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# Alternaria Diseases

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**D**iseases caused by *Alternaria* species are very common and are worldwide in their occurrence. Important host plants include a variety of crops such as apples, broccoli, cauliflower, carrots, potatoes, Chinese cabbage, tomatoes, bok choy, and citrus, plus many plants used as ornamentals and a number of weeds.

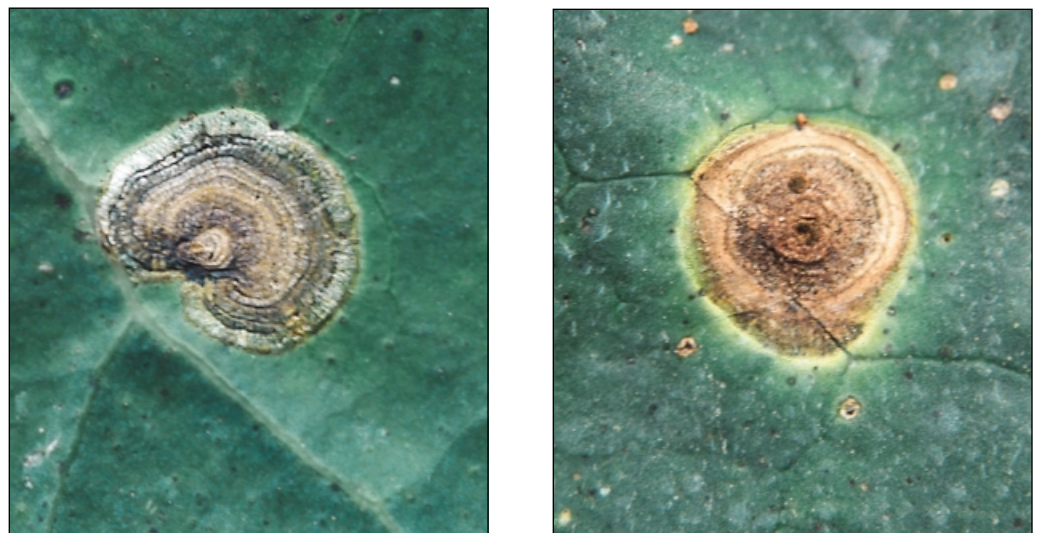
## SYMPTOMS

*Alternaria* generally attacks the aerial parts of its host. In the leafy vegetables, symptoms of *Alternaria* infection typically start as a small, circular, dark spot. As the disease progresses, the circular spots may grow to ½ inch (1 cm) or more in diameter and are usually gray, gray-tan, or near black in color.

Due to fluctuating environmental conditions, the pathogen does not have a uniform growth rate, thus spots develop in a target pattern of concentric rings (fig. 1). Where host leaves are large enough to allow unrestricted symptom development, the target spots are diagnostic for *Alternaria* as there are few other pathogens that cause this type of diagnostic expression. Apart from the target pattern, the lesion is also often covered with a fine, black, fuzzy growth. This growth is the *Alternaria* fungus sporulating on the dying host tissues.

Many *Alternaria* species also produce toxins that diffuse into host tissues ahead of the fungus. Therefore, it is not uncommon to see a yellow halo that fades into the healthy host tissues that surround the target spot.

Dark, sunken lesions are usually the expression of *Alternaria* infections on roots, tubers, stems, and fruits. The fungus may sporulate in these cankers, causing a fine, black, velvety growth of fungus and spores to cover the affected area.

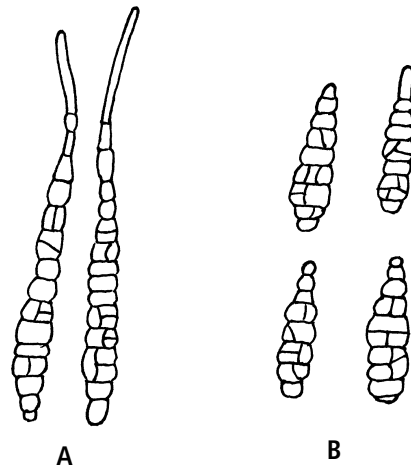


**Figure 1.** Leafspot of crucifers caused by *Alternaria brassicae*, showing the typical target spot composed of concentric rings.

## THE PATHOGEN

The spores of *Alternaria* species are often beaked and always multicelled. The cells are divided longitudinally and transversely. Spores are dark and borne singly or in chains (fig. 2). Some *Alternaria* species and the diseases they cause on specific hosts include

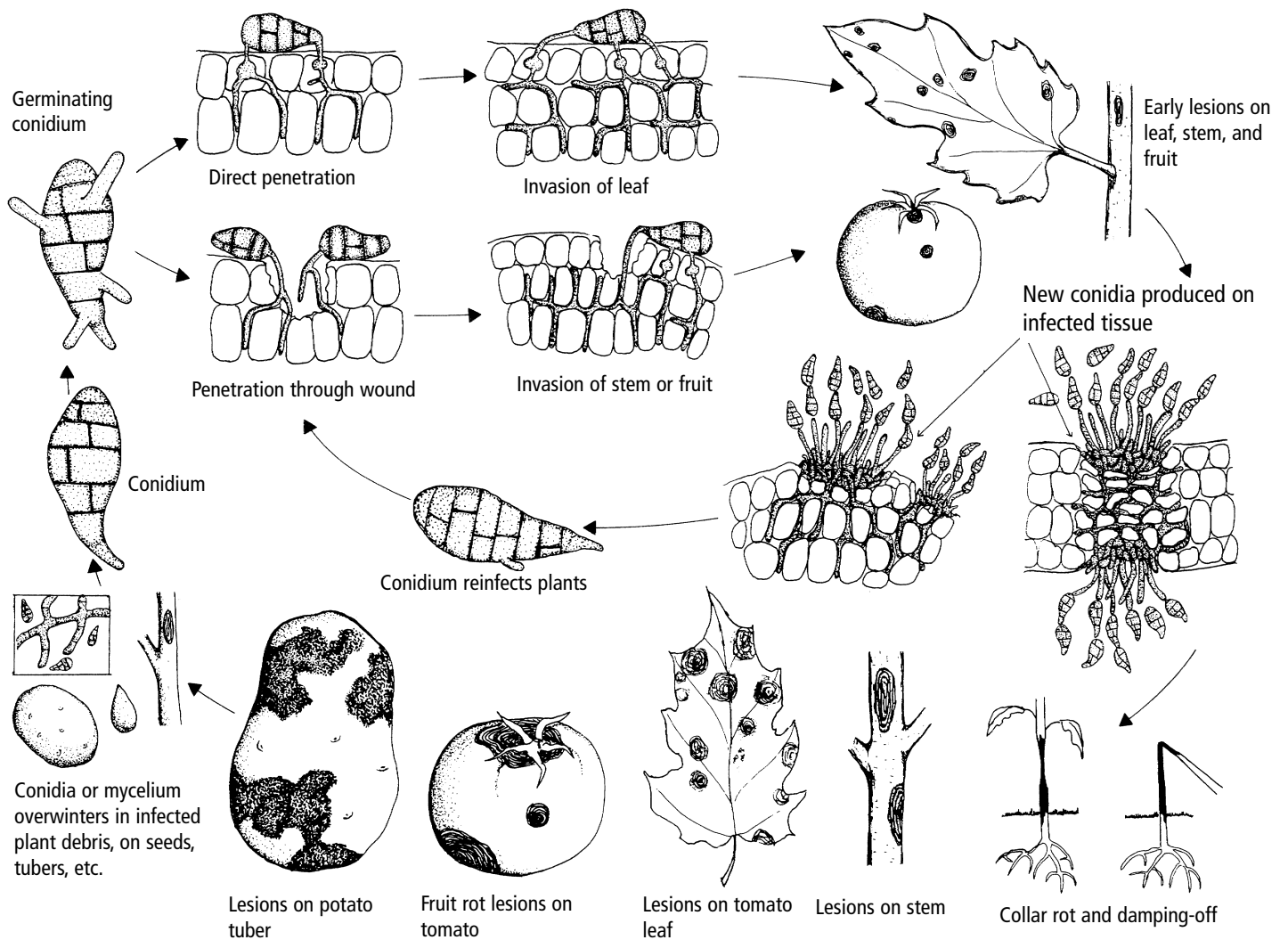
- *Alternaria dauci* (carrot leafblight)
- *A. radicina* (black rot of carrot)
- *A. brassicae* and *A. brassicicola* (leaf spot of crucifers)
- *A. solani* (tomato early blight and fruit rot)
- *A. brassicae* or *A. brassicicola* (broccoli headrot)
- *A. tenuis* and *A. alternata* (fruit spot on peppers)



**Figure 2.** Conidia of *Alternaria brassicae* (A) and *Alternaria brassicicola* (B).

## BIOLOGY

Plant pathogenic *Alternaria* species survive between crops as spores and mycelium in infected plant residues or in and on seeds. If the fungus is seedborne, it may attack seedlings, causing damping-off, stem lesions, or collar rot. Most often, however, the fungus grows and sporulates on plant residues during periods of rain, heavy dew, or under conditions of good soil moisture. Spores are wind blown or splashed onto plant surfaces where infection occurs. The spores must have free moisture to germinate and infect. Penetration of the host can be direct, through wounds, or through stomata (fig. 3). Tissues that are stressed, weak, old, or wounded are more susceptible to invasion than sound, vigorous tissues.



**Figure 3.** Development and symptoms of diseases caused by *Alternaria*.

(Source: Agrios, G. N. 1997. Plant pathology, 4th edition. San Diego: Academic Press.)

## DISEASE MANAGEMENT

Suppression of *Alternaria* diseases can be accomplished in several ways. Some plant cultivars carry resistance. When seed may be carrying the fungal spores, using disease-free seed or seed that has been treated can greatly reduce disease incidence. Rotating crops so that susceptible crops follow non-host crops is useful in reducing disease incidence. Crop residue destruction and weed control also helps reduce disease.

Ultraviolet light has been shown to be essential for spore formation in *Alternaria* species. Therefore, under greenhouse growing conditions, the use of ultraviolet light-absorbing film can greatly reduce the incidence of some *Alternaria* diseases.

Finally, there are a number of fungicides that have activity against *Alternaria* fungi. Chlorothalonil, captan, fludioxonil, imazalil, iprodione, maneb, mancozeb, thiram, and selected copper fungicides have varying degrees of efficacy against *Alternaria* species. Consult the product label for registered uses and dosage recommendations.

**FOR MORE INFORMATION**

You'll find detailed information on many aspects of disease and pest management in these titles and in other publications, slide sets, and videos from UC ANR:

*Alive and Well: Sustainable Soil Management*, Video V92-D

*Natural Enemies Handbook: The Illustrated Guide to Biological Pest Control*, Publication 3386

*Pests of the Garden and Small Farm: A Grower's Guide to Using Less Pesticide*, Second Edition, Publication 3332

*Plants in California Susceptible to Phytophthora cinnamomi*, Publication 21178

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#### **Publication 8040**

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pr-12/01-GM/VFG



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