CONTINENTAL FOREST DIALOGUE ON NON-NATIVE FOREST INSECTS & DISEASES
SEVENTH DIALOGUE MEETING

October 5-6, 2011
Boulder, CO

Poster Session Abstracts

1. **How can spread of *Phytophthora ramorum* (Sudden oak death) be prevented?**
Authors: Susan Frankel, Jerry Lee, **Ken Rauscher**

The Continental Dialogue, Address *Phytophthora ramorum* Initiative interdisciplinary team is working to prevent the impacts of Phytophthora ramorum, and other Phytophthora pathogens, to U.S. forests and nurseries. In February 2011, we convened a group of approximately 50 representatives from states and USDA (Animal and Plant Health Inspection Service, Agricultural Research Service, Forest Service); private industry; academia; and non-governmental organizations for a workshop to review USDA APHIS and National Plant Board P. ramorum updates and the USDA Forest Service, Sudden Oak Death Framework, as well as initiatives from the nursery industry. This poster summarizes a few of the issues raised and next steps identified to reduce the potential for *P. ramorum* spread to new areas.

2. **Firewood Passports - A Youth Activity on the Risks of Moving Firewood.**
Authors: **Janice Alexander** and **Katie Palmieri**

In spring 2011, we developed an activity to help educate youth and their families about the risk that moving firewood poses to our forests. Working closely with the Don't Move Firewood campaign, we created a "passport" that highlighted four parks around the country. During the course of the activity, children would travel to each "park" to get a stamp in their passport. They were told they were camping and there might be some secret hitchhikers in the firewood they were carrying. At each park, they would leave behind a sign of their visit through a small bug sticker. Over the course of the activity, each park would receive more and more of these stickers, signifying the pest invasions into the forest. After all parks had been visited and all of the stickers used, youth could return to the main table to get a prize, while adults received additional information on specific pests and ecological threats. In this way, both youth and adults were able to visibly see the effects that moving firewood could have on their favorite campgrounds and forests. This activity has subsequently been modified and delivered in San Diego County, heart of the goldspotted oak borer infestation. A version of this activity is also planned for Fall Fest on the Plumas National Forest. Additionally, the activity is being adapted and translated to be done online through a series of interactive modules. This work was conducted under the auspices of the California Oak Mortality Task Force, the California Firewood Task Force, and the Goldspotted Oak Borer Education Committee, and was funded by a federal ARRA grant administered by the USDA-Forest Service and CalFire.

3. **Assessing the survival of the redbay ambrosia beetle and laurel wilt pathogen in wood chips.**
Authors: **Don Spence**, Jason A. Smith, Albert Mayfield III, Jiri Hulcr, Randy Ploetz, and Lukasz Stelinski

Laurel wilt (LW) is a tree disease that was first identified near Savannah, GA in 2003 and affects members of the Lauraceae plant family. The fungus which causes LW is *Raffaelea lauricola* (T. C. Harrin., Aghayeva, & Fraedrich) and is vectored by the exotic redbay ambrosia beetle (RAB) *Xyleborus glabratus*, (Eichhoff, Coleoptera: Curculionidae). Typical of ambrosia beetles, RAB feeds on one or more of its fungal symbionts it carries in its mandibular mycangia, one of which is *R. lauricola*. As of May of 2011, LW occurs in 29 counties in Florida, 32 counties in Georgia, 1 county in Mississippi, 14 counties in South Carolina, and 4 counties in North Carolina. However, two recently-discovered outbreaks in Bay County, FL and in Jackson County, MS were likely due to the movement of firewood or other untreated wood products. As of yet, there are very few options for controlling the fungus or beetle. In this study we examined the survival of *X. glabratus* and *R. lauricola* in chipped dead redbay trees (*Persea borbonia*). A standard arborist-style tree chipper was used to chip twelve m^3 of RAB infested wood. The wood chips were placed in mesh bags that were positioned in the center of 1 m^3 bins of wood chips exposed to sun and shade. At each sampling period, wood chips were placed in insect rearing chambers and wood chips plated on CSMA semi-selective medium. No living RAB emerged or pupated from the rearing chambers and *R. lauricola* was only recovered from a few wood chips at 2 days post chipping. These results indicate that chipping is a useful tool for managing LW and that wood chips do not pose a significant risk for further transport LW. Additional studies on the temperature limits and saprophytic capacity of the pathogen are being conducted.

4. **Managing and sharing forest pest data through iMapInvasives.**
Author: **Jennifer Dean**

Management and prevention of forest pests requires coordinated regional efforts that collect and share data effectively. The *i*MapInvasives database, developed by the Natural Heritage Programs of New York and Florida, and supported by The Nature Conservancy and NatureServe, provides an online data management tool and alert system for volunteers and professionals. Users contribute point locations and photos of invasive forest pests for confirmation within a participating state. These points trigger matching email alerts and are added to the GIS-based reports for "early detection" and "approaching region" species. In addition to mapping observations, users can input complex data and polygon maps for forest survey efforts and treatment details. The online survey data entry is tailored towards specific survey types such as host tree inspections, insect traps, and cerceris wasp biosurveillance. *i*MapInvasives provides a means for project managers to organize invasive species data from many sources, from citizen scientists to land managers.

5. **Another threat to oak forests in North America: Diplodia corticola causes a new canker disease of live oak in Florida**.
Authors: Tyler Dreaden, University of Florida; Keumchul Shin, and **Jason A. Smith**.

Live oak (*Quercus virginiana*) trees growing on a farm in Marion County, Florida were observed having numerous cankers on small branches showing dieback. Isolations from symptomatic tissues yielded a fungus identified as *Diplodia corticola* based on top matches from BLASTn searches of the internal transcribed spacer region of the rDNA (100% (579/579) match with *D. corticola* strain CBS 112074) and beta tubulin DNA sequences (99% (391/393) match with *D. corticola* strain UCD2397TX). Koch's postulates were completed by inoculating live oak seedlings with an isolate using a mycelia

plug that was placed in a wound made in the stem. Eight weeks post-inoculation, the lengths of the necrotic lesions were measured. The inoculated seedlings had a mean lesion length of 41.2 cm and a range of 27 to 63 cm. The negative control inoculations all had no necrotic lesions. Tissue from three of the inoculated seedlings was plated on PDA and *D. corticola* was isolated from each and all had the same ITS sequence as *D. corticola* strain CBS 112074. Despite having been found in seven counties in Florida so far, the threat to live oak by *D. corticola* in Florida is still unknown. Significant decline of oak forests has been associated with this pathogen in Europe and recent reports of the disease in California signify a need to conduct further research on the potential threat this pathogen poses to oaks in North America.

6. **Current efforts to improve our understanding of the biology and develop management practices against laurel wilt**

Authors: **Jason A. Smith** and Randy C. Ploetz

Laurel wilt (LW) is a devastating, emerging disease of native and non-native members of the Lauraceae family in the southeastern United States. Currently, the fungal pathogen (*Raffaelea lauricola*) and its vector (*Xyleborus glabratus*) are found in Florida, Georgia, Mississippi, and North and South Carolina. LW is decimating native stands of redbay (*Persea borbonia*) and causing significant damage to planted and native sassafras (*Sassafras albidum*) and avocado (*Persea americana*). Genetic diversity studies of the pathogen suggest a single introduction event into the US. To date, effective fungicidal management of LW has been limited to the expensive, preventative treatment of high value landscape trees with systemic fungicides. Long-term management in landscape and avocado plantings may rely on a combination of sanitation practices and the use of disease-resistant germplasm. The susceptibility of different taxa and avocado germplasm has been assessed. Host range experiments have assessed the response of 35 taxa, which include known hosts of the vector in Southeast Asia and their relatives. Members of the Lauraceae that are native to the southeastern U.S. have been most susceptible, whereas those in the family from Asia and in other families have been resistant. 41 cultivars of avocado, representing the three races of the species (Guatemalan, West Indian and Mexican) and hybrids thereof, have been screened for disease response. Unfortunately, West Indian cultivars that predominate in Florida have been most susceptible. Studies of host-pathogen interactions indicate that: (i) systemic colonization by the pathogen, without apparent internal or external symptom development, occurs in some hosts; (ii) wilting is associated with reduced hydraulic conductivity in the xylem; (iii) vascular dysfunction results from host responses, not occlusion of vessels by the pathogen; (iv) the pathogen does not produce wilt-inducing toxins. In on-going research, greater understandings are sought for how susceptible and tolerant/resistant host plants respond to this disease.

7. **Conifer on the brink: A novel Fusarium causes a devastating canker disease of the critically endangered Florida torreya (*Torreya taxifolia*)**

Authors: **Jason A. Smith**, Kerry O'Donnell, Lacey Mount, Keumchul Shin, Aaron Trulock, Kelly Peacock, Tova Spector, Jenny Cruse-Sanders and Ron Determann

Laurel wilt is a destructive disease of redbay (*Persea borbonia*) and other Lauraceous natives in the southeastern US. The disease and associated vector, the redbay ambrosia beetle (*Xyleborus glabratus*), has spread though the U.S. coastal plain. The presence of surviving and asymptomatic individuals in severely affected stands illustrates the possibility of natural resistance by surviving redbays. In 2008, a field survey was initiated to locate and identify healthy, asymptomatic redbays in areas of severe mortality. Six heavily affected sites were chosen along the redbay-dense barrier islands of Florida, Georgia, and South Carolina. Over eighty trees with a 3"+ diameter at breast height were selected

as putatively resistant candidates. A 1/5 acre plot was then established around each candidate tree; along with measurements of redbay plot disease severity and redbay ambrosia beetle activity, based on trapping studies. Branch cuttings were taken and used in novel experiments to investigate methods of redbay vegetative propagation and disease resistance screening. A mean of 20 % rooting was achieved in the propagation experiment, although genotype had a large effect on rooting success. The vegetatively propagated clones of live parent trees are currently being tested for resistance/tolerance to the laurel wilt fungus by inoculation experiments. A preliminary study tested ten clones, and a single clone (FG-C1) has survived at 10 months post-inoculation, suggesting a possible tolerance response. Further testing of FG-C1 and over 50 new clones is under way. Additional studies on the genetic/pathogenic variability of the pathogen and effects of inoculum concentration on symptom expression are under way.

8. **Development of a laurel wilt screening program in redbay (*Persea borbonia*)**
Authors: Marc Hughes and **Jason A. Smith**

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9. **Invasive Species Management in the Forest: Theories and Practices**
Authors: **Donald A. Eggen** and Houping Liu

Invasive species pose great threat to the environment, economy, and human health. In the U. S., an estimated $137 billion has been lost to these species in agriculture, forestry and other economic segments annually (Pimentel et al. 2000). It is clear that management strategies are critically needed to protect the environment and natural resources, as well as food and human safety. In this presentation, we will introduce the basic theories and practices of invasive species management in the forest through prevention, monitoring, control, and restoration activities. Successful programs with specific objectives will be reviewed as case studies. The future of our forest in the wake of increasing invasions from alien species will also be discussed.

10. History doesn't repeat itself, but it does rhyme - Mark Twain
Author: **Susan Schechter**

Just as the rhyme in the first two lines of a limerick gives us a clue to predict the fifth line, the record of exotic pest introductions in the US provides insights for predicting the future events. The National Agricultural Pest Information System (NAPIS) has been the repository for APHIS exotic pest survey data since 1985. The Pest Tracker website publishes NAPIS survey maps and curates exotic pest news and web sites. We will leverage content from the NAPIS and Pest Tracker databases to present:

- A history of exotic forest pests in the US as a timeline of introductions.
- A map graphic of APHIS exotic forest pest positive surveys will illustrate the exotic pest pressure in forests today.

Viewers will be invited to speculate on the impact of exotic pests on forest systems in coming years.

11. Focus on the FOCI (Firewood Outreach Coordinating Initiative)
Authors: **Leigh Greenwood** and Ann Gibbs

Do you do outreach on the topic of firewood movement? Are you planning to do outreach in the future? If so, you should join the FOCI and learn more about various efforts nationwide. The Continental Dialogue's FOCI is an initiative designed to share information, experience, successes and failures in the realm of firewood outreach. Through a grant from USDA-APHIS, and directly motivated by the recommended actions of the National Firewood Task Force, the FOCI was created to help you get the most from your colleagues and fellow outreach specialists as you design and implement firewood education plans.