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Yields of the Field Experiments 1976

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76/R/CS/10 and 76/W/CS/10 Long-term Liming - S. Oilseed Rape

Rothamsted Research

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76/R/CS/10 and 76/W/CS/10

LONG TERM LIMING

Object: To study the effects of different amounts of lime on the yields of a sequence of crops. The effects of P, K and Mg are also studied - Rothamsted (R) Sawyers I and Woburn (W) Stackyard C.

Sponsor: J. Bolton.

The 15th year, spring oilseed rape.

For previous years see 'Details' 1967, 68/C/3(t), 69/R&W/CS/10, 70/R&W/CS/10(t) and 71-75/R&W/CS/10.

Design: 2 randomised blocks of 16 plots, split into 2.

Whole plot dimensions: 6.40 x 18.3.

Treatments: All combinations of:-

Whole plots

1. LIME Ground chalk (tonnes CaCO₃) (total applied 1962-63):

R	W	Rothamsted (R)	Woburn (W)
0	0	None	None
5	5	5	5
10	12	10	12
20	19	20	19

2. P205 Phosphate, applied cumulatively to previous dressings, as superphosphate (kg P205):

0	None
63	63

3. K20 Potassium, applied cumulatively to previous dressings, as muriate of potash (kg K20):

0	None
126	126

Sub plots

4. MG Magnesium, applied cumulatively in 1974 and 1976 only, as Epsom salts (kg Mg):

0	None
112	112

Basal applications:

Sawyers I (R): Manures: N at 170 kg. Weedkillers: Paraquat at 0.56 kg ion in 220 l.

Stackyard C (W): Manures: N at 170 kg.

Seed: Sawyers I (R): Maris Haplona, sown at 5.6 kg.

Stackyard C (W): Maris Haplona, sown at 6.2 kg.

76/R/CS/10 and 76/W/CS/10

Cultivations, etc.:-

Sawyers I (R): Weedkiller applied: 7 Oct, 1975. Ploughed: 20 Oct.
 Spring-tine cultivated: 11 Mar, 1976. Treatment P, K and Mg and basal N applied: 24 Mar. Spring-tine cultivated, seed sown: 26 Mar. Harvested green: 14 July.
 Stackyard C (W): Heavy spring-tine cultivated, rotary cultivated: 2 Sept, 1975. Ploughed: 21 Oct. Spring-tine cultivated: 9 Mar, 1976. Treatment P, K and Mg applied: 26 Mar. Basal N applied: 29 Mar. Spring-tine cultivated with crumbler: 30 Mar. Rolled, seed sown: 31 Mar. Harvested green: 7 July.

NOTES: (1) Photographs were taken and growth scores made in July.
 (2) Because of crop failure no yield was harvestable on 5 plots with the following Treatment Combinations:-

LIME	P205	K20	Mg
0	0	0	0
0	0	126	0 (TWO)
0	0	126	112 (TWO)

These yields were treated as zero, missing values were not estimated.

76/R/CS/10 SAWYERS I (R)

GREENCROP DRY MATTER TONNES/HECTARE

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	15	0.470	30.3
BLOCK.WP.SP	16	0.236	15.2

MEAN DM% 34.6

SUB PLOT AREA HARVESTED 0.00084

76/W/CS/10 STACKYARD C(W)

GREENCROP DRY MATTER TONNES/HECTARE

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	15	0.324	28.7
BLOCK.WP.SP	16	0.234	20.7

MEAN DM% 26.6

SUB PLOT AREA HARVESTED 0.00251

76/R/CS/10 SAWYERS I (R)

GREENCROP DRY MATTER TONNES/HECTARE

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

K20	0	126	MEAN		
P205					
0	0.75	0.94	0.85		
63	1.62	2.89	2.25		
MEAN	1.19	1.91	1.55		
MG	0	112	MEAN		
P205					
0	0.90	0.79	0.85		
63	2.34	2.17	2.25		
MEAN	1.62	1.48	1.55		
MG	0	112	MEAN		
K20					
0	1.20	1.18	1.19		
126	2.05	1.78	1.91		
MEAN	1.62	1.48	1.55		
LIME	0	5	10	20	MEAN
P205					
0	0.15	0.75	1.20	1.27	0.85
63	1.13	1.95	2.74	3.19	2.25
MEAN	0.64	1.35	1.97	2.23	1.55
LIME	0	5	10	20	MEAN
K20					
0	0.51	0.99	1.66	1.60	1.19
126	0.78	1.71	2.29	2.86	1.91
MEAN	0.64	1.35	1.97	2.23	1.55
LIME	0	5	10	20	MEAN
MG					
0	0.61	1.50	2.03	2.34	1.62
112	0.68	1.20	1.92	2.12	1.48
MEAN	0.64	1.35	1.97	2.23	1.55
K20	0	126			
MG	0	112	0	112	
P205					
0	0.75	0.76	1.05	0.82	
63	1.64	1.60	3.04	2.74	
LIME	0	5	10	20	
P205					
0	0	0.31	0.81	1.08	0.82
	126	0.90	0.70	1.33	1.72
63	0	0.71	1.18	2.23	2.37
	126	1.56	2.73	3.26	4.01

76/R/CS/10 SAWYERS I (R)

GREENCROP DRY MATTER TONNES/HECTARE

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

	LIME	0	5	10	20	
P205	MG					
0	0	0.17	0.81	1.21	1.41	
63	0	1.05	2.20	2.85	3.27	
	112	1.22	1.71	2.63	3.11	
K20	LIME	0	5	10	20	
	MG					
0	0	0.50	1.02	1.59	1.67	
	112	0.52	0.97	1.72	1.52	
126	0	0.72	1.99	2.47	3.01	
	112	0.84	1.44	2.12	2.72	
P205	K20	LIME	0	5	10	20
		MG				
0	0	0	0.35	0.92	1.00	0.73
		112	0.27	0.69	1.16	0.92
	126	0	0.00	0.69	1.42	2.10
		112	0.00	0.71	1.23	1.33
63	0	0	0.65	1.11	2.19	2.62
		112	0.76	1.24	2.27	2.13
	126	0	1.44	3.28	3.52	3.92
		112	1.67	2.17	3.00	4.10

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	P205	K20	MG	LIME
SED	0.166	0.166	0.059	0.235
TABLE	P205	P205	K20	P205
	K20	MG	MG	LIME
SED	0.235	0.176	0.176	0.332
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
P205		0.083		
K20			0.083	
TABLE	K20	MG	P205	P205
	LIME	LIME	K20	K20
			MG	LIME
SED	0.332	0.249	0.249	0.470
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
LIME		0.118		
P205.K20			0.118	
TABLE	P205	K20	P205	
	MG	MG	K20	
	LIME	LIME	MG	
			LIME	
SED	0.352	0.352	0.498	
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
P205.LIME	0.167			
K20.LIME		0.167		
P205.K20.LIME			0.236	

76/W/CS/10 STACKYARD C(W)

GREENCROP DRY MATTER TONNES/HECTARE

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

K20	0	126	MEAN		
P205					
0	0.57	0.92	0.74		
63	0.87	2.15	1.51		
MEAN	0.72	1.54	1.13		
MG	0	112	MEAN		
P205					
0	0.66	0.83	0.74		
63	1.48	1.55	1.51		
MEAN	1.07	1.19	1.13		
MG	0	112	MEAN		
K20					
0	0.66	0.78	0.72		
126	1.48	1.59	1.54		
MEAN	1.07	1.19	1.13		
LIME	0	5	12	19	MEAN
P205					
0	0.19	0.82	0.80	1.16	0.74
63	1.03	1.47	1.75	1.81	1.51
MEAN	0.61	1.15	1.27	1.48	1.13
LIME	0	5	12	19	MEAN
K20					
0	0.45	0.61	0.85	0.97	0.72
126	0.77	1.69	1.70	1.99	1.54
MEAN	0.61	1.15	1.27	1.48	1.13
LIME	0	5	12	19	MEAN
MG					
0	0.59	1.05	1.22	1.42	1.07
112	0.64	1.24	1.33	1.55	1.19
MEAN	0.61	1.15	1.27	1.48	1.13
K20	0		126		
MG	0	112	0	112	
P205					
0	0.51	0.62	0.80	1.03	
63	0.80	0.95	2.15	2.15	
	LIME	0	5	12	19
P205	K20				
0	0	0.17	0.59	0.81	0.71
	126	0.22	1.05	0.80	1.60
63	0	0.74	0.62	0.90	1.23
	126	1.32	2.32	2.59	2.38

76/W/CS/10 STACKYARD C (W)

GREENCROP DRY MATTER TONNES/HECTARE

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

	LIME	0	5	12	19	
P205	MG					
0	0	0.15	0.67	0.68	1.13	
	112	0.23	0.97	0.93	1.18	
63	0	1.02	1.42	1.77	1.70	
	112	1.05	1.52	1.72	1.91	
K20	LIME	0	5	12	19	
	MG					
0	0	0.40	0.54	0.82	0.87	
	112	0.50	0.67	0.89	1.07	
126	0	0.77	1.56	1.62	1.97	
	112	0.77	1.81	1.77	2.02	
P205	K20	LIME	0	5	12	19
		MG				
0	0	0	0.13	0.46	0.71	0.77
		112	0.21	0.73	0.91	0.65
	126	0	0.18	0.89	0.64	1.50
		112	0.25	1.20	0.95	1.71
63	0	0	0.68	0.62	0.93	0.97
		112	0.80	0.62	0.87	1.50
	126	0	1.35	2.23	2.60	2.44
		112	1.29	2.42	2.58	2.33

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	P205	K20	MG	LIME
SED	0.114	0.114	0.058	0.162
TABLE	P205	P205	K20	P205
	K20	MG	MG	LIME
SED	0.162	0.129	0.129	0.229
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
P205		0.083		
K20			0.083	
TABLE	K20	MG	P205	P205
	LIME	LIME	K20	K20
			MG	LIME
SED	0.229	0.182	0.182	0.324
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
LIME		0.117		
P205.K20			0.117	
TABLE	P205	K20	P205	
	MG	MG	K20	
	LIME	LIME	MG	
			LIME	
SED	0.257	0.257	0.364	
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
P205.LIME	0.165			
K20.LIME		0.165		
P205.K20.LIME			0.234	