ROTHAMSTED RESEARCH

Yields of the Field Experiments 1978

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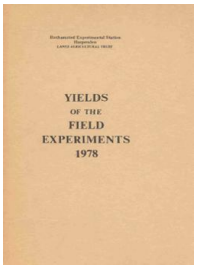

78/R/WW/4 Precision Sowing, Irrigation and N - W. Wheat

Rothamsted Research

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78/R/WW/4

WINTER WHEAT

PRECISION SOWING, IRRIGATION & N

Object: To study the effects of precision sowing, seed rates, irrigation and nitrogen fertiliser on the growth and yield of winter wheat - Gt. Field I & II.

Sponsors: G.N. Thorne, P.J. Welbank, F.V. Widdowson.

Design: Single replicate of 3 x 2 x 2 x 2 x 2 + 20 extra plots.

Whole plot dimensions: (1) ND, BND and HS: 4.27 x 15.2
(2) ST: 4.88 x 15.2

Treatments: All combinations of:-

1. DRL SPAC — Drills and spacing between rows:

ST1	Stanhay precision drill, rows 10.5 cm apart
ND1	Nordsten drill, rows 10.5 cm apart
ND2	Nordsten drill, rows 21 cm apart

2. SEEDRATE — Seed rates:

S1	Half standard (188 seeds per square metre, 115 kg)
S2	Standard (376 seeds per square metre, 230 kg)

3. IRRIGATN — Irrigation:

NONE	None
FULL	Irrigated (total 102.2 mm). Whenever the soil moisture deficit exceeded 25 mm, irrigation was applied to reduce this to 12 mm.

4. EARLY N — Nitrogen fertiliser as 'Nitro-Chalk 25' on 28 April (kg N):

EN3	90
EN5	150

5. LATE N — Nitrogen fertiliser as 'Nitro-Chalk 25' on 24 May (kg N):

LN0	0
LN1	30

plus twenty additional plots:

EXTRA — Sown with the Nordsten drill, rows 10.5 cm apart, standard seed rate, not irrigated, with eight nitrogen rates, applied in April (kg N):

ND1S2EN0	0
ND1S2EN1	30
ND1S2EN2	60
ND1S2EN3	90
ND1S2EN4	120
ND1S2EN5	150
ND1S2EN6	180
ND1S2EN7	210

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Sown with Nordsten drill but with seed tubes disconnected to broadcast the seed, unirrigated, nitrogen applied on 28 April, all treatments duplicated:

BNDS1EN3	Half standard seed rate, 90 kg N
BNDS1EN5	Half standard seed rate, 150 kg N
BNDS2EN3	Standard seed rate, 90 kg N
BNDS2EN5	Standard seed rate, 150 kg N

Sown by hand at half standard seed rate in rows 10.5 cm apart, unirrigated, nitrogen applied on 28 April, all treatments duplicated:

HS1S1EN3	Half standard seed rate, 90 kg N
HS1S1EN5	Half standard seed rate, 150 kg N

NOTE: Irrigation treatments (mm water)

30 May, 1978	25.6
14 June	21.6
21 June	15.5
19 July	18.3
28 July	21.2
Total	102.2

Basal applications: Manures: (0:20:20) at 310 kg. Weedkillers: (1) Methabenzthiazuron 2.0 kg in 280 l, (2) Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.9 l in 220 l). Growth regulator: Chlormequat at 1.4 kg in 220 l. Fungicide: Triadimefon at 0.13 kg in 220 l.

Seed: Maris Huntsman.

Cultivations, etc.:- Ploughed: 20 Oct, 1977. Heavy spring-tine cultivated, PK applied: 24 Oct. Rotary harrowed: 25 Oct. Seed sown: 27 Oct. Weedkiller (1) applied: 4 Nov. Rolled: 6 April, 1978. Weedkiller (2) and growth regulator (mix) applied: 10 May. Fungicide applied: 14 June. Combine harvested: 4 Sept. Previous crops: Barley 1976, beans 1977.

NOTE: Emergence counts were made in December. Measurements were made of shoot numbers, dry weight of tops and ears, leaf area, and nitrogen content four times during the season. Weekly measurements were made of stem nitrate (between late April and mid July), of soil moisture (between mid April and August) and on two occasions measurements were made of light intensity at ground level.

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GRAIN TONNES/HECTARE

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

SEEDRATE DRL SPAC	S1	S2	MEAN
ST1	7.99	8.11	8.05
ND1	8.00	8.33	8.17
ND2	7.86	8.01	7.94
MEAN	7.95	8.15	8.05

IRRIGATN DRL SPAC	NONE	FULL	MEAN
ST1	8.16	7.94	8.05
ND1	8.27	8.06	8.17
ND2	8.09	7.78	7.94
MEAN	8.18	7.93	8.05

IRRIGATN SEEDRATE	NONE	FULL	MEAN
S1	8.00	7.91	7.95
S2	8.35	7.94	8.15
MEAN	8.18	7.93	8.05

EARLY N DRL SPAC	EN3	EN5	MEAN
ST1	7.81	8.29	8.05
ND1	7.96	8.38	8.17
ND2	7.55	8.32	7.94
MEAN	7.77	8.33	8.05

EARLY N SEEDRATE	EN3	EN5	MEAN
S1	7.70	8.21	7.95
S2	7.85	8.45	8.15
MEAN	7.77	8.33	8.05

EARLY N IRRIGATN	EN3	EN5	MEAN
NONE	7.88	8.47	8.18
FULL	7.67	8.18	7.93
MEAN	7.77	8.33	8.05

LATE N DRL SPAC	LN0	LN1	MEAN
ST1	7.81	8.29	8.05
ND1	8.03	8.30	8.17
ND2	7.80	8.07	7.94
MEAN	7.88	8.22	8.05

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

LATE N SEEDRATE	LN0	LN1	MEAN
S1	7.80	8.10	7.95
S2	7.95	8.34	8.15
MEAN	7.88	8.22	8.05

LATE N IRRIGATN	LN0	LN1	MEAN
NONE	7.99	8.36	8.18
FULL	7.77	8.08	7.93
MEAN	7.88	8.22	8.05

LATE N EARLY N	LN0	LN1	MEAN
EN3	7.52	8.03	7.77
EN5	8.24	8.42	8.33
MEAN	7.88	8.22	8.05

SEEDRATE	S1		S2	
IRRIGATN DRL SPAC	NONE	FULL	NONE	FULL
ST1	8.19	7.80	8.13	8.09
ND1	7.95	8.06	8.60	8.06
ND2	7.85	7.87	8.33	7.68

SEEDRATE	S1		S2	
EARLY N DRL SPAC	EN3	EN5	EN3	EN5
ST1	7.82	8.17	7.80	8.41
ND1	7.83	8.18	8.09	8.57
ND2	7.45	8.27	7.65	8.37

IRRIGATN	NONE		FULL	
EARLY N DRL SPAC	EN3	EN5	EN3	EN5
ST1	7.78	8.54	7.84	8.04
ND1	8.19	8.36	7.72	8.39
ND2	7.66	8.53	7.45	8.11

IRRIGATN	NONE		FULL	
EARLY N SEEDRATE	EN3	EN5	EN3	EN5
S1	7.72	8.27	7.68	8.14
S2	8.03	8.68	7.66	8.22

SEEDRATE	S1		S2	
LATE N DRL SPAC	LN0	LN1	LN0	LN1
ST1	7.71	8.27	7.90	8.31
ND1	7.88	8.13	8.18	8.47
ND2	7.82	7.91	7.78	8.24

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

IRRIGATN	NONE		FULL	
LATE N	LN0	LN1	LN0	LN1
DRL SPAC				
ST1	7.92	8.39	7.69	8.19
ND1	8.11	8.43	7.95	8.17
ND2	7.93	8.25	7.66	7.89

IRRIGATN	NONE		FULL	
LATE N	LN0	LN1	LN0	LN1
SEEDRATE				
S1	7.84	8.16	7.77	8.05
S2	8.14	8.57	7.77	8.12

EARLY N	EN3		EN5	
LATE N	LN0	LN1	LN0	LN1
DRL SPAC				
ST1	7.47	8.16	8.15	8.43
ND1	7.83	8.08	8.23	8.52
ND2	7.26	7.84	8.33	8.30

EARLY N	EN3		EN5	
LATE N	LN0	LN1	LN0	LN1
SEEDRATE				
S1	7.51	7.89	8.09	8.32
S2	7.52	8.17	8.38	8.52

EARLY N	EN3		EN5	
LATE N	LN0	LN1	LN0	LN1
IRRIGATN				
NONE	7.57	8.19	8.41	8.54
FULL	7.47	7.87	8.07	8.30

EXTRA	
ND1S2EN0	5.75
ND1S2EN1	6.20
ND1S2EN2	6.09
ND1S2EN3	7.41
ND1S2EN4	7.85
ND1S2EN5	8.30
ND1S2EN6	8.59
ND1S2EN7	8.71
BNDS1EN3	8.05
BNDS1EN5	8.84
BNDS2EN3	8.05
BNDS2EN5	8.78
HS1S1EN3	7.52
HS1S1EN5	8.62

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GRAIN TONNES/HECTARE

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

TABLE	DRL SPAC	SEEDRATE	IRRIGATN	EARLY N
SED	0.155	0.127	0.127	0.127

TABLE	LATE N	DRL SPAC SEEDRATE	DRL SPAC IRRIGATN	SEEDRATE IRRIGATN
SED	0.127	0.220	0.220	0.179

TABLE	DRL SPAC EARLY N	SEEDRATE EARLY N	IRRIGATN EARLY N	DRL SPAC LATE N
SED	0.220	0.179	0.179	0.220

TABLE	SEEDRATE LATE N	IRRIGATN LATE N	EARLY N LATE N	DRL SPAC SEEDRATE IRRIGATN
SED	0.179	0.179	0.179	0.311

TABLE	DRL SPAC SEEDRATE EARLY N	DRL SPAC IRRIGATN EARLY N	SEEDRATE IRRIGATN EARLY N	DRL SPAC SEEDRATE LATE N
SED	0.311	0.311	0.254	0.311

TABLE	DRL SPAC IRRIGATN LATE N	SEEDRATE IRRIGATN LATE N	DRL SPAC EARLY N LATE N	SEEDRATE EARLY N LATE N
SED	0.311	0.254	0.311	0.254

TABLE	IRRIGATN EARLY N LATE N	EXTRA	
SED	0.254	0.621	MIN REP
		0.538	MAX-MIN
		0.439	MAX REP

EXTRA
MAX REP BNDS1EN3,BNDS1EN5,BNDS2EN3,BNDS2EN5,
HS1S1EN3,HS1S1EN5
MAX-MIN THOSE IN MAX REP V ANY OF REMAINDER
MIN REP ANY OF REMAINDER

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

STRATUM	DF	SE	CV%
WP	17	0.439	5.5

MEAN DM% 83.2

PLOT AREA HARVESTED 0.00195

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