ROTHAMSTED RESEARCH

Yields of the Field Experiments 2000

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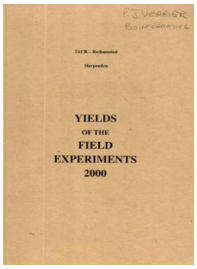

00/R/PG/5 Park Grass - Hay

Rothamsted Research

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PARK GRASS

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

The 145th year, hay.

For previous years see 'Details' 1977 and 1973 and 74-99/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 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
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 was applied in 2000, the third application in a triennial scheme of soil pH analysis and remedial chalk applications.

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 1978; plot 18/2 no further chalk after 1972.

Chalk applied 2000 (tonnes $CaCO_3$):

Plot	A	B	C
1	3.0	1.5	0.8
2/1	3.0	0.8	0.3
2/2	3.0	0.8	-
3	3.0	-	-
4/1	3.0	0.8	0.3
4/2	6.0	3.6	1.5
6	3.0	1.5	-
7	3.0	0.8	0.3
8	3.0	0.8	0.3
9/1	6.0	1.5	1.5
9/2	6.0	3.6	3.0
10	6.0	5.0	2.1
11/1	12.0	4.5	3.0
11/2	10.2	5.0	3.0
12	3.0	-	-
13/1	3.0	-	-
13/2	3.0	-	-
14/1	3.0	-	-
14/2	2.2	-	-
15	5.1	0.8	0.3
16	2.2	-	-
17	2.2	-	-
18	5.1	2.1	2.1

None applied to plots 18/2, 19 and 20.

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Experimental diary:

07-Dec-99 : **T** : P applied (except plot 20).
09-Dec-99 : **T** : P to plot 20 only.
20-Dec-99 : **T** : K, Mg, Na and Si applied.
20-Mar-00 : **T** : Chalk application started.
22-Mar-00 : **T** : Chalk application completed.
10-Apr-00 : **T** : N applied.
20-Jun-00 : B : Cutting started.
17-Jul-00 : B : Cutting completed.
18-Jul-00 : B : Hay turned.
19-Jul-00 : B : Hay turned.
20-Jul-00 : B : Hay turned.
21-Jul-00 : B : Hay baled.
08-Jan-01 : B : Second cut started.
09-Jan-01 : B : Second cut completed.

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

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1ST CUT (20-22/6/00) DRY MATTER TONNES/HECTARE

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

LIME / MANURE		A	B	C	D	MEAN
N1	1	3.59	3.16	3.07	1.29	2.78
K	2/1	3.78	4.03	2.27	3.00	3.27
O(D)	2/2	3.60	3.55	2.42	2.44	3.00
O	3	2.97	3.35	2.03	2.39	2.69
P	4/1	3.70	3.99	3.25	3.01	3.49
N2P	4/2	4.22	3.94	5.59	4.47	4.56
N1MN	6	5.45	5.80			5.62
MN	7	6.31	5.74	5.76	4.33	5.53
PNAMG	8	3.43	3.98	3.13	3.27	3.45
MN(N2)	9/1	5.25	5.54	5.76	2.05	4.65
N2MN	9/2	6.07	6.09	7.25	5.82	6.31
N2PNAMG	10	4.69	4.17	5.87	3.13	4.47
N3MN	11/1	6.94	6.46	5.29	5.37	6.02
N3MNSI	11/2	6.62	6.33	5.79	6.54	6.32
O	12	2.89	2.47	2.46	2.24	2.52
(D/F)	13/1	2.81	4.01	4.08	4.56	3.87
D/F	13/2	3.30	4.77	5.17	5.28	4.63
MN(N2*)	14/1	5.26	4.93	4.38	5.47	5.01
N2*MN	14/2	5.01	4.79	4.05	4.21	4.52
MN(N2*)	15	5.55	4.71	4.32	3.49	4.52
N1*MN	16	5.86	5.07	4.75	4.40	5.02
N1*	17	3.15	2.85	2.83	2.90	2.93
N2KNAMG0	18/1			6.12	2.51	4.32
N2KNAMG2	18/2					4.26
N2KNAMG1	18/3	3.02	3.63			3.33
D0	19/1					5.13
D2	19/2					5.63
D1	19/3					5.00
D/N*PK0	20/1					5.68
D/N*PK2	20/2					6.13
D/N*PK1	20/3					5.21

1ST CUT MEAN DM% 24.2

NOTE: The second cut was taken after prolonged heavy rain. Many of the samples were contaminated with soil and the yields were unreliable. Following chemical analysis an adjusted yield will be published.

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