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Yields of the Field Experiments 1975

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75/ R&w/CS/166 - Liquid Fertilisers - Potatoes

Rothamsted Research

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75/R/CS/166 and 75/W/CS/166

LIQUID FERTILISERS

Object: To study the effects of a range of rates and methods of applying liquid fertilisers on the quality and yield of potatoes - Rothamsted (R), Long Hoos I/II and Woburn (W), Far Field I.

Sponsors: F.V. Widdowson, A. Penny.

The first year, potatoes.

Design: 2 randomised blocks of 32 plots.

Whole plot dimensions: 4.27 x 12.2

Treatments: All combinations of:

1. Form and method of applying fertiliser:	APPLICN
Granules (13:13:20), broadcast over the plough furrow	GRAN B
Liquid (7:7:10), sprayed on plough furrow	LIQUID S
Liquid, placed in bands on each side of the seed	LIQUID P
Liquid, divided, half on plough furrow, half placed	LIQUID D
2. Rate of nitrogen in NPK fertiliser (kg N):	N LN NPK
126	126
188	188
251	251
314	314
3. Spacing of tubers within the rows (rows all 71 cm apart) (cm):	SPACING
30	30 CM
45	45 CM

Basal applications:-

Long Hoos I/II (R): Weedkiller: Linuron at 1.0 kg plus paraquat at 0.42 kg ion in 450 l. Insecticide: Demeton-s-methyl at 0.25 kg in 450 l. Fungicide: Mancozeb at 1.3 kg in 450 l.

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Irrigation (mm water):

21 July	76
26 July	51
19 Aug	51
29 Aug	38

Total 216

Far Field I (W): Weedkiller: Linuron at 1.2 kg plus paraquat at 0.28 kg ion in 280 l. Insecticide: Demeton-s-methyl at 0.25 kg in 280 l. Fungicide: Mancozeb 1.3 kg in 390 l.

Seed: Long Hoos I/II (R): King Edward.

Far Field I (W): Pentland Crown.

Cultivations, etc.:-

Long Hoos I/II (R): Ploughed: 7 Jan, 1975. Treatments applied: 2 May. Rotary cultivated: 7 May. Treatments applied, potatoes planted: 9 May. Grubbed: 14 May. Rotary ridged: 22 May. Weedkiller applied: 30 May. Grubbed: 26 June. Insecticide applied: 27 June. Rotary ridged: 7 July. Fungicide applied: 28 July. Haulm mechanically destroyed: 26 Sept. Sprayed with undiluted BOV at 170 l: 1 Oct. Lifted: 10 Oct. Previous crops: Barley 1973, beans 1974.

Far Field I (W): Ploughed: 9-10 Jan, 1975. Deep-tine cultivated: 21 Apr. Spring-tine cultivated: 3 May. Treatments applied, potatoes planted: 5-6 May. Weedkiller applied: 30 May. Grubbed: 23 June. Rotary ridged: 24 June. Insecticide applied: 26 June. Fungicide applied: 16 July. Haulm mechanically destroyed: 29 Sept. Sprayed with undiluted BOV at 160 l: 2 Oct. Lifted: 8-9 Oct. Previous crops: Fallow 1973, beans 1974.

NOTES: (1) Emergence counts were made. Emergence was uneven because of the wet seedbeds.

(2) Leaf and haulm samples were taken in early September for N, P, K and Mg analysis.

75/R/CS/166 LONG HOOS I/II (R)

TOTAL TUBERS TONNES/HECTARE

*** TABLES OF MEANS ***

N IN NPK APPLICN	126	188	251	314	MEAN
GRAN B	36.9	34.2	38.9	38.2	37.0
LIQUID S	33.6	35.5	31.3	34.3	33.7
LIQUID P	31.8	32.9	40.4	34.3	34.9
LIQUID D	31.0	38.3	37.0	37.6	36.0
MEAN	33.3	35.2	36.9	36.1	35.4

SPACING APPLICN	30 CM	45 CM	MEAN
GRAN B	38.8	35.2	37.0
LIQUID S	33.8	33.6	33.7
LIQUID P	35.2	34.5	34.9
LIQUID D	37.0	34.9	36.0
MEAN	36.2	34.6	35.4

SPACING N IN NPK	30 CM	45 CM	MEAN
126	34.7	31.9	33.3
188	36.4	34.1	35.2
251	38.4	35.4	36.9
314	35.2	36.9	36.1
MEAN	36.2	34.6	35.4

APPLICN	SPACING N IN NPK	30 CM	45 CM
GRAN B	126	38.5	35.2
	188	40.0	28.4
	251	41.3	36.5
	314	35.5	40.8
LIQUID S	126	34.1	33.2
	188	34.0	37.1
	251	34.0	28.6
	314	33.2	35.4
LIQUID P	126	33.9	29.7
	188	32.0	33.9
	251	42.6	38.2
	314	32.2	36.4
LIQUID D	126	32.4	29.5
	188	39.7	36.8
	251	35.7	38.2
	314	40.0	35.2

75/R/CS/166 LONG HOOS 1/11 (R)

PERCENTAGE WARE 3.81CM (1.5INCH) RIDDLE

*** TABLES OF MEANS ***

N IN NPK	126	188	251	314	MEAN
APPLICN					
GRAN B	69.4	68.8	71.9	68.7	69.7
LIQUID S	66.8	69.8	65.2	70.7	68.1
LIQUID P	70.0	68.3	76.7	78.1	73.3
LIQUID D	70.7	71.3	71.2	68.1	70.3
MEAN	69.2	69.5	71.3	71.4	70.4

SPACING	30 CM	45 CM	MEAN
APPLICN			
GRAN B	69.4	69.9	69.7
LIQUID S	66.9	69.4	68.1
LIQUID P	72.2	74.3	73.3
LIQUID D	67.5	73.2	70.3
MEAN	69.0	71.7	70.4

SPACING	30 CM	45 CM	MEAN
N IN NPK			
126	68.6	69.8	69.2
188	69.5	69.6	69.5
251	69.7	72.9	71.3
314	68.3	74.5	71.4
MEAN	69.0	71.7	70.4

APPLICN	SPACING	30 CM	45 CM
GRAN B	N IN NPK		
	126	68.5	70.2
	188	74.4	63.1
	251	70.9	72.9
LIQUID S	314	63.9	73.6
	126	66.3	67.4
	188	68.4	71.2
	251	65.1	65.3
LIQUID P	314	67.8	73.6
	126	75.5	64.4
	188	65.0	71.7
	251	75.8	77.5
LIQUID D	314	72.6	83.6
	126	64.2	77.2
	188	70.2	72.4
	251	66.7	75.7
	314	68.9	67.4

PLOT AREA HARVESTED 0.00173

75/W/CS/166 FAR FIELD I (W)

*** TABLES OF MEANS ***

TOTAL TUBERS TONNES/HECTARE

N IN NPK APPLICN	126	188	251	314	MEAN
GRAN B	38.7	40.3	43.7	43.5	41.5
LIQUID S	37.5	40.8	41.7	43.6	40.9
LIQUID P	41.7	43.5	43.9	45.1	43.6
LIQUID D	36.7	45.5	42.8	44.6	42.4
MEAN	38.6	42.5	43.0	44.2	42.1

SPACING APPLICN	30 CM	45 CM	MEAN
GRAN B	43.4	39.7	41.5
LIQUID S	40.1	41.7	40.9
LIQUID P	44.6	42.6	43.6
LIQUID D	43.8	41.0	42.4
MEAN	43.0	41.2	42.1

SPACING N IN NPK	30 CM	45 CM	MEAN
126	40.0	37.3	38.6
188	43.0	42.1	42.5
251	43.4	42.7	43.0
314	45.5	42.9	44.2
MEAN	43.0	41.2	42.1

APPLICN	SPACING N IN NPK	30 CM	45 CM
GRAN B	126	41.2	36.1
	188	42.1	38.4
	251	44.6	42.8
	314	45.5	41.5
LIQUID S	126	36.2	38.7
	188	39.6	42.1
	251	40.5	42.9
	314	44.1	43.0
LIQUID P	126	44.1	39.3
	188	44.6	42.4
	251	43.3	44.6
	314	46.4	43.9
LIQUID D	126	38.5	34.9
	188	45.6	45.3
	251	45.0	40.6
	314	46.1	43.0

75/W/CS/166 FAR FIELD I (W)

PERCENTAGE WARE 3.81CM (1.5INCH) RIDDLE

*** TABLES OF MEANS ***

N IN NPK	126	188	251	314	MEAN
APPLICN					
GRAN B	88.2	89.6	90.0	89.4	89.3
LIQUID S	86.2	88.0	88.4	90.3	88.2
LIQUID P	87.7	89.6	89.5	92.4	89.8
LIQUID D	86.8	89.9	90.2	90.0	89.2
MEAN	87.2	89.3	89.5	90.5	89.1

SPACING	30 CM	45 CM	MEAN
APPLICN			
GRAN B	89.0	89.7	89.3
LIQUID S	87.3	89.2	88.2
LIQUID P	88.5	91.1	89.8
LIQUID D	88.4	90.0	89.2
MEAN	88.3	90.0	89.1

SPACING	30 CM	45 CM	MEAN
N IN NPK			
126	86.5	88.0	87.2
188	88.5	90.0	89.3
251	88.5	90.5	89.5
314	89.6	91.4	90.5
MEAN	88.3	90.0	89.1

APPLICN	SPACING	30 CM	45 CM
GRAN B	N IN NPK		
	126	88.2	88.2
	188	89.1	90.1
	251	89.8	90.3
LIQUID S	314	88.6	90.1
	126	86.5	86.0
	188	88.1	87.8
	251	86.0	90.8
LIQUID P	314	88.4	92.1
	126	85.0	90.5
	188	88.8	90.4
	251	87.7	91.4
LIQUID D	314	92.5	92.3
	126	86.1	87.4
	188	88.0	91.7
	251	90.7	89.7
	314	88.9	91.1

PLOT AREA HARVESTED 0.00173

75/R/CS/166 LONG HOOS 1/11 (R)

TOTAL TUBERS TONNES/HECTARE

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

TABLE	APPLICN	N IN NPK	SPACING	APPLICN N IN NPK
SED	1.51	1.51	1.07	3.02

TABLE	APPLICN SPACING	N IN NPK SPACING	APPLICN N IN NPK SPACING
SED	2.13	2.13	4.26

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

STRATUM	DF	SE	CV%
BLOCK.WP	31	4.26	12.1

75/W/CS/166 FAR FIELD I (W)

TOTAL TUBERS TONNES/HECTARE

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

TABLE	APPLICN	N IN NPK	SPACING	APPLICN N IN NPK
SED	0.75	0.75	0.53	1.50

TABLE	APPLICN SPACING	N IN NPK SPACING	APPLICN N IN NPK SPACING
SED	1.06	1.06	2.12

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

STRATUM	DF	SE	CV%
BLOCK.WP	31	2.12	5.0