


Danger under foot: The spread of *Phytophthora ramorum*




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Outline

- Introduction to *Phytophthora ramorum*
 - Life cycle
 - symptoms
- History of *P. ramorum* in the US
- Current range of *P. ramorum*
- Management practices for *P. ramorum*
- Future directions

Introduction

- It's a plant pathogen, sometimes called "a fungus like organism"
- Spread through the air, water, or soil.



Matteo Garbelotto, UC Berkeley

Introductions

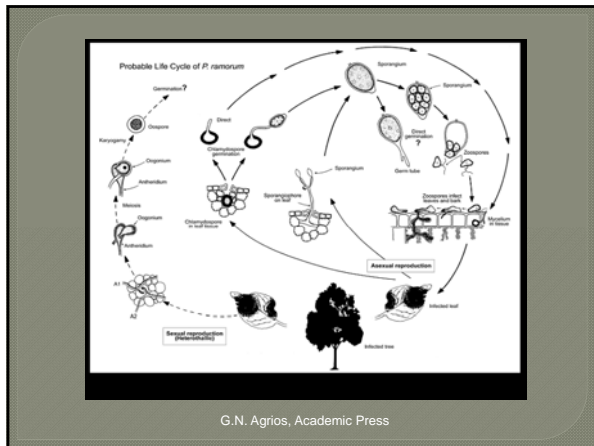
- Part of a group of root rots
 - But it doesn't attack the roots
- Hosts: tanoak (*Lithocarpus densiflorus*), *Quercus* spp., *Viburnum*, *Rhodendron*, and many more
 - Only infects red oaks
- Casual agent for Sudden Oak Death



Susan Frankel, USDA-FS

Life cycle

- Can reproduce sexual and asexually
 - Has multiple spore types that can infect trees
- Spores land on leaf and develop chlamydospores which leads to the production of sporangia and zoospores.
- Spores survival dependent on moisture
 - Study showed that they weren't viable after 1/2 hour of drying at 30% RH (Davidson et al. 2002)
 - Lasted for months with sufficient moisture.



Symptoms

- Symptoms are different in different hosts.
- Leaf blight and shoot dieback- *Rhodendron*, *Pieris*, *Viburnum*, and *Camellia*
- Cankers, discolored outer bark, dark red sap- tanoaks and *Quercus* spp.

Symptoms



Davidson et al. 2003

Symptoms



Dr. Anna Brown, DEFRA, United Kingdom

Symptoms



Oregon Department of Forestry

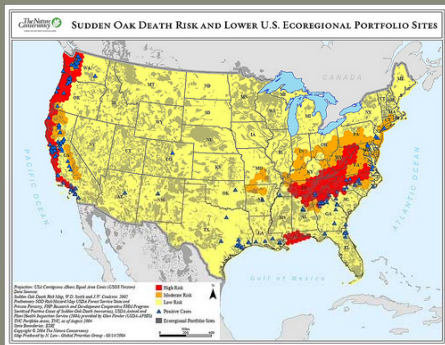
History

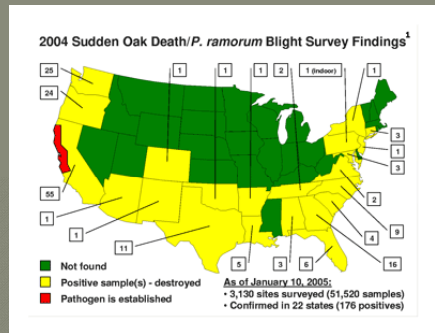
- 1993 found in Germany, Netherlands, San Francisco Bay Area
- 2001 detected in Oregon native forest
- May 2003 in nursery in Oregon
- June 2003 in Washington retail outlet.

Current Range

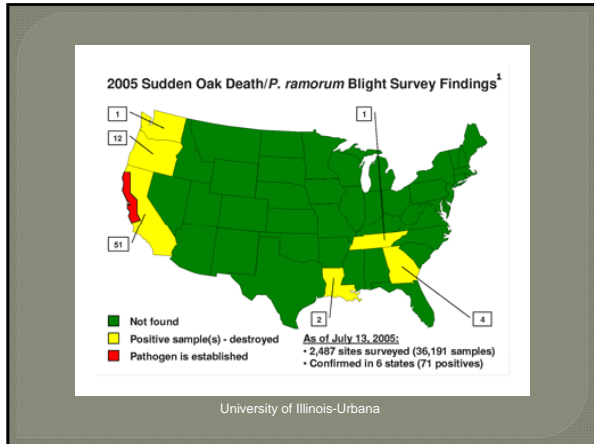
- Found in Oregon, and California in native forests
- Areas are quarantined
- Concern about spread to other states through nursery stock







University of Illinois-Urbana



Management

- When *P. ramorum* is found the area is quarantined or access is restricted.
- Fungicide can be used as for single trees but only preventative not a cure
- Burning is suggested but concerns about dispersal.
- Removal of infected plants.

Future Directions

- More studies about its exact modes of dispersal
 - Distance travels by wind
 - Potting substances
- Continuing monitoring of nurseries and native forests
- Find a treatment




Above: Cheryl Blomquist and Tom Kubisiak
Below: Jennifer L. Parke and Sunny Lucas

References

- Davidson, J.M., Werres, S., Garbelotto, M., Hansen, M., Rizzo, D.M. 2003. Sudden oak death and the associated diseases caused by *Phytophthora ramorum*. Plant Management Network.
- Balci, Y., Balci, S., Eggers, J., MacDonald, W.L. 2007. *Phytophthora* spp. Associated with forest soils in eastern and northern-central U.S. oak ecosystems. *Plant Disease*. 91:6. 705-710.
- Venette, R.C., Cohen, S.D. 2006. Potential climatic suitability for establishment of *Phytophthora ramorum* within contiguous United States. *Forest Ecology and Management*. 231. 18-26.
- Rizzo, D.M., Garbelotto, M., Davidson, J.M., Slaughter, G.W., Koike, S.T. 2002. *Phytophthora ramorum* as the cause of extensive mortality of *Quercus* spp. And *Lithocarpus densiflorus* in California. *Plant Disease*. 205-214.
- APHIS. Unknown date. National Pest Alert. Sudden Oak Death. *Phytophthora ramorum*.
- Oregon State University. 2004. *Phytophthora ramorum*: a guide for Washington Nurseries.

Questions