

Twig Blight and Branch Dieback of Oaks in California

It has been brought to my attention on many occasions that there are quite a few California Live Oaks in the area that have dead leaves over a large portion of their branches. I have seen quite a number of these trees along Highway 154 and Highway 101 and there are many causes for this condition.

Two diseases found to cause significant injury to oaks in California have been descriptively called "oak twig blight" and "oak branch dieback." Each disease produces characteristic symptoms: twig blight causes a dieback of the current season's growth, while branch dieback causes the death of branches up to 4 inches in diameter. Both diseases can be found on several oak species and both are of concern on trees in range and wild land areas, urban landscapes and production nurseries.

TWIG BLIGHT - While coast live oak appears to be the most susceptible oak species, twig blight also has been found on valley oak, blue oak, interior live oak, and Oregon white oak. Symptoms appear most commonly in midsummer and fall. Leaves on the current season's growth turn a straw brown color, but usually remain attached to the shoot for several months afterward. Dieback of leaves and shoots appears scattered throughout the tree crown, though the greatest amount of injury is often found in the lower crown. Only a few shoots may be affected on some trees, while almost all shoots may be blighted on others. A general thinning (reduction in foliar density) of the crown is observed in the year following infection. Heavy infections render trees unsightly and most likely reduce their vigor and vitality. Death of large branches or of entire sections of the crown, typical of branch dieback, is not common, but has been observed.

Disease severity varies from year to year and among individual trees of an oak species. Twig blight is usually more severe in wet years, since water plays an important role in the twig blight infection process. Individual trees also exhibit varying degrees of susceptibility: some trees may be heavily infected while others appear disease-free. Susceptible and apparently healthy trees can be found growing next to one another.

BRANCH DIEBACK - Branch dieback is found on several oak species in California, including coast live oak, valley oak, black oak, and English oak. The causal fungus, *Diplodia quercina*, enters branch tissues through wounds, leaf scars, and possibly buds. Leaves on infected branches wilt and then turn a dark brown color. Branch death occurs shortly afterward. Wood of infected branches becomes discolored, usually turning a dark brown-black color. Discoloration has been found to extend up to 1 meter beyond the zone of fungal activity. Often there is a well-defined border between discolored wood and unaffected tissue. Infections occur mainly on branches up to 4 inches in diameter. The dieback of individual branches causes the appearance of well-defined dead areas in the tree crown. Whole sections of the crown turn brown while other parts appear healthy. Symptoms do not generally appear scattered throughout the crown, as is found in twig blight infections. The pathogen apparently does not move internally from one fork of a branch to another or from a branch into the main stem. Thus symptoms are localized close to the point of infection. However, inoculum produced in these areas can spread to other branches or trees. *Diplodia quercina* forms fruiting structures on infected branches, causing small breaks in the bark surface that give it a roughened appearance. Spores produced in mature pycnidia can spread and infect other branches or trees. Single pycnidia have been found to produce viable spores for up to 2 years. Inoculation of oaks in the field showed that infection could occur from February to October. Inoculations made from November to January were generally not successful. Insects were not found to be directly involved in the transmission or development of this disease. Branch dieback was most prevalent in California from 1977 to 1981, following a severe drought. Since similar conditions preceded a related dieback of oaks in Europe, it is thought that severe water stress may predispose susceptible oaks to infection.

PREVENTION - Prevention may be the best strategy for minimizing branch dieback and twig blight. Twig blight prevention would include pruning out infected twigs and other tree care practices appropriate for oaks should produce the best results for controlling this disease. In branch dieback it may be possible to limit infection by irrigating susceptible trees after dry winters as well as appropriate tree care practices that help to reduce stress in oaks.

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