

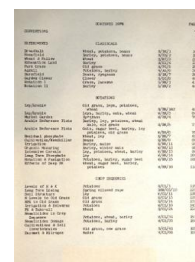
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76/R/CS/14 N P K to Old Grass - Old Grass

Rothamsted Research

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76/R/CS/14

NPK TO OLD GRASS

Object: To study the effects of a range of P and K levels on yields of permanent pasture on sites with much or little P and K in the soil - Park Grass Old Plots 5/1 and 5/2.

Sponsor: A.E. Johnston.

The 12th year, old grass.

For previous years see 65/C/22(t), 66/C/13(t), 67/C/9(t), 68/C/7 and 69-75/R/CS/14.

Design: On each site: A single replicate of 2 x 4 x 4 in 2 blocks of 16 plot each, with 2 x 2 additional plots in each block.

Whole plot dimensions: 1.83 x 10.1.

Treatments:

The experiment is duplicated on sites differing in previous history:-
PLOT

5/1NORES	Park Grass Plot 5/1: No P or K
5/2PKRES	Park Grass Plot 5/2: Superphosphate to supply 34 kg P, sulphate of potash to supply 224 kg K, annually 1898-1964

On each site, all combinations of:-

1. NPERCUT Nitrogen fertiliser (kg N for each cut):

33.6	33.6
67.2	67.2

2. P Phosphate (kg P) as superphosphate annually:

0.0	0.0
16.8	16.8
33.6	33.6
67.2	67.2

3. K Potassium (kg K) as potassium chloride annually:

0	0
112	112
224	224
448	448

76/R/CS/14

together with extra treatments, all combinations of:-

1. NPERCUT Nitrogen fertiliser (kg N for each cut):

33.6	33.6
67.2	67.2

2. PKRES65 Residues of PK fertilisers applied 1965 only:

34P56K	33.6 kg P, 56 kg K
34P336K	33.6 kg P, 336 kg K

NOTE: NPERCUT was not applied after the second cut.

Basal applications: Weedkiller: 24-D ester at 3.4 kg acid equivalent in 220 l.

Cultivations, etc.: - P and K applied: 9 Dec, 1975. N applied: 18 Mar, 1976, 18 May. Cut: 17 May, 23 Aug, 9 Nov. Weedkiller applied: 17 Sept.

76/R/CS/14 PLOT 5/1 NORES

EXCLUDING PKRES65 PLOTS

1ST CUT (17/5/76) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

P	0.0	16.8	33.6	67.2	MEAN
NPERCUT					
33.6	1.33	2.29	2.38	2.59	2.15
67.2	1.29	3.08	3.34	3.15	2.72
MEAN	1.31	2.69	2.86	2.87	2.43
K	0	112	224	448	MEAN
NPERCUT					
33.6	1.54	2.32	2.59	2.14	2.15
67.2	1.27	3.13	3.46	3.01	2.72
MEAN	1.40	2.72	3.03	2.57	2.43
K	0	112	224	448	MEAN
P					
0.0	1.16	1.65	1.35	1.07	1.31
16.8	1.45	3.15	3.51	2.63	2.69
33.6	1.28	3.16	3.66	3.34	2.86
67.2	1.71	2.93	3.58	3.25	2.87
MEAN	1.40	2.72	3.03	2.57	2.43
	K	0	112	224	448
NPERCUT	P				
33.6	0.0	1.43	1.47	1.25	1.18
	16.8	1.62	2.69	2.50	2.36
	33.6	1.19	2.56	3.45	2.32
	67.2	1.90	2.56	3.19	2.69
67.2	0.0	0.90	1.83	1.46	0.95
	16.8	1.28	3.62	4.52	2.91
	33.6	1.37	3.76	3.87	4.36
	67.2	1.51	3.30	3.98	3.81

1ST CUT MEAN DM% 24.3

76/R/CS/14 PLOT 5/1 NORES

EXCLUDING PKRES65 PLOTS

2ND CUT (23/8/76) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

P	0.0	16.8	33.6	67.2	MEAN
NPERCUT					
33.6	0.71	0.91	0.76	0.85	0.81
67.2	1.26	0.78	1.18	1.27	1.13
MEAN	0.99	0.85	0.97	1.06	0.97
K	0	112	224	448	MEAN
NPERCUT					
33.6	0.53	0.77	0.96	0.97	0.81
67.2	0.43	1.02	1.45	1.60	1.13
MEAN	0.48	0.90	1.21	1.28	0.97
K	0	112	224	448	MEAN
P					
0.0	0.69	1.14	1.18	0.93	0.99
16.8	0.34	0.83	1.17	1.06	0.85
33.6	0.50	0.63	1.23	1.53	0.97
67.2	0.40	0.98	1.25	1.61	1.06
MEAN	0.48	0.90	1.21	1.28	0.97
	K	0	112	224	448
NPERCUT	P				
33.6	0.0	0.59	0.80	0.69	0.74
	16.8	0.54	0.78	1.17	1.16
	33.6	0.48	0.61	0.90	1.06
	67.2	0.51	0.89	1.09	0.91
67.2	0.0	0.78	1.48	1.67	1.13
	16.8	0.14	0.88	1.16	0.95
	33.6	0.52	0.65	1.56	2.01
	67.2	0.30	1.08	1.41	2.30

2ND CUT MEAN DM% 45.9

76/R/CS/14 PLOT 5/1 NORES

EXCLUDING PKRES65 PLOTS

3RD CUT (9/11/76) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

P	0.0	16.8	33.6	67.2	MEAN
NPERCUT					
33.6	0.29	0.53	0.80	0.71	0.58
67.2	0.39	0.68	0.62	0.68	0.59
MEAN	0.34	0.60	0.71	0.70	0.59
K	0	112	224	448	MEAN
NPERCUT					
33.6	0.61	0.52	0.56	0.65	0.58
67.2	0.35	0.89	0.68	0.45	0.59
MEAN	0.48	0.70	0.62	0.55	0.59
K	0	112	224	448	MEAN
P					
0.0	0.31	0.29	0.39	0.38	0.34
16.8	0.30	0.79	0.72	0.62	0.60
33.6	0.83	1.01	0.58	0.42	0.71
67.2	0.48	0.73	0.79	0.79	0.70
MEAN	0.48	0.70	0.62	0.55	0.59
	K	0	112	224	448
NPERCUT	P				
33.6	0.0	0.28	0.20	0.16	0.54
	16.8	0.32	0.68	0.56	0.54
	33.6	1.34	0.73	0.68	0.46
	67.2	0.49	0.47	0.82	1.06
67.2	0.0	0.34	0.38	0.61	0.23
	16.8	0.27	0.89	0.83	0.69
	33.6	0.33	1.30	0.49	0.38
	67.2	0.46	0.99	0.75	0.52

3RD CUT MEAN DM% 21.4

76/R/CS/14 PLOT 5/1 NORES

EXCLUDING PKRES65 PLOTS

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

P	0.0	16.8	33.6	67.2	MEAN
NPERCUT					
33.6	2.33	3.73	3.94	4.15	3.54
67.2	2.94	4.55	5.15	5.10	4.43
MEAN	2.63	4.14	4.55	4.62	3.99

K	0	112	224	448	MEAN
NPERCUT					
33.6	2.67	3.61	4.12	3.75	3.54
67.2	2.05	5.04	5.59	5.06	4.43
MEAN	2.36	4.33	4.85	4.41	3.99

K	0	112	224	448	MEAN
P					
0.0	2.16	3.08	2.92	2.38	2.63
16.8	2.08	4.77	5.40	4.30	4.14
33.6	2.62	4.81	5.47	5.30	4.55
67.2	2.59	4.64	5.62	5.65	4.62
MEAN	2.36	4.33	4.85	4.41	3.99

K	0	112	224	448	
P					
NPERCUT					
33.6	0.0	2.30	2.47	2.10	2.46
	16.8	2.48	4.16	4.23	4.05
	33.6	3.01	3.90	5.03	3.84
	67.2	2.91	3.91	5.11	4.66
67.2	0.0	2.01	3.70	3.74	2.30
	16.8	1.69	5.38	6.56	4.55
	33.6	2.22	5.72	5.92	6.75
	67.2	2.26	5.37	6.13	6.64

TOTAL OF 3 CUTS MEAN DM% 30.5

PLOT AREA HARVESTED 0.00086

76/R/CS/14 PLOT 5/1 NORES

PKRES65 PLOTS

1ST CUT (17/5/76) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

PKRES65 NPERCUT	34P56K	34P336K	MEAN
33.6	1.19	1.25	1.22
67.2	1.20	0.89	1.04
MEAN	1.19	1.07	1.13

1ST CUT MEAN DM% 31.2

2ND CUT (23/8/76) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

PKRES65 NPERCUT	34P56K	34P336K	MEAN
33.6	0.60	0.74	0.67
67.2	0.75	0.49	0.62
MEAN	0.68	0.61	0.64

2ND CUT MEAN DM% 47.2

3RD CUT (9/11/76) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

PKRES65 NPERCUT	34P56K	34P336K	MEAN
33.6	0.41	0.40	0.41
67.2	0.37	0.22	0.29
MEAN	0.39	0.31	0.35

3RD CUT MEAN DM% 27.0

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

PKRES65 NPERCUT	34P56K	34P336K	MEAN
33.6	2.20	2.39	2.29
67.2	2.32	1.60	1.96
MEAN	2.26	1.99	2.13

TOTAL OF 3 CUTS MEAN DM% 35.2

PLOT AREA HARVESTED 0.00086

76/R/CS/14 PLOT 5/2 PKRES

EXCLUDING PKRES65 PLOTS

1ST CUT (17/5/76) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

P	0.0	16.8	33.6	67.2	MEAN
NPERCUT					
33.6	2.73	2.55	2.62	2.33	2.56
67.2	4.25	4.49	4.25	4.08	4.27
MEAN	3.49	3.52	3.43	3.20	3.41
K	0	112	224	448	MEAN
NPERCUT					
33.6	2.58	2.69	2.51	2.45	2.56
67.2	4.12	4.34	4.53	4.08	4.27
MEAN	3.35	3.51	3.52	3.26	3.41
K	0	112	224	448	MEAN
P					
0.0	3.25	3.63	3.71	3.37	3.49
16.8	3.29	3.48	3.81	3.50	3.52
33.6	3.51	3.60	3.45	3.17	3.43
67.2	3.35	3.34	3.10	3.02	3.20
MEAN	3.35	3.51	3.52	3.26	3.41
NPERCUT	K	0	112	224	448
	P				
33.6	0.0	2.53	2.74	2.98	2.67
	16.8	2.40	2.72	2.60	2.46
	33.6	2.74	2.89	2.31	2.55
	67.2	2.64	2.40	2.14	2.13
67.2	0.0	3.97	4.51	4.45	4.06
	16.8	4.17	4.23	5.01	4.54
	33.6	4.28	4.32	4.59	3.79
	67.2	4.07	4.29	4.06	3.91

1ST CUT MEAN DM% 22.5

76/R/CS/14 PLOT 5/2 PKRES

EXCLUDING PKRES65 PLOTS

2ND CUT (23/8/76) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

P	0.0	16.8	33.6	67.2	MEAN
NPERCUT					
33.6	1.35	1.06	1.16	1.06	1.16
67.2	1.50	1.53	1.43	1.97	1.61
MEAN	1.43	1.30	1.29	1.52	1.38
K	0	112	224	448	MEAN
NPERCUT					
33.6	1.12	1.20	1.11	1.20	1.16
67.2	1.56	1.16	1.96	1.76	1.61
MEAN	1.34	1.18	1.53	1.48	1.38
K	0	112	224	448	MEAN
P					
0.0	1.24	1.03	1.61	1.82	1.43
16.8	1.13	1.15	1.52	1.40	1.30
33.6	1.28	1.20	1.67	1.02	1.29
67.2	1.71	1.33	1.34	1.70	1.52
MEAN	1.34	1.18	1.53	1.48	1.38
NPERCUT	K	0	112	224	448
33.6	P				
	0.0	1.24	1.21	1.42	1.53
	16.8	0.97	1.20	1.23	0.85
	33.6	0.96	1.41	1.05	1.21
	67.2	1.31	0.96	0.74	1.23
67.2	0.0	1.25	0.85	1.80	2.11
	16.8	1.28	1.09	1.81	1.96
	33.6	1.60	0.99	2.29	0.83
	67.2	2.11	1.69	1.93	2.16

2ND CUT MEAN DM% 41.3

76/R/CS/14 PLOT 5/2 PKRES

EXCLUDING PKRES65 PLOTS

3RD CUT (9/11/76) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

P	0.0	16.8	33.6	67.2	MEAN
NPERCUT					
33.6	0.36	0.38	0.47	0.48	0.42
67.2	0.73	0.75	0.70	0.67	0.71
MEAN	0.55	0.57	0.59	0.57	0.57
K	0	112	224	448	MEAN
NPERCUT					
33.6	0.48	0.41	0.41	0.39	0.42
67.2	0.97	0.52	0.76	0.61	0.71
MEAN	0.72	0.46	0.58	0.50	0.57
K	0	112	224	448	MEAN
P					
0.0	0.57	0.58	0.65	0.39	0.55
16.8	0.87	0.42	0.57	0.40	0.57
33.6	0.71	0.49	0.54	0.62	0.59
67.2	0.75	0.36	0.59	0.59	0.57
MEAN	0.72	0.46	0.58	0.50	0.57
NPERCUT	K	0	112	224	448
	P				
33.6	0.0	0.30	0.43	0.42	0.30
	16.8	0.47	0.34	0.38	0.34
	33.6	0.58	0.41	0.41	0.49
	67.2	0.58	0.46	0.43	0.44
67.2	0.0	0.83	0.73	0.88	0.49
	16.8	1.27	0.51	0.76	0.47
	33.6	0.83	0.57	0.66	0.75
	67.2	0.93	0.26	0.75	0.74

3RD CUT MEAN DM% 20.1

76/R/CS/14 PLOT 5/2 PKRES

EXCLUDING PKRES65 PLOTS

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

P	0.0	16.8	33.6	67.2	MEAN
NPERCUT					
33.6	4.44	3.99	4.25	3.86	4.14
67.2	6.49	6.77	6.37	6.73	6.59

MEAN	5.46	5.38	5.31	5.29	5.36
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K	0	112	224	448	MEAN
NPERCUT					
3.6	4.18	4.30	4.03	4.05	4.14
67.2	6.65	6.01	7.25	6.45	6.59

MEAN	5.41	5.15	5.64	5.25	5.36
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K	0	112	224	448	MEAN
P					
0.0	5.06	5.24	5.97	5.58	5.46
16.8	5.28	5.05	5.89	5.31	5.38
33.6	5.50	5.29	5.66	4.81	5.31
67.2	5.82	5.04	5.02	5.30	5.29

MEAN	5.41	5.15	5.64	5.25	5.36
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	K	0	112	224	448
NPERCUT	P				
33.6	0.0	4.06	4.38	4.82	4.49
	16.8	3.85	4.27	4.20	3.65
	33.6	4.28	4.71	3.78	4.24
	67.2	4.53	3.82	3.30	3.80
67.2	0.0	6.06	6.09	7.13	6.66
	16.8	6.72	5.82	7.58	6.97
	33.6	6.71	5.88	7.54	5.38
	67.2	7.11	6.25	6.74	6.81

TOTAL OF 3 CUTS MEAN DM% 28.0

PLOT AREA HARVESTED 0.00086

76/R/CS/14 PLOT 5/2 PKRES

PKRES65 PLOTS

1ST CUT (17/5/76) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

PKRES65 NPERCUT	34P56K	34P336K	MEAN
33.6	2.56	2.68	2.62
67.2	3.84	4.14	3.99
MEAN	3.20	3.41	3.30

1ST CUT MEAN DM% 23.8

2ND CUT (23/8/76) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

PKRES65 NPERCUT	34P56K	34P336K	MEAN
33.6	1.43	1.17	1.30
67.2	1.30	1.46	1.38
MEAN	1.37	1.31	1.34

2ND CUT MEAN DM% 41.6

3RD CUT (9/11/76) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

PKRES65 NPERCUT	34P56K	34P336K	MEAN
33.6	0.43	0.38	0.40
67.2	0.76	0.72	0.74
MEAN	0.59	0.55	0.57

3RD CUT MEAN DM% 20.5

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

PKRES65 NPERCUT	34P56K	34P336K	MEAN
33.6	4.42	4.23	4.32
67.2	5.90	6.32	6.11
MEAN	5.16	5.27	5.21

TOTAL OF 3 CUTS MEAN DM% 28.7

PLOT AREA HARVESTED 0.00086