



CALIFORNIA OAK MORTALITY TASK FORCE REPORT JULY 2012

RESEARCH

A fourth, genetically distinct lineage of *Phytophthora ramorum* has been discovered in the United Kingdom on Japanese larch. The intensity of recent infestations in the United Kingdom (including Northern Ireland, southwest England, Wales, and southwest Scotland) led Clive Brasier, Joan Webber, and others (UK Forest Research) to analyze samples of new detections, resulting in the find. Based on genetic analysis, it is believed that the previously unknown European type 2 (EU2) lineage has been newly introduced into southwest Scotland and Northern Ireland. The pathway by which the new lineage arrived into the UK is unknown, and researchers are assessing the extent of its distribution.

Genetic analysis of the four lineages (EU2, EU1, NA2, NA1) indicates that the pathogen emanates from some unknown center of origin. Each is a distant relative of the others, having diverged hundreds of thousands of years ago. Reuniting the lineages through trade and long-distance plant movement may have unknown and unintended consequences. The co-mingling of these lineages increases potential for sexual recombination, possibly creating more virulent strains.

For information about *P. ramorum* in Great Britain, go to www.forestry.gov.uk/pramorur, and for a map of the larch outbreak, go to [http://www.forestry.gov.uk/pdf/Pramorum_outbreaks_13_10_11.pdf/\\$FILE/Pramorum_outbreaks_13_10_11.pdf](http://www.forestry.gov.uk/pdf/Pramorum_outbreaks_13_10_11.pdf/$FILE/Pramorum_outbreaks_13_10_11.pdf). For information about *P. ramorum* in Northern Ireland, go to http://www.dardni.gov.uk/forests-service/index/forest-service-press-releases/press_releases-2010/press_releases-phytophthora-ramorum.htm.

Progress on the comparison of the current in situ (bait bags) and in vitro (Bottle O' Bait) methods for *P. ramorum* water baiting was reported at the 5th SOD Science Symposium in Petaluma, CA (<http://ucanr.org/sites/sod5/files/147425.pdf>) in June. The in vitro method was decidedly superior during the spring baiting season and will be continued in the fall to provide two full years of survey data for determining possible modifications to the National Survey protocol.

Lee, C.A.; Alexander, J.M.; Frankel, S.J., and Valachovic, Y. 2012. Evolution of an Invasive Species Research Program and Implications for Large-scale Management of a Non-native, Invasive Plant Pathogen. Environment and Natural Resources Research Vol. 2, No. 2: 99 – 111. DOI: 10.5539/enrr.v2n2p99.

Abstract: We conducted a research needs assessment (RNA) in 2010 to gather opinions of “experts” and a larger public on research priorities for *Phytophthora ramorum*, the pathogen that causes sudden oak death in forest trees and Ramorum blight in ornamental plants. We place these 2010 findings in context with findings of similar *P. ramorum* needs assessments from 2002 and 2007-2008 and with a comprehensive literature review



published in 2010. *P. ramorum* research needs have evolved from an emphasis on basic biological information toward an emphasis on management. As with many other non-native, invasive organisms, a major challenge remains how to move *P. ramorum* research into more wide-scale, unified attempts at management. Our analysis suggests that successfully moving from basic research to on-the-ground management requires overcoming the tendency toward specialized, limited viewpoints and providing stakeholders a comprehensive, integrated picture of the necessity and possibility of managing this plant disease.

Noble, R.; Dobrovin-Pennington, A.; Pietravalle, S.; and Henry, C.M. 2011. Composting of *Rhododendron* and Bilberry Wastes to Contain Spread of Exotic Plant Pathogens *Phytophthora kernoviae* and *Phytophthora ramorum*. *Compost Science & Utilization*, Vol. 19, No. 4: 219-225.

Abstract: Plant material infected with the exotic pathogens *Phytophthora kernoviae* and *Phytophthora ramorum*, particularly of the invasive and highly susceptible *Rhododendron ponticum*, can pose a risk to indigenous host flora in Britain. Areas of infected bilberry (*Vaccinium myrtillus*) can also threaten surrounding non-infected heathland. Composting was examined as a more environmentally acceptable method of disposal of infected plant material than burning. Three types of low cost composting systems were developed and tested on shredded rhododendron and chopped bilberry wastes: permanent and mobile insulated bays, and insulated cargo containers, located at six different sites. In addition to temperature-time profiles of the composting wastes, the discoloration of the waxy leaves of *R. ponticum* and Portugal laurel (*Prunus lusitanica*) was developed as a potential indicator of the sanitizing effect of the composting process. The relationship between the mean compost temperature and the percentage of green area of leaves positioned in the compost enabled the sanitizing effect of a composting process to be immediately assessed. Mean compost temperatures and exposure times achieved in shredded rhododendron or chopped bilberry wastes in the majority of the compost in the insulated composting systems were above those needed to reduce *P. ramorum* and *P. kernoviae* to below detectable limits, and to eliminate any green color in the indicator leaves. The exception was in the corners of the systems that contained $>4 \text{ m}^3$ waste, and in the outer surfaces at one site where the volume of waste was only 2.9 m^3 . Temperature-time profiles of the composts and positioned indicator leaves demonstrated that the main pathogen survival risk was in the corners of the insulated composting systems; pathogen survival risk could be minimized by positioning the corner material into the center of the composting system during sequential refilling.

Shishkoff, N. 2012. Susceptibility of Some Common Container Weeds to *Phytophthora ramorum*. *Plant Disease*, Vol. 96, No. 7: 1026-1032. Available online at <http://dx.doi.org/10.1094/PDIS-09-10-0695-RE>.

Abstract: *Phytophthora ramorum* is known to infect a number of ornamental plants grown in containerized culture. However, pots may also contain weeds. In this research, the foliage of 14 common weeds of containerized plant culture was inoculated with *P.*



ramorum to determine susceptibility of aboveground parts. Three species were found to develop leaf lesions: northern willowherb (*Epilobium ciliatum*), fireweed (*Chamerion angustifolium*), and a fern (*Pteris cretica*). Weed roots from 11 species were inoculated to see if *P. ramorum* could persist on roots, and *P. ramorum* was isolated from most plant roots 1 month after inoculation when the washed roots were plated on selective medium; they were recovered only to a minor extent from surface-sterilized roots of weeds. Additional experiments were done to collect and sample runoff from pots containing inoculated plants to see if inoculum was produced on weed roots. In these experiments, little inoculum was found in runoff from root-inoculated weeds compared to *Viburnum tinus*. Percent root colonization recorded from washed roots was significantly greater in *Viburnum* compared to the weeds, and weeds that were foliar hosts had greater root colonization than weeds that were not.

MONITORING

A stream in western Washington and one in northern Georgia have been found *P. ramorum* positive for the first time as a result of the National Early Detection Survey of Forests, bringing the total number of positives to date for this year to 14. Both new stream positives are in urban areas with current or formerly positive nurseries in the vicinity. Stream baiting will continue in an effort to identify the inoculum sources. In addition, the eight eastern sites in MS, AL, GA, FL, and NC found positive in the past have been confirmed positive again in 2012.

NURSERIES

Four California nurseries were found *P. ramorum* positive in June – two within the quarantine area and two within the regulated area. The first confirmation was made on June 1st at a Mendocino County (within the quarantine area) retail nursery that was found to have a positive *Camellia* during a general nursery inspection. The nursery was also positive in 2008, 2010, and 2011; is not under compliance; and does not ship interstate. The second confirmation was made on a positive *Camellia* June 4th during a compliance agreement inspection at a Mendocino County production nursery. The nursery has not previously been positive and does not ship interstate. Following the confirmation, the facility chose to no longer participate in the *P. ramorum* host interstate shipping program. Implementation of the ‘Nursery Stock Standards of Cleanliness’ protocol is underway at both facilities.

On June 6th, a third nursery confirmation was made from a *Viburnum tinus* ‘Spring Bouquet’ (5 gal. container) at a Sacramento County (regulated area) production facility during a compliance agreement inspection. The nursery was also found positive in 2005, 2006, 2007, and 2011, and does ship interstate (to Nevada). Trace-forward information is being provided to the USDA Animal and Plant Health Inspection Service. The Confirmed Nursery Protocol (CNP) is underway. The fourth confirmation was at a Sacramento County retail nursery on June 18th. Identified during a compliance agreement inspection, positive plants included a *Rhododendron sp.* ‘Boule de Neige’ and a *Camellia japonica* ‘Pink Parade.’ The Nursery does not ship interstate and has not previously been positive. The Retail CNP is underway.



The Oregon Department of Agriculture 2112 Federal Order survey of nurseries shipping interstate is about 50 percent complete. To date, 7,841 samples have been analyzed, with nine nurseries (5 grower and 4 retail) in Clackamas, Lane, Lincoln, Marion, Polk, Tillamook, and Washington Counties found positive. Four of the nurseries ship interstate and four are repeat positives. Nursery stock found infected includes *Camellia*, *Cornus*, *Hamamelis*, *Kalmia*, *Magnolia*, *Pieris*, *Rhododendron*, and *Viburnum*. CNP has been completed at one nursery and is underway at the remaining eight.

Washington has had 10 confirmed positive nurseries to date in 2012, the most in a single year since 2006. Counties with detections include King, Pierce, Thurston, Lewis, Clark, Clallam, and Skagit. Eight of the nurseries are repeat positives and six are certified interstate host shippers, three of which have shipped host and associated host plant material in the past six months. Positive plants have included *Rhododendron*, *Viburnum*, *Camellia*, *Magnolia*, two *Pieris*, and one *Gaultheria*. With most of the positive nurseries in Washington catering to the landscape trade, and the housing industry slow, at least four of the 10 sites have had some of the currently positive plants in the nursery yard for over a year. It is unknown how long they have been infected on site.

REGULATIONS

As of June 8, 2012, the Republic of Korea's Animal, Plant, and Fisheries Quarantine and Inspection Agency, Ministry for Food, Agriculture, Forestry, and Fisheries added six countries (Croatia, Czech Republic, Greece, Finland, Lithuania, and Serbia) to their "Phytosanitary measures to prevent the introduction of Sudden Oak Death Disease."

These countries now must abide by the Republic of Korea's rule applying to any propagated host or associated host material such as nursery stock (including root stock), cuttings, and scions (except seeds and fruits) and wood (including logs) with bark. All shipments will be required to have phytosanitary certificates accompany *P. ramorum* host and associated host importation, with an additional declaration that, "The shipment was inspected and found free of *Phytophthora ramorum*." For more information, go to http://members.wto.org/crnattachments/2012/sps/KOR/12_2280_00_e.pdf.

MANAGEMENT

The Food and Environment Research Agency (FERA) held an open meeting May 15, 2012 on their *Phytophthora* program. The meeting was an opportunity to engage the public and affected industries by providing information about *P. ramorum* and *P. kernoviae* program efforts as well as a forum for attendees to share their views and have an open dialogue. FERA's hope is to involve communities and industries so that efforts to overcome current issues can be joint, and addressed cooperatively by all impacted parties.

Of the approximately 65 people in attendance, most were supportive of current activities even though there have been considerable costs for commercial forest owners in felling larch before it is ready and in biosecurity actions. A smaller segment believed the government should pay compensation or that action should be taken to prevent any



movement of plants into the UK. Many understood the potential costs if no action were taken.

The next step for the *Phytophthora* program will be to have two reviews, the first to assess how it has been managed and the second to review the science and implementation. Findings will be used to inform future policy and whether the program should be financed by government, jointly with industry, or by industry alone. Participants from the open meeting are likely to be asked for their views as part of the review. Presentations from the meeting can be found at <http://www.fera.defra.gov.uk/plants/plantHealth/pestsDiseases/phytophthora/openMeetingMay2012.cfm>.

RELATED RESEARCH

Everts, K.L.; Osborne, L.; Gevens, A.J.; Vasquez, S.J.; Gugino, B.K.; Ivors, K.; and Harmon, C. 2012. Extension plant pathology: Strengthening resources to continue serving the public interest. *Phytopathology*, Vol. 102, No. 7: 652-655.

Green, S. and Webber, J.F. 2012. The emerging threat from *Phytophthora* to trees in Scotland. *RSFS Scottish Forestry*, Vol. 6, No. 1: 8 – 16.

Hansen, E.M.; Reeser, P.W.; and Sutton, W. 2012. *Phytophthora* Beyond Agriculture. *Annual Review of Phytopathology*. DOI: 10.1146/annurev-phyto-081211-172946.

Man in 't Veld, W.A.; Rosendahl, K.; and Hong, C. 2012. *Phytophthora Xserendipita* sp. nov. and *P. Xpelgrandis*, two destructive pathogens generated by natural hybridization. *Mycologia*. DOI:10.3852/11-272.

Meentemeyer, R.K.; Haas, S.E.; and Václavík, T. 2012. Landscape Epidemiology of Emerging Infectious Diseases in Natural and Human-Altered Ecosystems. *Annual Review of Phytopathology*. DOI: 10.1146/annurev-phyto-081211-172938.

MEETINGS

The 5th Sudden Oak Death Science Symposium, held in Petaluma, CA June 19 – 22, 2012, brought together researchers, regulators, land managers, and industry representatives from throughout the world working on Sudden Oak Death, *Phytophthora ramorum*, and other related forest and nursery pests. The Symposium included 52 talks and 25 posters from top researchers around the globe as well as a “SOD: Biosecurity Concerns and Forest Restoration” field trip, where attendees heard about international plant hunters and biosecurity risks related to plant hunting and walked through a local preserve, learning about long-term system changes and restoration efforts following SOD outbreaks. There was also a community “Ask the Expert” evening session where the public was able to talk one on one with researchers and outreach specialists, and a special tanoak session was offered on Friday, focusing on the history, values, and ecology of tanoak.



Presentations from the meeting as well as a recording of the live stream can be accessed via the conference website at <http://ucanr.org/sites/sod5/Agenda/>. Electronic evaluations of the Symposium are also still being accepted at <http://ucce.ucdavis.edu/survey/survey.cfm?surveynumber=8752> as are evaluations of the live video stream at <http://ucce.ucdavis.edu/survey/survey.cfm?surveynumber=8815>.

RESOURCES

SODMAP is now accessible through the COMTF homepage

(www.suddenoakdeath.org) under the Quick Links menu. It is an easily accessible database that currently displays approximately 9,000 laboratory-confirmed *P. ramorum* positive and negative samples collected by citizen scientists and researchers over the last five years. A primary objective of the SODMAP is to provide a more accurate understanding of Sudden Oak Death (SOD) distribution throughout California's 14 infested counties, so those facing the impacts of SOD will be better informed as to when preventative treatments should be considered.

CALENDAR OF EVENTS

7/11 – 7/12 - California Forest Pest Council Weed Tour; Burney, CA; Tour topics

include transmission line herbicide treatments, the Fountain fire 20-year anniversary, new forestry herbicides, fuel break creation and maintenance, aerial Velpar® ULW release, a wind farm tour, demonstration of goat vegetation management, a cooperative cedar stock trial, insecticide trial updates, Douglas-fir seed orchard insect and weed management, State Park Himalayan blackberry control, a Douglas-fir sunscald and frost research trial, and more. CEUs will be offered for PCA, QAL, QAC, and Private Applicator Certificates. For more information, go to the California Forest Pest Council website: <http://caforestpestcouncil.org/2012/01/cfpc-2012-weed-tour-and-gold-tournament-save-the-date/>.

7/17 – 7/18 - 2012 Agriculture Stakeholder Conference: Pests, Pathways, and

Partnerships; The purpose of this conference is to discuss the future of Agricultural Quarantine Inspection initiatives and to garner input on how US Customs Border Protection and APHIS can better serve stakeholder needs. This conference will bring together diverse stakeholder groups representing the animal product, plant product, and shipping industries as well federal and state regulatory officials to engage in an open dialogue centered on pest exclusion efforts and trade facilitation. While registration is full, a Live Web Cast will be offered for those still interested in participating. For more information, go to http://www.aphis.usda.gov/plant_health/agstakeholder/index.shtml or contact Melonie Torillo (301) 851-2269 or Melonie.J.Torillo@aphis.usda.gov.

7/24 – California Forest Pest Council Summer Insect and Disease Field Tour;

Warner Mountains, Modoc National Forest; Meet in Likely, CA; 9:00 a.m. – 5:00 p.m.; The tour will feature the current mountain pine beetle outbreak in lodgepole and whitebark pine with an emphasis on mountain pine beetle biology, individual tree protection, and stand level management. Other topics include the effects of



- thinning on fir engraver beetle-caused tree mortality, *Heterobasidion* (Annosus) root disease in white fir, Jeffrey pine beetle outbreak dynamics, and insects and diseases of aspen. CE Credits will be applied for from the Department of Pesticide Regulations. For more information or to sign up, contact Danny Cluck at dcluck@fs.fed.us or (530) 252-6431.
- 8/29 - Southern Regional Extension Forestry “Firewood and Forest Pests: The Risk of Spread by Recreationists?”** webinar; 9:00 – 10:00 a.m.; Pre-registration is not required. Credits will be offered for Society of American Foresters (1 hour category 1 credit); This webinar will provide some context regarding firewood and forest pests, and will also discuss what has been learned about this issue through indirect analysis of camper travel patterns rather than their actual use of firewood. For more information, go to <http://www.forestrywebinars.net/webinars/firewood-and-forest-pest-the-risk-of-spread-by-recreationist>.
- 9/9 – 9/14 – Sixth Meeting of the International Union of Forest Research Organizations IUFRO Working Party 7-02-09 “Phytophthora in Forests and Natural Ecosystems;”** Colegio Mayor Universitario Nuestra Señora de la Asunción, Avd. Menéndez Pidal s/n, 14004 Córdoba, Spain; For more information, contact M^a Pérez Sierra at aperesi@eaf.upv.es or see <http://iufrophytophthora2012.org/>.