FUNGICIDE RESISTANCE MANAGEMENT AND DISEASE IMPACTS

Centre for Crop and Disease Management

GRDC Grains Research & Development Corporation

Curtin University

The Centre for Crop and Disease Management (CCDM), a co-investment by the Grains Research and Development Corporation (GRDC) and Curtin University, is a leading research centre committed to reducing the economic impact of crop disease in the Australian grains industry.

Better understanding of how fungicide resistance occurs enables us to optimise disease control options for farmers and minimise the loss of effective fungicide chemistry. Through molecular investigations in the lab, modelling and the development of high-tech detection and testing tools, we're developing new, more effective and cheaper ways to control the build-up of fungicide resistant populations.

Our research is delivering advances to industry with on-the-ground impact.

We're identifying new cases of fungicide resistance

> Discovery of new dual form of resistance in barley net form net blotch (SDHIs, DMIs) – (more detail over page).

> Fungicide resistance identified in wheat and barley powdery mildew; and spot form net blotch in barley.

We're providing best-practice management advice to growers and industry

> Provision of non-chemical and chemical management advice through the development of integrated disease management strategies.

We're speeding up detection

> Development of a suite of high throughput technologies for faster lab-based and in-field detection and quantification of fungicide resistance.

Information about our key research projects over page

"Our ultimate aim is to uncover the science that ensures the greatest chance of strong economic return for Australian grower investment in fungicide applications and practices."

Dr Fran Lopez-Ruiz, Theme Leader, Fungicide Resistance Management and Disease Impacts

Benefits for Growers, Agronomists, Breeders, Life Science Companies and Researchers

Better economic return on investment
Better chemical management techniques, greater ability to predict and manage disease impact.

Better disease knowledge
Identifying the molecular mechanisms underlying fungicide resistance in key pathogens threatening Australian agriculture.

Improved fungicide management
Detection and monitoring of fungicide resistance status and preservation of current and new active ingredients.

Faster, more effective early detection
Designing and developing tools for near real-time identification of fungicide resistance.

Our fungicide resistance researchers are using new technologies to enable faster, more effective disease detection.

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CCDM researchers Kejal Dodhia and Fran Lopez-Ruiz collecting samples for fungicide resistance testing.

CASE STUDY: CCDM researchers confirm case of new dual fungicide resistance

CCDM researchers, in partnership with SARDI and PIRSA, identified a new genotype in net form net blotch in barley, which for the first time showed resistance to both a succinate dehydrogenase inhibitor (SDHI) fungicide as well as some DeMethylation Inhibitor (DMI) fungicides.

The discovery, following testing of samples from South Australia's Yorke Peninsula in late 2019, found fungal strains showing resistance to the SDHI fungicide fluxapyroxad.

Further testing also showed a high frequency of resistance to the Group 3 DMI fungicide tebuconazole in the majority of sites tested.

At the CCDM we have four projects targeting fungicide resistance:

1. Fungicide resistance detection and underlying mechanisms

AIM: Detailed information on fungicide resistance distribution, molecular mechanisms underlying resistance and timely reports on new resistance cases.

2. Modelling framework for optimising deployment of fungicides for management of resistance

AIM: Fungicide resistance models to explore new areas of resistance management to develop practical guidance for Australian cereal crops.

3. Management of barley diseases under threat of fungicide resistance

AIM: Management strategies for barley diseases at threat of fungicide resistance.

4. Improved approaches for rapid de novo fungicide resistance and disease diagnostics

AIM: Improved technology for detection and monitoring of fungicide resistance in diseases of grain crops.

Want to know more?

Our team is happy to answer your fungicide resistance questions and we encourage you to get in touch if you have a specific fungicide resistance query or suspect fungicide resistance in your paddock:

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