CALIFORNIA
OAK MORTALITY TASK FORCE

Sudden Oak Death and *Phytophthora ramorum*

2009
Summary Report

A Compendium of Monthly Newsletters

Katie Palmieri, California Oak Mortality Task Force
US Forest Service, Pacific Southwest Research Station
UC Berkeley Center for Forestry

Janice Alexander, UC Cooperative Extension, Marin County

Chris Lee, UC Cooperative Extension, Humboldt/Del Norte Counties

Susan J. Frankel, Sudden Oak Death Research Program Manager
US Forest Service, Pacific Southwest Research Station, Albany

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2009 SIGNIFICANT EVENTS

- Six streams outside of nurseries are found *Phytophthora ramorum* positive in five states: WA(1), MS(1), AL(2), GA(1), and FL(1). All confirmed locations have had more than one positive detection in 2009.

- *P. ramorum* is detected in 6 landscapes and 1 nursery perimeter. Washington has 3 trace-forward landscape detections and 1 nursery perimeter detection. The perimeter detection is the first documented case of the pathogen escaping a nursery and moving into a local environment. Maryland, Pennsylvania, and South Carolina each have 1 trace-forward landscape detection.

- In U.S. nurseries, *P. ramorum* is detected in 9 states at 26 sites. Positive nursery detections by state include: CA(4), OR(6), WA(6), AL(3), GA(2), MS(1), NJ(1), NC(2), and SC(1).

- Ten new hosts are added to the federal list of regulated hosts: *Cornus kousa*, *Choisya ternate*, *Daphniphyllum glaucescens*, *Ilex aquifolium*, *Lithocarpus glaber*, *Magnolia cavalieri*, *Magnolia foveolata*, *Ribes laurifolium*, *Vaccinium myrtillus*, and *Vaccinium vitis-idaea*.

- Camfor tree (*Cinnamomum camphora*) is found *P. ramorum*-positive for the first time in the US at a Sacramento County, CA nursery.

- *P. ramorum* is found in a McKinleyville (Humboldt County) stream for the fourth year. The inoculum source has not yet been found.

- Japanese larch (*Larix kaempferi*), western hemlock (*Tsuga heterophylla*), and birch (*Betula pendula*) are reported as new *P. ramorum* hosts in the UK. The pathogen is found infecting both foliage and bark of larch. Beech, birch, oak, and Western hemlock are found with bole cankers. Some of the sites have little or no rhododendron. Prior to these findings, tree infection in the UK has only been identified in relatively close proximity to infected rhododendron.

- EU1 is now the most commonly identified lineage in Washington. In four of the five sites where the EU1 lineage occurred, the NA1 lineage was also detected at the same time.

- *P. ramorum* is confirmed in MacKerricher State Park, 3 miles north of Fort Bragg in Mendocino County, and approximately 40 miles south of the nearest known positive

site in Humboldt County. MacKerricher is now the northernmost location within Mendocino County from which the pathogen has been isolated.

NURSERIES

A Nursery in Cumming, Forsyth County, GA was found to have *P. ramorum*-positive *Viburnum* on 12/16/08. Additional *P. ramorum*-positive leaves (five separate species) were confirmed 1/6/09. The leaves were from a collection of leaf litter. (2/09)

WA State had two *P. ramorum*-positive residential landscape finds confirmed on 1/9/09. One site was in Olympia, Thurston County, and the other was in Bremerton, Kitsap County. The positive plants found at both locations were *Rhododendrons*. (2/09)

As part of the regulatory program for *P. ramorum* in CA, 1,267 nurseries were surveyed in 2008, of which 618 contained host material. Thirteen inspected sites did contain *P. ramorum*-positive samples. At the 13 positive nurseries, infested material included: 41 *Camellia* sp.; 2 *Leucothoe fontanesiana*; 2 *Loropetalum* sp.; 2 *Michelia* sp.; 4 *Pieris japonica*; 9 *Rhododendron* sp.; and 4 soil. (2/09)

Washington State Department of Agriculture (WSDA) Plant Services Specialists inspected 320 production nurseries and 538 retail nurseries, and processed 19,965 samples for *P. ramorum* in 2008. Five of the nurseries inspected were placed under USDA Emergency Action Notification for the pathogen, and one of the nurseries was a repeat positive.

One wholesale nursery in King County, WA and another in Clark County, WA each had a single PCR positive sample found during 2008 inspections; however, symptomatic plants were not found during a second inspection at either facility. Consequently, neither fell under USDA regulation due to the new Potentially Actionable Suspect Sample protocol. (2/09)

The Canadian Food Inspection Agency (CFIA) 2008 National Survey for *P. ramorum* included approximately 10,300 samples from 262 nursery locations throughout Canada. One hundred and forty-seven locations in British Columbia were sampled, which represents the majority of nurseries importing plant material. The pathogen was detected in plants at six nurseries in the greater Vancouver and Victoria areas. (2/09)

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(CDFA), Washington State Nursery and Landscape Association, WSDA, and USDA APHIS to review the Oregon Grower Assisted Inspection Program (GAIP). 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. (3/09)

A Sacramento County, CA nursery was found *P. ramorum*-positive in March while undergoing Confirmed Nursery Protocol (CNP) inspections as a result of a positive find for the pathogen in the fall of 2008. Several plants were found *P. ramorum* positive during the inspections, including *Cinnamomum camphora* (camphor tree). This is the first time this host has been detected in the Unites States. (4/09)

A CA production nursery in Contra Costa County was found infested with *P. ramorum* infected *Leucothoe fontanesiana* on 4/22. The nursery was also found positive in 2004 and ships interstate. (5/09)

A Lane County OR production nursery was confirmed to have *P. ramorum*-positive *Camellia* sp. on 4/23. The nursery was also found *P. ramorum* positive in 2006. (5/09)

Three WA nurseries were found to have *P. ramorum*-positive plants in May. On 5/1 a Snohomish County small rhododendron production nursery was found with *P. ramorum* infected *Rhododendron* spp. The nursery ships rhododendrons interstate and internationally, primarily via mail order sales. A second nursery in Pierce County was found to have *P. ramorum*-positive *Rhododendron* on 5/6. This retail nursery was also found positive for the pathogen in 2004. It does not ship interstate. The third infested nursery was a production facility in Clark County found on 5/6 with *P. ramorum*-positive *Rhododendron* sp. The nursery was also positive for *P. ramorum* in 2008. The nursery does ship interstate. (6/09)

A Fulton County, GA retail nursery was confirmed to have *P. ramorum*-positive *Rhododendron* on 5/14. This is the first time this nursery has been found positive for the pathogen. (6/09)

A Mecklenburg County, NC retail nursery was confirmed to have *P. ramorum*-positive *Pieris japonica* and *Kalmia latifolia* on 5/22. The nursery was found positive in 2008. (6/09)

A Greenville County, SC retail nursery was confirmed to have *P. ramorum*-positive *Pieris* on 5/15. The nursery was found positive in 2008 as part of a trace-forward investigation from the Mecklenburg County, NC 2008 nursery confirmation. (6/09)

As of 5/15/09, the ODA has surveyed 212 nursery grower sites for *P. ramorum*. So far, the pathogen has been detected at four sites, two in Washington County, one in Clackamas County, and one in Lane County. At the first Washington County nursery, the pathogen was initially detected twice on *Pieris japonica* and, during delimitation, in a third block of *P. japonica* and in the potting media associated with an infected plant. At the second Washington County nursery, *P. ramorum* was initially detected on *Pieris* and, during delimitation, in the soil. This was the fourth consecutive year *P. ramorum* was detected at this site. Initially, *P. ramorum* was detected on *P. japonica* at the Clackamas County site and twice on *Camellia* at the Lane County site. So far, additional positives have been detected in *Rhododendron* at the Lane County site. To date, cultures have been recovered from every *P. ramorum*-positive sample found. (6/09)

A Sacramento, CA production nursery was found to have *P. ramorum*-positive *Camellia* *japonica* and *Arctostaphylos* on 6/26. This nursery does ship host and associated host plants interstate. (7/09)

An Alameda County, CA retail nursery was found to have *P. ramorum*-positive *Rhododendron* on 5/26. (7/09)

A Kitsap County, WA residential landscape site was found to have *P. ramorum*-positive *Rhododendron* on 6/10 as part of a trace-forward investigation from an infested wholesale/production nursery in Thurston County, WA. (7/09)

A King County, WA production nursery was confirmed to have *P. ramorum*-positive *Rhododendron* on 6/23. The nursery was also found positive in 2006, 2007, and 2008. (7/09)

A Greenville County, SC residential landscape site was confirmed to have a *P.* *ramorum*-positive *Rhododendron* on 6/25. The detection was made as a result of a trace-forward inspection of plants received from an infested nursery in Snohomish County, WA. (7/09)

A Pierce County, WA retail nursery was found with two *P. ramorum*-positive *Rhododendron* cultivars in May and June, 2009. The nursery was also found positive in 2003 with two cultivars of *Camellia,* and in 2004 with 14 cultivars of *Camellia* and *Rhododendron*. A perimeter survey was conducted and several salal (*Gaultheria shallon*) plants in one colony were found to be *P. ramorum*-positive on a bank outside the nursery on county land. Water from the infested nursery area drains into the native salal stand. This is a documented incident of *P. ramorum* moving out of an infested nursery and causing disease outside the nursery. (8/09)

On 7/1 a Transylvania County, NC retail nursery was found to have *P. ramorum*- infected *Rhododendron*. (8/09)

***P. ramorum* was detected at a small Clackamas County retail nursery in mid-July on** a *Rhododendron* and *Viburnum tinus*. (8/09)

CDFA and County Agricultural Commissioners welcomed representatives from the National Plant Board, USDA, and California Association of Nurseries and Garden Centers (CANGC) on 7/13 to witness the State's implementation of the federal domestic quarantine restrictions for Light Brown Apple Moth (LBAM) and *P. ramorum* at nurseries in California that ship interstate. (8/09)

As of 9/18 ODA has tested 24,189 samples from 583 grower sites in 2009, and identified six *P. ramorum*-positive nurseries. High-risk surveys are also being conducted at nurseries that grow and ship *Rhododendron* and *Camellia*. As of 9/18, the Department has tested 2,853 samples from 143 grower sites. All samples have been negative for *P. ramorum*. (10/09)

A Montgomery County, MD residence was identified on 9/18 as having a *P. ramorum*-positive witch hazel (*Hamamelis intermedia* 'Jelena') plant as a result of a trace-forward investigation from a Lane County, Oregon nursery found *P. ramorum*-positive in April 2009. (11/09)

Two Shelby County, AL nurseries were confirmed *P. ramorum*-positive on 12/1. One of the sites is a retail nursery/garden shop found to have infected *Pieris japonica* and *Camellia* sp. The nursery was previously inspected in June and July of 2009, at which time water samples were taken and confirmed positive for the pathogen. This nursery was previously found positive for *P. ramorum* in 2004 and 2006. The other site was a retail nursery, which was previously inspected in July 2009. At the time, water within the nursery was confirmed positive for the pathogen. (12/09)

A ribbon-cutting ceremony for the National Ornamentals Research Site at Dominican University of California (NORS-DUC) in San Rafael, California, was held 10/26. Representatives of Congresswoman Woolsey, Senator Feinstein, and CA Assemblyman Jared Huffman presented proclamations, and Joseph Fink, Dominican University President, congratulated all parties on the establishment of this first national US nursery site for invasive species research. (12/09)

REGULATIONS

APHIS will be adding *Choisya ternate* (Mexican orange) and *Ribes laurifolium* to the federally regulated list of *P. ramorum* associated hosts. The newly identified hosts were found at a United Kingdom (UK) nursery in February 2008 with foliar dieback symptoms. (2/09)

The CFIA has completed a new risk assessment for *P. ramorum*. The principal conclusions are that the disease is unlikely to become established in the Canadian environment, with the exception of south coastal British Columbia, where the risk remains medium. The pathogen will remain a quarantine pest for Canada. (2/09)

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 6/08. (3/09)

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 5/08 by the CFIA. Symptoms include leaf spots and necrosis as well as stem dieback. (3/09)

USDA APHIS National Quality Assurance and Program and Planning will hold a *P.* *ramorum* Quality Assurance Program Review: Industry Focus Discussion at the Fourth SOD Science Symposium on 6/17. The objective of the meeting is to provide a brief overview of the federal *P. ramorum* program quality assurance review. Discussions will also explore how

the regulatory program works for the various impacted industries and user groups, how it affects those parties, and how some processes might be improved. (6/09)

USDA APHIS and the Center for Plant Health Science Technology (CPHST) are holding a *P. ramorum* Program Technical Review on 6/15 at the Fourth SOD Science Symposium. The objective of the meeting is to initiate discussions about the scientific integrity of current nursery regulations based on the best available science. (6/09)

Israel has included *P. ramorum* in its 2009 "Plant Import Regulations," which can be found at http://www.ppis.moag.gov.il/NR/rdonlyres/BFAAC1EB-EBBC-430D-BD31-D92401EA691B/0/PlantImportRegulations2009UnofficialTranslation.pdf. (6/09)

SC implemented state regulations on 6/3/09 regarding the importation of *P. ramorum* host plants into the state from CA, OR, and WA nurseries. As of 6/26, any *P. ramorum* host, associated host, or other regulated article moving into SC from any area regulated for the pathogen must be accompanied by a state phytosanitary certificate. In addition, prior notification of movement of *P. ramorum* host and associated plant material is required at least 24 hours prior to scheduled shipment arrival. (7/09)

A Federal Order prohibiting all countries from importing *Alnus* spp. (alder) plants for planting (excluding seed) into the US was issued on 6/22 by APHIS because they are hosts of *Phytophthora alni*. *P. alni* is a destructive plant pathogen that seriously affects and leads to the death of plants in its host genus, *Alnus* Mill, and it is rapidly spreading through European riparian environments, possibly through the movement of plants for planting. Implementation of the Federal Order will begin 7/6, and will remain in effect until a pest risk analysis has been completed and effective mitigation measures have been established. (7/09)

APHIS posted a new proposed rule online in July to establish the new "plants for planting" import category (plants whose importation is not authorized pending pest risk analysis). Comments are due by 10/21/09. (9/09)

USDA APHIS PPQ will conduct a comprehensive review of the *P. ramorum* federal program during the first quarter of the 2010 fiscal year. The purpose of the review is to openly exchange ideas and perspectives on federal and state efforts to regulate *P. ramorum.* (10/09)

The APHIS Official Regulatory Protocol for *Phytophthora ramorum* Detections in Residential or Landscaped Commercial Settings has been updated. The new "Confirmed Residential Protocol: Version 2.0," revised 9/1/09, has been posted to the APHIS website at http://www.aphis.usda.gov/plant_health/plant_pest_info/pram/downloads/pdf_files/residential-protocol-final%20.pdf. (10/09)

MONITORING

Follow-up survey efforts regarding the *P. ramorum*-positive MS nursery and ditch finds in 2008 are still underway. 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. (3/09)

The 2009 USDA FS *P. ramorum* National Wildland Survey will include 17 states. This year's survey protocols will be identical to those in 2008. 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. (3/09)

A rhododendron leaf bait deployed in 12/08 in a Gadsden County, FL stream (outside a previously confirmed positive retail nursery) has been found positive. The nursery had most recently been confirmed positive in 2/08 from soil and water samples. (4/09)

The UK confirmed the first case of *P. ramorum* on European blueberry (*Vaccinium myrtillus*) in February. The small patch of the infested blueberry was found in a mixed deciduous woodland with *P. ramorum*-infected *Rhododendron ponticum*. Symptoms are the same as those of *P. kernoviae* on European blueberry. APHIS is reviewing the findings and anticipates adding this newly identified host to the federally regulated list of *P. ramorum* hosts. (4/09)

***P. ramorum* has once again been confirmed in McKinleyville's Mill Creek** (Humboldt County). This is the fourth year the pathogen has been recovered from McKinleyville streams with no obvious symptomatic hosts (the second year for Mill Creek). Of the two streams from which the pathogen has been recovered, Widow White Creek drains directly into the ocean, while Mill Creek drains into the Mad River a short distance from the ocean. Both streams primarily drain developed residential areas. (5/09)

The NV Department of Agriculture's "Sudden Oak Death Pathogen (*P. ramorum*) Survey in Nevada Forest Environments: a Five-Year Summary" has been released. The annual survey, conducted from 2004 – 2008, was based on plant distribution in major NV forest environments. Areas sampled were considered high-risk because of their proximity to nurseries and/or residential areas. All samples were negative for *P. ramorum*; however, results did identify *Phytophthora cactorum* and *P. citricola* on maple trees and other tree species from urban forest samples. (5/09)

A Forsyth County, GA nursery was found to have a *P. ramorum*-positive plant in 12/08. Follow-up surveys conducted from 12/08 to 3/09 detected the pathogen from multiple sample types collected inside the nursery, as well as an off-site positive obtained by filtration of

water draining from the nursery. As part of the National *P. ramorum* Early Detection Survey of Forests effort in GA, rhododendron leaf baiting was initiated in 1/09. *P. ramorum*-positive findings were obtained in 2/09 from a nearby lake. The lake is used to irrigate the positive nursery as well as an adjacent woody ornamental nursery (not known to be *P. ramorum*-positive) and an adjacent subdivision (not known to be *P. ramorum*-positive). A stream draining the lake, nurseries, and subdivision was also found positive just downstream from the nurseries in March, April, and May. Additional positives were obtained in April from one of two streams feeding the lake. March survey efforts of the vegetation along the stream draining the lake were all negative. (6/09)

To date, the 2009 National Survey has identified six stream baiting positives in water outside of nurseries in five states: WA (1), MS (1), AL (2), GA (1), and FL (1). All confirmed locations have had more than one positive survey this year. All vegetation samples collected so far in 2009 from an environs survey outside the MS nursery have been negative for the pathogen after multiple positives in 2008. (6/09)

***P. ramorum* has been confirmed in MacKerricher State Park, 3 miles north of Fort** Bragg in Mendocino County, and approximately 40 miles south of the nearest known positive site in Humboldt County. The MacKerricher site is now the northernmost location within Mendocino County from which the pathogen has been isolated.

Laboratory confirmation was based on samples taken from a stem canker on a living tanoak and a sprout canker growing from the base of a dead tanoak. Surveys have yielded the discovery of 13 dead, and eight symptomatic, tanoak within Pinewood Campground. The original source of inoculum is not known. CA bay laurel is not found within or adjacent to the infested campground area. (8/09)

Another Mendocino County watershed has been confirmed *P. ramorum* positive. At the far eastern reaches of Big River, a hillside above the Orr Hot Springs resort has been found to have infected CA bay laurel and tanoak. The immediate area drains into the South Fork Big River. From an early July investigation conducted by Cal Fire, eight red-crowned tanoaks were symptomatic, and several more dead trees were noted in the area. This new find is 11 miles due north from one of the earliest confirmed Mendocino County infestations found off Peachland Road in the Indian Creek drainage north of Boonville in 2002. (9/09)

The USDA FS, Forest Health Protection (FHP) SOD 2009 aerial survey indicates that current SOD mortality rates are reduced. The first flights included Marin, Napa, and Sonoma Counties; parts of Solano County; and Lake and Mendocino Counties. Approximately 6,000 acres of mortality were mapped in these counties. Mortality for tanoak and coast live oak was relatively low, and the number of dead trees per acre has greatly diminished. The north and central coast aerial surveys, including Mendocino, Humboldt, Del Norte, Monterey, Santa Cruz, Santa Clara, and San Mateo Counties also detected less mortality than in previous years. The decreased levels of mortality are attributed to the weather patterns over the last couple of years, which have been relatively dry. (9/09)

A meeting to develop a community-based monitoring program for invasive *Phytophthora* species in western WA streams was held in September at Washington State

University, Puyallup. Outcomes of the meeting included connecting with Pierce College, Puyallup and University of Washington, Tacoma educators who are interested in the educational aspects of stream monitoring and the potential for student projects, as well as with volunteer groups, such as Friends of Clarks Creek and Master Gardeners, that are willing to help monitor streams. Consequently, a pilot study consisting of one or two watersheds is being planned. (9/09)

The Oregon Department of Forestry has found 41 new *P. ramorum* infestations in Curry County to date in 2009, for a total of 85 dead trees within 14 acres, resulting in 31 treatment areas over 230 acres. The new sites are within the known infested area, are small in size, and have very few infected trees; however, several of the sites are along the west and northwest edge of the infestation.

One of the more high-profile sites identified is on USDA FS land near the Chetco River. The positive tanoak is located in the understory of a mature coast redwood/Douglas-fir stand adjacent to the very popular Redwood Nature Trail that loops through the area. The trail is used throughout the year and is connected to Loeb State Park on the Chetco River via a riverfront trail. As a result of the find, the trail was officially closed to the public to reduce the risk of pathogen spread along the river trail and into Loeb State Park.

Additional sampling of host vegetation near the confirmed tanoak was conducted; no other infected plants were found. The area is Late Successional Reserve, marbled murrelet habitat, northern spotted owl habitat, and incorporates a stream (non-fish-bearing) that flows into the Chetco River. The trail will remain closed throughout the time treatment is occurring and until information from post-treatment monitoring of soil and vegetation indicates low risk of pathogen spread. (10/09)

***P. ramorum* has been detected in a new watershed in Humboldt County. The pathogen** was found on symptomatic *Rhododendron* leaf baits deployed in May in Blue Slide Creek, a tributary to the Mattole River with headwaters approximately 9 km northwest of the community of Redway. Blue Slide Creek is located at the southwestern boundary of the watershed; adjacent creeks that flow to the South Fork Eel River have been known to be infested for some time. Portions of the Mattole River watershed, which encompasses concentrations of small, private parcels as well as eastern sides of the 68,000-acre King Range National Conservation Area, contain very dense stands of both California bay laurel and tanoak, making spread of *P. ramorum* a major regional concern. No infected vegetation has been found to date. (11/09)

The 2009 *P. ramorum* Survey for the Northern Sierra Nevada was completed in September. The stream-based *P. ramorum* detection survey was conducted in Butte, Yuba, Nevada, Placer, and El Dorado Counties in northern CA. A total of 20 watercourse sites were surveyed during May and June using rhododendron leaves as bait for *Phytophthora* spp. The pathogen was not detected in any of the samples. (11/09)

MANAGEMENT

The UK will provide £25 million over five years to help contain and eradicate *P.* *ramorum* and *P. kernoviae* in historic gardens, woodlands, heathlands and from nurseries

and retailers in England and Wales. The program will focus on disease management, education and awareness, and research and development. Activities will be reviewed after three years to analyze successes and plan future strategies. Funding for the program will begin April 1, 2009. (4/09)

The Marin County Department of Public Works, Road Maintenance Division is currently dedicating a substantial amount of resources toward hazard tree removals, particularly in West Marin. Currently the department commits one day a week to SOD tree removals. It is estimated that approximately $90,000 has been spent by the county to remove nearly 100 trees so far this calendar year. (6/09)

Clorox® Regular-Bleach (EPA Reg. No. 5813-50) was officially registered for use against *P. ramorum* in California forests by the California Department of Pesticide Regulation on 8/5/09. The label states, "When used as directed, this product is effective in controlling the spread of the invasive pathogen *Phytophthora ramorum* in forests. *P. ramorum* causes a fatal canker disease of several tree species and damages many other plant species. Water is commonly drafted from streams and fire ponds within forested areas to use in dust abatement on forest roads, equipment cleaning and fire suppression. The use of infested water sources can spread *P. ramorum* to uninfested areas. Treating water prior to use helps control the spread of this pathogen. Directions for use: Add 1 gallon of this product to 1000 gallons (~50 ppm available chlorine) of drafted water. Prepare the mixture at least 5 minutes prior to application for dust abatement, fire suppression, and cleaning vehicles and logging, road building, and maintenance equipment." (9/09)

WSDA is working with the APHIS and the Forest Service (FS), as well as the State Department of Natural Resources and Pierce County, to mitigate the impacts of the previously identified *P. ramorum*-positive salal plants in a native landscape adjacent to a Pierce County retail nursery. The response will include remounting drainage ditches where the landscape finds were made and lining them with rock. The infected salal plants have been killed with herbicide, and the debris cleaned out of the ditches. (10/09)

In a collaborative effort, California State Parks (CSP) and the California Department of Forestry and Fire Protection (CalFire) are removing infected and symptomatic tanoaks from MacKerricher State Park campground. The project is a proactive and precautionary measure intended to help reduce the spread of SOD in the area, particularly before the wet season begins. The Park infestation was first identified in spring 2009, and is the first known occurrence of the disease along the Northern Mendocino coast. (11/09)

RESEARCH

The USDA FS Pacific Southwest Research Station, UC Berkeley researchers, the Midpeninsula Regional Open Space District (MROSD), and the San Francisco Public Utilities Commission have undertaken a project to determine if acorns from tanoaks that are genetically resistant to *P. ramorum* could be used to reforest areas where tanoaks have been decimated by the disease.

Thousands of tanoak acorns gathered from MROSD land in the fall of 2007 and 2008 were grown into saplings and are being tested for *P. ramorum* resistance at the UC Berkeley Garbelotto lab and in the field. Tanoaks showing possible genetic resistance to the pathogen

have already been identified. On 3/19/09, acorns from the possibly resistant trees were planted at MROSD's Skyline Ridge Open Space Preserve in the hills above Palo Alto, where SOD is present. Staff will monitor the health of the trees as they grow. (5/09)

Dominican University of California in San Rafael, CA has been selected as the research site (National Ornamental Research Nursery) for ornamental nursery-based studies that will initially focus on *P. ramorum*. Located in a quarantined county, the site will be designed to reflect ornamental nursery conditions, providing an opportunity for studies on the epidemiology and behavior of new and emerging ornamental pests and pathogens in a real-world setting. (7/09)

***P. ramorum* likely kills canyon live oak (*Quercus chrysolepsis*) according to a recent** investigation. The study of recent mortality among large canyon live oaks at the Midpeninsula Regional Open Space District's Los Trancos Preserve was conducted in a forest dominated by canyon live oak and California bay laurel, a species mix unlike most stands where SOD studies have been conducted. *P. ramorum* has been isolated from symptomatic bay and coast live oak at the Los Trancos Preserve, and positive PCR results were obtained from internal bole canker tissue in two sampled canyon live oaks, indicating that *P. ramorum* DNA was present in the symptomatic host tissues. The canyon live oak SOD diagnosis is further supported by symptom and epidemiological data; however, *P. ramorum* has not yet been isolated from canyon live oak trunk cankers. (9/09)

Assessing the potential of Silv-Ex® and Silv-Ex Plus® to eradicate *P. ramorum* spores in water - Based on two studies at UC Davis, using Silv-Ex® or Silv-Ex Plus® (foaming agent used in fire control) to treat water that is potentially infested with *P. ramorum,* greatly reduces, but does not eliminate, the concern for inadvertently spreading the pathogen through fire suppression efforts. (10/09)

Japanese larch, western hemlock, and birch have been reported as new *P. ramorum* hosts. These new finds were made in the UK in August 2009 when infected rhododendron was identified in the understory of mature Japanese larch (*Larix kaempferi*). At that time, the pathogen was also found on the foliage of young thicket-stage Japanese larch nearby. Subsequent testing of sites known to have *P. ramorum* in north and west Devon and west Somerset has found the pathogen in mature Japanese larch, infecting both foliage as well as bark. Species in the larch understory, such as rhododendron and sweet chestnut, have shoot and leaf infections, while beech, birch (*Betula pendula*), oak, and Western hemlock (*Tsuga heterophylla*) have all been found with bole cankers. Some of the confirmed sites have little or no rhododendron present. Prior to these findings, tree infection in the UK has only been identified in relatively close proximity to infected rhododendron.

To date, Japanese larch symptoms have been found on shoots and foliage, with wilted, withered shoot tips and blackened needles. Infected shoots shed their needles prematurely. Other symptoms include branch dieback, and the worst affected trees have been found with numerous cankers on branches and upper trunks. (12/09)

New SOD study aimed at protecting canyon live oak - The Midpeninsula Regional Open Space District's Los Trancos Preserve is the only known site where heritage canyon live oaks

are dying from *P. ramorum*. Consequently, the District and scientists implemented a new study in November to determine if use of Agri-Fos®, in combination with removal of California bay laurel in close proximity to canyon live oaks, can help protect specimen trees. Twelve large canyon live oak trees along two popular trails were sprayed with Agri-Fos®. The trees will be sprayed again in spring 2010 and then annually thereafter each fall. Select bays near the treated oaks were removed to reduce the risk of infection. Bay trees will also be removed from around large canyon live oaks in the District's Russian Ridge Preserve. (12/09)

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FEATURE ARTICLES

Status of *P. ramorum* in Washington - During the past four years (2005-2008), *P. ramorum* has been detected in 27 western Washington nurseries. To date, 314 *P. ramorum* isolates have been collected from the 27 nurseries, as well as two streams, a retention pond, and one landscape site, and genotyped using four microsatellite markers.

All three lineages (EU1, NA1, and NA2) were detected in each of the four years. In this population, the EU1 lineage is represented by one genotype, the NA2 lineage is represented by one genotype, and the NA1 lineage is represented by four genotypes. The NA1 lineage was the most common, occurring in 24 nurseries, one landscape situation, and both streams. The NA2 lineage was detected at 10 nurseries and one stream, while the EU1 lineage was detected at five nurseries. The occurrence of the EU1 lineage in Washington has increased in frequency over the past four years while the overall number of *P. ramorum* sites and isolates has declined. In four of the five sites where the EU1 lineage occurred, the NA1 lineage was also detected at the same time. At one nursery in 2007, these two lineages were isolated from different branches on the same rhododendron plant. At another nursery in 2008, they were isolated from the same soil bait. Although no genotype detected to date possesses a hybrid of alleles from both the European (EU1) and North American (NA1 and NA2) lineages, the presence of the EU1 and NA1 lineages on the same plant and soil bait illustrates the need for a better overall understanding of the population structure of *P. ramorum* in nurseries to reduce the risk of hybridized species occurring as a result of sexual recombination.

The APHIS confirmed nursery protocol (CNP) appears to be effective in eradicating the pathogen from infected nurseries in some instances. Fifteen of the 27 positive nurseries were negative for *P. ramorum* in subsequent years after completing the CNP. On the other hand, 12 nurseries were repeatedly positive for two or more years in a row. At only one repeat-positive nursery did a new genotype appear in the second positive year that was not present in the nursery during the first positive year. Thus it is unclear if inoculum was persisting from year to year or if the same genotypes that were initially detected at 11 of the repeat nurseries was reintroduced in subsequent years. At the six

nurseries showing the most genetic variability, three different genotypes were detected in a single year. (2/09)

What can be Learned about *P. ramorum* by Genomic Comparison?

Haas, B. J., et al. 2009. Genome sequence and analysis of the Irish potato famine pathogen *Phytophthora infestans*. Nature: online 09 September 2009. DOI: 10.1038/nature08358.
Over 90 authors from around the globe contributed to the genetic sequencing of *Phytophthora infestans* and its comparison to two other sequenced *Phytophthora* species, *P. sojae* (cause of soybean root rot) and *P. ramorum*. While the Haas et al. (2009) paper published in Nature is primarily focused on the *P. infestans* genome, this summary focuses on what can be learned about *P. ramorum* by genomic comparison.

Amongst all three *Phytophthora* species, there is an unusual genome organization where blocks of conserved gene order (with high gene density and low repeat content) are mixed with blocks where gene order is not conserved (with low gene density and high repeat content). This pattern of intergenic spacing and repeat content seen in *P. infestans* and the other *Phytophthoras* has been suggested for large, unsequenced genomes in the grass family (Poaceae) but has so far not been seen in the genomes of other sequenced eukaryotes.

Within blocks of conserved genes, the genes are tightly spaced in all three genomes (median intergenic distance of 633 base pairs for *P. ramorum*). These conserved blocks represent ~90% of the size of the three genomes, with a core set of approximately 8,500 clusters of shared genes. These core genes code for cellular processes including DNA replication, transcription, and protein translation. In regions between conserved blocks, intergenic distances are greater and increase with increasing genome size (median 1.5 kb for *P. ramorum* versus 3.7 kb for *P. infestans*). Despite the high degree of similarity between the species, the *P. infestans* genome is much larger than the other two. Within *P. infestans*' genome, there is an abundance of repetitive DNA in the blocks of non-conserved genetic material which accounts for 74% of its size. By contrast, only 24% of *P. ramorum*'s genome is made up of these DNA repeats.

Like many pathogens, *Phytophthora* species secrete effector proteins that alter host physiology and facilitate colonization. Two notable effector protein genes are the RXLR and Crinkler (CRN) cytoplasmic effectors. RXLR genes are more numerous in *P. infestans*, with ~60% more than *P. sojae* or *P. ramorum*. CRN cytoplasmic effectors were also numerous in the *P. infestans* genome (196 CRN genes for *P. infestans* versus 19 CRN genes for *P. ramorum*), as well as being unexpectedly complex and diverse.

Both of these CRN and RXLR genes occur in the sparse, repeat heavy areas of the *P. infestans* genome rather than the core, high-density gene areas where the three species are most similar. Since these RXLR and CRN families lie in the most dynamic areas of the genome there is a great ability for them to quickly evolve. Interestingly, another group of genes called NPP1-like proteins that induce necrosis and also are implicated in pathogenesis have 59 genes in *P. ramorum* versus 27 in *P. sojae.* All of these genes are thought to play an important role in the pathogen's ability to adapt to its host plants. Having the blueprint for the

genetic arsenal in *Phytophthora* that makes this pathogen group so hard to control is a major step towards development of smart (i.e., informed) breeding and fungicide development programs. We expect that knowing which genes are evolving rapidly will allow breeders and plant pathologists to develop more targeted disease control measures. (10/09)

***Annulohypoxylon thouarsianum,* a New Name for *Hypoxylon thouarsianum* - The wood** decay fungus *Hypoxylon thouarsianum* (Léveillé) Lloyd, which commonly forms black, rounded fruiting bodies on the trunks of SOD-affected oaks and tanoaks, has recently been reassigned to the new genus *Annulohypoxylon.* The new scientific name for this fungus is *Annulohypoxylon thouarsianum* (Léveillé) Y.-M. Ju, J.D. Rogers & H.-M. Hsieh.
The genus *Hypoxylon* has a tortuous history, but was broadly redefined by J.H. Miller initially in 1928 and later in 1961 to include a somewhat heterogeneous variety of taxa. In subsequent revisions of the genus, many of the species were assigned to other genera. By 1996, *Hypoxylon* had been pared down to two sections – *Hypoxylon* and *Annulata* – which were recognized as separate based on three distinct morphological characteristics. Since 2000, several molecular studies of *Hypoxylon* and closely related taxa have been interpreted to suggest that further reassignment of the species in this genus was in order. In 2005, Hsieh, Ju, and Rogers suggested that section *Annulata* should be segregated from *Hypoxylon* into a new genus based on both molecular data and some morphological differences. The new genus, *Annulohypoxylon,* is equivalent to *Hypoxylon* section *Annulata* (sensu Ju and Rogers, 1996).

A. thourasianum is a sapwood-decaying fungus that is very commonly associated with *P. ramorum* cankers. The fruiting bodies that emerge through the bark develop after the fungus has already caused significant decay of the underlying sapwood. The fruiting bodies are initially rounded and covered with a dark, glossy membrane, which ruptures to reveal greenish asexual spores beneath. The fruiting body continues to expand and forms a hard, charcoal-like hemisphere 1-4 cm in diameter. This structure houses a large number of flask-like perithecia in which sexual spores (ascospores) are formed. The opening of each perithicium is surrounded by a raised, ring-like (annulate) disk (hence *Annulohypoxylon*). These discs are visible as fine bumps on the surface of the mature fruiting body.

In connection with Sudden Oak Death, *A. thourasianum* functions as an opportunistic secondary pathogen. As has been seen with other *Hypoxylon* spp. (broad sense), *A. thourasianum* is thought to be present as limited inactive infections in the bark of healthy oaks, and may actually grow endophytically to a limited degree, but without causing disease. When the host tissue is damaged or severely stressed, *A. thourasianum* begins to actively decay the sapwood, disrupting water flow in the trunk, and accelerating tree decline. Extensive sapwood decay caused by *A. thourasianum,* especially in smaller stems, can cause trunks to fail. (11/09)

SOD Regulations Impact Coast Redwood Cone (Seed) Collections - Coast redwood (*Sequoia sempervirens*) seed production, like that of most conifer species, is periodic and irregular. This year, for the first time since 1985, there is an abundant redwood cone crop in Mendocino County, with cone production the heaviest in areas that were directly impacted by 2008 fires. *P. ramorum* regulations now must be incorporated into the seed collection process. Enacted to help prevent inadvertent transport of the pathogen, the regulations require

that redwood needles and twigs be treated or removed from cones prior to leaving the quarantine area. Since the cones and seeds of redwood are live and perishable, treatments such as heat (temperatures above 46o C) and sterilizing agent dips (bleach) are impractical as they are damaging to the seed's vital tissues. Therefore, the only effective method of compliance is cone clipping, or removing all plant parts from the cone.

The clipping process has time constraints and is labor intensive. Coast redwood cones are quite small (~1.5-2.5 cm length), and there are thousands of redwood cones per bushel. Clipping each cone at the apex requires many workers since one worker can generally only clip 1-2 bushels per 8-hour day depending on proper tool use and experience level. Correct timing of collections is essential. Quality seed comes from fully ripened cones, and there is a very short window (often one week or less) in which to collect cones once they are mature, yet before the scales open and shed their seed. In addition, once cones are removed from a tree, they immediately begin to dry and start to open. It is imperative to complete clipping before the cones open to avoid mixing the seed with debris.

Redwood cone collection in Mendocino County this year has ranged from 50-200 bushels per lot and, depending on lot size, can take weeks to clip. For example, last year, Cal Fire collected 74 bushels of redwood cones on Soquel Demonstration State Forest in Santa Cruz County. Utilizing nursery and forest staff plus five days of work by a 12-person Conservation Camp crew, it took more than six days to clip all cones from the small branches and twigs. Mendocino County's redwood collection target for this season is 200-300 bushels. Depending on labor force availability and duration, cooperators may pay up to $5760 per day for a week or more of clipping cones, or approximately $135 per bushel.

This year's bumper crop replenished the seed reserve, and will likely supply Mendocino's Cooperative redwood seed needs for the next 15-20 years. Abundant coast redwood seed crops are rare, and healthy, local seed reserves are essential to preserving the genetic integrity of California's redwood forests. (12/09)

REGULATORY PROGRAM UPDATES

The UK's Department for Environment, Food, and Rural Affairs has been reorganized. The newly restructured Food and Environment Research Agency (FERA) is a merging of the Central Science Laboratory, Plant Health Division/Plant Health & Seeds Inspectorate, the Plant Varieties and Seeds Division, and the Government Decontamination Service. The formal vesting date for FERA was April 1, 2009. Information on FERA, including their Statement of Purpose, key facts, Agency organization, and FAQs, can be found at http://services.csl.gov.uk/fera/. (4/09)

USDA APHIS has restructured its Emergency and Domestic program staff into focused teams that include appropriate subject matter experts. The new *P. ramorum* team comprises Scott Pfister, team director; Prakash Hebbar, National Program Manager; Jonathan Jones, team member; and Dave Kaplan, team member. In his new role, Pfister will provide overall direction and guidance in program delivery and serve as the national program representative. Hebbar, in his new role as National Program Manager, works directly with Pfister and provides technical expertise, policy and budget consultation, program coordination, and

facilitation of stakeholder communication and collaboration. As team members, Jones and Kaplan will play an advisory role. (11/09)

MEETINGS

The Fourth Sudden Oak Death Science Symposium will be held June 15 – 18, 2009 at the Hilton in Scotts Valley, near Santa Cruz. This conference is aimed at researchers, natural resource and horticultural managers, regulators, policy makers, and public and private interest groups. The agenda will include an afternoon field trip on 6/15, presentations and a poster session on 6/16 and 6/17, and a half-day COMTF-wide management meeting on 6/18. (2/09)

The Continental Dialogue on Non-Native Forest Insects and Diseases Fifth Meeting will be held 10/27 – 10/28 at the Fort Mason Center in San Francisco. The meeting will include two concurrent field trips, one on SOD nursery and forest issues and the other on Port of Oakland inspections and handling of wood packaging. Panel sessions will also be offered on the risks of firewood movement, interstate movement of *P. ramorum*, preventing and slowing the spread of pests of non-quarantine significance, solid wood packaging as a pathway for invasives, and outreach and education challenges. (10/09)

EDUCATION AND OUTREACH

Spring 2009 *P. ramorum* Preventative Treatment Training sessions will be offered on the UC Berkeley campus. Each two-hour outdoor session will cover basic SOD information, integrated pest management approaches, how to select candidate trees for treatment, and proper preventative treatment application. (2/09)

A series of SOD Blitzes will be held in spring 2009. Blitz participants will be given a two-hour training course on how to identify SOD symptoms, correctly sample symptomatic plants, and document 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. (2/09)

A "Science for Managing the Big Sur Ecosystem" seminar will take place on 5/27/09 at the Big Sur Lodge Conference Room. Intended to support land managers working in the Big Sur area, this seminar will present research relevant to natural resource issues in Big Sur. Presentations from leading researchers will include the Big Sur ecosystem, the role of fire in Big Sur and coastal areas, coastal grasslands and invasive species, and Sudden Oak Death status and management. There will also be a land manager panel discussion, and an interdisciplinary dialogue addressing key management issues. (5/09)

RESOURCES

A new Spanish language version of OR's online *P. ramorum* training course is now available to nursery growers at www.ecampus.oregonstate.edu/phytophthora. Both the English and Spanish courses are offered by the Oregon State University Extended Campus (Ecampus), in partnership with ODA. For an optional $100 fee, nursery growers

can earn a Certificate of Mastery after successfully completing an online exam. Those who pass the exam can also earn four pesticide recertification credits in Oregon. (2/09)

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. (3/09)

The final "Risk Analysis of *Phytophthora ramorum*, a Newly Recognised Pathogen Threat to Europe and the Cause of Sudden Oak Death in the USA" (RAPRA), as well as a summary of the report, have been posted to the RAPRA website at http://rapra.csl.gov.uk/. (4/09)

The program, abstracts, and presentations from the 3rd International *Phytophthora*, *Pythium*, and Related Genera Workshop are now available online at http://www.aphis.usda.gov/plant_health/identification/phytophthora/index.shtml. (4/09)

The World Wildlife Fund-Australia report "Arresting *Phytophthora* Dieback – the Biological Bulldozer" is available online at http://wwf.org.au/publications/dieback_report/. This document discusses the biology and epidemiology of *Phytophthora cinnamomi*, and its effects on Australia's native plants and animals. It is a call to the community to increase the awareness of the pathogen and its impacts, and to work together to invest in the research and management necessary to help put a stop to its devastating impacts. (5/09)

The Rutgers University "Sudden Oak Death and Ramorum Blight caused by *Phytophthora ramorum*" DVD and CD-Rom set is now available for free. To order a copy, contact William Hlubik at (732) 398-5262 or hlubik@aesop.rutgers.edu or via mail at: Rutgers Cooperative Extension of Middlesex County Davidson's Mill Pond Park; 42 Riva Avenue; North Brunswick, NJ 08902. (7/09)

A "Comparison of Relocatable Commercial Vehicle Washing Systems" is available through the Forest Service. Systems tested were moderately priced, and were evaluated for cleaning system efficacy, recycling system performance, waste containment, and the amount of viable seeds remaining in the system waste. (7/09)

Murdoch University in Western Australia officially launched a "Fishing for *Phytophthora*" website on 6/5 at the Dieback Information Group meeting. The website is intended to catalogue *Phytophthora* species found in Western Australia's rivers, streams, dams, and estuaries. Website (http://www.fishingforphytophthora.murdoch.edu.au/) information includes a project overview, a detailed map with findings noted at each location, an interpretation of the findings, the latest news on the project, and a photo gallery. (7/09)

The "Quarantine Barcoding of Life" (QBOL) website has been launched at www.qbol.org. Funded by the European Union, QBOL is made up of a consortium of 20 partners (universities, research institutes, and phytosanitary organizations) from around the world working together and sharing their expertise in the field of DNA barcoding of

arthropods, bacteria, fungi, nematodes, phytoplasmas, and viruses. The goal of the website is to make collections harboring plant pathogenic quarantine organisms available. (8/09)

Presentations from the Fourth Sudden Oak Death Science Symposium are now posted to the Symposium website. To access the slideshows and accompanying audio files, go to http://nature.berkeley.edu/comtf/sodsymposium4/schedule.htm. (9/09)

Chapter 6 of the "Sudden Oak Death and *Phytophthora ramorum*: A Summary of the Literature" is now online at http://www.suddenoakdeath.org/html/sod_literature_summary.html. (10/09)

USDA APHIS has posted the "*Phytophthora ramorum* Program 2009 3rd Quarter Summary" to its website (www.aphis.usda.gov/plant_health/plant_pest_info/pram). The document includes a comprehensive summary of nursery and landscape detections; program goals; a detailed accounting of 2009 detections; and updates on protocols, Federal Orders, regulations, diagnostics, the website, and new hosts. (11/09)

The video "Sudden Oak Death: Battling an Invasive Disease" is released by the National Park Service, Pacific Coast Science and Learning Center. The ten minute documentary explores the story of *P. ramorum*, documenting the history of the disease, describing its pathology, and explaining measures that can be taken to help prevent its spread. To access the video, go to YouTube at http://www.youtube.com/watch?v=lewpMtIosPI. (12/09)

RELATED RESEARCH

The first Southern CA detection of *Phytophthora siskiyouensis* was found by Drs. Michael Coffey and Deborah Mathews (UC Riverside) during an investigation into the cause of declining alder trees. The positive white alder (*Alnus rhombifolia*) was found in a grassy landscape strip along a city street sidewalk in front of a commercial building complex in Costa Mesa, Orange County. Symptoms included upper canopy dieback, tree mortality, and trunk bark exhibiting dark brown, moist spots. Since that isolation, at least two of the approximately eight trees there have died and are flagged for removal. Alders with similar symptoms have been found at several landscape sites, including commercial complexes and residential landscapes. Another *P. siskiyouensis*-positive alder was found recently at a residential development in Lake Forest, CA. In 2006, Suzanne Rooney-Latham and Cheryl Blomquist, CA Department of Food and Agriculture, reported similar symptoms and dieback on alders in Foster City caused by *P. siskiyouensis.* (4/09)

Last year during a survey of Cannock Chase, Staffordshire County (England) for *P.* *ramorum* and *P. kernoviae*, swathes of symptomatic bilberry were found. Consequently, a management program was implemented that included destroying the symptomatic plants. Since discovery of the symptoms, it has been determined that the Chase bilberry infection is actually being caused by *P. pseudosyringae*. This is the first time the pathogen has been found in ground-covering bilberry. Recently 14 new outbreak sites have been identified in the Chase, including some in open heathland. Cannock Chase is a mixed area of countryside.

It is the largest lowland heath area (a scarce and threatened wildlife habitat) left in the Midlands. (9/09)

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Bobev, **S.G.; Van Poucke, K.; and Maes, M**. **2009. Disease Notes: First Report of** *Phytophthora citricola* on *Cornus mas* in Bulgaria. Volume 93, Number 5, Page 551. DOI: 10.1094/PDIS-93-5-0551A. (5/09)

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. (3/09)

Garbelotto, M. 2008. Molecular analysis to study invasions by forest pathogens: examples from Mediterranean ecosystems. Phytopathologia Mediterranea 47:183–203. (4/09)

Ghimire, S.R.; Richardson, P.A.; Moorman, G.W.; Lea-Cox, J.D.; Ross, D.S.; and Hong, C.X. 2009. An *in-situ* baiting bioassay for detecting *Phytophthora* species in irrigation runoff containment basins. *Plant Pathology* 58:577–583. DOI: 10.1111/j.1365-3059.2008.02016.x. (6/09)

Jung, T. 2009. Beech decline in Central Europe driven by the interaction between *Phytophthora* infections and climatic extremes. Forest Pathology 39:73–94. DOI: 10.1111/j.1439-0329.2008.00566.x. (5/09)

Jung, T. and Burgess, T.I. 2009. Re-evaluation of *Phytophthora citricola* isolates from multiple woody hosts in Europe and North America reveals a new species, *Phytophthora plurivora* sp. nov. Persoonia 22:95–110. DOI:10.3767/003158509X442612. (5/09)

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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. (3/09)

McCarren, K.L.; McComb, J.A.; Shearer, B.L.; and St. J. Hardy, G.E. 2009. Phosphite impact on the in vitro production and viability of selfed oospores by *Phytophthora cinnamomi*. Forest Pathology 39:124–132. DOI: 10.1111/j.1439-0329.2008.00571.x. (6/09)

Quesada-Ocampo, L.M.; Fulbright, D.W.; and Hausbeck, M.K. 2009. Susceptibility of Fraser fir to *Phytophthora capsici*. Plant Disease 93:135-141. (2/09)

Reglinski, T.; Spiers, T.M.; Dick, M.A.; Taylor, J.T.; and Gardner, J. 2009. Management of phytophthora root rot in radiata pine seedlings. *Plant Pathology* 58:723–730. DOI: 10.1111/j.1365-3059.2009.02021.x. (8/09)

Rooney-Latham, S.; Blomquist, C.L.; Pastalka, T.; and Costello, L. 2009. Collar rot on Italian alder trees in California caused by *Phytophthora siskiyouensis*. Online. Plant Health Progress. DOI: 10.1094/PHP-2009-0413-01-RS. (5/09)

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Williams, N.; St. J. Hardy, G.E.; and O'Brien, P.A. 2009. Analysis of the distribution of *Phytophthora cinnamomi* in soil at a disease site in Western Australia using nested PCR. Forest Pathology 39:95–109. DOI: 10.1111/j.1439-0329.2008.00567.x. (6/09)

Worrall, J.J. 2009. Dieback and mortality of *Alnus* in the Southern Rocky Mountains, USA. Plant Disease 93:293-298. (3/09)

Zeng, Hui-cai; Ho, Hon-hing; and Zheng, Fuy-Cong. 2009. A Survey of *Phytophthora* Species on Hainan Island of South China. J. Phytopathology 157, 33–39. DOI: 10.1111/j.1439-0434.2008.01441.x. (2/09)

RELATED TOPIC RESOURCES

The USDA Forest Service posted 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. (3/09)

Related Resource – A goldspotted oak borer website is available online at http://groups.ucanr.org/GSOB/index.cfm. Topics addressed include identification of the insect, host trees, impacts, known infestation sites, firewood issues, treatment options, how to report a find, and additional resources. (10/09)

PERSONNEL

Guillaume Bilodeau is a new postdoctoral researcher in Dr. Frank Martin's lab at the USDA Agricultural Research Service in Salinas, CA. Guillaume's work 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. Guillaume can be reached at (831) 755-2878 or Guillaume.Bilodeau@ars.usda.gov. (3/09)

Scott Pfister was hired in June 2009 as the new USDA APHIS PPQ Director of Forest Pest Programs. APHIS created the position in response to the expanding nature of forest health issues in the US. In this role, Scott oversees forest pest programs, such as those for Asian longhorned beetle, *P. ramorum*, and emerald ash borer, and he works to coordinate the development of forest pest mitigation measures at the national level. Scott can be reached at Scott.E.Pfister@aphis.usda.gov. (10/09)

Erin Lovig has been hired as an Interior Pest Exclusion Agricultural Biologist with CDFA. In her new position she will be responsible for assisting with SOD-related regulatory inquires and statewide management of the regulatory program for *P. ramorum*. Erin can be reached at elovig@cdfa.ca.gov or (916) 654-0312. (10/09)

Dr. Prakash Hebbar is the new *P. ramorum* National Program Manager. He can be reached at (301) 734-5717 or prakash.hebbar@aphis.usda.gov. (11/09)

Jonathan Jones has moved into an advisory role with the USDA APHIS National *P.* *ramorum* Program, functioning as a team member rather than program manager. He can be reached at (301) 734-5038 or jmjones@aphis.usda.gov. (11/09)

CALENDAR OF EVENTS

2/11 – SOD Treatment Workshop; UC Berkeley Campus
3/11 – SOD Treatment Workshop; UC Berkeley Campus
4/17 – 4/19 Woodside and Portola Valley SOD Blitz
4/18 – Northern Big Sur/Carmel SOD Blitz; Mandatory training and organizational meeting; Carmel Valley Middle School, Carmel
4/22 – SOD Treatment Workshop; UC Berkeley Campus
4/24 – 4/26 Pepperwood Preserve SOD Blitz; Santa Rosa
5/2 – Northern Big Sur/Carmel SOD Blitz; Sampling Day
5/6 – SOD Treatment Workshop; UC Berkeley Campus
5/9 – 5/10 Los Altos Hills SOD Blitz
5/16 – 5/17 East Bay SOD Blitz
5/27 – 5/28 Science for Managing the Big Sur Ecosystem workshop for land managers; Big Sur
6/15 – 6/18 Fourth Sudden Oak Death Science Symposium; Hilton, Scotts Valley
8/13 – Montalvo Arts Center Presents: *O OAKS OH!:* Part 1 of 2; Saratoga
9/23 – SOD Treatment Workshop; UC Berkeley Campus

10/7 – SOD Treatment Workshop; UC Berkeley Campus
10/27– 10/28 Continental Dialogue on Non-Native Forest Insects and Diseases Fifth Meeting; San Francisco
11/4 – SOD Treatment Workshop; UC Berkeley Campus
11/17– 11/18 58th Annual Meeting of the California Forest Pest Council, What's Ailing California's Forests? Heidrick Ag History Center; Woodland
12/9 – SOD Treatment Workshop; UC Berkeley Campus