

Alternaria Diseases of Brassicas

Alternaria diseases, caused by the fungi *Alternaria brassicae* and *A. brassicicola*, are common diseases of brassicas. The diseases are also known as Alternaria blight, black spot, and dark leaf spot. *Alternaria* pathogen can infect susceptible hosts and survive on dead plant material. Inoculum of the pathogens is always available in the nature. Both *A. brassicae* and *A. brassicicola* are seedborne pathogens. Black spot caused by these pathogens affects the quality of the produce.

Symptoms

All aboveground parts of the host plants can be infected. Symptoms on leaves begin as small, dark spots (1-3 mm) that gradually enlarge and turn brown to gray. A chlorotic halo is often visible if the surrounding leaf area is still green (Figure 1). Leaf spots are often concentrically zonate like a target, and the center may become so brittle that it splits open (Figure 2). Older leaves normally have more and larger lesions than younger leaves. *Alternaria* species cause dark, brown lesions on cauliflower curd (Figure 3), heads of cabbage, Brussels sprouts, and broccoli. In storage, secondary fungi and bacteria may invade *Alternaria*-infected produce.

Dark brown to black, elongate lesions develops on petioles, stems and pods (Figure 4). Infection of pods results in infection of seeds. Infected seeds germinate poorly and cause pre- and post-emergence damping-off.

No sexual state has been known for *A. brassicae* and *A. brassicicola*. They are identified from each other based on



Figure 1. *Alternaria* black spots on a brassica leaf (Courtesy U Mass Extension).



Figure 2. An *Alternaria* spot on a brassica leaf (Courtesy Cornell University).

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the morphology of their conidia. Conidia of *A. brassicae* is almost twice as long (75-350 µm) as conidia of *A. brassicicola* (Figure 5). The conidia have 6-15 transverse and 0-3 longitudinal septa.

Disease cycle

Both *A. brassicae* and *A. brassicicola* survive on plant debris. Conidia formed in debris on the soil surface are dispersed by wind to host plants. Infected winter-sown brassica crops can be a source of inoculum for neighboring spring-sown vegetables.

Seedborne inoculum of the pathogen is important. Seedborne *A. brassicae* is particularly important where seeds are sown into warm soil.

Often lower and older leaves become infected first. Secondary conidia produced on older leaves are spread by wind, rain splash, and runoff water. Host plants become more susceptible with age. Wet weather conditions at crop maturity result in a rapid increase of conidial production and incidence of secondary infection.

Generally, *A. brassicicola* requires a longer time for infection and disease development and a higher temperature than does *A. brassicae*. Dispersal of conidia is greatest in warm and dry periods following rainy weather. Free water, or relative humidity above 95%, is required for conidial germination and plant infection. *A. brassicicola* infects plant tissues both through stomata and directly through the epidermis.

Disease management

- Plant pathogen-free seed (certified seed).
- Plant disease-free transplants.
- Plant resistant or less susceptible cultivars.
- Consider ≥ 3 years of crop rotations with nonhost crops. Effectively control weeds and volunteer plants.
- Incorporate plant debris into the soil after harvesting crops.



Figure 3. Cauliflower head with black lesions caused by *Alternaria brassicicola* (Courtesy The Ohio State University).



Figure 4. *Alternaria* spots on stems (left: Courtesy APS, G. A. Petrie) and on pods (right: Courtesy APS, J. P. Tewari) of brassica plants.

- Fungicides are available for foliage applications. Current available fungicides for foliage applications in the Midwest states are: Cabrio, chlorothalonil (e.g., Bravo), Endura, Inspire Super, Orondis Opti, Quadris, Quadris Top, Reason, and Switch. For the up-to-date information on using chemicals for managing *Alternaria* diseases of brassicas, refer to the Midwest Vegetable Production Guide for Commercial Growers (<https://mwvegguide.org/uploads/pdfs/2022-Midwest-Veg-Guide-8.5-x-11-with-covers-no-bleeds-bookmarked-compressed.pdf>).



Figure 5. Conidia of *Alternaria brassicae* (left: Courtesy B. Watt, University of Maine) and *Alternaria brassicicola* (right: Courtesy Wikipedia).