CAES
The Connecticut Agricultural Experiment Station
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BACTERIAL SPOT OF TOMATO

Bacterial spot of tomato is a common disease throughout of the United States and worldwide. The disease affects all above ground parts of a tomato plant, including leaves, stems, and fruit. In rainy and wet weather conditions, the disease can cause early defoliation and fruit spotting, which results in reduced yield and non-marketable fruit.

SYMPTOMS AND DIAGNOSTICS

On leaves, the initial symptom appears as small, round, water-soaked spots that gradually turn dark-brown or black and are surrounded by yellow halo. The size of lesions is fairly variable, but rarely develops to more than 1/10 inch in diameter (Figure 1). When numerous lesions coalesce, a large portion of the leaf is blighted and collapses. On stems and petioles, lesions are normally elliptical and dark brown in color (Figure 2). When fruit is infected, lesions are small, water-soaked, slightly raised spots. As lesions develop, they become black, slightly sunken, and scabby (Figure 3). Although spots on fruit remain small and rarely result in rot, many lesions may reduce the quality of tomato fruit and expose the fruit to various fungi and other bacteria that can cause secondary fruit rots.

DISEASE CYCLE AND DEVELOPMENT

Bacterial spot of tomato is caused by *Xanthomonas campestris* pv. *vesicatoria* that also infect some other plant species in the Solanaceae family, such as pepper. The

Figure 1. Brown spots and yellow halo on leaves

Figure 2. Dark brown spots on stems and petioles

Figure 3. Dark brown and black spots on fruit

pathogen survives from season to season in plant debris and contaminated seeds, which serve as major primary inoculum sources of the disease. The pathogen does not survive more than 2 years in plant debris in soil, but it can survive on dried seeds for several years. Contaminated seed and infected transplants are important means of a long distance spread of the disease. In fields, the pathogen is dispersed by splashing rain droplets, by overhead irrigation, and by handling wet plants. The pathogen penetrates plant tissues through stomata and wounds created by wind-driven sand, insect damages, or mechanical means. Prolonged periods of high relative humidity and wetness favor infection and disease development. The optimal temperature for the disease development is between 75 and 86°F. So, warm and moist conditions are favorable to bacterial spot of tomato.

MANAGEMENT

Disease-free seeds and transplants: Always use disease-free seeds and transplants as the first step in disease management. Scout plants for the disease daily and destroy diseased seedlings.

Seed treatment: Soak seeds in 10% water solution of household bleach (5.25% sodium hypochlorite) for 45 min, and rinse thoroughly. This can effectively reduce bacterial population on seed surface. Hot water treatment at 122°F for 25 min is effective in reducing bacterial population on the surface and inside the seeds, but may affect seed germination when the temperature is not properly controlled. Rinse seed in clean water immediately after treatments. The seed should be air dried prior to storing.

Rotation and cultural practice: Practice a 2-3 year rotation with non-host crops. Control weeds and volunteer tomato and pepper plants. Remove and destroy infected leaves in the early stage of disease epidemics. Use drip irrigation and avoid overhead irrigation if possible. Water plants in the morning to allow water on plants to evaporate quickly. Avoid handling plants while plants are wet.

Pesticide: For homeowners, copper products or copper plus mancozeb are registered and effective to control bacterial spot of tomato. For commercial growers, control of bacterial spot on greenhouse transplants by using streptomycin can prevent spread of the disease in the field. Multiple applications of streptomycin may result in the pathogen resistant to streptomycin. Always read and follow label instructions before using any pesticides.

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