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## Yields of the Field Experiments 1973

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

#### Rothamsted Research

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73/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 fifth year, potatoes, sugar beet, barley.

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

Design: 4 series of 3 blocks of 10 plots.

Whole plot dimensions: 4.27 x 9.14. Area harvested: Potatoes - 0.00130, sugar beet - 0.00130, barley - 0.00260.

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

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

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

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

Treatments to barley (Series I) and sugar beet (Series II): All combinations of:-

1. Nematicides:

Barley - NEMACIDE(71)  
Sugar beet - NEMACIDE(72)

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

Aldicarb  
Dupont  
Nemacur  
CGA

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

RATE

2.8  
5.6  
11.2

2.8  
5.6  
11.2

together with one untreated plot per block

0.0

73/W/CS/34

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

1. 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
together with one untreated plot per block	0.0

Basal applications:

Potatoes: Test and preparatory crop: Manures: (13:13:20) at 1830 kg.  
 Weedkiller: Linuron at 1.2 kg plus paraquat at 0.56 kg ion in 280 l.  
 Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 390 l. Fungicide: Mancozeb at 1.3 kg in 390 l on the first occasion and in 370 l on the second occasion.  
 Sugar beet: Manures: Magnesian limestone at 5 tonnes. (0:14:28) at 730 kg, N at 190 kg as 'Nitro-Chalk'. Boron at 7.4 kg B2O3 (as 'Solubor') applied with insecticide. Insecticide: Demeton-s-methyl at 0.25 kg in 450 l. Weedkiller: Phenmedipham at 1.6 kg in 280 l.  
 Barley: Manures: (20:15:15) at 500 kg combine drilled. Weedkiller: Ioxynil at 0.53 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.

Cultivations, etc.:-

Potatoes, Test crop: Ploughed: 18 Dec, 1972. NPK applied: 26 Mar, 1973.  
 Treatments applied, all plots rotary cultivated: 30 Mar. Potatoes planted: 3 Apr. Weedkiller applied: 9 May. Grubbed: 31 May.  
 Fungicide with insecticide applied: 6 July. Fungicide applied: 26 July, 13 Aug. Haulm mechanically destroyed: 12 Sept. Lifted: 20 Sept.

73/W/CS/34

Potatoes, Preparatory crop: Ploughed: 19 Dec, 1972. NPK applied: 26 Mar, 1973. Rotary cultivated, potatoes planted: 3 Apr. Weedkiller applied: 9 May. Grubbed: 31 May. Rotary ridged: 25 June. Fungicide with insecticide applied: 6 July. Fungicide applied: 26 July, 13 Aug. Haulm mechanically destroyed: 23 Aug. Lifted: 13 Sept.  
Sugar beet: Magnesian limestone applied: 17 Nov, 1972. Ploughed: 18 Dec. PK and N applied: 20 Mar, 1973. Power harrowed, seed sown: 21 Mar. Weedkiller applied: 15 May. Singled: 21-24 May. Boron and insecticide applied: 25 June. Lifted: 9 Nov.  
Barley: Ploughed: 18 Dec, 1972. Seed sown: 12 Mar, 1973. Weedkiller applied: 15 May. Combine harvested: 10 Aug.

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, Total tubers, tonnes/hectare:	3.38 or 17.0% (18 d.f.)
Sugar beet, Roots (washed), tonnes/hectare:	2.37 or 5.9% (18 d.f.)
Total sugar, tonnes/hectare:	0.425 or 5.7% (18 d.f.)
Barley, Grain, tonnes/hectare:	0.318 or 6.6% (18 d.f.)

73/W/CS/34

TABLES OF MEANS

POTATOES SERIES III

	Single	RATE Double	Quad	Mean
TOTAL TUBERS: TONNES/HECTARE				
NEMACIDE(73)				
Benomy1	14.4	10.9	15.0	13.4
Dupont	29.4	31.9	31.3	30.8
Dowco	15.8	19.1	22.3	19.1
Mean	19.9	20.6	22.9	21.1

RATE 0.0 9.0  
Grand mean 19.9

STANDARD ERRORS OF DIFFERENCES

NEMACIDE(73)	RATE	NEMACIDE(73) RATE & RATE 0.0
1.59	1.59	2.76

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

NEMACIDE(73)				
Benomy1	83.9	77.5	83.0	81.5
Dupont	87.1	86.2	86.6	86.6
Dowco	84.3	88.1	83.8	85.4
Mean	85.1	84.0	84.5	84.5

RATE 0.0 75.8  
Grand mean 83.6

73/w/cs/34

SUGAR BEET SERIES II

ROOTS (WASHED): TONNES/HECTARE

	RATE			Mean
	2.8	5.6	11.2	
NEMACIDE(72)				
Aldicarb	40.7	38.3	42.4	40.5
Dupont	41.5	39.2	38.1	39.6
CGA	42.2	39.7	40.4	40.8
Mean	41.5	39.1	40.3	40.3

RATE 0.0 41.0

Grand mean 40.4

STANDARD ERRORS OF DIFFERENCES

NEMACIDE(72)	RATE	NEMACIDE(72) RATE & RATE 0.0
1.12	1.12	1.93

73/w/cs/34

SUGAR BEET SERIES II

RATE

	2.8	5.6	11.2	Mean
SUGAR PERCENTAGE				
NEMACIDE(72)				
Aldicarb	18.3	18.7	18.4	18.5
Dupont	18.5	18.4	18.5	18.5
CGA	18.4	18.4	18.5	18.4
Mean	18.4	18.5	18.5	18.4

RATE 0.0 18.2

Grand mean 18.4

TOTAL SUGAR: TONNES/HECTARE

NEMACIDE(72)				
Aldicarb	7.47	7.15	7.81	7.48
Dupont	7.66	7.23	7.05	7.31
CGA	7.76	7.29	7.45	7.50
Mean	7.63	7.22	7.44	7.43

RATE 0.0 7.47

Grand mean 7.43

STANDARD ERRORS OF DIFFERENCES

NEMACIDE(72)	RATE	NEMACIDE(72) RATE S RATE 0.0
0.201	0.201	0.347

73/W/CS/34

BARLEY SERIES I

	2.8	RATE 5.6	11.2	Mean
GRAIN: TONNES/HECTARE				
NEMACIDE(71)				
Aldicarb	5.04	4.85	5.17	5.02
Dupont	4.71	4.87	4.74	4.78
Nemacur	4.50	4.51	5.19	4.73
Mean	4.75	4.74	5.03	4.84

RATE 0.0 4.57

Grand mean 4.82

STANDARD ERRORS OF DIFFERENCES

NEMACIDE(71)	RATE	NEMACIDE(71) RATE %
0.150	0.150	0.259

STRAW: TONNES/HECTARE

NEMACIDE(71)				
Aldicarb	4.32	3.69	4.46	4.16
Dupont	3.97	4.10	4.02	4.03
Nemacur	3.90	3.80	4.37	4.03
Mean	4.06	3.86	4.29	4.07

RATE 0.0 3.65

Grand mean 4.03

Mean D.M. % Grain: 84.6  
Straw: 89.3