CALIFORNIA OAK MORTALITY TASK FORCE

2005 SUDDEN OAK DEATH &

PHYTOPHTHORA RAMORUM SUMMARY REPORT

A Compendium of the 2005 COMTF Monthly Newsletters

Photo credit: Dave Rizzo, UC Davis

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

Susan J. Frankel*, USDA Forest Service, Pacific Southwest Research Station,*
Albany

TABLE OF CONTENTS

2005 Significant Events……... 02

Background…….. 03

Regulations……..... 04

New Hosts……... 07

Research……...08

Published Research…….. 13

Nurseries…….. 15

Monitoring……22

Management…….25

Funding and Legislation…...……... 30

Resources……. 30

Featured Hosts and Associated Hosts…….……33

Outreach Activities…….. 35

Feature Stories……. 36

Personnel Changes……...37

Acronym Key……...40

2005 SIGNIFICANT EVENTS

- The USDA Animal and Plant Health Inspection Service (APHIS) 1/10/05 Emergency Order for nurseries takes effect. The new order regulates the interstate movement of quarantine plants from all nurseries in California, Oregon, and Washington to help prevent the spread of *P. ramorum* to uninfested areas of the United States.

- In 2005, the number of plant species found to be *P. ramorum*-susceptible increases by 16, for a total of 84. Known *P. ramorum*-affected conifers now include: Pacific yew, coast redwood, Douglas-fir, nutmeg, white fir, grand fir, and California red fir.

- The third *P. ramorum* lineage (first identified in a Washington state nursery in 2004) has been found in a California nursery. Successful isolations were taken from asymptomatic stems and roots of rhododendron. This is the first time the pathogen has been found naturally infecting roots as well as asymptomatic tissue.

- *P. ramorum* wildland infestations in quarantined areas of California and Oregon continue to expand. Humboldt County's scope of infection increases to at least 21 mi^2, and includes the Avenue of the Giants. California's Point Reyes National Seashore, Big Sur coast, the Los Padres National Forest, as well as areas of Mendocino, Marin, Sonoma, and Santa Cruz Counties are found with new substantial zones of infestation. Oregon identifies nine new *P. ramorum* infection sites within one-half mile of their eradication zone. The nine existing eradication sites are expanded to include infected trees found near perimeters.

- In 2005, 99 sites in seven states have had nursery-related *P. ramorum* detections. Positive findings by state are: CA(55), GA(4), LA(2), OR(20), TN(1), SC(1), and WA(16).

- Federal funding to address *P. ramorum* totaled $18 million in 2005. USDA APHIS provided $12.4 million for quarantine programs and the USDA Forest Service provided $4.4 million for pathogen research, monitoring, education, and management. Research funding also included $1 million from the USDA Agricultural Research Service, and the Cooperative State Research, Education, and Extension Service provided $115,000 for educational outreach activities.

BACKGROUND

Sudden Oak Death is a forest disease caused by the plant pathogen *Phytophthora ramorum*. Since 1995, it has killed hundreds of thousands of native tanoak, coast live oak, and other tree species in California, as well as southwest Oregon. Currently *P. ramorum* is found in the wildlands of 14 coastal California counties, from Monterey to Humboldt, as well as Curry County, Oregon and several isolated locations in the United Kingdom and the Netherlands.

Tree losses continue to occur in both wildland and urban/wildland interface areas, with up to 80 percent of trees affected in some stands. This unprecedented loss of oaks in California is causing dramatic landscape changes that affect ecosystem function, increase fire and safety hazards, and reduce land values.

P. ramorum not only causes deadly cankers on bole hosts, but it also manifests itself as a foliar or twig blight on 84 known plant species, including CA bay laurel, Douglas-fir, coast redwood, and numerous ornamentals, such as rhododendron and camellia. Unlike bark cankers, the foliar and twig blight rarely causes the host plant to die. Instead, these hosts allow for large amounts of inoculum to build up, thereby facilitating pathogen spread.

Foliar host infection has not only been identified in wildland settings among infected oaks, but it has also been found in European, United States, and Canadian nurseries. In Europe, more than 825 nurseries, in at least 11 countries, have been found to have the pathogen since 2002, whereas in the United States 278 nurseries have had positive *P. ramorum* detections in 21 states since 2002. In Canada, more than 20 nursery detections have been confirmed.

With many of the hosts being popular ornamental plants that are shipped nationally and internationally, there is concern over areas at high-risk of disease establishment becoming exposed to the pathogen. In response to these challenges, state and federal agencies have implemented *P. ramorum* quarantine regulations to help limit the pathogen's artificial movement. States with regulations in place control the intrastate movement of *P. ramorum* host and associated host material, while USDA APHIS oversees interstate and international movement under federal regulation.

Federal, state, and local agencies; non-profit organizations; and private parties formed the California Oak Mortality Task Force (COMTF) to coordinate a comprehensive and unified program of research, management, monitoring, education, and public policy for California.

This report collates and condenses the COMTF monthly newsletters. The information is presented for various subject areas in chronological order. To understand the current situation, the entire section, or at least the most recent postings, should be read. More information on most topics is available at www.suddenoakdeath.org under archived newsletters. The date the item originally appeared is noted after each entry.

REGULATIONS

APHIS issued an emergency federal order for nurseries 12/21/04 that will take effect on 1/10/05, superseding the 4/22/04 emergency order that restricted the interstate movement of several varieties of *P. ramorum* host and associated plants from California. The new order regulates the interstate movement of plants from all nurseries in California, Oregon and Washington to help prevent the spread of *P. ramorum* to uninfested areas of the United States.

Under the new federal order, California, Oregon, and Washington nurseries that ship *P. ramorum* host and associated host plants interstate must be inspected, sampled, tested, and certified as *P. ramorum*-free before transporting plants across state lines. In addition, all nurseries that ship non-host plants interstate must undergo a visual inspection to ensure plants are not exhibiting *P. ramorum* symptoms. These inspections will be repeated annually. (1/05)

CFIA has lifted its restriction on *P. ramorum* host cut flowers (including roses) from non-quarantine California counties as a result of the new USDA APHIS Federal Emergency Order. Based on the 12/21/04 Emergency Order, and continued efforts to harmonize regulatory efforts between the two countries, Canada is in the process of releasing updated *P. ramorum* phytosanitary requirements. (2/05)

USDA APHIS issued a memo 3/14/05 that defines shipment documentation for non-host nursery stock from approved non-host nurseries in CA, OR, and WA. Nurseries in these three regulated states shipping non-host plants interstate are encouraged to include a printout (with each shipment) from their state department of agriculture's website that lists the state's approved nurseries. (4/05)

CPHST is working on granting provisional approval for laboratories to perform PCR assays for *P. ramorum*. These labs will be permitted to make final determinations of negative samples, while positive samples will need to be confirmed by APHIS PPQ. So far, the WSDA has been provisionally approved. Nine other labs are at various points in the approval process. (4/05)

The UK has completed Koch's postulates on the following associated hosts: sweet chestnut (*Castanea sativa*), Holm oak (*Quercus ilex*), and European ash (*Fraxinus excelsior*). Following USDA APHIS review and approval, these associated hosts will be moved to the USDA *P. ramorum* host list. (5/05)

CFIA issued an updated *P. ramorum* directive 3/1/05, superseding the 9/25/03 order. The new "Phytosanitary Requirements to Prevent the Entry of *Phytophthora ramorum*" policy was revised based on the USDA APHIS 12/21/04 emergency order. As a result, Canada has dropped its emergency border lookout for propagative and non-propagative material that was not permitted into Canada from California. Under the new directive, non-propagative material, including cut flowers from non-quarantined counties are free to move into Canada. Additionally, propagative material from non-quarantine counties in California, Oregon, and Washington are allowed entry into Canada. In the new CFIA directive, Canada will still regulate for hosts at the genus level. Soil and related matter or growing media either alone or in association with plant material, as well as all non-manufactured wood products with bark of the regulated genera,

including logs, bark, bark chips, bark mulch, pulpwood, and firewood are also still regulated. (5/05)

USDA APHIS and National Plant Board (NPB) representatives met with CFIA and Canadian Forest Service representatives in Quebec to harmonize *P. ramorum* inspection, sampling, and response protocols. CFIA and USDA analyzed current CNPs. While some concerns were resolved at the meeting, others were assigned to individuals to develop recommendations for the working group.

Research needs were also identified at the meeting, and will be catalogued by the Pest Risk Analysis group along with those needs identified by the CFIA and USDA Pest Risk Assessments (PRA). These needs will be communicated to the research community. CFIA and USDA PRAs were agreed upon and will be periodically updated as new information becomes available. Additionally, both CFIA and USDA Pest Risk Analysis groups will develop and maintain a common document of *P. ramorum* Pest Information. USDA is also conducting an analysis of high-risk *P. ramorum* hosts. The results of this analysis will be used for development of specific mitigation measures for identified high-risk plants. CFIA and USDA harmonization communications are still underway. (7/05)

USDA APHIS published a final rule on 6/23 that amended treatment regulations for California bay laurel (*Umbellularia californica*) leaves to include vacuum heat as a treatment option for leaves moving interstate from a *P. ramorum* quarantine area. (7/05)

USDA APHIS has issued an updated State Plant Regulatory Official (SPRO) Letter, adding eight new associated host plants and two new host plants to the list of plants regulated for *P. ramorum*. The addition of these 10 plants brings the list of regulated *P. ramorum* host and associated hosts to 75.

The SPRO also updated the status of six hosts from the associated host list to the host list, with all having completed Koch's postulates and having been reviewed and approved by APHIS. The six newly classified hosts are: *Castanea sativa*, *Fraxinus excelsior*, *Quercus falcata*, *Quercus ilex*, *Syringa vulgaris*, and *Taxus baccata*. Information on reported affected parts of each of these hosts can also be obtained in the SPRO. (8/05)

NPB members from 10 states met in Raleigh, NC on 7/19/05 along with USDA *P. ramorum*- program staff and CPHST scientists to discuss the effectiveness of the USDA APHIS PPQ December Federal Order that took effect in 1/05. 2005 *P. ramorum* program data were reviewed and show a 55 percent decrease in pathogen detections compared to the same time last year, despite more intensive and focused surveys. To date, the National Nursery Survey has identified seven *P. ramorum*-positive sites in three non-West Coast states, compared to 61 sites in 17 states in 7/04.

The group reviewed the CNP and the issue of repeat positives at mitigated sites. Based on a CPHST analysis, several recommendations are under review as enhancements to the CNP. CPHST also reported that five laboratories are now provisionally approved to run nested-PCR *P.*

ramorum tests for negative confirmation. Sixteen additional labs have been inspected, but have not yet completed the approval process.

At the meeting, the NPB Board of Directors approved creation of a NPB working group to review, discuss, and assist in resolving *P. ramorum* issues. Additionally, PPQ and NPB representatives reached consensus on an interim protocol for regulating new hosts, which will add newly identified hosts immediately to the host list. Those host plant nurseries operating under a compliance agreement may continue to ship host and associated host plants, including the new host. Those non-host nurseries that have been inspected and found free from *P. ramorum* may continue to ship plants interstate, except for the new host, which will be withheld from trade until inspected, sampled, and tested. The NPB working group will evaluate this interim protocol.

Action items for the NPB working group include a discussion of the role of high-risk hosts in spreading *P. ramorum*. CPHST is also conducting an analysis of the relative risk of infestation among *P. ramorum* hosts at the cultivar level. The goal is to determine if a few high-risk plants or plant varieties may be responsible for most of the movement of *P. ramorum* in nursery stock. Pending results, PPQ headquarter staff and select State Plant Regulatory Officials will be working together to identify, if possible, appropriate short-term mitigations. (8/05)

Riverside County agricultural officials are going to broaden the county's Sudden Oak Death prevention program following a vote by the County Board of Supervisors in support of the expansion. Since March of 2003, the county has had four inspectors examining and sampling shipments of commercially grown trees and shrubs shipped into and out of the county. While officials there realize Riverside is not a likely environment for pathogen establishment, they are concerned for the health of the dense groves of coast live oak trees in the Cleveland National Forest and the Santa Rosa Plateau. Local officials are also hoping to keep the pathogen out of the nursery industry, which is the county's leading agricultural commodity, valued at $211 million in 2004. (10/05)

USDA APHIS has issued an updated State Plant Regulatory Official (SPRO) Letter, adding *Acer laevigatum* (Evergreen maple), *Michelia doltsopa* (Michelia), *Quercus petraea* (Sessile oak), *Adiantum aleuticum* (Maidenhair fern), *Fraxinus latifolia* (Oregon ash), *Osmorhiza chilensis* (Sweet Cicely), *Torreya californica* (California nutmeg), and *Vancouveria planipetala* (Redwood ivy) to the list of regulated *P. ramorum* hosts, raising the list of federally regulated species to 83. (10/05)

Real-Time or quantitative PCR (qPCR), originally developed by the Central Science Laboratory (CSL) in York, UK, has been validated by USDA APHIS PPQ CPHST for providing diagnostic determinations for the *P. ramorum* federal emergency program. The result was that minor modifications were made for optimization of the assay on a Cepheid SmartCycler® II. However, the primers used by this assay are the same as the CSL procedure. The *P. ramorum* qPCR can detect the pathogen in a broad range of host plants. The test utilizes internal control primers based on the COX gene that are multiplexed with *P. ramorum* primers and probe for each DNA sample in order to confirm that amplifiable DNA is present in environmental samples that test PCR-negative for *P. ramorum*.

The protocol was evaluated in a ring-test involving several laboratories and showed consistent results. During the ring-test on the Cepheid SmartCycler® platform, some of the participating laboratories were asked to extend the protocol to two models of the ABI system (models 7900 and 7000) and successful results were achieved eliminating the cross reactivity of the assay. (11/05)

NEW HOSTS

The UK's Department of Environment, Forestry, and Rural Affairs (DEFRA) has identified six new plants associated with *P. ramorum*: *Griselinia littoralis* – Cornaceae (NZ privet), *Hamamelis mollis* – Hamamelidaceae (Chinese witch-hazel), *Magnolia stellata* – Magnoliaceae (star magnolia), *Magnolia x loebneri* – Magnoliaceae (Loebner magnolia), *Magnolia x soulangeana* – Magnoliaceae (saucer or Japanese magnolia), *Parrotia persica* – Hamamelidaceae (Persian Parrotia or irontree). It is anticipated that APHIS will soon be adding these species to their official *P. ramorum* associated host list. Once included on the US list, these plants will fall under federal *P. ramorum* regulations. (2/05)

On 4/8/05, an Oregon jasmine plant sample was confirmed to be *P. ramorum*-positive by the Beltsville USDA APHIS National Plant Germplasm and Biotechnology Lab. Jasmine is not yet on the APHIS *P. ramorum* host or associated host list. The symptomatic plant was identified during a non-host nursery inspection, and then submitted to ODA for testing. DNA samples were forwarded from ODA to Beltsville. The sample is nested and Real-Time PCR-positive and sequencing of the DNA appears to confirm the finding; ODA has not been able to culture *P. ramorum*. As an initial find in a new species, ODA, APHIS, and others are working to determine jasmine's status as a host of *P. ramorum*. ODA will implement regulatory action at the facility. (5/05)

The first *P. ramorum*-positive *Acer pseudoplatanus* (Planetree maple) tree has been confirmed at one of the *P. ramorum* woodland garden sites in Cornwall, UK. All four of the trees in close proximity to the Planetree maple—Fagus sylvatica, Cornus, Acer laevigatum, and Pieris—also appear to be symptomatic, although testing has not been completed. *A. pseudoplatanus* had previously been shown in UK laboratory testing to be potentially susceptible to the pathogen; however, this is the first tree found naturally infected in the field. Following USDA APHIS review and approval, this new host will be added to the USDA APHIS associated host list. (5/05)

***Phytophthora ramorum* has been recovered from symptomatic California maidenhair fern** (*Adiantum jordanii*) and spice bush (*Calycanthus occidentalis*) samples collected at Jack London State Park, Sonoma County, CA. Laboratory results have been forwarded to the California Department of Food and Agriculture (CDFA) as well as the USDA Animal and Plant Health Inspection Service (APHIS) for review. (7/05)

The first *P. ramorum*-infected *Taxus media* has been reported from the Plant Protection Services of the Netherlands. This is the third yew to be identified as susceptible to *P. ramorum*. Although confirmation of the Boskoop, Holland nursery plant was made by PCR and isolation, Koch's postulates were unable to be performed because the isolate was contaminated and

couldn't be preserved. As Koch's postulates have not been completed, this plant has been added to the USDA APHIS list of *P. ramorum*-regulated associated host plants. (8/05)

The UK's DEFRA has officially identified, and reported to USDA APHIS, three new *P. ramorum*-infected plants. *Acer laevigatum* – Aceraceae (Evergreen maple), *Michelia doltsopa* – Magnoliaceae (Michelia), and *Quercus petraea* – Fagaceae (Sessile oak) were found in UK outdoor, green areas; all were naturally infected. While *P. ramorum* culturing has been completed, Koch's postulates have not. Consequently, these newly identified hosts will join the USDA APHIS associated host plant list, and will be published as a regulatory update in the Federal Register for public comment. (9/05)

Five new *P. ramorum* hosts have been identified in the forests of California's quarantined counties after suspicious symptoms prompted testing. The newly confirmed *P. ramorum*-susceptible plants are: *Adiantum aleuticum* – Polypodiaceae (Maidenhair fern), *Fraxinus latifolia* – Oleaceae (Oregon ash), *Osmorhiza chilensis* – Apiaceae (Sweet Cicely), *Torreya californica* – Taxaceae (California nutmeg), and *Vancouveria planipetala* – Berberidaceae (Redwood ivy). *P. ramorum* culturing has been completed on all five of the confirmed hosts, but Koch's postulates have not. Consequently, these newly reported hosts will be added to the USDA APHIS associated host list, and they will be published as a regulatory update in the Federal Register for public comment. (9/05)

CDFA has confirmed the detection of *P. ramorum* on *Abies concolor* (white fir) at a Christmas tree farm in the quarantined county of Santa Clara. This is the first report of the pathogen on this species of *Abies*. Additional sampling of the tree farm is underway. Koch's postulates have not been completed. USDA APHIS has reviewed the CDFA data and expects to add *A. concolor* to the official list of associated host plants soon. APHIS anticipates requiring all *A. concolor* grown in California, Oregon, and Washington intended for planting to be inspected as nursery stock. (10/05)

Viburnum opulus* (=*V. trilobum*) - (American cranberry viburnum) - was found to be *P. *ramorum*-positive at a nursery in Clackamas County, Oregon on 6/6/05. USDA APHIS has reviewed the findings and expects to add *Viburnum opulus* (=*V. trilobum*) to the *P. ramorum* associated host list soon. (11/05)

A Washington State University researcher has isolated *P. ramorum* from California red fir (*Abies magnifica*) symptomatic shoots at a Christmas tree farm near Los Gatos, CA. Samples were tested using PCR; Koch's postulates have not been completed. The findings are currently being evaluated and considered for the potential addition of California red fir to the regulated associated host list by USDA APHIS. (12/05)

RESEARCH

The CDFA Science Advisory Panel on *P. ramorum* in the Nursery Industry final report is complete. Key questions were addressed within the report, including: general pest risk; nursery, host plant, and natural setting disease transmission; differences between the European A1 strain and the North American A2 strain; fungicide use; and diagnostics. Following each panel response, research needs necessary to more fully answer each question have been noted.

While able to provide some answers and direction, the panel did note that many questions can't be answered until additional research has been conducted and peer reviewed. However, the panel does feel that the evidence indicates *P. ramorum* is an introduced (exotic) pathogen and that it is known to cause disease on an expanding list of plant species. Additionally, the panel feels that *P. ramorum* may be managed in a nursery environment with fungicides that currently control other *Phytophthora* diseases, although further studies are needed to more fully understand their appropriate use and potential consequences (e.g., masking pathogen presence). The panel also acknowledged that outside the nursery environment, some hosts are only slightly affected by *P. ramorum*, while others are severely affected, and that limiting identifiable pathways of pathogen spread is a reasonable means of slowing disease spread. (2/05)

The Second Sudden Oak Death Science Symposium (1/18–1/21) was attended by 350 people, and had 80 formal presentations as well as 47 posters. Eleven countries, 28 states, and Washington DC representatives were in attendance. While wildland issues and *P. ramorum* epidemiology continued to be areas of interest at the Symposium, increased areas of emphasis from 2002 included nursery issues, soil considerations, and pathogen and host genetics. (2/05)

The USDA Forest Service Pacific Southwest Research Station (PSW) continues to manage a national program of research for *P. ramorum*/Sudden Oak Death. In preparation for their 2005 Request for Proposals (RFP), they conducted a Research Needs Assessment meeting on 3/3/05. Representatives from USDA research, management, and regulatory agencies, including the Forest Service; Agricultural Research Service (ARS); APHIS; and Cooperative State Research, Education, and Extension Service (CSREES) participated in the meeting to identify research gaps and focus areas for the 2005 RFP. (3/05)

Both the APHIS PPQ Beltsville National Plant Germplasm and Biotechnology Laboratory (NPGBL) and the CDFA laboratory in Sacramento have encountered a *Phytophthora* species that inconsistently produces bands similar to that produced by *P. ramorum* when using nested PCR. Real-Time PCR currently in validation at the Beltsville laboratory appears to not react to this organism. CDFA reports possible detections of this species on photinia, pyracantha, and azalea. The new species is being temporarily referred to as *Phytophthora* "azalea." CDFA has agreed to share DNA samples and cultures of *P.* "azalea" with the NPGBL, where the use of Real-Time PCR will be investigated for distinguishing between the species as it continues to validate this diagnostic method. According to CDFA, based on morphology and partial ITS sequence, the newly identified species is not a strain or subspecies of *P. ramorum*. (4/05)

The European Union Risk Analysis for *P. ramorum* (RAPRA) team met 3/9-11 in Majorca, Spain. Five European countries are participating in RAPRA under the leadership of Joan Webber, UK Forest Research. The goal of the group is to investigate, collate, and identify information on the pathogen's distribution in the EU and Europe; host susceptibility to both the European and American isolates; European and American isolate epidemiology; mating potential, chemical control in ornamentals; management; and pest risk analysis. (4/05)

Australia is interested in developing a *P. ramorum* risk map similar to the US *P. ramorum* risk map. Such a map would enable them to prioritize what species to target for pathogenicity studies to be undertaken in the US and/or Europe to evaluate the risk that *P. ramorum* poses to

Australian flora. Two Australian species, *Eucalyptus gunnii* and *Pittosporum undulatum*, and a South American species, *Nothofagus obliqua* (the genus is a significant component of temperate rainforests in Australia), have been found sensitive to *P. ramorum* outside of Australia. The USDA Forest Service has been working with the University of Melbourne, instructing them on the procedures for *P. ramorum* risk mapping, formulation, basic data analysis, GIS, and interpretation of results. (4/05)

The USDA APHIS PPQ *P. ramorum* science panel report addressing General Issues, Biology and Ecology, Epidemiology, Control and Eradication, Survey and Monitoring, and Diagnostics has been updated based on new information presented in 1/05 at the Second Sudden Oak Death Science Symposium in Monterey, and can be accessed at: http://www.aphis.usda.gov/ppq/ispm/pramorum/sciencepanel.html. (4/05)

Evaluating the survival of *Phytophthora ramorum* in Firewood. Singh, Ramnik, J. Shelly, C. Langford. Progress Report 1 to the USDA Forest Service, Pacific Southwest Research Station. April 2005. For more information, go to: http://groups.ucanr.org/sodbusters/Sudden_Oak_Death_Firewood_Project/. (6/05)

Funded projects for the FY'05 USDA PSW *P. ramorum* RFP have been selected. PSW funded 12 proposals, allocating $800,000 during this funding cycle. Chosen proposals represent a broad array of disciplines, and include projects throughout the US as well as internationally. Forty proposals were submitted in response to the RFP, for a total of $5 million. (7/05)

UC Berkeley Professor Robert Lane and colleagues, studying the ecology, epidemiology, and prevention of Lyme disease and other emerging tick-borne diseases in California, have found the highest risk habitats for exposure to spirochete-infected ticks are various subtypes of dense woodlands carpeted with leaf litter, such as those that occur in many habitats affected by Sudden Oak Death. Interested in studying the impact of Sudden Oak Death on Lyme disease risk in northwestern California, the team visited China Camp State Park's Miwok Meadows and Back Ranch Campground earlier this year and collected 98 adult ticks. Of those collected, 3.9 or 6.4% of the ticks from each site were determined by PCR to contain Lyme disease spirochetes. Since the infection rates in the nymphal ticks typically range several times higher than those in adult ticks from the same population, the infection rates in the nymphs could range as high as 10-15% or higher in springtime (though no nymphs have been tested from either site so far). In Mendocino County, infection rates in adult ticks average about 1-4%, whereas nymphal infection rates in most of the 30 plus study sites in that county have averaged around 5 to 15%, with a few sites having infection rates as high as 25-41%. The latter infection rates are as high as those in some of the most highly infested regions of the northeastern US.

The research team also notes that considerable contact with wood in dense woodlands (e.g., sitting on logs or against tree trunks, gathering wood) is even riskier than prolonged contact with leaf-litter areas. Consequently, it is recommended that anyone working in dense woodlands when nymph ticks are active (April through June and into July in some areas) follow precautions, paying particular attention to clothing and skin, checking both several times per day for ticks. Other advised precautions include tucking pant legs into socks, shirts into pants, and using a tick repellent or toxicant on clothing, such as Permanone Tick Repellent. (7/05)

The Canadian Forest Service's Pacific Forestry Centre has recently awarded funding to Brenda Callan to develop a synthesis paper by March 2006 on the potential impact of *P. ramorum* on Western Canadian forest tree species and ecosystems. With many of the *P. ramorum* host plants being important components to Western Canadian forests, establishment of the pathogen in British Columbia could change the province's ecosystem composition as well as restrict trade and movement of forest products regionally and across Canadian borders. (7/05)

A wide-ranging systematic experiment is underway to assist APHIS in identifying the next method for detection of *P. ramorum*. The project is a collaborative effort among several US, Canadian, and UK laboratories. Under the leadership of Mike Coffey (UC Riverside) and Frank Martin (ARS, Salinas), the world *Phytophthora* collection is being 'mined,' with approximately 400 identical DNA samples being shared among project partners. The investigations are intended to determine the overall specificity of the varied tests that have been developed for *P. ramorum* identification. Follow-up testing of DNA from selected isolates to determine sensitivity is anticipated. When completed, this study should identify the next appropriate test for validation, which will be based on a genetic locus different than the ITS used by both the current nested PCR and Real-Time PCR. (8/05)

Currently underway are two research efforts focused on obtaining further information on the relative sensitivity and specificity of the tests used for *P. ramorum* identification, including ELISA, culturing, baiting, nested PCR, and Real-Time PCR. One study being conducted by USDA's CPHST analyzed a block of heavily infected Camellias from a California nursery. Identical samples were used to test all of the current diagnostic methods on a block of over 300 individuals (a large enough population for a detailed statistical analysis). The results of this study are being analyzed, and preliminary results were presented at the annual American Phytopathological Society meeting in Austin, TX. A second research effort underway at UC Berkeley is designed to obtain similar data, but also investigate the influence of different hosts, environmental conditions, and other factors on the ability to accurately detect and identify the pathogen. (8/05)

Concerned with the potential threat of *P. ramorum* to European forests, gardens, and nurseries, European Union researchers are gathering for a three-day informational meeting on the pathogen in San Francisco, CA 7/26 – 7/28. During the three days, indoor information-sharing sessions, outlining current *P. ramorum* knowledge, strategies, and challenges will be addressed. A field trip is scheduled to infested Marin and Sonoma County forests, where researchers will have the opportunity to experience the pathogen's impact to CA's natural habitat and talk to researchers conducting field experiments. The group will also tour impacted nurseries, where researchers will meet first-hand with regulators and industry representatives. This meeting will serve as a fact gathering trip for RAPRA's use in the development of a European Pest Risk Analysis for *P. ramorum*, which will include risk management strategies and EU-applicable pathogen contingencies. (8/05)

The American Phytopathological Society's 2005 Annual Meeting was held 7/30 – 8/3 in Austin, TX. Many different issues were presented at the meeting, including *P. ramorum*-related topics. The proceedings are available for purchase in the online APS store at: http://www.shopapspress.org/poprof20apsa2.html. (8/05)

Epidemiology of *Phytophthora ramorum* Infecting *Rhododendron* under Simulated Nursery Conditions – A research update by Steve Tjosvold, UCCE, Santa Cruz County, CA.

Some important observations have been documented over the past two years in experiments devised to understand the spread and infection of *Phytophthora ramorum* under simulated nursery conditions. More disease has been observed in the nursery experiments during the relatively wet winter/spring season of 2005 as compared to the relatively dry and unusually warm spring of 2004. The following summary is organized according to the three inoculum sources that were evaluated. Experiments are underway to repeat observations for the 2005/06 winter/spring season.

Irrigation water:

- (2004) Viable naturally-occurring inoculum was detected (by pear-baiting) in winter and spring from a nearby stream and at sprinkler heads after pumping from the stream. (2005) Inoculum is detected all year in the stream and at sprinkler heads after pumping.
- (2004) No disease is detected on rhododendron stock irrigated with infested stream water.
- (2005) Disease occurred in the wet spring on plants irrigated with sprinkler-applied stream water, but not on plants irrigated with drip-applied stream water or with city water.

Soil:

- (2004) In field conditions, infested rhododendron leaf-disks mixed into the top 1 cm soil of rhododendron stock were viable for 28 weeks (direct plating onto selective media). In greenhouse conditions, viability was up to at least 66 weeks.
- Infected plants were observed both years during the spring only. (2004) Infection was only found on leaves touching inoculated soil and in (2005) soil-inoculum was splash dispersed to plants and infection occurred with sprinkler irrigation but was avoided with drip irrigation.

Aerial:

- During rain storms, inoculum was caught in rain up to 0.5m from inoculated rhododendron. In plant blocks (nursery stock spaced at commercial spacing), plant infections were detected up to 0.5 m from inoculated plants. New infections occurred on inoculated plants relatively frequently. No long distance movement in wind was detected; possibly only rain-splash dispersal is important in nursery stock. (11/05)

Researchers modeling *P. ramorum* met on 11/1 at the USDA Forest Service, Southern Research Station in Asheville, NC. Eight national-scale *P. ramorum* risk models were presented and compared as well as several models predicting risk of *P. ramorum* for California. An APHIS comparison of the models reveals a consistent national pattern of high risk in the coastal Northwest and the central Appalachian Mountains, and low risk through the Great Plains. The models differ in predicting the extent of risk in the Northeast, coastal California, parts of the Southeast and the Northern Midwest. The greatest uncertainty appears to be the extent of the Northern boundary of risk east of the Rockies and the degree of risk in the Southeast. Most likely comparing the output from multiple models will give decision makers more information than a single model alone. USDA APHIS provided an overview of all the models. The

presentations and *P. ramorum* modeling publications will be posted to the COMTF website in the next few weeks. (11/05)

The European and Mediterranean Plant Protection Organization (EPPO) Conference, "*Phytophthora ramorum* and other forest pests," held 10/3-10/8 in Great Britain, was attended by 76 delegates from 22 EPPO member countries as well as the United States, Canada, and Australia. The conference provided a forum for presentations and discussions on distribution, detection, management, research, and prevention of *P. ramorum* and other invasive species. Participants also discussed current phytosanitary alerts concerning forest pests, and reviewed the EPPO forest quarantine project and its outcomes. Attendees also visited The Lost Gardens of Heligan, where rhododendrons (originally imported from China in the late 19th century) infected with *P. ramorum* and *P. kernoviae* were viewed and phytosanitary measures were discussed. Proceedings will be available on the EPPO website later this year. (11/05)

PSW is planning to issue its 2006 Sudden Oak Death/*P. ramorum* RFP in January. Proposals will be due in mid-February. Approximately $650,000 will be awarded through a peer-reviewed, competitive process. The 2006 RFP, will fund research both nationwide and internationally in an effort to increase the understanding of Sudden Oak Death/*P. ramorum*. The knowledge will be used to guide development and implementation of regulatory policies, monitoring programs, and management and treatment strategies in an effort to minimize the spread of this quarantine pathogen. (12/05)

PUBLISHED RESEARCH

Hansen, E. M., Parke, J. L., and Sutton, W. 2005. Susceptibility of Oregon forest trees and shrubs to *Phytophthora ramorum*: A comparison of artificial inoculation and natural infection. Plant Dis. 89:63-70. (2/05)

First Report of Foliar Infection of *Maianthemum racemosum* by *Phytophthora ramorum*. D. Hüberli, K. L. Ivors, A. Smith, J. G. Tse, and M. Garbelotto. Department of ESPM-ES, 151 Hilgard Hall, University of California, Berkeley 94720. Plant Dis. 89:204, 2005; published on-line as DOI: 10.1094/PD-89-0204C. Accepted for publication 22 November 2004. (2/05)

Stopping the Rot. Henry Nicholls. Public Library of Science (a public access journal) Vol. 2 Issue 7:0891-0895. July 2004. This article discusses *P. ramorum* as well as *Phytophthoras* in general. The article includes information on the origins of *Phytophthoras*, genetic testing, financial impacts, environmental impacts, reproduction and recombination, and epidemiology. (3/05)

Preventing invasive pathogens: deficiencies in the system. Clive Brasier, Emeritus Mycologist; Forest Research, UK Forestry Commission; Forest Research Station, Alice Holt, Farnham, Surrey, GU10 4LH, United Kingdom. The Plantsman 4, 54-57 (2005). http://www.rhs.org.uk/learning/publications/plantsman/0305/plantsmanmar2005.asp. (4/05)

***Phytophthora ramorum*: Integrative Research and Management of an Emerging Pathogen** in California and Oregon Forests. David Rizzo, Matteo Garbelotto, Everett Hansen. Annual Reviews, Phytopathology. 2005. 43: (in press). (5/05)

Transmission of *Phytophthora ramorum* in Mixed-Evergreen Forest in California. Davidson, J. M., Wickland, A. C., Patterson, H. A., Falk, K. R., and Rizzo, D. M. 2005. Phytopathology 95:587-596. (5/05)

Establishment of an emerging generalist pathogen in redwood forest communities. Maloney, P. E., S. C. Lynch, S. F. Kane, C. E. Jensen, and D. M. Rizzo. Journal of Ecology (in press). (6/05)

Sudden oak death in California: Disease progression in oaks and tanoaks. Brice A. McPherson, Sylvia R. Mori, David L. Wood, Andrew J. Storer, Pavel Svihra, N. Maggi Kelly, and Richard B. Standiford. Forest Ecology and Management. 2005. (in press). (6/05)

***Phytophthora ramorum*: one pathogen and many diseases, an emerging threat to forest** ecosystems and ornamental plant life. Alex A. Appiah, Phil Jennings, and Judith A. Turner. Mycologist, Volume 18, Part 4 November 2004. ©The British Mycological Society. Printed in the United Kingdom. DOI: 10:1017/S0269915XO4004136. (6/05)

Moritz, M. A. and Odion, D. C. 2005. Examining the strength and possible causes of the relationship between fire history and Sudden Oak Death. *Oecologia*. DOI 10.1007/s00442-005-0028-1. (7/05)

***In vitro* leaf inoculation studies as an indication of tree foliage susceptibility to** *Phytophthora ramorum* in the UK. Denman, S., Kirk, S. A., Brasier, C. M., and Webber, J. F. 2005. *Plant Pathology* 54, 512-521. http://www.blackwell-synergy.com/doi/abs/10.1111/j.1365-3059.2005.01243.x?cookieSet=1. (8/05)

Foliar infection of sweet chestnut (*Castanea sativa*) by *Phytophthora ramorum* in the UK. Denman, S., Kirk, S. A., Brasier, C. M., Hughes, K. J. D., Griffin, R., Hobdon, E., and Webber, J. F. 2005. New Disease Report *Plant Pathology* 54, 581. (8/05)

Brasier, Clive M., Beales, Paul A., Kirk, Susan A., Denman, Sandra, and Rose, Joan. August 2005. *Phytophthora kernoviae* sp. nov., an invasive pathogen causing bleeding stem lesions on forest trees and foliar necrosis of ornamentals in the UK. Mycological Research. 109 (8): 853-859. (9/05)

Garbelotto, Matteo and Rizzo, David M. August 2005. A California-based chronological review (1995-2004) of research on *Phytophthora ramorum*, the causal agent of sudden oak death. Phytopathol. Mediterr. Vol. 44. No. 2. (9/05)

Werres, S. and Kaminski, K. August 2005. Characterisation of European and North American *Phytophthora ramorum* isolates due to their morphology and mating behaviour *in vitro* with heterothallic *Phytophthora* species. Mycological Research. 109 (8): 860-871. (9/05)

Davison, E. M. and Tay, F. C. S. 2005. How many soil samples are needed to show that *Phytophthora* is absent from sites in the south-west of Western Australia? Australasian Plant Pathology. 34, 293-297. (10/05)

Maloney, P. E., Lynch, S. C., Kane, S. F., Jensen, C. E., and Rizzo, D. M. 2005. Establishment of an emerging generalist pathogen in redwood forest communities. Journal of Ecology. 93, 899-905. (10/05)

McCarren, K. L., McComb, J. A., Shearer, B. L., and St J. Hardy, G. E. 2005. The role of chlamydospores of *Phytophthora cinnamomi* – a review. Australiasian Plant Pathology. 34, 333-338. (10/05)

O'Gara, Emer; Hüberli, Daniel, and Hardy, Giles. March – May 2005. *Phytophthora ramorum*: a threat to Australia? Australasian Plant Conservation. Vol. 13 No. 4, 22-24. (10/05)

Denman, S., Kirk, S. A., and Brasier, C. M. *Phytophthora ramorum* on *Quercus ilex* in the United Kingdom. Plant Disease. 89:1241, 2005; published online as DOI: 10.1094/PD-89-1241A. Accepted for publication 8 August 2005. (11/05)

Tomlinson, J. A., Boonham, N., Hughes, K. J. D., Griffin, R. L., and Barker, I. Nov. 2005. On-Site DNA Extraction and Real-Time PCR for Detection of *Phytophthora ramorum* in the Field. Applied and Environmental Microbiology. Vo. 71, No. 11. 6702-6710. (12/05)

Judelson, Howard S. and Blanco, Flavio A. January 2005. The Spores of *Phytophthora*: Weapons of the Plant Destroyer. Microbiology. Nature Reviews. Vol.3. 47-58. www.nature.com/reviews/micro. (12/05)

NURSERIES

A previously identified *P. ramorum*-positive nursery in Los Angeles County, CA has found a new infection on a camellia. Following a series of rainstorms, the nursery's Research Director surveyed the camellias for pathogen symptoms. Identifying one symptomatic plant, leaf samples were taken and cultured on-site. Following CDFA's review and confirmation of the nursery's camellia culture sample, the USDA's Confirmed Nursery Protocol (CNP) has been implemented. Additionally, as per the Emergency Federal Order, the nursery is prohibited from moving the following plants until the conditions of the CNP are met: all genera of host or associated plants; all plants within the same genus as a host or associated plant; any plants within 10 m of host or associated plants; and any genera of other plants found infected. All other plants may move intrastate or interstate. Trace-forward information has been submitted to CDFA and USDA APHIS for follow-up investigations. (2/05)

As of 2/4/05, CDFA completed delimitation and perimeter surveys of the Los Angeles County nursery found in January to have one *P. ramorum*-positive camellia. Water, soil, and potting media samples were collected on 2/9. Diagnostic results from the delimiting samples are pending. To date, one culture sample from a block of 898 *Camellia japonica* plants has been determined by CDFA and confirmed by the USDA APHIS Plant Protection and Quarantine (PPQ) to be positive. Four other samples from the block have tested positive by CDFA. All 898 plants in the infected block were destroyed on 2/18.

According to CDFA, the nursery resumed shipping non-host plants from outside the destruction block and buffer areas on 2/4. Host and associated host plants, to the genera level are still being held and will not be released until all test results are completed. (3/05)

To date, trace-forward investigations from the *P. ramorum*-positive wholesale nursery in Los Angeles County have identified 13 California nurseries with *P. ramorum* infection on camellias. Ten of the 13 confirmations are retail outlets, one has both retail and production operations, one is a production nursery, and one is a wholesale nursery. None of the identified nurseries ship out of California. CDFA is applying their CNP, modified for retail facilities at the retail stores, and USDA APHIS PPQ CNP at the other sites. (4/05)

A retail nursery in Sacramento, CA was identified as having *P. ramorum*-infested Rhododendron on 3/15/05. CDFA has delimited the infestation and destroyed infected lots. Additional mitigation measures will be implemented. Trace-back investigations are underway to determine the probable source of the infected plants. (4/05)

A Nursery Interception Task Force, comprised of nursery industry, CDFA, and APHIS representatives, was deployed in 2/05, to capture key biological information regarding *P. ramorum* in nurseries without disrupting ongoing regulatory activities. Issues being explored include comparing various detection methodologies, the correlation between soil and plant symptoms, comparisons of *P. ramorum* in symptomatic or asymptomatic plant tissue, analyzing soil under pots, and water and soil testing. The information will be published and accessible when testing is complete and results have been analyzed. (4/05)

***P. ramorum* nursery detection statistics for 2004 have been updated to account for an** additional bonsai camellia confirmed 2/15/05 by USDA APHIS PPQ. The bonsai camellia sample submitted from Pennsylvania was received by the customer in 12/03 and confiscated on 6/8/04. The plant had not been outdoors. With this new confirmation, the total number of USDA APHIS *P. ramorum*-positive detections (in or associated with nurseries) for 2004 has been adjusted to 177 positive finds in 22 states, with Pennsylvania having 2 detections. (4/05)

Monrovia has implemented a plant replacement program for retail customers whose plants originated from their Azusa facility. Customers can either obtain home garden camellia testing through their local master gardeners or county officials (with credit or replacement of infected or potentially infected camellias), or they may contact their local garden center for a credit or replacement plant and instructions on the proper disposal of recently purchased camellias. These plants should NOT be brought to garden centers. (5/05)

ODA recently identified 2 *P. ramorum*-positive nurseries while conducting Federal Order compliance surveys. One of the positives was at a small retail nursery in Washington County and the other a production and wholesale facility in Clackamas County. The Washington County site was found to have infected Pieris, while the Clackamas County site was found to have infected Rhododendron. ODA has taken regulatory action at the sites and has completed delimiting surveys. DNA has been sent to the USDA APHIS Beltsville laboratory for confirmation.

Oregon also reported 4 trace-forward positives in residential settings. The residential finds originated at a nursery found positive in 2004. Delimitation surveys confirmed the disease has apparently not spread to other plants already in the landscapes. Infected plants have been destroyed. (5/05)

Investigations continue at the Sacramento retail nursery found *P. ramorum*-positive in March. CDFA has reported additional positives since the initial find, including Rhododendron, Camellia, Viburnum, and Pieris plants. The nursery owners also operate a production and wholesale nursery; to date, it has not been found infested. CDFA has conducted intensive re-sampling at the wholesale nursery; results are pending. Regulatory action is underway at the positive retail site. (5/05)

***P. ramorum*-positive mountain laurel (*Kalmia latifolia*) has been confirmed at a Gwinnett** County, GA wholesale nursery. The positive plant was identified during the USDA APHIS National Nursery Survey. A camellia plant was also found positive during the delimiting survey. The nursery had a previous camellia *P. ramorum* confirmation in 2004. The positive samples have been linked to several suppliers in two states. Inspections at those nurseries are underway, though no *P. ramorum*-positive plants have been found so far.

A second GA retail nursery has been found positive for *P. ramorum*. The facility was a positive trace-forward in 2004. (6/05)

Two LA nurseries were found to have *P. ramorum*-positive camellias during the USDA APHIS National Nursery Survey. One of the nurseries was found to have the pathogen in 2004, while the other was an initial find. (6/05)

CDFA identified 16 new nurseries in May with *P. ramorum*-positive plants; four of the nurseries ship interstate. Two of the new confirmations came from previously positive nurseries, and were identified both times during trace-forward investigations. (6/05)

The *P. ramorum* 2004 National Nursery Survey Annual Report is now available on the USDA APHIS website at: http://www.aphis.usda.gov/ppq/ispm/pramorum/pdf_files/2004pramsurveyreport.pdf. The report includes information on the national nursery survey program, the 2004 survey method, and results of the survey. (6/05)

A retail nursery in Bradley County, Tennessee was found to have *P. ramorum*-positive Rhododendrons during their *P. ramorum* National Nursery Survey inspection. Trace-back investigations at the source West Coast nursery are underway. CNP has been implemented at the Tennessee nursery. (7/05)

A production nursery in Lincoln County, Oregon has been found with infected *Rhododendron* sp. The nursery was found to be infested as the result of a compliance agreement renewal. Investigations are underway, and CNP has been implemented. (7/05)

A retail nursery found to have *P. ramorum*-positive plants in Los Angeles County, CA shipped plants directly to customers, not nurseries or garden centers. Shipments went to 32 states nationwide as well as nine foreign countries. Regulatory officials are informing affected states of the shipments. (7/05)

Six additional California nurseries have been identified as *P. ramorum*-positive; one had been found positive for the pathogen previously. Five of the nurseries are production facilities and one is a retail site. Of the two nurseries that ship interstate, one only ships stock to Nevada. (7/05)

ODA has identified five additional nurseries in four counties with *P. ramorum*-positive plants. The Multnomah County retail/wholesale nursery was found to have infected *Pieris japonica*. The Deschutes County retail garden center was found to have positive *Magnolia loebneri* (the first *P. ramorum*-positive Magnolia reported in the US), and the Coos County retail nursery was found to have infected Rhododendron. One of the Lane County nurseries was confirmed to have *P. ramorum*-positive Pieris, while the other was found to have infected *Rhododendron*. Trace-forward/-back investigations are underway. CNP has been implemented at all sites. (8/05)

The Washington Department of Agriculture (WSDA) has confirmed two nurseries to be *P. ramorum*-positive. Both the Pierce and Clark County nurseries were found during the National Nursery Survey. The Clark County facility was found to have infected Rhododendron, while the Pierce County facility was found with infected Viburnum, Rhododendron, and Pieris. Trace-back/-forward investigations are underway. Both facilities had been found with *P. ramorum* during the 2004 year and had completed CNP. (8/05)

Two additional retail garden center nurseries have been found infested with *P. ramorum* in Georgia. One nursery in Forsyth County was found with infected Rhododendron and Camellia, while the other was in Gwinnett County and found to only have infected Camellia. Trace-back/ -forward investigations are underway. CNP has been implemented at both sites. (8/05)

The Canadian Food Inspection Agency's (CFIA) Canadian *P. ramorum* survey is underway across Canada. CFIA has detected *P. ramorum* at three British Columbia sites this year. Two of the affected nurseries are retail sites and one is a wholesale nursery. All sites were found positive for the pathogen in 2004. CNP was implemented last year and has been applied upon confirmation this year. Trace-forward activities are underway. (8/05)

National *P. ramorum* Nursery Surveys are complete in 41 states, for a total of 2,433 nurseries visited and 39,345 samples collected. To date, 38 positive sites in six states have been identified through the National Nursery Survey, *P. ramorum* federal order, and annual cleanliness compliance surveys. The only seven nurseries found positive outside of the three regulated West Coast states were all found during the National Nursery Survey: GA(4), LA(2), and TN(1). (8/05)

A South Carolina wholesale nursery/broker in Jasper County has been found to have a *P. ramorum*-positive Camellia plant. The nursery is part of a chain of 25 nurseries in five states, all

of which deal primarily with the landscape industry. Surveys of the remaining 24-related nurseries are underway. Trace-back investigations of the Jasper County infestation, as well as CNP, are underway. (9/05)

WSDA has identified eight additional *P. ramorum*-positive Washington nurseries, bringing the total number of 2005 confirmed nurseries for the state to 10. Eight of the 10 nurseries were found positive for *P. ramorum* in 2004. Of the eight new confirmations, four were retail nurseries in Pierce County, one was a retail facility in Thurston County, two were wholesale nurseries in King County, and one was a retail nursery in Skagit County. Identified hosts included primarily Rhododendron, but also Kalmia, Viburnum, and Pieris. In most of the trace-back investigations, out-of-state sources were identified as the cause of infection. CNP is underway at all of the facilities. (9/05)

Oregon has confirmed six new *P. ramorum* findings since August, bringing the state's 2005 confirmation total to 20 in eight counties. Four of the *P. ramorum*-positive sites were wholesale nurseries and 13 were retail facilities. Three of the *P. ramorum*-positive nurseries ship out-of-state; all three ship primarily to the West Coast. CNP is complete or in progress at all locations. (9/05)

The *P. ramorum*-positive *Camellia japonica* confirmed at a wholesale nursery/broker in South Carolina in August was traced back to a Florida supplier. Samples taken at the Florida nursery following the trace-back identification were all found to be negative for the pathogen. (10/05)

As a result of a trace-forward investigation from a *P. ramorum*-positive California nursery, a *Camellia japonica* planted in a residential landscape has been found to be *P. ramorum*-positive in El Dorado County, CA. Consequently, the local landscape will be surveyed and the soil sampled, along with any nearby water. Additionally, the plant will be properly disposed of and the area will be delimited and monitored for 90 days. (10/05)

***P. ramorum* has been confirmed at three additional Washington nurseries on several** Rhododendrons and a Kalmia plant sampled by WSDA. The detections, made as part of the National *P. ramorum* Nursery Survey, were found in King County (2 nurseries) and Pacific County (1 nursery). (10/05)

***P. ramorum* federal order compliance agreements, trace-forward/-back investigations, the** USDA APHIS National Nursery Survey, and other investigations are ongoing. To date, 95 sites in seven states have had *P. ramorum* detections. Positive findings by state are: CA(55), GA(4), LA(2), OR(20), TN(1), SC(1), and WA(13). (10/05)

The Horticultural Research Institute (HRI), the research division of the American Nursery & Landscape Association (ANLA), has convened a national working group to explore the role of nursery management practices in the battle to limit the spread of *P. ramorum*. The working group is comprised of diverse representatives from the nursery industry, with key technical, research, and policy experts from USDA's Agricultural Research Service (ARS), APHIS, and

Cooperative State Research, Education, and Extension Service (CSREES), as well as the National Plant Board.

The working group met 10/25 – 10/26 to review the current regulatory status of *P ramorum* and the progress of ongoing research initiatives in preparation for a discussion on the role of "recommended management practices" (RMPs) in disease prevention, rapid detection, containment, and elimination in nurseries. The working group evaluated and fine-tuned existing best management practices that have been developed in California, Oregon, and elsewhere. Individual management practices were considered for their conformance with key "filters," or evaluative criteria, such as their scientific basis and relevance for industry across the country. (11/05)

A Nursery Pest Advisory Task Force (NPATF) was created in 8/05 at the request of California's Secretary of Agriculture, AG Kawamura. The Task Force is comprised of representatives from the USDA, CDFA, CDF, UC Davis, county agricultural commissioners, and the nursery industry.

The purpose of the NPATF is to address issues related to new and/or emerging nursery pests, as well as to help identify research needs to address the management of these pests, help identify potential research funding sources, and facilitate communication between regulators and CA nursery industry representatives.

Objectives of the present NPATF group are to initially focus on *P. ramorum*, working in concert with the California Oak Mortality Task Force (COMTF) in its efforts to address *P. ramorum* issues, help identify *P. ramorum* research needs of direct relevance to the CA nursery industry, help identify *P. ramorum* research funding, and provide advice based on sound science and best management practices to help inform state and federal regulatory agencies. (11/05)

USDA APHIS has confirmed the detection of *P. ramorum* at two nurseries in Washington State. These two additional infested nurseries are located in Snohomish County and King County. Infected species at both nurseries are varieties of Rhododendron. The King County nursery is a trace-forward from a positive supplier in Oregon; the Snohomish County nursery was found during the National *P. ramorum* Nursery Survey. (11/05)

In 2005, CDFA sampled approximately 20,000 plants for *P. ramorum*, of which 219 were confirmed positive (1% of all samples collected) in 53 nurseries* (3% of all nurseries inspected for *P. ramorum*). More than half of the positive nurseries (27/53) were found positive during trace-forward inspections. Twenty of the facilities were producers, 16 retailers, 7 producer/retailers, 6 producer/brokers, 1 retailer/landscaper, 2 brokers, and 1 landscaper. Quarantined county confirmations included: Alameda(6), Contra Costa(1), Monterey(1), Napa(1), San Mateo(2), Santa Clara(3), Santa Cruz(2), and Sonoma(3), while regulated county confirmations were made in: El Dorado(1), Fresno(1), Los Angeles(7), Madera(1), Nevada(1), Orange(2), Placer(3), Riverside(2), Sacramento(4), San Diego(5), San Joaquin(1), San Luis Obispo(1), Shasta(2), Stanislaus(2), and Ventura(1). Of the 53 positive nurseries, eight had been identified as positive in previous years. *Camellia* spp. and *Rhododendron* spp. accounted for 93 percent of the finds, while the remaining seven percent was comprised of *Pittosporum*

undulatum, *Pyracantha koidzumii*, *Viburnum tinus*, *Pieris japonica*, and *Laurus nobilis*. Three of the positive nurseries also had positive soil samples; all were treated with Basamid and tested negative for *P. ramorum* following treatment. (*The USDA total differs from the California total for the number of confirmed nurseries because CDFA does not consider one of the confirmed CA locations to be a nursery, while the federal government counts it as such.) (12/05)

In order to meet the requirements of the *P. ramorum* Federal Order, ODA staff in 2005 collected 51,605 samples from 1,020 *P. ramorum* host as well as 13 non-host nursery growing areas to test for the presence of the pathogen. *Phytophthora* species were detected at 156 (15.1%) surveyed sites, with *P. ramorum* found at eight (0.7%) of the sites surveyed CNP was enacted and completed at the eight sites. Seven hundred ninety-six host nurseries and 1,028 non-host nurseries have entered into federal compliance agreements and are eligible to ship plants interstate.

Throughout the state, ODA surveyed retail nurseries that sell plants susceptible to *P. ramorum*. A total of 136 retail nurseries were inspected for *P. ramorum*, with 5,590 samples collected for pathogen testing. *Phytophthora* species were detected at 24 (17.6%) sites, and *P. ramorum* was found at four (2.9%) of the surveyed locations. CNP was enacted at the four sites. One of these sites remains under CNP.

ODA has also been completing trace-out investigations to both nursery and landscape/homeowner sites. A total of 324 sites have been surveyed with 9,000 samples collected for testing. *Phytophthora* species were detected at 25 sites (7.7%), with *P. ramorum* identified at nine locations (2.8%) - three nurseries and six landscape settings. The USDA Confirmed Nursery and Confirmed Residential and Landscape protocols were enacted at the nine sites as appropriate. Two landscape sites and one nursery have yet to complete the requirements of the USDA protocols.

In 5/05, ODA surveyed Christmas tree plantations with Abies spp. and *Pseudotsuga menziesii* for *P. ramorum*. One hundred and three plantations in 22 counties were surveyed, with 4,170 samples collected for testing per the USDA *P. ramorum* National Survey Protocol. *P. ramorum* was not detected in any of the samples, nor was any other *Phytophthora*. This is the fourth consecutive year that *P. ramorum* has not been found in Oregon Christmas tree plantations.

Oregon is also revising state regulations for its *P. ramorum* quarantine and for the federally required nursery certification program. The quarantine will be updated to reflect new information from survey and eradication efforts in Curry County. The nursery rule will be updated to reflect the new host list and revisions to the USDA Confirmed Nursery Protocol. Public hearings will be held in 2/06. (12/05)

In 2005, Washington sampled over 25,000 plants in their *P. ramorum* National Nursery Survey, from approximately 250 nurseries, and identified 16 *P. ramorum*-positive sites, compared to 25 sites in 2004. Of the positives for this year, 13 were retail nurseries and three were wholesale facilities; no production nurseries were found positive. Counties with confirmations included: Pierce(5), King(5), Thurston(1), Clark(2), Pacific(1), Skagit(1), and Snohomish(1). Nine of the 2005 *P. ramorum*-positive sites were also found positive in 2004.

Twelve of the 16 sites' infected stock came from out-of-state growers. Of the four sites infected by in-state stock, all trace-backs were found to be negative. Out of the 7,913 WA samples collected in 2005, 97 were positive for *P. ramorum*, accounting for just over one percent of the material. Of the positive samples, 90 percent were from Rhododendron, with the remaining 10 percent being comprised of Kalmia, Viburnum, and Pieris. For the first time this year, WA also found positive soil samples at one retail facility that was a *P. ramorum*-positive site last year. (12/05)

MONITORING

In early 3/05, Point Reyes National Seashore staff conducted a *P. ramorum* survey along several of the seashore trails that traverse areas where host species are abundant. A UC Berkeley graduate student researcher obtained two positive cultures for *P. ramorum* within Point Reyes National Seashore boundaries. (7/05)

The first *P. ramorum* caused cankers on *Taxus brevifolia* (Pacific yew) have been identified on a tree in Mendocino County, CA. Bleeding symptoms were noticed on Pacific yew among infected CA bay laurel, tanoak, woodrose, evergreen huckleberry, and CA honeysuckle. Having been identified as *P. ramorum*-positive five months earlier, with branches exhibiting dieback symptoms, the same tree was found to have a bleeding canker six inches above the soil line on the mainstem in June. Isolations were made from the canker margin, and *P. ramorum* was recovered. PCR testing has not been performed, and CDFA has not confirmed the findings. This was an understory tree with severe foliar dieback; it appears to be dying. Symptoms similar to those observed on *P. ramorum*-infected Douglas-fir and *Torreya californica* were also observed on multiple Pacific yews in this area. Symptoms consisted of wilted, necrotic shoots and twig cankers on multiple branches. *P. ramorum* was recovered from the margins of twig cankers when plated onto PARP medium. Twig cankers were observed on three understory yews. (9/05)

The USDA Forest Service mapped Sudden Oak Death mortality in the Los Padres National Forest and along the Big Sur Coast in August. Mortality was found to be extensive in Partington Canyon and along the Big and Little Sur Rivers. Much of the infested land identified was in the Ventana Wilderness. Resource managers are concerned about increased fire risk due to the amount of dead woody debris. The flight noted increased tanoak mortality in the southern-most known *P. ramorum* infested areas, just north of the San Luis Obispo border; however, several canyons between Julia Pfeiffer Burns State Park and Plaskett Creek along the southern Big Sur Coast appear to remain uninfested. The area was also flown last year, and in 2004 found to have an estimated 8,000 acres of mortality and 119,000 dead tanoaks and oaks. (9/05)

Results of the 2005 *P. ramorum* Humboldt County aerial, ground, and stream survey efforts reveal more host infestation and spread in southern Humboldt County.
In 2002, a geographically isolated area of infected California bay laurel trees was identified in the southern part of Humboldt County in the town of Redway. Following an experimental treatment project in February 2004 to attempt to control the limited number of infected California bay laurel trees in Redway, a collaborative aerial, water, and ground-based survey began to delimit the infested area and to test the feasibility of future control treatments.

With the completion of the survey, cooperators recognize that the disease is operating at a scale that is much more difficult to manage than previously thought, with at least 21 mi^2 of infection identified surrounding the Redway/Garberville area. While there has been continuous sampling for the pathogen in the region, this is the most comprehensive study of its distribution in Humboldt County to date.

Management of *P. ramorum* at a landscape scale has not been attempted before in California. The group recommends an adaptive management approach that attempts to contain the pathogen within the smallest geographic area possible, treating the area much like a wildfire containment area. (9/05)

The California Sudden Oak Death/*P. ramorum* National Wildland Survey is complete. ***P.*** *ramorum* was not detected. Detection surveys in eastern Butte and Yuba Counties, including a road survey combined with vegetation transects to record hosts of *P. ramorum* and sample symptomatic host tissue, and a stream survey that utilized rhododendron leaves as bait for *Phytophthora* spp. in stream water were conducted. (10/05)

A new *P. ramorum*-infested site in Humboldt County has been confirmed 6 miles north of the Garberville/Redway area on Humboldt Redwoods State Park property along the Avenue of the Giants. The site features a moderately steep hillside dissected by ephemeral drainages running directly into the South Fork Eel River. Old-growth redwood, in places with an understory of nearly pure California bay laurel, grows on the site's lower slopes; the stand grades into a Douglas-fir/tanoak and madrone mix on upper slopes. Symptoms are found in both forest types.

Tanoak shoots and bark, as well as California bay laurel leaves from the site all yielded *P. ramorum*. Numerous symptomatic hosts, including California black oak, madrone, and Douglas-fir, have since been observed on the site and sampled; results are pending. UCCE Humboldt County and the California Department of Forestry and Fire Protection (CDF) have proposed to California State Parks that an adaptive management trial designed to reduce *P. ramorum* inoculum and slow pathogen spread to adjacent sites be implemented. State Parks has begun the review process for the project. (11/05)

The 2005 National *P. ramorum* Survey of Forest Environments debriefing was held 10/25 – 10/26 in Atlanta, GA following the completion of the field work for the 39 participating states. The 2005 survey results to date include 519 nursery perimeter locations and 472 forest locations. Of those areas surveyed, 2,038 samples were submitted. Sixty-two percent of the submitted samples have completed PCR testing and, as of the end of October, all samples have been negative for *P. ramorum*.

Cumulative forest survey totals from 2003 to present include 1,254 nursery perimeter locations and 856 forest locations, with 7,671 samples having been submitted. To date, the only *P. ramorum*-positive PCR results that have been obtained through the survey were from San Francisco County, CA in 2004.

Results of the pilot stream sampling in western North Carolina for *Phytophthora* spp. with rhododendron baits and filtering conducted by Clemson University and the USDA Forest Service were presented at the debriefing. Fifteen different *Phytophthora* species were detected in monthly samplings between April and August 2005. *P. ramorum* was not detected, although sampling will continue through November. A monthly stream baiting pilot project was also conducted in 2005 in 10 Washington state streams, with no *P. ramorum* detected.

The 2006 National *P. ramorum* Survey of Forest Environments priorities will be the same as the 2004 survey. The largest change in the protocol for next year will be to permit both nested and Real-Time PCR diagnostics. (11/05)

As of 9/13/05, the United Kingdom (UK) has found *P. ramorum* in rivers and streams near some outbreak sites, as well as at 475 sites in England and 34 sites in Wales, in addition to a number of sites in Scotland, Northern Ireland, and the Channel Isles. England's totals to date include 380 retail and nursery confirmations, in addition to 95 established gardens, woods, and other wild planting areas. Wales' totals include 26 retail and nursery confirmations along with eight established gardens, woods, and other wild planting areas. In addition to *Rhododendron* and *Viburnum,* findings in these areas have been made on *Pieris, Camellia, Syringa, Kalmia* and single findings on a pot-grown *Taxus baccata* (Yew)*, Hamamelis virginiana* (Witch hazel), *Laurus nobilis* (Bay laurel) and *Leucothoe* plants. Affected tree species have included a non-native American southern red oak (*Quercus falcata*), European Holm oak (*Q. ilex*) and Turkey oak (*Q. cerris*), as well as native beech (*Fagus sylvatica*), Southern beech (*Nothofagus obliqua*), horse chestnut (*Aesculus hippocastanum*), sweet chestnut (*Castanea sativa*), and winter's bark (*Drimys winterii*). All these findings are associated with previous adjacent findings of the disease in rhododendron. (11/05)

A meeting to refine *P. ramorum* stream sampling protocols for the National *P. ramorum* Wildland Survey was held 12/7 in Portland, OR. Informed by developmental work this year in WA, OR, CA, and NC, 10 states will participate in a pilot project during 2006 for early detection of *P. ramorum* by baiting streams with rhododendron leaf baits. Water sampling via leaf baits or filtering has been a very effective detection method around the margins of known infected areas; water baiting detected the southern most find of *P. ramorum* in Willow Creek, Monterey County and several new finds in the Oregon *P. ramorum* eradication area near Brookings, Curry County. (12/05)

The 2005 California Sudden Oak Death/*P. ramorum* aerial and ground-check survey covered 23 counties in the state and mapped approximately 81,000 acres of hardwood mortality. Targeted ground surveys covered seven California counties and identified four new findings in Humboldt County, expanding the known infested area for the county to include two additional watersheds. Flyovers concluded that *P. ramorum* remains undetected in Del Norte and San Luis Obispo Counties. Additionally, the flyovers made note that vegetation types containing coast live oak have less mortality and fewer confirmations of *P. ramorum*, while those with a tanoak component appear to be increasing both in terms of mortality area and new confirmations. (2/06)

MANAGEMENT

Two cleaning devices – one for shoes and one for bikes - are currently under development to address the inadvertent spread of *P. ramorum* by recreational forest users visiting infested wildlands. Both devices are designed to be very low maintenance and easy to operate.

The bike scrubber is a collaborative project with Dominican University of California, University of San Diego, and the National Park Service (NPS), with initial funding provided by the Resources Legacy Fund. A prototype was built and research is ongoing to quantify its cleaning ability. The shoe cleaning stations were designed and built by staff and volunteers of the NPS, with funding from the USDA Forest Service, State and Private Forestry. Portable versions of the shoe cleaning station are already in use for volunteer work days, research groups, and NPS maintenance and natural resource groups who are working in or around infested areas.
The next step for both projects is to deploy the wash stations at trailheads, along with interpretative signs and information. Locations for testing the bike cleaner have not yet been determined. The shoe cleaner will be placed at several sites throughout Golden Gate National Recreation Area to test their cleaning effectiveness as well as to see how well hikers accept and use them. Once complete, the NPS will make the shoe cleaning station plans and parts list available to interested parties. (2/05)

The Humboldt County Department of Agriculture, UC Cooperative Extension (UCCE), CDF, and the USDA Forest Service are conducting an ongoing survey and assessment of *P. ramorum*-infested areas near Redway and Garberville in southern Humboldt County in preparation for potential new suppression efforts. In the summer of 2004, USDA Forest Service aerial surveys identified seven patches of tanoak mortality near Redway and Garberville that were subsequently confirmed by ground crews to be *P. ramorum*-positive. The crews found these patches primarily in riparian forested settings, with steep, challenging topography.

These findings triggered the development of a survey designed to: delimit the extent of the newly discovered infestations; provide a strategic sampling that will assist in the identification of other unknown local infestations in forested and riparian areas; and continue to monitor the development of the disease in residential Redway and Garberville, including sites on which suppression activity took place in 2004. The Humboldt County Department of Agriculture has begun surveying in residential areas where permission has been given by property owners to survey for the pathogen, and they continue to seek permission from remaining landowners in the area. In March, Humboldt County UCCE personnel will likely take over surveying efforts in wildland settings, and may be seeking volunteer help from cooperators experienced in *P. ramorum*-identification.

In addition, CDF and UCCE are developing drafts for potential suppression activities in known infested areas, as well as any new infestations that the surveys may reveal. Possible suppression scenarios range from pruning of selected host branches on residential properties where landowners are unwilling to have trees removed, to felling and removal of selected hosts with or without additional thinning and pruning. Soil, plant parts, and new host sprouts from treatment sites will be monitored for at least two years after treatment.

CDF, the Humboldt County Agriculture Department, and UCCE also continue to monitor soil and leaves from the lower Redway sites treated in February 2004. UCCE staff has installed seven new watercourse monitoring sites, in addition to the five already in place around Redway and Garberville. Three more watercourse monitoring sites are being established this month. The Bureau of Land Management (BLM) Arcata Field Office staff has also installed two watercourse monitoring sites on the Mattole River and its tributaries in southwestern Humboldt County in cooperation with UCCE. These new monitoring sites in southern Humboldt County complement an already existing network of sites in Mendocino, northern Humboldt, and Del Norte Counties, which are regularly monitored by UC Davis and UCCE investigators. The remainder of Humboldt County, as well as Del Norte and northern Mendocino Counties, will continue to be surveyed in heavily visited municipal, county, state, and national parks, as well as in Six Rivers National Forest. (3/05)

The USDA APHIS PPQ Risk Analysis for *P. ramorum* is now available on the APHIS website at: http://www.aphis.usda.gov/ppq/ispm/pramorum/pramorumpra05-05-05.pdf. Topics in the 82-page document include general pest information, organism risk assessment, pathway assessments, and mitigation measures. (8/05)

"The Utilization of Sudden Oak Death-Diseased Woody Material," by John Shelly, University of California Cooperative Extension Advisor, Forest Products and Woody Biomass Advisor

Early in the study of *P. ramorum*, many people voiced the concern that large amounts of infested plant material would be removed from the landscape with little understanding of the risk transporting this material would have on the spread of the pathogen. In addition, if the early predictions of the magnitude of the infestation were correct, it was likely that the existing infrastructure for green waste removal, reuse, and disposal could be quickly overwhelmed. Out of these discussions, the Biomass Utilization Committee of the COMTF, in cooperation with the University of California Forest Products Laboratory, designed a project to coordinate the collection, disposal, and potential utilization of *P. ramorum*-infested material. This project, funded by the USDA Forest Service, Pacific Southwest Region, and the CDF, ended 6/30/05.

During the course of the project, two collection yards were set up and operated in California to provide central collection points for *P. ramorum*-diseased wood and plant material. The project also provided opportunities to monitor pathogen levels during transportation and processing activities, find potential uses for infested material, and develop recommendations for handling and processing diseased material. The first collection yard was set up in Marin County at the Marin Resource and Recovery Center in San Rafael in May 2003 and the second yard was set up in Santa Cruz County at the county waste transfer station in Ben Lomond in November 2003. During the past two years of operation, the two yards collectively received and processed approximately 1,300 green tons of *P. ramorum*-diseased wood and plant material, mostly from the removal of dead, hazardous trees. Twenty-five tree service companies participated in the project. Most of the material collected (about 1,000 tons or 82%) was processed into fuel for biomass power plants. While this was an acceptable use for woody biomass, the value of the material delivered to the power plant barely covered the cost of transportation to the plant. The search for higher value uses included conversion to firewood (about 220 tons or 17%) and

lumber (15 tons or 1%). In addition, a test run of 2 tons was processed into a feedstock for compressed firelogs. Acceptable products were produced in each of these tests. Positive cultures of *P. ramorum* were obtained before and during processing, but with the exception of partially air-dried firewood, the finished products did not yield any positive cultures. The temperatures reached in the kiln drying of the lumber and during the extrusion of the fire logs were high enough to destroy *P. ramorum* that may have survived the initial processing of these products. Preliminary results with the firewood indicated that *P. ramorum* may survive in firewood for many months. A follow-up study is underway to better understand this observation.

Positive *P. ramorum* cultures were obtained from the following:

- 16 of 112 freshly split firewood specimens
- 1 of 110 firewood specimens air-dried for at least 6 months
- 2 of 152 air-borne dust samples collected in the collection yards
- 8 of 49 dust samples collected adjacent to grinding and sawing equipment
- 7 of 16 rain water runoff samples collected in the collection yards

During this project the levels of *P. ramorum* symptoms in the host vegetation surrounding the collection yards were also monitored. Although active *P. ramorum* was cultured from the material collected at the yards and during the processing activities, along with the sharp increases in bark beetle activity that were correlated with the collection of diseased material, no evidence was found to support the hypotheses that the collection and processing activities influenced the background *P. ramorum* levels at the two sites. (8/05)

Kudos to the Elkhorn Slough National Estuarine Research Reserve in Watsonville, CA where approximately 50,000 visitors annually are asked to clean their shoes before walking on the trails to prevent the introduction and spread of *Phytophthora ramorum*. The shoe-cleaning station, comprised of boot scrapes and pans with Lysol® solution, is outside of the Visitor Center so that Reserve personnel can easily refer to it as they explain the procedure and so they can insure visitor compliance. Each visitor is required to obtain a day use pass, show a hunting/fishing license, or show their annual pass. During this admittance process, they are instructed or reminded about the foot wash. Additionally, before a school group can visit the Reserve, teachers must go through a Teacher Training Workshop, which includes instructions on the shoe wash. Upon arrival, each school group is given an orientation to the Reserve and then guided through the shoe cleaning process. The public is not allowed off-trail, and researchers either have dedicated Elkhorn Slough shoes or they use the Lysol® spray or bleach on their shoes. (8/05)

Congressman Pombo (CA) has requested that the Government Accountability Office (GAO) report on government responses to invasive species that threaten forest resources. In response, the GAO chose to report on Asian longhorned beetle, Emerald ash borer, and Sudden Oak Death/*P. ramorum*. With the site visits for the first two pests complete, the GAO will be visiting California from 9/19 – 9/22 to conduct the *P. ramorum* review of government programs dealing with this pathogen. While here, GAO representatives hope to gain insight into how *P. ramorum* got into the US, what damage it has and could cause, how efforts have minimized its impact to the forests, what risk assessments have been done and used for allocating resources, and what lessons have been learned that will be used to improve this or future responses. The

USDA's APHIS and Forest Service, in cooperation with CDFA, the COMTF, CDF, Native Americans, County Agricultural Commissioners, nursery industry representatives, regulated states, and other stakeholders, are coordinating the compilation of information and site visits for the review. (9/05)

The USDA has issued a strategic plan for *P. ramorum*, titled: "Plant Diseases Caused by *Phytophthora ramorum*: A National Strategic Plan for USDA," which has been posted to the APHIS website at: http://www.aphis.usda.gov/ppq/ispm/pramorum/pdf_files/usdaprstratplan.pdf. The report addresses the goals for the *P. ramorum* detection, control, management, research, and restoration programs of the Department and was developed by APHIS; the Forest Service; ARS; and CSREES. The primary objective of the strategy is to prohibit introduction, or significantly reduce the rate of *P. ramorum* introduction, into presently non-infested areas of the country, and to effectively manage infested nurseries, forests, and urban landscapes to minimize and mitigate damage. (10/05)

The Washington Organic Recycling Council's (WORC) "Organic Waste Processing Pathogen Control: Best Management Practices Workshop" was held on 9/23/05. A follow-up training to the Sudden Oak Death workshop held last spring at WA State University Puyallup, the focus was on human and plant pathogen management as they relate to organic waste processing and handling. Concerned with the potential impact of *P. ramorum* on the industry, the WORC presented draft *P. ramorum* best management practices, and a number of companies discussed options for alternative methods of handling plant material if *P. ramorum* were to become established in Washington's natural environment. Additionally, the group hopes to develop contingency plans with APHIS so that transporters and sites can be pre-approved for handling host material if *P. ramorum* is found in Washington's landscape and a quarantine is put in place. (10/05)

***P. ramorum* was first discovered in Oregon forests in July 2001. Since then, the Oregon** Department of Forestry, in partnership with others, has been attempting to eradicate the pathogen by cutting and burning all infected host plants and adjacent apparently uninfected plants. As of 12/8/05, eradication treatments are in progress on 51 sites, totaling approximately 88 acres. The majority of sites are on private land.

The number of new sites and infected trees discovered each year appears in the table below. Both the number of infected trees and the number of infested acres have increased from 2004. This increase may be partially attributable to the unusually wet spring and early summer weather. Of the nine new sites detected in 2005, eight are within 1/4 mile of previously known sites, and one is approximately 1/2 mile away from a known site. This latter site consists of two infected trees just east of the current quarantine boundary, and on the east side of the North Fork of the Chetco River. Both infected trees had no crown symptoms, and were discovered during ground surveys triggered by the recovery of *P. ramorum* from rhododendron leaf baits in a nearby stream in October 2005. In addition to these nine new sites, nine existing eradication sites were expanded to include infected trees that were found near their perimeters in 2005. At the landscape level, the distribution of newly infected trees continues to suggest spread in a north to northeast direction, following the south to southwest winds that prevail during rainy periods.

TABLE: Number of infected trees, number of new disease patches, and number of acres infested with *P. ramorum* in Oregon from 2001 – 12/8/05

YEAR	# tanoaks infected with *P. ramorum*	# new disease patches (Not including expansions of existing sites)	# acres newly infested each year (new sites plus expansions of existing sites)
2001	100+	9	40
2002	85	12	8
2003	49	12	12
2004	30	9	10
2005	49	9	18
TOTAL		51	88

Monitoring within the eradication sites has shown that the pathogen survived cutting and burning on many sites, primarily in stumps and sprouts of host plants that were infected prior to cutting. Since 2003, all stumps and sprouts of host vegetation on private land were treated with herbicide to kill sprouts and prevent future sprouting. On federal lands, sprouts are being cut and burned repeatedly in order to keep sites free of host sprouts until the pathogen can no longer be recovered. Ongoing chemical and mechanical destruction of sprouts on all sites will be essential to curtail future spread of the pathogen. The eradication protocol on private land now requires injecting trees with herbicide (glyphosate or imazapyr) at least two weeks prior to cutting to prevent sprouting.

Despite several new occurrences of *P. ramorum* in 2004 and 2005, distribution of the pathogen in Oregon forests remains limited to a very small area near Brookings, suggesting that the eradication effort has at least slowed pathogen spread. Repeated aerial surveys and ground-checks have failed to detect the pathogen in forests beyond this area. The forested area in Oregon under quarantine by ODA and USDA APHIS is 11 mi^2 as of 12/8/05, and will increase soon to include recent discoveries. Efforts to eradicate the pathogen from Oregon forests likely will continue for several years. (12/05)

The CA SOD Hazardous Tree Removal Program (State funding made available to SOD-impacted counties with hazardous trees in need of removal) has come to a close. In all, approximately 4,020 trees were removed under the contract for a cost of $1,503,645, averaging $374 per removal. Assessment, restoration, fiscal agent, and education were additional expenses not counted in the average tree removal costs. Counties with tree removals included: Alameda(2), Marin(1,259), Monterey(243), Napa(1), Santa Cruz (2,323), and Sonoma(191). (12/05)

UK's DEFRA held an "Interested Organizations Meeting" on *P. ramorum* and *P. kernoviae* 11/14/05. Participants included representatives from the horticultural trade, forestry organizations, environmental bodies, historic gardens, research institutes, and local authorities. The meeting included updates from the UK, France, and the US. Future UK plans were also presented, as were possible future scenarios for the two pathogens. Afternoon break-out sessions

covered science in relation to risks; action in woodlands and gardens; and nursery practice, movement controls, and clean-up. (12/05)

FUNDING AND LEGISLATION

H.R. 4569 (Burns, GA), calling for a national plan for the control and management of Sudden Oak Death, was signed into law 12/23/05. Cosponsored by 19 representatives, the new law directs the Secretary of Agriculture, through USDA APHIS, to develop the plan in consultation with other federal agencies. Issues to be address include identifying *P. ramorum* hosts and surveying for the extent of Sudden Oak Death; defining risks posed by the pathogen; and control and management efforts. While there are no appropriations of funds for its implementation, cost estimates are expected to be included with the plan. (2/05)

USDA APHIS has been provided $9.5 million in emergency funds through the USDA Commodity Credit Corporation to help support *P. ramorum* activities in 2005. The majority of the funding will be used to support the national nursery survey in all 50 states, as well as the required regulatory inspections in California, Oregon, and Washington. It will also be used to fund educational outreach efforts and short-term methods development in support of program activities. (5/05)

The US House of Representatives approved nearly $6 million for Sudden Oak Death in the 2006 Agricultural Spending Bill. If the bill goes through as is, $3 million would be allocated to USDA APHIS for regulatory issues, $2 million would go to the USDA ARS for pathogen-related research, and $930,000 would be allocated to the USDA CSREES for education and outreach purposes. The bill has been forwarded to the Senate and is expected to be heard next month. (7/05)

The Agriculture appropriations bill was passed by the Senate November 3rd, and includes $37 million for disease, pest control, and research for California agriculture, of which $3,076,000 has been earmarked for *P. ramorum* detection, monitoring, control, and eradication, as well as $98,000 for disease research being conducted at UC Davis. The bill is being forwarded to the President for final approval. (11/05)

RESOURCES

Photos, maps, and summary reports from several 2004 *P. ramorum* surveys in California have been posted to a new research section of the COMTF website: www.suddenoakdeath.org. Results of California's National *P. ramorum* Wildland Survey, Ground-based Targeted Risk Survey, and aerial survey are available under "Monitoring." (1/05)

USDA APHIS has posted "*P. ramorum* APHIS Emergency Federal Order "Frequently Asked Questions" (FAQ) to its website. Twenty-nine questions and answers are posted, addressing the regulation of non-host plants, shipping, compliance agreements, certified nurseries, handling of items other than nursery plants, and enforcement of the order at: http://www.aphis.usda.gov/ppq/ispm/sod/faqprorder011305.html. (2/05)

The "*Phytophthora ramorum*: Educate to Detect (PRED)" nationwide training session for Master Gardeners is now available on cd as well as downloadable and free of charge at: http://www.ncpmc.org/sod/. (2/05)

The 2004 *P. ramorum* Summary Report, a compendium of COMTF monthly newsletters, has been posted to the COMTF website: www.suddenoakdeath.org. The report includes a significant events page, a summary of 2004 occurrences, and background information on the pathogen. (2/05)

The updated table "*Phytophthora ramorum* Regulations for Forest Products" is now available and has been posted to the COMTF website: www.suddenoakdeath.org. The matrix summarizes state and federal *P. ramorum* regulations pertaining to the movement of eight different categories of regulated forest articles. (3/05)

USDA APHIS has changed its *P. ramorum* website address. The new address: http://www.aphis.usda.gov/ppq/ispm/pramorum/ has been established to refer to the site by the pathogen's name, rather than Sudden Oak Death, which only represents one of the diseases caused by *P. ramorum.* (4/05)

The COMTF now has a Spanish translation of Sudden Oak Death guidelines for tree care professionals, as well as a Spanish version of the general Sudden Oak Death fact sheet. Both documents are available as PDFs on the COMTF website: www.suddenoakdeath.org. (5/05)

An updated "Nursery Guide for Diseases Caused by *Phytophthora ramorum* on Ornamentals: Diagnosis and Management" is available online and free of charge at the University of California Agriculture and Natural Resources website: http://anrcatalog.ucdavis.edu/InOrder/Shop/ItemDetails.asp?ItemNo=8156. The guide offers basic information on the pathogen as well as disease biology and symptoms on numerous ornamental host plants. It also provides useful information regarding Christmas tree plantations, regulations, nursery inspections, record keeping, sampling and diagnosis, and disease management strategies. (6/05)

The *P. ramorum* 2005 National Nursery Survey Manual has been finalized and can be accessed through the National Agricultural Pest Information System website at: http://ceris.purdue.edu/napis/pests/sod/natplan/fy05/index.html. Biological information, host information, the 2005 survey protocol, sampling protocol, and reporting results are included in the manual, as well as other information. (6/05)

A new *P. ramorum* information sheet has been posted to the UK DEFRA website at: http://www.defra.gov.uk/planth/pramorum.htm. Information on international *P. ramorum*-confirmed locations, hosts, symptom descriptions and photos, pathogen spread, and UK efforts are included in the fact sheet. (6/05)

The updated USDA Forest Service Western Sudden Oak Death (*P. ramorum*) Pest Alert is now available on the COMTF website at: www.suddenoakdeath.org under "Library" "Pest

Alerts." This 1-page informational sheet is useful as a general handout and includes background information on the disease as well as symptoms and other look-alike diseases. (7/05)

Oregon State University Extension has developed and posted "Nursery Guidelines for the Exclusion and Management of *Phytophthora ramorum* in Nurseries" to their website at: http://extension.oregonstate.edu/emergency/oak_death.php. Topics addressed include keeping *P. ramorum* out of a nursery as well as cultural practices to reduce disease risk and losses, including nursery field layout strategies, sanitation information, fungicides, water management, and monitoring. (7/05)

A Sudden Oak Death/*P. ramorum* wanted poster has been developed for display in public areas. The poster alerts the public to *P. ramorum* and provides tear-off tabs at the bottom of the poster for interested parties to take home website information where further resources on the subject can be found at: http://www.ncipmc.org/alerts/suddenoakdeath/index.cfm. Copies of the poster can be ordered through Susan Ratcliffe, North Central Integrated Pest Management Facilitator, University of Illinois. (7/05)

To assist researchers and other affected parties in complying with various landowner and government permit requirements, the COMTF has posted general permit guidelines and contact information to its website at: www.suddenoakdeath.org. Permits are required when plant collecting as well as transporting *P. ramorum*-cultures and infested material. (8/05)

The publication "Diversity and Management of *Phytophthora* in Southeast Asia" is available online in a three-part series at: http://www.aciar.gov.au/web.nsf/doc/ACIA-67E8HU. Topics addressed include hosts, biology, and economics as well as integrated management of *Phytophthoras* found in Southeast Asia. (8/05)

DEFRA has several new resources posted to their website at:
http://www.defra.gov.uk/planth/ph.htm, including: key research findings for *P. ramorum* and *P. kernoviae* funded by the DEFRA Plant Health Division; an updated *P. ramorum* FAQ; a *P. kernoviae* FAQ; "A Practical Guide for the Nursery Stock and Garden Centre Industry" for *P. ramorum*; and a *P. kernoviae* chronology documenting noteworthy events. (11/05)

A modeling page has been added to the COMTF website at: www.suddenoakdeath.org.
The page has a comparison of the various risk models being used to assess the likelihood of *P. ramorum* establishment in areas of the US, Canada, and CA. This is the first of several planned web pages to summarize research on various aspects of *P. ramorum.* (12/05)

USDA APHIS has developed a color brochure titled "*Phytophthora ramorum*: Stopping the Spread" and posted it to their website at:
http://www.aphis.usda.gov/publications/plant_health/index_ph_p.shtml. The brochure provides photos and discusses plants naturally infected by *P. ramorum*, pathogen movement and infection, impacts to the nursery industry, and efforts to stop pathogen spread. (12/05)

FEATURED HOSTS AND ASSOCIATED HOSTS

The following six plants have recently been identified by DEFRA as susceptible to *P. ramorum.* It is anticipated that APHIS will be adding these plants to the associated host list soon.

- *Griselinia littoralis* – New Zealand Privet (Cornaceae): *P. ramorum*-infected New Zealand Privet was found on one established plant in South Wales. Symptoms included leaf blight and dieback. Culturing and TaqMan PCR are complete; Koch's postulates are pending. The identified plant has been destroyed.

- *Hamamelis mollis* – Chinese witch-hazel (Hamamelidaceae): *P. ramorum*-infected Chinese witch-hazel was found on one grown plant in South Wales. Symptoms included leaf blight and dieback. Culturing and TaqMan PCR are complete, but Koch's postulates are not. The identified plant has been destroyed. *Hamamelis mollis* is the second *P. ramorum*-regulated witch hazel, following *Hamamelis virginiana*.

- *Magnolia stellata* –star magnolia (Magnoliaceae): *P. ramorum*-infected star magnolia was found on one established plant in South Wales. Symptoms were limited to leaf blight. Culturing and TaqMan PCR are complete; Koch's postulates are pending. The identified plant has been destroyed.

- *Magnolia x loebneri* – Loebner magnolia (Magnoliaceae): Loebner magnolia was found infected with *P. ramorum* on one established plant in South Wales. Symptoms were limited to leaf blight. Culturing and TaqMan PCR are complete; Koch's postulates are pending. The identified plant has been destroyed.

- *Magnolia x soulangeana* – saucer magnolia (Magnoliaceae): Saucer magnolia was found infected with *P. ramorum* on three grown plants in a nursery in Northwest England. Symptoms included leaf blight and dieback. Culturing and TaqMan PCR are complete; Koch's postulates are pending. The identified plants have been destroyed.

- *Parrotia persica* – Persian Parrotia (Hamamelidaceae): Persian Parrotia was found infected with *P. ramorum* on one grown plant in South Wales. Symptoms were limited to leaf blight. Culturing, TaqMan PCR, and Koch's postulates have been completed. The identified plant has been destroyed. (2/05)

***Acer pseudoplatanus* (Planetree Maple): *P. ramorum* was found causing characteristic** lesions on an infected Planetree Maple found at a known *P. ramorum*-positive woodland garden site in the UK. The 70 cm diameter tree had lesions on two sides of the trunk, extending from ground level to 1.5 and 2.0 m high. The pathogen was readily isolated from cankers. Additionally, Armillaria was identified on the tree as a secondary invader. (5/05)

***Adiantum jordanii* (California maidenhair fern): The symptomatic maidenhair fern were** found at Jack London State Park along a trail with symptomatic woodrose, western starflower, and CA bay laurel. Symptoms on the ferns ranged from leaf spots to entirely necrotic leaves. (7/05)

***Calycanthus occidentalis* (Spice Bush): Symptomatic spice bush samples from Jack London** State Park were found along a creek near symptomatic bigleaf maple and CA bay laurel. Symptoms on spice bush ranged from leaves with necrotic lesions along leaf margins to dead leaves. The lesions were grayish-brown in color, and some had a dark margin. Small necrotic spots were also observed beyond the lesions found on spice bush. (While this is the first official confirmation of spice bush, original identification was made by Arborist Rob Gross in Sonoma County.) (7/05)

***Taxus media* (a yew): The one confirmed positive *T. media* found at a Boskoop, Holland** nursery was observed in November 2003. No other host plants at the nursery were found to be *P. ramorum*-positive. Symptoms included *P. ramorum* stem-base rot and root rot caused by *P. cinnamomi*. The plants in the lot were two to three years old. (NOTE: *Taxus baccata* was formerly identified as a host in the UK from a container plant.) (8/05)

***Acer laevigatum* (Evergreen maple): Evergreen maple was detected in a UK outdoor green** area. Symptoms included chlorotic leaves and leaf necrosis. (9/05)

***Adiantum aleuticum* (Maidenhair fern): Symptomatic *P. ramorum* maidenhair fern were** found along the same Mendocino County tributary as infected *V. planipetala* and *T. californica*. Symptomatic plants were found on a hillside associated with infected CA bay laurel, tanoak, Pacific yew, woodrose, CA honeysuckle, madrone, evergreen huckleberry, and toyon. Symptoms were similar to those observed on *Adiantum jordanii* (CA maidenhair fern), with necrotic areas on the leaves. The necrosis appeared to begin near the leaf margins and advance between the veins. Although some leaves were nearly or entirely necrotic, the disease did not appear to be fatal to the ferns. *P. ramorum* has been recovered from plated leaf tissue, but PCR testing has not been conducted. State and federal regulatory officials are reviewing the findings. (9/05)

***Fraxinus latifolia* (Oregon ash): A *P. ramorum*-symptomatic Oregon ash was found at** Sugarloaf State Ridge Park, along Sonoma Creek, near the visitor's center. The infected tree was part of a research plot established that included 10 *P. ramorum* infected CA bay laurel trees. Symptoms on the Oregon ash consisted of necrotic lesions developing on the leaves and along the leaf margins. Lesions had a grayish-brown color with a water-soaked appearance, similar to lesions caused by ash anthracnose. Leaf tissue isolations were made, and *P. ramorum* was recovered. PCR testing has not been performed. State and federal regulatory officials are reviewing the findings. (9/05)

***Michelia doltsopa* (Michelia): Michelia was detected in an outdoor green area of the UK.** Michelia *P. ramorum* symptoms were limited to necrotic leaf lesions. (9/05)

***Osmorhiza chilensis* (Sweet Cicely): *P. ramorum* was isolated from Sweet Cicely plants** collected at Bouverie Preserve in Sonoma County. The plants were found near heavily infected CA bay laurel and dead and dying coast live oak. Symptoms observed included leaves with marginal necrosis, necrotic leaf lesions, and leaf dieback. In addition, *P. ramorum* infected Sweet Cicely was found in Humboldt County in association with *P. ramorum* infected maidenhair fern, as well as symptomatic CA bay laurel and canyon live oak. The sample was

taken from private property west of Redway, near Redwood Creek. Symptoms observed consisted of marginal leaf necrosis, necrotic leaf lesions, and leaf dieback. Leaf tissue isolations were made, and *P. ramorum* was recovered. PCR has not been performed. State and federal regulatory officials are reviewing the findings. (9/05)

***Quercus petraea* (Sessile oak): *P. ramorum*-infected Sessile oak was found in an outdoor** green area of the UK. Symptoms on the tree were limited to bole cankers. (9/05)

***Torreya californica* (California nutmeg): *P. ramorum*-infected California nutmeg was** found in Mendocino County along the same unnamed tributary as the infected Redwood ivy (see below). One understory symptomatic California nutmeg was found near infected CA bay laurel, tanoak, CA honeysuckle, toyon, and madrone. Identified symptoms were similar to those seen on Douglas-fir, with wilted, necrotic shoots and twig cankers. *P. ramorum* was successfully recovered from the margins of the twig cankers, but not from necrotic needles. PCR testing has not been performed. State and federal regulatory officials are reviewing the findings. (9/05)

***Vancouveria planipetala* (Redwood ivy): *P. ramorum*-infected Redwood ivy was found in** Mendocino County along the same unnamed tributary as the infected California nutmeg. Other *P. ramorum*-infected host plants present included CA bay laurel, tanoak, Pacific yew, woodrose, evergreen huckleberry, and CA honeysuckle. Symptoms consisted of necrotic lesions developing along the leaf margins. Lesions had a grayish-brown color and sometimes had a dark lesion margin. Small spots were observed beyond the lesions, and dead leaves were also observed. *P. ramorum* was recovered in culture; PCR testing has not been performed. State and federal regulatory officials are reviewing the findings. (9/05)

***Abies concolor* (white fir): *P. ramorum*- infected *Abies concolor* (white fir) was first** reported in the 10/05 COMTF newsletter as having been found at a Christmas tree farm in the quarantined county of Santa Clara. Additional sampling of the tree farm is underway. Koch's postulates have not been completed. USDA APHIS has reviewed the CDFA data and expects to add *A. concolor* to the official list of associated host plants soon. (11/05)

***Viburnum opulus* (=*V. trilobum*) - (American cranberry viburnum): *P. ramorum*-infected** *Viburnum opulus* (=*V. trilobum*) 'Baily Compact' (American cranberry viburnum) was identified as one of several Viburnum, Rhododendron, and Camellia species found positive at a Clackamas County, OR nursery. This new associated hosts joins the already listed Viburnum opulus (European cranberrybush). (11/05)

OUTREACH ACTIVITIES

3/05 – 4/05 – COMTF survey conducted of Task Force outreach activities for feedback on effectiveness and development of future outreach plans

4/5/05 - Free half-day "*P. ramorum* Diagnosis and Management" refresher course; Contra Costa County, CA; Sponsored by COMTF

5/24 – Free all day "P. *ramorum* Diagnosis and Management" training; Santa Cruz County, CA; Sponsored by COMTF

9/16 – Free Sudden Oak Death Workshop and Community Update; Fort Ross State Historic Park Visitor Center, CA

10/7 – 9 – "Finding Balance Through Traditional Native Knowledge," California Indian Conference 2005; Humboldt State University, CA

3/05 – 6/05 - State Cooperator Training for the 2005 National *P. ramorum* Early Detection Survey for Forests; Seven sessions for cooperator training are conducted in various regions of the country; Sponsored by the USDA FS

FEATURE STORIES

Native Americans are among the groups most affected by the impacts of *P. ramorum*. Tanoak, a heavily impacted host of *P. ramorum*, provides food and medicine, and is a source of spirituality for many of California's Tribes. Other host plants, such as California bay laurel, huckleberry, and salmonberry, are also important food sources, as well as used in cultural practices. To address the needs of California Tribes dealing with *P. ramorum*, the COMTF has been working in cooperation with Tribal members and a number of groups and agencies on outreach efforts.

This spring the COMTF has been assisting the North Coast Resource Conservation and Development Council (RC&D) in their Tribal outreach efforts in Marin, Sonoma, Mendocino, and Lake Counties. A "Tribal Toolkit," comprised of hardcopy and electronic versions of outreach materials, has been developed and presented to interested Tribes. Additionally, the Sudden Oak Death Tribal outreach team has focused on developing and providing small training sessions for key Tribal members and department officials, providing them with the information and resources necessary to train and update Tribe members, as well as act as a resource for support and information. So far, the team has met with Northern California Tribal representatives at a Tribal environmental meeting in Santa Rosa. The team also conducted the first "train the trainer" workshop with Round Valley Tribal members in Mendocino County, and they participated in a workshop hosted by the Kashia Band of Pomo Indians at the Stewarts Point Rancheria. As a result of the Kashia workshop, the Tribe received a toolkit and the Kashia Tribal Environmental Department will be working with surrounding landowners, UC Davis researchers, and USDA Forest Service representatives to develop a management plan for dealing with the *P. ramorum* infestation on their land.

Additional "train the trainer" sessions are planned for this spring and summer. In addition, a UCCE Humboldt/Del Norte COMTF representative will be working with the Round Valley Tribe on surveying and monitoring their 31,000 acres of land, as well as monitoring streams for *P. ramorum* on both the Hoopa and Yurok reservations. Educational presentations will also be provided to the Yurok forestry staff and at a North Coast Tribal/interagency meeting at the Trinidad Rancheria.

USDA APHIS has also been working on Tribal outreach tools, including *P. ramorum* host data sheets with a listing of traditional uses and Native American languages names, and a directory of Tribes and Tribal member contacts, which will be of great use during any future emergency

program work in California. The COMTF will continue to work with APHIS to create and disseminate these educational resources to interested Tribes. (5/05)

California black oak (*Quercus kelloggii*) and blue oak *(Q. douglasii*) in the Sierra Nevada and Coast Ranges are being reported as having premature leaf edge curling, browning, and abscission. In some cases, entire hillsides now have oak forests with few, if any, leaves. While both of these deciduous species do lose all of their foliage in the fall, in mid-summer they are normally green and leafy.

Many of the landowners reporting these symptoms are concerned that symptomatic oaks may be infected with *P. ramorum*. However, it is important to note that blue oak is not a known host of *P. ramorum* and in CA black oak, Sudden Oak Death symptoms begin as stem cankers. The more likely culprits of the leaf spotting and dropping are fungal organisms, including Septoria leaf blight (*Septoria quercicola*) and oak anthracnose (*Apiognomonia errabuna*). During previous similar outbreaks, both of these pathogens have been identified as principal causes.

While these foliage diseases are fairly common and may be found on many oaks in normal rainfall years, they are much more prevalent and widespread during years with unusually wet, late-spring conditions. Cool wet weather in mid-spring slows leaf development and extends the period in which the leaves remain succulent and most susceptible to fungal pathogens. Since wet weather this year continued as temperatures increased, it provided an ideal environment for infection. With unusual weather patterns necessary for these spikes in leaf diseases, such outbreaks are typically limited to one growing season. While the immediate effects may be startling, there should be little long-term impact on tree health.

During the coming months, affected trees may continue to lose their leaves. Additionally, many trees will grow new leaves before the fall, especially trees that lost their leaves relatively early in the season. Tree vigor also helps determine the amount of refoliation, since trees with more energy reserves are better able to refoliate than weakened trees. Trees with pre-existing stress, or trees that lose their foliage relatively late in the season, may not refoliate as fully. The leaf loss resulting from these diseases does reduce the tree's ability to manufacture food through photosynthesis and, over time, repeated defoliations could weaken trees. But, because these events are often widely spaced, long-term tree health is usually not seriously impacted. (8/05)

PERSONNEL CHANGES

Pat Shea is retiring from his position as the PSW Sudden Oak Death Research Program Manager, and will consequently be leaving his position as the COMTF Research Committee Co-Chairman. However, he will not be retiring from the natural resource management platform, as he has agreed to take leadership of the Wildlife Heritage Foundation, a nonprofit conservation organization that currently manages 3800 acres of wildlife habitat predominantly in the Sacramento Valley. (2/05)

Rick Standiford relocated to the University of California President's Office in Oakland effective 1/1/05. In his new role, he assumed the duties as Associate Vice President of the UC Division of Agriculture and Natural Resources, the oversight group for the Agricultural Experiment Station and Cooperative Extension on the Berkeley, Davis, and Riverside Campuses,

and the various County Extension offices. He will step down as the co-chair of the COMTF research committee, but will continue with his research interests in Sudden Oak Death and changes in stand structure. (2/05)

Dr. David T. Kaplan has been appointed Assistant Deputy Administrator to the USDA APHIS PPQ Pest Detection and Management Programs. Beginning 5/1/05, he will provide national leadership to PPQ's pest detection activities, pest management programs, and emergency response, which includes the *P. ramorum* federal regulatory program. Kaplan will be vacating his position as National Science Program Leader for Integrated Pest Management and Emergency Programs in the PPQ Center for Plant Health Science and Technology. (4/05)

James Writer, formerly the USDA APHIS Science and Technical Liaison, has officially received the new USDA APHIS Assistant National *P. ramorum* Program Manager position, located at the USDA Headquarters in Riverdale, MD. Under his new title, Writer will continue to work closely with Jonathan Jones, USDA APHIS National *P. ramorum* Program Manager, on national and international *P. ramorum* issues. (6/05)

Susan Frankel has left her position as Plant Pathologist for the USDA Forest Service, State and Private Forestry to join the USDA Forest Service, PSW in Albany, CA. In her new role, which began 6/12, Frankel assumed the title of Sudden Oak Death/*P. ramorum* Research Program Manager. She may be reached in her new position at: (510) 559-6472 or via email at: sfrankel@fs.fed.us. (7/05)

Don Gasser, COMTF Biomass Co-chair, retired from his position with Pacific Gas and Electric. Gasser's new phone number for Task Force-related activities is (707) 253-0576. He may also be contacted via email at dgasser@napanet.net. (7/05)

Ross Meentemeyer left his position as Assistant Professor and Director of the Geographic Information Center at Sonoma State University in June, where he focused on landscape ecology and spatial analysis, particularly as it related to the spread of *P. ramorum* in CA forests. In his new position with the University of North Carolina at Charlotte, he will be an Associate Professor and Director of a newly established Center for Applied Geographic Information Science in the Department of Geography and Earth Sciences. In his new role, Meentemeyer will continue work on his current Sudden Oak Death projects and plans to stay integrally involved in Sudden Oak Death research and management issues with his collaborators. Meentemeyer can be reached in his new position at (704) 687-2293 or via email at: rkmeente@email.uncc.edu. (7/05)

Art Wagner, having left his WSDA Pathologist position on 7/15/04, has recently taken a new position as a Pest Survey Specialist with the USDA APHIS PPQ Wisconsin office. While *P. ramorum* will no longer be the main focus of his job, he still plans to stay as involved in the subject as his current duties will allow. Wagner can be reached in his new position at (608) 231-9577 or via email at: arthur.c.wagner@aphis.usda.gov. (7/05)

Gary Chastagner, Professor of Plant Pathology at Washington State University's (WSU) Research and Extension Center, has hired Norm Dart as the new WSU Sudden Oak Death Education Coordinator. Dart recently received his Masters of Science in Plant Pathology from

Washington State University, with his thesis work focusing on the population biology of *Heterobasidion annosum* infecting Pacific Northwest Christmas trees. In his current duties, Norm will spearhead *P. ramorum* outreach efforts, including working with Master Gardeners, creating Washington state-specific *P. ramorum* educational materials, and providing technical assistance in setting up a new molecular lab at WSU Puyallup to assist with research and diagnostics. Dart can be reached at (253) 445-4596 or via email at: dart@puyallup.wsu.edu. (10/05)

Effective 11/28, Kate Symonds left her position with the USDA North Coast Resource Conservation and Development Council (RC&D) for a position with the US Fish and Wildlife Service Conservation Partnerships program. In her new position, Symonds will be promoting partnerships and various USFWS non-regulatory restoration grant programs in several of the Bay Area counties, and can be reached at: kate_symonds@fws.gov. Until her position with RC&D is filled, all inquiries regarding general RC&D matters should be directed to the RC&D Chair, Bev Wasson, at: bfwasson@earthlink.net. (12/05)

ACRONYM GLOSARY

A

AB	Assembly Bill
AK	Alaska
AL	Alabama
ANLA	American Nursery & Landscape Association
APHIS	(USDA) Animal and Plant Health Inspection Service
AR	Arkansas
ARS	(USDA) Agricultural Research Service
AZ	Arizona

B

BC	British Columbia
BMP	Best Management Practice
BOF	(CA) Board of Forestry and Fire Protection

C

CA	California
CAN	California Association of Nurseries and Garden Centers
CANGC	California Association of Nurseries and Garden Centers
CCC	Commodity Credit Corporation
CDF	California Department of Forestry and Fire Protection
CDFA	California Department of Food and Agriculture
CFIA	Canadian Food Inspection Agency
CNLA	Canadian Nursery Landscape Association
CNP	(USDA APHIS) Confirmed Nursery Protocol
CO	Colorado
COMTF	California Oak Mortality Task Force
CPHST	(USDA APHIS PPQ) Center for Plant Health Science Technology
CSREES	(USDA) Cooperative State Research, Education, and Extension Service
CT	Connecticut

D

DC	District of Columbia
DE	Delaware
DEFRA	(UK) Department for Environment, Food and Rural Affairs
DPR	(CA) Department of Pesticide Regulation
DOE	(US) Department of Energy
DNA	Deoxyribonucleic acid

E

EPA	Environmental Protection Agency
EU	European Union

F

FL	Florida
FS	(USDA) Forest Service

G

GA	Georgia

H

HI	Hawaii
HR	(US) House of Representatives
HRI	(ANLA) Horticultural Research Institute

I

IA	Iowa
ID	Idaho
IL	Illinois
IN	Indiana

J

JGI	(US DOE) Joint Genome Institute

K

KS	Kansas
KY	Kentucky

L

LA	Louisiana

M

MA	Massachusetts
MD	Maryland
ME	Maine
MI	Michigan
MN	Minnesota
MO	Missouri
MS	Mississippi
MT	Montana

N

NC	North Carolina
ND	North Dakota
NE	Nebraska
NH	New Hampshire
NJ	New Jersey
NM	New Mexico

NPGBL	(USDA APHIS PPQ) National Plant Germplasm and Biotechnology Lab
NV	Nevada
NY	New York

O

ODA	Oregon Department of Agriculture
OH	Ohio
OK	Oklahoma
OR	Oregon
OSU	Oregon State University

P

P.	*Phytophthora*
PA	Pennsylvania
PCR	Polymerase Chain Reaction
PPQ	(USDA APHIS) Plant Protection and Quarantine
PSW	(USDA FS) Pacific Southwest Research Station

R

RI	Rhode Island
RMP	Recommended Management Practice

S

SC	South Carolina
SD	South Dakota
SOD	Sudden Oak Death
SPRO	State Plant Regulatory Official

T

TN	Tennessee
TX	Texas

U

UC	University of California
UCB	University of California Berkeley
UCD	University of California Davis
UCCE	University of California Cooperative Extension
UK	United Kingdom
US	United States
USDA	United States Department of Agriculture
UT	Utah

V

VA	Virginia
VT	Vermont

W

WA	Washington
WSDA	Washington State Department of Agriculture
WSU	Washington State University
WV	West Virginia
WI	Wisconsin
WY	Wyoming

Z

ZOI	Zone of Infestation