



Downy mildew of brassicas

Elizabeth Minchinton, Knoxfield

Caused by

Peronospora parasitica

Introduction

Downy mildew is caused by a fungus which mainly attacks foliage. It is responsible for substantial losses in seedling production, especially during the cooler months. Young plants are more susceptible than older plants.

Symptoms

Downy mildew is first seen as a fluffy or powdery-white mass of spores on the undersurface of brassica seed leaves (cotyledons). This is followed by a black speckling and puckering of the uppersurface. Leaves prematurely yellow and fall from the plants.

Symptoms on mature plants in the field are generally confined to the leaves closest to the ground. The fungus produces spores on the undersurface, and brown to black, sunken, angular, pepper-like lesions on the uppersurface of leaves. The fungus can cause black lesions on cabbage heads and breakdown of cauliflower curds in storage.



Figure 1. Powdery white spores of downy mildew on the undersurface of a cotyledon.

Biology

Survival

Oospores (sexually produced or survival spores) of the fungus are formed in ageing and dying leaves, and survive in debris in the soil from one crop to the next. The fungus is known to survive on seed and on several species of crucifer weeds. In seedling nurseries the fungus often

survives on old, slightly-infected seedlings which have passed their "use-by-date."

Dispersal

The powdery white spores are the major means of dispersal of the fungus, especially once it is established within seedlings crops. Spores are produced overnight and released the following morning as the air dries out. They are dispersed by wind and rain splash.

Environmental conditions

The disease is favoured by cool temperatures with an optimum range of 8-16°C. The vegetative spores need water to germinate and can infect seedlings within three hours of contact with a leaf. Deficiencies of potash have been shown to increase the susceptibility of cauliflower seedlings to downy mildew.

Host range

The fungus infects a wide range of plants, including broccoli, brussels sprouts, cauliflower, cabbage, kale, chinese cabbage, chinese broccoli, chinese mustard, radish, turnip, kohlrabi, swede, water cress, shepherds purse, and many more. A different race of *P. parasitica* causes downy mildew on stocks. The fungus on brassicas will not infect stocks and vice versa.

Control

Control of this disease is achieved by integrating management practices and fungicide protocols:

- Use seed treated with hot water or seedlings raised from such treatment.
- Plant disease-free seedlings.
- Do not water seedlings in the morning when spores are released.
- Keep seedlings as dry as possible. One heavy watering is preferable to a long light watering.
- Use a preventative fungicide spray program if weather conditions favour disease.
- Maintain a well ventilated environment - a lower relative humidity minimises spore production. This may mean fewer plants and trays per square meter.
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- Maintain a well ventilated environment - a lower relative humidity minimises spore production. This may mean fewer plants and trays per square meter.
- Maintain a balanced program of nutrition - deficiency of potash will increase the susceptibility of seedlings to downy mildew.
- Remove any source of spores, such as heavily infected trays of seedlings, old infected seedlings, and weedy crucifer weeds.
- Disinfect glasshouses and igloos and rotate areas housing seedlings.
- Plough in field crop debris immediately after harvest and use a crop rotation of two to three years if possible.
- Alternate chemicals of different classes to avoid the fungus developing resistance to a particular group of fungicides.
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edited by Kathy Pullman

Correct diagnosis is essential for effective pest and disease control. A commercial diagnostic service is available at the Institute for Horticultural Development (IHD). For further information, phone Crop Health Services on (03) 9210-9222 or fax (03) 9800 3521.

For further information on registered chemicals, phone the DPI Chemical Information Service.

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