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Yields of the Field Experiments 1971

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71/R/RN/1 Irrigation - Potatoes, Beans

Rothamsted Research

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IRRIGATION

Object: To study the effects of different timing and intensity of irrigation on a rotation of crops. Other agronomic factors are included from time to time - Great Field I and II.

The eighth year, potatoes, spring beans.

For previous years see 64/C/15(t), 65/C/14(t), 66/C/9(t), 67/C/7(t), 68/C/6(t), 69/R/RN/11(t), and 70/R/RN/11(t).

Design: Potatoes: 4 randomised blocks of 4 plots split into half and quarter plots.

Spring beans: 8 randomised blocks of 2 plots split into half and quarter plots.

Whole plot dimensions:-

Potatoes: 15.2 x 32.0. Sub plot area harvested: 0.00303.

Spring beans: 14.9 x 30.5. Sub plot area harvested: 0.00530.

Treatments:-

Potatoes: All combinations of:-

Whole plots: 1. Irrigation: None (O), full irrigation (I).

2. Chitting and time of planting: Chitted seed planted early (CE), unchitted seed planted late (OL).

Half plots: 3. Planting distances: Ridges 71.1 cm (28 inches) apart, seed 38.2 cm (15 inches) apart (N), ridges 142.2 cm (56 inches) apart, seed 76.3 cm (30 inches) apart (W).

Quarter plots: 4. Fertiliser rates: 1255 (F1), 2510 (F2) kg (13:13:20).

Spring beans: All combinations of:-

Whole plots: 1. Irrigation: None (O), full irrigation (I).

Half plots: 2. Distance between rows and seed rate: 25.4 cm (10 inches), seed rate 336 kg (C), 50.8 cm (20 inches), seed rate 112 kg (W).

Quarter plots: 3. Malathion insecticide: None (O), sprayed at 1.26 l in 809 l on 2 occasions (20 May, 7 June) (M).

Standard applications:

Potatoes: Manures: None. Weedkiller: Linuron at 0.84 kg plus paraquat at 0.42 kg ion in 427 l. Fungicide: Mancozeb at 1.35 kg in 438 l on 2 occasions.

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Spring beans: 405 kg (0:14:28) applied by 'Tume' drill across plots.
Weedkillers: Paraquat at 0.28 kg ion in 225 l. Simazine at
1.12 kg in 427 l. Insecticide: Demeton-s-methyl at 245 g
in 438 l.

Cultivations, etc.: Ploughed: 2 Nov, 1970.

Potatoes: NPK applied to CE plots: 5 Apr, 1971. Rotary cultivated
and machine planted CE plots: 7 Apr. NPK applied to OL plots,
rotary cultivated and machine planted OL plots: 5 May. Weedkiller
applied to CE plots: 10 May. Weedkiller applied to OL plots:
18 May. CE plots grubbed and rotary ridged: 4 June. OL plots
rotary ridged: 18 June. Fungicide applied: 23 June, 13 Aug.
Sprayed with undiluted BOV at 168 l: 14 Sept. Haulm destroyed
mechanically: 21 Sept. Lifted: 5 Oct. Variety: King Edward.
Spring beans: Paraquat applied: 19 Sept, 1970. PK applied:
24 Feb, 1971. Rotary cultivated*: 26 Feb * 30 Mar. Seed
drilled*: 30 Apr. Simazine applied: 3 May. Demeton-s-methyl
applied: 6 July. Combine harvested: 16 Sept. Variety:
Maris Bead.

* Originally it was intended to include 2 different sowing dates
for beans. Early sown plots were rotary cultivated and drilled
on 26 Feb, late sown plots were rotary cultivated and drilled
on 30 Mar. Because of severe bird damage all plots were power
harrowed on 30 Apr for re-drilling as shown above.

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RAINFALL AND IRRIGATION: MM

| Week- ending | Rainfall | IRRIGATION | |
|-----------------|----------|------------|-------|
| | | Potatoes | Beans |
| | | I | I |
| May 1 | 3.8 | | |
| May 8 | 17.3 | | |
| May 15 | 7.6 | | |
| May 22 | 7.0 | | |
| May 29 | 17.1 | | |
| June 5 | 0.1 | | |
| June 12 | 37.9 | | |
| June 19 | 60.2 | | |
| June 26 | 2.2 | | |
| July 3 | 3.2 | 15.0 | 15.0 |
| July 10 | 1.2 | | |
| July 17 | 0.0 | 25.0 | 25.0 |
| July 24 | 0.9 | 25.0 | 25.0 |
| July 31 | 13.1 | 15.0 | 15.0 |
| Aug 7 | 31.2 | | |
| Aug 14 | 21.5 | | |
| Aug 21 | 5.0 | | |
| Aug 28 | 3.0 | | |
| Sept 4 | 2.9 | | |
| Sept 11 | TR | | |
| Sept 18 | 0.0 | | |
| Sept 25 | 3.0 | | |
| Oct 2 | 10.3 | | |
| | 248.5 | 80.0 | 80.0 |

Standard errors per plot.

Potatoes, total tubers: tonnes/hectare:

Whole plot: 2.45 or 7.6% (9 d.f.)

1/2 plot: 2.82 or 8.7% (12 d.f.)

1/4 plot: 5.09 or 15.7% (24 d.f.)

Spring beans, grain: tonnes/hectare:

Whole plot: 0.140 or 8.1% (7 d.f.)

1/2 plot: 0.187 or 10.9% (14 d.f.)

1/4 plot: 0.234 or 13.6% (28 d.f.)

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SUMMARY OF RESULTS

POTATOES

TOTAL TUBERS: TONNES/HECTARE

| | CE | CL | N | W | F1 | F2 | Mean |
|--------------|---------|------|-------------|------|-------------|------|---------|
| | (±1.22) | | (1) and (2) | | (3) and (4) | | (±0.86) |
| O | 28.2 | 27.8 | 37.7 | 18.3 | 25.0 | 31.0 | 28.0 |
| I | 36.3 | 37.3 | 47.9 | 25.7 | 34.7 | 38.9 | 36.8 |
| | | | (1) and (2) | | (3) and (4) | | (±0.86) |
| | | CE | 43.1 | 21.4 | 28.9 | 35.6 | 32.3 |
| | | CL | 42.4 | 22.7 | 30.7 | 34.3 | 32.5 |
| | | | | | (5) and (6) | | (±0.71) |
| | | | | N | 39.5 | 46.0 | 42.8 |
| | | | | W | 20.1 | 23.9 | 22.0 |
| Mean (±0.90) | | | | | 29.8 | 35.0 | 32.4 |

- (1) (±1.12) (3) (±1.25) (5) (±1.14) For use in vertical and diagonal comparisons only
 (2) (±1.00) (4) (±1.27) (6) (±1.27) For use in horizontal and interaction comparisons only

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POTATOES

% WARE: 4.44 CM (1.75 INCH) RIDDLE

| | CE | OL | N | W | F1 | F2 | Mean |
|------|------|------|------|------|------|------|------|
| O | 75.7 | 74.6 | 71.0 | 79.3 | 74.6 | 75.8 | 75.2 |
| I | 86.2 | 83.9 | 80.1 | 90.0 | 84.4 | 85.7 | 85.1 |
| | | CE | 77.5 | 84.4 | 79.5 | 82.5 | 81.0 |
| | | OL | 73.6 | 85.0 | 79.5 | 79.0 | 79.3 |
| | | | | N | 73.5 | 77.6 | 75.6 |
| | | | | W | 85.5 | 83.9 | 84.7 |
| Mean | | | | | 79.5 | 80.7 | 80.1 |

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BEANS

GRAIN: TONNES/HECTARE

| | C | W | O | M | Mean |
|---------------|-------------|------|-------------|------|----------|
| | (1) and (2) | | (3) and (4) | | (±0.049) |
| O | 2.33 | 1.24 | 1.69 | 1.88 | 1.79 |
| I | 2.25 | 1.04 | 1.64 | 1.65 | 1.65 |
| | | | (3) and (4) | | (±0.047) |
| | | C | 2.22 | 2.37 | 2.29 |
| | | W | 1.11 | 1.16 | 1.14 |
| Mean (±0.041) | | | 1.67 | 1.77 | 1.72 |

(1) (±0.068) (3) (±0.064) For use in vertical and diagonal comparisons only

(2) (±0.066) (4) (±0.058) For use in horizontal and interaction comparisons only

Mean D.M. %: 74.2