

Integrated Pest Management: Science and Practice

Video Series: Integrated Pest Management focusing on disease control in cereals

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Citation: Paveley, N and van den Bosch, F. (2024) Video Series: Integrated Pest Management focusing on disease control in cereals, DOI.10.5281/zenodo.13982925

Introduction

Welcome to this video series on IPM, focusing on disease control in cereals.

The challenge of IPM is to make the control methods we use appropriate to the circumstances, and to balance between the productivity of the crop and minimising the impact on the environment. The control decisions we make on one field or in one season may not be appropriate in another set of circumstances – there is no ‘blue print’. In these videos we delve into the physiology of the crop, the epidemiology of the diseases and how different control methods work. By understanding the biology of the systems we're trying to control, we're better equipped to make appropriate decisions. Going into depth means we can't cover all aspects of IPM. In practice, decisions about disease control are being made alongside decisions about invertebrate pests and weeds, and in the wider context of integrated crop management. In the UK, information on those topics is available from organisations such as LEAF, AHDB and the Voluntary Initiative. Nevertheless, disease control is still a big topic, so we have broken it down into bite size chunks - although each video is still a pretty substantial bite and will need some digesting.

The videos can be viewed in any order that interests you, but they'll make most logical sense viewed in the order in the menu.

Disclaimer

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Department
for Environment
Food & Rural Affairs

The video series “Integrated Pest Management focusing on disease control in cereals” was funded by Defra in 2024
Project title: IPM instructional videos, reference RDE451.

Summary video content

Introduction

- [Introduction to 'Integrated Pest Management \(IPM\): Science and Practice' video series](#)

Crop productivity and foliar disease

- [Which parts of the crop canopy need protecting from disease and when?](#)
- [How long does the crop canopy need protecting for?](#)
- [How to predict epidemic severity?](#)
- [How to delay and slow epidemics?](#)

Disease control methods

- [How can choice of variety help?](#)
 - Disease escape
 - Disease resistance
 - Disease tolerance
- [When do I need to treat with fungicide?](#)
- [How much fungicide is needed?](#)

The pathogen strikes back

- [How to manage fungicide resistance? Part A](#)
- [How to manage fungicide resistance? Part B](#)
- [How to manage pathogen virulence?](#)
- [How to combine control measures in IPM?](#)

The environment

- [Is disease control good or bad for the environment?](#)

References

Crop productivity and foliar disease

Guides and guidance

- AHDB Wheat growth guide. <https://ahdb.org.uk/knowledge-library/wheat-growth-guide>.
- AHDB Barley growth guide. <https://ahdb.org.uk/knowledge-library/barley-growth-guide>
- AHDB Wheat and barley disease management guide. <https://ahdb.org.uk/knowledge-library/integrated-pest-management-ipm-of-cereal-diseases>

Books

- Crop physiology: case histories for major crops. Editors: Sadras VO, Calderini DF (2021). <https://doi.org/10.1016/C2018-0-05018-5>
- Madden, L.V., Hughes, G. & van den Bosch, F. (2007). The Study of Plant Disease Epidemics APS Press.
- Parker, S R, Lovell, D J, Royle, D J and Paveley, N D (1999). Analysing epidemics of *Septoria tritici* for improved estimates of disease risk. In: *Septoria on cereals: a study of pathosystems*. Eds. Lucas J.A., Bowyer P. and Anderson H.M., 96-107.

Disease control methods

Guides and guidance

- AHDB Recommended Lists <https://ahdb.org.uk/knowledge-library/recommended-lists-for-cereals-and-oilseeds-rl>
- Defra pest and disease survey (wheat and oilseed rape) <https://www.pestanddiseasesurvey.co.uk/>
- UK Cereal Pathogen Virulence Survey <https://ahdb.org.uk/knowledge-library/uk-cereal-pathogen-virulence-survey-ukcpvs>
- The genetic technology (precision breeding) act 2023 <https://bills.parliament.uk/bills/3167/publications>
- Wheat and barley disease management guide. <https://ahdb.org.uk/knowledge-library/integrated-pest-management-ipm-of-cereal-diseases>
- Fungicide performance in cereals. <https://ahdb.org.uk/knowledge-library/a-guide-to-fungicide-performance-in-wheat-barley-and-oilseed-rape>
- Fungicide programmes for wheat. <https://ahdb.org.uk/knowledge-library/fungicide-programmes-for-wheat>
- Cereal growth stages. <https://ahdb.org.uk/knowledge-library/the-growth-stages-of-cereals>

The pathogen strikes back

Guides and guidance

- Guidance from the UK Fungicide Resistance Action Group (FRAG-UK): <https://ahdb.org.uk/knowledge-library/the-fungicide-resistance-action-group-frag-uk>
- Guidance from the industry Fungicide Resistance Action Committee (FRAC): <https://www.frac.info/>
- Information on variety mixtures: <https://ahdb.org.uk/variety-blend-tool-for-winter-wheat>
- IPM Planning Tool <https://www.ipmtool.net/>
- Sustainable Use Directive, Annex III <http://data.europa.eu/eli/dir/2009/128/2019-07-26>

Book

- Understanding and minimising fungicide resistance (2023). Edited by: Lopez-Ruiz FJ. Published by: Burleigh Dodds

The environment

Guides and guidance

- For references related to environmental impacts of pesticides: How pesticides impact human health and ecosystems in Europe. <https://www.eea.europa.eu/publications/how-pesticides-impact-human-health>

Books

No books on this topic area available. Some key research papers are:

- Berry, P, Kindred, D, Paveley, N (2008) Quantifying the effects of fungicides and disease resistance on greenhouse gas emissions associated with wheat production. *Plant Pathology*, 57, 1000–1008.
- Grimmer, M, Foulkes, MJ, Paveley, N (2012). Foliar pathogenesis and plant water relations – a review. *Journal of Experimental Botany* 63, 4321-4331.
- Kindred, D, Berry, P, Burch, O, Sylvester-Bradley, R (2008). Effects of nitrogen fertiliser use on green house gas emissions and land use change. *Aspects of Applied Biology 89 Effects of Climate Change on Plants: Implications for Agriculture*. 53-56
- Bryson R (2022) Evaluating the contribution of synthetic fungicides to cereal plant health and CO2 reduction targets against the backdrop of the increasingly complex regulatory environment in Europe. *Plant Pathology* 71:170–186.

Specific references cited during each video are detailed in the final slide of the presentation.