

Sudden Oak Death is causing widespread oak mortality in parts of California. The cause is a previously unknown pathogen called *Phytophthora ramorum*, which causes bark cankers on some species of oak that are native to the Pacific coast of the USA. These cankers can quickly girdle the entire stem or branch of a mature tree the trees wilt, the foliage turns brown and death can be very rapid. Apart from oaks, a range of other trees and understorey plants can be infected by the pathogen but for most of these the infection is limited to foliage and shoots and rarely kills the entire plant.

Apart from the USA, *P. ramorum* has been found in several EU countries infecting the shoots and leaves of ornamental plants such as Rhododendron, *Viburnum*, *Pieris*, *Camellia* and *Syringa*. Most of these infected plants have been found in nurseries and have been destroyed. Some mature rhododendrons in public gardens and estates have also been infected with the pathogen, with symptoms of shoot wilting and dieback (see right).



On rhododendron the diseased shoots have brown to black lesions that usually begin at the tip and spread downwards. Diseased shoots are often on the lower part of the bush and cankers near the ground level and can result in rapid shoot wilt, so the leaves hang down. Although rhododendrons are rarely killed by the disease, infected plants probably produce many spores of the fungus which can spread to other plants.

Symptoms on leaves include blackening of the leaf petiole and this usually extends into the leaf base. Blackening can also spread up the midrib, and the lesion edge tends to have a diffuse water-soaked appearance. Frequently brown blotches or spots occur on leaf tips, then spread towards the petiole. Symptoms on just the leaves may appear while the rest of the shoot remains healthy.



In the USA, oaks in the 'red oak' group are most affected. In Europe, only a few trees with stem cankers have been found all are mature trees. Species affected are *Quercus falcata* (southern red oak), *Q. rubra* (red oak), beech (*Fagus sylvatica*) and horse chestnut. External symptoms consist of bleeding cankers (see right) reaching 2-3m up the stem. None of the cankers had entirely girdled the tree so crown symptoms were not apparent.



Inner bark under a bleeding canker is usually dead and discoloured, with a mottled appearance (see left). Towards the edge of the infected bark, where the pathogen is actively growing into healthy phloem tissue, the discolouration may be a lighter brown and look water-soaked. Lab tests show that beech, red oak, Sitka spruce and Douglas fir are susceptible to bark killing by *P. ramorum*, but our native oaks are more resistant.

P. ramorum has also been found causing death of new shoots of container grown *Taxus baccata* (yew) in the nursery, but has not been seen on mature trees. In the US, it has been found to cause needle and shoot dieback of Douglas fir (see right). Climate may play a key role in this disease; mild, humid locations may favour infection, spore dispersal and disease development.



This disease is notifiable, so if you see trees or rhododendrons with these symptoms you should inform FC Plant Health. If you need more information please contact:

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(Illustrations of rhododendrons provided by kind courtesy of CSL, York.)