



## CALIFORNIA OAK MORTALITY TASK FORCE REPORT DECEMBER 2005

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NOTE: THIS REPORT PROVIDES A COMBINATION OF UPDATES AND YEAR-END SUMMARIES. A MORE COMPREHENSIVE 2005 YEAR-END SUMMARY PUBLICATION WILL BE ISSUED IN JANUARY IN LIEU OF A MONTHLY REPORT; THEREFORE, THE FIRST 2006 COMTF MONTHLY REPORT WILL BE ISSUED IN FEBRUARY.

### REGULATIONS

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**A Washington State University researcher has isolated *Phytophthora ramorum* from California red fir (*Abies magnifica*) symptomatic shoots at a Christmas tree farm near Los Gatos, CA.** Samples were tested using PCR; Koch's Postulates have not been completed. The findings are currently being evaluated and considered for the potential addition of California red fir to the regulated associated host list by the USDA Animal and Plant Health Inspection Service (APHIS).

### NURSERIES

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**In 2005, the California Department of Food and Agriculture sampled approximately 20,000 plants for *P. ramorum*, of which 219 were confirmed positive (1% of all samples collected) in 53 nurseries (3% of all nurseries inspected for *P. ramorum*).**

More than half of the positive nurseries (27/53) were found positive during trace-forward inspections. Twenty of the facilities were producers, 16 retailers, 7 producer/retailers, 6 producer/brokers, 1 retailer/landscaper, 2 brokers, and 1 landscaper. Quarantined county confirmations included: Alameda(6), Contra Costa(1), Monterey(1), Napa(1), San Mateo(2), Santa Clara(3), Santa Cruz(2), and Sonoma(3), while regulated county confirmations were made in: El Dorado(1), Fresno(1), Los Angeles(7), Madera(1), Nevada(1), Orange(2), Placer(3), Riverside(2), Sacramento(4), San Diego(5), San Joaquin(1), San Luis Obispo(1), Shasta(2), Stanislaus(2), and Ventura(1). Of the 53 positive nurseries, eight had been identified as positive in previous years. *Camellia* spp. and *Rhododendron* spp. accounted for 93 percent of the finds, while the remaining seven percent was comprised of *Pittosporum undulatum*, *Pyracantha koidzumii*, *Viburnum tinus*, *Pieris japonica*, and *Laurus nobilis*. Three of the positive nurseries also had positive soil samples; all were treated with Basamid and tested negative for *P. ramorum* following treatment.

**In order to meet the requirements of the *P. ramorum* Federal Order, Oregon Department of Agriculture (ODA) staff in 2005 collected 51,605 samples from 1,020 *P. ramorum* host as well as 13 non-host nursery growing areas to test for the presence of the pathogen.** *Phytophthora* species were detected at 156 (15.1%) surveyed sites, with *P. ramorum* found at eight (0.7%) of the sites surveyed. The USDA Confirmed Nursery Protocol (CNP) was enacted and completed at the eight sites. Seven hundred ninety-six host nurseries and 1,028 non-host nurseries have entered into federal compliance agreements and are eligible to ship plants interstate.

Throughout the state, ODA surveyed retail nurseries that sell plants susceptible to *P. ramorum*. A total of 136 retail nurseries were inspected for *P. ramorum*, with 5,590 samples collected for pathogen testing. *Phytophthora* species were detected at 24 (17.6%) sites, and *P. ramorum* was found at four (2.9%) of the surveyed locations. CNP was enacted at the four sites. One of these sites remains under CNP.

ODA has also been completing trace-out investigations to both nursery and landscape/homeowner sites. A total of 324 sites have been surveyed with 9,000 samples collected for testing. *Phytophthora* species were detected at 25 sites (7.7%), with *P. ramorum* identified at nine locations (2.8%) - three nurseries and six landscape settings. The USDA Confirmed Nursery and Confirmed Residential and Landscape protocols were enacted at the nine



sites as appropriate. Two landscape sites and one nursery have yet to complete the requirements of the USDA protocols.

In May of 2005, ODA surveyed Christmas tree plantations with *Abies* spp. and *Pseudotsuga menziesii* for *P. ramorum*. One hundred and three plantations in 22 counties were surveyed, with 4,170 samples collected for testing per the USDA *P. ramorum* National Survey Protocol. *P. ramorum* was not detected in any of the samples, nor was any other *Phytophthora*. This is the fourth consecutive year that *P. ramorum* has not been found in Oregon Christmas tree plantations.

Oregon is also revising state regulations for its *P. ramorum* quarantine and for the federally required nursery certification program. The quarantine will be updated to reflect new information from survey and eradication efforts in Curry County. The nursery rule will be updated to reflect the new host list and revisions to the USDA Confirmed Nursery Protocol. Public hearings will be held in February 2006.

**In 2005, Washington sampled over 25,000 plants in their *P. ramorum* National Nursery Survey, from approximately 250 nurseries, and identified 16 *P. ramorum*-positive sites, compared to 25 sites in 2004.** Of the positives for this year, 13 were retail nurseries and three were wholesale facilities; no production nurseries were found positive. Counties with confirmations included: Pierce(5), King(5), Thurston(1), Clark(2), Pacific(1), Skagit(1), and Snohomish(1). Nine of the 2005 *P. ramorum*-positive sites were also found positive in 2004. Twelve of the 16 sites' infected stock came from out-of-state growers. Of the four sites infected by in-state stock, all trace-backs were found to be negative. Out of the 7,913 WA samples collected in 2005, 97 were positive for *P. ramorum*, accounting for just over one percent of the material. Of the positive samples, 90 percent were from Rhododendron, with the remaining 10 percent being comprised of Kalmia, Viburnum, and Pieris. For the first time this year, WA also found positive soil samples at one retail facility that was a *P. ramorum*-positive site last year.

#### MANAGEMENT

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***Phytophthora ramorum* was first discovered in Oregon forests in July 2001.** Since then, the Oregon Department of Forestry, in partnership with others, has been attempting to eradicate the pathogen by cutting and burning all infected host plants and adjacent apparently uninfected plants. As of December 8, 2005, eradication treatments are in progress on 51 sites, totaling approximately 88 acres. The majority of sites are on private land.

The number of new sites and infected trees discovered each year appears in the table below. Both the number of infected trees and the number of infested acres have increased from 2004. This increase may be partially attributable to the unusually wet spring and early summer weather. Of the nine new sites detected in 2005, eight are within 1/4 mile of previously known sites, and one is approximately 1/2 mile away from a known site. This latter site consists of two infected trees just east of the current quarantine boundary, and on the east side of the North Fork of the Chetco River. Both infected trees had no crown symptoms, and were discovered during ground surveys triggered by the recovery of *P. ramorum* from rhododendron leaf baits in a nearby stream in October 2005. In addition to these nine new sites, nine existing eradication sites were expanded to include infected trees that were found near their perimeters in 2005. At the landscape level, the distribution of newly infected trees continues to suggest spread in a north to northeast direction, following the south to southwest winds that prevail during rainy periods.

TABLE: Number of infected trees, number of new disease patches, and number of acres infested with *P. ramorum* in Oregon from 2001 – December 8, 2005



YEAR	# tanoaks infected with <i>P. ramorum</i>	# new disease patches (Not including expansions of existing sites)	# acres newly infested each year (new sites plus expansions of existing sites)
2001	100+	9	40
2002	85	12	8
2003	49	12	12
2004	30	9	10
2005	49	9	18
TOTAL		51	88

Monitoring within the eradication sites has shown that the pathogen survived cutting and burning on many sites, primarily in stumps and sprouts of host plants that were infected prior to cutting. Since 2003, all stumps and sprouts of host vegetation on private land were treated with herbicide to kill sprouts and prevent future sprouting. On federal lands, sprouts are being cut and burned repeatedly in order to keep sites free of host sprouts until the pathogen can no longer be recovered. Ongoing chemical and mechanical destruction of sprouts on all sites will be essential to curtail future spread of the pathogen. The eradication protocol on private land now requires injecting trees with herbicide (glyphosate or imazapyr) at least two weeks prior to cutting to prevent sprouting.

Despite several new occurrences of *P. ramorum* in 2004 and 2005, distribution of the pathogen in Oregon forests remains limited to a very small area near Brookings, suggesting that the eradication effort has at least slowed pathogen spread. Repeated aerial surveys and ground-checks have failed to detect the pathogen in forests beyond this area. The forested area in Oregon under quarantine by ODA and USDA Animal and Plant Health Inspection Service (APHIS) is 11 mi<sup>2</sup> as of December 8, 2005, and will increase soon to include recent discoveries. Efforts to eradicate the pathogen from Oregon forests likely will continue for several years.

For more information, contact Alan Kanaskie, Oregon Department of Forestry, at: [akanaskie@odf.state.or.us](mailto:akanaskie@odf.state.or.us).

**The CA SOD Hazardous Tree Removal Program (state funding made available to SOD-impacted counties with hazardous trees in need of removal) has come to a close.** In all, approximately 4,020 trees were removed under the contract for a cost of \$1,503,645, averaging \$374 per removal. Assessment, Restoration, Fiscal Agent, and Education were additional expenses not counted in the average tree removal costs. Counties with tree removals included: Alameda(2), Marin(1,259), Monterey(243), Napa(1), Santa Cruz (2,323), and Sonoma(191).

For more information on the final report of the Hazardous Tree Removal program, contact Stephen Jones at: [Stephen.Jones@fire.ca.gov](mailto:Stephen.Jones@fire.ca.gov).

#### MONITORING

**A meeting to refine *P. ramorum* stream sampling protocols for the National *P. ramorum* Wildland Survey was held December 7, 2005 in Portland, OR.** Informed by developmental work this year in WA, OR, CA, and NC, 10 states will participate in a pilot project during 2006 for early detection of *P. ramorum* by baiting streams with rhododendron leaf baits. Water sampling via leaf baits or filtering has been a very effective detection method around the margins of known infected areas; water baiting detected the southern most find of *P. ramorum* in



Willow Creek, Monterey County and several new finds in the Oregon *P. ramorum* eradication area near Brookings, Curry County. For more information on the stream sampling pilot program in the National Wildland Survey, contact Steve Oak, USDA Forest Health Protection, Asheville, NC at [soak@fs.fed.us](mailto:soak@fs.fed.us).

#### RESEARCH

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**The Pacific Southwest Research Station is planning to issue its 2006 Sudden Oak Death/*Phytophthora ramorum* Request for Proposals in January.** Proposals will be due in mid-February. Approximately \$650,000 will be awarded through a peer-reviewed, competitive process. The 2006 Request for Proposals (RFP), will fund research both nationwide and internationally in an effort to increase the understanding of Sudden Oak Death/*Phytophthora ramorum*. The knowledge will be used to guide development and implementation of regulatory policies, monitoring programs, and management and treatment strategies in an effort to minimize the spread of this quarantine pathogen. The Request for Proposals will be emailed to the COMTF listserv and posted at: [www.suddenoakdeath.org](http://www.suddenoakdeath.org). To view last year's 2005 Sudden Oak Death/*Phytophthora ramorum* Request for Proposals, go to: <http://www.fs.fed.us/psw/programs/sod/>. For more information, contact Susan Frankel, Sudden Oak Death Research Program Manager, at: [sfrankel@fs.fed.us](mailto:sfrankel@fs.fed.us).

**Tomlinson, J. A., Boonham, N., Hughes, K. J. D., Griffin, R. L., and Barker, I. Nov. 2005.** On-Site DNA Extraction and Real-Time PCR for Detection of *Phytophthora ramorum* in the Field. Applied and Environmental Microbiology. Vol. 71, No. 11. 6702-6710.

Abstract: *Phytophthora ramorum* is a recently described pathogen causing oak mortality (sudden oak death) in forests in coastal areas of California and southern Oregon and dieback and leaf blight in a range of tree, shrub, and herbaceous species in the United States and Europe. Due to the threat posed by this organism, stringent quarantine regulations are in place, which restrict the movement of a number of hosts. Fast and accurate diagnostic tests are required in order to characterize the distribution of *P. ramorum*, prevent its introduction into pathogen-free areas, and minimize its spread within affected areas. However, sending samples to a laboratory for testing can cause a substantial delay between sampling and diagnosis. A rapid and simple DNA extraction method was developed for use at the point of sampling and used to extract DNAs from symptomatic foliage and stems in the field. A sensitive and specific single-round real-time PCR (TaqMan) assay for *P. ramorum* was performed using a portable real-time PCR platform (Cepheid SmartCycler II), and a cost-effective method for stabilizing PCR reagents was developed to allow their storage and transportation at room temperature. To our knowledge, this is the first description of a method for DNA extraction and molecular testing for a plant pathogen carried out entirely in the field, independent of any laboratory facilities.

**Judelson, Howard S. and Blanco, Flavio A. January 2005. The Spores of *Phytophthora*: Weapons of the Plant Destroyer.** Microbiology. Nature Reviews. Vol.3. 47-58. Available at: [www.nature.com/reviews/micro](http://www.nature.com/reviews/micro).

Abstract: Members of the genus *Phytophthora* are among the most serious threats to agriculture and food production, causing devastating diseases in hundreds of plant hosts. These fungus-like eukaryotes, which are taxonomically classified as oomycetes, generate asexual and sexual spores with characteristics that greatly contribute to their pathogenic success. The spores include survival and dispersal structures, and potent infectious propagules capable of actively locating hosts. Genetic tools and genomic resources developed over the past decade are now allowing detailed analysis of these important stages in the *Phytophthora* life cycle.

#### RESOURCES

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**A modeling page has been added to the Task Force website at: [www.suddenoakdeath.org](http://www.suddenoakdeath.org), under "Research," "Modeling."** The page has a comparison of the various risk models being used to assess the likelihood of *P. ramorum* establishment in



various areas of the US, Canada, and CA. This is the first of several planned web pages to summarize research on various aspects of *P. ramorum*.

**USDA APHIS has developed a color brochure titled “*Phytophthora ramorum*: Stopping the Spread.”** The brochure provides photos and discusses plants naturally infected by *P. ramorum*, pathogen movement and infection, impacts to the nursery industry, and efforts to stop pathogen spread. To access the brochure, go to:  
[http://www.aphis.usda.gov/publications/plant\\_health/index\\_ph\\_p.shtml](http://www.aphis.usda.gov/publications/plant_health/index_ph_p.shtml).

**The UK’s Department for Environment, Food, and Rural Affairs held an “Interested Organizations Meeting” on *P. ramorum* and *P. kernoviae* 11/14/05.** Participants included representatives from the horticultural trade, forestry organizations, environmental bodies, historic gardens, research institutes, and local authorities. The meeting included updates from the UK, France, and the US. Future UK plans were also presented, as were possible future scenarios for the two pathogens. Afternoon break-out sessions covered science in relation to risks; action in woodlands and gardens; and nursery practice, movement controls, and clean-up. To access the presentations and all other additional information from the meeting, go to: <http://www.defra.gov.uk/plant/pram2005.htm>.

#### NOTEWORTHY

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The COMTF website ([www.suddenoakdeath.org](http://www.suddenoakdeath.org)) was featured in Science’s NetWatch feature <http://www.sciencemag.org/netwatch/>. The November 18, 2005 issue included a “Resources” box on *P. ramorum* titled “Death in the Woods.”

#### PERSONNEL

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**Effective 11/28, Kate Symonds left her position with the USDA North Coast Resource Conservation and Development Council (RC&D) for a position with the US Fish and Wildlife Service Conservation Partnerships program.** In her new position, Symonds will be promoting partnerships and various USFWS non-regulatory restoration grant programs in several of the Bay Area counties, and can be reached at: [kate\\_symonds@fws.gov](mailto:kate_symonds@fws.gov). Until her position with RC&D is filled, all inquiries regarding general RC&D matters should be directed to the RC&D Chair, Bev Wasson, at: [bfwasson@earthlink.net](mailto:bfwasson@earthlink.net).

#### CALENDAR OF EVENTS

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**Spring 2006 – The next COMTF-wide meeting will be held March 21, 2005 in Monterey.** The meeting will provide an update on management and research covering all aspects of Sudden Oak Death/*Phytophthora ramorum*. Additional information, including the meeting location, will be posted to the COMTF website soon, and will also be provided in upcoming COMTF newsletters. All interested parties are encouraged to attend.