sustainable agriculture

Sifting through the 'grey areas' – learning more about alternative fertiliser options

Project Snapshot

Land Manager Names:	**Quairading Land Conservation District Committee (LCDC)**
Property Site:	**Dangin Trial Site**
Location:	**Quairading**
Annual Rainfall (mm):	**300**
Soil Types/Vegetation Types:	**heavy loam, york gum**

Above:
Quairading LCDC
Field walk

Key Messages

- **Alternative fertilisers are still highly speculative for broadacre agriculture because little independent research has been conducted.**
- **Long term replicated trials are needed to better understand the impact of alternative fertiliser on crop growth and performance.**
- **After a one year trial, the LCDC have found 'conventional' and 'conventional' + manure fertiliser options the best for growing wheat.**

This project is supported by Wheatbelt NRM, through funding from the Australian Government's Caring for our Country.

Continuing the good work

The Quairading Land Conservation District Committee (LCDC) was formed in 1985 over concerns of salinity and erosion in the district. In 2011, the Quairading LCDC developed a strategic plan to achieve direction and motivation towards their key priorities in Natural Resource Management. The LCDC priorities are water, biodiversity, land, people and their community, and organisational capacity.

With the help of funding from Wheatbelt NRM, this not for profit organisation took part in the Soil Conservation Incentives Program to assist the group to trial alternative fertilisers for broadacre agriculture. The products used included compost, manure, worm juice and an Australian Mineral Fertilizers compound product. This sustainable agriculture focused trial was designed to benefit farmers in the Quairading district by attempting to address the 'grey areas' surrounding the topic. The trial was developed in collaboration with a York-based consultancy Living Farm to explore alternative cropping inputs that were perceived to have an influence on soil health. "Soil health is an essential part of all farming landscapes. Our goal is to ensure landholders have access to information and research that covers an array of techniques from alternative to conventional", said Rowlie Mellor (Quairading LCDC Secretary and Treasurer).

Table 1: The fertiliser treatments

Treatment	Description
1	Control
2	'Conventional' 100kg/ha Gusto Gold
3	Compost 2t/ha
4	Manure 2t/ha
5	Worm Juice 10L/ha
6	'Conventional' + Worm Juice 10L/ha
7	'Conventional' + Manure 2t/ha
8	WMF NPK Crop Plus (100kg/ha) with microbes (750g/1000kg/ seed) + oil (4L/1000kg/ seed).

The trial

The replicated 'alternative fertiliser' trial was set up in 2012. Each plot was 12m long by 1.83m wide. See Table 1 for a description of the treatments used. All treatments (except Worm juice, applied 31st May) were applied at seeding with Cobra wheat, sown on the 20th of May at a rate of 75kg/ha. Table 2 gives a breakdown of the nutritional makeup of each of the fertiliser treatments.

NB. Data was statistically analysed to understand the effect treatments had on wheat yield and quality, as well as soil nutrient changes in the first year.

Table 2: Nutrient concentration of each treatment

Treatment	N%	P%	K%	Ca%	S%	Mg%
1	-	-	-	-	-	-
2	10.2	13.1	12	0	7.2	0
3	1.9	0.7	1.8	2.5	0.36	0.5
4	2	0.6	1.8	1.4	0.46	0.4
5	Unknown nutrient composition					
6	10.2	13.1	12	0	7.2	0
7	10.2/2	13.1/0.6	12/1.8	0/1.4	7.2/0.46	0/0.4
8	8.5	8.5	4.5	4	8	0.8

An overview of the results

Treatment	Yield (t/ha)	Protein (%)	Gross margins ($/ha)
1	1.71	11.6	458.25
2	2.37	12.1	770.25
3	1.97	10.8	628.25
4	2.06	12.0	657.50
5	1.91	11.1	620.75
6	2.10	11.7	682.50
7	2.48	12.8	794.00
8	1.83	12.0	594.75

NB. A total of 144.6mm of rain was received during the growing season period (April-October).

These results and other observations are explained in more detail below:

- Conventional 100kg + Manure 2t had significantly higher crop vigour than all other treatments.
- Assessment of crop vigour in September also found Conventional fertiliser 100kg/ha and Conventional 100kg + Manure 2t to have significantly higher crop vigour than the untreated control.
- It was observed that the protein concentration of Conventional 100kg + Manure 2t was higher than all other treatments.
- Composite soil samples collected post-harvest showed Manure 2t had a higher concentration of Ammonium Nitrogen and sulphur and Compost 2t had high Nitrate nitrogen. Gross margins of treatments containing conventional fertilizer were much higher than other treatments.

Trialling into the future

The group intends to continue testing each trial plot for a number of years so they can gain a more comprehensive perspective about the long term effects of the alternative fertilisers used in this project. As Living Farm research agronomist Richard Devlin explained, “Compost and manure based fertilizer may take a longer time to break down and release nutrients that are available to the plants, inhibiting the ability to compare it to conventional or AMF fertilizers in the first year of application”.

Obviously different results may occur under different seasonal conditions and so multiple season will help to test whether conventional fertiliser alone and also with the addition of manure are still the most successful options over the long term.

If you are interested in viewing the complete set of results from this trial, a report written by Living Farm Research is available through the Quairading LCDC, phone Rowlie Mellor on 9645 1439.

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