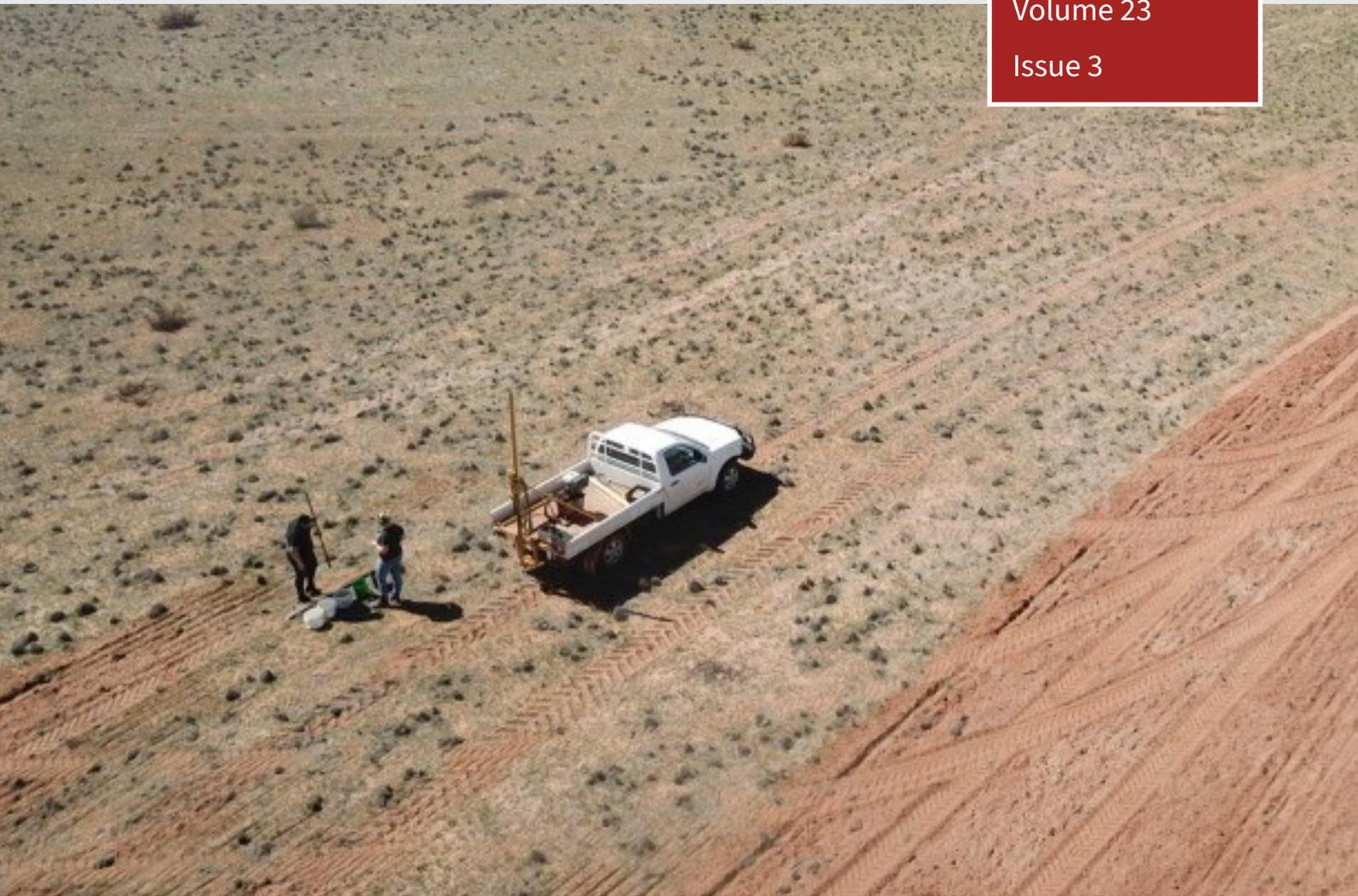


# LIEBE GROUP NEWS

April 2020

Volume 23

Issue 3



## What's Inside



*Word from our  
Liebe Patron, Dr  
Michael Robinson*



*Send in your snaps  
for Liebe Photo  
Competition*



*Stored soil moisture  
on canola yield in  
Liebe Area*



*Are you eligible?  
JobKeeper COVID-19  
Stimulus Package*



*The Liebe Group mission is to facilitate grower prioritised research, development and extension to support our members to be profitable and sustainable.*

# From the Cover

Liebe Group staff soil sampling at Todd Carter's Gen Y Project site, April 2020.

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## DIAMOND PARTNERS



**Rabobank**



## MEMBER NEWS

|   |   |
|---|---|
| From our Patron   | 4 |
| Stored soil moisture at sowing increases canola yield in the Liebe area | 5 |
| Liebe Group Photo Competition   | 8 |

## PARTNER UPDATES

|   |    |
|---|----|
| Downside Giving Upside: Global Perspective    | 9  |
| JobKeeper Payments: COVID-19 Stimulus Package | 11 |

## NEWS

|   |    |
|---|----|
| Azole Resistance in Spot Form Net Blotch in WA                    | 13 |
| Diamondback Moth Caterpillars are being found in the Green Bridge | 15 |
| Keeping the Finger on the Pulse: Speeding Pulse Breeding          | 17 |

# FROM THE EXECUTIVE OFFICER

KATRINA VENTICINQUE

Welcome to the April edition of the Liebe Group Newsletter.

To say these past couple of months have taken an interesting turn would be an understatement, with the unprecedented COVID-19 pandemic at the forefront of many actions and decisions both within our local community and on a global scale.

Due to the present restrictions in place, the Liebe Group is continually reviewing the format of all events and extension, to ensure that we are able to deliver timely and relevant information to our members. Potential avenues for our communication activities may include podcasts, webinars and other e-learning opportunities. We hope to have some of these up and running within the next month, so please stay tuned!



On a more positive note, our Main Trial Site at Hirsch's property in Latham has broken ground with multiple trials pegged out and awaiting implementation within the next few weeks. 17 trials and demonstrations have been confirmed, including various National Variety Trials. We aim to have a more detailed update on these in the coming weeks.

There has been several project opportunities arise including a MLA funded Producer Demonstration Site (PDS) Project focusing on the adoption of key livestock management practices and technologies for improved business performance. We are still seeking several more sheep producers to be involved with this project, so if this sounds of interest to you please get in touch with the Liebe Group office.

The Liebe team have also been busy executing our 2020 project activities, including a new two-year GRDC Double Break Pulse demonstration looking at the increase of value and effectiveness using high-value legumes grown as the second break crop in a rotation, with both early and traditional sowing dates for further evaluation. Our GRDC Lupin Establishment Project is also entering the next stage of assessment with pre and post-seeding samples.

Whilst the 2020 season may look a bit different, it is fantastic to see our regional community standing strong together to support each other through these difficult times. The Liebe team may be cooped up in the office right now, but we are always only a phone call away.

With the next newsletter due out in June, the Liebe team wish you all a happy start to seeding!

## GOLD PARTNERS



## SILVER PARTNERS

- Syngenta
- Landmark
- Nufarm
- Pacer Legal
- Australian Grain Technologies
- Intergrain
- Adama Australia
- Scott's Watheroo Dolomite
- FMC Crop Protection
- GrainGrowers
- Refuel Australia
- Boekemans Machinery Dalwallinu

# FROM OUR PATRON

Dr. Michael Robertson  
Science Director  
CSIRO



Dear All

I hope you are all well and gearing up for the season ahead. I am picking up a note of optimism from many because of good soil moisture levels, let's hope that we can capitalise on that and have a profitable year.

A few words from me about the current strange times we are living in and the impact it's currently having on the agricultural research community. In CSIRO we are doing our best to abide by government guidelines by having about 80% of our staff working out of home. Essential work that's required in the laboratory or field is being done but with social distancing very much in mind. We have every intention to meet as many of our research obligations as possible and are in constant discussions with funders and partners like the GRDC.

Of course working from home is only possible because we have digital technologies and are fortunate to have a world-class IT system in CSIRO. This enforced period of working remotely is forcing us to think about how we can use digital systems to be more efficient in our research. Such systems will never replace the necessity of needing to visit a field trial in person or interact with stakeholders like you our grower collaborators (although it is amazing what you can accomplish if you have to communicate by video).

We are in the process of establishing a state-of-the-art field research station in southern New South Wales that will be decked out with all manner of digital technologies, such as soil moisture sensors. It will be an interesting showcase for researchers and farmers. We hope to learn a lot, and get a realistic assessment of the strengths and pitfalls of trying to implement such systems on farm. Ultimately we would like to be able to use such approaches in all our field experimental work.

Because we are working in a somewhat isolated manner at the moment I am becoming more conscious about staying in touch with my staff, checking on each other's welfare, and being accommodating about other obligations people might have, such as caring for family while trying to work. Sounds a lot like living in a farming community doesn't it? This experience might give us more insight and empathy for the kinds of social challenges you folks deal with every day and appreciate the need to build and maintain a sense of community if you want to achieve something as a group.

Regards, Michael

## Key Messages

- Early sowing opportunity is key to good yields. Maximum canola yields are achieved with April germination.
- Stored soil moisture from summer rains can significantly contribute to final yields.

## Background

In the last 20 years there has been a significant increase in summer rain in most of the wheatbelt. There is a debate as to how much of the summer rainfall is actually contributing to final yield. Specifically, how much of the summer rain is lost in soil evaporation and how much is stored in the soil to be used later by the crop? We have used the APSIM-Canola model to study the contribution of summer rain to final canola yields.

## Canola yield response to sowing date

The APSIM-Canola model was run for the period 1976-2019 using 44 years of local rainfall and temperature data for Wongan Hills for fixed sowing dates from end of March to end of June. Simulations were for a light soil and a mid-maturity cultivar (ATR Bonito). In the simulations, each sowing date represents a sowing opportunity and therefore the crop germinates immediately after sowing. It is different to dry sowing. Consequently, in this paper, sowing date is equivalent to germination date.

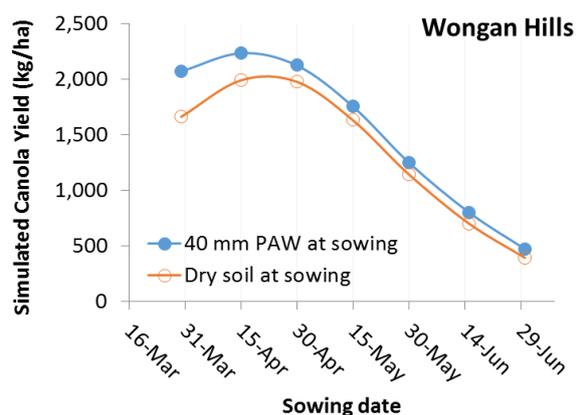
Maximum canola yields, in Wongan Hills on a light soil, are achieved with sowings in April (Figure 1). On average, after April, each delay in sowing diminishes the yield. In some years, May sowings can have higher yields than the plotted average if rainfall amount and distribution is favourable.

## Stored soil moisture at sowing

The model was run using local climate data for 2 soil moisture scenarios for each sowing date:

- 40 mm of plant available water (PAW) stored in the soil at sowing (accumulated from summer rainfall) (40 mm PAW at sowing)
- Zero mm of plant available water at sowing, this being soil water content at lower limit (Dry Soil at sowing) (no soil moisture accumulated due to summer rain, due to no summer rain or small rainfall events lost in evaporation)

The average yield response to sowing time for the 2 scenarios is plotted in Figure 1.



**Figure 1:** Simulated canola yields for Wongan Hills for sowings from 30-March to 30-June on a light soil with cultivar ATR-Bonito. Yields are average for the period 1976-2019. Two soil moisture scenarios: 40 mm of plant available water at sowing (full circle) and dry soil at sowing (open circle).

## STORED SOIL MOISTURE AT SOWING INCREASES CANOLA YIELD IN THE LIEBE AREA

Dr Imma Farre  
Research Officer  
DPIRD South Perth



The potential yield is higher for early sowings for both soil moisture scenarios (Figure 1). The yield advantage due to stored soil moisture is also higher for early sowings than for late sowings (Table 1).

The contribution of stored soil moisture at sowing on final yield is variable and depends on the amount of plant available water stored in the soil, on the date of the break and on the type of season that follows.

On average 40 mm of stored soil moisture at sowing in Wongan Hills on a light soil can contribute in the order of 200 to 400 kg/ha if early sowing opportunity occurs (break of the season in April). If break of the season is in May or June, the soil moisture at sowing can contribute on average to about 100 kg/ha of the final yield (Table 1).

**Table 1:** Long-term simulated canola yields (kg/ha) for Wongan Hills on a light soil, cultivar ATR-Bonito for fixed sowing dates for 2 scenarios: 40 mm plant available water at sowing and dry soil at sowing. Yield advantage of stored soil moisture at sowing. Yields are average for the period 1976-2019.

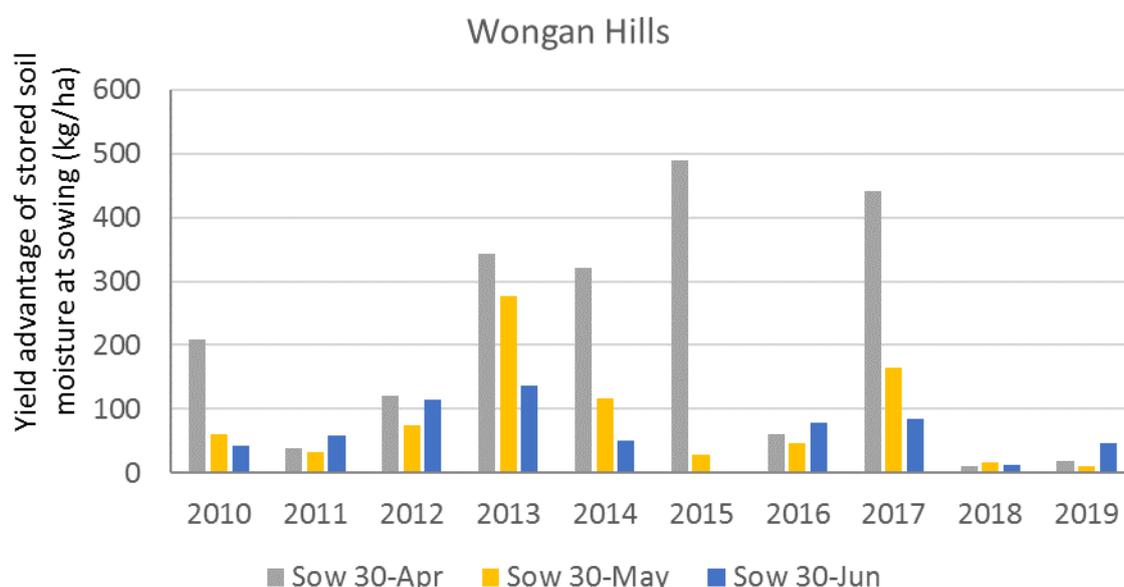
| Sowing date | Yield with 40 mm moisture at sowing (kg/ha) | Yield with dry soil at sowing (kg/ha) | Yield advantage of stored soil moisture (kg/ha) |
|-------------|---|---------------------------------------|---|
| 30-Mar      | 2071  | 1664                                  | 407   |
| 15-Apr      | 2234  | 1992                                  | 242   |
| 30-Apr      | 2124  | 1978                                  | 145   |
| 15-May      | 1754  | 1632                                  | 123   |
| 30-May      | 1250  | 1143                                  | 107   |
| 15-Jun      | 804   | 703                                   | 102   |
| 30-Jun      | 474   | 393                                   | 81  |

### Influence of Season Rainfall

Figure 2 presents the yield advantage of 40 mm stored soil moisture on a light soil in the last 10 years for sowings on 30-April, 30-May and 30-June. In general the contribution of stored soil moisture to final yield is greater for early sowings than for late sowings. There is also an important influence of season type. Table 2 presents the seasonal rainfall (expressed as rainfall from April to October) for the last 10 years in Wongan Hills. Depending on the amount and distribution of the seasonal rainfall there will be more or less contribution of the stored soil moisture to final yield. For example, in a favourable season like 2016 the yield contribution from stored soil moisture was smaller than in a drier season like 2017 (Figure 2).

**Table 2:** Seasonal rainfall (April to October rain in mm) for Wongan Hills in the last 10 years.

| Year | Season Rainfall (mm) |
|------|----------------------|
| 2010 | 146                  |
| 2011 | 259                  |
| 2012 | 178                  |
| 2013 | 163                  |
| 2014 | 188                  |
| 2015 | 259                  |
| 2016 | 291                  |
| 2017 | 171                  |
| 2018 | 277                  |
| 2019 | 228                  |



**Figure 2:** Yield advantage of 40 mm stored soil moisture at sowing in Wongan Hills, on a light soil in the last 10 years for sowings on 30-April, 30-May and 30-June.

### Comments

Small summer rainfall events will be mainly lost in evaporation. However big summer rainfall events will have part of the rain lost in evaporation and part of the rain stored in the soil profile. The stored soil moisture will be available to crops later in the year and can contribute to final yield. The extent of the contribution of summer rainfall to final yield depends on the date of the break and the rainfall amount and distribution during the season.

### Take home messages

As a rule of thumb, in the Liebe region (using Wongan Hills climate data), maximum yields are achieved with sowing opportunities in April. After April any delay in sowing diminishes the yield.

Look at the risk figures to see the chances of achieving a certain yield after a given sowing date. (<https://www.agric.wa.gov.au/canola/canola-sowing-time-maximise-yield-western-australia>)

Stored soil moisture at sowing from summer rainfall events can contribute to final yields.

### Acknowledgements

Thanks to GRDC funding, DPIRD and Project team “Expanding Sowing Window of canola and lupins”.

# LIEBE GROUP PHOTO COMPETITION

ENTRIES CLOSE  
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3 X LUCKY WINNERS EACH RECEIVE A  
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## THE RULES

- Photos are to be submitted via [email](#) or [Dropbox](#)
- 5 photos may be entered into the competition per person but more can be shared via Facebook
- Judging will be completed by 3 members of the Liebe Group Management Committee
- Entry into the competition includes permission for the Liebe Group to use images in future publications and media
- Mobile phone images are welcome
- Winner will be announced Thursday 2nd July

## DOWNSIDE GIVING UPSIDE: GLOBAL PERSPECTIVE

Management of, and reaction to, the coronavirus pandemic is shutting down countries, creating supply chain havoc and of course leaving Australian supermarket shelves devoid of toilet paper. Together with the US-China trade war – which, though temporarily in the shadows, is an ongoing dynamic – and now OPEC's inability to reach an oil production agreement, global market fallout is surpassing that of the GFC. Downside is playing out as dramatic stock market losses and record low bond yields and has unarmed central banks looking to government for fiscal support to keep economies from falling into recession. Australian currency downside is however a silver lining in all of this for Australian grain exports.

With a 56 per cent year-on-year increase in east coast winter crop production for 2019/20, the best rain seen for a couple of years in many areas over the past eight weeks, and a favourable three-month rainfall forecast, we have hopefully seen the worst of Australia's grain production slump. Of course for grain pricing, that means we are moving from local prices being at record levels above global benchmarks to return to the position where global price movements will make a far greater difference to local prices than they have for two years.



But returning to that global grain scene will be with a much softer Australian dollar. Three years ago our dollar was trading around 77USc, and we now find ourselves with an Australian dollar closer to 60USc. The depreciation of the Aussie dollar from 77USc to 60USc sees grain prices around AUD75/tonne higher than they would otherwise have been. That is AUD4 - 5/tonne for every cent the Australian dollar has depreciated (in the range that wheat has been trading for the past two years).

And the upside of Australia being so exposed to China and global markets is that whilst ever there is downside for those markets, there is downside for the Australian dollar (that is, a lower AUD). And our outlook for Chinese growth and global markets tells us that the Australian dollar will prevail closer to 60USc throughout 2020/21, with the prospect of moving closer to 55USc in the near term.

However pricing compared to global competitors is what's important to export grain, and our currency is not the only one that has found its way lower. While the Australian dollar is now trading more than 19 per cent below three years ago in US dollar terms, the Ruble is now 18 per cent lower in US dollar terms than it was three years ago, and Argentina's peso is a whopping 75 per cent lower. By contrast, the Ukrainian Hryvnia and the Euro are actually three to four per cent higher in US dollar terms.

Cheryl Kalisch Gordon  
Rabobank



**Rabobank**

## PARTNER UPDATES

The relatively uncompetitive pricing of US wheat exports due to the strength of the US dollar will however bring CBOT wheat pricing under pressure. In this situation, Australian local pricing will be gaining on its softer currency and losing on the global price benchmark.

With fundamentals still supporting a wheat price lift year-on-year for 2020, some wheat exporters' currencies having not depreciated, and the Australian dollar with a sustained position around 60USc, Australian wheat prices stand to remain supported by global factors, even as local basis narrows in growing anticipation of, hopefully, a great looking harvest for east coast Australia in 2020/21.

## JOBKEEPER PAYMENT: COVID-19 STILUMUS PACKAGE

Under the JobKeeper Payment, businesses impacted by the Coronavirus will be able to access a subsidy from the Government to continue paying their employees. Affected employers will be able to claim a fortnightly payment of \$1,500 per eligible employee from 30 March 2020, for a maximum period of 6 months.

### Key Points Summary

- Expected to support the continued employment of around six million Australian workers and is estimated to cost \$130 billion over six months.
- Delivered as a wage subsidy for eligible employers (including not-for-profits) whose turnover has fallen by more than 30% relative to a comparable period (of at least one month) in the prior year. Businesses with a turnover of \$1bn or more would need to have experienced a reduction in turnover of more than 50%. Businesses subject to the Major Bank Levy are not eligible.
- Eligible employees are those currently employed by eligible employers (including those that have been stood down and those that are re-employed) who were employed by the employer at 1 March 2020. They must also be at least 16 years old, not receiving JobKeeper payments from another employer, and be an Australian citizen/permanent resident, or holder of certain visa types.
- Set at a flat rate of \$1,500 per fortnight per employee, for all full-time, part-time or long term casual workers, which approximates 70% of the median wage. Long term casual works are described as those casual employed on a regular basis for longer than 12 months at 1 March 2020.
- The subsidy is paid by the ATO to the employer who is obliged to pass on the full \$1,500 through their payroll system to eligible employees. The JobKeeper payments form part of the employees' taxable income and are subject to PAYG withholding.
- The subsidy has a start date of 30 March 2020. Payments commence in early May, backdated to 30 March 2020. The ATO will then make the payments monthly in arrears to eligible employers.

### To receive the subsidy employers must:

- Register their interest on the ATO website and assess that they have or will experience the required turnover decline.
- Provide information to the ATO on eligible employees. This includes the number of eligible employees engaged at 1 March 2020 and those currently employed by the business (including those stood down or rehired). The ATO will use single touch payroll (STP) data to assist pre-populate some of the required reporting.
- Ensure that all eligible employees receives at least \$1,500 per fortnight (before tax). For employees that were already receiving this amount or greater from their employer then their income will not change. For employees that have been receiving less than this amount, the employer will need to top up the payment to the employee up to \$1,500, before tax. There is no compulsory superannuation obligation referable to any necessary top-up amount.
- Notify all eligible employers that they are receiving the Job Keeper Payment.

Judy Snell  
Director  
RSM Australia



## PARTNER UPDATES

- Continue to provide the ATO with relevant information on a monthly basis, including the number of eligible employees employed by the business.
- Where employees have multiple employers, only one employer will be eligible to receive the payment. The employee will need to notify their primary employer who can claim the JobKeeper payment on their behalf. The claiming of the tax free threshold will in most cases be sufficient notification that the employer is the employee's primary employer.

### **Businesses without employees (self-employed)**

- Businesses without any employees, such as the self-employed, may be able to nominate an individual to receive the payment and provide a declaration as to recent business activity along with monthly reporting of continued eligibility.

### **Items requiring clarification**

- If an eligible employer will have an ongoing requirement to monitor and report its reduction in income over the maximum 6 months period and whether it would cease to be entitled part way through the six month period if turnover was restored.
- If those self-employed who operate their business through a partnership, trust or company structure will be eligible to nominate an individual (or more than one individual) to receive the payment – initial indications they will be eligible but no details to date

We are waiting on further details from Treasury.

This is an important measure designed to keep employees connected with their employers in a period of sharp downturn, allowing those businesses to re-emerge on the other side of COVID-19 with a workforce intact.

### Key Points

- Fungicide resistance to Group 3 (DMI) fungicides in SFNB is spreading in the southern region of WA.
- Resistance was found from 2017 onwards and was associated with the barley variety Oxford.
- Several Group 3 actives (DMI) are affected and effective management strategies need to be deployed to limit further development and spread of fungicide resistance.

Net blotches are major diseases of barley in Western Australia, caused by the closely related fungal species *Pyrenophora teres* f. sp. *teres* (causal agent of net form net blotch, NFNB) and *P. teres* f. sp. *maculata* (causal agent of spot form net blotch, SFNB). Net blotches are regularly controlled by Group 3 demethylase-inhibitor (DMI) fungicides.

Following reports of DMI fungicide failure to control SFNB in a barley paddock near South Stirling in 2017, researchers from the Centre for Crop and Disease Management (CCDM) - a co-investment by the Grains Research and Development Corporation (GRDC) and Curtin University, joined forces with DPIRD and the Centre for Crop Health at University of Southern Queensland to investigate the issue.

Isolates of SFNB from across WA were studied using traditional laboratory plating techniques, where the fungus is challenged with increasing rates of fungicide dose, and molecular techniques that look for changes in the DNA of the fungus associated with fungicide resistance.

From these studies, the team found three sensitivity groups of SFNB to DMI fungicides in WA – sensitive, where isolates were still controlled by the fungicide, reduced sensitive, where increasing doses of fungicide could still control the fungus, and resistant, where the fungus was no longer controlled by the fungicide at label rates. Two major gene changes were found to be associated with resistant isolates. These resistant isolates were also found to be clonal hybrids between the fungi that cause NFNB and SFNB, and were found to be associated with the barley variety Oxford.

### What does this mean for growers?

Barley growers are advised to avoid planting susceptible varieties in areas known to have, or be at a high risk of, SFNB fungicide resistance. While resistant isolates were largely found to be associated with Oxford, collections were also made in lower frequencies from Planet and La Trobe. Preliminary studies by DPIRD have shown that less susceptible barley varieties do exist.

In the high rainfall areas of Esperance and Albany zones where resistant SFNB has been detected, tebuconazole and propiconazole use should be avoided in solo formulations, and limited when any of these two compounds are mixed with the different fungicide, especially with other DMIs. In areas where only the reduced sensitive type have been detected (central and northern regions), propiconazole use should be limited to once per season to avoid placing extra pressure on this active.

## AZOLE RESISTANCE IN SPOT FORM NET BLOTCH IN WA

**Fran Lopez-Ruiz**  
Fungicide Resistance  
Management and Disease  
Impacts Research Leader  
Centre for Crop and Disease  
Management (CCDM)

 Centre for Crop and  
Disease Management

 **GRDC**  
GRAINS RESEARCH &  
DEVELOPMENT CORPORATION

 Curtin University

Other fungicide modes of action (Group 7 SDHIs and Group 11 strobilurins) remain effective at controlling these hybrids and should be incorporated into spray programmes. Growers are cautioned against overuse of SDHIs however, given the high levels of resistance recently reported in the Yorke Peninsula following repeated use of this fungicide.

No matter the incidence or severity of fungicide resistance in a growing region, growers can always work to manage and prevent fungicide resistance by adopting good integrated disease management and using fungicides strategically and responsibly. Variety choice is a foundational tool. Choosing less susceptible varieties of any crop, selected with the main diseases you experience in mind, can significantly reduce reliance on fungicides throughout the growing season. This can then be supported with a variety of non-chemical integrated disease management tools, such as stubble management, crop rotation, and good hygiene to reduce disease pressure.



Fungicides should then only be used as necessary and applied strategically, when conditions are known to favour disease and prior to wide infection (but not prophylactically). Growers should plan to rotate chemical modes of action, use mixtures (if available), never apply the same Group 3 DMI fungicide twice in a row (even if in mixture), not use Group 7 SDHI and Group 11 strobilurin fungicides more than once per season in any crop rotation (including seed dressing/in-furrow), and always stray within label rates.

### **How can you learn more?**

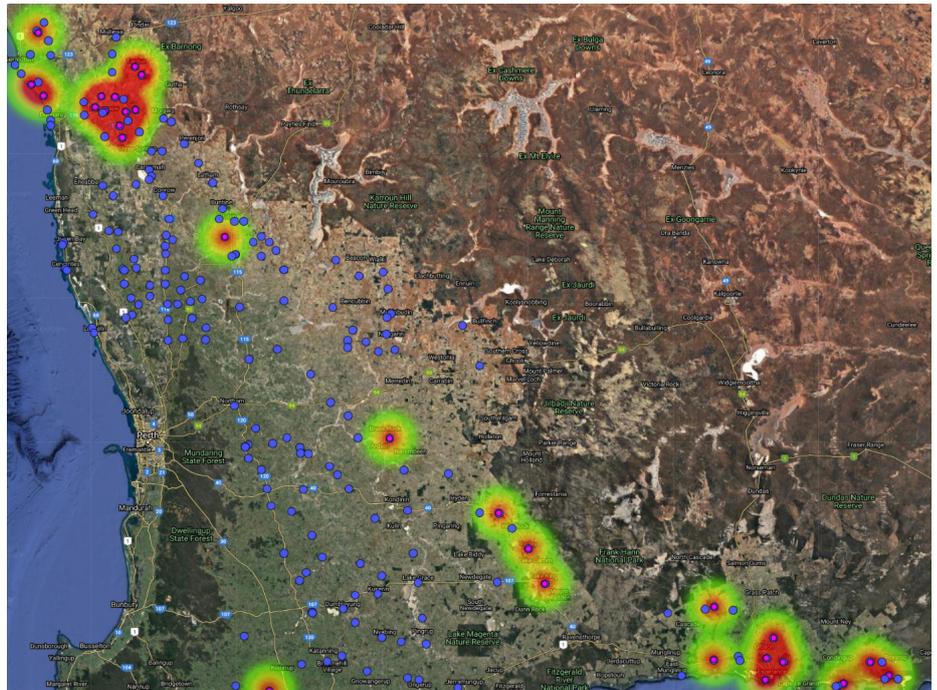
Fungicide resistance research continues at the CCDM. A barley cohort project focused on SFNB and NFNB is underway in WA – linking researchers and growers in an effort to proactively and adaptively manage fungicide resistance in this crop. Growers can keep up to date through CCDM social media channels (@theCCDM for twitter and facebook), the CCDM website ([ccdm.com.au/frg](http://ccdm.com.au/frg)), or via the CCDM email – [ccdm@curtin.edu.au](mailto:ccdm@curtin.edu.au)

The GRDC have also funded the Australian Fungicide Resistance Extension Network (AFREN) - to develop and deliver regionally specific fungicide resistance resources over the next two years. To be included in the AFREN mailing list please contact Dr Kylie Ireland - [kylie.ireland@curtin.edu.au](mailto:kylie.ireland@curtin.edu.au)

# DIAMONDBACK MOTH CATERPILLARS ARE BEING FOUND IN THE GREEN BRIDGE

Dusty Severtson  
 Research Scientist  
 DPIRD Northam

As part of a GRDC-funded diamondback moth (DBM) project, staff from DPIRD, Mingenew Irwin Group, West Midlands Group and Liebe Group have found and identified DBM larvae in green bridge plants, including wild Brassicas (e.g. wild radish) and volunteer canola, during March this year. The map below shows some scattered detections but general hotspots of DBM larvae were found in the Geraldton and Esperance regions.



**Image 1:** Map of south-west WA showing points where Brassica plants were found and diamondback moth (DBM) traps installed. Blue dots show where DBM were not found on Brassica hosts and highlighted areas indicate where DBM were found. Map courtesy of: DPIRD.

### What does this mean for germinating canola crops?

DBM are often present in the green bridge in years such as this when sufficient pre-season rainfall allows for their hosts to germinate and sustain DBM populations. In previous years DBM have caused some feeding damage to leaves of young and vegetative plants, which can look like shotgun damage, but it is rarely worthwhile spraying for DBM at this time of the year.

As the temperatures drop over the winter period the caterpillars reduce in number and do not do much damage as their feeding and reproduction is very reliant on temperatures.

Therefore, growers should be vigilant and monitor crops if we have warm days during the early crop growth stages. However, it is generally when temperatures begin to rise in early spring that DBM pose the highest risk of causing crop defoliation and stress, flower abortion and reduced seed set.



Department of  
**Primary Industries and  
 Regional Development**

During March DBM surveys pheromone moth traps were set up at sites where Brassica plants could be found, and DBM moths will be monitored over the coming weeks to get a better idea of where they are spatially. Entomologists at DPIRD and the South Australian Research and Development Institute (SARDI) are working together to get a better understanding of over-summering pre-season Brassica hosts of DBM and the risk of DBM outbreaks in spring. As part of this project, SARDI will be testing multiple populations of DBM from WA for resistance to key insecticides.

For more DBM information refer to:

- DPIRD's Diagnosing diamondback moth page.
- GRDC's Diamondback moth fact sheet.
- GRDC's Managing diamondback moth video.

For more information contact Dustin Severtson, Research Scientist, Northam on +61 (0)427 196 656.



**Image 2:** Feeding damage by diamondback moth caterpillars. Photo courtesy of: Dusty Severtson (DPIRD).

## KEEPING A FINGER ON THE PULSE: SPEEDING PULSE BREEDING

Dr Janine Croser  
Senior Research Fellow  
The University of Western  
Australia

Turnover of up to eight generations per year in major pulse species is now possible using new technology developed at The University of Western Australia through GRDC funding.

The controlled environment-based platform is based on optimised daylength, temperature and light spectrum. It is already being deployed at UWA for breeding and pre-breeding programs across Australia in an effort to speed the rate of genetic gain in chickpea, lentil, fieldpea and faba bean.

Fixing lines after crossing usually takes 5-6 generations. The technique of single seed descent (SSD) has been used since the 1940s to speed generation turnover. It relies on quick plant growth rather than yield as you only need one successful seed to take the plant to the next generation.

Under conventional SSD two generations per year can be achieved in the field (at different sites) and up to four generations in the glasshouse.

The UWA team, led by Dr Janine Croser, have accelerated SSD by exploiting ancient plant shade-avoidance responses to achieve flowering in as little as 23 days from sowing.



**Image 1:** UWA senior research fellow Janine Croser in front of chickpea plants being grown under a combination of daylight and LED lighting.

Plants that are not experiencing shade perceive red, green, blue and far red light in approximately equal quantities. As soon as they begin to be shaded, this ratio changes, with everything except the far-red spectrum being reduced through reflection.

The team identified LED lighting with a higher output in the far-red spectrum convinces plants they need to move through their lifecycle as fast as possible to avoid being fully shaded.



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**WESTERN  
AUSTRALIA**

Combined with long daylength and optimal temperatures, the far-red enriched lighting resulted in rapid flowering across all the pulse species. Importantly, it is effective across all the flowering time variability present in the existing breeding programs including those considered 'late flowering'.

To further speed the generation turnover the team developed a seed treatment process that enables the germination of immature seed, harvested around 18-20 d after flowering.

Combining the fast flowering with immature seed germination has led to generation turnover in as little as 45 d for chickpea. For large-seeded faba, this extends to 70 d.

The team has manipulated plant size to enable high density, multi-tier plant growth in the controlled environment rooms. Plant size is reduced through both physical containment and for faba bean and field pea, through the application of chemical to reduce internode spacing.

Further efficiencies are achieved by combining selection for traits such as herbicide tolerance while the plants are progressing through the generations.

The platform has more recently been modified to include wild chickpea relatives. The optimised plant growth conditions enable compressed and synchronised flowering of wild relatives and domestic parents for efficient crossing. The accelerated single seed descent platform is then used to rapidly take the progeny to fixed lines for field testing.

The team has delivered fixed lines from crosses between wild and domestic chickpea to the Australian Grains Genebank for distribution to end-users for further analysis. The wild relatives are expected to hold valuable traits including the potential for chilling tolerance at flowering, disease resistance and acid soils tolerance.

It is expected that the accelerated-SSD technology will deliver cultivars 2-3 years faster than conventional techniques. Modelling suggests that combining with other new techniques, such as genome selection, could lead to new pulse cultivars in a 3-4 year timeframe from first cross.

# LIEBE GROUP TEAM

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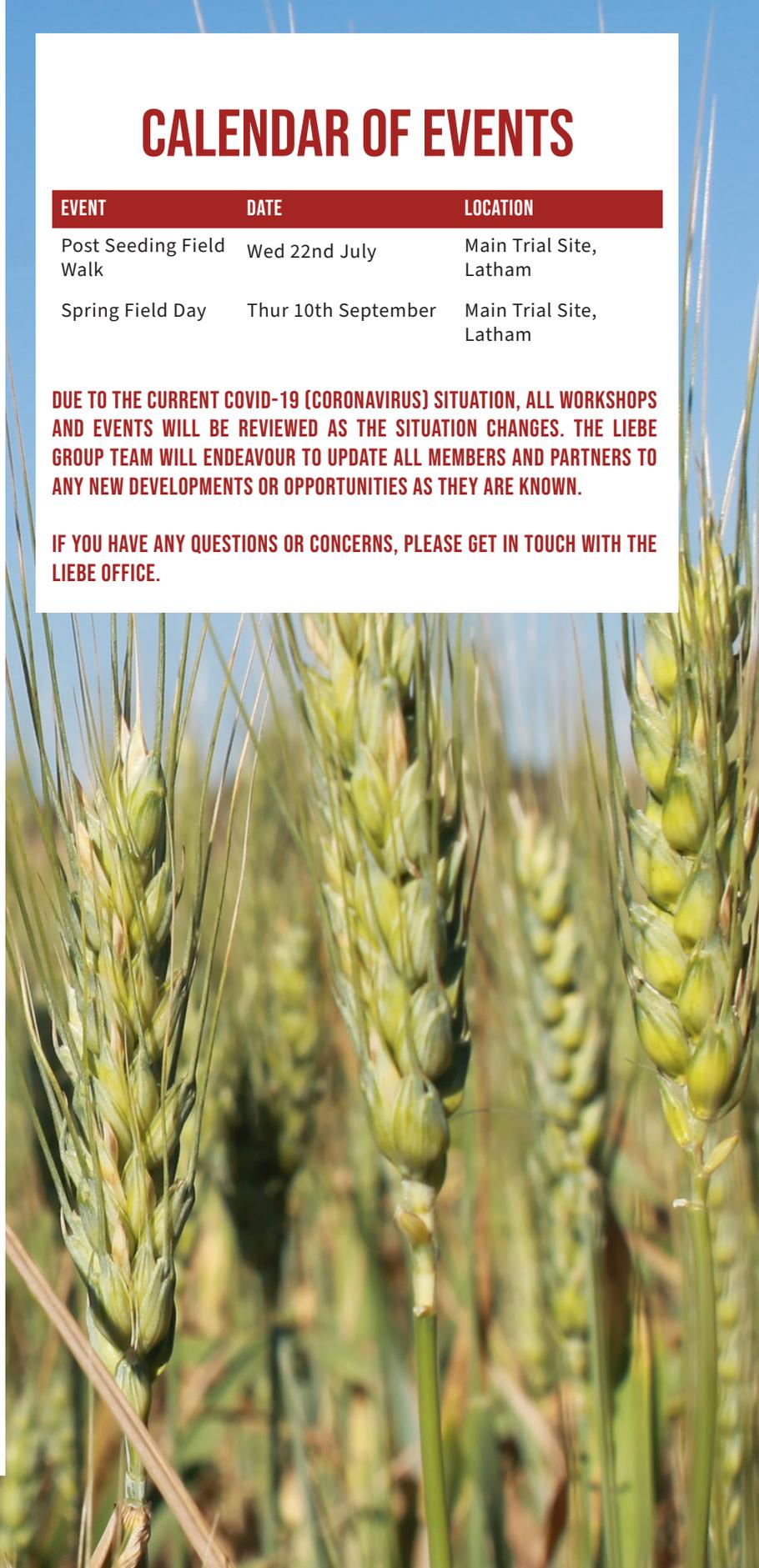
Liebe member, Mark Wilson receiving his 2019 Spring Field Day raffle prize of 1t Havoc, kindly sponsored by Pacific Seeds.

# CALENDAR OF EVENTS

| EVENT                   | DATE                | LOCATION                |
|-------------------------|---------------------|-------------------------|
| Post Seeding Field Walk | Wed 22nd July       | Main Trial Site, Latham |
| Spring Field Day        | Thur 10th September | Main Trial Site, Latham |

**DUE TO THE CURRENT COVID-19 (CORONAVIRUS) SITUATION, ALL WORKSHOPS AND EVENTS WILL BE REVIEWED AS THE SITUATION CHANGES. THE LIEBE GROUP TEAM WILL ENDEAVOUR TO UPDATE ALL MEMBERS AND PARTNERS TO ANY NEW DEVELOPMENTS OR OPPORTUNITIES AS THEY ARE KNOWN.**

**IF YOU HAVE ANY QUESTIONS OR CONCERNS, PLEASE GET IN TOUCH WITH THE LIEBE OFFICE.**



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