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FIGHTING FUNGICIDE RESISTANCE WITH DIGITAL PCR

A new-age technique that rapidly
detects genetic mutations

[ccdm.com.au/research/
fungicide-resistance-group](http://ccdm.com.au/research/fungicide-resistance-group)

The Centre for Crop and Disease Management is a national research centre co-supported by Curtin University and the Grains Research and Development Corporation.

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ADV086600



DIGITAL PCR is a technique being used by researchers to analyse large amounts of disease DNA to detect and quantify mutations associated with fungicide resistance



Belinda Cox
CCDM researcher

Digital PCR is a highly time efficient process with results available within 1-2 days (traditional methods take up to 2 weeks).

A crop can be screened for resistance by sampling multiple points in the crop and pooling them for the extraction of disease DNA. The digital PCR machine will analyse all the disease DNA for the presence of mutations associated with fungicide resistance, from as little as 1%. Digital PCR is greatly reducing the possibility that known mutations may pass by undetected.

An Example

Digital PCR is being used to combat fungicide resistance in barley powdery mildew by detecting, and quantifying, the presence of disease DNA mutations associated with resistance to some triazole fungicides in the field.

Digital PCR results can reflect the resistance level in the field. If digital PCR identifies that 10% of the barley powdery mildew DNA (from your pooled sample) contains the resistance mutation, it is likely that this mutation is present in 10% of the field population.

How digital PCR works

- 1. Leaf samples** with disease symptoms are collected and sent into the lab. The leaf samples are crushed and prepared so the disease DNA can be extracted for analysis.



- 2. The DNA** is loaded onto a 'chip', and the 'chip' is inserted into a PCR machine. This machine uses heat to prepare the DNA for analysis.



- 3. The 'chip'** with the prepared DNA is placed into the 'chip' reader for analysis. The disease DNA is analysed and quantified to detect and determine the percentage of DNA containing the mutation associated with fungicide resistance.



- 4. Findings** are reported to the wider Australian grains industry to help growers develop personalised anti-resistance strategies.

Digital PCR can quickly detect mutations associated with resistance so important updates can be delivered to Australian growers allowing them to act early