ILLINOIS FIRST DETECTOR

OAK DISEASES: EXOTIC, EMERGING, AND ENDEMIC

Diane Plewa, *University of Illinois Plant Clinic*

Definitions

- Exotic: A pest with a foreign origin

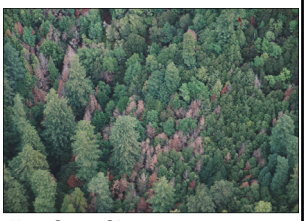
- Emerging: A pest that may have existed previously in the area, but is rapidly increasing in incidence or geographic range
- Endemic: A pest that is native, or regularly found in a certain area

Phytophthora ramorum

- Exotic, federally regulated pathogen
- Causal agent of Sudden Oak Death and Ramorum Blight
- Fungal-like organism (oomycete, aka "water mold")

History of *P. ramorum*

- 1995: Reports of large numbers of tanoaks dying in Marin, Santa Cruz, and Monterey counties by homeowners and arborists
- 1997: Coast live oaks with similar symptoms observed in San Francisco Bay area
- 1998: Coast live and California black oaks with same symptoms observed in Marin county



Marin County, CA
Photo: Marin County Fire Department

History of *P. ramorum*

Photo: Jennifer Parke, OSU

- Symptoms: bleeding basal cankers, heavy ambrosia beetle attacks, black fungal fruiting bodies, death of tree
- Thought that several years of environmental stress (drought in 1990 through 1992 followed by extremely wet years in 1993 and 1994) weakened the trees, making them more vulnerable to attack by secondary pests including ambrosia beetles and Hypoxylon (fungal) cankers
- Did not account for bleeding cankers and sudden death

History of *P. ramorum*

- 1999:
  - Oak death epidemic leads to concerns about fire hazards
  - UC Extension publication refers to the problem as "Sudden Oak Death"
  - Funding to UC and USDA FS for research and monitoring to determine cause and management

Marin County, CA
Photo: Marin County Fire Department

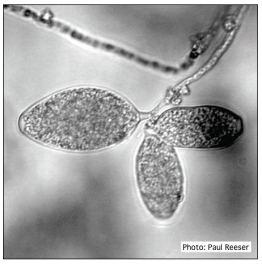
History of *P. ramorum*

- 2000
  - Marin County Board of Supervisors declare sudden oak death a state of emergency
  - Local, state, and federal agencies form the state-wide California Oak Mortality Task Force (COMTF)
  - Similar group formed in Oregon
- Pathogen is identified by UC Davis researchers

P. ramorum in culture

Photo: Jeffrey W. Lotz, Florida Dept. of Agriculture and Consumer Services, Bugwood.org

History of *P. ramorum*



- Identified as an unknown *Phytophthora* species
- Found to be the same species as a pathogen isolated in 1993 from rhododendron in Germany and the Netherlands

History of *P. ramorum*

- Pathogen found on a rhododendron in a Santa Cruz nursery
- Nursery is surrounded by dying oak woodlands
- Suggests that:
  - The pathogen has a fairly wide host range
  - May be transported via nursery stock

Photo: Jonathon Jones, APHIS PPQ

History of *P. ramorum*

- 2001
  - Pathogen discovered in Curry County, Oregon across the border from California
  - Area is quarantined and eradication is attempted by clear-cutting and burning

Photo: Mike McWilliams, ODF

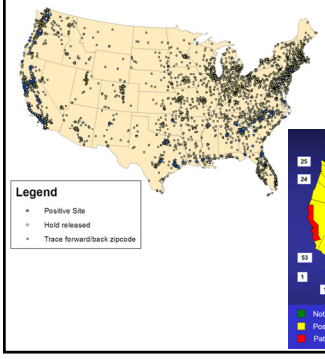
Photo: Everett Hansen, OSU

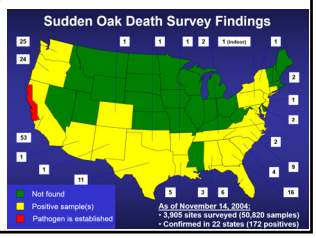
History of *P. ramorum*

- 2003
  - 17 nurseries on west coast of US and Canada are positive for *P. ramorum*
- 2004
  - National survey of 3000 nurseries; 15 confirmations in 7 states
- 2009
  - Washington State: first time *P. ramorum* is documented escaping from nursery to native forest via water source

Photos: Jonathon Jones, APHIS PPQ; Jennifer Parke, OSU

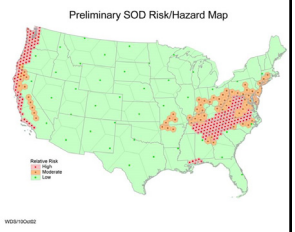
Trace-forwards and positive detections (2004)



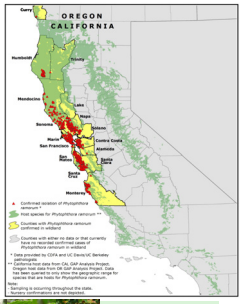


Potential Risk to Illinois

- Most likely pathway for introduction to IL is via infected nursery stock
- IL hosts of concern:
  - Pin Oak (*Q. palustris*)
  - Northern Red Oak (*Q. rubra*)



P. ramorum



- 2 different mating types
- Genetic studies have confirmed multiple introductions
- Native to: ???
- 2 sets of symptoms
  - Ramorum Blight
  - Sudden Oak Death

Ramorum Blight

- Spots and blotches on leaves
- Shoot dieback
- Can kill juvenile plants, occasionally mature plants
- Numerous hosts (non-oak)
  - Rhododendron
  - Camellia
  - Pieris
  - California bay laurel
  - Viburnum
  - Bigleaf maple
  - Douglas fir and true firs
  - And many more …

Ramorum Blight – Leaf Blight

Host: Rhododendron and Azalea

Photos: Joseph O'Brien, USDA Forest Service, Bugwood.org

Ramorum Blight – Leaf Blight

Host: Camellia

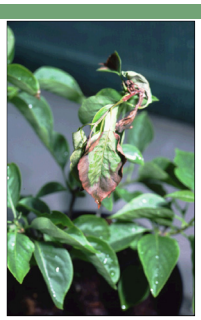
Photo: Cheryl Blomquist, CDFA

Ramorum Blight – Leaf Blight

Host: Viburnum

Photo: Jennifer Parke, OSU

Ramorum Blight – Leaf Blight



Host: Lilac

Photo: Alexandra Schlenzig, Scottish Agricultural Science Agency

Ramorum Blight – Shoot Dieback

Host: Rhododendron

Photo: Everett Hansen, OSU

Ramorum Blight – Shoot Dieback

Host: Viburnum

Photo: Oregon Dept. of Agriculture

Ramorum Blight – Shoot Dieback

Host: Douglas-Fir

Photo: Dave Rizzo, UC Davis

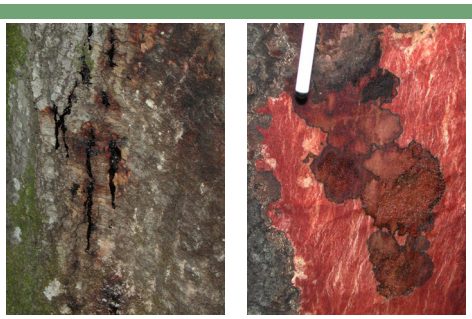
Sudden Oak Death

- Stem or trunk lesions beneath the bark
- May bleed or ooze
- Can kill adult plants
- Oak hosts
  - Red oak group
  - Tanoak (Fagaceae family)

Sudden Oak Death – Bleeding Cankers

Photos: Carbelotto Lab, UC Berkeley; ODF, Missouri Dept. of Conservation

Sudden Oak Death – Cankers



Host: Tanoak

Photo: Bruce Moltzen, Missouri Dept. of Conservation

Sudden Oak Death – Shoot Dieback

Host: Tanoak, California black oak

Photos: Joseph O'Brien, USDA Forest Service, Bugwood.org; www.suddenoakdeath.org

Lots of Look-Alikes …

Photos: Steve Oak, USDA-Forest Service; Rich Regan, OSU; Univ. of Maryland Ext.;

If you suspect *P. ramorum*

- Contact IL Dept. of Ag or the Univ. of IL Plant Clinic
- Collect leaves with various symptoms & take pictures
- Place sample on dry paper towel
- Double bag and seal in zippable bags
- Ship in a crushproof box with seams sealed completely with tape
- Include sample submission form or other information

P. ramorum Sampling

- Samples should only be submitted to a federally-designated lab (in Illinois, the Plant Clinic)
- Please contact us prior to shipping!

  217-649-3941

  plantclinic@Illinois.edu

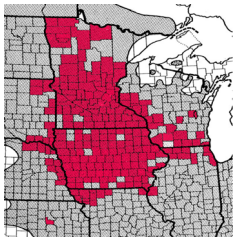
Bur Oak Blight (*Tubakia iowensis*)

- Late 1990s
  - Symptoms first described
- 2012
  - Pathogen identified
- Pathogen appears to be native, but disease incidence is increasing

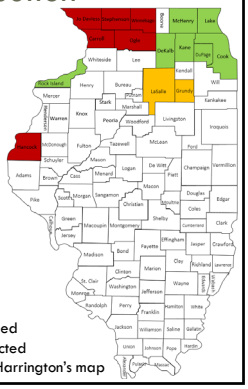
Bur Oak Blight (*Tubakia iowensis*)

- Host range is limited to bur oaks
- Most severe on mature bur oaks on former savanna sites and on upland sites
- The variety *Quercus marcocarpa* var. *oliviformis* is especially susceptible
  - Smaller acorns
  - More narrow leaves

Bur Oak Blight Distribution



From Dr. Harrington, Iowa State University
Updated Fall 2015



Green = confirmed
Orange = suspected
Red = from Dr. Harrington's map

Bur Oak Blight Symptoms

Photos: Travis Cleveland, University of Illinois; Univ. of IL Plant Clinic

Bur Oak Blight Sampling

- Collect ~10 symptomatic leaves from this season and petioles from last season

Photo: Travis Cleveland, University of Illinois

Fungal Leaf Pathogens

- Tubakia and Anthracnose (and many more …)
- Leaf spots and lesions
- Heavy infection can lead to defoliation

Photos: University of Illinois Plant Clinic

Fungal Leaf Pathogen Sampling

- Collect several symptomatic leaves
- Look for varying levels of infection
- Single bag, shipped in bubble mailer or small box

Bacterial Leaf Scorch (*Xylella fastidiosa*)

Photos: University of Illinois Plant Clinic

Bacterial Leaf Scorch Sampling

- Collect symptomatic leaves <u>including petioles</u> in last summer and fall
- Tested using ELISA

Photo: University of Illinois Plant Clinic

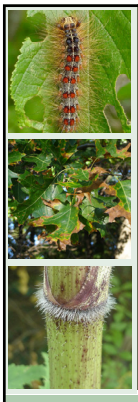
Oak Wilt (*Ceratocystis fagacearum*)

Photos: University of Illinois Plant Clinic

Oak Wilt Sampling

- Sample from symptomatic branches
- 8-10" long
- Diameter of adult thumb
- Look for vascular discoloration
- <u>Keep sample cool during shipping</u>

Photos: University of Illinois Plant Clinic



THANK YOU

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