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77/W/CS/34 Nematicides in Crop Sequence - Potatoes, Wheat, Barley

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77/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 eighth year, potatoes, wheat, barley.

For previous years see 71/W/CS/34(t), 72/W/CS/34(t) and 73-76/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	1970	1971	1972	1973	1974	1975	1976	1977
Series I	P	P	P*	SB	B	P	P*	W	B
Series II	P	P	P	P*	SB	B	P	P*	W
Series III	P	B	P	P	P*	SB	B	P	P*
Series IV	P	B	P	P	P	P*	SB	B	P

P = potatoes, SB = sugar beet, B = barley, W = wheat

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

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

1. NEMACIDE(75) Residues of nematicides applied 1975:

DURSBAN	'Dursban'
PHOXIM	Phoxim
DACAMOX	'Dacamox'

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

SINGLE	Single (2.8 kg for 'Dursban' and 'Dacamox': 5.6 kg for phoxim)
DOUBLE	Double (5.6 kg for 'Dursban' and 'Dacamox': 11.2 kg for phoxim)
QUAD	Quadruple (11.2 kg for 'Dursban' and 'Dacamox': 22.4 kg for phoxim)
NONE	plus one untreated plot per block

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

1. NEMACIDE(76) Residues of nematicides applied 1976:

AC 64475	'AC 64475'
CARBOFUR	Carbofuran
PHOXIM	Phoxim

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

	'AC 64475'	Carbofuran	Phoxim
SINGLE	Single 2.2	2.8	5.6
DOUBLE	Double 4.4	5.6	11.2
QUAD	Quadruple 8.8	11.2	22.4

NONE plus one untreated plot per block

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

1. NEMACIDE(77) Nematicides applied 1977:

AC 64475	'AC 64475'
CARBOFUR	Carbofuran
PHOXIM	Phoxim

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

		'AC 64475'	Carbofuran	Phoxim
SINGLE	Single	2.2	2.8	5.6
DOUBLE	Double	4.4	5.6	11.2
QUAD	Quadruple	8.8	11.2	22.4
NONE	plus one untreated plot per block			

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

1. NEMACIDE(74) Residues of nematicides applied 1974:

BENOMYL	Benomyl
CARBOFUR	Carbofuran
THIABEND	Thiabendazole

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

5.6	5.6
11.2	11.2
22.4	22.4

0.0 plus one untreated plot per block

Standard applications:

Potatoes (Series III & IV): Manures (13:13:20) at 1860 kg. Fungicide: Mancozeb at 1.3 kg on four occasions, the last three with insecticide, in 420 l, 390 l and twice in 370 l successively. Insecticide: Pirimicarb at 0.14 kg on three occasions with fungicide.

Wheat (Series II): Manures: Magnesian limestone at 5 tonnes (10:24:24) at 250 kg combine drilled, N at 90 kg as 'Nitro-Chalk'. Weedkillers: Ioxynil at 0.53 kg plus mecoprop at 1.6 kg in 220 l. Insecticide: Pirimicarb at 0.14 kg in 270 l.

Barley Series I: Manures: (20:14:14) at 450 kg combine drilled. Weedkillers: Ioxynil at 0.53 kg plus mecoprop at 1.6 kg in 220 l.

Seed: Potatoes: Pentland Crown

Wheat: Cappelle, sown at 210 kg

Barley: Julia, dressed with ethirimol, sown at 160 kg.

Cultivations, etc.:-

Potatoes, test crop (Series III): Heavy-tine cultivated: 8 Nov, 1976. NPK applied: 5 Apr, 1977. Treatments applied, all plots rotary cultivated, potatoes planted: 14 Apr. Grubbed: 3 May. Fine-tooth harrowed and grubbed: 25 May. Earthed up: 26 May. Fungicide applied: 24 June. Fungicide with insecticide applied: 8 July, 21 July, 11 Aug. Haulm mechanically destroyed: 20 Sept. Lifted: 14 Oct.

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Potatoes (Series IV): Subsoiled, tines 140 cm apart and 50 cm deep: 7 Sept, 1976. Ploughed: 9 Nov. NPK applied: 5 Apr, 1977. Rotary cultivated, potatoes planted: 14 Apr. Grubbed: 3 May. Fine-tooth harrowed and grubbed: 25 May. Earthed up: 26 May. Fungicide applied: 24 June. Fungicide with insecticide applied: 8 July, 21 July, 11 Aug. Haulm mechanically destroyed: 20 Sept. Lifted: 14 Oct.

Wheat (Series II): Magnesian limestone applied: 1 Nov, 1976. Heavy-tine cultivated: 8 Nov. Seed sown: 9 Nov. N applied: 25 Apr, 1977. Weedkillers applied: 11 May. Insecticide applied: 11 July. Combine harvested: 7 Sept.

Barley (Series I): Ploughed: 9 Nov, 1976. Spring-tine cultivated with crumbler attached, seed sown: 9 Mar, 1977. Weedkillers applied: 11 May. Combine harvested: 15 Aug.

- NOTES: (1) Soil samples were taken before applying treatments and after harvest for counts of cysts, eggs and larvae of *Globodera rostochiensis*.
(2) For Barley (Series I) the analysis has been adjusted by covariance for a linear trend.
(3) For Potatoes (Series IV) the analysis presented assumes a Fourier curve with 2 terms, a sine and a cosine to represent positional variation.

ERRATA TO 'YIELDS' 1976 76/W/CS/34

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

page 157. TOTAL TUBERS TONNES/HECTARE

NEMACIDE(73) OXAMYL, RATE DOUBLE should read 23.0 not 3.0

page 157. PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

NEMACIDE(73) OXAMYL, RATE SINGLE should read 82.1 not 2.1

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POTATOES SERIES III

TOTAL TUBERS TONNES/HECTARE

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

RATE	SINGLE	DOUBLE	QUAD	MEAN
NEMACIDE(77)				
AC 64475	14.3	15.8	20.3	16.8
CARBOFUR	13.2	21.1	20.5	18.3
PHOXIM	12.9	14.2	16.8	14.6
MEAN	13.4	17.0	19.2	16.6
RATE NONE		6.4		
GRAND MEAN		15.5		

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

TABLE	NEMACIDE(77)	RATE NEMACIDE(77)	RATE & RATE NONE
SED	1.68	1.68	2.91

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	3.56	22.9

PERCENTAGE 3.81CM (1.5 INCH) RIDDLE

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

RATE	SINGLE	DOUBLE	QUAD	MEAN
NEMACIDE(77)				
AC 64475	66.0	66.5	70.7	67.7
CARBOFUR	63.7	77.8	77.7	73.1
PHOXIM	61.1	59.7	69.0	63.3
MEAN	63.6	68.0	72.5	68.0
RATE NONE		48.7		
GRAND MEAN		66.1		

PLOT AREA HARVESTED 0.00130

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POTATOES SERIES IV

TOTAL TUBERS TONNES/HECTARE

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

	RATE	5.5	11.2	22.4	MEAN
NEMACIDE(74)					
BENOMYL	9.7	15.7	13.3	12.9	
CARBOFUR	9.5	12.4	14.6	12.2	
THIABEND	9.0	9.4	17.0	11.8	
MEAN	9.4	12.5	15.0	12.3	
RATE 0.0		9.8			
GRAND MEAN		12.0			

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

TABLE	NEMACIDE(74)	RATE NEMACIDE(74)	RATE & RATE 0.0
SED	1.16	1.26	2.16

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

STRATUM	DF	SE	CV%
BLOCK.WP	16	2.43	20.2

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

NEMACIDE(74)				
BENOMYL	49.2	64.5	53.7	55.8
CARBOFUR	51.3	56.1	69.8	59.1
THIABEND	42.6	45.1	64.6	50.7
MEAN	47.7	55.2	62.7	55.2
RATE 0.0	49.0			
GRAND MEAN	54.6			

PLOT AREA HARVESTED 0.00130

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WINTER WHEAT SERIES II

GRAIN TONNES/HECTARE

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

RATE	SINGLE	DOUBLE	QUAD	MEAN
NEMACIDE(76)				
AC 64475	2.85	3.37	2.88	3.04
CARBOFUR	2.49	2.35	2.34	2.39
PHOXIM	2.53	2.39	2.81	2.58
MEAN	2.62	2.70	2.68	2.67
RATE NONE		2.61		
GRAND MEAN		2.66		

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

TABLE	NEMACIDE(76)	RATE NEMACIDE(76)	RATE & RATE NONE
SED	0.139	0.139	0.241

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	0.296	11.1
GRAIN MEAN DM%	81.7		

STRAW TONNES/HECTARE

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

RATE	SINGLE	DOUBLE	QUAD	MEAN
NEMACIIE(76)				
AC 64475	2.18	2.80	2.46	2.48
CARBOFUR	1.84	2.07	2.12	2.01
PHOXIM	2.04	2.22	2.33	2.20
MEAN	2.02	2.36	2.30	2.23
RATE NONE		2.21		
GRAND MEAN		2.23		

STRAW MEAN DM% 85.2

PLOT AREA HARVESTED 0.00260

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BARLEY SERIES I

GRAIN TONNES/HECTARE

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

RATE	SINGLE	DOUBLE	QUAD	MEAN
NEMACIDE(75)				
DURSBAN	4.21	4.35	4.46	4.34
PHOXIM	4.34	4.12	4.21	4.22
DACAMOX	4.36	4.16	4.12	4.21
MEAN	4.30	4.21	4.26	4.26
RATE NONE		3.63		
GRAND MEAN		4.20		

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

TABLE	NEMACIDE(75)	RATE NEMACIDE(75)	RATE & RATE NONE
SED	0.187	0.190	0.328

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

STRATUM	DF	SE	CV%
BLOCK.WP	17	0.391	9.3
GRAIN MEAN DM%	79.1		

STRAW TONNES/HECTARE

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

RATE	SINGLE	DOUBLE	QUAD	MEAN
NEMACIDE(75)				
DURSBAN	2.21	2.60	2.45	2.42
PHOXIM	2.52	2.20	2.01	2.24
DACAMOX	2.18	2.43	2.36	2.32
MEAN	2.30	2.41	2.27	2.33
RATE NONE		2.35		
GRAND MEAN		2.33		

STRAW MEAN DM% 75.3

PLOT AREA HARVESTED 0.00260