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

Rothamsted Research

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83/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 15th year, potatoes, w. wheat, s. barley.

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

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

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

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

1. NEMACIDE(83) Nematicides applied 1983:

FMC65201
FMC67825
OXAMYL

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

2.8
5.6
11.2

plus one untreated plot

RATE

0.0

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Treatments to potatoes (Series II):

NEMACIDE(80)	Residues of 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 s. barley (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

RATE

0.0

Treatments to w. wheat (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, for 'DS 46995' and 'DS 47187': 2.8 kg for oxamyl)
DOUBLE Double (3.0 kg for 'DS 46995' and 'DS 47187': 5.6 kg for oxamyl)
QUAD Quadruple (6.0 kg for 'DS 46995' and 'DS 47187': 11.2 kg for oxamyl)

plus one untreated plot

RATE

NONE

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Standard applications:

- Potatoes (Series I and II): Manures: (10:10:15+4.5 Mg) at 2480 kg. N at 90 kg as 'Nitro-Chalk'. Weedkillers: Linuron at 1.0 l with paraquat at 0.4 kg ion in 250 l. Fungicides: Mancozeb at 1.4 kg in 250 l on three occasions, with insecticide on the first and third occasions, Fentin hydroxide at 0.28 kg in 250 l on five occasions, with insecticide on the first four occasions. Insecticide: Pirimicarb at 0.14 kg. Haulm desiccant: Diquat at 0.50 kg ion in 250 l.
- S. barley (Series III): Manures: (20:10:10) at 630 kg. Weedkillers: Dicamba with mecoprop and MCPA (as 'Herrisol' at 5.0 l) in 250 l. Fungicide: Tridemorph at 0.52 kg in 250 l.
- W. wheat (Series IV): Manures: Magnesian limestone at 5.0 t. (0:20:20) at 310 kg. N at 180 kg as 'Nitro-Chalk'. Weedkillers: Dicamba with mecoprop and MCPA (as 'Banlene Plus' at 4.9 l) in 280 l.

- Seed: S. barley: Triumph, dressed with triadimenol plus fuberidazole, sown at 160 kg.
W. wheat: Avalon, sown at 190 kg.
Potatoes: Pentland Crown.

Cultivations, etc.:-

- Potatoes (Series I and II): Heavy spring-tine cultivated (Series I): 26 Oct, 1982. Ploughed (Series II): 8 Nov. Deep-tine cultivated (Series I): 12 Jan, 1983. Heavy spring-tine cultivated (Series I): 8 Mar. Heavy spring-tine cultivated: 21 Mar, 14 Apr, 5 May. NPK with Mg applied: 14 Apr. N applied: 5 May. Treatments applied, rotary cultivated, potatoes planted (Series I): 10 May. Rotary cultivated, potatoes planted (Series II): 11 May. Rotary ridged: 6 June. Weedkillers applied: 7 June. Mancozeb applied with insecticide: 22 June, 8 July. Mancozeb applied: 1 July. Fentin hydroxide applied with insecticide: 18 July, 29 July, 11 Aug, 26 Aug. Fentin hydroxide applied: 9 Sept. Haulm mechanically destroyed: 5 Oct. Haulm desiccant applied: 17 Oct. Lifted: 19 Oct.
- S. barley (Series III): Ploughed: 8 Nov, 1982. Spring-tine cultivated: 7 Mar, 1983. NPK applied: 8 Mar. Spring-tine cultivated with crumbler attached, seed sown: 9 Mar. Weedkillers applied: 27 May. N applied: 3 June. Fungicide applied: 16 June. Combine harvested: 5 Aug.
- W. wheat (Series IV): Magnesian limestone and PK applied, heavy spring-tine, and spring-tine cultivated, seed sown: 26 Oct, 1982. Weedkillers applied: 16 Apr. N applied: 29 Apr. Combine harvested: 12 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 I

TOTAL TUBERS TONNES/HECTARE

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

RATE	2.8	5.6	11.2	MEAN
NEMACIDE (83)				
FMC65201	26.7	31.6	38.4	32.2
FMC67825	26.6	31.5	38.4	32.2
OXAMYL	40.3	42.7	39.7	40.9
MEAN	31.2	35.3	38.8	35.1

RATE 0.0 14.4

GRAND MEAN 33.0

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

TABLE	NEMACIDE (83)	RATE NEMACIDE (83)	RATE & RATE 0.0
SED	2.33	2.33	4.04

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	4.95	15.0

PERCENTAGE WARE 3.81CM (1.5 INCH) RIDDLE

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

RATE	2.8	5.6	11.2	MEAN
NEMACIDE (83)				
FMC65201	92.4	92.4	92.6	92.5
FMC67825	92.1	93.3	93.4	92.9
OXAMYL	93.1	93.5	92.4	93.0
MEAN	92.5	93.0	92.8	92.8

RATE 0.0 88.7

GRAND MEAN 92.4

PLOT AREA HARVESTED 0.00130

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POTATOES SERIES II

TOTAL TUBERS TONNES/HECTARE

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

NEMACIDE (80)	
NONE	18.7
BAS 1	22.4
BAS 2	24.6
BAS 4	27.2
CARBOF 2	24.2
ETHOP 4	26.8
FMC 2	15.0
OX 2	27.2
OX S1 2	24.3
OX S2 2	24.9
MEAN	23.5

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

TABLE	NEMACIDE (80)
SED	1.40

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	1.71	7.3

PERCENTAGE WARE 3.81CM (1.5 INCH RIDDLE)

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

NEMACIDE (80)	
NONE	90.6
BAS 1	91.7
BAS 2	91.8
BAS 4	92.2
CARBOF 2	91.5
ETHOP 4	92.9
FMC 2	88.6
OX 2	92.1
OX S1 2	90.8
OX S2 2	90.4
MEAN	91.3

PLOT AREA HARVESTED 0.00130

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WINTER WHEAT SERIES IV

GRAIN TONNES/HECTARE

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

	RATE	SINGLE	DOUBLE	QUAD	MEAN
NEMACIDE (82)					
DS 46995		4.82	5.32	4.96	5.03
DS 47187		4.78	4.81	5.15	4.92
OXAMYL		5.70	5.26	5.07	5.34
MEAN		5.10	5.13	5.06	5.10

RATE NONE 4.66

GRAND MEAN 5.05

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

TABLE	NEMACIDE (82)	RATE NEMACIDE (82)	RATE NEMACIDE (82) & RATE NONE
SED	0.341	0.341	0.591

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	0.724	14.3

GRAIN MEAN DM% 85.9

PLOT AREA HARVESTED 0.00130

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BARLEY SERIES III

GRAIN TONNES/HECTARE

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

	RATE	2.8	5.6	11.2	MEAN
NEMACIDE (81)					
ALDICARB	6.01	5.03	4.79	5.27	
HOE00668	4.43	4.68	4.79	4.63	
RH 9358	4.73	4.66	5.20	4.87	
MEAN	5.06	4.79	4.93	4.92	

RATE 0.0 5.06

GRAND MEAN 4.94

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

TABLE	NEMACIDE (81)	RATE NEMACIDE (81)	RATE NEMACIDE (81)
			& RATE 0.0

SED	0.326	0.326	0.564

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	0.691	14.0
GRAIN MEAN DM%	86.6		
PLOT AREA HARVESTED	0.00251		