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83/W/CS/35 Nematicides Dosage - Potatoes, S. Barley

Rothamsted Research

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83/W/CS/35

NEMATICIDES DOSAGE

Object: To study the effects of rates and methods of applying nematicides on *Globodera rostochiensis* and yield of potatoes; residual effects are also studied - Woburn Stackyard AII.

Sponsor: A.G. Whitehead.

The 12th year, potatoes, s. barley.

For previous years see 72/W/CS/35(t) and 73-82/W/CS/35.

Design: 2 series each of 4 randomised blocks of 18 plots with S NEM YR on blocks

Whole plot dimensions: 4.27 x 6.10.

Treatments:-

The experiment has two series with the following cropping:-

	1968-72	73	74	75	76	77	78	79	80	81	82	83
Series II	P	P*	SB	B	P*	P	P	P*	W	B	B	P*
Series III	P	P	P*	SB	B	P*	P	P	P*	W	B	B

Series I was damaged by soil erosion and has been excluded from the experiment since 1980.

P = Potatoes, SB = Sugar beet, B = S. barley, W = W. wheat

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

Treatments:

Series II, potatoes 1983, tests the residual and fresh effects of treatments applied for potatoes in 1979 and 1983, ignoring those applied in earlier years. All combinations of:-

Blocks

1. S NEM YR Years of applying spring nematicides:
 - 1979 1979 only
 - 1979 + 83 1979 repeated cumulatively in 1983

Whole plots

2. A NEM(79) Residual effects of nematicide applied autumn 1978:
 - NONE None
 - TELONE 'Telone' at 224 kg
3. S NEM Nematicides applied in spring 1979 and 1983:
 - ALDICARB
 - OXAMYL

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4. SNEMRATE Rates of spring nematicides (kg):

2.5
5.0
7.5
10.0

plus two untreated plots per block

RATE

0.0

Series III, s. barley 1983, tests the residual effects of sets of treatments applied for potatoes in 1980, ignoring those applied in earlier years. All combinations (duplicated) of:-

1. S NEM(80) Spring nematicides:

ALDICARB
OXAMYL

2. SNEMRATE Rates of spring nematicides (kg):

2.5
5.0
7.5
10.0

plus two untreated plots per block

RATE

0.0

Standard applications:

Potatoes (Series II): Manures: Magnesian limestone at 5.0 t. (10:10:15+ 4.5 Mg) at 2480 kg. N at 90 kg as 'Nitro-Chalk'. Weedkillers: Glyphosate at 1.5 kg in 280 l. Linuron at 1.0 l with paraquat at 0.4 kg ion in 250 l. Fungicide: Mancozeb at 1.4 kg in 250 l on three occasions, with insecticide on the first and third occasions. Fentin hydroxide at 0.28 kg in 250 l on five occasions, with insecticide on the first four occasions. Insecticide: Pirimicarb at 0.14 kg. Haulm desiccant: Diquat at 0.50 kg ion in 250 l.

S. barley (Series III): Manures: (20:10:10) at 500 kg. N at 60 kg as 'Nitro-Chalk'. Weedkillers: Glyphosate at 1.5 kg in 280 l. Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 250 l.

Seed: S. barley: Triumph, dressed with triadimenol plus fuberidazole, sown at 160 kg.
Potatoes: Pentland Crown.

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Cultivations, etc.:-

Potatoes (Series II): Magnesian limestone applied: 5 Oct, 1982. Glyphosate applied: 6 Oct. Ploughed: 3 Nov. Spring-tine cultivated: 8 Mar, 1983. NPK with Mg applied, heavy spring-tine cultivated: 14 Apr. N applied, heavy spring-tine cultivated: 5 May. Treatments applied, spring-tine cultivated: 11 May. Rotary cultivated, potatoes planted: 16 May. Rotary ridged: 6 June. Linuron with paraquat applied: 7 June. Mancozeb applied with insecticide: 22 June, 8 July. Mancozeb applied: 1 July. Fentin hydroxide applied with insecticide: 18 July, 29 July, 11 Aug, 26 Aug. Fentin hydroxide applied: 9 Sept. Haulm mechanically destroyed: 5 Oct. Haulm desiccant applied: 17 Oct. Lifted: 18 Oct.

S. barley (Series III): Glyphosate applied: 6 Oct, 1982. Ploughed: 3 Nov. Spring-tine cultivated: 8 Mar, 1983. NPK applied: 9 Mar. Spring-tine cultivated with crumbler attached, seed sown: 10 Mar. Spring-tine cultivated with crumbler attached, seed resown: 14 Apr. 'Brittox' applied: 30 May. N applied: 3 June. Combine harvested: 10 Aug.

- NOTES: (1) Soil samples were taken before treatments were applied and after harvest for cyst and egg counts of *Globodera rostochiensis*.
 (2) Because of waterlogging seven plots were lost from series II, those with treatment combinations:

S NEM YR	1979	1979	1979	1979
A NEM(79)	TELONE	NONE	TELONE	NONE
S NEM	OXAMYL	ALDICARB	OXAMYL	OXAMYL
SNEMRATE	2.5	2.5	7.5	2.5

and 3 plots with RATE 0.0

Estimated values were used in the analysis.

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SERIES II POTATOES

TOTAL TUBERS TONNES/HECTARE

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

A NEM(79)	NONE	TELONE	MEAN		
S NEM YR					
1979	34.9	35.9	35.4		
1979+83	42.5	40.3	41.4		
MEAN	38.7	38.1	38.4		
S NEM	ALDICARB	OXAMYL	MEAN		
S NEM YR					
1979	35.1	35.6	35.4		
1979+83	40.1	42.7	41.4		
MEAN	37.6	39.2	38.4		
S NEM	ALDICARB	OXAMYL	MEAN		
A NEM(79)					
NONE	37.0	40.4	38.7		
TELONE	38.3	37.9	38.1		
MEAN	37.6	39.2	38.4		
SNEMRATE	2.5	5.0	7.5	10.0	MEAN
S NEM YR					
1979	33.7	36.3	36.4	35.1	35.4
1979+83	41.8	41.5	42.4	39.8	41.4
MEAN	37.8	38.9	39.4	37.5	38.4
SNEMRATE	2.5	5.0	7.5	10.0	MEAN
A NEM(79)					
NONE	40.7	39.0	38.2	36.8	38.7
TELONE	34.8	38.8	40.6	38.1	38.1
MEAN	37.8	38.9	39.4	37.5	38.4
SNEMRATE	2.5	5.0	7.5	10.0	MEAN
S NEM					
ALDICARB	39.4	38.3	36.1	36.8	37.6
OXAMYL	36.2	39.5	42.8	38.2	39.2
MEAN	37.8	38.9	39.4	37.5	38.4
A NEM(79)	NONE	TELONE			
S NEM	ALDICARB	OXAMYL	ALDICARB	OXAMYL	
S NEM YR					
1979	33.2	36.5	37.0	34.7	
1979+83	40.7	44.3	39.6	41.0	

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SERIES II POTATOES

TOTAL TUBERS TONNES/HECTARE

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

		SNEMRATE	2.5	5.0	7.5	10.0
S NEM YR	A NEM(79)					
1979	NONE		37.5	34.9	34.6	32.6
	TELONE		29.9	37.7	38.3	37.7
1979+83	NONE		43.9	43.2	41.8	41.1
	TELONE		39.8	39.9	43.0	38.6
		SNEMRATE	2.5	5.0	7.5	10.0
S NEM YR	S NEM					
1979	ALDICARB		36.3	36.6	33.1	34.5
	OXAMYL		31.2	35.9	39.8	35.8
1979+83	ALDICARB		42.4	40.0	39.1	39.0
	OXAMYL		41.2	43.0	45.8	40.7
		SNEMRATE	2.5	5.0	7.5	10.0
A NEM(79)	S NEM					
NONE	ALDICARB		38.1	40.3	34.9	34.5
	OXAMYL		43.2	37.7	41.5	39.1
TELONE	ALDICARB		40.6	36.4	37.3	39.0
	OXAMYL		29.1	41.2	44.0	37.3
		SNEMRATE	2.5	5.0	7.5	10.0
S NEM YR	A NEM(79)	S NEM				
1979	NONE	ALDICARB	33.2	37.0	34.4	28.4
		OXAMYL	41.8	32.8	34.8	36.8
	TELONE	ALDICARB	39.3	36.3	31.8	40.7
		OXAMYL	20.5	39.0	44.8	34.7
1979+83	NONE	ALDICARB	43.0	43.7	35.4	40.7
		OXAMYL	44.7	42.7	48.3	41.5
	TELONE	ALDICARB	41.9	36.4	42.8	37.4
		OXAMYL	37.7	43.4	43.2	39.8
		RATE	0.0	33.9		

GRAND MEAN 37.9

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

TABLE	S NEM YR	A NEM(79)	S NEM	SNEMRATE
-----	-----	-----	-----	-----
SED	1.83	1.42	1.42	2.01
TABLE	S NEM YR	S NEM YR	A NEM(79)	S NEM YR
	A NEM(79)	S NEM	S NEM	SNEMRATE
-----	-----	-----	-----	-----
SED	2.32	2.32	2.01	3.07
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
S NEM YR	2.01	2.01		2.85

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SERIES II POTATOES

TOTAL TUBERS TONNES/HECTARE

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

TABLE	A NEM(79) SNEMRATE	S NEM SNEMRATE	S NEM YR A NEM(79) S NEM	S NEM YR A NEM(79) SNEMRATE
SED	2.85	2.85	3.07	4.19
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF: S NEM YR			2.85	4.03

TABLE	S NEM YR S NEM SNEMRATE	A NEM(79) S NEM SNEMRATE	S NEM YR A NEM(79) S NEM SNEMRATE
SED	4.19	4.03	5.81
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF: S NEM YR	4.03		5.69

SED FOR COMPARING A RATE 0.0 WITH ANY ITEM
IN SNEM YR.A NEM(79).S NEM.SNEMRATE TABLE IS 4.50

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

STRATUM	DF	SE	CV%
BLOCK.WP	29	5.69	15.0

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

A NEM(79) S NEM YR	NONE	TELONE	MEAN
1979	92.5	93.1	92.8
1979+83	93.2	92.9	93.0
MEAN	92.8	93.0	92.9
S NEM S NEM YR	ALDICARB	OXAMYL	MEAN
1979	93.3	92.4	92.8
1979+83	92.9	93.1	93.0
MEAN	93.1	92.7	92.9

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SERIES II POTATOES

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

S NEM	ALDICARB	OXAMYL	MEAN		
A NEM(79)					
NONE	93.0	92.7	92.8		
TELONE	93.2	92.8	93.0		
MEAN	93.1	92.7	92.9		
SNEMRATE	2.5	5.0	7.5	10.0	MEAN
S NEM YR					
1979	92.6	92.9	93.8	92.0	92.8
1979+83	93.3	93.0	92.7	93.1	93.0
MEAN	92.9	92.9	93.2	92.6	92.9
SNEMRATE	2.5	5.0	7.5	10.0	MEAN
A NEM(79)					
NONE	93.3	92.5	93.1	92.5	92.8
TELONE	92.6	93.4	93.4	92.6	93.0
MEAN	92.9	92.9	93.2	92.6	92.9
SNEMRATE	2.5	5.0	7.5	10.0	MEAN
S NEM					
ALDICARB	93.7	93.3	93.0	92.4	93.1
OXAMYL	92.2	92.6	93.5	92.8	92.7
MEAN	92.9	92.9	93.2	92.6	92.9
A NEM(79)	NONE	TELONE			
S NEM	ALDICARB	OXAMYL	ALDICARB	OXAMYL	
S NEM YR					
1979	92.9	92.1	93.6	92.6	
1979+83	93.1	93.3	92.8	93.0	
S NEM YR	SNEMRATE	2.5	5.0	7.5	10.0
1979	A NEM(79)				
	NONE	93.1	92.4	93.1	91.5
	TELONE	92.1	93.3	94.5	92.5
1979+83	NONE	93.5	92.7	93.1	93.5
	TELONE	93.1	93.4	92.4	92.7
S NEM YR	SNEMRATE	2.5	5.0	7.5	10.0
1979	S NEM				
	ALDICARB	93.7	93.6	93.5	92.2
	OXAMYL	91.5	92.1	94.1	91.8
1979+83	ALDICARB	93.7	93.0	92.5	92.5
	OXAMYL	92.9	93.0	92.9	93.7

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SERIES II POTATOES

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

		SNEMRATE	2.5	5.0	7.5	10.0
A NEM(79)	S NEM					
NONE	ALDICARB	93.8	93.2	92.9	92.1	
	OXAMYL	92.8	91.9	93.2	92.9	
TELONE	ALDICARB	93.6	93.5	93.1	92.6	
	OXAMYL	91.6	93.2	93.7	92.7	
		SNEMRATE	2.5	5.0	7.5	10.0
S NEM YR	A NEM(79)	S NEM				
1979	NONE	ALDICARB	93.9	93.3	93.1	91.2
		OXAMYL	92.2	91.4	93.0	91.8
	TELONE	ALDICARB	93.5	93.9	93.9	93.2
		OXAMYL	90.7	92.8	95.1	91.9
1979+83	NONE	ALDICARB	93.7	93.0	92.7	93.1
		OXAMYL	93.3	92.4	93.4	94.0
	TELONE	ALDICARB	93.7	93.1	92.3	92.0
		OXAMYL	92.5	93.6	92.4	93.5
	RATE	0.0	91.5			

GRAND MEAN 92.8

PLOT AREA HARVESTED 0.00087

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SERIES III SPRING BARLEY

GRAIN TONNES/HECTARE

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

	2.5	5.0	7.5	10.0	MEAN
SNEMRATE					
S NEM(80)					
ALDICARB	2.34	2.37	2.25	2.36	2.33
OXAMYL	2.00	2.12	2.28	2.12	2.13
MEAN	2.17	2.25	2.27	2.24	2.23

RATE 0.0 2.26

GRAND MEAN 2.23

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

TABLE	S NEM(80)	SNEMRATE	S NEM(80) SNEMRATE & RATE 0.0

SED	0.086	0.122	0.173

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

STRATUM	DF	SE	CV%
BLOCK.WP	60	0.345	15.5

MEAN DM% 83.0

PLOT AREA HARVESTED 0.00126