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

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78/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 ninth year, potatoes, wheat, barley.

For previous years see 71/W/CS/34(t), 72/W/CS/34(t) and 73-77/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	1978
Series I	P	P	P*	SB	B	P	P*	W	B	P
Series II	P	P	P	P*	SB	B	P	P*	W	B
Series III	P	B	P	P	P*	SB	B	P	P*	W
Series IV	P	B	P	P	P	P*	SB	B	P	P*

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

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

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

1. NEMACIDE(77) Residues of 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(78) Nematicides applied 1978:

BENDIOCA	Bendiocarb
THIOPHAN	Thiophanate methyl
TERBUFOS	Terbufos

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

5
10
20

0.0 plus one untreated plot per block

Standard applications:

Potatoes (Series I & IV): Manures: (13:13:20) at 1850 kg. Weedkillers: Linuron at 1.3 kg plus paraquat at 0.42 kg ion in 280 l. Fungicide: Mancozeb at 1.3 kg on three occasions, in 280 l on the first, in 420 l on the second, in 420 l with insecticide on the third. Fentin acetate with maneb ('Fennite A' at 1.7 kg in 280 l). Insecticide: Pirimicarb at 0.14 kg, on one occasion with fungicide, in 420 l.

Wheat (Series III): Manures: Magnesian limestone at 5 t. (10:24:24) at 250 kg, combine drilled. N at 130 kg as 'Nitro-Shell 34'. Weedkillers: Mecoprop, bromoxynil and ioxynil ('Brittox' at 3.5 l in 280 l).

Barley (Series II): Manures: (20:14:14) at 450 kg, combine drilled. Weedkillers: Mecoprop, bromoxynil and ioxynil ('Brittox' at 2.5 l in 280 l).

Seed: Potatoes: Pentland Crown

Wheat: Cappelle, sown at 210 kg

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

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Cultivations, etc.:-

- Potatoes (Series I & IV): Ploughed: 28 September, 1977 (Series I), 1 Dec. (Series IV). NPK applied: 5 Apr, 1978. Deep-tine cultivated: 10 Apr. Rotary cultivated, potatoes planted: 17 Apr (Series I). Spring-tine cultivated with crumbler attached: 18 Apr (Series IV). Treatments applied, all plots rotary cultivated, potatoes planted: 19 Apr (Series IV). Fine-tooth harrowed: 11 May. Grubbed and earthed up: 12 May. Weedkillers applied: 15 May. Mancozeb applied: 5 July, 20 July. Mancozeb applied with insecticide: 10 Aug. Fentin acetate with maneb applied: 23 Aug. Haulm mechanically destroyed: 14 Sept. Lifted: 4 Oct.
- Wheat (Series III): Magnesian limestone applied: 24 Oct, 1977. Ploughed: 25 Oct. Spring-tine cultivated with crumbler attached, seed sown: 26 Oct. N applied 8 Apr, 1978. Weedkillers applied: 10 May. Combine harvested: 25 Aug.
- Barley (Series II): Ploughed: 28 Sept, 1977. Spring-tine cultivated: 8 Mar, 1978. Seed sown: 9 Mar. Weedkillers applied: 17 May. Combine harvested: 18 Aug.

- NOTES: (1) Soil samples were taken before applying treatments and after harvest for counts of cysts, eggs and larvae of *Globodera rostochiensis*.
(2) The yields of barley and wheat (especially those of straw) showed that the performance of the combine harvester was different when working in different directions. An appropriate adjustment has been made by covariance.
(3) Because of bird damage, the yields of two plots of Barley were lost, those with treatment combinations
- | | |
|--------------|--------|
| NEMACIDE(76) | RATE |
| PHOXIM | SINGLE |
| CARBOFUR | DOUBLE |
- Estimated values were used in the analysis.

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POTATOES SERIES I

TOTAL TUBERS TONNES/HECTARE

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

RATE	SINGLE	DOUBLE	QUAD	MEAN
NEMACIDE(75)				
DURSBAN	22.5	24.2	29.2	25.3
PHOXIM	27.0	24.5	26.1	25.9
THIOFAN	24.3	25.2	29.3	26.3
MEAN	24.6	24.6	28.2	25.8
RATE NONE		26.9		
GRAND MEAN		25.9		

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

TABLE	NEMACIDE(75)	RATE NEMACIDE(75)	RATE & RATE NONE
SED	1.46	1.46	2.52

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	3.09	11.9

PERCENTAGE WARE 3.81CM (1.5 INCH) RIDDLE

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

RATE	SINGLE	DOUBLE	QUAD	MEAN
NEMACIDE(75)				
DURSBAN	88.0	89.5	94.2	90.6
PHOXIM	90.9	88.3	91.9	90.4
THIOFAN	91.7	90.1	93.3	91.7
MEAN	90.2	89.3	93.1	90.9
RATE NONE		92.9		
GRAND MEAN		91.1		

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	26.2	28.4	25.5	26.7
THIOPHAN	17.8	18.9	21.4	19.4
TERBUFOS	24.0	23.4	26.7	24.7
MEAN	22.7	23.6	24.5	23.6
RATE 0.0		13.5		
GRAND MEAN		22.6		

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

TABLE	NEMACIDE(78)	RATE NEMACIDE(78) RATE & RATE 0.0
SED	1.71	1.71 2.96

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	3.62	16.0

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

RATE	5	10	20	MEAN
NEMACIDE(78)				
BENDIOCA	86.5	86.1	84.5	85.7
THIOPHAN	83.0	88.8	85.7	85.8
TERBUFOS	86.2	84.9	85.2	85.4
MEAN	85.3	86.6	85.1	85.7
RATE 0.0		82.8		
GRAND MEAN		85.4		

PLOT AREA HARVESTED 0.00130

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BARLEY SERIES II

GRAIN TONNES/HECTARE

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

RATE NEMACIDE(76)	SINGLE	DOUBLE	QUAD	MEAN
AC 64475	2.59	3.17	2.88	2.88
CARBOFUR	1.93	2.52	2.86	2.43
PHOXIM	2.66	1.66	2.60	2.30
MEAN	2.39	2.45	2.78	2.54
RATE NONE		2.87		
GRAND MEAN		2.57		

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

TABLE	NEMACIDE(76)	RATE NEMACIDE(76) RATE & RATE NONE
SED	0.397	0.405 0.703

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

STRATUM	DF	SE	CV%
BLOCK.WP	15	0.841	32.7
GRAIN MEAN DM%	84.8		

STRAW TONNES/HECTARE

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

RATE NEMACIDE(76)	SINGLE	DOUBLE	QUAD	MEAN
AC 64475	1.22	1.27	1.22	1.24
CARBOFUR	0.97	0.94	1.13	1.01
PHOXIM	1.15	0.89	1.23	1.09
MEAN	1.12	1.03	1.19	1.11
RATE NONE		1.02		
GRAND MEAN		1.11		

STRAW MEAN DM% 90.0

PLOT AREA HARVESTED 0.00260

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WINTER WHEAT SERIES III

GRAIN TONNES/HECTARE

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

RATE NEMACIDE(77)	SINGLE	DOUBLE	QUAD	MEAN
AC 64475	5.60	4.99	5.19	5.26
CARBOFUR	4.98	5.06	5.44	5.16
PHOXIM	5.17	4.08	4.75	4.67
MEAN	5.25	4.71	5.13	5.03
RATE NONE		5.01		
GRAND MEAN		5.03		

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

TABLE	NEMACIDE(77)	RATE NEMACIDE(77)	RATE & RATE NONE
SED	0.246	0.247	0.427

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

STRATUM	DF	SE	CV%
BLOCK.WP	17	0.520	10.3
GRAIN MEAN DM%	82.4		

STRAW TONNES/HECTARE

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

RATE NEMACIDE(77)	SINGLE	DOUBLE	QUAD	MEAN
AC 64475	4.42	3.86	4.25	4.18
CARBOFUR	4.05	4.38	4.35	4.26
PHOXIM	4.06	3.52	3.94	3.84
MEAN	4.18	3.92	4.18	4.09
RATE NONE		3.79		
GRAND MEAN		4.06		

STRAW MEAN DM% 83.7

PLOT AREA HARVESTED 0.00260