



Founded in 1875
Putting science to work for society

Dr. Yonghao Li
Department of Plant Pathology and Ecology
The Connecticut Agricultural Experiment Station
123 Huntington Street, P. O. Box 1106
New Haven, CT 06504

Phone: (203) 974-8601
Fax: (203) 974-8502
Email: Yonghao.Li@ct.gov
Website: www.ct.gov/caes

EARLY BLIGHT OF TOMATO

Early blight, caused by *Alternaria solani*, is a common fungal disease of tomatoes grown in fields, greenhouses, and high tunnels. In warm, rainy and wet weather, epidemics of this disease can cause severe defoliation, yield loss, and poor fruit quality. The fungus also infects potato.

SYMPTOMS AND DIAGNOSTICS

The fungus can infect most parts of a tomato plant, including leaves, stems, and fruit. Lesions on leaves first appear as small (less than 1/16 inch) brown spots surrounded by yellow discolorations. Diagnostic symptoms develop as the spots enlarge and become dark brown or black lesions with concentric rings, usually 1/3 to 1/4 inch in diameter (Figure 1). Under favorable conditions, many lesions coalesce and result in severe defoliation and sunscald of fruit.



Figure 1. Dark brown or black concentric lesions (arrows) on tomato leaves.

Stem infections can occur at any age, and result in small, dark, slightly sunken areas that enlarge to form circular or elongated concentric lesions (Figure 2).

Fruit can be infected during the green or ripe stage. Sunken lesions with concentric rings of



Figure 2. An elongated concentric lesion (arrow) on the stem.

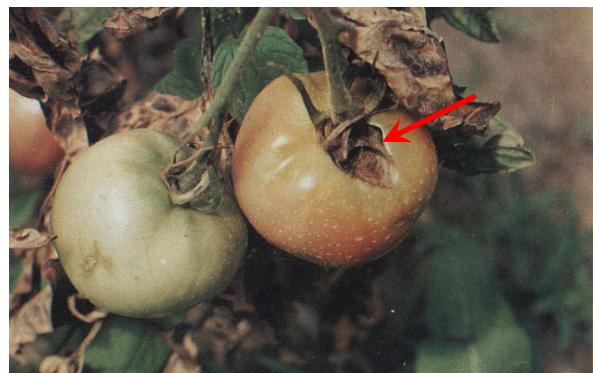


Figure 3. A black and sunken lesion (arrow) on the tomato fruit.

variable sizes form on fruit near the calyx or stem ends (Figure 3).

DISEASE DEVELOPMENT

The fungus survives in contaminated seed and in infected crop debris. Contaminated seed can cause damping-off in seedbeds under high humidity and warm temperatures. Diseased seedlings, along with infected debris from the last season, serve as major primary inoculum sources for disease development in fields.

The pathogen produces numerous spores on infected tissues under wet and humid conditions. The spores are disseminated from plant to plant by means of wind and rain-splashing. Overhead irrigation may exacerbate disease development by increasing leaf wetness for spore germination and splashing spores from diseased plants. Favorable weather conditions for early blight development are warm temperatures (75° - 84° F) and extended periods of leaf wetness from frequent rain or overhead sprinkler irrigation.

Early blight is often associated with tomato plants under stress from lack of nitrogen, particularly towards the end of the growing season on older senescing foliage.

MANAGEMENT

Rotate tomato with non-host crops at least 2 to 3 years. Use pathogen-free seed and transplants. Remove infected materials from the field to reduce inoculum of the disease. Control volunteer crops and weeds, such as tomato, potato, nightshade and horsenettle, to eliminate reservoirs of the pathogen.

Spore germination and infection require warm temperatures and high humidity or long periods of wetness. Improving air circulation by staking or trellising tomato plants is an effective strategy of early blight management. Avoid overhead irrigation and use furrow or drip irrigation. Do not water in cool, cloudy periods or late in the evening, since this may

extend wetness periods. Schedule early morning irrigation to minimize the duration of leaf wetness and to keep leaves dry during the night.

Apply nitrogen fertilizer and maintain adequate soil fertility levels during the fruiting stage.

A number of hybrids tomatoes are resistant or moderately resistant to early blight, such as Defiant PHR and JTO-99197.

Protectant fungicides are often helpful to prevent early blight infections. Fungicides registered for use in Connecticut include mancozeb, chlorothalonil, and azoxystrobin. These fungicides must be applied every 7-10 days to provide protection of new growth. Options for organic production include copper hydroxide, copper sulfate, and Serenade® ASO (*Bacillus subtilis* QST 713).

March 2012