

Bacterial Spot of Tomato and Pepper

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Cause and Symptoms

Bacterial spot of tomato and pepper is a serious disease because it has a high rate of spread, especially during periods with wind driven rains, because adequate control measures are not available, and because fruit symptoms reduce marketable fruit. Bacterial spot is caused by the bacterium, *Xanthomonas campestris* pv. *vesicatoria* (*X.c.v.*). Entry into the plant occurs when bacterial cells pass through natural plant openings (stomates and hydathodes) or wounds made by wind driven soil, insects, or cultural operations. This bacterium can be seed-transmitted. Temperatures of 75-87° F are ideal for bacterial spot, but it can occur at lower and higher temperatures.

Lesions can occur on leaf parts (leaflets and petiole) and fruit parts (fruit, peduncle, and calyx). Stems are also susceptible but usually the other foliage parts are infected to a greater degree. Positive diagnosis requires testing in a laboratory; however, certain symptoms, especially those on the fruit, are suggestive of bacterial spot. On tomatoes, distinct leaf spots with or without yellowing occur (Figure 2). Individual leaf spots are not more than 1/8 inch across unless they coalesce with each other, which results in browning of entire leaflets. Spots restricted by leaf veins are sometimes angular while those not restricted by veins may be somewhat round. Leaf spots often are

sunken on the upper leaf surface. Leaf spots and fruit spots tend to be aggregated. Fruit spots often begin as dark specks with or without a white halo (Figure 1). As the spots enlarge, they become raised and scab-like. The centers of older spots may be sunken. In pepper leaves, spots may be similar to those in tomato. However, leaf spots in pepper tend to be lighter in color in the centers of the spots (Figure 3). Also, in some situations, larger spots with definite water-soaking can occur (Figure 4). Fruit spots in pepper are similar to those in tomato except that spots in pepper may appear blistered.

Control

Control is achieved by using several techniques together. During periods of wind-driven rains, no available control measures are adequate. Purchase seed that has been treated with acid or bleach to reduce inoculum on the seed. Destroy volunteer tomato and pepper plants. Do not place transplant beds or greenhouses near functional or abandoned tomato or pepper fields. Purchase only certified disease-free transplants. Spray plants with a tank mix of maneb (pepper or tomato) or mancozeb (tomato only) plus copper prior to the occurrence of this disease. An approved phage (bacterial virus) can be used. Maintain a residue of these materials on plants so that when heavy rains occur, some protection is available. Sprays applied to the plants before rain or irrigation are most ben-

eficial. Avoid working in the fields when plants are wet because this disease will be spread more readily under wet conditions. Use drip irrigation rather than overhead irrigation. Different races of *X. c. v.* exist; therefore use those

varieties that have resistance to existing races in your area. Resistant varieties are available for pepper. Destroy solanaceous weeds such as ground cherry and nightshade in the vicinity of tomato and pepper plantings.



Figure 1. Bacterial spot in tomato fruit.



Figure 2. Bacterial spot in tomato leaflet.



Figure 3. Bacterial spot in pepper leaf.



Figure 4. Bacterial spot in pepper leaf