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# Yields of the Field Experiments 1981

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## 81/W/WW/3 Growth and Yield on a Contrasted Site - W. Wheat

### Rothamsted Research

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81/W/WW/3

WINTER WHEAT

GROWTH AND YIELD ON A CONTRASTED SITE

Object: To study on a contrasted site the effects of some of the factors tested in 81/R/WW/3 Factors Limiting Yield and to determine the extent to which differences between the sites can be eliminated by appropriate combinations of the factors - Woburn Butt Close III.

Sponsors: F.V. Widdowson, P.J. Welbank.

Design: Half replicate of  $2^6$ , arranged as 16 whole plots split into 2 sub plots, plus 24 extra sub plots.

Whole plot dimensions: 2.74 x 14.8.

Treatments: Combinations of:-

Whole plots

1. SOWDATE	Dates of sowing:
16 SEP	16 September, 1980
31 OCT	31 October

Sub plots

2. TOTAL N	Total amount of nitrogen fertiliser (kg N) applied:
150	
220	
3. N DIVIS	Division of total nitrogen fertiliser:
SINGLE	Single dressing
DIVIDED	40 kg of the total before single dressing, 40 kg of the total after single dressing, remainder on single date
4. N TIME	Time of applying single dressing of nitrogen fertiliser:
EARLY	At ear initiation of SOWDATE 16 SEP on 17 March
LATE	At ear initiation of SOWDATE 31 OCT on 21 April
5. AUT PEST	Autumn pesticide:
NONE	None
ALDICARB	Aldicarb at 5 kg worked in to seedbed
6. IRRIGATN	Irrigation:
NONE	None
FULL	Full (196 mm) to lessen a deficit of 25 mm to 12.5 mm

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plus all combinations of the following (all given N as a single dressing at ear initiation, aldicarb to seedbed, irrigated):

1. SOWDATEX Dates of sowing:

16 SEP  
31 OCT

2. TOTAL NX Total amount of nitrogen fertiliser (kg N):

0  
80  
115  
185  
220  
255

plus all combinations of the following (all sown on 16 September, given 220 kg N as 'Nitro-Chalk', divided dressing, except plots given 40 kg N as urea on 3 February which received 180 kg N as 'Nitro-Chalk', aldicarb to seedbed, irrigated):

1. N INHIB Nitrification inhibitor:

NONE None  
DICYANDI Dicyandiamide at 3.0 kg

2. UREA N Nitrogen (kg N) as urea:

0  
40

3. I U DATE Times of applying nitrification inhibitor and urea:

10 DEC 10 December, 1980  
3 FEB 3 February, 1981

plus four extra sub plots used for root sampling, all sown 31 October, given 220 kg N as 'Nitro-Chalk' as a single dressing at ear initiation, aldicarb to seedbed, not irrigated. Yields not presented.

Irrigation was applied as follows (mm water):

11 June	20	16 July	5
18 June	20	17 July	5
22 June	10	20 July	9
26 June	10	22 July	5
29 June	10	23 July	5
2 July	10	27 July	10
6 July	9	30 July	10
8 July	9	31 July	5
10 July	9	5 Aug	10
13 July	10		
14 July	10	Total	196
15 July	5		

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N DIVIS

	SINGLE	DIVIDED
SOWDATE 16 SEP	17 Mar	3 Feb, 17 Mar, 5 May
SOWDATE 31 OCT	21 Apr	3 Feb, 21 Apr, 5 May

Standard applications: Manures: (0:14:28) at 360 kg. Weedkillers: Methabenzthiazuron at 1.6 kg in 280 l to SOWDATE 31 OCT only; Methabenzthiazuron at 1.6 kg with mecoprop (as 'Herrifex DS' at 2.5 l) in 280 l to SOWDATE 16 SEP only; mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 280 l to both sowing dates. Insecticides: Chlorfenvinphos at 0.67 kg in 280 l, pirimicarb at 0.14 kg in 280 l. Fungicide: Triadimefon with carbendazim (as 'Bayleton BM' at 0.32 kg) in 280 l, triadimefon with captafol (as 'Bayleton CF' at 2.1 kg) in 280 l. Growth regulator: Chlormequat at 1.4 l in 280 l.

Seed: Hustler, sown at 200 kg.

Cultivations, etc.: Deep-tine cultivated: 7 Aug, 1980. PK applied: 15 Sept. Heavy spring-tine cultivated, aldicarb applied for SOWDATE 16 SEP and rotary cultivated: 16 Sept. Aldicarb applied for SOWDATE 31 OCT and rotary cultivated: 31 Oct. Methabenzthiazuron applied to SOWDATE 31 OCT and methabenzthiazuron with 'Herrifex DS' applied to SOWDATE 16 SEP: 10 Nov. Chlorfenvinphos applied: 30 Jan, 1981. Growth regulator and 'Brittox' applied to SOWDATE 16 SEP: 3 Apr. 'Bayleton BM' applied: 15 Apr. Growth regulator and 'Brittox' applied to SOWDATE 31 OCT: 21 Apr. 'Bayleton CF' applied: 5 June. Pirimicarb applied: 13 July. Combine harvested: 28 Aug. Previous crops: W. wheat 1979, early potatoes 1980.

NOTE: Measurements were made of plant and shoot numbers, dry weight of tops and ears, leaf areas and N, P and K contents during growth. Weekly measurements were made of soil moisture (between April and harvest). Plant water stress and stomatal resistance were measured in July. Disease assessments were made during the growing season. Soil samples were taken in autumn and spring to determine N contents.



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GRAIN TONNES/HECTARE

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

TOTAL N	150	220	MEAN
SOWDATE			
16 SEP	9.41	9.39	9.40
31 OCT	7.45	8.23	7.84
MEAN	8.43	8.81	8.62
N DIVIS	SINGLE	DIVIDED	MEAN
SOWDATE			
16 SEP	9.11	9.69	9.40
31 OCT	7.65	8.03	7.84
MEAN	8.38	8.86	8.62
N DIVIS	SINGLE	DIVIDED	MEAN
TOTAL N			
150	8.19	8.68	8.43
220	8.57	9.04	8.81
MEAN	8.38	8.86	8.62
N TIME	EARLY	LATE	MEAN
SOWDATE			
16 SEP	9.13	9.66	9.40
31 OCT	8.27	7.41	7.84
MEAN	8.70	8.54	8.62
N TIME	EARLY	LATE	MEAN
TOTAL N			
150	8.50	8.36	8.43
220	8.90	8.71	8.81
MEAN	8.70	8.54	8.62
N TIME	EARLY	LATE	MEAN
N DIVIS			
SINGLE	8.88	7.88	8.38
DIVIDED	8.52	9.20	8.86
MEAN	8.70	8.54	8.62
AUT PEST	NONE	ALDICARB	MEAN
SOWDATE			
16 SEP	8.77	10.02	9.40
31 OCT	7.68	8.00	7.84
MEAN	8.23	9.01	8.62

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GRAIN TONNES/HECTARE

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

AUT PEST	NONE	ALDICARB	MEAN
TOTAL N			
150	8.09	8.77	8.43
220	8.36	9.25	8.81
MEAN	8.23	9.01	8.62

AUT PEST	NONE	ALDICARB	MEAN
N DIVIS			
SINGLE	7.95	8.81	8.38
DIVIDED	8.50	9.21	8.86
MEAN	8.23	9.01	8.62

AUT PEST	NONE	ALDICARB	MEAN
N TIME			
EARLY	8.62	8.78	8.70
LATE	7.84	9.24	8.54
MEAN	8.23	9.01	8.62

IRRIGATN	NONE	FULL	MEAN
SOWDATE			
16 SEP	9.03	9.76	9.40
31 OCT	7.47	8.21	7.84
MEAN	8.25	8.99	8.62

IRRIGATN	NONE	FULL	MEAN
TOTAL N			
150	8.07	8.79	8.43
220	8.44	9.18	8.81
MEAN	8.25	8.99	8.62

IRRIGATN	NONE	FULL	MEAN
N DIVIS			
SINGLE	7.96	8.80	8.38
DIVIDED	8.54	9.17	8.86
MEAN	8.25	8.99	8.62

IRRIGATN	NONE	FULL	MEAN
N TIME			
EARLY	8.43	8.97	8.70
LATE	8.07	9.00	8.54
MEAN	8.25	8.99	8.62

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GRAIN TONNES/HECTARE

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

IRRIGATN	NONE	FULL	MEAN				
AUT PEST							
NONE	7.74	8.72	8.23				
ALDICARB	8.77	9.25	9.01				
MEAN	8.25	8.99	8.62				
TOTAL NX	0	80	115	185	220	255	MEAN
SOWDATE							
16 SEP	7.02	8.20	8.95	10.75	10.13	10.71	9.29
31 OCT	6.37	5.72	7.45	8.11	7.50	6.97	7.02
MEAN	6.69	6.96	8.20	9.43	8.81	8.84	8.16
N INHIB	UREA N	I D DATE					
NONE	0	-	10.17				
NONE	40	10 DEC	11.76				
NONE	40	3 FEB	11.19				
DICYANDI	0	10 DEC	10.06				
DICYANDI	0	3 FEB	11.54				
DICYANDI	40	10 DEC	11.16				
DICYANDI	40	3 FEB	11.34				

GRAND MEAN 8.75

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

SED FOR TABLES EXCEPT THOSE INVOLVING FACTORS. TOTAL NX, SOWDATE, N INHIB, UREA N OR I D DATE ARE

MARGINS OF 2 WAY TABLES 0.194  
TWO WAY TABLES 0.275

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

STRATUM	DF	SE	CV%
WP	10	0.549	6.4

GRAIN MEAN DM% 84.2

PLOT AREA HARVESTED 0.00223