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83/R/CS/10 and 83/W/CS/10 Long-term Liming - Potatoes

Rothamsted Research

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83/R/CS/10 and 83/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 are also studied - Rothamsted (R) Sawyers I and Woburn (W) Stackyard C.

Sponsors: S.P. McGrath, D.P. Stribley.

The 22nd year, potatoes.

For previous years see 'Details' 1967, 1973 and 74-82/R&W/CS/10.

Design: 2 randomised blocks of 16 plots.

Whole plot dimensions: 6.40 x 18.3.

Treatments: All combinations of:-

1. CHALK Ground chalk (tonnes CaCO₃) (total applied 1962-83):

		Rothamsted Total			Woburn Total		
R	W	1962-78	1982	1983	1962-78	1982	1983
0	0	0	0	0	0	0	0
14	8	7	2	5	6	2	0
23	24	15	5	3	14	5	5
50	43	30	10	10	23	10	10

2. P P fertilizer applied:

	Until 1978	1981	1982	1983	
	R & W	R & W	R & W	R	W
0	0	0	0	0	0
P1	0	P1	P1	0	P2
P2	P	P1	0	P2	P2
P3	P	P3	P1	P2	P4

Rates 1981-1983 P1, P2, P3, P4 = 25, 50, 75, 100 kg P as superphosphate

- NOTES: (1) Until 1978 test P was applied cumulatively, rates varied with crop. None was applied in 1979 and 1980 (fallow). K was applied, cumulatively, to P1 and P3 plots. Since 1981 K has been applied basally.
 (2) A sub plot test of Mg applied in earlier years has been ignored. Since 1981 Mg has been applied basally.

Basal applications:

Sawyers I (R): Manures: N at 250 kg as 'Nitro-Chalk', K at 210 kg as muriate of potash, Mg at 40 kg as kieserite. Weedkillers: Linuron at 1.0 l with paraquat at 0.4 kg ion in 500 l. Fungicide: Mancozeb at 1.4 kg in 250 l on three occasions. Fentin hydroxide at 0.28 kg in 250 l on five occasions with the insecticide on the first four occasions. Insecticide: Pirimicarb at 0.14 kg. Haulm desiccant: Undiluted BOV at 170 l.

83/R/CS/10 and 83/W/CS/10

Stackyard C (W): Manures: N at 260 kg as 'Nitro-Chalk', K at 210 kg as muriate of potash, Mg at 40 kg as kieserite. Weedkillers: Glyphosate at 1.5 kg in 280 l. Linuron at 1.0 l with paraquat at 0.4 kg ion in 250 l. Fungicide: Mancozeb at 1.4 kg in 250 l on four occasions with the insecticide on the first, third and fourth occasions. Fentin hydroxide at 0.28 kg in 250 l on four occasions with insecticide on the first three occasions. Insecticide: Pirimicarb at 0.14 kg. Haulm desiccant: Diquat at 0.50 kg ion in 250 l.

Seed: Pentland crown.

Cultivations, etc.:-

Sawyers I (R): Ground chalk treatments applied: 26 Nov, 1982. Ploughed: 1 Dec. P treatments and N, K and Mg applied: 11 May, 1983. Rotary harrowed, potatoes planted: 23 May. Rotary ridged: 26 May. Weedkillers applied: 7 June. Mancozeb applied: 22 June, 25 Aug, 9 Sept. Fentin hydroxide applied with insecticide: 1 July, 8 July, 18 July, 28 July. Fentin hydroxide applied: 11 Aug. Haulm mechanically destroyed: 11 Oct. Haulm desiccant applied: 19 Oct. Lifted: 28 Oct.

Stackyard C (W): Glyphosate applied: 12 Sept, 1982. Ploughed: 8 Oct. Ground chalk treatments applied: 4 Nov. Ploughed: 23 Dec. Heavy spring-tine cultivated: 21 Mar, 1983. P treatments and N, K and Mg applied: 22 Mar. Heavy spring-tine cultivated: 28 Mar, 11 May. Rotary cultivated, potatoes planted: 11 May. Rotary ridged, weedkiller applied: 7 June. Mancozeb applied with insecticide: 22 June, 8 July, 18 July. Mancozeb applied: 1 July. Fentin hydroxide applied with insecticide: 29 July, 11 Aug, 26 Aug. Fentin hydroxide applied: 9 Sept. Haulm mechanically destroyed: 5 Oct. Haulm desiccant applied: 17 Oct. Lifted: 7 Nov.

NOTE: Soil samples were taken from both sites after harvest for chemical analyses.

83/R/CS/10 SAWYERS (R)

TOTAL TUBERS TONNES/HECTARE

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

P	0	P1	P2	P3	MEAN
CHALK					
0	19.3	18.7	27.9	29.4	23.8
14	26.8	28.8	29.4	33.1	29.5
23	26.6	29.2	30.7	33.5	30.0
50	26.3	27.8	29.0	32.2	28.8
MEAN	24.8	26.1	29.2	32.0	28.0

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

TABLE	CHALK	P	CHALK P
-----	-----	-----	-----
SED	0.99	0.99	1.97

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

STRATUM	DF	SE	CV%
BLOCK.WP	15	1.97	7.0

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

P	0	P1	P2	P3	MEAN
CHALK					
0	97.4	96.6	97.3	97.5	97.2
14	97.6	98.2	96.7	97.3	97.5
23	97.6	97.8	97.6	97.8	97.7
50	97.6	97.5	97.2	98.2	97.6
MEAN	97.5	97.5	97.2	97.7	97.5

PLOT AREA HARVESTED 0.00274

83/W/CS/10 STACKYARD (W)

TOTAL TUBERS TONNES/HECTARE

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

P	0	P1	P2	P3	MEAN
CHALK					
0	29.8	40.2	45.5	43.0	39.6
8	43.9	52.2	46.1	50.0	48.1
24	37.7	42.9	41.9	42.4	41.2
43	36.6	41.9	37.5	40.0	39.0
MEAN	37.0	44.3	42.7	43.8	42.0

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

TABLE	CHALK	P	CHALK P
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SED	0.88	0.88	1.77

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

STRATUM	DF	SE	CV%
BLOCK.WP	15	1.77	4.2

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

P	0	P1	P2	P3	MEAN
CHALK					
0	97.6	96.8	95.7	95.9	96.5
8	97.8	96.9	96.9	96.2	97.0
24	97.5	98.2	96.0	96.1	97.0
43	98.6	98.5	97.4	97.6	98.0
MEAN	97.9	97.6	96.5	96.5	97.1

PLOT AREA HARVESTED 0.00274