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## Yields of the Field Experiments 1998

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

#### Rothamsted Research

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**98/R/PG/5**

**PARK GRASS**

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

The 143rd year, hay.

For previous years see 'Details' 1977 and 1973 and 74-97/R/PG/5.

**Treatments:** Combinations of:-

Whole plots

<b>1. MANURE</b>	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

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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:

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:**

03-Dec-97 : **T** : (Not plot 20) P applied.  
22-Jan-98 : **T** : K, Mg, Na and Si applied.  
22-Jan-98 : **T** : Plot 20 only: P applied.  
08-May-98 : **T** : Sulphate of ammonia applied. Nitrate of soda applied.  
24-Jun-98 : **T** : Cut.  
07-Dec-98 : **T** : Cut.

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

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1ST CUT (25/6/98) DRY MATTER TONNES/HECTARE

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

	LIME	A	B	C	D	MEAN
	<b>MANURE</b>					
N1	1	2.96	3.13	2.02	1.09	2.30
K	2/1	1.81	2.88	1.88	2.22	2.20
O(D)	2/2	2.29	2.90	1.60	1.47	2.06
O	3	2.36	2.31	1.71	2.12	2.12
P	4/1	2.34	3.14	3.00	2.74	2.81
N2P	4/2	3.03	2.65	3.20	2.88	2.94
N1MN	6	4.32	3.83			4.08
MN	7	4.98	4.23	5.28	2.64	4.28
PNAMG	8	2.47	3.31	3.14	2.84	2.94
MN(N2)	9/1	4.83	4.39	2.66	2.96	3.71
N2MN	9/2	4.63	5.06	4.42	4.81	4.73
N2PNAMG	10	4.09	4.10	4.39	4.24	4.20
N3MN	11/1	4.69	4.44	4.00	4.75	4.47
N3MNSI	11/2	4.93	4.99	4.36	4.75	4.76
O	12	2.04	2.22	2.05	1.88	2.05
(D/F)	13/1	2.89	3.83	4.14	3.45	3.58
D/F	13/2	2.99	4.41	4.95	3.97	4.08
MN(N2*)	14/1	4.68	4.50	4.14	4.41	4.43
N2*MN	14/2	3.73	4.11	4.68	4.93	4.36
MN(N2*)	15	4.69	4.60	3.92	3.19	4.10
N1*MN	16	4.34	3.57	3.23	3.18	3.58
N1*	17	3.00	2.96	3.12	3.02	3.03
N2KNAMG0	18/1			4.88	1.16	3.02
N2KNAMG2	18/2					3.41
N2KNAMG1	18/3	3.20	4.01			3.61
D0	19/1					5.54
D2	19/2					4.52
D1	19/3					4.59
D/N*PK0	20/1					5.38
D/N*PK2	20/2					4.37
D/N*PK1	20/3					4.89

1ST CUT MEAN DM% 25.2

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2ND CUT (7/12/98) DRY MATTER TONNES/HECTARE

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

	LIME	A	B	C	D	MEAN
	<b>MANURE</b>					
N1	1	2.22	2.61	1.61	1.29	1.93
K	2/1	0.72	1.00	0.77	1.38	0.97
O(D)	2/2	0.61	1.31	0.69	1.21	0.95
O	3	0.79	0.58	0.67	2.09	1.03
P	4/1	0.43	0.56	0.83	1.10	0.73
N2P	4/2	1.03	1.56	1.85	1.21	1.41
N1MN	6	1.77	1.52			1.65
MN	7	1.91	2.22	2.48	1.01	1.91
PNAMG	8	1.64	1.14	1.90	1.35	1.51
MN(N2)	9/1	1.25	1.63	0.78	0.73	1.10
N2MN	9/2	1.71	2.69	1.89	1.24	1.88
N2PNAMG	10	2.94	3.74	1.52	0.94	2.29
N3MN	11/1	4.08	2.00	1.26	2.89	2.56
N3MNSI	11/2	3.39	2.24	1.10	2.35	2.27
O	12	0.46	0.40	0.60	0.45	0.48
(D/F)	13/1	2.64	1.97	1.86	1.54	2.00
D/F	13/2	4.72	4.33	4.39	2.93	4.09
MN(N2*)	14/1	1.46	1.65	1.77	2.02	1.72
N2*MN	14/2	2.49	2.07	1.59	2.00	2.04
MN(N2*)	15	2.38	1.79	1.89	1.95	2.00
N1*MN	16	2.11	1.57	1.55	1.38	1.65
N1*	17	1.23	1.13	1.10	1.27	1.18
N2KNAMG0	18/1			7.35	1.18	4.27
N2KNAMG2	18/2					3.91
N2KNAMG1	18/3	3.21	4.66			3.93
D0	19/1					5.22
D2	19/2					4.25
D1	19/3					4.42
D/N*PK0	20/1					4.15
D/N*PK2	20/2					5.66
D/N*PK1	20/3					4.16

2ND CUT MEAN DM% 27.7

98/R/PG/5

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

	LIME	A	B	C	D	MEAN
	<b>MANURE</b>					
N1	1	5.18	5.74	3.63	2.38	4.23
K	2/1	2.53	3.88	2.66	3.60	3.17
O(D)	2/2	2.89	4.21	2.28	2.68	3.02
O	3	3.15	2.89	2.38	4.21	3.16
P	4/1	2.76	3.70	3.83	3.84	3.53
N2P	4/2	4.06	4.21	5.05	4.09	4.35
N1MN	6	6.10	5.36			5.73
MN	7	6.89	6.45	7.77	3.65	6.19
PNAMG	8	4.11	4.44	5.04	4.20	4.45
MN(N2)	9/1	6.08	6.02	3.44	3.69	4.81
N2MN	9/2	6.34	7.75	6.31	6.05	6.61
N2PNAMG	10	7.03	7.84	5.91	5.18	6.49
N3MN	11/1	8.77	6.43	5.26	7.64	7.03
N3MNSI	11/2	8.32	7.24	5.46	7.10	7.03
O	12	2.50	2.62	2.64	2.34	2.53
(D/F)	13/1	5.53	5.81	5.99	4.99	5.58
D/F	13/2	7.72	8.74	9.35	6.90	8.18
MN(N2*)	14/1	6.13	6.15	5.91	6.43	6.15
N2*MN	14/2	6.23	6.19	6.28	6.94	6.41
MN(N2*)	15	7.06	6.39	5.81	5.15	6.10
N1*MN	16	6.45	5.14	4.78	4.57	5.23
N1*	17	4.23	4.09	4.22	4.28	4.21
N2KNAMG0	18/1			12.23	2.35	7.29
N2KNAMG2	18/2					7.33
N2KNAMG1	18/3	6.41	8.67			7.54
D0	19/1					10.77
D2	19/2					8.77
D1	19/3					9.01
D/N*PK0	20/1					9.54
D/N*PK2	20/2					10.03
D/N*PK1	20/3					9.05

TOTAL OF 2 CUTS MEAN DM% 26.5