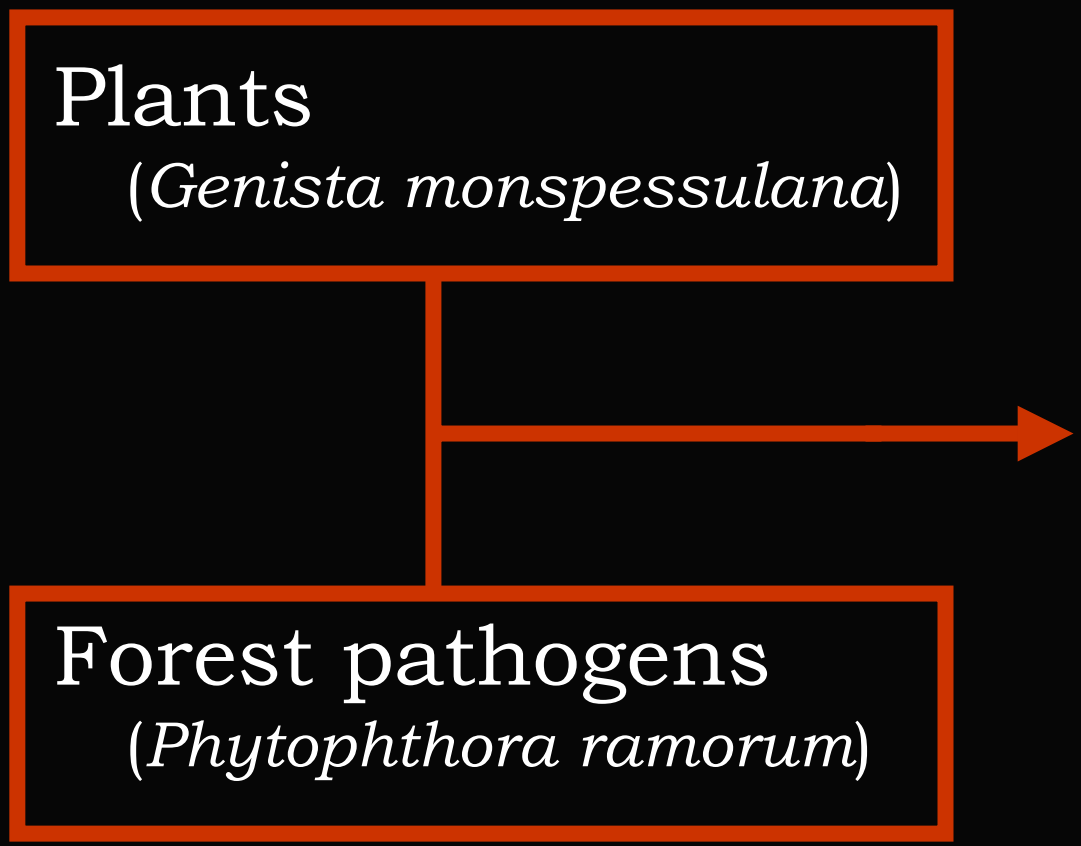
Beyond the Plantae:

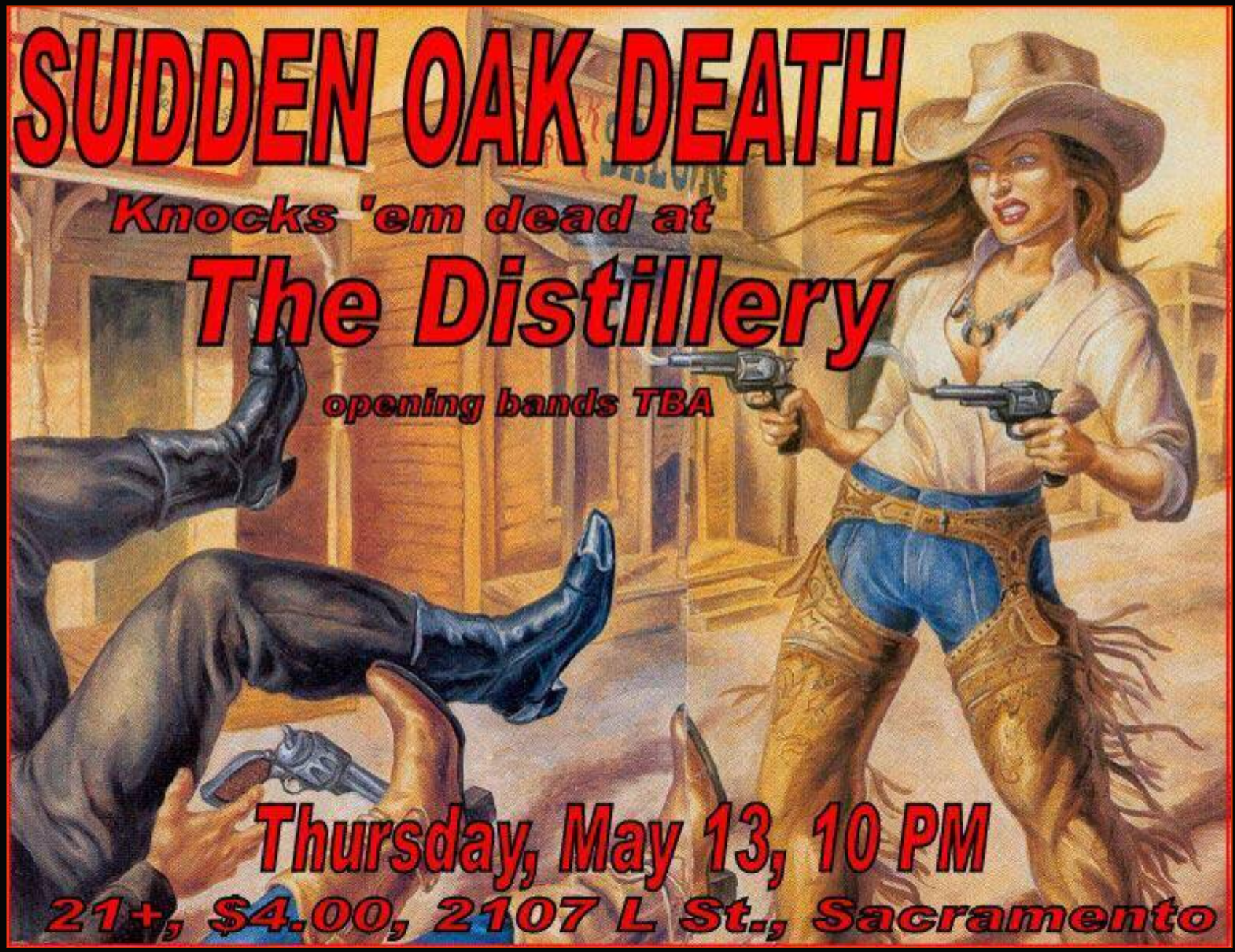
P. ramorum (cause of Sudden Oak Death and other plant diseases) and opportunities for partnerships

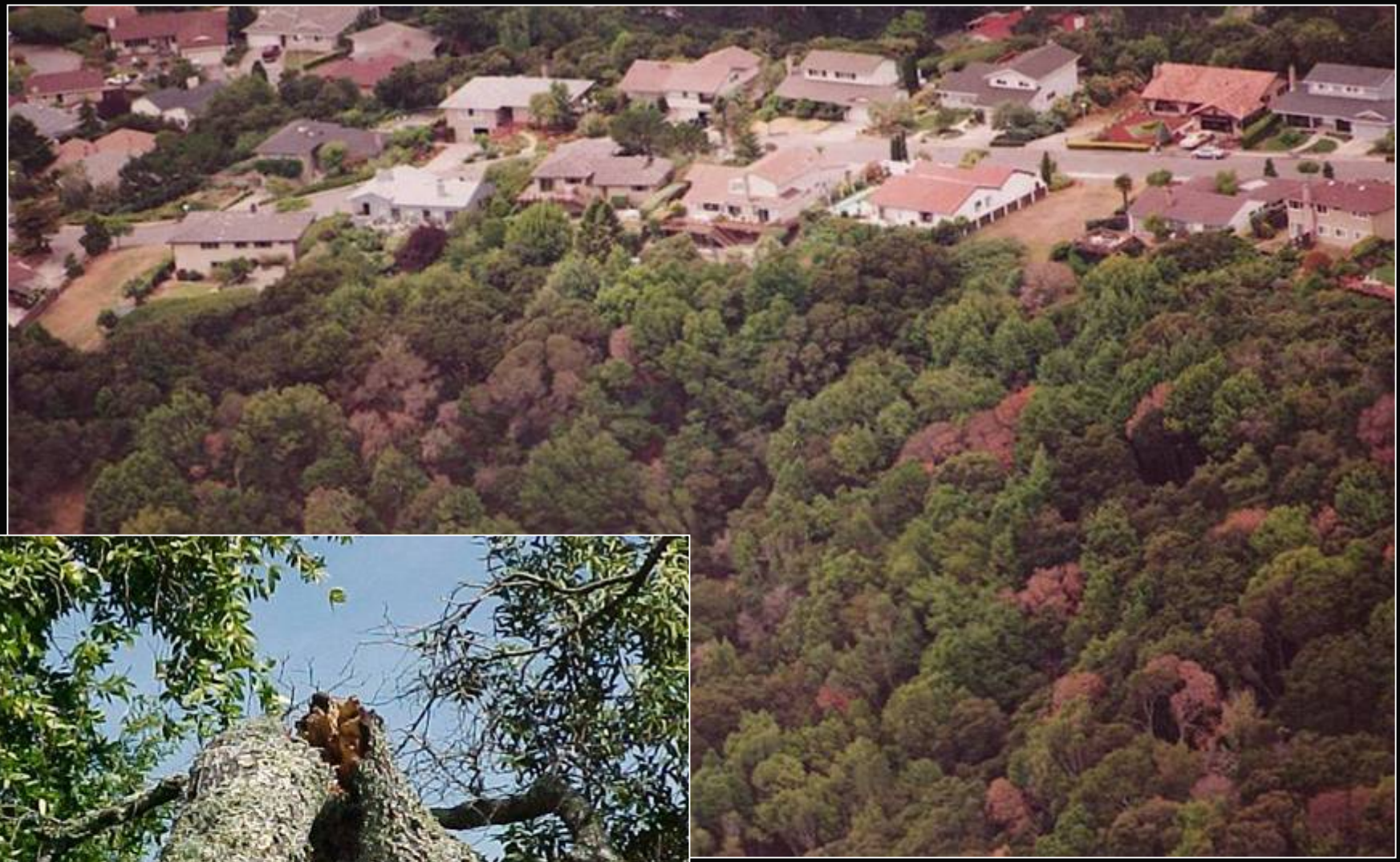
Janice Alexander
University of California Cooperative Extension
California Oak Mortality Task Force

Cal-IPC and COMTF Connections



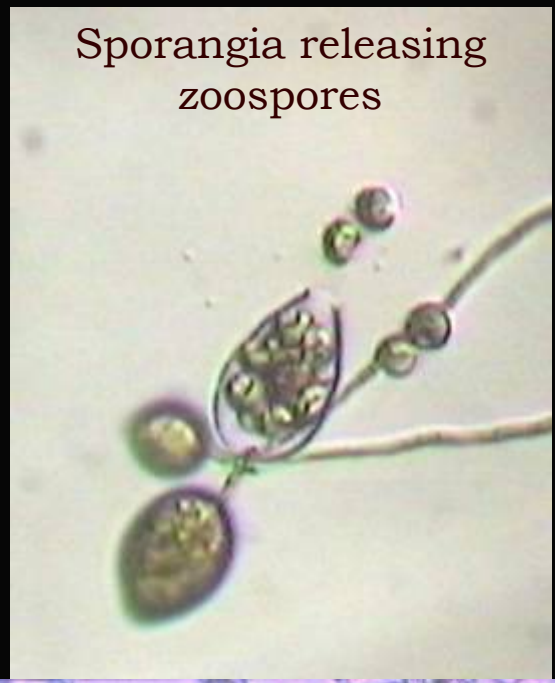
- Biology & Ecology
- Nursery Industry
- Public Education
- Partnerships

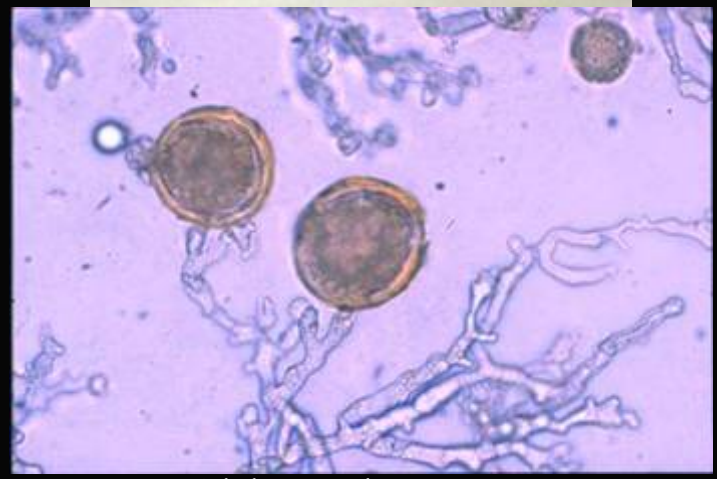

SUDDEN OAK DEATH
Knocks 'em dead at
The Distillery
opening bands TBA
Thursday, May 13, 10 PM
21+, $4.00, 2107 L St., Sacramento



Phytophthora ramorum

Phytophthora ramorum in culture





Chlamydospores

European gardens & nurseries

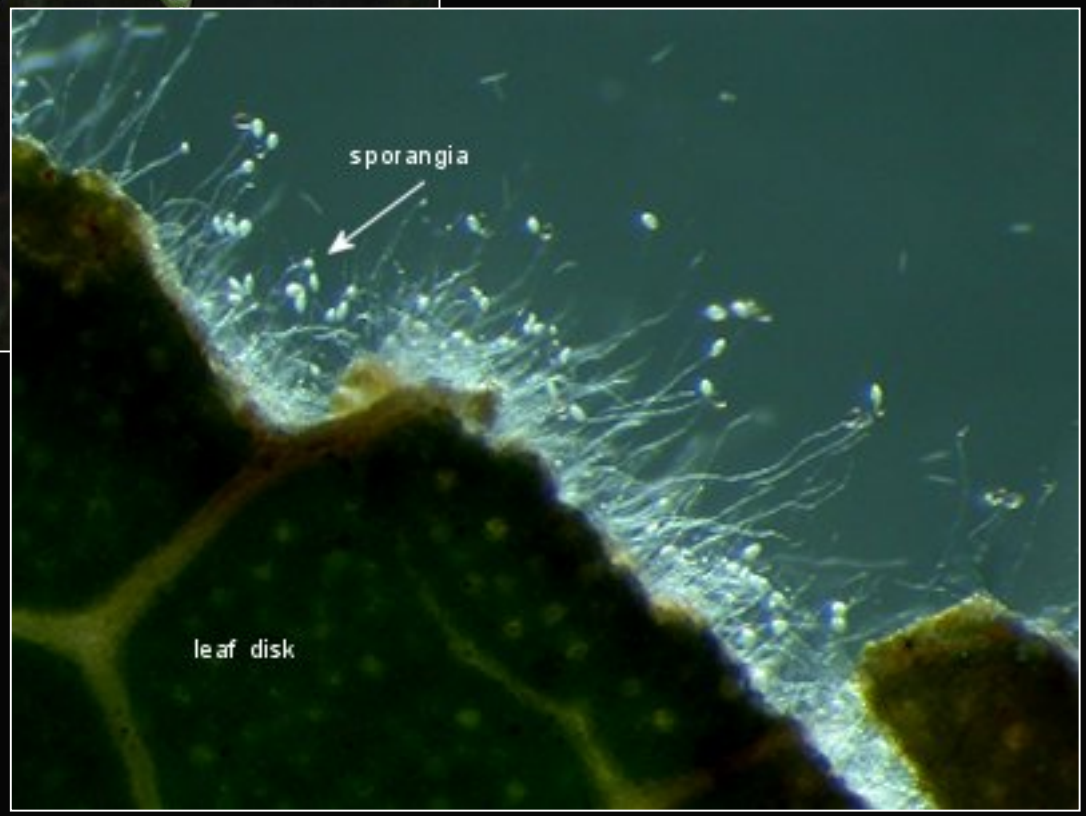
Phytophthora ramorum infection on rhododendron in Europe

Susceptible Species*

Over 40 genera; more than 80 species/varieties

Andrew's clintonia bead lily
Bigleaf maple
California bay laurel
California black oak
California buckeye
California coffeeberry
California hazelnut
California honeysuckle
California maidenhair fern
California nutmeg
California wood fern
Camellia species
Canyon live oak
Cascara
Chinese witch-hazel
Coast live oak
Coast redwood
Douglas fir
Drooping leucothoe
European ash
European Beech
European turkey oak
European yew
Evergreen huckleberry
Evergreen maple
False Solomon's seal
Formosa firethorn
Goat willow
Grand fir
Griselinia
Holm oak
Horse-chestnut
Laurustinus
Lilac
Loebner magnolia
Madrone
Maidenhair fern
Manzanita
Michelia
Mountain laurel
New Zealand Privet
Northern red oak
Oregon ash
Pacific yew
Persian Parrotia
Pieris varieties
Planetree maple
Poison oak
Red tip or Fraser's Photinia
Redwood ivy
Rhododendron species
Salmonberry
Saucer magnolia
Scotch heather Sessile oak
Shreve oak
Southern or Roble beech
Southern red oak
Spicebush
Star magnolia
Strawberry tree
Sweet bay laurel
Sweet chestnut
Sweet Cicely
Tanoak
Toyon
Viburnum varieties
Victorian box
Western starflower
Winter's bark
Witch hazel
Wood rose
Yew

*as of September 2005


sporangia
leaf disk

Phytophthora ramorum

- Why do pathologists consider this an exotic species?
  - Limited geographic range
  - High susceptibility of some hosts (e.g. tanoak)
  - Limited genetic variability
- Theory: *P. ramorum* was introduced to both Europe and North America separately from a third location.
- Researchers are looking at native rhododendrons and viburnums in Asian forests for the possible origin of *P. ramorum*.

Connections

- Biology & Ecology
- Nursery Industry
- Public Education
- Partnerships

- urban-wildland interface
- lag time for population explosion
- can’t stop it once it has established itself in the wildlands

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Drooping leucothoe
European ash
European Beech
European turkey oak
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Evergreen maple
False Solomon's seal
Formosa firethorn
Goat willow
Grand fir
Griselinia
Holm oak
Horse-chestnut
Laurustinus
Lilac
Loebner magnolia
Madrone
Maidenhair fern
Manzanita
Michelia
Mountain laurel
New Zealand Privet
Northern red oak
Oregon ash
Pacific yew
Persian Parrotia
Pieris varieties
Planetree maple
Poison oak
Red tip or Fraser's Photinia
Redwood ivy
Rhododendron species
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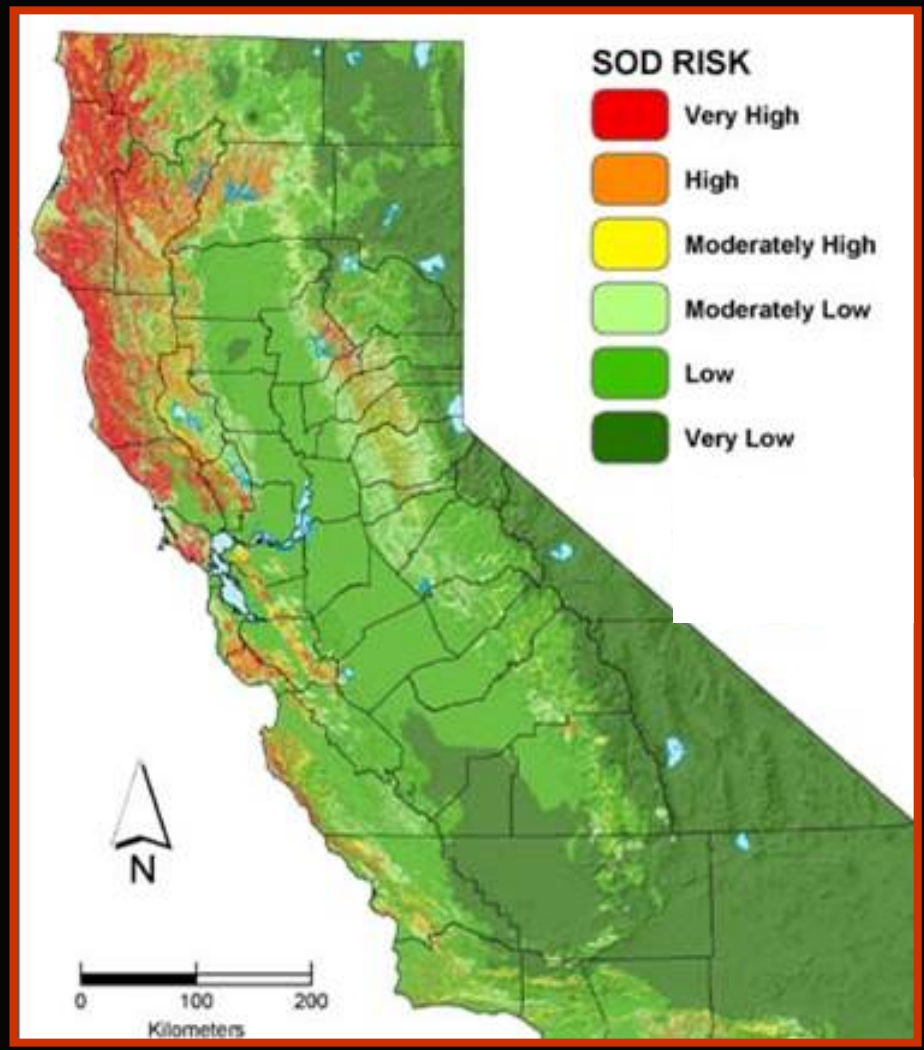
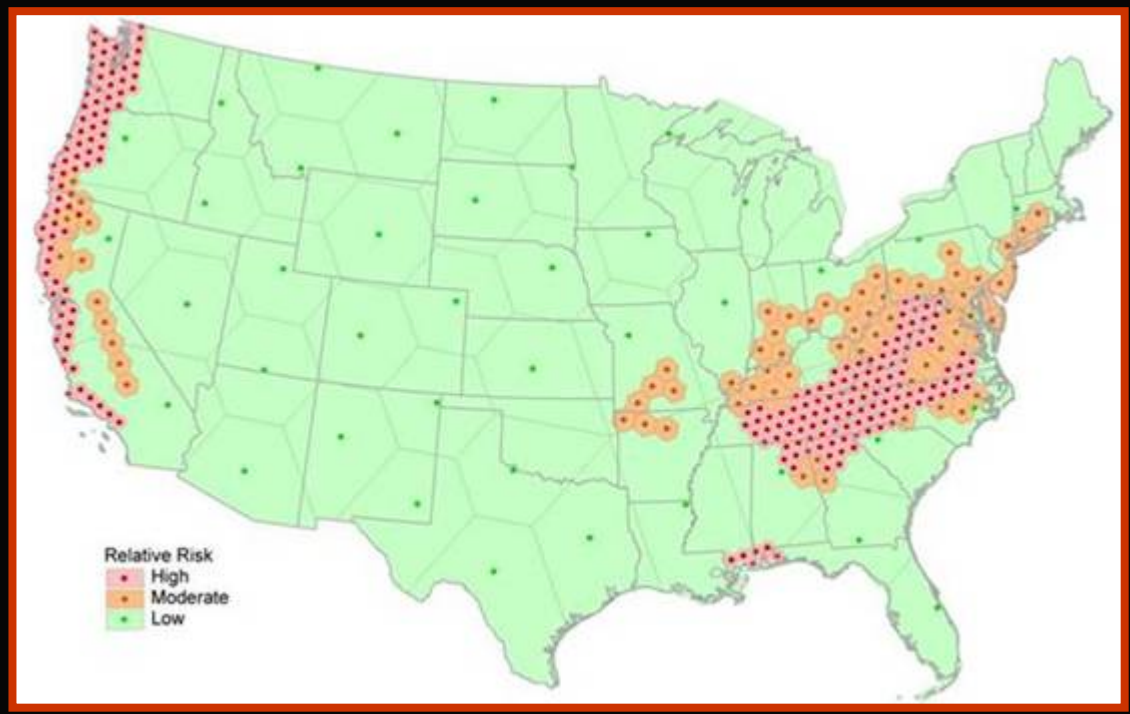
Current forest distribution



Potential forest distribution

Nursery shipments

Forests at risk



Connections

- Biology & Ecology
- Nursery Industry
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- Partnerships

- Need for education
- Main message: prevent artificial spread
- Inadvertent movement
- Purposeful movement (of hosts)

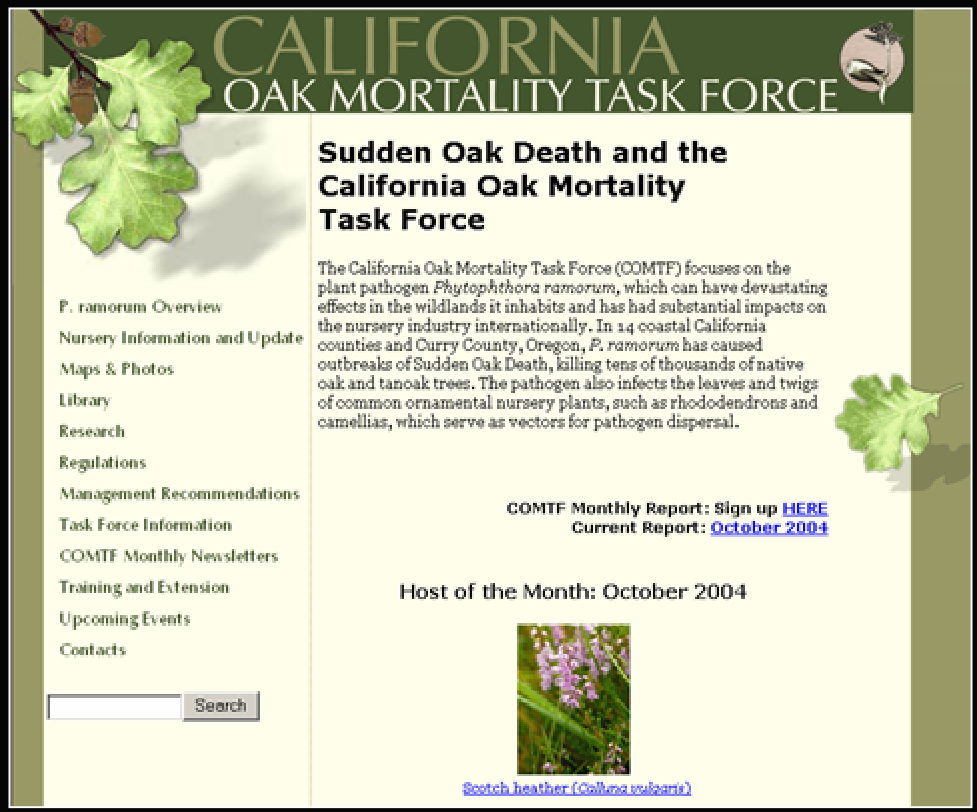
Why do we care?

- Ecology - forests look and act differently, wildlife impacts
- Safety - Hazard trees, fire dangers
- Economics - Costs of mitigation & quarantines, tree removals
- Emotional - individual property owners, recreational users

Main Messages

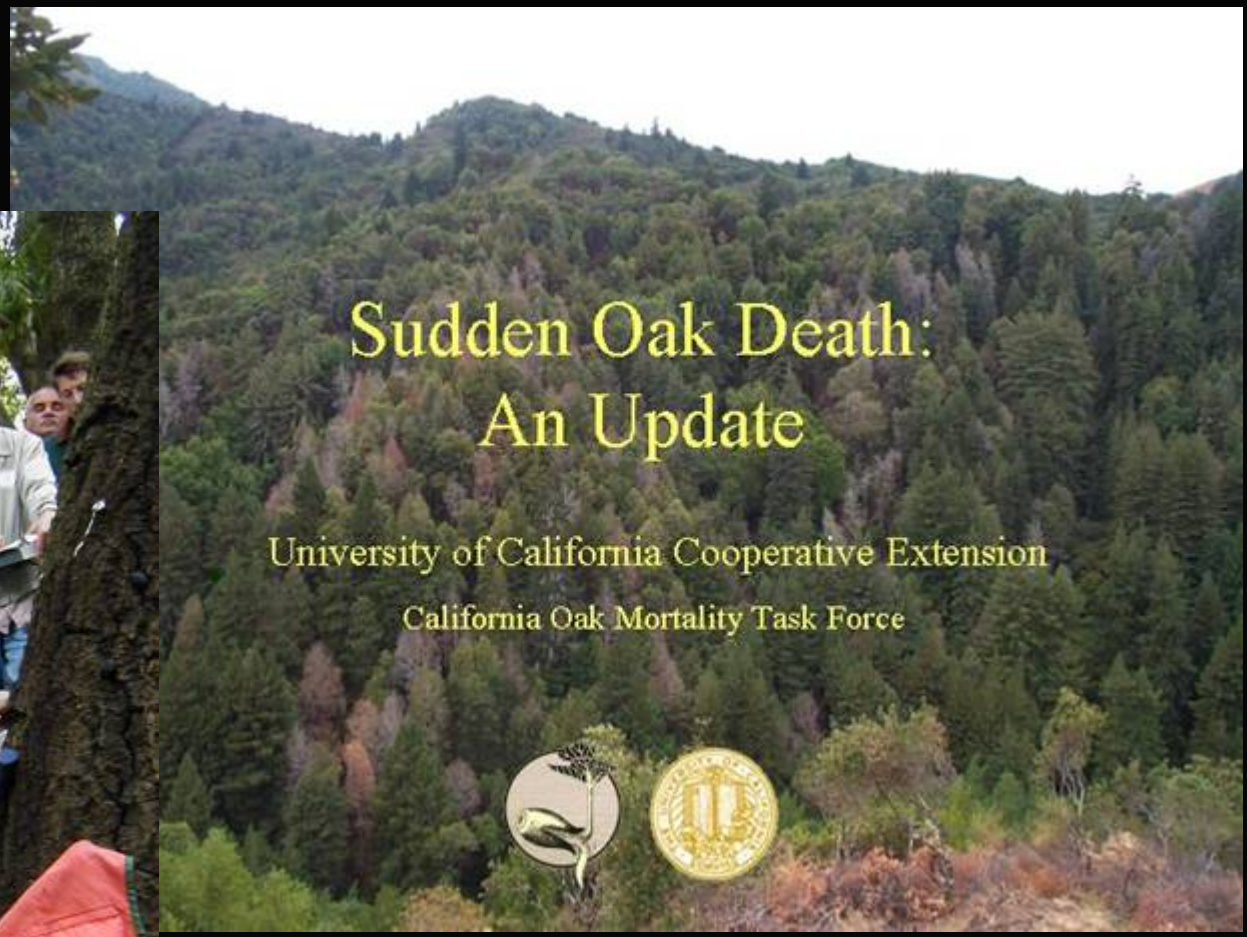
- Stop The Spread!
  - Avoid becoming contaminated.
  - Do not collect or move any infectious material.

Website

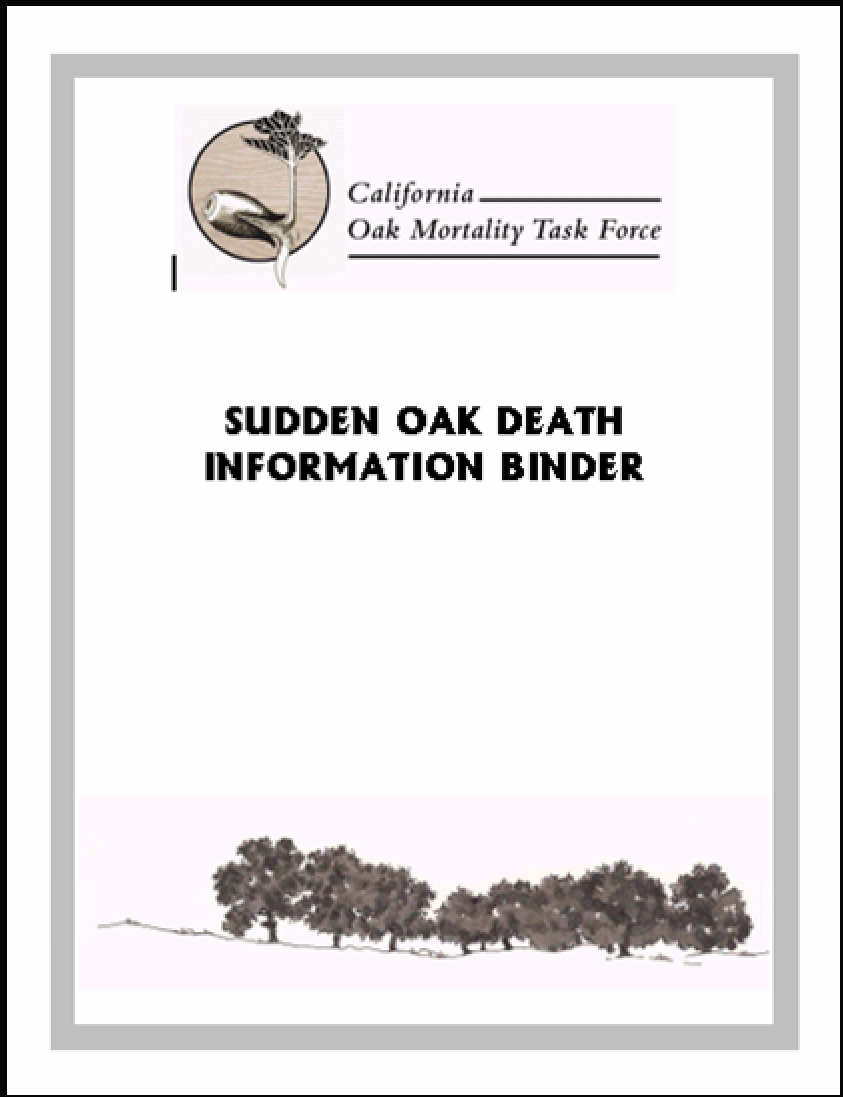


www.suddenoakdeath.org

Training sessions & Presentations



Information Binders & CDs



Posters

SUDDEN OAK DEATH in California

www.suddenoakdeath.org

An Introduction to Sudden Oak Death

Sudden Oak Death is a forest disease caused by the pathogen *Phytophthora ramorum*. It is killing tanoaks and some species of oaks in coastal California, while also infecting many other plants. The effects of this pathogen may include adverse economic impacts, decreased water quality and wildlife habitat, increased risk of fire, and tree failure.

Oak and Tanoak Trunk Symptoms

An early symptom is bleeding or seeping of dark thick sap from areas of infection on the lower trunk. Infection results in a canker or dead area within the bark and outer tissues.

As Sudden Oak Death progresses, cankers spread and interrupt the flow of food and water. Weakened trees are susceptible to attack from beetles and decay fungi, which may hasten the tree's demise.

Help Control the Spread!

- Comply with State and Federal regulations: Do not move host plant material, including leaves and small twigs, out of infected areas.

-Hikers, bikers, equestrians, campers, and other recreational users should always clean dirt and mud from shoes, clothing, equipment, their animals, and cars when leaving an infested area to minimize the chance of accidental spread of the disease to uninfected areas.

- Contact the California Oak Mortality Task Force at www.suddenoakdeath.org to learn more about this pathogen - where it is found, what plants are susceptible - and how you can get involved.

California Oak Mortality Task Force

Other Host Symptoms

Many other hosts have symptoms that are generally limited to leaf spots and twig dieback. These plants are not usually killed by the disease. Spores of the pathogen can build up rapidly on these plants' leaves and help spread the disease to other host plants through rain splash.

HELP PREVENT THE SPREAD OF SUDDEN OAK DEATH

California Oak Mortality Task Force

Your logo here

MARIN MUNICIPAL WATER DISTRICT

Trees in this area are infected with the fungus that causes Sudden Oak Death. This deadly fungus is killing tanoak, coast live oak, black oak and Shreve's oak in California's Coastal Counties. It also infects huckleberry, bay laurel, madrone and ornamental rhododendron.

Help prevent the spread of this serious tree pathogen by taking the following precautions.

WHILE HERE...

- Park your vehicle only in designated parking areas.
- Stay on established trails - respect trail closures.
- Do not collect wood, plants (acorns, leaves) or soil.
- Avoid muddy areas.

BEFORE GOING TO UNINFESTED AREAS*...

- Clean soil and mud off of shoes, mountain bikes, horse's hooves, and pet's paws.
- Sudden Oak Death is present only in the following counties: Marin, Sonoma, Napa, San Mateo, Santa Cruz, Monterey and Santa Clara*
- Wash off mud or soil on tires, wheel wells and the undercarriage of your vehicle at the nearest automated car wash.

For further information visit www.suddenoakdeath.org or call your phone #

Guidelines provided by the California Oak Mortality Task Force are based on the best current knowledge and may change as new information becomes available.
June 4, 2001

Teacher and student resources

Junior Ranger Activity Guide: Sudden Oak Death

Sudden Oak Death is a disease that kills trees such as tanoak, coast live oak, and California black oak. It also infects many other plants without killing them. The disease is caused by a microscopic organism named "Phytophthora ramorum" (pronounced "Fi-TOFF-thor-ra ra-MOR-um"). That's a lot to say, so we call it "**P.r.**" for short. Organisms that cause diseases are called pathogens. **P.r.** acts like a fungus, and can make trees sick or kill them. When it infects a tanoak or oak tree, the bark on the trunk can start "bleeding" or oozing. This bleeding is called a canker and when a canker gets very big it can wrap all the way around a tree's trunk. Eventually the tree becomes so sick that its leaves suddenly turn brown and the tree soon dies.

Page 1

Trees in Trouble - Sudden Oak Death

A Resource for Educators
Winter 2003

California's native oaks offer serenity, beauty, and so much more to our landscape. Oak woodlands profoundly affect the variety and abundance of wildlife, providing food, water, cover, and space for approximately 350 vertebrate species. Oak woodlands are also the basis for watersheds that protect drinking water for millions of Californians. The oaks face a new threat to their existence - Sudden Oak Death.

The Oak Community

California's native oak landscapes are very diverse and widespread, covering nearly 11 million acres statewide. From the Pacific shore to high desert slopes, mingling with redwood trees to the north and cactus to the south, oaks are included in many kinds of forests, woodlands, and chaparral communities. Oak woodlands provide forage for grazing animals, habitat for hundreds of wildlife species, and protection for water quality. Oaks give our state its character - golden hills dotted with deep green trees.

Trees in Trouble

Despite growing attention by Californians toward protecting individual oaks, California's oak woodlands remain a community at risk. In many areas of the state, oak populations are experiencing little or no tree replacement. Without regeneration, the sustainability of oak woodlands are in jeopardy. This decline, as well as concerns about loss of habitat and open spaces, are prominent reasons for studying oak communities. An especially timely concern is the recent advent of the disease Sudden Oak Death that has already killed tens of thousands of oaks and tanoaks and threatens the larger oak community.

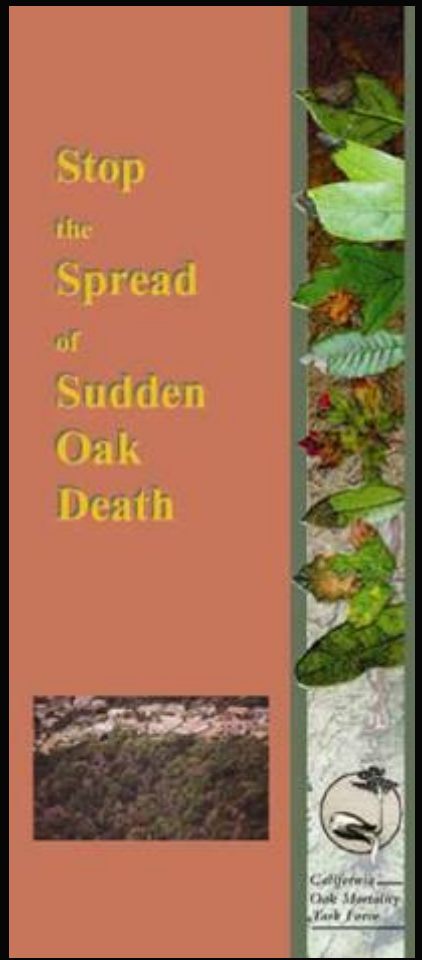
What is Sudden Oak Death?

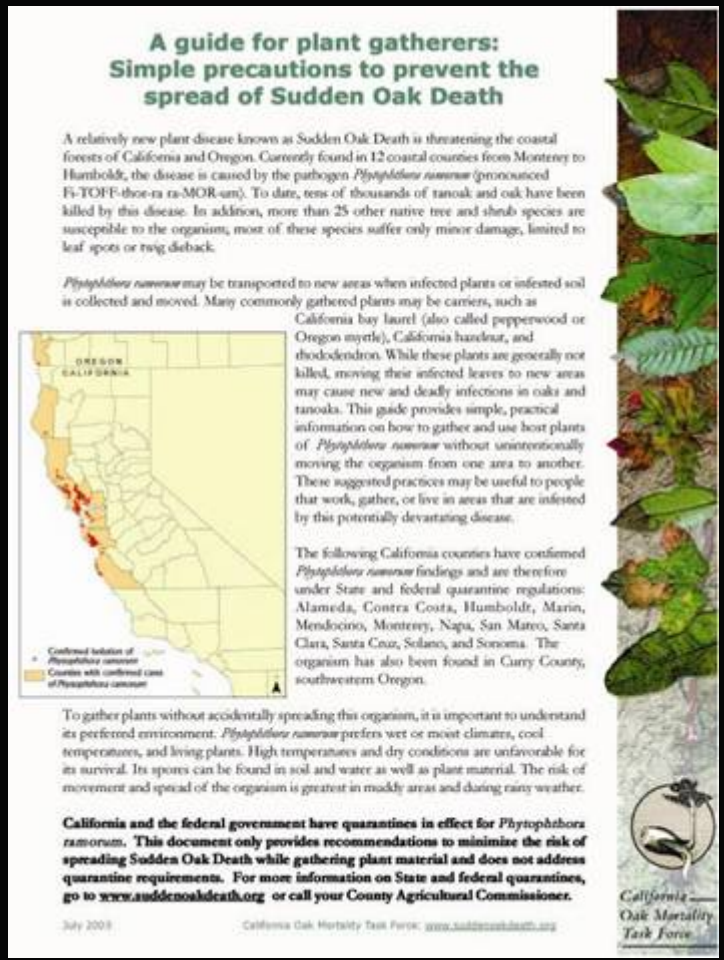
Sudden Oak Death is a forest disease that kills black oak, canyon live oak, coast live oak, Shreve's oak, and tanoak and also infects many other plant species. The disease is caused by a recently discovered pathogen (disease causing agent) called *Phytophthora* ("Phy-TOFF-thoruh") *ramorum*. It was originally named "Sudden Oak Death" due to the rapid color change from green to brown of the leaves of infected oaks and tanoaks.

Counties currently known to have Sudden Oak Death:

Alameda	Napa
Contra Costa	San Mateo
Humboldt	Santa Clara
Marin	Santa Cruz
Mendocino	Solano
Monterey	Sonoma

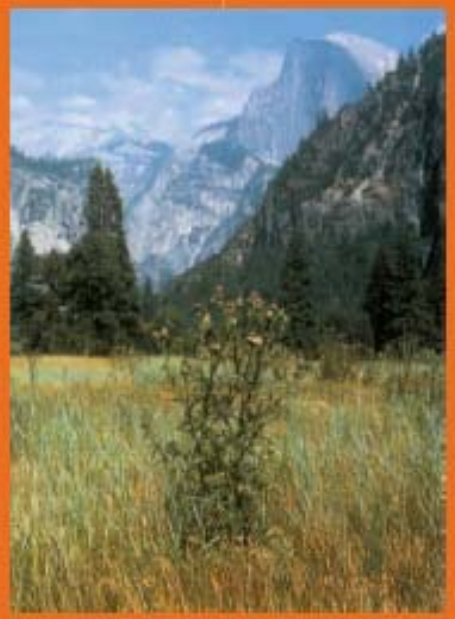
Brochures & Handouts





biological pollution:

what you should know about invasive plants in California



Stop the Spread of Sudden Oak Death

California Oak Mortality Task Force

What's Being Done

Finding solutions

Many agencies and groups, from local to international, are working to solve the problems invasive plants pose for the state's lands. Their work includes:

- Implementing on-the-ground control projects aimed at removing invasive plants.
- Developing policies and practices to limit the spread of invasive plants.
- Advancing awareness of invasive plant problems and solutions.
- Mapping infestations to set priorities and guide planning.
- Working in collaboration with public and private partners to develop programs.
- Researching ecological impacts and effective long-term solutions.

What You Can Do

You can help

Invasive plants are a serious and growing problem, and California's threatened landscapes need whatever help they can get. You can prevent the spread of plant invaders and help reduce the problems they cause. Here are a few suggestions:

- Don't use known invasive plants in gardens or landscaping.
- Know how to identify invasive plants, and who in your area to notify when you see them. (For a list of county weed management groups, see our website.)
- Volunteer with habitat restoration efforts at local parks, creeks, or other natural areas.
- Do not move plants in the wild, especially over long distances. Clean boots, boats and cars so weed seeds cannot "hitchhike."
- Consider becoming a member of Cal-IPC, the California Invasive Plant Council.

You Can Help Stop the Spread!

The best defense against Sudden Oak Death in our forests is to follow the regulations and best management practices that are in place to help slow the "artificial" or human-mediated spread of the disease.

- State and federal regulations must be complied with when moving host plant material and other regulated materials from regulated counties. Contact your local County Agricultural Commissioner for the most up-to-date regulations.
- Stay on established trails and respect trail closures.
- Before leaving infested areas, clean soil and mud that could carry host material from:
  - shoes
  - horses' hooves
  - vehicles
  - mountain bikes
  - pets' paws

- Clean and disinfect equipment (saws, shovels, pruning equipment, etc.) that has been used in infested areas.
- Report hosts exhibiting symptoms to your local County Agricultural Commissioner, California Department of Forestry and Fire Protection, or UC Cooperative Extension.

At www.suddenoakdeath.org you can:

- Familiarize yourself with associated plants and their symptoms.
- Stay current on quarantines and best management practices to minimize disease spread.
- And much, much more...

Connections

- Biology & Ecology
- Nursery Industry
- Public Education
- Partnerships

"…despite the attractiveness of regulation as a strong tool for controlling business practices, it is not clear that regulation alone is the most effective tool for preventing new and continuing introductions…"

Partnership to Prevent the Introduction of Invasives through Horticulture

"…a collaborative effort to develop and foster implementation of strategies for preventing invasive plant introductions through nurseries is needed in California…"

- "bringing the right people to the table with respect to both the constituency and individual represents, and the commitment of that person's organization to the process"
- "consumer preferences for particular plants"
- "the diversity of the audiences that this effort needs to reach"
- "the need for high-quality scientific information"

California Oak Mortality Task Force

- 1000+ members from 80 public agencies, non-profits, universities, private and special interest groups
- Runs on consensus format
- Executive Committee meets twice per year

Next Steps?

How can COMTF and other pathogen/insect groups work with Cal-IPC?

What could we gain by joining forces?

How could we work with common partners to develop strategies to keep weeds and pathogens out of wildlands?

How could we work on vegetation management plans for ecosystems that deal with all threats – fire, weeds, invasive pathogens, etc.?