



Concentrated PK Fertilisers

TRIAL REPORT 6

Magnesium & Sodium

Carried out By:	LA Project 98717
Levington Agriculture Ltd Levington Park Ipswich Suffolk IP10 0LU	Trial work commenced: 04.03.1998 Lab work completed: 28.07.1998
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ABBREVIATIONS

cm	centimetre
CV%	Co-efficient of Variation
g	gram
GM	General Mean
KCl	Potassium Chloride
l	litre
LA	Levington Agriculture Ltd
LSD	Least Significant Difference
Mg	Magnesium
mg	milligram
ml	millilitre
mm	millimetre
Na	Sodium
NS	Not Significant
SE	Standard Error
TSP	Triple Superphosphate
+	(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

OBJECTIVE

To test two rates of Fibrophos Traditional against inorganic fertilizer and untreated control for Na and Mg uptake by grass.

TREATMENTS

	<u>Treatment</u>	<u>Rate</u>
1.	Fibrophos Traditional	0.83g/pot
2.	Fibrophos Traditional	1.67g/pot
3.	TSP / KCl	0.2g P ₂ O ₅ /pot, 0.12g K ₂ O/pot
4.	TSP / KCl	0.4g P ₂ O ₅ /pot, 0.23g K ₂ O/pot
5.	Untreated control	

The Fibrophos Traditional had a nominal analysis of 0-24-14. Analysis of the material indicated total values of 23.4% P₂O₅, 16.1% K₂O, 5.6% Mg and 2.9% Na₂O.

METHODS

The pot trial was conducted by Levington Agriculture in glasshouses with heating and lighting as required. Each treatment was replicated four times in the trial which was of a randomised block design and statistically analysed accordingly. For trial diary see Table 1 and for soil details, Table 2.

5" pots were filled with soil which had been mixed with uniform nitrogen fertilizer, treatment fertilizers and ryegrass cv Port Stewart sown. The TSP and KCl were added at rates equal to the phosphate and potash contents of the Fibrophos Traditional treatments (using the nominal analysis). The grass was cut three times. A top dressing of ammonium nitrate was applied to the grass after the second cut. At each cut, the total grass dry weight, Na and Mg contents and uptakes were calculated.

Table 1 Trial Diary

4.3.98	Treatment fertilizers mixed with soil, seed sown placed in glasshouse.
8.4.98	Cut 1
22.4.98	Cut 2
27.4.98	Top dressing applied
9.5.98	Cut 3

Table 2 Soil details

Soil No.:	PT 184	
pH	6.1	
P mg/l (index)	75 (3)	resin method
K mg/l (index)	125 (2)	
Mg mg/l (index)	20 (0)	very low
Na mg/l	21	benefits possible
Organic matter %	2.1	
Calcium carbonate %	0.2	
Clay %	14	
Silt %	40	
Sand %	46	
Texture	Sandy silt loam	

RESULTS

The grass dry matter increased above that in the untreated controls from the Fibrophos Traditional and TSP/KCl treatments with rate responses being evident. As the increases in yield were similar for the nutrient sources at each rate of phosphate and potash added, they are likely to be in response to these nutrients.

The sodium content of the grass was significantly decreased by the addition of TSP/KCl, especially at the higher rate. However, the addition of Fibrophos Traditional increased the sodium content of the grass at the second cut at the lower rate, and at the third cut both rates increased the content of this nutrient in the grass. Sodium deficiency with regards to animal diet occurs below 0.15% Na in the grass and Fibrophos Traditional maintained the sodium content well above this level compared with TSP/KCl which resulted in a level of 0.20% Na at the third cut. The total uptake in the grass of sodium was significantly greater when Fibrophos Traditional was used.

The magnesium content of the grass was marginally deficient in the control and Fibrophos Traditional treated grass at the first cut whereas where TSP/KCl was applied the deficiency was significant. At the second and third cuts, although the grass fed with Fibrophos Traditional had lower Mg contents than control, the levels were adequate, whereas for the TSP/KCl, especially at the higher rate of addition, the Mg content remained low. The overall uptake of magnesium by the grass in this deficient soil was greatest where Fibrophos Traditional was applied, with TSP/KCl resulting in significantly lower uptake.

These effects demonstrated are important for grazing animals where sodium and magnesium are important constituents of their diets. Fibrophos Traditional did not show the antagonism found with KCl against sodium and magnesium, and the sodium and magnesium content of Fibrofos Traditional was shown to be effectively taken up by the grass.

Trial Id: 987170 Grass pot trial
 Client & Client Ref: J Hatcher & Co Ltd

MAIN EFFECTS

	CUT-1 TOTAL DRY WEIGHT (G) 8/4/98	CUT-2 TOTAL DRY WEIGHT (G) 22/4/98	CUT-3 TOTAL DRY WEIGHT (G) 9/5/98	CUTS 1-2 TOTAL DRY WEIGHT (G)	CUTS 1-3 TOTAL DRY WEIGHT (G)
Treatments Rate g/pot					
Fibrophos 0.83	1.42 ab	1.82 b	2.70 bc	3.25 bc	5.95 bc
Fibrophos 1.67	1.49 b	1.83 b	2.90 c	3.32 bc	6.22 c
TSP/KCL 0.2g P2O5/0.12g K2O	1.22 ab	1.82 b	2.58 b	3.04 ab	5.62 b
TSP/KCL 0.4g P2O5/0.23g K2O	1.46 ab	2.00 c	2.77 bc	3.45 c	6.22 c
Untreated -	1.17 a	1.59 a	1.60 a	2.76 a	4.37 a
LSD (0.05)	0.267	0.121	0.229	0.297	0.394
LSD (0.01)	0.374	0.170	0.322	0.416	0.552
SIGNIFICANCE	+	**	**	**	**
CV%	12.79	4.35	5.93	6.10	4.51
GM	1.35	1.81	2.51	3.16	5.67
SE PER PLOT	0.173	0.079	0.149	0.193	0.256

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MAIN EFFECTS

	CUT-1 % Na 8/4/98	CUT-2 % Na 22/4/98	CUT-3 % Na 9/5/98	GRASS % Mg 8/4/98	CUT-2 % Mg 22/4/98	CUT-3 % Mg 9/5/98
Treatments Rate g/pot						
Fibrophos 0.83	0.40 b	0.52 d	0.30 b	0.18 b	0.20 bc	0.25 b
Fibrophos 1.67	0.40 b	0.44 c	0.44 c	0.19 b	0.20 bc	0.24 b
TSP/KCL 0.2g P2O5/0.12g K2O	0.26 a	0.30 b	0.22 a	0.16 a	0.17 b	0.19 a
TSP/KCL 0.4g P2O5/0.23g K2O	0.25 a	0.21 a	0.20 a	0.15 a	0.14 a	0.18 a
Untreated -	0.43 b	0.44 c	0.24 a	0.18 b	0.22 c	0.28 c
LSD (0.05)	0.085	0.047	0.041	0.017	0.029	0.015
LSD (0.01)	0.119	0.066	0.057	0.024	0.040	0.021
SIGNIFICANCE	**	**	**	**	**	**
CV%	15.74	7.97	9.54	6.50	10.06	4.22
GM	0.35	0.38	0.28	0.17	0.18	0.23
SE PER PLOT	0.055	0.031	0.027	0.011	0.019	0.010

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MAIN EFFECTS

	CUT-1 Na UPTAKE MG/POT 8/4/98	CUT-2 GRASS Na UPTAKE MG/POT 22/4/98	CUT-3 Na UPTAKE MG/POT 9/5/98	CUTS 1-2 Na UPTAKE MG/POT	CUTS 1-3 Na UPTAKE MG/POT	CUT-1 Mg UPTAKE MG/POT 8/4/98	CUT-2 Mg UPTAKE MG/POT 22/4/98	CUT-3 Mg UPTAKE MG/POT 9/5/98	CUTS 1-2 Mg UPTAKE MG/POT	CUTS 1-3 Mg UPTAKE MG/POT 9/5/98
Treatments Rate g/pot										
Fibrophos 0.83	5.82 b	9.48 d	8.01 c	15.30 c	23.32 c	2.54 ab	3.57 b	6.62 c	6.12 bc	12.73 b
Fibrophos 1.67	6.05 b	8.10 c	12.75 d	14.14 bc	26.89 d	2.86 b	3.61 b	6.88 c	6.46 c	13.34 b
TSP/KCL 0.2g P205/0.12g K20	3.18 a	5.50 b	5.59 b	8.67 a	14.26 ab	1.96 a	3.13 ab	4.88 ab	5.09 a	9.98 a
TSP/KCL 0.4g P205/0.23g K20	3.72 a	4.09 a	5.58 b	7.82 a	13.40 a	2.14 a	2.80 a	4.98 b	4.93 a	9.91 a
Untreated -	4.98 ab	7.00 c	3.76 a	11.98 b	15.74 b	2.13 a	3.42 b	4.45 a	5.55 ab	10.00 a
LSD (0.05)	1.881	1.118	1.077	2.192	1.885	0.550	0.561	0.450	0.827	1.155
LSD (0.01)	2.637	1.567	1.510	3.073	2.643	0.771	0.786	0.631	1.160	1.619
SIGNIFICANCE	*	**	**	**	**	*	*	**	**	**
CV%	25.70	10.62	9.79	12.28	6.54	15.35	11.01	5.25	9.53	6.70
GM	4.75	6.83	7.14	11.58	18.72	2.33	3.31	5.56	5.63	11.19
SE PER PLOT	1.221	0.726	0.699	1.423	1.224	0.357	0.364	0.292	0.537	0.750