FAR AUSTRALIA

GRDC
GRAINS RESEARCH & DEVELOPMENT CORPORATION

WA CROP TECHNOLOGY CENTRE (ESPERANCE)

Friday 25 September 2020

Featuring High Rainfall Zone Farming Systems

12:30pm – 4:30pm followed by refreshments

277 Freebairns Road, Gibson

Trial site courtesy of the Whiting Family

BBQ and refreshments kindly sponsored by Rabobank

The GRDC HRZ Farming Systems Project is led by DPIRD in collaboration with:

FAR AUSTRALIA

CSIRO

GOVERNMENT OF WESTERN AUSTRALIA
Department of Primary Industries and Regional Development

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VISITOR INFORMATION

We trust that you will enjoy your day with us at the Crop Technology Centre (Esperance) Field Day. Your health and safety is paramount, therefore whilst on the property we ask that you both read and follow this information notice.

HEALTH & SAFETY

- All visitors are requested to follow instructions from FAR Australia staff at all times.
- All visitors to the site are requested to stay within the public areas and not to cross into any roped off areas.
- All visitors are requested to report any hazards noted directly to a member of FAR Australia staff.

FARM BIOSECURITY

- Please be considerate of farm biosecurity. Please do not walk into farm crops without permission. Please consider whether footwear and/or clothing have previously been worn in crops suffering from soil borne or foliar diseases.

FIRST AID

- We have a number of First Aiders on site. Should you require any assistance, please ask a member of FAR Australia staff.

LITTER

- Litter bins are located around the site for your use; we ask that you dispose of all litter considerately.

VEHICLES

- Vehicles will not be permitted outside of the designated car parking areas. Please ensure that your vehicle is parked within the designated area(s).

SMOKING

- There is No Smoking permitted inside any marquee or gazebo.

Thank you for your cooperation, enjoy your day.

WELCOME TO THE WA CROP TECHNOLOGY CENTRE (ESPERANCE) FIELD DAY

FEATURING HIGH RAINFALL ZONE FARMING SYSTEMS (ESPERANCE PORT ZONE)

On behalf of the project team, I am delighted to welcome you to the 2020 WA Crop Technology Centre (Esperance) Field Day. This centre currently hosts the GRDC's High Rainfall Zone (HRZ) Farming Systems project.

The GRDC's HRZ Farming Systems project is led by the Department of Primary Industries and Regional Development (DPIRD) in collaboration with FAR Australia and Commonwealth Scientific and Industrial Research Organisation (CSIRO). This project has the objective of optimising cropping in western HRZ regions. Research this season at Esperance is looking at first wheat following canola on clayed and unclayed ground. The canola trials being led by CSIRO are based at the EDRS near Gibson.

What's happening on the WA Crop Technology Centre (Esperance) in 2020?

Today you will have an opportunity to look at the following:

- Different levels of nutrition and fungicide management in early sown Illabo superimposed on commercial scale soil amelioration (deep ripping and spading).
- A comparison of early sown winter and spring wheat germplasm managed under different levels of management (mid-April sown).
- Assessing the phenology, standing power and disease resistance of earlier generation winter and spring wheat candidates sown in the early-mid April sowing window.
- Comparisons to wheat sown in the traditional May sowing window (10th – 20th May).
- Winter versus spring barley – is there a place for short season winter barleys in WA HRZ farming systems?

Speakers at today's event

The event will feature a range of research trial demonstrations in barley and wheat and a line-up of speakers who will discuss various aspects of the climate effect on HRZ farming systems in WA, soil amelioration, improved germplasm and agronomy, fungicide management and new varieties.

We are fortunate to have secured the following speakers who will share their expertise in topics relevant to the WA HRZ farming system:

David Hall, DPIRD
Mark Seymour, DPIRD
Andrew Fletcher, CSIRO
Michael and Jordan Whiting, Host farmers
James Rollason, FAR Australia
Jeremy Curry, DPIRD

Should you require any assistance throughout the day, please don't hesitate to contact a member of the FAR Australia team who will be more than happy to help.

Thank you once again for taking the time to join us today; we hope that you find the presentations useful, and as a result, take away new ideas which can be implemented in your own farming business. Have a great day and we look forward to seeing you again at future project events.

Nick Poole
Managing Director
FAR Australia

Funding Acknowledgements
The High Rainfall Zone (HRZ) Farming Systems project team would like to place on record their grateful thanks to the Grains Research & Development Corporation (GRDC) for their funding support for this event and featured project.

What is the High Rainfall Zone Farming Systems project aiming to achieve and how did this project originate?

Over the past decade there has been a trend towards more cropping in the High Rainfall Zone (HRZ) but yields are typically 1-3 t/ha below water-limited yield potential for wheat and 0.5-1.5 t/ha for canola in an average season. This presents a significant opportunity to lift the profitability of cropping systems in the HRZ, defined in Western Australia as arable areas with annual rainfall above 450mm. This GRDC project was created to support growers to overcome major constraints, adopt superior long-season varieties and develop management packages to express superior yield potentials. In this project, DPIRD, CSIRO and FAR Australia have combined their expertise in farming systems, bio-economic modelling, disease management, and systems agronomy to work with growers to develop high production packages for the HRZ.

Over the next three years the project team will focus on supporting growers to increase the value of the cropping phase in the HRZ farming system by 10% by addressing both crop yield potential and the gap between potential and realised yield in wheat and canola crops grown in the HRZ of the Albany and Esperance port zones.

In 2019 the project team ran workshops at Dandaragan, Green Range and Esperance with farmers and advisers to help define the key elements of the HRZ and R&D needs to support increased productivity and profit. Issues, opportunities and priority questions identified have guided the establishment of the experimental program in 2020. Key priorities coming from these workshops included how to best manage agronomy when potential is increased with soil amelioration, how to lift production through a combination of early sowing, improved genotypes and appropriate agronomy in cereals, how to manage nutrition to target high yields in HRZ environments, and how to improve the harvest index (achieved yield from established biomass) in large and bulky HRZ crops. The project team is also working closely with SEPWA and Stirlings to Coast Farmers who are running paddock-scale demonstration projects (under PROC-9175784). This provides regular engagement with growers and consultants and ensures promising results from small-plot trials are validated at a paddock scale using commercial machinery.

This project will deliver a better understanding of the yield potential of different combinations of germplasm (i.e. winter versus spring germplasm) and farming systems inputs, identify options to reduce the yield gap, and quantify the economic risks associated with potentially higher input farming systems. The intensively monitored field experiments

and paddock-scale demonstrations provide a focus for extension activities to improve grower knowledge and cropping aspirations. We will work with leading growers and consultants to develop guidelines about the profitability and risks of incorporating new agronomic practices and more diverse crop sequences into HRZ farming systems.

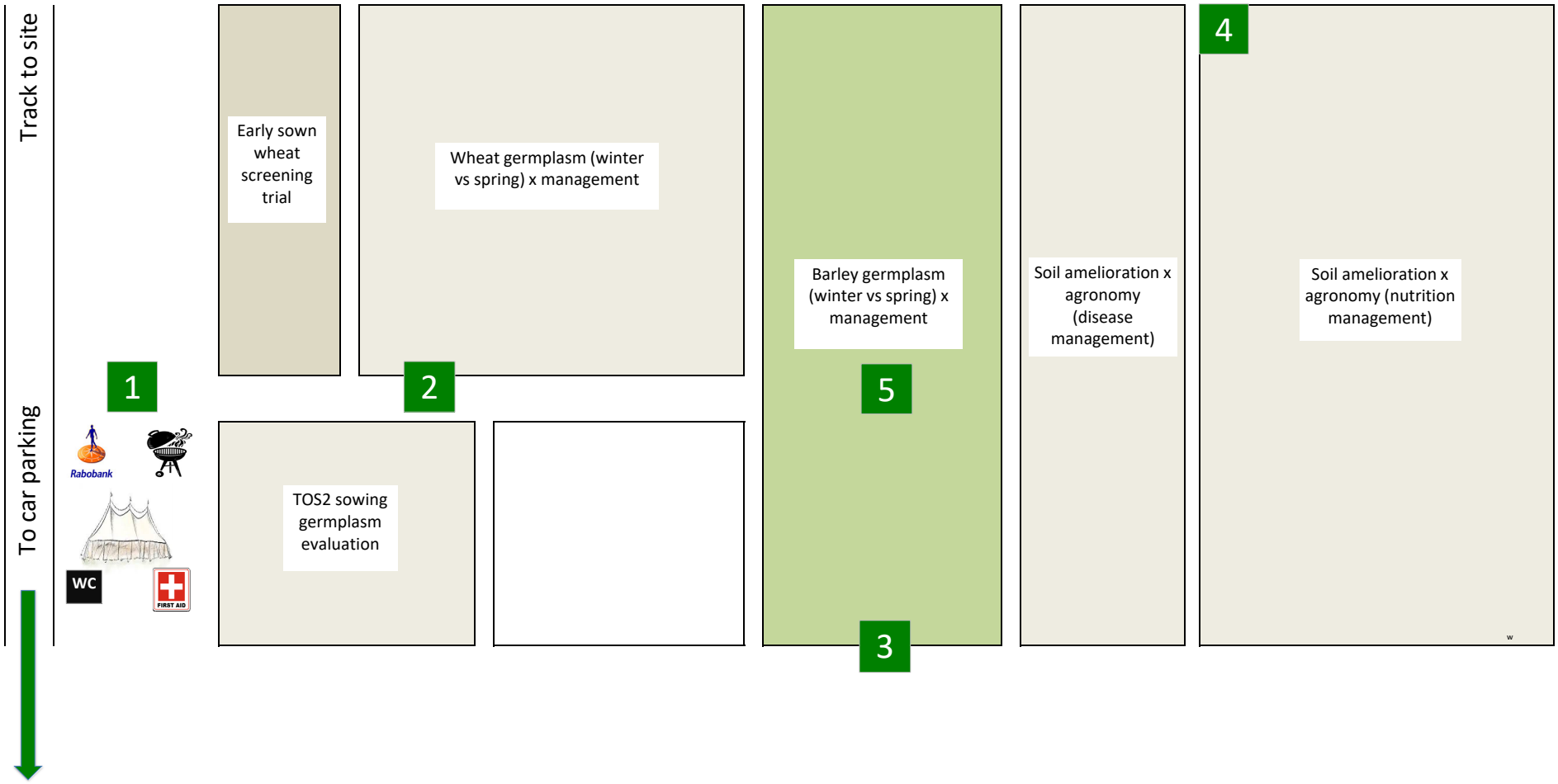
By working together, we can refine and transform HRZ farming systems towards increasing average yield by 2t/ha in cereals and 1t/ha in canola (i.e. the five-year stretch target set by GRDC for the HRZ).

David Ferris
Director – Farming Systems Innovation
Department of Primary Industries and Regional Development (DPIRD)

For more information on cereals contact James Rollason (james.rollason@faraustralia.com.au) or Nick Poole (nick.poole@faraustralia.com.au) from FAR Australia and with regards to canola Jens Berger from CSIRO (jens.berger@csiro.au) or Jeremy Curry from DPIRD (jeremy.curry@agric.wa.gov.au).

CROP TECHNOLOGY CENTRE (ESPERANCE)
SITE PLAN 2020
FEATURING HIGH RAINFALL ZONE (HRZ) FARMING SYSTEMS

not to scale



TIMETABLE

WA CROP TECHNOLOGY CENTRE FIELD DAY (ESPERANCE) 2020: FRIDAY 25 SEPTEMBER 2020

Opening address by David Ferris, DPIRD

In-field presentations	Station No.	12:30	1:30	1:45	2:15	2:45	3:15	3:45	4:30
Mark Seymour, DPIRD (Canola and Pulses)	1	Lunch	Welcome and opening address	1			2	3	Closing address and refreshments
James Rollason, FAR Australia (Wheat)	2			3	1			2	
Andrew Fletcher, CSIRO (Cereals and how the HRZ is changing)	3			2	3	1			
David Hall, DPIRD (Soils) and Michael and Jordan Whiting, Host farmers	4				2	3	1		
Jeremy Curry, DPIRD (Barley)	5					2	3	1	
In-field presentations	**Station No.**	**12:30**	**1:30**	**1:45**	**2:15**	**2:45**	**3:15**	**3:45**	**4:30**

We would be obliged if you could remain within your designated group number throughout the day.

Thank you for your cooperation.

1 **GROUP 1**

2 **GROUP 2**

3 **GROUP 3**

Changes to cropping in the High Rainfall Zone of WA

Andrew Fletcher, Jens Berger, Heping Zhang, Chao Chen, Chris Herrmann

The high rainfall zone is defined as being between 450mm and 750mm annual rainfall. There have been substantial changes in cropping in this region in the past 20 years in climate, cropping patterns and yields. In this talk we will discuss some of those changes. This report has compiled a range of datasets to define the HRZ in space and time, describe farming systems' trends using grower data, analyse on-farm yield and potential yield using a combination of grower data and simulation modelling to highlight trends across the HRZ.

Climate and soils

We analysed historical weather data across WA. This showed that the HRZ is shrinking and moving westwards as overall rainfall declines with climate change. The area bounded by the 450mm and 750mm annual rainfall isohyets has shrunk from approximately 6.5 mill ha in the previous century to 5.8 mill ha since 2000. This change in location and area of the HRZ has altered the soil types fitting within this boundary. The proportion of sandy soils and duplexes has decreased while the proportion of gravels and clay-rich soils has increased. The proportion of gravel soils increased from 34 to 41%.

Cropping patterns

We analysed consultant data bases to investigate cropping patterns in the HRZ from 2000 to 2018. While the cropping area proportion of HRZ enterprises continue to increase. the median crop area per farm has nearly tripled from 600 ha in 2000 to 1700 ha in 2018. Between 2000 and 2018 the proportion of farm area planted in crop has increased by 53% from 43% to 66%.

There have been some important changes in the make of cropping programs in the HRZ from 2000 to 2018. The total area of cereals (including oats, and small areas of hay and triticale) has remained relatively constant at approximately 65% of cropping programs. However, the proportion of wheat in cropping programs has fallen from 56% to 36%. This has been made up for by an increase in the proportion of barley from 5% to 20%. Canola has become the break crop of choice with the proportion of canola increasing from 10% to 25%. This has been at the expense of the area of legume crops (mainly lupins) which has decreased substantially from 20% to 10%.

Crop yields

The median wheat yield has increased by 60 kg/ha/yr, the median barley yield increased by 72 kg/ha/yr, and the median canola yield increased by 24 kg/ha/yr. The top 5 % of farmers are now producing wheat yields of 4.2t/ha, canola yields of 2.3t/ha and barley yields of 4.6t/ha.

We calculated yield gaps for wheat and canola by comparing observed farmer yields with those simulated by the APSIM crop model. Yield gaps in canola are lower and less variable than in wheat, which fluctuate widely both in time and space. Wheat yield gaps are highest in the central and southern HRZ, but are decreasing over time everywhere except the central HRZ, as a result of cool, frost-prone seasons with little post-flowering rainfall.

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Trial 1
Early sown wheat nutrition on ameliorated soils

Objectives: To examine the influence of different soil amelioration and establishment methods on the performance of early sown wheat (mid-April).

Cultivar: Illabo
Individual objectives specific to the trial are:

- Assessing the establishment, yield and profitability of autumn 2020 deep ripping on a soil that was ripped in autumn 2019.
- Comparing the establishment, yield and profitability of early sown wheat when established with a tine based seeder versus a spade seeder.
- Influence of spade seeding versus conventional tine seeding following deep ripping on early sown wheat dry matter production, yield and harvest index.
- To examine the influence of additional nutrition (N and other nutrients) on the dry matter, yield and profitability of early sown wheat established using three methods of establishment.
- To determine how much of any additional nutritional yield response is derived from the additional N applied.

Trial 2
Early sown wheat disease management on ameliorated soils

Objectives: To examine the influence of different soil amelioration and establishment methods on the requirement for fungicide input in early sown wheat (mid-April).

Cultivar: Illabo
Individual objectives specific to the trial are:

- Assessing whether different soil amelioration and establishment combinations have any influence on responsiveness of the crop canopy to disease management.
- To examine whether earlier sowing and amelioration makes the use of more expensive QoI (Group 11) and SDHI (Group 7) fungicides more profitable than standard triazole (Group 3) chemistry.
- Does more regularly deep ripping and or spading increase green leaf retention and is this influence enhanced by the addition of so called “stay green” fungicides, such as QoIs and SDHIs.

Trial 3
Early sown germplasm (winter v spring) x management interaction trial

Objectives: To assess a comparison of early sown winter and spring wheat germplasm managed under different levels of management (mid-April sown).

Cultivar: various
Individual objectives specific to the trial are:

- Assessing the phenology, dry matter production, yield and profitability of winter versus spring wheat sown in mid-April.
- To examine the effect of defoliation in winter and spring wheat on dry matter removed, final dry matter, phenology, grain yield and profitability
- To compare the performance of feed and milling winter wheats sown early.

Trial 4
Early sowing wheat germplasm screening trial – winter and spring (not taken to yield)

Objectives: To assess elite breeders' lines for mid-April sowing opportunities.

Cultivar: various
Individual objectives specific to the trial are:

- Assessing the phenology, standing power and disease resistance of earlier generation winter and spring wheat candidates sown in the mid-April sowing window.
- To select the promising candidates for inclusion in future agronomy studies that would be taken to yield.
- To compare the performance of feed and milling winter wheats candidate lines sown early.

Trial 5
Main season sowing germplasm evaluation

Objectives: To assess the performance of wheat sown in the traditional May sowing window (10^{th} – 20^{th} May).

Cultivar: various
Individual objectives specific to the trial are:

- Assessing the phenology, standing power, disease resistance of commercially available spring wheat candidates sown in the mid May sowing window.
- Although not statistically comparable to the early sown wheat blocks (April 16 sown) the trial would compare the yield and profitability of May sown crops grown alongside the main blocks.
- To compare the performance of feed and milling winter wheats sown early.

Trial 6
Early sown barley germplasm (winter v spring) x management interaction trial

Objectives: To assess a comparison of early sown winter and spring barley germplasm managed under different levels of management (mid-April sown).

Cultivar: various
Individual objectives specific to the trial are:

- Assessing the phenology, dry matter production, yield and profitability of winter versus spring barley sown in mid-April.
- To examine the effect of defoliation in winter and spring barley on dry matter removed, final dry matter, phenology, grain yield and profitability.

COVID-19

Help us keep COVID-19 away If you are visiting FAR Australia offices or trial sites by observing the following good hygiene practices to reduce the risk of infection with COVID-19:

- Sanitise your hands when entering the office or trials site and at regular intervals.
- Wash your hands regularly for 20 to 30 seconds. If soap and water is not available, use an alcohol-based hand sanitiser. Hand sanitiser does not replace washing your hands after using the bathroom.
- Avoid touching your eyes, nose and mouth.
- Cover your mouth and nose when coughing and sneezing with a tissue or cough into your elbow.
- Dispose used tissues into a bin immediately and wash your hands afterwards.
- Practice social distancing:
    - Keep a distance of 1.5 metres between you and other people.
    - Avoid crowds and large public gatherings.
    - Avoid shaking hands or any other physical contact.

Thank you for your cooperation.

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