

“Visualizing Sudden Oak Death”

An online e-conference: February 10-21, 2014



The “Visualizing Sudden Oak Death” e-conference will provide attendees with updates on research and management while also illustrating disease impacts and ecology. Check this page daily for updates and activities or [contact Katie Palmieri](#).

Schedule of Events

Monday, 2/10

- Online discussion forum opens
- Opening of *The Fourth Art of Saving Oaks* art exhibition and online [Art Gallery](#)
- Beginning of caption contest

Tuesday, 2/11

- A SOD webinar exploring the progress and challenges faced in containing *Phytophthora ramorum*; 9 a.m. PST
- Continue discussions via online forum
- Submit captions for the caption contest by 3 p.m. PST

Wednesday, 2/12

- “Focus on Figures” online poster session
- Presentation of SOD Timeline via discussion forum
- Continue discussions via online forum
- Caption finalists announced for voting

Thursday, 2/13

- A discussion with SOD experts via Google+ Hangout. Broadcast at 1 p.m. PST. More details on our [Google Events page](#) or [watch live on YouTube](#).
- Continue discussions via online forum
- Voting for caption finalists continues

Friday, 2/14

- Happy Valentine’s Day! Watch a video with your sweetheart
- Continue online discussions
- Caption contest winner announced

Monday, 2/17 – President’s Day Holiday

Tuesday, 2/18 – Friday, 2/21 – Online forum remains open for review

Phytophthora ramorum VS. Homo sapiens

Where do we stand in our battle against the sudden oak death pathogen?

The live webinar took place Tuesday, February 11, 2014 at 9 a.m. PST. A recording is available at <http://cemarin.ucanr.edu/files/262992.mp4>. Maps and status summaries for 2013 *Phytophthora ramorum*/sudden oak death in California, Oregon, Washington, and UK wildlands are available below, as is an overview of US nursery *P. ramorum* detections and regulatory changes.

Webinar Agenda

Welcome and housekeeping– Katie Palmieri

“Around the world with *Phytophthora ramorum* in 5 minutes” – [Mark Stanley](#)

Sudden oak death status in Oregon: From eradication to containment – [Alan Kanaskie](#)

Summary of 2013 *Phytophthora ramorum* activity in the UK – [Joan Webber](#)

Taking stock: How are we doing in our battle against the sudden oak death pathogen? – [Dave Rizzo](#)

Call to action – [Everett Hansen](#)

Questions and Answers

Online Conference “Handouts”

- 2013 Year-end report: [Overview of *Phytophthora ramorum* in 2013](#)
- [Status in California urban and wildland forests](#)
- [Status in Oregon](#)
- [Status in US Waterways and Landscape Settings](#)
- [Status in UK](#)
- [US nursery detections and regulatory update](#)

- Now available! [SOD Management Manual](#)
- [SOD timeline](#) (DRAFT - please share your comments in the [online forum](#))
- Download the [SODMAP mobile application](#) and sign up for the [2014 SOD Blitzes](#)

Caption contest

And the winner is...



"I found the geocache in this large, white rectangle!"

Congratulations to our winner, Inspector Scott Wise.

And many thanks to all who submitted entries and voted!

"Focus on Figures" online poster session

SOD in Oregon



Dead and dying tanoak trees inside the Quarantine Area in Curry County, Oregon. Red trees are current year mortality, gray trees have been dead more than one year. All images taken in 2013. Ebba Peterson photo.



Dead and dying tanoak trees inside the Quarantine Area in Curry County, Oregon. Red trees are current year mortality, gray trees have been dead more than one year. All images taken in 2013. Oregon Department of Forestry photo.

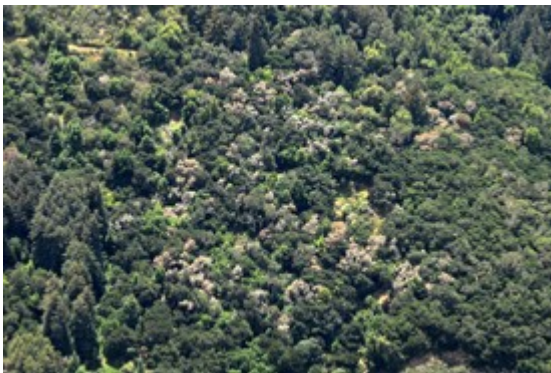


Dead and dying tanoak trees inside the Quarantine Area in Curry County, Oregon. Red trees are current year mortality, gray trees have been dead more than one year. All images taken in 2013. Oregon Department of Forestry photo.

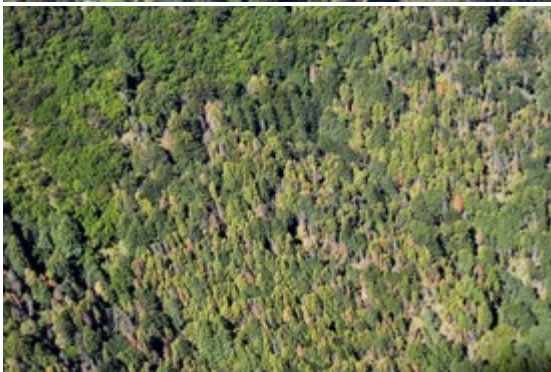


Dead and dying tanoak trees inside the Quarantine Area in Curry County, Oregon. Red trees are current year mortality, gray trees have been dead more than one year. All images taken in 2013. Oregon Department of Forestry photo.

SOD in California



Coast live oak mortality in Santa Clara County, in the vicinity of Watsonville. June 17, 2013. Zachary Heath, USDA-FS, Forest Health Protection photo.



Tanoak mortality on the Monterey Coast. June 21, 2013. Jeffery Moore, USDA-FS, Forest Health Protection photo.



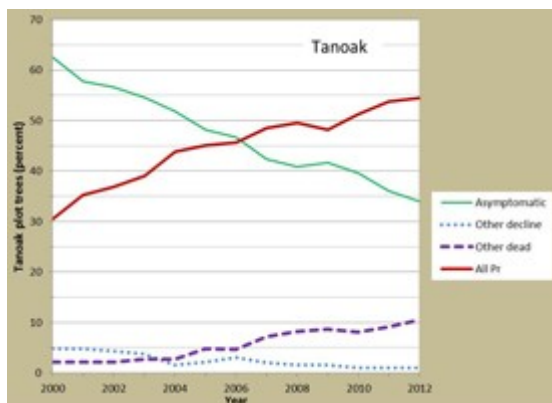
Oak and tanoak mortality among houses near Pt. Reyes National Seashore in June, 2013. Zachary Heath, USDA-FS, Forest Health Protection photo.

SOD in the UK

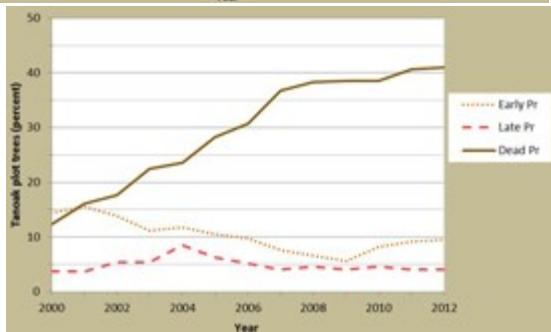


Infested Japanese larch plantation in Wales undergoing mandatory felling to comply with UK *Phytophthora ramorum* regulations. Credit: Forestry Commission Wales.

Mortality and Infection Trends in CA

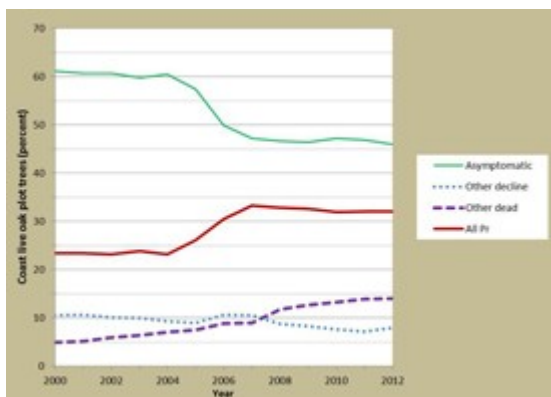


Percent *Phytophthora ramorum* infection of tanoak - 2000 to 2012. Changes in disease status of tanoak (*Notholithocarpus densiflorus*) in 26 plots in Marin and Sonoma Counties from 2000 to 2012. In 2012, over half of the tanoak trees showed some symptoms. Phytosphere Research, Vacaville, CA.

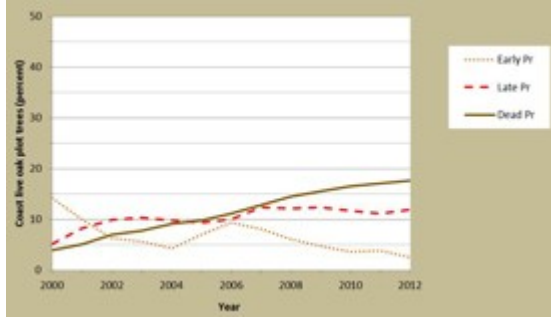


Percent *Phytophthora ramorum* mortality of tanoak - 2000 to 2012. Percent dead tanoak (*Notholithocarpus densiflorus*) in 26 plots in Marin and Sonoma Counties from 2000 to 2012.

Approximately 40% of the tanoak trees were dead from *P. ramorum* infection in 2012. Phytosphere Research, Vacaville, CA.



Percent *Phytophthora ramorum* infection of coast live oak - 2000 to 2012. Changes in disease status of coast live oak (*Quercus agrifolia*) in 128 plots in Marin, Sonoma and Napa Counties from 2000 to 2012. In 2012 approximately 30% of the coast live oak trees showed some symptoms. Phytosphere Research, Vacaville, CA.

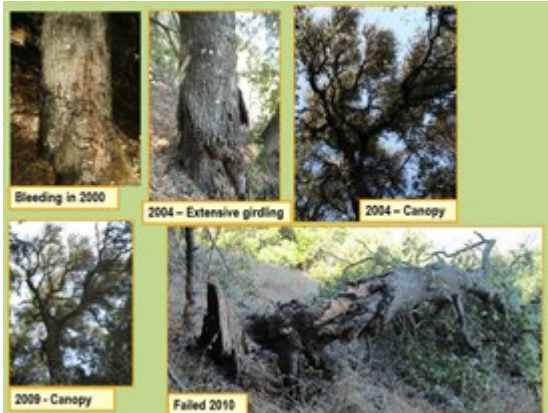


Percent *Phytophthora ramorum* mortality of coast live oak - 2000 to 2012. Percent coast live oak killed by *Phytophthora ramorum* in 128 plots in Marin, Sonoma and Napa Counties from 2000 to 2012. Approximately 18% of the coast live oak trees had been killed from *P. ramorum* infection by 2012 and 12% were showing severe infection. Phytosphere Research, Vacaville, CA.

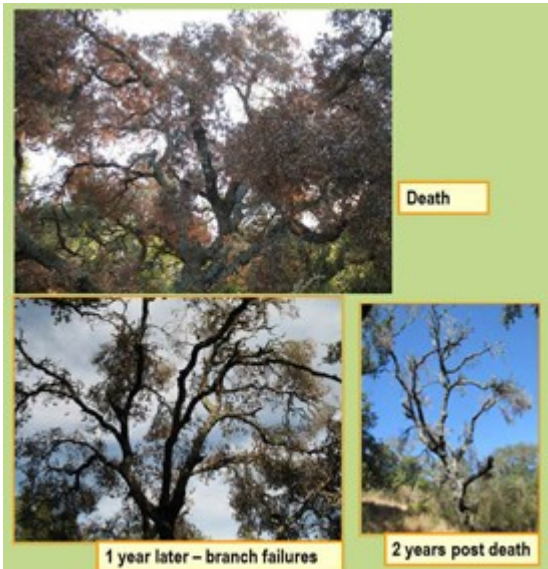
Disease Progression



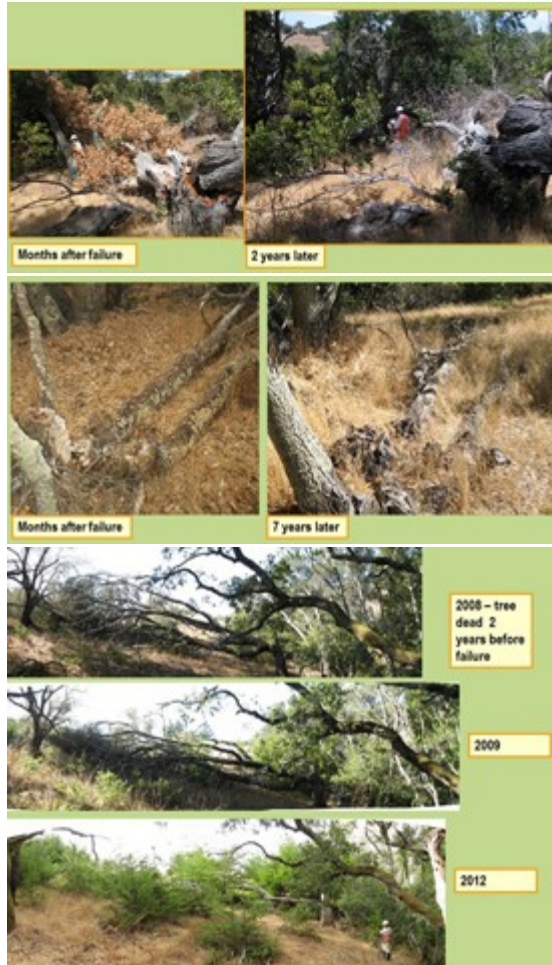
Recovering from *Phytophthora ramorum* infection. Some trees can stop infections, such as this California black oak, *Quercus kelloggii*, that callused over this trunk infection. Phytosphere Research, Vacaville, CA.



Disease progression on a coast live oak, *Quercus agrifolia*. This tree had been infected more than 10 years before it collapsed due to *P. ramorum*, beetle activity and decay fungi. The rate of sudden oak death disease progression is highly variable. Phytosphere Research, Vacaville, CA.



The pattern of branch and tree failure after a tree dies from *P. ramorum* is highly variable. Two years after dying, this coast live oak, *Quercus agrifolia*, primarily retains only its main scaffold branches. Phytosphere Research, Vacaville, CA.

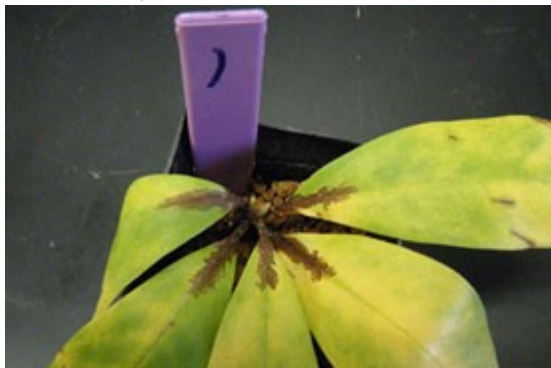


On this failed coast live oak, *Quercus agrifolia*, most of its leaves are gone 2 years post failure. The top was alive at the time of failure. Phytosphere Research, Vacaville, CA.

This coast live oak, *Quercus agrifolia*, is slowly decaying 7 years after it collapsed due to infection with *P. ramorum*, beetles and decay fungi. *Phytophthora ramorum* is not a decay organism, secondary organisms break down tissues after tree death. Phytosphere Research, Vacaville, CA.

The trunk of this coast live oak, *Quercus agrifolia*, failed two years after it died from an extensive *P. ramorum* canker. Leaves had already fallen off by that time. Within a year, the debris pile has flattened out considerably due to decay of fine branches. Four years later, only large branches are left. Note the amount of Douglas-fir growth that has developed over this period in the opening created by the loss of SOD-killed oaks. Phytosphere Research, Vacaville, CA.

Submissions from USDA Agriculture Research Service, *Phytophthora ramorum* Research, Frederick, MD



Rhododendron inoculated on the roots showing above-ground symptoms after *Phytophthora ramorum* traveled up the stem tissue. Nina Shishkoff, USDA Agricultural Research Service, Frederick, MD.

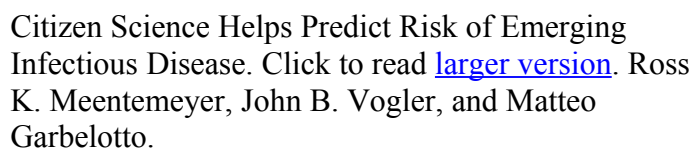
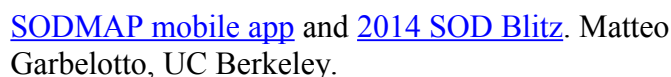


Germinating chlamydospore of *Phytophthora ramorum*. Chlamydospores can germinate to form as many as eight sporangia. Paul Tooley, USDA Agricultural Research Service, Frederick, MD.



Thunder, the dog that can smell *Phytophthora*, at work at the USDA ARS facility. See more of him at work on the Videos page. Paul Tooley, USDA Agricultural Research Service, Frederick, MD.

Submissions from UC Berkeley Forest Pathology and Mycology Laboratory



David King, Amy Harris and Peter Walker (journals@hmcrygo.gov.uk)

Keywords: *work, stress, coping, organizational commitment, organizational citizenship behavior*

Myxobolus caryophylli is an aggressive, introduced pathogen of unknown geographical origin. Current known distribution is western North America and parts of Europe (Strömstedt et al. 2012). In North America, it is known as the cause of sudden oak death. In the UK it affects mainly *Podocarpus*, but from 2009 onwards has caused heavy dieback and mortality of Japanese larch (*Larix laricina*).

The pathogen was in three distinct lineages (seen in 2010) designated as NA1, NA2 and NA3 (Gorwood et al. 2010). NA1 and NA2 lineages are confined to North America, and recently the NA3 lineage was the only first found in Europe and caused most 'P' minimum outbreaks on both in the UK (Bourne et al. 2011) and fourth genotype lineage was discovered, designated as NA4 (Figure 1), and limited to the Azores Islands, Northern Ireland and the Northern Gateway border region of south-west Scotland (Dier Pasche et al. 2012).

Recent studies show that the E-2 finding is especially applicable to South Africa & Australia (2013), an understanding of the distribution of the two findings and how quickly it may be spreading beyond the 2011 findings is critical to effective communication of E-2 concepts.

Experimental approach

- a) a comprehensive microsatellite profiling (142-allele range) of 2447 *W. fabae* was used to analyse the range of *W. fabae* in the UK.
 b) Over 3000 samples of *W. fabae* were collected from 1000 Phacelias (Cultus collection) and associated between 2010 and 2015 were submitted for forensic analysis (see Methods (Section 2.1.1)).
 c) However, it was proved not possible to identify *W. fabae* from individual leaves, so to measure the distribution of *W. fabae* and *S. fabae* across different leafy tea samples, we used a different method.
 d) Therefore, a method was developed to determine if *W. fabae* 'fingerprints' using DNA directly extracted from samples of infused tea. This new method was an extension of a diagnostic test developed by van Weelden et al. (2012) and previously only applied to teas.
 e) We also wanted to know if *W. fabae* DNA in infused teas inhibits PCR and so the leafy tea infusions were tested for *W. fabae*.
 f) The *W. fabae* microsatellite DNA profiles collected during 2014 from England, Scotland and Wales were used to compare using the DNA fingerprint.



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- The earliest finding of the G22 lineage was from County Down in Northern Ireland, dating from November 2007.
- Only the G22 lineage was widely distributed throughout England and Wales, with no G22 detected (Figure 2).
- The G22 lineage of *P. marmoratus* was only found in Northern Ireland and south-west Scotland, as found previously with seven isolates collected in 2011 (de Boer et al. 2012).
- However, the G22 was more widespread in south-west Scotland than previously known: it was found further south and east, co-occurring in some areas with the G21, with both lineages of *P. marmoratus* infecting both (Figure 3).



References

- [illegible]

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- LasCasas**
- A new diagnostic method was developed to detect *Brucella* directly in infected sheep tissue.
 - The *B. melitensis* strains found in Northern Ireland and the Republic of Ireland have been found in sheep and goats in adjacent countries, such as the Isle of Man, Jersey, Guernsey, Scotland, the state of Qatar and Cambodia and in Lancashire and West England were *B. melitensis* positive.
 - Without controls the *B. melitensis* will probably spread further as a consequence of infected pig material, on machinery or the natural spread, for example, sporecysts in animal faeces etc.
 - As the *B. melitensis* *B. melitensis* group may be slightly different from the *B. melitensis* already present in the UK (LasCasas *et al.*, 2014) and more monitoring in such areas is advised (2015) this possibility should be assessed.

Current distribution of the new EU2 lineage of *Phytophthora ramorum*. Click to read a [larger version](#). Kevin King, Anna Harris, and Joan Webber, UK FERA.

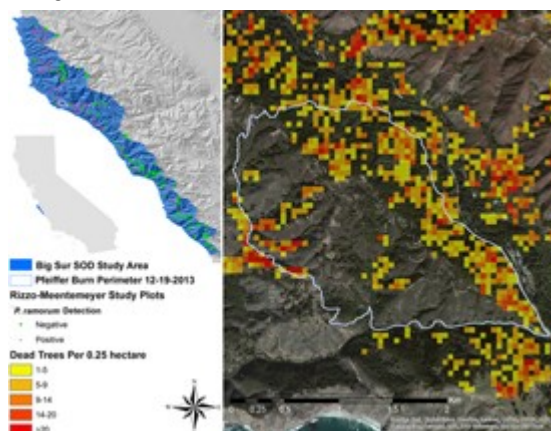
Phytophthoras in Nurseries

Table 1. *Phytophthora* spp. isolated from Maryland nurseries in 2010, 2011, and 2012 from asymptomatic and asymptotically diseased plants, and tested from seedling, root, and taproot tissue

[illegible]

Phytophthora spp. isolated from Maryland nurseries in 2010, 2011, and 2012 from symptomatic and asymptomatic ornamental plants, and baited from potting media and irrigation water. Click to read a [larger version](#). Bienapfl, J. C., and Balci, Y. 2014. Movement of *Phytophthora* spp. in Maryland's nursery trade. Plant Dis. 98:134-144.

Sudden Oak Death Interactions with Fire



Resistance

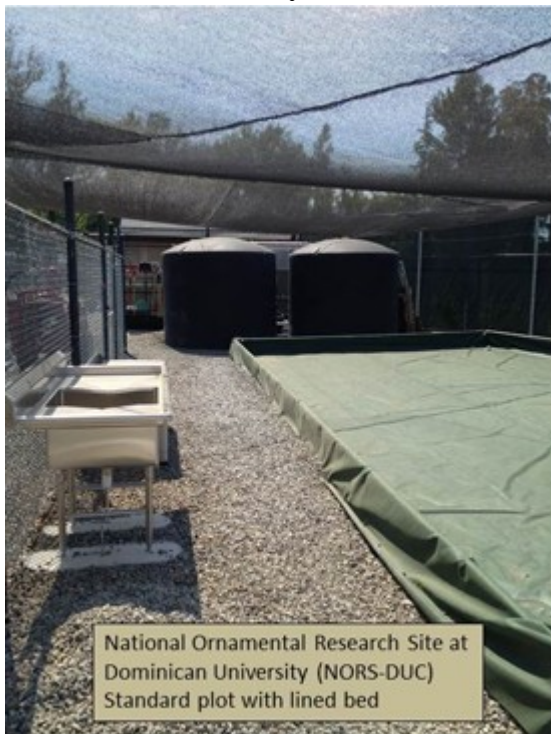
Sudden Oak Death Tree Mortality and the Pfeiffer Fire in Big Sur, California. Figure and the calculated mortality estimate produced by Whalen Dillon, NC State University. See the [full description](#).



How do trees fight off *Phytophthora ramorum*? Typical internal canker of a resistant coast live oak in July 2009 that was inoculated in 2002. The lesion is completely contained within a defined wound periderm (arrows) that separates the necrotic tissue from healthy phloem. The circle in the center shows the location of the original inoculation. [The bark has been cut away to show the margin between the healthy (rusty colored) tissues and the area where the pathogen killed the cells (brown).] Brice McPherson, UC Berkeley. DOI:

<http://dx.doi.org/10.1016/j.foreco.2013.10.009>

National Ornamental Research Site at Dominican University



The National Ornamental Research Site at Dominican University (NORS-DUC) is an experimental nursery focusing on soil borne pathogens. The facility opened in 2009 to respond to the quarantine pathogen, *Phytophthora ramorum*. Funding is provided by the USDA APHIS and other cooperators. Photos courtesy of Karen Suslow, NORS-DUC, Dominican University, San Rafael, Marin County, CA.



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Steam Sterilization at NORS-DUC bed during decommissioning of site.
2014 Farm Bill has funded a multi-state nursery steaming project in CA, OR and WA



In-ground Soil Solarization plot at NORS-DUC

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