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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 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) RATE & RATE NONE
SED	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 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

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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 & 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 & 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		