4.4 INVESTIGATION OF THE BENEFITS OF SPECIALTY PHOSPHORUS PRODUCTS AND LIQUID PHOSPHORUS OPTIONS IN CEREALS (YALLA-Y-POORA VIC)

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Location: SFS Yalla-Y-Poora Research site

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Rainfall (2005): 543 mm
GSR: (Apr – Nov) 359 mm

Summary:
Liquid phosphorus fertilisers did not significantly increase grain yield over traditional granular fertililsers. The more technically advanced Granulock fertilisers were able to significantly increase grain yield over MAP and the Ammonium Polyphosphate (APP) at the high rate of 30 kg P/ha.

The research also highlighted the need for increased N application rates when P rates are increased so that maximum yield and protein can be achieved.

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 a 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. Field trials have demonstrated equivalent agronomic efficacy using suspension products based on both MAP and DAP. Currently, there are no commercially available suspensions in the Australian market however they are common place in parts of the US.

Another technology of interest is a composted rock phosphate. While designed for pasture application, a single cropping trial in Australia has provided interesting responses on a high PBI soil.

Objectives:
To compare phosphorus responses in wheat using a range of traditional granular fertilisers, specialty granular fertiliser, organic fertiliser and fluid fertilisers in South West Victoria, in a quest to provide the grower with the most economic and agronomic phosphorus fertiliser.

Methodology:
- Completely randomised split plot block design with 4 replicates.
- Basal N application made at sowing as granular urea.
- Plots were 20m x 2m.
- Plant tissue analysis of whole tops at 3 leaf stage by removing 3m of row (6 x 50cm cut) from either end of plots.
- Inside six of eight rows harvested with the ends of the plots trimmed prior to harvest.

Table 4-8: Trial Details

Variety	Chara
Sowing date	30/06/2005
Sowing rate	81 kg/ha
Roundup Powermax	2 l/ha
Dual Gold	500 ml/ha
Basal N	50 kg/ha
pH (1:5 water) 0-10 cm	5.5
Phosphorus Colwell P	37

Fertilisers:
- NP Suspension
- MAP
- Tech Grade MAP (Clear Liquid)
- Granulock 15
- Ammonium Polyphosphate
- Composted Rock Phosphate
- Evaluation P Liquid
- Evaluation Granular P
- Easy NP (Clear Liquid)
- Fish Emulsion

All the above treatments sown at rates to supply 0, 15 and 30 kg P/ha. The fish emulsion was applied at 0, 155 l/ha and 310 l/ha (not 0, 15 & 30 P/ha). The nitrogen was balanced out using urea to supply each treatment with 50 kg N/ha.

Results and Discussion

The site had a moderate Colwell P level (Table 4-8) with all products producing significant yield increases over the control with the exception of the Fish Emulsion. No significant yield increases were achieved by increasing P rates from 15 to 30 kg P/ha.

Table 4-9: Grain Protein & Grain N Removal

Fertiliser Treatment	Grain Protein			Grain N Removal		
	0P	15P	30P	0P	15P	30P
App	11.60	10.34	10.98	48.84	65.48	71.74
Composted rock phos	11.33	11.05	10.83	46.36	58.28	54.21
Evaluation Granular P	11.50	11.35	11.18	51.51	71.80	76.90
Easy NP Suspension	11.45	10.83	11.23	43.98	61.65	67.43
Granulock 15	11.28	11.10	10.88	49.83	66.73	71.64
Evaluation Liquid P	11.18	10.78	10.73	49.57	64.58	61.12
Fish Emulsion	11.38	11.13	10.78	52.44	55.16	56.28
MAP	11.10	10.83	10.85	49.04	66.53	65.22
Tech Grade MAP	11.55	11.25	10.85	49.98	57.99	60.64
Easy NP	11.30	11.30	10.60	51.71	69.77	69.74

All controls had significantly higher protein than respective treatments due to yield dilution. All treatments with the exception of the Fish Emulsion significantly increased the amount of grain removal over that of the control and suggests that yields may have been restricted by a lack of nitrogen.

The Evaluation Granular P at 30 kg P/ha significantly increased the amount of N removed when compared to all treatments with the exception of Easy NP.

Ammonium Polyphosphate was unable to significantly increase yield over granular fertilisers, with the Evaluation Granular P performing on a par at 15 kg P/ha and significantly outperforming all other treatments at 30 kg P/ha.

Figure 4-1: Effect Of P Source & Rate On Wheat Yield