

# IMPACT

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*IMPACT is a series of publications highlighting how UC Davis' College of Agricultural and Environmental Sciences makes a difference in the lives of Californians. Through research, teaching and outreach programs, UC Davis research touches almost all aspects of Californian life. Today, millions of people eat safer foods, breathe cleaner air and drink healthier water with the help of our researchers. We're making discovery work -- for California and the world.*

## MONITORING SUDDEN OAK DEATH

### THE ISSUE

A deadly plant disease that has killed tens of thousands of oaks along the Northern California coast is now infecting two of California's signature trees -- coast redwoods and Douglas firs.

The findings mark the first time the "pathogen" or fungus-like organism that causes Sudden Oak Death has been discovered in conifers, adding to scientific uncertainty over how far the disease will ultimately spread and how dramatically it might alter the landscape of California's coastal woods and forests. While the pathogen has not been found to kill mature redwoods and firs, it can cause browning and withering of seedlings.

Sudden Oaks strikes quietly and -- as its name implies -- quickly. The tree's leaves seem to turn brown all at once and other fungi and insects move in, causing its branches to rot and fall. It takes roughly 18 months for a tree to die. "We're at the point where every woody species in these forests can be considered a potential host," said David Rizzo, a UC Davis plant pathologist who is one of two leading researchers on Sudden Oak Death.

The dead oak trees pose a fire and safety hazard, especially if they rot and fall on power lines, roads or buildings. Ecologically, the impact may be even more devastating - - the death of the oak forests harms the plants and animals that share the oaks' habitat and rely on them for food.



### WHAT WE'RE DOING

Rizzo is a member of a UC team of specialists in plant pathology, entomology, remote sensing and monitoring, urban forestry and field ecology that is monitoring the spread of Sudden Oak Death. The disease is caused by a fungus-like organism called *Phytophthora ramorum* (phy-TOFF-thoruh ruh-MOR-um), which was identified in 2000 by University of California researchers at the Davis and Berkeley campuses.

Rizzo and fellow researchers have conducted DNA tests on diseased sprouts growing from the base of mature redwood trees in Marin, Sonoma, Santa Cruz, Alameda and Monterey counties. The presence of the pathogen in the sampled trees has been strongly suggested by repeated positive DNA identification.

The discovery of Sudden Oak Death in redwood and Douglas fir saplings adds to a burgeoning list that now includes 17 potential carriers of the disease, including three kinds of oak, rhododendron, manzanita, bigleaf maples and buckeye.

“It seems that some species are able to tolerate the pathogen better than others,” said Rizzo. “We see a whole range of symptoms in the field, from nasty cankers on the trunks of oaks to minor spots on the leaves of the buckeye.”

In addition to checking diseased trees in the field, researchers conducted a battery of lab tests to see how *P. ramorum* would affect healthy trees and to confirm that the pathogen was the cause of the symptoms observed in the field. Bleeding or oozing of a dark reddish-brown thick sap is the first symptom to appear on oaks. It typically occurs on the lower portion of tree trunks.

Since various tree and plant species seem to be more severely affected by *P. ramorum* than others, it may take years before the full ecological impact of this disease-causing organism will be known. California’s redwood and Douglas fir trees are ecologically and economically vital to the state, particularly to the timber, nursery, landscape and construction industries. Redwoods can reach heights beyond 350 feet and live up to 2,000 years.

## PREVENTION TIPS

Preventing the movement of infected leaves, wood and soil is critical to slowing the spread of Sudden Oak Death. Following are some tips:

- Plant material and soil should not be moved from coastal areas.

- Wood already moved from coastal areas should be burned.
- Visitors to coastal forests should clean their tires, shoes and animals’ feet thoroughly before leaving the area.
- Construction workers should wash equipment well and should not move dirt from one place to another.
- Ornamental plants, such as rhododendrons, that may be hosts should not be moved from infected counties unless certified to be free of the pathogen.

## A SHARED VISION

On the issue of Sudden Oak Death, UC Davis scientists consult with the California Department of Food and Agriculture, the California Oak Mortality Task Force, the California Department of Forestry and Fire Protection, and county agricultural commissioners, in conjunction with the U.S. Department of Agriculture. So far, quarantined regions include 12 counties in California. Those counties account for 95 percent of the redwood harvested in California and 42 percent of the timber produced for California’s \$3 billion timber industry.

At the same time scientists work to understand the disease, they also research ways to fight it. Scientists like Rizzo and his colleagues have made rapid progress in the past couple years, and they’re hopeful they’ll slow Sudden Oak Death’s destructive march across the Pacific landscape.

That’s impact -- science and public policy at work together.

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