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Yields of the Field Experiments 1976

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76/R/RN/11 Irrigation - Barley, Maize

Rothamsted Research

Rothamsted Research (1977) *76/R/RN/11 Irrigation - Barley, Maize* ; Yields Of The Field Experiments 1976, pp 90 - 95 - DOI: <https://doi.org/10.23637/ERADOC-1-15>

76/R/RN/11

IRRIGATION

Object: To study the effects of irrigation on a rotation of crops. Other agronomic factors are also included - Great Field I and II.

Sponsors: B.J. Legg, B.K. French.

The twelfth year, barley (Great Field I); forage maize (Great Field II).

For previous years see 64/C/15(t), 65/C/14(t), 66/C/9(t), 67/C/7(t), 68/C/6(t), 69/R/11(t), 70/R/RN/11(t), 71/R/RN/11(t), 72/R/RN/11(t), and 73-75/R/RN/11.

Design: 4 randomised blocks of 4 plots split into half and quarter plots (Great Field I).
4 randomised blocks of 2 plots split into quarter plots (Great Field II).

Whole plot dimensions: Barley - 15.2 x 32.0, forage maize - 15.2 x 15.2.

Treatments to barley: All combinations of:-

Whole plots

1. IRRIGTN Irrigation (by oscillating spray line), cumulative to previous years:-

NONE	None
EARLY	Early
LATE	Late
FULL	Full

Half plots

2. FUNGCIDE Fungicides:

NONE	None
E+T+B	Ethirimol seed dressing, tridemorph spray on 28 May and 7 July, benodanil spray on 7-July

Quarter plots

3. ALDICARB(75) Residuals of aldicarb applied to beans 1975:

(0)	None
(14)	14 kg

4. N TIME Time of applying nitrogen fertiliser (total dressing 50 kg N):

SEEDBED	All to seedbed, dressing divided before (6 Mar) and after (23 Mar) sowing
SB+TD	Half to seedbed (6 Mar), half top dressed (28 June)

76/R/RN/11

NOTE: Tridemorph at 0.53 kg in 220 l for first spray; with benodanil at 1.12 kg in 450 l for second spray.

Treatments to forage maize: All combinations of:-

Whole plots

1. IRRIGTN Irrigation:

NONE	None
FULL	Full

Quarter plots

2. N Nitrogen fertiliser (kg N):

50	50 to seedbed
100	100 to seedbed
150	150 to seedbed
100+50	100 to seedbed, 50 top dressed five weeks after establishment

NOTE: Seedbed N applied on 5 May, top dressed on 28 June.

Standard applications: Barley: Manures: (0:20:20) at 310 kg, combine drilled. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 5.6 l in 220 l). Forage maize: Manures: (0:20:20) at 450 kg. Weedkillers: Atrazine at 1.7 kg in 220 l. Paraquat at 0.42 kg ion in 220 l. Insecticide: Dimethoate at 0.07 kg in 450 l.

Seed: Barley: Julia, sown at 160 kg.

Forage maize: Cargill Primeur 170, sown at 100,000 seeds per hectare.

Cultivations, etc.: Barley: Ploughed: 20 Nov, 1975. Spring-tine cultivated: 3 Mar, 1976, 6 Mar. Seed sown: 8 Mar. Weedkiller applied: 7 May. Combine harvested: 26 July.

Forage maize: Paraquat applied: 27 Oct, 1975. Ploughed: 17 Oct. Spring-tine cultivated: 3 Mar, 1976. PK applied: 5 May. Atrazine applied and harrowed in: 7 May. Power harrowed: 10 May. Seed sown: 11 May. Insecticide applied: 8 June. Harvested by hand: 7 Oct.

NOTES: (1) Mildew on the barley was assessed on two occasions.

(2) Soil moisture measurements were made during the season.

76/R/RN/11

RAINFALL AND IRRIGATION: MM

Week ending	Rainfall	IRRIGATION			
		EARLY	BARLEY LATE	FULL	MAIZE FULL
May 1	0.4				
May 8	0.8				
May 15	7.2				
May 22	4.9	30		30	
May 29	5.2	25		25	
June 5	1.8				
June 12	Trace	25		25	20
June 19	16.5				
June 26	Trace		25	25	
July 3	0.1		25	20	25
July 10	0.4		30		30
July 17	39.0				
July 24	2.1				
July 31	Trace				25
Aug 7	Trace				25
Aug 14	Trace				25
Aug 21	0				
Aug 28	2.8				30
Sept 4	9.0				
Sept 11	30.6				
Sept 18	5.9				
Sept 25	36.7				
Oct 2	44.6				
Total	208.0	80	80	125	180

- NOTES: (1) BARLEY IRRIGTN FULL plots started to lodge at the beginning of July and irrigation was stopped to prevent further lodging. -
- (2) Analysis of two blocks given ALDICARB(75) showed the residual effect to be negligible, therefore all four blocks were analysed together ignoring this factor.
- (3) There was a systematic difference between the yields recorded from even and odd sub plots in the order of harvesting. An adjustment has been made for this in the yields presented. An explanation is being sought.

76/R/RN/11

BARLEY

GRAIN TONNES/HECTARE

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

FUNGCIDE	NONE	E+T+B	MEAN
IRRIGTN			
NONE	4.04	4.87	4.45
EARLY	4.89	5.61	5.25
LATE	5.04	5.09	5.07
FULL	4.81	5.95	5.38

MEAN	4.69	5.38	5.04
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N TIME	SEEDBED	SB+TD	MEAN
IRRIGTN			
NONE	4.45	4.45	4.45
EARLY	5.26	5.23	5.25
LATE	4.98	5.16	5.07
FULL	5.42	5.35	5.38

MEAN	5.03	5.05	5.04
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N TIME	SEEDBED	SB+TD	MEAN
FUNGCIDE			
NONE	4.74	4.65	4.69
E+T+B	5.32	5.44	5.38
MEAN	5.03	5.05	5.04

FUNGCIDE	NONE	E+T+B
N TIME	SEEDBED	SB+TD
IRRIGTN		
NONE	4.08	3.99
EARLY	5.01	4.77
LATE	4.85	5.24
FULL	5.02	4.60

SEEDBED	4.83	4.90
SB+TD	5.51	5.70
SEEDBED	5.11	5.08
SB+TD	5.82	6.09

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

TABLE	IRRIGTN	FUNGCIDE	N TIME	IRRIGTN FUNGCIDE
SED	0.205	0.079	0.074	0.233
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF: IRRIGTN				0.157

TABLE	IRRIGTN N TIME	FUNGCIDE N TIME	IRRIGTN FUNGCIDE N TIME
SED	0.235	0.110	0.281
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF: IRRIGTN	0.151		0.219
FUNGCIDE		0.107	
IRRIGTN.FUNGCIDE			0.212
IRRIGTN.N TIME			0.219

76/R/RN/11

BARLEY

GRAIN TONNES/HECTARE

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

STRATUM	DF	SE	CV%
BLOCK.WP	9	0.290	5.8
BLOCK.WP.HP	12	0.222	4.4
BLOCK.WP.HP.SP	23	0.295	5.9

GRAIN MEAN DM% 87.5

STRAW TONNES/HECTARE

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

FUNGCIDE	NONE	E+T+B	MEAN
IRRIGTN			
NONE	3.04	3.44	3.24
EARLY	4.22	4.59	4.41
LATE	3.11	3.33	3.22
FULL	4.05	4.50	4.28

MEAN 3.61 3.96 3.78

N TIME	SEEDBED	SB+TD	MEAN
IRRIGTN			
NONE	3.28	3.20	3.24
EARLY	4.61	4.20	4.41
LATE	3.30	3.13	3.22
FULL	4.38	4.18	4.28

MEAN 3.89 3.68 3.78

N TIME	SEEDBED	SB+TD	MEAN
FUNGCIDE			
NONE	3.75	3.46	3.61
E+T+B	4.03	3.90	3.96

MEAN 3.89 3.68 3.78

FUNGCIDE	NONE	SB+TD	E+T+B	SB+TD
N TIME	SEEDBED		SEEDBED	
IRRIGTN				
NONE	3.13	2.94	3.42	3.46
EARLY	4.51	3.93	4.70	4.47
LATE	3.22	3.00	3.39	3.27
FULL	4.15	3.96	4.60	4.40

STRAW MEAN DM% 90.4

SUB PLOT AREA HARVESTED 0.00347

76/R/RN/11

FORAGE MAIZE DRY MATTER TONNES/HECTARE

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

	N	50	100	150	100+50	MEAN
IRRIGTN						
NONE		9.45	10.00	10.33	9.61	9.85
FULL		11.79	13.08	13.34	13.42	12.91
MEAN		10.62	11.54	11.84	11.51	11.38

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

TABLE	N	IRRIGTN*
		N
SED	0.556	0.786

* WITHIN THE SAME LEVEL OF IRRIGTN ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	18	1.111	9.8

MEAN DM% 40.8

SUB PLOT AREA HARVESTED 0.00156