



## VERTICILLIUM WILT OF TOMATO

Verticillium wilt, caused by the fungi *Verticillium albo-atrum* and *Verticillium dahliae*, occurs in all tomato-growing areas in the world. The pathogens can infect more than 200 plant species, including many vegetables.

### SYMPTOMS

Wilting is the major symptom of the disease (Figure 1).

Verticillium wilt can easily be confused with Fusarium wilt and

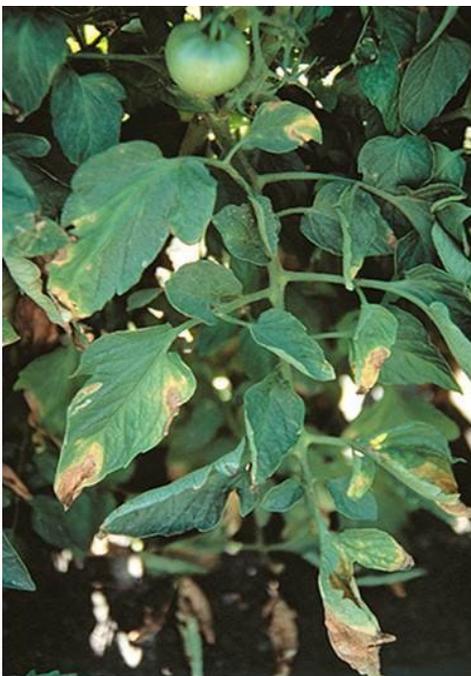


Figure 2. The V-shaped lesions characteristics of Verticillium wilt. (Photo courtesy J.P. Jones)

other wilt diseases. Unlike Fusarium wilt, symptoms of Verticillium wilt do not progress along one side of a leaflet, branch, or plant. Verticillium wilt, like Fusarium wilt, causes internal browning of the water-conducting tissue (xylem) in stems. The discoloration is most pronounced near the soil.

Vascular discoloration is evident when stems of infected plants are cut open longitudinally, especially in the lower parts of the plants. Often the first indication of Verticillium wilt is diurnal wilting pattern. Plants show mild to moderate wilting during the warmest part of the day but recover at night. As the disease advances, some marginal and interveinal chlorosis develops on lower leaves. These leaves may also show characteristic V-shaped lesions (Figure 2), in which yellowing occurs in a fan pattern, narrowing proximally from the leaf margins.

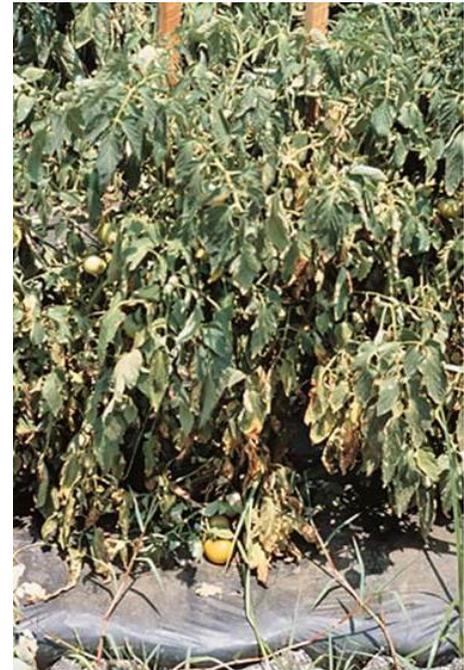


Figure 1. Verticillium wilt of tomato. (Photo courtesy J.P. Jones)

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## **DISEASE CYCLES**

Both fungal species survive in soil primarily as dark resting mycelium or microsclerotia in infected plant debris. Microsclerotia form under cool conditions [50-54°F (10-12°C)] and can survive for up to 8 years in soil. Infection usually occurs through wounds on roots, such as those produced by cultivation or as a result of nematode feeding. Soil saturation increase the chance of infection. Soil temperature of 75°F (24°C) is optimum for infection, with 55°F (13°C) minimum and 86°F (30°C) maximum.

## **DISEASE MANAGEMENT**

Management of Verticillium wilt is similar to that of Fusarium wilt. Verticillium-resistant tomato cultivars are available. However, races of *V. dahliae* that overcome simple monogenic resistance have been identified. Crop rotations with non-solanaceous species, including pepper, potato, and eggplant, for at least 4 years, are needed. In addition, control of weeds that are hosts of *Verticillium* spp. is needed. Removing and destroying plant debris after harvest reduces the amount of inoculum liberated into the soil.