



## CALIFORNIA OAK MORTALITY TASK FORCE REPORT MARCH 2008

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### REGULATIONS

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**In 2006 and 2007 the extent of Sudden Oak Death increased considerably in Oregon**, probably due to consecutive years of unusually wet spring and early summer weather which appears to favor long distance spread of *P. ramorum*. In 2007, 60 new infested sites (55 acres total) were discovered ([fig. 1](#) and [fig. 2](#)). Six of these sites occurred outside of the quarantine area, and several of them were two or more miles from the nearest infested site. Most of the other new sites were small (less than 1 acre) and scattered near the center of the Oregon quarantine zone.

As a result of this disease expansion, Oregon's Curry County quarantine area was officially expanded to 162 square miles in January 2008, following the State's amendment to their *P. ramorum* quarantine ([fig. 3](#)). For the first time, nurseries and a lumber mill are located within the quarantine area. The Oregon Department of Agriculture is working with affected businesses to set up the compliance agreements and inspection schedules necessary to meet federal interstate shipping requirements.

The eradication program will remain ongoing in Oregon as long as funding continues. However, if the disease continues to expand as it did in 2007, finding funds to support the program will become challenging. In 2007, 720 acres were identified for treatment (infection zones and buffer areas). Approximately 420 acres have been treated; treatment of the remaining 300 acres is in progress and will be completed in early 2008 upon receipt of additional funding.

**The USDA Animal and Plant Health Inspection Service intends to add five new species or hybrids of *Magnolia* to the *P. ramorum* host list in the near future.** The impetus for these additions is positive confirmations for the pathogen in United Kingdom gardens and a nursery in British Columbia, Canada. Symptoms found on the Magnolias included leaf necrosis, stem dieback, and one stem canker.

**The Norwegian Food Safety Authority implemented updated *P. ramorum* regulations on 2/15/08.** Norway's new regulations can be found at [http://www.mattilsynet.no/english/plant\\_health/regulations\\_on\\_measures\\_against\\_phytophthora\\_ramorum\\_have\\_been\\_amended\\_55856](http://www.mattilsynet.no/english/plant_health/regulations_on_measures_against_phytophthora_ramorum_have_been_amended_55856).

### NURSERIES

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**A Florida nursery was found to have *P. ramorum*-positive *Camellia sasanqua* at two of its facilities in January.** Both sites were found positive for the pathogen in 2007. The USDA Confirmed Nursery Protocol (CNP) is underway at both locations.

**California had three *P. ramorum*-positive nursery confirmations in February.** A Los Angeles County production nursery was found to have a *P. ramorum*-positive *Camellia sinensis* plant during a compliance agreement renewal inspection. Other



sample results for this nursery are pending. This nursery's compliance agreement has been suspended. The CNP is under way.

A production/retail nursery in Los Angeles County had one positive *Camellia japonica* 'Kramer's Supreme' plant confirmed as a result of a compliance agreement renewal inspection. Other sample results for this nursery are pending. This nursery's compliance agreement has been suspended. The CNP is under way.

A retail nursery in Humboldt County had soil samples confirmed positive for *P. ramorum* as a result of a soil delimitation sampling following a 2007 positive. Since the nursery does not ship plants, it is not under a compliance agreement. Soil samples have been collected in an effort to determine where treatments (paving) should be focused.

### **MONITORING**

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**Point Reyes National Seashore has issued “Spatial distribution and impacts of *Phytophthora ramorum* and Sudden Oak Death in Point Reyes National Seashore,”** by Max Mortiz, UC-Berkeley, and others. Based on the proportion of randomly located plots infected with *P. ramorum*, the following findings were reported:

- As much as 63% of redwood forests, 45% of coast live oak forests, and 24% of Douglas-fir forests at Point Reyes may be infected.
- There were no confirmations of *P. ramorum* on the west side of Inverness Ridge.
- Tanoak comprised approximately 30% of the basal area in the forests studied. In diseased areas, approximately 75 - 95% of the tanoak is dead (in terms of basal area).
- Diseased redwood plots had fuel loadings in excess of 80 tons per acre, compared to approximately 50 tons per acre in healthy redwood plots.
- Douglas-fir plots actually had higher fuel loading in healthy plots than in diseased plots due to more fuels in the duff layer.
- Within the Point Reyes National Seashore area, centers of infection were determined to be Bolinas Ridge, Bear Valley/Limantour Road, and Five Brooks areas.

For a copy of the complete report, or for more information, contact Alison Forrestel at [alison\\_forrestel@nps.gov](mailto:alison_forrestel@nps.gov).

### **RESEARCH**

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**Linderman, R.G. and Davis, E.A. 2008. Evaluation of chemical agents for the control of *Phytophthora ramorum* and other species of *Phytophthora* on nursery crops.** Online. Plant Health Progress. DOI: 10.1094/PHP-2008-0211-01-RS.

Abstract: *Phytophthora* diseases occur frequently in nurseries, and the recent incidence of ramorum blight, caused by *P. ramorum*, on nursery crops has underscored the need for improved management strategies against all *Phytophthora* diseases. We evaluated several chemicals that target Oomycete pathogens, inoculating detached rhododendron or lilac leaves removed from plants previously treated with various chemicals, or chemically-treated leaves on intact plants. Results indicated that Subdue MAXX (drench or foliar



application) was the most effective chemical in suppressing infections caused by all species of *Phytophthora* tested (*P. ramorum*, *P. citricola*, *P. citrophthora*, and *P. nicotianae*) except *P. citrophthora*; with *P. ramorum*, it was active for at least 6 weeks after spray application. More chemicals were effective when sporangial rather than mycelial plug inoculum of *P. ramorum* was used, including Aliette, Ranman, Stature DM, and Fenamidone. All chemicals tested were fungistatic, not fungicidal. These tests indicate that several materials inhibit infection by *Phytophthora* species, and that the detached leaf test is effective in evaluating efficacy of chemical agents for the suppression of *Phytophthora* pathogens from nurseries.

**Schena, L.; Duncan, J.M.; and Cooke, D.E.L. 2008. Development and application of a PCR-based ‘molecular tool box’ for the identification of *Phytophthora* species damaging forests and natural ecosystems. *Plant Pathology* 57, 64–75. DOI: 10.1111/j.1365-3059.2007.01689.x**

Abstract: A PCR-based ‘molecular tool box,’ based on a region of the ras-related protein gene *Ypt1*, was developed for the identification of 15 *Phytophthora* species that damage forests and trees: *P. cactorum*, *P. cambivora*, *P. cinnamomi*, *P. citricola*, *P. europaea*, *P. inundata*, *P. lateralis*, *P. megasperma*, *P. nemorosa*, *P. kernoviae*, *P. pseudosyringae*, *P. psychrophila*, *P. quercina*, *P. ramorum*, and *P. ilicis*. Most primers proved highly specific in blast analyses and in tests with DNA from 72 isolates of 35 species of *Phytophthora* and nine species representative of *Pythium*. Exceptions were primers designed for *P. cactorum* and *P. ilicis*, which cross-reacted with *P. idaei* and *P. nemorosa*, respectively. Amplification with *Phytophthora*-genus-specific primers before amplification with the various species-specific primers (nested PCR) increased the sensitivity of detection over amplification with species-specific primers only: detection limits ranged between 100 and 10 pg target DNA  $\mu\text{L}^{-1}$  in the latter, compared with 100 fg  $\mu\text{L}^{-1}$  in nested PCR. Using existing methods for rapid extraction and purification of DNA, single-round amplification was appropriate for detection of target *Phytophthora* species in leaves, but nested PCR was required for soil and water samples. The quarantine pathogens *P. ramorum* and *P. kernoviae* were detected in a number of naturally infected leaves collected in England and Wales, whereas *P. citricola* was most common in water and soil samples from natural Scottish ecosystems.

**Tjosvold, S.A.; Koike, S.T.; and Chambers, D.L. 2008. Evaluation of fungicides for the control of *Phytophthora ramorum* infecting *Rhododendron*, *Camellia*, *Pieris*, and *Viburnum*. Online. Plant Health Progress DOI: 10.1094/PHP-2008-0208-01-RS.**

Abstract: Fungicides were evaluated for pre- and post-infection control of ramorum blight, caused by *Phytophthora ramorum*, on *Rhododendron* cvs. Cunningham’s White and Irish Lace, *Camellia japonica*, *Pieris japonica*, and *Viburnum tinus*. Cyazofamid, dimethomorph, mefenoxam, pyraclostrobin, and fenamidone applied as foliar sprays consistently provided preventative control as indicated by reduced lesion size compared to water controls. These fungicides provided preventative activity for at least 28 days in the tested species except in *Rhododendron* where fungicides were active for at least 14



days following application. With preventative fungicide applications, the pathogen was recovered from most fungicide-treated leaves by isolation onto selective media. Dimethomorph consistently reduced the percent recovery from diseased *Rhododendron* leaves. With post-infection treatments, the fungicides did not significantly reduce lesion growth and percent recovery of the pathogen. The pathogen was recovered from lesions consistently at least 6 weeks after fungicide application in *Rhododendron* regardless of treatment on intact and fallen diseased leaves. However, the cultures resulting from isolations of diseased tissue treated with cyazofamid and dimethomorph were significantly slower growing than those cultures from other fungicide treatments. *P. ramorum* management issues relating to fungicide use in commercial nurseries are discussed.

**Tooley, P.W.; Browning, M.; and Berner, D. 2008. Recovery of *Phytophthora ramorum* following exposure to temperature extremes.** Plant Dis. 92:431-437.

**Abstract:** We examined the impact of exposure to high and low temperature extremes on recovery of *Phytophthora ramorum* both as free chlamydospores and within infected rhododendron tissue over a 7-day period. Chlamydospores held in moistened sand were incubated at 30, 35, 40, 0, -10, and -20°C for up to 7 days. Infected *Rhododendron* 'Cunningham's White' leaf disks held in sandy loam, loam, or sand at two different soil moisture levels also were subjected to these temperatures for up to 7 days, and to a variable temperature regimen for 12 weeks. Recovery was characterized by growth of *P. ramorum* on selective agar medium following exposures to temperature treatments. Chlamydospores held in moistened sand showed a high rate of recovery at 30°C, steadily declining recovery at 35°C, and no recovery at 40°C over the 7-day period. Chlamydospores were recovered from 0°C after 7 days, with little or no recovery observed at -10 or -20°C. In infected rhododendron tissue, *P. ramorum* was recovered at 20 and 30°C after 7 days but, at 35°C, the pathogen showed a decline within 2 days and no recovery by 4 days. A 40°C treatment allowed no recovery of *P. ramorum* from infected tissue after 2 days. For cold treatments, *P. ramorum* was recovered from infected leaf disks at 0 and -10°C after 7 days. At -20°C, recovery declined rapidly after 1 to 3 days and no recovery was obtained after 4 days. *P. ramorum* showed nearly 100% recovery from leaf disks subjected to a 12-week variable temperature treatment based on ambient summer temperatures in Lewisburg, TN. The results suggest that *P. ramorum* is capable of surviving some highly adverse temperature conditions for at least 7 days both as free chlamydospores in sand and within infected host tissue. Thus, *P. ramorum* present as free chlamydospores or within tissue of infected plants shipped to the eastern United States has the potential to survive some of the adverse conditions encountered in summer and winter in many eastern states.

**Warfield, C.Y.; Hwang, J.; and Benson, D.M. 2008. *Phytophthora* blight and dieback in North Carolina nurseries during a 2003 survey.** Plant Dis. 92:474-481.

**Abstract:** A survey of 14 nurseries growing hybrid rhododendron, *Pieris* spp., or *Viburnum* spp. was conducted as part of the 2003 Sudden Oak Death Pilot National



Survey to determine if *Phytophthora ramorum*, the causal agent of sudden oak death, had been introduced to nurseries in North Carolina. Over 220,000 hybrid rhododendrons, 1,700 plants of *Pieris* spp., and 2,800 plants of *Viburnum* spp. were surveyed. Across nurseries, blight and dieback incidence averaged 2.4% for *Pieris* spp. and 10% for rhododendron. *P. ramorum* was not recovered by isolation or detected by polymerase chain reaction in the 347 plant samples collected. Three species of *Phytophthora* were isolated from hybrid rhododendron and *Pieris* spp., but no *Phytophthora* isolates were recovered from *Viburnum* spp. *P. citricola* and *P. cambivora* were isolated most frequently (61 and 39 isolates, respectively), while 2 isolates of *P. cactorum* were recovered. Occasionally, two *Phytophthora* spp. were found in the same block of rhododendrons within a nursery, but only one species was recovered from an individual plant. Most cultivars of rhododendron surveyed, including ‘English Roseum,’ ‘Nova Zembla,’ and ‘Roseum Elegans,’ had less than 0.5% incidence of *Phytophthora* blight and dieback, whereas ‘Lee’s Dark Purple’ had 3.8% disease incidence across all nurseries surveyed.

#### COMTF SPONSORED MEETINGS AND TRAININGS

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##### **Reserve your place at the “Sudden Oak Death: A Decade of Management**

**Challenges”** 2008 COMTF-wide annual meeting in San Rafael at the Marin Center, April 15 – 17, 2008. The meeting includes an afternoon field trip on 4/15, followed by an evening reception at a local brewery. The general session on 4/16 will focus on nursery, wildland, and regulatory updates as well as the latest management and research information available and challenges being faced, and on 4/17, the Nursery Committee (open meeting) half-day session will focus on nursery-related research, management and regulation issues. For more information, or to register by the 4/11 deadline, go to the Task Force website at [www.suddenoakdeath.org](http://www.suddenoakdeath.org).

##### **Free one-day COMTF Sudden Oak Death/*P. ramorum* Wildland Training Sessions**

will be offered this spring. The morning of each session will be indoors, discussing symptoms, regulations, treatment and management options, and research. The second half of the day will be in the field, where attendees will have the opportunity to engage in practical applications of the information discussed in the morning. The May 8<sup>th</sup> South Bay training session will be held at Thomas Fogarty Winery (see details in Calendar of Events). The North Bay training session date and location are pending. Additional details and registration information will be forthcoming. For questions on the South Bay training, contact Katie Palmieri at: [Palmieri@nature.berkeley.edu](mailto:Palmieri@nature.berkeley.edu) or (916) 435-3230. North Bay training questions should be directed to Janice Alexander at [jalexander@ucdavis.edu](mailto:jalexander@ucdavis.edu) or (415) 499-3041.

#### RESOURCES

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##### **A plant disease lesson on *P. ramorum* has been posted to the American**

Phytopathological Society Education Center website at <http://apsnet.org/education/LessonsPlantPath/SuddenOakDeath/default.htm>. The lesson, authored by Jennifer Parke and Sunny Lucas of Oregon State University, includes information on symptoms, pathogen biology, the disease cycle and epidemiology, disease



management, and its significance in the US, both to affected industries and natural ecosystems.

**A summary handout of the Homeowner's Guide has been posted to the Task Force website.** While similar to the Homeowner's Guide the summary handout is condensed and without pictures, making duplication of large quantities quicker and more cost effective. To access the summary sheet, go to [http://nature.berkeley.edu/comtf/pdf/Homeowner\\_handout\\_Feb2008.pdf](http://nature.berkeley.edu/comtf/pdf/Homeowner_handout_Feb2008.pdf).

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#### **VOLUNTEER REQUEST**

**University of North Carolina at Charlotte ecologists are looking for volunteers for field projects studying Sudden Oak Death in the Big Creek Reserve, Big Sur.** Work will include long days in the field, carrying supplies and water samples in steep terrain and assisting with water filtering procedures. Volunteers are tentatively needed March 8, 9, 10; March 22, 23, 24; March 31, April 1, 2; and April 5, 6, 7. Dates may vary depending upon weather. Volunteer housing will be provided at Big Creek. For more information, contact Alicia Ellis at 831-667-0604 or [alicia.m.ellis@gmail.com](mailto:alicia.m.ellis@gmail.com).

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#### **PERSONNEL**

**Greg Parra is currently the acting interim staff scientist working on *P. ramorum* for USDA's Center for Plant Health Science Technology.** USDA anticipates advertising for this position in April. In his regular duties Greg is a pest exclusion specialist working on international quarantine treatments. Greg can be reached at [greg.r.parra@aphis.usda.gov](mailto:greg.r.parra@aphis.usda.gov) or (919) 855-7548.

**Karin Tuxin has left her position with the Kelly Lab at UC Berkeley as the Geospatial Imaging & Informatics Facility (GIIF) Manager in order to take a position with Google Earth Outreach in Mountain View.** Karin designed and maintained the OakMapper database for the past 6 years. John Connors has taken over Karin's SOD GIS work. Prior to UC Berkeley, John worked in the Clark University Geography Department in Worcester, MA on land-use mapping and map comparison methods, specifically object-based and fuzzy classification. John can be reached at [jconnors@nature.berkeley.edu](mailto:jconnors@nature.berkeley.edu).

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#### **CALENDAR OF EVENTS**

**3/12 - Sudden Oak Death (SOD) Treatment Workshop; Tolman Hall "Portico," UC Berkeley Campus; 1 – 3 p.m.;** Pre-registration is required. This class is free. 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, contact Katie Palmieri at (510) 847-5482 or [palmieri@nature.berkeley.edu](mailto:palmieri@nature.berkeley.edu).

**3/14 – 2008 USDA FS Pacific Southwest Research Station Request for Proposals Deadline;** Proposals must be received by 4:00 p.m.; For more information, contact



Susan Frankel at [sfrankel@fs.fed.us](mailto:sfrankel@fs.fed.us) or go to <http://nature.berkeley.edu/comtf/pdf/PramRFP.2008.012308.pdf>.

- 4/9 - Sudden Oak Death (SOD) Treatment Workshop; Tolman Hall “Portico,” UC Berkeley Campus; 1 – 3 p.m.; Pre-registration is required. This class is free. For more information, see the 3/12 listing above.**
- 4/11 – Online Registration Deadline for “Sudden Oak Death: A Decade of Management Challenges” COMTF 2008 general meeting.** To register, go to the COMTF website at: [http://nature.berkeley.edu/comtf/html/comtf\\_2008\\_meeting.html](http://nature.berkeley.edu/comtf/html/comtf_2008_meeting.html); For more information, contact Janice Alexander at [jalexander@ucdavis.edu](mailto:jalexander@ucdavis.edu).
- 4/15 – 17 - “Sudden Oak Death: A Decade of Management Challenges” COMTF 2008 Meeting;** Marin Center Showcase Theatre; 10 Avenue of the Flags, San Rafael, CA 94903; 4/15 - half-day field trip and evening reception; 4/16 – general session; 4/17 - Nursery Committee Meeting (Friends Room, 10 Ave. of the Flags, San Rafael); Registration is required for ALL activities. To register, go to: [www.suddenoakdeath.org](http://www.suddenoakdeath.org). For questions, contact Janice Alexander at [jalexander@ucdavis.edu](mailto:jalexander@ucdavis.edu).
- 5/4 – Bringing Back the Natives Free Garden Tour; 3 Sudden Oak Death talks will be provided throughout the day.;** Registration is required in order to receive a guidebook, which contains garden addresses, maps, and directions. The Tour is expected to fill up, so register early at: [www.bringingbackthenatives.net](http://www.bringingbackthenatives.net).
- 5/8 – Free one-day COMTF Sudden Oak Death/*P. ramorum* Wildland Training Session;** Thomas Fogarty Winery; 19501 Skyline Blvd.; Woodside, CA 94062; More information will be forthcoming. For questions, contact Katie Palmieri at: [Palmieri@nature.berkeley.edu](mailto:Palmieri@nature.berkeley.edu) or (916) 435-3230.
- 5/14 - Sudden Oak Death (SOD) Treatment Workshop; Tolman Hall “Portico,” UC Berkeley Campus; 1 – 3 p.m.; Pre-registration is required. This class is free. For more information, see the 3/12 listing above.**
- 6/11 - Sudden Oak Death (SOD) Treatment Workshop; Tolman Hall “Portico,” UC Berkeley Campus; 1 – 3 p.m.; Pre-registration is required. This class is free. For more information, see the 3/12 listing above.**
- 7/9 - Sudden Oak Death (SOD) Treatment Workshop; Tolman Hall “Portico,” UC Berkeley Campus; 1 – 3 p.m.; Pre-registration is required. This class is free. For more information, see the 3/12 listing above.**