

A Homeowner's Guide to Sudden Oak Death

A plant disease commonly called Sudden Oak Death is threatening coastal forests in California and Oregon. Currently found in coastal California counties from Monterey to Del Norte and in a small portion of southwest Oregon, the disease is caused by the pathogen *Phytophthora ramorum* (pronounced Fi-TOFF-thor-ra ra-MOR-um). Sudden Oak Death has resulted in the death of millions of tanoak and coast live oak trees. In addition, more than 100 other plant species are susceptible to the pathogen, yet most of these species suffer only minor damage, limited to leaf spots or twig dieback. Though Sudden Oak Death is a forest disease, it is common in urban-wildland interface areas, so it presents many challenges for homeowners. This guide addresses homeowner concerns, including diagnosing infected trees, disposing of contaminated material, and understanding treatment options that are available.

What is the connection between Sudden Oak Death and nursery plants?

Many common horticultural plants are hosts for *Phytophthora ramorum*; consequently, nurseries in California, other states, and other countries, have found the pathogen on their plants. Plants are shipped all across the country, but they are strictly regulated. All *P. ramorum* host plants in California's regulated counties must be inspected and approved prior to shipment out of the regulated area. Nevertheless, carefully inspect the leaves of host plants for symptoms before making a purchase, and refrain from planting these horticultural hosts near susceptible oaks in your yard.

Because *P. ramorum* may be spread through the movement of infested soil and plant materials, State and federal regulations are in place to control the potential spread of the pathogen to uninfested areas. *P. ramorum* host species plant material is regulated by the California Department of Food and Agriculture (CDFA) and the U.S. Department of Agriculture, Animal and Plant Health Inspection Service (USDA-APHIS). Quarantine regulations are in place for the infested counties, and before moving susceptible plant material out of the regulated area, you must contact your Agricultural Commissioner for a permit.

If my oak tree has Sudden Oak Death, what are the chances it will die?

There is no way to determine if an individual tree will live or die after contracting Sudden Oak Death. Each tree responds differently to infection: experience tells us that it is rare for a tree pathogen to kill all of the trees it infects. Depending on a number of factors, some trees may never become infected, some may become infected and survive for various lengths of time, and others may become infected and die quickly. Because Sudden Oak Death is a relatively new disease in California, it will take time to determine just how likely different outcomes are for different tree species. Initial observations tell us that once infected, tanoak has a high probability of being killed by *P. ramorum*, but some individuals are still likely to survive. Coast live oaks appear to have a lower probability of being killed, though many have been killed by the disease. There is little mortality information on California black oak at this time, so it is difficult to predict how this tree species will fare.



California
Oak Mortality
Task Force

Hosts, Symptoms, & Diagnosis

Phytophthora ramorum affects different species in different ways. It can be lethal to tanoak, coast live oak, California black oak, Shreve oak, canyon live oak, madrone, and some manzanita species, while it may cause only a minor leaf or needle disease for other hosts such as California bay laurel, coast redwood, and Douglas-fir. The list of species and varieties known to be susceptible to this plant pathogen continues to grow; check suddenoakdeath.org for the latest host list.

How can I confirm that my oak tree has Sudden Oak Death?

Because other organisms and injuries can produce symptoms on oaks that look similar to Sudden Oak Death, homeowners will not be able to diagnose their trees by themselves with absolute certainty. However, there are some steps that can help you determine if *Phytophthora ramorum* is likely.

- (1) Determine if your oak tree is a susceptible species. Sudden Oak Death is most commonly found on the following tree species in California: tanoak, coast live oak, Shreve oak, canyon live oak, and California black oak. Of these, tanoak is the species most likely to be killed.
- (2) Determine if you are in an infested area. Check the SOD MAP site or contact staff in your local County Extension, Agricultural Commissioner, or CALFIRE offices. If you are outside of an infested area, your tree could still be infected with *Phytophthora ramorum*, but it would be less likely.
- (3) Compare the symptoms of Sudden Oak Death with those on your oak tree. Check other susceptible tree and shrub species nearby. Do they have leaf spots or other symptoms of *P. ramorum*? California bay laurel is the best indicator of the risk and presence of the disease. Photos of symptoms on oaks, California bay laurel, and other hosts can be found at suddenoakdeath.org.

The probability that your tree is infected with *Phytophthora ramorum* will be greater if your tree is a susceptible species, exhibits typical symptoms, and is located in an infested area where other trees and plants are showing symptoms. Although positive confirmation can only be done through laboratory testing, diagnosis of *Phytophthora ramorum* based on visual symptoms can justify taking preventative action if you live in a generally infested area. If you ask a tree care professional to make such a judgment, determine what training or qualifications enable them to do this.



Bleeding cankers on a coast live oak trunk (Photo by Matteo Garbelotto, University of California, Berkeley)



Bleeding cankers on a tanoak trunk (Photo by Pavel Svihra, UC Cooperative Extension)

Rhododendron leaf spots (Photo by B. Moltzan, Missouri Department of Conservation)



(Left) California bay laurel showing leaf spots typical of *P. ramorum* (Photo by Bruce Moltzan, Missouri Department of Conservation)
(Right) California bay laurel leaf spots (Photo by Matteo Garbelotto, University of California, Berkeley)



Treatments: A phosphonate compound is registered as a preventative treatment for *Phytophthora ramorum*, for use on individual, high-value tanoak and oak trees. This treatment is NOT a cure, but can help protect trees from infection, as well as suppress disease progression in very early infections. However, fungicide treatment of *P. ramorum*-infected trees is not always appropriate. Trees with advanced symptoms cannot be saved. The treatment itself may harm the tree.

The phosphonate compound may be injected or mixed with a surfactant and sprayed on the trunk for absorption through bark. The optimal treatment routine for coast live oaks calls for multiple applications. It is recommended to treat in either the fall then spring, or spring then fall the first year.

Since the treatment must be made to healthy trees, and the pathogen's distribution and activity is patchy and somewhat unpredictable, it is difficult to determine which trees need to be treated. For more guidance on treatment methods and recommendations for use check the UC Berkeley Forest Pathology and Mycology laboratory website.

Who should I hire to treat my trees?

The California Oak Mortality Task Force and UC Berkeley, Garbelotto laboratory have held many training sessions for tree care professionals in California. Even if they have been trained, it is still important to ask for references, as well as to interview the arborist and applicator to see if they are up-to-date on the latest *Phytophthora ramorum* management strategies.

Treatment is NOT recommended in areas where infested plants are not already present. Although these treatments are best used as a preventative approach, it may be possible to prolong the life of trees already infected by *P. ramorum*. Research results indicate that treatments are effective only if trees are treated within the first two months of infection. Treatment of trees having displayed symptoms for six months or longer is not recommended.

The most common way the pathogen moves to oaks is from infected neighboring California bay laurel. Removal of bay laurel has been shown to protect oaks but the loss of bay laurel may be ecologically, culturally or aesthetically undesirable. Ideally plant non-*Phytophthora ramorum* hosts under or adjacent to oak trees. But avoid summer watering necessary to keep lawns and non-native ornamental shrubs alive under an oak tree because that may predispose the oak to other diseases.

The use of insecticides to prevent *P. ramorum* infection is not recommended.

Tree Removal: A tree with Sudden Oak Death needs to be considered and treated differently than a tree without the disease, but the disease alone is not justification for removing a tree. Current information indicates that non-oak foliar hosts contribute the most to disease spread, so removing infected oak trees will probably have little or no impact on local disease levels and spread. However, an important consideration with respect to any tree is whether or not it presents a hazard to life or property. All trees present some hazard, depending on the tree's structural integrity and its potential to do harm should it fail or portions break off. Preliminary research has shown that trees infected or killed by *P. ramorum* are prone to rapid decay and unpredictable failure. Green infected trees, as well as trees already dead from *P. ramorum* and/or secondary pests, are at increased risk of trunk and limb breakage.

The decision to remove a hazardous tree ultimately lies with the property owner. In order to get an objective assessment of hazardous conditions, contact a certified arborist or other qualified professional. Any dead tree has an increased risk of failure, but even dead trees have value, and if there is not a risk to life or property, consider leaving it standing. Standing dead trees provide important wildlife habitat, and after they fall and decay, they are a source of nutrients to be recycled into the soil.

Always consult regulatory officials regarding local tree ordinances before deciding to remove trees. Experienced tree service technicians should conduct tree felling, as infected trees may have an abundance of structural wood decay. If there is an acute emergency, contact your city arborist, local fire, or police department.

If I have an infected oak tree cut down, what should be done with the wood?

The simplest and best way to deal with infested wood is to leave it on site, chipping the smaller pieces of wood for use as mulch, and splitting the larger pieces of wood for firewood. Do not stack oak firewood next to living oak trees since this can lead to insect attack on the living trees. If the stack must be next to living trees, consider seasoning the logs beneath a tightly sealed, clear plastic tarp to prevent the buildup of destructive insects.

What should be planted to replace a tree that was killed by *Phytophthora ramorum*?

If you want to replant, it is important to choose a plant that will suit your needs and adapt well to the site. There are many resources available that can guide you in making the right choice. Check to see if there are any local ordinances or guidelines that govern tree replacement or planting.

Resistance to *P. ramorum* in oak trees is just beginning to be explored. Resistant planting stock is not available at this time, nor is it known if it will ever be available. If you want to replant the same species of tree that was lost, there is a risk that the new tree may also suffer from the disease. If you have space for replanting many trees, consider replanting the same species in combination with other trees that don't get the disease. Thus, if some trees are lost to *P. ramorum* there will still be other trees that survive. Coast live oaks do not seem to be infected by *P. ramorum* until they reach about 4" in diameter, so new trees should be immune for a number of years, and high value trees can be treated if necessary once they reach a susceptible age. Species in the white oak group such as valley oak, Garry oak, and blue oak are not susceptible to *P. ramorum*.

Many common ornamental plants, such as rhododendrons, azaleas, and camellias, are also known hosts of *P. ramorum*. These plants not only can host spores that may infect oak trees, but their watering requirements are vastly different than those of California native oaks. We do not recommend planting these species under or near native oaks.

If infected wood is removed from your property, make sure it is utilized or disposed of in a way that does not spread the disease. Avoid leaving wood next to roads where it could be picked up and transported off-site by unauthorized parties. Regulations prohibit the movement of host plants and plant parts out of the quarantined area. If you have infected trees cut down, make sure the wood and other tree parts are not moved outside of the quarantine area.

Debris Disposal:

Disposal of infested material is extremely important because branches, twigs, and leaves from California bay laurel, rhododendron and other host plants may harbor *P. ramorum*, even after they are removed from the plant. If infested plant debris

or infected live plants are moved, they may inadvertently transfer the pathogen to uninfested areas. Unfortunately, *P. ramorum* has been present in many areas of coastal California for a decade or longer, making complete eradication impossible. In infested areas, the best option is to leave infested material on site, chipping the small material (for use as ground cover) and using larger pieces for firewood. Composting can also successfully kill the pathogen, but the compost must reach temperatures that are probably not possible or practical in a home composting site. Since inoculum levels are already thought to be high, leaving the additional inoculum from the infested plant material on site will not significantly worsen the local disease conditions. Plant debris removal from the property is only recommended if it is the first infected tree to be detected in the area, or if fire risk is high.