



County of Santa Barbara  
Agricultural Commissioner's Office

SUDDEN OAK DEATH

May 10, 2005



# Overview

- History of *P. ramorum*
- Symptoms and look-alikes
- Regulations





**Marin County, CA (north of San Francisco)**

Photo: Marin County Fire Department





**Marin County, CA (north of San Francisco), 2000**

Photo: Marin County Fire Department





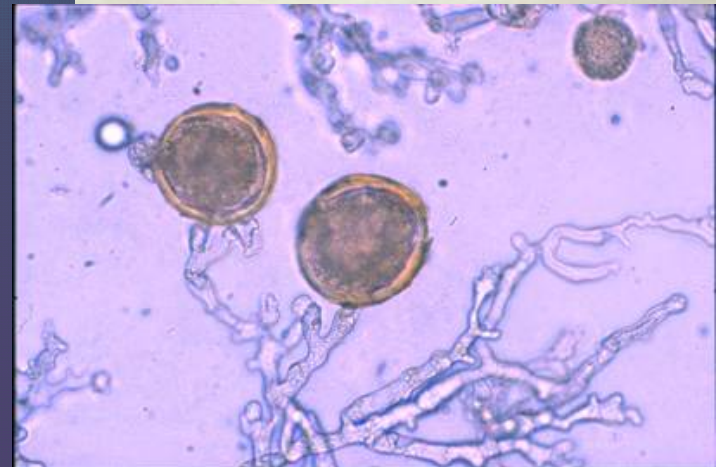
# *Phytophthora ramorum*



*Phytophthora ramorum* in culture



Sporangia releasing zoospores



Chlamydospores



# *Phytophthora* species







# Two sets of symptoms caused by *Phytophthora ramorum*

- Sudden Oak Death
  - Red oak group hosts and tanoak
  - Stem lesions beneath the bark
  - May bleed or ooze
  - Can kill adult plants
- *Phytophthora ramorum* Foliar Blight
  - Non-oak hosts
  - Spots and blotches on leaves
  - Shoot dieback
  - Can kill juvenile plants, occasionally mature plants



# *P. ramorum* confirmations in forests

Distribution of Sudden Oak  
Death as of September 1, 2004.

-  Confirmed isolation of *Phytophthora ramorum*\*
  -  Counties with *Phytophthora ramorum* confirmed in wildland
- \* Data provided by CDFA and UC Davis/UC Berkeley pathologists

Notes:

1. Sampling is occurring throughout the state.
2. Nursery confirmations are not depicted.

Map from [www.suddenoakdeath.org](http://www.suddenoakdeath.org)  
Kelly, UC-Berkeley







# Symptoms caused by *P. ramorum* differ on different hosts

Sudden Oak Death  
affects members of the oak family  
(Fagaceae)

- True oaks (*Quercus* spp.)
- Tanoak (*Lithocarpus densiflorus*)
- Chestnut (*Castanea*) [Europe only]
- Beech (*Fagus*) [Europe only]

*P. ramorum* on coast live oak







# ‘Bleeding’ canker on tree trunk



- ‘Bleeding’ or oozing on the bark
- Not associated with cracks in bark or insect holes
- Usually on the lower 6 ft. of tree trunks





# *Phytophthora ramorum*



"bleeding"







# *Phytophthora ramorum*



Cankers (in inner bark) are surrounded by a black line





# *Phytophthora ramorum*

outer bark



inner bark







# Other common diseases & injuries



- Bacterial wetwood
- Boring insects
- Mechanical injury
- Fungi



# On other plant hosts, *P. ramorum* causes symptoms of foliar blight

- Camellia
- Rhododendron
- Viburnum
- Pieris
- Mountain laurel
- Lilac
- Pyracantha
- Honeysuckle
- Yew
- Douglas-fir
- Grand fir
- Coast redwood





# Symptoms on Camellia





# *Phytophthora ramorum* regulations & quarantines

- Federal quarantines –
  - prevent movement between states
- State quarantines –
  - prevent movement within a state
  - prevent introductions





# *Phytophthora ramorum* domestic regulated materials

- Nursery stock
- Forest stock
- Wood
- Bark
- Soil
- Wreaths & greenery



# *Phytophthora ramorum* host list

- tanoak
- canyon live oak
- coast live oak
- California black oak
- Shreve oak
- bigleaf maple
- coffeeberry
- California buckeye
- salmonberry
- Western starflower
- California hazelnut
- mountain laurel
- *Pieris* varieties
- *Camellia* species
- European yew
- false Solomon's seal
- goat willow
- California bay laurel/pepperwood
- horse-chestnut
- sweet chestnut
- European beech
- drooping leucothoe
- European turkey oak
- toyon
- cascara
- coast redwood
- manzanita
- grand fir
- Douglas-fir
- European yew
- strawberry tree
- California wood fern
- Pacific yew
- winter's bark
- Andrew's clintonia
- bead lily
- southern red oak
- northern red oak
- Holm oak
- wood rose
- *Viburnum* varieties
- madrone
- Formosa firethorn
- huckleberry
- honeysuckle
- poison oak
- Scotch heather
- witch-hazel
- Victorian box
- lilac
- rhododendrons/azaleas
- sweet bay laurel