ROTHAMSTED RESEARCH

Yields of the Field Experiments 1953

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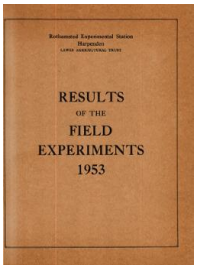

Long-term Experiments

Rothamsted Research

Rothamsted Research (1954) *Long-term Experiments ;* Yields Of The Field Experiments 1953, pp 13 - 67 **- DOI: https://doi.org/10.23637/ERADOC-1-173**

THREE COURSE ROTATION EXPERIMENT

2nd year of revised scheme

For details of rotation, treatments etc., see "Results of the Field Experiments 1952", Section 52/Ba/1.

Area of each plot: Potatoes (sub-plot) - 0.0092 acre; Barley - 0.0200 acre; Sugar beet - 0.0205 acre.

Cultivations, etc.:

Potatoes: Straw applied, ploughed all plots: Jan 22, 1953. Fertilizers applied: Mar 25. Ridged: Mar 27. Potatoes planted with mechanical dropper: Apr 11. Earthed up ridges: June 25. Sprayed with copper fungicide, 5½ lb per acre: July 28 and again Aug 8. Haulm destroyed mechanically: Sept 17. Lifted: Sept 28. Variety: Majestic.

Barley: Straw applied, ploughed all plots: Jan 22, 1953. Seed drilled at 3 bushels per acre, fertilizers applied: Feb 28. Harvested: Aug 11. Variety: Plumage Archer.

Sugar beet: Straw applied, ploughed all plots: Jan 22, 1953. Fertilizers applied: Mar 18. Seed drilled at 18 lb per acre: Mar 26. Sprayed with D.D.T. emulsion, 3 pints in 10 gallons: May 11. Singled: May 31. Lifted: Nov 12. Variety: Klein E.

Treatment symbols

Ar Complete artificials only.
St1 Straw ploughed in in autumn, artificials applied in spring.
St2 Straw ploughed in in autumn, artificials applied half in autumn, half in spring.
Ad Adco ploughed in in autumn with supplementary artificials.
St $53\frac{1}{3}$ cwt cut straw in autumn.
Nitrogen dressing: 0.2, 0.4, 0.6 cwt N as sulphate of ammonia.
K_s Muriate of potash equivalent to K_2O in straw.
K^s 0.5 cwt K_2O as muriate of potash.

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Summary of Results

Potatoes

Treatments applied			0		0.4N		St + 0.2N		St + 0.6N		K_s		K_s + 0.4N	
1950	1951	1952	-	K	-	K	-	K	-	K	-	K	-	K
			Total tubers: tons per acre											
	Ar	0			9.92	10.79								
		0.4N	8.49	8.24										
Ar		0			10.04	10.28								
		0.4N	7.54	8.44										
	St1 St2	0			11.54	11.88			11.40	12.03			9.55	10.77
		0.4N	9.60	8.68			9.31	9.21			10.38	9.17		
St1 St2		0			9.75	10.28								
		0.4N	9.70	9.85										
		St+0.2N			10.67	10.62								
		St+0.6N	9.17	8.88										
		K_s			9.36	9.99								
		K_s 0.4N	10.43	10.09										
	Ad	0			10.33	9.60			10.09	8.78			12.42	12.37
Ad		0.4N	8.34	9.31										
		St+0.6N	8.29	7.76										
		K_s 0.4N	11.30	11.15										

53/Ba/1.2

Potatoes

Treatments applied			1953	0		0.4N		St + 0.2N		St + 0.6N		K_s		K_s + 0.4N	
1950	1951	1952	1953	-	K	-	K	-	K	-	K	-	K	-	K
				Percentage ware											
	Ar	0				86.8	84.6								
		0.4N		82.5	87.3										
Ar		0				85.3	87.4								
		0.4N		82.2	86.3										
	St1 St2	0				87.7	91.2			85.6	88.3			86.7	89.5
		0.4N		82.0	82.8			89.9	84.8			84.2	82.8		
St1 St2		0				84.9	84.3								
		0.4N		89.6	84.9										
		St+0.2N				87.6	85.5								
		St+0.6N		87.4	86.4										
		K_s				86.9	90.1								
		K_s 0.4N		84.8	88.1										
	Ad	0				88.4	82.8			84.7	86.4			86.4	90.1
Ad		0.4N		81.4	87.7										
		St+0.6N		85.9	84.6										
		K_s 0.4N		84.6	83.8										

53/Ba/1.3

Barley

Treatments applied		1953	0	0.4N	St + 0.2N	St + 0.6N	K_s	K_s + 0.4N
1950	1951	1952						
			Grain: cwt per acre					
	Ar	0		31.2				
		0.4N	28.6					
Ar		0		30.2				
		0.4N	31.5					
	St1 St2	0		27.4		31.4		27.3
		0.4N	21.9		26.0		26.3	
St1 St2		0		30.4				
		0.4N	30.3					
		St+0.2N		30.7				
		St+0.6N	30.6					
		K_s		31.3				
		K_s 0.4N	26.0					
	Ad	0		28.0		30.0		31.4
Ad		0.4N	35.2					
		St+0.6N	28.5					
		K_s 0.4N	22.3					
			Straw: cwt per acre					
	Ar	0		44.8				
		0.4N	31.9					
Ar		0		41.3				
		0.4N	33.7					
	St1 St2	0		40.2		41.4		36.8
		0.4N	25.9		30.0		29.6	
St1 St2		0		41.9				
		0.4N	37.1					
		St+0.2N		46.5				
		St+0.6N	38.0					
		K_s		40.8				
		K_s 0.4N	39.7					
	Ad	0		35.9		41.7		39.4
Ad		0.4N	27.7					
		St+0.6N	30.2					
		K_s 0.4N	25.5					

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Sugar beet

Treatments applied		1953	0	0.4N	St + 0.2N	St + 0.6N	K_s	K_s + 0.4N
1950	1951	1952						
			Roots (washed): tons per acre					
	Ar	0		15.84				
		0.4N	12.07					
Ar		0		15.12				
		0.4N	12.45					
	St1 St2	0		16.04		14.25		14.53
		0.4N	12.09		12.31		14.62	
St1 St2		0		15.19				
		0.4N	13.73					
		St+0.2N		14.82				
		St+0.6N	12.81					
		K_s		15.39				
		K_s 0.4N	13.05					
	Ad	0		15.63		13.64		16.11
Ad		0.4N	12.31					
		St+0.6N	13.36					
		K_s 0.4N	12.83					
			Sugar percentage					
	Ar	0		17.98				
		0.4N	18.64					
Ar		0		18.44				
		0.4N	18.60					
	St1 St2	0		18.81		18.67		18.52
		0.4N	18.64		18.52		18.58	
St1 St2		0		18.29				
		0.4N	18.18					
		St+0.2N		18.44				
		St+0.6N	18.38					
		K_s		17.74				
		K_s 0.4N	18.23					
	Ad	0		18.34		18.55		17.74
Ad		0.4N	18.26					
		St+0.6N	17.86					
		K_s 0.4N	18.35					

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53/Ba/1.6

Sugar beet

Treatments applied		1953	0	0.4N	St + 0.2N	St + 0.6N	K_s	K_s + 0.4N
1950	1951	1952						
			Total sugar: cwt per acre					
	Ar	0		57.0				
		0.4N	45.0					
Ar		0		55.9				
		0.4N	46.5					
	St1 St2	0		60.2		53.3		53.7
		0.4N	45.0		45.4		54.1	
St1 St2		0		55.4				
		0.4N	49.8					
		St+0.2N		54.6				
		St+0.6N	47.1					
		K_s		54.6				
		K_s 0.4N	47.6					
	Ad	0		57.2		50.6		57.2
Ad		0.4N	45.0					
		St+0.6N	47.6					
		K_s 0.4N	47.1					
			Tops: tons per acre					
	Ar	0		8.33				
		0.4N	5.91					
Ar		0		7.31				
		0.4N	5.76					
	St1 St2	0		7.44		7.81		7.22
		0.4N	5.63		5.70		7.94	
St1 St2		0		7.70				
		0.4N	6.68					
		St+0.2N		7.73				
		St+0.6N	6.92					
		K_s		7.73				
		K_s 0.4N	6.13					
	Ad	0		8.82		6.79		8.64
Ad		0.4N	6.22					
		St+0.6N	6.94					
		K_s 0.4N	5.87					

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Sugar beet

Treatments applied		1953	0	0.4N	St + 0.2N	St + 0.6N	K_s	K_s + 0.4N
1950	1951	1952						
			Plant number: thousands per acre					
	Ar	0		26.9				
		0.4N	29.2					
Ar		0		29.6				
		0.4N	28.2					
	St1 St2	0		28.4		27.3		28.0
		0.4N	28.4		28.9		28.5	
St1 St2		0		27.9				
		0.4N	28.3					
		St+0.2N		25.9				
		St+0.6N	27.5					
		K_s		26.7				
		K_s 0.4N	27.7					
	Ad	0		28.2		27.3		28.3
Ad		0.4N	29.6					
		St+0.6N	28.6					
		K_s 0.4N	29.0					
			Noxious nitrogen: mg. per 100 g.					
	Ar	0		15.0				
		0.4N	15.0					
Ar		0		15.0				
		0.4N	15.0					
	St1 St2	0		15.0		15.0		15.0
		0.4N	15.0		15.0		15.0	
St1 St2		0		15.0				
		0.4N	15.0					
		St+0.2N		25.0				
		St+0.6N	15.0					
		K_s		25.0				
		K_s 0.4N	15.0					
	Ad	0		15.0		25.0		15.0
Ad		0.4N	15.0					
		St+0.6N	15.0					
		K_s 0.4N	25.0					

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FOUR COURSE ROTATION EXPERIMENT

The 24th year

Direct and residual effects of organic manures and phosphatic fertilizers - Hoosfield 1953.

For details of treatments and rotation see "Results of the Field Experiments 1939-47" Vol. I, Section Ba/3.

Area of each plot: Potatoes (whole plot): 0.0242 acre. Barley and ryegrass: 0.0244 acre. Wheat: 0.0233 acre.

Manures (cwt per acre) applied 1952-53

	Organic manures and phosphates				Supplementary fertilizers		
Treatment	Organic matter	N	P_2O_5	K_2O	N as Sulph. of amm.	P_2O_5 as Super	K_2O as Mur. of potash
Dung	50	2.131*	0.820	1.066	-	0.380	1.934
Adco	50	1.012	0.600	0.750	0.788	0.600	2.250
Straw	112	0.496	0.108	0.312	1.304†	1.092	2.688
Super			1.2		0.36 †		0.6 †
Rock phosphate			1.2		0.36 †		0.6 †

*In excess of the standard rate (1.800 cwt N).
†Yearly dressings totalling to the standard rate in the 5 year period.

Cultivations, etc.:

Potatoes.

Ploughed: Sept 1, 1952. Supplementary fertilizers to dung and adco plots applied: Jan 20, 1953. Dung and adco applied: Jan 21. Straw and first dressing to straw plots applied, all plots ploughed: Jan 26. Ridged: Mar 31. Spring fertilizers, including second and third dressing to straw plots, and sulphate of ammonia to half plots, applied: Apr 1. Potatoes planted: Apr 2. Earthed up: June 27. Sprayed with copper fungicide 5½ lb per acre: July 28 and again Aug 8. Sprayed with sulphuric acid, 20% B.O.V.: Sept 26. Lifted: Oct 1. Variety: Majestic.

Barley.

Dung, adco and supplementary fertilizers and first dressing to straw plots applied: Jan 20, 1953. Straw applied, all plots ploughed: Jan 21. 19 cwt ground chalk per acre applied: Feb 25. Spring fertilizers and second and third dressing to straw plots applied: Feb 27. Seed drilled at 3 bushels per acre: Feb 28. Harvested: Aug 11. Variety: Plumage Archer.

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Ryegrass.

Dung and adco applied: Sept 13, 1952. Straw applied, all plots ploughed: Sept 15. Supplementary fertilizers to dung and adco plots, first dressing to straw plots, autumn fertilizers applied and seed sown at 112 lb per acre: Sept 19. Second dressing to straw plots applied: Jan 23, 1953. Sulphate of ammonia and third dressing to straw plots applied: Apr 7. Harvested: June 25. Variety: Western Wolths.

Wheat.

Ploughed: Aug 7, 1952. Supplementary fertilizers to dung and adco plots and first dressing to straw plots applied: Sept 16. Dung, adco and straw applied, ploughed all plots: Sept 17. Autumn fertilizers applied: Oct 8. Seed drilled at 3 bushels per acre: Oct 27. Second dressing to straw plots applied: Jan 23, 1953. Sulphate of ammonia and third dressing to straw plots applied: Apr 22. Harvested: Aug 20. Variety: Squareheads Master 13/4.

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Summary of Results

Manure[+]	Year of Cycle	Potatoes: Total tubers, tons per acre — Additional N Without	Additional N With	Mean	Resp. to Nitrogen	Potatoes: Percentage Ware — Additional N Without	Additional N With	Mean	Resp. to Nitrogen	Barley (at 85% D.M.) Grain cwt per acre	Barley Straw cwt per acre	Ryegrass Dry Matter cwt per acre	Wheat Grain cwt per acre	Wheat Straw cwt per acre
Dung	I	8.33	10.40	9.36	+2.07	87.1	91.1	89.1	+4.0	31.9	40.2	20.7	20.7	37.6
	II	7.23	8.90	8.06	+1.67	87.5	91.1	89.3	+3.6	27.8	32.5	18.3	21.4	34.6
	III	8.03	5.77	6.90	-2.26	91.5	88.3	89.9	-3.2	24.4	27.3	14.9	17.5	27.6
	IV	6.04	8.68	7.36	+2.64	87.6	88.7	88.2	+1.1	21.9	24.6	12.3	17.7	28.6
	V	5.45	8.05	6.75	+2.60	81.2	82.6	81.9	+1.4	23.7	26.8	11.9	17.7	26.1
Adco (Straw compost)	I	10.09	12.04	11.06	+1.95	81.1	93.1	87.1	+12.0	28.1	44.8	34.1	29.6	52.0
	II	7.23	8.91	8.07	+1.68	84.4	83.4	83.9	-1.0	26.4	31.2	15.7	15.8	22.6
	III	5.31	6.40	5.86	+1.09	84.2	86.2	85.2	+2.0	21.7	24.6	12.5	15.9	21.8
	IV	6.17	7.40	6.78	+1.23	87.3	90.6	89.0	+3.3	24.5	26.1	13.9	16.9	26.5
	V	5.86	7.70	6.78	+1.84	86.8	86.6	86.7	-0.2	21.5	22.9	12.2	18.5	27.0
Straw	I	8.52	12.84	10.68	+4.32	89.6	93.4	91.5	+3.8	26.0	37.7	59.7	28.7	55.8
	II	6.84	7.66	7.25	+0.82	81.6	90.3	86.0	+8.7	13.3	17.0	14.7	17.6	28.1
	III	6.75	8.17	7.46	+1.42	88.5	91.0	89.8	+2.5	25.1	26.0	17.3	18.7	30.0
	IV	7.19	8.80	8.00	+1.61	88.4	89.2	88.8	+0.8	27.1	32.2	12.2	18.9	31.9
	V	6.99	8.41	7.70	+1.42	89.5	90.6	90.0	+1.1	22.0	24.2	12.2	16.8	26.5
Super-phosphate	I	9.07	9.18	9.12	+0.11	87.2	87.3	87.5	+0.6	30.9	38.1	32.7	19.7	31.9
	II	7.58	9.46	8.52	+1.88	86.2	85.4	85.8	-0.8	25.1	31.3	30.2	21.5	37.4
	III	8.41	8.84	8.62	+0.43	89.0	89.9	89.4	+0.9	26.9	36.9	26.7	20.6	30.8
	IV	7.19	9.11	8.15	+1.92	89.7	89.9	89.8	+0.2	24.3	29.7	30.3	22.3	33.2
	V	8.33	7.78	8.06	-0.55	94.0	89.3	91.6	-4.7	26.6	33.5	30.3	22.5	34.6
Rock phosphate	I	5.93	6.01	5.97	+0.08	83.3	86.6	85.0	+3.3	29.3	34.8	29.4	21.5	33.2
	II	4.87	6.00	5.44	+1.13	84.3	88.1	86.2	+3.8	25.7	32.7	23.5	19.9	31.2
	III	6.39	5.77	6.08	-0.62	89.6	80.1	84.8	-9.5	27.3	32.3	29.4	20.8	29.1
	IV	6.48	7.23	6.86	+0.75	89.5	91.7	90.6	+2.2	22.9	26.2	28.0	21.5	33.5
	V	5.10	6.48	5.79	+1.38	88.2	90.1	89.2	+1.9	29.0	36.1	26.9	20.6	29.7
Mean Dry Matter %										84.5	83.4			

[+]Note. All manures are supplemented by fertilizers as shown in table on page 53/Ba/2.1

53/Ba/2.3

SIX COURSE ROTATION EXPERIMENT

The 24th year

Seasonal effects of fertilizers - Rothamsted Long Hoos IV and Woburn Stackyard, 1953.

For details of rotation and treatments etc. see "Results of the Field Experiments 1939-47" Vol. I, Section Ba/4.

Area of each plot: Rothamsted - 0.0250 acre. Woburn - 0.0266 acre.

Cultivations, etc.:

Rothamsted

Sugar beet.
Ploughed: Aug 18, 1952 and again Feb 2, 1953. Fertilizers applied: Mar 17. Seed drilled at 18 lb per acre: Mar 26. Sprayed with D.D.T. emulsion, 3 pints in 10 gallons per acre: May 11. Singled: June 5. Lifted: Nov 15. Variety: Klein E.

Barley.
Ploughed: Jan 22, 1953. 20 cwt ground chalk per acre applied: Feb 4. Fertilizers applied, seed drilled at 3 bushels per acre: Feb 27. Harvested: Aug 10. Variety: Plumage Archer.

Clover.
Seed undersown in barley at 40 lb per acre: Apr 18, 1952. Autumn fertilizers applied: Nov 12. Sulphate of ammonia applied: Apr 7, 1953. Cut: June 23. Variety: Late flowering Montgomery Red.

Wheat.
Ploughed: Aug 6, 1952 and again Sept 5. Autumn fertilizers applied: Oct 8. Seed drilled at 3 bushels per acre: Oct 29. Sulphate of ammonia applied: Apr 21, 1953. Harvested: Aug 12. Variety: Yeoman.

Potatoes.
Ploughed: Aug 24, 1952. Ridged and fertilizers applied: Mar 27, 1953. Potatoes planted: Mar 28. Earthed up: June 25. Sprayed with copper fungicide, $5\frac{1}{2}$ lb per acre: July 28 and again Aug 8. Lifted: Sept 29. Variety: Majestic.

Rye.
Ploughed: Oct 8, 1952. 23 cwt ground chalk per acre applied: Oct 11. Autumn fertilizers applied: Oct 15. Seed drilled at 3 bushels per acre: Oct 29. Sulphate of ammonia applied: Apr 21, 1953. Harvested: Aug 10. Variety: King II.

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Woburn

Sugar beet.

Ploughed: Aug 19, 1952 and again Nov 11. Fertilizers applied: Mar 20, 1953. Seed drilled at 18 lb per acre: Mar 24. Dusted with D.D.T.: Apr 25. Singled: May 29. Lifted: Oct 20. Variety: Klein E.

Barley.

Ploughed: Nov 11, 1952. 25 cwt ground chalk per acre applied: Feb 23, 1953. Fertilizers applied and seed drilled at 3 bushels per acre: Mar 5. Harvested: Aug 13. Variety: Plumage Archer.

Clover.

Seed undersown in barley at 40 lb per acre: May 9, 1952. Autumn fertilizers applied: Jan 14, 1953. Sulphate of ammonia applied: Apr 20. Cut: June 25. Variety: Late flowering Montgomery Red.

Wheat.

Ploughed: July 9, 1952 and again Aug 20. Autumn fertilizers applied: Oct 9. Seed drilled at 3 bushels per acre: Oct 10. Sulphate of ammonia applied: Apr 21, 1953. Sprayed with D.N.O.C. 80 gallons per acre: May 26. Harvested: Aug 26. Variety: Squareheads Master 13/4.

Potatoes.

Ploughed: Aug 19, 1952 and again Nov 11. Ridged, fertilizers applied, potatoes planted: Apr 10, 1953. Sprayed with sulphuric acid, 15% B.O.V.: Sept 17. Lifted: Sept 24. Variety: Majestic.

Rye.

Cultivated: Oct 5, 1952. 25 cwt ground chalk per acre applied: Oct 9. Autumn fertilizers applied, seed drilled at 3 bushels per acre: Oct 11. Sulphate of ammonia applied: Apr 21, 1953. Harvested: Aug 13. Variety: King II.

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Summary of Results

Mean yields per acre and responses in yield per cwt of N, P_2O_5 and K_2O

	Rothamsted	Woburn	Rothamsted	Woburn
	Sugar Beet, roots (washed): tons per acre		Barley, grain: cwt per acre	
Mean	13.84	12.66	23.2	21.8
Response to: N	+1.32	+9.71	+22.8	+24.5
P	-1.57	-1.24	-4.3	+0.3
K	+1.71	+0.30	-0.4	+5.9
	Sugar Beet, sugar percentage		Barley, straw: cwt per acre	
Mean	18.07	17.27	25.0	29.0
Response to: N	+0.53	+1.67	+23.6	+25.1
P	-0.17	-0.71	-9.7	-0.7
K	+0.06	+0.28	+1.1	+6.8
	Sugar Beet, total sugar: cwt per acre		Clover, hay: dry matter cwt per acre	
Mean	50.0	43.8	35.3	33.6
Response to: N	+6.1	+37.5	+3.5	-2.0
P	-6.2	-6.3	+1.3	+7.3
K	+6.3	+1.7	+2.7	+8.9
	Sugar Beet, tops: tons per acre		Wheat, grain: cwt per acre	
Mean	8.41	7.14	34.1	6.0
Response to: N	+1.79	+9.27	+5.5	+10.6
P	-0.29	-1.53	-6.7	+0.6
K	+1.58	+0.70	-2.8	-2.8
	Sugar Beet, plant number: thousands per acre		Wheat, straw: cwt per acre	
Mean	26.6	*	58.1	12.7
Response to: N	-5.1		+20.9	+17.8
P	+3.7		-1.5	+4.5
K	+0.8		-2.3	-4.1
	Potatoes, total tubers: tons per acre		Rye, grain: cwt per acre	
Mean	10.95	10.16	26.7	16.8
Response to: N	+5.11	+5.04	+28.7	+27.0
P	+1.54	+2.57	+0.2	+2.3
K	-0.09	+1.83	-3.4	-2.4
	Potatoes, percentage ware		Rye, straw: cwt per acre	
Mean	88.9	90.0	38.0	26.1
Response to: N	-1.9	+1.0	+28.0	+36.7
P	-1.8	+5.9	-7.1	+9.4
K	-2.5	+2.5	+3.2	-0.8

*not recorded.

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53/Bb/1.1

DEEP CULTIVATION ROTATION EXPERIMENT

The 10th year

Deep ploughing, fertilizers and dung - Long Hoos I and II 1953.

For details of rotation and treatments, etc., see "Results of the Field Experiments, 1939-47" Vol. I, Section Bc/1.

Area of each plot: 0.0312 acre. Area harvested: Sugar beet (sub plot), 0.0119 acre; barley, wheat, spring oats, 0.0265 acre; ley, 0.0275 acre; potatoes (sub plot), 0.0107 acre.

Cultivations, etc.:

Sugar beet (Series 5)

Dung and fertilizers for ploughing in deep applied: Sept 9, 1952. Ploughed 'deep' plots: Oct 7. Dung and fertilizers for ploughing in shallow applied: Oct 8. Ploughed 'shallow' plots: Oct 16. Fertilizers for surface application broadcast: Mar 18, 1953. Seed drilled at 18 lb per acre: Mar 26. Sprayed with D.D.T. emulsion, 3 pints in 10 gallons: May 11. Singled: June 7. Lifted: Nov 16. Variety: Klein E.

Barley (Series 1)

Ploughed: Jan 25, 1953. 20 cwt ground chalk per acre applied: Jan 30. Basic slag applied: Feb 25. Sulphate of ammonia applied: Feb 26. Seed drilled at 3 bushels per acre: Feb 27. Harvested: Aug 10. Variety: Plumage Archer.

Ley (Series 6)

Seeds undersown in barley: Apr 18, 1952. Cut: June 29, 1953. Seeds mixture (per acre): 18 lb S.24 perennial ryegrass, 8 lb Montgomery Red clover, 2 lb American Alsike clover.

Wheat (Series 2)

Ploughed 'deep' and 'shallow' plots: Oct 8, 1952. Seed drilled at 3 bushels per acre: Oct 30. 2½ cwt sulphate of ammonia per acre applied: Apr 24, 1953. Harvested: Aug 15. Variety: Yeoman.

Potatoes (Series 3)

Dung and fertilizers for ploughing in deep applied: Sept 9, 1952. Ploughed 'deep' plots: Oct 7. Dung and fertilizers for ploughing in shallow applied: Oct 8. Ploughed 'shallow' plots: Oct 16. Ridged: Apr 20, 1953. Fertilizers applied in ridges, potatoes planted: Apr 21. Earthed up ridges: June 27. Sprayed with copper fungicide, 5½ lb per acre: Aug 8. Lifted: Sept 25. Variety: Majestic.

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Spring oats (Series 4)
Ploughed: Nov 11, 1952. 19 cwt ground chalk per acre applied: Jan 30, 1953. Basal sulphate of ammonia drilled: Feb 26.
Seed drilled at 3½ bushels per acre: Feb 27. Harvested: Aug 8.
Variety: Star.

Standard errors per plot:

Sugar beet,	Total sugar,	whole plot:	2.63 cwt per acre or 4.8%	(4 d.f.)
		sub-plot:	5.04 cwt per acre or 9.3%	(7 d.f.)
	Tops,	whole plot:	0.797 tons per acre or 7.6%	(4 d.f.)
		sub-plot:	0.861 tons per acre or 8.3%	(7 d.f.)
Barley,	Grain:		0.799 cwt per acre or 2.4%	(4 d.f.)
Ley,	Hay:		5.18 cwt per acre or 9.1%	(4 d.f.)
Wheat,	Grain:		0.707 cwt per acre or 1.6%	(4 d.f.)
Potatoes,	Total tubers,	whole plot:	1.702 tons per acre or 15.1%	(4 d.f.)
		sub-plot:	0.519 tons per acre or 4.6%	(7 d.f.)
Spring oats,	Grain:		1.89 cwt per acre or 7.3%	(4 d.f.)

Summary of Results

Series 5: Sugar Beet

Responses to treatments

Response to	Mean	Ploughing Shallow	Ploughing Deep	Dung Abs.	Dung Pres.	Phosphate Abs.	Phosphate Pres.	Potash Abs.	Potash Pres.
Roots (washed): Mean yield 15.49 tons per acre									
Ploughing deep-shallow	+2.28	-	-	+1.77	+2.79	+1.80	+2.76	+2.58	+1.98
Dung	+2.85	+2.34	+3.36	-	-	+2.98	+2.72	+2.51	+3.19
Phosphate	+0.13	-0.35	+0.61	+0.26	0.00	-	-	+0.25	+0.01
Potash	+0.60	+0.90	+0.30	+0.26	+0.94	+0.72	+0.48	-	-
Sugar Percentage: Mean 17.59									
Ploughing deep-shallow	-0.10	-	-	-0.08	-0.12	+0.07	-0.27	-0.06	-0.14
Dung	-0.29	-0.27	-0.31	-	-	-0.13	-0.45	-0.25	-0.33
Phosphate	+0.11	+0.28	-0.06	+0.27	-0.05	-	-	+0.15	+0.07
Potash	+0.17	+0.21	+0.13	+0.21	+0.13	+0.21	+0.13	-	-
Total Sugar: Mean yield 54.4 cwt per acre									
	(±1.32)					(±1.86)			
Ploughing deep-shallow	+7.7	-	-	+6.1	+9.3	+6.4	+9.0	+8.8	+6.6
Dung	+9.2	+7.6	+10.8	-	-	+10.2	+8.2	+8.0	+10.4
Phosphate	+0.6	-0.7	+1.9	+1.6	-0.4	-	-	+1.2	0.0
Potash	+2.6	+3.7	+1.5	+1.4	+3.8	+3.2	+2.0	-	-
Tops: Mean yield 10.43 tons per acre									
	(±0.399)					(±0.564)			
Ploughing deep-shallow	+1.32	-	-	+1.09	+1.55	+1.45	+1.19	+1.81	+0.83
Dung	+1.36	+1.13	+1.59	-	-	+1.24	+1.48	+0.71	+2.01
Phosphate	-0.01	+0.12	-0.14	-0.13	+0.11	-	-	+0.18	-0.20
Potash	+0.18	+0.67	-0.31	-0.47	+0.83	+0.37	-0.01	-	-
Plant Number: Mean 23.1 thousands per acre									
Ploughing deep-shallow	+2.6	-	-	+1.7	+3.5	+1.9	+3.3	+2.7	+2.5
Dung	+0.7	-0.2	+1.6	-	-	+0.9	+0.5	+0.2	+1.2
Phosphate	-0.9	-1.6	-0.2	-0.7	-1.1	-	-	-0.3	-1.5
Potash	+0.0	+0.1	-0.1	-0.5	+0.5	+0.6	-0.6	-	-
Noxious Nitrogen: Mean 28.4 mg. per 100 g.									
Ploughing deep-shallow	-0.6	-	-	+0.6	-1.8	+1.9	-3.1	-0.6	-0.6
Dung	0.0	+1.2	-1.2	-	-	-0.6	+0.6	+0.6	-0.6
Phosphate	+1.2	+3.7	-1.3	+0.6	+1.8	-	-	+0.6	+1.8
Potash	0.0	0.0	0.0	+0.6	-0.6	-0.6	+0.6	-	-

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Series 5: Sugar Beet

	Phosphate			Potash			
	None	Ploughed in	In seed bed	None	Ploughed in	In seed bed	Mean
Roots (washed): tons per acre							
Shallow	14.53	13.86	14.49	13.90	15.18	14.42	14.35
Deep	16.33	17.61	16.27	16.48	16.66	16.90	16.63
No Dung	13.94	14.03	14.36	13.94	14.17	14.22	14.06
Dung	16.92	17.44	16.40	16.45	17.67	17.11	16.92
Mean	15.43	15.73	15.38	15.19	15.92	15.66	15.49
Sugar Percentage							
Shallow	17.50	17.91	17.64	17.53	17.98	17.50	17.63
Deep	17.57	17.36	17.65	17.48	17.42	17.78	17.54
No Dung	17.60	17.80	17.94	17.63	17.77	17.90	17.73
Dung	17.47	17.48	17.34	17.38	17.62	17.38	17.44
Mean	17.53	17.64	17.64	17.50	17.70	17.64	17.59
Total Sugar: cwt per acre							
	(a)	(b) and (c)		(a)	(b) and (c)		
Shallow	50.9	49.6	51.0	48.7	54.5	50.5	50.6
Deep	57.3	61.0	57.4	57.5	58.1	60.0	58.3
No Dung	49.1	49.8	51.5	49.1	50.2	50.9	49.9
Dung	59.2	60.8	56.9	57.1	62.3	59.5	59.0
Mean	54.1	55.3	54.2	53.1	56.3	55.2	54.4
Tops: tons per acre							
	(a)	(b) and (c)		(a)	(b) and (c)		
Shallow	9.71	9.62	10.03	9.43	10.10	10.11	9.76
Deep	11.16	11.25	10.78	11.24	10.70	11.17	11.09
No Dung	9.81	9.68	9.68	9.98	9.32	9.71	9.75
Dung	11.05	11.19	11.13	10.69	11.48	11.56	11.11
Mean	10.43	10.44	10.41	10.34	10.40	10.64	10.43

Total Sugar (a) ±1.32 for use in comparisons other than horizontal.
(b) ±2.52 for use in horizontal comparisons.
(c) ±2.22 as (a).

Tops (a) ±0.399 for use in comparisons other than horizontal.
(b) ±0.430 for use in horizontal comparisons.
(c) ±0.502 as (a).

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Series 5: Sugar Beet

	Phosphate			Potash			
	None	Ploughed in	In seed bed	None	Ploughed in	In seed bed	Mean
Plant Number: thousands per acre							
Shallow	22.6	20.9	21.0	21.7	21.7	21.9	21.8
Deep	24.5	23.8	24.7	24.4	23.7	25.0	24.4
No Dung	23.1	21.5	23.2	23.0	21.3	23.6	22.7
Dung	24.0	23.2	22.4	23.2	24.1	23.3	23.4
Mean	23.5	22.4	22.8	23.1	22.7	23.4	23.1
Noxious Nitrogen: mg. per 100 g.							
Shallow	26.9	28.8	32.5	28.8	27.5	30.0	28.8
Deep	28.8	30.0	25.0	28.1	28.8	27.5	28.1
No Dung	28.1	30.0	27.5	28.1	28.8	28.8	28.4
Dung	27.5	28.8	30.0	28.8	27.5	28.8	28.4
Mean	27.8	29.4	28.8	28.4	28.1	28.8	28.4

Series 1: Barley

Responses to treatments to previous Sugar Beet

Response to	Mean	Ploughing		Dung		Phosphate		Potash	
		Shallow	Deep	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.
Grain: Mean yield 32.7 cwt per acre									
	(±0.40)					(±0.57)			
Ploughing deep-shallow	+1.0	-	-	+1.3	+0.7	+1.6	+0.4	+1.5	+0.5
Dung	+0.2	+0.5	-0.1	-	-	-0.2	+0.6	-1.0	+1.4
Phosphate	+1.2	+1.8	+0.6	+0.8	+1.6	-	-	+2.4	0.0
Potash	+0.9	+1.4	+0.4	-0.3	+2.1	+2.1	-0.3	-	-
Straw: Mean yield 47.9 cwt per acre									
Ploughing deep-shallow	+1.7	-	-	+1.8	+1.6	+0.2	+3.2	+2.7	+0.7
Dung	+5.4	+5.5	+5.3	-	-	+4.4	+6.4	+6.3	+4.5
Phosphate	-0.9	-2.4	+0.6	-1.9	+0.1	-	-	-0.4	-1.4
Potash	+2.2	+3.2	+1.2	+3.1	+1.3	+2.7	+1.7	-	-

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Series 6: Ley

Responses to treatments to previous Sugar Beet

Response to	Mean	Ploughing Shallow	Ploughing Deep	Dung Abs.	Dung Pres.	Phosphate Abs.	Phosphate Pres.	Potash Abs.	Potash Pres.
Hay: Mean yield 56.7 cwt per acre									
	(±2.59)				(±3.66)				
Ploughing deep-shallow	+1.1	-	-	+5.0	-2.8	+4.5	-2.3	+3.2	-1.0
Dung	+10.3	+14.2	+6.4	-	-	+8.8	+11.8	+15.3	+5.3
Phosphate	-1.0	+2.4	-4.4	-2.5	+0.5	-	-	-2.7	+0.7
Potash	+4.0	+6.1	+1.9	+9.0	-1.0	+2.3	+5.7	-	-
Series 2: Wheat*									
Grain: Mean yield 45.1 cwt per acre									
	(±0.35)				(±0.50)				
Ploughing deep-shallow	+1.1	-	-	+1.0	+1.2	+2.4	-0.2	+1.2	+1.0
Dung	+0.5	+0.4	+0.6	-	-	+1.2	-0.2	0.0	+1.0
Phosphate	0.0	+1.3	-1.3	+0.7	-0.7	-	-	+1.0	-1.0
Potash	+0.8	+0.9	+0.7	+0.3	+1.3	+1.8	-0.2	-	-
Straw: Mean yield 67.7 cwt per acre									
Ploughing deep-shallow	+2.3	-	-	+3.9	+0.7	+3.7	+0.9	+2.0	+2.6
Dung	+6.7	+8.3	+5.1	-	-	+7.3	+6.1	+7.5	+5.9
Phosphate	+1.1	+2.5	-0.3	+1.7	+0.5	-	-	+0.4	+1.8
Potash	+1.1	+0.8	+1.4	+1.9	+0.3	+0.4	+1.8	-	-
Series 3: Potatoes									
Total tubers: Mean yield 11.27 tons per acre									
	(±0.851)				(±1.204)				
Ploughing deep-shallow	-0.05	-	-	+0.16	-0.26	+0.30	-0.40	-0.22	+0.12
Dung	+5.30	+5.51	+5.09	-	-	+4.40	+6.20	+7.39	+3.21
Phosphate	+1.56	+1.91	+1.21	+0.66	+2.46	-	-	+1.32	+1.80
Potash	+3.24	+3.07	+3.41	+5.33	+1.15	+3.00	+3.48	-	-
Percentage Ware ($1\frac{1}{2}$" riddle): Mean 81.8									
Ploughing deep-shallow	0.0	-	-	+1.0	-1.0	0.0	0.0	-1.5	+1.5
Dung	+6.7	+7.7	+5.7	-	-	+1.5	+11.9	+12.4	+1.0
Phosphate	-1.1	-1.1	-1.1	-6.3	+4.1	-	-	-2.7	+0.5
Potash	+7.4	+5.9	+8.9	+13.1	+1.7	+5.8	+9.0	-	-

*Cultivation treatments direct to wheat, remainder to previous sugar beet.

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Series 3: Potatoes

	Phosphate			Potash			
	None	Ploughed in	In ridges	None	Ploughed in	In ridges	Mean
Total Tubers: tons per acre							
	(a)	(b) and (c)		(a)	(b) and (c)		
Shallow	10.34	12.04	12.45	9.76	12.17	13.49	11.29
Deep	10.64	11.90	11.79	9.53	12.47	13.42	11.24
No Dung	8.29	8.69	9.20	5.95	10.60	11.96	8.62
Dung	12.69	15.25	15.64	13.34	14.04	14.95	13.92
Mean	10.49	11.97	12.12	9.65	12.32	13.46	11.27
Percentage Ware ($1\frac{1}{2}$" riddle)							
Shallow	82.3	81.8	80.7	78.8	83.8	35.7	81.8
Deep	82.4	84.8	77.8	77.4	85.0	87.6	81.8
No Dung	81.6	78.8	71.9	71.9	83.4	86.6	78.4
Dung	83.1	87.8	86.6	84.3	85.4	86.8	85.2
Mean	82.3	83.3	79.3	78.1	84.4	86.6	81.8

Total tubers (a) ±0.851 for use in comparisons other than horizontal.
(b) ±0.260 for use in horizontal comparisons.
(c) ±0.871 as (a).

Series 4: Spring Oats

		Responses to treatments to previous potatoes.							
		Ploughing		Dung		Phosphate		Potash	
Response to	Mean	Shallow	Deep	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.
Grain: Mean yield 26.0 cwt per acre									
	(±0.94)			(±1.33)					
Ploughing deep-shallow	-3.2	-	-	-1.7	-4.7	-2.2	-4.2	-2.1	-4.3
Dung	+1.0	+2.5	-0.5	-	-	-0.1	+2.1	+0.3	+1.7
Phosphate	+2.4	+3.4	+1.4	+1.3	+3.5	-	-	+0.2	+4.6
Potash	-0.5	+0.6	-1.6	-1.2	+0.2	-2.7	+1.7	-	-
Straw: Mean yield 38.1 cwt per acre									
Ploughing deep-shallow	-1.3	-	-	-2.5	-1.1	-0.3	-2.3	-0.9	-2.7
Dung	+2.3	+2.1	+3.5	-	-	+1.2	+4.4	+2.6	+3.0
Phosphate	+1.4	+2.4	+0.4	-0.2	+3.0	-	-	-0.6	+3.4
Potash	-0.3	+0.6	-1.2	-0.5	-0.1	-2.3	+1.7	-	-

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LEY AND ARABLE ROTATIONS

Highfield and Fosters Field 1953 - the 5th year.

For details of treatments, rotation, etc., see "Results of the Field Experiments 1952", Section Bc/1.

Cultivations, etc.:

HIGHFIELD

1st year Treatment Crops

Cut grass, Grazed ley, Lucerne, Hay. Ploughed (not hay plots): Aug 16, 1952, Oct 4 and Nov 18. Basal dressing applied: Mar 23, 1953.

Cut grass: Nitrochalk applied, seeds hand sown at 38 lb per acre: Mar 25. Cut: 5 times, June 20, July 7, July 30, Aug 18, Oct 15. Nitrochalk applied after each cut except the last.
Grazed ley: Nitrochalk applied, seeds hand sown at 55 lb per acre: Mar 25. Nitrochalk applied: July 24. Grazed: 9 circuits, June 7 - Sept 27.
Lucerne: Seed drilled at 28 lb per acre: Mar 25. Cut twice: July 28 and Oct 15. Variety: Du Puits.
Hay: Seeds undersown in barley at 38 lb per acre: Apr 9, 1952. Crop failed. Seeds resown: Aug 29. Nitrochalk applied: Mar 27, 1953. Cut: June 11.

2nd year Treatment Crops

Cut grass, Grazed ley, Lucerne, Potatoes. Basal dressing to leys applied: Dec 18, 1952.

Cut grass: Nitrochalk applied: Mar 27, 1953 and after each cut except the last. Cut 5 times: May 5, May 29, July 7, Aug 7, Oct 15.
Grazed ley: Nitrochalk applied: Mar 27, 1953 and July 24. Grazed: 11 circuits, Apr 15 - Oct 1.
Lucerne: Cut: 3 times, July 3, Aug 18, Oct 15.
Potatoes: For cultivations see Potato Test Crop.

3rd year Treatment Crops

Cut grass, Grazed ley, Lucerne, Barley. Basal dressing to leys applied: Dec 18, 1952.

Cut grass: Nitrochalk applied: Mar 27, 1953 and after each cut except the last. Cut: 5 times, May 5, May 29, July 7, Aug 7, Oct 15.
Grazed ley: Nitrochalk applied: Mar 27, 1953 and July 24. Grazed: 11 circuits, Apr 19 - Oct 5.
Lucerne: Cut: 3 times, July 3, Aug 18, Oct 15.
Barley: For cultivations see Barley Test Crop.

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1st Test Crop, Wheat

Ploughed: Aug 16, 1952 and again Oct 4. Ploughed leys: Oct 4. Seed drilled at 3 bushels per acre with basal dressing: Oct 31. Nitrochalk applied: Apr 24, 1953. Harvested: Aug 14. Variety: Yeoman.

2nd Test Crop, Potatoes

Ploughed: Wheat stubble Aug 20, 1952, hay plots (treatment crop) Aug 28. Ploughed all plots: Nov 18. Ridged, basal dressing, dung, sulphate of ammonia applied, potatoes planted: Apr 8, 1953. Earthed up: June 24. Sprayed with copper fungicide: 5½ lb in 40 gallons July 28, 5½ lb in 10 gallons Aug 8. Lifted: Sept 30. Variety: Majestic.

3rd Test Crop, Barley

Ploughed: Nov 15, 1952. Ground chalk applied at 19½ cwt per acre to blocks 10 and 11: Feb 25, 1953. Seed drilled at 3 bushels per acre with basal dressing: Feb 28. Nitrochalk applied: Mar 2. Harvested: Aug 18. Variety: Plumage Archer.

Permanent Grasses

3rd year Reseeded and Permanent Grass.

Basal dressing applied: Dec 18, 1952. Ground chalk applied at 19½ cwt per acre to blocks 10 and 11: Feb 25, 1953. Nitrochalk applied: Mar 27. Cut: June 11-16. Nitrochalk applied: June 17. Grazed: 4 circuits, July 5 - Sept 23.

4th year Reseeded and Permanent Grass.

Basal dressing applied: Dec 18, 1952. Nitrochalk applied: Mar 27, 1953 and July 24. Grazed: 7 circuits, Apr 23 - Sept 7.

5th year Reseeded and Permanent Grass.

Basal dressing applied: Dec 18, 1952. Nitrochalk applied: Mar 27, 1953 and July 24. Grazed: 8 circuits, Apr 15 - Sept 15.

FOSTERS

1st year Treatment Crops

Cut grass, Grazed ley, Lucerne, Hay. Ploughed (not hay plots): Aug 8, 1952, Oct 8 and Nov 13. Basal dressing applied: Mar 23, 1953.

Cut grass: Nitrochalk applied, seeds hand sown at 38 lb per acre: Mar 25. Cut: 5 times, June 21, July 8, July 30, Aug 21, Oct 16. Nitrochalk applied after each cut except the last.

Grazed ley: Nitrochalk applied, seeds sown at 55 lb per acre: Mar 25. Nitrochalk applied: July 24. Grazed: 5 circuits, June 20 - Sept 22.

Lucerne: Seed drilled at 28 lb per acre: Mar 25. Cut twice: July 29 and Oct 16. Variety: Du Puits.

Hay: Seeds undersown in barley at 38 lb per acre: Apr 18, 1952. Crop failed. Ploughed, seeds resown: Aug 29. Nitrochalk applied: Mar 26, 1953. Cut: June 10.

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2nd year Treatment Crops

Cut grass, Grazed ley, Lucerne, Potatoes. Basal dressing to leys applied: Dec 13, 1952.

Cut grass: Nitrochalk applied: Mar 26, 1953 and after each cut except the last. Cut: 5 times, May 11, June 10, July 8, Aug 7, Oct 16.
Grazed ley: Nitrochalk applied: Mar 26, 1953 and July 27. Grazed: 9 circuits, May 2 - Sept 30.
Lucerne: Cut: 3 times, July 6, Aug 17, Oct 16.
Potatoes: For cultivations see Potato Test Crop.

3rd year Treatment Crops

Cut grass, Grazed ley, Lucerne, Barley.

Cut grass: Basal dressing applied: Dec 13, 1952. Nitrochalk applied: Mar 26, 1953 and after each cut except the last. Cut: 5 times, May 11, June 10, July 8, Aug 7, Oct 14.
Grazed ley: Basal dressing applied: Dec 13, 1952. Nitrochalk applied: Mar 26, 1953 and July 24. Grazed: 8 circuits, May 6 - Sept 26.
Lucerne: Basal dressing applied: Dec 15, 1952. Cut: 3 times, July 6, Aug 17, Oct 14.
Barley: For cultivations see Barley Test Crop.

1st Test Crop, Wheat

Ploughed: Aug 7, 1952 and again Oct 8. Ploughed leys: Sept 29. Seed drilled at 3 bushels per acre with basal dressing: Oct 30. Nitrochalk applied: Apr 24, 1953. Harvested: Aug 13. Variety: Yeoman.

2nd Test Crop, Potatoes

Ploughed: Wheat stubble Aug 8, 1952, hay plots (treatment crop) Aug 29. Ploughed all plots: Oct 8 and Nov 14. Ridged, basal dressing applied: Mar 31, 1953. Dung, sulphate of ammonia applied, potatoes planted: Apr 1. Earthed up: June 24. Sprayed with copper fungicide: 5½ lb in 40 gallons July 28, 5½ lb in 10 gallons Aug 8. Pulverized haulms: Sept 14. Lifted: Sept 29. Variety: Majestic.

3rd Test Crop, Barley

Ploughed: Nov 10, 1952. Seed drilled at 3 bushels per acre with basal dressing: Feb 28, 1953. Nitrochalk applied: Mar 2. Harvested: Aug 12. Variety: Plumage Archer.

Permanent Grasses

3rd year Reseeded Grass.

Basal dressing applied: Dec 13, 1952. Nitrochalk applied: Mar 26, 1953. Cut: June 10. Nitrochalk applied: June 13. Grazed: 4 circuits, July 2-Sept 28.

https://doi.org/10.23637/ERADOC-1-173

4th year Reseeded Grass.
Basal dressing applied: Dec 13, 1952. Nitrochalk applied: Mar 26, 1953 and July 24. Grazed: 6 circuits, May 2 - Sept 26.

5th year Reseeded Grass.
Basal dressing applied: Dec 13, 1952. Nitrochalk applied: Mar 26, 1953 and July 24. Grazed: 9 circuits, May 2 - Oct 2.

Standard errors per $\frac{1}{4}$ plot. Test crops.

Wheat, grain	Highfield:	1.12 cwt per acre or 2.9% (13 d.f.)
	Fosters:	2.44 cwt per acre or 6.4% (11 d.f.)*
Potatoes, total tubers.	Highfield:	0.888 tons per acre of 5.9% (15 d.f.)
	Fosters:	0.605 tons per acre or 5.4% (15 d.f.)
Barley, grain.	Highfield:	1.48 cwt per acre or 8.2% (21 d.f.)
	Fosters:	1.29 cwt per acre or 4.2% (21 d.f.)

*2 missing sub plot values

Erratum to Results of the Field Experiments 1952, page 52/Bc/1.7.
Delete all standard errors except those of the differences of means of two levels of N.

https://doi.org/10.23637/ERADOC-1-173

Summary of Results

Wheat 1st test crop

Grain: cwt per acre

cwt N per acre	Previous rotation 1950, 1951, 1952 Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
Mean	41.8	38.6	31.6	44.5	39.2
To test crop					
0.3	42.9	39.4	34.1	44.8	40.3
0.6	40.7	37.8	29.2	44.3	38.0
Difference (±0.79)	-2.2	-1.6	-4.9	-0.5	-2.3 (±0.39)
To treatment crops					
Single rate		39.7	32.4	45.2	39.1
Double rate		37.5	30.8	43.9	37.4
Difference (±0.79)		-2.2	-1.6	-1.3	-1.7 (±0.46)
Fosters					
Mean	41.3	37.2	37.4	36.3	38.0
To test crop					
0.3	38.9	36.2	37.3	34.8	36.8
0.6	43.7	38.1	37.5	37.7	39.3
Difference (±1.73)	+4.8	+1.9	+0.2	+2.9	+2.5 (±0.86)
To treatment crops					
Single rate		38.0	38.9	35.5	37.5
Double rate		36.3	35.9	37.0	36.4
Difference (±1.73)		-1.7	-3.0	+1.5	-1.1 (±1.00)

https://doi.org/10.23637/ERADOC-1-173

Wheat 1st test crop

Grain: cwt per acre

cwt N per acre	Excluding Lucerne: N to previous treatment crop: Single rate	Excluding Lucerne: N to previous treatment crop: Double rate	Excluding Lucerne: Mean	Arable with hay only: Dung: tons per acre to potatoes 1951: None	Arable with hay only: Dung: tons per acre to potatoes 1951: 12	Arable with hay only: Mean
Highfield						
To test crop	(±0.46)		(±0.32)	(±0.79)		(±0.56)
0.3	41.1	37.8	39.4	45.4	44.1	44.8
0.6	37.1	37.1	37.1	42.4	46.2	44.3
Mean	39.1	37.4	38.3	43.9	45.2	44.5
	(±0.32)			(±0.56)		
To previous treatment crops				(±0.79)		(±0.56)
Single rate				43.9	46.5	45.2
Double rate				44.0	43.8	43.9
Mean				43.9	45.2	44.5
				(±0.56)		
Fosters						
To test crop	(±1.00)		(±0.70)	(±1.73)		(±1.22)
0.3	36.1	36.1	36.1	33.5	36.1	34.8
0.6	38.8	36.7	37.8	37.8	37.7	37.7
Mean	37.5	36.4	36.9	35.6	36.9	36.3
	(±0.70)			(±1.22)		
To previous treatment crops				(±1.73)		(±1.22)
Single rate				35.0	36.0	35.5
Double rate				36.2	37.8	37.0
Mean				35.6	36.9	36.3
				(±1.22)		

https://doi.org/10.23637/ERADOC-1-173

Wheat 1st test crop

Straw: cwt per acre

cwt N per acre	Previous rotation 1950, 1951, 1952 Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
Mean	72.6	65.2	50.5	77.0	66.3
To test crop					
0.3	71.2	64.0	52.5	74.9	65.7
0.6	74.1	66.4	48.6	79.1	67.0
Difference	+2.9	+2.4	-3.9	+4.2	+1.3
To treatment crops					
Single rate		65.3	53.4	77.5	65.4
Double rate		65.1	47.6	76.6	63.1
Difference		-0.2	-5.8	-0.9	-2.3
Fosters					
Mean	67.2	65.2	60.6	63.8	64.2
To test crop					
0.3	65.6	60.2	58.7	61.5	61.5
0.6	68.8	70.2	62.5	66.0	66.9
Difference	+3.2	+10.0	+3.8	+4.5	+5.4
To treatment crops					
Single rate		67.8	63.2	63.1	64.7
Double rate		62.7	58.0	64.5	61.7
Difference		-5.1	-5.2	+1.4	-3.0

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Wheat 1st test crop

Straw: cwt per acre

cwt N per acre	Excluding Lucerne: N to previous treatment crop: Single rate	Excluding Lucerne: N to previous treatment crop: Double rate	Excluding Lucerne: Mean	Arable with hay only: Dung: tons per acre to potatoes 1951: None	Arable with hay only: Dung: tons per acre to potatoes 1951: 12	Arable with hay only: Mean
Highfield						
To test crop						
0.3	65.7	62.0.	63.8	69.8	80.1	74.9
0.6	65.1	64.2	64.7	77.5	80.7	79.1
Mean	65.4	63.1	64.2	73.6	80.4	77.0
To previous treatment crops						
Single rate				74.7	80.2	77.5
Double rate				72.6	80.6	76.6
Mean				73.6	80.4	77.0
Fosters						
To test crop						
0.3	60.2	60.1	60.2	60.7	62.3	61.5
0.6	69.2	63.3	66.2	61.2	70.8	66.0
Mean	64.7	61.7	63.2	61.0	66.6	63.8
To previous treatment crops						
Single rate				59.9	66.3	63.1
Double rate				62.1	66.9	64.5
Mean				61.0	66.6	63.8

https://doi.org/10.23637/ERADOC-1-173

Potatoes 2nd test crop

Total tubers: tons per acre

	Previous rotation 1949, 1950, 1951				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
N: cwt per acre					
0.5	14.02	14.93	14.34	16.56	14.96
1.0	15.07	15.90	14.26	15.96	15.30
Difference (±0.628)	+1.05	+0.97	-0.08	-0.60	+0.34 (±0.314)
Dung: tons per acre					
None	12.27	14.00	11.73	15.06	13.27
12	16.81	16.82	16.87	17.47	16.99
Difference (±0.628)	+4.54	+2.82	+5.14	+2.41	+3.72 (±0.314)
Mean	14.54	15.41	14.30	16.26	15.13
Fosters					
N: cwt per acre					
0.5	11.63	11.17	9.82	11.58	11.05
1.0	12.47	11.99	10.49	11.35	11.58
Difference (±0.428)	+0.84	+0.82	+0.67	-0.23	+0.53 (±0.214)
Dung: tons per acre					
None	10.00	10.44	8.71	10.51	9.91
12	14.11	12.72	11.60	12.42	12.71
Difference (±0.428)	+4.11	+2.28	+2.89	+1.91	+2.80 (±0.214)
Mean	12.05	11.58	10.16	11.46	11.31

	Highfield N: cwt per acre		Fosters N: cwt per acre	
	0.5	1.0	0.5	1.0
	(±0.314)		(±0.214)	
Dung: tons per acre				
None	13.24	13.29	9.86	9.96
12	16.68	17.31	12.23	13.19

https://doi.org/10.23637/ERADOC-1-173

Potatoes 2nd test crop

Percentage Ware

	Previous rotation 1949, 1950, 1951				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
N: cwt per acre					
0.5	88.0	80.8	80.5	84.7	83.5
1.0	85.5	81.0	77.5	82.9	81.7
Difference	-2.5	+0.2	-3.0	-1.8	-1.8
Dung: tons per acre					
None	84.0	79.8	79.1	86.4	82.3
12	89.5	82.0	79.0	81.1	82.9
Difference	+5.5	+2.2	-0.1	-5.3	+0.6
Mean	86.7	80.9	79.0	83.8	82.6
Fosters					
N: cwt per acre					
0.5	89.8	81.2	87.0	82.4	85.1
1.0	86.5	86.0	87.8	84.5	86.2
Difference	-3.3	+4.8	+0.8	+2.1	+1.1
Dung: tons per acre					
None	89.4	82.6	87.6	82.0	85.4
12	86.9	84.6	87.2	84.9	85.9
Difference	-2.5	+2.0	-0.4	+2.9	+0.5
Mean	88.1	83.6	87.4	83.4	85.6

	Highfield N: cwt per acre		Fosters N: cwt per acre	
	0.5	1.0	0.5	1.0
Dung: tons per acre				
None	83.6	81.0	84.6	86.2
12	83.4	82.4	85.6	86.2

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Barley 3rd test crop (not yet in full cycle)

Dung to potatoes 1952: tons per acre	N: cwt per acre to test crop 0.2	0.4	Mean	Dung to potatoes 1952: tons per acre	N: cwt per acre to test crop 0.2	0.4	Mean
	Highfield				Fosters		
Grain (at 85% Dry Matter): cwt per acre				Grain: cwt per acre			
	(±0.52)		(±0.37)		(±0.46)		(±0.32)
None	18.2	16.9	17.6	None	29.9	30.2	30.1
12	18.6	18.3	18.5	12	30.7	30.8	30.8
Mean (±0.37)	18.4	17.6	18.0	Mean (±0.32)	30.3	30.5	30.4
				Straw: cwt per acre			
				None	33.0	41.2	37.1
				12	37.4	43.0	40.2
				Mean	35.2	42.1	38.7

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Treatment crops Arable and Hay rotation

(values based on Mean of 2 sub plots only)

	Highfield N: cwt per acre applied in 1953			Fosters N: cwt per acre applied in 1953		
	Single rate	Double rate	Mean	Single rate	Double rate	Mean
Hay (dry matter): cwt per acre						
No dung	59.8	68.8	64.3	22.1	41.6	31.8
Dung in 1951	56.5	52.9	54.7	27.3	45.1	36.2
Mean	58.2	60.8	59.5	24.7	43.4	34.0
Potatoes, total tubers: tons per acre						
No dung	11.65	13.46	12.56	10.07	10.32	10.19
Dung in 1953	15.74	16.00	15.87	11.82	12.08	11.95
Mean	13.70	14.73	14.21	10.94	11.20	11.07
Potatoes, percentage ware						
No dung	78.8	85.2	82.0	84.6	88.4	86.6
Dung in 1953	85.2	84.0	84.6	84.8	87.7	86.2
Mean	82.0	84.6	83.3	84.7	88.1	86.4
Barley, grain (at 85% dry matter): cwt per acre				**Barley, grain: cwt per acre**		
No dung	15.6	15.5	15.6	32.1	31.1	31.6
Dung in 1952	19.1	15.0	17.0	32.3	30.7	31.5
Mean	17.3	15.3	16.3	32.2	30.9	31.5
				Barley, straw: cwt per acre		
No dung	No yields of straw recorded			37.5	41.5	39.5
Dung in 1952				38.3	45.2	41.8
Mean				37.9	43.4	40.6

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53/Bc/1.13

Cut grass

Dry Matter: cwt per acre

1st year	Highfield N: to previous 3 test crops Single rate	Highfield N: to previous 3 test crops Double rate	Highfield Dung to potatoes 1951 tons per acre None	Highfield Dung to potatoes 1951 tons per acre 12	Highfield Mean	Fosters N: to previous 3 test crops Single rate	Fosters N: to previous 3 test crops Double rate	Fosters Dung to potatoes 1951 tons per acre None	Fosters Dung to potatoes 1951 tons per acre 12	Fosters Mean
N(1) to cut grass										
Single rate	75.1	71.4	71.0	75.5	73.2	40.8	45.2	43.1	42.9	43.0
Double rate	75.5	81.8	72.1	85.2	78.7	47.5	52.5	50.2	49.7	50.0
N to test crops										
Single rate			71.1	79.5	75.3			44.6	43.7	44.1
Double rate			72.0	81.2	76.6			48.8	48.9	48.8
Mean			71.6	80.3	75.9			46.7	46.3	46.5

	Highfield N to cut grass (1) Single rate	Highfield N to cut grass (1) Double rate	Highfield Mean	Fosters N to cut grass (1) Single rate	Fosters N to cut grass (1) Double rate	Fosters Mean
2nd year (5 cuts)	66.9	79.2	73.1	71.3	83.2	77.2
3rd year (5 cuts)	63.2	73.2	68.2	62.8	71.1	67.0

(1) 0.15 v. 0.3 cwt N as Nitrochalk for every cut.

Lucerne

Dry Matter: cwt per acre

1st year (2 cuts)	Highfield N to 3 previous test crops Single rate	Highfield N to 3 previous test crops Double rate	Highfield Mean	Fosters N to 3 previous test crops Single rate	Fosters N to 3 previous test crops Double rate	Fosters Mean
Dung to potatoes 1951						
None	58.3	59.0	58.7	42.6	41.1	41.8
12 tons	57.6	60.7	59.2	43.7	48.3	46.0
Mean	58.0	59.9	58.9	43.1	44.7	43.9

	Highfield	Fosters
2nd year (3 cuts)	Mean 103.1	Mean 107.3
3rd year (3 cuts)	Mean 84.7	Mean 113.2

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Grazed Ley

Dry Matter: cwt per acre (estimated from sampling cuts)

	Highfield N: cwt per acre (yearly)			Fosters N: cwt per acre (yearly)		
	Single rate 0.15	Double rate 0.30	Mean	Single rate 0.15	Double rate 0.30	Mean
1st year	41.1	47.4	44.3	31.7	31.3	31.5
2nd year	64.9	62,8	63.8	60.4	54.1	57.3
3rd year	61.5	63.4	62.4	51.1	51.6	51.4

Reseeded Grass

Dry Matter: cwt per acre

	Cut for hay N			Grazed Estimated from sampling cuts N		
	Single rate	Double rate	Mean	Single rate	Double rate	Mean
Highfield						
4th year, grazing				42.7	50.5	46.6
5th year, grazing				54.9	58.0	56.4
3rd year, hay	53.2	57.5	55.3	31.7*	33.0*	32.4*
Fosters						
4th year, grazing				40.2	39.9	40.0
5th year, grazing				40.4	40.6	40.5
3rd year, hay	40.4	40.5	40.4	30.4*	31.8*	31.1*

Permanent Grass

Dry Matter: cwt per acre

Highfield

Grazing, Blocks 5-8				33.1	40.4	36.8
Grazing, Blocks 1-4				40.0	45.1	42.5
Hay, Blocks 9-12	35.5	39.7	37.6	37.5	35.3	36.4

*Aftermath grazing.

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53/Bd/1.1

GREEN MANURING EXPERIMENT

Woburn Stackyard - 1953, the 17th year

For details of treatments etc. see "Results of Field Experiments 1939-47" Vol. I, Section Be/1. Since 1950 the fallow, lupin and ryegrass plots of the cabbage crop have been split into two for early and late planting.

Cultivations, etc.:

Green manures. Clover and ryegrass undersown in barley: Apr 17, 1952. Ploughed fallow, lupin and rape plots: Aug 29, 1952 and Jan 7, 1953. Sulphate of ammonia applied to clover, rape and ryegrass plots, rape sown: Mar 27. Sulphate of ammonia applied to fallow and lupin plots: Mar 28. Lupins drilled: Mar 31. Rape dusted with D.D.T.: May 5 and May 9.

Cabbages. Dung and straw applied to fallow, clover and ryegrass plots, and ploughed in: June 4, 1953. Dung and straw applied to lupin and rape plots, ploughed in: June 15. Basal fertilizers applied: June 18. Cabbages planted and watered in (calomel treated): June 20. Harvested: Dec 2, 1953-Feb 24, 1954.

Barley. Ploughed: Mar 11, 1953. 29½ cwt ground chalk per acre applied: Mar 15. Sulphate of ammonia applied, seed drilled at 3 bushels per acre: Mar 16. Clover and ryegrass undersown: Apr 24. Harvested: Aug 14. Variety: Plumage Archer.

Note: Because of weather conditions it was not possible to plant the 'early' cabbages and all cabbages were therefore planted on the same date.

Standard errors per plot:

Cabbages, weight of headed cabbages: 1.04 tons per acre or 14.8% (9 d.f.)

Barley, grain: 1.62 cwt per acre or 5.6% (9 d.f.)

https://doi.org/10.23637/ERADOC-1-173

Summary of Results

Cabbages

	Green manure					
	None	Lupins	Clover	Rape	Rye-grass	Mean
Weight of headed cabbages: tons per acre						
			(±0.522)			(±0.234)
No dung	6.28	7.15	8.68	4.79	2.38	5.86
Dung	8.83	9.66	11.75	6.56	4.63	8.28
No straw	7.15	8.49	10.87	6.23	3.78	7.31
Straw	7.96	8.31	9.56	5.11	3.23	6.84
Sulph. amm.						
2 cwt per acre	6.18	7.82	8.35	5.67	2.55	6.11
4 cwt per acre	8.94	8.99	12.08	5.67	4.45	8.03
Sulph. amm. to green manure						
Low	7.46	8.24	9.72	5.56	3.11	6.82
High	7.66	8.56	10.71	5.78	3.90	7.32
Mean (±0.369)	7.56	8.40	10.22	5.67	3.50	7.07
Total produce: tons per acre						
No dung	8.16	8.67	10.20	6.70	4.57	7.66
Dung	10.22	11.04	13.22	8.41	6.56	9.89
No straw	8.89	10.12	12.21	7.92	5.84	9.00
Straw	9.49	9.59	11.21	7.18	5.30	8.55
Sulph. amm.						
2 cwt per acre	8.12	9.32	9.99	7.32	4.67	7.88
4 cwt per acre	10.26	10.39	13.43	7.79	6.46	9.67
Sulph. amm. to green manure						
Low	9.29	9.95	11.38	7.34	5.21	8.63
High	9.09	9.76	12.04	7.77	5.93	8.92
Mean	9.19	9.86	11.71	7.55	5.57	8.78
Headed cabbages as percentage of total number						
No dung	56.6	66.0	70.8	52.7	29.4	55.1
Dung	70.3	75.0	78.2	61.2	50.2	67.0
No straw	60.3	70.3	76.5	61.5	40.8	61.9
Straw	66.6	70.7	72.4	52.4	38.8	60.2
Sulph. amm.						
2 cwt per acre	55.5	69.7	69.6	59.8	30.2	57.0
4 cwt per acre	71.4	71.3	79.4	54.1	49.4	65.1
Sulph. amm. to green manure						
Low	62.9	66.2	70.3	57.2	37.2	58.8
High	64.0	74.8	78.6	56.6	42.4	63.3
Mean	63.4	70.5	74.5	56.9	39.8	61.0

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53/Bd/1.3

Cabbages

Differential Responses

Response to	Mean	Dung Abs.	Dung Pres.	Straw Abs.	Straw Pres.	Sulph. amm. cwt per acre 2	Sulph. amm. cwt per acre 4	Sulph. amm. to green manure Low	Sulph. amm. to green manure High
Weight of headed cabbages: tons per acre									
	(±0.330)					(±0.472)			
Dung	+2.43	-	-	+2.63	+2.23	+2.64	+2.22	+2.42	+2.44
Straw	-0.47	-0.27	-0.67	-	-	-0.82	-0.12	-1.10	+0.16
Sulph. amm.	+1.91	+2.12	+1.70	+1.56	+2.26	-	-	+2.82	+1.00
Sulph. amm. to green manure	+0.50	+0.49	+0.51	-0.13	+1.13	+1.41	-0.41	-	-
Total produce: tons per acre									
Dung	+2.23	-	-	+2.36	+2.10	+2.37	+2.09	+2.24	+2.22
Straw	-0.44	-0.31	-0.57	-	-	-0.62	-0.26	-1.01	+0.13
Sulph. amm.	+1.78	+1.92	+1.64	+1.60	+1.96	-	-	+2.45	+1.11
Sulph. amm. to green manure	+0.28	+0.29	+0.27	-0.29	+0.85	+0.95	-0.39	-	-
Headed cabbages as percentage of total number									
Dung	+11.9	-	-	+12.8	+11.0	+15.0	+8.8	+11.9	+11.9
Straw	-1.7	-0.8	-2.6	-	-	-3.3	-0.1	-3.6	+0.2
Sulph. amm.	+8.1	+11.2	+5.0	+6.5	+9.7	-	-	+12.4	+3.8
Sulph. amm. to green manure	+4.5	+4.5	+4.5	+2.6	+6.4	+8.8	+0.2	-	-

https://doi.org/10.23637/ERADOC-1-173

Barley

	Green manure					
	None	Lupins	Clover	Rape	Rye-grass	Mean
Grain: cwt per acre						
			(±0.81)			(±0.36)
No dung to cabbages 1952	24.0	29.7	30.6	26.5	28.0	27.8
Dung to cabbages	31.0	29.8	31.7	30.3	30.2	30.6
No straw to cabbages 1952	28.3	29.6	30.9	27.8	28.5	29.0
Straw to cabbages	26.7	30.0	31.4	29.0	29.7	29.4
Sulph. amm. to cabbages 1952						
2 cwt per acre	27.1	29.1	31.4	27.6	28.0	28.7
4 cwt per acre	27.8	30.4	30.9	29.2	30.2	29.7
Sulph. amm. to barley						
Nil	24.5	29.4	31.7	25.7	28.7	28.0
1½ cwt per acre	30.4	30.2	30.6	31.1	29.5	30.4
Mean (±0.57)	27.5	29.8	31.1	28.4	29.1	29.2
Straw: cwt per acre						
No dung to cabbages 1952	31.0	41.2	42.6	36.0	37.1	37.6
Dung to cabbages	44.6	46.6	51.?	47.6	48.4	47.6
No straw to cabbages 1952	38.2	44.1	46.2	42.2	40.8	42.3
Straw to cabbages	37.5	43.8	47.5	41.4	44.7	43.0
Sulph. amm. to cabbages 1952						
2 cwt per acre	36.8	41.6	45.4	39.3	41.4	40.9
4 cwt per acre	38.3	46.3	43.2	44.4	44.1	44.4
Sulph. amm. to barley						
Nil	29.8	38.7	44.9	33.9	36.8	36.8
1½ cwt per acre	45.9	49.2	43.8	49.3	48.7	48.5
Mean	37.8	43.9	46.8	41.8	42.7	42.6

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Barley

Differential Responses

Response to	Mean	Dung to cabbages Abs.	Dung to cabbages Pres.	Straw to cabbages Abs.	Straw to cabbages Pres.	Sulph. amm. to cabbages cwt per acre 2	Sulph. amm. to cabbages cwt per acre 4	Sulph. amm. to barley cwt per acre 0	Sulph. amm. to barley cwt per acre 1½
Grain: cwt per acre									
	(±0.51)			(±0.73)					
Dung to cabbages 1952	+2.8	-	-	+3.7	+1.9	+4.2	+1.4	+4.4	+1.2
Straw to cabbages 1952	+0.3	+1.2	-0.6	-	-	+1.5	-0.9	-0.1	+0.7
Sulph. amm. to cabbages 1952	+1.1	+2.5	-0.3	+2.3	-0.1	-	-	+2.2	0.0
Sulph. amm. to barley	+2.4	+4.0	+0.8	+2.0	+2.8	+3.5	+1.3	-	-
Straw: cwt per acre									
Dung to cabbages 1952	+10.0	-	-	+10.3	+9.7	+13.3	+6.7	+9.3	+10.7
Straw to cabbages 1952	+0.7	+1.0	+0.4	-	-	+2.5	-1.1	-1.3	+2.7
Sulph. amm. to cabbages 1952	+3.5	+6.8	+0.2	+5.3	+1.7	-	-	+6.5	+0.5
Sulph. amm. to Barley	+11.7	+11.0	+12.4	+9.7	+13.7	+14.7	+8.7	-	-

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53/Be/1.1

LEY AND ARABLE ROTATIONS

Woburn Stackyard - 1953, the 16th year.

For details of rotations and treatments etc., see "Results of Field Experiments" 1939-47 Vol.I, Section Bf/1, with the exception that in 1949 and subsequently Rye replaced Wheat.

Cultivations, etc.:

Treatment crops

Ley rotations

Ley 1st year. Ploughed: Aug 26, 1952 and Nov 24. Basal fertilizers applied: Apr 1, 1953. Seeds sown: Apr 9. Grazed by sheep: 5 circuits - June 25-July 3, July 19-27, Aug 12-19, Sept 7-15 and Oct 6-14. Seeds mixture, 21 lb S24 Perennial Ryegrass, 12 lb S143 Cocksfoot, 6 lb Aberystwyth S123 Red Clover, 3 lb S100 White Clover per acre.

Ley 2nd year. Nitrochalk applied: June 4, 1953. Grazed by sheep: 6 circuits - May 11-19, June 9-17, July 3-11, July 27-Aug 4, Aug 19-27 and Sept 15-23.

Ley 3rd year. Nitrochalk applied: June 26, 1953. Grazed by sheep: 7 circuits - May 19-27, June 1-9, 17-25, July 11-19, Aug 4-12, Aug 27-Sept 7 and Sept 23-Oct 5.

Lucerne 1st year. Ploughed: Aug 26, 1952 and Nov 24. Basal fertilizers applied: Apr 1, 1953. Seed drilled at 28 lb per acre: Apr 9. Dusted with DDT: May 5 and again May 7. Cut twice: Aug 5 and Oct 28. Variety: Du Puits.

Lucerne 2nd year. Cut three times: June 24, 1953, Aug 5 and Oct 28.

Lucerne 3rd year. Cut three times: June 24, 1953, Aug 5 and Oct 28.

Arable rotations

Potatoes 1st course. Ploughed: Aug 26, 1952 and Nov 24. Ridged, basal fertilizers applied, potatoes planted: Apr 1, 1953. Earthed up: June 17. Sprayed with sulphuric acid, 15% B.O.V.: Sept 17. Lifted: Sept 23. Variety: Majestic.

Rye 2nd course. Cultivated: Oct 8, 1952. Seed drilled at 3 bushels per acre: Oct 11. Nitrochalk applied: Apr 23, 1953. Harvested: Aug 13. Variety: King II.

Hay 3rd course. Seeds undersown in rye: Apr 17, 1952. 2 cwt nitrochalk per acre applied: Mar 30, 1953. First cut: June 16. 1 cwt nitrochalk per acre applied: June 17. Second cut: Aug 20. Seeds mixture, 27 lb S24 Perennial Ryegrass, 12 lb Montgomery Red Clover, 3 lb Canadian Alsike Clover per acre.

Sugar beet 3rd course. Ploughed: Aug 20, 1952 and Nov 24. Nitrate of soda applied: Mar 20, 1953. Seed drilled at 18 lb per acre: Mar 24. Singled: May 28. Lifted: Oct 21. Variety: Klein E.

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Test Crops

Potatoes 1st test crop. Ploughed: Nov 10, 1952. Cultivated: Mar 25, 1953. Ridged, dung and basal fertilizers applied, potatoes planted: Apr 14. Earthed up: June 20. Sprayed with sulphuric acid 15% B.O.V.: Sept 17. Lifted: Sept 24. Variety: Majestic.

Barley 2nd test crop. Ploughed: Nov 10, 1952. 22 cwt ground chalk per acre applied: Feb 25, 1953. Nitrochalk applied, seed drilled at 3 bushels per acre: Mar 5. Harvested: Aug 13. Variety: Plumage Archer.

Standard errors per plot, Test crops:

Potatoes, Total tubers, whole plot: 1.772 tons per acre or 12.9% (4 d.f.)
sub plot: 0.739 tons per acre or 5.4% (4 d.f.)

Barley, Grain, whole plot: 1.067 cwt per acre or 3.9% (4 d.f.)
sub plot: 0.766 cwt per acre or 2.8% (4 d.f.)

Summary of Results

Treatment crops

Ley, Sheep days of grazing per acre

1st year	2nd year	3rd year
1513	1647	2134

Lucerne, yield of hay (at 85% D.M.): cwt per acre

	1st crop	2nd crop	3rd crop	Total
1st year				
No Dung	21.2	16.2		37.4
Dung in 1951	24.5	19.6		44.1
Increase	+3.3	+3.4		+6.7
Previous Rotation				
Lucerne	26.5	16.8		43.3
Arable with Sugar beet	19.2	19.0		38.2
Mean	22.8	17.9		40.7

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Treatment crops

Lucerne, yield of hay (at 85% D.M.): cwt per acre

	1st crop	2nd crop	3rd crop	Total
2nd year				
No Dung	32.3	26.1	16.1	74.5
Dung in 1950	49.6	38.8	18.0	106.4
Increase	+17.3	+12.7	+1.9	+31.9
Previous Rotation				
Lucerne	42.6	31.8	17.9	92.3
Arable with Hay	39.3	33.1	16.2	88.6
Mean	41.0	32.4	17.0	90.4
3rd year				
No Dung	37.7	28.3	17.8	83.8
Dung in 1949	41.5	28.9	16.1	86.5
Increase	+3.8	+0.6	-1.7	+2.7
Previous Rotation				
Lucerne	34.5	26.3	17.6	78.4
Arable with Sugar beet	44.7	30.9	16.3	91.9
Mean	39.6	28.6	17.0	85.2

	Potatoes		Rye	
	Total tubers: tons per acre	Percentage ware	Grain: cwt per	Straw: acre
No Dung	11.27	92.3	26.6	33.6
Dung*	13.93	93.2	25.7	35.7
Increase	+2.66	+0.9	-0.9	+2.1
Previous Rotation				
Ley	14.11	94.0	25.9	33.5
Lucerne	12.64	92.1	27.1	36.3
Arable with Hay	12.36	91.6	25.6	32.8
Arable with Sugar beet	11.28	93.2	25.9	36.0
Mean	12.60	92.8	26.2	34.6

*Dung applied: Potatoes:- 1951. Rye:- 1950.

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Treatment crops

Hay

Yield (at 85% D.M.): cwt per acre

	1st crop	2nd crop	Total
No Dung	51.7	18.3	70.0
Dung in 1949	59.6	20.2	79.8
Increase	+7.9	+1.9	+9.8
Previous Rotation			
Ley	58.6	22.2	80.8
Arable with Hay	52.7	16.3	69.0
Mean	55.6	19.2	74.8

Sugar Beet

	Roots (washed): tons per acre	Sugar percentage	Total sugar: cwt per acre	Tops: tons per acre
No Dung	14.68	17.22	50.6	10.34
Dung in 1949	14.94	17.70	52.9	9.48
Increase	+0.26	+0.48	+2.3	-0.86
Previous Rotation				
Lucerne	13.62	17.57	47.8	9.66
Arable with Sugar beet	16.00	17.36	55.6	10.17
Mean	14.81	17.46	51.7	9.92

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Test crops

		Previous Rotation				
		Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
Potatoes, Total tubers: tons per acre						
No Dung	(±1.31)*	14.23	12.85	10.66	9.02	11.69
Dung in 1953		16.82	16.85	15.72	14.16	15.88
Mean	(±1.25)	15.52	14.85	13.19	11.58	13.79
Increase	(±0.74)	2.59	4.00	5.06	5.14	4.19 (±0.37)
Potatoes, Percentage ware						
No Dung		96.8	95.2	90.4	89.1	92.9
Dung in 1953		97.4	96.8	96.1	95.8	96.5
Mean		97.1	96.0	93.3	92.5	94.7
Increase		0.6	1.6	5.7	6.7	3.6
Barley, Grain: cwt per acre						
No Dung	(±0.85)*	28.5	26.1	25.2	23.2	25.8
Dung in 1952		31.1	29.5	28.6	27.1	29.1
Mean	(±0.75)	29.8	27.8	26.9	25.2	27.4
Increase	(±0.77)	2.6	3.4	3.4	3.9	3.3 (±0.38)
Barley, Straw: cwt per acre						
No Dung		33.6	30.8	27.9	26.8	29.8
Dung in 1952		40.2	38.1	38.6	34.2	37.7
Mean		36.9	34.4	33.3	30.5	33.8
Increase		6.6	7.3	10.7	7.4	7.9

*for use in comparisons other than vertical.

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53/Bf/1.1

WOBURN MARKET GARDEN EXPERIMENT

Organic manures and N - Lansome 1953 the 12th year.

The present cropping comprises two series, each carrying in turn the crops of a two course rotation: 1st year - Globe beet followed by Spring cabbages; 2nd year - Leeks.

In 1953 the Globe beet crop failed and was replaced by White turnips. The Spring cabbage crop of 1952-53 also failed (see 52/Bf/1), and was replaced by Peas, the results of which are included in this report.

System of replication (each series): 4 randomized blocks of 10 plots each, certain interactions being confounded with block differences.

Area of each plot: 0.0125 acre.

Treatments applied to each crop:
Organic manures: Dung; sewage sludge compost; sewage sludge (West Middlesex); vegetable compost, each at 10 and 20 tons per acre.
N (applied as nitrochalk): None; 0.3 cwt per acre on plots receiving organic manure. None; 0.3; 0.6; 0.9 cwt per acre on plots not receiving organic manure. The last two rates are applied in two equal dressings.

Basal manuring per acre to each crop: 0.3 cwt P_2O_5; 0.3 cwt K_2O, applied as granular fertilizer (13% P_2O_5; 13% K_2O).

Cultivations, etc.:
Globe beet. Organic manures applied and ploughed in: Apr 22. Basal manure applied: Apr 24. Nitrochalk applied (first dressing 0.6 and 0.9 N plots): May 11. Seed drilled at 13 lb per acre: May 12. Singled, second application of nitrochalk to 0.6 and 0.9 N plots: July 6. Crop failed. Variety: Detroit.

White turnips. (Replacement for Globe beet). Ploughed: June 19. Seed drilled at 6 lb per acre: June 22. Dusted with DDT June 27 and July 3. Lifted: Sept 2-28. Variety: 6 week Turnip.

Spring cabbages 1953-54. Organic manures applied and ploughed in: Sept 29, 1953. Basal manures applied, cabbages planted: Sept 30. Nitrochalk applied (first dressing 0.6 and 0.9 N plots): Mar 10, 1954. Second dressing of nitrochalk to 0.6 and 0.9 N plots: Apr 9. Cut: May 21-July 13. Variety: Durham Early.

Peas. (Replacement for Spring cabbages of 1952-53). Nitrochalk applied (first dressing 0.6 and 0.9 N plots): Mar 23, 1953. Peas drilled at 180 lb per acre: Mar 27. Dusted with DDT: May 9. Second dressing of nitrochalk to 0.6 and 0.9 N plots: June 3. Harvested: July 8-15. Variety: Kelvedon Wonder.

Leeks 1953-54. Organic manures applied and ploughed in: July 24, 1953. Basal manures and nitrochalk applied (first dressing to 0.6 and 0.9 N plots): July 27. Leeks planted and watered in: Aug 28. Second dressing of nitrochalk to 0.6 and 0.9 N plots: Sept 21. Harvested: Jar 6 - Mar 9, 1954.

Standard errors per plot:
White turnips roots: 1.70 tons per acre or 10.1% (17 d.f.)
Spring cabbages, weight of headed cabbages: 0.882 tons per acre or 20.4% (17 d.f.)
Leeks, saleable produce: 0.464 tons per acre or 7.6% (17 d.f.)
Peas, saleable produce: 11.9 cwt per acre of 16.2% (17 d.f.)

Summary of Results

White turnips

Organic manures	Level of manuring tons per acre	N, cwt per acre None	0.3	0.6	0.9	Mean
Weight of roots: tons per acre						
			(±1.20)			(±0.85)
None		10.08	15.52	16.92	15.68	12.80[*]
Dung	10	18.02	17.72			17.88
	20	19.92	17.08			18.50
Sludge compost	10	18.32	17.22			17.78
	20	16.38	18.22			17.30
Sludge	10	16.78	15.78			16.28
	20	18.12	14.68			16.40
Vegetable compost	10	17.08	17.28			17.18
	20	18.42	18.48			18.45
Mean (±0.42)		17.88[+]	17.06[+]			16.88

[*] Mean over None and 0.3 cwt N per acre only.

[+] Excluding 'No Organics'.

White turnips

Organic manures	Level of manuring tons per acre	N: cwt per acre None	0.3	0.6	0.9	Mean
Plant number: thousands per acre						
None		156.6	174.2	174.7	170.8	165.4*
Dung	10	157.9	185.8			171.8
	20	159.3	126.2			142.8
Sludge compost	10	182.1	141.5			161.8
	20	153.4	141.0			147.2
Sludge	10	160.0	160.9			160.5
	20	142.3	136.1			139.2
Vegetable compost	10	158.2	154.1			156.2
	20	142.3	162.6			152.4
Mean		156.9+	151.0+			157.0

Spring cabbages 1953-54

		Weight of headed: tons per acre				
			(±0.623)			(±0.441)
None		0.11**	1.91	3.44	4.22	1.01*
Dung	10	3.06	4.26			3.66
	20	5.98	7.63			6.80
Sludge compost	10	2.05	4.70			3.37
	20	4.51	6.17			5.34
Sludge	10	3.84	6.26			5.05
	20	6.08	6.86			6.47
Vegetable compost	10	2.42	3.93			3.18
	20	3.59	5.60			4.60
Mean (±0.220)		3.94+	5.68+			4.32

Total produce: tons per acre

None		1.88**	4.51	6.43	6.87	3.19*
Dung	10	6.03	6.96			6.50
	20	8.11	9.00			8.55
Sludge compost	10	5.67	7.61			6.64
	20	7.25	7.98			7.62
Sludge	10	6.99	8.25			7.62
	20	8.55	9.26			8.90
Vegetable compost	10	5.37	6.61			5.99
	20	6.75	7.41			7.08
Mean		6.84+	7.88+			6.87

*Mean over None and 0.3 cwt N per acre only.

**Both plots receiving no Organics or N, were badly damaged by birds.

+Excluding 'No Organics'.

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Spring cabbages 1953-54

Organic manures	Level of manuring tons per acre	N: cwt per acre None	0.3	0.6	0.9	Mean
Percentage headed, (by number)						
None		1.8**	30.4	48.1	55.4	16.1*
Dung	10	42.4	56.4			49.4
	20	67.4	78.4			72.9
Sludge compost	10	31.6	57.8			44.7
	20	58.7	70.2			64.4
Sludge	10	46.3	69.7			58.0
	20	62.9	75.2			69.0
Vegetable compost	10	37.3	54.8			46.0
	20	48.0	69.6			58.8
Mean		49.3+	66.5+			53.0

Leeks

Saleable produce: tons per acre						
			(±0.328)			(±0.232)
None		3.79	4.45	5.40	5.33	4.12*
Dung	10	5.40	6.24			5.82
	20	7.51	7.72			7.62
Sludge compost	10	5.63	6.06			5.84
	20	6.32	7.15			6.73
Sludge	10	6.43	6.41			6.42
	20	6.30	7.05			6.68
Vegetable compost	10	5.04	5.99			5.51
	20	6.51	7.59			7.05
Mean (±0.116)		6.14+	6.78+			6.12
Percentage saleable, (by number)						
None		99.4	100.0	100.0	99.9	99.7*
Dung	10	99.9	100.0			100.0
	20	99.7	99.7			99.7
Sludge compost	10	100.1	99.7			99.9
	20	99.9	99.7			99.8
Sludge	10	99.8	99.7			99.8
	20	100.1	99.6			99.8
Vegetable compost	10	99.5	100.0			99.8
	20	100.0	100.0			100.0
Mean		99.9+	99.8+			99.8

*Mean over None and 0.3 cwt N per acre only

** Both plots receiving no Organics or N, were badly damaged by birds.

+Excluding 'No Organics'.

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Peas (replacement for Spring Cabbages 1952-53)

Organic manures	Level of manuring tons per acre	N: cwt per acre None	0.3	0.6	0.9	Mean
		Saleable produce: cwt per acre				
			(±8.39)			(±5.93)
None		48.8	73.6	92.9	69.2	61.2*
Dung	10	62.5	94.5			78.5
	20	94.5	77.3			85.9
Sludge compost	10	56.8	78.5			67.6
	20	56.3	72.6			64.4
Sludge	10	78.5	70.5			74.5
	20	54.8	62.0			58.4
Vegetable compost	10	89.3	74.1			81.7
	20	67.6	89.5			78.6
Mean (±2.97)		70.0+	77.4+			73.2
		Total produce: cwt per acre				
None		53.4	78.4	99.4	74.5	65.9*
Dung	10	69.3	102.0			85.6
	20	99.8	84.0			91.9
Sludge compost	10	60.8	83.2			72.0
	20	60.3	78.8			69.5
Sludge	10	83.9	76.2			80.1
	20	59.2	65.3			62.2
Vegetable compost	10	94.0	78.9			86.5
	20	72.6	97.4			85.0
Mean		75.0+	83.2+			78.6

*Mean over None and 0.3 cwt N per acre only.

+Excluding 'No Organics'.

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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:-

	Cut grass	Early potatoes, Barley and Sugar beet.
0	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.

https://doi.org/10.23637/ERADOC-1-173

53/Bg/1.2

Rainfall and Irrigation: inches

Week-ending	Rain-fall	Irrigation: Early potatoes A	B	C	Sugar beet A	B	C	Cut grass A	B	C	Barley 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			
24	1.95									.18			
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.

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Basal dressing: cwt per acre

	As compound fertilizer			
	N	P_2O_5	K_2O	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.)

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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. (total of 7 cuts)	Hay at 85% D.M.	whole plot:	3.33 cwt per acre or 2.9%	(6 d.f.)
		sub plot:	7.11 cwt per acre or 6.2%	(8 d.f.)

Summary of Results

cwt N per acre		Irrigation 0	A	B	C	Mean
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.

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cwt N per acre	Irrigation 0	A	B	C	Mean
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.

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cwt N per acre	Irrigation 0	A	B	C	Mean
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 0 & B	A	C	Mean
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 0	A	B	C	Mean
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	114.2
Difference (±5.80)	15.1	12.5	11.4	19.8	14.7 (±2.90)

(1) ±0.68 (2) ±0.92

*for use in comparisons other than vertical

+in spring and after each cut.