

## Cabbage black leaf spot (133)

### Common Name

Cabbage black leaf spot

### Scientific Name

*Alternaria brassicicola*. Another *Alternaria* fungus, *Alternaria brassicae*, grey leaf spot, also occurs, and causes similar symptoms (see **Fact Sheet no. 310**). Microscopic examination of the spores is needed to distinguish between the two species (Photo 5).

### Distribution

Asia, Africa, North, South and Central America, the Caribbean, Europe, Oceania. It is recorded from American Samoa, Australia, Cook Islands, French Polynesia, Federated States of Micronesia, New Zealand, Niue, Papua New Guinea, Samoa, Tonga, Tuvalu, Vanuatu, and Wallis & Futuna. Note that *Alternaria brassicae* has not been recorded in Fiji, Samoa, Solomon Islands, or Tonga, but has been recorded from Niue and Papua New Guinea.

### Hosts

Members of the brassica family, e.g., broccoli, cabbage, cauliflower, mustard, oilseed rape, and cruciferous weeds. Chinese cabbages and mustards are especially susceptible to *Alternaria brassicae*.

### Symptoms & Life Cycle

Brown or black leaf spots, circular or irregular, and mostly between the veins, occur on the leaves (Photos 1&2). The spots, up to 25 mm diameter, show concentric rings, giving a target-like appearance (Photo 3). The spots usually have a well-defined margin surrounded by a halo; and they are usually darker than those caused by *Alternaria brassicae*. Black spore masses form on the lower leaf surfaces (Photos 2&3). As spots age, they become papery, and the centres fall out giving a 'shot-hole' appearance (Photo 4). Under favourable conditions (wet and warm, 20-30°C), the spots merge, causing the leaf to dry out and look scorched. Spots also develop on stems, leaf and flower stalks, and on seed heads. Dark, sunken rots occur on the heads of broccoli and cauliflower.

Spread of the fungus over short distances occurs in water droplets splashed from infected plants to those nearby; further spread occurs in wind-driven rain, and in wind alone when the crop is harvested. Spread over long distances occurs on seed.

### Impact

A fungus is the cause of the leaf spot. It is an important disease, causing economic loss in several different ways. Its effect on seed is twofold: (i) seed infection causes both pre- and post-emergence damping-off (see **Fact Sheet no. 47**) leading to stem cankers of the survivors; and (ii) seed infection also affects the amount of seed harvested and its quality. On mature plants, the spots on the head and/or outer leaves are unsightly and reduce market price, as well as the time that cabbages and related crops can be stored.

In Samoa, the disease is said to be more common in cooler highland areas on over-mature cabbage heads.

### Detection & inspection

Look for the brown or black leaf spots with concentric black rings - the target spot appearance is characteristic of this disease. Look with a x10 lens to see the velvety appearance of the spots on the lower surface of the leaf where the spores form. Look to see the 'shot-holes' as the centres of the spots dry and fall away.

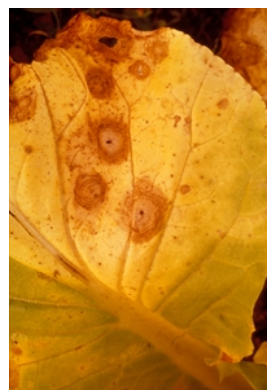


Photo 1. Roughly circular leaf spots, with concentric rings, mostly between the veins on cabbage caused by black leaf spot, *Alternaria brassicicola*.



Photo 2. Cabbage leaf spot, possibly *Alternaria brassicicola*, showing dark brown areas where spores are forming, and a large spot (lower left) with a crack in the centre; later, the crack will widen and the centre of the spot will fall out becoming similar to Photo 5.



Photo 3. Spots of black leaf spot, *Alternaria brassicicola*, on Chinese cabbage.



Photo 4. Single leaf spot on a cabbage leaf caused by *Alternaria brassicicola*, showing the "shot-hole" effect: the centre of the spot rots and falls out. A yellow margin or halo is also seen.

## Management

### CULTURAL CONTROL

#### Before planting:

- Treat seeds with hot water at 50°C for 25-30 minutes, and then dry them.
- Grow seedlings in soilless or pasteurized media in clean trays. Check regularly for signs of disease, and discard any plants with symptoms.

#### During growth:

- Plant cabbages apart so that air can circulate between them; this will help to dry the leaves and reduce the time that spores have to germinate and infect.
- Remove weeds from in and around the plots of cabbages (and related crops).
- Avoid overhead irrigation, especially from the time leaves start to show infections.

#### After harvest:

- Remove the remains of the crop after harvest, and destroy. Note, infections on the leaves produce spores until the leaves are completely decomposed. Alternatively, plough in the remains as deeply as possible.
- Rotate crops, leaving a 1-2-year interval between crops of cabbages (and related crops) planted on the same land.

### CHEMICAL CONTROL

- *Seed treatment:* Iprodione has been used as a seed treatment. Captan or thiram can be used as alternatives.
- *In the field:* Fungicides used against *Alternaria* leaf spot include chlorothalonil, copper formulations, mancozeb, iprodione and members of the strobilurin group.

When using a pesticide, always wear protective clothing and follow the instructions on the product label, such as dosage, timing of application, and pre-harvest interval. **Recommendations will vary with the crop and system of cultivation. Expert advice on the most appropriate pesticides to use should always be sought from local agricultural authorities.**



Photo 5. Spores of black leaf spot, *Alternaria brassicicola*. Compare with spores of cabbage grey leaf spot, *Alternaria brassicae* (see Fact sheet no. 310).

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Information (and Photo 1) from Gerlach WWP (1988) *Plant diseases of Western Samoa*. Samoan German Crop Protection Project, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Germany; and (including Photo 4) *Diseases of vegetable crops in Australia* (2010). Editors, Denis Pearsley, et al. CSIRO Publishing; and Seemadua S, et al. (2011) *Alternaria spot (Alternaria brassicicola)*: PaDIL - <http://www.padil.gov.au>; and from (including Photos 5) McKenzie E (2013) *Alternaria brassicicola*: PaDIL - (<http://www.padil.gov.au>). Photo 4 Gerald Holmes, California Polytechnic State University at San Luis Obispo, Bugwood.org.

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