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Yields of the Field Experiments 1974

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74/R/CS/10 and 74/W/CS/10 Long-term Liming - Potatoes

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74/R/CS/10 and 74/W/CS/10

LONG TERM LIMING

Object: To study the effects of different amounts of lime on the yields of a range 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 13th year, potatoes.

For previous years see 'Details' 1967, 68/C/3(t), 69/R&W/CS/10, 70/R&W/CS/10(t) and 71-73/R&W/CS/10.

Design: 2 randomised blocks of 16 plots.

Whole plot dimensions: 6.40 x 18.3. Sub plot area harvested: 0.00117.

Treatments: All combinations of:-

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

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

2. Phosphate, applied cumulatively to previous dressings, as superphosphate (kg P₂O₅): P₂O₅

None	0
125	125

3. Potassium, applied cumulatively to previous dressings as muriate of potash (kg K₂O): K₂O

None	0
188	188

Sub plots: 4. Magnesium, applied 1974 only, as Epsom salts (kg Mg): MG

None	0
112	112

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Basal applications:

Sawyers I (R): Manures: 190 kg N as 'Nitro-Chalk'. Weedkillers: Linuron at 1.2 kg plus paraquat at 0.42 kg ion in 450 l. Fungicide and insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 450 l. Fungicide: Mancozeb at 1.3 kg in 450 l.

Stackyard C (W): Manures: 250 kg N as 'Nitro-Chalk'. Weedkillers: Aminotriazole at 4.5 kg plus ammonium thiocyanate at 4.1 kg in 370 l. Linuron at 1.2 kg plus paraquat at 0.28 kg ion in 280 l. Fungicide and insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 450 l. Fungicide: Mancozeb at 1.3 kg in 450 l.

Seed: Sawyers I (R) and Stackyard C (W): Pentland Crown.

Cultivations, etc.:-

Sawyers I (R): Ploughed: 19 Nov, 1973. Basal N applied: 23 Apr, 1974. Treatment P, K and Mg applied, spike rotary cultivated, potatoes planted: 24 Apr. Weedkiller applied: 17 May. Grubbed: 19 June. Rotary ridged: 21 June. Fungicide with insecticide applied: 11 July. Fungicide applied: 2 Aug. Haulm mechanically destroyed: 10 Sept. Sprayed with undiluted BOV at 225 l: 19 Sept. Lifted: 30 Oct.

Stackyard C (W): Aminotriazole plus ammonium thiocyanate applied: 13 Sept, 1973. Subsoiled, tines 140 cm apart 50 cm deep: 25 Oct. Ploughed: 13 Nov. Spring-tine cultivated: 4 Apr, 1974. Basal N, treatment P, K and Mg applied: 16 Apr. Rotary cultivated, potatoes planted: 17 Apr. Weedkiller applied: 15 May. Rotary ridged: 12 June. Fungicide with insecticide applied: 19 July. Fungicide applied: 7 Aug. Haulm mechanically destroyed: 12 Sept. Sprayed with undiluted BOV at 170 l. Lifted: 30 Sept.

- NOTES: (1) Leaf samples were taken in July for N, P, K, Ca and Mg analysis.
- (2) Photographs were taken and growth scores made in June.
- (3) 74/R/CS/10. Estimated values were used in the analysis for yields from one whole plot, LIME - 20, P205 - 125, K20 - 0, because there was both visual and analytical evidence that K residues from an unknown source affected growth over most of the plot area.
- (4) 74/W/CS/10. An anomalous yield from one sub plot LIME - 12, P205 - 125, K20 - 188, MG - 112, was treated as missing. An estimated value was used in the analysis.

Standard errors per plot. Total tubers: tonnes/hectare.

Sawyers I (R). Whole plot: 3.85 or 13.0% (14 d.f.)
Sub plot: 4.05 or 13.7% (15 d.f.)

Stackyard C (W). Whole plot: 3.86 or 15.8% (15 d.f.)
Sub plot: 4.13 or 16.9% (15 d.f.)

74/R/CS/10 and 74/W/CS/10

TABLES OF MEANS

SAWYERS I (R)

TOTAL TUBERS: TONNES/HECTARE

	P205		K20		MG		Mean
	0	125	0	188	0	112	
LIME							
0	10.0	36.5	23.8	22.7	18.0	28.5	23.2
5	25.6	37.9	23.2	40.3	29.1	34.4	31.7
10	28.3	40.1	20.1	48.3	33.0	35.3	34.2
20	24.5	33.5	11.4	46.7	28.7	29.3	29.0
	P205						
		0	16.6	27.6	20.1	24.0	22.1
		125	22.6	51.4	34.3	39.7	37.0
		K20					
			0		19.2	20.0	19.6
			188		35.2	43.8	39.5
Mean					27.2	31.9	29.5
	K20	0	0	188			
	MG	0	112	0	112		
LIME	P205						
0	0	11.2	14.2	3.6	11.0		
	125	34.2	35.7	22.9	53.2		
5	0	21.9	26.2	21.6	32.6		
	125	22.6	22.0	50.3	56.7		
10	0	18.2	18.2	37.3	39.3		
	125	20.7	23.3	56.0	60.5		
20	0	12.6	10.4	34.6	40.4		
	125	12.4	10.2	55.3	56.3		

74/R/CS/10 and 74/W/CS/10

SAWYERS I (R)

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

	P205		K20		MG		Mean
	0	125	0	188	0	112	
LIME							
0	81.9	95.9	92.2	85.5	82.5	95.3	88.9
5	98.7	97.7	97.2	99.2	98.2	98.2	98.2
10	98.9	97.6	97.4	99.1	98.0	98.5	98.2
20	97.6	94.9	93.2	99.3	96.6	95.9	96.2
	P205						
		0	94.8	93.7	91.8	96.7	94.2
		125	95.2	97.8	95.8	97.2	96.5
			K20				
				0	94.2	95.8	95.0
				188	93.4	98.1	95.8
Mean					93.8	97.0	95.4

	LIME	P205	K20		0		188	
			MG		0	112	0	112
	0	0			80.0	92.5	63.6	91.4
		125			98.0	98.2	88.4	98.9
	5	0			98.4	98.4	99.0	98.8
		125			96.0	96.0	99.3	99.5
	10	0			98.1	98.8	99.3	99.2
		125			95.5	97.1	98.9	99.0
	20	0			97.0	95.1	99.0	99.3
		125			90.9	90.0	99.6	99.1

74/R/CS/10 and 74/W/CS/10

STACKYARD C (W)

TOTAL TUBERS: TONNES/HECTARE

	P205		K20		MG		Mean
	0	125	0	188	0	112	
LIME							
0	8.2	27.6	13.7	22.1	9.2	26.6	17.9
5	18.4	32.0	15.2	35.2	20.6	29.8	25.2
12	22.6	30.9	15.7	37.8	22.0	31.6	26.8
19	24.9	30.7	11.7	43.9	24.6	31.0	27.8
	P205						
		0	11.6	25.5	14.6	22.4	18.5
		125	16.6	44.0	23.6	37.0	30.3
		K20					
				0	13.4	14.8	14.1
				188	24.7	44.7	34.7
Mean					19.1	29.7	24.4

	LIME	P205	K20		MG	
			0	112	0	188
	0	0	4.9	11.6	2.6	13.6
		125	16.1	22.2	13.2	58.8
	5	0	14.6	13.0	13.6	32.4
		125	17.2	16.0	37.0	57.9
	12	0	15.1	14.6	20.0	41.0
		125	15.8	17.5	37.1	53.2
	19	0	10.8	8.1	35.5	45.3
		125	12.9	15.0	39.0	55.7

74/R/CS/10 and 74/W/CS/10

STACKYARD C (W)

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

	P205		K20		MG		Mean
	0	125	0	188	0	112	
LIME							
0	78.8	95.2	85.0	88.9	80.9	93.1	87.0
5	95.7	95.9	93.8	97.8	95.6	96.0	95.8
12	96.8	94.8	93.1	98.5	95.2	96.4	95.8
19	96.2	96.0	93.1	99.0	96.3	95.8	96.1
	P205						
		0	89.9	93.9	89.2	94.5	91.9
		125	92.7	98.2	94.8	96.1	95.5
			K20				
				0	89.8	92.7	91.3
				188	94.2	97.9	96.1
Mean					92.0	95.3	93.7

		K20		0		188	
		MG	0	112	0	112	
LIME	P205						
0	0		64.6	87.7	72.1	90.6	
	125		92.6	95.0	94.1	99.0	
5	0		94.9	93.4	95.5	99.0	
	125		93.9	93.1	98.3	98.4	
12	0		96.0	95.4	97.2	98.8	
	125		88.8	92.3	98.8	99.1	
19	0		94.8	92.0	98.5	99.5	
	125		93.0	92.8	99.0	99.0	

74/R/CS/10 and 74/W/CS/10

STANDARD ERRORS OF DIFFERENCES

TOTAL TUBERS

SAWYERS I (R)

LIME	P205	K20	MG	LIME P205	LIME K20	P205 K20
1.93	1.36	1.36	1.01	2.72	2.72	1.93
			LIME MG	P205 MG	K20 MG	LIME P205 K20 MG
			2.40	1.70	1.70	4.80
Except when comparing means with same levels of						
LIME			2.02			
P205				1.43		
K20					1.43	
LIME.P205.K20						4.05

STACKYARD C (W)

LIME	P205	K20	MG	LIME P205	LIME K20	P205 K20
1.93	1.36	1.36	1.03	2.73	2.73	1.93
			LIME MG	P205 MG	K20 MG	LIME P205 K20 MG
			2.42	1.71	1.71	4.84
Except when comparing means with same levels of						
LIME			2.06			
P205				1.46		
K20					1.46	
LIME.P205.K20						4.13