

Liquid Verse Compound Fertiliser Trial

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Key messages

- There was a response to higher rates of nutrients supplied by compound fertiliser compared to the liquid fertiliser although some of this may have come from the extra nitrogen provided in these mixes.
- Small on farm plot trials can provide a cost effective opportunity to evaluate different fertiliser strategies.

Aim

To compare the gross margins of a liquid fertiliser to a granular fertiliser strategy.

Background

Following years of paddock trials looking at phosphorous efficiency and nutrient efficiency in general, I decided to replicate some of my different fertiliser strategies in a small-scale replicated trial. This work has also been backed by studying the work of Wong, MTF, Grundy MJ, Barson, M and Walcott, J (2012) - "A strategic framework to improve phosphorus management in the Australian grains industry", CSIRO, Australia. The last seven years have seen me move towards a system that promotes biology as an important component of soil health and efficient use of applied nutrients. With soil tests showing adequate nutrient levels in the soil I have been using liquid fertiliser to lower my rates of phosphorous applications with increasing confidence, while still monitoring soil test results to insure that they remain above critical levels. In some areas I have lowered rates to as low as 0.7 of a unit of P per hectare I have been using liquids to increase target sites as research would indicate that granules are likely to be spaced too far apart to allow for efficient recovery by seedlings. The trial was set up on a paddock that has not been cropped extensively as it is part of a series of small paddocks that have been better suited to running cattle.

Trial Details

Property	Stuart and Leanne McAlpine, west Buntine
Plot size & replication	10m x 2m, 3 replicates
Soil type	Sandy loam
Sowing date	01/06/13
Seeding rate	70 kg/ha Corack wheat
Paddock rotation	2010: pasture, 2011: wheat, 2012: pasture
Fertiliser	As per protocol
Herbicides	01/06/13: 2 L/ha Roundup Attack, 118 g/ha Sakura, 2 L/ha Avadex, 400 mL/ha Diuron.
Growing Season Rainfall	163mm
Harvest	10/11/13

Table 1: Soil test results from sample taken from trial site in May 2013.

Measurement	Analysis Results
EC ($\mu\text{S.cm}^{-1}$)	69.70
pH (CaCl_2)	4.59
pH (H_2O)	5.41
Ammonia-N (mg.kg^{-1})	9.77
Phosphate-P (mg.kg^{-1})	29.50
Nitrate-N (mg.kg^{-1})	0.51
Extractable Calcium (meqiv.L^{-1})	10.80
Extractable Magnesium (meqiv.L^{-1})	1.46
Extractable Sodium (meqiv.L^{-1})	1.80
Extractable Potassium (meqiv.L^{-1})	3.40
Total Calcium (mg.kg^{-1})	96.60
Total Magnesium (mg.kg^{-1})	11.40
Total Sodium (mg.kg^{-1})	144.50
Total Potassium (mg.kg^{-1})	55.90
Total Iron (mg.kg^{-1})	7549.00
Total Manganese (mg.kg^{-1})	26.50
Total Copper (mg.kg^{-1})	7.18
Total Zinc (mg.kg^{-1})	1.99
Carbon (%)	0.5572
Sulphur (%)	0.0078
Moisture Content (%)	5.32

Results

Table 2: Grain yield (t/ha) of Corack wheat grown in 2013 under different crop nutrition treatments.

Treatment	Rate	Yield (t/ha)
AgBalance PK + TE	10 L/ha	1.74 ^c
Control	nil	1.75 ^c
Nachurs: PK Focus	10 L/ha	1.79 ^c
DKP	10 L/ha	1.89 ^c
CSBP: K Till Extra	50 kg/ha	2.07 ^b
K Till Extra + Flexi N	50 kg/ha + 40 L/ha	2.11 ^{ab}
Guano + Flexi N	50 kg/ha + 40 L/ha	2.12 ^{ab}
K Till Extra + Flexi N + CalSap	50 kg/ha + 40L/ha + 10 L/ha	2.26 ^a
LSD (P=0.05)		0.276 t/ha
Standard Deviation		0.158
CV (%)		4.45
Bartlett's X2		10.27
P(Bartlett's X2)		0.174

Means followed by same letter do not significantly differ (P=0.05, LSD)

Table 3: Grain yield and quality results of Corack wheat grown in 2013 under different crop nutrition treatments.

Treatment	Yield (t/ha)	Protein (%)	Hectolitre Weight (kg/hL)	Screenings (%)	Grade
AgBalance PK + TE	1.74 ^c	9.70	83.91	4.11	APW
Control	1.57 ^c	9.43	83.90	3.96	ASW
Nachurs: PK Focus	1.79 ^c	9.77	83.63	4.51	APW
DKP	1.89 ^c	9.53	83.92	4.31	APW
CSBP: K Till Extra	2.07 ^b	9.80	83.70	3.60	APW
K Till Extra + Flexi N	2.11 ^{ab}	10.10	83.41	3.39	APW
Guano + Flexi N	2.12 ^{ab}	9.73	83.15	4.36	APW
K Till Extra + Flexi N + CalSap	2.26 ^a	10.00	83.52	3.29	APW

Economic Analysis

Table 4: Economic analysis (\$/ha) of different crop nutrition treatments in Corack wheat grown in 2013.

Treatment	Yield	Gross Return	Direct Costs	Gross Margin
AgBalance PK + TE	1.74	\$505.35	\$35.00	\$470.35
Control	1.75	\$506.96	\$0.00	\$506.96
Nachurs: PK Focus	1.79	\$519.85	\$30.00	\$489.85
DKP	1.89	\$547.24	\$11.00	\$536.24
CSBP: K Till Extra	2.07	\$601.48	\$41.95	\$559.53
K Till Extra + Flexi N	2.11	\$612.76	\$66.95	\$545.81
Guano + Flexi N	2.12	\$613.83	\$56.50	\$557.33
K Till Extra + Flexi N + Calsap	2.26	\$656.26	\$81.95	\$574.31

Wheat price base on farm gate price of \$290/t

Table 5: Input levels of nitrogen (N), phosphorous (P) and potassium fertiliser (K) in units (kg/ha).

Treatment	Rate	Units N	Units P	Units K
Control	nil	0.0	0.0	0.0
AgBalance PK + TE	10 L/ha	0.3	1.0	1.4
DKP	10 L/ha	0.0	0.9	1.8
CSBP: K Till Extra	50 kg/ha	5.1	6.0	5.5
Nachurs: PK Focus	10 L/ha	0.4	1.1	2.2
K Till Extra + Flexi N	50 kg/ha + 40 L/ha	22.1	6.0	5.5
K Till Extra + Flexi N + Calsap	50 kg/ha + 40 L/ha + 10 L/ha	22.1	6.0	5.5
Guano + Flexi N	50 kg/ha + 40 L/ha	17.0	6.7	0.0

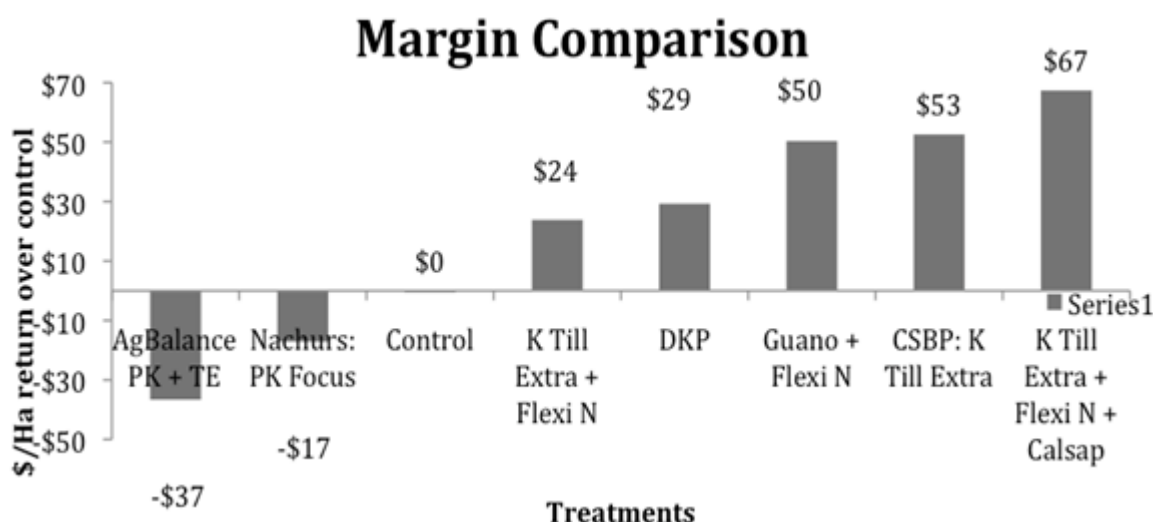


Figure 1: Economic analysis (\$/Ha) of treatments relative to control

Comments

The trial was established in ideal conditions. Richard Devlin commented, “This was a high quality trial with even soil type, good germination and no weed issues and as a result the yields returned some low CV’s which reflected this.” I set this trial up to evaluate many of the different fertiliser strategies that I have been employing on the farm. This gave me a great opportunity to reference some of the side-by-side comparisons from the yield monitor with greater confidence.

On reflection, the soil nitrogen was lower than most of my other paddocks and this trial could have been improved with the addition of a further two treatments, one with Flexi N and one with Flexi N + CalSap®. This paddock has only been cropped twice in the last eight years and has not had as much focus on promoting biology as some of my other paddocks and could be why nitrogen levels were lower than other paddocks. That being said, I was more than happy with the results and the trial demonstrates that input costs can affect end gross margins. I made up the DKP blend on farm from phosphoric acid and caustic potash and this was considerably cheaper than the other liquid fertiliser treatment. I am likely to investigate this further with liquids generally being considerably dearer per unit of nutrient applied. The Guano and the CalSap® treatments looked good all year and compared well in the yield results.

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