FOREST HEALTH FACT SHEET

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Sudden Oak Death *Phytophthora ramorum*

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What is it?

Sudden Oak Death (SOD) is a plant disease caused by the water mold *Phytophthora ramorum*. This organism causes disease in more than 100 species of trees, shrubs, herbs, and ferns.

P. ramorum can infect oak and tanoak directly through the bark, causing an area of dead tissue, a canker, often indicated by bleeding on the bark surface (Figure 1). The tree eventually is compromised and dies. It may look as if the tree dies suddenly, but actually it's been infected much longer.

P. ramorum causes leaf blight and twig dieback in most host species, especially in rhododendron, camellia, and huckleberry. The disease is called ramorum leaf and shoot blight in these hosts. Common plants in Oregon that are known hosts for *P. ramorum*, and the diseases in those hosts, are shown in Table 1. For a complete host list, see the California Oak Mortality Task Force website http://nature.berkeley.edu/comtf/

Figure 1.—Bleeding on bark surface of tanoak. Photos: Alan Kanaskie, Oregon Department of Forestry.

Figure 2.—Shoot dieback symptoms of *P. ramorum* on rhododendron. Photos: Alan Kanaskie, Oregon Department of Forestry.

What is at risk?

Phytophthora ramorum is an internationally quarantined plant pathogen, and strict restrictions aim to prevent its spread. Quarantines and regulatory compliance impact the economics of growing wood and plants in Oregon. We must do all we can to prevent the spread of this disease.

The disease threatens timber trade, the floral-greens industry, Christmas tree production, and plant nurseries throughout Oregon. It has the potential to increase fuel loads in forests, thus increasing fire risk. In forests, it also could affect slope stability, harm wild mushroom populations, and alter forage and structural components of wildlife habitat. The cost to forests and nurseries in Oregon of eradication and compliance work already is more than $10 million.

How is it spread?

Sudden Oak Death and the other diseases caused by *P. ramorum* are so new that information is only now accumulating rapidly. Observations from California, where the disease is widespread, suggest it may be limited to warmer, wetter coastal and near-coastal environments. In California, disease behavior is linked closely to forest composition and structure, spreading on California bay laurel (called myrtlewood in Oregon) and killing tanoak. In Oregon, tanoak and rhododendron are the primary hosts on which we know the disease can spread (Figure 2). So far, Oregon myrtle has not become widely infected, as in California (Figure 3, next page).

Local spread of *P. ramorum* is well documented, but its long-distance dispersal is less well understood. Populations of *P. ramorum* in California and

Table 1.—*P. ramorum* hosts and diseases.

Disease	Host
Sudden Oak Death	Tanoak California black oak
Ramorum leaf blight	Oregon myrtle Bigleaf maple
Ramorum shoot dieback	Evergreen huckleberry Rhododendron Pacific madrone

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Figure 3.—Symptoms of *P. ramorum* on Oregon myrtlewood (California bay laurel).

Oregon woodlands belong to a single clone that has reproduced asexually. This occurs via the prolific production of spore packets, called sporangia, that can easily break off in rain and flowing water. Sporangia release spores that can swim through films of water to infect leaves and bark. *P. ramorum* also can form a resting spore (chlamydospore) that stays in plant material or soil a long time, perhaps more than 1 year, and germinates only under the proper conditions.

People are the best means for long-distance spread of *P. ramorum*, by transporting potted plants or infected wood, leaves, and stems. *P. ramorum* spores also can survive in soil on bike and vehicle tires and on shoes and tools. If you have been in an infested area in California, remove the soil from these items before you return to Oregon. Do not transport plant material from coastal California to Oregon!

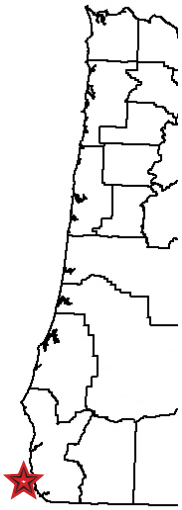

Figure 4.—In the wild in Oregon, SOD currently is limited to an area around Brookings (star).

Where did it come from, and where is it now?

The origin of *P. ramorum* is unknown. It also is in Europe, in a population genetically distinct from the one in North America. It appears that both the European and North American types of *P. ramorum* were introduced from an unknown location.

In the urban–woodland interface and in forests, Sudden Oak Death is known only in 14 counties in California and in a 26-square-mile area near Brookings, OR (Figure 4). How SOD came to the Brookings area is not known. No other locations in the wild are known in North America.

Sudden Oak Death has been found in several plant nurseries in Oregon and other states, and these nurseries are under strict inspection and eradication protocols. Each year, new outbreaks are detected, and much effort is spent suppressing the disease.

What is being done?

Phytophthora ramorum is being eradicated in Oregon forests (Figure 5) through the cooperation of the Oregon Departments of Forestry and Agriculture, the USDA Forest Service, the USDI Bureau of Land Management, and Oregon State University.

Surveys for the disease are done by air and ground and in streams throughout the year. In nurseries, inspections for diseased plants are routine. Whenever infected plants are discovered, they and neighboring plants are destroyed.

What you can do

- Do not transport plant material or firewood from affected areas in California to Oregon.
- Before returning to Oregon from affected areas in California, wash mud and soil off your vehicle, equipment, clothing, and footwear. If possible, use a 10-percent bleach solution for washing.
- Familiarize yourself with host plants and symptoms of the diseases caused by *P. ramorum*. This can be tricky! The host list is long, and many other plant pathogens cause diseases with similar symptoms. See below for some sources that can help.
- Keep on the lookout for infected plants in south coastal Oregon.
- Report to OSU Extension foresters or state or federal forestry officials if you think you have seen Sudden Oak Death.
- Do not move host materials or soil from the quarantine zone near Brookings, OR.
- When purchasing host plants from nurseries, ask nursery management about the origin of the plants and whether they have been inspected.

For more information

Sudden Oak Death and Phytophthora ramorum. *A guide for forest managers, Christmas tree growers, and forest-tree nursery operators in Oregon and Washington,* EM 8877. 2006. E.M. Goheen, E. Hansen, A. Kanaskie, N. Osterbauer, J. Parke, J. Pscheidt, and G. Chastagner. http://extension.oregonstate.edu/catalog/pdf/em/em8877.pdf

The California Oak Mortality Task Forest
http://nature.berkeley.edu/comtf/

USDA Agricultural and Plant Health Inspection Service (APHIS)
http://www.aphis.usda.gov/plant_health/plant_pest_info/pram/regulations.shtml

OSU Extension Service
http://extension.oregonstate.edu/emergency/oak_death.php

Figure 5.—Symptoms of *P. ramorum* infection on a Douglas-fir shoot tip (left) and on grand fir. Photos: (left) Alan Kanaskie, Oregon Department of Forestry; (right) Santa Clara County (CA) Agriculture Department.