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72/W/RN/4 Market Garden - Potatoes, Sugar Beet

Rothamsted Research

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72/W/RN/4

MARKET GARDEN

Object: To study direct and residual effects of phosphate, applied either as fertiliser or in organic manures in the period 1942 - 67, on yields of three crops grown in rotation - Woburn Lansome I.

Sponsor: A.E. Johnston.

The third year of revised scheme, potatoes and sugar beet.

For previous years see 'Details' 1967, 68/B/4(t), 69/W/RN/4, 70/W/RN/4(t) and 71/W/RN/4(t).

Whole plot dimensions: 8.53 x 5.18. Area harvested: Potatoes - 0.00147, sugar beet - 0.00127.

Superphosphate treatments (applied to whole plots with confounding of certain two and three factor interactions):-

Series A: Potatoes: None (O), 188 kg P2O5 (P).

Series B: Sugar beet: None (O), 126 kg P2O5 (P).

Basal applications:-

Series A: Potatoes: Manures: 2.5 tonnes ground chalk, 420 kg muriate of potash (60% K2O), 1170 kg 'Nitro-Chalk', 605 kg Epsom salts (16% MgO), Weedkillers: Paraquat at 0.56 kg ion in 280 l. Linuron at 1.1 kg plus paraquat at 0.42 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.

Series B: Sugar beet: Manures: 2.5 tonnes ground chalk, 630 kg muriate of potash (60% K2O) in autumn, 750 kg (25:0:16), 590 kg Epsom salts (16% MgO), boron at 6.7 kg B2O3 in 400 l. Weedkiller: Phenmedipham at 1.1 kg in 280 l. Insecticide: Demeton-s-methyl at 0.5 kg in 280 l.

Varieties: Potatoes: Pentland Crown.

Sugar beet: Klein E sown at 11 kg.

Cultivations, etc.:

Series A: Potatoes: Paraquat applied: 9 Sept, 1971. Ground chalk applied: 4 Oct. Ploughed: 15 Oct. Deep-tine cultivated: 3 Nov. N and K applied: 23 Mar, 1972. P treatments applied: 12 Apr. Mg applied: 13 Apr. Rotary cultivated: 17 Apr. Potatoes planted: 18 Apr. Linuron and paraquat applied: 8 May. Rotary ridged: 7 June. Fungicide applied: 6 July. Fungicide plus

72/W/RN/4

insecticide applied: 27 July. Sprayed with undiluted BOV at
200 l: 22 Sept. Haulm mechanically destroyed: 27 Sept.
Lifted: 2 Oct.

Series B: Sugar beet: Ground chalk applied: 4 Oct, 1971. Deep-
tine cultivated: 6 Oct. K applied: 27 Oct. Deep-tine cultivated:
3 Nov. Ploughed: 15 Nov. NK, P, and Mg applied: 22 Mar. Power
harrowed, seed drilled: 23 Mar. Weedkiller applied: 3 May.
Singled: 19 - 22 May. Boron spray applied: 9 June. Insecticide
applied: 29 June. Lifted: 6 - 8 Nov.

72/W/RN/4

TABLES OF MEANS

SERIES A

POTATOES

Organic		POKO		PK1		P2K2	
1942-61*	1962-67	O	P	O	P	O	P

TOTAL TUBERS: TONNES/HECTARE

O	O			42.0	44.7	30.5	48.5
S1	O					52.2**	58.7**
S2	O					61.8**	58.0**
T1	O					54.5**	56.9**
T2	O					58.3**	58.5**
D1	D1	40.2	54.3	43.0	49.7		
D2	D2	58.8	62.7	52.6	46.7		
C1	D1	50.9	52.3	40.3	54.6		
C2	D2	58.5	56.5	49.6	64.6		

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

O	O			97.7	97.9	96.8	97.7
S1	O					97.7**	97.8**
S2	O					98.0**	98.0**
T1	O					97.8**	97.8**
T2	O					98.7**	98.1**
D1	D1	97.3	98.1	97.4	96.8		
D2	D2	98.3	98.8	98.2	98.1		
C1	D1	97.9	97.0	97.1	98.4		
C2	D2	99.0	99.0	98.5	97.9		

* Last applied to leeks 1961/62

** PK1 1962-65

72/W/RN/4

SERIES B

SUGAR BEET

Organic
1942-61 1962-64 1966-67

POKO		P1K1		P2K2	
O	P	O	P	O	P

ROOTS (WASHED): TONNES/HECTARE

O	O	O			42.5	42.2	42.5	46.6	
O	O	PT			46.8	44.3	44.1	46.5	
S1	O	O	45.7*	45.9*					
S2	O	O	44.6*	47.8*					
T1	O	O	52.7*	47.2*					
T2	O	O	49.1*	45.6*					
D1	D1	D1	48.9	49.4	53.8	36.0			
D1	D1	O	51.3	47.5	52.7	34.9			
D2	D2	D2	44.2	49.2	47.1	55.7			
D2	D2	O	48.7	46.1	49.0	50.3			
C1	D1	D1	49.5	52.4	49.8	51.2			
C2	D2	D2	49.8	46.1	52.9	52.5			

SUGAR %

O	O	O			17.4	17.4	17.0	17.5	
O	O	PT			17.5	17.4	17.6	17.3	
S1	O	O	17.1*	17.4*					
S2	O	O	17.3*	17.1*					
T1	O	O	17.4*	17.1*					
T2	O	O	17.1*	17.4*					
D1	D1	D1	17.5	17.2	17.3	17.4			
D1	D1	O	17.1	17.4	17.2	17.1			
D2	D2	D2	17.1	17.1	16.7	17.1			
D2	D2	O	17.0	17.0	17.6	17.0			
C1	D1	D1	17.8	17.3	17.5	17.3			
C2	D2	D2	16.9	16.6	17.1	17.3			

* P1K1 1962-64

72/W/RN/4

SERIES B

SUGAR BEET

1942-61	Organic		POKO		P1K1		P2K2	
	1962-64	1966-67	O	P	O	P	O	P

TOTAL SUGAR: TONNES/HECTARE

O	O	O			7.41	7.36	7.22	8.18
O	O	PT			8.18	7.69	7.79	8.05
S1	O	O	7.79*	7.97*				
S2	O	O	7.69*	8.19*				
T1	O	O	9.19*	8.04*				
T2	O	O	8.41*	7.93*				
D1	D1	D1	8.55	8.50	9.29	6.27		
D1	D1	O	8.78	8.27	9.06	5.95		
D2	D2	D2	7.53	8.39	7.86	9.53		
D2	D2	O	8.27	7.82	8.64	8.55		
C1	D1	D1	8.83	9.06	8.75	8.85		
C2	D2	D2	8.43	7.65	9.05	9.11		

TOPS: TONNES/HECTARE

O	O	O			37.6	39.2	30.0	36.5
O	O	PT			36.5	32.7	31.1	38.6
S1	O	O	39.7*	38.1*				
S2	O	O	39.2*	40.2*				
T1	O	O	41.3*	46.1*				
T2	O	O	39.2*	36.5*				
D1	D1	D1	38.6	38.6	44.0	29.0		
D1	D1	O	40.8	44.0	34.3	24.7		
D2	D2	D2	31.1	32.2	36.5	37.6		
D2	D2	O	34.3	38.6	34.3	36.5		
C1	D1	D1	34.3	41.8	33.3	37.0		
C2	D2	D2	34.3	30.6	33.3	36.5		

* P1K1 1962-64