



## CALIFORNIA OAK MORTALITY TASK FORCE REPORT MARCH 2009

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### MONITORING

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**Follow-up survey efforts regarding the *P. ramorum*-positive Mississippi nursery and ditch finds last year are still under way.** The latest survey efforts resulted in the recovery of *P. ramorum*-positive stream bait samples monthly from 11/08 – 2/09. The positive samples were taken from the ditch (outside the nursery), Hog Creek (about 100 feet downstream from the confluence of the ditch and Hog Creek), or both.

A vegetation survey of ditch environs was also conducted on 1/15/09, during which samples collected from nursery azaleas and nursery water were both found positive for the pathogen. Plant samples collected outside the nursery were negative. Vegetation samples were also collected from the ditch environs inside the nursery. A *Viburnum awabuki* sample (a former nursery plant that was found in the ditch inside the nursery) was diagnosed *P. ramorum*-positive via PCR by the USDA Animal and Plant Health Inspection Service (APHIS).

As a result of the detections, the azaleas in the destruction block were destroyed and the nursery elected to destroy the azaleas in the quarantine block (about 100 plants total). Additionally, the *V. awabuki* was destroyed. No other hosts were identified within 10 meters of this *Viburnum*.

**The 2009 USDA Forest Service *P. ramorum* National Wildland Survey will include 17 states.** This year's survey protocols will be identical to those in 2008 (2 bait bags of 4 rhododendron leaves each for 6 baiting periods in each surveyed stream). In states where summer temperatures get too high, baiting periods will be split between spring and fall. The 2009 program will also be supporting an intensive water baiting survey of the Sammamish River in WA (first detected positive for *P. ramorum* in 2007) in an attempt to identify the unknown inoculum source.

### REGULATIONS

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**The USDA APHIS Offshore Pest Information System has reported that *P. ramorum* has been confirmed for the first time in Serbia.** Symptoms of leaf necrosis and blight and petiole necrosis were found on twelve *Rhododendron* sp. cv. "Baden – Baden" trees in an open garden in June 2008. The infected plants were destroyed and measures were taken to eradicate the pathogen according to European Union (EU) legislation. As a result of the findings, APHIS will add Serbia to the list of countries currently regulated for *P. ramorum* host material on its online Nursery Stock Restrictions Manual.

**USDA APHIS will be adding *Daphniphyllum glaucescens* to the federally regulated list of *P. ramorum* associated hosts.** The pathogen was detected in a British Columbia nursery in May 2008 by the Canadian Food Inspection Agency. [Symptoms](#) include leaf spots and necrosis as well as stem dieback. Koch's Postulates are under way, but have not yet been completed. This plant is native to Indonesia and Malaysia.

**RESEARCH**

**Registration for the [Fourth Sudden Oak Death Science Symposium](#)** is now open and available online. The conference, aimed at researchers, natural resource and horticultural managers, regulators, policy makers, and public and private interest groups, will be held 6/15 – 6/18 at the Hilton in Scotts Valley/Santa Cruz. Hotel reservations at the discounted Symposium rate can be made online at:

<http://www.hilton.com/en/hi/groups/personalized/SJCSVHF-SODS-20090612/index.jhtml>.

**Thank you to everyone who submitted an abstract for the Fourth SOD Science Symposium.** Authors of accepted papers and posters will be notified by March 13, 2009. For more information, contact Katie Palmieri at (530) 344-7530 or [Palmieri@nature.berkeley.edu](mailto:Palmieri@nature.berkeley.edu).

**Brown, L.B. and Allen-Diaz, B. 2009. Forest stand dynamics and sudden oak death: Mortality in mixed-evergreen forests dominated by coast live oak.** *Forest Ecology and Management* 257:1271–1280.

Abstract: Sudden oak death (SOD), caused by the recently discovered non-native invasive pathogen, *Phytophthora ramorum*, has already killed tens of thousands of native coast live oak and tanoak trees in California. Little is known of potential short- and long-term impacts of this novel plant–pathogen interaction on forest structure and composition. Coast live oak (*Quercus agrifolia*) and bay laurel (*Umbellularia californica*) form mixed-evergreen forests along the northern California coast. This study measured tree mortality over a gradient of disease in three time periods. Direct measurements of current mortality were taken during 2004, representing a point-in-time estimate of present and ongoing mortality. Past stand conditions, c. 1994, were estimated using a stand reconstruction technique. Future stand conditions, c. 2014, were calculated by assuming that, given a lack of host resistance, live trees showing signs of the disease in 2004 would die. Results indicate that coast live oaks died at a rate of 4.4–5.5% year<sup>-1</sup> between 1994 and 2004 in highly impacted sites, compared with a background rate of 0.49% year<sup>-1</sup>, a ten-fold increase in mortality. From 2004 to 2014, mortality rates in the same sites were 0.8–2.6% year<sup>-1</sup>. Over the entire period, in highly impacted sites, a 59–70% loss of coast live oak basal area was predicted, and coast live oak decreased from 60% to 40% of total stand basal area, while bay laurel increased from 22% to 37%. Future stand structures will likely have greater proportions of bay laurel relative to coast live oak.

**Tooley, P.W. and Browning, M. 2009. Susceptibility to *Phytophthora ramorum* and inoculum production potential of some common Eastern forest understory plant species.** *Plant Disease* 93:249-256.

Abstract: Twenty-five plant species (21 genera, 14 families), which comprise a portion of the understory in forests of the Eastern United States, were evaluated for susceptibility to infection by *Phytophthora ramorum*. The degree to which *P. ramorum* is able to form



sporangia and chlamydo spores was also assessed on these hosts. Seedlings were spray-inoculated with a mixture (4,000 sporangia/ml) of four *P. ramorum* isolates followed by incubation in a dew chamber at 20°C in darkness for 5 days. Percent infection on individual leaves/leaflets was assessed visually. Mean percent leaf area infected ranged from 0.7% for *Smilax rotundifolia* to 93.8% for *Kalmia latifolia*. Eight plant species tested developed significantly larger lesion areas than those found on susceptible control *Rhododendron* 'Cunningham's White'. Fourteen species in addition to the susceptible control exhibited infection of over 90% of their leaves. Sporangia production by *P. ramorum* varied considerably among plant species, ranging from 36 per cm<sup>2</sup> lesion area on *Myrica pennsylvannica* to 2,001 per cm<sup>2</sup> lesion area on *Robinia pseudoacacia*. Numbers of chlamydo spores produced per 6-mm-diameter leaf disk incubated in a *P. ramorum* sporangia suspension ranged from 25 on *Ilex verticillata* to 493 on *Rhus typhina*. The results indicate that many common understory species in Eastern U.S. forests are susceptible to *P. ramorum* and capable of providing ample sources of inoculum (sporangia and chlamydo spores) for forest epidemics should the pathogen be introduced and should temperature and moisture conditions exist that are conducive to disease development.

#### NURSERIES

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**Mock Nursery Update: USDA APHIS is providing infrastructure funding to CA for** the development of a mock nursery site; however, the funds are only available until the end of the federal fiscal year (9/30/09). Should a location not be secured, the money will be forfeited. Currently there is one site under consideration at Patterson Ranch in Alameda County; however, there is still no agreement in place. With time of the essence, it is important to explore all potential locations. Anyone who knows of a possible mock nursery site is encouraged to contact Kathy Kosta at (916) 653-1440 as soon as possible. Ideally, potential sites would be 5 - 10 acres, secure, and located in a quarantined county with no oaks or bay nearby. It is also hoped that the site chosen will agree to at least a 5-year lease, and that there will be access to power, water, and sewer.

**In February, the Oregon Department of Agriculture (ODA) met with** representatives from the National Plant Board, California Association of Nurseries, California Department of Food and Agriculture, Washington State Nursery and Landscape Association, Washington State Department of Agriculture, and USDA APHIS to review the Oregon Grower Assisted Inspection Program (GAIP). GAIP takes an audit-based, systems approach to managing *Phytophthora* diseases within nurseries. It is based largely on research conducted by Oregon State University (OSU) and USDA Agricultural Research Service (ARS) scientists that identified critical control points in nursery production and procurement processes where *Phytophthora* can be introduced. The review included presentations on this research, a demonstration of the OSU *Phytophthora* Online Course: Training for Nursery Growers (<http://ecampus.oregonstate.edu/phytophthora>), and visits to four nurseries participating in the program. The visitors also met with representatives from the Oregon Association of Nurseries to discuss the program. Funding for this pilot program has been provided by a



2-year grant from the USDA Natural Resource Conservation Service that is projected to end 8/31/09. ODA will be seeking additional funds to continue GAIP after that date.

#### RELATED RESEARCH

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**Burgess, T.I.; Webster, J.L.; Ciampini, J.A.; White, D.; Hardy, G.E.StJ.; and Stukely, M.J.C.** 2009. Re-evaluation of *Phytophthora* species isolated during 30 years of vegetation health surveys in Western Australia using molecular techniques. *Plant Disease* 93:215-223.

**Linzer, R.E.; Rizzo, D.M.; Cacciola, S.O.; Garbelotto, M.** In Press. AFLPs detect low genetic diversity for *Phytophthora nemorosa* and *P. pseudosyringae* in the US and Europe. *Mycological Research*. [DOI:10.1016/j.mycres.2008.11.004](https://doi.org/10.1016/j.mycres.2008.11.004).

**Manos, P.S.; Cannon, C.H.; Oh, S.H.** 2008. Phylogenetic Relationships and Taxonomic Status of the Paleoendemic Fagaceae of Western North America: Recognition of a New Genus, *Notholithocarpus*. *Madroño*, 55(3): 181–190.

**Worrall, J.J.** 2009. Dieback and mortality of *Alnus* in the Southern Rocky Mountains, USA. *Plant Disease* 93:293-298.

#### OUTREACH AND EDUCATION

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***P. ramorum* Preventative Treatment Training sessions are being offered on the UC Berkeley campus this spring.** Each two-hour outdoor session covers basic Sudden Oak Death information, integrated pest management approaches, selection of candidate trees for treatment, and proper preventative treatment application. DPR, ISA, SAF, and California Urban Forestry Council credits are available. See the “Calendar of Events” below for additional details.

**Sudden Oak Death (SOD) Blitzes will be held in the counties of San Mateo, Sonoma, Monterey, Santa Clara, and Alameda this spring.** The intention of the Blitzes is to engage people in SOD as it relates to their local areas, and to assist communities in identifying locations where the pathogen is present. Participants will be given a two-hour training on identifying SOD symptoms, correctly sampling symptomatic plants, and documenting sample locations. Samples will then be taken to the UC Berkeley Garbelotto lab where they will be analyzed to determine the presence or absence of *P. ramorum*. Laboratory results will be used to generate maps of disease distribution within surveyed areas. For more information on the Blitzes, go to <http://nature.berkeley.edu/garbelotto/english/sodblitz.php>.

#### WWW.SUDDENOAKDEATH.ORG

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**Chapter 4 (Modeling Disease Distribution and Spatial-Temporal Patterns of Mortality) of Sudden Oak Death and *Phytophthora ramorum*: A Summary of the Literature**, by John T. Kliejunas, is now available on the COMTF website at [http://www.suddenoakdeath.org/html/sod\\_literature\\_summary.html](http://www.suddenoakdeath.org/html/sod_literature_summary.html).

**RELATED TOPIC RESOURCES**

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The USDA Forest Service has a new Alder *Phytophthora* (*Phytophthora alni* subsp. *uniformis*) webpage: <http://www.fs.fed.us/r10/spf/fhp/>. The page provides monthly updates on *P. alni* as well as a current map of its distribution. For more information on *P. alni*, contact Lori Trummer at [ltrummer@fs.fed.us](mailto:ltrummer@fs.fed.us).

**PERSONNEL**

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**Guillaume Bilodeau is a new postdoctoral researcher in Dr. Frank Martin's lab at the USDA ARS in Salinas, CA.** Guillaume's research will focus on genomic research of the mitochondrial genomes of *Phytophthora* and *Pythium* species, including *P. ramorum* and the development of molecular diagnosis assays for each genus and species. Prior to working in the Martin lab, Guillaume worked at Natural Resources Canada and the University of Laval, Quebec City, on *P. ramorum* diagnostics using Real-time PCR on three nuclear genes and genotyping using SNP markers. Guillaume can be reached at (831) 755-2878 or [Guillaume.Bilodeau@ars.usda.gov](mailto:Guillaume.Bilodeau@ars.usda.gov).

**CALENDAR OF EVENTS**

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- 3/11 - SOD Treatment Workshop; meet at oak outside of Tolman Hall, UC**  
Berkeley Campus; 1 – 3 p.m.; Pre-registration is required. This class is free and will be held rain or shine. To register, email [SODtreatment@nature.berkeley.edu](mailto:SODtreatment@nature.berkeley.edu), and provide your name, phone number, affiliation (if applicable), and the date for which you are registering. For more information, go to <http://nature.berkeley.edu/garbelotto/english/sodtreatmenttraining.php> or contact Katie Palmieri at (510) 847-5482 or [palmieri@nature.berkeley.edu](mailto:palmieri@nature.berkeley.edu).
- 4/22 - SOD Treatment Workshop; meet at oak outside of Tolman Hall, UC**  
Berkeley Campus; 1 – 3 p.m.; Pre-registration is required. For more information, see the 3/11 listing above.
- 5/6 - SOD Treatment Workshop; meet at oak outside of Tolman Hall, UC**  
Berkeley Campus; 1 – 3 p.m.; Pre-registration is required. For more information, see the 3/11 listing above.
- 6/15 – 6/18 –Fourth Sudden Oak Death Science Symposium; Hilton, Scotts Valley**  
(near Santa Cruz); For Symposium registration information, go to <http://nature.berkeley.edu/comtf/sodsymposium4/> or contact Janice Alexander at [JAlexander@ucdavis.edu](mailto:JAlexander@ucdavis.edu). For submission of abstracts, conference logistics, and facilities information, contact Katie Palmieri at [Palmieri@nature.berkeley.edu](mailto:Palmieri@nature.berkeley.edu). For hotel room reservations go to <http://www.hilton.com/en/hi/groups/personalized/SJCSVHF-SODS-20090612/index.jhtml>.