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ALTERNARIA LEAF SPOT OF BRASSICAS

Alternaria leaf spot is a common disease of brassica vegetables including broccoli, Brussels sprouts, cabbage, cauliflower, and kale. The disease attacks leaves, stems, curds/heads, seed pods, and seed. Severe infections may cause pre- and post-harvest yield loss and quality reduction, respectively.

SYMPTOMS AND DIAGNOSTICS

The disease starts on older leaves at the bottom of a plant. The initial symptom appears as small dark-brown spots on leaves. As a spot enlarges, symptoms appear concentric rings at the center of the lesion surrounded by a yellow halo (Figure 1). Numerous lesions may coalesce and form large areas of necrosis, causing the tissue to dry and fall out. On cauliflower curds or broccoli heads, symptoms appear as yellow



Figure 1. Dark-brown lesions on a broccoli leaf with concentric rings at the center.

to dark brown patches on the floret (Figure 2), which can develop downward and cause curd or head rot. Symptoms on stems and petioles are dark brown or black elongated lesions. On seed pods, symptoms appear as tan to black spots that may result in seed infection and contamination. Symptoms on seedlings from infected seed include black spots on cotyledons and hypocotyle, damping-off, and stunted growth. The sign of the disease is a fine, black, fuzzy fungal growth (spores) on dying host tissues in high relative humidity conditions (Figure 3), which is detectible under a magnifier or a microscope, but is rarely visible to the naked eye.

DISEASE DEVELOPMENT

Three *Alternaria* species, *A. brassicicola*, *A.*



Figure 2. Yellowing and browning of florets on broccoli heads.



Figure 3. Black spore masses on broccoli

brassicae, and *A. raphanin*, have been reported to cause leaf spots of brassica crops despite their host specificity. *Alternaria* leaf spot of brassica is a seed-borne disease. The pathogen also survives in plant debris left in fields. Movement of contaminated seed and diseased transplants is a means of long-distance dispersal of the pathogen, which serves as a primary inoculum source of the disease in fields. In the spring, the overwintered pathogen on plant debris or infected seedlings/transplants produces conidia (asexual spores), resulting in primary infections in fields. Although the primary infection level may be very low in the spring, numerous conidia from infected tissues cause repeated secondary infections and the spread of the disease during the summer. Conidia are dispersed by wind, rain splash, and overhead irrigation. Spore germination and infection require free water on the surface of plant tissues, or high relative humidity (> 95%). The optimum temperatures for spore germination and disease development are between 82 °F and 88 °F. So, warm temperatures and periods of rain or high relative humidity are favorable for the disease development.

MANAGEMENT

Cultural practice: Purchase certified clean seed or transplants from reputable suppliers to prevent the introduction of the disease to

fields. Scout seedlings in greenhouses and destroy symptomatic seedlings to prevent the spread of the disease. Practice a three-year rotation with non-brassica crops to reduce primary inoculum in the field. Maintain proper spacing between plants for a better air circulation. Remove and destroy symptomatic old leaves to reduce secondary infections in fields during the season. Hot water seed treatments (120 °F, between 10 and 25 minutes) can kill the pathogen on seed coat but are not effective for internally infected seed.

Fungicide: Fungicide treatments are preventative rather than curative. Good cultural prevention practices are essential for effective fungicide control. Fungicide spray should start before infections occur or when symptoms first appear. Fungicides that are registered for the disease include chlorothalonil, copper products, extract of *Reynoutria sachalinensis*, and *B. subtilis* strain QST 713. Dry seed treatments with a biofungicide, *Streptomyces* sp. strain K61 (0.04-4 oz/lb. seed), can suppress the pathogen on seed and reduce seedling infection rates.

READ THE LABEL BEFORE APPLYING ANY PESTICIDE! We keep all archives of our fact sheets posted. While most practices for disease management do not change over time, please be aware that changes in pesticide regulations occur constantly. When applying pesticides, always consult the label to make sure the pesticide is approved for use on your plants.