

VERTICILLIUM WILT

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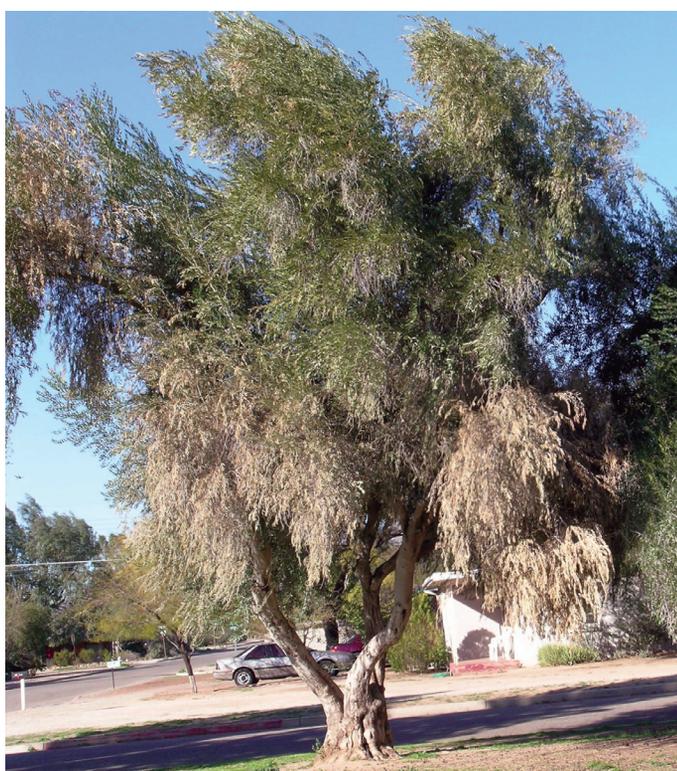


Figure 1. Verticillium wilt may cause wilting of all or only parts of susceptible hosts such as olive.

Pathogen

Fungus, *Verticillium dahliae*

Host

Trees and shrubs including olive, pistachio and maple; vegetables including cucurbits, eggplant and pepper; many other hosts are often listed but disease has not been reported on them in Arizona.

Symptoms/signs

Verticillium wilt may cause wilting of all or only parts of plants (Figure 1). Leaves become mottled or chlorotic and



Figure 2. Brown flecking of the vascular tissue is commonly used for diagnosis of Verticillium wilt but may not always be present.

turn brown, often in interveinal parts of the leaves only. Symptoms vary with plant species and severity of disease. Discoloration of the vascular tissue, especially in roots and lower stems, is commonly used as a diagnostic tool but is not always present (Figure 2). Plants often have symptoms on one branch or one side of the plant. Individual branches or portions of trees may die in one season. The entire plant

At a Glance

- Verticillium wilt causes wilting and yellowing of leaves, death of limbs, often on one side or a portion of the plant. Foliar symptoms usually appear in the spring or fall.
- No root rot occurs.
- The pathogen is a soilborne fungus that persists in the soil for many years.
- Use resistant or immune plants in areas where disease is known to occur.



Figure 3. The entire tree such as this pistachio may die suddenly in a few weeks.

may die suddenly in a few weeks (Figure 3) or slowly over a period of years. These symptoms may be confused with cotton (Texas) root rot in hosts that are susceptible to both diseases such as pistachio. Since roots are not rotted in Verticillium wilt and discoloration of the vascular system is not characteristic of cotton (Texas) root rot, it is easy to distinguish the two diseases.

Environmental conditions

Verticillium wilt is considered a cool season disease because the fungus grows best between about 70° F to 85° F. Plants are infected when temperatures in soil are within this temperature range. During hot weather in the low desert, as well as cold weather in the high deserts or mountains, the fungus is not active. However, it can survive in soils for long periods of time under extreme environmental conditions.

Disease

Verticillium wilt is caused by the soilborne fungus, *Verticillium dahliae*. The fungus produces survival structures called microsclerotia within the hyphae, the tubular filaments that make up the “body” of the fungus. The microsclerotia germinate and produce hyphae in the presence of host plant roots when environmental conditions are favorable. The fungal hyphae enter the host plant roots and grow in the vascular tissue. *Verticillium dahliae* does not cause root rot, but restricts the flow of water and nutrients in the vascular system of the host plant.

Substances produced in the plant during infection may also result in discoloration of the vascular tissue or sapwood. Leaves turn yellow and die and entire limbs die as fungal growth progresses. Leaves often stay on the plant after totally wilting and dying. Growth of the fungus continues as long as temperatures are favorable, but stops if air temperatures are above about 90°F. Disease symptoms usually are not expressed when temperatures are hot, as in the low deserts during the summer. When temperatures are optimal, as in the fall and spring in the low desert and much of the summer in the high desert, wilt symptoms reappear. When plants begin to senesce or die, microsclerotia are produced in the plant. Microsclerotia survive in soil under adverse environmental conditions and in the absence of a host for many years.

Prevention/control

Verticillium wilt can be prevented by planting resistant varieties and by avoiding plants that are known to be susceptible in areas where disease has occurred. Disease may likely occur in residential areas built on old cotton land since cotton is a host. Resistant varieties of olive, pistachio and cucurbits are available. Native species of trees and shrubs are not affected, and monocots such as grasses, palms and yuccas are immune. Once plants are infected there is no control. Rotations with non-hosts such as grasses may reduce disease in some cases but is not a reliable control.



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