

# Resistance to fungicides

'Fungicide resistance' occurs as populations of a pathogen adapt to a fungicide. The specific mode of action of some modern fungicides (eg strobilurins) means the risk of resistance occurring is greater than with older ones (eg chlorothalonil) with less specific activity.

**Resistance to strobilurins** is widespread in barley pathogens. However, the effectiveness of fungicides against different pathogens varies:

- powdery mildew and Ramularia – strobilurins no longer effective
- net blotch – still some activity, especially from pyraclostrobin and picoxystrobin
- Rhynchosporium – no resistance has been detected and control remains effective
- rusts – no resistance has been detected and control remains effective.

**Triazole resistance** results in reduced efficacy over seasons.

- powdery mildew – the first disease to develop triazole resistance. Some of the newer triazoles provide useful control.
- Rhynchosporium – insensitivity is developing across most of the UK, with Northern Ireland less affected. Higher doses are required to control less sensitive strains.

Prothioconazole continues to show useful activity against both powdery mildew and Rhynchosporium, but should be used in mixture with an effective partner.

**Quinoxifen resistance** may be reflected in poor activity against powdery mildew. Alternative fungicides include metrafenone and proquinazid.

## Good resistance management is based on limiting exposure of target pathogen to fungicides

- Practise good hygiene through disposal of crop debris and control of volunteers which may harbour disease.
- Select varieties exhibiting a high degree of resistance to diseases known to be prevalent in your area.
- Avoid growing large areas of any one variety, particularly in areas of high disease risk where the variety is known to be susceptible.
- Only use fungicides in situations where the risk or presence of disease warrants treatment.
- Monitor crops regularly for disease and treat before infection becomes established.
- Use the minimum effective fungicide dose.
- Use effective fungicides with different modes of action in mixtures or as alternate sprays. Mixtures of eradicant fungicides with protectant materials offer the most flexibility as well as reducing resistance risk.
- Avoid repeated applications of the same product or mode of action. Never exceed the maximum recommended number of applications to each crop for any particular fungicide group.
- When planning spray programmes, take into account any earlier use of fungicide groups as seed treatments.



For more information on resistance management, see the Fungicide Resistance Action Group – UK ([www.pesticides.gov.uk/rags.asp](http://www.pesticides.gov.uk/rags.asp))