CALIFORNIA OAK MORTALITY TASK FORCE REPORT
FEBRUARY 2011

REGULATIONS

The USDA Animal and Plant Health Inspection Service (APHIS) will implement a Federal Order on 3/1/11 requiring interstate shipping nurseries in *P. ramorum* quarantine areas or in regulated counties that have previously tested positive for the pathogen to provide advance notification to destination states in non-regulated areas for certain high-risk plant species. Advanced notification is intended to enhance the traceability of potentially infected nursery stock. Under the new requirements, all nurseries located in a quarantine area that ship any species of *Camellia, Kalmia, Pieris, Rhododendro*n (including Azalea), and *Viburnum* interstate to non-regulated areas must provide advance notification. In addition, nurseries shipping any of these species interstate to non-regulated areas must provide advance notification if they are located in regulated counties with one or more interstate shippers that have tested positive for *P. ramorum* since 2003. The Federal Order and guidance documents are available at www.aphis.usda.gov/plant_health/plant_pest_info/pram/regulations.shtml. For more information, contact Prakash Hebbar at prakash.hebbar@aphis.usda.gov or (301) 734-5717.

The California Board of Forestry and Fire Protection passed an interim emergency regulation for Sudden Oak Death at their January 2011 meeting. The rule defines an Emergency Condition (under 14 CCR §1052.1) and specifies the location, treatments, and environmental protection measures related to the removal of live and dead hardwood trees or vegetation infected by or susceptible to Sudden Oak Death. The action will enable private landowners in isolated areas outside of California's generally infested area to more rapidly remove host hardwoods and take treatment actions on newly discovered infested sites. The rule requires plans to be developed with the concurrence with CAL FIRE's pest specialists. All plans will include treatments intended to slow or stop pathogen spread, and will incorporate best management practices for sanitation as well as wildlife and watershed protections. The regulation has a 180-day life, during which time the Board will be working on implementing a permanent rule.

MONITORING

***P. ramorum*-infected Japanese larch trees were confirmed in Scotland for the first** time in December 2010. The finding was made in a forestry plantation on the west coast of Scotland (Craignish Peninsula, Argyll). Approximately three acres of larch are being felled in hopes of preventing further pathogen spread. Although *P. ramorum* has been detected in Scotland before in plant and shrub species, including rhododendron, it has not been found in trees. All owners of larch trees are being asked to inspect them regularly for symptoms and to report suspicious findings to the Forestry Commission.

Only about 30 percent of laboratory tests of suspect tree tissue samples collected around the country have produced conclusive positive or negative results. Although the Craignish trees displayed *P. ramorum* infection, and the pathogen had been isolated from ground litter, the first laboratory tests of suspect foliage collected from the trees was negative. However, since it was not possible to attribute the damage to other causes, additional inspections and tests were conducted, which confirmed pathogen presence.

Northern Ireland's Glenariff Forest Park was found to be *P. ramorum* positive in December after an aerial survey, bringing the total number of infested sites in Northern Ireland woodlands to eight. The find is the first in a forest park situation for Northern Ireland, and will require the felling of 10.6 acres of larch to limit disease spread. In all, approximately 667 acres of public forest land and 15 acres of private woodlands are directly affected. All woodland owners and managers are being asked to look for disease symptoms and to report suspicious sites to the Department of Agriculture and Rural Development.

RESEARCH

Fichtner, E.J.; Rizzo, D.M.; Kirk, S.A.; and Webber, J.F. 2011. Root Infections May Challenge Management of Invasive *Phytophthora* spp. in U.K. Woodlands. Plant Disease, Volume 95, Number 1, Pages 13-18. DOI: 10.1094/PDIS-03-10-0236.

Abstract: Because sporulation of *Phytophthora ramorum* and *P. kernoviae* on *Rhododendron ponticum*, an invasive plant, serves as primary inoculum for trunk infections on trees, *R. ponticum* clearance from pathogen-infested woodlands is pivotal to inoculum management. The efficacy of clearance for long-term disease management is unknown, in part due to lack of knowledge of pathogen persistence in roots and emerging seedlings. The main objectives of this work were to (i) investigate whether both pathogens infect *R. ponticum* roots, (ii) determine the potential for residual inoculum of *P. kernoviae* to infect *R. ponticum* seedlings in cleared woodlands, and (iii) assess potential for *R. ponticum* roots to support survival and transmission of *P. kernoviae*. Roots of *R. ponticum* were collected from both unmanaged and cleared woodlands and assessed for pathogen recovery. Both *P. ramorum* and *P. kernoviae* were recovered from asymptomatic roots of *R. ponticum* in unmanaged woodlands, and *P. kernoviae* was recovered from asymptomatic roots from seedlings in cleared woodland. Oospore production of *P. kernoviae* was observed in naturally infected *R. ponticum* foliage and in inoculated roots. Roots also supported *P. kernoviae* sporangia production. The results of this study suggest that post-clearance management of *R. ponticum* regrowth is necessary for long-term inoculum management in invaded woodlands.

Goss, E.M.; Larsen, M.; Vercauteren, A.; Werres, S.; Heungens, K.; Grünwald, N.J. 2011. *Phytophthora ramorum* in Canada: Evidence for Migration Within North America and from Europe. Phytopathology, Volume 101, Number 1, Pages 166-171. DOI: 10.1094/PHYTO-05-10-0133.

Phytophthora ramorum, the cause of sudden oak death on oak and ramorum blight on woody ornamentals, has been reported in ornamental nurseries on the West Coast of North America from British Columbia to California. Long-distance migration of *P. ramorum* has occurred via the nursery trade, and shipments of host plants are known to have crossed the U.S.–Canadian border. We investigated the genotypic diversity of *P. ramorum* in Canadian nurseries and compared the Canadian population with U.S. and European nursery isolates for evidence of migration among populations. All three of the *P. ramorum* clonal lineages were found in Canada but, unexpectedly, the most common was the NA2 lineage. The NA1 clonal lineage, which has been the most common lineage in U.S. nurseries, was found relatively infrequently in Canada, and these isolates may have been the result of migration from the United States to Canada. The EU1 lineage was observed almost every year and shared multilocus genotypes with isolates from Europe and the United States. Estimation of migration rates between Europe and North America indicated that migration was higher from Europe to North America than vice versa, and that unidirectional migration from Europe to North America was more likely than bidirectional migration.

Herrero, M.L.; Toppe, B.; and Brurberg, M.B. First report of *Phytophthora* *ramorum* on bilberry (*Vaccinium myrtillus*) in Norway. Plant Disease, Volume 0, Number ja. DOI: 10.1094/PDIS-10-10-0709. Available online at http://apsjournals.apsnet.org/doi/abs/10.1094/PDIS-10-10-0709.

Abstract: In the annual Norwegian *Phytophthora ramorum* survey in 2009, wild bilberry samples collected during September/October in a semi-managed park (arboretum) in the south-west coast of Norway tested positive in a *P. ramorum* specific real-time PCR test (1). Necrotic lesions were observed in shoot tips, branching points and around leaf abscission scars. The lesions were of variable dimensions. In the samples collected in October some lesions were confluent and completely covered some shoots. After direct detection on plant material, *P. ramorum* was isolated from necrotic lesions of the stems on semi-selective media PARP (corn meal agar amended with pimaricin, ampicillin, rifampicin and pentacloronitrobenzene) (2). The isolates were identified by the production on agar of abundant chlamydospores and deciduous, semi-papillate sporangia characteristic of *P. ramorum* (3). Sexual structures were not observed. The three pure cultures obtained from different plant samples, also tested positive for *P. ramorum* by the specific real-time PCR test (1). All the positive samples were found in close vicinity to infected rhododendron plants. In this location, *P. ramorum* had already been detected on rhododendron in 2005. A pathogenicity test was performed with two isolates from bilberry and one from rhododendron. Wild healthy looking bilberry plants were collected at the end of June in the forest around Oslo. Two shoot tips with 6-10 leaves each and one small part of a branch with several shoots and immature berries were used for testing each isolate. The inoculations were made by dipping the shoots in a zoospore suspension (2-3 x 10^4 zoospores mL^{-1}) for 1 min. Inoculated material was placed in moist incubation chambers and incubated at room temperature (19-24°C). Controls were obtained by dipping shoots in sterile water. After 2 days, lesions were observed on leaf laminae from all the shoots inoculated with the three different isolates. After 4 days, severe petiole necroses were observed, and leaves abscised easily from the stems. Symptoms on the stems were observed in the apical part or areas around the nodes. Some shoots were almost completely necrotic. Heavy sporulation was observed on the berries. *P. ramorum*

was reisolated from leaves and stems of inoculated shoots for all the isolates. *P. ramorum* was not recovered from control plants.

Jinek, A.; Simard, M.; Brière, S.C.; Watson, A.K.; Tweddell, R.J.; and Rioux, D. 2010. Foliage susceptibility of six eastern Canadian forest tree species to *Phytophthora ramorum*. Canadian Journal of Plant Pathology. DOI: 10.1080/07060661.2010.534892. Online at http://dx.doi.org/10.1080/07060661.2010.534892.

Abstract: To help assess the risk of establishment of *Phytophthora ramorum* in eastern Canada, detached leaves/needles of six eastern native forest species were inoculated with *P. ramorum* and the amount of necrosis and sporulation was determined. Inoculation was also performed by plant dipping. Balsam fir (*Abies balsamea*), sugar maple (*Acer saccharum*), yellow birch (*Betula alleghaniensis*), white ash (*Fraxinus americana*), tamarack (*Larix laricina*), and red oak (*Quercus rubra*) were the species tested. *Rhododendron* 'Nova Zembla,' which is putatively sensitive to the pathogen, was also included in the assays. The degree of necrosis on detached leaves was particularly high on *F. americana* and *B. alleghaniensis*. This susceptibility was also confirmed after wounding in the plant-dip experiment in which *Q. rubra* was also susceptible. For the coniferous species, needle necrosis was higher on *A. balsamea* than on *L. laricina*. Reisolation assays and PCR detection of *P. ramorum* were generally positive when necrosis occurred, except on conifer needles and especially after plant-dipping. Sporulation was particularly intense after plant-dip assays but was barely noticeable on detached leaves/needles. Sporulation was higher on leaves of *F. americana* and *B. alleghaniensis* than on leaves of *A. saccharum* and *Q. rubra*, while needles of *A. balsamea* supported more sporulation than needles of *L. laricina*. Sporulation was even observed on some asymptomatic leaves and needles. During conducive climatic conditions, *F. americana*, *B. alleghaniensis*, and *A. balsamea* could be infected in eastern Canada by *P. ramorum* and sporangia could be produced on their foliage if the pathogen were introduced into eastern Canada.

Kliejunas, J.T. 2010. Sudden oak death and *Phytophthora ramorum*: a summary of the literature. Gen. Tech. Rep. PSW-GTR-234. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. 181 p. Available as a CD, book, or downloadable file at http://www.fs.fed.us/psw/publications/documents/psw_gtr234/.

Abstract: Sudden oak death and *Phytophthora ramorum*, both first recognized about a decade ago, have been the subject of hundreds of scientific and popular press articles. This document presents a comprehensive, concise summary of sudden oak death and *P. ramorum* research findings and management activities. Topics covered include introduction and background, identification and distribution, the disease cycle, epidemiology and modeling, management and control, and economic and environmental impacts.

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Moralejo, E. and Descals, E. 2011 Diplanetism and microcyclic sporulation in *Phytophthora ramorum*. Forest Pathology. *In press*. http://dx.doi.org/10.1111/j.1439-0329.2010.00674.x.

Abstract: The zoosporic phase of the pathogen *Phytophthora ramorum* plays a crucial role in the process of plant infection, yet little is known about the fate of zoospores failing to target their hosts. Here, we describe new stages in the life cycle of *P. ramorum* concerning the *in vitro* development of monomorphic diplanetism and microcyclic sporulation in free water. Papillate cysts were formed after zoospore suspensions of isolates of the EU1 and NA1 clonal lineages were vortexed. Cysts usually germinated directly forming an emerging tube, or indirectly by releasing a secondary zoospore, which leaves behind an empty cyst with a short evacuation tube. Germinate cysts frequently developed either an appressorium or a microsporangium both terminally. We also observed microcyclic sporulation, i.e. sporangia indirectly germinated by forming a microsporangium, as in microcyclic conidiation of true fungi. Temporal progress of encysted zoospores in solution showed that percentage of germination varied significantly among and within isolates as well as between experiments, suggesting that germination is partly ruled by internal mechanisms. Diplanetism and microcyclic sporulation in *P. ramorum* may provide a second opportunity for host infection and may increase the chance of long dispersal in moving water.

Nagle, A.M.; Mcpherson, B.A.; Wood, D.L.; Garbelotto, M.; Bonello, P. 2011. Relationship between field resistance to *Phytophthora ramorum* and constitutive phenolic chemistry of coast live oak. Forest Pathology. DOI: 10.1111/j.1439-0329.2010.00703.x.

Abstract: Sudden oak death, caused by *Phytophthora ramorum*, has resulted in high levels of coast live oak (CLO) mortality. However, some CLO survive in areas with high disease pressure and may thus be resistant. We tested the hypothesis that such field-resistant trees contain constitutively higher levels of phenolics than susceptible trees. Phloem was sampled from the trunks of two groups of trees (one previously inoculated, one naturally infected with *P. ramorum*) categorized over the course of several years as putatively resistant (PR, no symptoms), in remission (IR, showed symptoms but then

recovered) and symptomatic (S). Individual and total soluble phenolics from these trees were quantified. There were no significant differences in individual or total soluble phenolics between groups of naturally infected trees. However, inoculated PR and IR trees were characterized by higher constitutive levels of ellagic acid, a tyrosol derivative, and an unidentified phenolic than S trees. Ellagic acid and tyrosol-like compounds in CLO phloem are promising resistance biomarker candidates.

Tsopelas, P.; Paplomatas, E.; Tjamos, S.; Soulioti, N.; and Kalomoira, E. 2011. First report of *Phytophthora ramorum* on *Rhododendron* in Greece. Plant Disease. In press. http://dx.doi.org/10.1094/PDIS-08-10-0607.

In April 2010, during a survey conducted in Fthiotis Prefecture of central Greece, symptoms of stem necrosis and leaf lesions were observed on two container-grown plants of *Rhododendron*, hybrid 'Kate Waterer' in a nursery. From symptomatic leaves, a *Phytophthora* species was isolated on PARPH-V8 selective agar medium (2) with typical morphological characters of *Phytophthora ramorum* S. Werres & A.W.A.M. de Cock (4). The whole block of plants was under probation until molecular verification of the pathogen was completed. The nursery was reexamined 6 weeks after the first encounter, whereas spread of the pathogen was noticed to neighboring plants in the same block; five more *Rhododendron* plants with similar symptoms were recorded while one of the originally infected plants was dead. Isolates of *Phytophthora* with similar morphology were obtained from symptomatic leaves of three new plants as well as from the potting mix of a severely infected plant that was baited in a *Rhododendron* leaf assay (2). All *Rhododendron* plants in the block belonged to the same consignment imported from Belgium and covered by a phytosanitary plant passport. Colonies on 10% clarified V8 juice agar appeared with coralloid, coenocytic mycelium with radial growth at 1.7 mm per day at 20°C and maximum temperature 26 to 27°C. Propagules characteristic of *P. ramorum*, including semipapillate, caducous, sporangia measuring 35 to 55 × 15 to 30 μm (1.9 length/width ratio) and large chlamydospores (45 to 80 μm), were observed on V8 agar. One isolate was confirmed as *P. ramorum* by sequence analysis of the internal transcribed spacer region of rDNA and was deposited in the culture collection of the University of Athens (ATHUM 6522). Comparison of amplicon sequences (using ITS4/5 primer pair) of approximately 875 bp long was carried out using MEGABLAST search for highly similar sequences. Alignment data revealed the highest and most significant homology to *P. ramorum* (GenBank Accession No. AY594198.1) at 99%. Pathogenicity tests were carried out using detached leaves of *Rhododendron* hybrid 'Red Jack' and *Arbutus unedo* L., which were slightly wounded and inoculated with mycelium agar plugs (3). Necrotic lesions appeared on the inoculated leaves of both plant species 10 days after incubation at 20°C, while no symptoms developed on control leaves inoculated with sterile agar plugs. *P. ramorum* was consistently reisolated from artificially infected leaves of both plant species. Following confirmation of pathogen presence, eradication measures were applied in the nursery. The adverse weather conditions encountered in summer, with temperatures very often above 35°C, are expected to favor pathogen eradication. However, not all plants of the same consignment imported from Belgium were traced and it is possible that other infected plants have been sold in other areas of

Greece. So far, *P. ramorum* had been reported in 21 other European countries; Serbia is the nearest country where the pathogen was detected (1). To our knowledge, this is the first report of *P. ramorum* in Greece.

Vercauteren, A.; De Dobbelaere, I.; Van Bockstaele, E.; Maes, M.; and Heungens, K. 2011. Genotypic and phenotypic characterization of the European A2 isolates of *Phytophthora ramorum*. European Journal of Plant Pathology. *In press*. http://dx.doi.org/10.1007/s10658-010-9727-5.

Abstract: *Phytophthora ramorum,* a recently described North American and European pathogen, has three clonal lineages. The NA1 and NA2 lineages are found in North American forests and nurseries, while the EU1 lineage appears mainly in European nurseries. *P. ramorum* is heterothallic, having two mating types A1 and A2. All NA1 and NA2 isolates are of A2 mating type. When first collected, all EU1 isolates were of A1 mating type, with the exception of one A2 isolate collected in Belgium in 2002. Screening 410 other Belgian isolates for mating type revealed two additional EU1-A2 isolates collected in 2002 and 2003. PCR-RFLP, AFLP and SSR markers were used to determine the nature of the mating type change. The three isolates show no indications of sexual recombination or mitotic crossing over, indicating that mutation or mitotic gene conversion is the most likely explanation for the mating type change. We compared the pathogenicity and sporulation characteristics of the EU1-A2 isolates to those of EU1-A1 and NA1-A2 isolates on four host plants. Despite small differences in pathogenicity on some hosts, the EU1-A2 isolates were similarly aggressive to each other and to the EU1-A1 isolates and more aggressive than the NA1-A2 isolates. Sporulation characteristics were also comparable among EU1-A2 isolates and between EU1-A1 and EU1-A2 isolates, except for EU1-A2 isolate BBA 26/02. The limited genotypic and phenotypic differences between EU1-A2 isolates probably evolved after the mating type change, which may have occurred several years before the isolates were detected. There are strong indications that the EU1-A2 population has been eradicated from Belgium.

NURSERIES

California had 874 establishments under compliance for *P. ramorum* in 2010, including 634 host nurseries. A total of 18,418 samples were taken in California nurseries, with 2,090 nursery sites found to be negative for the pathogen and eight sites found positive. Five of the confirmed locations were production facilities, two were retail sites (both in quarantined counties), and one was a residential location (regulated county).

Nurseries identified as *P. ramorum* positive throughout the US in 2010 included: CA (7); OR (9); WA (6); IA (1-Trace Forward); IL (1-Trace Forward); AL (1); NC (1); SC (1); VA (1-hoop house leaf debris); NY (1-Collection Pond), MS (3); GA (1-irrigation pond); PA (1-greenhouse seeding flats). Confirmations by plant genera included: *Rhododendron/Azalea* (41); *Camellia* (18); *Viburnum* (7); *Pieris* (6); *Kalmia* (2); *Laurus noblis* (3); *Loropetalum chinensis* (1); *Magnolia* (2); *Tracheolospermum jasminoides* (2); *Osmanthus fragrans* (1); *Mahonia nervosa* (1); *Sequoia sempevirens* (1); and *Veronica spicata* (1). There were two positive residential landscape detections and one water-pond positive. Eighteen of the infested nurseries were interstate shippers and 13 were retail facilities. Subsequent plant and soil samples taken in each of the nurseries were all negative for *P. ramorum.* For more information, contact Prakash Hebbar at (301) 734-5717 or prakash.hebbar@aphis.usda.gov.

2010 WILDLAND SUMMARIES

2010 California *P. ramorum* Stream Survey Highlights - In Humboldt County, the recovery of *P. ramorum* from Redwood Creek marked a considerable shift north in the pathogen's known distribution. Intensive sampling throughout its tributaries yielded no additional stream findings. Additionally, pathogen detection in Blue Slide Creek of the Mattole River watershed was confirmed for a second year, and through expanded upstream sampling, two tributary infestations were discovered.

In Mendocino County, the pathogen was found in the South Fork of the Eel River at Piercy. The spore source has yet to be identified; an upstream baiting site at Leggett was negative. Another positive site was confirmed in the Big River near Mendocino Woodlands, just south of Jackson State Demonstration Forest. The closest known infestation is near Orr Springs. The Little River continued to have regular culture positive samples (since 2008), though the spore source has not been identified.

There were no signs of new infestations in the Central Coast. As in the past, the pathogen was not detected at any of the Sierra Nevada Foothill nor Del Norte County sites. For more information, contact Kamyar Aram at kamaram@ucdavis.edu.

Sudden Oak Death in Oregon Forests – Ten years ago in 2001, Sudden Oak Death was discovered in Curry County, Oregon, five miles north of the California border near the town of Brookings. At that time, five infested sites were known, encompassing a total of 36 acres. The Oregon Department of Agriculture responded by declaring a state quarantine, and implemented an eradication program that involved cutting and burning infected and nearby host plants. The initial quarantine area was 9 mi^2 in size. It has been expanded four times since then, with the most recent expansion to 162 mi^2 occurring in 2008.

The initial objective of the eradication program was to eliminate disease and the pathogen from the infested sites, thereby stopping spread. Post-treatment monitoring in 2009 and 2010 showed clearly that the disease and the pathogen are absent from most, but not all, of the treated sites. Despite the effectiveness of eradication treatments on many sites, disease has continued to spread slowly (predominantly northward), following the prevailing wind direction during storms and wet weather. From the initial infestations the disease has spread southward only 1.2 miles, and northward and eastward 5.3 and 4.7 miles, respectively. This spread is largely the result of limitations to early detection and delays in completing eradication treatments. Although eradication *per se* has not been achieved on all sites, the treatments have prevented disease intensification in most areas and slowed disease spread overall.

The number of infested sites discovered annually had stabilized at approximately 60 new sites per year from 2007 to 2009; however, in 2010, 83 new sites were detected (Figure 1). These sites represent approximately 27 infested acres and involve more than 120 infected trees (Figure 2). Seventy-five of these sites occurred on private land and eight occurred on lands administered by the US Department of Interior Bureau of Land Management. All of the 2010 infested sites were well within the quarantine area and most contained few infected trees, suggesting reasonably early detection. The geographic distribution of new infested sites was uneven, with most located in the Taylor and Duley Creek drainages two miles north of Brookings. The disease is intensifying in this area and treatments are challenging and expensive because of landownership, dwellings, and difficult terrain. We also observed continued but less intense expansion of disease in the Bravo Creek area to the northwest (Figure 3).

Eradication projects have been delayed or interrupted many times due to uneven funding for activities on non-federal lands. Many of the sites discovered in 2009 on private land remained untreated from 2009 through the very wet spring of 2010. This undoubtedly contributed to disease spread and intensification. Federal stimulus funds (American Recovery and Reinvestment Act - ARRA) became available in April 2010, allowing work to resume on the backlog of 2009 treatment areas and new sites identified in 2010. All high-priority sites (outliers or those closest to the periphery of the quarantine area) were treated promptly in 2010. All of the infested sites on federal land have been fully or partially treated. Funding for treatment of the remaining infested sites and anticipated new ones looms as a challenge for 2011.

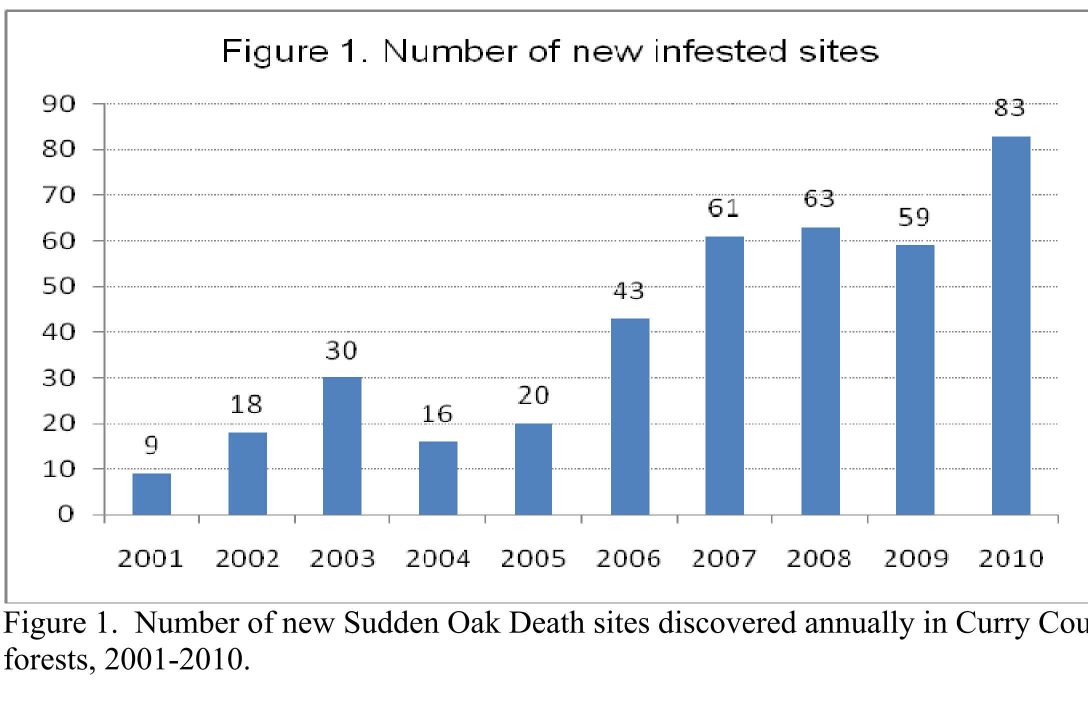

Figure 1. Number of new Sudden Oak Death sites discovered annually in Curry County forests, 2001-2010.

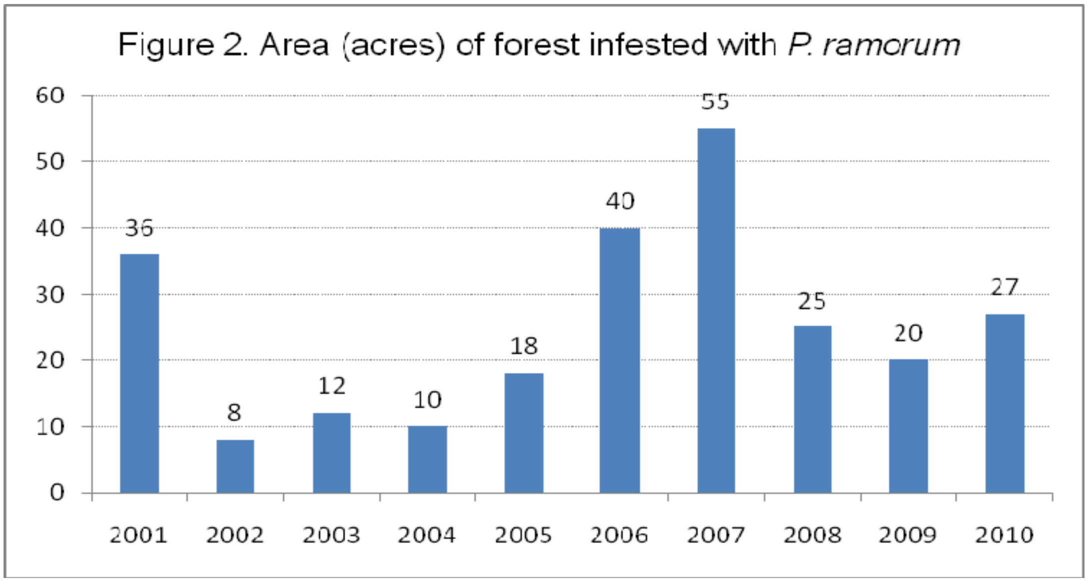

Figure 2. Area (acres) infested with *Phytophthora ramorum* annually in Curry County forests, 2001-2010.

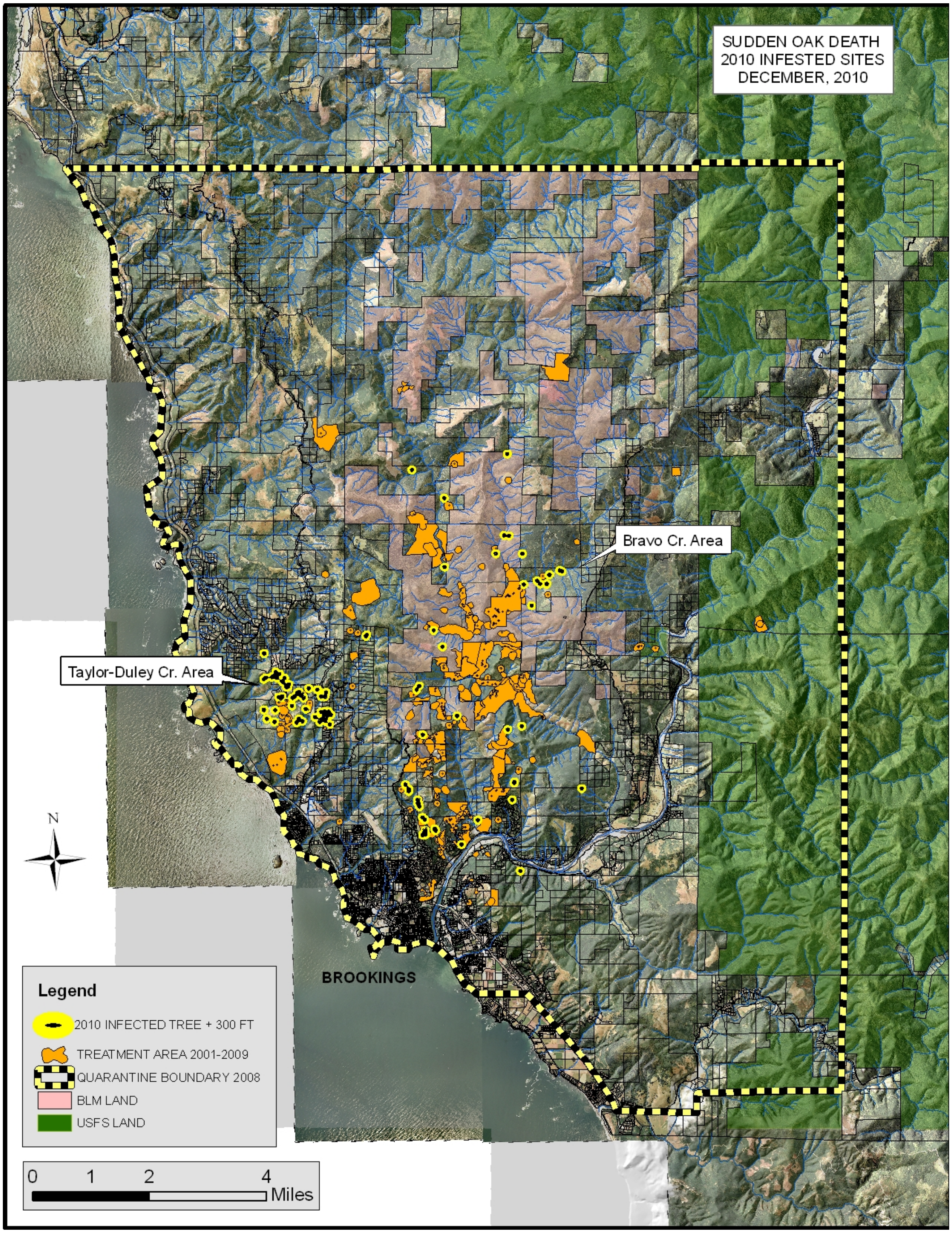

Figure 3. Location of areas infested with *Phytophthora ramorum* in 2010, Curry County, Oregon, December 2010. Sites enlarged by yellow halo for visibility.

RELATED RESEARCH

Dehnen-Schmutz, K.; Holdenrieder, O.; Jeger, M.J.; and Pautasso, M. 2010. Structural change in the international horticultural industry: some implications for plant health. Scientia Horticulturae, 125: 1-15. http://dx.doi.org/10.1016/j.scienta.2010.02.017.

Érsek, T. and Ribeiro, O.K. 2010. An annotated list of new *Phytophthora* species described post 1996. Acta Phytopathologica et Entomologica Hungarica, 45, 2: 251-266. http://dx.doi.org/10.1556/APhyt.45.2010.2.2.

MacLeod, A.; Pautasso, M.; Jeger, M.J.; and Haines-Young, R. 2010. Evolution of the international regulation of plant pests and challenges for future plant health. Food Security, 2: 49-70. http://dx.doi.org/10.1007/s12571-010-0054-7.

Orlikowski, L.B. 2010 Occurrence and harmfulness of *Phytophthora* spp. in Polish hardy ornamental nursery stock. Acta Horticulturae 885: 243-248. http://www.actahort.org/books/885/885_32.htm.

Pautasso, M.; Moslonka-Lefebvre, M.; and Jeger, M.J. 2010. The number of links to and from the starting node as a predictor of epidemic size in small-size directed networks. Ecological Complexity, 7: 424-432. http://dx.doi.org/10.1016/j.ecocom.2009.10.003.

Pautasso, M.; Xu, X.M.; Jeger, M.J.; Harwood, T.; Moslonka-Lefebvre, M.; and Pellis, L. 2010. Disease spread in small-size directed trade networks: the role of hierarchical categories. Journal of Applied Ecology, 47: 1300-1309. http://dx.doi.org/10.1111/j.1365-2664.2010.01884.x.

Pautasso, M.; Dehnen-Schmutz, K.; Holdenrieder, O.; Pietravalle, S.; Salama, N.; Jeger, M.J.; Lange, E.; and Hehl-Lange, S. 2010. Plant health and global change – some implications for landscape management. Biological Reviews, 85: 729-755. http://dx.doi.org/10.1111/j.1469-185X.2010.00123.x.

Vettraino, A.M.; Brasier, C.M.; Brown, A.V.; and Vannini, A. 2011 *Phytophthora* *himalsil*va sp. nov. an unusually phenotypically variable species from a remote forest in Nepal. Fungal Biology. *In press*. http://dx.doi.org/10.1016/j.funbio.2010.12.013.

Ramage, B.S.; O'Hara, K.L.; and Caldwell, B.T. 2010. The role of fire in the competitive dynamics of coast redwood forests. Ecosphere 1:art20. DOI: 10.1890/ES10-00134.1.

WWW.SUDDENOAKDEATH.ORG

The “Arborist and Applicators” page of the COMTF website has been revised. Please NOTE that due to a change in policy, only those professionals who have attended a COMTF-sponsored workshop *within the last three years* will be listed. Additionally, information will no longer be provided on a county by county basis, but rather as one comprehensive list. For questions, contact Janice Alexander at (415) 499-3041 or jalexander@ucdavis.edu.

EDUCATION AND OUTREACH

The OakMapper project now has a downloadable iphone® application that enables users to report trees suspected of having *P. ramorum*. Using the application, people can note symptoms such as bleeding cankers, bark and crown discoloration, dead leaves, shoot die-back, and beetle activity. The iphone's® built-in GPS identifies the participant's location when the data is submitted. On your phone you can view a map of confirmed and suspected locations of Sudden Oak Death in your vicinity and around the state. For more information, visit http://oakmapper.org, or contact Maggi Kelly at http://kellylab.berkeley.edu.

CALENDAR OF EVENTS

2/9 - SOD Treatment Workshop; Meet at oak outside of Tolman Hall, UC Berkeley Campus; 1 – 3 p.m.; Pre-registration is required. This class is free and will be held rain or shine. To register, or for questions, email kpalmieri@berkeley.edu, and provide your name, phone number, affiliation and license number(if applicable), and the date for which you are registering. For more information, go to http://nature.berkeley.edu/garbelotto/english/sodtreatmenttraining.php.

3/9 - SOD Treatment Workshop; meet at oak outside of Tolman Hall, UC Berkeley Campus; 1 – 3 p.m.; Pre-registration is required. For more information, see the 2/9 listing above.

3/15 – Guidelines for Managing Oak Rangelands; four-part webinar series; University of California Division of Agriculture and Natural Resources; 10:00 a.m. – 12:00 p.m.; Intended for oak woodland landowners, certified range managers, and registered professional foresters; This series is designed to create an awareness of the importance of managing oak woodlands and to present alternative management strategies.; Registration is $25. The series will continue on 3/22, 3/29, and 4/5. To register, go to http://ucanr.org/oakwebinar. Registered participants will receive follow-up log-in instructions. For more information, contact Richard Standiford at (510) 643-5428 or standifo@berkeley.edu.

4/16 – Guidelines for Managing Oak Rangelands; webinar series field trip to Sierra Foothill Research and Extension Center; 10:00 a.m. – 3:00 p.m.; For more information, see the 3/15 listing above or contact Richard Standiford at (510) 643-5428 or standifo@berkeley.edu.

4/20 - SOD Treatment Workshop; meet at oak outside of Tolman Hall, UC Berkeley Campus; 1 – 3 p.m.; Pre-registration is required. For more information, see the 2/9 listing above.

4/30 – Guidelines for Managing Oak Rangelands; webinar series field trip to Hopland Research and Extension Center; 10:00 a.m. – 3:00 p.m.; For more information, see the 3/15 listing above or contact Richard Standiford at (510) 643-5428 or standifo@berkeley.edu.

5/11 - SOD Treatment Workshop; meet at oak outside of Tolman Hall, UC Berkeley Campus; 1 – 3 p.m.; Pre-registration is required. For more information, see the 2/9 listing above.

6/21 – 6/23/2011 - Coast Redwood Forests in a Changing California: A Symposium for Scientists and Managers; University of California, Santa Cruz; For more information on the conference, go to http://ucanr.org/sites/redwood.

7/31 – 8/5/2011 – Disease and Insect Resistance in Forest Trees: Fourth International Workshop on the Genetics of Host-Parasite Interactions in Forestry; Valley River Inn; 1000 Valley River Way; Eugene, OR 97401; Details will be forthcoming. For questions, contact Richard Sniezko at rsniezko@fs.fed.us; Katie Palmieri at (510) 847-5482 or kpalmieri@berkeley.edu; or Janice Alexander at (415) 499-3041 or jalexander@ucdavis.edu.