

Phosphorus rate trial

Key findings

- Phosphorus treatment had no significant impact on grain yield, screenings or protein at Hart in 2008.

Why do the trial?

To investigate the impact of phosphorus fertiliser on the grain yield and quality of wheat.

How was it done?

Plot size 1.5m x 10m **Fertiliser** All treatments Urea @ 30kg/ha IBS
Post emergent urea @
75 kg/ha urea 29th July 2008
Phosphorus applied as per treatment

Seeding date 23rd May 2008 **Variety** Derrimut wheat

This trial is a randomised complete block design with 3 replicates of 10 fertiliser treatments (Table 1). Treatments 1 to 4 were re-sown over exactly the same treatments from 2007.

Single superphosphate and urea were sown with the seed.

Biosolids and chicken litter were broadcast by hand prior to sowing.

Table 1: Treatments in the Hart phosphorus rate trial at Hart 2008

Treatment No.	Biosolids or Chicken litter	Single super kg/ha	Total phosphorus kg P/ha
1	0	0	0
2	0	55	5
3	0	110	10
4	0	165	15
5	Biosolids 5t/ha	0	6
6	Biosolids 5t/ha	65	12
7	Chicken litter 3t/ha	0	25
8	Chicken litter 3t/ha	65	31
9	0	0	0
10	0	110	10

Initial soil phosphorus, 0 – 10cm 40mg/kg.

Plots were assessed for grain yield, screenings, and leaf tissue nutrient concentration.

Tissue tests were taken on 31st July at GS14, 22.

Samples of the Biosolids and Chicken litter were analysed for nutrient concentration (Table 2).

Table 2: Fertiliser nutrient concentrations, kg/t.

Nutrient	Single superphosphate	DAP	Biosolids	Chicken litter
kg/t				
Nitrogen	0	180	15	43
Phosphorus	90	200	1	8
Potassium	0	0	8	2
Sulphur	110	15	8	6
Zinc	0	0	1	1

Results

Fertiliser treatment had no significant impact on grain yield or screenings (Table 3).

Treatments 1 to 4 produced lower protein than treatments 5 to 10 due to a different soil nitrogen history. There was no difference between fertiliser treatments.

Table 3: Grain yield (t/ha), protein (%) and screening (%) for phosphorus fertiliser treatments at Hart in 2008.

Treatment	Fertiliser treatment	Grain yield (t/ha)	Protein (%)	Screenings (%)
1	Nil	1.78	15.4	9
2	55kg/ha Single	1.75	14.8	9
3	110kg/ha Single	1.86	14.0	6
4	165kg/ha Single	1.79	14.8	11
5	5t/ha Biosolids	1.60	16.4	8
6	5t/ha Biosolids + 65kg/ha Single	1.60	16.2	11
7	3t/ha Chicken litter	1.73	16.6	10
8	3t/ha Chicken litter + 65kg/ha Single	1.60	16.8	13
9	Nil	1.63	16.2	9
10	110kg/ha Single	1.70	15.7	8
LSD (0.05)		ns	1.7	ns

Leaf nutrients analysis tests show that there was no direct relationship between phosphorus rate or source and plant leaf phosphorus concentration (Table 4).

Table 4: Tissue test results for 7 treatments showing phosphorus, zinc and potassium levels.

Treatment	Fertiliser treatment	Applied phosphorus	Leaf concentration (ppm)		
		kg P/ha	Phosphorus	Zinc	Potassium
1	Nil 1	0	3800	21	37000
2	55kg/ha Single	5	3600	19	38000
5	5t/ha Biosolids	6	3500	25	40000
6	5t/ha Biosolids + 65kg/ha Single	12	3400	20	38000
7	3t/ha Chicken litter	25	3400	24	40000
8	3t/ha Chicken litter + 65kg/ha Single	31	3200	22	39000
9	Nil 2	0	3300	20	36000