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## Yields of the Field Experiments 1996

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### 96/R/PG/5 Park Grass - Old Grass

#### Rothamsted Research

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96/R/PG/5

PARK GRASS

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

The 141st year, hay.

For previous years see 'Details' 1967 and 1973 and 74-95/R/PG/5.

**Treatments:** Combinations of:-

Whole plots

1. <b>MANURE</b>	Fertilizers and organic manures:
N1	Plot 1 N1
K	Plot 2/1 K in 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

96/R/PG/5

Sub-plots

2. LIME Liming plots 1-17:

- |   |  |
|---|--|
| 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. Lime last applied in 1994.

Liming plots 18-20:

Differential rates of lime were applied to sub-plots 2 and 3 regularly 1920-1964. 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'. Plots 19 and 20 received no further chalk after 1968; plot 18/2 no further chalk after 1972.

In 1995 plot 13 was split in two, 13/1 to receive no more manure, 13/2 to receive organic manures as hitherto. In 1996 plot 2 was split in two, 2/1 to test potassium, 2/2 to continue without fertilizers.

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

**Experimental diary:**

- 02-Nov-95 : T : P applied.
- 07-Nov-95 : T : K, Na, Mg and Si applied.
- 29-Apr-96 : T : N applied.
- 17-Jun-96 : B : Cut.
- 19-Jun-96 : B : Hay turned.
- 20-Jun-96 : B : Hay rowed up and baled.
- 11-Nov-96 : B : Cut and herbage removed.

**NOTE:** Samples of herbage from selected plots were taken for chemical analysis. Unground herbage samples from all plots from both cuts were archived.

96/R/PG/5

1ST CUT (17/6/96) DRY MATTER TONNES/HECTARE

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

	LIME	A	B	C	D	MEAN
	MANURE					
N1	1	2.74	2.30	1.58	0.53	1.79
K	2/1	1.79	2.60	1.52	1.87	1.94
O(D)	2/2	2.09	2.77	1.19	1.35	1.85
O	3	1.80	1.88	1.06	1.32	1.51
P	4/1	2.41	3.08	1.80	2.03	2.33
N2P	4/2	2.39	2.18	1.88	0.57	1.75
N1MN	6	4.11	3.78			3.95
MN	7	4.05	4.45	3.14	1.59	3.31
PNAMG	8	2.66	3.41	2.31	2.21	2.65
MN(N2)	9/1	4.34	3.65	0.95	0.51	2.36
N2MN	9/2	4.92	4.09	3.01	1.93	3.49
N2PNAMG	10	4.27	3.20	2.54	1.42	2.86
N3MN	11/1	5.49	4.68	3.62	3.61	4.35
N3MNSI	11/2	5.19	4.21	3.27	4.26	4.23
O	12	1.84	1.99	1.17	1.21	1.55
(D/F)	13/1	3.23	4.23	3.08	3.03	3.39
D/F	13/2	3.52	4.89	4.47	3.84	4.18
MN(N2*)	14/1	3.97	4.08	3.21	4.01	3.82
N2*MN	14/2	4.94	4.94	5.26	4.72	4.97
MN(N2*)	15	3.54	3.66	2.44	1.82	2.87
N1*MN	16	4.07	4.09	2.88	3.28	3.58
N1*	17	2.41	2.23	3.11	2.92	2.67
N2KNAMG0	18/1			2.36	0.14	1.25
N2KNAMG2	18/2					2.91
N2KNAMG1	18/3	2.05	2.40			2.22
D0	19/1					3.39
D2	19/2					4.96
D1	19/3					3.46
D/N*PK0	20/1					4.24
D/N*PK2	20/2					5.01
D/N*PK1	20/3					4.55

1ST CUT MEAN DM% 33.4

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2ND CUT (11/11/96) DRY MATTER TONNES/HECTARE

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

	LIME	A	B	C	D	MEAN
	<b>MANURE</b>					
N1	1	1.20	1.14	0.78	0.16	0.82
K	2/1	0.75	0.73	0.65	0.72	0.71
O(D)	2/2	0.38	0.35	0.32	0.41	0.37
O	3	0.42	0.37	0.43	0.56	0.44
P	4/1	0.44	0.51	0.59	0.68	0.55
N2P	4/2	1.02	0.87	0.64	0.51	0.76
N1MN	6	0.64	0.66			0.65
MN	7	0.45	0.54	0.78	0.50	0.57
PNAMG	8	0.76	0.90	1.02	0.95	0.91
MN(N2)	9/1	0.42	0.49	0.31	0.17	0.35
N2MN	9/2	0.85	0.95	0.77	1.10	0.92
N2PNAMG	10	0.85	1.07	0.85	0.83	0.90
N3MN	11/1	1.43	1.04	1.10	1.71	1.32
N3MNSI	11/2	1.64	0.97	0.75	1.67	1.26
O	12	0.31	0.34	0.49	0.34	0.37
(D/F)	13/1	0.73	0.61	0.38	0.39	0.53
D/F	13/2	1.24	1.33	0.64	0.72	0.99
MN(N2*)	14/1	0.94	0.73	0.69	1.00	0.84
N2*MN	14/2	1.16	1.12	1.40	1.60	1.32
MN(N2*)	15	0.65	0.69	0.68	0.56	0.65
N1*MN	16	0.92	0.82	0.66	0.70	0.78
N1*	17	0.64	0.71	0.90	1.05	0.82
N2KNAMG0	18/1			1.03	0.20	0.61
N2KNAMG2	18/2					1.68
N2KNAMG1	18/3	0.87	1.16			1.02
D0	19/1					0.63
D2	19/2					0.65
D1	19/3					0.64
D/N*PK0	20/1					0.71
D/N*PK2	20/2					0.72
D/N*PK1	20/3					0.68

2ND CUT MEAN DM\* 29.5

96/R/PG/5

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

LIME		A	B	C	D	MEAN
MANURE						
N1	1	3.94	3.45	2.35	0.68	2.61
K	2/1	2.53	3.33	2.16	2.59	2.65
O(D)	2/2	2.47	3.11	1.51	1.76	2.21
O	3	2.21	2.24	1.49	1.89	1.96
P	4/1	2.85	3.59	2.39	2.71	2.88
N2P	4/2	3.40	3.05	2.52	1.09	2.52
N1MN	6	4.75	4.44			4.60
MN	7	4.50	4.99	3.93	2.08	3.88
PNAMG	8	3.42	4.31	3.34	3.17	3.56
MN(N2)	9/1	4.75	4.14	1.26	0.68	2.71
N2MN	9/2	5.76	5.04	3.78	3.03	4.40
N2PNAMG	10	5.12	4.27	3.40	2.25	3.76
N3MN	11/1	6.92	5.72	4.72	5.32	5.67
N3MNSI	11/2	6.83	5.17	4.02	5.94	5.49
O	12	2.15	2.33	1.66	1.54	1.92
(D/F)	13/1	3.96	4.83	3.46	3.42	3.92
D/F	13/2	4.76	6.22	5.11	4.56	5.16
MN(N2*)	14/1	4.91	4.81	3.90	5.01	4.66
N2*MN	14/2	6.10	6.07	6.66	6.33	6.29
MN(N2*)	15	4.19	4.35	3.12	2.38	3.51
N1*MN	16	4.99	4.91	3.53	3.98	4.36
N1*	17	3.04	2.95	4.00	3.97	3.49
N2KNAMG0	18/1			3.39	0.34	1.86
N2KNAMG2	18/2					4.58
N2KNAMG1	18/3	2.92	3.56			3.24
D0	19/1					4.03
D2	19/2					5.62
D1	19/3					4.10
D/N*PK0	20/1					4.95
D/N*PK2	20/2					5.73
D/N*PK1	20/3					5.23

TOTAL OF 2 CUTS MEAN DM% 31.5