Focus Paddock Report

Faba Beans, UREA Top Dressed as per FAR Results 2022

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Focus Paddock Summary

The action learning group identified through the 2021 results from the Optimising irrigated Grains Project that FAR saw significant results in yield of Faba beans when top dressed with Urea at Finley.

- The aim of the focus paddock was to look at growing the higher yields and understand the impact of this on residual Nitrogen left behind in the soil. Many growers use Faba Beans in their rotation to try and fix non bagged N
- The crop emerged and looked wonderful, the top dressing of urea was conducted at 100kg, 150kg, 200kg, 250kg and a brown manure strip. We ended the season with intense disease pressure due to the relentless weather and rain. The increased Nitrogen had an impact on increasing disease pressure.
- Be prepared for multiple passes with fungicide when lifting Nitrogen top dress rates and wet conditions prevail. Under extreme wet conditions, disease pressure has limited grain yield potential.
- No significant differences were found of soil N pre sowing, across treatments.
- Fresh weight cuts were highest with no applied N (disease limited).

Background & Paddock Aims

Paddock Size = 20ha

Paddock History

- 2019 Wheat 7.5t/ha
- 2020 Faba Beans 4.78t/ha
- 2021 Wheat 9.3t/ha

The Finley Irrigated Discussion Group meets every February to discuss their successes & failures from the previous season. They as a group analyse the preliminary results supplied by FAR as part of the broader project. Upon analysis they choose strategies to apply either on the Trial farm or in cooperators projects.

The group identified the significant yield differences in Faba beans when they were top dressed pre-flowering. The group questioned what N would be left behind if they are extracting such high yields. Most growers decide to grow Faba beans in their rotation to fixate Nitrogen without utilising “bagged N”.

Farmers in our district usually grow Faba Beans with some up-front fertilizer and no top dressing through out the season. Yield historically hasn’t been the key driver for growing Faba Beans.

AS a collective they asked our cooperator to grow a Faba crop as normal at the higher seeding rate identified 180-200kg/ha & to apply random strips of Urea in crop at 4 rates.

Focus Paddock Details

Location	Blighty, NSW
Crop type	Faba Beans – Samira
Irrigation system	Surface

Methodology:

Faba Bean to be planted in the first week of May, with up front fertilizer. Sow at a higher rate as per results shown by FAR at Finley in Optimising Irrigated Grains trial. Aim 180kg/ha with 4kg granular inoculant and 120kg SSP fertilizer up front.

Top dress urea crop pre flowering at 100kg/ha, 150kg/ha, 200kg/ha, 250kg/ha. Allow for control strips between

Brown Manure a control strip.(04/10/2022)

Farmer to apply district practice to rest of 20ha paddock, manger for weed & disease pressure in whole paddock, best practice agronomy.

Data to be captured.

- Soil Testing (pre-sowing & pre-sowing 2024)
- Biomass Cuts – Pod set
- Water Applied
- Yield

Agronomic results

The 2022 season was extremely wet compared to average (see diagram 1. below). The wet spring induced abnormal conditions that induced high levels of Chocolate Spot disease across the site. Along with the high density of plants and additional Nitrogen, the disease had ideal conditions to thrive. The farmer applied multiple passes of fungicide to slow the effects, but the conditions did not allow for recovery.

The fresh weight cuts showed a significant difference with the zero applied N compared to all other rates. There was no significant difference between 100, 150, 200 and 250kg/ha of urea applications on fresh weight.

The dry weights showed no significant differences between all applications of urea. (Appendix 1.)

There were no significant differences with Grain Yields across treatments. (Appendix 2.)

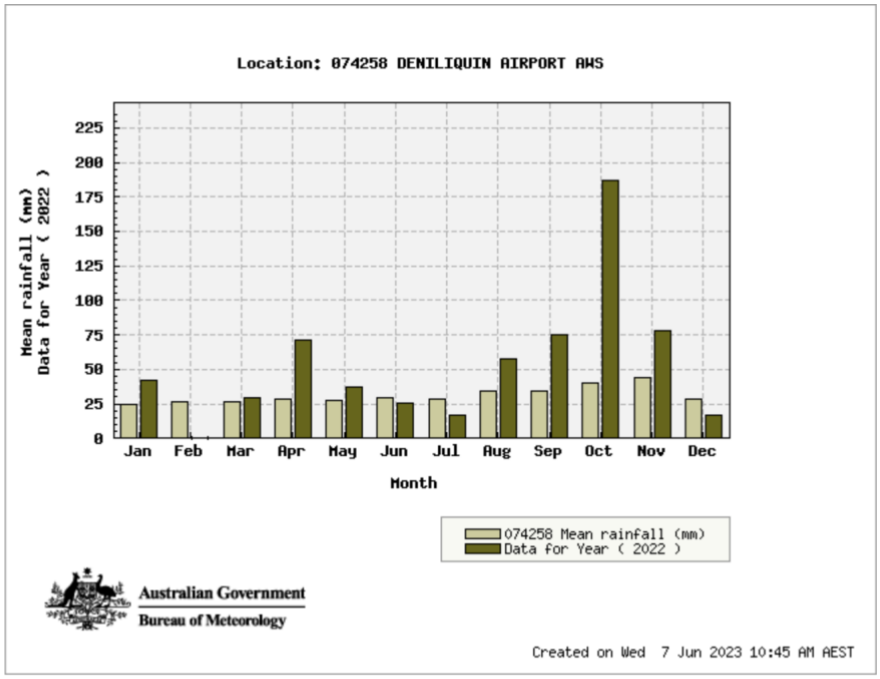
No irrigation water was used on the site due to ample rainfall.

The disease pressure in 2022 for Faba Beans was similar across the Riverina region. All crops of Faba Beans were severely affected by Chocolate Spot.

The brown manure trial was conducted using a mower and roller (Pictures below). Noticeable regrowth of the Faba Beans occurred post mowing and rolling.

Unfortunately, the trial did not result in variations to crop performance that would normally be expected. The next round of soil tests to assess soil N will be conducted pre-cropping in 2024.

Brown Manuring Trial mowed and rolled.



Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
Mean rainfall (mm) for years 1997 to 2023	24.8	26.5	26.3	28.2	27.1	29.8	28.3	33.9	34.7	40.3	43.6	28.8	372.3	26
Statistics	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**	**Years**
Rainfall (mm) for year 2022	*42.4*	*0.6*	*29.8*	*71.2*	*37.2*	*25.6*	*17.0*	*58.0*	*74.8*	*187.0*	*77.8*	*16.6*	*638.0*	1

12.3 = Not quality controlled

Figure 1. Monthly rainfall for Deniliquin Airport vs 5-year mean

Economic results

With the extreme wet conditions, there was a likely overall cost to this project overall. With no significant increase in Grain Yield and Fresh Weight cuts the same, the additional money spent on increasing seeding rates and top-dressing Urea, were all lost in this case.

The amount of N fixed to the soil has not yet been calculated for this trial and could well end up with a financial benefit.

The trial site was just below Faba Bean Crop Averages for the region in 2022. This is likely to be a combination of a fertile paddock and high-density planting compared to other sites.

Key learnings & recommendations

The grower practice of applying Nitrogen topdressing is a risky option in wet years. Higher densities mixed with high N rates both contribute to a higher risk of disease. Added to good fertility already residing in this soil, such practice should be used with caution.

The trial should be conducted over a few years and different soil types to gain an understanding of Best Practice Management guidelines. Additional data will give growers a comfort factor to adopt such practices in the future.

Appendix 1.

Faba Bean Crop Data including Establishment Counts, Fresh Weight Cuts, Dry Weight.

Variety	Samira 180kg per ha plus granular inoculant down tube 4kg / ha
Sown	1st May
Fert	120kg SSP
Row Spacing	250mm

Plant counts

Application rates	Plants per square m	Plants per ha
0kg /ha (Nill)	18.8	18800
100kg/ha	20.8	20800
150kg/ha	18.8	18800
200kg/ha	19.6	19600
250kg/ha	18.4	18400

Fresh weight cuts

Application rates	Weight per square m (kg)	t/ha estimate
0kg /ha (Nill)	7.68	7.6
100kg/ha	6.12	6.1
150kg/ha	6.68	6.7
200kg/ha	6.92	6.9
250kg/ha	6	6

Dry weight cuts

Application rates	Weight per square m (kg)	t/ha estimate
0kg /ha (Nill)	4.48	4.5
100kg/ha	4.62	4.6
150kg/ha	3.28	3.3
200kg/ha	4.164	4.2
250kg/ha	3.412	3.4

Appendix 2.

Grain Yield Data

Treatment	T/Ha
Top Dress 0kg	1.65
Top Dress 100kg	2.21
Top Dress 150kg	1.82
Top Dress 200kg	1.88
Top Dress 250kg	1.85

Appendix 3.

Soil Test Pre-Sow

Sample ID	Sample Name	Sampling Date	Depth From	Depth To	Deep N	Ammonium Nitrogen	Total Nitrogen	T
130384421	Control-1	02/05/2023	0	30	<10	15.0	58.5	
130384420	Control-2	02/05/2023	30	60	<10	8.0	31.2	
130384419	Control-3	02/05/2023	60	90	<10	5.8	22.62	
							112.32	
130384418	Flicker 1-1/100	02/05/2023	0	30	12	23.0	29.9	
130384417	Flicker 1-2/100	02/05/2023	30	60	<10	9.4	24.44	
130384416	Flicker 1-3/100	02/05/2023	60	90	<10	5.9	23.01	
							77.35	
130384415	Flicker 2-1/150	02/05/2023	0	30	<10	19.0	24.7	
130384414	Flicker 2-2/150	02/05/2023	30	60	<10	22.0	57.2	
130384413	Flicker 2-3/150	02/05/2023	60	90	<10	13.0	50.7	
							132.6	
130384412	Flicker 3-1/200	02/05/2023	0	30	<10	17.0	22.1	
130384411	Flicker 3-2/200	02/05/2023	30	60	<10	13.0	33.8	
130384410	Flicker 3-3/200	02/05/2023	60	90	<10	7.5	29.25	
							85.15	
130384409	Flicker 4-1/250	02/05/2023	0	30	14	28.0	36.4	
130384408	Flicker 4-2/250	02/05/2023	30	60	<10	16.0	41.6	
130384407	Flicker 4-3/250	02/05/2023	60	90	<10	8.9	34.71	
							112.71	
130384406	Flicker 5-1/BM	02/05/2023	0	30	<10	19.0	24.7	
130384405	Flicker 5-2/BM	02/05/2023	30	60	<10	14.0	36.4	
130384404	Flicker 5-3/BM	02/05/2023	60	90	<10	9.9	38.61	
							99.71	
130384019	N trial- 0-10- control	27/07/2022	0	10	57	77.0	100.1	
130384018	N trial- 10-30 control	27/07/2022	10	30	12	27.0	75.6	
130384017	N trial- 30-60 control	27/07/2022	30	60	<10	12.0	50.4	
							226.1	