



CALIFORNIA OAK MORTALITY TASK FORCE REPORT JUNE 2006

MONITORING

***Phytophthora ramorum* was detected on dead tanoaks a few miles outside the Oregon quarantine area on Oregon State Parks and Rogue River-Siskiyou National Forest-administered lands near Brookings, OR.** This is the first find of *P. ramorum* on USDA Forest Service land in Oregon. Oregon Department of Forestry survey crews made the discovery while searching upstream from a stream baiting location found *P. ramorum*-positive last fall. State and Forest Service officials are planning to implement eradication treatments on several acres of land this summer. Treatments involve herbicide treatment of tanoak and cutting and burning of tanoak, myrtlewood (California bay laurel), huckleberry, and rhododendron. The infested area will be added to quarantined portions of Curry County, OR. Surveys will continue in the area to find any additional disease centers.

***P. ramorum* has been confirmed on California bay laurel in El Sobrante, Contra Costa County.** Pavel Svihra, emeritus advisor from Marin County, first notified county officials of the infestation after *Quercus agrifolia* tree samples he had taken were confirmed *P. ramorum*-positive via laboratory analysis. Follow-up samples of *Umbellularia californica* were taken from the site by county officials and submitted on 5/2/06 to CDFA for analysis. The CA bay laurel leaves were also found positive for *P. ramorum*. The site is in a residential neighborhood with homes surrounded by canyon live oak and CA bay laurel woodlands, on the top of a southwest facing ridge. This is a new location for SOD in northwestern Contra Costa County.

EDUCATION AND OUTREACH

The COMTF is sponsoring a free workshop “Forest Management in Western Sonoma County: Sudden Oak Death (*Phytophthora ramorum*) and Other Issues for Small Landowners” on Thursday, July 20, 2006. Registration is required for the day-long meeting that will be held from 10:30 am. – 4:30 p.m. in the Forum Room at the Guerneville Regional Library. Topics discussed will include pathogen and disease symptomology and diagnosis, treatment options, and wildland control projects. Management issues, including fuel loads, restoration, regulatory updates, best management practices, and research efforts will also be addressed. For more information, or to register, visit the COMTF website at: www.suddenoakdeath.org or contact Janice Alexander at: (415) 499-3041.

REGULATIONS

Based on new scientific findings that *P. ramorum* infects tanoak beyond the bark, and into the wood, the USDA Animal and Plant Health Inspection Service (APHIS) is considering an update to the *P. ramorum* federal quarantine. If revised, it is anticipated that the federal



order will likely prohibit the movement of unprocessed *Lithocarpus densiflorus* (tanoak) wood from areas quarantined for *P. ramorum*. The current regulation prohibits the movement of tanoak bark chips, forest stock, and mulch, while allowing movement of wood and wood products, such as firewood logs and lumber, by requiring a certification that the wood is free of bark.

RESEARCH

Surveys for *P. ramorum* along the west coast of Norway indicate the pathogen is more common than previously realized, according to Maria Herrero and colleagues at the Norwegian Institute for Agricultural and Environmental Research. The following is an excerpted summary from surveys in areas with climates similar to Cornwall, U.K. This information has been submitted to Plant Disease for publication.

In November 2002, we received a sample of *Rhododendron catawbiense* for diagnosis from the city of Bergen, along the west coast of Norway. *P. ramorum* was isolated from the wilted branches. After the first detection of *P. ramorum*, the Norwegian Food Safety Authority started a survey in 2003, and of 21 samples from 10 locations, two were positive. All rhododendron plants containing positive samples from both 2002 and 2003 had been imported the same year the disease was detected on them. The production of rhododendron in Norwegian nurseries is limited, and most rhododendrons marketed in the country are imported in spring from other European countries. The main sale of rhododendron occurs in spring, often before symptoms of *P. ramorum* are easy to observe.

In 2004, a total of 133 samples from 53 locations were analyzed. *P. ramorum* was found in 29 new locations. It was detected in 57 samples of rhododendron, one sample of *Pieris japonica*, and one of *Kalmia* sp. Symptoms on *Pieris* were similar to those on *Rhododendron*, with blighted twigs and leaf spots. On *Kalmia* sp., *P. ramorum* was isolated from small foliar spots. In no case were symptoms detected before June. In 2005, special efforts were directed towards detecting *P. ramorum* before the spring sale. Between January and May, 142 samples were analyzed (including plants from 45 import shipments), and 19 yielded positive (including 6 samples from 5 import shipments). In total, 370 samples from 74 nurseries were analyzed in 2005, and 97 were positive (all *Rhododendron*). A part of the samples that yielded positives in the summer and autumn came from import shipments or nurseries controlled earlier and found free from *P. ramorum*. As suggested previously, the pathogen is probably moving in trade as symptom-free plants and also likely in batches with few mildly infected plants that are difficult to detect when random control is carried out in large shipments. During 2005, *P. ramorum* was detected on well-established *Viburnum fragrans* and *Rhododendrons* in a private garden in Bergen. The *Viburnum* plants in this garden were heavily infected, with wilting of whole branches from the base to the top. The *Rhododendrons* in the same garden were apparently healthy, but after a careful inspection, twig dieback was observed on



several bushes. The pathogen was also found on established *Rhododendron* shrubs in four public greens in Bergen and two in Stavanger in southwestern Norway.

"Sudden Oak Death and *Phytophthora ramorum* risk for Special Status Vertebrates in California, Oregon, and Washington;" prepared by K. Fischer and L. Hadj-Chikh. Wildlife Conservation Society. Posted online at: <http://nature.berkeley.edu/comtf/html/conservation.html>.

This report used a series of models and predictions, including state GAP and wildlife-habitat relationship models, to display where the habitats of wildlife may be at risk of *P. ramorum* infection. The risk assessment encompassed all mammals, birds, reptiles, and amphibians native to California, Oregon, and Washington, with special status at the species, subspecies, or population level.

Balci, Y., Balci, S., Eggers, J., MacDonald, W.L., Juzwik, J., Long, R., and Gottschalk, K.W. 2006. First Report of *Phytophthora europaea* in Oak Forests in the Eastern and North-Central United States. DOI: 10.1094/PD-90-0827B. Page 827. Online at: <http://www.apsnet.org/pd/current/>.

The potential threat posed by the introduction of *P. ramorum*, coupled with the informational void that exists about *Phytophthora* species that occur in forest soils of the central and eastern U.S., provided the impetus for a multi-state soil survey of oak cover types. Research focused on sampling declining and non-declining oak sites in IL, IN, MD, MI, MN, OH, PA, WI, and WV to isolate and identify species of *Phytophthora*. The following is an abstract of one discovery from this study: the first find of *Phytophthora europaea* in the Eastern and North-Central US.

In 2003 and 2004, soils in oak forest ecosystems in nine central and eastern states of the United States were surveyed for *Phytophthora* spp. Soil samples were collected around healthy and symptomatic trees. Symptoms included dieback of branches, gaps in lateral branch systems, yellowing of foliage, wilting and clustering of leaves, and the presence of epicormic shoots. Soil subsamples were collected in each of the four cardinal directions and at a distance of 1 to 2 m from the base of a tree. The four subsamples were bulked to produce a sample of approximately 2,000 ml. In the laboratory, each sample was mixed thoroughly and a single 250-g subsample was flooded with 500 ml of distilled water and baited with *Quercus robur* leaflets for 3 to 5 days at 17 to 20°C. Discolored leaflets were examined microscopically (×200) and those with sporangia typical of *Phytophthora* spp. were plated on PARPNH selective medium (1).

Phytophthora europaea was recovered from soil samples collected from *Q. alba* in West Virginia, *Q. rubra* in Minnesota, West Virginia, and Wisconsin, *Q. phellos* in Ohio, and *Q. velutina* in Pennsylvania. Cultures were identified as *P. europaea* by their morphological, physiological, and molecular characteristics (4). Average dimensions of nine isolates were determined. Oogonia were 40 ±



3.9 μm in diameter and often had few bullet protuberances and tapered bases; oospores mostly filled the oogonia and averaged $36 \pm 3.7 \mu\text{m}$; sporangia dimensions averaged $42 \pm 6.1 \times 30 \pm 4.1 \mu\text{m}$ with a length/width ratio of 1:4. Isolates produced larger oogonia and oospores but had similar sporangia length/width ratios comparable to the species description (4). Growth optimum (5.8 to 6.9 mm day^{-1}) on V8 juice agar (V8A) occurred at 25°C . On potato dextrose agar, colonies produced dense, felt-like mycelia, often with a central mound of aerial hyphae. DNA also was extracted from eight representative isolates and the internal transcribed spacer (ITS) region of rDNA from each isolate was amplified and sequenced. ITS sequences were identical to those of *P. europaea* in the NCBI GenBank database (Accession No. DQ313222). Pathogenicity of six isolates (one from each site) was confirmed by wounding stems of 2-year-old *Q. alba*, *Q. rubra*, and *Q. velutina* seedlings and inoculating wounds with V8A plugs (6 mm) containing mycelia; V8A plugs without mycelia were used for controls. Two months after inoculation, *P. europaea* was reisolated on PARPNH medium from advancing lesions on all inoculated seedlings but was not isolated from control plants. Mean lesion lengths on seedlings inoculated with *P. europaea* were significantly greater ($P < 0.05$) than those on control plants; lesions averaged 0.46 cm on *Q. alba*, 1.38 cm on *Q. rubra*, and 1.01 cm on *Q. velutina*. Previously, *P. europaea* only was reported from oak trees and soil in forests of Austria, France, and Germany (1–4). These findings extend the current distribution of *P. europaea* and raise questions about its origin and role in the health of oak forests in eastern and north-central United States. *Q. alba*, *Q. phellos*, *Q. rubra*, and *Q. velutina* are new host associations for *P. europaea*.

Dick, Margaret A., Dobbie, Kiryn, Cooke, David E. L., Brasier, Clive M. 2006. *Phytophthora captiosa* sp. nov. and *P. fallax* sp. nov. causing crown dieback of *Eucalyptus* in New Zealand. Mycological Research 110:393-404. Available online at: www.sciencedirect.com.

This paper discusses the possible geographic origins of two previously unknown aerial *Phytophthora* species that have been identified in association with a locally severe crown disease of exotic plantation *Eucalyptus* trees in New Zealand. These *Phytophthora* are described and formally designated here as *P. captiosa*, from *Eucalyptus botryoides* and *E. saligna*; and *P. fallax*, from *E. delegatensis*, *E. fastigata*, *E. nitens* and *E. regnans*.

Linderman, Robert G. and E. Anne Davis. 2006. Survival of *Phytophthora ramorum* compared to other species of *Phytophthora* in potting media components, compost, and soil. HortTechnology 16(3):502-507.

Abstract: *Phytophthora ramorum*, while thought to be primarily an above-ground pathogen, can be introduced into soilless potting media in the nursery industry as sporangia or chlamydospores and remain undetected while disseminated geographically. Inoculum of this pathogen, both North American (A-2 mating type) and European (A-1 mating type) isolates, was used to infest



potting media components or soil, using either sporangia, chlamydo-spores produced in vermiculite culture, or dry infected rhododendron (*Rhododendron* sp. 'Nova Zembla') leaf pieces. Vermiculite chlamydo-spore/oospore inoculum of *P. citricola*, *P. cactorum*, and *P. citrophthora* were included for comparison. Survival was determined monthly by leaf disc baiting or direct plating on selective medium. Results indicated that *P. ramorum* survived in most media components or soil for up to 6 months when introduced as sporangia, or up to 12 months as chlamydo-spores. However, it was not detected at all from infected rhododendron leaf pieces by either detection method. These results show that *P. ramorum* can survive in potting media if introduced as sporangia or chlamydo-spores, and accordingly the pathogen could be disseminated geographically without being detected visually.

LEGISLATION

Passed by the House of Representatives on May 23, 2006, the Agriculture Appropriations Bill included \$7.73 million for Sudden Oak Death. Funds were earmarked for research and control, with \$6.5 million to USDA APHIS and \$1.2 million to the USDA Agricultural Research Service. The Senate is expected to consider the Bill later this month.

NURSERIES

Six California nurseries were identified as *P. ramorum*-positive in May, bringing the State's 2006 total number of positive nurseries to 18. The first confirmation came from a Humboldt County retail nursery, confirmed positive on 5/1, that does not ship out of the quarantined area. After self-reporting symptomatic material, samples were collected by county officials and then submitted to the California Department of Food and Agriculture (CDFA) lab. *Viburnum tinus* was identified as *P. ramorum*-positive. A second confirmation was made at a Marin County retail nursery on 5/2. Samples were collected as part of a nursery stock cleanliness inspection. *P. ramorum*-positive plants included: *Camellia sasanqua* 'Setsugekka,' *Camellia japonica* 'Mathotiana Supreme,' and *Camellia japonica* 'Colonel Firey.' The nursery, also found positive in 2003 and 2004, is not under a compliance agreement and does not ship intra- or interstate. A third identified nursery was a Mendocino County production facility found *P. ramorum*-positive on 5/8. Samples were collected as part of an annual compliance agreement inspection. All positive samples were *Rhododendron*; the nursery does not ship interstate. A fourth *P. ramorum*-positive nursery, identified in Los Angeles County, was found to have a positive *Laurus nobilis* on 5/15. Samples were taken at the production facility as part of a compliance agreement inspection. The nursery does ship interstate, and the compliance agreement has been suspended. The fifth CA nursery found positive in May was a Tulare County production facility. Samples taken during an annual compliance agreement inspection yielded a *P. ramorum*-positive *Camellia japonica* 'Kramer's Supreme.' The nursery does not ship interstate. The final CA nursery confirmation was made at a Santa Clara County production nursery on



5/30. The positive *Magnolia grandiflora* sample was collected during an annual compliance agreement inspection. This is the first detection of *P. ramorum* on *Magnolia grandiflora* in a US nursery. The nursery does ship interstate, and was also found *P. ramorum*-positive in 2005.

KUDOS

The Arcata Field Office of the Bureau of Land Management (BLM) has been conducting *P. ramorum* monitoring of the Mattole Watershed for nearly two years. Recently, students, teachers, and parents from Honeydew Elementary, Triple Junction High, and the Whale Gulch schools met with BLM staff at stream baiting sites in the King Range National Conservation Area. School volunteers learned basic pathogen information, as well as about the threat of *P. ramorum* to the local area and the importance of tanoak to their communities and local ecology. They assisted the BLM staff in water-trap retrieval and site data collection, as well as how to help with disease detection and what measures they can take to help prevent pathogen spread. BLM staff is planning to offer a follow-up field trip to an infested site this summer, where students can observe the impact of Sudden Oak Death in southern Humboldt County, as well as practice proper sanitation techniques and learn about various treatment methods being used to help slow the spread of *P. ramorum*. The project is being carried out in cooperation with the Humboldt County Agriculture Department and the University of California Cooperative Extension. For more information, contact Jeanne McFarland, BLM, at: (707) 825-2332 or jeanne_mcfarland@ca.blm.gov.

MANAGEMENT

The Government Accountability Office's (GAO) report, "Invasive Forest Pests: Lessons Learned from Three Recent Infestations May Aid in Managing Future Efforts," (GAO-06-353, April 2006) has been published. The report evaluates the federal response to three invasive forest pests: Asian longhorned beetle, emerald ash borer, and *P. ramorum*. Recommendations to the Secretary of Agriculture included: expanding efforts to monitor forest health conditions to include urban areas, regularly updating and publishing management plans for pests that include status information and funding needs, and implementing written procedures that broadly define when and how to operate science panels for specific pests.

The report will be discussed June 21 at a Congressional Forest Health Subcommittee meeting hearing in Washington D.C. COMTF Chairman Mark Stanley will be testifying on lessons learned from addressing Sudden Oak Death in California.

To access the report, as well as highlights and the abstract, go to the GAO website at:

<http://searching.gao.gov/query.html?col=+&qt=+sudden+oak+death&charset=i>



[so-8859-1&q1](#). Additionally, a related report, "Homeland Security: Management and Coordination Problems Increase the Vulnerability of U.S. Agriculture to Foreign Pests and Disease (GAO-06-644)," posted May 19, 2006, is also available at the site.

RESOURCES

Goheen, E.M., Hansen, E., Kanaskie, A., Osterbauer, N., Parke, J. Pscheidt, J., Chastagner, G. April 2006. Sudden Oak Death and *Phytophthora ramorum*: A Guide for Forest Managers, Christmas Tree Growers, and Forest Tree Nursery Operators in Oregon and Washington. Oregon State University Extension Service, EM8877. 16 pgs. This publication can be found online at: <http://extension.oregonstate.edu/catalog/pdf/em/em8877.pdf>.

PERSONNEL

The University of California, Cooperative Extension Office in Marin County hired Deborah Zierten for a summer intern position. Under the direction of Janice Alexander, COMTF Educational Outreach Coordinator, Deborah's primary duty will be to update the Task Force website. Time permitting, she will also be assisting with the development of the Sudden Oak Death Science Symposium III website as well as other educational outreach materials. Deborah can be reached at: (415) 499-3281 or via email at: dlzieren@ucdavis.edu. For suggested improvements to www.suddenaokdeath.org, contact Janice Alexander at: JAlexander@ucdavis.edu.

The Canadian Forest Service (CFS), Pacific Forestry Center, in cooperation with the Canadian Food Inspection Agency (CFIA), has hired Marianne Elliott for a two-year position to analyze the potential for biocontrol of *P. ramorum*. One goal of the two-part project will include examining a large collection of *P. ramorum* isolates from the US, Europe, and Canada, and screening for those that might contain dsRNA viruses or other cytoplasmic elements. This research is being conducted in conjunction with the CFIA plant virology group in Sidney, BC. The second component of the project involves screening and testing chemical fungicides and biocontrol agents on *P. ramorum*-infected leaves of several plant hosts common in BC nurseries, landscapes, and forests. A subset of the isolates from the first study covering a range of pathogenicity, and from both mating types, will be used. It is hoped that the results of these studies will provide information on factors that affect pathogenicity in *P. ramorum* and methods for screening large numbers of control agents for managing the disease. The Principal Investigators for the project are Simon Shamoun, CFS, and Delano James and Saad Masri, CFIA. For more information on the project, contact Marianne Elliott at: (250) 363-0715 or via email at: melliott@pfc.cfs.nrcan.gc.ca.

**CALENDAR OF EVENTS**

7/20 – Free “Forest Management in Western Sonoma County: Sudden Oak Death (*Phytophthora ramorum*) and Other Issues for Small Landowners” workshop; 10:30 am. – 4:30 p.m.; Forum Room, Guerneville Regional Library; 14107 Armstrong Woods Rd., Guerneville, CA 95446; Registration is required.; For more information, or to register, visit the COMTF website at: www.suddenoakdeath.org or contact Janice Alexander at: (415) 499-3041 or JAlexander@ucdavis.edu.

10/9 – 12 – 6th California Oak Symposium, titled “California’s oaks: Today’s challenges, tomorrow’s opportunities;” The conference features a field trip and two indoor sessions on Sudden Oak Death, and is intended for academics, planners, conservation practitioners, foresters, arborists, land owners, and oak enthusiasts. For more information, visit the Symposium website at: <http://danr.ucop.edu/ihrmp/symposium.html>.