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72/W/RN/14 Long Term Phosphate - Potatoes, Sugar Beet

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LONG TERM PHOSPHATE

Object: To study direct and residual effects of superphosphate on yields of three crops grown in rotation - Woburn Stackyard III.

Sponsor: G.E.G. Mattingly.

The fifth year, potatoes, sugar beet.

For previous years see 68/B/8(t), 69/W/RN/14, 70/W/RN/14(t) and 71/W/RN/14(t).

Design: 6 blocks of 6 plots, split into 2.

Whole plot dimensions: 8.53 x 15.8. Area harvested: Potatoes - 0.00451, sugar beet - 0.00130.

Treatments:

Sub plots: Superphosphate:

Potatoes: None (0), 188 kg P₂O₅ (P).

Sugar beet: None (0), 126 kg P₂O₅ (P).

Basal applications:

Potatoes: Manures: 2.5 tonnes ground chalk, 270 kg K₂O as muriate of potash in autumn, 250 kg K₂O as muriate of potash in spring, 250 kg N as 'Nitro-Chalk', 100 kg MgO as Epsom salts. Weedkiller: Linuron at 1.1 kg with paraquat at 0.4 kg ion in 370 l. Fungicide: Mancozeb at 1.3 kg in 430 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 430 l.

Sugar beet: Manures: 2.5 tonnes of ground chalk, 370 kg K₂O as muriate of potash in autumn, 190 kg N plus 120 kg K₂O as (25:0:16), 100 kg MgO as Epsom salts, 6.8 kg B₂O₃ as 'Solubor' in 400 l. Weedkiller: Phenmedipham at 1.1 kg in 280 l. Insecticide: Demeton-s-methyl at 0.5 kg in 280 l.

Seed: Potatoes: Pentland Crown. Sugar beet: Klein E, sown at 6 kg.

Cultivations, etc.:

Potatoes: Ground chalk applied: 4 Oct, 1971. K applied: 11 Oct. Ploughed: 28 Oct. P applied: 7 Apr, 1972. Mg applied: 13 Apr. K and N applied: 17 Apr. Rotary cultivated, potatoes

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planted: 19 Apr. Weedkiller applied: 11 May. Rotary ridged:
19 June. Fungicide applied: 5 July. Fungicide with insecticide
applied: 27 July. Sprayed with undiluted BOV at 200 l:
22 Sept. Haulm mechanically destroyed: 27 Sept. Lifted:
28 - 29 Sept.

Sugar beet: Ground chalk applied: 4 Oct, 1971. Deep-tine
cultivated: 7 Oct. K applied: 11 Oct. Deep-tine cultivated:
3 Nov. Ploughed: 11 Nov. N, K and P applied: 22 Mar, 1972.
Mg applied, power harrowed, seed drilled: 24 Mar. Weedkiller
applied: 3 May. Singled: 23 - 26 May. Boron spray applied:
9 June. Insecticide applied: 29 June. Lifted: 6 - 9 Nov.

Standard errors per plot.

Potatoes: Total tubers, tonnes/hectare:

Whole plot: 1.71 or 4.6% (11 d.f.)

Sub plot: 2.35 or 6.3% (13 d.f.)

Sugar beet: Roots, (washed), tonnes/hectare:

Whole plot: 3.21 or 8.9% (11 d.f.)

Sub plot: 2.18 or 6.1% (13 d.f.)

Total sugar, tonnes/hectare:

Whole plot: 0.556 or 8.7% (11 d.f.)

Sub plot: 0.400 or 6.3% (13 d.f.)

Tops, tonnes/hectare:

Whole plot: 3.82 or 14.3% (11 d.f.)

Sub plot: 3.54 or 13.3% (13 d.f.)

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TABLES OF MEANS

POTATOES

RESIDUAL P (R)

	0*	1	2	4	6	Mean
TOTAL TUBERS: TONNES/HECTARE						
ANNUAL P (A)						
O	32.1	34.4	38.4	41.1	39.0	36.2
P	37.3	39.1	40.5	39.7	35.9	38.3
Mean	34.7	36.7	39.4	40.4	37.5	37.2

STANDARD ERRORS OF DIFFERENCES

	R	A	R A
Between any of R1, 2, 4 or 6	1.40	0.78	1.95
RO v any of R1, 2, 4 or 6	1.21		1.69
Unless same level of R			
R1, 2, 4 or 6			1.92
RO			1.36

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

ANNUAL P (A)						
O	98.4	98.6	98.9	98.2	97.5	98.3
P	97.6	97.8	96.8	96.2	97.0	97.2
Mean	98.0	98.2	97.8	97.2	97.3	97.8

* Duplicated treatment

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SUGAR BEET

	RESIDUAL P (R)					Mean
	0*	1	2	4	6	
ANNUAL P (A)	ROOTS (WASHED): TONNES/HECTARE					
O	35.4	36.1	36.5	37.6	35.4	36.1
P	35.0	36.5	36.2	35.0	36.8	35.8
Mean	35.2	36.3	36.4	36.3	36.1	35.9

STANDARD ERRORS OF DIFFERENCES

	R	A	R A
Between any of R1, 2, 4 or 6	2.62	0.73	2.91
RO v any of R1, 2, 4 or 6	2.27		2.52
Unless same level of R			
R1, 2, 4 or 6			1.78
RO			1.26

ANNUAL P (A)	SUGAR %					
O	17.8	17.7	17.8	18.0	17.7	17.8
P	17.8	17.9	17.6	17.8	17.6	17.8
Mean	17.8	17.8	17.7	17.9	17.7	17.8

* Duplicated treatment

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SUGAR BEET

	RESIDUAL P (R)					Mean
	0*	1	2	4	6	
ANNUAL P (A)	TOTAL SUGAR: TONNES/HECTARE					
O	6.30	6.39	6.49	6.76	6.27	6.42
P	6.23	6.54	6.39	6.22	6.47	6.35
Mean	6.27	6.47	6.44	6.49	6.37	6.38

STANDARD ERRORS OF DIFFERENCES

	R	A	R A
Between any of R1, 2, 4 or 6	0.454	0.133	0.509
RO v any of R1, 2, 4 or 6	0.393		0.441
Unless same level of R			
R1, 2, 4 or 6			0.327
RO			0.231

* Duplicated treatment

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SUGAR BEET

	RESIDUAL P (R)					
	O*	1	2	4	6	Mean
ANNUAL P (A)	TOPS: TONNES/HECTARE					
O	25.2	26.3	25.8	27.2	26.3	26.0
P	26.9	27.2	27.9	28.6	26.5	27.3
Mean	26.0	26.7	26.9	27.9	26.4	26.7

STANDARD ERRORS OF DIFFERENCES

	R	A	R A
Between any of R1, 2, 4 or 6	3.12	1.18	3.73
RO v any of R1, 2, 4 or 6	2.70		3.23
Unless same level of R			
R1, 2, 4 or 6			2.89
RO			2.05

* Duplicated treatment