

Verticillium Wilt of Tomato

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The soilborne fungus *Verticillium albo-atrum* is present in most cool soils of the Northeast and can attack over 200 plant species, especially tomatoes, potatoes, eggplant, strawberries, and black raspberries. Other susceptible vegetables include artichoke, beet, broad bean, chicory, cucumber, dandelion, endive, horseradish, musk melon, okra, peppers, radish, rhubarb, salsify, and watermelon. Corn, other cereals, and grasses are resistant.

Symptoms

In spite of the name verticillium wilt, a true wilt seldom occurs in tomato, at least not until late in the season. Rather, under good conditions of moisture and nutrition, yellow blotches on the lower leaves may be the first symptoms, then brown veins appear, and finally chocolate brown dead spots. The spots may be confused with alternaria early blight, but they are not definite, nor do they develop concentric bull's-eye rings.

The leaves may wilt, die, and drop off. The disease symptoms progress up the stem, and the plant becomes stunted. Only the top leaves stay green. Fruits remain small, develop yellow shoulders, and may sunburn because of loss of leaves.

Infection takes place directly when the fungus threads enter the root hairs. It is aided in its entrance if rootlets are broken or nematodes have fed on the root system. The fungus grows rapidly up the xylem, or sap-conducting channels. Its activity there results in interference with the normal upward movement of water and nutrients. The fungus produces a toxin that contributes to the wilting and spotting of the leaves. Diagnosis involves making a vertical slice of the main stem just above the soil line and observing a brown color in the conducting tissues under the bark. This discoloration can be traced upwards as well as downwards into the roots. In contrast to fusarium wilt, verticillium wilt discoloration seldom

extends more than 10-12 inches above the soil, even though its toxins may progress farther.

The Causal Fungus

Its wide host range permits *Verticillium* to persist in soils for long periods. It remains alive by means of dark resting threads, which form in great numbers on dying diseased underground plant parts. It can attack and multiply in many common weeds, including ragweed, cocklebur, and velvet leaf. One form of the fungus produces tiny black resting bodies (microsclerotia), which help it survive over winter.

The pathogen is sensitive to soil moisture and temperature. Tomatoes and potatoes must have at least a day of saturated soil before infection occurs. Soil temperatures must be moderate or cool for infection to take place: 75° F (24° C) is optimum with 55° F (13° C) minimum and 86° F (30° C) maximum.

Controls

Long rotations (4-5 years) with nonrelated crops, well-drained soils, and soil moisture kept at the minimum for good growth are advisable.

In greenhouses or with plastic-strip mulch, soil fumigation gives good control and is feasible on high-value crops.

By far the most feasible and economic control is the use of *Verticillium-tolerant* tomato cultivars of which there are many with varying maturities and excellent horticultural qualities. These include the following:

| | | |
|----------------|---------------------|---------------|
| New Yorker (V) | Earlirouge | Basket Vee |
| Springset | Supersteak | Campbell 17 |
| Pic Red | Campbell 1327 | Big Set |
| Jet Star | Fireball (V) | Setmore |
| Supersonic | Beefmaster | Small Fry |
| Heinz 1350 | Better Boy | Terrific |
| Heinz 1439 | Bonus | Big Girl |
| Westover | Gardener (V) | Mainpak |
| Royal Flush | Monte Carlo | Early Cascade |
| Flora merica | Nova (Paste) | Jumbo |
| Veebrite | Crimson Vee (Paste) | Wonder Boy |
| Veemore | Veeroma (Paste) | Rutgers 39 |
| Veegan | Vee pick (Paste) | Ultra Boy |
| Veaset | Ramapo | Ultra Girl |
| Burpee VF Hyb. | Moreton Hyb. | Rushmore |
| Starshot | Spring Giant | J etfire |

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