



FUSARIUM WILT OF TOMATO

Fusarium wilt, caused by the fungus *Fusarium oxysporum* f. sp. *lycopersici*, is a serious soil-borne disease of tomato in almost all areas where tomatoes are grown. First described in 1895 in England, it now occurs worldwide, having been reported in more than 40 countries. Three races have been identified of the Fusarium wilt pathogen of tomato (races 1, 2, and 3), and all three occur in the United States.



Figure 2. A Fusarium infected tomato leaf: unilateral yellowing of a leaf. (Photo courtesy J.P. Jones, University of Florida)



Figure 1. Fusarium wilt of tomato. (Photo courtesy North Carolina State University)

SYMPTOMS

Infected seedlings are stunted. The older leaves droop and curve downward, and some might turn yellow (Figure 1). The vascular tissue becomes dark brown, the bases of the affected stems enlarge, and the plants frequently wilt and die. Symptoms on older plants generally become apparent during the interval from blossoming to fruit maturation. The earliest symptom is the yellowing of the older leaves. This often develops on only one side of the plant, and the leaflets on one side of a petiole frequently turn yellow before those on the other side (Figure 2). The yellowing gradually affects most of the foliage and is accompanied by wilting of the plant during the hottest part of the day. The vascular tissue of a diseased plant is usually dark brown (Figure 3). This browning extends far up the stem and is especially noticeable in a petiole scar.

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The browning of the vascular system is characteristic of the disease and generally can be used for its identification. The pith remains healthy.

DISEASE CYCLES

F. oxysporum f. sp. *lycopersici* is a soil-borne pathogen and remains in infested soils for several years. Infection of plant occurs through wounds in roots. Fusarium wilt is a warm-weather disease, most prevalent on acid, sandy soils. Soil temperature of 82°F (28°C) and a soil moisture optimum for plant growth favor disease development. Virulence of the pathogen is enhanced by micronutrients, phosphorus, and ammoniacal nitrogen and decreased by nitrate nitrogen. Dissemination of the pathogen is via seed, tomato stakes, soil, and infected transplants. Local dissemination is by transplants, tomato stakes, windborne and waterborne infested soil, and farm machinery.

DISEASE MANAGEMENT

Fusarium wilt can be managed by planting resistant cultivars; pasteurizing the soil in the greenhouse and fumigating field soil; planting pathogen-free seed and disease-free transplants; raising the soil pH to 6.5-7.0; using nitrate nitrogen rather than ammoniacal nitrogen; preventing Fusarium-infested soil clinging to machinery; transplants, tools, and stakes into areas free of the pathogen; avoid flooding the field, since this will spread the pathogen; keeping tomato fields away from seedling production houses and seedbeds; and crop rotations of 5- to 7-year with non-host crops.



Figure 3. A Fusarium infected tomato stem: browning of the vascular system. (Photo courtesy J.P Jones, University of Florida)