

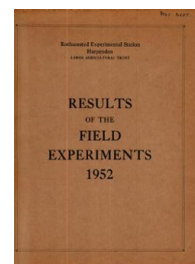
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Yields of the Field Experiments 1952

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52/BG/1 Irrigation - Woburn

Rothamsted Research

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IRRIGATION EXPERIMENT

The 2nd year

The effects of irrigation and nitrogen - Woburn Butt Close 1952.

The cropping comprises four series; three of these in turn carry the crops of a 3-course rotation:-

- 1st year: Early potatoes followed by winter cabbages
- 2nd year: Sugar beet
- 3rd year: Barley

The fourth series remains in long term grass for cutting.

System of replication: 3 randomized blocks of 4 plots each, plots being split into two for the application of nitrogen.

Area of each sub plot: Cut grass - 0.0264, remainder - 0.0278 acre.
Area harvested: Cut grass - 0.0264, early potatoes - 0.0155,
winter cabbages - 0.0175, sugar beet - 0.0176, barley - 0.0168 acre.

Treatments: All combinations of:-

Whole plots. Irrigation:-

	Grass	Arable crops
O	None	None
C	Full irrigation	Full irrigation to maintain deficit at 1".
B	2/3 of C	None till mid-season, then as C.
A	1/3 of C	As C till mid-season, then none

The actual amounts applied are given below.

Sub plots. Nitrogen: 2 levels applied to crops as below.

Rainfall and Irrigation: inches

Week ending	Rain-fall	Irrigation											
		Early Potatoes			Sugar beet			Barley			Cut Grass		
		A	B	C	A	B	C	A	B	C	A	B	C
May 19	.08												
26	.40												
June 2	.30												.16
9	.19	1.00		1.00	.83		.83	1.09		1.09	.51	.85	.97
16	.62	.50		.50	.67		.68	.50		.50			.50
23	.29												
30	.00		.50	.50				.50	.50			.53	.53
July 7	.12		.75	.75	.50		.50						
14	.21				1.15		1.15	.81	.81		.53	.70	.80
21	.02					.52	.52				.56	.56	.52
28	.00					1.21	1.21				.25	.77	1.41
Aug 4	1.03												
11	1.51												
18	.27												
25	.38												
Sept 1	.00												
8	.90					.70	.70						.20
15	.50												
22	.25												
29	.53												
Total	7.60	1.50	1.25	2.75	3.15	2.43	5.59	1.59	1.31	2.90	1.85	3.41	5.09

Levels of nitrogen (in addition to N in basal dressing):

cwt per acre)

Early Potatoes: None; 0.5 Applied as sulphate of ammonia
 Winter Cabbages
 (after potatoes): 0.5; 1.0 Applied as nitrochalk
 Sugar beet: None; 0.4 Applied as nitrochalk
 Barley: None; 0.2 Applied as nitrochalk
 Cut grass: 0.15; 0.30 Applied as nitrochalk after each cut

Basal manurings: cwt per acre

	As compound fertilizer			
	N	P ₂ O ₅	K ₂ O	Salt
Early potatoes	0.5	0.5	0.75	None
Winter cabbages (after potatoes)		None		None
Sugar beet	0.4	0.4	0.6	None
Barley	0.2	0.2	0.3	5.0
Cut grass (yearly)	None	0.6	0.6	None

In addition 18 cwt carbonate of lime per acre was applied after early potatoes.

52/Bg/1.3

Cultivations, etc.:

Early potatoes. Ploughed: Sept 20 and again Dec 17, 1951. Potatoes planted by machine: Apr 10, 1952. Ridged: Apr 12. Fertilizers applied: Apr 18. Earthed up ridges: Apr 29. Lifted: July 10. Variety: Ulster Chieftain.

Winter cabbages. 19 cwt chalk per acre applied: July 11, 1952. Irrigated all plots ready for planting, planted cabbages and watered in: July 21. Sprayed with Parathion: Aug 12 and again Sept 8. Variety: January King. The crop was a failure, mainly owing to bird damage.

Sugar beet. Fertilizers applied, seed drilled at 18 lb per acre: Apr 18. Singled: May 26. Lifted: Nov 20. Variety: Klein E.

Barley. Fertilizers applied: Mar 12. Seed drilled at 3 bushels per acre: Mar 14. Harvested: Aug 12. Variety: Plumage Archer.

Cut grass. Basal fertilizers applied: Mar 21. Cut: Apr 29, May 19, June 16, July 9 and Aug 11. Nitrochalk applied after each cut except the last.

Standard errors per plot:

Early potatoes.	Total tubers,	whole plot	0.506 tons per acre	or 6.3%
				(6 d.f.)
		sub plot	0.446 tons per acre	or 5.6%
				(8 d.f.)
Sugar beet.	Total sugar,	whole plot	4.85 cwt per acre	or 8.4%
				(6 d.f.)
		sub plot	1.88 cwt per acre	or 3.3%
				(8 d.f.)
	Tops,	whole plot	0.690 tons per acre	or 6.5%
				(6 d.f.)
		sub plot	0.940 tons per acre	or 8.9%
				(8 d.f.)
Barley.	Grain,	whole plot	2.27 cwt per acre	or 9.8%
				(6 d.f.)
		sub plot	1.95 cwt per acre	or 8.4%
				(8 d.f.)
Cut grass	Hay (85% D.M.)	whole plot	5.59 cwt per acre	or 6.6%
(total of 5 cuts)				(6 d.f.)
		sub plot	6.21 cwt per acre	or 7.3%
				(8 d.f.)

Summary of Results

cwt N per acre	Irrigation				Mean
	0	A	B	C	
Early Potatoes, total tubers: tons per acre					
		(±0.344)*			
0	6.05	8.08	6.72	9.74	7.65
0.5	6.20	8.89	7.43	10.38	8.35
Mean (±0.292)	6.12	8.49	7.08	10.31	8.00
Difference (±0.364)	0.15	0.81	0.71	1.14	0.70 (±0.182)

*for use in comparisons other than vertical.

52/Bg/1.4

cwt N per acre	Irrigation				Mean
	0	A	B	C	
Sugar beet, roots (washed): tons per acre					
0	12.90	16.11	15.86	15.85	15.43
0.4	15.06	15.60	17.37	16.52	16.14
Mean	13.98	15.86	17.11	16.18	15.78
Difference	+2.16	-0.51	+0.51	+0.67	+0.71
Sugar beet, sugar percentage					
0	18.22	18.39	18.27	18.20	18.27
0.4	18.41	17.97	18.15	18.04	18.14
Mean	18.31	18.18	18.21	18.12	18.21
Difference	+0.19	-0.42	-0.12	-0.16	-0.13
Sugar beet, total sugar: cwt per acre (±2.90)*					
0	47.1	59.3	61.6	57.7	56.4
0.4	55.5	56.2	63.1	59.6	58.6
Mean (±2.80)	51.3	57.7	62.3	58.7	57.5
Difference (±1.53)	+3.4	-3.1	+1.5	+1.9	+2.2 (±0.77)
Sugar beet, tops: tons per acre (±0.553)*					
0	8.14	9.80	10.65	10.11	9.67
0.4	10.32	11.29	12.71	11.58	11.43
Mean (±0.398)	9.23	10.54	11.63	10.85	10.58
Difference (±0.768)	+2.18	+1.49	+2.06	+1.47	1.31 (±0.384)
Sugar beet, noxious nitrogen: mg. per 100 g.					
0	25.0	26.7	26.7	26.7	26.2
0.4	25.0	25.0	26.7	25.0	25.4
Mean	25.0	25.8	26.7	25.8	25.3
Difference	0.0	-1.7	0.0	-1.7	-0.8

* for use in comparisons other than vertical.

cwt N per acre	Irrigation				52/Bg/1.5
	0	A	B	C	Mean
Barley, grain: cwt per acre					
(± 1.53) [*]					
0	21.7	13.8	21.7	22.7	21.2
0.2	23.1	23.3	26.3	27.2	25.0
Mean (± 1.31)	22.4	21.1	24.0	25.0	23.1
Difference (± 1.59)	1.4	4.5	4.6	4.5	3.8 (± 0.80)
Barley, straw: cwt per acre					
0	25.2	23.3	24.6	25.6	24.7
0.2	27.9	27.2	32.8	34.3	30.6
Mean	26.5	25.3	28.7	30.0	27.6
Difference	2.7	3.9	3.2	8.7	5.9
Cut grass, hay at 35% D.M. 7 cuts: cwt per acre					
after each cut					
(± 4.10) [*]					
0.15	63.1	76.1	93.3	97.3	82.6
0.30	66.2	83.0	95.0	103.5	86.9
Mean (± 3.23)	64.6	79.6	94.2	100.7	84.3
Difference (± 5.07)	3.1	6.9	1.7	5.7	4.3 (± 2.54)

*for use in comparisons other than vertical.

Winter Cabbages. Crop failed.