



Sudden Oak Death

Phytophthora ramorum Werres, de Cock & Man in't Veld (Peronosporales: Pythiaceae)

Sudden Oak Death (SOD) is caused by a fungal-like organism identified as *Phytophthora ramorum*. It has become established in the Pacific Northwest, and in 2004 infected nursery stock shipped throughout the nation spread SOD to another 21 states coast to coast, including Maryland. Diseases caused by *P. ramorum* have been observed in dozens of forest and ornamental plant species, so it is increasingly called “ramorum blight”. SOD spores are spread naturally by wind and contaminated soil and water, and artificially through transportation of infected nursery plants, and in spore-infested soil on boot soles, vehicle wheels, gardening equipment, etc.

IDENTIFICATION:

- **SOD can not be identified by visual inspection of host symptoms.** Many other organisms and injuries produce similar symptoms. **Confirmation can only be done by laboratory analysis.**
- SOD has two categories of host plants (trunk and foliar), and different symptoms for the two types of hosts.
- Symptoms are grouped into three disease categories: leaf blight (spots) and twig dieback on foliar hosts, and cankers on trunk hosts.
- Infected trunk hosts, primarily trees, develop bleeding cankers on the trunk, and often die.
- Infected foliar hosts, primarily ornamental and forest understory plants, typically show symptoms on leaves and twigs, but rarely die.



Hypoxylon thouarsianum, a sapwood decay fungus, is often found on trees in advanced stages of SOD (note *Hypoxylon thouarsianum* on trunk of tree in image to the right).

General Symptoms on Trunk Hosts:

- Bleeding cankers on the trunk, typically above the soil line within the first 10' (3 m), which may be > 7 feet (2 m) in length.



- Cankers ooze deep-red/black sap from intact bark with no obvious wounds; the sap does not have a foul odor.
- Beneath the bleeding, cankers are sunken with discolored bark (dark red-brown to black), outlined by thin black lines.

What to Look For:

SOD infects ornamental plants such as rhododendrons, viburnums, pieris, and camellias; tree species such as oaks, beech and chestnuts; understory plants such as bay laurel; and conifers such as coastal redwood, Douglas-fir, and grand fir. Foliar hosts provide a reservoir for the infectious zoospores, which may then be dispersed to trunk hosts. Typically, foliar hosts must be present for trunk hosts to become infected. Hosts can exhibit one or more symptoms at the same time, and symptoms may vary slightly between species.

- In later stages the bark may split.



Bleeding canker, split bark (above); exposed canker showing sunken, discolored area with dark outline (below).



- Sudden oak death syndrome: progression over 2-4 weeks from healthy-green to dead-brown; dead leaves remain on tree.

General Symptoms of Foliar Hosts:

- Leaf spots, shoot tip wilt, and twig dieback (below).



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- Spots can occur on the leaf or petiole, and are sometimes accompanied by small branch cankers.
- Leaf spots are usually dark gray to brown with indistinct edges, appear water-soaked, and may be surrounded by a yellow halo or a diffuse margin of black.



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- Spots may be triangular or irregular in shape; and 2/5" (0.5 cm) to nearly half the leaf surface.
- Leaf drop and defoliation of the lower part of the plant.



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- In tanoak, wilted twig shoots are usually the first symptom, followed by twig dieback and Shepherd's crook. Leaf flagging is a particularly good indicator of the disease in tanoak (below).



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