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78/W/CS/174 Sowing Dates and Ccn - S. Wheat, Barley and Oats

Rothamsted Research

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78/W/CS/174

SOWING DATES AND CCN

Object: To study the residual effects of sowing date and the effect of a nematicide and a soil sterilant on the incidence of cereal cyst-nematode (*Heterodera avenae*) (CCN) and the yield of three cereals in a soil known to contain a fungal parasite of the nematode - Woburn, Butt Close.

Sponsor: B.R. Kerry.

The fourth year, spring wheat, barley and oats.

For previous years see 75/W/M/1 and 76-77/W/CS/174.

Design: Single replicate of 36 plots split into 2.

Whole plot dimensions: 2.13 x 6.70.

Treatments: All combinations of:-

Whole plots

1. CROP(76) Crop (cumulative 1975-76):

WHEAT
BARLEY
OATS

2. SOW DATE(76) Sowing date (cumulative 1975-76):

AUTUMN
SPRING

3. NEMACIDE(78) Nematicide (cumulative 1975-78):

NONE None
OXAMYL Oxamyl at 8.8 kg

4. CROP(78) Crop in 1977 & 1978, (all spring sown):

WHEAT
BARLEY
OATS

Sub plots

5. STERILNT Sterilant

NONE None
FORMALIN Formalin at 3000 l in 109000 l. To SOW DATE SPRING in 1976 & 1978 only. To SOW DATE AUTUMN in 1977 only.

Basal applications: Manures: (20:14:14) at 400 kg, combine drilled. Weedkillers: Mecoprop, bromoxynil and ioxynil ('Brittox' at 2.5 kg in 340 l).

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Irrigation (mm water):

25 May	25.0
1 June	25.0
15 June	25.0
22 June	21.0
29 June	8.0
13 July	20.0
20 July	25.0
27 July	17.0

Total 166.0

Seed: Wheat: Sicco, sown at 200 kg.

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

Oats: Manod, sown at 200 kg.

Cultivations, etc.:— All cereals: Ploughed: 28 Sept, 1977. Spring-tine cultivated: 9 Mar, 1978. Formalin applied: 13 Mar. Oxamyl applied, rotary cultivated, spring-tine cultivated with crumbler attached, seed sown: 31 Mar. Weedkiller applied: 15 May. Combine harvested: 5 Sept.

- NOTES: (1) Yields were not taken of the oats because of severe damage to plots by grazing bullocks.
 (2) Soil samples were taken in March for estimates of *Heterodera avenae* cysts and eggs.
 (3) Soil and plant samples were taken from plots not treated with oxamyl at weekly intervals from 6 June to 21 August and on 12 September after harvest for estimates of numbers of females and eggs of *H. avenae* and the amount of fungal parasitism of these stages.
 (4) Soil samples were taken in June from plots treated with oxamyl for counts of unhatched *H. avenae*.

GRAIN TONNES/HECTARE

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

SOW DATE(76)	AUTUMN	SPRING	MEAN
CROP(76)			
WHEAT	2.19	3.30	2.74
BARLEY	2.81	3.07	2.94
OATS	2.92	3.22	3.07
MEAN	2.64	3.20	2.92

NEMACIDE(78)	NONE	OXAMYL	MEAN
CROP(76)			
WHEAT	1.95	3.54	2.74
BARLEY	1.64	4.24	2.94
OATS	2.36	3.79	3.07
MEAN	1.98	3.86	2.92

NEMACIDE(78)	NONE	OXAMYL	MEAN
SOW DATE(76)			
AUTUMN	1.53	3.75	2.64
SPRING	2.43	3.96	3.20
MEAN	1.98	3.86	2.92

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GRAIN TONNES/HECTARE

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

CROP(78)	WHEAT	BARLEY	MEAN
CROP(76)			
WHEAT	1.93	3.56	2.74
BARLEY	2.20	3.68	2.94
OATS	2.55	3.60	3.07
MEAN	2.23	3.61	2.92
CROP(78)	WHEAT	BARLEY	MEAN
SOW DATE(76)			
AUTUMN	2.08	3.20	2.64
SPRING	2.37	4.02	3.20
MEAN	2.23	3.61	2.92
CROP(78)	WHEAT	BARLEY	MEAN
NEMACIDE(78)			
NONE	1.48	2.49	1.98
OXAMYL	2.97	4.74	3.86
MEAN	2.23	3.61	2.92
STERILNT	NONE	FORMALIN	MEAN
CROP(76)			
WHEAT	2.37	3.12	2.74
BARLEY	2.49	3.39	2.94
OATS	2.79	3.35	3.07
MEAN	2.55	3.29	2.92
STERILNT	NONE	FORMALIN	MEAN
SOW DATE(76)			
AUTUMN	2.48	2.80	2.64
SPRING	2.62	3.77	3.20
MEAN	2.55	3.29	2.92
STERILNT	NONE	FORMALIN	MEAN
NEMACIDE(78)			
NONE	1.69	2.28	1.98
OXAMYL	3.42	4.29	3.86
MEAN	2.55	3.29	2.92
STERILNT	NONE	FORMALIN	MEAN
CROP(78)			
WHEAT	1.96	2.49	2.23
BARLEY	3.15	4.08	3.61
MEAN	2.55	3.29	2.92

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GRAIN TONNES/HECTARE

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

SOW DATE(76)	AUTUMN		SPRING	
NEMACIDE(78)	NONE	OXAMYL	NONE	OXAMYL
CROP(76)				
WHEAT	1.73	2.65	2.16	4.43
BARLEY	1.23	4.39	2.06	4.09
OATS	1.63	4.21	3.08	3.36

SOW DATE(76)	AUTUMN		SPRING	
CROP(78)	WHEAT	BARLEY	WHEAT	BARLEY
CROP(76)				
WHEAT	1.25	3.13	2.61	3.98
BARLEY	2.40	3.22	2.00	4.14
OATS	2.59	3.25	2.50	3.95

NEMACIDE(78)	NONE		OXAMYL	
CROP(78)	WHEAT	BARLEY	WHEAT	BARLEY
CROP(76)				
WHEAT	1.42	2.48	2.45	4.63
BARLEY	1.20	2.09	3.20	5.28
OATS	1.81	2.90	3.28	4.29

NEMACIDE(78)	NONE		OXAMYL	
CROP(78)	WHEAT	BARLEY	WHEAT	BARLEY
SOW DATE(76)				
AUTUMN	1.23	1.83	2.93	4.57
SPRING	1.72	3.15	3.02	4.90

SOW DATE(76)	AUTUMN		SPRING	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
CROP(76)				
WHEAT	2.07	2.31	2.67	3.92
BARLEY	2.45	3.17	2.54	3.61
OATS	2.93	2.91	2.65	3.79

NEMACIDE(78)	NONE		OXAMYL	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
CROP(76)				
WHEAT	1.53	2.37	3.21	3.87
BARLEY	1.38	1.91	3.60	4.87
OATS	2.16	2.56	3.43	4.14

NEMACIDE(78)	NONE		OXAMYL	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
SOW DATE(76)				
AUTUMN	1.49	1.57	3.48	4.02
SPRING	1.89	2.98	3.35	4.57

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GRAIN TONNES/HECTARE

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

CROP(78)	WHEAT		BARLEY	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
CROP(76)				
WHEAT	1.68	2.18	3.06	4.05
BARLEY	1.97	2.43	3.01	4.35
OATS	2.22	2.87	3.36	3.83
CROP(78)	WHEAT		BARLEY	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
SOW DATE(76)				
AUTUMN	1.94	2.22	3.02	3.38
SPRING	1.97	2.77	3.27	4.78
CROP(78)	WHEAT		BARLEY	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
NEMACIDE(78)				
NONE	1.29	1.66	2.08	2.89
OXAMYL	2.62	3.33	4.21	5.26

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

TABLE	STERILNT	CROP(76)	SOW DATE(76)	NEMACIDE(78)
		STERILNT	STERILNT	STERILNT
SED	0.208	0.360*	0.294*	0.294*
TABLE	CROP(78)	CROP(76)	CROP(76)	SOW DATE(76)
	STERILNT	SOW DATE(76)	NEMACIDE(78)	NEMACIDE(78)
		STERILNT	STERILNT	STERILNT
SED	0.294*	0.509*	0.509*	0.415*
TABLE	CROP(76)	SOW DATE(76)	NEMACIDE(78)	
	CROP(78)	CROP(78)	CROP(78)	
	STERILNT	STERILNT	STERILNT	
SED	0.509*	0.415*	0.415*	

* USE ONLY TO COMPARE THE TWO LEVELS OF STERILNT FOR THE SAME LEVEL(S) OF THE OTHER FACTOR(S)

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

STRATUM	DF	SE	CV%
WP.SP	9	0.719	24.6
GRAIN MEAN DM%	77.5		

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STRAW TONNES/HECTARE

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

SOW DATE(76)	AUTUMN	SPRING	MEAN
CROP(76)			
WHEAT	2.52	3.16	2.84
BARLEY	2.99	3.01	3.00
OATS	2.83	3.53	3.18
MEAN	2.78	3.23	3.00

NEMACIDE(78)	NONE	OXAMYL	MEAN
CROP(76)			
WHEAT	2.08	3.60	2.84
BARLEY	2.08	3.92	3.00
OATS	2.41	3.94	3.18
MEAN	2.19	3.82	3.00

NEMACIDE(78)	NONE	OXAMYL	MEAN
SOW DATE(76)			
AUTUMN	1.94	3.62	2.78
SPRING	2.44	4.02	3.23
MEAN	2.19	3.82	3.00

CROP(78)	WHEAT	BARLEY	MEAN
CROP(76)			
WHEAT	3.11	2.57	2.84
BARLEY	3.38	2.62	3.00
OATS	3.64	2.71	3.18
MEAN	3.38	2.63	3.00

CROP(78)	WHEAT	BARLEY	MEAN
SOW DATE(76)			
AUTUMN	3.26	2.30	2.78
SPRING	3.49	2.97	3.23
MEAN	3.38	2.63	3.00

CROP(78)	WHEAT	BARLEY	MEAN
NEMACIDE(78)			
NONE	2.39	1.99	2.19
OXAMYL	4.36	3.28	3.82
MEAN	3.38	2.63	3.00

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STRAW TONNES/HECTARE

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

STERILNT CROP(76)	NONE	FORMALIN	MEAN	
WHEAT	2.57	3.11	2.84	
BARLEY	2.36	3.64	3.00	
OATS	2.78	3.57	3.18	
MEAN	2.57	3.44	3.00	
STERILNT SOW DATE(76)	NONE	FORMALIN	MEAN	
AUTUMN	2.70	2.86	2.78	
SPRING	2.44	4.02	3.23	
MEAN	2.57	3.44	3.00	
STERILNT NEMACIDE(78)	NONE	FORMALIN	MEAN	
NONE	1.80	2.58	2.19	
OXAMYL	3.34	4.30	3.82	
MEAN	2.57	3.44	3.00	
STERILNT CROP(78)	NONE	FORMALIN	MEAN	
WHEAT	2.80	3.95	3.38	
BARLEY	2.33	2.93	2.63	
MEAN	2.57	3.44	3.00	
SOW DATE(76) NEMACIDE(78) CROP(76)	AUTUMN NONE	OXAMYL	SPRING NONE	OXAMYL
WHEAT	2.01	3.03	2.15	4.17
BARLEY	1.97	4.00	2.19	3.83
OATS	1.83	3.82	2.99	4.06
SOW DATE(76) CROP(78) CROP(76)	AUTUMN WHEAT	BARLEY	SPRING WHEAT	BARLEY
WHEAT	2.84	2.20	3.37	2.94
BARLEY	3.70	2.28	3.05	2.96
OATS	3.23	2.42	4.06	2.99
NEMACIDE(78) CROP(78) CROP(76)	NONE WHEAT	BARLEY	OXAMYL WHEAT	BARLEY
WHEAT	2.24	1.91	3.98	3.22
BARLEY	2.52	1.63	4.23	3.61
OATS	2.41	2.41	4.88	3.00

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STRAW TONNES/HECTARE

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

NEMACIDE(78)	NONE		OXAMYL	
CROP(78)	WHEAT	BARLEY	WHEAT	BARLEY
SOW DATE(76)				
AUTUMN	2.37	1.51	4.15	3.09
SPRING	2.42	2.47	4.57	3.46

SOW DATE(76)	AUTUMN		SPRING	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
CROP(76)				
WHEAT	2.57	2.47	2.57	3.75
BARLEY	2.66	3.31	2.06	3.96
OATS	2.87	2.78	2.68	4.37

NEMACIDE(78)	NONE		OXAMYL	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
CROP(76)				
WHEAT	1.90	2.25	3.23	3.97
BARLEY	1.53	2.63	3.19	4.64
OATS	1.97	2.85	3.59	4.29

NEMACIDE(78)	NONE		OXAMYL	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
SOW DATE(76)				
AUTUMN	1.84	2.04	3.56	3.67
SPRING	1.76	3.12	3.11	4.93

CROP(78)	WHEAT		BARLEY	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
CROP(76)				
WHEAT	2.79	3.43	2.34	2.79
BARLEY	2.50	4.25	2.22	3.03
OATS	3.11	4.18	2.44	2.97

CROP(78)	WHEAT		BARLEY	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
SOW DATE(76)				
AUTUMN	3.15	3.36	2.25	2.35
SPRING	2.45	4.54	2.42	3.51

CROP(78)	WHEAT		BARLEY	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
NEMACIDE(78)				
NONE	1.88	2.90	1.72	2.25
OXAMYL	3.73	5.00	2.95	3.61

STRAW MEAN DM% 51.7

PLOT AREA HARVESTED 0.00041