CALIFORNIA OAK MORTALITY TASK FORCE REPORT
AUGUST 2013

REGULATIONS

***Phytophthora ramorum* Regulatory Requirements Revised – Nurseries located in the** regulated areas of California, Oregon, and Washington that do not contain nor ship host or associated plant nursery stock interstate are no longer required to comply with 7CFR 301.92. This Federal Order does not change the requirements for *P. ramorum* host nurseries in the regulated areas and all interstate shipping nurseries located in quarantine areas, including those that contain only non-host nursery stock. Effective immediately, the USDA Animal and Plant Health Inspection Service issued the Federal Order (DA-2013-27) on 7/3/13.

NURSERIES

To date this year, 17 nurseries in four states have been found *P. ramorum* positive: CA(1), OR(9), WA(6), and NY(1). Of the 17 positive nurseries, 12 are interstate shippers and 5 are retail establishments. So far, there have been no detections of *P. ramorum* on trace-forward material in receiving states. Positive plants have included: *Camellia* (2); *Choisya* (1); *Gaultheria* (1); *Kalmia* (4); *Loropetalum* (2); *Magnolia* (1); *Pieris* (6); *Rhododendron* (50); *Trachelospermum* (1); and *Viburnum* (8). Cull piles (1), potting media (1), soil samples (3), and water samples (1) were also found *P. ramorum* positive in one retail (soil, water) and two interstate (soil, cull pile, potting medium) shipping nurseries.

The California nursery industry has developed voluntary best management practices (BMPs) to assist nursery crop producers in implementing effective preventive action and monitoring plans to reduce the risk of introducing quarantine pests and pathogens into their operations. Over the next several months, six workshops sponsored by UC Nursery and Floriculture Alliance will be held throughout CA to assist growers in customizing site-specific BMPs through the use of a new online tool which incorporates information such as county location as well as the pests and pathogens under quarantine or of concern in the local area. It is anticipated that the online tool will be released for general use this fall after beta testing by growers at the workshops is complete. The project was sponsored by a CA Association of Nurseries and Garden Centers Specialty Crop Block Grant. For more information about the workshops or online tool, contact Karen Suslow at karen.suslow@dominican.edu.

RESEARCH

Chandelier, A.; Heungens, K.; and Werres, S. 2013. Change of Mating Type in an EU1 Lineage Isolate of *Phytophthora ramorum*. Journal of Phytopathology. DOI:10.1111/jph.12150.

Abstract: All *Phytophthora ramorum* EU1 lineage isolates tested are of A1 mating type, except for three rare isolates from 2002 to 2003 from Belgium, which were originally assigned the A2 mating type. In one of these isolates (2338), a switch from A2 to A1

mating type was observed in 2006. This observation initiated a larger study in which all cultures and subcultures of the original three EU1 A2 isolates, maintained in three laboratories under different storage conditions, were checked for mating type change. The A2 to A1 mating type switch was observed in four of seven independently maintained isolates that were derived from isolate 2338 in two laboratories, using different transfer regimes and storage conditions. Following the mating type switch to A1 in these four derived isolates, no reversion back to A2 mating was observed, even after up to 5 years of additional isolate maintenance and several more subculturing events. The three other isolates that were derived from isolate 2338 as well as the other EU1 A2 isolates collected in 2002 and 2003 and stored in the same conditions did not display such mating type change. The potential causes of the mating type conversions as well as their epidemiological implications are discussed.

Cobb, R.C.; Eviner, V.T.; and Rizzo, D.M. 2013. Mortality and Community Changes Drive Sudden Oak Death Impacts on Litterfall and Soil Nitrogen Cycling. New Phytologist. DOI: 10.1111/nph.12370.

Summary:

- Few studies have quantified pathogen impacts to ecosystem processes, despite the fact that pathogens cause or contribute to regional-scale tree mortality.
- We measured litterfall mass, litterfall chemistry, and soil nitrogen (N) cycling associated with multiple hosts along a gradient of mortality caused by *Phytophthora ramorum*, the cause of sudden oak death.
- In redwood forests, the epidemiological and ecological characteristics of the major overstory species determine disease patterns and the magnitude and nature of ecosystem change. Bay laurel (*Umbellularia californica*) has high litterfall N (0.992%), greater soil extractable NO_3–N, and transmits infection without suffering mortality. Tanoak (*Notholithocarpus densiflorus*) has moderate litterfall N (0.723%) and transmits infection while suffering extensive mortality that leads to higher extractable soil NO_3–N. Redwood (*Sequoia sempervirens*) has relatively low litterfall N (0.519%), does not suffer mortality or transmit the pathogen, but dominates forest biomass.
- The strongest impact of pathogen-caused mortality was the potential shift in species composition, which will alter litterfall chemistry, patterns and dynamics of litterfall mass, and increase soil NO_3–N availability. Patterns of *P. ramorum* spread and consequent mortality are closely associated with bay laurel abundances, suggesting this species will drive both disease emergence and subsequent ecosystem function.

The following 12 abstracts on *P. ramorum* are being presented at the 2013 American Phytopathological Society – Mycological Society of America (APS-MSA) Joint Meeting in Austin, TX, August 10th – 14th.

Conrad, A.O.; McPherson, B.; Wood, D.; and Bonello, P. 2013. Can Constitutive Phenolic Biomarkers be Used to Predict Coast Live Oak Resistance to *Phytophthora ramorum*? Phytopathology 103(Suppl. 2):S2.29.

Dale, A.L.; Everhart, S.E.; Feau, N.; Bilodeau, G.J.; Grunwald, N.J.; and Hamelin, R.C. 2013. Genome-Wide Patterns of Diversity in Four Lineages of the Sudden Oak Death Pathogen, *Phytophthora ramorum*. Phytopathology 103(Suppl. 2):S2.32.

Everhart, S.E.; Larsen, M.M.; and Grunwald, N.J. 2013. Where is *Phytophthora ramorum* Now? An Update on Clonal Populations in the U.S. Phytopathology 103(Suppl. 2):S2.41.

Funahashi, F. and Parke, J.L. 2013. Effects of Solarization and Biocontrol on Soilborne *Phytophthora* spp. in Container Nurseries. Phytopathology 103(Suppl. 2):S2.46.

Goss, E.M. 2013. Migration and Evolution of *Phytophthora* Plant Pathogens in the Age of Globalization. Phytopathology 103(Suppl. 2):S2.177.

Kozanitas, M.; Osmundson, T.; and Garbelotto, M. 2013. Epidemiology and Ecology of the Sudden Oak Death Epidemic: Disease Progression and the Population Genetics of *P. ramorum* Within a CA Watershed. Phytopathology 103(Suppl. 2):S2.75.

Larson, E.; Eberhart, J.; and Parke, J. 2013. Potential Treatments for Disinfesting Runoff Water From Nurseries Contaminated With *Phytophthora ramorum*. Phytopathology 103(Suppl. 2):S2.77.

Lichter, F.; Blasioli, K.; Gleeson, G.; Coats, K.; Elliot, M.; Hammett, C.; Hamelin, R.; Shamoun, S.; and Broders, K. 2013. Comparative Genomic Analysis of Phenotypically and Genotypically Diverse Isolates of *Phytophthora ramorum*. Phytopathology 103(Suppl. 2):S2.82.

Roubtsova, T.V. and Bostock, R.M. 2013. Interaction of Root Stress, Chemical Management, and Ramorum Blight Development From Soilborne Inoculum in Potted Rhododendron Plants. Phytopathology 103(Suppl. 2):S2.124.

Schweigkofler, W.; Kosta, K.; Suslow, K.; Huffman, V.; and Ghosh, S. 2013. Steaming is a Sustainable Method to Eradicate the Quarantine Pathogen *Phytophthora ramorum* From Infested Nursery Soil. Phytopathology 103(Suppl. 2):S2.129.

Shishkoff, N. 2013. The Concentration of Sporangia or Zoospores of *Phytophthora ramorum* Required for Infection of Host Roots. Phytopathology 103(Suppl. 2):S2.132.

Snover-Clift, K.L.; Daughtrey, M.L.; Swartwood Towne, M.; King, K.; and Kelly, M. 2013. Initial Detection of *Phytophthora ramorum* at Two New York Nurseries Through Sampling of Water in Retention Ponds. Phytopathology 103(Suppl. 2):S2.136.

MANAGEMENT

The UK Technical Review of the DEFRA *Phytophthora* Disease Management Program is now available online at Phytophthora Review - Final Report. Findings took into consideration the science and modelling work that has informed the 5-year program as well as issues of implementation and knowledge transfer to growers, the wider horticultural industry, forest managers, and other key stakeholders. It will be used to inform future control strategies as well as for decisions on further management and funding.

RELATED RESEARCH

Lynch, S.C.; Zambino, P.J.; Mayorquin, J.S.; Wang, D.H.; and Eskalen, A. 2013. Identification of New Fungal Pathogens of Coast Live Oak in California. Plant Disease. 97(8): 1025-1036.

Mayfield III, A.E.; MacKenzie, M.; Cannon, P.G.; Oak, S.W.; Horn, S.; Hwang, J.; and Kendra, P.E. 2013. Suitability of California Bay Laurel and Other Species as Hosts for the Non-Native Redbay Ambrosia Beetle and Granulate Ambrosia Beetle. Agricultural and Forest Entomology 15: 227–235. DOI: 10.1111/afe.12009.

The following 5 abstracts on related research topics are being presented at the 2013 APS –MSA Joint Meeting in Austin, TX, August 10th – 14th.

Clement, D.L.; Malinoski, M.K.; Dawson, N.; and Bargeron, C. 2013. Development of a Smartphone App to Increase Accuracy and Early Detection of New or Invasive Diseases. Phytopathology 103(Suppl. 2):S2.28.

Gutierrez, W. 2013. Free Trade, Fair Trade, Safe Trade: The role of Plant Pathology in Filling Regulatory Gaps. Phytopathology 103(Suppl. 2):S2.180.

Martin, F.N.; Douhan, G.W.; Grunwald, N.J.; and Coffey, M.D. 2013. Evaluating the Correlation Between Mitochondrial Haplotype and Nuclear Genotype of *Phytophthora cinnamomi*. Phytopathology 103(Suppl. 2):S2.91.

McConnell, M.E. and Balci, Y. 2013. *Phytophthora cinnamomi* as a Possible Contributor to White Oak (*Quercus alba*) Decline in Mid-Atlantic Forests. Phytopathology 103(Suppl. 2):S2.191.

Schreier, S. and Jeffers, S.N. 2013. Characterization of *Phytophthora cinnamomi* From Ornamental Crops in South Carolina. Phytopathology 103(Suppl. 2):S2.128.

Widmer, T. 2013. Use of a fungal “cocktail” to inhibit growth of *Phytophthora cinnamomi*. Phytopathology 103(Suppl. 2):S2.160.

RESOURCES

University of Illinois Extension specialists have created a series of free online IPM Training Modules (http://mg.cropsci.illinois.edu/) on newly emerging, exotic, or invasive pests (including sudden oak death) as well as pests or diseases which have generated significant questions or concerns. Each module features information about the distribution/history of the pathogen or pest; host plant(s); pathogen or vector information; diagnostics; symptoms; look-alike diseases; management; and references. Developed for Master Gardeners, the modules can also be used by gardeners and green industry professionals. For more information, go to NPDN News, Volume 8, Issue 7, July 2013, Special Training & Education Issue, at https://www.npdn.org/webfm_send/2003.

Dobson, A.; Barker, K.; Taylor, S.L. 2013. Biosecurity: The Socio-Politics of Invasive Species and Infectious Diseases. Routledge. 256 pages. ISBN-10: 0415534771. ISBN-13: 978-0415534772.

This book addresses biosecurity as it relates to the protection of indigenous biological organisms, agricultural systems, and human health from invasive pests and diseases. It describes the ways in which biosecurity is understood and theorized in different disciplines, including anthropology, political theory, ecology, geography, and environmental management. It examines the different practices connected to biosecurity governance, such as legal regimes, ecology, and risk management, and assesses it in the context of future risk and uncertainties, such as globalization and climate change.

CALENDAR OF EVENTS

8/24 - 25 - Fifth *Phytophthora, Pythium*, and Related Genera Workshop; Beijing, China; The first day focuses on the methodology for studying Oomycetes (particularly *Phytophthora* and *Pythium* species), while the second day will cover contemporary research topics. The meeting is being held in conjunction with the 10th International Congress of Plant Pathology. For abstract submission, registration, and workshop information, go to http://www.icppbj2013.org/file/workshop/5thInternationalWorkshop.asp.

9/4 - SOD Treatment Workshop; meet at oak outside of Tolman Hall, UC Berkeley Campus; 1:00 – 3:00 p.m.; Pre-registration is required. This class is free and will be held rain or shine. To register, or for questions, email kpalmieri@berkeley.edu, and provide your name, phone number, affiliation, license number (if applicable), and the date for which you are registering. For more information, go to http://nature.berkeley.edu/garbelotto/english/sodtreatmenttraining.php.

10/2 - SOD Treatment Workshop; meet at oak outside of Tolman Hall, UC Berkeley Campus; 1:00 – 3:00 p.m.; Pre-registration is required. For more information, see the 9/4 listing above.

10/23 - SOD Treatment Workshop; meet at oak outside of Tolman Hall, UC Berkeley Campus; 1:00 – 3:00 p.m.; Pre-registration is required. For more information, see the 9/4 listing above.

11/13 - SOD Treatment Workshop; meet at oak outside of Tolman Hall, UC

Berkeley Campus; 1:00 – 3:00 p.m.; Pre-registration is required. For more information, see the 9/4 listing above.