



CALIFORNIA OAK MORTALITY TASK FORCE REPORT DECEMBER 2011

Note: The COMTF report is produced 11 times a year. There will be no report in January 2012. The next report will be issued the first week of February 2012.

FUNDING

The USDA Forest Service, Pacific Southwest Region, State and Private Forestry, Forest Health Protection program has issued its 2012 *P. ramorum* Request for Proposals (RFP) for management projects. Approximately \$500,000 in grants is expected to be available in federal fiscal year 2012. Proposals should focus on: detection and evaluation of pathogen presence, management activities that could limit the impact of Sudden Oak Death (SOD) in California or southwest Oregon, pathology activities that will provide new information on the spread of *P. ramorum*, and activities that promote the exchange of relevant information. In general, proposals should be for grants of between \$10,000 and \$100,000 per year. Multi-year, collaborative projects are encouraged. The submission deadline is January 27, 2012. For a copy of the announcement, go to <http://www.suddenoakdeath.org/wp-content/uploads/2011/12/SOD-RFP-2012.pdf>. For questions, email [Phil Cannon](mailto:Phil.Cannon@aphis.usda.gov) or call (707) 562-8913.

RESEARCH

Shishkoff, N. 2011. A test system to quantify inoculum in runoff from *Phytophthora ramorum*-infected plant roots. *Phytopathology* 101:1457-1464.

Abstract: Foliar hosts of *Phytophthora ramorum* are often susceptible to root infection but the epidemiological significance of such infections is unknown. A standardized test system was developed to quantify inoculums in runoff from root-infected *Viburnum tinus* 'Spring Bouquet' or *Rhododendron* 'Cunningham's White' cuttings. Cuttings of both species gave off a maximum amount of inoculum 1 to 3 weeks after inoculation. The greatest amount of inoculum was recovered from *Viburnum* roots that were 48 to 70 days old at the time of inoculation, or roots incubated at 15 to 20°C rather than 25°C. Inoculum in runoff from inoculated *Viburnum* roots was similar for four different isolates of *P. ramorum* representing both the NA1 and EU1 lineages. When *Rhododendron* cuttings were inoculated with *P. ramorum*, *P. citricola*, or *P. cactorum*, inoculum of all three pathogens was recovered from runoff, with the highest amount recovered from plants inoculated with *P. citricola*, followed by the other two. Compared with the other two pathogens, *P. ramorum* colonized root tissue to a smaller extent. The epidemiology of root infection by *P. ramorum* is important in itself but the assay might lend itself for use in risk analysis for root infection of other plant species and evaluation of control measures, and also shed light on other root-infecting *Phytophthora* spp.

REGULATIONS

Canada/United States bilateral talks on *P. ramorum* policy - The USDA Animal and Plant Health Inspection Service *P. ramorum* program manager and trade director for



Canada attended a meeting hosted by CFIA (Canadian Food Inspection Agency) in Vancouver, British Columbia (BC) November 8 - 9, 2011 to discuss certification processes for shipments of *P. ramorum* host plants from Canada as well as other international commerce concerns. Regulatory survey data in addition to protocols and harmonization of regulations and host lists were reviewed, and visits were conducted to three propagation nurseries in BC under the Canadian Nursery Certification Institute (CNCI) Program. To date, *P. ramorum* detections in BC have only been in retail establishments and not in propagation nurseries which are the major shippers of host plants to the US.

MANAGEMENT

Fire Safe Sonoma received a \$120,000 grant for Sonoma County Roadside Hazard Fuels Survey and Removal from the USDA Forest Service through the California Fire Safe Council Grants Clearinghouse. The purpose of the project is to survey, prioritize, and treat roadside vegetative fire fuels build up and hazard trees, particularly on roadways impacted by SOD or other diseases. Approximately 150 miles of SOD and/or beetle impacted roads throughout Sonoma County will be surveyed in an effort to prioritize treatment areas. Project decisions will be guided collaboratively by fire and road agencies, professionals working with SOD, and the private sector.

NURSERIES

The National Plant Board (NPB) sponsored a workshop in November on best management practices (BMP) for nurseries and soil remediation for *P. ramorum*. NPB members from seven states and representatives from the USDA Plant Protection Quarantine National *P. ramorum* program attended. Presentations covered the California Department of Food and Agriculture BMP Program, repeat positive nursery issues from a grower's perspective, the Oregon Department of Agriculture Grower Assisted Inspection Program, and the California Association of Nurseries and Garden Centers Multiple Pest Management Program (currently under development in collaboration with the UC Nursery and Floriculture Alliance).

The field component of the meeting included visiting a repeat positive nursery. There attendees were able to hear from the nursery owner as well as gain information about two studies currently underway on site. One of the projects, conducted by Tim Widmer (USDA Agricultural Research Service), incorporates *Trichoderma* into contaminated soil. Widmer's work began over a year ago at the National Ornamentals Research Site at Dominican University of California (NORS-DUC). Early lab studies indicated that *Trichoderma* may be efficacious against *P. ramorum*. The nursery study is the first field test to be conducted. The second study demonstrates steam disinfection of contaminated soil at the nursery based on work conducted by Sheila Johnson-Brousseau and Glenn Copeland (NORS-DUC). This project has focused on using steam (per the permit requirement) to sterilize soil, pots, tools, plants, and substrate. Temperatures attained by steaming are documented by probes and data is being collected. Preliminary observations indicate the steam appears to be effective and may prove to be a feasible tool for destroying *P. ramorum* in soil. The group then toured the NORS-DUC facility



and heard presentations on soil remediation studies underway, including work by Steven Jeffers (Clemson University), exploring the efficacy of copper hydroxide to prevent dissemination and establishment of *P. ramorum* in nursery soils.

RELATED ISSUES

Patterns of Firewood and Forest Pests Brought to California in 2011, By Matthew Bokach, USDA Forest Service, Pacific Southwest Region Forest Health Protection

In the last year (October 2010-September 2011), over 18 million pounds of firewood were recorded entering the State by the California Department of Food and Agriculture (CDFA). The Hornbrook, Redwood Highway, and Alturas border stations were the top three entry points. Firewood came from 47 other states, Canada, and Mexico, with 87% of the wood by mass coming from Oregon, California, Arizona, and British Columbia. Most (86%) of the firewood was being taken to a destination in California, and almost half of the remaining wood was being carried to Reno, NV. Firewood in commercial vehicles was expected to travel over twice as far on average than wood in private vehicles: 185 miles versus 87.

Over the same time period, CDFA border stations intercepted 317 potential forest pests. The majority of these (93%) were beetles (longhorned, bark beetles, and wood borers). Almost half of the potential forest pests (44%) were intercepted at the Needles station, followed by the Meyers (15%) and Redwood Highway (10%) stations. Over 90% of the intercepted forest pests were intercepted in private vehicles.

Pests were intercepted in firewood that originated in 36 other states, California, and Canada, with the top origins being Arizona, Oregon, Colorado, and Texas. However, over a quarter of the pests were intercepted in vehicles bearing California license plates. Californians brought firewood containing forest pests back to the state from at least 17 other states. Most of these were in the West but pests were brought back to California from as far away as Georgia and Alabama. Vehicles with license plates from Colorado (9%) and Texas (5%) were the next most frequent.

Nearly all (97%) of the intercepted forest pests were going to a destination in California and there were 122 destinations total. Top destinations were: the Los Angeles urban area (31 pests), the San Francisco-Oakland urban area (20), the Sacramento urban area (19), Yosemite National Park and the Riverside-San Bernardino urban area (15 each), Barstow (12), the Victorville urban area (11), and Placerville (10).

An analysis of the factors that best predicted destinations for firewood coming from outside California was conducted. Using logistic regression and Akaike's information criterion, it was determined that out-of-state firewood in private vehicles was more likely to go to areas with higher populations, larger numbers of homes that heated with wood, larger numbers of visitors to public campgrounds, and lower median incomes. Commercial loads of firewood were more likely to go to areas with higher populations, larger numbers of homes that heated with wood, and greater overall truck traffic.



Alder *Phytophthora*: Native or Exotic? --Surprising New Findings - Throughout Europe, alder species have been devastated by Alder *Phytophthora*. Consequently, there has been significant concern that epidemic levels of alder mortality could also occur in the US if these *Phytophthora* were introduced here. To address these concerns, the USDA FS Forest Health Technology Enterprise Team developed risk models, analyzing the likelihood of introduction, establishment, and spread of *P. alni* on susceptible alder in the lower 48 states (http://www.fs.fed.us/foresthealth/technology/invasives_phytophthoraalni_riskmaps.shtml). Then, in 2007, a subspecies of *P. alni* was discovered in Alaska under alder stands exhibiting considerable sudden mortality. It was later determined that the subspecies was widespread and capable of infecting Alaskan alder species.

Phytophthora alni is recognized as a species that resulted from hybridization of other *Phytophthora* species. The Alder *Phytophthora* are a subspecies group of *P. alni*: *P. alni* ssp. *alni* (PAA), *P. alni* ssp. *multiformis* (PAM), and *P. alni* ssp. *uniformis* (PAU). The parent species could not infect alder and the hybrids exclusively infect alders, so these hybrids are of special interest to scientists as one of only a small sample of plant pathogens shifting hosts following hybridization. How likely is it that hybrids will form in nature? How likely is it they will jump hosts? We do not yet know.

European forest pathologists have considered their Alder *Phytophthora* to be exotic invasive pathogens that entered Europe prior to 1993 and began causing widespread damage. But, proving a pathogen is exotic requires detailed population genetic analysis, as does determining if it is native. To this end, this year cooperative research between European and American pathologists has uncovered some cogent information on the subspecies PAU that occurs in Alaska and Europe. Population genetic studies of many isolates of PAU support the opinion that PAU is native to Alaska. Analysis has also found that the European population appears to be very limited in genetic diversity, and therefore presumably clonal in nature. Conversely, the Alaskan population is sexually reproducing, showing much higher levels of diversity and heterozygosity. Additionally, the differentiation between the two populations is high, with many unique alleles in both European and Alaskan isolates. While the alleles in the European population were not found in the Alaskan population of PAU, suggesting that Alaska is not the origin of the European introduction, the sample size of Alaskan isolates to date has been small, suggesting that there is a chance that the unique alleles present in Europe could be rare Alaskan alleles that were missed in current collections. These findings support the hypotheses that the Alaskan PAU population is likely endemic while the European PAU population is likely invasive, and the present data do not point toward an Alaskan origin of the European population. These results are presented in a poster at a COST FP0801 meeting on "Established and Emerging *Phytophthora*: Increasing Threats to Woodland and Forest Ecosystems in Europe," held last month in Budapest, and authored by J. Aguayo, B. Marçais, P. Frey and others from Nancy-Université, France and G. Adams from Michigan State University.



The results on the Alaskan PAU study agree with the ecological scenario of widespread occurrence of PAU beneath alders but low propagule numbers and scarce symptoms of root rot. Despite five years of intensive sampling for *Phytophthora* species under diseased and healthy alder, the subspecies PAM, PAA, and the suspected parent species *P. cambivora* have not been discovered in Alaska. Today the pathologists working on alder mortality in Alaska believe the damage is not the result of the Alder *Phytophthora*, but rather the result of climate induced susceptibility to alder canker pathogens and a later antagonist defoliator that has worsened the damage. However, concern is yet warranted because PAU hybridizing with PAM is believed to result in formation of PAA, the most highly virulent of the Alder *Phytophthora* subspecies and introduction of either PAM or PAA into the Alaskan riparian forests is predicted to result in long-term alder devastation.

***Phytophthora lateralis* has been confirmed in Lawson cypress trees at**

Blubberhouses, near Otley in North Yorkshire, England. This is the second confirmed outbreak in the country. The first UK finds were made last year in Scotland, followed this year by cases in Northern Ireland and Devon in southwest England. France and the Netherlands have also recently confirmed outbreaks.

The affected trees are on sites owned by Yorkshire Water, the British Canoe Union, and private owners alongside the River Washburn near Fewston Reservoir. The Forestry Commission has served Plant Health Notices on the owners requiring them to fell and destroy the trees in an effort to contain the disease and prevent it spreading. All owners are cooperating.

RELATED RESEARCH

Campbell, F. 2011. The hidden cost of trade: Invasive species as a trade “externality.” Bridges Trade BioRes Review, Volume 5, Number 3. Available online at <http://ictsd.org/i/news/bioresreview/117729/>.

Harrington, T.C.; McNew, D.; and Young Yun, H. 2011. Bur oak blight, a new disease on *Quercus macrocarpa* caused by *Tubakia iowensis* sp. nov. Mycologia. In press. DOI: 10.3852/11-112.

Kale, S.D. 2011. Oomycete and fungal effector entry, a microbial Trojan horse. New Phytologist. DOI: 10.1111/j.1469-8137.2011.03968.x.

Nechwatal, J.; Hahn, J.; Schönborn, A.; and Schmitz, G. 2011. A twig blight of understorey European beech (*Fagus sylvatica*) caused by soilborne *Phytophthora* spp. Forest Pathology 41, pages 493–500. DOI: 10.1111/j.1439-0329.2011.00711.x.

WWW.SUDDENOAKDEATH.ORG

The COMTF is revising criteria for the arborist and pesticide applicator list at www.suddenoakdeath.org. As of January 2012, arborists and pesticide applicators must have attended a *P. ramorum* training session on disease symptom recognition, sampling, and treatment applications within the last three years to be listed. Professionals that have



not attended a class since 2009 will be removed from the list. If you are in need of updating your training or if you are interested in joining our list of professionals, please watch for upcoming workshops posted on our [Calendar of Events](#). To request additional training opportunities for our consideration, please submit a [Workshop Request](#). Professionals needing to update their online contact information can do so by filling out and submitting the “Professionals Trained in Sudden Oak Death” [online form](#). Once received, your information will be updated online.

RESOURCES

A website devoted to kauri dieback is now online at www.kauridieback.co.nz. The site provides information about *Phytophthora taxon Agathis* (PAT), the fungus-like pathogen first identified in 2008 that causes the disease in New Zealand’s kauri trees as well as information on disease prevention, the kauri tree, related publications, and much more.

CALENDAR OF EVENTS

- 6/18 – 6/22/12 – Sudden Oak Death Fifth Science Symposium; More information** will be forthcoming.
- 9/9 – 9/14/12 – Sixth Meeting of the International Union of Forest Research Organizations IUFRO Working Party 7-02-09 “Phytophthora in Forests and Natural Ecosystems;”** Colegio Mayor Universitario Nuestra Señora de la Asunción, Avd. Menéndez Pidal s/n, 14004 Córdoba, Spain; For more information, contact M^a Pérez Sierra at aperesi@eaf.upv.es.