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Yields of the Field Experiments 2009

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Results of the
Classical and other
Long-term Experiments
2009

R/PG/5 Park Grass

Rothamsted Research

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09/R/PG/5

PARK GRASS

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

The 154th year, hay.

For previous years see 'Details' 1977 and 1973 and Yield Books for 74-08/R/PG/5.

Treatments: Combinations of:-

Whole plots

1.	Manure	Fertilizers and organic manures:
	N1	Plot 1
	K	Plot 2/1
	None (FYM)	Plot 2/2
	None	Plot 3
	P	Plot 4/1
	N2P	Plot 4/2
	N1PKNaMg	Plot 6
	PKNaMg	Plot 7
	PNaMg	Plot 8
	PKNaMg(N2)	Plot 9/1
	N2PKNaMg	Plot 9/2
	N2PNaMg	Plot 10
	N3PKNaMg	Plot 11/1
	N3PKNaMgSi	Plot 11/2
	None	Plot 12
	(FYM/F)	Plot 13/1
	FYM/PM	Plot 13/2
	PKNaMg (N2*)	Plot 14/1
	N2*PKNaMg	Plot 14/2
	PKNaMg (N2*)	Plot 15
	N1*PKNaMg	Plot 16
	N1*	Plot 17
	N2KNaMg	Plot 18
	FYM	Plot 19
	FYM/N*PK	Plot 20
	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
	FYM:	Farmyard manure at 35 t every fourth year

09/R/PG/5

Experimental diary

			Rate	Unit
02-Dec-08	f	Triple Superphosphate - Plots 4/1, 4/2, 6, 7, 8, 9/1, 9/2, 10, 11/1, 11/2, 14/1, 14/2, 15 and 16	171.00	kg/ha
08-Dec-08	f	Sulphate of Potash - Plots 2/1, 6, 7, 9/1, 9/2, 11/1, 11/2, 14/1, 14/2, 15, 16 and 18, completed 09-Dec-08	542.00	kg/ha
	f	Sodium Sulphate - plots 6, 7, 8, 9/1, 9/2, 10, 11/1, 11/2, 14/1, 14/2, 15, 16 and 18, completed 09-Dec-08	43.00	kg/ha
	f	Manganese Sulphate - plots 6, 7, 8, 9/1, 9/2, 10, 11/1, 11/2, 14/1, 14/2, 15, 16 and 18, completed 09/12/08	111.00	kg/ha
	f	Silicate of Soda- plot 11-2, completed 09-Dec-08	450.00	kg/ha
11-Dec-08	f	Chalk - plot 13/2a	2.00	t/ha
	f	Chalk - plot 13/2b	0.50	t/ha
	f	Farm Yard Manure - plots 13/2, 19 and 20	35.00	t/ha
	a	Mow paths		
14-Jan-09	f	Chalk plots - 13/1a, 12a, 11/1c, 9/2b, 9/2c and 9/1a	2.00	t/ha
	f	Chalk plots - 13/1b, 12b, 9/1c, 7b, 4/2b and 4/2c	1.00	t/ha
	f	Chalk plots - 13/1c, 12c and 8c	0.30	t/ha
	f	Chalk plots - 11/2b, 11/2c, 11/1b and 10b	1.50	t/ha
	f	Chalk plots - 11/2a, 9/2a, 8a, 7a and 6b	3.00	t/ha
	f	Chalk - plot 11/1a	5.00	t/ha
	f	Chalk - plots 10a, 6a and 4/2a	4.00	t/ha
	f	Chalk - plot 9/1b	0.75	t/ha
	f	Chalk - plots 8b and 7c	0.50	t/ha
20-Jan-09	f	Chalk - plots 2/2c, 4/1b, 15c and 18c	0.30	t/ha
	f	Chalk - plots 1b and 1c	0.75	t/ha
	f	Chalk - plots 2/1c, 2/2b, 3a, 3b and 3c,	0.50	t/ha
	f	Chalk - plots 2/1a, 2/1b and 15b	1.00	t/ha
	f	Chalk - plots 1a and 18/b	1.50	t/ha
	f	Chalk - plots 4/1a, 14/1a, 14/2a and 17a	2.00	t/ha
	f	Chalk - plots 15a and 16a	3.00	t/ha
	f	Chalk - plot 18a	4.00	t/ha
29-Apr-09	f	Ammonium Sulphate Plots 1, 6a and b)	229.00	kg/ha
	f	Ammonium Sulphate Plots 4/2, 9/2, 10 18	457.00	kg/ha
	f	Ammonium Sulphate Plots 11/1, 11/2	686.00	kg/ha
30-Apr-09	f	Nitrate of Soda - Plots 16, 17	300.00	kg/ha
	f	Nitrate of Soda - Plot 14/2	600.00	kg/ha
19-May-09	a	Cut paths		
15-Jun-09	a	Mow paths		
17-Jun-09	a	Cut harvest strips, weighed and sampled		
18-Jun-09	a	Cut harvest strips, weighed and sampled		
	a	Mown discards		
19-Jun-09	a	Turned hay		
21-Jun-09	a	Turned hay		

09/R/PG/5

22-Jun-09	a	Turned hay		
	a	Row up, baled and removed		
09-Jul-09	a	Mow 1m path along fence		
28-Jul-09	a	Put wooden marker posts in place	-	-
	a	Mow paths		
09-Nov-09	a	Cut harvest strips, weighed and sampled - Started		
10-Nov-09	a	Cut harvest strips, weighed and sampled - Finished		
11-Nov-09	a	Mown, baled and bales removed		
23-Dec-09	a	Fixed outer fence		

1ST CUT (17-18/6/09) DRY MATTER TONNES/HECTARE

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

Grand mean 3.24

	Lime	a	b	c	d	Mean
	Manure					
	N1 1	2.36	1.41	0.90	0.66	1.33
	K 2/1	1.80	2.98	0.79	0.56	1.53
	None (FYM) 2/2	2.31	2.07	0.89	0.95	1.56
	None 3	2.29	2.33	0.82	0.88	1.58
	P 4/1	3.02	3.19	1.65	1.64	2.38
	N2P 4/2	1.84	2.11	2.05	1.42	1.86
	N1PKNaMg 6	5.04	5.48			5.26
	PKNaMg 7	5.27	5.73	5.13	3.18	4.83
	PNaMg 8	2.53	2.51	2.25	2.12	2.35
	PKNaMg (N2) 9/1	5.28	5.54	4.65	1.34	4.20
	N2PKNaMg 9/2	5.37	5.49	4.20	3.26	4.58
	N2PNaMg 10	2.49	2.65	3.58	1.65	2.59
	N3PKNaMg 11/1	5.44	5.18	5.05	3.52	4.80
	N3PKNaMgSi 11/2	4.75	5.17	4.79	3.34	4.51
	None 12	1.97	2.03	0.85	1.14	1.50
	(FYM/F) 13/1	3.10	3.29	2.25	2.13	2.69
	FYM/PM 13/2	3.71	4.66	3.85	3.24	3.86
	PKNaMg (N2*) 14/1	4.53	5.06	4.26	4.22	4.52
	N2*PKNaMg 14/2	4.62	4.64	4.14	3.85	4.31
	PKNaMg (N2*) 15	4.96	5.40	4.52	2.21	4.27
	N1*PKNaMg 16	5.26	5.69	3.77	3.39	4.53
	N1* 17	2.03	2.01	1.71	1.92	1.92
	N2KNaMg 18	2.04	2.81	2.53	1.57	2.24
	N2KNaMg 18/2					2.96
	FYM 19/1					4.21
	FYM 19/2					5.47
	FYM 19/3					5.27
	FYM/N*PK 20/1					4.77
	FYM/N*PK 20/2					5.00
	FYM/N*PK 20/3					5.55
	1ST CUT MEAN DM%	28.1				

09/R/PG/5

2ND CUT (09 – 10/11/08) DRY MATTER TONNES/HECTARE

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

Grand mean 1.13

	Lime	a	b	c	d	Mean
	Manure					
	N1 1	0.95	0.84	0.52	0.20	0.63
	K 2/1	0.57	0.64	0.35	0.30	0.47
	None (FYM) 2/2	0.61	0.58	0.42	0.39	0.50
	None 3	0.64	0.77	0.39	0.44	0.56
	P 4/1	0.97	0.72	0.54	0.48	0.68
	N2P 4/2	0.86	0.98	0.76	0.72	0.83
	N1PKNaMg 6	1.31	1.60			1.45
	PKNaMg 7	1.44	1.83	1.50	0.96	1.44
	PNaMg 8	1.19	1.09	0.80	0.77	0.96
	PKNaMg (N2) 9/1	1.78	1.80	1.41	0.39	1.34
	N2PKNaMg 9/2	1.47	1.49	1.06	1.81	1.46
	N2PNaMg 10	0.94	0.92	1.00	1.20	1.01
	N3PKNaMg 11/1	1.13	1.18	0.84	2.20	1.34
	N3PKNaMgSi 11/2	1.42	1.33	1.02	1.89	1.42
	None 12	1.04	0.85	0.54	0.57	0.75
	(FYM/F) 13/1	2.42	1.91	1.57	0.76	1.67
	FYM/PM 13/2	2.81	3.07	2.21	1.74	2.46
	PKNaMg (N2*) 14/1	1.51	1.58	1.15	1.03	1.32
	N2*PKNaMg 14/2	1.39	1.45	1.23	1.21	1.32
	PKNaMg (N2*) 15	1.36	1.55	1.04	0.33	1.07
	N1*PKNaMg 16	1.66	1.86	0.86	0.65	1.26
	N1* 17	0.63	0.67	0.43	0.72	0.61
	N2KNaMg 18	0.68	0.80	0.94	0.45	0.72
	N2KNaMg 18/2					1.12
	FYM 19/1					1.74
	FYM 19/2					2.04
	FYM 19/3					1.91
	FYM/N*PK 20/1					1.65
	FYM/N*PK 20/2					1.83
	FYM/N*PK 20/3					1.78

2ND CUT MEAN DM% 28.52

09/R/PG/5

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

Grand mean 4.37

	Lime	a	b	c	d	Mean
	Manure					
N1	1	3.30	2.25	1.42	0.86	1.96
K	2/1	2.37	3.62	1.14	0.86	2.00
None (FYM)	2/2	2.92	2.65	1.31	1.34	2.05
None	3	2.93	3.10	1.21	1.32	2.14
P	4/1	4.00	3.92	2.19	2.12	3.06
N2P	4/2	2.70	3.09	2.82	2.15	2.69
N1PKNaMg	6	6.35	7.07			6.71
PKNaMg	7	6.71	7.56	6.64	4.15	6.26
PNaMg	8	3.72	3.59	3.06	2.89	3.31
PKNaMg (N2)	9/1	7.06	7.34	6.05	1.73	5.54
N2PKNaMg	9/2	6.84	6.99	5.26	5.07	6.04
N2PNaMg	10	3.42	3.57	4.58	2.85	3.60
N3PKNaMg	11/1	6.57	6.36	5.88	5.72	6.13
N3PKNaMgSi	11/2	6.17	6.50	5.82	5.24	5.93
None	12	3.01	2.88	1.39	1.70	2.25
(FYM/F)	13/1	5.53	5.20	3.82	2.89	4.36
FYM/PM	13/2	6.52	7.73	6.05	4.98	6.32
PKNaMg (N2*)	14/1	6.05	6.64	5.41	5.24	5.83
N2*PKNaMg	14/2	6.01	6.09	5.37	5.05	5.63
PKNaMg (N2*)	15	6.32	6.96	5.56	2.55	5.35
N1*PKNaMg	16	6.92	7.55	4.63	4.04	5.78
N1*	17	2.66	2.68	2.14	2.65	2.53
N2KNaMg	18	2.72	3.61	3.47	2.02	2.95
N2KNaMg	18/2					4.08
FYM	19/1					5.96
FYM	19/2					7.50
FYM	19/3					7.18
FYM/N*PK	20/1					6.43
FYM/N*PK	20/2					6.83
FYM/N*PK	20/3					7.33

TOTAL OF 2 CUTS MEAN DM% 28.31