WHAT'S WRONG WITH MY TOMATOES?

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In New York State, tomato diseases are as consistent as taxes - they are guaranteed in one form or another! In 1993, the diseases that were most common included anthracnose, bacterial speck and spot, early blight, and Septoria leaf spot. The following information should serve as a guide to identification of those diseases, and common practices for disease control.

Anthracnose

Anthracnose is caused by the fungus *Colletotrichum coccodes*, an organism that is naturally present in many soils in New York State. The fungus can infect both green and red fruit, but typical anthracnose symptoms develop only on ripe fruit. The symptoms produced on fruit are circular sunken lesions. When the humidity is high, a salmon colored spore mass may be observed on the lesion. As the lesion matures, the center may darken and produce survival structures. The fungus also infects tomato roots and produces a disease known as black dot root rot.

This fungus is especially difficult to control because it has weed hosts such as nightshade and velvetleaf, it can attack above or below ground parts of tomatoes and potatoes, and it is able to survive in soil for several years. The fungus produces survival structures on tomato fruit and roots that are called sclerotia, which have a function similar to seeds. The sclerotia are able to remain dormant in soil until conditions are suitable for them to germinate and infect a host. In our experiments, the sclerotia have survived for 5 years in soil without a host crop such as tomato or potato. For most tomato or potato growers, rotations of 5+ years are difficult if not impossible to achieve.

Control:

1. Rotate to prevent buildup of the fungal population in the soil. Once the fungal population has reached high levels in soil, it will be very difficult to reduce levels in soil via rotation.
2. Fresh market growers should plant tomatoes on raised beds, stake them, or use a straw mulch to keep the fruit from coming in contact with contaminated soil.
3. Avoid excessive irrigation; the fungus is most troublesome in wet conditions.
4. Harvest fruit as soon as possible after they ripen. Although green fruit are infected, symptoms develop on ripe fruit.
5. Protectant fungicides are registered and can provide good control. Consult the 1994 Pest Management Recommendations.

Bacterial speck and spot

Bacterial speck and spot are caused by the bacteria *Pseudomonas syringae* pv. *tomato* and *Pseudomonas campestris* pv. *vesicatoria*, respectively. Both bacterial species produce symptoms on the leaves and fruit. Bacterial speck produces small black superficial specks on the fruit and the tissue around the specks sometimes is slow to ripen. Bacterial spot results in black, slightly raised superficial spots with lobed margins

and water-soaked borders. Lesions from the two diseases look very similar, but usually the lesions produced by bacterial spot are larger.

Both of these bacteria can be seedborne and will also survive on infested debris from the previous year. Long distance spread is via seed and transplants, while short distance spread can occur via machinery, workers, splashing rain or irrigation water. Disease development is promoted by wet weather.

Control:

1. Use disease free seed and transplants.
2. Follow a minimum 1 year rotation.
3. Avoid clipping transplants, working in fields that are wet, and frequent overhead irrigation.
4. Streptomycin treatments may be used prior to transplanting, and copper sprays are registered for use after transplanting. Consult the 1994 Pest Management Recommendations.

Early blight

Early blight is caused by the fungus *Alternaria solani* and is destructive in humid climates on potatoes and tomatoes. The 'early' in early blight refers to the time of disease appearance relative to plant age. All aboveground parts of the plant can be affected. Typical leaf symptoms are circular lesions that are brown and contain dark concentric rings like a target board. Leaf spotting first appears on the oldest leaves and progresses upward on the plant. Entire plants can be defoliated and killed, and the exposed fruit are prone to sunscald and anthracnose infections.

The fungus survives in soil associated with infested debris. Long distance dispersal can occur with seed and transplants. The fungal spores are disseminated by wind, water, machinery and workers. Early blight development is enhanced in wet weather.

Control:

1. Use disease free seed and transplants.
2. A minimum 2 year rotation should be used to prevent buildup of inoculum in soil. Rotations should not include potato, eggplant and pepper.
3. Fungicides can be used to reduce disease development. Consult the 1994 Pest Management Recommendations.

Septoria leaf spot

Septoria leaf spot is caused by the fungus *Septoria lycopersici*. The fungus can infect horsenettle, eggplant, and some species of nightshade and groundcherry. The symptoms produced on the leaves are circular lesions that are grayish in color with very tiny black dots in the middle of those grayish lesions. The black dots are fruiting structures called pycnidia, where the fungus produces spores. Lesions start on the oldest leaves and spread toward the new growth. Infections by this fungus can result in rapid defoliation of the plant.

The fungus can survive on seed, in overwintered debris from diseased plants and in infected perennial weeds. The spores are not windborne like Alternaria spores, but are dispersed in water or by machinery and people. The disease is most destructive when wet weather is persistent or heavy dews are present.

Control:

1. Use disease free seeds and transplants.

2. A minimum 2 year rotation should be used to prevent buildup of inoculum in soil.
3. Workers should not enter the field when the foliage is wet because the fungus relies on spread via water droplets.
4. Fungicides can be used to reduce disease development. Consult the 1994 Pest Management Recommendations.

GENERIC TIPS ON TOMATO DISEASE MANAGEMENT:

1. Avoid planting tomatoes in fields with low areas or fields surrounded by wooded areas. Air movement promotes drying of the soil and leaf surfaces and helps minimize opportunities for pathogens to germinate and infect plants.

2. Do not handle seeds or transplants when they are wet. Bacterial speck, bacterial spot, and Septoria are highly dependent on water for transportation, germination, and infection of tomato plants.

3. Use healthy looking transplants. If transplants are chlorotic or wilting or look suspicious, contact the Department of Agriculture and Markets for an inspection or contact your Extension Agent or Specialist for help in diagnosing the problem. Early disease detection will allow you to implement disease management strategies before the problem becomes a full blown epidemic.