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# Yields of the Field Experiments 1980

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## 80/W/CS/34 Nematicides in Crop Sequence

### Rothamsted Research

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80/W/CS/34

NEMATICIDES IN CROP SEQUENCE

Object: To study the effects of a range of nematicides on incidence of *Globodera rostochiensis* and yield of potatoes. Residual effects of previous treatments are studied in wheat and barley - Woburn Great Hill II and III.

Sponsor: A.G. Whitehead.

The 11th year, potatoes, s. barley.

For previous years see 71/W/CS/34(t), 72/W/CS/34(t) and 73-79/W/CS/34.

Design: 4 series of 3 blocks of 10 plots.

Whole plot dimensions: 4.27 x 9.14.

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

|            | 1969 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
|------------|------|----|----|----|----|----|----|----|----|----|----|----|
| Series I   | P    | P  | P* | SB | B  | P  | P* | W  | B  | P  | P* | B+ |
| Series II  | P    | P  | P  | P* | SB | B  | P  | P* | W  | B  | P  | P* |
| Series III | P    | B  | P  | P  | P* | SB | B  | P  | P* | W  | B  | P  |
| Series IV  | P    | B  | P  | P  | P  | P* | SB | B  | P  | P* | W  | B  |

P = potatoes, SB = sugar beet, B = s. barley, W = w. wheat

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

+ W. wheat failed and was replaced by s. barley.

Treatments to s. barley (Series I): All combinations of:-

1. NEMACIDE(79) Residues of nematicides applied 1979:

|          |             |
|----------|-------------|
| ALDICARB | Aldicarb    |
| CARBENDA | Carbendazim |
| TERBUFOS | Terbufos    |

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

|        |   |
|--------|---|
| SINGLE | Single (2.5 kg for aldicarb and terbufos : 5.0 kg for carbendazim)      |
| DOUBLE | Double (5.0 kg for aldicarb and terbufos : 10.0 kg for carbendazim)     |
| QUAD   | Quadruple (10.0 kg for aldicarb and terbufos : 20.0 kg for carbendazim) |

plus one untreated plot

RATE

NONE

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Treatments to potatoes (Series II):

|              |   |
|--------------|---|
| NEMACIDE(80) | Nematicides applied 1980 (kg a.i.):               |
| NONE         | None  |
| BAS 1        | 'BAS 263 08J 80-1' at 2.8                         |
| BAS 2        | 'BAS 263 08J 80-1' at 5.6                         |
| BAS 4        | 'BAS 263 08J 80-1' at 11.2                        |
| CARBOF 2     | Carbofuran at 5.6                                 |
| ETHOP 4      | Ethoprophos at 11.2                               |
| FMC 2        | 'FMC 35001' at 5.6                                |
| OX 2         | Oxamyl at 5.6                                     |
| OX S1 2      | Oxamyl slow-release formulation 'DPX 4702' at 5.6 |
| OX S2 2      | Oxamyl slow-release formulation 'DPX 5577' at 5.6 |

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

1. NEMACIDE(77) Residues of nematicides applied 1977:

|          |            |
|----------|------------|
| AC 64475 | 'AC 64475' |
| CARBOFUR | Carbofuran |
| PHOXIM   | Phoxim     |

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

|        |           | 'AC 64475' | Carbofuran | Phoxim |
|--------|-----------|------------|------------|--------|
| SINGLE | Single    | 2.2        | 2.8        | 5.6    |
| DOUBLE | Double    | 4.4        | 5.6        | 11.2   |
| QUAD   | Quadruple | 8.8        | 11.2       | 22.4   |

plus one untreated plot

RATE

NONE

Treatments to s. barley (Series IV): All combinations of:-

1. NEMACIDE(78) Residues of nematicides applied 1978:

|          |                    |
|----------|--------------------|
| BENDIOCA | Bendiocarb         |
| THIOPHAN | Thiophanate methyl |
| TERBUFOS | Terbufos           |

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

5  
10  
20

plus one untreated plot

RATE

0.0

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Standard applications:

Barley (Series I after failed w. wheat & IV): Manures: Magnesian limestone at 5 t to Series I only, (0:20:20) at 310 kg, combine drilled to wheat Series I only, (20:10:10) at 450 kg, combine drilled. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.9 l in 280 l). Fungicides: Tridemorph to Series I only at 0.53 kg in 280 l. Triadimefon to Series IV only at 0.13 kg in 280 l.  
Potatoes (Series II and Series III): Manures: (13:13:20) at 1880 kg. Weedkiller: Linuron at 1.1 l in 280 l. Fungicide: Mancozeb at 1.3 kg in 300 l applied five times, with insecticide on the first, third, fourth and fifth occasions. Insecticide: Pirimicarb at 0.14 kg. Haulm desiccant: Undiluted BOV at 170 l.

Seed: Wheat: Flanders, sown at 190 kg.  
Barley: Georgie, dressed with ethirimol, sown at 160 kg.  
Potatoes: Pentland Crown.

Cultivations, etc.:-

Wheat (Series I): Magnesian limestone applied, heavy spring-tine cultivated, spring-tine cultivated, seed sown: 31 Oct, 1979. Ploughed: 14 Feb, 1980.  
Barley (Series I & IV): Ploughed (Series IV): 23 Nov, 1979. Spring-tine cultivated with crumbler attached: 28 Feb, 1980. Seed sown: 29 Feb. Weedkillers applied: 7 May. Tridemorph applied: 13 May and 5 June to Series I. Triadimefon applied: 5 June to Series IV. Combine harvested: 19 Aug.  
Potatoes (Series II & III): Heavy spring-tine cultivated, spring-tine cultivated: 30 Oct, 1979 (Series II). Ploughed: 23 Nov (Series III), 14 Feb, 1980 (Series II). NPK applied: 12 Apr. Rotary cultivated, potatoes planted: 18 Apr (Series III). Spring-tine cultivated: 23 Apr (Series II). Treatments applied, rotary cultivated, potatoes planted: 28 Apr (Series II). Weedkiller applied: 17 May. Grubbed: 11 June. Earthed up: 12 June. Fungicide applied: 18 June, 3 July, 22 July, 8 Aug, 22 Aug. Insecticide applied: 18 June, 22 July, 8 Aug, 22 Aug. Haulm mechanically destroyed: 22 Sept. Haulm desiccant applied: 24 Sept. Lifted: 1 - 2 Oct.

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

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POTATOES SERIES II

TOTAL TUBERS TONNES/HECTARE

\*\*\*\*\* TABLES OF MEANS \*\*\*\*\*

| NEMACIDE (80) |      |
|---------------|------|
| NONE          | 29.2 |
| BAS 1         | 51.4 |
| BAS 2         | 49.7 |
| BAS 4         | 51.3 |
| CARBOF 2      | 55.4 |
| ETHOP 4       | 54.2 |
| FMC 2         | 46.8 |
| OX 2          | 59.9 |
| OX S1 2       | 58.4 |
| OX S2 2       | 61.3 |
| MEAN          | 51.8 |

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

| TABLE | NEMACIDE (80) |
|-------|---------------|
| ----- | -----         |
| SED   | 2.37          |

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

| STRATUM  | DF | SE   | CV% |
|----------|----|------|-----|
| BLOCK.WP | 18 | 2.90 | 5.6 |

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

\*\*\*\*\* TABLES OF MEANS \*\*\*\*\*

| NEMACIDE (80) |      |
|---------------|------|
| NONE          | 94.2 |
| BAS 1         | 97.6 |
| BAS 2         | 96.8 |
| BAS 4         | 97.9 |
| CARBOF 2      | 97.6 |
| ETHOP 4       | 97.8 |
| FMC 2         | 97.1 |
| OX 2          | 97.6 |
| OX S1 2       | 97.5 |
| OX S2 2       | 98.0 |
| MEAN          | 97.2 |

PLOT AREA HARVESTED 0.00130

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POTATOES SERIES III

TOTAL TUBERS TONNES/HECTARE

\*\*\*\*\* TABLES OF MEANS \*\*\*\*\*

| RATE NEMACIDE(77) | SINGLE | DOUBLE | QUAD | MEAN |
|-------------------|--------|--------|------|------|
| AC 64475          | 54.4   | 55.8   | 59.7 | 56.6 |
| CARBOFUR          | 52.7   | 55.2   | 57.6 | 55.2 |
| PHOXIM            | 48.1   | 50.8   | 52.9 | 50.6 |
| MEAN              | 51.7   | 53.9   | 56.8 | 54.1 |
| RATE NONE         | 48.3   |        |      |      |
| GRAND MEAN        | 53.6   |        |      |      |

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

| TABLE | NEMACIDE(77) | RATE NEMACIDE(77) | RATE & RATE NONE |
|-------|--------------|-------------------|------------------|
| SED   | 1.50         | 1.50              | 2.60             |

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

| STRATUM  | DF | SE   | CV% |
|----------|----|------|-----|
| BLOCK.WP | 18 | 3.18 | 5.9 |

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

\*\*\*\*\* TABLES OF MEANS \*\*\*\*\*

| RATE NEMACIDE(77) | SINGLE | DOUBLE | QUAD | MEAN |
|-------------------|--------|--------|------|------|
| AC 64475          | 98.6   | 98.1   | 98.4 | 98.4 |
| CARBOFUR          | 98.6   | 98.6   | 98.7 | 98.6 |
| PHOXIM            | 98.5   | 98.3   | 98.4 | 98.4 |
| MEAN              | 98.6   | 98.3   | 98.5 | 98.5 |
| RATE NONE         | 98.4   |        |      |      |
| GRAND MEAN        | 98.5   |        |      |      |

PLOT AREA HARVESTED 0.00130

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BARLEY SERIES I

GRAIN TONNES/HECTARE

\*\*\*\*\* TABLES OF MEANS \*\*\*\*\*

| RATE NEMACIDE (79) | SINGLE | DOUBLE | QUAD | MEAN |
|--------------------|--------|--------|------|------|
| ALDICARB           | 3.90   | 4.14   | 3.57 | 3.87 |
| CARBENDA           | 3.63   | 3.52   | 3.91 | 3.69 |
| TERBUFOS           | 3.83   | 4.36   | 4.19 | 4.13 |
| MEAN               | 3.78   | 4.01   | 3.89 | 3.90 |
| RATE NONE          | 3.93   |        |      |      |
| GRAND MEAN         | 3.90   |        |      |      |

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

| TABLE | NEMACIDE (79) | RATE NEMACIDE (79) | RATE NEMACIDE (79)<br>& RATE NONE |
|-------|---------------|--------------------|-----------------------------------|
| SED   | 0.205         | 0.205              | 0.354                             |

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

| STRATUM             | DF      | SE    | CV%  |
|---------------------|---------|-------|------|
| BLOCK.WP            | 18      | 0.434 | 11.1 |
| GRAIN MEAN DM%      | 81.0    |       |      |
| PLOT AREA HARVESTED | 0.00260 |       |      |

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BARLEY SERIES IV

GRAIN TONNES/HECTARE

\*\*\*\*\* TABLES OF MEANS \*\*\*\*\*

|               | RATE | 5    | 10   | 20   | MEAN |
|---------------|------|------|------|------|------|
| NEMACIDE (78) |      |      |      |      |      |
| BENDIOCA      |      | 4.36 | 4.39 | 4.84 | 4.53 |
| THIOPHAN      |      | 4.85 | 4.74 | 4.74 | 4.78 |
| TERBUFOS      |      | 4.47 | 4.55 | 4.74 | 4.59 |
| MEAN          |      | 4.56 | 4.56 | 4.77 | 4.63 |
| RATE 0.0      | 4.59 |      |      |      |      |
| GRAND MEAN    |      | 4.63 |      |      |      |

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

| TABLE | NEMACIDE (78) | RATE NEMACIDE (78) | RATE<br>& RATE 0.0 |
|-------|---------------|--------------------|--------------------|
| ----- |               |                    |                    |
| SED   | 0.173         | 0.173              | 0.300              |

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

| STRATUM             | DF      | SE    | CV% |
|---------------------|---------|-------|-----|
| BLOCK.WP            | 18      | 0.368 | 8.0 |
| GRAIN MEAN DM%      | 81.3    |       |     |
| PLOT AREA HARVESTED | 0.00260 |       |     |