




Concentrated PK Fertilisers

TRIAL REPORT 5

High pH Soils

Carried out By:	LA Project 97104
Levington Agriculture Ltd Levington Park Ipswich Suffolk IP10 0LU	Trial work commenced: 27.09.1996 Trial work completed: 15.08.1997 Lab work completed: 12.11.1997
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FIBROPHOS FOR HIGH pH SOILSC O N T E N T S

SUMMARY

SITE DETAILS

TRIAL DIARY

APPENDIXTables of Results
Project PlanABBREVIATIONS

ai	active ingredient
CV%	Co-efficient of variation
cm	centimetre
DAT	days after treatment
DM	Dry matter
g	gram
GM	General Mean
ha	hectare
Id/No.	Identity (Number)
kg, kg/hl	kilogram, kilograms per hectolitre (specific weight)
LA	Levington Agriculture Limited
LSD	Least Significant Difference
m	metre
mm	millimetre
MRT	(Duncans) Multiple Range Letter Test
NS	not significant
S	Significant
SE	Standard Error
t, t/ha	tonnes, tonnes per hectare
+ (P=0.10)	Significant at 0.10 probability level
* (P=0.05)	Significant at 0.05 probability level
** (P=0.01)	Significant at 0.01 probability level

SUMMARY

Background

This trial was designed to test the performance of Fibrophos as a P source on a high pH, calcareous soil. Earlier pot trials had shown the performance of Fibrophos to be little affected by soil pH, but field demonstrations of this was desirable.

One trial was established on a P deficient (index 0), sandy clay loam soil with a pH of 7.6 and a free calcium carbonate content of 0.3%.

Treatments applied were:

P source: Fibrophos, triple superphosphate, rock phosphate (Gafsa).

P rate (kg P₂O₅/ha): 50, 100, 150

These treatments were combined factorially so that every P source was included at every rate of application. A control treatment, receiving no applied P, was included. Treatments were replicated 4 times to give a total of 40 plots.

P was applied to the seedbed in September 1996. Uniform N was applied as a top-dressing in 1997 (40 kg N/ha in late February, 150 kg N/ha in April). Uniform K (70 kg K₂O/ha) was applied to the seedbed.

Assessments included grain and straw yields and P contents.

Results

The crop was inspected on 10 April at GS 30 and on 27 June at GS 69. On the first occasion, the crop was visibly affected by dry conditions.

GS 30: Crop growth slow due to dry conditions, around 45% bare ground when looking down vertically on crop.

GS 69: All plots showing some variation in height, but this is not treatment-related.

Despite this apparent effect of dry conditions early in the season, grain yields at harvest were typical for the area and soil type with a general mean of 7.4 t/ha (at 85% DM).

However, although the soil P index was 0, there was no significant effect of any of the P sources on grain or straw yields. This was not due to variability in the crop over the trial area as the cv% for grain yield was only 3.5%, at which level, relatively small treatment differences would be detected statistically.

There was an apparent effect of P treatment on grain P content but no positive P treatments gave a higher content than did the control treatment. The treatment differences were significant only at the 10%

level and so could have been due to chance. There was no effect of P treatment on straw P content.

There was a significant ($P < 0.05$) interaction between P source and rate of application in terms of grain P yield. P yield increased with rate of P application for Fibrophos but declined with rate of P application for rock phosphate. However, none of the positive P treatments gave a higher P yield than did the control treatment.

There were no significant effects of P treatment on straw P yield or on grain and straw P yield.

Total P offtakes around 22-23 kg P/ha were lower than average for wheat, yielding 7.4 t/ha. Recently published figures from the PDA indicate a removal of 27 kg P/ha for this yield.

Conclusions

Although the site of this trial was apparently P deficient and P removals in the crop were lower than would be expected, there was no consistent response to any of the P sources applied.

The lack of response was not due to excessive experimental error as coefficients of variation were low. It is possible that dry conditions during the season limited crop growth and so masked any P deficiencies, but yields were not unduly low. Most likely the lack of response was due to a number of the unpredictable soil and climatic conditions that affect field trials.

SITE DETAILS

Trial Id No.	971040
Site name	Amesbury
County	Wiltshire
OS map reference	SU 171362

Soil texture *	SCL
Clay (%)	29
Silt (%)	52
Sand (%)	19
pH	7.6
P mg/l (index)	19 (0)
K mg/l (index)	232 (2)
Mg mg/l(index)	27 (1)
Org. matter %	4.65
CaCO ₃ %	0.3

Previous crop:		
	1996	w. wheat
	1995	w. oats
	1994	w. barley
	1993	w. barley

Trial crop:		
	Species	w. wheat
	Variety	Rialto
	Date Planted	1/10/96

* C = clay, S = sand, Z = silt, L = loam, Calc = calcareous

TRIAL DIARY

Site marked out, soil sample taken	27/9/96
Treatment P applied	27/9/96
Uniform N applied	28/2 10/4
Visual inspections	10/4 (GS 30) 27/6 (GS 69)
Harvested	15/8

Trial Id: 971040

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MAIN EFFECTS

	GRAIN YIELD T/HA 15/8/97	STRAW DM YIELD T/HA 15/8/97	GRAIN % P 15/8/97	STRAW % P 15/8/97	GRAIN P YIELD KG/HA 15/8/97	STRAW P YIELD KG/HA 15/8/97	GRAIN+STRAW P YIELD KG/HA 15/8/97
Product							
Fibrofos	7.42	4.52	0.30	0.06	18.88	2.72	21.60
TSP	7.46	4.33	0.30	0.06	19.27	2.63	21.91
Rock phosphate	7.36	4.53	0.30	0.05	18.56	2.46	21.02
LSD (0.05)	0.220	0.279	0.015	0.008	0.911	0.388	1.058
LSD (0.01)	0.297	0.376	0.020	0.010	1.230	0.524	1.428
SIGNIFICANCE	NS	NS	NS	NS	NS	NS	NS
Rates kg P2O5/ha							
50	7.39	4.47	0.29	0.06	18.49	2.57	21.07
100	7.41	4.38	0.31	0.06	19.22	2.64	21.86
150	7.43	4.53	0.30	0.06	19.00	2.60	21.61
LSD (0.05)	0.220	0.279	0.015	0.008	0.911	0.388	1.058
LSD (0.01)	0.297	0.376	0.020	0.010	1.230	0.524	1.428
SIGNIFICANCE	NS	NS	NS	NS	NS	NS	NS
CV%	3.54	7.44	5.76	15.70	5.72	17.81	5.84
GM	7.41	4.47	0.30	0.06	19.01	2.60	21.61
SE PER PLOT	0.263	0.333	0.017	0.009	1.087	0.463	1.263

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INTERACTIONS

Rates kg P2O5/ha	GRAIN YIELD T/HA 15/8/97		
	50	100	150
Product			
Fibrophos	7.39	7.29	7.56
TSP	7.46	7.50	7.41
Rock phosphate	7.33	7.44	7.31
ADDITIONALS Control		7.38	
LSD(0.05)		0.381	
LSD(0.01)		0.514	
INTERACTIONS SIGNIFICANCE		NS	
ADDITIONALS SIGNIFICANCE		NS	

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INTERACTIONS

Rates kg P2O5/ha	STRAW DM YIELD T/HA 15/8/97		
	50	100	150
Product			
Fibrophos	4.35	4.48	4.74
TSP	4.30	4.31	4.37
Rock phosphate	4.77	4.34	4.47
ADDITIONALS Control		4.61	
LSD(0.05)		0.483	
LSD(0.01)		0.652	
INTERACTIONS SIGNIFICANCE		NS	
ADDITIONALS SIGNIFICANCE		NS	

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INTERACTIONS

Rates kg P2O5/ha	GRAIN % P 15/8/97		
	50	100	150
Product			
Fibrophos	0.29	0.30	0.32
TSP	0.29	0.32	0.30
Rock phosphate	0.31	0.30	0.29
ADDITIONALS Control		0.32	
LSD(0.05)		0.025	
LSD(0.01)		0.034	
INTERACTIONS SIGNIFICANCE		+	
ADDITIONALS SIGNIFICANCE		+	

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INTERACTIONS

Rates kg P2O5/ha	STRAW % P 15/8/97		
	50	100	150
Product			
Fibrophos	0.06	0.06	0.06
TSP	0.06	0.06	0.06
Rock phosphate	0.06	0.06	0.05
ADDITIONALS Control		0.06	
LSD(0.05)		0.013	
LSD(0.01)		0.018	
INTERACTIONS SIGNIFICANCE		NS	
ADDITIONALS SIGNIFICANCE		NS	

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INTERACTIONS

Rates kg P2O5/ha	GRAIN P YIELD KG/HA 15/8/97		
	50	100	150
Product			
Fibrophos	17.93	18.47	20.23
TSP	18.54	20.23	19.05
Rock phosphate	19.02	18.94	17.73
ADDITIONALS Control		19.93	
LSD(0.05)		1.578	
LSD(0.01)		2.130	
INTERACTIONS SIGNIFICANCE		*	
ADDITIONALS SIGNIFICANCE		+	

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INTERACTIONS

	STRAW P YIELD KG/HA 15/8/97		
Rates kg P2O5/ha	50	100	150
Product			
Fibrophos	2.49	2.71	2.97
TSP	2.57	2.61	2.71
Rock phosphate	2.65	2.60	2.12
ADDITIONALS Control		2.58	
LSD(0.05)		0.672	
LSD(0.01)		0.908	
INTERACTIONS SIGNIFICANCE		NS	
ADDITIONALS SIGNIFICANCE		NS	

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INTERACTIONS

	GRAIN+STRAW P YIELD KG/HA 15/8/97		
Rates kg P2O5/ha	50	100	150
Product			
Fibrofos	20.42	21.19	23.20
TSP	21.11	22.84	21.76
Rock phosphate	21.66	21.54	19.85
ADDITIONALS Control		22.51	
LSD(0.05)		1.832	
LSD(0.01)		2.473	
INTERACTIONS SIGNIFICANCE		**	
ADDITIONALS SIGNIFICANCE		NS	