ROTHAMSTED RESEARCH

Yields of the Field Experiments 1974

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74/R/RN/11 Irrigation - Wheat , Kale

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IRRIGATION

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

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

The eleventh year, wheat (Gt. Field I), kale (Gt. 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/RN/11(t), 70/R/RN/11(t), 71/R/RN/11(t), 72/R/RN/11(t) and 73/R/RN/11.

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

Whole plot dimensions: Wheat - 15.2 x 32.0, kale - 15.2 x 30.5. Sub plot area harvested: Wheat - 0.00356, kale - 0.00098.

Treatments to wheat: All combinations of:-

Whole plots: 1. Irrigation:		IRRIGTN
	None	None
	Full	Full
2. Plant population:		POPULATN
	Normal, 18 cm (7 inch) between rows, seed rate 224 kg	Normal
	Quarter normal, 36 cm (14 inch) between rows, seed rate 56 kg	Quarter
Half plots: 3. Sowing date:		SOWING
	Autumn, 12 Oct, 1973	Autumn
	Spring, 27 Mar, 1974	Spring
Quarter plots: 4. Nitrogen fertiliser (kg N):		N
	45	45
	90	90

Treatments to kale: All combinations of:-

Whole plots: 1. Irrigation:		IRRIGTN
	None	None
	Full	Full

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Half plots: 2. Rates of compound fertiliser (20:14:14) kg: COMPFERT

750	750
1130	1130

Quarter plots: 3. Residues of N fertiliser to potatoes in 1973 (kg N): NRES(73)

163	163
326	326

Standard applications:

Wheat: Manures: (0:20:20) at 280 kg, combine drilled. Weedkiller: Dicamba with mecoprop and MCPA (Autumn sown wheat: 'Banlene Plus' at 5.6 l in 220 l, spring sown wheat: 'Tetralex Plus' at 7.0 l in 220 l).

Kale: Weedkiller: Desmetryne ('Semeron 25 WP' at 1.7 kg in 220 l).

Seed: Wheat: Maris Ranger, dressed with dieldrin.

Kale: Maris Kestrel, dressed with BHC and captan, sown at 2.2 kg.

Cultivations, etc.:-

Wheat: Deep-tine cultivated: 28 July, 1973. Rotary cultivated: 29 Aug. Spring-tine cultivated: 9 Oct. Autumn seed sown: 12 Oct. Plots for spring sowing power harrowed and seed sown: 27 Mar, 1974. N applied: to spring sowing: 8 Mar, to autumn sowing: 19 Apr. Weedkiller applied: to autumn sowing: 18 Apr, to spring sowing: 28 May. Combine harvested: 18 Sept.

Kale: Ploughed: 17 Dec, 1973. Spring-tine cultivated and NPK applied: 9 Apr, 1974. Rotary harrowed and seed sown: 10 Apr. Weedkiller applied: 3 June. Cut: 19 Nov.

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RAINFALL AND IRRIGATION: MM

Week-ending	Rainfall	IRRIGATION WHEAT (Winter & Spring)	IRRIGATION KALE
May 4	9.2		
May 11	6.7	15.0	
May 18	4.6	15.0	
May 25	7.0		
June 1	1.9		
June 8	14.1	25.0	
June 15	1.6	20.0	
June 22	23.9		
June 29	36.7		
July 6	8.6		
July 13	10.3		
July 20	8.7		
July 27	1.9	25.0	25.0
Aug 3	2.6		
Aug 10	32.7		
Aug 17	20.7		
Aug 24	2.6		
Aug 31	21.8		
Sept 7	52.4		
Sept 14	5.0		
Sept 21	3.9		
Sept 28	54.1		
Total	331.0	100.0	25.0

Standard errors per plot. Wheat. Grain: tonnes/hectare.

Whole plot: 0.319 or 6.0% (9 d.f.)
Half plot: 0.441 or 8.3% (12 d.f.)
Quarter plot: 0.505 or 9.5% (24 d.f.)

Kale. Total weight: tonnes/hectare.

Quarter plot: 3.17 or 4.0% (4 d.f.)

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TABLES OF MEANS

WHEAT

GRAIN: TONNES/HECTARE

	POPULATN		SOWING		N		
	Normal	Quarter	Autumn	Spring	45	90	Mean
IRRIGTN							
None	6.05	5.05	7.01	4.09	5.45	5.65	5.55
Full	5.57	4.51	6.26	3.82	4.85	5.23	5.04
POPULATN							
Normal			6.70	4.92	5.65	5.96	5.81
Quarter			6.58	2.99	4.64	4.92	4.78
SOWING							
Autumn					6.52	6.76	6.64
Spring					3.78	4.13	3.95
Mean					5.15	5.44	5.29

	SOWING	Autumn		Spring	
	N	45	90	45	90
IRRIGTN	POPULATN				
None	Normal	6.72	7.35	5.06	5.07
None	Quarter	7.11	6.88	2.92	3.30
Full	Normal	6.28	6.44	4.56	4.99
Full	Quarter	5.96	6.36	2.59	3.14

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STANDARD ERRORS OF DIFFERENCES

IRRIGTN	POPULATN	SOWING	N	IRRIGTN POPULATN	IRRIGTN SOWING	IRRIGTN N
0.159	0.159	0.156	0.126	0.226	0.223	0.203
Except when comparing means with same levels of IRRIGTN					0.221	0.179

POPULATN SOWING	POPULATN N	SOWING N	IRRIGTN POPULATN SOWING N
0.223	0.203	0.201	0.404
Except when comparing means with same levels of POPULATN 0.221	0.179		
SOWING		0.179	
IRRIGTN.POPULATN			0.401
IRRIGTN.POPULATN.SOWING			0.357
IRRIGTN.POPULATN.N			0.401

Mean D.M. % 78.0

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WHEAT

STRAW: TONNES/HECTARE

	POPULATN		SOWING		N		
	Normal	Quarter	Autumn	Spring	45	90	Mean
IRRIGTN							
None	4.07	3.27	5.22	2.12	3.75	3.59	3.67
Full	5.20	4.07	5.82	3.45	4.63	4.64	4.64
		POPULATN					
		Normal	6.01	3.27	4.63	4.64	4.64
		Quarter	5.04	2.30	3.75	3.59	3.67
				SOWING			
				Autumn	5.60	5.44	5.52
				Spring	2.78	2.79	2.79
Mean					4.19	4.12	4.15

	SOWING	Autumn		Spring	
	N	45	90	45	90
IRRIGTN	POPULATN				
None	Normal	5.90	5.54	2.42	2.44
None	Quarter	4.72	4.73	1.97	1.66
Full	Normal	6.25	6.33	3.96	4.27
Full	Quarter	5.53	5.18	2.79	2.77

Mean D.M. % 74.0

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KALE

TOTAL WEIGHT: TONNES/HECTARE

	COMPFERT 750	COMPFERT 1130	NRES(73) 163	NRES(73) 326	Mean
IRRIGTN					
None	77.9	85.1	78.4	84.6	81.5
Full	74.1	77.8	74.1	77.8	75.9
		COMPFERT			
		750	71.4	80.6	76.0
		1130	81.0	81.8	81.4
Mean			76.2	81.2	78.7

COMPFERT	750		1130	
NRES(73)	163	326	163	326
IRRIGTN				
None	73.9	81.8	82.8	87.4
Full	68.8	79.3	79.3	76.3

STANDARD ERRORS OF DIFFERENCES

NRES(73)	IRRIGTN(1) NRES(73)	COMPFERT(2) NRES(73)	IRRIGTN(3) COMPFERT NRES(73)
1.58	2.24	2.24	3.17

(1) Within the same level of IRRIGTN only
(2) Within the same level of COMPFERT only
(3) Within the same level of IRRIGTN*COMPFERT only

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