CWFS
Central West Farming Systems Inc.
"Farmers Advancing Research"
PO Box 171 CONDOBOLIN NSW 2877 | 1 FIFIELD ROAD
Ph: (02) 6895 1025 | Fax: (02) 6895 2688
cwfs@dpi.nsw.gov.au | www.cwfs.org.au

9 February 2024

TITLE

Organic N vs. Synthetic N: soil health, yield response and its economic analysis

GUNNING GAP

The project commenced in 2022 with soil samples undertaken on a grower property 20 km east of Forbes, NSW. Due to poor weather conditions, the trial activities for this project could not continue for 2022.

2022

Soil sampling was done on the 14 June 2022 deep to 1 meter in all the 4 blocks. Predicta B was taken and dispatched to the lab on 20 July 2022. Plant emergence counts were undertaken on 12th of July 2022, but emergence was extremely poor due to heavy rainfall post sowing. With further rain and flooding in 2022, the trial was abandoned.

Block	2022 crop	2023 crop	2023 urea type	2024 crop	2024 urea type
Control Block	Wheat	Wheat	Nil	Legume	
T1	Wheat	Wheat	Synthetic	Legume	
T2	Legume	Wheat	Organic	Cereal	Control + Synthetic
T3	Fallow/Wheat	Legume	will be used in 2024	Cereal	Organic

Revised Plan

The 2023 replicates the original plan (with same treatment blocks), however, there is an inclusion of a backup site. To mitigate weather risk, it was decided to undertake a trial at CWFS The Fettell Centre where irrigation is an option.

Grower site 2023

A new grower site was identified as the 2022 site was not suitable. This site is located near the 2022 grower site at Gunning Gap. The milestones for this project as below:

	Action	Date
1	Knockdown spray	
2	Pre-sowing soil coring Mineral N & Soil Water (1m deep); Predicta B	03/04/2023
3	Pre-emergence spray	09/04/2023
4	Sowing – Wheat (Control, T1, T2) – Lupin (T3)	09/04/2023 & 13/04/2023 20/04/2023
5	Plant emergence count (3 weeks after sowing) – Lupin (T3) – Wheat (Control, T1, T2)	 15/05/2023 26/04/2023
6	Post-sowing spray	18/06/2023
7	Legume assessment (nodulation scoring)	02/08/2023
8	Ground Biomass assessment (dry matter biomass cuts at GS31)	02/08/2023
9	Urea top dressing	11/08/2023
10	Normalized difference vegetation index (NDVI) – measure of crop greenness) prior to flowering	20/09/2023
11	Index cuts at maturity	06/11/2023
12	Tissue Nitrogen sampling at maturity	06/11/2023
13	Yield and grain protein percent will be calculated	March 2024
14	Gross profit analysis will be calculated by taking yield levels, capital costs, etc into consideration.	March 2024
15	Post-harvest soil coring	23/01/2024

During 2023, the weather conditions were extremely dry. Urea top dressing was conducted much later than usual due to the lack of rain. The on-ground activities have been completed, tissue nitrogen samples will be sent to the lab, and grain quality will be assessed by the end of February.

There was considerable weed pressure in the paddock that contained Control Plot and Treatment 1 (ryegrass and black oats) and feral pigs were a problem in the Lupin paddock. As a result of these issues, the grower may decide to change his plans and give the paddock a rest for a period of time. Although we are in contact with the grower, we also have the backup site at the Fettell Centre.

Gunning Gap (Grower)

Site Visit 30/11/2023

Control Block

T1

T2

T3

The Fettell Centre

As a backup, a small plot trial was established at the CWFS Fettell Centre in 2023. The objective of this small plot trial is to derive the results in soil health improvement and grain yield response by using two different forms of Nitrogen (N), i.e., Organic N (Leguminous crops + Crop Rotation) and Synthetic N (Urea). Furthermore, this study will also aim to deliver the cost-benefit analysis of the two different strategies over the period of two years.

Plan

Block	2023 crop	2023 urea type	2024 crop	2024 urea type
Control Block (T1)	Wheat	Nil	Wheat	Nil
T2	Wheat	Synthetic	Wheat	Synthetic
T3	Legume	Organic	Wheat	Organic
T4	Fallow		Fallow	

In 2023, the backup site at the Fettell Centre was irrigated twice due to dry weather conditions. Due to kangaroo damage to wheat crops, an electric fence was erected in July. The on-ground activities have been completed, tissue nitrogen samples will be sent to the laboratory, and grain quality will be assessed by the end of February.

The trial site was kept clean and had a low level of weed growth. As the wheat plants approached maturity, we observed crown rot. Based on this observation, we plan to sow interrow in 2024. Furthermore, the new Syngenta Victrato seed treatment can be used to lower crown rot pressure. The wheat can be replaced with barley in 2024 if there will be no trial at the growers site.

2023

	Action	Date
1	Knockdown spray	03/04/2023 04/04/2023
2	Pre-sowing soil coring Mineral N & Soil Water (1m deep); Predicta B	19/04/2023
3	Pre-emergence spray	26/04/2023
4	Sowing – Wheat (T1 & T2) – Lupin (T3)	 26/04/2023 27/04/2023
5	Plant emergence count – Wheat & Lupin	 17/05/2023
6	Irrigated	29/05/2023
7	Post-sowing spray	20/06/2023
8	Urea top dressing	14/07/2023
9	Building up an electric fence due to crop damage through kangaroos	24/07/2023
10	Legume assessment (nodulation scoring)	02/08/2023
11	Biomass assessment (dry matter biomass cuts at GS31)	02/08/2023
12	Normalized difference vegetation index (NDVI) – measure of crop greenness) prior to flowering	20/09/2023
13	Index cuts at maturity	14/11/2023
14	Tissue Nitrogen sampling at maturity	14/11/2023
15	Yield and grain protein percent will be calculated	March/April 2024
16	Gross profit analysis will be calculated by taking yield levels, capital costs, etc into consideration.	March/April 2024
17	Post-harvest soil coring	12/12/2023

CWFS The Fettell Centre

Site Visit 26/10/2023

Control Block (T1)

T2

T3

Extension

A workshop was held at The Fettell Centre on 16 August 2023 with 30 growers. Newsletter article in Spring edition of CWFS Newsletter. CWFS website hosts project information.

Workshop at The Fettell Centre, Condobolin 16/8/2024

Site Visit 02/11/2023

Report compiled by Chiara Stommel, CWFS Trials Agronomist

For more information please contact
Diana Fear
CEO, CWFS
Contact: 0427 897530 or diana.fear@dpi.nsw.gov.au