

Problem: Verticillium Wilt of Trees - *Verticillium dahliae*



Host Plants: Catalpa, maple, Russian olive, redbud, smoketree, golden-rain tree, cherry and other stone fruits, and barberry. It also occasionally occurs on ash and elm.

Description: Symptoms of Verticillium wilt vary depending on the species of tree infected, time of symptom development, and other environmental and host factors. Initially, leaves on diseased branches appear off-color (pale green to yellow) and are limp or flaccid. These symptoms may appear on individual branches in a section of the tree crown or throughout the entire tree. In some cases, the disease progresses slowly over a period of months or years, resulting in gradual defoliation, branch dieback and a general tree decline. Trees affected in this manner are stunted, unthrifty and eventually may die. In other cases, affected foliage wilts, turns dry and brittle, and drops from the tree in a matter of days or weeks. This type of wilting can result in rapid branch or tree mortality. As previously mentioned, the disease may affect only a portion of the crown during the growing season, only to develop again the following spring in another portion of the tree. In other cases, symptoms will not reappear. Symptoms of Verticillium wilt can develop throughout the growing season, but are more common in late spring or early summer in our state. Occasionally symptoms may develop during cool periods of the summer or in the fall.

Diagnosis: Another diagnostic symptom of Verticillium wilt is vascular discoloration or streaking in sapwood of diseased branches. This symptom can be viewed by carefully removing the bark from a recently wilted branch. Streaking may occur directly at the bark-wood interface or appear deeper (closer to the branch center) in the sapwood. It may be necessary to whittle away the outer sapwood layers to view deep-seated discoloration. Vascular streaking may not occur in recently infected sapwood, twigs smaller than ½ inch in diameter, or in certain tree species. Sapwood discoloration is dark green in maple, and brown to greenish-black in catalpa, redbud, elm and other tree species. Other pathogens and mechanical damage may cause wood discoloration in branches.

Sample Collection: Branch samples 4-6 inches long, exhibiting vascular streaking, should be submitted to the diagnostic laboratory for confirmation of Verticillium wilt.

Disease Cycle:

The Verticillium fungus can survive long periods in soil or in infected plant tissue. The pathogen usually enters healthy trees through root or root collar wounds caused by insects or mechanical injuries. Infection and colonization of host tissue is favored by relatively cool temperatures. This is why most symptom expression is observed in the spring. The fungus becomes less active during hot weather. In fact, it is very difficult to isolate Verticillium from diseased trees during the summer months. Once inside the vascular system, the fungus blocks water- conducting tissue and impedes water movement, resulting in wilting. If the tree is vigorous, it may be able to restrict the fungus within certain portions of the vascular system and produce new vascular tissue for water movement. However, continued invasion by the pathogen will result in tree death.

Recommendations:

Presently, there are no satisfactory chemical controls for Verticillium wilt. The best means of avoiding Verticillium wilt of trees is prevention and sanitation. Susceptible trees should not be planted in areas where the disease has previously occurred. Several trees, including pines, spruce, yew, junipers, arborvitae, apple and crabapple, hackberry, sweetgum, sycamore, walnut, hickory, and linden have excellent resistance and can be planted in infested soils. Fumigation of infested soil and replanting with susceptible trees is sometimes used, but I do not recommend it except in certain nursery situations. Trees showing symptoms of Verticillium wilt should be watered weekly to alleviate water stress caused by blockage of the water conducting system by the pathogen. Some studies indicate that fertilization of diseased trees with ammonium sulfate or a balanced fertilizer (10-10-10) may help in suppressing disease development. However, over- application of high nitrogen fertilizers may increase wilting symptoms.

Wilted branches should be removed from the tree. Pruning cuts normally should be made at the junction of the diseased branch with the main stem. Do not leave branch stubs. While pruning will not eradicate the fungus from the tree, it can help the vigor and appearance of the tree. Pruning tools should be disinfected with a 10% household bleach solution or some other disinfectant between cuts to prevent contamination of new pruning wounds. Avoid unnecessary wounding of the roots or root collar. Small wounds made by mowers or "weed eaters" provide entrance courts for the fungus.

References:

1. [Verticillium Wilt of Shade Trees](#). Purdue University, Plant & Pest Diagnostic Laboratory, Publication BP-6-W

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