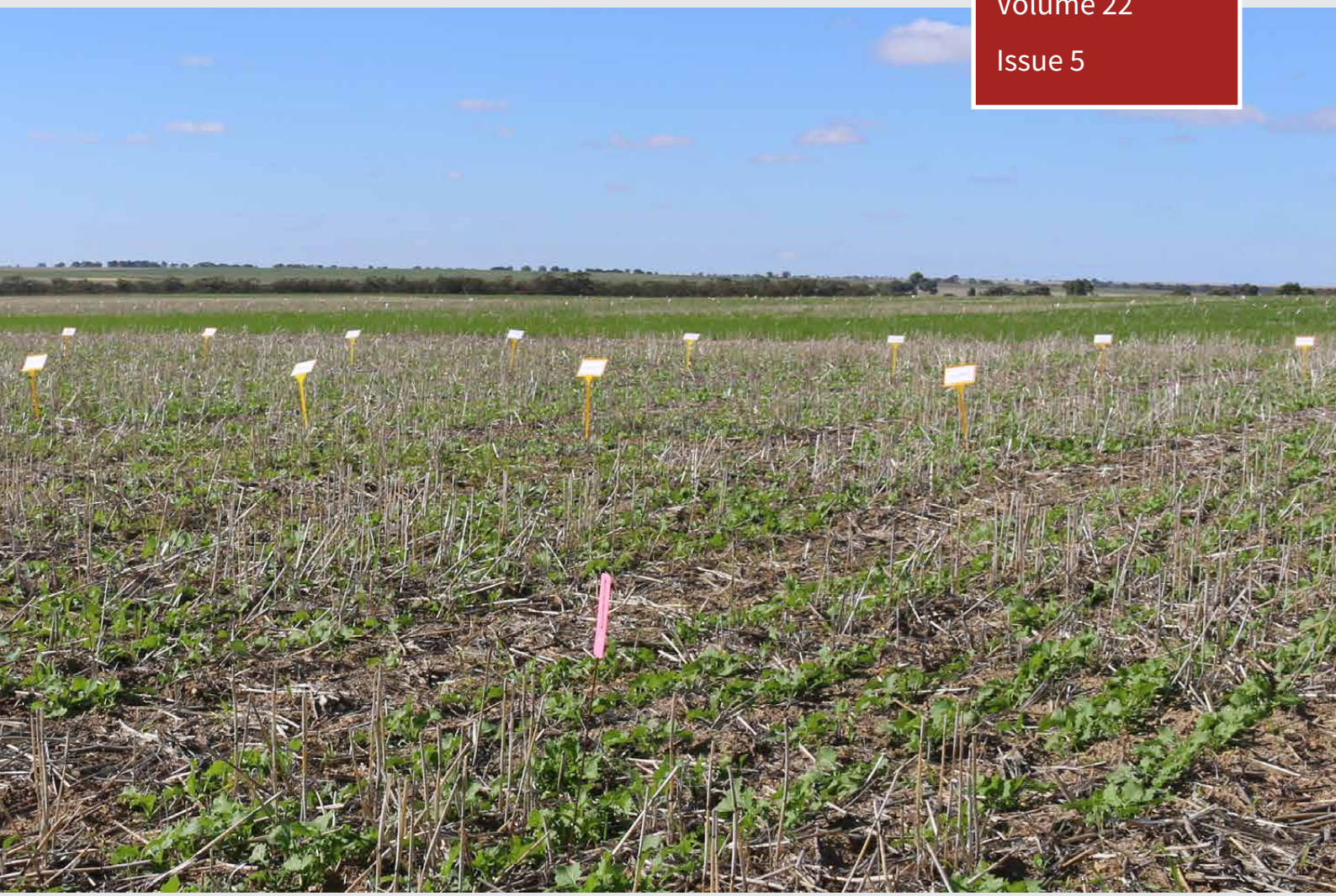
LIEBE GROUP NEWS

July 2019
Volume 22
Issue 5



What's Inside

Post Seeding Field Walk Agenda

AgChats - Grain marketing

RSM

Higher education options for rural families

Diagnosing lucerne flea

LiEBE GROUP
Working together in Agriculture

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

The Canola Variety Trial at the 2019 Main Trial Site, Watheroo.

DIAMOND PARTNERS

Rabobank

CSBP

CBHGROUP

RSM

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FROM THE EXECUTIVE OFFICER

Bec McGregor

WELCOME to the July edition of the Liebe Group Newsletter. With widespread rains throughout the Liebe region we are pleased to see plenty of crops emerging and smiling faces after the dry start to the season.

This month has been a busy one for the Liebe staff with emergence counts taken at all of our trial sites throughout the area and the running of another successful Women's Field Day. We were fortunate in early July to have work experience student, Lauren Rayner from Murdoch University join us in the Liebe office. Lauren was a great assistance during her week with the group and it was great to see the passion and enthusiasm of the next generation joining the agricultural industry. We asked Lauren to share a summary of her experience which can be found on page 8.

The third Liebe Group Bitesize Learning session was held on the 2nd July which focused on Microsoft Excel basics. The session was a great success with 12 Liebe women coming together to share their experience and build their own skills in Microsoft Excel. The Liebe Group would like to thank Ethan Sirr from Rabobank for facilitating this session. An overview of the event can be found on page 10.

The next Bitesize Learning session will be on Grain Marketing Basics on Thursday 1st August from 11am-12.30 in the Liebe office. This will follow an AgChats session on Grain Marketing with TenTigers from 7.45-10am.

Our Liebe Group Post Seeding Field Walk is next week, starting at 2pm on Wednesday 24th July. The afternoon is your chance to view the abundance of research at the Main Trial Site and share your ideas for the future of research and development in your region. The field walk will be followed by an R&D session and Beer and Burger night at the Miling Sports Club. See page 6 for the full agenda.

We look forward to seeing you at an upcoming Liebe Group event or workshop!

GOLD PARTNERS

Elders SCHOLZ RURAL

FARMANCO

IMTRADE AUSTRALIA Agriculture Reimagined

BAYER

SoilTech

SILVER PARTNERS

Syngenta
Pacer Legal
Agrimaster
Adama Australia
GrainGrowers
Landmark
Advanta Seeds
Australian Grain Technologies
Scott's Watheroo Dolomite
Refuel Australia
NuFarm
Intergrain
Boekemans Machinery Dalwallinu

MAIN TRIAL SITE UPDATE

THIS year the Main Trial Site has ventured to the Watheroo region, to the Keamy family property, west of Dalwallinu. Located on Merrewana Road, this year's trial site hosts a wide range of trials relevant to the local region.

In 2019, the Main Trial Site showcases both small plot trials and large scale grower demonstrations. This year has a variety of trials that meet the R&D requirements of the members and the group over the last couple of years. The trials, with support from our partners, are investigating herbicide management strategies of cereals and canola, fungicide options for barley, nitrogen management and timing, time of sowing in wheat, residues in canola and variety performance for canola, wheat and barley.

The 2019 Main Trial Site is also home to a Liebe Group initiated ripping demonstration. The Liebe Group, with support from the Keamy, Carlshausen and Martin families are investigating the impacts of compaction on crop establishment and growth, through use of different ripping treatments including a Terreland, Agroplough and Grizzly. This demonstration will be viewed at the Post Seeding Field Walk on the 24th July 2019 and soil pits will be dug for the Spring Field Day on the 12th September 2019.

While there are many trials located at the Main Trial Site this season, the Liebe Group would also like to acknowledge the overwhelming community effort shown by the wider grower membership, who are kindly hosting trials for the group and it'sresearch partners.

For the full details of all the research being conducted in the Liebe region, contact the Liebe Group office. Updates of each of these projects and activities at the Main Trial Site, will be bought to you via the Liebe website, Liebe Newsletter, Farm Weekly, the Liebe Facebook page and the Liebe twitter page.

Results from all the trials being conducted across the Liebe region will be published in the annual R&D book at the beginning of 2020.

A full trial list can be seen on the following page. Trials to be viewed at the Post Seeding Field Walk can be found on page 6.

Canola Variety Trial

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Trial	Research Organisation	Key Researcher
Canola Systems Trial: Comparing truflex®, roundup ready® and triazine tolerant herbicide systems	Bayer Crop Science	Matt Willis
Investigation into the efficacy of pre-emergent herbicides for the controls of weeds in tt canola	Imtrade Australia	Michael Macpherson
Comparing simulated IMI Soil Residue and Group B Tank Mix Contamination on Hyola® CT Stacked Technology vs Open Pollinated TT single herbicide trait Technology	Pacific Seeds Bayer	Justin Kudnig
Comparing simulated IMI soil residue and Group B Tank mix contamination on hyola® xc stacked technology vs hyola® xx and rr single herbicide trait technologies	Pacific Seeds Bayer	Justin Kudnig
Increasing nitrogen use efficiency - mid row banding	CSBP	Angus McAlpine
Knockdown Demonstration	Nufarm	Steven Tilbrook
Ultro, a novel pre-emergent herbicide and SE 14 for lupin establishment and ryegrass control	Adama	Bevan Addison
New pre-emergent herbicide for controlling broadleaf weeds in cereals	Elders Scholz Rural Syngenta	Clare Johnston Owen Langley
Barley National Variety Trial	GRDC	Peter Bird
Main Season Wheat National Variety Trial	GRDC	Peter Bird
Canola Variety Trial	Liebe Group Pacific Seeds BASF Seed Pioneer Seeds NuSeed	
The interaction between the seeding rate and row spacing of hybrid and open pollinated canola (Brassica napus) varieties on ryegrass (Lolium rigidum) and wild radish (Raphanus raphanistrum) growth and competition.	AHRI	Mike Ashworth
The interaction between the seeding rate and seed size of hybrid and open pollinated canola (Brassica napus) varieties on ryegrass (Lolium rigidum) growth and competition.	AHRI	Mike Ashworth
Wheat time of sowing 1: The interaction between wheat (Triticum aestivum) establishment timing and pre-emergent herbicides choice on annual ryegrass (Lolium rigidum) growth and competition.	AHRI	Mike Ashworth
Wheat time of sowing 2: The interaction between wheat (Triticum aestivum) establishment timing and pre-emergent herbicides choice on annual ryegrass (Lolium rigidum) growth and competition	AHRI	Mike Ashworth
Deep Ripping Demonstration	Liebe Group	
Fungicide options for barley	Adama	Bevan Addison
FCI herbicide resistance screening	Landmark	Richard Stone

LIEBE GROUP POST SEEDING FIELD WALK 2019
WEDNESDAY 24TH JULY

TIME: 2:00 - 5:00PM

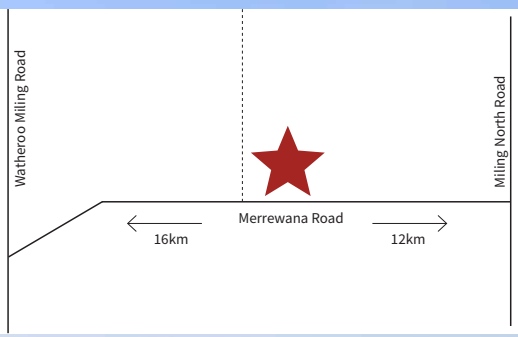
LOCATION: KEAMY PROPERTY, MERREWANA ROAD, WATHEROO

R&D SESSION AND BEER & BURGER NIGHT TO FOLLOW AT MILING SPORTS CLUB

EVENT PARTNER

BAYER

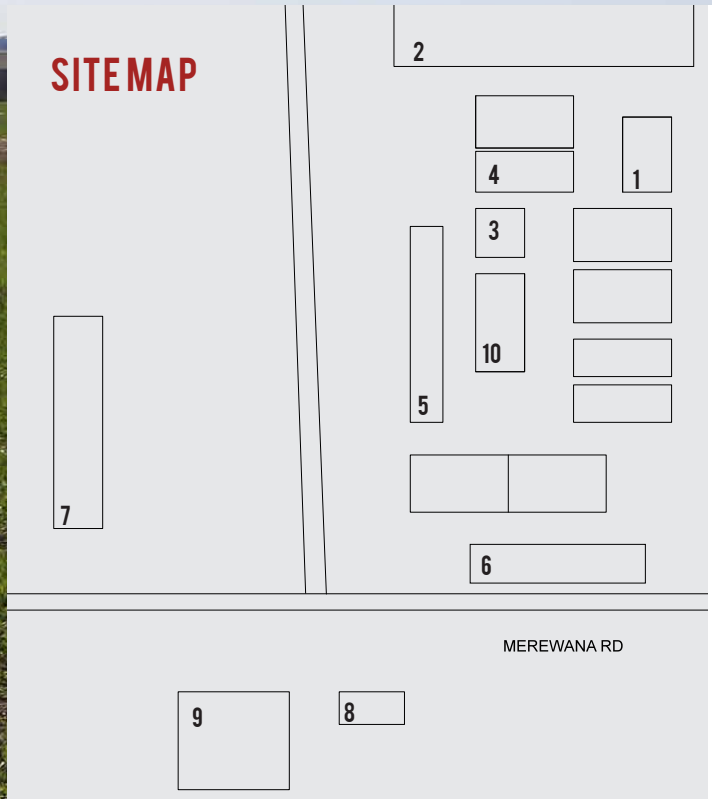
SITE LOCATION



QUERIES

For more information, contact the Liebe Group office on 08 9661 1907 or email admin@liebegroup.org.au

SITE MAP



TRIALS

Site 1: Truflex Canola Systems - Bayer

Site 2: Liebe Group Ripping Demonstration

Site 3: Pre-emergent weed control in canola - Imtrade

Site 4: Hyola XC imi residue and investigating the impact of different levels of imi residue/contamination on XX vs XC canola - Advanta Seeds and Bayer

Site 5: Nitrogen management and timing in wheat - CSBP

Site 6: Knockdown demonstration - Nufarm

Site 7: Pre-emergent grass control in lupins - Adama

Site 8: Calisto pre-emergent annual broadleaf weed control in wheat - Elders and Syngenta

Site 9: National Variety Trials; Wheat and Barley - GRDC

Site 10: Canola Variety Trial - Liebe Group, Advanta, BASF Seed, Pioneer and NuSeed

DIAMOND PARTNERS

Rabobank

AFGRI EQUIPMENT

CBHGROUP

CSBP

RSM

POST SEEDING FIELD WALK 2019 AGENDA

Time	Agenda		
2pm	Meet at Main Trial Site and Afternoon Tea		
	Group 1	**Group 2**	**Group 3**
2:30 - 2:40	**Site 1**: Truflex Canola Systems - Bayer	**Site 6**: Knockdown demonstration - Nufarm	**Site 7**: Pre-emergent grass control in lupins - Adama
2:45 - 2:55	**Site 2**: Liebe Group Ripping Demonstration	**Site 7**: Pre-emergent grass control in lupins - Adama	**Site 6**: Knockdown demonstration - Nufarm
3:00 - 3:10	**Site 3**: Pre-emergent weed control in canola - Imtrade	**Site 1**: Truflex Canola Systems - Bayer	**Site 5**: Nitrogen management and timing in wheat - CSBP
3:15 - 3:25	**Site 4**: Hyola XC imi residue and investigating the impact of different levels of imi residue/ contamination on XX vs XC canola - Advanta Seeds and Bayer	**Site 2**: Liebe Group Ripping Demonstration	**Site 3**: Pre-emergent weed control in canola - Imtrade
3:30 - 3:40	**Site 5**: Nitrogen management and timing in wheat - CSBP	**Site 3**: Pre-emergent weed control in canola - Imtrade	**Site 4**: Hyola XC imi residue and investigating the impact of different levels of imi residue/contamination on XX vs XC canola - Advanta Seeds and Bayer
3:45 - 3:55	**Site 6**: Knockdown demonstration - Nufarm	**Site 4**: Hyola XC imi residue and investigating the impact of different levels of imi residue/contamination on XX vs XC canola - Advanta Seeds and Bayer	**Site 2**: Liebe Group Ripping Demonstration
4:00 - 4:10	**Site 7**: Pre-emergent grass control in lupins - Adama	**Site 5**: Nitrogen management and timing in wheat - CSBP	**Site 1**: Truflex Canola Systems - Bayer
4:15 - 4:25	**Site 8**: Calisto pre-emergent annual broadleaf weed control in wheat - Elders and Syngenta		
4:30 - 4:50	**Sites 9 & 10**: Variety Trials; Barley, Wheat and Canola		
5:00pm	Travel to Miling Sports Club		
5:30pm	R&D Session Beer and BBQ		

WORK EXPERIENCE INSIGHT

Lauren Rayner
Bachelor of Science
Murdoch University

I am currently in my second year studying a Bachelor of Science and majoring in both Animal Science and Crop and Pasture Science at Murdoch University. I grew up on the family farm west of Brookton, where we run predominately merino sheep, a small mob of cows and cereal and lupin cropping rotations. My love of agriculture lead me to complete my final years of school at the WA College of Agriculture – Narrogin where I learnt to judge sheep and also studied animal and plant production systems and loved every minute of it. From there I applied to Murdoch to increase my awareness and knowledge of the agricultural industries.

I have always had a love for agriculture, but I felt that I needed to be exposed to areas that are different to home. I also wanted to see a different side to the grain and cropping industry, one that I haven't been exposed to through the farm at home or through working as a sampler at CBH over the harvest seasons. With my family having farmed up in this area a couple of generations before me, I had also heard a lot about what the Liebe Group do and what they are about. Hence the reason I applied to do my work experience here at the Liebe Group and was lucky enough to be here for five days.

To say that I had a great time at the Liebe Group is an understatement. It has been a remarkable five days, by visiting the Main trial site, collecting plant establishment data, taking part in crop surveys, helping plan the post seeding field walk, visiting local shires for other trial sites and learning about what each is about. I have learnt the true power of research and the importance of extending the knowledge found from those trials to the farming community. I have gained a whole new insight into the R&D side of agriculture that is vital for the industry to move forward. To learn about the history and involvement the Liebe Group has with the community is incredible, from interactive workshops, field walks to AgChats and the engagement with the community and surrounding shires.

Lauren at the Liebe Group Main Trial Site Watheroo

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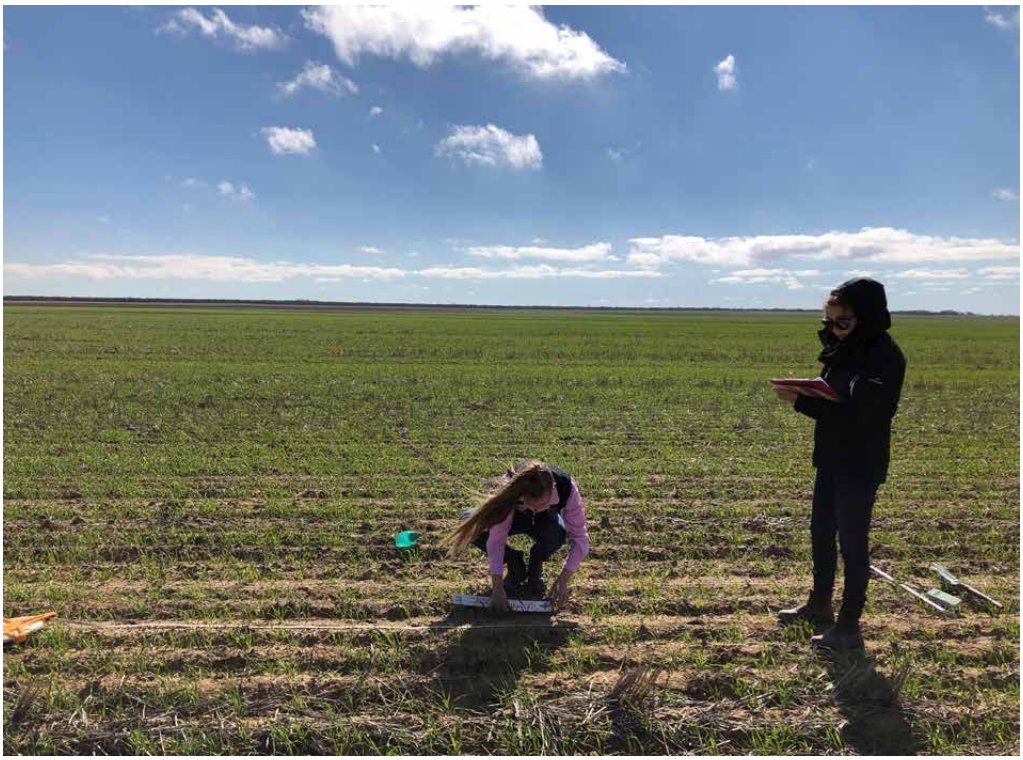
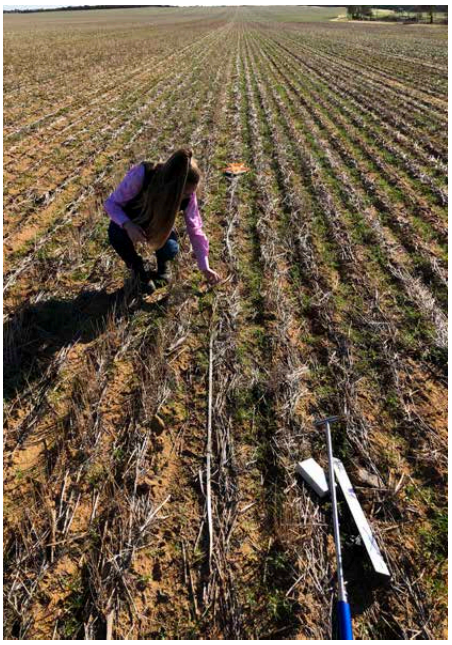
The work experience has definitely opened up my eyes, in terms of the Liebe Group having so much interaction with trials, industry professionals and the wider community, the dedication and hard work by the Liebe staff to keep the priorities of the group in order and the vast difference in the landscape, crop type, soil type and decisions that make up the northern agricultural region. I would like to sincerely thank the Liebe Group for having me for the past five days. I have had an incredible experience that has exposed me to a whole new side of research and communication that overall will have an ever improving effect of productivity in this region. Thank you very much for letting me be a part of the Liebe Group for this short time and giving me the opportunity to learn about new and exciting research.



Conducting wheat plant counts for the Crop Establishment Project, Buntine



Conducting lupin plant counts for the Crop Establishment Project, Buntine

BITESIZE LEARNING – MICROSOFT EXCEL ESSENTIALS TO EXPERTS

Bec McGregor
Executive Officer
Liebe Group

ON Tuesday 2nd July the Liebe Group hosted its second Bitesize Learning session with 12 local Liebe women. The session was focused on providing practical skills and knowledge on the use of Microsoft Excel that could be applied in a farming business, and for use in personal and family life. Microsoft Excel is one of the worlds most popular and easily accessible spreadhseet applications however the Liebe Women's Committee recognised that many people have never used the program or may not be using it to its full potential.

Ethan Sirr from Rabobank facilitated the session and took it back to basics with an overview of Excel and how to get started. The women then worked through some of the functions of the program including how to format and enter data, and how to use basic formulas and functions.

Leanne Sawyer attended the workshop and said "We developed overall skills and enhanced our Excel knowledge with the use of keyboard functions for more efficient data entering. We also learnt other aspects like freezing columns and protecting worksheets; all aspects that I was unaware of before the session".

The workshop was highly interactive with many sharing their own experiences, tips and tricks. At the end of session all of the attendees agreed that it was a highly beneficial session with many eager for a follow up session to continue to advance their skills.

The Liebe Group would like to thank Ethan Sirr from Rabobank for assisting with the workshop and to all the women who attended for sharing their own experiences and for their enthusiasm to learn. The next Liebe Group Bitesize Learning session will be focused on Grain marketing basics with TenTigers on Thursday 1st August. See the adjacent flyer for further details.

Useful tools and resources

https://support.office.com/en-us/article/excel-for-windows-training-9bc05390-e94c-46af-a5b3-d7c22f6990bb

https://www.excel-easy.com/

https://chandoo.org/wp/excel-basics/

Liebe women at the Microsoft Excel Bitesize Learning session

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EVENTS

LIEBE GROUP AGCHATS

GRAIN MARKETING: SETTING STRATEGIES FOR YOUR BUSINESS

Thursday 1st August

7:45 - 10:00am at the Liebe Group Office

Tea, coffee and toasties on arrival

Join Chris Tonkin, Jacquie Warr and the Ten Tigers team as they share their knowledge and expertise of grain marketing.

- Learn how to set grain marketing strategies and targets for your farm business
- Know and understand your percentiles
- Know how to plan beyond the season; planning for 2 - 3 years down the track

For more information, or to register, contact the Liebe Group office by phoning 9661 1907 or email admin@liebegroup.org.au

SUPPORTED BY Grain Growers *Real benefits. Real results.*

BITESIZE LEARNING

LIEBE GROUP *Working together in Agriculture*

GRAIN MARKETING BASICS

THURSDAY 1ST AUGUST

11AM - 12:30PM AT THE LIEBE GROUP OFFICE

TEA AND COFFEE ON ARRIVAL

BABIES AND KIDS WELCOME

Are you new to grain marketing? Do you want to learn some new skills to apply in your business? Jacquie Warr of Ten Tigers is passionate about grain marketing and is ready to share her knowledge with Liebe ladies!

WHAT WILL BE COVERED

- Understanding the basics of grain marketing
- Knowing where to start your grain marketing journey

QUERIES

For more information or to register, contact the Liebe Group office on 9661 1907 or email admin@liebegroup.org.au

CROP SEQUENCE AND SWAPS WORKSHOPS

FARMANCO

9am Tuesday 23 July 2019 @ Dalwallinu Liebe Offices

Afternoon Session 1pm - Swaps Workshop

9AM - CROP SEQUENCING

- Project Overview, demonstration of legume crops for profitability in the Western Region
- CSIRO, crop sequence trials and models and how these apply to your farm
- Paddock measurements and DPIRD trials, what are the trends in the WA farming system? — Greg Shea, DPIRD
- Farm rotations and grower profits. What are the profit drivers for choice and how to build the best rotation. — Greg Easton, Farmanco
- Agronomy and rotations, how the decisions are made. Where to from here? You've been given the information, now how to tie it together? — Peter Borstel, Farmanco
- Group discussion re: crop rotations and drivers

1PM - FARMANCO MARKETING SWAPS WORKSHOP

- An introduction and refresher on futures, foreign exchange and basis (SWAPS).
- How do you get set up and started?
- When to use swaps
- Historical performance of swaps in the WA market
- Farmanco case study
- Long term wheat, barley and canola basis analysis and trends
- Different hedging and swaps strategies your business may utilise supported by long term benchmarking
- Using wheat swaps to hedge barley

RSVP on 08 9295 0940 for catering purposes

www.farmanco.com.au

Department of Primary Industries and Regional Development
GOVERNMENT OF WESTERN AUSTRALIA

FARMANCO

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GRDC
GRAINS RESEARCH & DEVELOPMENT CORPORATION

Department of
Primary Industries and Regional Development
GOVERNMENT OF WESTERN AUSTRALIA

2019 SOIL CONSTRAINTS TOUR 6-7 AUGUST

Tour begins and ends in Geraldton each day

Register at agric.wa.gov.au/events/2019-soil-constraints-tour

$50/day (incl. lunch); Accommodation options available at time of booking

Enjoy a wealth of information from researchers, industry and growers on the soils and management solutions in the northern ag region through a mixture of farm and trial site visits

Tuesday 6th August

Northern loop; Nabawa, Yuna, Binnu, Northampton

- **Management of pastures and soil** *Chad Reynolds, DPIRD*
- **Managing traffic in soft soils post ripping and spading** *Bindi Isbister, DPIRD*
- **Interrogation of deep ripping costs and returns** *Wayne Parker, DPIRD*
- **Which of the many constraints do we combat first in a compacted acidic subsurface sand?** *Wayne Parker, DPIRD*
- **Understanding the role of manufacturers in soil amelioration: A tour at Nufab Industries** *Wayne Parker and Steve Davies, DPIRD*

Lunch at Binnu Hall, all welcome to meet for open discussion on managing soil constraints RSVP to Jenni for catering

Ending with a sundowner at Nufab Industries

Wednesday 7th August

Southern loop; Mingenew, Tardun, Eradu

- **Potassium fertiliser strategies in a wheat/lupin rotation** *Luigi Moreschi, CSBP*
- **Seeding systems and herbicide strategies on mouldboard ploughed paddocks** *Steve Davies, DPIRD*
- **Long-term liming, ripping and spading strategies** *Steve Davies, DPIRD*
- **How to improve structure in a sodic, dispersive, sub-soil** *Ben McTaggart and Debbie Gillam, MIG*
- **Liming and incorporation to overcome acidity in low rainfall** *Chad Reynolds and Gaus Azam, DPIRD*
- **Deeper ripping with inclusion plates** *Bindi Isbister, DPIRD*

Enquires to Jenni Clausen
jenni.clausen@dpird.wa.gov.au

GRDC GRAINS RESEARCH & DEVELOPMENT CORPORATION

SOILSWEST

This tour is supported by GRDC/DPIRD Soil Constraints West projects DAW00236, DAW00242, DAW00243, DAW00244, DAW00252 and Soil Constraints West II projects DAW1902_003RTX, DAW1901-006RTX and DAW1902-001RTX

TACKLING SOME OF THE COMMON ISSUES FARMING FAMILIES FACE WHEN TRANSITIONING THEIR BUSINESS TO THE NEXT GENERATION

Rosemary Bartle
Head of Succession Planning
Rabobank

Rabobank

DURING the recent Liebe Group Women's Field Day in Dalwallinu, we explored the ways families have tackled three common succession planning issues, namely:

- Providing opportunities for all children
- Deciding who (in the next generation) will take the baton of the farming business
- Achieving fair inheritance for both on-farm and off-farm children.

How do we provide farming opportunities for all children?

Firstly, the family must consider if there is room on the farm for more than one child, or if there is potential to expand the business to incorporate additional children. Some points that need to be discussed and agreed upon, include:

- Are those already home agreeable to "sharing the sandpit"? i.e. can they work together towards common goals?
- How long does the "door remain open" for other siblings to return to the farm? A defined timeframe gives everyone certainty, and makes it possible to establish fairness.
- Prior to children returning to the farm, it is imperative that the family has a business meeting to determine the "rules of engagement". No-one can be expected to make a decision about being involved in the business if they don't know what their "employment contract" encompasses. Issues to consider and come to agreement on are:
    - Initially, a "line in the sand" must be drawn for those already in the business to ensure fairness. It should be established if they have been adequately remunerated for their work in the business and contribution to the growth of the business. Any gifts should also be considered. If adjustments are required, these can be paid out or recorded as a debt to the business, for payment at a later stage. If inadequate remuneration is to continue, then reach an agreement around how this is calculated and ensure it is recorded each year.
    - Roles and responsibilities for each of those in the family business.
    - Look at upskilling the next generation via a training/coaching/development program on decision making, risk taking and business management.
    - Communication – by holding regular operational and strategic business meetings.
    - Housing issues: privacy, access, who pays for repairs and renovations?
    - Remuneration including what expenses the business pays, what are considered personal costs and how wages are to be determined and reviewed?
    - Hours/days of work, holidays, personal leave etc. Yes, this is essential as differences in work hours can cause a lot of conflict in the workplace!
    - How will spouses be involved? Will they have roles and responsibilities in the business and if so, how are they paid?
    - A plan for earning equity in the business and/or gaining land ownership.

It may be that other children do not wish to have direct involvement in the family's farming business, but rather be assisted by the family – through varying means, such as leasing land to children or providing land as security to purchase their own farm/obtain loans – to establish a business in their own right.

Who will take the baton of the farming business?

If it has been determined that there is only capacity for one child to return to the farm, or if children do not wish to work together, how does a family decide which child will take the baton and continue the business?

An example:
This situation was faced by a family who had four children wishing to take over the family farming business from their parents who were wanting to gradually step back from the physical work and management. However, capacity was limited and the children did not wish to work together. The parents were faced with having to choose one child. All had had some previous involvement in the farm, however due to conflicts, they had all gone their separate ways and established their own farming enterprises with the assistance of the family business.

Initially, the parents considered leasing various parcels of land and livestock to children as individual arrangements. Leasing would enable the parents to have security of ownership and income – something very important to them. The lease payments required from both the land and cattle to cover debt servicing, land costs and living expenses was considerably higher than the going rate in the area and considered by the children to be unviable.

Debt would need to be significantly reduced before leasing would become a viable option, and it was estimated that this would take around five years if seasons and commodity prices were favourable.

Following three facilitated succession planning meetings, two of the children decided they were not interested in taking over the management of the farms, due to a multitude of reasons. It was then decided the remaining two siblings would each apply for the position of "Farm Manager". During the succession planning meetings, the family determined parameters and process for applications:

Each applicant was asked (by a specified date) to prepare a five-year strategic plan based around:

- Vision; goals and strategies for the business
- SWOT analysis
- Roles and responsibilities
- Remuneration package for successful applicant
- Communication strategy (operational and strategic) including dispute resolution procedure
- Strategies for achieving productivity and profitability goals
- Development plans
- Debt reduction plan; with a view to the business being "lease ready" at the end of five years
- Cashflow budgets
- Consideration of the impact of the five-year plan on other family members and how any negative impacts would be mitigated.
- Process for review after five years, with various options proposed e.g. continue the arrangement, lease to all children, outright sale of farms etc.

In the meantime, parents prepared their own five year plan and this was used as the base for assessing applications. Applicants were interviewed by a panel comprising parents, the two children not involved in the farming business and the business' accountant.

The successful applicant commenced duties 12 months ago, following negotiated changes to their business plan. The new arrangements have not been easy, however parents and son have committed to working together, improving communication, and pulling the business in the one direction. Future family meetings will be required to reach agreement around inheritance.

How can we achieve fair inheritance for all children - both on-farm and off-farm?

Achieving fair inheritance for all children is often one of the most difficult issues faced in succession planning. Quite often parents (especially mothers) would prefer inheritance to be equal, however the desire for equal inheritance is mostly incompatible with the family's desire to pass on the family farm intact and as a viable business.

Of all the families we have assisted in succession planning over the past 17 years, only five per cent have been able to achieve equal inheritance, and the majority of families decide that passing on an intact and viable business to the next generation is their highest priority. That means that for all but a few, families need to come to agreement around what is fair inheritance for all children.

Some considerations when determining fair inheritance:
For on-farm children

- Determine if they have been appropriately remunerated for the work done in the business and their contribution to the growth of the business. If not, determine what is "owed" and if it can be paid now. If it can't be paid now, record and take it into account at a later agreed time, perhaps as an adjustment to inheritance. If this "sweat equity" will be ongoing, determine how it will be calculated over time, and ensure it is recorded.
- Who will be responsible for looking after the older generation, financially and physically? Should this become an adjustment to inheritance for those taking on this responsibility? The retiring generation need to get a good handle on what their financial requirements will be once they step back from the business, to ensure the next generation have some degree of certainty around their financial obligations.
- It is important to negotiate access to the farm and family home for off-farm family members, once the older generation are no longer there. This includes "perks" for off-farm children e.g. that tank of fuel that parents always provide when children visit.

For off-farm children

- Have they been provided any assistance to date? If so, document and take into account.
- Discuss ideas around what they may inherit – cash, off-farm assets, land etc.
- If they are to inherit land, negotiate any lease and/or purchase options and agreements for on-farm children; especially if access to the land is required to retain a viable business.
- Early inheritance for off-farm children
    - This provides certainty for on-farm children as to their financial commitments.
    - Early inheritance is often worth a lot more than receiving inheritance years in the future, especially if the off-farm children are on "struggle street".
    - Parents to consider including a "Considered Persons" clause in their Will, detailing why certain children are receiving less, or nothing from their estate.
    - Consider a "Sunset Clause" to protect off-farm children in the event of on-farm children selling the farm soon after inheriting it. These are generally for no more than 10 years on a sliding scale, with allowance for extenuating circumstances.

How to get to fair? Just start! Throw around some ideas and figures – what is fair often "falls out", and have confidence that you will know it when you see it. Alternatively, you could start with equal and work through adjustments as discussed above. Agreement has been reached in 99 per cent of the businesses we have worked with. Agreeing to a review process and timeframe is critical, as people's views on these issues change with different stages of life and circumstances, however keep in mind that reviews cannot go on forever.

HIGHER EDUCATION OPTIONS FOR RURAL FAMILIES

Danelle Smith
Assistant Manager
RSM

For families with children in rural WA, the decision to send children to Perth for high school can be quite an overwhelming matter. A decision that works for one family may not be the right decision for another family.

In an effort to clarify the choices, RSM has had a look at what benefits you can possibly receive from the government as well as various options available to sending your children to Perth for high school.

The government provides benefits to families who meet the eligibility criteria for Assistance for Isolated Children (AIC). AIC is available to families who are unable to attend a local government school due to geographical isolation, disability or special needs. In order to receive the benefit, the child must meet the living requirements, the age requirement and the study requirement.

The child's living arrangement will determine which allowance you may be entitled to receive.

- They must live in a boarding facility at the school;
- hostel or privately;
- in the family's second home;
- at home doing distance education or
- going to a Northern Territory Homeland Learning Centre.

They need to be studying full time and meet the age requirements.

The scheme recognises your child as geographically isolated if:

- Your family home is 56 km or more from the nearest suitable government school, or;
- Your family home is 16 km or more from the nearest suitable governments school and at least 4.5 km away from the nearest transport to school;
- Your family home is 16 km or more from the nearest suitable government school and your child has no transport to get there, or;
- Your child can't get to the nearest suitable government school for at least 20 school days a year due to circumstances beyond your control.

If you meet the requirements you can receive one of the four payments depending on your living arrangement. The four payment are Boarding Allowance, Distance Education Allowance, Second Home Allowance or Pensioner Education Supplement. See the maximum payment rates for 2019 below:

	Assistance for Isolated Children Scheme Allowance	Payment
Option 1	Boarding Allowance (Basic & Additional)	$10,838 per year, made up of 2 parts: • $8,422 – basic • $2,416 – additional
Option 2	Second Home Allowance	$245.36 per fortnight, per child (for a maximum of 3 children)
Option 3	Distance Education Allowance	$ 4,211 per year
Option 4	Assistance for Isolated Children Pensioner Education Supplement	$ 62.40 per fortnight

Keep in mind that the additional payment for the boarding allowance is subject to parental income and the actual boarding costs.

- If parental income is less than $ 53,728 then there is no effect on your payment.
- The payment is reduced by 20 cents for every dollar over $ 53,728 that you earn. This figure will depend on the number of children in your family pool. You may still be eligible for a higher rate of additional boarding allowance if you're eligible for Family Tax Benefit Part A for the child you're claiming or there are 2 or more dependent children in the family pool.

Remember to lodge a new claim for each new year. A separate form is required for each child that you are claiming for and all claims need to be lodged by 31 December of that year, any received after this date will not be approved.

For further information on AIC go to https://www.humanservices.gov.au/individuals/services/centrelink/assistance-for-isolated-children-scheme . You can download a claim form and submit the completed form through your myGov account, by post, by fax or in person.

If you are eligible for AIC, then you will also be eligible for the Boarding Away from Home Allowance (BAHA). BAHA is the WA state government funding for isolated children. The 2019 payment rate is $1791.

The downside is that the WA state government has decided to reduce BAHA by 30% over the next few years so that by 2021 it will only be $1477 per year.

You will need to fill out and send in the claim form by 29 November. You can find the form at student.allowances@education.wa.edu.au or by contacting the WA Department of Education on 08 9264 4516.

Now there is an awareness of payments available; we set up a few scenarios to see what would it cost to send your children to boarding school. Assumptions:

- 2 parents with 3 children.
- living 250 kms north of Perth and each child will be receiving 6 years of secondary education, 18 years of school fees in total.
- CPI in at 3%
- interest rates of 6% and
- an estimate of the private school fees from a sample of schools.

We looked:

i) at either boarding the children for their entire education or;
ii) paying tuition and purchasing a house in Perth;
iii) or paying tuition and renting a house in Perth for either a first tier, second tier or state school

Our first-tier school has a tuition of $ 26,400 and boarding of $24,500, our second-tier school tuition was $ 5,617 and boarding of $ 20,829. For the state school, it was assumed voluntary fees were paid, but $1,000 a year was put in to the calculations for various school items that would be required in the year.

In regards to the options of purchasing a house or renting a property, we made the following assumptions:

Purchasing a house

- The deposit was $150,000 and capital purchases for the house were $40,000;
- The mortgage was an interest only loan with a rate of 6%
- with a view to selling the house with a capital gain once all the children have completed their education;
- the annual cost of maintaining the house is $12,000 a year increasing by 3% each year;
- the cost of maintaining a child at $100 per week for 38 weeks.
- the family would receive the full second home allowance.

Renting a property

- the rental bond and rent were $500 per week;
- the annual cost of maintaining the house is $12,000 a year increasing by 3% each year;
- the cost of maintaining a child at $100 per week for 38 weeks
- the family would receive the full second home allowance.

These are the estimates that were generated with the above scenarios:

	1st Tier Private	2nd Tier Private	Perth State Senior High School
Boarding	$826,962	$322,941	N/A
Tuition Only - Purchase House	$955,871	$527,513	$432,352
Tuition Only - Rent House	$928,595	$400,237	$405.076

This information is intended as general information, and a starting point in the financial discussion on where families want to send their children.

Unfortunately deciding where to send your children is not just a cut and dry choice. There are emotions and other family members to take into consideration.

If you require further information do not hesitate to contact our office RSM Moora.

HOW TO COMPLETE THE NATIONAL WOOL DECLARATION CORRECTLY

What is the National Wool Declaration?

The National Wool Declaration (NWD) is a voluntary Declaration that allows Owners/Managers to provide information to Buyers/Processors/ Retailers on the Mulesing Status and Dark and Medullated Fibre Risk (DMFR) of their mobs of sheep and lines of wool.

What is the NWD -Integrity Program (NWD-IP)?

The NWD-IP is an industry program conducted by AWEX. Through randomly selected Desk Audits, Pain Relief Verifications and On Farm Inspections, AWEX determines whether the Mulesing Status Declarations are correct (Compliant), or not (Non Compliant).

How is the NWD information used?

Buyers use the information in the NWD to make purchasing decisions in good faith and on behalf of their clients. If the buyer's client (the processor) requests that wool be sourced from sheep that are; for example, Non Mulesed (NM) or mulesed with Pain Relief (PR), the buyers expect the information in the NWD to be correct.

If a Declaration (regardless of type) is found to be Non Compliant, the buyers (and the broker) of the incorrectly declared wool are informed and they will consider their position.

In addition, instances of Non Compliance can seriously reduce the credibility of the Declarations, which reflects badly on the Australian wool industry.

Who should complete the NWD?

The NWD is the responsibility of the Owner/Manager. The wool classer should only fill out the Mulesing Status and DMFR details if the grower gives clear advice on this. When the Declaration is being signed, the wool classer should ensure that the Owner/Manager is fully aware of Mulesing status declared for each mob. The NWD **must be signed** by the Owner/Manager to be valid.

Which sheep breeds are eligible for a mulesing status declaration?

All sheep breeds and their crosses, of any age, are eligible for a Mulesing Status Declaration.

What is the definition of mulesing?

Mulesing: "**the removal of skin from the breech and/or tail of a sheep using mulesing shears**". This definition is determined by Animal Health Australia and is consistent across the industry.

Industry has agreed that the removal of any amount of skin from the breech and/or tail by shears is mulesing. This definition is absolute to prevent people who may try to take advantage of any flexibility in the definition.

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When should ceased mulesing status be declared?

Ceased Mulesing (CM) status can be declared if lambs **have not** been mulesed on the property in the last 12 months and **no purchased ewes or wethers are mulesed**.

- If a Merino and/or Crossbred producer does not mules on their property but buys sheep that are mulesed or mulesed with Pain Relief, the property is not eligible for CM status (answer No to the question).
- If a Merino and/or Crossbred producer has ceased mulesing and either (a) does not buy sheep or (b) only purchases sheep that are Non Mulesed, the property is eligible for CM status (answer Yes to the question).
- Regardless of CM status, each individual mob should be declared in the Mulesing Status column of the NWD as Non Mulesed (NM), Mulesed (M) or mulesed with Pain Relief (PR). In the Classer's Speci, all mobs should be listed against each line of wool (including oddments) in the Mob Number column.

Ceased Mulesing [CM] appears in the sale catalogue and test certificate when CM has been declared for the property and the mob/sale lot is declared as M or PR.

When can I declare a mob as non mulesed?

To declare a mob as Non Mulesed, prior to shearing, any Mulesed sheep must be drafted from the Non Mulesed sheep. There is no "acceptable" number of Mulesed sheep in a Non Mulesed mob. Sheep of different Mulesing Status should be easily differentiated (e.g. by ear tags or ear marks).

How do I declare the mob mulesing status?

If a mob comprises:

- Only Non Mulesed sheep, it is eligible to be declared as Non Mulesed (NM).
- Only sheep mulesed with Pain Relief, it is eligible to be declared as Pain Relief (PR).
- Any mulesed sheep (PR was not used), it should be declared as Mulesed (M).

How do I declare mobs of mixed mulesing status?

Wool from mobs that have different Mulesing Status, regardless of the number of sheep in each category, should be declared as the lowest common denominator. For example:

- If Non Mulesed sheep are mixed with Mulesed sheep, the mob Declaration should be Mulesed (M).
- If Non Mulesed sheep are mixed with sheep mulesed with Pain Relief, the mob Declaration should be mulesed with PR (PR).
- If sheep mulesed with Pain Relief are mixed with Mulesed sheep, the mob Declaration should be Mulesed (M).

What if i don't want to make a mulesing status declaration?

Do not complete either the Ceased Mulesing question or the Mulesing Status question for your property/ mobs. Not Declared [ND] will appear in the sale catalogue and test certificate against each line of wool.

How does the Dark and Medullated Fibre Risk declaration scheme work?

The DMFR Scheme is applicable to Merino fleece and pieces only; however, the information in the Declaration is also used by the wool broker when putting lines of wool together for any breed. To allow a DMFR Rating to be calculated, the following information is required:

- Mob Number (1, 2, 3, 4 etc.).
- Age Code (in years, where 1 = 1st shearing to 1 year old, 2 = 2nd shearing to 2 years old, 3, 4, 5 etc. Mixed age mobs should be described as an age range, e.g. 3 – 6).
- Breed Code (M, FO, SM, CD, XB, DN, SB or CW).
- Was there Contact (i.e. mated to or run with) with Shedding Breeds or their crosses (Yes or No).
- Was the Mob Crutched since the last Shearing (Yes or No).
- Was Crutching conducted less than 3 months before Shearing (Yes or No).

FOR MORE INFORMATION CONTACT:

Dr Kerry Hansford,
ph.03 9318 0277
e. khansford@awex.com.au

Mr Mark Grave
ph. 02 9428 6100
e. mgrave@awex.com.au

website: www.awex.com.au

Fax This End First

National Wool Declaration

(Mulesing Status and Merino Dark and Medullated Fibre Risk for Sheep Mobs)

Grower ID: For Office Use Only

Owner Trading Name:.....

Property Brand:.....**Phone No:** (.....).....

Property Identification Code (PIC): **Location (Town):** .....

This **DECLARATION** is for wool from a shearing completed ...../...../.....

Has mulesing Ceased on this property? YES ☐ **or NO** ☐ (Tick Box)

Mob No. (Refer Speci)	Mob Breaks/ Bale Ranges e.g. 1 – 9, 14, 19, 20, 30	Mulesing Status (circle answer)	Age Code	Breed Code	Sex Code	Contact with Shedding Breeds (Y/N)	Mob Crutched (Y/N)	Crutched within 3 mths prior to Shearing (Y/N)	Office Use Only
		NM M PR							
		NM M PR							
		NM M PR							
		NM M PR							
		NM M PR							
		NM M PR							
		NM M PR							
		NM M PR							
		NM M PR							
		NM M PR							
		NM M PR							

Age/Shearing Code		Breed Code		Sex Code	
1st Shearing	1	Merino	M	Ewes	E
2nd Shearing to 2 yrs	2	Afrino	FO	Wethers	W
3 years	3	SAMM	SM	Rams	R
4 years	4	Corriedale	CD	Mixed (E/W)	M
5 years	5	Crossbred	XB		
6, 7, 8 years etc.	6, 7, 8...	Downs	DN		
Mixed, e.g. 3 to 6 yrs	3 – 6	Shedding Breeds	SB		
NWD V7.0, 1st July 2017		Carpet Wool	CW		

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How to Complete the NWD

→ To declare the DMFR and/or Mulesing Status for each mob (and each line of wool) the **Owner/Manager,** in consultation with the **Woolclasser**, must:

- Record the trading details and the **PIC**.
- Answer the question **"Has Mulesing Ceased on this Property?"**
- Complete all the **NWD Mob questions** (Mob No., Mulesing Status, Age, Breed, Sex, Shedding Breeds and Crutching History).
- **Sign** and **Date** the **Declaration.**

→ The **Woolclasser** will complete the remainder of the Classer's Specification, **including filling out the Bales Ranges and Mob Numbers for all lines of wool (both fleece and oddments).**

National Wool Declaration (NWD) Definitions

Mulesing	The removal of skin from the breech and/or tail of a sheep using mulesing shears. *Source:* Australian Animal Welfare Standards and Guidelines for Sheep.
Ceased Mulesing (CM)	Wool from sheep where mulesing has ceased on the property. No lambs born on this property in the last 12 months have been mulesed. No purchased sheep are mulesed.
Non Mulesed (NM)	No sheep in this mob has been mulesed.
Pain Relief (PR)	All sheep in this mob have been mulesed using a registered Pain Relief product. ***Note:*** PR must be declared separately for each mob (it is not a property declaration).
Mulesed (M)	Some/all sheep in this mob have been mulesed.
Shedding Breeds	Breeds that shed fibre (e.g. Afrikaner, Australian White, Awassi, Damara, Dorper, Karakul, Meatmaster, Persian, Van Rooy, Wiltipoll, Wiltshire Horn).
Contact with Shedding Breeds	Mated to, or run in the same paddock as shedding sheep/lambs or their crosses.

By signing this declaration,I warrant that (a) I am authorised to complete this declaration and confirm that all details contained in it are true and correct, (b) I authorise the selling agent to submit this document to AWEX (if requested) for the purpose of the Integrity Program and (c) I understand that I may be subject to random desk audits and on farm inspections, the results of which may be made available to the buyers of the declared wool and the selling agent. Details of the AWEX Integrity Program and Privacy Policy are available on the AWEX website: www.awex.com.au.

Owner/Manager

Name.....

Signature.....**Date**...../...../.....

WHEAT POWDERY MILDEW EPIDEMIOLOGY AND CROP MANAGEMENT OPTIONS

Jason Bradley
Technical Officer
DPIRD

Geoff Thomas
Research Officer
DPIRD

This article has been republished from the GRDC Update Paper dated 25 Feb 2019

KEY messages

- Wheat powdery mildew (WPM) infection is favoured by temperatures of 15-23°C and is sensitive to periods over 25°C. Rate of infection and spore production are optimum at 20-23°C. Parameters favouring WPM can be used to identify the periods of increased epidemic risk and guide the need for management intervention in the different climatic regions of the WA wheatbelt.
- Fertiliser applications can influence powdery mildew severity. With increasing nitrogen fertilisation, plants are effectively more susceptible to WPM and crop canopies are more dense favouring epidemic development. These crops will require more intensive monitoring and disease management. While responses were small and inconsistent, experiments suggest that maintenance of adequate potassium nutrition can benefit in helping reduce powdery mildew development.
- All commercial wheat varieties tested were susceptible as seedlings to all powdery mildew isolates from across the wheatbelt. Some variability in virulence of isolates was evident on alternate resistance genes, however until varieties with improved resistance are released placing selection pressure on the powdery mildew population, variety responses should be consistent across the wheatbelt and reflect NVT disease ratings.

Aims

Wheat powdery mildew caused by the fungus Blumeria graminis f.Sp tritici is a significant pathogen in wheat growing areas with temperate maritime climates worldwide. In Australia it can cause yield losses of up to 25%. The disease is favoured by stubble retention, high seeding and nitrogen fertiliser rates and large areas planted with susceptible varieties.

The disease is sensitive to environmental conditions and can vary from season to season. Control can be complicated due to the multiple, rapid life cycles (5-12 days) and wide dispersal of large numbers of small, light, wind-borne spores. Understanding the diversity of powdery mildew pathotypes (virulence frequencies) in WA is important in the development of wheat lines with effective, enduring resistance and for management of existing commercial varieties.

Nitrogen and potassium application has been shown to influence disease severity. How these nutrients influence a crop's susceptibility to WPM will influence integrated disease management (IDM) practices.

The main aims of this research are to i) investigate the diversity of virulence in WPM isolates from across WA, ii) measure the influence of growth stage and temperature on infection efficiency, latent period and severity of WPM, iii) determine the impact of macro-nutrients nitrogen and potassium on WPM infection and iv) understand how varietal resistance influences response to these factors.

Method

WPM Virulence Spectrum
Wheat powdery mildew samples were collected from 31 locations across the WA wheatbelt in 2016 and 2017. Each sample was stored and bulked up in isolation to maintain purity. All samples were screened in a glasshouse against a differential set of wheat lines with known resistance genes, (Golzar et al., 2016) and a set of commercial varieties with varying reported resistance levels to WPM. Inoculum was dusted onto plants grown in pots at 2 leaf stage (31 samples) and head emergence (5 samples) and disease assessed after 12 days using a 0-5 scale where 0 = no infection and 5 = severe sporulation.

Temperature Thresholds (Latent Period, Sporulation, Spore Germination)
All temperature threshold experiments were conducted using the variety Wyalkatchem which is rated susceptible very susceptible (SVS) to WPM. Under laboratory conditions and in a controlled environment, excised leaf fragments (3 replicate plates of 8 leaf fragments) and 3 leaf seedlings (2 replicate pots of 5 seedlings) were dusted with spores of a WPM isolate collected from DPIRD Woorree research station in 2016. They were then held under plastic covers to maintain humidity and infection from a single isolate at constant temperature for a period of two weeks. Temperatures tested were 5, 10, 15, 20, 23.5, 25°C. Each temperature experiment was paired with baseline control plants inoculated at the same time and kept at 20°C. Daily observations were carried out for germination of inoculated spores, lesion development, presence of sporulation and disease severity. Spore production in lesions was counted 12 days after inoculation.

Using the same experimental design, inoculated leaf fragments and seedlings were exposed to 25°C for 6, 12, 24, and 30 hours post inoculation before being returned to the "optimum" temperature of 20°C and evaluated for infection type and percentage leaf area infected at 4, 6, 7 and 11 days after inoculation.

Growth Stage Impact On Disease Severity
In controlled environment conditions (average 17°C), three varieties (Scepter SVS, Mace MSS, Magenta MR) were sown in pots at three times to achieve three growth stages (~Z13, Z32, Z43). All plants were inoculated with a WPM isolate from DPIRD Woorree research station on the same day. Plants were assessed for leaf area affected by mildew on the top three fully expanded leaves 14 days after inoculation.

Nitrogen And Potassium Nutrition
Field trials to examine impact of nitrogen and potassium nutrition on WPM development and severity were carried out as individual experiments at DPIRD Medina Research station in 2017 (Scepter, Zen, Mace, Tungsten, Magenta) and UWA Shenton Park field station in 2018 (Scepter, Mace, Magenta). Trials were sown in small plots as a split plot design with 4 replicates, with nutrition as main-plots and variety as sub-plots.

Baseline soil nutrient concentrations were assessed from 0-10cm, 10-30cm and 30-60cm soil samples submitted to CSBP laboratories for analysis before planting. Fertiliser applications for both years are listed in table 3. Nitrogen was added as urea, and potassium as muriate of potash applied at up to three times (0, 3 and 6 weeks after sowing).

Powdery mildew was introduced by natural spread from inoculated susceptible spreader rows adjacent to each plot. Disease severity was measured as leaf area affected by WPM in 5 replicate plants per plot on a fortnightly basis from Z39 (flag leaf emergence) in each plot.

Table 1. Nitrogen and potassium fertiliser applied in field and glasshouse trials in 2017 and 2018

	Field trials*				Glasshouse trials#			
	Nitrogen (kg/ha)		Potassium (kg/ha)		Nitrogen (kg/ha)		Potassium (kg/ha)	
Nutrient Level	2017	2018	2017	2018	2017	2018	2017	2018
Nil	-	-	-	-	0	0	0	0
Inadequate	40	40	20	0	40	20	20	5
Low	80	60	40	10	80	40	40	10
Adequate	120	100	80	20	120	80	60	15
Luxury	160	180	160	40	160	120	80	20

*baseline levels in field sites (kg/ha): 18 K, 2 N (2017) and 32 K, 1 N (2018)
#baseline levels in coarse river sand used in glasshouse trials (kg/ha): 17 K, 1 N (2017) and 19 K, 0 N (2018)

Glasshouse experiments in 2017 and 2018 were carried out under controlled environment conditions using similar varieties to field experiments. Plants were sown into coarse river sand (baseline nutrient concentration assessed by CSBP laboratories) with nitrogen and potassium as liquid formulation applied at up to 3 times to achieve application rate. Plants were inoculated by dusting with WPM spores at Z13 (3-4 leaf stage) and disease severity assessed as leaf area on top 3 leaves affected by WPM at stem elongation (~Z31-32) and full head emergence (~Z59-65), 21 and 42 days after inoculation.

Statistical Analysis
Analysis of variance (Genstat 19th edition) were performed on data from field and glasshouse trials. Some data required square root transformation to stabilise variance (van Burgel, pers. comm.)

Results

PM Virulence
Thirty one WPM isolates sourced from widespread locations in five Port zones in 2016 and 2017 were assessed for virulence (Geraldton 4, Metro 2, Kwinana 7, Albany 11, Esperance 7). All isolates were virulent on seedlings of commercial lines tested (Arrino, Binnu, Calingiri, Corack, Mace, Magenta, Wyalkatchem and Yitpi), adult plant responses were evident in Binnu, Magenta, and Yitpi, reflecting NVT rankings for these varieties. Screening at seedling stage showed across the board susceptibility to isolates in four differential lines (incl. genes Pm1a, Pm5a, Pm8, Pm17), resistance to all isolates in 11 differential lines (incl. genes Pm2, Pm3a, Pm3c, Pm3e, Pm4a, Pm13) and varying response in five lines (incl. genes Pm6, Pm7, Pm24, Pm28). Virulence on Pm24 was only detected in 2017 and isolates from Metro and Esperance port zones did not have virulence on Pm7.

Temperature Thresholds (Incubation Period, Latent Period, Sporulation, Spore Germination)
The incubation period (time to appearance of first symptoms) and latent period (time to start of sporulation) of wheat powdery mildew more than doubled at 5 °C (~12 days) compared to 20°C (~4 days). Spore production in lesions was also delayed and reduced at lower temperatures (Figure 1 a, b, c). Linear regression of data showed a significant relationship between temperature and % spore production (ANOVA groups: 20-a, 23.5-ab, 15-bc, 10-c). In additional experiments comparing 23.5°C to 20 °C (data not shown) latent period, disease severity and spore germination rates were similar to 20 °C.

Approximately half of spores counted germinated when held at 20°C. When compared to the 20°C control, spores incubated at 5, 10 and 15°C showed similar germination rates, ranging from 80-110% of the control over the 96 hour test. However, viability of spores held at 25°C diminished compared to the 20°C control (Figure 2).

Exposure to 25°C for periods of time immediately post inoculation (prior to returning to 20 °C) progressively delayed and reduced severity of infection on seedlings and leaf fragments compared to the 20°C control (Figure 3). Six and 12 hours exposure reduced severity by 15% while 24 and 30 hours exposure significantly reduced severity at all times of assessment compared to the control.

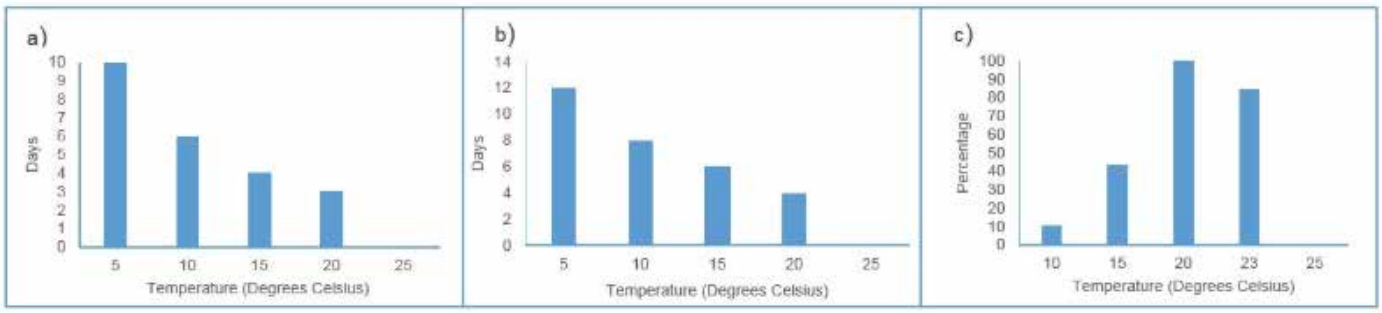


Figure 1: Impact of incubation at a range of constant ambient temperatures on a) incubation period, b) latent period and c) comparative spore production at 12 days after incubation of Wyalkatchem seedlings or excised leaves.

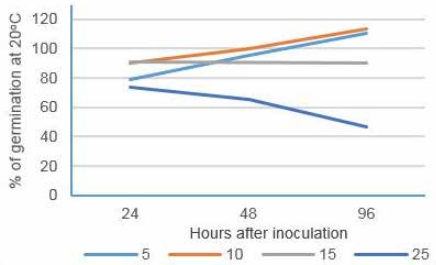


Figure 2: Impact of incubation at a range of constant ambient temperatures on germination of wheat powdery mildew spores (expressed as a percentage of that at 20 degrees).

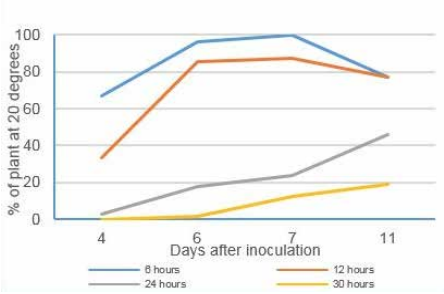


Figure 3: Impact on WPM infection over 11 days after 4 different exposure times to 25 degrees, expressed as a percentage of that at 20 degrees (LSD at 4d 8.6%, 6d 18.1%, 7d 29.4%, 11d 19.6%)

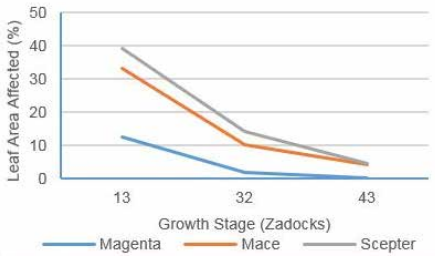


Figure 4: Wheat powdery mildew severity, assessed 5 weeks after inoculation, on three varieties inoculated at three growth stages. Scepter rated SVS, Mace MSS, and Magenta MR to powdery mildew (LSD: GS = 3.27%, variety = 4.34%, var x GS = 6.64% p=0.05)

Plant Growth Stage

Susceptible (Scepter) and moderately susceptible to susceptible (Mace) plants inoculated at Z13 and Z31 had significantly greater severity of disease compared to those inoculated at Z43. Moderately resistant Magenta exhibited minor levels of disease at seedling stage but had significantly less disease than Scepter or Mace at all growth stages (Figure 4).

Nitrogen

In three out of four experiments, WPM severity was greater with higher rates of applied nitrogen fertiliser. Variations in starting soil nitrogen concentration and seasonal conditions meant that establishing a consistent threshold application level was not possible. At Medina (2017) severity of wheat powdery mildew in susceptible varieties Scepter and Mace increased with increasing application rate up to the 'luxury' rate (120 kg/ha). Disease severity in Magenta (MRMS) did not respond to nitrogen rate (data not shown). Similarly at Shenton Park in 2018, increasing nitrogen application resulted in greater WPM severity in the susceptible varieties but not significantly so in Magenta, despite growth in all varieties being nitrogen responsive, having increased NDVI readings and yield at increasing rates (Figure 5 a,b,c).

No response was evident in the 2017 glasshouse experiment, however significant differences in disease severity were evident between nitrogen treatments in the 2018 glasshouse experiment.

Replicating the field responses, disease responses in Magenta were minor, however in the susceptible varieties Mace and Scepter, significant differences were evident between nitrogen rates. At inadequate and low rates, plants suffered nitrogen deficiency symptoms and disease levels were negligible. At adequate and luxury levels, plants were healthy and disease severity showed a significant increasing trend (Figure 6). With glasshouse trial design eliminating canopy impacts of higher nitrogen rates, this result indicates nitrogen was directly influencing plant disease response.

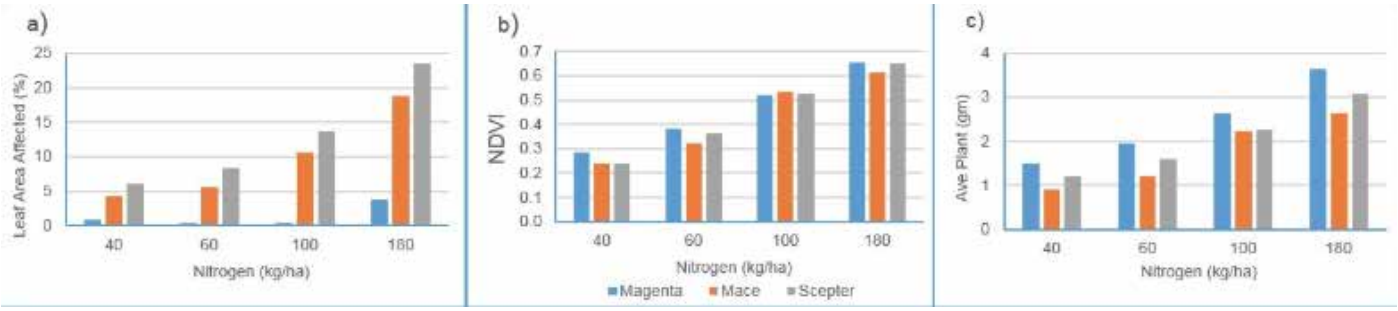
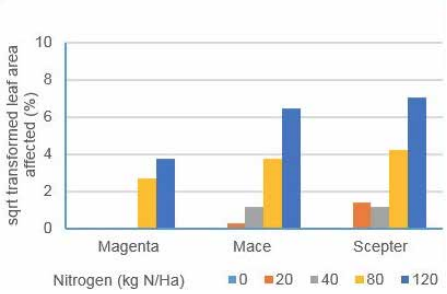


Figure 5: Impact of rates of nitrogen applied on a) powdery mildew severity (LSD: N level 2.1%, variety 1.7%, N x var 3.3%), b) NDVI (LSD: N level 0.03, variety 0.02, N x var 0.04) and c) yield of three wheat varieties at Shenton Park in 2018 (LSD: N level 0.31g, variety 0.26g, N x var 0.5g)



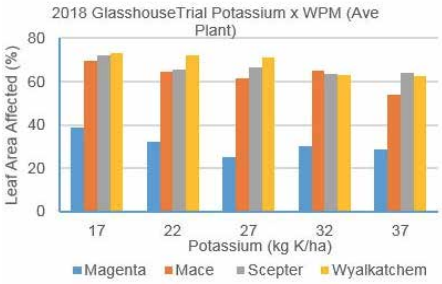


Figure 6 (L). Impact of rates of nitrogen applied on powdery mildew severity, of three wheat varieties grown in glasshouse conditions in 2018. Scepter rated SVS, Mace MSS, and Magenta MR to powdery mildew. Data shown has undergone a square root transformation (LSD: variety 0.48%, N level 0.95%, N x var 1.3%)

Figure 7 (R): Impact of rates of potassium applied on powdery mildew severity, of four wheat varieties grown in glasshouse conditions in 2018. Magenta rated MR, Mace MSS, Scepter and Wyalkatchem SVS to powdery mildew (LSD: variety 4.7%, K level 8.9%, K x var 12.4%)

Potassium

Significant impact of application rates of muriate of potash on wheat powdery mildew were evident at only two of four experiments (Medina 2017 and Glasshouse 2018). Baseline soil potassium concentrations in trials were only marginally below recommended thresholds and establishment of potassium deficiency was problematic. Response to potassium is inverse of nitrogen response, greater disease severity occurs when potassium is deficient.

In 2017, moderately severe WPM was present in all plots, however disease severity in three of five varieties (Magenta, Tungsten, Zen) was marginally higher (10-15%) at inadequate potassium concentration (of 20 and 40kg applied) compared to adequate (80 and 160kg applied).

Similarly, in the 2018 glasshouse experiment, under high disease pressure, two varieties (Mace and Wyalkatchem) showed significant reduction of disease severity (10-15%) between minimum and maximum fertiliser treatments (Figure7).

Conclusion

Understanding the environmental, genetic and agronomic factors which influence wheat powdery mildew development are important for developing crop monitoring and disease management programs across the climatic zones of the WA wheatbelt.

The response of commercial varieties tested reflected current NVT ratings, with all being susceptible as seedlings and a small number showing, at best, a moderately resistant to moderately susceptible (MRMS) response as adult plants. The dominance of susceptible varieties (e.g. Mace) has placed very little selection pressure on the WPM population in WA and correspondingly only a small proportion of tested lines (resistance genes) showed differential responses between isolates. Until new seedling resistance genes are widely deployed placing greater selection pressure on the population, variety responses should remain constant across the wheatbelt and management should reflect the NVT ratings.

These experiments have shown that factors such as optimum nitrogen nutrition and disease onset at early growth stages magnify risk of powdery mildew in susceptible varieties, effectively rendering plants more susceptible. The use of seed dressings and in-furrow fungicides has been shown to effectively delay powdery mildew onset (Thomas et al. 2017) and may be of extra benefit where early onset of disease at more susceptible growth stages is expected (e.g. green bridge years), or when higher rates of nitrogen are applied at early growth stages. At later growth stages, high nitrogen status can result in greater susceptibility of plants and denser canopies, increasing disease severity and potentially placing greater pressure on fungicide efficacy.

Understanding environmental drivers of disease risk can provide guidance on how disease may develop in different regions of WA and potentially how fungicide programs might be tailored to suit how epidemics develop in these regions. In a typical year, with inoculum present, northern growing regions are at risk of experiencing the earliest outbreaks of WPM in the WA wheatbelt. For Geraldton, peak rainfall is in June-July, with optimum daily conditions averaging 20-21°C and nights averaging 10-11°C, an ideal environment for a rapid lifecycle of WPM. Epidemics will spread quickly in susceptible varieties in June - August, however by September rainfall decreases (lowering canopy humidity) and the number of days over 25°C increases markedly (e.g.14 days in 2015) reducing likelihood of successful WPM infection and disease spread. In contrast, regions south of Perth, like Katanning, are likely to have epidemics developing later in the season. Winter is significantly cooler (av. day temp 15°C and night 5-6°C) resulting in a longer latent period and decreased sporulation but more suitable temperatures persist longer into spring with rainfall maintained, and fewer days over 25°C. The Esperance region has seen significant disease outbreaks in several years, early disease development is favoured by mild April and May conditions with few days over 25 degrees. Peak rain is July-August with optimum temperatures (including few days over 25°C) continuing into October. This environment appears to have the greatest span of favourable weather conditions for the disease with mildew developing rapidly in spring and affecting both foliage and heads of susceptible varieties. This has been reflected in epidemic development observed in recent seasons.

References

Golzar, H., Shankar, M., and D'Antuono, M. (2016) Responses of commercial wheat varieties and differential lines to western Australian powdery mildew (Blumeria graminis f. Sp. tritici) populations. Australasian Plant Pathology 45:347-355.

Thomas, G., Beard, C., Jayasena, K., Hills, A., Bradley, J., and Smith, A., (2017) Fungicides at seeding for management of cereal foliar diseases: powdery mildew in wheat GRDC Grains Research Update, Perth

Varieties displaying this symbol beside them are protected under the Plant Breeders Rights Act 1994.
DPIRD research support units at Medina , Esperance, Geraldton and Katanning.

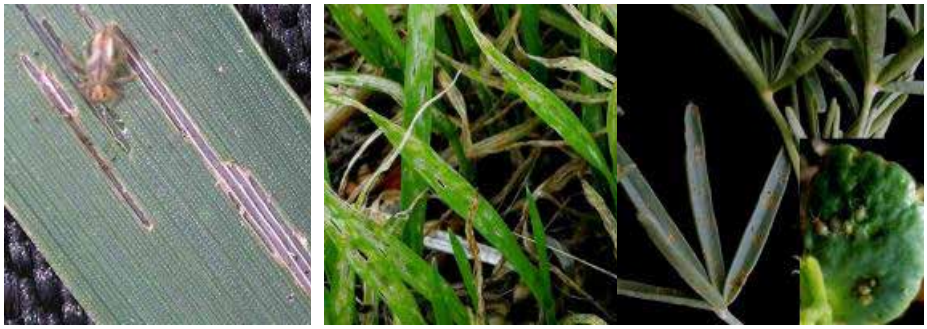
DIAGNOSING LUCERNE FLEA

Svetlana Micic
Research Officer
DPIRD

This article has been republished from the Department of Primary Industries and Regional Development

LUCERNE FLEA

A pest mainly of young legume pastures and broadleaf crops but can also affect cereals. Commonly observed on loam-clay soils.



What to look for

Paddock

- Small jumping bugs that appear early in the season and chew young leaves on heavier textured soils.

Plant

- Cereals, canola and pasture legumes have chewed leaves with transparent 'windows'.
- Green material completely removed in severe infestations.
- Lupins and canola have pitted cotyledons.
- Lupins have chewed leaflet spots and edges.

Insect Adult

- Adults (3 millimetres) yellow-green, wingless and globular in shape sometimes with dark markings.
- Insects 'spring' off foliage when disturbed.

Where did it come from

- Lucerne flea is a European insect that is a pest on heavy soils in WA.
- It requires cool, moist conditions and will produce up to five generations in most years with the final generation of females each season laying eggs that over-summer in the soil.
- The first soaking autumn rains cause over-summering eggs to hatch.
- Broadleaf weeds, particularly capeweed, favour lucerne flea

Management strategies

- Apply systemic or contact insecticides.
- Do not use synthetic pyrethroid sprays as these are ineffective against lucerne flea.

Economic and financial considerations

To assist in assessing the economic risk and financial costs associated with various treatment strategies go to **MyEconomicTool**

There may be other economic and financial implications that need to be considered when choosing a management option. These may include:

Pre-crop:
- Understand the potential yield losses associated with lucerne flea feeding damage.
- Assess the costs and benefits of taking preventative action.
- Assess the cost and benefits of controlling summer weeds to reduce potential feed sources for fleas.

In-crop:
- Compare the costs, benefits and risk of each management option against doing nothing.
- Consider risk and associated costs or savings of no treatment or delaying treatment.
- Ignore all previous treatment costs in assessing current management options.

Post-crop:
- Continue to monitor.

See also:

Monitoring insects and other crop pests

Further information

Svetlana Micic
+61 (0)8 9892 8591
svetlana.micic@dpird.wa.gov.au

COST OF PRODUCTION

All content has been republished from the GRDC Factsheet November 2013
Authors:
T. Hudson
M. Krause

GRDC
GRAINS RESEARCH & DEVELOPMENT CORPORATION

WHAT is your business cost of grain, wool and meat production?

As most Australian farmers are 'price takers' rather than 'price makers', it is important to know the business cost of production for your various commodities. Knowing this cost will inform your marketing decisions and ensure that you are selling at a profit.

Key points

- Successful farm businesses know the cost of production of each commodity they produce.
- The challenge in calculating the cost of production is the allocation of overhead costs.
- Knowing the cost of production is fundamental to maintaining profitability.
- Cost of production data can be used to drive marketing decisions and improve profitability.
- Cost of production data can also be used to reduce business risk.

What is the cost of production?

Cost of Production (COP) is the total cost to produce a unit of any given commodity. It must be expressed in the same terms for which the farmer is paid for that commodity: $/t for cereal, grain legume or oilseed, $/kg for beef or lamb, c/litre for milk etc. It must include:

- All variable costs to produce a unit of commodity (divide $costs/ha by yield per hectare).
- An allocation of overhead costs to producing a unit of commodity

How do I allocate overhead costs to an enterprise?

There are three common ways to allocate overhead costs: on the basis of land, whole farm gross revenue or whole farm gross margin. Each option allocates costs based on a percentage of use or contribution:

Option 1: Percentage of Land Area

- calculates the % of the total usable hectares devoted to each enterprise and apportions that percentage of total overhead costs to each enterprise.

Option 2: Percentage of Gross Revenue

- calculates the percentage of total gross revenue which each enterprise contributes and apportions overhead costs on the same percentage basis.

Option 3: Percentage of Whole Farm Gross Margin

- as for (2) above, but allocates overheads on the percentage contribution of the enterprise to the Whole Farm Gross Margin.

Case study

In the following example, we have assumed a 2,500ha mixed farming operation producing cereal, oilseeds and wool, with total overhead costs of $350,000pa and total revenue of $1,147,400pa.

Table 1 Options of calculating Cost of Production

Enterprise	Wheat	Barley	Canola	SR Merino
Enterprise Area	500ha	500ha	500ha	1,000ha
Yield (t/ha or kg/ha)	3.2t	3.2t	1.4t	22kg
Total Production (t or kg)	1,600t	1,600t	700t	22,000kg
Commodity Price ($/t or $/kg)	$220	$180	$420	$9.70
Variable Costs ($/ha)	$300	$345	$390	$125
Overhead Costs ($/ha)	$140	$140	$140	$140
Option 1: COP based on % Land Use				
Enterprise % of Farm Area	20%	20%	20%	40%
Variable Costs: ($/t or $/kg)	$93	$107	$278	$5.68
Overhead Costs: ($/t or $/kg)	$43	$43	$100	$6.36
Cost of Production: ($/t or $/kg)	**$137**	**$151**	**$378**	**$12.05**
Option 2: COP based on % Gross Revenue				
Enterprise Revenue	$352,000	$288,000	$294,000	$213,400
Enterprise % of Gross Revenue	31%	25%	26%	19%
Variable Cost ($/t or $/kg)	$93	$107	$279	$5.68
Overhead Costs ($/t or $/kg)	$67	$54	$128	$2.96
Cost of Production: ($/t or $/kg)	**$160**	**$161**	**$407**	**$8.64**
Option 3: COP based on % Gross Margin				
Enterprise Gross Margin	$202,000	$115,500	$99,000	$88,400
Enterprise % of Whole Farm Gross Margin	40%	23%	20%	17%
Variable Cost ($/t or $/kg)	$94	$108	$279	$5.68
Overhead Costs ($/t or $/kg)	$88	$50	$100	$2.70
Cost of Production: ($/t or $/kg)	**$182**	**$158**	**$379**	**$8.39**

Source: Hudson Facilitation

Each of the three calculation options are presented to illustrate the alternative overhead cost allocations and the effect that this has on estimated cost of production for each commodity.

Which method should I use?

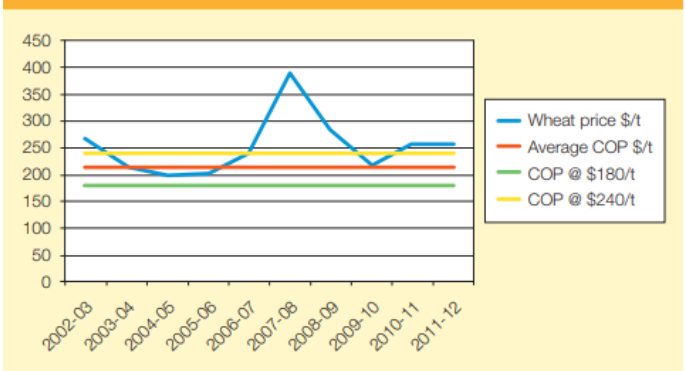
Option 1 (% Land Area) is probably the simplest and is fine if you have a single enterprise, or a purely cropping business with predominantly one land class over most of the farm. However, for more complex businesses, which could include intensive enterprises such as chicken or pork production or those with varying land classes, options 2 or 3 tend to be more accurate.

For the case study above, imagine most arable land (say 1,800ha) was cropped most years and the sheep grazed cropping paddocks in fallow and scrubby and rocky country, which accounts for the other 700ha. To apportion overhead costs on a percentage of land area would unfairly bias against the sheep enterprise.

Indeed, the cost of production for a kg of wool on %Land Area is $12.05 while on %Gross Revenue is $8.64. At the wool price of $9.70/kg used in the example, merinos are a loss making enterprise by Option 1, but are profitable by Options 2 and 3.

Options 2 and 3 tend to be more accurate. Option 3 can unfairly weight overheads towards the enterprise with the highest gross margin, which may not in fact be fair either. To illustrate this, refer to Table 1 again. Overhead cost allocated to wheat is $88/t and to barley is only $50/t. In reality, this may be an unreasonable allocation.

Figure 1 Wheat Price compared to COP



Source: Holmes and Sackett (2010)

Our preference is to use Option 2: %Gross Revenue when calculating past COP for a commodity and estimating future COP. Overhead costs are unlikely to change greatly from year to year, however crop yield, for example, will. Chances are that if your wheat yield is down, so are the other crop yields, but their contribution as a percentage of gross revenue will likely be of similar proportion.
So, for a quick analysis Option 1 is fine, but for greater accuracy, we recommend Option 2: Percentage of Gross Revenue. The important point is to be consistent with the option used for allocating overheads across years so actual COP results can be compared.

Once I know my COP, how does it help?

Knowing the COP for a commodity has several benefits to your business. It will assist you to:

- Identify enterprises which consistently have a commodity price higher than your COP and so are consistently profitable.
- Identify enterprises with a commodity price which is consistently below COP and investigate cost savings, or changes to your enterprise mix.
- Use commodity price projections to enhance profitability in the medium term.
- Select a consistently profitable enterprise mix across the business.
- Gain clarity around marketing decisions. It is easier to sell grain when you know the profit it will generate.
- Decrease business risk.

In Figure 1, the average cost of production for wheat in Australia for the last decade is the middle, bright red line at $214/t. At this cost, wheat is break-even or profitable in 8 of the 10 years and significantly profitable (more than $40/t over COP) in 4 of those years. However, if your COP is around the yellow line at $240/t, there are only 5 years in 10 when growing wheat has made you any profit, it has lost you money in several years, and on average over the decade, your profit is only $12/t. Issues such as expansion, debt reduction and improving quality of life are a struggle at this COP, and you might be asking yourself:

1. How can I grow wheat more cheaply?

or,

2. Are my odds of success better if I grow something else?

If however, you are producing wheat on average at the green line at $180/t, you are making profit every year and average $72/t profit over the period. It still requires comparison with alternative enterprises, but wheat is profitable for you most of the time.

If however, you are producing wheat on average at $180/t (the green line), you are making profit every year and averaging $72/t profit over the period. It still requires comparison with alternative enterprises, but wheat is profitable for you most of the time.

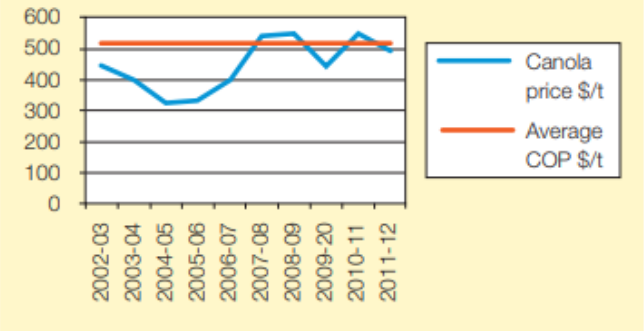
Figures 2-5 on the following page plot annual commodity prices from 2002-2012 for barley, wheat, canola and wool against the average COP for those commodities over the years 1998-2010.

Given the average COP over the decade, the results are pretty clear. On average, growing wheat was more profitable than canola or barley and growing wool was profitable every year for an average producer.

- How could we use this data to vary our enterprise mix towards greater profitability?
- Do we need to consider how we manage the riskier crops, especially in tight seasons?

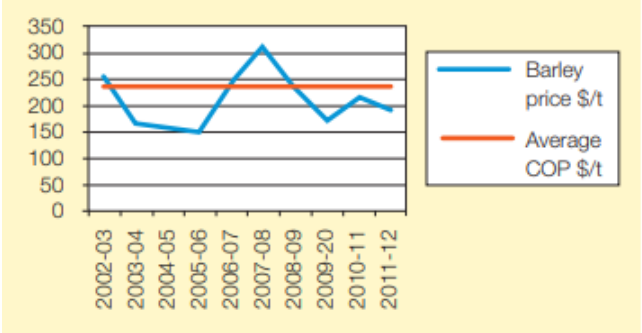
This seems a good time to discuss the data itself. The period of analysis includes significant periods of drought where crop yields were low or zero. Under these conditions, barley is often the ‘go to’ crop, as it is seen by many as a lower risk, easier to grow and more tolerant of a dry spring than wheat or canola. The argument could be made therefore that the figures are giving barley a bad rap, due to it being the crop of choice when ‘rolling the dice’ in a tight season. Wool obviously has the benefit of complementary lamb production included in the figures and ‘wipe out’ yields are highly unlikely from sheep. You may ask how the sheep numbers would stack up if they didn’t get the benefit of grazing failed cereal crops year after year!

Figure 2 Decade Canola price vs Average COP



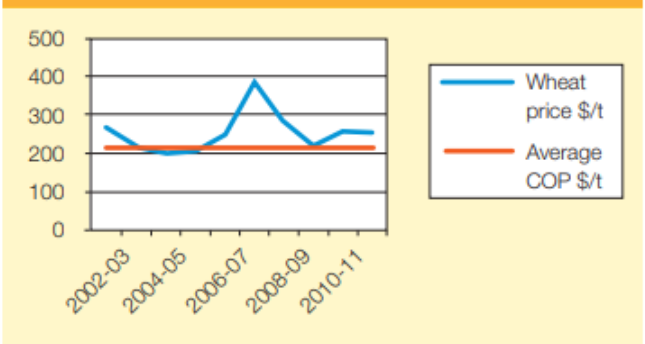
Source: *Holmes and Sackett (2010)*

Figure 3 Decade Barley price vs Average COP



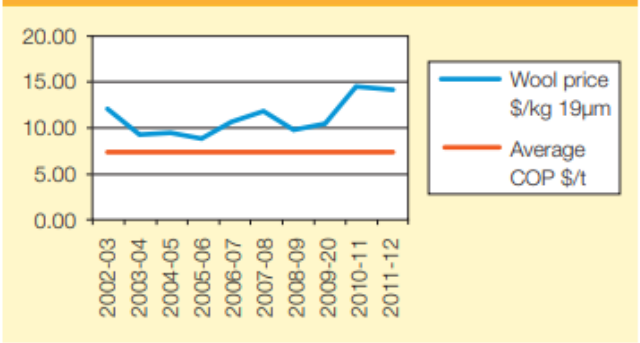
Source: *Holmes and Sackett (2010)*

Figure 4 Decade Wheat price vs Average COP



Source: *Holmes and Sackett (2010)*

Figure 5 Decade Wool price vs Average COP



Source: *Holmes and Sackett (2010)*

Make what you will of the data, the important point is that you understand the need to calculate your Cost of Production and use it to help analyse input expenditure and guide production and marketing decisions in *your* business.

Cost of Production calculations are unique to each farming business and while the results in Figures 2 to 6 show industry trends, this would be very powerful business information if it were known for your particular farm. The use of trend data from a business is an essential tool to demonstrate (1) business performance to banks and (2) provide a 'big picture' view of the business performance, especially when a poor season is being experienced. In a poor season, it is important not to lose sight of the long-term trends, which will assist in managing the physical effects that a poor season brings.

Other resources

Other related factsheets in this Farm Business Management series can be found on the GRDC website https://grdc.com.au/resources-and-publications/all-publications/farm-business-management-manuals

APPS TO HELP YOUR FARM BUSINESS

iLime

Want to know which lime to use? And how much? Enter your lime source to compare quality, price and distanbce in iLime a new app that has been developed through GRDC investment.

Available in app stores now:

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https://play.google.com/store/apps/details?id=au.gov.wa.dpird.ilime

Zoom Cloud Meetings

Zoom is a modern video communication tool, with an easy, reliable cloud platform for video and audio conferencing, chat, and webinars . Zoom is available for your mobile with free access for up to 40 minute video meetings.

https://apps.apple.com/au/app/zoom-cloud-meetings/id546505307

https://play.google.com/store/apps/details?id=us.zoom.videomeetings&hl=en_AU

PODCASTS

Weedsmart

Farming with the premise of reducing reliance on chemicals and why you might not need a knockdown

Listen in to the WeedSmart podcast, where Jessica Strauss interviews co-host Peter Newman on why he's telling farmers they might not need to worry about not having a knockdown.

They chat with farmer Ian Taylor about his innovative farming system and how his family is farming with the premise of reducing their reliance on chemicals.

"Farmers are all in a war against weeds. We are winning, but you're never going to win because the war will always continue. However, with an open mind, we'll win the battle, but not the war," Ian Taylor.

Listen now:
https://soundcloud.com/weedsmart/farming-with-the-premise-of-reducing-reliance-on-chemicals

AWI The Yarn

Smart Tags and WoolQ: the future of wool

Real time monitoring of stock is unlocking many sheep secrets but using powerful computer learning, could we identify stock by facial recognition also?

WoolQ brings woolgrower closer to the consumer, hear the latest on this exciting new platform for wool.

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LIEBE GROUP TEAM

Executive Officer

Bec McGregor
(08) 9661 1907
eo@liebegroup.org.au

Administration & Communications Officer

Danielle Hipwell
(08) 9661 1907
admin@liebegroup.org.au

Finance Manager

Sophie Carlshausen
sophie@liebegroup.org.au

Development & Support Officer

Rebecca Wallis
rebeccawallis01@gmail.com

Liebe Group
PO Box 340, Dalwallinu WA 6609
Phone: (08) 9661 1907

www.liebegroup.org.au

CALENDAR OF EVENTS

Event	Date	Location
Post Seeding Field Walk	Wednesday 25th July	Main Trial Site, Watheroo
AgChats: Grain Marketing	Thursday 1st August	Liebe Group Office
Bitesize Learning: Grain Marketing Basics	Thursday 1st August	Liebe Group Office
Spring Field Day	Thursday 12th September	Main Trial Site, Watheroo