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Yields of the Field Experiments 1983

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85/S/CS/1 Factors Affecting Yield - W. Wheat

Rothamsted Research

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83/S/CS/1

FACTORS AFFECTING YIELD

Object: To study the effects of a range of factors on the yield of w. wheat
- Saxmundham.

Sponsors: F.V. Widdowson, A. Penny.

The 18th year, w. wheat.

For previous years see 66/C/30(t), 67/C/23(t), 68/C/39, 69-82/S/CS/1.

Design: The experiment was on two sites, one after beans and one after wheat. On each site the design was a half replicate of 2 x 2 x 2 x 4 x 2 arranged as 8 whole plots split into 4 sub-plots. One extra sub-plot was included in each whole plot.

Whole plot dimensions: Wheat after wheat: 8.53 x 18.3.
Wheat after beans: 6.20 x 30.0.

Treatments: On each site, combinations of:-

Whole plots

1. VARIETY Varieties:

 AVALON
 NORMAN
2. AUT N Nitrogen fertilizer to the seedbed in autumn on 29 Sept, 1982:

 0 None
 40 40 kg as 'Nitro-Chalk':
3. PATHCONT Pest and pathogen control:

 NONE None
 FULL Benomyl at 0.28 kg with sulphur (as 'Thiovit' at 9.9 kg) in 220 l on 4 May, 1983.
 Propiconazole at 0.12 kg with sulphur (as 'Thiovit' at 9.9 kg) in 220 l on 25 May.
 Carbendazim at 0.15 kg, maneb at 1.6 kg and tridemorph at 0.37 kg with captafol at 1.0 kg and pirimicarb at 0.14 kg in 220 l on 22 June.
 Propiconazole at 0.12 kg in 220 l, to wheat after beans only, on 13 July.

Sub plots

4 N RATE Total nitrogen fertilizer applied in spring (kg N) as 'Nitro-Chalk':

After wheat	After beans
160	100
190	130
220	160
250	190

83/S/CS/1

5. N TIME Times of applying spring nitrogen fertilizer:

SINGLE	All on 27 April
DIVIDED	40 kg N on 8 March, remainder on 27 April

plus whole plot treatments as above but given no spring nitrogen

Basal applications: Manures: (0:20:20) at 630 kg. Weedkillers: Chlortoluron at 3.5 kg with mecoprop, bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 220 l with the permethrin. Insecticide: Permethrin at 0.05 kg.

Seed: Varieties sown at 400 seeds per m².

Cultivations, etc.: - PK applied: 3 Sept, 1982. Ploughed: 15 Sept. Power harrowed, seed sown: 29 Sept. Weedkillers and insecticide applied: 28 Oct. Combine harvested: 9 Aug, 1983.

NOTE: Mineral N content of soil to 90 cm depth and the nitrate content of the crop were assessed in autumn and spring. N content of grain and N content of straw (except after wheat) were measured.

83/S/CS/1 WHEAT AFTER WHEAT

GRAIN TONNES/HECTARE

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

SPRING NITROGEN APPLIED

AUT N	0	40	MEAN		
VARIETY					
AVALON	8.45	8.76	8.60		
NORMAN	10.42	10.88	10.65		
MEAN	9.43	9.82	9.63		
PATHCONT	NONE	FULL	MEAN		
VARIETY					
AVALON	8.60	8.61	8.60		
NORMAN	10.31	11.00	10.65		
MEAN	9.46	9.80	9.63		
PATHCONT	NONE	FULL	MEAN		
AUT N					
0	9.26	9.61	9.43		
40	9.65	10.00	9.82		
MEAN	9.46	9.80	9.63		
N TIME	SINGLE	DIVIDED	MEAN		
VARIETY					
AVALON	8.39	8.82	8.60		
NORMAN	10.51	10.80	10.65		
MEAN	9.45	9.81	9.63		
N TIME	SINGLE	DIVIDED	MEAN		
AUT N					
0	9.13	9.74	9.43		
40	9.77	9.88	9.82		
MEAN	9.45	9.81	9.63		
N TIME	SINGLE	DIVIDED	MEAN		
PATHCONT					
NONE	9.37	9.54	9.46		
FULL	9.53	10.07	9.80		
MEAN	9.45	9.81	9.63		
N RATE	160	190	220	250	MEAN
VARIETY					
AVALON	8.30	8.51	8.63	8.97	8.60
NORMAN	10.42	10.52	10.79	10.89	10.65
MEAN	9.36	9.51	9.71	9.93	9.63

83/S/CS/1 WHEAT AFTER WHEAT

GRAIN TONNES/HECTARE

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

SPRING NITROGEN APPLIED

N RATE	160	190	220	250	MEAN
AUT N					
0	8.95	9.28	9.56	9.94	9.43
40	9.76	9.75	9.87	9.91	9.82
MEAN	9.36	9.51	9.71	9.93	9.63
N RATE	160	190	220	250	MEAN
PATHCONT					
NONE	9.09	9.40	9.48	9.85	9.46
FULL	9.63	9.63	9.94	10.00	9.80
MEAN	9.36	9.51	9.71	9.93	9.63
N RATE	160	190	220	250	MEAN
N TIME					
SINGLE	9.18	9.30	9.57	9.75	9.45
DIVIDED	9.54	9.73	9.86	10.10	9.81
MEAN	9.36	9.51	9.71	9.93	9.63

NO SPRING NITROGEN

AUT N	0	40	MEAN
VARIETY			
AVALON	1.94	2.34	2.14
NORMAN	3.40	4.23	3.81
MEAN	2.67	3.28	2.97
PATHCONT	NONE	FULL	MEAN
VARIETY			
AVALON	2.25	2.02	2.14
NORMAN	3.40	4.23	3.81
MEAN	2.82	3.13	2.97
PATHCONT	NONE	FULL	MEAN
AUT N			
0	2.37	2.96	2.67
40	3.28	3.29	3.28
MEAN	2.82	3.13	2.97

GRAND MEAN 8.30

GRAIN MEAN DM% 84.9

SUB PLOT AREA HARVESTED 0.00126

83/S/CS/1 WHEAT AFTER BEANS

GRAIN TONNES/HECTARE

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

SPRING NITROGEN APPLIED

AUT N	0	40	MEAN		
VARIETY					
AVALON	10.03	10.33	10.18		
NORMAN	10.75	10.89	10.82		
MEAN	10.39	10.61	10.50		
PATHCONT	NONE	FULL	MEAN		
VARIETY					
AVALON	9.66	10.69	10.18		
NORMAN	10.74	10.90	10.82		
MEAN	10.20	10.80	10.50		
PATHCONT	NONE	FULL	MEAN		
AUT N					
0	9.97	10.80	10.39		
40	10.43	10.79	10.61		
MEAN	10.20	10.80	10.50		
N TIME	SINGLE	DIVIDED	MEAN		
VARIETY					
AVALON	10.12	10.23	10.18		
NORMAN	10.69	10.95	10.82		
MEAN	10.41	10.59	10.50		
N TIME	SINGLE	DIVIDED	MEAN		
AUT N					
0	10.30	10.47	10.39		
40	10.51	10.71	10.61		
MEAN	10.41	10.59	10.50		
N TIME	SINGLE	DIVIDED	MEAN		
PATHCONT					
NONE	10.09	10.31	10.20		
FULL	10.72	10.88	10.80		
MEAN	10.41	10.59	10.50		
N RATE	100	130	160	190	MEAN
VARIETY					
AVALON	9.48	10.13	10.49	10.61	10.18
NORMAN	10.32	10.67	11.03	11.27	10.82
MEAN	9.90	10.40	10.76	10.94	10.50

83/S/CS/1 WHEAT AFTER BEANS

GRAIN TONNES/HECTARE

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

SPRING NITROGEN APPLIED

N RATE	100	130	160	190	MEAN
AUT N					
0	9.86	10.23	10.70	10.76	10.39
40	9.94	10.57	10.81	11.12	10.61
MEAN	9.90	10.40	10.76	10.94	10.50
N RATE	100	130	160	190	MEAN
PATHCONT					
NONE	9.72	10.11	10.45	10.52	10.20
FULL	10.08	10.69	11.06	11.36	10.80
MEAN	9.90	10.40	10.76	10.94	10.50
N RATE	100	130	160	190	MEAN
N TIME					
SINGLE	9.85	10.28	10.70	10.80	10.41
DIVIDED	9.95	10.53	10.82	11.08	10.59
MEAN	9.90	10.40	10.76	10.94	10.50

NO SPRING NITROGEN

AUT N	0	40	MEAN
VARIETY			
AVALON	4.99	6.08	5.53
NORMAN	5.55	6.75	6.15
MEAN	5.27	6.41	5.84
PATHCONT	NONE	FULL	MEAN
VARIETY			
AVALON	5.46	5.61	5.53
NORMAN	6.17	6.13	6.15
MEAN	5.82	5.87	5.84
PATHCONT	NONE	FULL	MEAN
AUT N			
0	5.17	5.37	5.27
40	6.46	6.36	6.41
MEAN	5.82	5.87	5.84

GRAND MEAN 9.57

GRAIN MEAN DM% 84.3

83/S/CS/1 WHEAT AFTER BEANS

STRAW TONNES/HECTARE

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

SPRING NITROGEN APPLIED

AUT N	0	40	MEAN		
VARIETY					
AVALON	5.97	6.68	6.33		
NORMAN	6.32	6.42	6.37		
MEAN	6.14	6.55	6.35		
PATHCONT	NONE	FULL	MEAN		
VARIETY					
AVALON	6.42	6.23	6.33		
NORMAN	6.50	6.24	6.37		
MEAN	6.46	6.24	6.35		
PATHCONT	NONE	FULL	MEAN		
AUT N					
0	6.01	6.28	6.14		
40	6.91	6.20	6.55		
MEAN	6.46	6.24	6.35		
N TIME	SINGLE	DIVIDED	MEAN		
VARIETY					
AVALON	5.95	6.70	6.33		
NORMAN	6.08	6.66	6.37		
MEAN	6.02	6.68	6.35		
N TIME	SINGLE	DIVIDED	MEAN		
AUT N					
0	5.76	6.53	6.14		
40	6.27	6.84	6.55		
MEAN	6.02	6.68	6.35		
N TIME	SINGLE	DIVIDED	MEAN		
PATHCONT					
NONE	6.15	6.77	6.46		
FULL	5.88	6.59	6.24		
MEAN	6.02	6.68	6.35		
N RATE	100	130	160	190	MEAN
VARIETY					
AVALON	5.79	6.31	6.25	6.95	6.33
NORMAN	6.09	5.96	6.50	6.94	6.37
MEAN	5.94	6.13	6.38	6.95	6.35

83/S/CS/1 WHEAT AFTER BEANS

STRAW TONNES/HECTARE

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

SPRING NITROGEN APPLIED

N RATE	100	130	160	190	MEAN
AUT N					
0	5.95	5.71	6.39	6.53	6.14
40	5.93	6.56	6.36	7.36	6.55
MEAN	5.94	6.13	6.38	6.95	6.35
N RATE	100	130	160	190	MEAN
PATHCONT					
NONE	6.04	6.50	6.23	7.07	6.46
FULL	5.84	5.76	6.53	6.82	6.24
MEAN	5.94	6.13	6.38	6.95	6.35
N RATE	100	130	160	190	MEAN
N TIME					
SINGLE	5.70	5.65	6.20	6.52	6.02
DIVIDED	6.18	6.62	6.56	7.37	6.68
MEAN	5.94	6.13	6.38	6.95	6.35

NO SPRING NITROGEN

AUT N	0	40	MEAN
VARIETY			
AVALON	3.69	4.30	4.00
NORMAN	3.28	3.49	3.38
MEAN	3.48	3.89	3.69
PATHCONT	NONE	FULL	MEAN
VARIETY			
AVALON	4.15	3.84	4.00
NORMAN	3.45	3.31	3.38
MEAN	3.80	3.58	3.69
PATHCONT	NONE	FULL	MEAN
AUT N			
0	3.23	3.74	3.48
40	4.37	3.42	3.89
MEAN	3.80	3.58	3.69

GRAND MEAN 5.82

STRAW MEAN DM% 79.5

SUB PLOT AREA HARVESTED 0.00189