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74/W/CS/34 Nematicides in Crop Sequence - Potatoes, Sugar Beet, Barley

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74/W/CS/34

NEMATOCIDES IN CROP SEQUENCE

Object: To study the effects of a range of nematicides on incidence of *Heterodera rostochiensis* and yield of potatoes. Residual effects of previous treatments are studied in sugar beet and barley - Woburn Great Hill II and III.

Sponsor: A.G. Whitehead.

The sixth year, potatoes, sugar beet, barley.

For previous years see 71/W/CS/34(t), 72/W/CS/34(t) and 73/W/CS/34.

Design: 4 series of 3 blocks of 10 plots.

Whole plot dimensions: 4.27 x 9.14. Area harvested: Potatoes - 0.00139, barley - 0.00260.

Treatments: The experiment has four series with the following cropping:-

	1969	1970	1971	1972	1973	1974
Series I	P	P	P*	SB	B	P
Series II	P	P	P	P*	SB	B
Series III	P	B	P	P	P*	SB
Series IV	P	B	P	P	P	P*

P = potatoes, SB = sugar beet, B = barley.

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

Treatments to potatoes (Series I) and barley (Series II):

All combinations of:-

1. Residues of nematicides: Potatoes - NEMACIDE(71)
Barley - NEMACIDE(72)

Aldicarb	Aldicarb
Du Pont 1410	Du Pont
Nemacur P (series I only)	Nemacur
CGA 10576 (series II only)	CGA

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

2.8	2.8
5.6	5.6
11.2	11.2

plus one untreated plot per block 0.0

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Treatments to sugar beet (Series III): All combinations of:-

1. Residues of nematicides:	NEMACIDE(73)
Benomyl	Benomyl
Du Pont 1410	Dupont
Dowco 275	Dowco
2. Rates of nematicide (kg a.i.):	RATE
Single rate (2.8 Du Pont 1410, Dowco 275: 5.6 benomyl)	Single
Double rate (5.6 Du Pont 1410, Dowco 275: 11.2 benomyl)	Double
Quadruple rate (11.2 Du Pont 1410, Dowco 275: 22.4 benomyl)	Quad
plus one untreated plot per block	0.0

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

1. Nematicides:	NEMACIDE(74)
Benomyl	Benomyl
Carbofuran	Carbofur
Thiabendazole	Thiabend
2. Rates of nematicide (kg a.i.):	RATE
5.6	5.6
11.2	11.2
22.4	22.4
plus one untreated plot per block	0.0

Standard applications:

Potatoes (Series I and IV): Manures: (13:13:20) at 1940 kg. Weedkillers: Linuron at 1.2 kg plus paraquat at 0.28 kg ion in 280 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 450 l. Fungicide: Mancozeb at 1.3 kg in 450 l.

Sugar beet (Series III): Manures: Magnesian limestone at 5 tonnes. (0:14:28) at 750 kg, N at 180 kg as 'Nitro-Chalk'. Boron at 6.7 kg B203 (as 'Solubor') applied with insecticide. Insecticide: Demeton-s-methyl at 0.21 kg in 390 l. Weedkiller: Phenmedipham at 1.1 kg in 340 l.

Barley (Series II): Manures: (20:15:15) at 500 kg, combine drilled. Weedkiller: Ioxynil at 0.52 kg and mecoprop at 1.6 kg in 280 l.

Seed: Potatoes: Pentland Crown.

Sugar beet: Klein E, sown at 8.0 kg.

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

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Cultivations, etc.:-

Potatoes (Series I): Subsoiled, tines 140 cm apart and 50 cm deep: 15 Oct, 1973. Ploughed: 4 Dec. Spring-tine cultivated: 1 Apr, 1974. NPK applied, spring-tine cultivated: 8 Apr. Rotary cultivated, potatoes planted: 9 Apr. Weedkiller applied: 15 May. Rotary ridged: 11 June. Fungicide with insecticide applied: 12 July. Fungicide applied: 6 Aug. Haulm mechanically destroyed: 10 Sept. Sprayed with undiluted BOV at 170 l: 18 Sept. Lifted: 30 Sept.

Sugar beet (Series III): Magnesian limestone applied: 29 Oct, 1973. Ploughed: 4 Dec. Spring-tine cultivated: 1 Apr, 1974. N & PK applied: 2 Apr. Power harrowed, rolled, seed sown: 3 Apr. Weedkiller applied: 26 May. Boron and insecticide applied: 24 June. Rotary cultivated: 1 July.

NOTE: Crop destroyed because of very poor germination.

Barley (Series II): Ploughed: 4 Dec, 1973. Spring-tine cultivated with crumbler, seed sown: 28 Mar, 1974. Weedkiller applied: 7 May. Combine harvested: 21 Aug.

Potatoes (Series IV): Ploughed: 4 Dec, 1973. Spring-tine cultivated: 1 Apr, 1974. Treatments applied, all plots harrowed: 4 Apr. NPK applied, spring-tine cultivated: 8 Apr. Rotary cultivated, potatoes planted: 9 Apr. Weedkiller applied: 15 May. Rotary ridged: 11 June. Fungicide with insecticide applied: 12 July. Fungicide applied: 6 Aug. Haulm mechanically destroyed: 10 Sept. Sprayed with undiluted BOV at 170 l: 18 Sept. Lifted: 30 Sept.

NOTE: Soil samples were taken before applying treatments and after harvest for counts of cysts, eggs and larvae of *Heterodera rostochiensis*.

Standard errors per plot.

Potatoes (Series I). Total tubers: tonnes/hectare: 4.26 or 10.3% (18 d.f.)
Potatoes (Series IV). Total tubers: tonnes/hectare: 4.32 or 12.7% (18 d.f.)
Barley (Series II), Grain: tonnes/hectare: 0.257 or 5.5% (18 d.f.)

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TABLES OF MEANS

POTATOES (SERIES I)

RATE

	2.8	5.6	11.2	Mean
TOTAL TUBERS: TONNES/HECTARE				
NEMACIDE(71)				
Aldicarb	45.6	42.9	48.0	45.5
Dupont	39.9	41.3	43.9	41.7
Nemacur	38.5	40.6	43.9	41.0
Mean	41.3	41.6	45.3	42.7

RATE 0.0 28.2

Grand mean 41.3

STANDARD ERRORS OF DIFFERENCES

NEMACIDE(71)	RATE	NEMACIDE(71) RATE & RATE 0.0
2.01	2.01	3.48

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

NEMACIDE(71)

Aldicarb	97.5	97.2	96.6	97.1
Dupont	96.6	96.9	95.2	96.3
Nemacur	95.3	95.9	96.7	96.0
Mean	96.5	96.7	96.2	96.4

RATE 0.0 94.0

Grand mean 96.2

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POTATOES (SERIES IV)

RATE

	5.6	11.2	22.4	Mean
TOTAL TUBERS: TONNES/HECTARE				
NEMACIDE(74)				
Benomyl	30.4	32.4	37.2	33.3
Carbofur	40.9	45.9	42.4	43.1
Thiabend	22.0	31.5	34.5	29.3
Mean	31.1	36.6	38.0	35.2

RATE 0.0 23.6

Grand mean 34.1

STANDARD ERRORS OF DIFFERENCES

NEMACIDE(74)	RATE	NEMACIDE(74) RATE & RATE 0.0
2.04	2.04	3.53

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

NEMACIDE(74)				
Benomyl	96.4	97.3	96.9	96.9
Carbofur	95.7	96.1	95.5	95.7
Thiabend	91.2	95.6	96.2	94.3
Mean	94.4	96.3	96.2	95.6

RATE 0.0 94.5

Grand mean 95.5

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BARLEY (SERIES II)

RATE

	2.8	5.6	11.2	Mean
GRAIN: TONNES/HECTARE				
NEMACIDE(72)				
Aldicarb	4.51	4.71	5.25	4.82
Dupont	4.63	4.62	4.43	4.56
CGA	4.67	4.44	4.65	4.59
Mean	4.60	4.59	4.78	4.66

RATE 0.0 4.74

Grand mean 4.67

STANDARD ERRORS OF DIFFERENCES

NEMACIDE(72)	RATE	NEMACIDE(72) RATE & RATE 0.0
0.121	0.121	0.210

STRAW: TONNES/HECTARE

NEMACIDE(72)				
Aldicarb	2.24	2.23	2.51	2.33
Dupont	2.12	2.10	1.97	2.06
CGA	2.06	2.09	2.12	2.09
Mean	2.14	2.14	2.20	2.16

RATE 0.0 2.11

Grand mean 2.16

Mean D.M. % Grain: 80.7
Straw: 88.0