

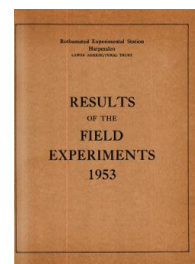
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Yields of the Field Experiments 1953

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53/BG/1 Irrigation - Woburn

Rothamsted Research

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53/Bg/1.1

IRRIGATION EXPERIMENT

The 3rd year

The effects of irrigation and nitrogen - Woburn Butt Close 1953.

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 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(acres): Cut grass - 0.0264, remainder - 0.0278.
Area harvested: Cut grass - 0.0165, early potatoes - 0.0155,
sugar beet - 0.0176, barley - 0.0168.

Treatments: All combinations of:-
Whole plots. Irrigation:-

	<u>Cut grass</u>	<u>Early potatoes, Barley and Sugar beet.</u>
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 are given below.

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

53/Bg/1.2

Rainfall and Irrigation; inches

Week- ending	Rain- fall	Irrigation											
		Early potatoes			Sugar beet			Cut grass			Barley		
		A	B	C	A	B	C	A	B	C	A	B	C
May 4	0.98												
11	0.00												
18	0.75												
25	0.71												.35
June 1	0.19								.33	.11		.30	
8	0.47	.50		.50					.42	.83			.30
15	0.91	.60		.60	.50		.50	.75				.50	.50
22	0.41												
29	0.07		.38	.38	.42		.42						.50
July 6	0.01		.50	.50			.42		.53				
13	1.21				.44			.50	.83	.84			
20	0.37												
27	0.23					.85	.83						.50
Aug 3	1.07					.50	.50						.76
10	0.04							.83					
17	0.61					.50	.50		.50	.70			.18
24	1.95												
31	0.66												
Sept 7	0.17							.50					
14	0.00												.34
21	0.83					.40	.40		.41	.51			
28	0.43												
Oct 5	0.02												
Total	12.09	1.10	.88	1.98	1.36	2.25	3.57	2.58	3.02	5.62	.80		.80

N.B. (1) The cabbages received .90" on B and C plots during week ending 10th August.

(2) On barley 0 = B.

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 in spring after each cut except the last.

53/Bg/1.3

Basal dressing: 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	5.0
Barley	0.2	0.2	0.3	None
Cut grass (yearly)		0.6	0.6	None

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

N.B. Erratum to 52/Bg/1.2. 'Basal manurings: cwt per acre' under 'salt' for sugar beet read '5.0' instead of 'none', and for barley read 'none' instead of '5.0'.

Cultivations, etc.:

Early potatoes. Ploughed: Aug 26, 1952 and again Nov 15. Potatoes planted by machine, fertilizers applied: Mar 17, 1953. Ridged: Mar 19. Earthed up ridges: May 4. Lifted: July 16. Variety: Ulster Chieftain.

Winter cabbages. 18 cwt carbonate of lime applied: July 20. Nitrogen applied: July 21. Cabbages planted and watered in: July 21. Variety: January King.

Sugar beet. Ploughed: Mar 19. Fertilizers applied: Mar 20. Seed drilled at 18 lb per acre: Mar 25. Singled: May 27. Lifted: Nov 23. Variety: Klein E.

Barley. Ploughed: Jan 5. Fertilizers applied, seed drilled at 3 bushels per acre: Mar 6. Harvested: Aug 10. Variety: Plumage Archer.

Cut grass. Basal dressing applied: Mar 17. Nitrochalk applied: Mar 27. Cut 7 times: May 13, June 8, July 3, Aug 4, Aug 24, Sept 16, Oct 29. Nitrochalk applied after each cut except the last. Variety: Cocksfoot S.37.

Standard errors per plot:

Early potatoes. Total tubers, whole plot: 0.569 tons per acre or 4.6% (6 d.f.)
sub plot: 0.451 tons per acre or 3.6% (8 d.f.)

Winter cabbages. Weight of headed cabbages: whole plot: 0.449 tons per acre or 19.1% (6 d.f.)
sub plot: 0.295 tons per acre or 12.6% (8 d.f.)

53/Bg/1.4

Standard errors per plot (continued):

Sugar beet.	Total sugar, whole plot:	1.15 cwt per acre or 1.4%
		(6 d.f.)
	sub plot:	2.08 cwt per acre or 2.5%
		(8 d.f.)
Tops,	whole plot:	0.701 tons per acre or 6.6%
		(6 d.f.)
	sub plot:	0.473 tons per acre or 4.5%
		(8 d.f.)
Barley.	Grain,	whole plot: 1.67 cwt per acre or 6.3%
		(7 d.f.)
		sub plot: 1.59 cwt per acre or 6.0%
		(9 d.f.)
Cut grass.	Hay at 85% D.M.	whole plot: 3.33 cwt per acre or 2.9%
(total of 7 cuts)		(6 d.f.)
		sub plot: 7.11 cwt per acre or 6.2%
		(8 d.f.)

Summary of Results

cwt N per acre	Irrigation				Mean	
	0	A	B	C		
Early Potatoes, total tubers: tons per acre						
(±0.377) [#]						
0.0	10.04	11.10	11.54	11.96	11.16	
0.5	11.99	13.29	14.44	14.71	13.61	
Mean	(±0.328)	11.02	12.20	12.99	13.33	12.38
Difference	(±0.368)	1.95	2.19	2.90	2.75	2.45 (±0.184)
Cabbages, weight of headed: tons per acre						
(±0.286) [#]						
0.5	1.62	1.27	1.00	1.06	1.24	
1.0	3.35	3.38	4.00	3.07	3.45	
Mean	(±0.259)	2.48	2.33	2.50	2.06	2.34
Difference	(±0.241)	1.73	2.11	3.00	2.01	2.21 (±0.120)
Cabbages, Total produce: tons per acre						
0.5	4.17	3.95	3.54	3.49	3.79	
1.0	6.00	5.89	6.61	5.82	6.08	
Mean		5.08	4.92	5.07	4.65	4.93
Difference		1.83	1.94	3.07	2.33	2.29

[#]for use in comparisons other than vertical.

53/Bg/1.5						
cwt N per acre	Irrigation				Mean	
	0	A	B	C		
Cabbages, Percentage (by number) of headed						
0.5	25.3	21.3	17.2	18.8	20.6	
1.0	42.2	44.5	48.7	37.6	43.2	
Mean	33.7	32.9	32.9	28.2	31.9	
Difference	16.9	23.2	31.5	18.8	22.6	
Sugar beet, roots (washed): tons per acre						
0.0	21.82	22.38	22.36	21.89	22.11	
0.4	23.41	23.76	23.35	22.66	23.29	
Mean	22.62	23.07	22.86	22.28	22.70	
Difference	1.59	1.38	0.99	0.77	1.18	
Sugar beet, sugar percentage						
0.0	18.57	18.49	18.52	18.30	18.47	
0.4	18.64	18.73	18.20	18.35	18.48	
Mean	18.60	18.61	18.36	18.32	18.48	
Difference	+0.07	+0.24	-0.32	+0.05	+0.01	
Sugar beet, total sugar: cwt per acre						
	(± 1.08) [*]					
0.0	81.0	82.7	82.8	80.1	81.7	
0.4	87.3	89.0	85.0	83.2	86.1	
Mean	(± 0.66)	84.2	85.9	83.9	81.6	83.9
Difference	(± 1.70)	6.3	6.3	2.2	3.1	4.4 (± 0.85)
Sugar beet, tops: tons per acre						
	(± 0.448) [*]					
0.0	10.02	10.55	9.74	9.61	9.98	
0.4	11.39	11.48	10.72	10.78	11.09	
Mean	(± 0.404)	10.70	11.01	10.23	10.20	10.54
Difference	(± 0.386)	1.37	0.93	0.98	1.17	1.11 (± 0.193)

^{*} for use in comparisons other than vertical.

53/Bg/1.6

cwt N per acre	Irrigation				Mean
	0	A	B	C	

Sugar beet, noxious nitrogen: mg. per 100 g.

0.0	21.7	23.3	23.3	18.3	21.7
0.4	21.7	23.3	21.7	23.3	22.5
Mean	21.7	23.3	22.5	20.8	22.1
Difference	0.0	0.0	-1.6	+5.0	+0.8

cwt N per acre	Irrigation			Mean
	0 & B	A	C	

Barley, grain: cwt per acre

		(± 0.82) [#]	(± 1.16) [#]		
0.0		23.7	24.1	23.4	23.7
0.2		29.9	29.1	28.8	29.4
Mean	(± 0.97)	26.8 ⁽¹⁾	26.6	26.1	26.6
Difference	(± 1.30)	6.2 ⁽²⁾	5.0	5.4	5.7

Barley, straw: cwt per acre

0.0	30.9	33.3	29.8	31.2
0.2	42.1	43.7	41.6	42.4
Mean	36.5	38.5	35.7	36.8
Difference	11.2	10.4	11.8	11.2

cwt N per acre	Irrigation				Mean
	0	A	B	C	

Cut grass, hay at 85% D.M. 7 cuts: cwt per acre

		(±3.48) [#]			
0.15 ⁺	96.7	107.5	115.4	107.8	106.9
0.30 ⁺	111.8	120.0	126.8	127.6	121.6
Mean	(±1.92)	104.2	113.7	121.1	117.7
Difference	(±5.80)	15.1	12.5	11.4	19.8
					(±2.90)

(1) ± 0.68 (2) ± 0.92

[#] for use in comparisons other than vertical

⁺ in spring and after each cut.