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Tomato Wilt Problems

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TOMATO WILT PROBLEMS

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Fusarium and Verticillium Wilts

Fusarium oxysporum f. sp. lycopersici and *Verticillium albo-atrum* are two fungi that cause similar wilt diseases in tomato. *Fusarium* is more common in replant fields and gardens while *Verticillium* has been destructive on greenhouse tomatoes and in commercial stake tomatoes. *Verticillium* wilt is more of a problem at cooler temperatures while *Fusarium* wilt is considered a warm temperature disease. Both are favored by wet conditions.

Symptoms

The first symptom of both diseases is a slight wilting of the plants. *Fusarium* wilt symptoms also include strong downward bending of petioles, yellowing, wilting and dying of the lower leaves, often on one side of the plant. These symptoms may appear on successively younger leaves with one or more branches being affected and others remaining healthy. Root necrosis is often extensive. After a few weeks, browning of the vascular system may be seen by cutting the stem open with a knife. This brown discoloration inside the stem may extend from the roots of the plant to the top. Plant growth is stunted and, under warm conditions, the plant may die.

Verticillium wilt symptoms are very similar but often slower to develop and with much less yellowing. Early symptoms on the leaves may also include yellowing of V-shaped areas between the veins or leaf margins. Frequently, leaves on all sides of the plant show symptoms. Plants may wilt during the day and recover at night. Stunting occurs and plants may eventually die under relatively cool growing conditions. The dark discoloration inside the stem can be found mainly near the base of the plant.

Spread

Both fungi are common inhabitants of Kentucky soils. These fungi attack the plant through the roots and grow up through the water-conducting vessels (the vascular tissue). The cells in the vascular tissue are destroyed and water movement through this tissue is seriously impaired, causing wilting. *Fusarium* and *Verticillium* may be introduced to soils in several ways: old crop residues, transplants, wind, water, implement-borne soils, or mulches. These fungi become established readily in most soils and can remain in the soil for years. When susceptible tomatoes are planted in infested soil, their roots are also subject to attack by these fungi. Both diseases are much more serious when accompanied by root knot nematode.

Control

1. Use resistant tomato varieties. Such varieties are designated with the letter "V" or "F" in seed catalogs. Variety names followed by the letters "VF" or "VFN" are resistant to both wilt diseases. The letter "N" signifies resistance to root-knot nematode. If root knot is also present, controls for nematodes are necessary for the VF resistance to be effective.

2. Fumigate or steam sterilize greenhouse soils.

Walnut Wilt

Wilting of tomato plants may occur when they are planted near walnut or butternut trees. Large amounts of a toxic substance called juglone is excreted into the soil from the root systems of these trees. Walnut wilt causes wilt and vascular discoloration symptoms similar to those of *Verticillium* and *Fusarium* wilt.

Control

Avoid planting tomatoes near walnut or butternut trees, or in locations where these trees may have grown previously. The juglone can remain in the soil several years after a tree has been cut down since it

continues to diffuse from the dead root system.

Bacterial Wilt

Bacterial wilt is not a serious problem in Kentucky but some damage occasionally does occur, mainly through introduction on southern produced transplants.

Symptoms and Spread

The bacterial wilt organism (*Pseudomonas solanacearum*) survives in the soil and weedy hosts and infects susceptible plants through wounds in the roots or stem. The bacterium initially invades the water-conducting tissue of the vascular system. As a result, the vascular tissue turns black and the plant rapidly wilts. Next, the pith becomes decayed, appearing dark and water-soaked. A slimy bacterial ooze exudes from the stem when it is pressed. As decay progresses, the stem may become hollow. Unlike with the wilts caused by fungi, in hot weather, plants infected with the bacterium collapse quickly and die. As the cycle is completed, bacterial cells are released into the soil where they can survive even in the absence of a host. The pathogen can be carried into "clean" fields or gardens via infected transplants or through drainage water from adjacent infested land.

Control

1. Plant disease free transplants.
2. Do not plant tomatoes in sites where the disease has been a problem in the past. Practice long crop rotations.
3. Remove and destroy infected plants promptly.
4. Avoid hydroponic production systems where this bacterium exist.
5. Resistant varieties are available, but they do not grow well under Kentucky conditions.

Bacterial Canker

Bacterial canker is a seedborne disease that is increasing and has a wilt phase associated with it. The wilt phase can be easily confused with any of the wilt diseases described above. It is becoming more common in Kentucky with intensively managed tomato systems. See articles on bacterial canker for more details.