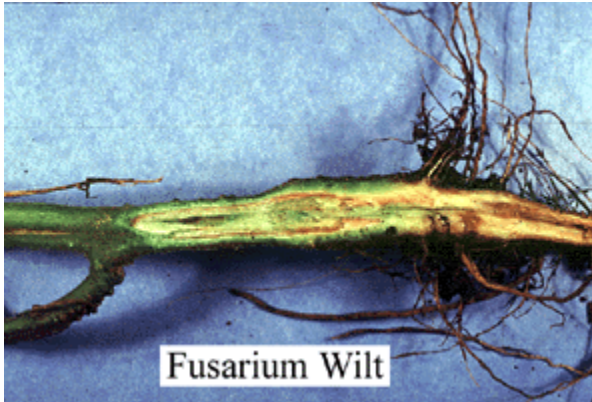**Problem:** Fusarium & Verticillium Wilt of Tomato -
Fusarium oxysporum f. sp. *lycopersici*
Verticillium spp.

Fusarium Wilt

Plant Host: Tomato

Description: Two major wilt diseases of tomatoes are Fusarium and Verticillium wilt. Fusarium wilt, the most prevalent of the two diseases, in Kansas generally occurs in midsummer when air and soil temperatures are high. Diseased plants first develop a yellowing of the oldest leaves (those nearing the ground). Often the yellowing is restricted to one side of the plant or even to leaflets on one side of the petiole. The affected leaves soon wilt and dry up, but they remain attached to the plant. The wilting continues on successively younger foliage and eventually results in the death of the plant. The stem remains firm and green on the outside but exhibits a narrow band of brown discoloration in the vascular tissue. This discoloration can be viewed easily by slicing vertically through the stem near the soil line and looking for a narrow column of browning between the central pith region and the outer portion of the stem.

Verticillium wilt tends to develop during the cooler periods of late spring. Symptoms of this disease are similar to Fusarium wilt. Older leaves are affected first; they turn yellow, wilt and eventually drop from the plant. Unlike Fusarium wilt, Verticillium wilt causes uniform yellowing and wilting of the lower leaves. As the disease progresses, younger leaves begin to wilt and die, until only a few healthy leaves remain at the top of the plant. Although diseased plants are not killed, they are stunted and weak and produce small fruit. Verticillium wilt also causes discoloration of the vascular system almost identical to that in Fusarium wilt except that the browning does not extend quite as far up the stem. Thus, laboratory analysis may be required to distinguish between the two diseases.

Life Cycle: The Fusarium wilt fungus can be introduced into fields on contaminated seed or in infected transplants. Once introduced, the fungus can survive for many years in the soil. The Verticillium wilt fungus also is a soil-borne pathogen that can attack a wide range of plants, including potato, eggplant, strawberry, black raspberry, and many common weeds. Both fungi invade the plant through the fibrous root system and disrupt water and mineral uptake within the plant.

Infection and disease development in Fusarium wilt are favored by warm soil temperatures (80° F) and low soil moisture, while Verticillium wilt develops best at relatively cool (55-75 F) soil temperatures.

Recommendations: Long rotations (4-6 years) may help to reduce fungal inoculum levels in the soil, but it will not completely control these diseases. The most practical means of controlling Fusarium and Verticillium wilt is the use of resistant varieties. Many of the popular varieties of tomatoes have resistance to the common race (race 1) of the Fusarium fungus, to the Verticillium fungus, or to both. A few tomato varieties with resistance to Verticillium (V) and/or Fusarium (F) include the following varieties. The number after the letter refers to the race of the disease. Jet Star VF_1, Big Beef VF_1F_2NTA, Beefy Boy VF_1F_2T, Florida 91 VF_1F_2, Crista $VF_1F_2F_3N$, RTF 6153 VF_1F_2 and BHN 602 VF_3. Other letters after the variety name are as follows: N = nematode resistance, T = tobacco mosaic virus resistance, A = anthracnose resistance.

References:
1. Wilt, Nematode and Virus Diseases of Tomato. K-State Research and Extension, Publication L-723.

Last Update: 2/3/2016

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