Coupled-experiment-modelling approach

Centre for Crop and Disease Management

GRDC GRAINS RESEARCH & DEVELOPMENT CORPORATION

Curtin University

Project description

Fungicides are important tools for the management of crop diseases, with their use in Australian broad acre crops having risen substantially. Recently, however, pathotypes with reduced sensitivity and/or resistance have been increasingly detected across all three major fungicide groups. Loss or reduction of the effectiveness of fungicides can adversely affect crop yield and profitability.

This project aims to develop an interlinked modelling and field experimentation approach to provide data-informed guidance to growers. By developing the capacity to predict the impact of disease on crop production, our researchers aim for this approach to advise the optimal adjustment time of treatment programmes in line with the increase of fungicide resistant pathogens to maximise economic return for growers.

Key achievements

We have developed a modelling framework to guide optimal adjustment of fungicide treatment programmes when resistance is increasing. The model is illustrated using the case of DMI resistance in the pathogen that causes spot-type net blotch of barley under a wide range of yield potentials.

We have developed a spatially explicit epidemiological model for estimating effect of a solo fungicide use by a grower on the durability of disease control in neighbouring growers fields who use fungicide mixtures or alternations as a resistance management strategy.

We developed an optimised sample processing pipeline for PCR-based determination of fungicide resistance in stubble-borne fungal pathogens.

Our team

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