PLANT DISEASE AND INSECT ADVISORY

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Why are my cucumber plants white?

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Each spring temperatures warm, sometimes prematurely, and vegetable crops are planted. Almost like clockwork, Oklahoma's fickle continental climate takes hold and a cold front or two comes through. When temperatures drop below freezing, damage to warm-season vegetables is immediate and easy to recognize. Freezing temperature causes ice crystals to form in the plant cells and damaged leaves and shoots first appear limp and water-soaked before they dry out and turn brown in color. Freezing temperatures cause permanent damage to plants.

Warm-season vegetable and row crops are also susceptible to damage by cool temperatures that do not reach freezing. Such damage is called "chilling injury". Exposure to chilling temperatures results in increased ethylene production and leakage of cell membranes. The degree of chilling injury depends on the temperature, the duration of chilling, and other factors such as relative humidity and soil moisture. Because chilling results in cell leakage, damage to plants can stress. These include loss of turgor (wilting or drooping leaves) and leaf scorch. Other symptoms include reduced growth rate after warming and plant yellowing. Brief periods of chilling may not cause symptoms. Generally, symptoms develop some time after the chilling period and are most severe on small plants and under conditions of low relative humidity and/or soil moisture. Unlike freeze damage, symptoms of chilling injury on plants in the field are reversible, i.e. the plants grow out of it. Research on chilling injury has mostly focused on post-harvest storage of fruits and vegetables where it is a problem in the quality and appearance of produce stored at excessively low temperature.

Fig. 1. White-colored leaf scorch on cucumber seedling.

In cucurbit plants in the field, temperatures in the 40's and low 50's can cause chilling injury. Small cucumber plants are particularly susceptible and the desiccation caused is bright white in color (Fig. 1). We get calls on this almost every year following a cool snap in the spring.

Affected plants generally grow out of this problem after warmer temperatures return (Fig. 2). Other cucurbits are susceptible, but symptoms are less obvious. Recent research indicates that susceptibility to chilling injury in cucumber seedlings is a genetically inherited trait.

Fig. 2. Chilling injury on cucumber seedlings. Note the healthy new leaves, a sign that the plants are recovering from the injury.

Preventive spray program needed for managing foliar diseases of tomato

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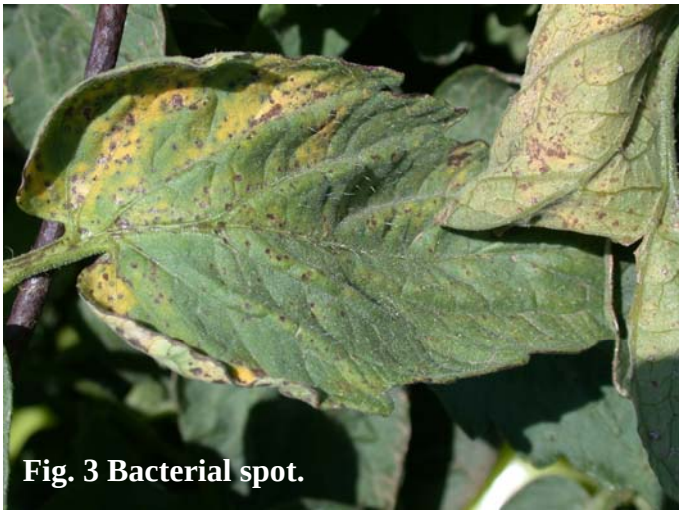

Fig. 3 Bacterial spot.

Tomato growers and gardeners should consider a timely spray program for managing foliar diseases. Foliar diseases damage plants by causing premature defoliation and blemishing of fruit. The most common foliar diseases of tomato are bacterial spot (Fig. 3), bacterial speck (Fig. 4), and Septoria leaf spot, a fungal disease (Fig. 5). These diseases can be difficult to distinguish, particularly in the early stages of disease development. On older plants with fruit, bacterial spot and speck may produce spots on fruit. Early blight apparently is a problem in southern Oklahoma, but I have personally never seen it. Control of these diseases is important in maintaining productive foliage and for providing shade to fruit for prevention of sunscald.

While there are some cultural practices that will help reduce foliar diseases, a spray program is needed to achieve adequate disease control because resistance to common foliar diseases is not available in tomato varieties. Formulations of chlorothalonil (e.g., Bravo or Ortho Garden Disease Control) and mancozeb (e.g., Dithane, Penncozeb) are effective against Septoria leaf

Fig. 4 Bacterial speck.

spot and early blight. Where bacterial spot and speck are anticipated, sprays with a fixed copper such as copper hydroxide (e.g., Kocide) are effective. Kocide can be used alone, but it is less effective than chlorothalonil or mancozeb on Septoria and early blight. Therefore, tank-mixes of mancozeb + copper hydroxide or chlorothalonil + copper hydroxide should be used where the grower is uncertain of the cause of the disease or where both fungal and bacterial diseases are present (a common occurrence). A problem with treatments containing mancozeb for tomato is the 5-day pre-harvest restriction. Consider applying chlorothalonil, coppers, or chlorothalonil + coppers during the harvest periods.

Fig. 5. Septoria leaf spot.

The first spray should be made at bloom and a 7-10 day schedule should be maintained thereafter. A preventive schedule is critical because these diseases are difficult to control once they become established. The fungicides must be reapplied regularly to protect new growth and because fungicides weather over time. Rates applied on a per acre basis should be applied a volume sufficient to achieve good coverage. Rates applied on a per gallon basis should be applied to runoff. The fungi and bacteria that cause these diseases require leaf wetness from dew, rain, or irrigation for infection. Septoria, anthracnose, and bacterial spot are spread by splashing water, wind-driven rain, and mechanically; while spores of early blight are airborne. Try to make applications before an anticipated rain. While some wash-off will occur, the residue will help prevent infection during these wet periods.

Cultural practices for foliar disease control are aimed at reducing periods of leaf wetness, maintaining adequate fertility, and reducing disease spread. Drip irrigation does not wet the foliage and reduces splash dispersal of pathogens. Plants should be supported by stake, cage, or stake and weave systems and rows should be oriented in a north-south direction. This promotes air circulation and allows better spray penetration. Adequate nitrogen fertility should be maintained to reduce stress during fruiting when foliar diseases rapidly increase. Working and harvest operations should be performed when foliage is dry to reduce plant to plant disease spread. These and other tomato diseases are more thoroughly described in OSU Extension Facts No.

7625, No. 7276, and No. 7627; and the OSU Extension Agents Handbook should be consulted for other chemical control options and for converting per acre rates to those used for mixing small quantities.

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