



# Bacterial Spot and Bacterial Speck of Tomato

**J.R. Venette**  
Associate Professor  
Plant Pathology

**H.A. Lamey**  
Extension Plant Pathologist

**R.C. Smith**  
Extension Horticulturist

Bacterial spot and bacterial speck have been reported in nearly all temperate countries. These diseases are generally of no major concern to North Dakota growers, but they can cause epidemics under unusually moist environmental conditions. Growers may experience considerable losses, especially when the diseases affect young, developing fruit. They cause spotting, blemishing, and distortion and thereby seriously reduce marketability and palatability of the fruit. Bacterial speck is restricted to tomato, but bacterial spot may also cause serious damage to peppers. Bacterial speck is most severe on early spring plantings where early infection causes significant yield reduction, quality loss, and a substantial delay of maturity.

Bacterial spot is caused by a bacterium, *Xanthomonas campestris* pv. *vesicatoria*, which can be a contaminant on tomato seed. The pathogen can survive in debris and in association with certain weeds such as black nightshade. It enters healthy plants through stomata or wounds and maximum infection occurs under very moist conditions in warm weather (68 degrees Fahrenheit to 95 F), especially when night temperatures are warm (75 F to 82 F).

Bacterial speck is caused by *Pseudomonas syringae* pv. *tomato*. The bacterium is believed to be widespread and is often isolated from plant roots and soil particles. The bacterium is seedborne and probably overwinters within infected tomato plant debris. It has been associated with different plants near tomato fields, where it survives as a saprophyte. Recently it was shown that these bacteria may multiply at the base leaf hairs on healthy tomato leaves and later cause disease. The disease is most serious in cool weather (55 F to 77 F) with high relative humidity, especially when dews wet plants for long periods.

## Symptoms

Both diseases produce similar symptoms and are often misdiagnosed. Bacterial spot leaf symptoms begin as small circular to irregular greasy spots most visible on the underside of the leaflets. As these water-soaked regions enlarge, colors change from dark green to purplish-gray, accompanied by a distinctive black center. Affected tissue becomes thin and may crack. The infected regions may be surrounded by a white to yellowish halo. In wet weather, infected leaves appear scorched. Large lesions result in defoliation. Fruit lesions begin as dark raised spots that become brown and sunken in the mature fruit. The associated skin rolls back giving the spots a scabby appearance. The spots rarely exceed one-fourth inch in diameter and are usually about one-eighth inch (Figure 1). Fruit lesions are superficial and rarely develop into extensive soft rot.

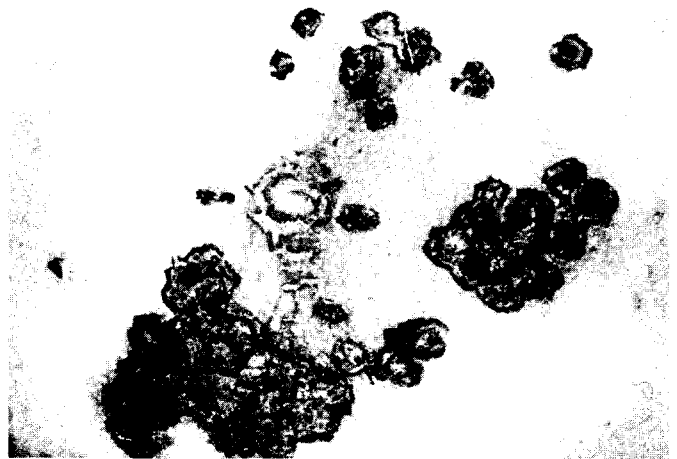


Figure 1. Closeup of bacterial spot on tomato fruit. The spots are magnified to twice their actual size.



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Symptoms of bacterial speck occur on all plant parts above the ground. Immature tissue is most susceptible. Symptoms on leaves are indistinct. Leaf spots are dark, round and lack haloes. On fruit, the disease initially appears as a black stippling, eventually causing lesions one-thirty-second inch to one-sixteenth inch in diameter with distinct margins (Figure 2). These small spots are superficial, do not rupture the skin, do not develop into soft rot, and are sometimes surrounded by an area that is slow to ripen. When fruits are infected early, the spots may cause pit-like distortions because the lesioned tissue grows slower than unaffected tissue. Mature fruits are resistant as a result of their high acidity.

## Control

Control methods for both diseases are identical. There are no tomato cultivars completely resistant to spot. Some lines hold up to speck better than others: Quick Pick, Floramerica and Early Girl are the best for North Dakota. Resistance lies in the wild lines of tomatoes which will be used in future breeding of North Dakota tomato releases. These lines should be available in three to four years.

Growers should buy tomato transplants from a reliable source or plant only treated seed (hot water, 122 F for 25 minutes; or sodium hypochlorite, 1.3 percent for 1 minute). Hot water controls bacteria both on and in seeds but reduces germination. Sodium hypochlorite affects only seed surface bacteria. Some growers control the disease by planting seed from their own disease-free fruits.

The location of tomatoes within the garden should be rotated from year to year. Irrigation should be controlled to minimize the length of time the foliage remains wet. Avoid working plants when they are wet.



Figure 2. Bacterial speck on tomato fruit.

Streptomycin sprays may be used until transplanting time. Copper-containing fungicides can help alleviate losses.

Follow recommendations given in PP-659, "Disease Control in Home-Grown Tomatoes" and PP469, "Plant Disease Control in the Home Garden." Also, maneb or zineb fungicide sprays help protect against fungus leafspot diseases that can occur in wet weather.

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