-8488
fax: 216-475-6517

www.soilmoist.com

ELLEPOTS

PREFILLED PROPAGATION TRAYS
Sizes from 209 cell to Jumbo 18-pack

- Custom soil mixes
- 20-40% faster rooting
- Roots air prune
- Reduces bench time
- No transplant shock (REALLY!)
- Finish crops faster
- Ideal for landscaping – no plastic to discard
- 100% degradable fabric pot
- Trays refillable or recyclable
- Available in 20, 23, 25, 30, 35, 40, 45, 60 & 70mm diameter – custom lengths available

 **MillerMorse, LLC**
Helping you grow from start to finish
Horticulturists • Growers • Licensed Consultants

The United States **FIRST**
wholesale manufacturer!

971-237-9786

EXPERIENCE THE SUCCESS!

www.millermorse.com