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Yields of the Field Experiments 1989

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89/R/PG/5 Park Grass - Old Grass

Rothamsted Research

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89/R/PG/5

PARK GRASS

Object: To study the effects of organic and inorganic manures and lime on old grass (for hay).

The 134th year, hay.

For previous years see 'Details' 1967 and 1973 and 74-88/R/PG/5.

Treatments: Combinations of:-

Whole plots

1. **MANURE** Fertilizers and organic manures:

N1	Plot 1	N1
O(D)	Plot 2	None (D until 1863)
O/PLOT3	Plot 3	None
P	Plot 4-1	P
N2P	Plot 4-2	N2 P
N1MIN	Plot 6	N1 P K Na Mg
MIN	Plot 7	P K Na Mg
PNAMG	Plot 8	P Na Mg
N2MIN	Plot 9	N2 P K Na Mg
N2PNAMG	Plot 10	N2 P Na Mg
N3MIN	Plot 11-1	N3 P K Na Mg
N3MINSI	Plot 11-2	N3 P K Na Mg Si
O/PLOT12	Plot 12	None
D/F	Plot 13	D/F
N2*MIN	Plot 14	N2* P K Na Mg
MIN(N2*)	Plot 15	P K Na Mg (N2* until 1875)
N1*MIN	Plot 16	N1* P K Na Mg
N1*	Plot 17	N1*
N2KNAMG	Plot 18	N2 K Na Mg
D	Plot 19	D
D/N*PK	Plot 20	D/N*P K

N1, N2, N3:	48, 96, 144 kg N as sulphate of ammonia
N1*, N2*:	48, 96 kg N as nitrate of soda (30 kg N to Plot 20, only in years with no farmyard manure)
P:	35 kg P (15 kg P to Plot 20, only in years with no farmyard manure) as single superphosphate until 1986, triple superphosphate in 1974, and since 1987
K:	225 kg K (45 kg K to Plot 20, only in years with no farmyard manure) as sulphate of potash
Na:	15 kg Na as sulphate of soda
Mg:	10 kg Mg as sulphate of magnesia
Si:	Silicate of soda at 450 kg
D:	Farmyard manure at 35 tonnes every fourth year
F:	Fish meal every fourth year to supply 63 kg N
MIN:	P K Na Mg

89/R/PG/5

Sub plots

2. **LIME** Liming:

A	a	Ground chalk applied as necessary to achieve pH7
B	b	Ground chalk applied as necessary to achieve pH6
C	c	Ground chalk applied as necessary to achieve pH5
D	d	None

NOTE: Lime was applied regularly, and at the same rate, to all a and b sub plots of Plots 1 to 17 (except 12) from 1924. Differential liming started in 1965 on certain b and c sub plots (except on Plot 12) and in 1976 on certain a sub plots (including Plot 12) and 12b.

Additional sub plots (Plots 18, 19 and 20 only) (tonnes CaCO₃ applied every fourth year 1920-1964):

N2KNAMG0	18-1	None
N2KNAMG2	18-2	13.5
N2KNAMG1	18-3	7.9
DO	19-1	None
D2	19-2	6.3
D1	19-3	1.1
D/N*PK0	20-1	None
D/N*PK2	20-2	5.6
D/N*PK1	20-3	1.1

Since 1965 Plot 18-1 has been split into two for treatments 'c' and 'd' above and Plot 18-3 split into two for treatments 'a' and 'b'. The remaining sub plots of Plots 18, 19 and 20 are treated as 'a'.

NOTE: For a fuller record of treatments see 'Details' etc.

Cultivations, etc.:- K, Na, Mg and Si applied: 7 Dec, 1988. P applied: 8 Dec. FYM applied: 14 Dec. N applied: 4 May, 1989. Cut: 12 June, 26 Sept.

89/R/PG/5

1ST CUT (12/6/89) DRY MATTER TONNES/HECTARE

***** Tables of means *****

LIME MANURE	A	B	C	D	MEAN
N1	1.65	1.13	0.56	0.36	0.92
O(D)	1.79	2.06	0.83	0.65	1.33
O/PLOT3	1.52	1.86	0.43	0.60	1.10
P	2.54	2.76	1.44	1.64	2.10
N2P	1.22	1.24	1.24	0.85	1.14
N1MIN	3.76	3.83			3.80
MIN	4.38	4.51	3.45	3.15	3.87
PNAMG	1.94	2.25	1.79	2.01	2.00
N2MIN	3.49	3.81	2.25	1.51	2.77
N2PNAMG	1.74	1.64	1.26	0.87	1.38
N3MIN	3.76	3.28	2.53	2.45	3.01
N3MINSI	4.13	3.80	3.33	1.97	3.31
O/PLOT12	1.16	1.08	0.55	0.75	0.89
D/F	4.60	4.36	3.89	3.45	4.08
N2*MIN	4.72	5.08	4.41	4.34	4.64
MIN(N2*)	3.52	3.38	2.61	2.50	3.00
N1*MIN	4.56	4.59	2.83	3.16	3.79
N1*	2.51	2.64	1.85	1.69	2.17
N2KNAMG0	0.24	0.24	0.24		
N2KNAMG2	1.59				1.59
N2KNAMG1	1.62	1.24			1.43
D0	4.14				4.14
D2	4.87				4.87
D1	4.54				4.54
D/N*PK0	4.64				4.64
D/N*PK2	5.10				5.10
D/N*PK1	4.41				4.41

1ST CUT MEAN DM% 28.4

89/R/PG/5

2ND CUT (26/9/89) DRY MATTER TONNES/HECTARE

***** Tables of means *****

LIME	A	B	C	D	MEAN
MANURE					
N1	1.28	0.60	0.17	0.08	0.53
O(D)	0.50	0.75	0.21	0.25	0.43
O/PLOT3	0.30	0.58	0.14	0.13	0.29
P	0.51	0.73	0.42	0.23	0.47
N2P	0.88	1.02	0.67	0.66	0.81
N1MIN	0.68	0.98			0.83
MIN	1.29	1.32	1.18	0.76	1.14
PNAMG	0.54	0.61	0.69	0.56	0.60
N2MIN	0.91	1.10	1.16	1.06	1.06
N2PNAMG	0.78	0.87	0.72	0.63	0.75
N3MIN	1.54	1.14	1.51	1.35	1.38
N3MINSI	1.61	1.55	1.43	1.73	1.58
O/PLOT12	0.52	0.49	0.55	0.48	0.51
D/F	1.67	1.50	1.04	0.94	1.29
N2*MIN	1.19	1.34	0.88	0.94	1.09
MIN(N2*)	1.10	0.75	0.69	0.55	0.77
N1*MIN	1.17	1.27	0.40	0.40	0.81
N1*	0.48	0.43	0.49	0.86	0.56
N2KNAMG0	0.10	0.09	0.09		
N2KNAMG2	1.00				1.00
N2KNAMG1	0.63	0.76			0.69
D0	0.80				0.80
D2	1.34				1.34
D1	1.02				1.02
D/N*PK0	1.05				1.05
D/N*PK2	1.24				1.24
D/N*PK1	1.23				1.23

2ND CUT MEAN DM% 43.9

89/R/PG/5

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

***** Tables of means *****

LIME MANURE	A	B	C	D	MEAN
N1	2.92	1.73	0.73	0.44	1.45
O(D)	2.29	2.81	1.04	0.90	1.76
O/PLOT3	1.82	2.44	0.57	0.72	1.39
P	3.05	3.49	1.87	1.87	2.57
N2P	2.11	2.26	1.90	1.51	1.94
N1MIN	4.45	4.81			4.63
MIN	5.67	5.83	4.64	3.91	5.01
PNAMG	2.49	2.86	2.48	2.57	2.60
N2MIN	4.40	4.91	3.41	2.57	3.82
N2PNAMG	2.52	2.51	1.98	1.50	2.13
N3MIN	5.31	4.41	4.04	3.80	4.39
N3MINSI	5.74	5.35	4.75	3.70	4.89
O/PLOT12	1.68	1.57	1.11	1.23	1.40
D/F	6.28	5.86	4.93	4.39	5.37
N2*MIN	5.91	6.42	5.29	5.28	5.73
MIN(N2*)	4.62	4.12	3.30	3.05	3.78
N1*MIN	5.73	5.86	3.23	3.56	4.59
N1*	2.98	3.07	2.34	2.55	2.74
N2KNAMG0	0.34	0.33	0.33		
N2KNAMG2					2.58
N2KNAMG1	2.25	2.00			2.12
D0					4.94
D2					6.21
D1					5.56
D/N*PK0					5.69
D/N*PK2					6.34
D/N*PK1					5.64

TOTAL OF 2 CUTS MEAN DM% 36.1

PLOT AREA HARVESTED 0.00002