fibrophos®
Concentrated PK Fertilisers

TRIAL REPORT 2

Fibrophos for Grassland

Carried out By:	LA Project 201
Levington Agriculture Ltd Levington Park Ipswich Suffolk IP10 0LU	Trial work commenced: 24.03.1993 Trial work completed: 15.08.1993 Lab work completed: 15.09.1993 H V Peake

A British Fertiliser for Britain's Farmers

www.fibrophos.co.uk

C O N T E N T S

Abbreviations

CV%	Co-efficient of Variation
DM	dry matter
GM	General Mean
K	potassium
kg/ha	kilograms per hectare
LA	Levington Agriculture Ltd
LSD	Least Significant Difference
N	nitrogen
NS	not significant
P	phosphorus
P=0.05	0.05 probability level
SE	Standard Error
+	significant at 0.10 probability level
*	significant at 0.05 probability level
**	significant at 0.01 probability level

ASHED POULTRY MANURE AS A PHOSPHATE SOURCE FOR GRASSLAND - YEAR 2

OBJECTIVE

To evaluate the residual effect of ashed poultry manure (APM) applied in autumn 1991 on grass yield in 1993.

SUMMARY

APM, TSP AND Gafsa were compared against a control as phosphate sources for grassland in replicated field trials (randomised block design x 4 reps) at two sites. Treatments were applied in autumn 1991 and yields measured in 1992 (see LA Report No. 227) and 1993.

1993 Results

There was a small DM yield response to phosphate at both sites from all three sources, but this was not statistically significant. As in 1992, there were significant effects on grass P yield and P content but no clear difference between sources. Treatments had no effect on grass N content in yield.

Overall Results 1992 and 1993

The combined results for both sites over the two years tend to support earlier trials which showed that APM was an effective phosphate source for grassland - superior to Gafsa but slightly less effective than TSP.

BACKGROUND

The original trials were set up in autumn 1991 to evaluate APM as a phosphate source for grass. Results for the first year were reported in LA Report No. 227. The trial was then continued for a 2nd year (1993) to assess the residual effects of the treatments applied in autumn 1991. The results for 1993 are given in this report together with a summary of the overall results for the two years.

TREATMENTS (Applied Autumn 1991)

	P_2O_5 Rate
Control	0
TSP	75
TSP	150
TSP	225
Gafsa	75
Gafsa	150
Gafsa	225
APM	75
APM	150
APM	225

These treatments were replicated 4 times in a randomised block design.

Analysis of the APM was:

Total	P	10.92%	=	25.0% P_2O_5
	K	9.61%	=	11.6% K_2O
	Mg	2.9%		
	Ca	18.60		
	Na	1.84		
	S	1.04		

SITE DETAILS

Trial Id:		2010	2011
Site Name:		Poundsgate	Cross Ash
County:		Devon	Gwent
OS Map Ref:		SX 678 748	SO 415 187
Soil:			
Texture:		Sandy Loam	Clay Loam
P Index:		1	1
K Index:		1	0
Mg Index:		2	4
pH		5.9	7.1
Organic Matter	%	8.8	1.9
Clay	%	12	23
Silt	%	31	52
Sand	%	57	25
Cropping:			
1993		Permanent Grass	Grass
1992		Permanent Grass	Grass
1991		Permanent Grass	Grass
1990		Permanent Grass	Barley Turnips

TRIAL DIARY - 1993

Trial Id:	2010	2011
Site Name:	Poundsgate	Cross Ash
Spring NK Applied	24.3.93	21.4.93
First Cut	23.6.93	22.6.93
NK for 2nd Cut	23.6.93	Field ploughed up for arable cropping
Second Cut	13.8.93	

METHODS

The trial was carried out as detailed in the attached Project Plan. No treatment materials were applied for the 1993 crop but uniform dressings of N and K fertilizer were applied before each cut. At Poundsgate, it was possible to extend the trial by taking a second cut. At Cross Ash (2011) no second cut was taken because the farmer ploughed up the field after the first cut.

RESULTS FOR 1993 (See Tables 1-5 for Details)

The results showed a slight dry matter (DM) yield response to phosphate from all three sources at both sites, but this was not statistically significant. There were no significant effects of the treatments on N content or N yield of grass at either site.

However, as was the case in the first year, there were significant effects on grass P content and P yield.

At Poundsgate (2010) both TSP and APM significantly increased P yield over the two cuts at all three application rates. Gafsa gave significant increases at the two higher rates of application (150 and 225 kg/ha of P_2O_5) but not at the lower rate (75 kg/ha). This suggests that the phosphate in the Gafsa, which was not effective in the first year, was beginning to be released in the second year. Results for the three sources, averaged over all positive phosphate rates, were:

	Id 2010 Average P Yield (kg/ha)
Control	22.2
TSP	25.5
Gafsa	25.4
APM	26.7

At Cross Ash (Id 2011) all three sources increased P uptake slightly but the only treatment to give a statistically significant effect was the highest rate of Gafsa.

OVERALL RESULTS 1992 AND 1993

Tables 6 and 7 show the results in terms of DM yield and P yield for both sites over the two years.

The results, averaged over all P_2O_5 rates can be summarised as follows:

Average Results for 2 Sites Over 2 Years and All P_2O_5 Rates

	DM t/ha	P Yield kg/ha
Control	8.83	23.4
TSP	9.34	27.4
Gafsa	9.19	25.3
APM	9.26	26.7

Although the DM yield responses were not statistically significant, the results tend to support previous pot trial results which showed that APM was an effective phosphate source - slightly inferior to TSP but superior to Gafsa. The data on P uptake shows the same trend.

PROJECT: 201

SUPERVISOR/TRIAL ID: CJC/2010 POUNDSGATE
PROGRAM: EAPRINT. DATE: 06-Sep-93

MAIN EFFECTS

	CUT-1 DM YIELD T/HA 23/6/93	CUT-2 DM YIELD T/HA 13/8/93	TOTAL DM YIELD CUT-1+2 T/HA
PHOSPHATE SOURCE AND RATE (KG/HA)			
NIL 0	5.55	2.78	8.32
TSP 75	6.30	2.79	9.09
TSP 150	5.97	2.98	8.95
TSP 225	5.68	2.71	8.39
GAFSA 75	6.22	2.73	8.95
GAFSA 150	5.77	2.80	8.57
GAFSA 225	6.08	2.83	8.91
APM 75	5.89	2.88	8.77
APM 150	6.24	2.90	9.14
APM 225	5.90	2.97	8.87
LSD (0.05)	0.752	0.243	0.749
LSD (0.01)	1.016	0.328	1.012
	NS	NS	NS
CV%	8.70	5.91	5.87
GM	5.96	2.84	8.80
SE PER PLOT	0.518	0.168	0.517

TABLE 1

PROJECT: 201

SUPERVISOR/TRIAL ID: CJC/2011 CROSS ASH
PROGRAM: EAPRINT. DATE: 06-Sep-93

MAIN EFFECTS

	DM YIELD T/HA 22/6/93
PHOSPHATE SOURCE AND RATE (KG/HA)	
NIL 0	6.19
TSP 75	6.27
TSP 150	6.45
TSP 225	6.43
GAFSA 75	6.31
GAFSA 150	6.25
GAFSA 225	6.36
APM 75	6.25
APM 150	6.30
APM 225	6.43
LSD (0.05)	0.561
LSD (0.01)	0.758
	NS
CV%	6.11
GM	6.33
SE PER PLOT	0.387

TABLE 2

PROJECT: 201

SUPERVISOR/TRIAL ID: CJC/2010 POUNDSGATE

MAIN EFFECTS

PHOSPHATE SOURCE AND RATE (KG/HA)	GRASS % N CUT-1 23/6/93	GRASS N YIELD KG/HA CUT-1 23/6/93	GRASS % N CUT-2 13/8/93	GRASS N YIELD KG/HA CUT-2 13/8/93	CUM N-YIELD CUT-1+CUT-2 KG/HA
NIL 0	1.43	78.55	3.01	83.36	161.9
TSP 75	1.34	84.32	3.14	87.27	171.6
TSP 150	1.35	80.35	2.88	85.38	165.7
TSP 225	1.41	79.87	2.97	80.27	160.1
GAFSA 75	1.31	81.57	3.06	83.36	164.9
GAFSA 150	1.46	83.93	3.01	84.09	168.0
GAFSA 225	1.35	82.16	2.96	83.87	166.0
APM 75	1.43	83.26	2.97	85.28	168.5
APM 150	1.45	90.16	2.88	83.10	173.3
APM 225	1.53	89.81	2.95	87.53	177.3
LSD (0.05)	0.189	9.949	0.188	7.935	12.97
LSD (0.01)	0.255	13.434	0.254	10.715	17.52
	NS	NS	NS	NS	NS
CV%	9.26	8.22	4.36	6.48	5.3
GM	1.41	83.40	2.98	84.35	167.8
SE PER PLOT	0.130	6.857	0.130	5.469	8.94

TABLE 3

PROJECT: 201

SUPERVISOR/TRIAL ID: CJC/2010 POUNDSGATE

MAIN EFFECTS

PHOSPHATE SOURCE AND RATE (KG/HA)		GRASS % P CUT-1 23/6/93	GRASS P YIELD KG/HA CUT-1 23/6/93	GRASS % P CUT-2 13/8/93	GRASS P YIELD KG/HA CUT-2 13/8/93	CUM P-YIELD CUT-1+CUT-2 KG/HA
NIL	0	0.24	12.92	0.34	9.32	22.24
TSP	75	0.24	15.14	0.37	10.30	25.43
TSP	150	0.25	14.91	0.37	10.89	25.80
TSP	225	0.26	14.78	0.39	10.49	25.27
GAFSA	75	0.23	14.28	0.36	9.78	24.06
GAFSA	150	0.25	14.44	0.36	10.13	24.57
GAFSA	225	0.27	16.28	0.39	10.97	27.25
APM	75	0.25	14.49	0.35	10.15	24.64
APM	150	0.27	16.98	0.39	11.14	28.12
APM	225	0.28	16.34	0.37	11.08	27.42
LSD (0.05)		0.023	1.756	0.035	1.293	2.290
LSD (0.01)		0.031	2.371	0.047	1.745	3.093
		**	**	+	NS	**
CV%		6.21	8.04	6.50	8.55	6.20
GM		0.25	15.06	0.37	10.42	25.48
SE PER PLOT		0.016	1.210	0.024	0.891	1.579

TABLE 4

PROJECT: 201

SUPERVISOR/TRIAL ID: CJC/2011 CROSS ASH

MAIN EFFECTS

	GRASS % N CUT-1 22/6/93	GRASS N YIELD KG/HA CUT-1 22/6/93	GRASS % P CUT-1 22/6/93	GRASS P YIELD KG/HA CUT-1 22/6/93
PHOSPHATE SOURCE AND RATE (KG/HA)				
NIL 0	1.39	85.70	0.22	13.27
TSP 75	1.43	89.41	0.22	13.46
TSP 150	1.33	84.78	0.22	14.14
TSP 225	1.39	89.15	0.23	14.60
GAFSA 75	1.33	83.34	0.22	13.98
GAFSA 150	1.23	76.40	0.21	13.09
GAFSA 225	1.40	89.19	0.25	15.99
APM 75	1.35	84.48	0.20	12.70
APM 150	1.34	84.17	0.22	13.83
APM 225	1.43	91.29	0.23	14.35
LSD (0.05)	0.231	14.087	0.034	1.633
LSD (0.01)	0.311	19.022	0.046	2.205
	NS	NS	NS	*
CV%	11.70	11.32	10.54	8.07
GM	1.36	85.79	0.22	13.94
SE PER PLOT	0.159	9.709	0.023	1.125

TABLE 5

Project 201
Total DM Yield t/ha

Treatment		Trial Id.	1992 2010	1992 2011	1993 2010	1993 2011	Mean
PHOSPHATE SOURCE AND RATE (KG/HA)							
1	NIL	0	8.86	11.95	8.32	6.19	8.83
2	TSP	75	9.84	11.86	9.09	6.27	9.26
3	TSP	150	10.05	12.41	8.95	6.45	9.47
4	TSP	225	9.54	12.77	8.39	6.43	9.28
5	GAFSA	75	9.03	12.31	8.95	6.31	9.15
6	GAFSA	150	9.32	12.21	8.57	6.25	9.09
7	GAFSA	225	9.64	12.45	8.91	6.36	9.34
8	APM	75	9.48	12.01	8.77	6.25	9.13
9	APM	150	10.26	12.52	9.14	6.30	9.55
10	APM	225	9.35	12.44	8.87	6.43	9.27
Mean			9.54	12.29	8.80	6.33	9.24
Significance			NS	NS	NS	NS	
LSD(0.05)			1.07	0.92	0.75	0.56	
LSD(0.01)			1.45	1.24	1.01	0.76	
CV%			7.8	5.2	5.9	6.1	
SE/Plot			0.74	0.63	0.52	0.39	
Interactions F test							NS
Treatments F test							NS
	LSD(0.05)						0.41
	LSD(0.01)						0.54
Trials	F test						**
	LSD(0.05)						0.26
	LSD(0.01)						0.34

Trial ID.:
2010 TOTAL DM YIELD CUT 1+2 1992
2011 TOTAL DM YIELD CUT 1+2 1992
2010 TOTAL DM YIELD CUT 1+2 1993
2011 DM YIELD CUT 1 1993

TABLE 6

Project 201
Total P Yield kg/ha

Treatment		Trial Id.	1992 2010	1992 2011	1993 2010	1993 2011	Mean
PHOSPHATE SOURCE AND RATE (KG/HA)							
1	NIL	0	26.68	31.31	22.24	13.27	23.38
2	TSP	75	31.00	34.50	25.43	13.46	26.10
3	TSP	150	33.22	38.53	25.80	14.14	27.92
4	TSP	225	34.49	38.30	25.27	14.60	28.16
5	GAFSA	75	26.14	32.79	24.06	13.98	24.24
6	GAFSA	150	26.22	34.26	24.57	13.09	24.53
7	GAFSA	225	30.64	34.40	27.25	15.99	27.07
8	APM	75	28.74	33.45	24.64	12.70	24.88
9	APM	150	34.08	34.56	28.12	13.83	27.65
10	APM	225	31.24	36.45	27.42	14.35	27.36
Mean			30.25	34.85	25.48	13.94	26.13
Significance			**	**	**	*	
LSD(0.05)			4.40	2.42	2.29	1.63	
LSD(0.01)			5.94	3.27	3.09	2.20	
CV%			10.0	4.8	6.2	8.1	
SE/Plot			3.03	1.67	1.58	1.13	
Interactions F test							**
Treatments F test							**
	LSD(0.05)						2.26
	LSD(0.01)						3.06
Trials	F test						**
	LSD(0.05)						1.43
	LSD(0.01)						1.93

Trial ID.:
2010 TOTAL P YIELD CUT 1+2 1992
2011 TOTAL P YIELD CUT 1+2 1992
2010 TOTAL P YIELD CUT 1+2 1993
2011 TOTAL P YIELD CUT 1 1993

TABLE 7