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Yields of the Field Experiments 2003

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Results of the
Classical
and other
Long-term Experiments
2003

Rothamsted Research

03/R/PG/5 - Park Grass

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03/R/PG/5

PARK GRASS

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

The 148th year, hay.

For previous years see 'Details' 1977 and 1973 and 74-02/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/PM(F)	Plot 13/2	D/PM (F until 1999)
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 in years with no farmyard manure)
P:	35 kg P (15 kg P to plot 20 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 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 (stopped 1999; replaced by PM)

03/R/PG/5

1. **MANURE** Fertilizers and organic manures(cont.)
- PM Rooster Booster, pelleted poultry manure, every fourth year to supply 63 kg N (started 2003)
- MN: P K Na Mg as above

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 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 was applied in 2003, the fourth application in a triennial scheme of soil pH analysis and remedial chalk applications.

[This note was incorrect in 97-01/R/PG/5 Yield book entries.]

- LIME** 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' as 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.

[This note was incorrect in 97-01/R/PG/5 Yield book entries.]

03/R/PG/5

Lime (chalk) applications 2003

Plot	t/ha		
	a	B	C
1	1.50	1.00	0.75
2/1	1.50	1.00	0.30
2/2	1.50	0.75	0
3	1.50	0	0
4/1	1.50	0.75	0
4/2	4.00	2.00	2.00
6	3.00	1.50	0
7	2.00	2.00	0.30
8	2.00	0.75	0
9/1	3.00	0	0
9/2	4.00	2.00	3.00
10	4.00	2.00	2.00
11/1	5.00	2.00	3.00
11/2	5.00	2.00	1.50
12	1.50	0.75	0
13/1	2.00	0.75	0.3
13/2	2.00	0.3	0
14/1	2.00	0	0
14/2	2.00	0	0
15	3.00	1.50	0.30
16	3.00	0	0
17	2.25	0	0
18	4.00	2.00	0

Experimental diary:

10-Jan-03 : T : : P applied.
 05-Feb-03 : T : : K, Si, Na, Mg applied.
 08-Apr-03 : T : : N applied.
 09-Apr-03 : T : : PM applied
 01-May-03 : P : : Cut paths.
 16-Jun-03 : T : : Cut sample areas for yield, sampled and weighed,
 and carted cut grass.
 17-Jun-03 : T : : Mowed.
 18-Jun-03 : B : : Baled hay.
 19-Jun-03 : B : : Topped.
 07-Jul-03 : T : : Chalk applied, started.
 23-Jul-03 : T : : Chalk applied, completed.
 21-Oct-03 : B : : Topped.

NOTE: There was insufficient growth during 2003 for a second yield cut.
 Plots were topped.

NOTE: Samples of herbage from cut was taken for chemical analysis.
 Unground samples of herbage from all plots were archived.

03/R/PG/5

1ST CUT (16-17/6/03) DRY MATTER TONNES/HECTARE

	LIME	A	B	C	D	MEAN
	MANURE					
N1	1	2.53	2.08	1.35	0.82	1.69
K	2/1	1.45	1.78	0.87	0.76	1.21
O(D)	2/2	1.56	2.12	1.00	1.05	1.43
O	3	1.84	1.87	0.99	0.93	1.41
P	4/1	2.73	3.03	1.92	1.59	2.32
N2P	4/2	3.53	3.57	3.80	1.45	3.09
N1MN	6	4.99	5.07			5.03
MN	7	4.38	4.77	4.45	2.74	4.09
PNAMG	8	2.61	3.04	2.99	2.88	2.88
MN(N2)	9/1	3.65	3.37	3.86	1.89	3.19
N2MN	9/2	5.65	6.10	5.21	4.82	5.44
N2PNAMG	10	4.68	4.54	5.18	2.28	4.17
N3MN	11/1	8.03	7.61	6.29	6.01	6.98
N3MNSI	11/2	7.49	7.89	7.00	6.35	7.18
O	12	1.53	2.07	1.45	1.20	1.56
(D/F)	13/1	3.31	4.49	3.24	3.28	3.58
D/PM(F)	13/2	3.54	4.79	4.81	4.35	4.37
MN(N2*)	14/1	3.72	4.89	4.27	3.18	4.02
N2*MN	14/2	6.17	5.56	6.03	5.10	5.72
MN(N2*)	15	3.13	3.60	2.86	1.73	2.83
N1*MN	16	5.06	5.21	4.64	3.66	4.64
N1*	17	2.46	2.88	2.41	1.73	2.37
N2KNAMG0	18/1			3.42	1.42	2.42
N2KNAMG2	18/2					3.17
N2KNAMG1	18/3	2.36	2.29			2.32
D0	19/1					3.12
D2	19/2					4.42
D1	19/3					2.90
D/N*PK0	20/1					5.00
D/N*PK2	20/2					5.17
D/N*PK1	20/3					4.65

1ST CUT MEAN DM% 29.3