Cabbage downy mildew (192)

Photo 1. Older leaves of cabbage seedlings showing speckled appearance caused by downy mildew, *Hyaloperonospora parasitica*.

Photo 2. Infection in the field: spots on the leaves caused by downy mildew, *Hyaloperonospora parasitica*, join together in wet weather and form large patches of decay.

Common Name

Cabbage downy mildew

Scientific Name

Hyaloperonospora parasitica; previously known as *Peronospora parasitica.* There are different strains of the Oomycete such that the strain on radish does little damage to cabbage.

Distribution

Worldwide. Asia, Africa, North, Central America, the Caribbean, Europe, Oceania. It is recorded from Australia, American Samoa, Fiji. French Polynesia, New Caledonia, New Zealand, Papua New Guinea, and Samoa.

Hosts

Members of the brassica family, e.g., cabbage, cauliflower, broccoli, Chinese cabbage, and many more. It also infects weeds (e.g., shepherd's purse) and some ornamentals (e.g., wallflower) in the brassica family.

Symptoms & Life Cycle

The disease is caused by an oomycete or water mould, not a fungus. Although they look like fungi, downy mildews are related to algae.

Attacks are more common in seedbeds. Under wet conditions favourable for the disease, yellow to pale brown spots develop rapidly into large irregular patches, on the upper surface of the young leaves. A greyish white growth occurs on the underside of the leaves, and may be present, too, on the upper surface during cool and moist conditions. The infected areas turn brown and papery in dry weather. Severely affected seedlings are stunted and killed. The older leaves may have a speckled appearance (Photo 1).

Similar symptoms appear in the field and lead to early death of the leaves; in moist weather the spots grow larger, join together and form large dead patches (Photo 2). The infections can lead to bacterial rots developing in storage. Large dark brown rots develop on cauliflower heads.

The Oomycete spreads in wind and water. Long distance spread occurs on seedlings, and also there is evidence for spread as spores on seed. The disease does best when there is high humidity, fog, drizzling rains, and heavy dew. Leaf wetness of 4-6 hours at 20°C and 6-8 hours at 15°C are necessary for significant infection and development of downy mildew.

Survival of the oomycete is on self-sown ('volunteer') brassica plants, and also on weeds. Survival is also possible in soil and plant remains as thick-walled spores known as oospores, which are produced through a sexual process.

Impact

Downy mildew of cabbage and other brassicas is not an important disease in the tropics as much as it is in the sub-tropics and temperate climates. Seedlings, especially if overcrowded, are more usually affected by the disease. Severely affected seedlings may die. Occasionally, severe outbreaks are reported. Downy mildew is more important on the crops used for flower heads, e.g., broccoli and cauliflower, than those used for leaves, e.g., cabbage, and least damaging on those used for roots, e.g., turnip.

Detection & inspection

Look for yellow patches on the cotyledons and young leaves, with white growth on the underside. Look for the spore-bearing structures within the white growth with a hand lens.

Management

CULTURAL CONTROL

Before planting:

- Keep nurseries free from weeds, especially those in the cababge family.
- Water plants early in the day so that leaves are wet only for a few hours, not long enough for downy mildew spore to germinate and infect.
- Avoid overcrowding seedlings so that there is sufficient air movement around them.
- Carefully check each seedling before transplanting in the field, and remove any that show downy mildew symptoms. If symptoms are seen, spray all the seedlings with a systemic fungicide.

During growth:

- Remove weeds in the brassica family that may be alternative hosts of downy mildew.

After harvest:

- Practice crop rotation, with non-brassica species.
- Collect and burn or bury as much of the crop as possible when harvest is complete.

CHEMICAL CONTROL

Use fungicides on seedlings, but to increase their effect keep humidity and leaf wetness low (see above). If fungicides are needed, spray with systemic metalaxyl, or protectant mancozeb, copper or chlorothalonil.

AUTHOR Grahame Jackson

Photo 1 *Diseases of vegetable crops in Australia* (2010). Editors, Denis Persley, Tony Cooke, Susan House. CSIRO Publishing. Photo 2 Kohler F, Pellegrin F, Jackson G, McKenzie E (1997) *Diseases of cultivated crops in Pacific Island countries.* South Pacific Commission. Pirie Printers Pty Limited, Canberra, Australia.

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