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70/W/RN/15 Rotation and Fumigation - Barley, Potatoes, Sugar Beet

Rothamsted Research

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ROTATION AND FUMIGATION

(70/W/RN/15)

The effects of soil fumigants on a rotation of crops - Woburn Butt
Close 1970, 2nd year.

For design, treatments and previous year's results see 'Results'
69/W/RN/15.

Area of each sub-plot: 0.0048. Area harvested: Barley, potatoes: 0.0013,
sugar beet: 0.0038.

NOTE: One of the sub-plots of each plot, untreated in 1969, is now used
to test dazomet at 200 lb before all crops (AZ).

Standard applications:

Barley: Manures: 280 lb (0:20:20). Weedkiller: Ioxynil at 7.5 oz
plus mecoprop at 22.5 oz in 25 gals.

Potatoes: Manures: 940 lb (0:14:28). Weedkiller: Linuron at 1.0 lb
plus paraquat at 0.37 lb ion in 33 gals. Fungicide: Mancozeb at
1.2 lb in 37 gals on two occasions. Insecticide: Demeton-s-methyl
at 3.5 fl oz in 37 gals on one occasion with fungicide.

Sugar beet: Manures: 940 lb (0:14:28). Weedkiller: Phenmedipham
('Betanal' at 5 pts in 20 gals). Insecticide: Demeton-s-methyl
at 3.5 fl oz in 25 gals.

Cultivations, etc.:

Barley: Ploughed: 12 Nov, 1969. Dazomet applied and rotary cultivated
in: 14 Nov. DD injected: 24 Nov. Reploughed: 3 Mar, 1970. N
applied, power harrowed, seed combine drilled at 140 lb: 27 Mar.
Weedkiller applied: 16 May. Combine harvested: 26 Aug. Variety:
Julia.

Potatoes: Ploughed: 12 Nov, 1969. Dazomet applied and rotary culti-
vated in: 14 Nov. DD injected: 24 Nov. Reploughed: 3 Mar, 1970.
N applied: 3 Apr. PK applied: 14 Apr. Rotary cultivated, potatoes
planted: 22 Apr. Weedkiller applied: 13 May. Grubbed: 3 June.
Rotary ridged: 5 June. Fungicide plus insecticide applied: 31 July.
Fungicide applied: 18 Aug. Sprayed with undiluted BOV at 15 gals:
19 Sept. Haulm destroyed mechanically: 23 Sept. Lifted:
30 Sept. Variety: Pentland Crown.

Sugar beet: Rotary cultivated twice: 11 Sept, 1969 and 30 Sept.
Dazomet applied and rotary cultivated in: 14 Nov. DD injected:
24 Nov. Ploughed: 3 Mar, 1970. N applied: 3 Apr. PK applied:
14 Apr. Power harrowed, seed drilled at 5 lb: 20 Apr. Weedkiller
applied: 15 May. Singled: 26 May. Insecticide applied: 22 June.
Lifted: 26 Oct. Variety: Klein E.

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- NOTES: (1) Soil samples were taken from all N2 plots for eelworm counts, (*Heterodera rostochiensis*, *H. avenae*) in late November.
- (2) The yields of barley grain and straw have been adjusted for a linear trend down the whole plots.

Standard errors per sub-plot.

| | |
|-------------------------------|--------------------------|
| Barley, grain, cwt: | 3.33 or 25.8% (17 d.f.) |
| Sugar beet, roots tons: | 1.252 or 9.1% (18 d.f.) |
| Total sugar, cwt: | 4.60 or 9.4% (18 d.f.) |
| Potatoes, total tubers, tons: | 2.012 or 11.2% (18 d.f.) |

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SUMMARY OF RESULTS

BARLEY

| | O,S&R | P | B | A | AZ | Mean |
|------|-----------------|------|-----------------|------|------|------|
| | | | GRAIN: CWT | | | |
| | (±1.36) | | (±2.36)* | | | |
| N1 | 7.2 | 12.2 | 8.9 | 10.1 | 16.9 | 9.9 |
| N2 | 10.6 | 15.7 | 15.9 | 18.4 | 16.7 | 14.1 |
| N3 | 12.5 | 18.0 | 15.7 | 14.0 | 17.7 | 14.7 |
| Mean | 10.1 (±0.78) | 15.3 | 13.5 (±1.36) | 14.2 | 17.1 | 12.9 |

* For use in horizontal and interaction comparisons only

STRAW: CWT

| | | | | | | |
|------|------|------|------|------|------|------|
| N1 | 8.7 | 10.5 | 11.2 | 11.1 | 14.0 | 10.4 |
| N2 | 12.3 | 15.6 | 15.2 | 16.5 | 16.0 | 14.3 |
| N3 | 11.4 | 14.2 | 14.5 | 12.6 | 16.5 | 13.1 |
| Mean | 10.8 | 13.4 | 13.6 | 13.4 | 15.5 | 12.6 |

Mean D.M. %: Grain: 80.1
Straw: 71.8

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POTATOES

| | O, B&R | P | S | A | AZ | Mean |
|--------------------|-------------------|-------|-------------------|-------|-------|-------|
| TOTAL TUBERS: TONS | | | | | | |
| | (±0.821) | | (±1.423)* | | | |
| N1 | 14.79 | 15.15 | 17.23 | 16.23 | 17.02 | 15.71 |
| N2 | 18.07 | 19.79 | 19.36 | 20.75 | 19.71 | 19.12 |
| N3 | 16.83 | 19.40 | 20.31 | 22.14 | 20.01 | 18.91 |
| Mean | 16.56 (±0.474) | 18.12 | 18.97 (±0.822) | 19.71 | 18.91 | 17.91 |

* For use in horizontal and interaction comparisons only

| % WARE: 1.5 INCH | | | | | | |
|------------------|------|------|------|------|------|------|
| N1 | 98.2 | 98.8 | 98.4 | 98.1 | 98.5 | 98.4 |
| N2 | 98.4 | 98.1 | 98.7 | 98.1 | 98.7 | 98.4 |
| N3 | 98.0 | 98.2 | 98.3 | 98.4 | 98.3 | 98.2 |
| Mean | 98.2 | 98.4 | 98.5 | 98.2 | 98.5 | 98.3 |

70/W/RN/15

SUGAR BEET

| | O, PGR | S | B | A | AZ | Mean |
|----------------------|-------------------|-------|-------------------|-------|-------|-------|
| ROOTS (WASHED): TONS | | | | | | |
| | (±0.511) | | (±0.885)* | | | |
| N1 | 10.85 | 10.46 | 11.41 | 10.66 | 15.73 | 11.54 |
| N2 | 14.34 | 14.92 | 13.58 | 16.07 | 15.52 | 14.73 |
| N3 | 14.02 | 14.90 | 17.01 | 15.74 | 16.70 | 15.20 |
| Mean | 13.07 (±0.295) | 13.43 | 14.00 (±0.511) | 14.16 | 15.99 | 13.82 |
| SUGAR % | | | | | | |
| N1 | 18.4 | 17.9 | 18.0 | 18.0 | 18.2 | 18.2 |
| N2 | 17.7 | 17.7 | 17.5 | 17.1 | 18.0 | 17.6 |
| N3 | 17.3 | 16.9 | 17.3 | 16.5 | 17.1 | 17.1 |
| Mean | 17.8 | 17.5 | 17.6 | 17.2 | 17.8 | 17.7 |
| TOTAL SUGAR: CWT | | | | | | |
| | (±1.88) | | (±3.25)* | | | |
| N1 | 40.0 | 37.5 | 40.9 | 38.3 | 57.6 | 42.0 |
| N2 | 50.9 | 52.7 | 47.6 | 54.9 | 55.9 | 52.0 |
| N3 | 48.6 | 50.4 | 58.9 | 51.9 | 57.3 | 52.0 |
| Mean | 46.5 (±1.08) | 46.9 | 49.2 (±1.88) | 48.4 | 56.9 | 48.7 |

* For use in horizontal and interaction comparisons only