



CALIFORNIA OAK MORTALITY TASK FORCE REPORT FEBRUARY 2014

REGULATIONS

Updates to the USDA Animal and Plant Health Inspection Service (APHIS)

Phytophthora ramorum Regulation - A Federal Order (DA-2013-27) was issued July 2013 that dropped certification requirements (annual inspections, sampling, and testing) for non-host nurseries in the regulated areas of CA, OR, and WA. The intent of the Order is to reduce the regulatory burden on the more than 1,500 nurseries where *P. ramorum* has not been detected since regulations for nurseries outside the quarantine area were first put in place 10 years ago. This change does not apply to the quarantine counties (14 CA counties and part of Curry County, OR).

Additionally, as a result of 3 years of analysis by APHIS Plant Protection and Quarantine (PPQ) in collaboration with subject matter experts from the State Departments of Agriculture, the National Plant Board, and industry, another Federal Order (DA-2014-02) was issued January 10, 2014 with an implementation date of March 31, 2014. This Order targets high-risk nurseries (recently and/or recurrently positive in the past 3 years) and requires an enhanced compliance program. All nurseries found positive in the past 3 years that wish to retain interstate shipping status will be subject to increased inspection, sampling, and testing. In addition, any U.S. interstate shipping nursery found positive will be regulated and required to address critical control points (CCPs) via remediation, mitigation, and best management practices (BMPs) in order to retain their interstate shipping status. Conversely, certification and annual inspection, sampling, and testing will no longer be required for host nurseries in the regulated areas where *P. ramorum* has never been detected or has not been detected in the last 3 years. This relieves the regulatory burden for more than 1,400 nurseries in the regulated areas of CA, OR, and WA. APHIS will provide FY14 funding to regulated states to conduct CCP/BMP outreach to host nurseries where certification is no longer required.

For more information on the latest Federal Order, go to http://www.aphis.usda.gov/plant_health/plant_pest_info/pram/downloads/pdf_files/DA-2014-02.pdf or contact Stacy E Scott, USDA APHIS PPQ, at (970) 494-7577 or stacy.e.scott@aphis.usda.gov.

On February 19th, the USDA Animal and Plant Health Inspection Service (APHIS) Plant Protection and Quarantine in Washington will host a Tabletop Emergency Response Exercise using a *P. ramorum* wildland detection scenario. Federal, state, tribal, and university personnel will participate. The focus of the exercise will be to practice using the Incident Command System (ICS) to address such a detection as a cohesive unit, not to develop solutions. All participants represent key players that would be present in a real-world *P. ramorum* wildland confirmation scenario.



MONITORING

Oregon Wildland Update - Over the past year, no new infested sites have been found outside of Oregon's 264 mi² expanded quarantine area. Disease and associated tanoak mortality continue to intensify and spread within the Generally Infested Area (GIA), which was increased to 56 mi² in November 2013 (figure 1). Eradication treatments (cutting and burning infected and nearby host plants) are no longer being conducted on private land inside the GIA, but the USDI Bureau of Land Management (BLM) continues to treat all infestations on their land. Outside of the GIA, all infested sites are being cut and burned in order to slow pathogen spread. The size of treatment area buffers is being adjusted so that all high priority infestations receive some level of treatment. Stream baiting results were negative for *P. ramorum* in drainages located at or beyond the Quarantine boundary. For more information contact Alan Kanaskie, Oregon Department of Forestry, at alan.kanaskie@state.or.us.

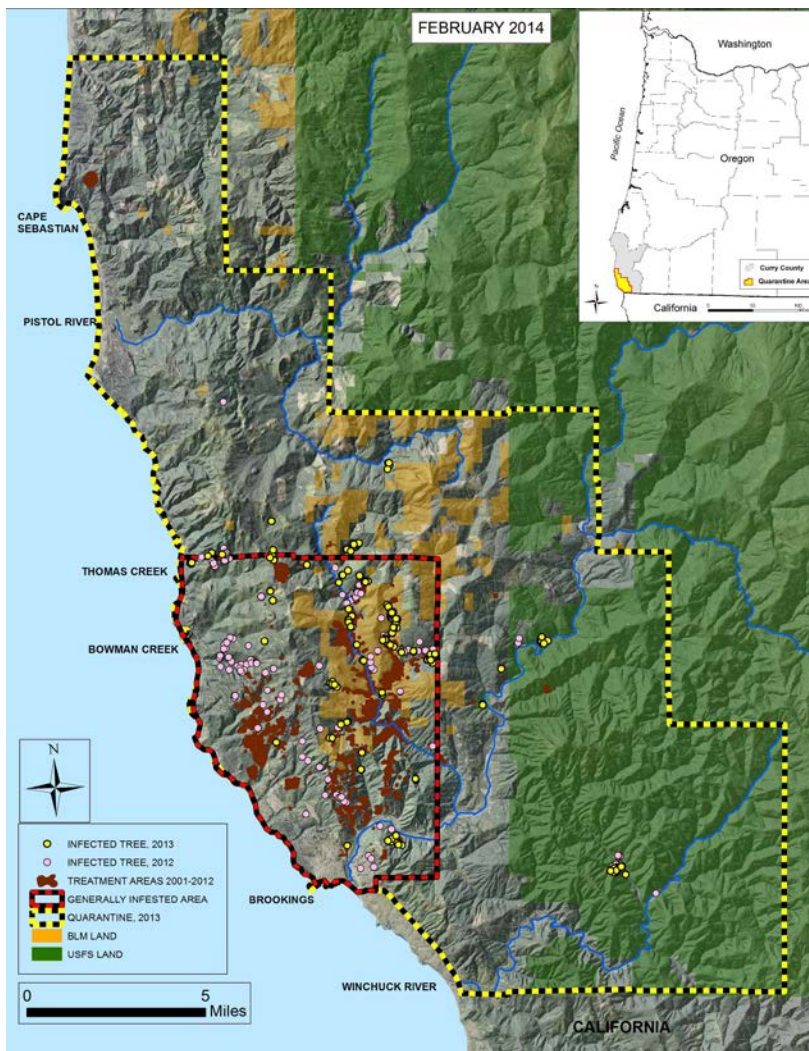


Figure 1. Location of sites infested with *Phytophthora ramorum* in southwest Oregon that were discovered in 2012 and 2013 (as of February, 2014). On many of the sites shown, infected and nearby host plants have been cut and burned in order to slow spread of the disease.



In California, SOD survey results from 2013 that have been laboratory validated are now being accepted for inclusion in the 2014 SODmap (www.sodmap.org). Both positive and negative plant, soil, and water findings will be accepted. Use the [Instructions for Submission of Data to SODmap](#) along with the [SODmap Submission Form for 2014](#) for logging results prior to submission. All submissions for SODmap are due via email by March 15th to dschmidt@berkeley.edu.

SODmap is the most complete distribution map available for *Phytophthora ramorum*/ Sudden Oak Death. It is the database accessed by SODmap mobile (app available for free for iPhone and Android), which allows users to identify known infected trees in the field as well as calculate risk for oak infection at the time and location of the user. For questions regarding SODmap or the submission process, contact Doug Schmidt at dschmidt@berkeley.edu.

RESEARCH

Bienapfl, J.C. and Balci, Y. 2014. Movement of *Phytophthora* spp. in Maryland's Nursery Trade. Plant Disease. 98(1): 134-144.

Phytophthora spp. cause major losses in the nursery industry worldwide. However, a clear demonstration of the route of movement has not been previously shown. A survey of 10 Maryland nurseries was conducted over a 3-year period to investigate the presence of *Phytophthora* spp. on newly arrived plants, mainly from West Coast suppliers. Local nursery plants, irrigation water, and potting media were also sampled for *Phytophthora* spp. Isolates were identified using a combination of morphological characteristics and DNA sequencing. Species identified included *Phytophthora cactorum*, *P. cambivora*, *P. cinnamomi*, *P. citrophthora*, *P. drechsleri*, *P. elongata*, *P. gonapodyides*, *P. hydropathica*, *P. irrigata*, *P. lacustris*, *P. multivora*, *P. nicotianae*, *P. pini*, *P. plurivora*, and *P. syringae*. *P. taxon pgchlamydo* was also isolated from irrigation water. Eight of the abovementioned *Phytophthora* spp. were isolated in association with incoming material, indicating that the movement of these pathogens continues to occur. Asymptomatic plant material was the main route of introduction of *Phytophthora* spp. to Maryland nurseries. Results also indicated that several *Phytophthora* spp. could be found in Maryland nurseries in association with infested potting media of asymptomatic plants. Although *P. ramorum* was not detected, our surveys underscore the significance of nursery practices that allow introductions of these significant plant pathogens to new geographic locations.

Franceschini, S.; Webber, J.F.; Sancisi-Frey, S.; and Brasier, C.M. 2013. Gene × Environment Tests Discriminate the New EU2 Evolutionary Lineage of *Phytophthora ramorum* and Indicate that it is Adaptively Different. Forest Pathology. DOI: 10.1111/efp.12085.

Summary: A new evolutionary lineage of the destructive introduced tree pathogen *Phytophthora ramorum*, EU2 lineage, was recently discovered attacking larch and other hosts in Northern Ireland and south west Scotland, UK. Sixteen 'medium × agar



concentration × incubation temperature' stress environments were tested to find a rapid and repeatable method to discriminate the known EU2 lineage from the EU1, NA1 and NA2 lineages in culture, in particular from the EU1 already prevalent across the UK; and to investigate whether EU2 might be adaptively different. At 28°C on both carrot agar and V8 juice agar, the mean radial growth rates of all four lineages were significantly different, with NA2 > EU2 > EU1 > NA1. At this temperature, EU2 colonies were not only phenotypically distinct from EU1 and all other lineages but on average grew three times as fast as EU1. This indicates that EU2 is adaptively different from EU1. Twelve days growth in the environment 'V8A/2% agar/28°C gave excellent discrimination of all four lineages in three repeat experiments, including clear discrimination of EU2 from EU1. Each lineage exhibited a distinctive colony pattern. The utility of this test environment was examined further by screening fresh UK isolates of unknown lineage from new larch outbreak sites alongside standard isolates. The lineage assignments predicted were corroborated by gene sequencing and RFLP profiling. These results also revealed that the EU2 lineage was present at several new larch sites in south west Scotland, whereas isolates from geographically adjacent areas such as the Isle of Mull, north west Scotland, the Isle of Man and north west England were all of EU1 lineage.

Shrestha, S.K.; Zhou, Y.; and Lamour, K. 2013. Oomycetes Baited from Streams in Tennessee 2010–2012. Mycologia. 105: 1516-1523.

Abstract: Sixteen streams in middle and eastern Tennessee were surveyed for the sudden oak-death pathogen *Phytophthora ramorum* from 2010–2012. Surveys were conducted in the spring and fall using healthy *Rhododendron* leaves, and a total of 354 oomycete isolates were recovered. Sequence analysis of the ITS region provisionally identified 151 *Phytophthora*, 200 *Pythium*, two *Halophytophthora* and one *Phytopythium*. These include six *Phytophthora* species (*P. cryptogea*, *P. hydropathica*, *P. irrigata*, *P. gonapodyides*, *P. lacustris*, *P. polonica*), members of the *P. citricola* species complex, five unknown *Phytophthora* species, 11 *Pythium* species (*P. helicoides*, *P. diclinum*, *P. litorale*, *P. senticosum*, *P. undulatum*, *P. vexans*, *P. citrinum*, *P. apieroticum*, *P. chamaihyphon*, *P. montanum*, *P. pyrilobum*), three unknown *Pythium* species, *Halophytophthora batemanensis*, and one *Phytopythium* isolate. The biology and implications are discussed.

MANAGEMENT

Wales has posted a new *P. ramorum* Disease Management Strategy and Disease Zone Map to their website at

<http://wales.gov.uk/topics/environmentcountryside/forestry/documents/phytophthora-ramorum-wales-disease-management-strategy/?lang=en>.

The report states that *P. ramorum* is the most serious tree disease problem to have affected forests in Wales, and that its rapid spread over the past year has led to serious economic, social, and environmental impacts. Management options, regulations, and prioritization of treatment types are discussed.

NURSERIES

California 2013 Nursery Summary - In 2013, the California Department of Food



and Agriculture inspected 1,575 nurseries and processed 18,013 *P. ramorum* compliance samples. The pathogen was detected on a *Loropetalum chinense* (5 gal) plant at one nursery (Gilroy, Santa Clara Co.). The facility was also positive in 2004 and 2005. The USDA Confirmed Nursery Protocol (CNP) was completed. In 2013, the pathogen was not recovered at any other nurseries in California.

Oregon 2013 Nursery Summary – The Oregon Department of Agriculture tested 22,550 samples from 552 grower sites for *P. ramorum* in 2013. *Phytophthora* species were detected at 238 of the sites surveyed. *Phytophthora ramorum* was detected in 10 facilities on *Camellia* 'April Dawn' and 'Rosehill Red'; *Choisya ternate*; *Gaultheria shallon*; *Kalmia* sp.; *Parrotia persica*; *Pieris japonica* 'Forest Flame'; *P. taiwaneensis*; *Rhododendron* cultivars Anah Kruschke, Baden Baden, Boule de Neige, Cheer, Cunningham's White, Orange Leopard, and Unique; *R. bathyphyllum*; *Rhododendron* sp.; *Trachelospermum jasminoides*; *Viburnum tinus* 'Spring Bouquet'; and *Viburnum* sp. Delimitation surveys within the *P. ramorum*-positive nurseries detected additional positives from *Magnolia grandiflora*; *Rhododendron* cultivars Baden Baden, Blewbury, Goldkroner, Lee's Dark Purple, Magret's Garden, Pohoob's Daughter, Raisa Dogwood, Rekka, and Unique; *Rhododendron* spp.; *Viburnum* 'Pink Dawn', soil from an infested pot, in-ground soil; and a cull pile. All of the nurseries have undergone CNP. As two of the positive facilities still have *P. ramorum* present in the native soil that was beneath infested plants, they have agreed to trial steam treatments of the infested soil in 2014 to eradicate the pathogen.

RELATED RESEARCH

Montecchio, L. and Faccoli, M. 2013. First Record of Thousand Cankers Disease *Geosmithia morbida* and Walnut Twig Beetle *Pityophthorus juglandis* on *Juglans nigra* in Europe. Plant Disease. 98. In Press. <http://dx.doi.org/10.1094/PDIS-10-13-1027-PDN>.

Weed, A.S.; Ayres, M.P.; and Hicke, J.A. 2013. Consequences of Climate Change for Biotic Disturbances in North American Forests. Ecological Monographs. 83(4): 441–470.

Yang, X.; Gallegly, M.E.; and Hong, C. 2014. A High-Temperature Tolerant Species in Clade 9 of the Genus *Phytophthora*: *P. hydrogena* sp. nov. Mycologia. 13-043.

The 2013 Kauri Dieback Symposium was held November 30 – December 1, 2013 in Auckland, New Zealand. The following 10 presentations were given at the Symposium on related research topics. To access the abstracts, go to <http://www.kauridieback.co.nz/media/38169/kauri%20symposium%202013%20-%20abstracts.pdf>.

Bellgard, S.E.; Weir, B.S.; Pennycook, S.R.; Paderes, E.P.; Johnston, P.R.; and Buchanan, P.K. Detection and Taxonomy of *Phytophthora* 'taxon Agathis'
Burns, B. The Kings of the Forest: Kauri Biology and Kauri Forest Ecology



McEntee, M. The Challenge of Communicating Complexity

Hardy, G.; Burgess, T.; Dunstan, B.; Paap, T.; and Crone, M. Living with *Phytophthora* Dieback: An Australian Perspective

Horner, I. and Hough, E. Phosphite Treatment to Manage Kauri Dieback

Scott, P. The Biology, Ecological Impact and Management Options *Phytophthora* Diseases in Natural Ecosystems

Schwendenmann, L.; Althuizen, I.; van der Westhuizen, D.; Macinnis-Ng, C.; Perry, G.; and Waipara, N. Impacts of Kauri Dieback on Key Ecosystem Processes

Steward, G. Kauri Plantation Opportunity

Waipara, N. and Beauchamp, T. Surveillance and Management of Kauri Dieback

Williams, N. *Phytophthora* Diseases Within New Zealand Forests

RESOURCES

Swiecki, T.J.; Bernhardt, E.A. 2013. A Reference Manual for Managing Sudden Oak Death in California. Gen. Tech. Rep. PSW-GTR-242. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. 129 p. To order a free copy, or to download it online, go to http://www.fs.fed.us/psw/publications/documents/psw_gtr242/.

Description: This publication contains background information and guidance for resource management professionals and landowners to understand and manage sudden oak death (SOD) in California forests. The publication is divided into three chapters: Chapter 1 discusses the epidemiology of SOD in California and includes information on biology of the pathogen *Phytophthora ramorum*, host-pathogen interactions, disease spread, and environmental conditions that affect disease development. An understanding of these relationships is needed to choose the most appropriate strategies for managing SOD at a given location. Chapter 2 describes how to develop a plan to manage SOD within a stand and how to identify and prioritize areas that may be suitable for SOD management activities. Options for managing SOD are presented by stage in the disease epidemic: before the SOD pathogen has reached a susceptible forest; during the local epidemic, while disease is active in an area and many hosts are still at risk of becoming diseased; and after SOD has killed so many host trees that forest restoration needs to be considered. Chapter 3 provides descriptions of management techniques.

MEETINGS

The “Visualizing Sudden Oak Death” E-conference, being held February 10 – 21, 2014 is underway. A recording of the webinar (held February 11th), as well as supporting documents, can be found online at <http://www.suddenoakdeath.org/news-and->



[events/visualizing-sudden-oak-death/status-of-sod-webinar/](http://www.suddenoakdeath.org/news-and-events/visualizing-sudden-oak-death/). The Google+Hangout (held February 13th) was also recorded and can be found at <http://www.youtube.com/watch?v=q9IKpo0ff6U>.

Please visit <http://www.suddenoakdeath.org/news-and-events/visualizing-sudden-oak-death/> to participate in the online forum; peruse the Fourth Art of Saving Oaks gallery and the SOD art gallery; or watch a video.

The annual North Coast Sudden Oak Death Meeting will held on Wednesday, February 26th from 10:00 a.m. to 2:30 p.m. in Eureka (UC Cooperative Extension Auditorium; 5630 South Broadway). Presentations from UC Cooperative Extension, private and public land managers, and researchers from UC Davis and the USDA Forest Service will focus on the management of SOD in Northern coastal California counties. This meeting is intended for private and public natural resource managers and professionals, as well as those interested in the management of sudden oak death. Advanced registration is required and costs \$10 (lunch included). For more information, or to register, go to <http://cehumboldt.ucanr.edu/> or call (707) 445-7351.

EDUCATION AND OUTREACH

Seventeen SOD Blitzes will be offered this year throughout communities impacted by *P. ramorum*. Community members living near areas known to be impacted by SOD are encouraged to attend a Blitz and learn how to look for the disease so that they can monitor for it in their community, facilitating early detection of new outbreaks. As symptomatic California bay laurel leaves generally precede oak and tanoak infections, and are often the first sign that *P. ramorum* is in a location, participants will be trained to identify and collect symptomatic bay leaves and record sample locations. Those that have attended a training before should still attend one this year to receive necessary supplies as well as to learn how to identify key bay trees that allow for survival of the pathogen during drought years. Samples will be taken to the Garbelotto lab at UC Berkeley to determine the presence or absence of the pathogen. Results will be published in the fall at www.sodblitz.org.

Blitz participants are encouraged to bring their iPhone or Android smartphone to the training session so they can learn how to use their mobile device as a GPS to mark sample locations using the free SODMAP app. For details on Blitz locations and information, see the "Calendar of Events" below. SOD Blitz activities are co-sponsored by the California Native Plant Society and are funded by the US Forest Service, State and Private Forestry and the Gordon and Betty Moore Foundation.

PERSONNEL

Kerry Britton, National Forest Pathologist, USDA Forest Service (USFS) Research and Development in Washington DC, has retired after 25 years of service. Kerry advised the USFS Sudden Oak Death Research Program and championed forest biosecurity for the US, including coordinating the IUFRO work group for "Alien Invasive Species and International Trade" and initiating the Sentinel Plant Network. She will be missed.



Steve Oak, Forest Pathologist with the USDA Forest Service, Southern Region, retired on January 10, 2014 after 34 years of service. Steve headed up the National *P. ramorum* Early Detection Survey of Forests since its inception in 2003, where he worked to protect high-risk watersheds through early pathogen detection. In his retirement, he hopes to hike El Camino de Santiago in Spain, canoe the boundary waters between Maine and Canada, and finish learning French. Steve and his commitment to managing *P. ramorum* will be missed.

CALENDAR OF EVENTS

- 2/10 – 2/21 - Visualizing Sudden Oak Death e-conference.** For more information, see “Meetings” above or visit the conference website at <http://www.suddenoakdeath.org/news-and-events/visualizing-sudden-oak-death/>. For questions, contact Katie Palmieri at kpalmieri@berkeley.edu.
- 2/26 – Annual North Coast Sudden Oak Death Meeting; 10:00 a.m. to 2:30 p.m.;** UC Cooperative Extension Auditorium; 5630 South Broadway; Eureka; For more information, see “Meetings” above.
- 2/26 – Western Forestry and Conservation Association “State of the States Regional Assessment of Forest Health in Oregon and Washington” conference;** Heathman Lodge; 7801 NE Greenwood Dr., Vancouver, WA.; For more information or to register, go to www.westernforestry.org, or contact Amanda at (888) 722-9416, (503) 226-4562, or amanda@westernforestry.org.
- 3/11 – 3/13 - 60th Annual Conference on Soilborne Plant Pathogens,** Dominican University of California, San Rafael; For more information, or to register, go to <http://soilfungus.ars.usda.gov/index.htm>. The field trip on 3/11 will feature sudden oak death at Mt. Tamalpais and Muir Woods.
- 4/5 – Santa Lucia SOD Blitz Training; Santa Lucia Preserve; 10:00 a.m.;** For residents only; More information will be forthcoming.
- 4/11 - Santa Cruz SOD Blitz Training; UCSC Arboretum; 1156 High St, Santa Cruz;** [Map Link](#); 7:00 p.m.; For more information, contact Brett Hall at brett@ucsc.edu.
- 4/12 - South Skyline SOD Blitz Training; Saratoga Summit (Cal Fire) Fire Station;** 12900 Skyline Blvd, Los Gatos; 10:00 a.m.; For more information, contact Jane Manning at skyline_sod@yahoo.com.
- 4/18 – Mendocino SOD Blitz Training, Option 1; Fort Brag location to be determined;** 7:00 p.m.; For more information, contact Lori Hubbart at lorih@mcn.org.
- 4/19 – Mendocino SOD Blitz Training, Option 2; Gualala location to be determined;** 10:00 a.m.; For more information, contact Lori Hubbart at lorih@mcn.org.
- 4/19 – Sonoma SOD Blitz Training, 3 Concurrent locations to be determined;** 10:00 a.m.; For more information, contact Lisa Bell at lkbell@ucanr.edu.
- 4/26 - Marin, San Rafael SOD Blitz Training; Dominican University of California;** Joseph R Fink Science Center, Rm 102; 10:00 a.m. For more information, contact Wolfgang Schweigkofler at wolfgang.schweigkofler@dominican.edu or Kristin Jacob at kristinjacob@att.net.



- 4/26 - San Mateo, Burlingame Hills SOD Blitz Training; 120 Tiptoe Lane (off Canyon Rd.), Burlingame; 1:00 p.m.;** For more information, contact Steve Epstein at steve@burlingamehills.org.
- 5/3 - Monterey SOD Blitz Training; Garland Ranch Regional Park Museum Visitors Center, Carmel Valley; 10:00 a.m.;** For more information, contact Kerri Frangioso at kfrangioso@ucdavis.edu or Brian LeNeve at bjleneve@att.net.
- 5/10 - Contra Costa SOD Blitz Training; Orinda Public Library; 26 Orinda Way, Orinda; 10:00 a.m.;** For more information, contact William Hudson at wllhh@gmail.com.
- 5/10 – Alameda SOD Blitz Training; UC Berkeley Campus; 159 Mulford Hall, Berkeley; 1:00 p.m.;** For more information, contact Toni Mohr at toni.mohr@gmail.com.
- 5/16 - San Luis Obispo SOD Blitz Training; location to be determined; 7:00 p.m.;** For more information, contact Lauren Brown at lbrown805@charter.net.
- 5/17 - San Mateo-Santa Clara, Woodside-Portola Valley/Emerald Hills/San Carlos/Atherton SOD Blitz Training; Woodside Town Hall; 2955 Woodside Road, Woodside; 10:00 a.m.;** For more information, contact Debbie Mendelson at sodblitz@gmail.com.
- 5/18 - Santa Clara SOD Blitz Training; Montalvo-Saratoga-Los Gatos; Montalvo Arts Center; 15400 Montalvo Road, Saratoga; 10:00 a.m.;** For more information, contact Kelly Sicat at KSicat@montalvoarts.org or president@cnps-scv.org.
- 5/22 - San Francisco SOD Blitz Training; Golden Gate Park Presidio and Golden Gate Park Rec. Room; San Francisco County Fair Building; Golden Gate Park near 9th Ave. & Lincoln Way, San Francisco; 10:00 a.m.;** For more information, contact Eric Anderson at eric.anderson@sfgov.org.
- 5/24 - Santa Clara, Los Altos Hills SOD Blitz Training; Los Altos Hills Town Hall; 26379 Fremont Road, Los Altos Hills; 10:00 a.m.;** For more information, contact Sue Welch at sodblitz09@earthlink.net.
- 5/31 – Napa SOD Blitz Training; UCCE Meeting Room; 1710 Soscol Avenue, Napa; 10:00 a.m.;** For more information, contact Bill Pramuk at info@billpramuk.com.
- 11/3 – 11/6 - 7th California Oak Symposium; Visalia Convention Center, Visalia;** For more information, go to http://ucanr.edu/sites/oaksymposium/?utm_source=Oak+Symposium+2014+Save+the+Date&utm_campaign=oak+symposium&utm_medium=email.
- 11/10 – 11/14/14 - Seventh meeting of the IUFRO Working Party 7.02.09**
“*Phytophthora* in Forests and Natural Ecosystems;” Esquel, Argentina. For more information, registration, or abstract submission details, go to <http://www.iufrophytophthora2012.org/>.