

Fighting fungicide resistance in a key barley disease

THERE are management strategies to help grain growers minimise the development of fungicide resistance in spot form of net blotch (SFNB) – one of Australia’s most damaging barley diseases.

Dr Fran Lopez-Ruiz from the Centre for Crop and Disease Management (CCDM) says the control of fungal diseases in broadacre crops is often very reliant on the use of fungicides,

but their continuous application has led to the development of resistance in fungal pathogens which in turn increases management costs and impacts on farm profitability.

Fran said fungicide resistance to some Group 3 DeMethylation Inhibitors (DMI) fungicides in SFNB, a disease caused by the pathogen *Pyrenophora teres f. maculata*, was present in southern grain growing regions of Western Australia.



CCDM Fungicide Resistance Management and Disease Impact Theme leader Fran Lopez-Ruiz (left), working in the lab with fellow CCDM researcher Wesley Mair. (PHOTO: CCDM)

You'll stick with
All Clear[®] DS
Because
little else
does!

Suction filter washed with water.

Suction filter cleaned with All Clear DS.

When it comes to removing damaging residues from your boom sprayer, All Clear DS outperforms other tank cleaners on the widest range of products.

agnova.com.au

* Registered trademark of AgNova Technologies Pty Ltd.

Innovation. Quality. Solutions.

He said sampling work detected SFNB strains moderately resistant to fungicide in the Esperance region from 2016 onwards, and highly resistant strains in the Great Southern and Esperance regions from 2017 onwards.

Current control measures for SFNB include the application of effective fungicides as well as on-farm practices that reduce disease establishment, reproduction, dispersal and survival. The use of varieties that contain genetic resistance to the disease is also effective.

“But due to the current lack of highly resistant cultivars, SFNB is controlled mainly using fungicides,” Fran said. “Growers need to take a cautious approach with controlling SFNB and implement adequate integrated disease management strategies to minimise the ongoing selection of SFNB resistant populations.

“Being a stubble-borne disease, rotating crops or managing stubble are paramount for reducing disease carry-over, and selecting varieties that have disease resistance will reduce the severity of SFNB during the growing season.

“But these measures will not be very effective unless growers choose fungicides carefully.

“Any spray program that is heavily dependent on Group 3 fungicides will increase the risk of resistant populations developing,” Fran warns.

Seed dressings and fungicide mixtures

“I encourage growers to use seed dressings, as well as in-furrow and foliar products containing fungicide mixtures from different chemical groups (Groups 3, 7 and 11), and to remove tebuconazole from control programs in areas where resistance has been found.

“This will help to limit the spread of resistance in SFNB and its emergence in other barley growing regions of Australia.”

In addition to using cultivars with good disease resistance levels, other cultural practices that growers can use to limit the development of resistance in SFNB include using disease-free seed; employing stubble management strategies to reduce the disease load; rotating crops; grazing with livestock; and, maintaining good farm hygiene.

Recommended chemical management strategies

- Only spray if necessary – limit applications;
- Choose fungicide mixtures with different modes of action (if available);
- Never apply the same Group 3 fungicide consecutively;
- Avoid consecutive use of fungicides with the same mode of action from Groups 7, or Succinate dehydrogenase inhibitor (SDHI), and Group 11, or quinone outside inhibitors (QoI);
- Incorporate the use of seed dressings (Group 7), in-furrow (Group 11) and foliar products containing fungicide mixtures from different chemical groups (such as Groups 3 (DMI), 7 (SDHI) and 11 (QoI) – in combination with limited use of propiconazole and no stand-alone tebuconazole use;
- Ideally use DMI-based mixtures (eg. Prosaro containing prothioconazole and tebuconazole) only once, followed by mixtures with other actives (preferably from Groups 7 or 11);
- If resistance is present or suspected, avoid or minimise use of that mode of action, as continuing its use will only further select for resistance; and,
- Do not exceed label rates.

CCDM research into SFNB is supported by GRDC investment, with this latest work also involving the Department of Primary Industries and Regional Development (DPIRD) and the Foundation for Arable Research in Australia.

More information about SFNB management is available in the GRDC Barley GrowNotes at <https://grdc.com.au/grownotes>

Are our weed seed ecology studies done correctly?

□ By Bhagirath S. Chauhan, Associate Professor, QAAFI, University of Queensland, Gatton

AT A GLANCE

- Studies on weed seed germination ecology have increased in Australia – this is a good thing. But we need to understand some basics to correctly conduct these studies.
- This article provides answers to some basic questions related to seed germination ecology.

WEEDS are among the most important biological constraints to crop production. They are also a problem on roadsides, railway lines and in the natural environment. Weeds reduce the productivity of a number of primary industries. For example, in Australia weeds cost grain growers alone more than \$3 billion annually.

Herbicides are used widely to manage weeds but there are concerns around environmental pollution, the scarcity of products with new modes of action and the evolution of herbicide resistance in weeds. Globally, about 500 unique cases of herbicide-resistant weeds have been recorded and Australia is in second place – after the US – on this unenviable list.

There is a need to develop integrated weed management (IWM) strategies to reduce reliance on herbicides. But to develop IWM programs, a basic understanding of weed biology is required, and seed germination ecology is an important component of weed biology.

Mistakes are being made

In my view, mistakes are being made in seed ecology studies. This article sets out to answer some basic questions related to weed seed germination ecology studies. Some ideas are taken from Baskin *et al* (*Seed Science Research*, 2006, 16:165–168) and



Bhagirath Chauhan.