Annual Results Report Template

2018
Annual Results Report
Summer Cropping Demonstrations in the Western Region

Project code:	9176156
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REPORT SENSITIVITY

Does the report have any of the following sensitivities?

Intended for journal publication	NO
Results are incomplete	NO
Commercial/IP concerns	NO
Embargo date	NO

KEY MESSAGES

- The summer cropping demonstration sites were sown at two different timings. The Ryansbrook trial, 35km south west of Kojonup, was sown 4th October 2018 into moisture and the Woodgenellup trial was dry sown on the 30th January 2019 prior to a predicted rainfall event.
- According to our producer rainfall records, since 2003, every 4 out of 5 years they have had summer rainfall events in January and February. Unfortunately, in the 2018/19 summer there was minimal summer rainfall and the summer crops at the Ryansbrook site failed. The C4 grasses (millet and sorghum) persisted better with little to no moisture in the soil profile compared to the broadleaf crop types (canola and cowpea).
- At the Woodgenellup site germination was patchy however, plants have developed reasonable biomass.
- Winter season in-crop measurements will be taken at the Woogenellup site to determine the effect of the summer crop on water logging. Due to the failure of the summer crop at the Ryansbrook site, no further measurements will be taken at this

SUMMARY

Two summer cropping sites were established in the Albany Port zone in 2018/2019. The trials were established in Ryansbrook near Kojonup and Woodgenellup near Mt Barker. Both sites experience high winter rainfall and subsequent waterlogging during the winter growing season.

The crop types sown were Ebony cowpeas, Pearler millet, Hyola 970cl canola and Sprint sorghum.

Ryansbrook: The demonstration site germinated well with plenty of moisture in the soil. In January the site only had 2mm of rainfall followed by nil in February. The trial was unexpectedly grazed in January for the sheep to be able to utilise the green feed available. By the end of January after no further rainfall and a grazing, the crops were struggling. The C4 Grasses (millet and sorghum) seemed to persist better compared to the broadleaf crops which died.

Woodgenellup: The trial was dry sown late January before a rainfall event. Since the trial was sown the site has received 35mm of rain and while the germination was patchy the soil moisture available has allowed the plants to develop reasonable biomass.

The Woodgenellup host grower's main aim for summer cropping is to dry out the soil profile to reduce waterlogging in the following winter crop. The growers are keenly interested to see if there will be any difference between the treatments in the coming growing season in regard to reduced waterlogging stress.

BACKGROUND

One of the most valuable contributions that summer cropping can provide to farming systems in the Albany port zone is the potential increase in cropping area on individual farms (arable land) due to reduction of waterlogging. On current waterlogged/ low capability areas, producers have been planting deep rooted perennial and/or annual pastures or accepting reduced winter crop yields and quality. Perennial and annual pasture phases 'lock' producers into a type of farming system whereby there is a phase that progresses more than one season. Short season summer cropping may enable

producers to reap the benefits of a deep-rooted species while still having a profitable and sustainable crop in the winter

Southern Dirt will collaborate with Stirling's to Coast Farmers to deliver two summer cropping demonstration trials.

The aim of the current project is to identify if summer cropping is a viable tool to improve crop establishment, crop rooting depth and yield in a waterlogging year. It will determine if summer cropping is a viable management farming system tool to increase winter crop area.

OBJECTIVES

Albany and Esperance port zone growers who frequently experience waterlogging will know if ripping and/or summer/cover crops are viable tools to improve crop establishment, crop rooting depth, and yield in a waterlogging year on their property.

METHODS

Two summer cropping sites were established in the Albany Port zone in 2018/2019. The trials were established in Ryansbrook near Kojonup and Woodgenellup near Mt Barker. Both sites experience high rainfall and waterlogging during the growing season. The trial design for both sites was pre-approved by SAGI West prior to trials being implemented.

Pre seeding soil samples were collected from each site with 0 – 10cm and 10 – 30m samples collected. Predicta B tests were also taken and sent away for analysis.

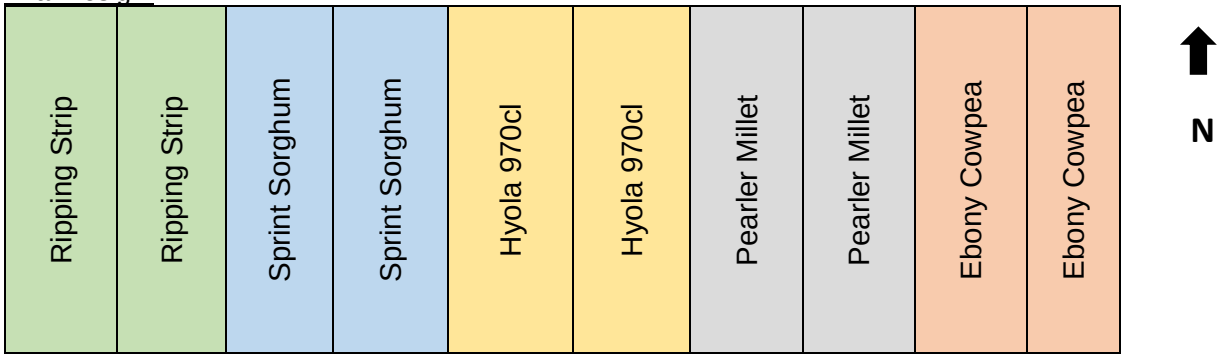
Ryansbrook

Host: Jono Clifton
Farm: "Fairbanks"

The trial was seeded on the 4th of October 2018 after a cumulative 10mm rainfall event 1st – 3rd of October 2018. The crop types were as follows:

Crop Types	Seeding Rate	Seeding Depth
Ebony Cowpea	20kg/ha	30mm
Pearler Millet	6kg/ha	30mm
Hyola 970 CL	5kg/ha	20mm
Sprint Sorghum	6kg/ha	30mm

Trial Design:



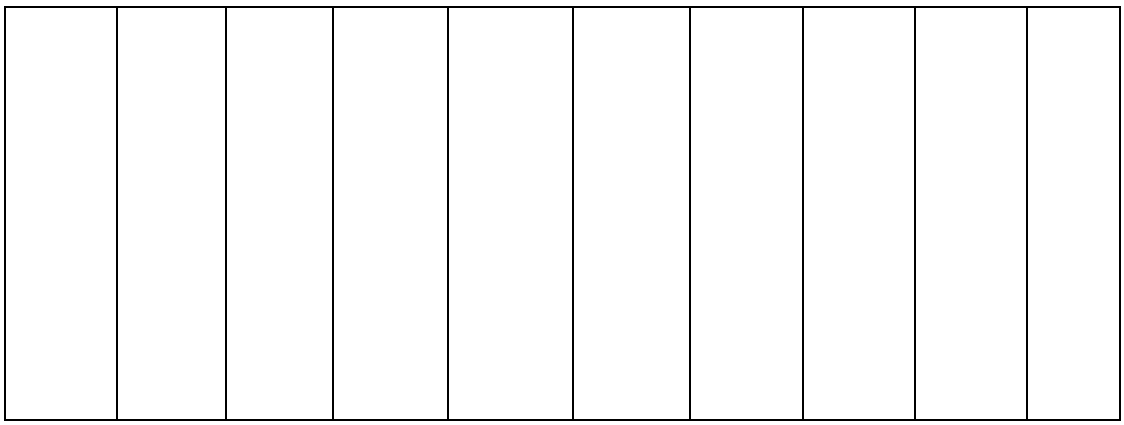


Figure 1: Diagram of the layout for Ryansbrook Summer Cropping demonstration sown on October 4th, 2018. Each air-seeder strip was approximately 200m long and 11 m wide.

Table 1: Summary of the rainfall over the previous 7 months at Frankland. Data taken from the BOM weather station 'Frankland' (009635).

Year	2018	2018	2018	2018	2019	2019	2019
Month	September	October	November	December	January	February	March (to the 12th)
Rainfall (mm)	20	26	21	20.5	2	0	37

The site was knocked down with 3 L/ha of paraquat on the 3rd of October 2018. The crops were sown with 80 kg/ha of MAP down the tube at seeding.

The site had an insecticide spray of 300 mL/ha of Affirm with a surfactant applied on the 3rd November 2018 targeting diamond back moth and green peach aphids. A second spray was followed up on the 6th of December 2018. The site was unexpectedly grazed 10th January – 17th January 2019, unfortunately however, biomass cuts were not taken prior.

Plant establishment counts were collected on the 13th of December with 4 x counts of 1 metre taken at 20m intervals (3 locations) along the plots with a total of 12 counts each plot.

NDVI assessments were collected from the trial on 13/12/2018 and 8/01/2019. This was conducted using a GreenSeeker and readings were repeated 3 times in each plot over a 10 m distance

At the time of writing this report, a number of assessments were yet to be completed and as the summer crop at this site failed, the below assessments will now not be taken.

NDVI 3 Maturity	Mar-19
Ripping Strip Implemented	Mar-19
Soil Tests	Apr-18
Winter Crop Sown	May-19
Plant Establishment	Jun-19
NDVI - Booting	Jun-19
NDVI 2 - Grain fill	Aug-19
NDVI 3 Maturity	Sep-19
Harvest	Dec-19

Woodgenellup (Stirlings to Coast Farmers)

Host: Brad and Steve Lync
Farm:" Wilgi Creek"

The trial was knocked down on the 27th January 2019 with 3 L/ha of Paraquat. The demonstration was dry sown on the 30th of January 2019. It was sown with 60 kg/ha MAPSZC: MOP mix (Ratio) 5:1. Crop types were as follows:

Crop Types	Seeding Rate	Seeding Depth
Ebony Cowpea	20kg/ha	30mm
Pearler Millet	6kg/ha	30mm
Hyola 970 CL	5kg/ha	20mm
Sprint Sorghum	6kg/ha	30mm

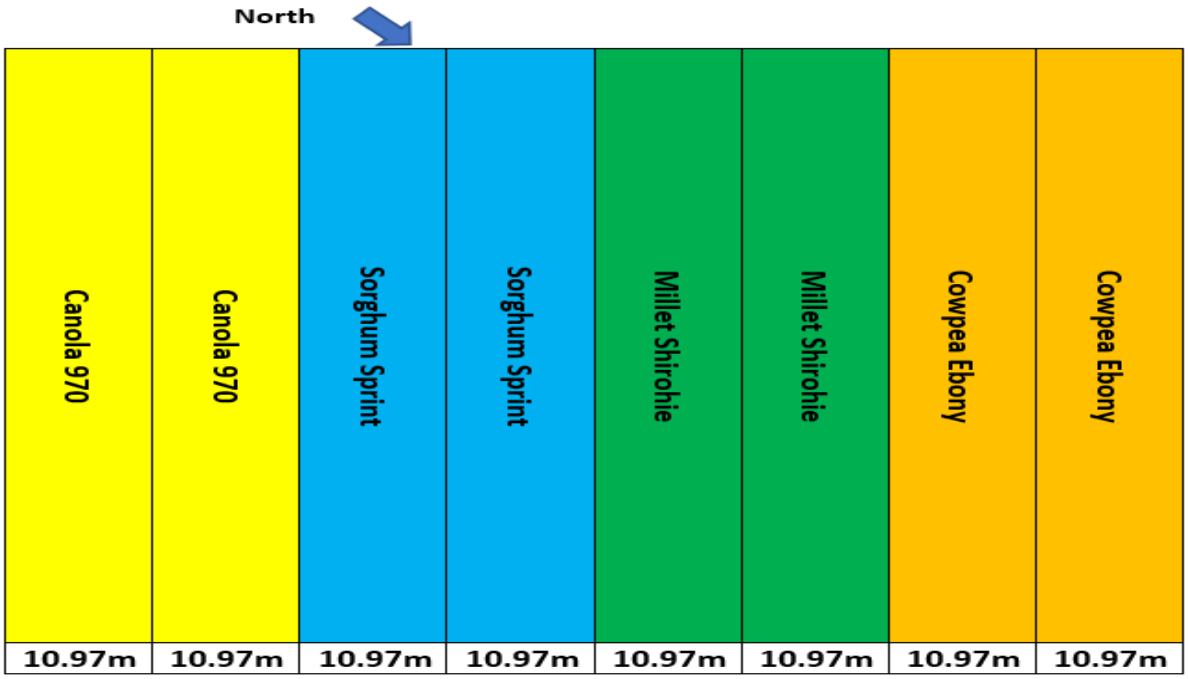


Figure 2: Diagram of the layout for Lynch's Summer Cropping demonstration sown on January 30th, 2019. Each air-seeder strip was approximately 250m long. Trial was sown in very dry soil.

Table 2: Summary of the rainfall over the previous 5 months at Mt Barker. Data taken from the BOM weather station 'Mt Barker' (009581). Approximately 20 mm of rain on March 7th, 2019 which should see the crops in the demonstration germinate from.

Year	2018	2018	2019	2019	2019
Month	Nov	Dec	Jan	Feb	March (to the 11th)
Rainfall (mm)	43.6	23	15.3	1.3	32.7

Woodgenellup site assessments yet to be completed at time of writing this report:

NDVI 3 Maturity	April-19
Soil Tests	Apr-18
Winter Crop Sown	May-19
Plant Establishment	Jun-19
NDVI - Booting	Jun-19
NDVI 2 - Grain fill	Aug-19
NDVI 3 Maturity	Sep-19
Harvest	Dec-19
Summer Crop Sown	Jan-20
Plant Establishment	Feb-20
NDVI - Booting	Feb-20

LOCATION

NOTE: Where field trials have been conducted please include location details: Latitude and Longitude, or nearest town, using the table below (please add additional rows as required):

	Latitude (decimal degrees)	Longitude (decimal degrees)
Trial Site #1	34° 7'41.07"S	117°11'50.42"E
Nearest Town	Frankland	
Trial Site #2	34°40'24.31"S	117°29'19.57"E
Nearest Town	Mt Barker	

Research	Benefiting GRDC Region (can select up to three regions)	Benefiting GRDC Agro-Ecological Zone (see link: http://www.grdc.com.au/About-Us/GRDC-Agroecological-Zones) for guidance about AE-Zone locations	
Experiment Title	Western Region Choose an item. Choose an item.	☐ Qld Central ☐ NSW NE/Qld SE ☐ NSW Vic Slopes ☐ Tas Grain ☐ SA Midnorth-Lower Yorke Eyre ☐ WA Northern ☐ WA Eastern ☒ WA Mallee	☐ NSW Central ☐ NSW NW/Qld SW ☐ Vic High Rainfall ☐ SA Vic Mallee ☐ SA Vic Bordertown-Wimmera ☒ WA Central ☒ WA Sandplain

RESULTS

Ryansbrook

The trial was sown into a pasture paddock and germinated well. There were good plant numbers in the majority of the plots, however there was the odd bare patch were no plants germinated. Table 3 shows the NDVI assessments completed in December 2018 and January 2019, however, we were unable to complete the third NDVI assessment as the crop had died due to lack of soil moisture.

Table 3. Displays the average NDVI readings and plants per meter^2 from the 13th of December 2018 and 7th of January 2019 at the Ryansbrook Summer Cropping demonstration site 2018/19.

Crop type	Average Plant p/m2	NDVI 13/12/2018	NDVI 07/01/2019
Ebony Cowpea	18.67	0.38	0.41
Pearler Millet	31	0.51	0.42
Hyola 970 CL	30.33	0.57	0.45
Sprint Sorghum	31.33	0.67	0.44

Figure 3 Sprint Sorghum and Hyola 970cl Ryansbrook 13/12/2018

Figure 4 Pearler millet, Summer cropping demonstration Ryansbrook 13/12/2018

The crops were unexpectedly and heavily grazed for 7 days from the 10th of January to the 17th of January. Unfortunately, the grower did not inform Southern Dirt personnel prior to putting the sheep into the trial and as such no measurements of biomass prior to grazing were taken. This was understandable as the grower was supplementary feeding his sheep at the time and wanted to utilise any green feed available on his property.

In January, only 2mm of rain was recorded. By the end of this month the crops were suffering and there was no moisture in the top 10cm.

The C4 grasses (sorghum and millet) seem to persist better given the drying out of the soil profile and were still persisting on the 29th of January 2019. The canola and cowpea crops at this stage had died.

Figure 5 Sprint Sorghum 29/01/2018 Ryansbrook

Figure 6 Ebony Cow pea 29/01/2019 Ryansbrook

Woodgenellup

Ideally this summer crop trial would have been sown earlier (immediately after the harvest of the winter crop) to give it the opportunity to develop significant biomass. However, there was not a prior opportunity due to lack of rainfall and the trial has performed well despite the late sowing date (Figure 7 & 8).

NDVI readings taken on the 17 April 2019 are fairly similar across all crop types (Table 4). As would be expected, penetrometer readings taken across all treatments show that soil depth on ripped treatments is deeper than where not ripped (Figure 9 & 10). There does not appear however, to be much difference in soil depth as a result of the summer crop type on both ripped and un-ripped sites.

The Woodgenellup host grower's main aim for summer cropping is to dry out the soil profile to reduce waterlogging in the following winter crop. The growers are keenly interested to see if there will be any difference between the treatments in the coming growing season in regard to reduced waterlogging stress.

Figure 7 Ebony Cowpea 21/03/2019 Woodgenellup

Figure 8 Hyola 970 21/03/2019 Woodgenellup

Table 4. Displays the average NDVI readings from the 17/04/2019 Woodgenellup Summer Cropping demonstration site 2019.

17/04/2019	Average NDVI
Cowpea	0.64
Millet	0.58
Sorghum	0.63
Winter Canola	0.57

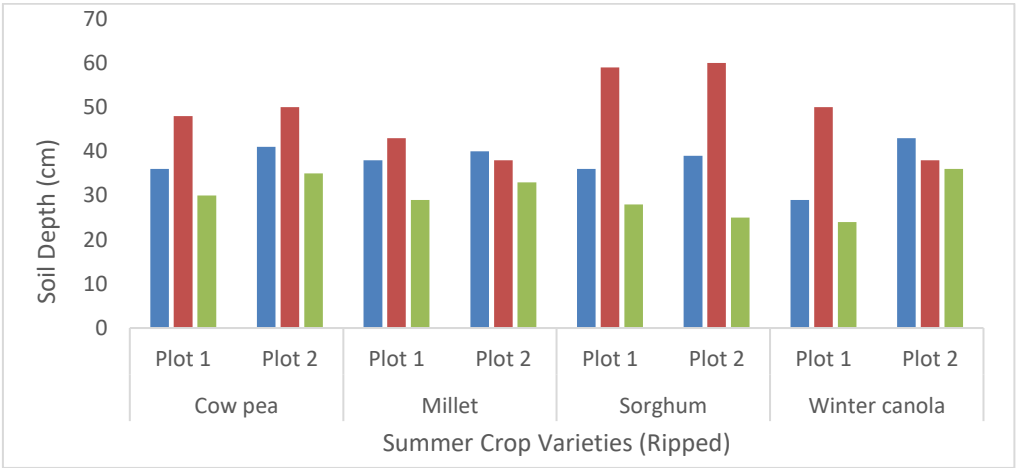


Figure 9 Penetrometer measurements depth (cm) from the summer crop treatments with ripping strips implemented at Woodgenellup site in 2019

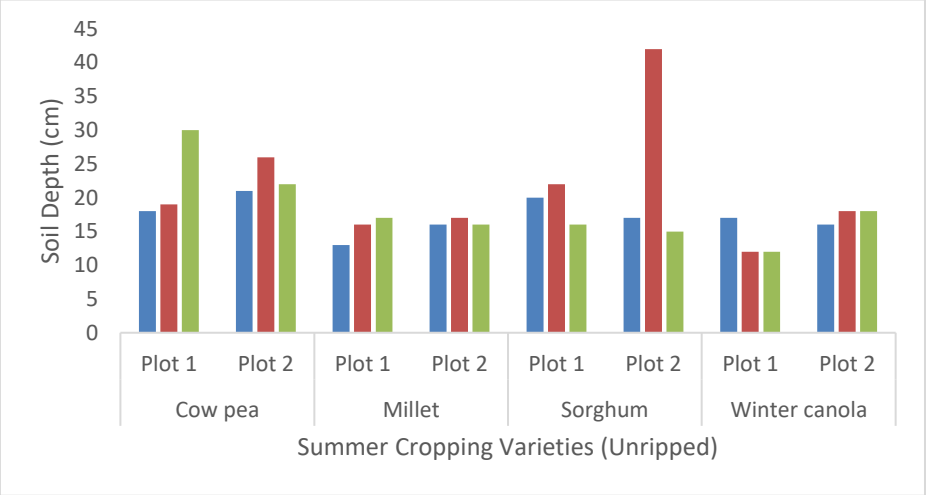


Figure 10 Penetrometer measurements depth (cm) from the unripped summer crop treatments at Woodgenellup site in 2019

CONCLUSIONS

- Although there may be good soil moisture at time of sowing of a summer crop, the Ryansbrook trial demonstrates that further rainfall is required to continue to sustain the crop throughout the summer. The summer crops at this site started to run out of moisture early on as only 2mm of rainfall was recorded in total in January and February 2019.

- It is unusual to receive so little summer rainfall in the Kojonup area. According to our producer rainfall records, since 2003 4 out of the 5 years we have had summer rainfall events in January and February. Unfortunately, in the 18/19 summer were have had minimal rainfall and the crops have run out of moisture.

- A the Ryansbrook site, the C4 grasses persisted better with little to no moisture in the soil profile compared to the broadleaf crop types which, by the end of February 2019, were dead.

- At the Ryansbrook site, the grower was able to utilise the green feed available (in a tight summer) from the summer crop, although crop biomass on offer was not measured.

- Although seeding was delayed at the Woodgenellup site until end of January 2019, the site germinated well and crop biomass is reasonable. Further measurements will be taken from the site as the season progresses and in the following winter crop.

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Is there any reason why this report cannot be communicated on social media? (Insert info here)

If no, please provide the following:

1. Who is the target audience for this content? (e.g., growers, adviser, researchers, policy makers, etc.)
    a. *Growers, advisors, agronomists and researchers*

2. At what time of year is this content most relevant to the target audience?
    a. *September – February*
    b.
3. On which of GRDC's social media accounts would you like this content posted? Please provide text (2-3 sentences for Facebook and LinkedIn and 140 characters for Twitter), images, graphs, or charts that support the content. Where applicable, please include any relevant Twitter handles (usernames) for project staff.
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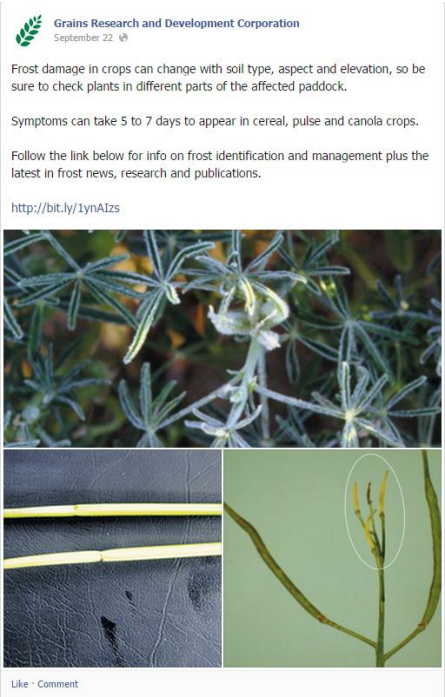

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REFERENCES & USEFUL LINKS

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