SUDDEN OAK DEATH AND *PHYTOPHTHORA RAMORUM*

2011 - 2012 SUMMARY REPORT

A COMPENDIUM OF 2012 MONTHLY NEWSLETTERS
PRODUCED BY THE CALIFORNIA OAK MORTALITY TASK FORCE

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The California Oak Mortality Task Force (COMTF) is a volunteer coalition of research/educational institutions, public agencies, non-profit organizations, and private interests. Its primary purpose is to coordinate a comprehensive and unified program of research, management, monitoring, education, and public policy addressing elevated levels of oak mortality in California resulting from *Phytophthora ramorum*, cause of Sudden Oak Death and other diseases.

The Task Force was formed in August 2000 by joining two emerging efforts to address Sudden Oak Death statewide: 1) a resolution of the California Forest Pest Council (CFPC) and 2) an initiative from the California Department of Forestry and Fire Protection (CDF). The Task Force is overseen by the California Board of Forestry and Fire Protection and the Resources Agency. It is also a task force of the California Forest Pest Council.

Cover Picture Credit: Tom Coleman, USDA Forest Service, Pacific Southwest Region, Forest Health Protection
Monterey County, summer 2012

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2012 *Phytophthora ramorum* and Sudden Oak Death Significant Events

- The USDA FS 2012 annual aerial detection survey for California mapped 376,000 new dead oak (*Quercus agrifolia*) and tanoak (*Notholithocarpus densiflorus*) over 54,000 acres in areas impacted by SOD.

- A fourth, genetically distinct lineage of *Phytophthora ramorum* (EU2) has been discovered in the UK on Japanese larch *(Larix kaempferi)*. This finding indicates that the pathogen again migrated from an unknown place of origin and was able to establish, infect, and kill trees.

- *Phytophthora ramorum* was reported in 33 nurseries in 8 states (CA, OR, WA, NC, ME, NY, PA, and IN). Forty-eight percent of the nurseries were repeat positives. Ten trace investigations for host plants shipped interstate to 33 states from *P. ramorum*-positive nurseries resulted in detections at two non-interstate shipping nurseries (ME, PA) and four residential (ME, OR, WA, CA) locations.

- USDA APHIS added eight plant species to the list of *P. ramorum* associated hosts, bringing the official U.S. *P. ramorum* host list to 137 plants: *Ilex cornuta* (Buford holly, Chinese holly, horned holly); *Illicium parviflorum* (yellow anise); *Larix kaempferi* (Japanese larch); *Magnolia denudate* (lily tree); *Mahonia nervosa* (creeping Oregon grape); *Molinadendron sinaloense*; *Trachelospermum jasminoides* (star jasmine, Confederate jasmine); and *Veronica spicata* Syn. *Pseudolysimachion spicatum* (spiked speedwell).

- *Trillium ovatum* (western wake robin), and *Garrya elliptica* (wavyleaf silk tassel) were found *P. ramorum* positive for the first time. *Cornus nuttallii* (western dogwood) was also found positive, marking the first instance of recovery from a North American dogwood species.

- *Phytophthora ramorum* was recovered from several Humboldt Co. waterways for the first time: the east and west forks of Mattole Canyon Creek, Grindstone Creek, and an upper tributary of Grizzly Creek.

- Redwood Valley (in the Redwood Creek watershed) *P. ramorum* containment efforts continued after new infestations were identified surrounding the 370 acres treated in phase one.

- A *P. ramorum*-positive tanoak was confirmed in Mendocino Co. a few miles north of MacKerricher State Park, making it the most northern coastal infestation in the county.

- Oregon's eradication program was redefined to a slow-the-spread program as the *P. ramorum* quarantine area increased to 229 mi^2.

- Most of the Bay Area locations sampled had increased levels of infection, with the East Bay infestation found to have transitioned from a newly arrived status (in 2011) to epidemic levels on California bay laurel (*Umbellularia californica*) (in 2012).

MONITORING

In January 2012, a *Phytophthora ramorum*-positive site with infected tanoak was confirmed in Mendocino Co. a few miles north of MacKerricher State Park near Inglenook. This location is now the most northern coastal infestation in the county. There are no bay trees in the immediate area. (2/12)

There were several new *P. ramorum* detections in Humboldt Co. in 2011. Larabee Creek tested positive in the spring of 2011. Follow-up ground surveys found a small number of infected bay and tanoak. This detection indicates the anticipated northward and eastern spread of the pathogen has begun. Grizzly Creek also tested positive for *P. ramorum* in the spring of 2011. This was first detection of *P. ramorum* in the Van Duzen River watershed. The pathogen was also detected within the Mattole River watershed in Mattole Canyon Creek and Crooked Prairie Creek as well as in the Mattole River at Ettersburg Bridge and at Whitethorn, and it was isolated from bay along Fire Creek. The new positive site in the Mattole River at Whitethorn is the southernmost positive detection in the watershed and indicates that the pathogen may be spreading into the far southwestern corner of the county. (2/12)

Washington's 2011 *P. ramorum* early detection survey of forests identified three new positive locations: a stream that feeds into the Sammamish River (positive since 2007); a watershed sub-basin adjoining the Sammamish River; and a Lewis Co. stream in a forested area. None of the finds were in association with streamside plant infections. Each stream was associated with a nursery previously identified as *P. ramorum* positive. (2/12)

WSDA will no longer monitor waterways in Washington as of 2012. Nursery-level monitoring required under the CNP will continue. Stream baiting efforts will still be conducted by the WDNR. (3/12)

***Phytophthora ramorum*-positive camphor (*Cinnamomum camphora; Lauraceae*) trees were** confirmed in Mill Valley, Marin Co. for the first time on street trees in September 2011. It is believed that the pathogen moved from the forest into the urban setting. Camphor was first identified as a *P. ramorum* host in 2006 when it was detected on nursery seedlings. (3/12)

Phytophthora ramorum* was recovered from *Cornus nuttallii* (western dogwood), *Trillium ovatum **(**western wake robin), and *Garrya elliptica* (wavyleaf silk tassel). While all three species are native to and common along the California coast, *P. ramorum* has only been isolated from one individual each of western dogwood and trillium growing in infested areas of Humboldt Co., and from one individual each of wavyleaf silk tassel and trillium in the wildlands of the Big Sur region (Monterey Co.). These recoveries are the first findings of the pathogen in members of the *Trillium* and *Garrya* genera. Confirmation of the pathogen from *C. nuttallii* marks the first instance of recovery from a North American dogwood species. (4/12)

In 2011, 329 Great Britain and Northern Ireland sites were identified with *P. ramorum* on Japanese larch, with clearing occurring on 8,488 acres (3435 hectares) and a volume of 678,000 m^3 logs removed. (5/12)

A forest planted by Paul McCartney in memory of his late wife Linda has been destroyed by *P.* *ramorum*. After Linda's death in 1998, McCartney planted numerous Japanese larch trees on the border of their family estate in Somerset, England. Most of the larch trees have had to be removed. (5/12)

Since *P. ramorum* was first discovered in southwest Oregon forests in July 2001, an interagency team has been attempting to eradicate the pathogen through early detection and destruction of infected and nearby host plants. Post-treatment monitoring in 2009 and 2010 showed that the disease and the pathogen were eliminated from more than 50 percent of the treated sites, yet the pathogen continued to slowly spread. From 2007 to 2009, there were approximately 60 new infested sites per year; in 2010, the number of new infested sites increased to 83. In 2011, 172 new sites were detected, one of which was located at Cape Sebastian, 6.5 miles north of the quarantine boundary and 12 miles from the nearest known outbreak (figures 1 and 2). As of May 2012, 40 new infested sites have been detected. Continued spread of *P. ramorum* is attributed to the slow development of symptoms in infected trees which hinders early detection, and to delays in completing eradication treatments which allow disease spread from known infestations.

The increase in disease and decrease in state and federal funds resulted in eradication treatment costs on private lands that exceeded project funds. In March 2012, the state quarantine area was expanded to 202 mi^2 and regulations were revised. The revised quarantine establishes a generally infested area in which eradication treatments are no longer required, and provides for increased utilization of tanoak within the region. Outside of the generally infested area eradication is required for all new infestations. Although the initial goal of complete eradication in Curry Co. forests is now considered unachievable, a slow-the-spread program will continue through early detection and rapid eradication of new infestations that are most important in terms of slowing disease spread; reducing inoculum levels wherever practical through cost-share projects and best management practices; and improved education and outreach to prevent spread by humans.

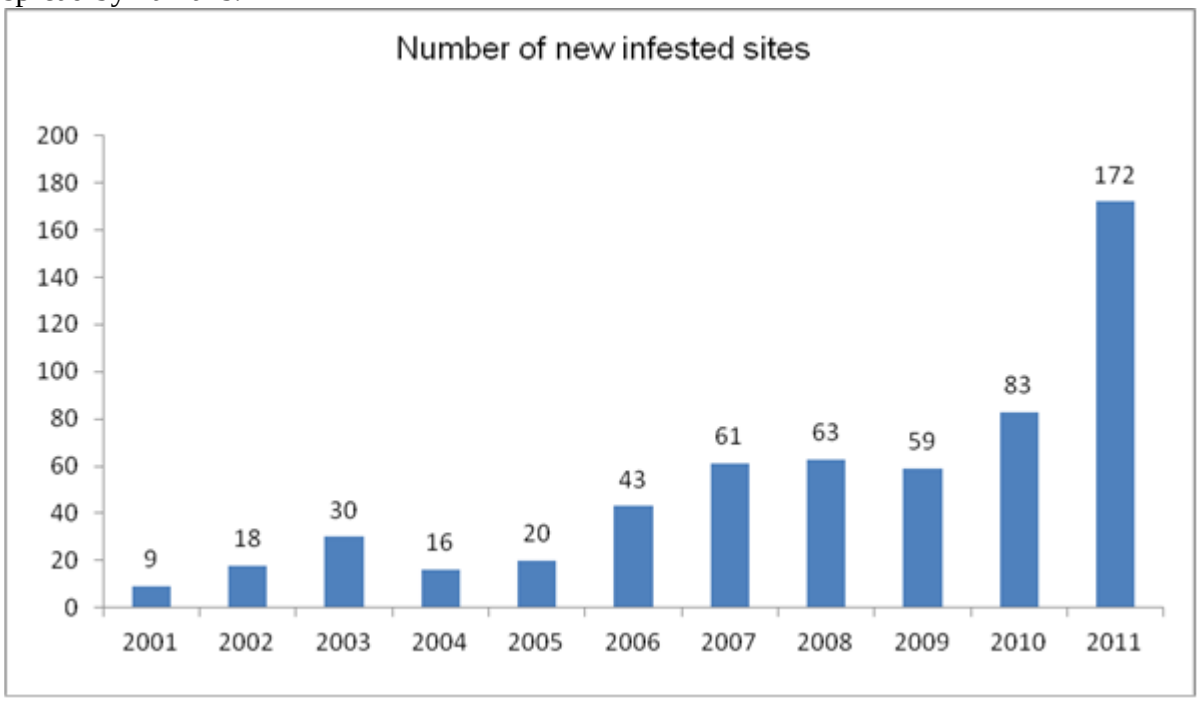

Figure 1. Number of new SOD sites discovered annually in Curry Co. forests, 2001-2011.

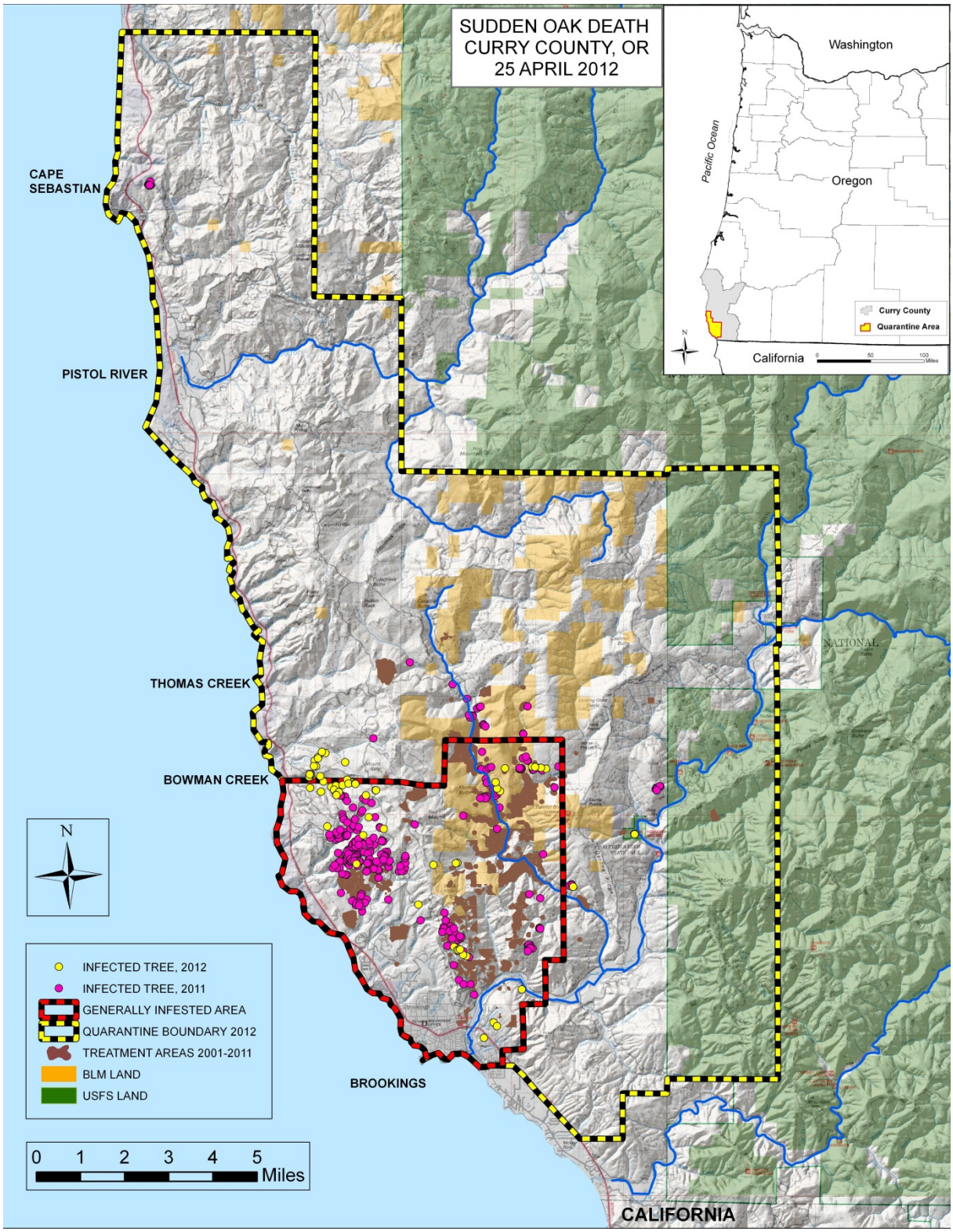

Figure 2. Location of *P. ramorum*-infested areas in 2011 and 2012, the revised quarantine area, Curry Co., Oregon, March 2011. Sites enlarged for visibility. (5/12)

A new *P. ramorum* wildland infection has been identified on the Rogue River in the Rogue River-Siskiyou National Forest. It is the first infection site in the Winchuck River drainage, approximately 6 miles southeast of previously identified infection sites and about ½ mile outside the current Oregon SOD quarantine boundary. ODA has enacted an emergency quarantine around the site. The USDA FS is preparing for an eradication treatment. (6/12)

Seventeen states with a history of *P. ramorum* introduction on ornamental nursery stock are participating in the 2012 USDA Forest Service National *P. ramorum* Wildland Survey. To date this year, pathogen detections have been reported from previously positive streams draining woody ornamental nurseries in Alabama, Florida, and North Carolina, and infested forests in Oregon. (6/12)

In Galloway (southwest Scotland), a cluster of suspected new *P. ramorum*-positive larch sites totaling more than 247 acres has been found. The site is distant from the nearest previously infected site. Only three confirmed sites have been previously recorded in Scotland. (6/12)

A new *P. ramorum* outbreak has been identified on the Rogue River-Siskiyou National Forest 10 miles east of Brookings, OR and ½ mile east of the current quarantine boundary. The outbreak was found when dead tanoaks were identified in the Wheeler Creek drainage during aerial surveys. An emergency quarantine has been put into effect, with approximately 50 acres being treated; consequently, Oregon's SOD quarantine area has been expanded to 229 mi^2. (8/12)

An updated *P. ramorum* outbreak map that displays confirmed larch outbreaks since 2010 for Great Britain is available on the UK Forestry Commission website at http://www.forestry.gov.uk/forestry/INFD-86AJQA. Also available is a risk map for larch infection, with the UK divided into high-, medium-, and low-risk zones. (8/12)

In May and June 2012, California's stream monitoring efforts recovered *P. ramorum* for the first time this season from the Mattole River at Whitehorn, and in the east and west forks of Mattole Canyon Creek, Grindstone Creek, and an upper tributary of Grizzly Creek (Humboldt Co.). The Mattole River at Whitethorn and the main stem of Mattole Canyon Creek were both found to be *P. ramorum* positive for the first time in 2011. This year's results indicate that both the east and west forks of Mattole Canyon Creek are also infested. Grindstone Creek was also found positive for the first time in April of this year. The main stem of Grizzly Creek was first found *P. ramorum* positive in 2011. To identify the source of the Grizzly Creek infestation, four additional sites within the watershed were sampled in 2012. Of these sites, only an upper tributary feeding into Grizzly Creek was found positive. (9/12)

The USDA FS has completed its 2012 California annual aerial detection survey for areas associated with SOD. This year, the aerial survey program mapped 376,000 dead oak and tanoak over 54,000 acres in areas impacted by SOD in California. In comparison, 38,000 trees across 8,000 acres were mapped in the same area last year. Tanoak stands in the Sierra Nevada Mountain Range (Nevada, Placer, El Dorado, Yuba Counties) were also flown, with no tanoak mortality observed. (9/12)

Southeast England Japanese larch trees have been found infected with *P. ramorum* for the first time in West Sussex and Surrey woodlands. Since 2009, more than 3 million larch trees in the UK have been prematurely felled as a result of *P. ramorum*. Most cases have occurred in the wetter, western parts of Great Britain as well as Northern Ireland, the Republic of Ireland, and the Isle of Man. (10/12)

A spike in infection and establishment of *P. ramorum* in Bay Area urban residential areas is one of the findings from the 2012 SOD Blitzes (see http://nature.berkeley.edu/garbelotto/english/sodblitzresults.php). Urban outbreaks were detected in Santa Cruz Co., Carmel Valley Village (Monterey Co.), and in Golden Gate Park (San Francisco Co.). Most of the Bay Area locations sampled had increased levels of infection, with the East Bay infestation found to have transitioned from a "newly arrived" status (in 2011) to epidemic levels on bay (in 2012), suggesting oak and tanoak infection in those areas are likely to increase. (11/12)

MANAGEMENT

The Santa Clara County Fire Safe Council expanded their Hazardous Fuel Reduction program to include SOD tree removals and chipping for six communities at risk of wildfire, thanks to a $156,485 grant from the USDA FS, with $50,000 in matching funds and in-kind services provided by Santa Clara Co. The 18-month-long effort felled 245 SOD trees and 58 other trees. (4/12)

The Forest Landowner Assistance program for SOD management is a trial project providing technical and financial assistance to forest landowners trying to manage SOD on their property. Participants are helped in designing and implementing model projects suitable for use as SOD management demonstration sites. The project directly assists participating landowners who are facing tree losses and struggling to deal with associated failing trees, fire, and environmental hazards. Over the past 5 years, the project has partially funded treatments, including tree removals; planting with non-host species; slash disposal via mastication; chipping; pile and burn; and use of Agri-Fos®, covering 80 acres on six properties. Management plans have been written for nine properties covering 139 acres. (4/12)

The Forestry Commission Scotland is providing up to $1,900 per hectare in financial support to landowners for clearing infested areas of *P. ramorum*-positive larch trees. The funding is timed to encourage early detection and eradication to control the spread of the disease as more cases are identified in the spring when new needles emerge. As of April, Scotland has eight confirmed areas with diseased larch trees, all on the west coast. (4/12)

The UK's FERA held an open meeting in May on their *Phytophthora* program. The meeting provided an opportunity to engage the public and affected industries through sharing information about *P. ramorum* and *P. kernoviae* program activities as well as a forum for attendees to share their views. The next step for the *Phytophthora* program will be to have two reviews, the first to assess how it has been managed and the second to review the science and implementation. Findings will be used to inform future policy and determine whether the program should be financed by government, jointly with industry, or by industry alone. (7/12)

A US "National Framework for Managing Sudden Oak Death (SOD) caused by *Phytophthora* *ramorum* in Forests and Wildlands" is available at http://www.fs.fed.us/foresthealth/management/fhm-national-frameworks.shtml. The framework links various levels of government, non-governmental groups, and private stakeholders to address the potential impact of SOD in forested landscapes should it be detected outside the current quarantine area. Overviews for prevention, detection, response, management, restoration, outreach, and research are included. (8/12)

"Standing Firm - tackling ramorum disease in public forests" by Lee Dawson, a forester with the Forestry Commission Wales, is a case study of the South Wales Japanese larch outbreak on public forest

land managed by the Commission. The study discusses six elements of response work, including biosecurity, disease identification, felling plans, end use, communications, and lessons learned. To access the report, go to http://www.forestry.gov.uk/forestry/INFD-8XLBYM. (9/12)

The UK Forestry Commission has published generic "Biosecurity Guidance" measures (http://www.forestry.gov.uk/pdf/FC_Biosecurity_Guidance.pdf/$file/FC_Biosecurity_Guidance.pdf) that are now required of Forestry Commission representatives and contractors carrying out official Commission business, and recommended for use by those in the forestry and arboricultural industries. (9/12)

"Case study - tackling *P. ramorum* in private-sector forests," is the story of Robert White, a woodland owner in Devon, England, impacted by *P. ramorum*-infected larch on his property. A forester by trade, he purchased 346 acres of commercial woodland in 1999. Eleven years later, he was faced with the first signs of infected larch. This article chronicles a private landowner's perspective, and is a companion case study to the "Standing Firm - Tackling ramorum disease in public forests" article. (10/12)

***Phytophthora ramorum* management efforts continue in Redwood Valley following the unexpected** 2010 discovery of SOD in the area (more than 50 miles from the nearest known infestation and farther north than previously detected in CA). The collaborative project is the largest landscape-level slow-the-spread project to date in CA. Redwood Valley's proximity to Redwood National and State Parks and Hoopa and Yurok Tribal lands, as well as valuable and productive timber lands and disease-free Del Norte Co., has made it an area of high priority for *P. ramorum* management. Over 370 acres have been treated in the first phase. Post treatment surveys around the perimeter of the treated zone have found the pathogen outside of the treated area. (11/12)

Establishment of *P. ramorum* in the Appalachian Mountains would pose the greatest threat to vegetation in the eastern US, according to a hazard map developed by modelers out of Chris Gilligan's lab at Cambridge University.

The hazard map (found at http://www.plantsci.cam.ac.uk/research/chrisgilligan.html) represents the spatial distribution of hazard, not risk. The Cambridge modelers explain that a hazard map shows the importance of each site in terms of that site's impact on a potential future epidemic. The value of hazard at any location in the map is a measure of the damage that would be done if that particular site became infected. Specifically, each location is given a value (its hazard) that reflects the average size of an infestation that would occur if an introduction occurred and an outbreak started at that location. They define the size of the epidemic in biomass terms as a volume measure of damage. In contrast, the Gilligan group defines a risk map as representing the probability of a particular location becoming infected. As such, a risk map represents the chance that a location will become infected, whereas, a hazard map represents the impact of a particular site becoming infected on the development of the epidemic.

The map uses a scale of 0 to 5, where 0 represents no damage and 5 represents the most damage. The map was calculated using a two-year time horizon; the hazard value for each location is the size of the epidemic after 2 years. To develop this hazard map, the US landscape was divided into 250m x 250m grid squares representing over 100 million locations. This hazard map is an output from a dynamic,

spatially explicit, stochastic epidemiological model of disease spread; it incorporates the effects of temporal variation in environmental suitability, the effects of host density and host connectivity, and also allows for the stochastic dynamical spread of the pathogen itself. (12/12)

RESEARCH

Sudden Oak Death and other *Phytophthora* tree diseases are predicted to be the most damaging of all tree diseases if climate change makes conditions in western North America wetter and warmer. This finding is one of the conclusions from "A Risk Assessment of Climate Change and the Impact of Forest Diseases on Forest Ecosystems in the Western United States and Canada." Drawing on a large body of published research, the report details the effects of eight forest diseases under two climate change scenarios - warmer and drier conditions, and warmer and wetter conditions.

Citation. Kliejunas, J.T. 2011. A Risk Assessment of Climate Change and the Impact of Forest Diseases on Forest Ecosystems in the Western United States and Canada. Gen. Tech. Rep. PSW-GTR-236. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. 70 p. (4/12)

A fourth, genetically distinct lineage of *P. ramorum* has been discovered in the UK on Japanese larch. Based on genetic analysis, it is believed that the previously unknown European type 2 (EU2) lineage has been introduced into southwest Scotland and Northern Ireland forests. (7/12)

The Chastagner lab at WSI, Puyallup plans to develop a biofiltration testing facility and determine the effectiveness of several techniques for removing *P. ramorum* inoculum from water. Pilot biofiltration systems will be installed at selected *P. ramorum*-positive nurseries in Washington and be part of a training program for nursery managers. (9/12)

Research at NORS-DUC has provided two green technology *P. ramorum* soil remediation deliverables that have been approved by USDA APHIS on a case by case basis for use in destroying *P. ramorum* in the soil substrate at contaminated nurseries. Both technologies (steaming and the use of a biological control agent) have been successfully tested at a contaminated retail nursery and a contaminated wholesale nursery (ships interstate) in CA. Follow-up sampling for the pathogen at both nurseries was negative, allowing each site to be released from the *P. ramorum* federal quarantine. (12/12)

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Rizzo, D.M.; Meentemeyer, R.K.; and Garbelotto, M. 2011. The Emergence of *Phytophthora* *ramorum* in North America and Europe. National Research Council. Fungal Diseases: An Emerging Threat to Human, Animal, and Plant Health: Workshop Summary. Washington, DC: The National Academies Press. Appendix A, pages 312 – 324. The book in its entirety can be accessed for free by going to http://www.nap.edu/catalog.php?record_id=13147. (2/12)

Shishkoff, N. 2012. Susceptibility of Some Common Container Weeds to *Phytophthora ramorum*. Plant Disease. 96(7): 1026-1032. (7/12)

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Vercauteren, A.; Riedel, M.; Maes, M.; Werres, S.; and Heungens, K. 2013 Survival of *Phytophthora ramorum* in *Rhododendron* Root Balls and in Rootless Substrates. Plant Pathology. 62(1): 166–176. (5/12)

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The 6th IUFRO Meeting Working Party 7-02-09 in Córdoba-Spain, "*Phytophthora* in Forests and Natural Ecosystems Meeting," included several *P. ramorum* presentations. To access the abstracts and a

list of presentations, see the Book of Abstracts at http://iufrophytophthora2012.org/downloads/IUFRO2012_BookofAbstracts.pdf. Highlights include:

Aram, K.; Moral, J.; and Rizzo, D.M. *Quercus chrysolepis* Foliage Supports Sporulation of *Phytophthora ramorum*. Poster. 6th IUFRO Meeting Working Party 7-02-09, *Phytophthora* in Forests and Natural Ecosystems Meeting. September 9 – 14, 2012. Córdoba-Spain.

Harris, A.R.; Sancisi-Frey, S.; and Webber, J. Persistence of *Phytophthora ramorum* on Infested Larch Sites. Poster 26. 6th IUFRO Meeting Working Party 7-02-09, *Phytophthora* in Forests and Natural Ecosystems Meeting. September 9 – 14, 2012. Córdoba-Spain.

Harris, A. and Webber, J. Comparative Sporulation of *Phytophthora ramorum* on Larch, Rhododendron, and Bay Laurel. Poster 27. 6th IUFRO Meeting Working Party 7-02-09, *Phytophthora* in Forests and Natural Ecosystems Meeting. September 9 – 14, 2012. Córdoba-Spain.

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FEATURED RESEARCH

Ireland, K. 2012. "*Phytophthora ramorum*: susceptibility of Australian plants, potential geographic range and science into policy and management." PhD thesis. Murdoch University, Western Australia.

A transdisciplinary approach was taken to understanding the potential threat of an incursion of the exotic plant pathogen, *P. ramorum*, into Australia. The study aimed to: (a) provide an understanding of the foliar, branch, and bole susceptibility to *P. ramorum* and sporangia producing potential of a broad range of Australian plant species; (b) develop a climate-based model of the potential geographic range of the pathogen; and (c) analyze the effectiveness of integration of scientific knowledge between European and North American policy and management responses to *P. ramorum*.

The study extended the known potential host range for *P. ramorum*, with nine out of the 70 native Australian species tested identified as being highly susceptible in foliar and/or branch/bole inoculations (Ireland *et al.* 2012a, b). The study also defined the pathogen's potential geographic range, confirming it as a potential threat to Australian plant industries and ecosystems. Analysis of 'boundary arrangements' in current use to communicate *P. ramorum* science into policy indicated that a number of

arrangements are in place, many of which may be applicable to the Australian situation, although it was identified that further research is needed to properly ascertain the relative benefits of these arrangements. These results will allow regulators to more effectively target high risk areas for early detection surveillance and assist in development of appropriate quarantine policies and protocols globally.

Journal papers on the susceptibility component of the thesis study have been published recently online (see below; Ireland *et al.* 2012a, b) and another manuscript outlining the CLIMEX risk model for *P. ramorum* has been prepared and will be submitted for review.

Thesis Publications:
- Ireland, K.B.; Hüberli, D.; Dell, B.; Smith, I.W.; Rizzo, D.M.; and Hardy, G.E. St J. 2012. Potential Susceptibility of Australian Native Flora to NA2 Isolate of *Phytophthora ramorum* and Pathogen Sporulation Potential. Forest Pathology. 42(4): pages 305–320.
- Ireland, K.B.; Hüberli, D.; Dell, B.; Smith, I.W.; Rizzo, D.M.; and Hardy, G.E. St J. 2012. Potential Susceptibility of Australian Native Plant Species to Branch Dieback and Bole Canker Diseases of *Phytophthora ramorum*. Plant Pathology. 61(2): pages 234–246. (2/12)

Sudden oak death increases forest fuels and puts infested stands at higher risk of severe wildfire, according to a study by Yana Valachovic and others. The researchers found fuel buildups in Douglas-fir-tanoak forests with high SOD-related hardwood mortality could increase wildfire flame lengths by 3 to 4 feet and double a wildfire's rate of spread, depending on how much time has elapsed since initial infection. Not only does SOD alter fuel quantity in these forest types, but it can also change the arrangements of fuels, posing serious challenges to firefighter response in infested stands. After trees die from the disease, they can remain standing with dry, dead leaves for several years, greatly increasing the likelihood of crown fire under extreme weather conditions. Likewise, the increased fuels on the forest floor can take a long time to break down, posing a long-term fire hazard and additional risks to firefighters. In many cases, modeled wildfire conditions in SOD-impacted forests exceed safety thresholds for hand crews, calling for changing suppression tactics and strategies, such as more heavy equipment, aircraft use, and indirect lines.

Citation: Valachovic, Y.S.; Lee, C.A.; Scanlon, H.; Varner, J.M.; Glebocki, R.; Graham, B.D.; and Rizzo, D.M. 2011. Sudden Oak Death-Caused Changes to Surface Fuel Loading and Potential Fire Behavior in Douglas-fir-Tanoak Forests. Forest Ecology and Management. 261:1973-1986. (3/12)

REGULATIONS

Effective March 1, 2012, USDA APHIS will add eight plant species to the list of *Phytophthora ramorum* associated hosts: *Ilex cornuta* (Buford holly, Chinese holly, horned holly); *Illicium parviflorum* (yellow anise); *Larix kaempferi* (Japanese larch); *Magnolia denudate* (lily tree); *Mahonia nervosa* (creeping Oregon grape); *Molinadendron sinaloense*; *Trachelospermum jasminoides* (star jasmine, Confederate jasmine); and *Veronica spicata* Syn. *Pseudolysimachion spicatum* (spiked speedwell). In addition, *Cinnamomum camphora* will be moved from the associated host list to the proven host list. These changes bring the official U.S. *P. ramorum* host list to 137 plants. (2/12)

ODA proposed amendments to Oregon's *P. ramorum* quarantine area in response to confirmation of the pathogen north of the current quarantine boundary near Cape Sebastian in Curry Co. If approved,

the quarantine boundary would adjust northward to include the new site and a buffer area of approximately 3 miles. With the expansion of the quarantine, ODA proposed to define disease-free and generally-infested areas within the quarantine. Provisions were proposed that would allow use of tanoak logs and firewood from disease-free areas. (2/12)

Porter, R.D. and Robertson, N.C. 2011 Tracking Implementation of the Special Need Request Process Under the Plant Protection Act. Environmental Law Reporter. Pages 11000 – 11019. (2/12)

USDA APHIS issued a Federal Order on April 18, 2012, placing restrictions on the importation of *P. ramorum* host plants for planting into the US. APHIS has been requiring that plants from several European countries and the UK be accompanied by inspection certifications and proof of *P. ramorum*-free testing. The new order requires specific countries to have annual pest exclusion programs to verify the absence of *P. ramorum* in places of production. APHIS will approve countries to export host material to the US if the program is comparable to APHIS' restrictions for interstate movement of *P. ramorum* hosts. Shipments must also be accompanied by a phytosanitary certificate and a declaration about the place of production. (5/12)

As of June 8, 2012, the Republic of Korea added six countries (Croatia, Czech Republic, Greece, Finland, Lithuania, and Serbia) to their "Phytosanitary measures to prevent the introduction of Sudden Oak Death Disease." These countries must abide by the Republic of Korea's rule applying to any propagated host or associated host material. All shipments are required to have phytosanitary certificates accompany *P. ramorum* host and associated host importation, with an additional declaration that, "The shipment was inspected and found free of *P. ramorum*." (7/12)

The NPB and USDA APHIS PPQ sponsored a *P. ramorum* Regulators meeting in Salem, OR the week of September 24, 2012. OAN, WSNLA, and CANGC were represented. Discussion focused on industry perspectives regarding the Advance Notification Federal Order, Best Management Practices in nurseries, and ways to provide economic incentives for regulated nurseries to voluntarily adopt cost-effective BMPs in their production practices. Research updates provided regulators with the latest information on *P. ramorum*, and discussions took place as to how to incorporate research findings, mitigation measures, and BMPs/Critical Control Points into the *P. ramorum* regulatory program. The final day entailed discussions on common issues facing both regulated and non-regulated states as well as the current and future direction of the *P. ramorum* regulatory framework. (10/12)

2011 NURSERY SUMMARIES

California had 12 *Phytophthora ramorum*-positive nurseries identified in 2011. Additionally, *Molinadendron sinaloense* was found to be *P. ramorum* positive and classified as an associated host on January 25, 2012. Positive plants in 2011 included *Camellia, Rhododendron, Prunus, Osmanthus, Pieris, Cinnamonum, Trachelospermum,* and *Magnolia*. (2/12)

The Oregon Department of Agriculture (ODA) reported six *P. ramorum*-positive nurseries detected in 2011. Infected plants included *Rhododendron, Viburnum, Camellia,* and *Pieris*. The pathogen was also detected in the soil at one nursery, the soil and potting media associated with an infected plant at another nursery, and in potting media associated with infected plants at two other nurseries. Four of the six nurseries were positive for the pathogen in previous years. *P. ramorum*

testing was also conducted on 5,562 samples from 121 Christmas tree growers. The pathogen was not detected at any of the sites. (2/12).

NURSERIES

California's first *Phytopthora ramorum*-positive nursery for 2012 was identified on April 13th. The Orange Co. production nursery ships interstate and has not been previously positive for the pathogen. (5/12)

The ODA 2012 Federal Order survey of nurseries shipping interstate is underway. As was done in the 2011 survey, ODA will assess certified nurseries for issues such as standing water and the presence of leaf debris. The goal is to help nurseries identify ways *Phytophthora* could enter and spread within their establishments. At the end of this season, ODA will compare data from 2011 and 2012 assessments to determine if the assessment itself caused nurseries to change production practices in a positive way. (5/12)

Two California nurseries have been found *P. ramorum* positive. A San Joaquin Co. production nursery was found positive on April 27th. The nursery was previously positive in 2011 and has not made any interstate shipments since. On May 3rd, a retail nursery in Sacramento Co. was found positive. The nursery is not under compliance and does not ship interstate. (6/12)

Holding pond water was found positive at two Washington wholesale landscape nurseries in Clark and Thurston Counties. Both ponds have been positive in past years. Neither site uses the ponds for irrigation. Positive rhododendrons were also found in a commercial landscape in Pierce Co. These plants were traced forward from the *P. ramorum*-positive wholesale landscape nursery in Thurston Co. (found positive 3/30/12). (6/12)

Four California nurseries were found *P. ramorum* positive in June. The first confirmation was made at a Mendocino Co. retail nursery. The facility was also positive in 2008, 2010, and 2011; is not under compliance; and does not ship interstate. The second confirmation was made at a Mendocino Co. production nursery which has not previously been positive and does not ship interstate. The third nursery confirmation was made at a Sacramento Co. production facility. The nursery was also found positive in 2005, 2006, 2007, and 2011, and does ship interstate (to Nevada). The fourth confirmation was at a Sacramento Co. retail nursery. The nursery does not ship interstate and has not previously been positive. (7/12)

Washington has had 10 confirmed positive nurseries to date in 2012, the most in a single year since 2006. Counties with detections include King, Pierce, Thurston, Lewis, Clark, Clallam, and Skagit. Eight of the nurseries are repeat positives and six are certified interstate host shippers, three of which have shipped host and associated host plant material in the past 6 months. (7/12)

To date this year, ODA has confirmed 11 *P. ramorum*-positive nurseries in Clackamas, Curry, Lane, Lincoln, Marion, Multnomah, Polk, Tillamook, and Washington Counties. The positive plants found in the Curry Co. nursery (now closed for business) were infected with the EU1 lineage. No infected plants were found at the nursery during inspection last year; however, 13 infected plants were found this year. This is the first report of the EU1 lineage in Curry Co. ODA has implemented a voluntary recall for all potentially infected plants sold from the nursery.

Phytophthora ramorum was also detected at a private residence in Lane Co., OR during a trace-forward investigation from a WA nursery. The plants were still in their containers. (8/12)

A residential site in Placer Co., CA was found to have a *P. ramorum*-positive rhododendron plant on August 28th. The infected plant was planted in the middle of a lawn. No other host material was growing nearby. The plant was traced back to a retail nursery in Placer Co., which was confirmed positive in 2006 and 2009. (9/12)

To date this year, *P. ramorum* has been reported in 8 states (CA, OR, WA, NC, ME, NY, PA, and IN) and 33 nurseries, including 17 interstate shipping facilities (10 nurseries did ship material out of state) and 16 non-interstate shipping nurseries. Forty-seven percent of the finds were first time detections (CA-3, OR-7, WA-2, NY-1, IN-1) and 48 percent were repeat nurseries. Host plants from *P. ramorum*-positive nurseries were shipped to 33 states, with positive finds in 2 (ME, PA traced-back to OR) non-interstate shipping nurseries and four residential locations. Of the four (ME, OR, WA, CA) residential confirmations, two (ME, CA) were traced back to a nursery in OR and two (OR, WA) were traced back to a WA nursery. (11/12)

The nursery industry, along with the ANLA research branch (the Horticultural Research Institute) and regulators, has begun updating the 2008 "Nursery Industry BMPs for *Phytophthora ramorum* to prevent the introduction or establishment in CA nursery operations." (12/12)

FUNDING

The NORS-DUC fiscal year 2012/2013 Request for Proposals has been announced. Proposals reflecting short-term applied research, including, but not limited to, methods development to inhibit *P. ramorum* spread; mitigations to manage *P. ramorum*; and epidemiological studies on inoculum sources, pathways, soil sampling focal points, and disease distribution in nurseries are encouraged. Approximately $200,000 is available to fund projects. (3/12)

Of the $15.5 million allocated to California in 2012 via the 2008 Farm Bill - Section 10201, $978,745 has been awarded for *P. ramorum* projects related to safeguarding nursery production and enhancing mitigation capabilities. A complete list of funded projects is posted at http://www.aphis.usda.gov/plant_health/plant_pest_info/pest_detection/farm_bill.shtml.(6/1)

The USDA FS, PSW SOD/*P. ramorum* fiscal year 2012 funded research projects are available at http://www.fs.fed.us/psw/partnerships/sod/funding/. Five continuing projects were funded, for a total of $75,836. In addition, $236,840 from partners supported six projects.

MEETINGS

The Fifth SOD Science Symposium, held in Petaluma, CA, June 19 – 22, 2012, brought together researchers, regulators, land managers, and industry representatives from throughout the world working on SOD, *Phytophthora ramorum*, and other related forest and nursery pests. The Symposium included 52 talks and 25 posters from researchers around the globe as well as a "SOD: Biosecurity Concerns and Forest Restoration" field trip. There was also a community "Ask the Expert" evening session where the public was able to talk one on one with researchers and outreach specialists, and a special tanoak session focusing on the history, values, and ecology of tanoak. Presentations from the meeting as well as a

recording of the live stream can be accessed via the conference website at http://ucanr.org/sites/sod5/Agenda/. (7/12)

EDUCATION AND OUTREACH

Fourteen SOD Blitzes are planned for coastal California in 2012. These community citizen-scientist events are intended to educate impacted communities on *P. ramorum* and help identify local areas where SOD is present. Participants learn to identify disease symptoms, correctly sample symptomatic plants, and document sample locations. Samples will then be analyzed and results will be provided to the community for their use. (2/12)

"A Planner's Guide for Oak Woodlands" four-part webinar lecture series (with optional field trips) will be offered this spring. The goal of the series is to create an awareness of the ecological, economic, and social values of California's oak woodlands as well as present general planning strategies to ensure long-term oak woodland conservation. (2/12)

The August 2012 IUFRO Pathology Newsletter features the article "Communicating Forest Pathology Issues to a Broad Audience." The story discusses how forest diseases caused by Phytophthoras have become increasingly visible to the general public as trees within recreational areas have succumbed to disease. SOD (California), kauri dieback (New Zealand), and *P. cinnamomi* (Australia) are cited as three examples of devastating diseases involving Phytophthoras that have had good coordination among scientists and different levels of government, resulting in effective research programs and communications strategies being put in place. (8/12)

This fall, the UC Berkeley Garbelotto lab will be conducting community indoor and outdoor meetings at locations where SOD Blitzes occurred last spring. Indoor "Results" meetings are intended to update community members on the 2012 SOD Blitz results (http://nature.berkeley.edu/garbelotto/english/sodblitzresults.php). Outdoor "Field" meetings will be an opportunity to discuss SOD management options and demonstrate treatment techniques. (9/12)

RESOURCES

A new Forest Phytophthoras of the World website (www.ForestPhytophthoras.org) **and a** companion online journal called Forest Phytophthoras (http://journals.oregondigital.org/ForestPhytophthora/issue/view/261) are now available. The website is a place to capture and share the latest information on *Phytophthora* species affecting forests around the globe, and the journal provides a permanent location for publication of peer-reviewed articles concerning Forest Phytophthoras. (2/12)

The article "Treating irrigation water" in the February 2012 issue of Digger magazine, pages 42 – 45, discusses water treatment methods that can be effective at eliminating damaging water molds in nurseries. To access the piece by Jennifer Parke and Paul Fisher, go to http://www.oan.org/associations/4440/files/digger/Digger_201202_pp41-45_web.pdf. (3/12)

The Forest Insect Disease Leaflet on Port-Orford-Cedar Root Disease was updated. To access it, go to http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5346825.pdf. (3/12)

"The Past, Present, and Future of Sudden Oak Death" article by Janice Alexander (Outlooks on Pest Management, 23(2), April 2012, pp. 72-76**)** provides a summary of *P. ramorum* impacts and issues to date and touches on challenges moving forward. (6/12)

Two new *Phytophthora* videos have been produced in the UK to inform professionals and the public about *P. ramorum* and *P. kernoviae*. The shorter film was produced primarily for people with little previous knowledge of plant diseases, but who are interested in the natural environment and what they can do to help. The longer film is intended for professionals who work in environments where the diseases may be present or that could easily become contaminated. Both clips can be found at http://www.fera.defra.gov.uk/plants/plantHealth/pestsDiseases/phytophthora/video.cfm. (6/12)

SODMAP is now accessible through the COMTF homepage under quick links. It is an easily accessible database that currently displays approximately 9,000 laboratory-confirmed *P. ramorum* positive and negative samples collected by citizen scientists and researchers over the last 5 years. (7/12)

A section on *P. ramorum* is included in Cram, M.; Frank, M.; and Mallams, K., tech cords. 2012. Forest Nursery Pests, Agriculture Handbook No. 680. U.S. Department of Agriculture, Forest Service. 202 p. This revision replaces "Forest Nursery Pests, Agriculture Handbook No. 680" that was issued in December 1989. (11/12)

Three videos on *P. ramor*um in the UK are now available from the UK Forestry Commission. The videos address "Helicopter Surveillance of Tree Diseases," "Spotting *Phytophthora ramorum* Symptoms in Larch Trees," and "Identification of *Phytophthora ramorum* in the Lab." To access the videos, go to http://www.youtube.com/watch?v=LzG0Pq0Wy9s. (11/12)

"Trees, Pests, & People," a video on the impacts to walnut, avocado, and ash from invasive species, addresses how forest pests affect people's lives and how we can all help to protect our trees and forests. To access the video, go to http://www.dontmovefirewood.org/films/trees-pests-people/watch-the-film/watch-online.html. (11/12)

The Don't Move Firewood campaign has posted an "Interview with Sudden Oak Death Pathogen" to its website at http://www.dontmovefirewood.org/videos/interview-sudden-oak-death-pathogen.html. In the humorous video, SOD and a talk show host have an informative "talk" about what plants are affected, how to prevent the spread, and more. (12/12)

RELATED ISSUES

In the "Montesclaros Declaration," approximately 70 scientists from 17 countries are asking trade policy makers around the globe to phase out international trade in high-risk plants that put forest health at high risk while offering limited economic benefit. The group developed their proposal following an IUFRO meeting in Spain in 2011. The complete Declaration can be found at: http://www.iufro.org/science/divisions/division-7/70000/publications/montesclaros-declaration/. (2/12)

***Phytophthora austrocedrae* has been identified for the first time in England infecting juniper** (*Juniperus communis*) trees in Upper Teesdale, North Pennines. The pathogen infects the rare, native conifer through the root system, causing the foliage to decline and die. It is transmittable in ground water, infected plant material, and contaminated soil, making containment challenging. The pathogen was first

confirmed in the UK in 2011 on Lawson cypress (*Chamaecyparis lawsoniana* or Port Orford Cedar) and Nootka cypress (*Callitropsis nootkatensis*) at two sites in Scotland. (3/12)

Chestnut blight (caused by *Cryphonectria parasitica***) has been confirmed for the first time in** Britain on European sweet chestnut (*Castanea sativa*). The finds came from two small European sweet chestnut orchards in Warwickshire and East Sussex, central and southern England, respectively. Trees at both sites were from a nursery in France. (4/12)

Great Britain is experiencing an increase in *Dothistroma* needle blight of pine caused by *Dothistroma septosporum*. The Commission has suspended use of Corsican pine (*Pinus nigra*) in its forests in response to the level of risk which the pathogen poses. Infection is now increasingly being found on lodgepole pine (*P. contorta*) and native Scots pine (*P. sylvestris*), raising concerns for the iconic Caledonian pinewoods of the Scottish Highlands. The aerial survey program in the UK is mapping the distribution and extent of deterioration in pine plantations and native trees. (6/12)

Updated thousand cankers disease survey guidelines for 2012 can be found at http://www.aphis.usda.gov/plant_health/plant_pest_info/tcd/downloads/TCDSurveyGuidelines2012.pdf. The main modification to the guidelines is the addition of instructions on how to use the lure that has been developed for walnut twig beetle. (6/12)

The UK's FERA has posted a *Phytophthora austrocedrae* Rapid Assessment (RA) to their website (http://www.fera.defra.gov.uk/plants/plantHealth/pestsDiseases/praTableNew.cfm) for public comment. The intent of the RA is to gain feedback on two options for addressing *P. austrocedrae* confirmations. The first option is to take no action, based on findings that there is already limited distribution present in the UK. The second option is to pursue containment, pending further information about pathogen distribution. The second option would focus on eradicating infected nursery plants and limited outbreaks as well as containing outbreaks affecting highly sensitive or environmentally valuable sites. (8/12)

A shipment of 75 walnut logs being delivered to Orange Co., CA from Yankton, South Dakota for wood crafting was stopped at California's Yermo Border Protection Station when pest samples collected from the logs revealed the presence of the Cerambycidae (longhorn beetles). Upon pest identification, the driver elected to return out of state. (10/12)

Coast live oak, Engelmann oak (*Quercus engelmannii*), and other native trees in southern California are declining as a result of a new disease/beetle complex - a new *Fusarium* species vectored by an exotic polyphagous shot hole borer (*Euwallacea* sp.). A survey of the Huntington Botanical Garden and Los Angeles Arboretum found more than 100 infected host tree species, including many native trees, coast live oak, Engelmann oak, box elder (*Acer negundo*), and sycamore. The problem was first noticed on several residential avocado trees and in a commercial avocado grove in Los Angeles Co. in spring 2012. The fungus attacks the vascular system of infested trees, ultimately causing branch dieback and tree death. (11/12)

The goldspotted oak borer, *Agrilus auroguttatus*, was found for the first time in Riverside Co. in a recently killed California black oak (*Quercus kelloggii*) tree in Idyllwild. The November detection represents the first long-distance movement of the beetle in California from its known area of infestation

in San Diego Co., 40 miles to the south. It is believed to have made the jump to Idyllwild via infested firewood. (12/12)

In February 2012, Chalara dieback of ash (a serious disease of ash trees caused by the fungus *Chalara fraxinea*) was first found in England at a nursery after receiving infected trees from a Netherlands nursery. Since then, it has been found in numerous landscape settings as well as nurseries throughout the UK that have received young ash within the past 5 years.

In October and November, UK scientists confirmed a small number of outbreaks in several counties at sites in the wider natural environment, including established woodlands. These sites did not appear to have any association with recently supplied nursery stock, and a cluster of sites, based on proximity to Europe's mainland, raised the possibility of windborne infection. Consequently, ash trees across the UK were checked for signs of the disease in November in a "rapid survey." As of November 22nd, there have been 257 UK confirmed locations, including: 17 nursery sites, 105 recently planted sites, and 135 wider environment (e.g. established woodland) sites. (12/12)

RELATED RESEARCH

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Yemshanov, D.; Koch, F.H.; Ducey, M.; and Koehler, K. 2012. Trade-Associated P**athways of** Alien Forest Insect Entries in Canada. Biological Invasions. 14: 797-812. (6/12)

The proceedings of the "Global change and forest diseases : new threats, new strategies" meeting (IUFRO WG 7.02.02) held in the Monastery of Montesclaros, Cantabria (Spain), May 23-28, 2011, have been published in the Journal of Agricultural Extension and Rural Development and are available at http://www.academicjournals.org/JAERD/contents/2012%20cont/14MayConf.htm. (8/12)

Reviews in Nature and Science report that damage from fungal pathogens and closely related oomycetes are on the rise. This phenomenon is attributed to ever-increasing global trade and travel, in addition to the ability of fungi to persist in unfavorable conditions on many hosts. The articles are:

- **Fisher**, M.C.; Henk, D.A.; Briggs, C.J.; Brownstein, J.S.; Madoff, L.C.; McCraw, S.L.; and Gurr, S.J. 2012. Emerging Fungal Threats to Animal, Plant, and Ecosystem Health. Nature. 484: 186-194.
- **Kupferschmidt**, K. 2012. Attack of the Clones. Science. 337: 636-638. (9/12)

At the 6th IUFRO Meeting Working Party 7-02-09 in Córdoba-Spain, "*Phytophthora* in Forest and Natural Ecosystems Meeting," held September 9 – 14, 2012, a new *Phytophthora* species, *Phytophthora bilorbang*, was presented. The *Phytophthora* was isolated from diseased blackberry

(*Rubus anglocandicans*) in western Australia. Of note is that the same organism has been commonly isolated from water and riparian alder stands in western Oregon, where it had been provisionally named *Phytophthora* taxon oaksoil. The citations for the abstracts addressing the situation are:

- **Aghighi, S.**; Hardy, G.; Scott, J.K.; and Burgess, T. 2012. *Phytophthora bilorbang* prov. nom., a New Species Associated With Declining *Rubus anglocandicans* (Blackberry) in Western Australia. Presentation and Poster. 6th IUFRO Meeting Working Party 7-02-09, *Phytophthora* in Forests and Natural Ecosystems Meeting.
- **Sims, L.** and Hansen, E. 2012. An Ecological Role for *Phytophthora* taxon oaksoil in Western Oregon Riparian Ecosystems. Poster 67. 6th IUFRO Meeting Working Party 7-02-09, *Phytophthora* in Forests and Natural Ecosystems Meeting. (10/12)

PERSONNEL

UCCE Humboldt-Del Norte Counties hired Brendan Twieg, and Lenya Quinn-Davidson to work with Yana Valachovic on SOD-related issues. Brendan may be reached at bdtwieg@ucdavis.edu or (707) 889-1301 and Lenya may be reached at lquinndavidson@ucdavis.edu or (707) 445-7351. (2/12)

Dr. Wolfgang Schweigkofler joined NORS-DUC as an on-site plant pathologist in April. He will work on nursery detection and control of *P. ramorum*, collaborating with ongoing projects as well as planning and initiating new ones. Dr. Schweigkofler can be reached at wolfgang.schweigkofler@dominican.edu or (415) 257-1366. (5/12)

Karen Suslow, Nursery Co-Chair of the COMTF, has accepted a job as Program Manager for NORS-DUC. Karen will continue to serve as the NORS-DUC Steering Committee Nursery Chair and to participate in the ANLA Systems Approach review team and the *P. ramorum* BMPs Working Group. Karen may be reached at KarenSuslow@gmail.com. (10/12)

KUDOS

Yana Valachovic, UCCE Humboldt and Del Norte Counties, and David Rizzo, UC Davis, accepted a Chiefs' Partnership Award on May 16, 2012 from USDA Deputy Secretary Kathleen Merrigan. The annual award recognizes exemplary partnerships in support of conservation and forest stewardship. Valachovic and Rizzo accepted the award on behalf of the federal, state, tribal, and private partners involved in the Redwood Creek SOD project in Humboldt Co. (6/12)

CONDOLENCES

Howard Kuljian, his wife Mary Scott, and their son Gregory passed away on November 24th after a tragic accident at Big Lagoon beach in Humboldt Co. They are survived by their daughter Olivia. A fire ecologist at Six Rivers National Forest, Howard's work on SOD as it relates to fire has been a valuable resource. He, his wife, and son will be missed. (12/12)

CALENDAR OF EVENTS

2/8 - UC Berkeley SOD Treatment Workshop
3/7 - UC Berkeley SOD Treatment Workshop
4/11 - UC Berkeley SOD Treatment Workshop
4/21 – Marin County SOD Blitz
4/28 – East Bay (Berkeley) SOD Blitz

4/28 – East Bay (Orinda) SOD Blitz
5/1 - San Francisco (Presidio) SOD Blitz
5/1 - San Francisco (Golden Gate Park) SOD Blitz
5/1 - SOD and ramorum blight: Disease symptoms and management tactics in forests and nurseries workshop; Gasquet
5/2 - UC Berkeley SOD Treatment Workshop
5/5 - Carmel Valley SOD Blitz
5/8 - Sunol Community SOD Blitz
5/8 - SOD Update for Foresters and Land Managers Workshop; Fort Bragg
5/8 - Mendocino Co. SOD Community Meeting for the public; Fort Bragg
5/12 - Mount Tamalpais SOD Blitz; Marin
5/12 - Napa SOD Blitz
5/19 - Sonoma SOD Blitz
5/19 - Santa Cruz SOD Blitz
5/26 - Los Alto Hills SOD Blitz
6/2 - Woodside/Portola Valley SOD Blitz
6/2 - Atherton SOD Blitz
6/6 - UC Berkeley SOD Treatment Workshop
6/9 - South Skyline SOD Blitz
6/16 - Burlingame Hills SOD Blitz
6/19 – 6/21 – The Fifth Sudden Oak Death Science Symposium; Petaluma
9/5 - UC Berkeley SOD Treatment Workshop
10/4 - East Bay SOD Blitz 2012 Results Meeting (Berkeley/Oakland/Orinda); Berkeley
10/5 - Garber Park SOD Field Meeting; Oakland
10/6 - Tilden Park SOD Field Meeting; Berkeley
10/6 - Knowland Park SOD Field Meeting; Oakland
10/12 - Sonoma/Marin SOD Blitz 2012 Results Meeting; Santa Rosa
10/13 - Sonoma County SOD Field Meeting #1; Sebastopol
10/13 - Sonoma County SOD Field Meeting #2; Santa Rosa
10/14 - East Bay/Lafayette/Orinda SOD Field Meeting; Lafayette
10/17 – UC Berkeley SOD Treatment Workshop
10/20 - Carmel Valley SOD Blitz 2012 Results Meeting
10/20 - Carmel Valley SOD Field Meeting
10/20 - Santa Lucia SOD Field Meeting
10/26 - Woodside/Portola Valley/Emerald Hills SOD Blitz 2012 Results Meeting
10/27 - San Mateo County, Portola Valley Ranch SOD Field Meeting
10/28 - San Mateo County, South Skyline SOD Blitz 2012 Results Meeting
10/31 - UC Berkeley SOD Treatment Training Workshop
11/2 - Atherton/Los Altos Hills SOD Blitz 2012 Results Meeting
11/3 - Los Altos Hills SOD Field Meeting
11/4 - Burlingame Hills SOD Field Meeting
11/7- 8 - Annual Meeting of the California Forest Pest Council; Sacramento
11/9 - Napa SOD Blitz 2012 Results Meeting
11/10 - Santa Cruz SOD Blitz 2012 Results Meeting
11/14 - UC Berkeley SOD Treatment Training Workshop

11/15 - San Francisco SOD Blitz 2012 Results Meeting; Golden Gate Park Presidio and Golden Gate Park, San Francisco
11/15 - Muir Heritage Land Trust (MHLT) Community Meeting: Managing for Sudden Oak Death; Martinez
11/16 - Marin County SOD Blitz 2012 Results Meeting
11/17 - West Marin SOD Field Meeting
11/17 - Marin/Mt. Tamalpais SOD Field Meeting