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

Rothamsted Research

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81/W/CS/34

NEMATOCIDES 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 12th year, potatoes, w. wheat, s. barley.

For previous years see 71/W/CS/34(t), 72/W/CS/34(t) and 73-80/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
Series I	P	P	P*	SB	B	P	P*	W	B	P	P*	B	B
Series II	P	P	P	P*	SB	B	P	P*	W	B	P	P*	W
Series III	P	B	P	P	P*	SB	B	P	P*	W	B	P	P*
Series IV	P	B	P	P	P	P*	SB	B	P	P*	W	B	P

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

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

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 w. wheat (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 potatoes (Series III): All combinations of:-

1. NEMACIDE(81) Nematicides applied 1981:

ALDICARB	Aldicarb
HOE00668	'HOE 00668'
RH 9358	'RH 9358'

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

2.8
5.6
11.2

plus one untreated plot

RATE

NONE

Treatments to potatoes (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): Manures: (20:10:10) at 450 kg. Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) with the fungicide in 280 l. Fungicide: Ethirimol (as 'Milgo E' at 1.3 l).
- W. wheat (Series II): Manures: Magnesian limestone at 5.0 t. (10:23:23) at 260 kg. 'Nitro-Chalk' at 560 kg. Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 2.5 l) in 280 l.
- Potatoes (Series III and Series IV): Manures: (10:10:15 + 4.5 Mg) at 2020 kg. Fungicide: Mancozeb at 1.4 kg in 250 l applied six times, with the insecticide on the first five occasions. Insecticide: Pirimicarb at 0.14 kg. Haulm desiccant: Undiluted BOV at 170 l.

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

Cultivations, etc.:-

- Barley (Series I): Ploughed: 23 Oct, 1980. NPK applied: 19 Feb, 1981. Spring-tine cultivated with crumbler attached: 26 Feb. Seed sown: 27 Feb. Weedkillers and fungicide applied: 1 May. Combine harvested: 4 Aug.
- Wheat (Series II): Magnesian limestone applied: 14 Oct, 1980. Heavy spring-tine cultivated, NPK applied, spring-tine cultivated with crumbler attached, seed sown: 15 Oct. N applied: 8 Apr, 1981. Weedkillers applied: 21 Apr. Combine harvested: 24 Aug.
- Potatoes (Series III & IV): Heavy spring-tine cultivated: 15 Oct, 1980 (Series III). Ploughed: 23 Oct (Series IV). Heavy spring-tine cultivated: 15 Apr, 1981. NPK with Mg applied: 17 Apr. Spring-tine cultivated: 22 Apr. Treatments applied (Series III), rotary cultivated, potatoes planted: 23 Apr. Grubbed: 15 May. Rotary ridged: 22 May. Grubbed and rotary ridged: 8 June. Fungicide with insecticide applied: 22 June, 3 July, 14 July, 28 July, 10 Aug. Fungicide applied: 27 Aug. Haulm desiccant applied: 6 Oct. Lifted: 14 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 III

TOTAL TUBERS TONNES/HECTARE

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

RATE	2.8	5.6	11.2	MEAN
NEMACIDE(81)				
ALDICARB	39.4	34.8	44.3	39.5
HOE00668	37.0	41.1	42.8	40.3
RH 9358	39.6	42.4	40.5	40.8
MEAN	38.7	39.4	42.5	40.2
RATE NONE	9.0			
GRAND MEAN	37.1			

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

TABLE	NEMACIDE(81)	RATE NEMACIDE(81)	RATE & RATE NONE

SED	1.80	1.80	3.13

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	3.83	10.3

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

RATE	1	2	4	MEAN
NEMACIDE(81)				
ALDICARB	92.6	91.2	93.7	92.5
HOE00668	91.4	93.6	94.0	93.0
RH 9358	91.9	93.8	92.8	92.8
MEAN	92.0	92.9	93.5	92.8

RATE NONE 81.1

GRAND MEAN 91.6

PLOT AREA HARVESTED 0.00130

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POTATOES SERIES IV

TOTAL TUBERS TONNES/HECTARE

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

	RATE	5	10	20	MEAN
NEMACIDE(78)					
BENDIOCA		15.1	16.5	25.8	19.1
THIOPHAN		17.1	11.8	16.8	15.2
TERBUFOS		14.0	15.8	22.7	17.5
MEAN		15.4	14.7	21.8	17.3

RATE 0.0 12.8

GRAND MEAN 16.8

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

TABLE	NEMACIDE(78)	RATE	NEMACIDE(78) RATE & RATE 0.0
-----	-----	-----	-----
SED	2.00	2.00	3.46

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	4.24	25.2

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

	RATE	5	10	20	MEAN
NEMACIDE(78)					
BENDIOCA		81.8	83.2	88.7	84.6
THIOPHAN		81.0	71.7	83.5	78.7
TERBUFOS		84.4	81.6	89.5	85.1
MEAN		82.4	78.8	87.2	82.8

RATE 0.0 77.0

GRAND MEAN 82.2

PLOT AREA HARVESTED 0.00130

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SERIES II WINTER WHEAT

GRAIN TONNES/HECTARE

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

NEMACIDE(80)	
NONE	4.57
BAS 1	4.90
BAS 2	4.68
BAS 4	5.43
CARBOF 2	5.13
ETHOP 4	5.01
FMC 2	4.97
OX 2	4.69
OX S1 2	4.78
OX S2 2	4.68
MEAN	4.89

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

TABLE	NEMACIDE(80)
-----	-----
SED	0.328

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	0.402	8.2

GRAIN MEAN DM% 82.4

PLOT AREA HARVESTED 0.00260

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BARLEY SERIES I

GRAIN TONNES/HECTARE

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

RATE NEMACIDE (79)	SINGLE	DOUBLE	QUAD	MEAN
ALDICARB	3.81	4.31	3.94	4.02
CARBENDA	3.81	3.68	3.99	3.83
TERBUFOS	3.68	4.29	4.37	4.11
MEAN	3.77	4.09	4.10	3.99
RATE NONE	3.73			
GRAND MEAN	3.96			

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

TABLE	NEMACIDE (79)	RATE NEMACIDE (79)	RATE & RATE NONE
SED	0.180	0.180	0.312

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	0.383	9.7
GRAIN MEAN DM%	81.0		
PLOT AREA HARVESTED	0.00251		