



AVRDC - The World Vegetable Center

Fact Sheet

Tomato Diseases

Fusarium Wilt

Fusarium oxysporum f.sp. *lycopersici*

Found worldwide, more prevalent in warmer climates



Symptoms

First symptoms are yellowing of the foliage, beginning with the lower leaves and working upward. Yellowing often begins on one side of the vine. Infected leaves later show downward curling, followed by browning and drying.

The top of the vine wilts during the day and recovers at night, but wilting becomes progressively worse until the entire vine is permanently wilted. Vascular browning can be seen in infected stems and large leaf petioles.

Affected plants and their root systems are stunted. The degree of stunting depends upon time of root infection. Plants infected when they are young will be more severely stunted than plants infected at a later stage.

Conditions for Disease Development

The pathogen is soil borne and persists for many years in the soil without a host. Most infections originate from the fungus associated with infected tomato debris. Root-

How to Identify Fusarium Wilt



Look for yellowing of the foliage, beginning with the lower leaves and working upward (left photo). Yellowing often begins on one side of the vine (top photo). The top of the vine wilts during the day and recovers at night. Vascular browning extends up the stem (middle photo) and into large petioles (right photo).

knot nematode infection makes *Fusarium* wilt-resistant varieties more susceptible to the fungus because of physiological changes in the root.

Disease development is favored by warm temperatures (for example, 27–28 °C), dry weather, and acidic soil (pH 5–5.6). Rapidly growing, highly succulent tomato plants exposed to fertilization with ammonium nitrate are especially susceptible to the disease.

The fungus can be disseminated by infected seed or by transplants grown in infested soil. The fungus can be introduced into a field on contaminated equipment, training stakes, packing crates or shoes. Soil particles from infested fields may be blown into disease-free fields.

Control

Varieties resistant to *Fusarium* wilt race 1 and race 2 are available. Control of root-knot nematode may be necessary in soils where populations of the nematode are high because genetic resistance may be lost when both the fungus and nematode are present.

Raise soil pH to 6.5–7.0 and use sources of nitrate nitrogen (for example, calcium nitrate) rather than sources of ammonium nitrogen (for example, ammonium nitrate).

Use clean equipment to avoid infesting new fields. Prevent the introduction of infested soil into production fields via contaminated tools, hands, clothing or shoes of farm workers. Do not use pond or ditch water located near infested fields.

Disinfect areas where transplants are grown. Greenhouse structures, crates, benches, tools and flats should be cleaned regularly. Use sterilized soil, if available. Locate seedbeds or seedling production areas away from infested fields.

Cultivate crops only when necessary since entry by the fungus into plant tissue occurs through damaged tomato roots.

A 5- to 7-year rotation reduces fungus inoculum and damage, but does not eliminate the pathogen. The use of paddy rice in rotation with tomato will reduce losses.

Avoid sowing seed produced from *Fusarium*-infected plants. Commercial seed is generally tested for seed-borne contamination.

For more information on the production of tomato and other vegetables, go to <www.avrdc.org>.