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97/R/PG/5 Park Grass - Old Grass

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97/R/PG/5

PARK GRASS

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

The 142nd year, hay.

For previous years see 'Details' 1977 and 1973 and 74-96/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	

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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 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.

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.

Chalk applied 1997 (tonnes Ca CO₃):

Plot	a	b	c
1	3.0	1.5	1.5
2/1	3.0	0.8	0.3
2/2	3.0	0.8	0.3
3	3.0	0.8	-
4/1	3.0	0.8	0.3
4/2	5.1	3.6	2.1
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	10.2	3.6	2.1
10	10.2	7.2	4.2
11/1	12.0	4.5	6.0
11/2	12.0	4.5	3.0
12	3.0	-	-
13/1	3.0	-	-
13/2	3.0	-	-
14/1	3.0	-	-
14/2	2.2	-	-
15	3.0	0.8	0.3
16	2.2	-	-
17	2.2	-	-
18	5.1	3.6	2.1

None applied to plots 18/2, 19 and 20. This was the second application in a triennial scheme of soil pH analyses and chalk applications.

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Experimental diary:

26-Nov-96 : T : (Not plot 20) P applied.
10-Dec-96 : T : (Not plot 20) K, Na, Mg and Si applied.
11-Dec-96 : T : Plot 20: P and K applied.
07-Jan-97 : T : Chalk application started.
29-Jan-97 : T : Farmyard manure applied.
31-Jan-97 : T : Chalk application finished.
09-Apr-97 : T : Sulphate of ammonia applied.
10-Apr-97 : T : Nitrate of soda applied.
07-Jul-97 : B : Cut.
09-Jul-97 : B : Hay turned twice.
10-Jul-97 : B : Hay rowed up and baled.
10-Nov-97 : 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.

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1ST CUT (8/7/97) DRY MATTER TONNES/HECTARE

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

	LIME	A	B	C	D	MEAN
	MANURE					
N1	1	2.68	2.98	2.12	0.87	2.16
K	2/1	1.68	2.37	1.46	1.75	1.82
O(D)	2/2	1.94	2.51	1.51	1.84	1.95
O	3	1.84	1.89	1.75	2.13	1.90
P	4/1	2.08	2.65	2.51	2.94	2.55
N2P	4/2	2.29	2.37	3.06	1.90	2.40
N1MN	6	3.10	3.11			3.11
MN	7	3.17	2.63	3.16	2.08	2.76
PNAMG	8	2.06	2.59	2.57	2.46	2.42
MN(N2)	9/1	2.65	2.79	1.38	0.95	1.94
N2MN	9/2	3.21	3.54	2.80	3.03	3.15
N2PNAMG	10	2.55	2.50	2.82	2.03	2.47
N3MN	11/1	3.52	3.59	2.59	3.70	3.35
N3MNSI	11/2	4.12	3.27	2.81	3.94	3.54
O	12	1.64	1.60	1.40	1.44	1.52
(D/F)	13/1	2.22	2.43	2.87	2.76	2.57
D/F	13/2	3.05	4.57	4.79	4.61	4.26
MN(N2*)	14/1	2.71	2.92	2.65	2.43	2.68
N2*MN	14/2	3.42	2.99	3.19	3.67	3.32
MN(N2*)	15	2.74	2.79	2.22	2.39	2.54
N1*MN	16	3.48	3.26	3.61	3.40	3.43
N1*	17	2.79	3.17	3.06	3.30	3.08
N2KNAMG	18/1			3.40	0.98	2.19
N2KNAMG	18/2					3.94
N2KNAMG	18/3	2.89	3.74			3.31
D	19/1					5.47
D	19/2					4.80
D	19/3					4.43
D/N*PK	20/1					4.69
D/N*PK	20/2					4.31
D/N*PK	20/3					4.40

1ST CUT MEAN DM% 31.3

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2ND CUT (11/11/97) DRY MATTER TONNES/HECTARE

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

	LIME	A	B	C	D	MEAN
	MANURE					
N1	1	1.13	1.49	1.00	0.37	1.00
K	2/1	1.28	1.66	1.60	1.57	1.53
O(D)	2/2	0.71	1.01	0.86	0.87	0.86
O	3	0.73	0.75	1.07	1.30	0.96
P	4/1	0.79	1.13	1.33	1.29	1.14
N2P	4/2	1.10	1.28	0.76	0.74	0.97
N1MN	6	0.83	0.82			0.83
MN	7	0.90	1.08	1.53	0.70	1.05
PNAMG	8	1.14	1.02	1.18	0.96	1.07
MN(N2)	9/1	0.92	0.78	0.47	0.43	0.65
N2MN	9/2	0.85	1.04	0.62	0.90	0.85
N2PNAMG	10	0.91	1.09	0.82	0.66	0.87
N3MN	11/1	0.95	0.83	0.64	1.39	0.95
N3MNSI	11/2	1.14	1.18	0.70	1.53	1.14
O	12	0.88	0.91	0.97	0.80	0.89
(D/F)	13/1	1.25	1.20	1.59	1.25	1.32
D/F	13/2	1.64	2.49	2.08	1.89	2.02
MN(N2*)	14/1	0.92	0.90	0.80	0.93	0.89
N2*MN	14/2	1.30	1.05	1.16	1.14	1.16
MN(N2*)	15	1.26	1.19	1.12	0.92	1.12
N1*MN	16	1.44	1.25	1.48	1.13	1.33
N1*	17	1.19	1.38	1.52	1.64	1.43
N2KNAMG	18/1			0.42	0.13	0.27
N2KNAMG	18/2					0.98
N2KNAMG	18/3	0.62	0.96			0.79
D	19/1					1.25
D	19/2					1.41
D	19/3					1.19
D/N*PK	20/1					1.20
D/N*PK	20/2					0.79
D/N*PK	20/3					0.93

2ND CUT MEAN DM% 28.2

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TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

	LIME	A	B	C	D	MEAN
	MANURE					
N1	1	3.81	4.47	3.12	1.23	3.16
K	2/1	2.96	4.03	3.06	3.33	3.34
O(D)	2/2	2.65	3.52	2.37	2.70	2.81
O	3	2.57	2.64	2.81	3.43	2.86
P	4/1	2.88	3.78	3.85	4.23	3.68
N2P	4/2	3.39	3.66	3.82	2.64	3.37
N1MN	6	3.94	3.94			3.94
MN	7	4.07	3.72	4.69	2.79	3.82
PNAMG	8	3.20	3.61	3.75	3.42	3.49
MN(N2)	9/1	3.57	3.57	1.84	1.38	2.59
N2MN	9/2	4.05	4.58	3.42	3.94	4.00
N2PNAMG	10	3.45	3.58	3.64	2.69	3.34
N3MN	11/1	4.47	4.41	3.23	5.09	4.30
N3MNSI	11/2	5.26	4.45	3.50	5.48	4.67
O	12	2.52	2.52	2.37	2.24	2.41
(D/F)	13/1	3.47	3.63	4.46	4.01	3.89
D/F	13/2	4.69	7.06	6.87	6.50	6.28
MN(N2*)	14/1	3.63	3.82	3.44	3.36	3.56
N2*MN	14/2	4.73	4.04	4.35	4.81	4.48
MN(N2*)	15	3.99	3.98	3.34	3.31	3.66
N1*MN	16	4.92	4.50	5.09	4.53	4.76
N1*	17	3.98	4.55	4.58	4.94	4.51
N2KNAMG	18/1			3.82	1.11	2.46
N2KNAMG	18/2					4.92
N2KNAMG	18/3	3.51	4.70			4.10
D	19/1					6.72
D	19/2					6.21
D	19/3					5.62
D/N*PK	20/1					5.89
D/N*PK	20/2					5.11
D/N*PK	20/3					5.34

TOTAL OF 2 CUTS MEAN DM% 29.7