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72/R/CS/93 and 72/W/CS/93 Rates of NPK Fertilisers - Potatoes

Rothamsted Research

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72/R/CS/93 and 72/W/CS/93

RATES OF NPK FERTILISER

Object: To study the effects of a range of rates of compound NPK fertiliser on yields of potatoes - Rothamsted (R) Delafield and Woburn (W) Great Hill III.

Sponsor: F.V. Widdowson.

The first year, potatoes.

Design: 4 blocks of 8 plots, split into 2.

Whole plot dimensions: Delafield: 4.27 x 16.1. Great Hill III: 4.27 x 21.0.
Area harvested: Delafield (R): 0.00108, Great Hill III (W): 0.00143.

Treatments:-

Whole plots: All combinations of:-

1. Rates of compound fertiliser (13:13:20): 1250, 1880, 2500, 3130 kg.
2. Spacing: Seed potatoes: 30 cm (12 inches), 45 cm (18 inches) apart within the row.

Sub plots:

3. Varieties:-

- Delafield (R): King Edward (KE), Pentland Crown (PC).
Great Hill III (W): Pentland Crown (PC), Record (R).

NOTE: All rows were spaced 71 cm (28 inches) apart.

Basal applications:-

Delafield (R): Weedkiller: Linuron at 0.84 kg with paraquat at 0.42 kg ion 1440 l. Fungicide: Mancozeb at 1.3 kg in 440 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 440 l.

Great Hill III (W): Farmyard manure at 23 tonnes. Weedkiller: Linuron at 1.1 kg with 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.

Cultivations, etc.:

Delafield (R): Ploughed: 12 - 15 Oct, 1971. NPK applied: 24 Apr, 1972. Rotary cultivated twice, potatoes planted: 25 Apr. Weedkiller applied: 17 May. Fungicide applied: 11 July, 25 July, 11 Aug. Insecticide with fungicide applied: 25 July. Sprayed with undiluted BOV at 200 l: 16 - 20 Sept. Haulm destroyed mechanically: 7 Oct. Lifted: 9 Oct. Previous crops: Barley 1970, fallow 1971.

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Great Hill III (W): Farmyard manure applied: 27 July - 6 Aug, 1971.
Ploughed: 9 - 12 Aug. Re-ploughed: 6 - 9 Nov. NPK applied:
6 Apr, 1972. Rotary cultivated twice, potatoes planted: 21 Apr.
Weedkiller applied: 11 May. Rotary ridged: 20 June. Fungicide
applied: 5 July. Fungicide with insecticide applied: 28 July.
Sprayed with undiluted BOV at 200 l: 5 Oct. Lifted: 16 - 17 Oct.
Previous crops: Barley 1970, grass 1971.

- NOTES: (1) The percentage of N, P and K in the tubers, and K and Mg in
the leaves were determined.
(2) Cooking tests were made on the ware potatoes.
(3) On Great Hill III Woburn the yields were adjusted for a linear
trend along the blocks.

Standard errors per plot. Total tubers: tonnes/hectare:
Delafield (R): Whole plot: 2.33 or 4.3% (21 d.f.)
Sub plot: 3.50 or 6.5% (24 d.f.)
Great Hill III (W): Whole plot: 5.98 or 14.7% (20 d.f.)
Sub plot: 3.99 or 9.8% (24 d.f.)

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TABLES OF MEANS

DELAFIELD (R)

COMPOUND FERTILISER (13:13:20) KG/HA (F)

	1250	1880	2500	3130	Mean
TOTAL TUBERS: TONNES/HECTARE					
SPACING: CM					
30	47.6	54.5	58.5	56.6	54.3
45	50.1	52.5	56.4	57.1	54.0
VARIETY					
KE	48.7	52.4	56.6	55.1	53.2
PC	49.0	54.7	58.4	58.7	55.2
Mean	48.9	53.5	57.5	56.9	54.2

STANDARD ERRORS OF DIFFERENCES

F	SPACING	VARIETY	F	F	SPACING	F
			SPACING	VARIETY	VARIETY	SPACING
						VARIETY
1.16	0.82	0.87	1.65	1.70	1.20	2.40
Unless same levels of						
F				1.75		
S					1.24	
F.S						2.47

PERCENTAGE WARE: 4.44 CM (1.75 INCH) RIDDLE

SPACING: CM					
30	70.6	76.8	79.0	78.6	76.2
45	80.3	83.0	83.5	81.5	82.1
VARIETY					
KE	69.2	73.9	74.4	72.6	72.5
PC	81.6	85.9	88.1	87.5	85.8
Mean	75.4	79.9	81.2	80.0	79.1

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GREAT HILL III (W)

COMPOUND FERTILISER (13:13:20) KG/HA (F)

	1250	1880	2500	3130	Mean
TOTAL TUBERS: TONNES/HECTARE					
SPACING: CM					
30	34.4	39.7	46.2	47.3	41.9
45	31.1	41.0	41.1	44.5	39.4
VARIETY					
PC	37.2	44.9	47.5	49.3	44.7
R	28.3	35.8	39.8	42.4	36.6
Mean	32.7	40.3	43.7	45.9	40.7

STANDARD ERRORS OF DIFFERENCES

F	SPACING	VARIETY	F SPACING	F VARIETY	SPACING VARIETY	F SPACING VARIETY
3.01	2.13	1.00	4.26	3.30	2.34	4.67
Unless same levels of						
F				2.00		
S					1.41	
F.S						2.82

PERCENTAGE WARE: 4.44 CM (1.75 INCH) RIDDLE

SPACING: CM					
30	70.0	76.9	83.0	85.5	78.8
45	73.6	82.0	85.4	87.8	82.2
VARIETY					
PC	83.3	87.5	91.0	91.1	88.2
R	60.3	71.3	77.5	82.1	72.8
Mean	71.8	79.4	84.2	86.6	80.5