

Barley Powdery Mildew

The fungus *Blumeria graminis* f.sp. *hordei* (Bgh) causes powdery mildew infection on the small grain cereal crop, barley. Closely related pathogens infect other cereals.



Pathogen Description

Blumeria graminis is an obligate, biotrophic fungal pathogen so it depends entirely on living plant tissue for its growth and reproduction. Within the species, several formae speciales (ff. spp.) exist adapted to particular host species. There are 4 ff. spp. one for each of the major cultivated cereals (barley, wheat, oats & rye). This sheet relates specifically to barley powdery mildew (*Bg* f.sp. *hordei*) formerly known as *Erysiphe graminis* f.sp. *hordei*

Mode of Infection

Spores of the fungus land on the leaf surface, germinating within 24 hrs., producing a primary germ tube. A second germ tube is produced, an appressorium, that penetrates the walls of the barley cells by means of turgor pressure and enzyme activity. An infection peg penetrates the plant's epidermal cell from where the fungus can 'steal' nutrients through a structure called a haustorium (a modification of the infection peg)

Symptoms

About 7-10 days after infection, small white & fluffy circular growths appear on the upper surface of the leaf. These expand and grow into one another giving a mass of grey/white powdery spores on the leaf surface. In heavy infections, or under favourable conditions, leaves may turn yellow as plants become stressed.

Occasionally, a reaction called hypersensitivity occurs on barley varieties with a high resistance rating. The symptoms are small brown flecks with no evidence of powdery mildew growth on the leaf surface

Disease Spread

Humid and warm conditions favour disease development. Many thousands of asexual spores (conidia) are produced on the leaf surface of a single barley plant. These are very lightweight and easily spread by wind. Leaf-to-leaf and plant-to-plant spread occur. Spores from Europe reaching the UK has been reported.

Control

Large economic losses are possible due to a direct reduction in yield or increased production costs (via the application of fungicides). A combined strategy of timely fungicide applications (using modern fungicides) and the use of resistant varieties is recommended to control the disease. Strobilurin fungicides are no longer effective, with the pathogen having evolved resistance.

Detection

The disease is one of the easiest to spot in the crop and very common. Visual diagnosis is relied upon.

Interesting Facts

Barley is grown for the brewing industry and pet food supplies. It can be grown as both a Winter and Spring crop (sown in September & April respectively). In spring barley, varieties with effective resistance provided by the 'mlo' gene should be grown. Some mildew can develop on these varieties, particularly on seedlings during dry conditions. However resistance has proved reliable and effective over the past ten years (durable).

Further Reading

<http://www.plantwise.org/Knowledgebank/Datasheet.aspx?dsid=22075>