

A large, spreading oak tree with a thick, textured trunk and dense green foliage stands in a field of tall, golden-brown grass. The tree's branches are wide and horizontal, creating a broad canopy. The background shows a clear blue sky with a few wispy white clouds. The overall scene is bright and sunny.

California oaks

California oaks

Hot spot for oak diversity

20 oak species in California

(divided into 30 subspecies)

Oaks cover ~10% of CA land area

Key habitat for many other species

Estimated that oaks interact with >300 vertebrates and >5,000 insects

Oaks in the “Oak” family (Fagaceae)

In CA, Beech family has 3 genera

Oak genus = *Quercus*

Latin name comes from 2 Celtic words

Quer = fine *cuez* = tree

Oaks distinguished by 4 features



Flowers wind
pollinated



Fruit = acorn

Strong, complex
wood



Long-lived: decades to
centuries

Oak flowers (male)

Male flowers in catkins
(25-100 flowers/catkin)



male catkins



stamen

male flower

Each tree has many 1000s
of catkins

Oak flowers (female)

Female flowers single or small clusters



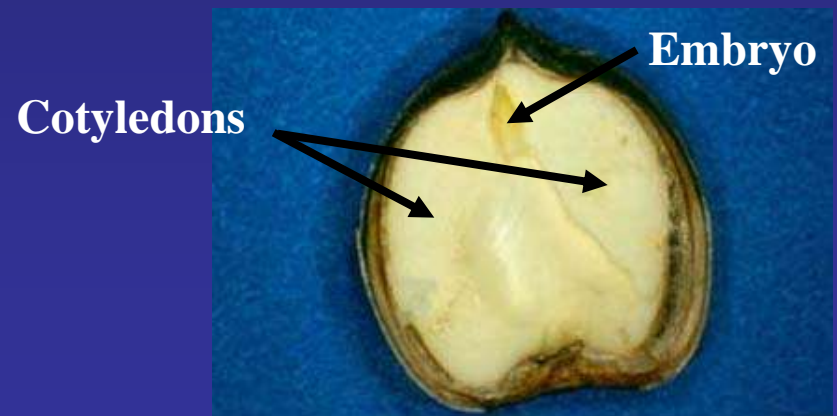
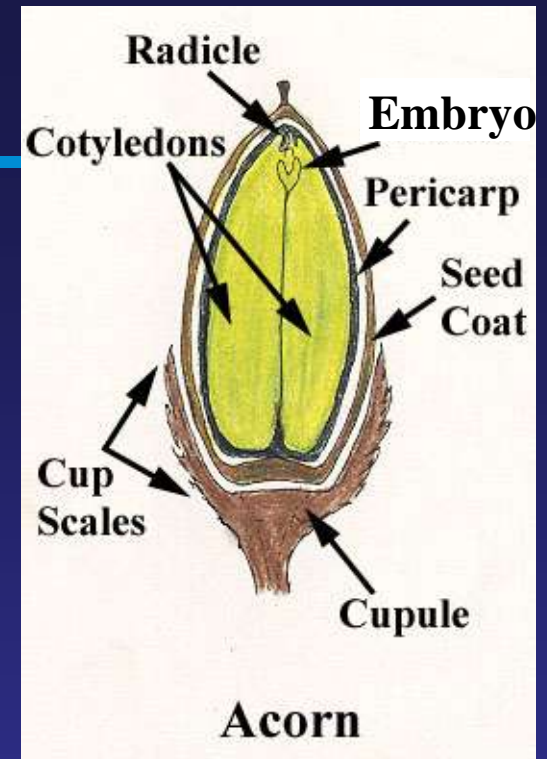
Acorns

Dry fruit

Develops from ovary of single flower

Outer shell protects seed within

Sits in a woody cup (of bract scales)



True and false oaks

True oaks in genus
Quercus



Poison oak
(*Toxicodendron diversiloba*)



Tanoak
(*Lithocarpus densiflora*)

Not true oaks!

El Dorado County Oaks 16 kinds

11 trees

- Valley
- Blue
- Black
- Oregon x 3
- Interior Live x 3
- Canyon Live
- Oracle (hybrid between Black and Interior Live)

5 shrubs

- Leather x 2
- Interior Scrub
- Nuttall's Scrub
- Huckleberry

Deciduous vs. evergreen leaves



Deciduous

Leaves thin, less rigid than evergreen

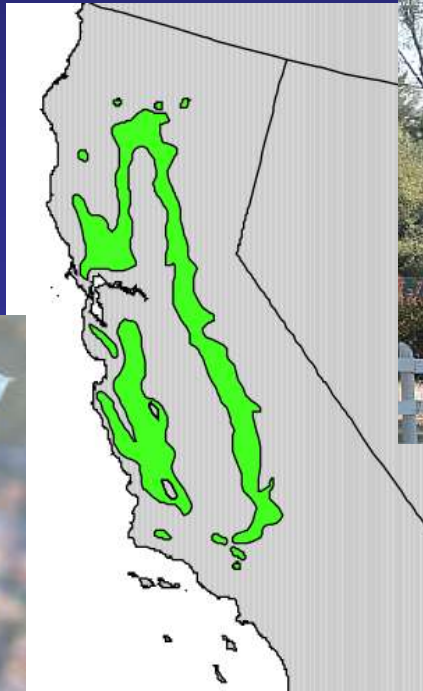
Evergreen

Leaves thick, more rigid than deciduous



Interior Live Oak (*Quercus wislizeni*)

- Only in CA
- Evergreen
- 1,000-4,000 ft
- Chaparral/Oak woodland



Black Oak (*Quercus kelloggii*)

- CA, Southern OR
- 1,500-5,000 ft
- OW, Mixed-conifer forest
- Wetter sites than Blue/Live Oaks



Blue Oak (*Quercus douglasii*)

- Only in CA
- Lower foothills
- 300-1,500 ft
- Oak woodland/
savanna
- Most palatable



Interactions with other organisms



Oak woodpecker

Acorn eating animals

Gall forming insects



oak apple gall



Black-tail Deer



Porcini mushroom

Mycorrhizal fungi

Native American uses of oaks

Food – acorns

Acorns broken open, the “meats” soaked to leached out their tannins, then ground (in rock grinders) into flour



Rock grinders

Fuel - wood

Tools – splints for basket making, scrapers for de-hairing animal skins, etc.

Threats to California oaks

Land conversion for range improvement and development (39 square miles per year)

Inadequate regeneration of blue oak, valley oak, and Engelmann oak may be due to:

Overgrazing, fire suppression or altered landscape composition (almost universal replacement of native perennial grasses with introduced European annual grasses)

Threats to California oaks

Sudden oak death (SOD)

Fungal infection caused by *Phytophthora ramorum*, same genus responsible for Irish potato famine and other forest and crop diseases – 1995 in Cali

Coast live oak and Black oak very susceptible, but others as well, including tanoak and Ca Bay

So far has killed millions of trees north & south of Bay Area and reached Oregon and a WA nursery (on nursery stock) in 2015, Alabama and North Carolina in 2016

Symptoms of SOD

- Leaves turn brown suddenly
- Cankers form on main trunk and branches
- Ooze from cankers is sticky, very dark reddish and smells fermented
- When the surface of the cankered bark is chipped away, the infected bark tissue below shows thick dark zone lines clearly separating the affected tissue from the uninfected area in the cankered region

Symptoms of SOD (Photos)



Oozing cankers



Dark zone lines

Distribution of SOD

First discovered in Marin Co. in 1995

Introduced from Europe, probably on ornamental *Rhododendron*

Distribution of Sudden Oak Death as of January 27, 2004

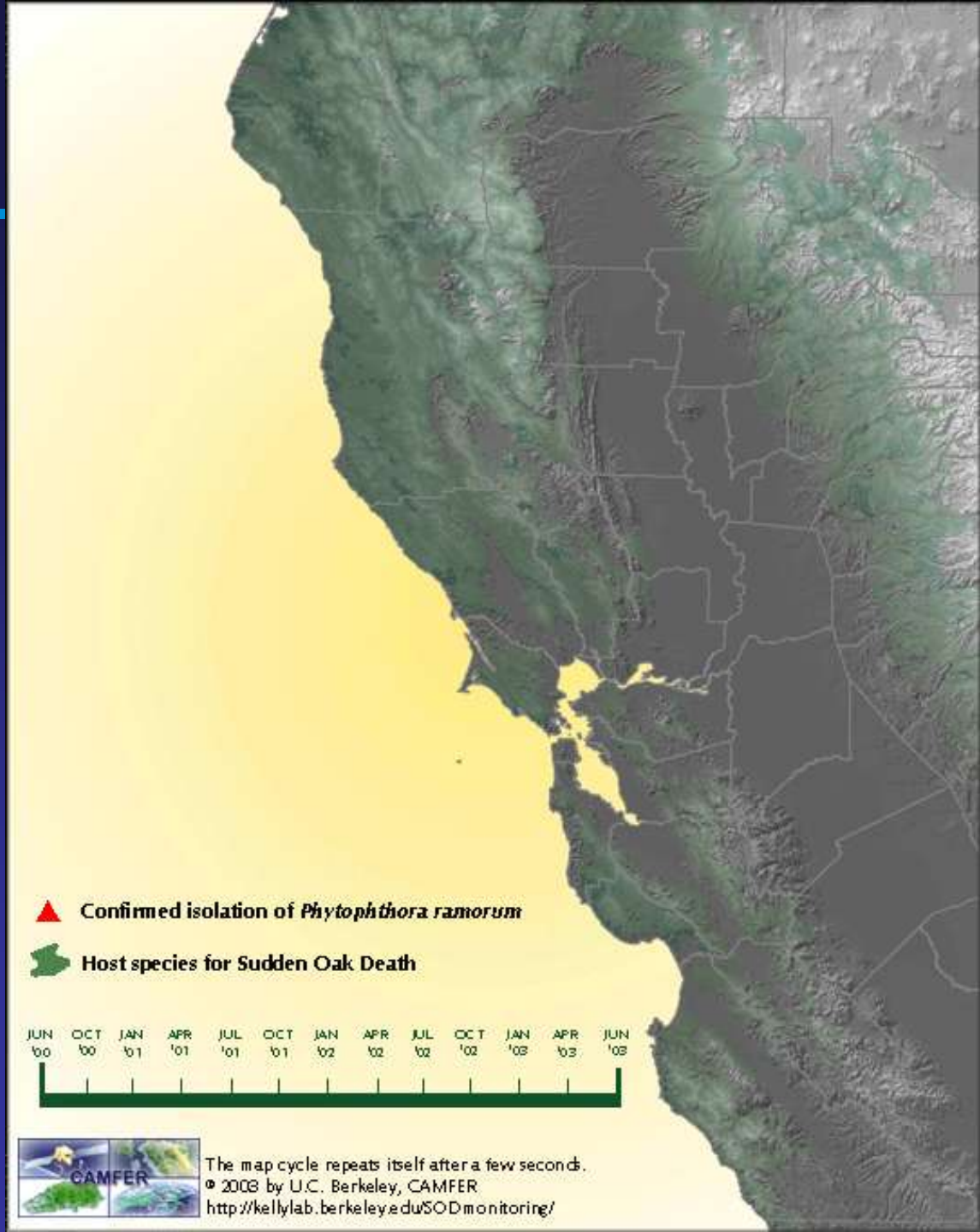


Map produced on 01/27/04 by UCB CAMFEE: <http://calylab.berkeley.edu/SODmonitoring/>
For more information about Sudden Oak Death, please visit the California Oak Mortality Task Force website at <http://www.suddenoakdeath.org/>



SOD over time

600 sq.miles in 2016
5,400 by 2030
Unstoppable



How does it spread?

Mobile spores and cysts

Spread by sporangia that release spores during wet weather – this year predicted to be BAD

People and animals track spores and cysts to uninfected areas (carried by vehicles, bicycles, footwear, garden tools etc.)

Cysts and spores transported in wood, leaves and wood chips from felled dead trees

What can you do?

1. Be aware of the problem
2. Do not transport plant material or soil from quarantined areas or areas of known infection
3. If traveling to infected area, clean any mud or soil from shoes, tools etc. before departing
4. Report infected trees