

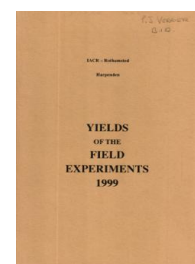
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99/R/PG/5 Park Grass - Hay

Rothamsted Research

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99/R/PG/5

PARK GRASS

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

The 144th year, hay.

For previous years see 'Details' 1977 and 1973 and 74-98/R/PG/5.

Treatments: Combinations of:-

Whole plots

1. MANURE

Fertilizers and organic manures:

N1	Plot 1	N1
K	Plot 2/1	K since 1996 (as 2/2 before)
O(D)	Plot 2/2	None (D until 1863)
O	Plot 3	None
P	Plot 4/1	P
N2P	Plot 4/2	N2 P
N1MN	Plot 6	N1 P K Na Mg
MN	Plot 7	P K Na Mg
PNAMG	Plot 8	P Na Mg
MN(N2)	Plot 9/1	P K Na Mg (N2 until 1989)
N2MN	Plot 9/2	N2 P K Na Mg
N2PNAMG	Plot 10	N2 P Na Mg
N3MN	Plot 11/1	N3 P K Na Mg
N3MNSI	Plot 11/2	N3 P K Na Mg Si
O	Plot 12	None
(D/F)	Plot 13/1	None (D/F until 1994)
D/F	Plot 13/2	D/F
MN(N2*)	Plot 14/1	P K Na Mg (N2* until 1989)
N2*MN	Plot 14/2	N2* P K Na Mg
MN(N2*)	Plot 15	P K Na Mg (N2* until 1875)
N1*MN	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 triple superphosphate in 1974 and since 1987, single superphosphate in other years
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 t every fourth year
F:	Fishmeal every fourth year to supply 63 kg N
MN:	P K Na Mg as above

99/R/PG/5

2ND CUT (14/10/99) DRY MATTER TONNES/HECTARE

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

	LIME	A	B	C	D	MEAN
	MANURE					
N1	1	1.73	1.81	1.28	0.10	1.23
K	2/1	1.82	2.03	1.57	1.17	1.65
O(D)	2/2	1.67	2.04	1.42	1.34	1.62
O	3	1.65	1.55	1.40	1.57	1.54
P	4/1	1.43	1.47	1.73	1.61	1.56
N2P	4/2	1.16	1.27	0.99	0.34	0.94
N1MN	6	2.67	2.31			2.49
MN	7	2.37	2.86	2.73	1.70	2.41
PNAMG	8	1.43	1.69	1.74	1.46	1.58
MN(N2)	9/1	2.00	2.21	1.37	0.42	1.50
N2MN	9/2	2.19	2.56	2.01	1.33	2.02
N2PNAMG	10	2.00	2.23	2.12	0.94	1.82
N3MN	11/1	2.44	2.66	2.42	2.28	2.45
N3MNSI	11/2	2.61	2.64	2.16	2.51	2.48
O	12	1.31	1.17	1.40	1.25	1.28
(D/F)	13/1	1.62	1.99	1.79	1.66	1.76
D/F	13/2	1.84	2.41	2.56	2.21	2.25
MN(N2*)	14/1	2.30	2.36	2.30	2.11	2.27
N2*MN	14/2	1.79	1.77	1.43	1.45	1.61
MN(N2*)	15	2.75	2.41	2.04	1.06	2.07
N1*MN	16	2.46	2.11	1.99	1.63	2.05
N1*	17	1.87	1.96	1.54	1.36	1.68
N2KNAMG0	18/1			1.29	0.10	0.69
N2KNAMG2	18/2					1.87
N2KNAMG1	18/3	1.67	1.80			1.73
D0	19/1					2.57
D2	19/2					2.24
D1	19/3					2.27
D/N*PK0	20/1					2.33
D/N*PK2	20/2					3.00
D/N*PK1	20/3					2.26

2ND CUT MEAN DM% 26.3

99/R/PG/5

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

	LIME	A	B	C	D	MEAN
	MANURE					
N1	1	5.42	5.28	3.71	1.48	3.97
K	2/1	5.27	6.07	3.43	3.23	4.50
O(D)	2/2	4.79	5.50	3.03	2.91	4.06
O	3	4.65	4.71	3.15	3.51	4.01
P	4/1	4.65	5.21	4.85	4.73	4.86
N2P	4/2	3.49	4.09	3.82	2.85	3.57
N1MN	6	8.76	8.28			8.52
MN	7	8.30	8.45	9.09	5.96	7.95
PNAMG	8	4.30	5.29	4.68	4.72	4.75
MN(N2)	9/1	6.94	8.00	6.33	3.69	6.24
N2MN	9/2	8.33	7.94	8.43	6.74	7.86
N2PNAMG	10	5.57	5.98	6.48	4.79	5.70
N3MN	11/1	8.06	8.66	7.80	7.29	7.95
N3MNSI	11/2	8.24	8.24	6.72	8.17	7.84
O	12	4.00	3.61	3.89	3.65	3.79
(D/F)	13/1	4.67	6.28	6.02	6.23	5.80
D/F	13/2	6.30	7.70	7.65	7.28	7.23
MN(N2*)	14/1	7.26	7.00	7.34	6.95	7.14
N2*MN	14/2	7.35	6.33	5.45	5.08	6.05
MN(N2*)	15	8.59	7.93	7.23	4.36	7.03
N1*MN	16	8.43	7.24	6.84	5.94	7.11
N1*	17	5.58	5.74	4.47	4.54	5.08
N2KNAMG0	18/1			6.73	1.43	4.08
N2KNAMG2	18/2					6.38
N2KNAMG1	18/3	5.00	6.16			5.58
D0	19/1					8.02
D2	19/2					7.53
D1	19/3					7.31
D/N*PK0	20/1					7.72
D/N*PK2	20/2					8.58
D/N*PK1	20/3					7.94

TOTAL OF 2 CUTS MEAN DM% 27.9

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Sub-plots

2. **LIME** Liming plots 1-17:

A	Ground chalk applied as necessary to achieve pH7
B	Ground chalk applied as necessary to achieve pH6
C	Ground chalk applied as necessary to achieve pH5
D	None

NOTE: Lime was applied regularly at the same rate, to all 'A' and 'B' sub-plots of plots 1 to 17 (except 12) from 1924. Differential liming started in 1975 on certain 'B' and 'C' sub-plots (except on plot 12) and in 1976 on certain 'A' sub-plots (including plot 12) and 12b. Lime last applied in 1997, the second application in a triennial scheme of soil pH analysis and remedial chalk applications.

Liming plots 18-20:

NOTE: Differential rates of lime were applied to sub-plots 2 and 3 regularly 1920-1974. Since 1975 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'. Plots 19 and 20 received no further chalk after 1978; plot 18/2 no further chalk after 1972.

Experimental diary:

26-Feb-99 : B : Rolled.
17-Mar-99 : T : Fishmeal, K, Mg, Na and Si applied.
18-Mar-99 : T : P applied (except plot 20).
19-Mar-99 : T : P to plot 20 only.
02-May-99 : T : N applied.
05-Jul-99 : B : Cut.
07-Jul-99 : B : Hay turned.
08-Jul-99 : B : Hay turned.
09-Jul-99 : B : Hay turned.
12-Jul-99 : B : Hay baled.
14-Oct-99 : B : Cut, herbage removed.