AUSTRALIAN FUNGICIDE RESISTANCE EXTENSION NETWORK

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WESTERN REGION

Continuous barley and continuous fluxapyroxad leads to SDHI resistance in barley net blotches

Succinate dehydrogenase inhibitors, or SDHIs, are some of the most effective chemistries to grace the market in recent years for the management of net blotches in barley. The problem is, we're breaking them already.

The Group 7 (SDHI) fungicide fluxapyroxad was registered for use as a seed treatment in Australia in 2015, to target net blotches and other diseases of barley under the trade name Systiva®.

In 2019, resistance was detected in net form net blotch (NFNB; *Pyrenophora teres* f. *teres*) on the Yorke Peninsula, South Australia. In 2020, resistance was detected in samples which had been collected the previous season from around Kybybolite on the Victorian border and in the Lock and Streaky Bay areas of Eyre Peninsula. Also in 2020, resistance was discovered in spot form net blotch (SFNB; *Pyrenophora teres* f. *maculata*) in the Cunderdin district of Western Australia.

Reduced sensitivity and resistance to Group 3 demethylase inhibitor (DMI) fungicides was also detected alongside this Group 7 resistance in both states, which could lead to dual resistance in some paddocks.

Usually, low to mid rainfall regions are not considered to be at high risk of fungicide resistance development. This is due to low disease pressure being associated with these regions, which in turn requires fewer fungicide applications to manage disease, and thus less opportunity to select for fungicide resistance.

So what happened?

In the affected areas, **agronomic practices were employed that increased the risk of fungicide resistance development:**

- ✗ Cropping susceptible barley varieties. In the case of the Yorke Peninsula, large areas were sown to the same susceptible variety, compounding the risk.
- ✗ Retaining stubble and cropping continuous barley for 2+ years
- ✗ Applying the same SDHI seed dressing fungicide (i.e. fluxapyroxad) repeatedly for 2+ years

What can growers do to reduce their risk?

First, **work to reduce your net blotch disease pressure**. This will help reduce your overall reliance on fungicides, which translates into a lower selection of resistant individuals.

- ✓ Choose less susceptible barley varieties and try to diversify the varieties grown across a region.
- ✓ Avoid sowing barley into barley stubble by changing your crop rotation.
- ✓ Reduce stubble density by grazing (or burning, as a last resort).

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Then, **apply fungicides only as necessary and be strategic about it**. Use fungicides as early as possible after symptoms develop, especially if conditions are conducive to disease development. Sometimes fungicides are not economical in low disease pressure scenarios, and the best way to avoid fungicide resistance is to not use fungicides (if that is a realistic option).

If resistance has been detected in your paddocks or region or you're cropping in a high risk region or situation (i.e. continuous barley/SDHI use):

- ✓ **Take a break** from all **Group 7** SDHIs, both seed and foliar. Cross-resistance is common for these fungicides.
- ✓ **Select** fungicides containing actives from other mode of action groups, such as Group 3 DMIs and Group 11 strobilurins, to control net blotches. Options are available as seed dressing, in-furrow and foliar applications

In high-risk regions or cropping scenarios (i.e. continuous barley/SDHI use):

- ✓ **Do not** apply **Group 7** SDHIs (seed dressing or foliar) more than once per season in any crop rotation – alternate them instead with other fungicides from different mode of action Groups.
- ✓ **Plan** fungicide rotations across seasons. If a **Group 7** fungicide is used at seeding with no follow-up foliar application containing an active from another mode of action group (e.g. **Group 3** or **11**) in that season **do not** sow **Group 7** treated seed directly into the stubble of that crop. This can select for resistance across seasons.

For all other growers:

- ✓ **Avoid** applying more than one application and **do not** apply more than two applications per growing season of **Group 7** (SDHI) containing products and do not use consecutively.

In addition to the above, in all growing regions:

- ✓ **Rotate** your fungicide mode of action groups and fungicide actives, aiming to never use any fungicide active or mode of action group consecutively, even across seasons.
- ✓ **Minimise** use of **Group 3** fungicides known to have compromised resistance status (see grdc.com.au/afren for details).
- ✓ **Do not** apply more than three applications containing **Group 3** fungicides, either as solo or mixed product, per growing season. **Reduce** this to one or two applications in regions where resistance has been reported.
- ✓ **Avoid** using tebuconazole, propiconazole and epoxiconazole as stand-alone products in barley for any disease, as a way of avoiding indirect selection for fungicide resistance.
- ✓ **Avoid** applying more than one application per growing season of **Group 11** containing products.
- ✓ **Choose** fungicide mixtures with different modes of action.
- ✓ If conditions are highly conducive for disease development, use fungicides as **early** as possible following symptom development.
- ✓ **Do not** spray below or above label rates.

Monitor your crops.

If you're concerned about fungicide resistance, contact a regional fungicide resistance expert (listed on the AFREN website at www.grdc.com.au/afren) or the fungicide resistance group at the CCDM (frg@curtin.edu.au) to get your situation assessed and samples tested.

Dominant fungicide Mode of Action (MoA) groups registered for diseases of Australian grain crops:

Group 3 - Azoles/demethylase inhibitors (DMIs).
Common actives: cyproconazole, epoxiconazole, flutriafol, tebuconazole, propiconazole, prothioconazole. Registered: canola, cereals and pulses. Risk of resistance development: moderate.

Group 7 - Succinate dehydrogenase inhibitors (SDHIs).
Common actives: bixafen, fluxapyroxad, penflufen, benzovindiflupyr. Registered: canola, cereals and pulses. Risk of resistance development: moderate to high.

Group 11 - Strobilurins/quinone outside inhibitors (QoIs).
Common actives: azoxystrobin, pyraclostrobin. Registered: canola, cereals and pulses. Risk of resistance development: high.

The Fungicide Resistance Five!

1. **Avoid susceptible crop varieties**
2. **Rotate crops – use time & distance to reduce disease carry-over**
3. **Use non-chemical control methods to reduce disease pressure**
4. **Spray only if necessary & apply strategically**
5. **Rotate & mix fungicides / MoA groups**

Fungicide resistance result	Impact on fungicide use
Sensitive	Still works
Reduced sensitivity	Might still work okay • May need to use higher rates • Higher risk of developing resistance
Resistant	Doesn't work – avoid use

MORE INFORMATION:

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GRDC RESEARCH CODES

CUR1905-001SAX, CUR00016, CUR00023

ACKNOWLEDGEMENTS

This fact sheet has been produced as part of GRDC investment CUR1905-001SAX. It was compiled by Dr Kylie Ireland from the Centre for Crop and Disease Management (CCDM) at Curtin University, drawing on results and publications from the fungicide resistance group and communications team at the CCDM. It was produced in consultation with fungicide resistant expert Dr Fran Lopez-Ruiz and regional plant pathologists Dr Hugh Wallwork and Dr Tara Garrard from the South Australian Research and Development Institute (SARDI) and Mr Geoff Thomas from the Department of Primary Industries and Regional Development (DPIRD) in Western Australia.

Resistance management strategies related to fungicide use in this guide do not replace product labels. They are a guide only and do not endorse particular products, groups of products or cultural methods in terms of their performance. Current information on registered fungicides can be found on the APVMA website at apvma.gov.au.

The information given in this guide is provided in good faith and without any liability for loss or damage suffered as a result of its application and use. While every effort has been made to ensure the scientific accuracy and currency of all information and recommendations, our understanding of fungicide resistance is constantly developing, and readers are advised to seek up-to-date and further information regarding fungicide resistance at the AFREN grdc.com.au/AFREN and CropLife Australia croplife.org.au websites. Advice given in this guide is valid as at February 2021.

USEFUL RESOURCES

AFREN Website – www.grdc.com.au/afren

DPIRD - Managing barley net blotches in the face of fungicide resistance - https://www.agric.wa.gov.au/barley/management-barley-net-blotches-face-fungicide-resistance

2020 Western Australian Crop Sowing Guide - https://grdc.com.au/NVT-WA-Sowing-Guide

Barley Western Region – GrowNotes™ - https://grdc.com.au/GN-Barley-West

DPIRD PestFax - https://www.agric.wa.gov.au/crop-diseases/about-pestfax

Centre for Crop and Disease Management

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