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## Yields of the Field Experiments 1984

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### 84/W/CS/34 Nematicides in Crop Sequence - Potatoes, W. Wheat, S. Barley

#### Rothamsted Research

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84/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 16th year, potatoes, w. wheat, s. barley.

For previous years see 71/W/CS/34(t), 72/W/CS/34(t) and 73-83/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 | 81 | 82 | 83 | 84 |
|------------|------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Series I   | P    | P  | P* | SB | B  | P  | P* | W  | B  | P  | P* | B  | B  | P  | P* | W  |
| Series II  | P    | P  | P  | P* | SB | B  | P  | P* | W  | B  | P  | P* | W  | B  | P  | P* |
| Series III | P    | B  | P  | P  | P* | SB | B  | P  | P* | W  | B  | P  | P* | W  | B  | P  |
| Series IV  | P    | B  | P  | P  | P  | P* | SB | B  | P  | P* | W  | B  | P  | P* | W  | B  |

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

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

Treatments to w. wheat (Series I): All combinations of:-

1. NEMACIDE(83) Residues of nematicides applied 1983:

FMC65201  
FMC67825  
OXAMYL

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

2.8  
5.6  
11.2

plus one untreated plot per block

RATE

0.0

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

1. NEMACIDE(84) Nematicides applied 1984:

ALDICARB  
DS 38697  
DS 46995

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

|        |                                                         |
|--------|---------------------------------------------------------|
| SINGLE | Single (2.8 kg of aldicarb, 1.4 kg of DS materials)     |
| DOUBLE | Double (5.6 kg of aldicarb, 2.8 kg of DS materials)     |
| QUAD   | Quadruple (11.2 kg of aldicarb, 5.6 kg of DS materials) |

plus one untreated plot per block

RATE

NONE

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

1. NEMACIDE(81) Residues of nematicides applied 1981:

ALDICARB  
HOE00668  
RH 9358

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

2.8  
5.6  
11.2

plus one untreated plot per block

RATE

0.0

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

1. NEMACIDE(82) Residues of nematicides applied 1982:

DS 46995  
DS 47187  
OXAMYL

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

|        |                                                       |
|--------|-------------------------------------------------------|
| SINGLE | Single (1.5 kg of DS materials, 2.8 kg of oxamyl)     |
| DOUBLE | Double (3.0 kg of DS materials, 5.6 kg of oxamyl)     |
| QUAD   | Quadruple (6.0 kg of DS materials, 11.2 kg of oxamyl) |

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plus one untreated plot per block

RATE

NONE

Standard applications:

- W. wheat (Series I): Manures: Magnesian limestone at 5.0 t. (5:14:30) at 340 kg. N at 180 kg as 'Nitro-Chalk'. Weedkiller: Chlortoluron at 3.5 kg in 250 l.
- Potatoes (Series II and III): Manures: (10:10:15+4.5 Mg) at 1990 kg. Weedkillers: Linuron at 0.75 l with paraquat at 0.20 kg ion in 250 l. Fungicides: Fentin acetate with maneb (as 'Brestan 60' at 0.5 kg) in 250 l with the insecticide. Fentin hydroxide at 0.28 kg in 250 l on six occasions, with the insecticide on the second and third occasions. Insecticide: Pirimicarb at 0.14 kg on three occasions.
- S. barley (Series IV): Manures: (20:10:10) at 630 kg. Weedkillers: 3, 6-dichloropicolinic acid at 0.07 kg with the bromoxynil at 0.34 kg and mecoprop at 2.1 kg in 250 l. Fungicide: Tridemorph at 0.52 kg in 250 l.

Seed: W. wheat: Avalon, sown at 200 kg.

Potatoes: Pentland Crown.

S. barley: Triumph, dressed with triadimenol plus fuberidazole, sown at 160 kg.

Cultivations, etc.:-

- W. wheat (Series I): Heavy spring-tine cultivated, NPK applied: 24 Oct, 1983. Magnesian limestone applied, spring-tine cultivated with crumbler attached, seed sown: 25 Oct. Weedkiller applied: 28 Oct. N applied: 11 Apr, 1984. Combine harvested: 20 Aug.
- Potatoes (Series II and III): Heavy spring-tine cultivated (Series II): 24 Oct, 1983. Ploughed (Series III): 16 Nov. Deep-tine cultivated: 16 Jan, 1984. NPK with Mg applied: 2 Apr. Heavy spring-tine cultivated: 5 Apr. Rotary cultivated, potatoes planted (Series III): 13 Apr. Treatments applied, rotary cultivated, potatoes planted (Series II): 16 Apr. Weedkillers applied: 4 May. Fentin acetate with maneb and insecticide applied: 19 June. Fentin hydroxide applied: 3 July, 1 Aug, 28 Aug, 12 Sept. Fentin hydroxide with insecticide applied: 18 July, 20 July. Haulm mechanically destroyed: 28 Sept. Lifted (Series II): 9 Oct. (Series III): 10 Oct.
- S. barley (Series IV): Ploughed: 16 Nov, 1983. NPK applied: 13 Mar, 1984. Spring-tine cultivated with crumbler attached, seed sown: 15 Mar. Weedkiller applied, fungicide applied: 30 May. Combine harvested: 14 Aug.

NOTES: 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 \*\*\*\*\*

| RATE<br>NEMACIDE(84) | SINGLE | DOUBLE | QUAD | MEAN |
|----------------------|--------|--------|------|------|
| ALDICARB             | 30.9   | 31.2   | 37.5 | 33.2 |
| DS 38697             | 24.8   | 31.0   | 32.1 | 29.3 |
| DS 46995             | 27.2   | 29.9   | 34.8 | 30.6 |
| MEAN                 | 27.6   | 30.7   | 34.8 | 31.0 |

RATE NONE 11.6

GRAND MEAN 29.1

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

| TABLE | NEMACIDE(84) | RATE NEMACIDE(84)<br>RATE<br>& RATE NONE |
|-------|--------------|------------------------------------------|
| SED   | 1.51         | 1.51 2.62                                |

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

| STRATUM  | DF | SE   | CV%  |
|----------|----|------|------|
| BLOCK.WP | 18 | 3.21 | 11.0 |

PERCENTAGE WARE 3.81CM (1.5 INCH RIDDLE)

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

| RATE<br>NEMACIDE(84) | SINGLE | DOUBLE | QUAD | MEAN |
|----------------------|--------|--------|------|------|
| ALDICARB             | 90.0   | 91.3   | 92.5 | 91.3 |
| DS 38697             | 85.8   | 90.2   | 91.4 | 89.1 |
| DS 46995             | 87.3   | 88.3   | 88.7 | 88.1 |
| MEAN                 | 87.7   | 89.9   | 90.8 | 89.5 |

RATE NONE 83.6

GRAND MEAN 88.9

PLOT AREA HARVESTED 0.00130

84/W/CS/34

POTATOES SERIES III

TOTAL TUBERS TONNES/HECTARE

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

|              |      |      |      |      |
|--------------|------|------|------|------|
| RATE         | 2.8  | 5.6  | 11.2 | MEAN |
| NEMACIDE(81) |      |      |      |      |
| ALDICARB     | 16.2 | 16.5 | 26.4 | 19.7 |
| HOE00668     | 16.3 | 15.4 | 21.5 | 17.7 |
| RH 9358      | 15.8 | 21.4 | 24.9 | 20.7 |
| MEAN         | 16.1 | 17.8 | 24.3 | 19.4 |

RATE 0.0 12.5

GRAND MEAN 18.7

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

| TABLE | NEMACIDE(81) | RATE NEMACIDE(81) | RATE |
|-------|--------------|-------------------|------|
| SED   | 1.52         | 1.52              | 2.64 |

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

| STRATUM  | DF | SE   | CV%  |
|----------|----|------|------|
| BLOCK.WP | 18 | 3.23 | 17.3 |

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

|              |      |      |      |      |
|--------------|------|------|------|------|
| RATE         | 2.8  | 5.6  | 11.2 | MEAN |
| NEMACIDE(81) |      |      |      |      |
| ALDICARB     | 83.9 | 79.6 | 86.8 | 83.4 |
| HOE00668     | 82.6 | 80.8 | 85.2 | 82.9 |
| RH 9358      | 80.9 | 84.4 | 88.5 | 84.6 |
| MEAN         | 82.5 | 81.6 | 86.8 | 83.6 |

RATE 0.0 76.6

GRAND MEAN 82.9

GRAIN MEAN DM% 86.6

PLOT AREA HARVESTED 0.00130

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WINTER WHEAT SERIES I

GRAIN TONNES/HECTARE

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

|              | RATE | 2.8  | 5.6  | 11.2 | MEAN |
|--------------|------|------|------|------|------|
| NEMACIDE(83) |      |      |      |      |      |
| FMC65201     |      | 4.07 | 4.28 | 4.19 | 4.18 |
| FMC67825     |      | 5.24 | 5.25 | 5.58 | 5.36 |
| OXAMYL       |      | 5.25 | 5.44 | 4.26 | 4.99 |
| MEAN         |      | 4.86 | 4.99 | 4.68 | 4.84 |

RATE 0.0 5.41

GRAND MEAN 4.90

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

| TABLE | NEMACIDE(83) | RATE NEMACIDE(83) | RATE<br>& RATE 0.0 |
|-------|--------------|-------------------|--------------------|
| SED   | 0.342        | 0.342             | 0.593              |

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

| STRATUM  | DF | SE    | CV%  |
|----------|----|-------|------|
| BLOCK.WP | 18 | 0.726 | 14.8 |

GRAIN MEAN DM% 88.4

PLOT AREA HARVESTED 0.00251

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SPRING BARLEY SERIES IV

GRAIN TONNES/HECTARE

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

| RATE         | SINGLE | DOUBLE | QUAD | MEAN |
|--------------|--------|--------|------|------|
| NEMACIDE(82) |        |        |      |      |
| DS 46995     | 6.50   | 5.33   | 6.21 | 6.01 |
| DS 47187     | 5.53   | 6.58   | 5.75 | 5.95 |
| OXAMYL       | 6.19   | 6.50   | 7.26 | 6.65 |
| MEAN         | 6.07   | 6.13   | 6.40 | 6.20 |

RATE NONE 7.16

GRAND MEAN 6.30

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

| TABLE | NEMACIDE(82) | RATE NEMACIDE(82) | RATE<br>& RATE NONE |
|-------|--------------|-------------------|---------------------|
| SED   | 0.432        | 0.432             | 0.749               |

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

| STRATUM  | DF | SE    | CV%  |
|----------|----|-------|------|
| BLOCK.WP | 18 | 0.917 | 14.6 |

GRAIN MEAN DM% 87.5

PLOT AREA HARVESTED 0.00130