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# Yields of the Field Experiments 1980

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## 80/W/CS/174 Sowing Dates and Ccn

### Rothamsted Research

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80/W/CS/174

SOWING DATES AND CCN

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

Sponsor: B.R. Kerry.

The sixth year, s. oats.

For previous years see 75/W/M/1 and 76-79/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)(all spring  
oats in 1979):  
WHEAT  
BARLEY  
OATS

Sub plots

5. STERILNT Sterilant:  
NONE None  
FORMALIN Formalin at 3000 l in 109000 l. To SOW DATE  
SPRING in 1976, 1977 and 1978 only.

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Basal applications: Manures: (20:10:10) at 400 kg, combine drilled.  
 Weedkillers: Mecoprop, bromoxynil and ioxynil ('Brittox' at 3.5 l in  
 280 l) applied twice, with fungicide on the second occasion. Fungicide:  
 Tridemorph at 0.53 kg. Irrigation (mm water):

12 June	20
23 July	10
Total	30

Seed: Manod, sown at 170 kg.

Cultivations, etc.: - Ploughed: 5 Nov, 1979. Heavy spring-tine cultivated:  
 28 Feb, 1980. Spring-tine cultivated with crumbler attached, seed  
 sown: 24 Mar. Missing rows resown, by hand: 17 Apr. Weedkillers  
 applied: 25 Apr, 13 May. Fungicide applied: 13 May. Combine  
 harvested: 27 Aug.

NOTE: Numbers of cereal cyst-nematodes in soil in April were counted.

GRAIN TONNES/HECTARE

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

SOW DATE (76)	AUTUMN	SPRING	MEAN	
CROP (76)				
WHEAT	4.07	4.10	4.09	
BARLEY	3.57	4.19	3.88	
OATS	3.87	4.03	3.95	
MEAN	3.83	4.11	3.97	
NEMACIDE (78)	NONE	OXAMYL	MEAN	
CROP (76)				
WHEAT	4.05	4.13	4.09	
BARLEY	3.63	4.13	3.88	
OATS	3.98	3.92	3.95	
MEAN	3.89	4.06	3.97	
NEMACIDE (78)	NONE	OXAMYL	MEAN	
SOW DATE (76)				
AUTUMN	3.89	3.78	3.83	
SPRING	3.88	4.34	4.11	
MEAN	3.89	4.06	3.97	
CROP (78)	WHEAT	BARLEY	OATS	MEAN
CROP (76)				
WHEAT	4.13	4.27	3.86	4.09
BARLEY	3.57	3.87	4.20	3.88
OATS	4.16	3.93	3.76	3.95
MEAN	3.95	4.02	3.94	3.97

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GRAIN TONNES/HECTARE

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

CROP(78)	WHEAT	BARLEY	OATS	MEAN
SOW DATE(76)				
	AUTUMN	3.84	3.93	3.83
	SPRING	4.21	3.95	4.11
	MEAN	3.95	4.02	3.94
CROP(78)	WHEAT	BARLEY	OATS	MEAN
NEMACIDE(78)				
	NONE	3.87	3.98	3.89
	OXAMYL	4.18	3.90	4.06
	MEAN	3.95	4.02	3.94
STERILNT	NONE	FORMALIN	MEAN	
CROP(76)				
	WHEAT	3.97	4.09	
	BARLEY	3.86	3.88	
	OATS	3.94	3.95	
	MEAN	4.02	3.92	3.97
STERILNT	NONE	FORMALIN	MEAN	
SOW DATE(76)				
	AUTUMN	3.85	3.83	
	SPRING	4.00	4.11	
	MEAN	4.02	3.92	3.97
STERILNT	NONE	FORMALIN	MEAN	
NEMACIDE(78)				
	NONE	3.85	3.89	
	OXAMYL	4.00	4.06	
	MEAN	4.02	3.92	3.97
STERILNT	NONE	FORMALIN	MEAN	
CROP(78)				
	WHEAT	3.89	3.95	
	BARLEY	4.06	4.02	
	OATS	3.82	3.94	
	MEAN	4.02	3.92	3.97
SOW DATE(76)	AUTUMN		SPRING	
NEMACIDE(78)	NONE	OXAMYL	NONE	OXAMYL
CROP(76)				
	WHEAT	4.07	4.03	4.18
	BARLEY	3.41	3.86	4.53
	OATS	4.19	3.76	4.30

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GRAIN TONNES/HECTARE

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

SOW DATE(76)	AUTUMN			SPRING		
CROP(78)	WHEAT	BARLEY	OATS	WHEAT	BARLEY	OATS
CROP(76)						
WHEAT	4.06	4.16	3.98	4.19	4.38	3.74
BARLEY	2.94	3.48	4.28	4.20	4.26	4.12
OATS	4.19	3.89	3.53	4.14	3.98	3.98
NEMACIDE(78)	NONE			OXAMYL		
CROP(78)	WHEAT	BARLEY	OATS	WHEAT	BARLEY	OATS
CROP(76)						
WHEAT	4.01	4.10	4.03	4.24	4.44	3.70
BARLEY	3.26	3.65	3.99	3.88	4.09	4.41
OATS	4.13	3.86	3.93	4.19	4.00	3.58
NEMACIDE(78)	NONE			OXAMYL		
CROP(78)	WHEAT	BARLEY	OATS	WHEAT	BARLEY	OATS
SOW DATE(76)						
AUTUMN	3.68	3.90	4.09	3.78	3.78	3.78
SPRING	3.92	3.84	3.88	4.43	4.57	4.02
SOW DATE(76)	AUTUMN		SPRING			
STERILNT	NONE	FORMALIN	NONE	FORMALIN		
CROP(76)						
WHEAT	4.17	3.97	4.24	3.97		
BARLEY	3.61	3.52	4.19	4.20		
OATS	3.69	4.05	4.24	3.83		
NEMACIDE(78)	NONE		OXAMYL			
STERILNT	NONE	FORMALIN	NONE	FORMALIN		
CROP(76)						
WHEAT	4.15	3.95	4.27	3.99		
BARLEY	3.64	3.63	4.15	4.10		
OATS	3.99	3.96	3.93	3.91		
NEMACIDE(78)	NONE		OXAMYL			
STERILNT	NONE	FORMALIN	NONE	FORMALIN		
SOW DATE(76)						
AUTUMN	3.81	3.97	3.84	3.72		
SPRING	4.05	3.72	4.40	4.28		
CROP(78)	WHEAT		BARLEY		OATS	
STERILNT	NONE	FORMALIN	NONE	FORMALIN	NONE	FORMALIN
CROP(76)						
WHEAT	4.21	4.04	4.37	4.17	4.04	3.69
BARLEY	3.73	3.42	3.71	4.03	4.25	4.14
OATS	4.11	4.22	3.89	3.97	3.89	3.63
CROP(78)	WHEAT		BARLEY		OATS	
STERILNT	NONE	FORMALIN	NONE	FORMALIN	NONE	FORMALIN
SOW DATE(76)						
AUTUMN	3.81	3.65	3.69	3.99	3.96	3.90
SPRING	4.22	4.13	4.29	4.12	4.16	3.74

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GRAIN TONNES/HECTARE

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

CROP(78) STERILNT NEMACIDE(78)	WHEAT		BARLEY		OATS	
	NONE	FORMALIN	NONE	FORMALIN	NONE	FORMALIN
NONE	3.86	3.74	3.81	3.93	4.10	3.86
OXAMYL	4.17	4.04	4.17	4.18	4.01	3.78

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

TABL E	CROP(76)	SOW DATE(76)	NEMACIDE(78)	CROP(78)
SED	0.175	0.143	0.143	0.175

TABLE	STERILNT	CROP(76) SOW DATE(76)	CROP(76) NEMACIDE(78)	SOW DATE(76) NEMACIDE(78)
SED	0.087	0.248	0.248	0.202

TABLE	CROP(76) CROP(78)	SOW DATE(76) CROP(78)	NEMACIDE(78) CROP(78)	CROP(76) STERILNT
SED	0.304	0.248	0.248	0.205
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF: CROP(76)				0.151

TABLE	SOW DATE(76) STERILNT	NEMACIDE(78) STERILNT	CROP(78) STERILNT	CROP(76) SOW DATE(76) NEMACIDE(78)
SED	0.168	0.168	0.205	0.351
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF: SOW DATE(76)				0.123
NEMACIDE(78)		0.123		
CROP(78)			0.151	

TABLE	CROP(76) SOW DATE(76) CROP(78)	CROP(76) NEMACIDE(78) CROP(78)	SOW DATE(76) NEMACIDE(78) CROP(78)	CROP(76) SOW DATE(76) STERILNT
SED	0.429	0.429	0.351	0.290
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF: CROP(76).SOW DATE(76)				0.214

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GRAIN TONNES/HECTARE

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

TABLE	CROP(76) NEMACIDE(78) STERILNT	SOW DATE(76) NEMACIDE(78) STERILNT	CROP(76) CROP(78) STERILNT	SOW DATE(76) CROP(78) STERILNT
SED	0.290	0.237	0.356	0.290
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
CROP(76).NEMACIDE(78)	0.214			
SOW DATE(76).NEMACIDE(78)		0.175		
CROP(76).CROP(78)			0.262	
SOW DATE(76).CROP(78)				0.214

TABLE	NEMACIDE(78) CROP(78) STERILNT
SED	0.290
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:	
NEMACIDE(78).CROP(78)	0.214

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

STRATUM	DF	SE	CV%
WP	4	0.429	10.8
WP.SP	16	0.370	9.3

GRAIN MEAN DM% 78.6

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STRAW TONNES/HECTARE

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

SOW DATE (76)	AUTUMN	SPRING	MEAN	
CROP(76)				
WHEAT	2.60	2.68	2.64	
BARLEY	2.32	2.43	2.38	
OATS	2.45	2.63	2.54	
MEAN	2.46	2.58	2.52	
NEMACIDE (78)	NONE	OXAMYL	MEAN	
CROP (76)				
WHEAT	2.63	2.66	2.64	
BARLEY	2.34	2.41	2.38	
OATS	2.48	2.60	2.54	
MEAN	2.48	2.55	2.52	
NEMACIDE (78)	NONE	OXAMYL	MEAN	
SOW DATE (76)				
AUTUMN	2.55	2.36	2.46	
SPRING	2.42	2.75	2.58	
MEAN	2.48	2.55	2.52	
CROP (78)	WHEAT	BARLEY	OATS	MEAN
CROP(76)				
WHEAT	2.81	2.71	2.40	2.64
BARLEY	2.20	2.28	2.64	2.38
OATS	2.72	2.86	2.04	2.54
MEAN	2.58	2.62	2.36	2.52
CROP(78)	WHEAT	BARLEY	OATS	MEAN
SOW DATE (76)				
AUTUMN	2.60	2.31	2.46	2.46
SPRING	2.56	2.92	2.26	2.58
MEAN	2.58	2.62	2.36	2.52
CROP (78)	WHEAT	BARLEY	OATS	MEAN
NEMACIDE(78)				
NONE	2.50	2.54	2.41	2.48
OXAMYL	2.66	2.70	2.31	2.55
MEAN	2.58	2.62	2.36	2.52
STERILNT	NONE	FORMALIN	MEAN	
CROP(76)				
WHEAT	2.83	2.45	2.64	
BARLEY	2.36	2.39	2.38	
OATS	2.55	2.52	2.54	
MEAN	2.58	2.45	2.52	



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STRAW TONNES/HECTARE

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

STERILNT	NONE	FORMALIN	MEAN			
SOW DATE(76)						
AUTUMN	2.44	2.47	2.46			
SPRING	2.73	2.43	2.58			
MEAN	2.58	2.45	2.52			
STERILNT	NONE	FORMALIN	MEAN			
NEMACIDE(78)						
NONE	2.64	2.33	2.48			
OXAMYL	2.53	2.58	2.55			
MEAN	2.58	2.45	2.52			
STERILNT	NONE	FORMALIN	MEAN			
CROP(78)						
WHEAT	2.59	2.56	2.58			
BARLEY	2.67	2.57	2.62			
OATS	2.49	2.23	2.36			
MEAN	2.58	2.45	2.52			
SOW DATE(76)	AUTUMN		SPRING			
NEMACIDE(78)	NONE	OXAMYL	NONE	OXAMYL		
CROP(76)						
WHEAT	2.59	2.61	2.66	2.71		
BARLEY	2.38	2.26	2.30	2.56		
OATS	2.67	2.23	2.28	2.97		
SOW DATE(76)	AUTUMN		SPRING			
CROP(78)	WHEAT	BARLEY	OATS	WHEAT	BARLEY	OATS
CROP(76)						
WHEAT	3.09	2.47	2.23	2.53	2.96	2.56
BARLEY	1.92	1.96	3.07	2.49	2.59	2.22
OATS	2.77	2.50	2.07	2.66	3.21	2.00
NEMACIDE(78)	NONE		OXAMYL			
CROP(78)	WHEAT	BARLEY	OATS	WHEAT	BARLEY	OATS
CROP(76)						
WHEAT	2.90	2.61	2.36	2.72	2.81	2.43
BARLEY	2.05	2.23	2.75	2.36	2.33	2.54
OATS	2.54	2.77	2.12	2.90	2.94	1.96
NEMACIDE(78)	NONE		OXAMYL			
CROP(78)	WHEAT	BARLEY	OATS	WHEAT	BARLEY	OATS
SOW DATE(76)						
AUTUMN	2.60	2.27	2.77	2.59	2.35	2.15
SPRING	2.39	2.80	2.05	2.73	3.04	2.47

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STRAW TONNES/HECTARE

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

SOW DATE (76)	AUTUMN		SPRING			
	NONE	FORMALIN	NONE	FORMALIN		
STERILNT CROP (76)						
WHEAT	2.68	2.52	2.98	2.38		
BARLEY	2.33	2.31	2.40	2.47		
OATS	2.30	2.60	2.80	2.45		
NEMACIDE (78)	NONE		OXAMYL			
STERILNT CROP (76)	NONE	FORMALIN	NONE	FORMALIN		
WHEAT	3.02	2.23	2.64	2.68		
BARLEY	2.44	2.24	2.29	2.53		
OATS	2.44	2.51	2.66	2.54		
NEMACIDE (78)	NONE		OXAMYL			
STERILNT SOW DATE (76)	NONE	FORMALIN	NONE	FORMALIN		
AUTUMN	2.52	2.57	2.35	2.38		
SPRING	2.75	2.08	2.70	2.79		
CROP (78)	WHEAT		BARLEY		OATS	
STERILNT CROP (76)	NONE	FORMALIN	NONE	FORMALIN	NONE	FORMALIN
WHEAT	2.86	2.77	2.98	2.45	2.66	2.13
BARLEY	2.15	2.25	2.14	2.42	2.80	2.49
OATS	2.77	2.67	2.88	2.83	2.00	2.08
CROP (78)	WHEAT		BARLEY		OATS	
STERILNT SOW DATE (76)	NONE	FORMALIN	NONE	FORMALIN	NONE	FORMALIN
AUTUMN	2.63	2.57	2.13	2.50	2.56	2.36
SPRING	2.56	2.56	3.21	2.63	2.42	2.11
CROP (78)	WHEAT		BARLEY		OATS	
STERILNT NEMACIDE (78)	NONE	FORMALIN	NONE	FORMALIN	NONE	FORMALIN
NONE	2.71	2.28	2.54	2.54	2.66	2.16
OXAMYL	2.48	2.84	2.80	2.59	2.31	2.31

STRAW MEAN DM% 72.4

SUB PLOT AREA HARVESTED 0.00041