

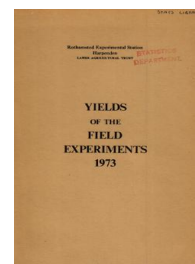
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73/W/CS/34 - Nematicides in Crop Sequence - Potatoes, Sugar Beet, Barley

Rothamsted Research

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73/W/CS/34

NEMATOCIDES IN CROP SEQUENCE

Object: To study the effects of a range of nematicides on incidence of *Heterodera rostochiensis* and yield of potatoes, residual effects of previous treatments are studied in sugar beet and barley - Woburn Great Hill II and III.

Sponsor: A.G. Whitehead.

The fifth year, potatoes, sugar beet, barley.

For previous years see 71/W/CS/34(t) and 72/W/CS/34(t).

Design: 4 series of 3 blocks of 10 plots.

Whole plot dimensions: 4.27 x 9.14. Area harvested: Potatoes - 0.00130, sugar beet - 0.00130, barley - 0.00260.

Treatments: The experiment has four series with the following cropping:-

| | 1969 | 1970 | 1971 | 1972 | 1973 |
|------------|------|------|------|------|------|
| Series I | P | P | P* | SB | B |
| Series II | P | P | P | P* | SB |
| Series III | P | B | P | P | P* |
| Series IV | P | B | P | P | P |

P = potatoes, SB = sugar beet, B = barley.

* Treatments applied to potatoes, later crops test residual effects.

Treatments to barley (Series I) and sugar beet (Series II): All combinations of:-

1. Nematicides:

Barley - NEMACIDE(71)
Sugar beet - NEMACIDE(72)

Aldicarb
Du Pont 1410
Nemacur P (series I only)
CGA 10576 (series II only)

Aldicarb
Dupont
Nemacur
CGA

2. Rates of nematicide (kg a.i.):

RATE

2.8
5.6
11.2

2.8
5.6
11.2

together with one untreated plot per block

0.0

73/W/CS/34

Treatments to potatoes (Series III): All combinations of:-

| | |
|--|--------------|
| 1. Nematicides: | NEMACIDE(73) |
| Benomyl | Benomyl |
| Du Pont 1410 | Dupont |
| Dowco 275 | Dowco |
| 2. Rates of nematicide (kg a.i.): | RATE |
| Single rate (2.8 Du Pont 1410, Dowco 275: 5.6 benomyl) | Single |
| Double rate (5.6 Du Pont 1410, Dowco 275: 11.2 benomyl) | Double |
| Quadruple rate (11.2 Du Pont 1410, Dowco 275: 22.4 benomyl) | Quad |
| together with one untreated plot per block | 0.0 |

Basal applications:

Potatoes: Test and preparatory crop: Manures: (13:13:20) at 1830 kg.
 Weedkiller: Linuron at 1.2 kg plus paraquat at 0.56 kg ion in 280 l.
 Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 390 l. Fungicide: Mancozeb at 1.3 kg in 390 l on the first occasion and in 370 l on the second occasion.
 Sugar beet: Manures: Magnesian limestone at 5 tonnes. (0:14:28) at 730 kg, N at 190 kg as 'Nitro-Chalk'. Boron at 7.4 kg B2O3 (as 'Solubor') applied with insecticide. Insecticide: Demeton-s-methyl at 0.25 kg in 450 l. Weedkiller: Phenmedipham at 1.6 kg in 280 l.
 Barley: Manures: (20:15:15) at 500 kg combine drilled. Weedkiller: Ioxynil at 0.53 kg and mecoprop at 1.6 kg in 280 l.

Seed: Potatoes: Pentland Crown.

Sugar beet: Klein E, sown at 8.0 kg.

Barley: Julia, dressed with ethirimol, sown at 160 kg.

Cultivations, etc.:-

Potatoes, Test crop: Ploughed: 18 Dec, 1972. NPK applied: 26 Mar, 1973.
 Treatments applied, all plots rotary cultivated: 30 Mar. Potatoes planted: 3 Apr. Weedkiller applied: 9 May. Grubbed: 31 May.
 Fungicide with insecticide applied: 6 July. Fungicide applied: 26 July, 13 Aug. Haulm mechanically destroyed: 12 Sept. Lifted: 20 Sept.

73/W/CS/34

Potatoes, Preparatory crop: Ploughed: 19 Dec, 1972. NPK applied: 26 Mar, 1973. Rotary cultivated, potatoes planted: 3 Apr. Weedkiller applied: 9 May. Grubbed: 31 May. Rotary ridged: 25 June. Fungicide with insecticide applied: 6 July. Fungicide applied: 26 July, 13 Aug. Haulm mechanically destroyed: 23 Aug. Lifted: 13 Sept.
Sugar beet: Magnesian limestone applied: 17 Nov, 1972. Ploughed: 18 Dec. PK and N applied: 20 Mar, 1973. Power harrowed, seed sown: 21 Mar. Weedkiller applied: 15 May. Singled: 21-24 May. Boron and insecticide applied: 25 June. Lifted: 9 Nov.
Barley: Ploughed: 18 Dec, 1972. Seed sown: 12 Mar, 1973. Weedkiller applied: 15 May. Combine harvested: 10 Aug.

NOTE: Soil samples were taken before applying treatments and after harvest for counts of cysts, eggs and larvae of *Heterodera rostochiensis*.

Standard errors per plot.

| | |
|---|-------------------------|
| Potatoes, Total tubers, tonnes/hectare: | 3.38 or 17.0% (18 d.f.) |
| Sugar beet, Roots (washed), tonnes/hectare: | 2.37 or 5.9% (18 d.f.) |
| Total sugar, tonnes/hectare: | 0.425 or 5.7% (18 d.f.) |
| Barley, Grain, tonnes/hectare: | 0.318 or 6.6% (18 d.f.) |

73/W/CS/34

TABLES OF MEANS

POTATOES SERIES III

| | Single | RATE Double | Quad | Mean |
|------------------------------|--------|----------------|------|------|
| TOTAL TUBERS: TONNES/HECTARE | | | | |
| NEMACIDE(73) | | | | |
| Benomy1 | 14.4 | 10.9 | 15.0 | 13.4 |
| Dupont | 29.4 | 31.9 | 31.3 | 30.8 |
| Dowco | 15.8 | 19.1 | 22.3 | 19.1 |
| Mean | 19.9 | 20.6 | 22.9 | 21.1 |

RATE 0.0 9.0
Grand mean 19.9

STANDARD ERRORS OF DIFFERENCES

| | | |
|--------------|------|---------------------------------------|
| NEMACIDE(73) | RATE | NEMACIDE(73) RATE & RATE 0.0 |
| 1.59 | 1.59 | 2.76 |

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

| | | | | |
|--------------|------|------|------|------|
| NEMACIDE(73) | | | | |
| Benomy1 | 83.9 | 77.5 | 83.0 | 81.5 |
| Dupont | 87.1 | 86.2 | 86.6 | 86.6 |
| Dowco | 84.3 | 88.1 | 83.8 | 85.4 |
| Mean | 85.1 | 84.0 | 84.5 | 84.5 |

RATE 0.0 75.8

Grand mean 83.6

73/w/cs/34

SUGAR BEET SERIES II

ROOTS (WASHED): TONNES/HECTARE

| | RATE | | | Mean |
|--------------|------|------|------|------|
| | 2.8 | 5.6 | 11.2 | |
| NEMACIDE(72) | | | | |
| Aldicarb | 40.7 | 38.3 | 42.4 | 40.5 |
| Dupont | 41.5 | 39.2 | 38.1 | 39.6 |
| CGA | 42.2 | 39.7 | 40.4 | 40.8 |
| Mean | 41.5 | 39.1 | 40.3 | 40.3 |

RATE 0.0 41.0

Grand mean 40.4

STANDARD ERRORS OF DIFFERENCES

| NEMACIDE(72) | RATE | NEMACIDE(72) RATE & RATE 0.0 |
|--------------|------|---------------------------------------|
| 1.12 | 1.12 | 1.93 |

73/w/cs/34

SUGAR BEET SERIES II

RATE

| | 2.8 | 5.6 | 11.2 | Mean |
|------------------|------|------|------|------|
| SUGAR PERCENTAGE | | | | |
| NEMACIDE (72) | | | | |
| Aldicarb | 18.3 | 18.7 | 18.4 | 18.5 |
| Dupont | 18.5 | 18.4 | 18.5 | 18.5 |
| CGA | 18.4 | 18.4 | 18.5 | 18.4 |
| Mean | 18.4 | 18.5 | 18.5 | 18.4 |

RATE 0.0 18.2

Grand mean 18.4

TOTAL SUGAR: TONNES/HECTARE

| NEMACIDE (72) | | | | |
|---------------|------|------|------|------|
| Aldicarb | 7.47 | 7.15 | 7.81 | 7.48 |
| Dupont | 7.66 | 7.23 | 7.05 | 7.31 |
| CGA | 7.76 | 7.29 | 7.45 | 7.50 |
| Mean | 7.63 | 7.22 | 7.44 | 7.43 |

RATE 0.0 7.47

Grand mean 7.43

STANDARD ERRORS OF DIFFERENCES

| NEMACIDE (72) | RATE | NEMACIDE (72) RATE S RATE 0.0 |
|---------------|-------|--|
| 0.201 | 0.201 | 0.347 |

73/W/CS/34

BARLEY SERIES I

| | 2.8 | RATE 5.6 | 11.2 | Mean |
|-----------------------|------|-------------|------|------|
| GRAIN: TONNES/HECTARE | | | | |
| NEMACIDE(71) | | | | |
| Aldicarb | 5.04 | 4.85 | 5.17 | 5.02 |
| Dupont | 4.71 | 4.87 | 4.74 | 4.78 |
| Nemacur | 4.50 | 4.51 | 5.19 | 4.73 |
| Mean | 4.75 | 4.74 | 5.03 | 4.84 |

RATE 0.0 4.57

Grand mean 4.82

STANDARD ERRORS OF DIFFERENCES

| NEMACIDE(71) | RATE | NEMACIDE(71) RATE % |
|--------------|-------|---------------------------|
| 0.150 | 0.150 | 0.259 |

STRAW: TONNES/HECTARE

| NEMACIDE(71) | | | | |
|--------------|------|------|------|------|
| Aldicarb | 4.32 | 3.69 | 4.46 | 4.16 |
| Dupont | 3.97 | 4.10 | 4.02 | 4.03 |
| Nemacur | 3.90 | 3.80 | 4.37 | 4.03 |
| Mean | 4.06 | 3.86 | 4.29 | 4.07 |

RATE 0.0 3.65

Grand mean 4.03

Mean D.M. % Grain: 84.6
Straw: 89.3