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Diseases of Home Garden Tomatoes

Tomato diseases occur every year in every garden to some extent. This NebGuide discusses the symptoms and management of the most common and damaging ones in Nebraska.

John E. Watkins, Extension Plant Pathologist

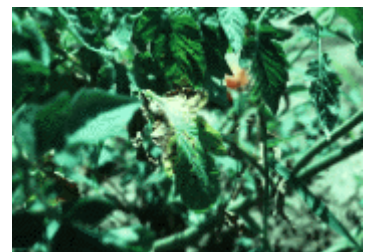
- [Septoria Leaf Spot](#)
- [Early Blight](#)
- [Bacterial Speck and Bacterial Spot](#)
- [Anthracnose](#)
- [Wilt Diseases](#)
- [Tomato Spotted Wilt](#)

Gardening is a favorite summer activity of backyard farmers and nothing tastes better than a ripe, home grown tomato. The popularity of local farmer's markets has increased tremendously in the 90s. Tomatoes are a mainstay of the backyard garden and the Saturday morning farmer's market. Being a successful gardener requires knowledge, skill and persistence. Every summer, nature pits the skills of the gardener against weather, insects and diseases. These challenges test our ability to grow plants free of blemishes from sun scald or blossom end rot, disease spots and rots and holes from chewing insects. In the end many gardeners feel it is worth all the time, expense and effort to raise that perfect tomato.

Tomatoes are subject to many diseases. This NebGuide will focus on the most common and serious ones that can damage our home grown tomatoes here in Nebraska. Fungi and bacteria attack leaves, stems and fruits and cause plants to wilt and die in midseason. More than 30 viruses can malform tomato plants and fruits.

Septoria Leaf Spot

Spores from *Septoria lycopersici*, the cause of Septoria leaf spot (*Figure 1*), survive the winter on tomato plant debris left in the garden from the previous season's crop. These spores are spread from this source to growing plants by wind or by water droplets from rain or sprinklers splashing them onto the lower leaves. From these early infection sites, the fungus spreads throughout the tomato plant during warm, wet weather. Rain, dew or sprinkler irrigation provides the necessary moisture on leaves to keep the



disease active during the growing season. Symptoms usually appear after fruit set.

Figure 1. Septoria Leaf Spot

Key Symptoms

- Small, circular spots with dark margins and gray centers on leaves.
- Leaf spots may be peppered with tiny black dots.
- Lesions on stems and petioles are dark elongated spots.
- Infected leaves and petioles yellow and die.

Disease Management

- Remove plant debris from last season or till it into the soil.
- Buy healthy transplants free of leaf spots.
- Plant tomatoes to a different site in the garden each year.
- Begin a fungicide spray program at bloom and continue through harvest. A chlorothalonil-based fungicide provides good disease control and has a short postharvest interval (the period between treatment and harvest). Read the product label before application to determine how long the waiting period is between treatment and harvest.
- Apply water at the base of plants instead of with a sprinkler.

Early Blight

Early blight (*Figure 2*) is a common disease on potatoes and egg plant as well as tomatoes. As in Septoria leaf spot, the spores that cause early blight overwinter in last year's garden crop debris. This disease occurs in midsummer during warm, humid periods. The fungus (*Alternaria solani*) is spread by wind and splashing sprinkler or rain water. Fungus spores that come in contact with a water droplet on the leaf germinate and ultimately infect the leaf. Symptoms appear on leaves about 10 days after infection. Symptoms also can appear on stems and fruit.

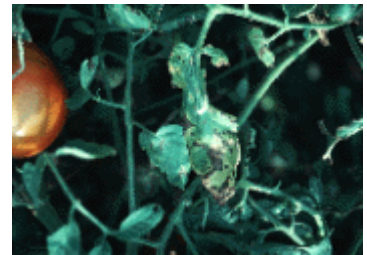


Figure 2. Early Blight

Key Symptoms

- Irregular, dark brown areas on leaves that show concentric, black rings in a target-like pattern.
- Yellowing around the necrotic area.
- Dark brown, elongated, sunken lesions on stems and petioles (*Figure 3*).



Figure 3. Early Blight Lesion

Disease Management

- Follow disease management practices outlined for Septoria leaf spot.
- Remove badly diseased leaves during the growing season.

Bacterial Speck and Bacterial Spot

Two bacterial diseases that occur on the tomato fruit in backyard gardens are bacterial speck (*Pseudomonas syringae*) and bacterial spot (*Xanthomonas vesicatoria*). The bacterial

speck (*Figure 4*) and bacterial leaf spot (*Figure 5*) diseases are introduced into the garden on infected transplants. They will persist in the garden on infected tomato plant debris. During the summer the bacteria are spread from infected to healthy plants by wind-driven rain during thunderstorms. They also can be spread by animals running through the garden or by gardeners working in the garden when the foliage is wet. Both bacterial diseases develop during periods of warm, humid, wet weather in summer.

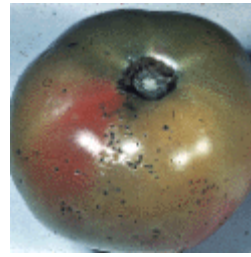


Figure 4.
Bacterial Speck

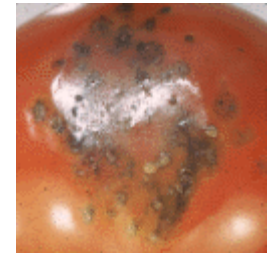


Figure 5.
Bacterial Spot

Key Symptoms

- Small, raised, water-soaked circular spots on fruit.
- Spots may have raised margins and be sunken in the middle; others may become cracked and scaly.
- Spots on immature fruit may be surrounded by a green halo.

Disease Management

- Purchase healthy transplants free of leaf spots.
- Apply water at the base of plants instead of with a sprinkler.
- Move tomatoes to a different site in the garden each year.
- Remove debris from tomato and pepper plants in the fall after harvest is completed or till it into the soil.
- Begin a fungicide spray program when fruits are small. Copper-based fungicides, registered for use on tomatoes, can be used to control bacterial diseases. Treat in the evening when temperatures are cooler since copper can cause leaf injury if applied in heat. Read the product label and note the postharvest treatment interval.

Anthracnose

This fungal disease is more common on tomato fruits in Nebraska than the two bacterial diseases. Anthracnose (*Figure 6*) becomes a problem during warm, humid periods in the latter half of summer when tomato fruits are ripening. This causal fungus survives on plant debris, like many pathogens of garden vegetables, and also survives in the soil. Fungus spores in the soil are spread to plants when rain drops splash them and small particles of soil onto the plants. On infected fruit, the fungus produces abundant spores that are spread to other ripening fruit by wind or by splashing water droplets from rain or irrigation. Sometimes anthracnose becomes established on areas damaged by diseases such as early blight or insect feeding.

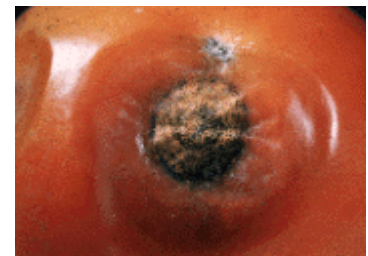


Figure 6. Anthracnose

Key Symptoms

- Early symptoms on ripe or ripening fruit are small, circular indented areas on the skin.
- Indented areas expand and develop black centers or concentric rings of dark specks.
- Rot penetrates beyond the skin into the fruit.
- Diseased areas become invaded by other fungi or bacteria that further rot the fruit.
- Harvested fruit may not show symptoms until placed in storage.

Disease Management

- Use the fungicide program previously outlined for Septoria leaf spot.
- Mulch around plants to reduce splashing of inoculum from the soil onto fruits.
- Improve air movement around plants by staking the tomatoes.
- Harvest tomatoes frequently and pick all ripe fruit at each harvest.
- Wash harvested fruit thoroughly to reduce the risk of anthracnose developing during storage.

Wilt Diseases

Verticillium wilt (*Figure 7*) and Fusarium wilt (*Figure 8*) are the major wilt diseases of garden tomatoes. Both diseases are caused by fungi that inhabit the soil and infect plant roots. Fusarium wilt (*Fusarium oxysporum*) occurs in midsummer when air and soil temperatures are high. Verticillium wilt (*Verticillium albo-atrum*) tends to occur during late spring. Verticillium wilt has a large host range and can affect many vegetables including potato, pepper and eggplant. The symptoms of both wilt diseases are similar. Damage results from the pathogen invading the water-conduction tissues (xylem) of the tomato plant.

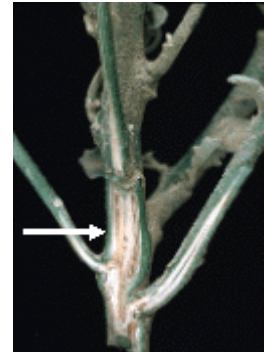


Figure 7. Verticillium Wilt

Key Symptoms of Fusarium Wilt

- Begins as a yellow flagging of branch shoots and leaves.
- Wilting progresses upward on the plant and at first may appear only on one side of the plant or branch.
- The water-conducting xylem turns reddish brown. This can be seen by slicing vertically through the stem near the soil line and looking for the discoloration between the central pith and the outer portion of the stem.

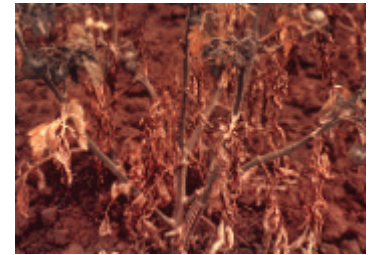


Figure 8. Fusarium Wilt

Key Symptoms of Verticillium Wilt

- General wilting and yellowing symptoms are similar to those of Fusarium wilt except they are not restricted to one side of the plant or branch.
- Symptoms begin with a general or blotchy yellowing of lower leaves.

Disease Management

- Grow varieties listed as VF (resistant to Verticillium and Fusarium wilts).
- Discard wilted plants. Do not compost plants infected with either of these wilt pathogens.
- Rotate away from solanaceous (pepper, eggplant, potato) plants. In other words don't follow tomato with pepper, eggplant, or potato.

Tomato Spotted Wilt

More than 30 virus diseases occur on tomatoes; fortunately, only tomato spotted wilt virus is of major concern in Nebraska. Diseases caused by tomato spotted wilt virus (*Figure 9*) are widespread and have been devastating in the greenhouse ornamental and vegetable industry. Tomato

spotted wilt virus occurs on many plant species, and many weed species and perennial ornamentals are hosts. Plant viruses are transmitted by insects and tomato spotted wilt is no exception. It is spread by thrips as they move from infected to healthy plants during feeding.

Virus-infected plants usually show some type of malformation that ranges from wrinkled leaves to mottled leaf patterns to severe stunting. Viruses live within plant cells and depend on the host plant for reproduction. Because they live within the host's cells, they are difficult to control. There are no chemical treatments for plant virus diseases like there are for fungal and bacterial diseases. Alternative methods of disease management are needed to reduce losses from this group of pathogens.

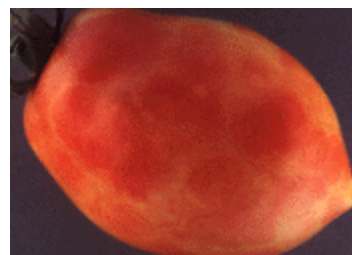


Figure 9. Tomato Spotted Wilt

Key Symptoms

- Affected plants may show symptoms only on one side or they may be entirely stunted and have drooping leaves.
- Infected young leaves appear bronze, develop numerous small, dark spots and may cup upward or downward.
- Infected plants are stunted with yellow leaves.
- Infected tomato fruits show a green, yellow and red raised ring pattern.
- The raised ring pattern gives the fruit a warty appearance.

Disease Management

- Good insect control in the garden.
- Remove virus-infected plants from the garden as soon as they are detected.
- Do not use tobacco products when handling tomatoes. Tobacco mosaic virus is not normally a problem but can be spread from tobacco products to tomatoes.

Table I. Fungicides for use in backyard vegetable gardens¹.

| <i>Product</i> | <i>Ingredient</i> |
|--|--------------------------------|
| Ortho Multi Purpose Fungicide | Chlorothalonil |
| Orthocide Garden Fungicide | Captan |
| Garden Sulfur Dust | Sulfur |
| Ortho Phaltan | Phaltan |
| Bonide Liquid Copper Fungicide | Copper |
| Bonide Captan | Captan |
| Bonide Sulfur Plant Fungicide | Sulfur |
| Bonide Liquid Sulfur | Sulfur |
| Bonide Manzate Flowable | Mancozeb |
| Acme Copper Fungicide | Copper |
| Acme Bordeaux Mixture | Hydrated lime + copper sulfate |
| Acme Tomato, Fruit & Vegetable Fungicide | Mancozeb |

| | |
|---|--------------------------------|
| Acme Maneb Tomato & Vegetable Fungicide | Maneb |
| Earl May Tomato & Vegetable Dust | Maneb |
| Earl May Tomato Blight Control | Maneb |
| Dragon Tomato & Vegetable Dust | Copper sulfate |
| Dragon Mancozeb Disease Control | Mancozeb |
| Dragon Daconil 2787 | Chlorothalonil |
| Ferti-lome Liquid Fungicide | Chlorothalonil |
| Ferti-lome Rose, Flower & Vegetable Dust | Sulfur |
| Green Light Maneb Plus | Mancozeb |
| Green Light Wettable Dusting Sulfur | Sulfur |
| HiYield Copper Fungicide | Copper hydroxide |
| American Captan Garden Fungicide | Captan |
| American Copper Fungicide | Copper oleate |
| Security Fungi-Gard | Chlorothalonil |
| Black Leaf Bordeaux Powder | Hydrated lime + copper sulfate |
| Green Up Captan Garden Spray | Captan |
| Safer Garden Fungicide | Sulfur |
| GroTec Pennington Multi-Purpose Fungicide | Chlorothalonil |
| <p>¹Check the product label before application to make certain it is registered for use on tomatoes. Also, the label will state the time interval between application and harvest; this will vary among different products. This list of fungicides represents the best information available. No criticism is intended of fungicides not listed, nor is endorsement given by the University of Nebraska to those listed. Always read and follow all label directions.</p> | |

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