

California Oak Mortality Task Force Report May 2004

Regulations

USDA APHIS issued an amended emergency order restricting the movement of nursery stock from California nurseries on April 22, 2004. The amended order replaces the April 9, 2004 Emergency Order and calls for nurseries that ship *P. ramorum* hosts or associated plants interstate to be inspected by a regulatory official, sampled, and tested for the disease. Until testing is complete and the nursery is found to be free from the pathogen, all out of state shipments of host nursery stock and associated articles, as well as plants within the same genus as any host or associated article, and any plant located within 10 meters of a host or associated article, must remain on hold. For a complete list of hosts and associated plants, as well as the complete text of the order, go to <http://www.aphis.usda.gov/ppq/ispm/sod/index.html>. For information on testing protocols, go to www.aphis.usda.gov/ppq/ispm/sod/survey.html.

The April 9, USDA Animal Plant Health Inspection Service, Plant Protection and Quarantine (USDA APHIS PPQ) Emergency Order required visual inspection of *P. ramorum* hosts and associated plants for disease symptoms prior to shipment out of CA. Still concerned about receiving infected nursery stock, 15 states implemented their own regulations. In response to concerns expressed by these states, APHIS worked with State partners to provide uniform rules to prevent interstate shipment of *P. ramorum*. To develop the amended order, APHIS met with National Plant Board members in Riverdale Maryland, which was followed by a meeting hosted by USDA Undersecretary Hawks with the National Association of State Departments of Agriculture. The resulting

April 22, 2004 order will remain in effect until amended or until USDA publishes an interim rule in the Federal Register.

In response to the Monrovia Nursery *P. ramorum* confirmations, trace-forward surveys throughout the US are being conducted. To date, the trace-forward investigations have found the following out-of-state nurseries to have infestations: FL(5); WA(5); OR(9); GA(13); LA(4); NC(8); NM(1); TN(2); TX(5); CO(1); and VA(1), for a total of 54 nurseries outside of CA. As of April 29, 2004, USDA APHIS PPQ reports that 1,232 initial trace-forward nurseries are being surveyed nationwide. To date, 700,624 plants have been destroyed, with

an additional 875,726 plants on hold. As these investigations are ongoing, figures will be updated in future newsletters.

Status of *P. ramorum* in CA nurseries – Since March 1, 2004, 28

California nurseries have been found to be positive for *Phytophthora ramorum*. Nineteen of the confirmed nurseries were the result of trace-forward surveys, of which 11 nurseries were within California's 12-county regulated area, and included the counties of Alameda, Contra Costa, Napa, Sonoma, and San Mateo. The remaining eight trace-forward nurseries were found in Yolo, Shasta, Butte, Orange, and Santa Barbara Counties.

Two nurseries, each under compliance agreements in CA's regulated Napa and Contra Costa Counties, were also found to be positive for the pathogen during their annual certification inspection. Another *P. ramorum* confirmation within the regulated area was made at a Sonoma County nursery receiving its initial annual inspection, in an effort to enter into a compliance agreement for shipment outside of the regulated area.

As part of the Statewide *Phytophthora ramorum* Detection Survey, one Los Angeles County nursery (Monrovia), one San Diego County nursery (Specialty Plants), two San Joaquin County nurseries, and one Butte County nursery were confirmed to have *Phytophthora ramorum*. A Stanislaus County nursery, previously detected for *P. ramorum*, was also confirmed to have new pathogen-positive plants. All six nurseries are located outside of the 12-county regulated area. For more information, contact Nick Condos, California Department of Food and Agriculture (CDFA), at ncondos@cdfa.ca.gov or go to the CDFA website at http://www.cdfa.ca.gov/phpps/pe/sod_survey/.

The Canadian Food Inspection Agency (CFIA) and the British Columbia Landscape & Nursery Association (BCLNA) are recalling Camellia plants imported from Monrovia Nursery, Azusa, CA in an effort to find and remove *P. ramorum*-infected plants. Anyone that purchased Camellia plants in BC since September 1, 2003 is asked to call (877) 666-4179 (outside Vancouver) or (604) 666-4179 (within the Vancouver area). BCLNA staff will visit the locations of the reported plants to collect the potentially infected material. The recall is in response to confirmation of *P. ramorum* in Monrovia trace-forward plants at seven retail garden centers (12 positive samples) in the Fraser Valley and Vancouver Island areas. The positive plants and adjacent host stock are being destroyed.

CFIA has implemented regulations prohibiting the importation of plants from Monrovia Nursery. Additionally, all *P. ramorum* host plants from California are suspended from entry into Canada and all *P. ramorum* host plants already in Canada from California are on hold pending approval by CFIA. CFIA inspectors are sampling all BC retailers and nurseries that received plant material from Monrovia Nursery. Approximately 3,400 camellias were shipped from Monrovia, Azusa to British Columbia. For more information, contact Jon Bell, CFIA, at bellj@inspection.gc.ca, or go to <http://www.inspection.gc.ca/english/toce.shtml>.

The Republic of Korea has modified their “Tentative phytosanitary measures to prevent the introduction of Sudden Oak Death (SOD) Disease” to add Denmark, Norway, Ireland, and Slovenia to the list of prohibited areas and four prohibited plant species: *Rosa gymnocarpa*, *Fagus sylvatica* (beech), *Castanea sativa* (Sweet chestnut), and *Aesculus hippocastanum* (Horse chestnut). The revisions also add 12 regulated species (equivalent to associated hosts in the USDA rule). The revised rule took effect April 20, 2004.

Monitoring

Lake County has been confirmed as the 13th county to have *Phytophthora ramorum* naturally occurring. The confirmation was made on four California bay laurel trees, located near a perennial stream, in a stand primarily composed of tanoak, California bay laurel, Douglas-fir, and poison oak. The samples were confirmed by the Rizzo Lab, UC Davis and the California Department of Food and Agriculture (CDFA). The finding came as the result of the Sudden Oak Death Aerial Survey conducted by the USDA Forest Service and Cal Poly, San Luis Obispo. The ground-check was triggered by the observation of two dead tanoak trees originally mapped during an aerial survey. While the ground inspection did not confirm the tanoak to be infected, the CA bay laurel trees were found to be positive for the pathogen. The newly identified infestation is just east of a confirmed *P. ramorum* infestation in Sonoma County. As an infested county, Lake County will be added to the regulated (quarantine) area. For more information, contact Jeff Mai, USDA Forest Service Aerial Survey Program, at jmai@fs.fed.us.

***Pyracantha koidzumii* (Formosa firethorn) has been found infected with *Phytophthora ramorum*.** The infected nursery stock was detected by the Canadian Food Inspection Agency (CFIA) in a Vancouver area nursery as part of the Monrovia trace-forward inspections. *P. ramorum* symptoms observed on the *Pyracantha* were limited to leafspots. The infected plant has been shipped to the CFIA quarantine lab in Ottawa for further study. As a result of the find,

Pyracantha koidzumii has been added to the USDA APHIS *P. ramorum* associated host list. Pending CFIA's Koch's postulates results, the new associated host may be moved to the USDA APHIS regulated host list. For more information on *Pyracantha koidzumii*, see the Host of the Month section of this report.

Update of *Phytophthora ramorum* National Wildland Survey - State and federal personnel will be conducting surveys in 37 states during 2004: South – VA, NC, GA, SC, AR, MS, AL, FL, LA, KY, TN, TX; Northeast – ME, NH, VT, NY, CT, RI, MA, PA, WV, MD, DE, NJ, OH, IN, IA, IL, MO, MI, MN, WI; Intermountain – UT, NV; and West Coast – CA, OR, WA. The highest priority for sampling will be assigned to forests adjacent to nurseries that may have received infected nursery plants from CA. Ground surveys will be conducted to locate symptomatic hosts along transects in forests near nurseries that received host plants from infested nurseries in CA. Other nurseries with host plants, as well as randomly selected general forest areas, will also be surveyed. Samples will be collected for laboratory analysis using USDA-approved diagnostic techniques.

The USDA Forest Service, Forest Health Protection is spending \$1,084,200 for the 2004 surveys, including an emergency supplemental allocation of \$530,000, triggered by the need to follow-up on trace-forward material from infested CA nurseries.

During the spring and summer of 2003, survey crews collected samples of suspected hosts in PA, WV, VA, GA, NC, SC, and TN. Diagnostic laboratories processed 1,116 samples, representing more than 10,000 individual leaf and oak bark samples, as a result of the survey. None of the samples were positive for *P. ramorum*.

Research

The USDA Cooperative State Research Education Extension Service (CSREES) Rapid Response to Emerging Issue Activity project has been initiated. Entitled "Management of *Phytophthora ramorum* in U.S. Nurseries, project W501," the program has three main objectives. 1) Provide a multi-state forum for the exchange of information among researchers and extension personnel concerned with *P. ramorum* in nurseries. 2) Develop protocol for coordinating *P. ramorum* research and extension activities in nurseries. 3) Recruit participants interested in developing a longer-term multi-state research project for the management of *P. ramorum* in nurseries.

Participation is encouraged from researchers and extension specialists who are likely to encounter *P. ramorum* in the nursery setting. Faculty members of Land Grant Universities, and scientists with USDA ARS, USDA Forest Service, and State Departments of Agriculture are also invited to join the project. For further information, contact Jennifer Parke, Oregon State University, at jennifer.parke@oregonstate.edu or Donald Cooksey, Administrative Advisor for the Project, at donald.cooksey@ucr.edu.

Calendar of Events

5/10 – Free “Sudden Oak Death Workshop for Tribal Members.” This **one-day** workshop is intended for plant-gathering Tribal members. It will be held in the Conference Room at 133 Aviation Blvd., Santa Rosa, from 10 a.m. – 3 p.m.; lunch will be included. To register, call (888) 311-6727, press *2530, and leave a message. For more information on the workshop, contact Lisa Woo Shanks at (707) 794-1242, ext. 121.

5/12 – Southern CA training session on “*Phytophthora ramorum* in Nurseries: Diagnosis and Control,” in Escondido, San Diego County. This free one-day class will be dedicated to pathogen recognition, regulations, and other *P. ramorum* nursery topics. For more information, or to register for the training, go to the Task Force website at www.suddenoakdeath.org.

5/13 – Southern CA training session on “*Phytophthora ramorum* in Nurseries: Diagnosis and Control,” in Arcadia, Los Angeles County. This free one-day class will be dedicated to pathogen recognition, regulations and other *P. ramorum* nursery topics. For more information, or to register for the training, go to the Task Force website at www.suddenoakdeath.org.

5/19 – Free training session on “Recognition, Sampling, Treatment, and Mitigation Measures for Sudden Oak Death.” This one-day class will be held for the northern region of the regulated area at the Marin Center, San Rafael (a.m. lecture) and China Camp State Park, San Rafael (p.m. field session), from 9:30 a.m. – 4:00 p.m. Registration is required. For more information, contact Lucia Briggs, at lbriggs@nature.berkeley.edu.

www.suddenoakdeath.org

The California Oak Mortality Task Force (COMTF) has posted a United States *Phytophthora ramorum* Nursery Chronology to its [homepage](http://www.suddenoakdeath.org), in addition to adding a [Nursery Section](#) to the site. The chronology documents notable nursery-related events dealing with *Phytophthora ramorum*, and

provides links to key websites addressing current issues. The Nursery Section is dedicated to providing up-to-date industry-related information on *Phytophthora ramorum*. Issues addressed in the section include the latest regulations, key agency information and links, and symptom guides to assist in disease detection.

Featured Research

Disease progression of Phytophthora ramorum and Botryosphaeria dothidea on Pacific Madrone

Pacific madrone (*Arbutus menziesii*) appears to be highly susceptible to *Phytophthora ramorum*. While we know that *P. ramorum* can cause leaf lesions and stem cankers on these trees, it's often difficult to confirm the presence of this pathogen when culturing. Additionally, there are a number of other common forest pathogens that can cause similar symptoms. Patricia Maloney, David Rizzo, and others examined the susceptibility of madrone to *P. ramorum* as well as to a native forest pathogen, *Botryosphaeria dothidea*, also common on madrone. Their study, *Disease progression of Phytophthora ramorum and Botryosphaeria dothidea on Pacific Madrone*, (soon to be published in Plant Disease) focused on the susceptibility of madrone to *P. ramorum* in a natural forest setting as well as in laboratory experiments; assessing disease development and recovery from host tissue infected by these pathogens; and determining whether there are any interactions between the two pathogens as they compete for similar resources.

Healthy 4-year-old madrone saplings were set out in 2001 and in 2002 at Jack London State Park, where *P. ramorum* could naturally infect them. Within two to five months, nearly all (70-100%) of the madrone saplings had *P. ramorum*-infections on both stems and leaves. *B. dothidea* was isolated from all of these samples as well. Over half (50-66%) of the madrones in this study ultimately died from *P. ramorum* infection.

Maloney *et al.* also inoculated 1-year-old seedlings in growth chamber experiments to measure lesion development, and to examine competition between the two pathogens. *P. ramorum* caused larger lesions than *B. dothidea*, but lesion size did increase for both pathogens when wound inoculated. In all cases *B. dothidea* symptoms were less severe than those caused by *P. ramorum*, with 75 percent of *P. ramorum*-inoculated seedlings having died, while only 25 percent of *B. dothidea*-inoculated seedlings died.

The two pathogens were found to be able to coexist when placed together on seedlings. However, while *B. dothidea* was recovered from stems and leaves for

all treatments, it was less frequently recovered when *P. ramorum* was also present. Generally, *P. ramorum* more effectively infected stems. On leaves, *P. ramorum* grew best in isolation or if it proceeded *B. dothidea* infection. The recovery rate of *P. ramorum* from stems where *B. dothidea* was established first was lower than the other treatments.

After 49 days of infection, recovery of *P. ramorum* was difficult from both infected stem and leaf tissue. This suggests that madrone field samples should be taken when the infection is recent and active. If this is not possible, and you cannot culture the pathogen from live plant material, PCR methods can often confirm the presence or absence of *P. ramorum* DNA. Unfortunately, larger trees are difficult to diagnose because symptomatic branches are often inaccessible and dieback looks very similar to *B. dothidea* infections.

B. dothidea is considered an opportunistic pathogen that rarely attacks healthy trees, and generally does not kill madrone unless coupled with other stress factors (i.e., drought, pathogens, insects). However, *B. dothidea* coupled with *P. ramorum* may affect growth and reproduction of madrone. Both pathogens readily disperse in the rainy winter months. While *P. ramorum* is most active in wetter months and less active during the dry season, the reverse is true for *B. dothidea*. Together, the two pathogens could create a continuous attack on madrone throughout the year.

Host of the Month

***Pyracantha koidzumii* (Formosa firethorn) - *Pyracantha* is a genus of shrubs** belonging to the rose family (Rosaceae). There are seven species originating from southeast Europe and eastern Asia, in addition to a number of cultivars. Tough, thorny branches and showy orange to red berries characterize this genus. Several cultivars are used for ground cover applications due to their low growth habit. Scarlet firethorn (*Pyracantha coccinea*), Formosa firethorn (*Pyracantha koidzumii*), and Roger's firethorn (*Pyracantha rogersiana*) are the most popular species for cultivating.

Formosa firethorn is native to Taiwan. While grown for its showy, bright red berries, it is also used as a natural fence, due to its formidable array of thorns and ability to grow up to 12 feet in height. Clusters of white, five-petaled flowers bloom in late spring, followed by a heavy crop of berries ripening in the fall. The berries can persist all winter if not eaten by birds. Firethorns prefer sunny locations (although they will tolerate partial shade), and are good for growing in hot, dry conditions.

REFERENCES

Arcadian Archives Gardening Resource (Cumbria, UK)

<http://www.arcadian-archives.com/pyracantha.htm>

Clemson University Home & Garden Information Center:

<http://hgic.clemson.edu/factsheets/HGIC1072.htm>

Oregon State University horticultural website:

<http://hort.science.orst.edu/classes/hort226/pyko-i.htm>

Plants of Hawaii, Hawaii Ecosystems at Risk website:

http://www.hear.org/starr/hiplants/images/thumbnails/html/pyracantha_koidzumii_thumbnails.htm