Verticillium Wilt of Catalpa, Maple, and Elm

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Vascular wilts are major pests of catalpa, maple, and elm trees in New Mexico. Verticillium wilt, caused by fungi in the genus *Verticillium*, affects more than 300 kinds of plants and is found worldwide in all soil types.

Symptoms

Verticillium wilt has acute and chronic phases. Catalpa, elm, and maple trees infected by an acute strain of *Verticillium* exhibit general yellowing, followed by rapid wilting and dying of individual limbs (fig. 1). If early leaf wilting on individual branches goes unnoticed, sudden wilting of the entire crown may be the first obvious symptom.

Acute symptoms include leaf curling, drying, or abnormal reddening or yellowing; defoliation; wilting; dieback; and death. These symptoms may be restricted to one branch or may involve an entire tree. Young trees are often killed within one year of infection, but older trees may live several years and gradually deteriorate over time. Other symptoms include reduced twig growth, branch dieback, and sparse crowns. Vascular streaking and discoloration in branch sapwood may be evident (fig. 2). In severely wilted trees, sapwood may be discolored to the tips of wilted branches. In others, the discoloration may be limited to the trunk sapwood.

Chronic phases of the disease include slow growth, sparse and stunted leaves, leaf scorch, and dieback. Acute and chronic symptoms may occur simultaneously.

Biology of *Verticillium*

Verticillium is a soil-borne fungus that invades trees through the root system. The fungus usually enters through wounds, although a weakened tree is often invaded directly. The fungus grows in the roots, and can spread throughout the tree by spores transported in the sap stream. Where the spores lodge and germinate, the infection intensifies.

Verticillium produces enzymes and toxins that can affect host cells distant from the infection site. When a plant dies, the fungus can survive in the roots and trunk for many years and can survive in soil by producing resting structures called "microsclerotia." Microsclerotia often are transported in soil when landscape trees are transplanted, but the disease also can be transported in graft or budding materials. The optimum temperature for fungus growth is 65–72°F.

Fig. 1

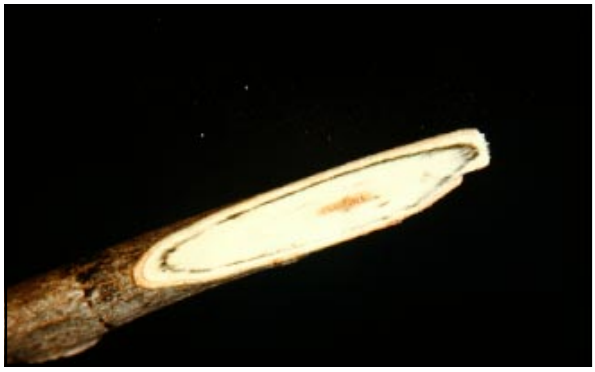

Fig. 2

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Managing *Verticillium*

Prevention is the best method for managing Verticillium wilt in trees and shrubs. Never plant susceptible trees in soils where other plants are known to have died from the disease.

Trees suffering from a chronic infection may benefit from simple cultural practices. For example, a balanced fertilizer (10-10-10) may help alleviate symptoms in infected trees; never use high-nitrogen fertilizers. Infected trees should be watered frequently to decrease wilt symptoms, and dead branches should be removed and burned.

Because *Verticillium* is a vascular wilt pathogen, surface-applied fungicides are not effective. Even with systemic fungicides, chemical control of Verticillium wilt is not practical for established trees.

The most economical control is to plant resistant tree and shrub cultivars. In New Mexico, more resistant trees and shrubs include all gymnosperms, monocots, and the following dicots: apples and crabapples, mountain ash, boxwood, ceanothus, pyracantha, sweet gum, honey locust, oaks, pears, pecans, sycamores, poplars, flowering quince, and willows.

Additional Reading

Riffle, J.W. and G.W. Peterson. 1986. Diseases of Trees in the Great Plains. USDA Forest Service, Technical Report RM-129.

Sinclair, W.A., H.H. Lyon, and W.T. Johnson. 1987. Diseases of Trees and Shrubs. Cornell University Press, 124 Roberts Place, Ithaca, NY 14850.

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