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

Rothamsted Research

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82/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 14th year, potatoes, w. wheat, s. barley.

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

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

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

Treatments to potatoes (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 s. barley (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 w. wheat (Series III): All combinations of:-

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

ALDICARB	Aldicarb
HOE00668	'HOE 00668'
RH 9358	'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 potatoes (Series IV): All combinations of:-

1. NEMACIDE(82) Nematicides applied 1982:

DS 46995	'DS 46995'
DS 47187	'DS 47187'
OXAMYL	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:

- S. barley (Series II): Manures: (20:10:10) at 440 kg. Weedkiller: Dicamba with mecoprop and MCPA (as 'Poly-Farmon' at 4.9 l) in 280 l.
- W. wheat (Series III): Manures: Magnesian limestone at 5.0 t. (0:20:20) at 310 kg. N at 150 kg as 'Nitro-Chalk'. Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 280 l. Fungicide: Propiconazole at 0.12 kg in 280 l applied with the insecticide. Insecticide: Pirimicarb at 0.14 kg.
- Potatoes (Series I and IV): Manures: (10:10:15+4.5 Mg) at 2020 kg. Weedkillers: Linuron at 1.1 l with paraquat at 0.28 kg ion in 280 l. Fungicides: Mancozeb at 1.4 kg in 250 l applied four times with insecticide on the first two occasions. Ofurace at 0.1 kg with maneb at 1.4 kg in 250 l applied twice, with insecticide on the first occasion. Insecticide: Pirimicarb at 0.14 kg. Haulm desiccant: Undiluted BOV at 220 l.

Seed: S. barley: Triumph, dressed with ethirimol, sown at 160 kg.
W. wheat: Avalon, sown at 200 kg.
Potatoes: Pentland Crown.

Cultivations, etc.:-

- S. barley (Series II): Ploughed: 14 Sept, 1981. Heavy spring-tine cultivated: 25 Mar, 1982. NPK applied, spring-tine cultivated with crumbler attached: 26 Mar. Seed sown: 27 Mar. Weedkiller applied: 17 May. Combine harvested: 10 Aug.
- W. wheat (Series III): Magnesian limestone applied: 6 Oct, 1981. Heavy spring-tine cultivated: 3 Nov. PK applied, spring-tine cultivated with crumbler attached, seed sown: 4 Nov. N applied: 14 Apr, 1982. Weedkillers applied: 20 Apr. Fungicide and insecticide applied: 14 June. Combine harvested: 17 Aug.
- Potatoes (Series I and IV): Ploughed: 14 Sept, 1981 (Series I). Heavy spring-tine cultivated: 3 Nov (Series IV). Heavy spring-tine cultivated: 15 Apr, 1982, 20 Apr. NPK with Mg applied: 19 Apr. Rotary cultivated with crumbler attached, potatoes planted: 22 Apr (Series I). Treatments applied, rotary cultivated with crumbler attached: 26 Apr (Series IV). Potatoes planted: 27 Apr (Series IV). Rotary ridged: 17 May. Weedkillers applied: 18 May (Series I), 19 May (Series IV). Mancozeb applied with the insecticide: 16 June, 2 July. Mancozeb applied: 14 July, 23 Aug. Ofurace plus maneb applied with the insecticide: 28 July. Ofurace plus maneb applied: 11 Aug. Haulm desiccant applied: 1 Oct. Haulm mechanically destroyed: 2 Oct. Lifted: 15 Oct (Series IV), 18 Oct (Series I).

- NOTES: (1) Soil samples were taken before applying treatments and after harvest for counts of cysts, eggs and larvae of *Globodera rostochiensis*.
- (2) Treatments were incorrectly applied to one plot of series IV with treatment combination OXAMYL QUAD. An estimated value was used in the analysis.

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POTATOES SERIES I

TOTAL TUBERS TONNES/HECTARE

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

RATE NEMACIDE (79)	SINGLE	DOUBLE	QUAD	MEAN
ALDICARB	27.7	29.1	28.4	28.4
CARBENDA	21.7	20.9	22.8	21.8
TERBUFOS	21.9	26.8	27.9	25.5
MEAN	23.8	25.6	26.4	25.2

RATE NONE 23.1

GRAND MEAN 25.0

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

TABLE	NEMACIDE (79)	RATE NEMACIDE (79) RATE & RATE NONE
SED	1.21	1.21 2.09

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	2.56	10.2

PERCENTAGE WARE 3.81CM (1.5 INCH) RIDDLE

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

RATE NEMACIDE (79)	SINGLE	DOUBLE	QUAD	MEAN
ALDICARB	93.5	95.1	94.6	94.4
CARBENDA	91.9	86.6	90.5	89.7
TERBUFOS	91.6	93.0	93.2	92.6
MEAN	92.3	91.6	92.8	92.2

RATE NONE 90.0

GRAND MEAN 92.0

PLOT AREA HARVESTED 0.00130

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POTATOES SERIES IV

TOTAL TUBERS TONNES/HECTARE

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

	RATE	SINGLE	DOUBLE	QUAD	MEAN
NEMACIDE (82)					
DS 46995		30.5	35.3	38.2	34.7
DS 47187		30.9	31.2	35.3	32.5
OXAMYL		36.9	40.2	47.4	41.5
MEAN		32.8	35.6	40.3	36.2

RATE NONE 11.4

GRAND MEAN 33.7

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

TABLE	NEMACIDE (82)	RATE NEMACIDE (82)	RATE & RATE 0.0
SED	1.90	1.90	3.28

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

STRATUM	DF	SE	CV%
BLOCK.WP	17	4.02	11.9

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

	RATE	SINGLE	DOUBLE	QUAD	MEAN
NEMACIDE (82)					
DS 46995		96.2	96.2	97.1	96.5
DS 47187		97.1	97.0	96.8	97.0
OXAMYL		97.5	97.3	96.9	97.2
MEAN		96.9	96.8	96.9	96.9

RATE NONE 82.4

GRAND MEAN 95.5

PLOT AREA HARVESTED 0.00130

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WINTER WHEAT SERIES III

GRAIN TONNES/HECTARE

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

	RATE	2.8	5.6	11.2	MEAN
NEMACIDE(81)					
ALDICARB		6.70	6.34	6.04	6.36
HOE00668		6.07	6.12	6.04	6.08
RH 9358		6.22	6.07	6.36	6.22
MEAN		6.33	6.18	6.14	6.22

RATE 0.0 6.48

GRAND MEAN 6.24

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

TABLE	NEMACIDE(81)	RATE NEMACIDE(81)	RATE & RATE NONE
SED	0.295	0.295	0.511

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	0.626	10.0

GRAIN MEAN DM% 79.1

PLOT AREA HARVESTED 0.00251

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SERIES II SPRING BARLEY

GRAIN TONNES/HECTARE

***** TABLES OF MEAN *****

NEMACIDE(80)

NONE	4.55
BAS 1	4.25
BAS 2	4.89
BAS 4	4.97
CARBOF 2	4.32
ETHOP 4	4.15
FMC 2	4.39
OX 2	4.43
OX S1 2	4.86
OX S2 2	4.16

MEAN 4.50

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

TABLE NEMACIDE(80)

SED 0.560

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	0.686	15.2

GRAIN MEAN DM% 85.8

PLOT AREA HARVESTED 0.00251