

3.2 Investigation of the benefits of specialty phosphorus products and liquid phosphorus options in cereals

Location: Yalla - Y- Poora Victoria

Funding: Grains Research and Development Corporation

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Rainfall: 223 mm GSR (April – November)

Summary of Findings:

There was no difference in wheat grain yield between the different phosphorus treatments in trial. The dry spring in 2007 resulted in considerably lower yields than expected due to a combination of severe frosts and moisture stress, delayed flowering and crop maturity. (There was substantial flowering “in the head” and failure of heads to fully grain fill.) There was also visual differences in growth across the trial (“patchiness”) that was evident in the high co-efficiency of variation (CV = 35.7).

Background:

Research on the Eyre Peninsula over the last 5 years has demonstrated the benefits of fluid P fertilisers over granular forms on highly alkaline calcareous clays. More recently, work in the Wimmera, Mallee and North East of Victoria has at times demonstrated some benefits of fluids over granules on variety of soil types albeit with advantages of generally lower magnitude.

Despite demonstrated advantages, adoption has been slow, mainly due to the high costs of liquid P alternatives (ammonium poly phosphate, phosphoric acid, tech grade MAP).

Aligned with the quest for more efficient P fertilisers is the search for more effective granular fertilisers. Numerous manufacturers such as Mosaic, Shell Canada and Specialty Fertiliser Products have introduced products that reportedly improve the efficiency of fertiliser P through either physical or chemical means. Further, there are reports from Italy of improved P efficiency in TSP through coating with humic acid.

As an integral part of the GRDC Nutrient Management Initiative, Incitec Pivot in co-operation with Melbourne University, DPI Victoria Birchip Cropping Group and Southern Farming Systems has trialled the following products at a range of phosphorus application rates and timing of applications (see table below) to answer some of the above questions. The trial was also repeated at Hopetoun (Mallee) and Kalkee (Wimmera).

Trial products/treatments at Yallee YPoora (Table1)

No.	Treatment
1	MAP
2	APP (Ammonium polyphosphate)
3	Easy NP™ (liquid ammonium phosphate-ammoniated phosphoric acid)
4	Granulock® 15 (compounded MAP and Sulphate of Ammonia)
5	Microessentials S15™ (MAP + Elemental S + additional sulphate S as added H2SO4)
6	Biophos® (Composted rock phosphate)
7	HA coated Triple Super (humic acid coated 8%)
8	HA coated MAP (humic acid coated 8%)
9	Split application MAP (50% at sowing, 50% at DC23)
10	MAP applied all at DC23

Trial Design:

Completely randomized split block design with 4 replicates. Each Treatment sown at 3 rates of phosphorus, 0, 15 and 30 kg/ha. Basal N and S (and Zn) applied at sowing as granular urea and sulphate of ammonia to balance both N and S across all treatments.

Trial Inputs:

Trials was sown at SFS Yalla-YPoora on 5th June 2006. The site was previously pasture, and treatments were sown to Ruby wheat at 80kg/ha. The trial was monitored and sprayed for weeds by SFS staff. Neither weeds or foliar diseases were issues encountered during the season.

Soil Test Results (Table 2)

Top soil 0-10cm	ColwellP mg/kg	Nitrate	Total N	OC %	pH (H2O)	pH	S ppm
Rep 1	70	46	64.4	3.8	5.5	4.9	27
Rep 2	75	36	50.4	4.2	6	5.5	29
Rep 3	86	35	49	3.5	5.7	5.1	23
Rep4	72	51	71.4	4	5.8	5.2	26

Average							
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Growing season data collected (table 3)

T. No	Treatment	P rate kg/ha	Dry matter early grain fill	Yield t/ha	Protein %
1	MAP	0	4970	0.611	16.6
2	MAP	15	5583	0.601	16.8
3	MAP	30	6562	0.561	16.9
4	APP	0	4723	0.511	16.9
5	APP	15	5799	0.541	17.2
6	APP	30	5679	0.579	17.1
7	Easy NP	0	5240	0.497	17.1
8	Easy NP	15	5955	0.659	16.6
9	Eassy NP	30	5679	0.608	17.1
10	Granulock 15	0	3624	0.489	16.9
11	Granulock 15	15	4988	0.629	16.9
12	Granulock 15	30	6070	0.660	16.9
13	Cargill MES 15	0	4537	0.452	16.7
14	Cargill MES 15	15	6046	0.681	16.6
15	Cargill MES 15	30	6430	0.672	16.7
16	Biophos	0	4850	0.522	16.6
17	Biophos	15	4748	0.402	16.9
18	Biophos	30	4693	0.452	16.8
19	HA coated TSP	0	3684	0.551	16.3
20	HA coated TSP	15	5451	0.690	16.5
21	HA coated TSP	30	5421	0.692	16.6
22	HA coated MAP	0	4219	0.375	16.8
23	HA coated MAP	15	5691	0.427	17.0

24	HA coated MAP	30	5781	0.464	17.0
25	Split MAP	0	5457	0.412	16.9
26	Split MAP	15	5655	0.516	16.8
27	Split MAP	30	5913	0.579	17
28	MAP @DC23	0	5457	0.471	16.9
29	MAP @DC23	15	5613	0.449	17.2
30	MAP @DC23	30	6094	0.434	17.0
	Lsd (0.05)		1089.5	0.271	0.67
	CV>		14.5	35.7	2.8

Results:

At harvest there were no significant yield differences above the controls (no P)