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76/R/WW/3 and 76/W/WW/3 Growth and Yield on Contrasted Sites - W. Wheat

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76/R/WW/3 and 76/W/WW/3

WINTER WHEAT

GROWTH AND YIELD ON CONTRASTED SITES

Object: To study the growth and yield of wheat on sites at Rothamsted and Woburn. The effects of rates and times of application of nitrogen and irrigation are also studied - Rothamsted (R) Gt Knott I and Woburn (W) Butt Close III.

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

Design: Single replicate of 2 x 6 x 2 arranged as 12 whole plots split into 2.

Whole plot dimensio: Gt Knott I (R): 13.4 x 15.2.
Butt Close III (W): 14.3 x 14.5.

Treatments: All combinations of:-

Whole plots

1. IRRIGTN Irrigation:

NONE	None
FULL	Full irrigation

NOTE: Because of practical difficulties the amounts of water applied (see below) were less than intended.

2. N RATE Nitrogen fertiliser (kg N):

	R	W
0	0	0
25	25	-
50	50	50
75	75	75
100	100	100
125	125	125
150	-	150

3. N TIME Times of applying nitrogen fertiliser:

SINGLE	Single dressing in spring
DIVIDED	Half in spring, quarter four and eight weeks later

Irrigation treatments (mm water):

Gt Knott I (R):	2 June	25.4
	15 June	25.4
	7 July	19.0

	Total	69.8

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Butt Close III (W):

18 May	19.0	22 June	12.7
26-27 May	19.0	28-29 June	25.4
2-3 June	19.0	5-8 July	25.4
8-9 June	25.4	14-15 July	25.4
14-15 June	25.4		

Total 196.7

Basal applications:

Gt Knott I (R): Manures: (0:14:28) at 500 kg, combine drilled. Weed-killers: Ioxynil at 0.53 kg plus mecoprop at 1.6 kg in 220 l.

Growth Regulator: Chlormequat at 2.8 kg in 220 l.

Butt Close III (W): Manures: (0:14:28) at 520 kg, combine drilled.

Weedkiller: Ioxynil at 0.63 kg plus mecoprop at 1.9 kg in 280 l.

Growth Regulator: Chlormequat at 1.7 kg in 280 l.

Seed: Both sites: Maris Huntsman, sown at 190 kg.

Cultivations, etc.:-

Gt Knott I (R): Ploughed: 17 Sept, 1975. Spring-time cultivated three times: 16 Sept, 17 Sept, 10 Oct. Seed sown: 31 Oct. Weedkiller applied, first N treatment applied: 22 Apr, 1976. Chlormequat applied: 5 May. Second N treatment applied: 17 May. Third N treatment applied: 23 June. Combine harvested: 3 Aug. Previous crops: Barley 1974, beans 1975.

Butt Close III (W): Heavy spring-time cultivated: 2 Sept, 1975. Deep-time cultivated: 24 Sept. Rotary cultivated: 25 Oct. Spring-time cultivated twice: 28 Oct, 30 Oct. Seed sown: 30 Oct. Weedkiller applied: 21 Apr, 1976. First N treatment applied: 23 Apr. Chlormequat applied: 4 May. Second N treatment applied: 19 May. Third N treatment applied: 14 June. Combine harvested: 30 July. Previous crops: Barley 1974, beans 1975.

- NOTES: (1) Estimates were made of leaf areas and number of tillers and spikelets during the season. Root samples were taken on one occasion.
- (2) Stomatal resistance and measurements of photosynthetic rates were made on Gt Knott I (R) only.
- (3) Shoot samples were taken for N determinations.
- (4) Soil water measurements were made weekly from April to July.
- (5) The percentages of N, P and K in grain were measured.
- (6) 1000 grain weights were determined.

76/R/WW/3 GREAT KNOTT 1(R)

GRAIN TONNES/HECTARE

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

N RATE	0	25	50	75	100	125	MEAN
IRRIGTN							
NONE	4.49	4.00	4.82	4.74	5.05	4.80	4.65
FULL	3.87	4.95	5.29	4.59	5.19	5.49	4.90
MEAN	4.18	4.48	5.05	4.66	5.12	5.14	4.77

EXCLUDING N RATE 0

N TIME	SINGLE	DIVIDED	MEAN
IRRIGTN			
NONE	4.51	4.86	4.68
FULL	5.59	4.62	5.10
MEAN	5.05	4.74	4.89

N TIME	SINGLE	DIVIDED	MEAN
N RATE			
25	4.42	4.54	4.48
50	5.11	5.00	5.05
75	4.26	5.07	4.66
100	5.63	4.61	5.12
125	5.82	4.47	5.14
MEAN	5.05	4.74	4.89

N RATE	IRRIGTN	NONE	FULL
25	SINGLE	3.28	5.55
	DIVIDED	4.73	4.35
50	SINGLE	4.50	5.72
	DIVIDED	5.13	4.86
75	SINGLE	3.77	4.74
	DIVIDED	5.71	4.44
100	SINGLE	5.50	5.76
	DIVIDED	4.60	4.63
125	SINGLE	5.47	6.16
	DIVIDED	4.13	4.81

GRAIN MEAN DM% 88.2

PLOT AREA HARVESTED 0.00434

76/R/WW/3 GREAT KNOTT I(R)

STRAW TONNES/HECTARE

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

N RATE	0	25	50	75	100	125	MEAN
IRRIGTN							
NONE	2.71	2.77	3.18	2.86	2.98	3.59	3.02
FULL	2.79	3.51	3.28	3.17	3.84	3.54	3.36
MEAN	2.75	3.14	3.23	3.01	3.41	3.56	3.19

EXCLUDING N RATE 0

N TIME	SINGLE	DIVIDED	MEAN
IRRIGTN			
NONE	3.09	3.07	3.08
FULL	3.54	3.40	3.47
MEAN	3.31	3.23	3.27

N TIME	SINGLE	DIVIDED	MEAN
N RATE			
25	2.80	3.48	3.14
50	3.26	3.20	3.23
75	3.13	2.90	3.01
100	3.60	3.22	3.41
125	3.77	3.36	3.56
MEAN	3.31	3.23	3.27

N RATE	IRRIGTN	NONE	FULL
25	N TIME		
	SINGLE	2.28	3.32
	DIVIDED	3.26	3.70
50	SINGLE	3.40	3.12
	DIVIDED	2.96	3.44
75	SINGLE	2.86	3.40
	DIVIDED	2.86	2.94
100	SINGLE	3.03	4.17
	DIVIDED	2.93	3.51
125	SINGLE	3.85	3.68
	DIVIDED	3.32	3.40

STRAW MEAN DM% 93.3

PLOT AREA HARVESTED 0.00434

76/W/WW/3 BUTT CLOSE III(W)

GRAIN TONNES/HECTARE

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

N RATE	0	50	75	100	125	150	MEAN
IRRIGTN							
NONE	1.13	2.25	2.02	2.61	1.87	1.96	1.97
FULL	3.07	4.32	4.20	4.96	4.42	3.64	4.10
MEAN	2.10	3.29	3.11	3.78	3.14	2.80	3.04

EXCLUDING N RATE 0

N TIME	SINGLE	DIVIDED	MEAN
IRRIGTN			
NONE	2.03	2.25	2.14
FULL	4.56	4.06	4.31
MEAN	3.29	3.16	3.23

N RATE	SINGLE	DIVIDED	MEAN
50	2.53	4.05	3.29
75	3.11	3.11	3.11
100	3.98	3.59	3.78
125	3.99	2.29	3.14
150	2.86	2.75	2.80
MEAN	3.29	3.16	3.23

N RATE	IRRIGTN	NONE	FULL
50	SINGLE	1.35	3.71
	DIVIDED	3.16	4.94
75	SINGLE	1.95	4.27
	DIVIDED	2.09	4.13
100	SINGLE	3.35	4.61
	DIVIDED	1.87	5.31
125	SINGLE	2.25	5.74
	DIVIDED	1.49	3.10
150	SINGLE	1.26	4.46
	DIVIDED	2.67	2.83

GRAIN MEAN DM% 85.5

PLOT AREA HARVESTED 0.00408

75/W/WW/3 BUTT CLOSE III(W)

STRAW TONNES/HECTARE

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

	MEAN						
N RATE	0	50	75	100	125	150	MEAN
IRRIGTN							
NONE	0.54	1.24	1.36	1.41	1.31	1.38	1.21
FULL	1.85	3.35	2.77	3.88	4.36	3.40	3.27
MEAN	1.20	2.30	2.07	2.65	2.83	2.39	2.24

EXCLUDING N RATE 0

N TIME	SINGLE	DIVIDED	MEAN
IRRIGTN			
NONE	1.39	1.29	1.34
FULL	3.50	3.60	3.55
MEAN	2.45	2.45	2.45

N TIME	SINGLE	DIVIDED	MEAN
N RATE			
50	2.07	2.52	2.30
75	2.13	2.01	2.07
100	2.27	3.03	2.65
125	3.47	2.20	2.83
150	2.29	2.49	2.39
MEAN	2.45	2.45	2.45

N RATE	IRRIGTN	NONE	FULL
	N TIME		
50	SINGLE	1.09	3.05
	DIVIDED	1.39	3.65
75	SINGLE	1.34	2.91
	DIVIDED	1.37	2.64
100	SINGLE	1.62	2.91
	DIVIDED	1.20	4.85
125	SINGLE	1.61	5.34
	DIVIDED	1.02	3.37
150	SINGLE	1.29	3.30
	DIVIDED	1.48	3.50

STRAW MEAN DM% 93.4

PLOT AREA HARVESTED 0.00408