Annual Results Report

2024

Validation and extension of management strategies for wheat powdery mildew

Project code: TRE2204-001RTX

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Date submitted to GRDC: 3 April 2024

REPORT SENSITIVITY

Does the report have any of the following sensitivities?

Intended for journal publication	YES ☐ NO ☒
Results are incomplete	YES ☒ NO ☐
Commercial/IP concerns	YES ☐ NO ☒
Embargo date	YES ☐ NO ☒ If Yes, Date: <Choose date>

KEY MESSAGES

List the key messages of the report.

- A large amount of extension and all field work has been completed to date. Majority of the data from last season has been analysed and reported. Only a small set of powdery mildew samples (15) are pending resistance testing through CCDM.
- Currently registered fungicide products from groups 3, 7 and 11 have continued to provide poor powdery mildew control in field trials.
- Microclimate monitoring sites have provided some useful crop and weather information to understand differences in powdery mildew infection in dune-swale landscapes.
- This project has provided information to assist with emergency use permits for three fungicides (Legend®, Talendo® and Vivando®) for powdery mildew control in wheat. These fungicides have limited activity on other diseases and need to be applied in combination with other fungicides for diseases such as Septoria and rusts.
- Several research, demonstration and extension gaps still exist that will not be addressed within this current project. A summary of these gaps was prepared and sent to GRDC in November 2023.

SUMMARY

Summarise the results.

- At Malinong, SA currently registered products from fungicide groups 3, 7 and 11 did not provide high levels of powdery mildew control. This is consistent with previous findings from trials conducted in this project and SAGIT project TC120 across 2020 to 2022.
- Products with an alternative mode of action (group 13) provided high levels of powdery mildew control. Septoria infection was also present at this site and must be taken into consideration when interpreting these results.
- There was no or low levels of powdery mildew infection at the Bute, SA and Katamatite, Vic trial sites. These trials did not generate significant new data towards powdery mildew management strategies.
- Field-based sensor surveys are providing some clues for differences in landscape position that might be important in powdery mildew development. Initial results reported here show temperature differences in July/August may be contributing to the differences in the level of powdery mildew infection. However, the results from one season of field monitoring are not sufficient to answer all research gaps.
- Last season a number of regions were resampled (central and northern YP, mid-north, Victoria) for resistance testing to look at the change in G143A mutation frequency overtime.

BACKGROUND

Detail the project background, which may include;

- **Why do the work?**
- **Why was the trial done?**
- **What is the issue, impetus or previous work that led to the project?**

Wheat powdery mildew (Blumeria graminis f. sp. tritici) is a sporadic disease that can cause up to 25% yield loss in conducive conditions. In the Southern region, wheat powdery mildew (WPM) has been increasing in incidence and severity in recent years and was particularly prevalent in areas of the Yorke Peninsula, Lower North, Eyre Peninsula and South-east of South Australia and the North-east of Victoria in 2021. However, in the 2022 and 2023 growing season, high incidences of wheat powdery mildew spread to other areas across the Southern region, including Mallee and Mid North SA regions.

Shifts in fungicide sensitivity and resistance to both Group 3 (DMI) and Group 11 (QoI) fungicides, which reduce the efficacy of these products when applied in-crop, have been detected in WPM in the Southern Region. The alternative fungicide mode of action, Group 7 (SDHI), has limited registered products for WPM. Resistance management strategies are necessary to prevent loss or reduced efficacy of the fungicide options available to manage this disease.

This project and trials continue the work initiated from the SAGIT project TC120 “management of fungicide resistant wheat powdery mildew”.

OBJECTIVES

What are the objectives of the trial/experiment? What is intended to be achieved in carrying out the trial/experiment?

The objectives include validation of the effectiveness of varietal resistance, application rates and timing, efficacy of pre and post emergent fungicides to assess how different actives (DMI, QoI and SDHI fungicides) perform in the presence of resistant powdery mildew mutations.

Project Outputs

Output	Description	Delivery
1a	5 validation trial sites located in the Southern region over 2 seasons, 2 in 2022 and 3 in 2023	Completed
1b	1 validation trial site in the Upper Southeast, SA. Treatments applied in September 2022. Apply 18 fungicide treatments and assess for wheat powdery mildew control. Assessments include wheat powdery	Completed

	mildew incidence, grain harvest and grain quality.	
1c	1 validation trial site on the Eyre Peninsula, SA. Treatments applied in September 2022. Apply 18 fungicide treatments and assess for wheat powdery mildew control, with a focus on mildew infection on the head and flag leaf. Assessments include wheat powdery mildew incidence, grain harvest and grain quality.	Completed
1d	Sample and test for fungicide resistance in 30 paddocks of each region (Vic, Upper SE SA, Yorke Peninsula) where the resistance status is unknown and determine the variability in resistance levels within and between regions.	Completed
1e	1 regional survey for fungicide resistance in wheat powdery mildew to test 30 paddocks in the SA Mallee in 2022.	Completed
1f	1 regional survey for fungicide resistance in wheat powdery mildew to test 50 paddocks on the Eyre Peninsula in 2022.	Completed
1g	Tissue test analysis of paired crop samples from 15 paddocks in September 2022 to determine the correlation between disease incidence and crop nutrition. 15 paddocks surveyed as part of the regional surveys for fungicide resistance will have dry matter cuts collected from locations within paddock showing high and low powdery mildew incidence, making a total of 30 samples. The paddocks will be located from the NYP, EP, Mallee and Upper SE.	Completed
1h	Establish paired monitoring sites in 6 paddocks in 2023. Locate weather sensor data loggers in 6 paddocks in locations identified as historically having high and low powdery mildew	Completed

	disease incidence, creating 12 monitoring sites. Monitor mildew development throughout the season. Tissue test each site to determine the correlation between crop nutrition and disease incidence.	
1i	Record current grower practices at the beginning of the project to benchmark practice change as management strategies are demonstrated, and to evaluate impact and grower adoption post project completion.	Growers and advisors attending crop walk events at Bute and Katamatite surveyed in Oct 2022. End of project survey is currently being completed and will be reported on in the Final Technical Report (30/04/2024)
2a	A minimum of 5 presentations at field trial sites as part of local grower group 'field walk' events.	Presentations at the Bute and Katamatite sites made in Oct 2022 to visiting growers and advisors as part of local crop walks. In 2023 presentations have included: - Presentation at grower field day at Malinong site. - Presentation to GRDC southern panel at Malinong site. - Farm Management (FM500) Meetings (x2 groups) - Crop Science Society - Hart Field Day
2b	A minimum of 2 presentations at GRDC Research Updates or industry forums/workshops	Presentations have occurred at the following: - GRDC grower update Ardrossan 2022 - GRDC research / grower updates in Adelaide, Bute, Bendigo, Perth and Keith in 2023 - GRDC NGN Coonalpyn, June 2023 - GRDC research update Adelaide 2024
2c	Development of written and technical content for a Factsheet (or Case Study)	Draft fact sheet prepared and currently under review with project partners.
2d	Final report and data uploaded to the 'Online Farm Trials' website.	This milestone report which summarized the findings from 2023 has been submitted and uploaded to OFT.

Achievements of the trials and resistance surveys include by 2024 wheat growers in the Southern region will have improved understanding of powdery mildew in wheat and the knowledge to implement cost effective and sustainable management strategies to reduce yield loss and minimise further development of fungicide resistance.

METHODS

How was the trial/experiment conducted? Avoiding overly technical language, describe the way the project has approached the task.

In 2023 the project has had three main field components

- investigating best management of wheat powdery mildew through replicated field trials at three locations.
- establish paired monitoring sites in grower paddocks to determine if there are differences in microclimate (and powdery mildew infection) in dune swale landscapes.
- Complete paddock survey sampling to understand spatial distribution of resistance.

(1) Trials investigating best management of wheat powdery mildew

Replicated field trials were established in 2023 at Bute and Malinong in SA and Katamatite, Vic. The trials included:

- Pre-em fungicide – Bute
- Post em fungicide product – Bute, Malinong and Katamatite
- DMI fungicide rates – Bute
- Fungicide application timing – Bute and Katamatite
- Wheat varietal resistance interaction with fungicide – Malinong

Assessments during the year have generally consisted of (dependent on site and disease presence) the following:

- Canopy powdery mildew infection score
- Powdery mildew pustule counts for individual leaves and stem
- Head score for powdery mildew infection
- Sampling individual treatments for resistance mutation frequency
- Scoring treatments for other incidental diseases

Currently all disease and crop assessments have been completed and analysed using R statistical package.

(2) Microclimate monitoring

The aim of this component of the project was to assess differences in canopy microclimate in two contrasting points in a paddock/landscape (for example, dune versus swale).

Six paddocks (2 monitoring locations per paddock) were selected in 2023;

- Upper Yorke (3 paddocks)
- Eyre Peninsula (2 paddocks)
- Upper south east (1 paddock)

Loggers were deployed at all sites to collect temperature, humidity and leaf wetness data. Powdery mildew was also assessed at all sites. Depending on the presence and level of the

disease, each site was assessed at 21 day intervals. Powdery mildew infection was recorded as either a canopy score (early in the season) or number of pustules present per plant part. Most sites recorded powdery mildew infection data up until end of flowering or early dough development. All weather and crop data has been collected and reviewed.

(3) Paddock sampling

Fifty paddock samples were collected and processed for resistance testing in 2023. These samples came from South Australia (central YP, northern YP, Mid-North, Upper North) and Victoria. For locations where resistance surveys have been conducted twice (e.g. northern and central YP and Vic) these samples provided useful information on the change in mutation frequency overtime.

LOCATION

Where field trials have been conducted, provide the following location details in the table below: latitude and longitude, or nearest town. (Add additional rows as required.)

Site #	Latitude (decimal degrees)	Longitude (decimal degrees)	Nearest town
Trial Site #1	-33.6746	137.89384	Bute, SA
Trial Site #2	-35.3001	139.30336	Malinong, SA
Trial Site #3	-36.0612	145.62579	Katamatite, Vic

If the research results are applicable to a specific GRDC region/s (e.g. North/South/West) or GRDC agro-ecological zone/s, indicate which in the table below:

Research	Benefiting GRDC region (select up to three)	Benefitting GRDC agro-ecological zone	
Validation and extension of management strategies for wheat powdery mildew	Southern Region Choose an item. Choose an item.	☐ Qld Central ☐ NSW NE/Qld SE ☒ NSW Vic Slopes ☐ Tas Grain ☒ SA Midnorth-Lower Yorke Eyre ☐ WA Northern ☐ WA Eastern ☐ WA Mallee	☐ NSW Central ☐ NSW NW/Qld SW ☒ Vic High Rainfall ☒ SA Vic Mallee ☒ SA Vic Bordertown-Wimmera ☐ WA Central ☐ WA Sandplain

RESULTS

What happened? Provide a description of the results from the work so far and some interpretation of what these mean in terms of farm practice or modified approaches to the underlying issue when interpreted for on-farm use. This can include graphs and photos.

(1) Trials investigating best management of wheat powdery mildew

A summary of the disease levels and some of the results from each of the three main sites has been provided below.

Bute, SA

The Bute location hosted four different powdery mildew trials. All trials were assessed for NDVI on 13th July 2023. The trials were monitored for powdery mildew infection however, no or low levels were detected this season. As a result, this site has not generated useful data towards powdery mildew management strategies.

Malinong, SA

Fungicide product trial

The fungicide efficacy trial at Malinong was sown to Scepter wheat on 9 May 2023. Fungicide treatments (Table 1) were applied at GS32 (2nd node) on 17 July 2023 and GS41 (flag leaf sheath extending) on 21 August 2023. Product rates were selected based on maximum label rate, unless specified otherwise. Wheat powdery mildew was scored as pustule counts on 21 August and 20 September 2023. Twelve middle tillers were selected from each plot and pustules were counted on the stem, flag-3 and flag-2 on 21 August and flag and flag-1 on 20 September.

Statistical analysis was conducted using the transformation 1-1/sqrt(pustule count + 1) using mixed linear models in R. Where large pustules occurred or merged, a count of 1 was given for each 2 mm^2 of pustule area. Septoria assessments were conducted by estimating the leaf area infected on the flag and flag-1 of the same tillers as for the powdery mildew assessment. Plant samples were collected from selected treatments to determine changes in frequencies of the G143A at CytB and Y136F at Cyp51 mutations in response to fungicide application.

Table 1. Fungicide treatments applied to the wheat powdery mildew fungicide product trial at Malinong, SA, 2023.

Product	Active ingredient	Fungicide Group	Rate applied (mL/ha)
Nil		0	
[b]Orius 430®	Tebuconazole 430g/L	3	290
[c]Opus 125®	Epoxiconazole 125g/L	3	500
[d]Proviso 250EC®	Prothioconazole 250g/kg	3	250
Prosaro®	Prothioconazole 210g/L	3	300
	Tebuconazole 210g/L	3	
[b]Orius 430® + [c]Opus 125® + [d]Proviso 250EC®	Tebuconazole 430g/L	3	290 + 500 + 250
	Epoxiconazole 125g/L	3	
	Prothioconazole 250g/kg	3	
[a]Mirador 625®	Azoxystrobin 625g/kg	11	256
Amistar Xtra®	Cyproconazole 80g/kg	3	800
	Azoxystrobin 200g/L	11	
TazerXpert®	Epoxiconazole 31.25g/L	3	2000
	Azoxystrobin 80g/L	11	
Maxentis®	Prothioconazole 100g/L	3	600
	Azoxystrobin 133g/L	11	
Aviator Xpro®	Prothioconazole 150g/L	3	500
	Bixafen 75g/L	7	
[g]Opera®	Epoxiconazole 62.5g/L	3	1000
	Pyraclostrobin 85g/L	11	
[e]Talendo® + [c]Opus 125®	Proquinazid 200g/L	13	250 + 500
	Epoxiconazole 125g/L	3	
[f]Legend® + [c]Opus 125® + Uptake®	Quinoxyfen 250g/L	13	250 + 500 + 0.5%
	Epoxiconazole 125g/L	3	

[a]Azoxystrobin (Mirador® 625) is registered in wheat only when mixed with a DMI mix partner. It has been applied standalone in this trial for research and demonstration purposes.
[b]Tebuconazole applied alone is not registered for the control of wheat powdery mildew. It has been applied standalone in this trial for research and demonstration purposes.
[c]Opus (Epoxiconazole 125) label rate for powdery mildew is 250mL/ha, 500mL/ha is maximum label rate for wheat for control of leaf rust, stripe rust and Septoria nodorum blotch. It has been applied standalone in this trial for research and demonstration purposes.
[d]Proviso (prothioconazole) is not registered in wheat when applied stand alone. It has been applied standalone in this trial for research and demonstration purposes.
[e]Talendo applied under APVMA permit PER93216, permit expiry date 31 July 2024. Always check the APVMA website for permit status prior to use.
[f]Legend applied under APVMA permit PER93197, permit expiry date 31 July 2024. Always check the APVMA website for permit status prior to use.
[g]Opera label rate for powdery mildew is 500mL/ha, 1000mL/ha is maximum label rate for wheat for control of leaf rust. It has been applied standalone in this trial for research and demonstration purposes.

A high level of powdery mildew infection occurred in both trials at Malinong. Septoria tritici blotch was also present in the trials and this has impacted the interpretation of fungicide efficacy and varietal resistance data. For example, there was a higher number of powdery mildew pustules in a range of the fungicide products compared to the nil (Figure 1). This has been observed in previous trials and fungicides (and the nil) which did not provide control of Septoria suffered high levels of infection and reduced green leaf area. Subsequently, there was less green leaf area for powdery mildew to infect.

The results show low levels of powdery mildew control with currently registered products at this site. The best powdery mildew control with registered products was from the triple combination of group 3s (teb + epoxi + prothio) and the group 3 (epoxy) + group 13 (Talendo or Legend). In all treatments pustule number was ≤1 on the flag-1 and flag (Figure 1). All remaining fungicide treatments did not improve powdery mildew control compared to the nil.

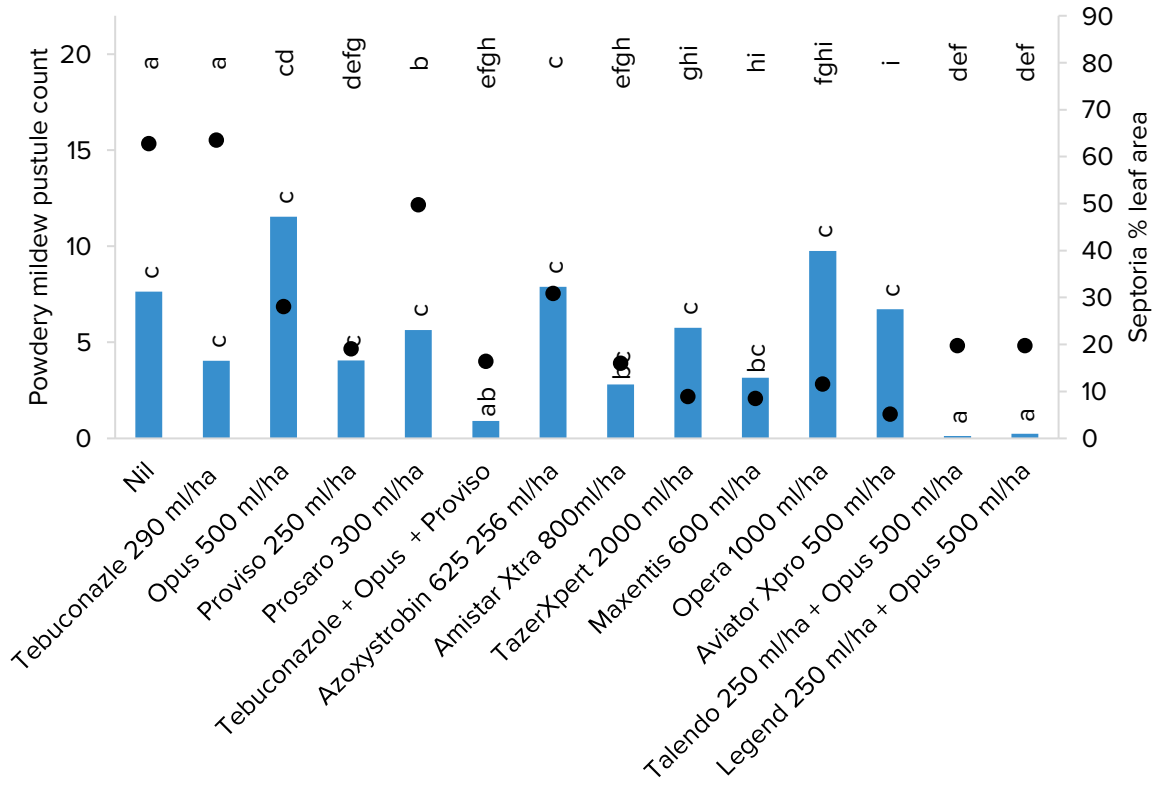

Figure 1. Wheat powdery mildew pustule number on the flag-1 and flag and Septoria tritici blotch (black dots) infection on the flag leaf (%) assessed on 20th September 2023 in the fungicide product trial at Malinong, SA.

Head infection results showed epoxiconazole (Group 3) mixed with either Talendo or Legend provided the lowest powdery mildew infection at <1.2% (Figure 2). In contrast to the leaf assessments the triple group 3 DMI mix had higher head infection at 4.7%. All remaining fungicide treatments did not improve powdery mildew control on the head compared to the nil.

Powdery mildew samples have been collected in five treatments (nil, azoxystrobin low and high, epoxiconazole and TazerXpert) from this trial and sent to CCDM for resistance testing. Results are currently pending.

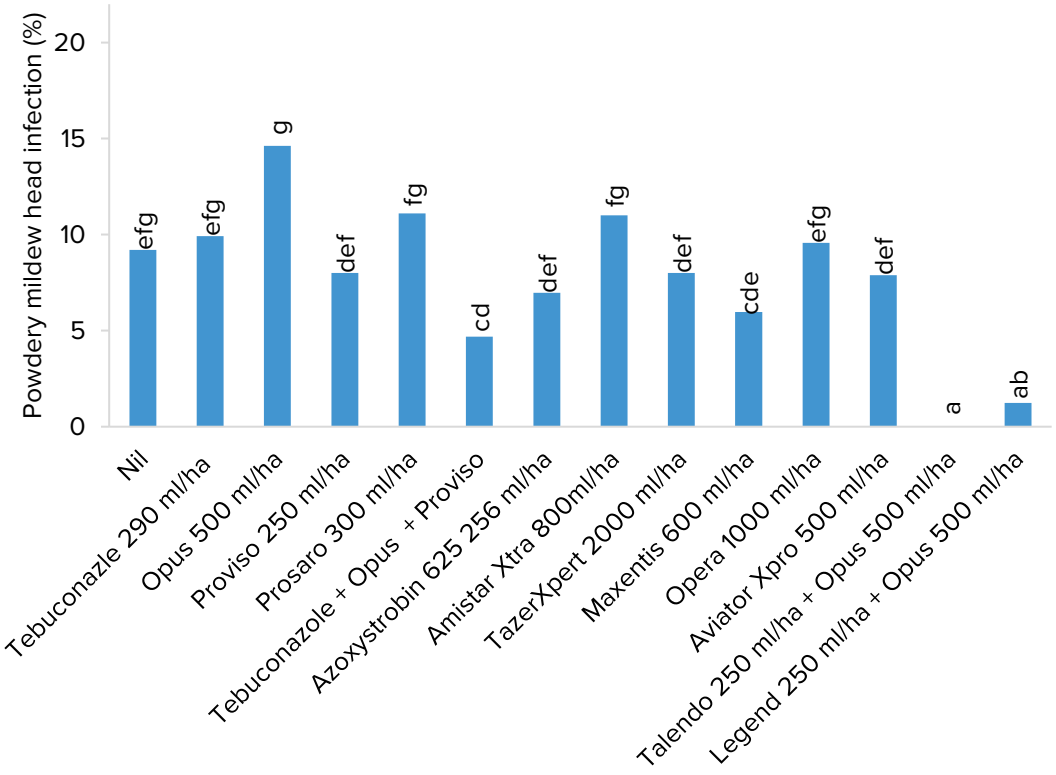

Figure 2. Powdery mildew head infection assessed on 20th September 2023 in the fungicide product trial at Malinong, SA.

Grain yields ranged from 5.1 t/ha to 6.3 t/ha across all treatments. Tebuconazole (5.2 t/ha) applied alone was the only treatment which did not improve grain yields compared to the control (5.1 t/ha). Despite a wide range in grain yields, high variability meant all remaining fungicide treatments had similar yields. In general, powdery mildew infection was poorly correlated to grain yield (Figure 3). However, the results show that Septoria infection had a larger impact on grain yields at Malinong this season (Figure 3).

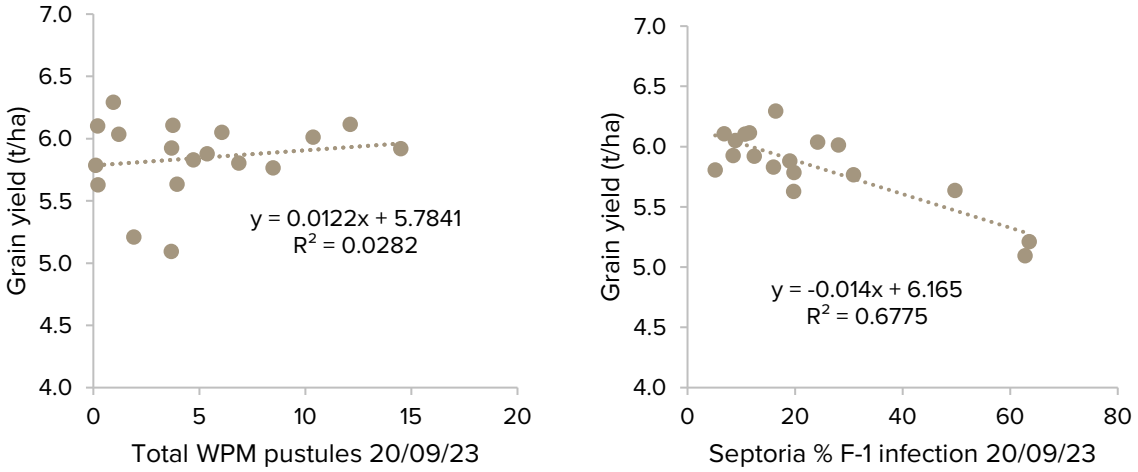

Figure 3. The relationship between grain yield and powdery mildew (left) and Septoria (right) in the Malinong fungicide product trial, 2023.

Varietal resistance and fungicide strategy trial

Variety resistance to powdery mildew is an important part of an integrated management strategy. Six varieties were selected for this trial with a range of resistance levels to determine the benefit of varietal resistance and its interaction with fungicide use. The fungicide strategies ranged in predicted powdery mildew control from 1 = low to 3 = complete control.

Similar to previous results collected at Bute, Calibre performed better than its previous S rating at Malinong (Figure 4). In January 2024, the variety disease ratings for wheat powdery mildew were updated and Calibre now has an MSS rating. In this trial powdery mildew infection in Calibre was similar to Grenade CL Plus (MS), Mace (MSS) and Scepter (SVS) when assessed in late September.

Brumby had a low level of powdery mildew infection (Figure 4). However, given Brumby is rated resistant (R) this low level of infection highlights the high genetic variability in wheat powdery mildew, and pathotypes may already exist that can overcome the major gene resistance and have virulence on this variety. A hot spot of powdery mildew in Brumby was also observed at Bute in 2021. The data here supports the findings that Brumby is expected to provide excellent resistance when first grown in a region. However, there is a risk it will be overcome by more virulent pathotypes if they are selected across a wide area on a repeated basis. Curtin University PhD candidate Ancy Kuthokathan Tony is investigating the genetic resistance of Brumby and looking to understand the complex of major gene resistance and the minor gene resistance that may underpin the major gene resistance, mildew samples collected from Brumby plots by project staff have been transported to Curtin University to support this work. Results are currently pending.

Similar to the product trial, Septoria infection has impacted the results and outcomes from the wheat variety trial. In general, the results show that for Grenade CL Plus (MS), Mace (MSS)and Scepter (SVS) there has been no difference between strategy 1 and strategy 2, reinforcing the lack of efficacy of currently registered group 3 and 11 fungicide options. The addition of mildewcide Vivando was required to improve control. In addition, the benefit of varietal

resistance has not been realised in this trial, with varieties from SVS to MS showing similar infection levels. This has not been observed in these trials previously at Bute, where improved varietal resistance has reduced infection accordingly. This may be a result of variable WPM pathotypes regionally having different virulence on varieties, depending on selection pressure. The VS variety Valiant had high infection levels, and the addition of mildewcide Vivando to the fungicide mix did not improve control. These results highlight the pressure VS varieties are putting on fungicides and fungicide resistance development. Varieties rated VS should be avoided in areas where WPM is a concern.

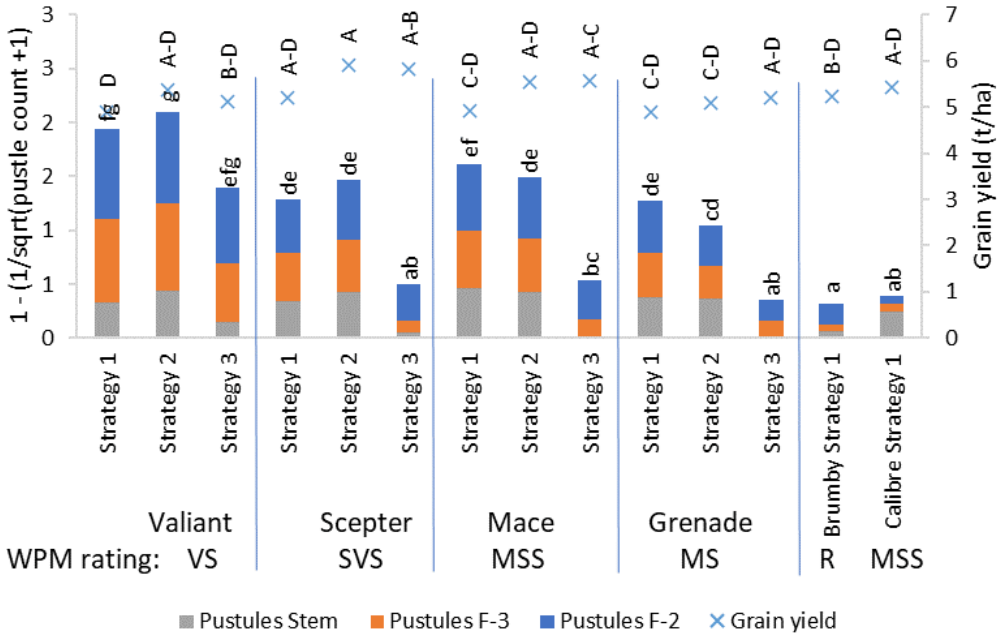

Figure 4. Powdery mildew pustule number on the stem, flag-2 and flag-3 assessed on 20th September 2023 and grain yield in the varietal resistance trial at Malinong, SA.

Katamatite, Vic

The Katamatite location hosted two powdery mildew trials (fungicide product and fungicide timing). All trials were assessed for foliar diseases at GS37 and GS59 (and GS39 in the fungicide timing trial). There was no or low levels of powdery mildew detected across the site in 2023. Both Septoria tritici blotch and stripe rust were observed at low to moderate levels.

(2) Microclimate monitoring

Six paddocks were monitored across the Yorke Peninsula (3), Eyre Peninsula (2) and South east (1). Only four out of six monitoring sites were infected with powdery mildew and have been presented in this report. Data collected from these four sites confirms anecdotal reports that lower lying landscape positions have less powdery mildew infection compared to adjacent hill areas (Figure 5).

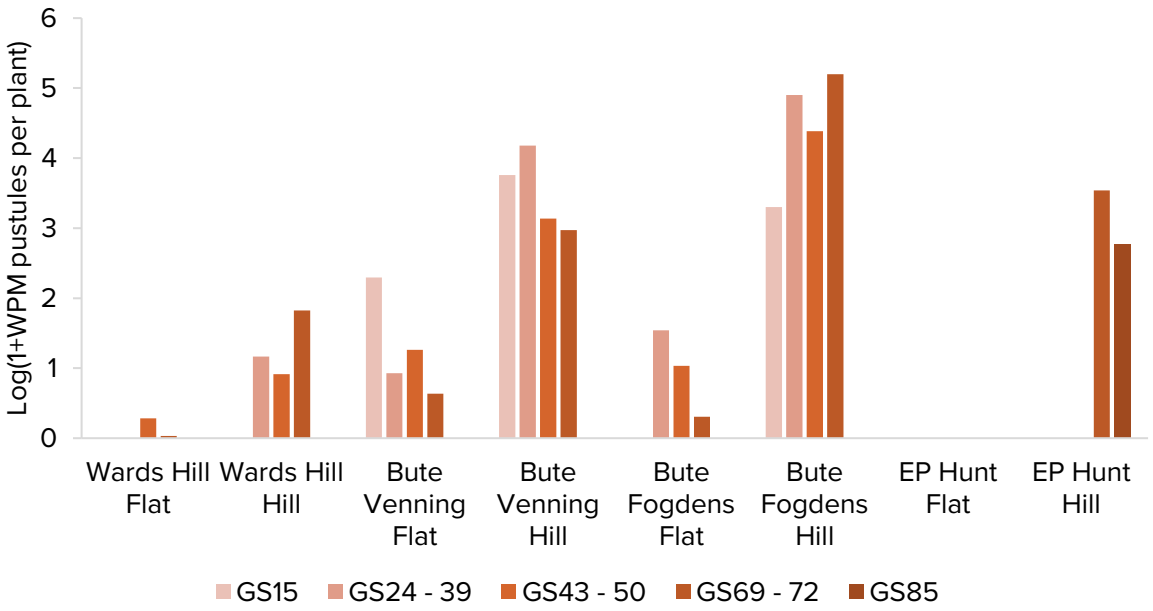

Figure 5. Wheat powdery mildew infection over the growing season at four paired monitoring sites in 2023.

A summary of the average temperature, humidity and leaf wetness for time of day are presented below. These graphs have been prepared using data from July and August, when the majority of the powdery mildew infection was occurring and/or increasing at the monitoring sites.

In general, across the sites both leaf wetness (Figure 6) and humidity (Figure 7) were variable across the flat and hill locations. That is, there was no difference that could be attributed to higher or lower powdery mildew infection.

The only parameter that showed any consistent variation across the two environments was temperature (Figure 8). The data indicated lower nightly temperatures on the flat compared to the paired hill location. This fits with suggestions that lower lying areas of the landscape are more frost prone and as a result have less wheat powdery mildew.

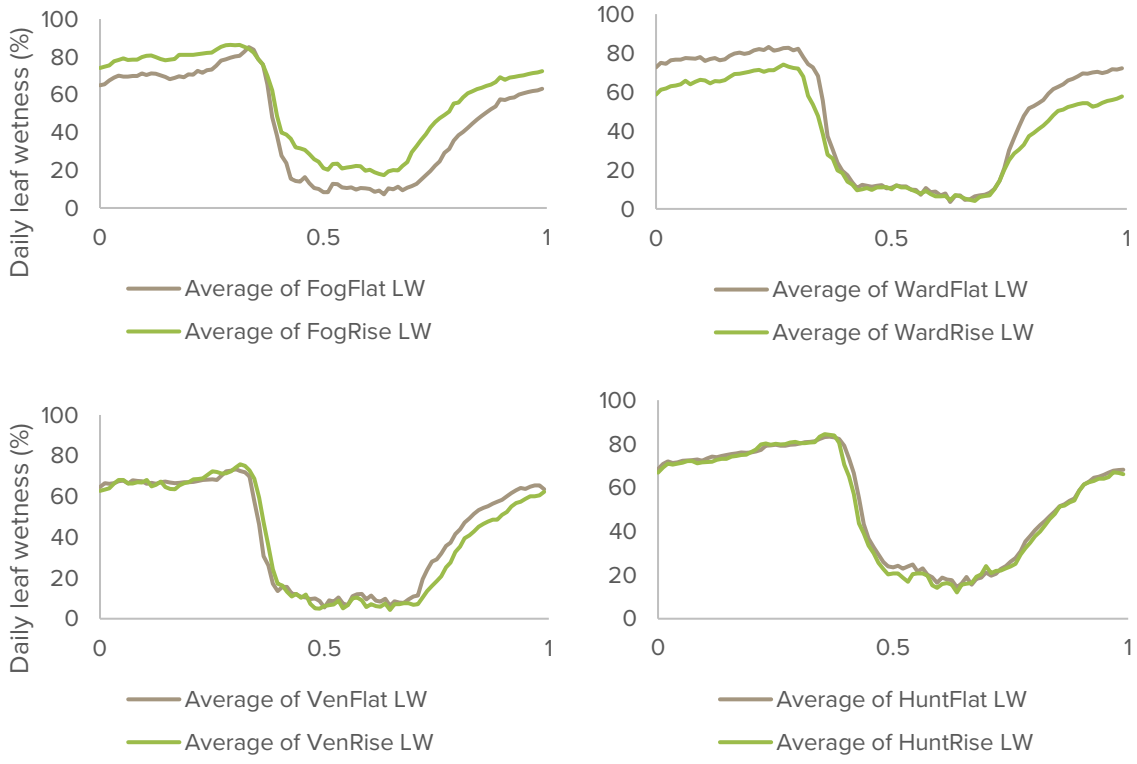

Figure 6. Average daily leaf wetness for July and August across four powdery mildew monitoring sites in 2023. Bottom axis presented as decimal day. i.e. 0.5 = midday.

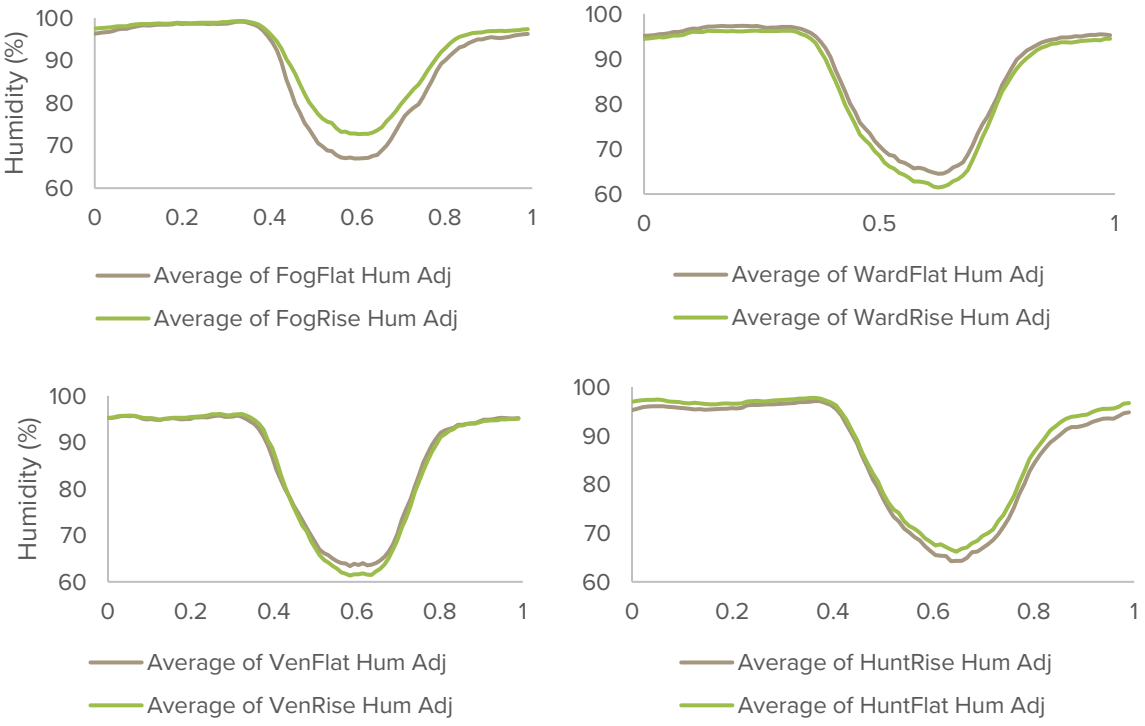

Figure 7. Average daily humidity for July and August across four powdery mildew monitoring sites in 2023. Bottom axis presented as decimal day. i.e. 0.5 = midday.

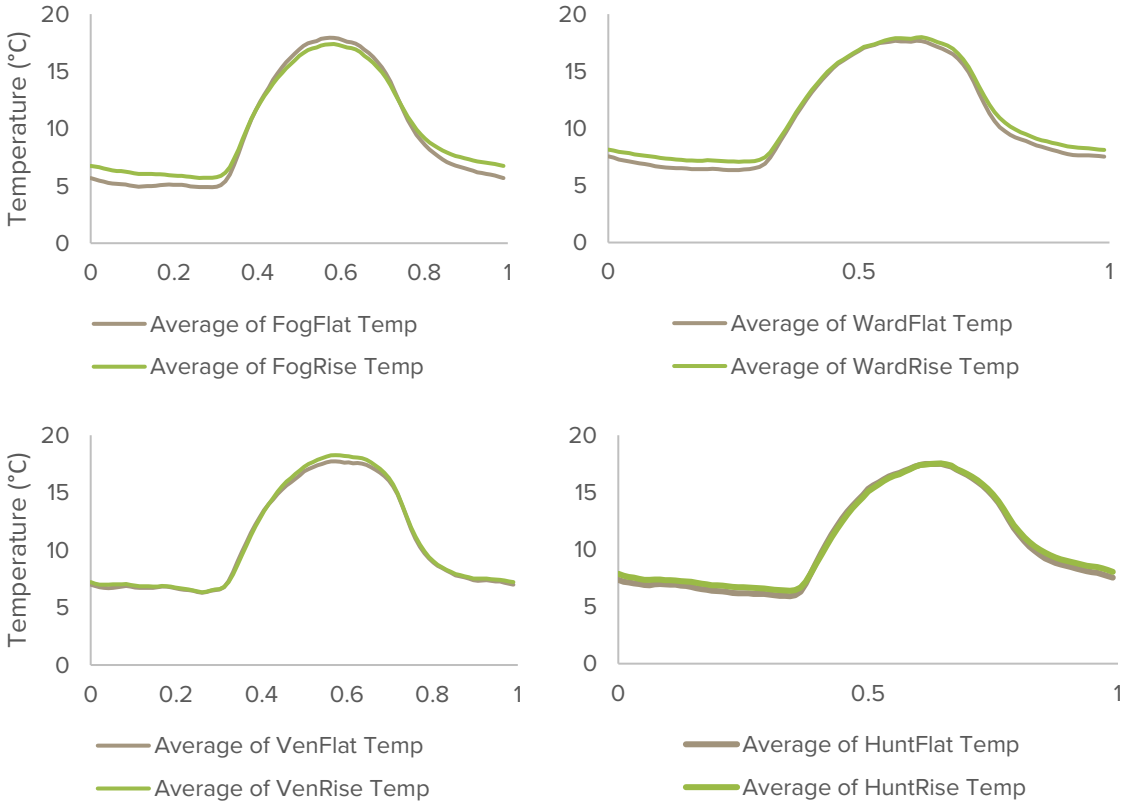

Figure 8. Average daily temperature for July and August across four powdery mildew monitoring sites in 2023. Bottom axis presented as decimal day. i.e. 0.5 = midday.

Field-based sensor surveys have provided some clues for differences in landscape position that might be important in powdery mildew development. However, the results from one season of field monitoring are not sufficient to answer all research gaps. Particular questions which remained are:

- Are there conditions that kill mildew, i.e., very low temperatures or frost?
- Is this more important in explaining landscape variability than how long each zone spends in the optimum temperature x humidity range?

(3) Powdery mildew regional surveys

Paddock wheat samples collected in 2023 from Victoria and South Australia were sent to CCDM for processing. All resistance testing data for this component of the project has been received and analysed.

Overall, the regional surveys have shown there is a geographic difference in the frequency of the G143A mutation with the frequency increasing from west to east (reported previously). The frequency of the G143A mutation is also changing overtime within regions (Figure 9). The highest values in mutation frequency have been observed in high rainfall areas of Victoria. Samples in 2020 showed a 32% mutation frequency and in two seasons had increased 64%. Interestingly the G143A% mutation frequency data from 2023 is lower compared to 2022 at 56%. The exact cause of the drop in mutation frequency is still unknown.

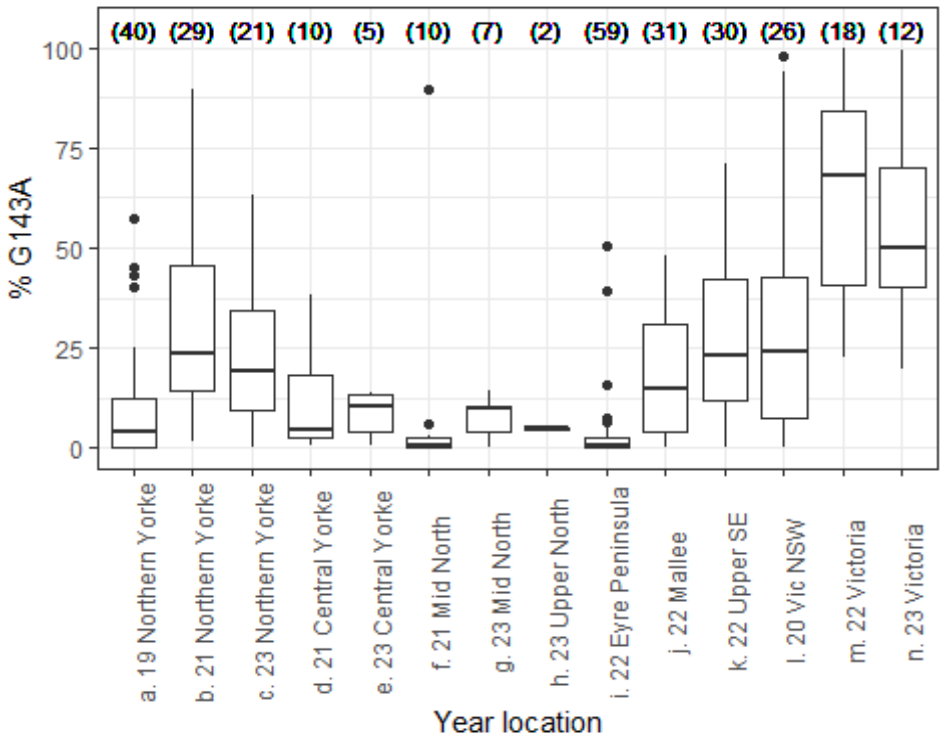

Figure 9. Frequency (%) of the G143A mutation from areas in the southern region sampled across 2019 - 2023.

Similarly, samples from the northern YP have shown both increases and decreases in mutation frequency over time (Figure 9). Paddock surveys showed moderate levels in 2019 and in 2021 increased to 32%. Sampling in 2023 showed the mutation frequency numbers had slightly reduced but, remained at high levels (>20%). Higher frequency in the northern YP area compared to the central Yorke Peninsula may be due to the high levels of WPM in the last 5-10 years resulting in repeated fungicide applications and greater selection for the resistant mutation.
The Upper SE also had moderate to high mutation frequencies (mean 26%, range 0–71%).

Regions with low incidence of the G143A mutation have only been sampled once in this project. Mutation frequency was low on the EP (3%) and Upper North (5%). Indicating that the group 11 (Qol) fungicides may still provide useful activity in many paddocks in these regions.

CONCLUSIONS

Provide a summary of findings, including implications and future activities.

- At the Malinong site, currently registered products from fungicide groups 3, 7 and 11 did not provide high levels of powdery mildew control, consistent with last season and previous findings from SAGIT project TC120.
- Products from alternative modes of action (group 13) provided high levels of powdery mildew control. Two of the four fungicides which performed well currently have emergency use permits in place. While the other two are unregistered.
- Trials continued to highlight the importance of variety resistance in an integrated powdery mildew management strategy. The occurrence of powdery mildew in the resistant variety Brumby shows the high genetic variability in wheat powdery mildew, and pathotypes that may overcome this major gene resistance.
- Microclimate monitoring sites are providing useful insights to understand why differences in powdery mildew infection in dune-swale landscapes often occur.
- Several research, demonstration and extension gaps still exist that have not been addressed within this current project.

REFERENCES AND USEFUL LINKS

Provide a list of key publication references and web links relevant to the project and for further exploration of the topic.

Fungicide resistant wheat powdery mildew – management and resistance testing 2020 – 2021 https://www.farmtrials.com.au/trial/33641