ROTHAMSTED RESEARCH

Yields of the Field Experiments 1955

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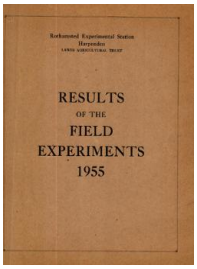

Long-term Experiments

Rothamsted Research

Rothamsted Research (1956) *Long-term Experiments ;* Yields Of The Field Experiments 1955, pp 17 - 70 **- DOI: https://doi.org/10.23637/ERADOC-1-175**

THREE COURSE ROTATION EXPERIMENT

4th year of revised scheme

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

Area of each plot: Potatoes (sub-plot), 0.0093 acre; Barley, 0.0200 acre; Sugar beet, 0.0205 acre.

Cultivations, etc.:

Potatoes. Straw applied, all plots ploughed: Feb 3, 1955. Fertilizers applied, potatoes planted: May 3. Earthed up: July 5. Sprayed with sulphuric acid, 15% B.O.V: Sept 26. Lifted: Oct 1. Variety: Majestic. Note: The crop yellowed off and died down very early in the season.

Barley. Straw applied, all plots ploughed: Feb 3, 1955. Ground chalk applied at 20 cwt per acre: Mar 19. Seed drilled at 3 bushels per acre: Mar 22. Fertilizers applied: Mar 28. Harvested: Aug 11. Variety: Plumage Archer.

Sugar beet. Straw applied, all plots ploughed: Feb 3, 1955. Fertilizers applied: Apr 15. Seed drilled at 18 lb per acre: Apr 16. Sprayed with D.D.T. emulsion, 3 pints in 40 gallons per acre: June 13. Singled: June 18. Lifted: Nov 17. Variety: Klein E.

Treatment symbols:-

Old Scheme

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.

Revised Scheme

St $53\frac{1}{3}$ cwt cut straw per acre in autumn
Nitrogen dressing: 0.2; 0.4; 0.6 cwt N per acre as sulphate of ammonia
K_s Muriate of potash equivalent to K_2O in straw
K 0.5 cwt K_2O per acre as muriate of potash.

https://doi.org/10.23637/ERADOC-1-175

Summary of Results

Potatoes

Treatments applied: 1950	1951	1952 & 1954 / 1955	0 –	0 K	0.4N –	0.4N K	St + 0.2N –	St + 0.2N K	St + 0.6N –	St + 0.6N K	K_s –	K_s K	K_s + 0.4N –	K_s + 0.4N K
			Total tubers: tons per acre											
	Ar	0			3.78	4.32								
		0.4N	3.67	3.66										
Ar		0			4.40	4.05								
		0.4N	3.43	3.72										
	St1 St2	0			4.16	4.12			4.56	4.47			5.26	5.40
		0.4N	4.35	4.06			4.00	4.08			4.23	4.00		
St1 St2		0			3.68	4.15								
		0.4N	4.09	4.19										
		St+ 0.2N			4.13	4.52								
		St+ 0.6N	4.07	4.38										
		K_s			4.46	4.06								
		K_s + 0.4N	3.54	3.45										
	Ad	0			4.23	4.46			4.95	5.48			4.38	4.08
Ad		0.4N	3.40	3.13										
		St+ 0.6N	4.46	4.23										
		K_s + 0.4N	3.94	3.71										

55/Ba/1.2

Potatoes

Treatments applied: 1953 and 1955			0		0.4N		St + 0.2N		St + 0.6N		K_s		K_s + 0.4N	
		1955	-	K	-	K	-	K	-	K	-	K	-	K
1950	1951	1952 & 1954												
			Percentage Ware ($1\frac{1}{2}$" riddle)											
	Ar	0			69.8	73.0								
		0.4N	64.7	69.4										
Ar		0			75.1	73.7								
		0.4N	63.4	68.6										
	St1 St2	0			69.1	71.7			69.4	74.5			77.5	77.6
		0.4N	70.2	69.6			68.6	69.8			72.8	68.8		
St1 St2		0			68.1	71.9								
		0.4N	76.2	67.7										
		St+ 0.2N			65.1	75.6								
		St+ 0.6N	78.2	71.7										
		K_s			76.1	66.5								
		K_s + 0.4N	66.5	73.3										
	Ad	0			68.8	74.1			77.7	80.3			72.6	71.1
Ad		0.4N	73.2	71.9										
		St+ 0.6N	77.6	81.0										
		K_s + 0.4N	73.2	75.8										

55/Ba/1.3

Barley

Treatments applied: 1953 and 1955			0	0.4N	St + 0.2N	St + 0.6N	K_s	K_s + 0.4N
1950	1951	1952 & 1954						
Grain (at 85% dry matter): cwt per acre								
	Ar	0		38.2				
		0.4N	32.8					
Ar		0		40.0				
		0.4N	34.4					
	St1 St2	0		40.3		34.4		38.2
		0.4N	32.9		29.5		33.1	
St1 St2		0		40.6				
		0.4N	32.8					
		St+ 0.2N		34.9				
		St+ 0.6N	29.5					
		K_s		40.3				
		K_s + 0.4N	35.7					
	Ad	0		39.4		37.0		38.1
Ad		0.4N	39.9					
		St+ 0.6N	41.1					
		K_s + 0.4N	30.6					
Straw (at 85% dry matter): cwt per acre								
	Ar	0		39.8				
		0.4N	32.6					
Ar		0		43.0				
		0.4N	34.8					
	St1 St2	0		42.8		37.6		39.0
		0.4N	29.9		36.1		31.0	
St1 St2		0		45.0				
		0.4N	29.7					
		St+ 0.2N		34.5				
		St+ 0.6N	29.2					
		K_s		43.9				
		K_s + 0.4N	33.6					
	Ad	0		43.0		37.9		39.6
Ad		0.4N	36.9					
		St+ 0.6N	38.9					
		K_s + 0.4N	27.8					

Mean dry matter % as harvested Grain: 83.7
Straw: 80.8

https://doi.org/10.23637/ERADOC-1-175

Sugar Beet

Treatments applied: 1953 and 1955			0	0.4N	St + 0.2N	St + 0.6N	K_s	K_s + 0.4N
1950	1951	1952 & 1954						
Roots (washed): tons per acre								
	Ar	0		9.56				
		0.4N	6.74					
Ar		0		8.18				
		0.4N	6.72					
	St1 St2	0		7.40		8.45		7.55
		0.4N	7.05		7.07		8.47	
St1 St2		0		7.70				
		0.4N	7.07					
		St+ 0.2N		7.31				
		St+ 0.6N	7.99					
		K_s		8.01				
		K_s + 0.4N	8.18					
	Ad	0		9.54		7.44		7.77
Ad		0.4N	6.29					
		St+ 0.6N	5.98					
		K_s + 0.4N	9.49					
Sugar Percentage								
	Ar	0		17.1				
		0.4N	17.1					
Ar		0		16.9				
		0.4N	16.7					
	St1 St2	0		16.8		16.5		17.0
		0.4N	16.8		17.3		16.9	
St1 St2		0		16.8				
		0.4N	17.0					
		St+ 0.2N		17.0				
		St+ 0.6N	17.5					
		K_s		16.8				
		K_s + 0.4N	17.6					
	Ad	0		17.2		16.6		16.1
Ad		0.4N	16.8					
		St+ 0.6N	16.6					
		K_s + 0.4N	17.6					

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Sugar Beet

Treatments applied: 1953 and 1955			0	0.4N	St + 0.2N	St + 0.6N	K_s	K_s + 0.4N
1950	1951	1952 & 1954						
Total sugar: cwt per acre								
	Ar	0		32.6				
		0.4N	23.1					
Ar		0		27.7				
		0.4N	22.4					
	St1 St2	0		24.8		27.9		25.8
		0.4N	23.7		24.5		28.7	
St1 St2		0		25.9				
		0.4N	24.1					
		St+ 0.2N		24.8				
		St+ 0.6N	28.0					
		K_s		27.0				
		K_s + 0.4N	28.8					
	Ad	0		32.9		24.8		25.1
Ad		0.4N	21.1					
		St+ 0.6N	19.9					
		K_s + 0.4N	33.5					
Tops: tons per acre								
	Ar	0		6.87				
		0.4N	3.91					
Ar		0		6.18				
		0.4N	4.12					
	St1 St2	0		5.09		6.83		5.85
		0.4N	4.34		4.69		5.28	
St1 St2		0		5.65				
		0.4N	4.54					
		St+ 0.2N		5.28				
		St+ 0.6N	4.82					
		K_s		5.70				
		K_s + 0.4N	4.74					
	Ad	0		6.59		5.78		6.59
Ad		0.4N	3.78					
		St+ 0.6N	3.95					
		K_s + 0.4N	6.37					

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Sugar Beet

Treatments applied: 1953 and 1955			0	0.4N	St + 0.2N	St + 0.6N	K_s	K_s + 0.4N
1950	1951	1952 & 1954						
			Plant number: thousands per acre					
	Ar	0		27.7				
		0.4N	31.1					
Ar		0		27.8				
		0.4N	29.6					
	St1 St2	0		26.7		28.2		26.9
		0.4N	27.7		29.5		28.0	
St1 St2		0		27.8				
		0.4N	29.7					
		St+ 0.2N		25.8				
		St+ 0.6N	30.6					
		K_s		27.6				
		K_s + 0.4N	28.7					
	Ad	0		27.8		26.7		29.5
Ad		0.4N	28.3					
		St+ 0.6N	25.8					
		K_s + 0.4N	26.9					

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FOUR COURSE ROTATION EXPERIMENT

1st year of revised scheme

The experiment in its original form ended at the harvest of 1954. A summary of the results and details of the original scheme appear in the Station annual report for 1954 (p.153).

The cropping rotation has been modified by introducing beans (autumn sown when possible) instead of ryegrass ley, the present rotation being: potatoes, barley, beans, wheat.

The applications of dung, straw, straw compost and rock phosphate have been discontinued. The plots of the original dung, straw and superphosphate series now receive an annual dressing of 0.24 cwt P_2O_5 per acre applied as superphosphate, while the old compost plots receive 0.12 cwt P_2O_5 annually as superphosphate. The rock phosphate plots receive no phosphate. All plots receive a basal dressing of 0.6 cwt K_2O annually as muriate of potash (but see below for the beans of 1955 and the wheat of 1956).

Each plot of wheat, barley and potatoes is split into 2 for the application of nitrogen:-

wheat and barley:	none; 0.4 cwt N per acre applied as sulphate of ammonia.
potatoes:	0.2; 0.6 cwt N per acre applied as sulphate of ammonia

The arrangement of the levels of nitrogen is randomized afresh each season. The beans do not receive nitrogen.

The phosphate and potash fertilizers are applied in autumn for beans and wheat, half-plots of wheat receiving a single top dressing of nitrogen in spring. All fertilizers for barley are applied to the seedbed. All fertilizers for potatoes are broadcast on the flat before planting, which is by machine.

In 1955 the plots of beans were split into 3 for the application of potash:-

none; 0.8; 1.6 cwt K_2O per acre applied as muriate of potash.

The wheat following these beans will receive equalizing amounts of potash:- 1.6 cwt K_2O following none; 0.8 following 0.8 and none following 1.6. It is not intended to repeat this test.

https://doi.org/10.23637/ERADOC-1-175

Area of each sub plot: Potatoes, wheat: 0.0129 acre. Barley: 0.0120 acre. Beans: 0.0081 acre.

Area harvested: Potatoes: 0.0106 acre. Wheat: 0.0057 acre. Barley: 0.0052 acre. Beans: 0.0038 acre.

Cultivations, etc.:

Potatoes.
Ploughed: Sept 22, 1954. Fertilizers applied broadcast on flat: May 3, 1955. Machine planted: May 4. Earthed up: July 6. Sprayed with sulphuric acid, 20% B.O.V.: Oct 4. Lifted: Oct 10. Variety: Majestic.

Barley.
Ploughed: Oct 12, 1954. Seed drilled at 3 bushels per acre: Mar 22, 1955. Fertilizers applied: Mar 31. Sprayed with M.C.P.A., medium volume, $2\frac{1}{2}$ pints per acre: June 8. Combine harvested: Aug 19. Variety: Plumage Archer.

Beans.
Ploughed: Sept 8, 1954. Potash dressings applied: Oct 26. Phosphate dressings applied: Mar 18, 1955. Seed drilled at 200 lb. per acre: Mar 21. Harvested: Aug 22. Variety: Gartons Spring Tick.

Wheat.
Ploughed: July 23 and again Aug 26, 1954. Seed sown at $2\frac{3}{4}$ bushels per acre: Oct 22. Basal potash fertilizer applied: Oct 26. Nitrogen and phosphate fertilizer treatments applied: May 11, 1955. Sprayed with M.C.P.A., medium volume, $2\frac{1}{2}$ pints per acre: May 31. Combine harvested: Aug 24. Variety: Yeoman.

https://doi.org/10.23637/ERADOC-1-175

Summary of Results

Previous Treatment			Potatoes								Barley			
			Total tubers: tons per acre				Percentage Ware				Grain (at 85% Dry matter): cwt per acre			
			N: cwt per acre				N: cwt per acre				N: cwt per acre			
Manure	Year applied	P_2O_5: cwt per acre applied 1955	0.2	0.6	Mean	Diff.	0.2	0.6	Mean	Diff.	None	0.4	Mean	Diff.
Dung	1954	0.24	4.28	5.03	4.66	+0.75	82.1	82.1	82.1	0.0	27.2	34.0	30.6	+6.8
	1953		4.28	4.91	4.60	+0.63	81.6	80.1	80.8	-1.5	19.4	33.8	26.6	+14.4
	1952		5.08	6.71	5.90	+1.63	81.6	89.7	85.6	+8.1	18.5	28.9	23.7	+10.4
	1951		3.69	4.70	4.20	+1.01	81.8	82.1	82.0	+0.3	25.7	26.9	26.3	+1.2
	1950		5.24	5.33	5.28	+0.09	82.0	83.8	82.9	+1.8	18.4	25.0	21.7	+6.6
Adco (straw compost)	1954	0.12	4.41	4.83	4.62	+0.42	84.1	83.6	83.8	-0.5	28.9	25.9	27.4	-3.0
	1953		4.66	4.70	4.68	+0.04	87.1	82.6	84.8	-4.5	17.9	21.1	19.5	+3.2
	1952		3.52	4.74	4.13	+1.22	84.3	86.3	85.3	+2.0	11.4	20.6	16.0	+9.2
	1951		4.66	4.62	4.64	-0.04	81.9	83.2	82.6	+1.3	10.0	16.8	13.4	+6.8
	1950		3.99	4.03	4.01	+0.04	84.6	87.5	86.0	+2.9	22.6	23.1	22.8	+0.5
Straw	1954	0.24	4.78	5.20	4.99	+0.42	82.0	83.9	83.0	+1.9	22.4	34.9	28.6	+12.5
	1953		4.78	5.33	5.06	+0.55	83.0	84.6	83.8	+1.6	23.5	23.3	23.4	-0.2
	1952		5.12	5.75	5.44	+0.63	85.9	84.8	85.4	-1.1	23.0	26.7	24.8	+3.7
	1951		3.73	5.12	4.42	+1.39	78.9	80.3	79.6	+1.4	18.5	33.7	26.1	+15.2
	1950		4.95	5.24	5.10	+0.29	87.7	84.4	86.0	-3.3	23.1	35.4	29.2	+12.3
Super-phosphate	1954	0.24	4.28	4.91	4.60	+0.63	83.3	84.6	84.0	+1.3	26.5	24.7	25.6	-1.8
	1953		4.99	6.04	5.52	+1.05	80.9	87.7	84.3	+6.8	17.3	27.6	22.4	+10.3
	1952		4.70	4.78	4.74	+0.08	81.0	82.3	81.6	+1.3	23.6	35.2	29.4	+11.6
	1951		3.78	4.41	4.10	+0.63	79.5	83.9	81.7	+4.4	15.0	23.6	19.3	+8.6
	1950		4.49	5.20	4.84	+0.71	85.0	83.7	84.4	-1.3	13.1	23.0	18.0	+9.9
Rock phosphate	1954	None	4.03	4.74	4.38	+0.71	80.5	87.6	84.0	+7.1	11.6	16.0	13.8	+4.4
	1953		3.52	4.57	4.04	+1.05	85.4	86.7	86.0	+1.3	18.9	21.3	20.1	+2.4
	1952		3.57	4.15	3.86	+0.58	76.5	84.8	80.6	+8.3	19.9	23.5	21.7	+3.6
	1951		3.52	4.45	3.98	+0.93	83.4	87.2	85.3	+3.8	10.9	13.8	12.4	+2.9
	1950		4.49	4.45	4.47	-0.04	86.7	85.2	86.0	-1.5	13.6	19.6	16.6	+6.0
Mean dry matter % as harvested:													82.4	

55/Ba/2.3

Previous Treatment			Beans				Wheat			
			Grain (at 85% dry matter): cwt per acre				Grain: cwt per acre			
			K_2O: cwt per acre				N: cwt per acre			
Manure	Year applied	P_2O_5: cwt per acre applied 1955	None	0.8	1.6	Mean	None	0.4	Mean	Diff.
Dung	1954	0.24	11.4	11.7	17.1	13.4	13.8	24.7	19.2	+10.9
	1953		15.5	15.2	13.8	14.8	9.4	17.2	13.3	+7.8
	1952		14.3	16.2	20.2	16.9	12.8	23.2	18.0	+10.4
	1951		14.8	12.1	12.1	13.0	9.7	20.4	15.0	+10.7
	1950		17.9	19.8	14.5	17.4	10.7	18.5	14.6	+7.8
Adco (straw compost)	1954	0.12	18.1	14.8	15.0	16.0	12.2	21.6	16.9	+9.4
	1953		16.7	13.1	12.6	14.1	11.7	19.1	15.4	+7.4
	1952		11.4	15.2	11.2	12.6	11.3	19.6	15.4	+8.3
	1951		18.1	16.7	14.3	16.4	9.1	16.0	12.6	+6.9
	1950		12.4	15.7	9.3	12.5	11.7	20.1	15.9	+8.4
Straw	1954	0.24	16.4	18.8	15.0	16.7	13.3	19.6	16.4	+6.3
	1953		16.4	13.1	15.7	15.1	11.0	20.1	15.6	+9.1
	1952		17.1	16.0	16.7	16.6	14.1	16.0	15.0	+1.9
	1951		13.8	12.1	10.5	12.1	11.0	20.4	15.7	+9.4
	1950		12.6	13.6	15.2	13.8	11.3	23.5	17.4	+12.2
Super-phosphate	1954	0.24	15.0	11.4	14.8	13.7	8.6	16.4	12.5	+7.8
	1953		15.0	6.9	13.3	11.7	9.4	18.5	14.0	+9.1
	1952		19.8	17.4	15.5	17.6	11.0	16.4	13.7	+5.4
	1951		10.7	13.3	12.9	12.3	9.1	16.9	13.0	+7.8
	1950		11.2	17.4	9.8	12.8	8.6	16.9	12.8	+8.3
Rock phosphate	1954	None	12.6	15.2	13.1	13.6	8.6	18.5	13.6	+9.9
	1953		12.6	12.4	11.4	12.1	11.7	17.2	14.4	+5.5
	1952		12.4	11.2	10.0	11.2	8.1	16.0	12.0	+7.9
	1951		12.1	11.2	13.3	12.2	10.7	17.2	14.0	+6.5
	1950		10.2	9.8	11.4	10.5	7.5	13.3	10.4	+5.8
Mean dry matter % as harvested:						87.0			84.9	

55/Ba/2.4

SIX COURSE ROTATION EXPERIMENT

The 26th year

Seasonal effects of fertilizers - Rothamsted Long Hoos IV and Woburn Stackyard 1955.

For details of treatments, rotation 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: Sept 6, 1954 and Nov 5. Fertilizers applied: Apr 15, 1955. Seed drilled at 18 lb per acre: Apr 16. Sprayed with D.D.T. emulsion, 3 pints in 40 gallons: June 13. Singled: June 20. Lifted: Nov 16. Variety: Klein E.

Barley.
Ploughed: Dec 27, 1954. Ground chalk applied at 20 cwt per acre: Mar 19, 1955. Seed drilled at 3 bushels per acre: Mar 22. Fertilizers applied: Mar 29. Harvested: Aug 8. Variety: Plumage Archer. Mean D.M.%: Grain, 81.8; Straw, 74.9.

Clover.
Seed undersown in barley at 40 lb per acre: Apr 20, 1954. Autumn fertilizers applied: Dec 1. Sulphate of ammonia applied: Apr 25,1955. Cut: July 12. Variety: Late flowering Montgomery Red.

Wheat.
Ploughed: Aug 5, 1954. Seed drilled at $2\frac{3}{4}$ bushels per acre: Oct 22. Autumn fertilizers applied: Oct 25. Sulphate of ammonia applied: May 12, 1955. Harvested: Aug 8. Variety: Yeoman. Mean D.M.%: Grain, 81.6; Straw, 82.0.

Potatoes.
Ploughed: Sept 6, 1954 and Nov 4. Ridged, fertilizers applied: Apr 26, 1955. Potatoes planted: Apr 27. Earthed up: July 4. Sprayed with sulphuric acid, 15% B.O.V: Sept 26. Lifted: Oct 1. Variety: Majestic.

Rye.
Cultivated: Oct 4, 1954. Ground chalk applied at 20 cwt per acre: Oct 9. Seed drilled at 3 bushels per acre: Oct 22. Autumn fertilizers applied: Oct 25. Sulphate of ammonia applied: May 12, 1955. Harvested: Aug 15. Variety: King II. Mean D.M.%: Grain, 85.9; Straw, 87.5.

Woburn

Sugar beet.

Ploughed: Sept 29, 1954 and Feb 2, 1955. Fertilizers applied: Apr 18. Seed drilled at 12 lb per acre: Apr 19. Sprayed with parathion, ½ pint per acre in 40 gallons: June 10. Singled: June 28. Lifted: Oct 27. Variety: Klein E.

Barley.

Ploughed: Nov 5, 1954 and Feb 1, 1955. Ground chalk applied at 20 cwt per acre: Mar 14. Fertilizers applied, seed drilled at 3⅓ bushels per acre: Mar 17. Harvested: Aug 5. Variety: Plumage Archer.

Clover.

Seed undersown in barley at 40 lb per acre: Apr 26, 1954. Autumn fertilizers applied: Dec 2. Sulphate of ammonia applied: Apr 29, 1955. Cut: July 6. Variety: Late flowering Montgomery Red. N.B. The crop was severely and irregularly damaged by Sclerotinia.

Wheat.

Ploughed: July 5, 1954 and Oct 1. Autumn fertilizers applied, seed drilled at 3 bushels per acre: Oct 28. Sulphate of ammonia applied: May 6, 1955. Sprayed with M.C.P.A. low volume, at 2½ pints per acre: May 20. Harvested: Aug 15. Variety: Squareheads Master 13/4.

Potatoes.

Ploughed: Sept 29, 1954 and Feb 1, 1955. Ridged, fertilizers applied: Apr 21. Potatoes planted: Apr 22. Earthed up: June 28. Sprayed with copper fungicide, 5 lb in 40 gallons per acre: Aug 19. Sprayed with arsenious compound, 1 gallon in 40 gallons per acre: Sept 27. Lifted: Oct 3. Variety: Majestic.

Rye.

Ploughed: Oct 23, 1954. Ground chalk applied at 20 cwt per acre, autumn fertilizer applied: Oct 28. Seed drilled at 3 bushels per acre: Oct 29. Sulphate of ammonia applied: May 6, 1955. Harvested: Aug 15. Variety: King II.

Erratum to "Results of the Field Experiments" 1954.

Page 54/Ba/3.3:- After "clover, hay" read "(at 85% Dry Matter)" not "dry matter".

Erratum to "Results of the Field Experiments" 1939-47, Vol. I.

Page Ba/4.4:- Woburn. Clover, Hay Dry Matter: cwt per acre. Response to N in 1945 should read "-12.5" NOT "12.5".

https://doi.org/10.23637/ERADOC-1-175

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	7.58	8.46	34.3	27.2
Response to: N	+5.95	+4.07	+23.3	+20.1
P	+0.11.	-1.74	+1.4	+2.2
K	-0.12	-0.58	-5.3	+3.7
	Sugar Beet, sugar percentage		Barley, straw: cwt per acre*	
Mean	16.7	18.4	39.0	34.7
Response to: N	+0.7	-0.1	+34.5	+39.9
P	+0.3	+0.1	+2.3	+3.3
K	+0.3	+0.9	-7.3	+2.2
	Sugar Beet, total sugar: cwt per acre		Clover, hay: dry matter cwt per acre	
Mean	25.4	31.1	54.0	46.0
Response to: N	+21.1	+14.6	+13.3	-9.5
P	+0.8	-6.2	+7.9	+2.5
K	+0.1	-0.6	-2.0	+12.8
	Sugar Beet, tops: tons per acre		Wheat, grain: cwt* per acre	
Mean	4.63	5.55	38.0	8.8
Response to: N	+4.05	+3.19	+8.1	+10.0
P	-0.16	-1.27	-5.3	+2.1
K	-0.25	+0.36	+0.4	+1.5
	Sugar Beet, plant number: thousands per acre		Wheat, straw: cwt* per acre	
Mean	28.3	+	56.1	12.6
Response to: N	+0.9		+14.3	+20.1
P	-0.1		-7.0	+2.5
K	+0.9		+3.5	+0.8
	Potatoes, total tubers: tons per acre		Rye, grain: cwt per acre	
Mean	4.99	5.33	32.7	25.4
Response to: N	+1.24	+0.83	+28.2	+27.7
P	+0.93	+0.67	-6.5	-2.4
K	+0.50	-0.23	-1.1	-0.5
	Potatoes, percentage ware.		Rye, straw: cwt* per acre	
Mean	83.1(1)	85.4(2)	37.2	30.9
Response to: N	-2.2	-1.4	+28.0	+33.3
P	-10.9	-4.8	-2.3	+0.5
K	+6.5	+3.1	-3.3	-1.8

* (at 85% dry matter) + not recorded.
Riddle: (1) $1\frac{1}{2}$"; (2) $1\frac{5}{8}$"

https://doi.org/10.23637/ERADOC-1-175

DEEP CULTIVATION ROTATION EXPERIMENT

The 12th year

Deep ploughing, fertilizers and dung - Long Hoos I and II 1955.

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 ($\frac{1}{2}$ plot) 0.0119 acre; barley, spring oats, 0.0265 acre; ley, 0.0275 acre; wheat, 0.0188 acre; potatoes ($\frac{1}{2}$ plot), 0.0107 acre.

Cultivations, etc.:

Sugar beet

Fertilizers for ploughing in "deep" applied: Sept 27, 1954. Dung to "deep" plots applied, ploughed all "deep" plots: Oct 22. Dung and fertilizers for ploughing in "shallow" applied: Oct 22. "Shallow" plots ploughed: Oct 29. Fertilizers for surface application applied: Apr 16, 1955. Seed drilled at 18 lb per acre: Apr 16. Sprayed with D.D.T. emulsion at 3 pints in 40 gallons per acre: June 13. Singled: June 21. Lifted: Nov 22. Variety: Klein E.

Barley

Ploughed: Jan 1, 1955. Ground chalk at 20 cwt per acre applied: Mar 18. Basic slag and sulphate of ammonia applied: Mar 21. Seed drilled at 3 bushels per acre: Mar 22. Harvested: Aug 8. Variety: Plumage Archer.

Ley

Seeds undersown in barley: Apr 21, 1954. Cut: July 11, 1955. Seeds mixture (per acre): 18 lb S.24 perennial ryegrass, 8 lb Montgomery red clover, 2 lb American Alsike clover.

Wheat

"Deep" plots ploughed: Oct 21, 1954. "Shallow" plots ploughed: Oct 27. Seed drilled at $2\frac{3}{4}$ bushels per acre: Dec 22. Sulphate of ammonia applied: May 13, 1955. Sprayed with M.C.P.A., medium volume, $2\frac{1}{2}$ pints per acre: May 31. Combine harvested: Aug 24. Variety: Yeoman.

Potatoes

Fertilizers for ploughing in "deep" applied: Sept 27, 1954. Dung to "deep" plots applied, ploughed all "deep" plots: Oct 22. Dung and fertilizers for ploughing in "shallow" applied: Oct 22. "Shallow" plots ploughed: Oct 29. Ridged: Apr 22, 1955. Fertilizers for surface application applied: Apr 27. Potatoes planted: Apr 28. Earthed up: July 4. Sprayed with sodium arsenite, 1 gallon in 80 gallons: Oct 10. Lifted: Oct 18. Variety: Majestic.

https://doi.org/10.23637/ERADOC-1-175

Spring oats

Ploughed: Nov 4, 1954. Ground chalk at 20 cwt per acre applied: Mar 18, 1955. Sulphate of ammonia applied, seed drilled at 4 bushels per acre: Mar 21. Sprayed with M.C.P.A., high volume, 2 pints in 80 gallons: June 2. Harvested: Aug 4. Variety: Star.

Standard errors per plot:

Sugar beet,	Total sugar.	Whole plot:	1.99 cwt per acre or 6.1% (4 d.f.)
		Sub plot:	2.31 cwt per acre or 7.1% (7 d.f.)
	Tops.	Whole plot:	0.387 tons per acre or 4.9% (4 d.f.)
		Sub plot:	0.553 tons per acre or 7.0% (7 d.f.)
Barley,	Grain:		2.27 cwt per acre or 7.1% (4 d.f.)
Ley,	Hay:		1.88 cwt per acre or 2.8% (4 d.f.)
Wheat,	Grain:		1.51 cwt per acre or 4.0% (4 d.f.)
Potatoes,	Total tubers.	Whole plot:	0.927 tons per acre or 13.3% (4 d.f.)
		Sub plot:	0.389 tons per acre or 5.6% (7 d.f.)
Spring Oats, Grain (at 85% D.M.):			2.21 cwt per acre or 5.8% (4 d.f.)

Erratum to "Results of the Field Experiments" 1949, page 49/Bb/1.5. Roots (washed): tons per acre, "Mean of Potash-None" should read "8.93 not 8.03".

https://doi.org/10.23637/ERADOC-1-175

55/Bb/1.3

Summary of Results

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 10.05 tons per acre									
Ploughing deep-shallow	+0.89	-	-	+1.07	+0.71	+0.31	+1.47	+0.77	+1.01
Dung	+5.18	+5.36	+5.00	-	-	+5.90	+4.46	+5.51	+4.85
Phosphate	+0.67	+0.09	+1.25	+1.39	-0.05	-	-	+0.71	+0.63
Potash	+0.53	+0.41	+0.65	+0.86	+0.20	+0.57	+0.49	-	-
Sugar Percentage: Mean 16.1									
Ploughing deep-shallow	-0.1	-	-	-0.3	+0.1	-0.3	+0.1	-0.1	-0.1
Dung	+0.6	+0.4	+0.8	-	-	+0.7	+0.5	+0.9	+0.3
Phosphate	+0.3	+0.1	+0.5	+0.4	+0.2	-	-	+0.3	+0.3
Potash	0.0	0.0	0.0	+0.3	-0.3	0.0	0.0	-	-
Total Sugar: Mean yield 32.6 cwt per acre									
	(±1.00)				(±1.41)				
Ploughing deep-shallow	+2.9	-	-	+3.1	+2.7	+0.4	+5.4	+2.3	+3.5
Dung	+17.9	+18.1	+17.7	-	-	+20.2	+15.6	+19.6	+16.2
Phosphate	+2.7	+0.2	+5.2	+5.0	+0.4	-	-	+3.0	+2.4
Potash	+1.6	+1.0	+2.2	+3.3	-0.1	+1.9	+1.3	-	-
Tops: Mean yield 7.86 tons per acre									
	(±0.193)				(±0.274)				
Ploughing deep-shallow	+0.41	-	-	+0.26	+0.56	+0.25	+0.57	+0.55	+0.27
Dung	+2.92	+2.77	+3.07	-	-	+2.98	+2.86	+2.81	+3.03
Phosphate	+0.66	+0.50	+0.82	+0.72	+0.60	-	-	+0.91	+0.41
Potash	+0.43	+0.57	+0.29	+0.32	+0.54	+0.68	+0.18	-	-
Plant Number: Mean 28.7 thousands per acre									
Ploughing deep-shallow	+0.4	-	-	+0.9	-0.1	+0.1	+0.7	+0.5	+0.3
Dung	+0.4	+0.9	-0.1	-	-	+0.5	+0.3	0.0	+0.8
Phosphate	-0.2	-0.5	+0.1	-0.1	-0.3	-	-	-0.3	-0.1
Potash	+0.1	+0.2	0.0	-0.3	+0.5	0.0	+0.2	-	-

https://doi.org/10.23637/ERADOC-1-175

Sugar Beet

	Phosphate			Potash			
	None	Ploughed in	In seed bed	None	Ploughed in	In seed bed	Mean
Roots (washed): tons per acre							
Shallow	9.56	9.96	9.34	9.40	9.77	9.86	9.61
Deep	9.87	11.49	10.75	10.17	10.91	10.74	10.49
No dung	6.77	8.78	7.53	7.03	8.05	7.73	7.46
Dung	12.67	12.67	12.56	12.54	12.62	12.86	12.64
Mean	9.72	10.72	10.04	9.78	10.34	10.30	10.05
Sugar Percentage							
Shallow	16.1	16.2	16.1	16.2	16.0	16.3	16.2
Deep	15.8	16.3	16.4	16.1	16.0	16.2	16.1
No dung	15.6	16.1	15.9	15.6	16.0	16.0	15.8
Dung	16.3	16.4	16.6	16.6	16.1	16.5	16.4
Mean	16.0	16.3	16.3	16.1	16.0	16.2	16.1
Total Sugar: cwt per acre							
	(a)	(b) and (c)		(a)	(b) and (c)		
Shallow	31.1	32.3	30.2	30.7	31.2	32.1	31.2
Deep	31.5	37.8	35.6	33.0	35.2	35.1	34.1
No dung	21.2	28.3	23.9	22.0	25.9	24.7	23.7
Dung	41.4	41.7	41.9	41.7	40.6	42.5	41.6
Mean	31.3	35.0	32.9	31.8	33.2	33.6	32.6
Tops: tons per acre							
	(a)	(b) and (c)		(a)	(b) and (c)		
Shallow	7.41	8.08	7.72	7.37	7.98	7.89	7.65
Deep	7.65	8.72	8.23	7.92	8.32	8.11	8.07
No dung	6.04	7.11	6.40	6.24	6.54	6.58	6.40
Dung	9.02	9.69	9.55	9.05	9.76	9.43	9.32
Mean	7.53	8.40	7.97	7.64	8.15	8.00	7.86
Plant Number: thousands per acre							
Shallow	28.8	28.2	28.4	28.4	28.8	28.6	28.6
Deep	28.9	29.0	28.9	28.9	28.8	29.0	28.9
No dung	28.6	28.5	28.6	28.7	28.4	28.4	28.6
Dung	29.1	28.7	28.7	28.6	29.2	29.2	28.9
Mean	28.9	28.6	28.7	28.7	28.8	28.8	28.7

	Total Sugar	Tops	
(a)	±1.00	±0.193	for use in comparisons other than horizontal
(b)	±1.16	±0.276	for use in horizontal comparisons
(c)	±1.29	±0.275	as (a).

https://doi.org/10.23637/ERADOC-1-175

Responses to treatments

Barley**

Response to	Mean	Ploughing Shallow	Ploughing Deep	Dung Abs.	Dung Pres.	Phosphate Abs.	Phosphate Pres.	Potash Abs.	Potash Pres.
Grain: Mean yield 32.2 cwt per acre	(±1.13)				(±1.60)				
Ploughing deep-shallow	+0.5	-	-	+0.2	+0.8	+1.7	-0.7	+0.3	+0.7
Dung	+3.3	+3.0	+3.6	-	-	+3.1	+3.5	+3.2	+3.4
Phosphate	+2.9	+4.1	+1.7	+2.7	+3.1	-	-	+2.2	+3.6
Potash	+1.5	+1.3	+1.7	+1.4	+1.6	+0.8	+2.2	-	-
Straw: Mean yield 39.5 cwt per acre									
Ploughing deep-shallow	+2.6	-	-	+0.5	+4.7	+3.1	+2.1	+2.5	+2.7
Dung	+6.6	+4.5	+8.7	-	-	+6.1	+7.1	+6.8	+6.4
Phosphate	+3.0	+3.5	+2.5	+2.5	+3.5	-	-	+2.3	+3.7
Potash	+3.7	+3.6	+3.8	+3.9	+3.5	+3.0	+4.4	-	-

Ley**

Hay: Mean yield 68.3 cwt per acre	(±0.94)				(±1.33)				
Ploughing deep-shallow	+2.6	-	-	+2.4	+2.8	+3.9	+1.3	+1.7	+3.5
Dung	+6.5	+6.3	+6.7	-	-	+9.4	+3.6	+10.9	+2.1
Phosphate	+0.4	+1.7	-0.9	+3.3	-2.5	-	-	+0.6	+0.2
Potash	+0.4	-0.5	+1.3	+4.8	-4.0	+0.6	+0.2	-	-

Wheat*

Grain: Mean yield 37.3 cwt per acre	(±0.75)				(±1.07)				
Ploughing deep-shallow	+3.2	-	-	+2.8	+3.6	+1.5	+4.9	+2.9	+3.5
Dung	+1.5	+1.1	+1.9	-	-	+1.7	+1.3	+0.8	+2.2
Phosphate	-0.6	-2.3	+1.1	-0.4	-0.8	-	-	0.0	-1.2
Potash	+0.6	+0.3	+0.9	-0.1	+1.3	+1.2	0.0	-	-

Potatoes

Total tubers: Mean yield 6.99 tons per acre	(±0.464)				(±0.656)				
Ploughing deep-shallow	+0.62	-	-	+0.50	+0.74	+0.43	+0.81	+0.96	+0.28
Dung	+3.10	+2.98	+3.22	-	-	+3.26	+2.94	+4.33	+1.87
Phosphate	+0.67	+0.48	+0.86	+0.83	+0.51	-	-	+0.29	+1.05
Potash	+1.73	+2.07	+1.39	+2.96	+0.50	+1.35	+2.11	-	-
Percentage ware ($1\frac{1}{2}$" riddle): Mean 82.8									
Ploughing deep-shallow	+1.9	-	-	+3.2	+0.6	+1.5	+2.3	+4.5	-0.7
Dung	+7.2	+8.5	+5.9	-	-	+6.2	+8.2	+12.6	+1.8
Phosphate	-1.7	-2.1	-1.3	-2.7	-0.7	-	-	-2.9	-0.5
Potash	+4.8	+7.4	+2.2	+10.2	-0.6	+3.6	+6.0	-	-

*Cultivation treatments direct to wheat, manures to previous sugar beet.
**Treatments to previous Sugar beet.

https://doi.org/10.23637/ERADOC-1-175

Potatoes

	Phosphate: None	Phosphate: Ploughed in	Phosphate: In ridges	Potash: None	Potash: Ploughed in	Potash: In ridges	Mean
Total tubers: tons per acre							
	(a)	(b) and (c)		(a)	(b) and (c)		
Shallow	6.44	6.75	7.08	5.64	7.49	7.94	6.68
Deep	6.86	7.52	7.94	6.60	7.57	8.41	7.29
No dung	5.02	5.62	6.07	3.96	6.42	7.40	5.43
Dung	8.28	8.65	8.94	8.29	8.64	8.94	8.54
Mean	6.65	7.14	7.51	6.12	7.53	8.17	6.99
Percentage ware ($1\frac{1}{2}$" riddle)							
Shallow	82.9	80.9	80.7	78.1	84.7	86.4	81.8
Deep	84.4	84.6	81.6	82.6	86.0	83.8	83.8
No dung	80.5	78.7	77.0	74.1	84.0	84.6	79.2
Dung	86.7	86.9	85.2	86.7	86.6	85.6	86.4
Mean	83.6	82.8	81.1	80.4	85.3	85.1	82.8

Spring Oats

Responses to treatments to previous potatoes

Response to	Mean	Ploughing: Shallow	Ploughing: Deep	Dung: Abs.	Dung: Pres.	Phosphate: Abs.	Phosphate: Pres.	Potash: Abs.	Potash: Pres.
Grain (at 85% D.M.): Mean yield 38.4 cwt per acre									
	(±1.11)			(±1.57)					
Ploughing deep-shallow	-2.3	-	-	-4.5	-0.1	-3.0	-1.6	-0.2	-4.4
Dung	+0.2	-2.0	+2.4	-	-	+0.3	+0.1	-1.5	+1.9
Phosphate	-0.4	-1.1	+0.3	-0.3	-0.5	-	-	+1.2	-2.0
Potash	+0.4	+2.5	-1.7	-1.3	+2.1	+2.0	-1.?	-	-

Total tubers
(a) ±0.464 for use in comparisons other than horizontal
(b) ±0.194 for use in horizontal comparisons
(c) ±0.484 as (a).

Mean dry matter % as harvested
Barley, grain: Not recorded
Wheat, grain: 86.4
Spring oats, grain: 84.4

https://doi.org/10.23637/ERADOC-1-175

LEY AND ARABLE ROTATIONS

Highfield and Fosters Field 1955 - the 7th year.

For details of treatments, rotations, etc., see "Results of the Field Experiments" 1952 , Section Bc/1, with the exception that the following alterations to the original scheme were introduced in the 1955 season:-

1. The third treatment crop of the arable rotation is now spring oats instead of barley.
2. On Highfield only, the rates of application of "nitro-chalk" to barley and oats are now: nil; 0.2 cwt N per acre. On Fosters the manuring of barley is unaltered (0.2; 0.4 cwt N) and oats receive these levels also.
3. Reseeded and old permanent grass are now grazed for 5 years; one cut of hay (followed by grazing of the aftermath) is taken in the sixth. In 1956 and later years the hay cut will be taken from plots in the blocks that are in the 1st treatment year; in 1955 however (in order to avoid hay cuts in successive years on certain plots) the hay cut was taken from plots in blocks in the 3rd treatment year. Rates of application of fertilizers are at the higher level (given under "Reseeded and Old Permanent Grass 3rd year" in "Results" 1952, on page 52/Bc/1.2) in hay years only.
4. On blocks in 2 out of the 6 phases viz:- the 1st and 2nd treatment years corrective dressings of muriate of potash were applied in order to compensate for different rates of withdrawal of potash by previous crops. Further dressings will be applied in future years, commencing as each block enters the 1st treatment year.

Rates of Application of Corrective Potash (K_2O: cwt per acre)

Crop	Year of cycle	Rate
Cut grass	"1st treatment"	2.4 (3 years previous cutting)
	"2nd treatment"	1.2 (1 year previous cutting)
Grazed Ley and Arable	"1st and 2nd treatment"	Nil
Lucerne	"1st treatment"	2.4 (3 years previous Lucerne)
	"2nd treatment"	0.6 (1 year previous Lucerne)
Permanent and Reseeded	"1st treatment"	2.4 (2 previous hay crops taken)
	"1st test"	None
	"2nd treatment"	1.2 (1 previous hay crop taken)
	"2nd test"	None

5. Each sub-plot of test crop potatoes is split into two for the application (in addition to the basal dressing) of all combinations of:
   Phosphate: None; 0.9 cwt P_2O_5 per acre as superphosphate.
   Potash: None; 0.9 cwt K_2O per acre as muriate of potash.
   The PK interaction is confounded with block differences except on the Lucerne rotation where it is confounded with quarter plot differences.
   For the succeeding barley crop similar dressings will be applied, but to different sub-plots, so that the totals of P_2O_5 and K_2O for the 2 crops will be equal. The barley will be harvested as hitherto by quarter plots.
6. Lucerne is now sown in rows 18" apart instead of 12".

https://doi.org/10.23637/ERADOC-1-175

Cultivations, etc.:

HIGHFIELD

1st year Treatment Crops

Cut grass: Ploughed: Oct 15, 1954. 1st dressing of supplementary K and nitrochalk applied: Apr 22, 1955. Basal PK applied: Apr 23. Seed sown at 33 lb per acre: Apr 25. 2nd dressing of supplementary K applied: July 9. Cut 3 times: June 30, July 26, Nov 21. Nitrochalk applied after each cut except the last.

Grazed ley: Ploughed: Oct 15, 1954. Nitrochalk applied: Apr 22, 1955. Basal PK applied: Apr 23. Seed sown at 44 lb per acre: Apr 25. Nitrochalk applied: July 16. Grazed: 5 circuits, June 22-Oct 6.

Lucerne: Ploughed: Oct 15, 1954. 1st dressing of supplementary K: Apr 22, 1955. Basal PK applied: Apr 23. Seed drilled 18" drills at 28 lb per acre: Apr 25. 2nd dressing of supplementary K applied: July 28. Cut 3 times: July 26, Sept 1, Nov 21. Variety: Du Puits.

Hay: Seeds undersown in barley at 28 lb per acre: Apr 22, 1954. Basal PK applied: Dec 30. Nitrochalk applied: Apr 15, 1955. Cut: June 10.

2nd year Treatment Crops

Cut grass: Basal PK applied: Dec 21, 1954. Supplementary K applied: Mar 11, 1955. Nitrochalk applied: Apr 18 and after each cut except the last. Cut 5 times: May 10, June 6, June 30, July 26, Nov 21.

Grazed ley: Basal PK applied: Dec 21, 1954. Nitrochalk applied: Apr 18 and July 9, 1955. Grazed: 8 circuits, Apr 27-Oct 3.

Lucerne: Basal PK applied: Dec 21, 1954. Supplementary K applied: Mar 11, 1955. Cut 4 times: June 24, July 26, Sept 1, Nov 21.

Potatoes: Ploughed: June 29, Aug 17 and Nov 16, 1954. Ridged: Apr 26, 1955. Basal PK, sulphate of ammonia, and dung applied, potatoes planted: Apr 29. For later cultivations see Potato Test Crop.

3rd year Treatment Crops

Cut grass: Basal PK applied: Dec 21, 1954. Nitrochalk applied: Apr 18, 1955 and after each cut except the last. Cut 5 times: May 19, June 13, June 30, July 26, Oct 14.

Grazed ley: Basal PK applied: Dec 21, 1954. Nitrochalk applied: Apr 18, 1955 and July 9. Grazed: 8 circuits, May 1-Oct 8.

Lucerne: Basal PK applied: Dec 21, 1954. Cut 4 times: June 14, July 26, Sept 1, Oct 12, 1955.

Oats: Ploughed: Nov 18, 1954. Nitrochalk applied: Mar 28, 1955. Seed drilled at $3\frac{1}{2}$ bushels per acre with basal PK: Mar 30. Combine harvested: Aug 12. Variety: Sun II.

1st Test Crop, Wheat

Ploughed leys: Oct 14, 1954. Ploughed after barley: Oct 15. Seed drilled at $2\frac{3}{4}$ bushels per acre with basal PK: Oct 20. Nitrochalk applied: May 10, 1955. Combine harvested: Aug 16. Variety: Yeoman.

2nd Test Crop, Potatoes

Ploughed: Oct 2, 1954. Ridged: Apr 26, 1955. Basal PK and additional P and K applied: Apr 28. Sulphate of ammonia and dung applied and potatoes planted: Apr 29. Earthed up: July 5. Sprayed with 20% sulphuric acid in 100 gallons per acre: Oct 4. Lifted: Oct 11. Variety: Majestic.

3rd Test Crop, Barley

Ploughed: Nov 18, 1954. Ground chalk applied to blocks 5 and 8: Dec 30. Nitrochalk applied: Mar 28, 1955. Seed drilled at 2 bushels per acre with basal PK: Mar 30. Combine harvested: Aug 12. Variety: Proctor.

Permanent Grasses. Basal PK applied to all plots: Dec 21, 1954.

5th year Reseeded, 5th experimental year of permanent grass, Blocks 9-12. Supplementary K applied to blocks 10 and 11: Mar 11, 1955. Nitrochalk applied: Apr 18 and July 9. Grazed: Permanent grass blocks 9 and 12 - 5 circuits, May 1-Oct 12; Remainder - 6 circuits Apr 27-Oct 15.

6th year Reseeded, 6th experimental year of permanent grass, Blocks 5-8. Blocks 5 and 8: Ground chalk applied: Dec 30,1954. Nitrochalk applied: Apr 18 and July 16, 1955. Grazed: 5 circuits, May 5-Oct 7. Blocks 6 and 7: Nitrochalk applied: Apr 15, 1955. Cut for hay: June 27. Nitrochalk applied: June 28. Grazed: 2 circuits, July 19-Oct 7.

7th year Reseeded, 7th experimental year of permanent grass, Blocks 1-4. Nitrochalk applied: Apr 22 and July 2, 1955. Supplementary K applied to blocks 2 and 3: Mar 11 and July 20. Grazed: 5 circuits, May 9-Sept 29.

FOSTERS

1st year Treatment Crops

Cut grass: Ploughed: Oct 13, 1954. 1st dressing of supplementary K and nitrochalk applied: Apr 22, 1955. Basal PK applied and seed sown at 33 lb per acre: Apr 23. 2nd dressing of supplementary K applied: July 8. Cut 3 times: July 1, July 27, Nov 19. Nitrochalk applied after each cut except the last.

Grazed ley: Ploughed: Oct 13, 1954. Nitrochalk applied: Apr 22, 1955. Basal PK applied and seed sown at 44 lb per acre: Apr 23. Nitrochalk applied: July 22. Grazed: 2 circuits, July 17-Sept 26.

Lucerne: Ploughed: Oct 13, 1954. 1st dressing of supplementary K applied: Apr 22, 1955. Basal PK applied and seed sown at 28 lb per acre: Apr 23. 2nd dressing of supplementary K applied: July 28. Cut 3 times: July 27, Aug 31, Nov 19. Variety: Du Puits.

Hay: Seeds undersown in barley at 28 lb per acre: Apr 21, 1954. Basal PK applied: Dec 23. Nitrochalk applied: Apr 15, 1955. Cut: June 6.

https://doi.org/10.23637/ERADOC-1-175

2nd year Treatment Crops

Cut grass: Basal PK applied: Dec 22, 1954. Supplementary K applied: Mar 11, 1955. Nitrochalk applied: Apr 18 and after each cut except the last. Cut 5 times: May 10, June 6, July 1, July 27, Nov 19.

Grazed ley: Basal PK applied: Dec 22, 1954. Nitrochalk applied: Apr 18 and July 22, 1955. Grazed: 6 circuits, Apr 28-Oct 4.

Lucerne: Basal PK applied: Dec 22, 1954. Supplementary K applied: Mar 11, 1955. Cut 4 times: June 23, July 27, Aug 31, Nov 19.

Potatoes: Ploughed: June 28, Aug 17 and Nov 4, 1954. Basal PK applied: Apr 28, 1955. Sulphate of ammonia and dung applied: May 2. For later cultivations see Potato Test Crop.

3rd year Treatment Crops

Cut grass: Basal PK applied: Dec 22, 1954. Nitrochalk applied: Apr 19, 1955 and after each cut except the last. Cut 5 times: May 19, June 13, July 1, July 27, Oct 14.

Grazed ley: Basal PK applied: Dec 22, 1954. Nitrochalk applied: Apr 19 and July 22, 1955. Grazed: 6 circuits, May 2-Sept 30.

Lucerne: Basal PK applied: Dec 22, 1954. Cut 4 times: June 14, July 27, Aug 31, Oct 12.

Oats: Ploughed: Oct 18, 1954. Nitrochalk applied: Mar 28. Seed drilled at $3\frac{1}{2}$ bushels per acre with basal PK: Mar 30. Combine harvested: Aug 9. Variety: Sun II.

1st Test Crop, Wheat

Ploughed: Oct 12, 1954. Seed drilled at $2\frac{3}{4}$ bushels with basal PK: Oct 20, 1954. Nitrochalk applied: May 11, 1955. Combine harvested: Aug 16. Variety: Yeoman.

2nd Test Crop, Potatoes

Ploughed: Oct 1, 1954. Ridged: Apr 27, 1955. Basal PK applied: Apr 28. Additional P and K, dung and sulphate of ammonia: May 2. Potatoes planted: May 3. Earthed up: June 29. Sprayed with 20% sulphuric acid in 100 gallons: Sept 30. Lifted: Oct 11. Variety: Majestic.

3rd Test Crop, Barley

Ploughed: Oct 18, 1954. Nitrochalk applied: Mar 28, 1955. Seed drilled at 2 bushels per acre with basal PK: Mar 30. Sprayed with MCPA, $2\frac{1}{2}$ pints in 40 gallons per acre: June 8. Combine harvested: Aug 9. Variety: Proctor.

Permanent grasses. Basal PK applied to all plots: Dec 22, 1954.

5th year reseeded grass, Blocks 6, 10, 11, 12.

Supplementary K applied to blocks 10 and 12: Mar 11, 1955. Nitrochalk applied: Apr 4 and July 15. Grazed: Blocks 6 and 10, 5 circuits, Apr 28-Oct 14; Blocks 11 and 12, 4 circuits, May 2-Oct 10.

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6th year reseeded grass, Blocks 5,7,8,9.
Blocks 5 and 7: Nitrochalk applied: Apr 18 and July 7, 1955.
Grazed: 5 circuits, May 16-Oct 14.
Blocks 8 and 9: Nitrochalk applied: Apr 18 and June 27, 1955. Cut for hay: June 27. Aftermath grazed: 1 circuit, Oct 2-Oct 6.

7th year reseeded grass, Blocks 1, 2, 3, 4.
Supplementary K applied to blocks 2 and 4: Mar 11, 1955 and July 15, 1955. Nitrochalk: Apr 18 and July 15. Grazed: 5 circuits, May 10-Sept 30.

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

Wheat, grain (at 85% dry matter).	Highfield:	2.10 cwt per acre or 4.6% (13 d.f.)
	Fosters:	2.70 cwt per acre or 7.7% (13 d.f.)
Potatoes, total tubers:	Highfield $\frac{1}{4}$ plot:	0.636 tons per acre or 6.2% (14 d.f.)
	Highfield $\frac{1}{8}$ plot:	0.702 tons per acre or 6.9% (20 d.f.)
	Fosters $\frac{1}{4}$ plot:	0.465 tons per acre or 5.8% (14 d.f.)
	Fosters $\frac{1}{8}$ plot:	0.594 tons per acre or 7.4% (20 d.f.)
Barley, grain (at 85% D.M.).	Highfield:	2.55 cwt per acre or 5.2% (15 d.f.)
	Fosters:	2.08 cwt per acre or 4.5% (15 d.f.)

https://doi.org/10.23637/ERADOC-1-175

Summary of Results

Wheat 1st test crop

N: cwt per acre	Treatment crops 1952-1954 Lucerne	Ley	Cut Grass	Arable with hay	Mean
Grain (at 85% Dry Matter): cwt per acre					
Highfield					
Mean	48.0	48.9	38.9	47.9	45.9
To test crop					
0.3	45.2	48.9	38.1	47.4	44.9
0.6	50.8	48.9	39.7	48.3	46.9
Difference (±1.49)	+5.6	0.0	+1.6	+0.9	+2.0 (±0.74)
To treatment crops					
Single rate		48.0	40.9	47.5	45.5
Double rate		49.9	36.9	48.2	45.0
Difference (±1.49)		+1.9	-4.0	+0.7	-0.5 (±0.86)
Fosters					
Mean	38.2	34.8	34.6	32.9	35.1
To test crop					
0.3	36.3	33.0	34.9	30.6	33.7
0.6	40.1	36.5	34.3	35.2	36.5
Difference (±1.91)	+3.8	+3.5	-0.6	+4.6	+2.8 (±0.95)
To treatment crops					
Single rate		35.6	35.2	33.1	34.6
Double rate		33.9	34.0	32.7	33.5
Difference (±1.91)		-1.7	-1.2	-0.4	-1.1 (±1.10)

https://doi.org/10.23637/ERADOC-1-175

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Wheat 1st test crop

N: cwt 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 to potatoes 1953: tons per acre None	Arable with hay only: Dung to potatoes 1953: tons per acre 12	Arable with hay only: Mean
Grain (at 85% Dry Matter): cwt per acre						
Highfield						
	(±0.86)		(±0.61)	(±1.49)		(±1.05)
To test crpp						
0.3	45.5	44.1	44.8	45.3	49.5	47.4
0.6	45.5	45.9	45.7	49.0	47.7	48.3
Mean	45.5	45.0	45.2	47.1	48.6	47.9
	(±0.61)			(±1.05)		
To previous treatment crops				(±1.49)		(±1.05)
Single rate				45.8	49.3	47.5
Double rate				48.5	48.0	48.2
Mean				47.1	48.6	47.9
				(±1.05)		

Mean dry matter % as harvested: 83.7

Fosters

	(±1.10)		(±0.78)	(±1.91)		(±1.35)
To test crop						
0.3	32.8	32.9	32.8	29.0	32.2	30.6
0.6	36.5	34.2	35.4	35.2	35.2	35.2
Mean	34.6	33.5	34.1	32.1	33.7	32.9
	(±0.78)			(±1.35)		
To previous treatment crops				(±1.91)		(±1.35)
Single rate				31.4	34.9	33.1
Double rate				32.9	32.5	32.7
Mean				32.1	33.7	32.9
				(±1.35)		

Mean dry matter % as harvested: 81.9

https://doi.org/10.23637/ERADOC-1-175

Potatoes 2nd test crop. Total tubers: tons per acre

	Treatment crops 1951-1953				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
Mean	10.05	10.48	9.78	10.53	10.21
N: cwt per acre					
0.5	9.50	10.18	9.78	10.28	9.94
1.0	10.60	10.77	9.78	10.78	10.48
Difference (±0.450)	+1.10	+0.59	0.00	+0.50	+0.54 (±0.225)
Dung: tons per acre					
None	8.76	10.09	8.88	9.74	9.37
12	11.34	10.86	10.69	11.32	11.05
Difference (±0.450)	+2.58	+0.77	+1.81	+1.58	+1.68 (±0.225)
P_2O_5: cwt per acre*					
0.9	9.77	10.53	9.72	10.40	10.11
1.8	10.33	10.42	9.85	10.66	10.31
Difference (±0.351)	+0.56	-0.11	+0.13	+0.26	+0.20 (±0.175)
K_2O: cwt per acre*					
0.9	9.38	9.94	8.95	10.12	9.60
1.8	10.72	11.01	10.62	10.94	10.82
Difference (±0.351)	+1.34	+1.07	+1.67	+0.82	+1.22 (±0.175)
Fosters					
Mean	8.62	8.29	7.35	7.65	7.97
N: cwt per acre					
0.5	8.73	8.13	7.64	7.58	8.02
1.0	8.50	8.44	7.05	7.71	7.93
Difference (±0.329)	-0.23	+0.31	-0.59	+0.13	-0.09 (±0.164)
Dung: tons per acre					
None	7.81	7.97	6.22	7.26	7.32
12	9.42	8.60	8.48	8.03	8.63
Difference (±0.329)	+1.61	+0.63	+2.26	+0.77	+1.31 (±0.164)
P_2O_5: cwt per acre*					
0.9	8.39	8.04	7.08	7.59	7.78
1.8	8.84	8.53	7.62	7.71	8.17
Difference (±0.297)	+0.45	+0.49	+0.54	+0.12	+0.39 (±0.148)
K_2O: cwt per acre*					
0.9	8.29	8.12	6.87	7.52	7.70
1.8	8.94	8.46	7.82	7.77	8.25
Difference (±0.297)	+0.65	+0.34	+0.95	+0.25	+0.55 (±0.148)

*Including basal dressing.

Potatoes 2nd test crop. Total tubers: tons per acre

	Dung: tons per acre		P_2O_5: cwt per acre*		K_2O: cwt per acre*	
	None	12	0.9	1.8	0.9	1.8
Highfield						
	(±0.225)		(1) and (2)		(1) and (2)	
N: cwt per acre						
0.5	9.19	10.68	9.94	9.93	9.18	10.69
1.0	9.55	11.42	10.27	10.69	10.01	10.96
			(1) and (2)		(1) and (2)	
Dung: tons per acre						
None			9.37	9.37	8.49	10.25
12			10.84	11.26	10.71	11.40

Lucerne rotation only	K_2O: cwt per acre*		
	0.9	1.8	Mean
P_2O_5: cwt per acre*	(3) and (4)		
0.9	9.12	10.42	9.77
1.8	9.65	11.01	10.33
Mean	9.38	10.72	10.05

	Dung: tons per acre		P_2O_5: cwt per acre*		K_2O: cwt per acre*	
	None	12	0.9	1.8	0.9	1.8
Fosters						
	(±0.164)		(1) and (2)		(1) and (2)	
N: cwt per acre						
0.5	7.20	8.84	7.86	8.18	7.83	8.21
1.0	7.43	8.43	7.69	8.16	7.57	8.28
			(1) and (2)		(1) and (2)	
Dung: tons per acre						
None			7.31	7.32	7.00	7.63
12			8.24	9.02	8.40	8.86

Lucerne rotation only	K_2O: cwt per acre*		
	0.9	1.8	Mean
P_2O_5: cwt per acre*	(3) and (4)		
0.9	7.96	8.83	8.39
1.8	8.63	9.05	8.84
Mean	8.29	8.94	8.62

*Including basal dressing

Highfield	Fosters	
(1) ±0.175	(1) ±0.148	for use in horizontal and interaction comparisons
(2) ±0.202	(2) ±0.157	for use in all others
(3) ±0.450	(3) ±0.329	for use only in testing the PK interaction
(4) ±0.403	(4) ±0.313	for use in all other comparisons.

https://doi.org/10.23637/ERADOC-1-175

Potatoes 2nd test crop. Percentage ware (1½" riddle)

	Treatment crops 1951-1953				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
Mean	82.5	82.7	81.0	82.3	82.1
N: cwt per acre					
0.5	82.2	80.8	81.2	82.3	81.6
1.0	82.8	84.6	80.7	82.4	82.6
Difference	+0.6	+3.8	-0.5	+0.1	+1.0
Dung: tons per acre					
None	81.4	81.3	79.1	81.4	80.8
12	83.5	84.1	82.8	83.2	83.4
Difference	+2.1	+2.8	+3.7	+1.8	+2.6
P_2O_5: cwt per acre*					
0.9	82.5	82.2	81.8	83.3	82.4
1.8	82.4	83.2	80.1	81.4	81.8
Difference	-0.1	+1.0	-1.7	-1.9	-0.6
K_2O: cwt per acre*					
0.9	81.2	82.8	78.9	81.3	81.0
1.8	83.7	82.6	83.0	83.4	83.2
Difference	+2.5	-0.2	+4.1	+2.1	+2.2
Fosters					
Mean	83.0	84.7	83.6	83.2	83.6
N: cwt per acre					
0.5	84.9	84.5	84.9	84.2	84.6
1.0	81.0	85.0	82.2	82.1	82.6
Difference	-3.9	+0.5	-2.7	-2.1	-2.0
Dung: tons per acre					
None	82.5	85.1	80.9	82.7	82.8
12	83.4	84.4	86.2	83.7	84.4
Difference	+0.9	-0.7	+5.3	+1.0	+1.6
P_2O_5: cwt per acre*					
0.9	82.7	84.7	83.6	83.3	83.6
1.8	83.2	84.8	83.6	83.1	83.7
Difference	+0.5	+0.1	0.0	-0.2	+0.1
K_2O: cwt per acre*					
0.9	83.6	85.0	82.6	82.4	83.4
1.8	82.3	84.5	84.6	84.0	83.8
Difference	-1.3	-0.5	+2.0	+1.6	+0.4

*Including basal dressing.

https://doi.org/10.23637/ERADOC-1-175

Potatoes 2nd test crop. Percentage ware ($1\frac{1}{2}$" riddle)

	Dung: tons per acre		P_2O_5: cwt per acre*		K_2O: cwt per acre*	
	None	12	0.9	1.8	0.9	1.8
Highfield						
N: cwt per acre						
0.5	80.7	82.5	82.2	81.0	80.4	82.8
1.0	80.9	84.3	82.6	82.6	81.7	83.5
Dung: tons per acre						
None			81.6	80.0	79.2	82.4
12			83.2	83.6	82.8	84.0

Lucerne rotation only	K_2O: cwt per acre*		
	0.9	1.8	Mean
P_2O_5: cwt per acre*			
0.9	81.4	83.6	82.5
1.8	81.1	83.8	82.4
Mean	81.2	83.7	82.5

	Dung: tons per acre		P_2O_5: cwt per acre*		K_2O: cwt per acre*	
	None	12	0.9	1.8	0.9	1.8
Fosters						
N: cwt per acre						
0.5	83.8	85.5	84.5	84.8	85.3	84.0
1.0	81.8	83.4	82.6	82.5	81.4	83.7
Dung: tons per acre						
None			83.1	82.5	82.5	83.1
12			84.0	84.8	84.3	84.6

Lucerne rotation only	K_2O: cwt per acre*		
	0.9	1.8	Mean
P_2O_5: cwt per acre*			
0.9	81.8	83.6	82.7
1.8	85.4	81.0	83.2
Mean	83.6	82.3	83.0

*Including basal dressing.

https://doi.org/10.23637/ERADOC-1-175

Barley 3rd test crop. Grain (at 85% Dry Matter): cwt per acre

	Treatment crops 1950-1952				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
Mean	50.6	48.6	48.6	49.0	49.2
N: cwt per acre					
None	49.7	48.5	50.6	46.8	48.9
0.2	51.5	48.7	46.6	51.2	49.5
Difference (±1.80)	+1.8	+0.2	-4.0	+4.4	+0.6 (±0.90)
Dung to potatoes 1954: tons per acre					
None	50.8	48.2	47.9	47.9	48.7
12	50.4	49.1	49.3	50.1	49.7
Difference (±1.80)	-0.4	+0.9	+1.4	+2.2	+1.0 (±0.90)

	N: cwt per acre	
	None	0.2
	(±0.90)	
Dung to potatoes 1954: tons per acre		
None	48.4	49.0
12	49.5	50.0

	Treatment crops 1950-1952				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Fosters					
Mean	48.4	46.5	45.1	45.5	46.4
N: cwt per acre					
0.2	47.3	44.5	43.6	44.7	45.0
0.4	49.5	48.5	46.7	46.4	47.8
Difference (±1.47)	+2.2	+4.0	+3.1	+1.7	+2.8 (±0.73)
Dung to potatoes 1954: tons per acre					
None	48.5	45.9	44.8	44.9	46.0
12	48.3	47.1	45.5	46.2	46.8
Difference (±1.47)	-0.2	+1.2	+0.7	+1.3	+0.8 (±0.73)

	N: cwt per acre	
	0.2	0.4
	(±0.73)	
Dung to potatoes 1954: tons per acre		
None	43.8	48.2
12	46.2	47.4

Mean dry matter % as harvested: Highfield: 78.7, Fosters: 79.6

https://doi.org/10.23637/ERADOC-1-175

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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 1955			Fosters N: cwt per acre applied in 1955		
	Single rate	Double rate	Mean	Single rate	Double rate	Mean
Hay (dry matter): cwt per acre						
No dung	51.4	53.1	52.3	51.4	55.7	53.5
Dung in 1953	48.5	45.7	47.1	52.7	57.0	54.9
Mean	50.0	49.4	49.7	52.0	56.4	54.2
Potatoes, total tubers: tons per acre						
No dung	8.83	8.61	8.72	6.96	7.34	7.15
Dung in 1955	10.29	9.68	9.99	9.29	9.28	9.29
Mean	9.56	9.15	9.35	8.13	8.31	8.22
Potatoes, percentage ware (1½" riddle)						
No dung	81.2	78.4	79.8	79.3	80.8	80.0
Dung in 1955	83.9	83.5	83.7	87.2	86.0	86.6
Mean	82.6	81.0	81.8	83.2	83.4	83.3
Oats, grain: cwt per acre						
	None	0.2		0.2 (at 85% Dry Matter)	0.4 (at 85% Dry Matter)	
No dung	50.6	52.9	51.8	39.7	45.9	42.8
Dung in 1954	50.2	49.7	49.9	40.6	45.1	42.9
Mean	50.4	51.3	50.8	40.2	45.5	42.8

Highfield, Oats, Mean dry matter % as harvested: 83.2
Fosters, Oats, Mean dry matter % as harvested: 81.9

https://doi.org/10.23637/ERADOC-1-175

Cut grass. Dry Matter: cwt per acre

Corrective dressing of K_2O: cwt per acre	Highfield					Fosters				
	N: to previous 3 test crops		Dung to potatoes 1953 tons per acre			N: to previous 3 test crops		Dung to potatoes 1953 tons per acre		
1st year 2.4	Single rate	Double rate	None	12	Mean	Single rate	Double rate	None	12	Mean
N(1) to cut grass (3 cuts)										
Single rate	30.3	31.2	32.9	28.5	30.7	7.9	9.8	9.1	8.6	8.8
Double rate	38.0	36.9	38.7	36.2	37.4	13.8	10.4	13.2	11.0	12.1
N to test crops										
Single rate			37.4	30.8	34.1			11.8	9.9	10.8
Double rate			34.2	33.8	34.0			10.5	9.7	10.1
Mean			35.8	32.3	34.1			11.1	9.8	10.5

	Highfield N to cut grass (1)			Fosters N to cut grass (1)		
	Single rate	Double rate	Mean	Single rate	Double rate	Mean
2nd year (5 cuts) 1.2	46.8	60.7	53.7	37.8	42.6	40.2
3rd year (5 cuts) None	32.2	45.7	39.0	31.9	36.5	34.2

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

Lucerne. Dry Matter: cwt per acre

Corrective dressing of K_2O: cwt per acre	Highfield			Fosters		
	N to 3 previous test crops			N to 3 previous test crops		
1st year 2.4 (3 cuts)	Single rate	Double rate	Mean	Single rate	Double rate	Mean
Dung to potatoes 1953						
None	24.4	23.2	23.8	21.6	23.5	22.6
12 tons	25.9	24.4	25.2	24.4	23.7	24.0
Mean	25.2	23.8	24.5	23.0	23.6	23.3

2nd year (4 cuts) 0.6	109.8	111.9
3rd year (4 cuts) None	79.6	106.9

https://doi.org/10.23637/ERADOC-1-175

Grazed Ley. Dry Matter: cwt per acre (estimated from sample cuts)

	Highfield N: cwt per acre (yearly)			Fosters N: cwt per acre (yearly)		
	0.15	0.30	Mean	0.15	0.30	Mean
1st year	26.9	27.2	27.1	10.4	10.3	10.4
2nd year	56.5	57.5	57.0	38.7	36.5	37.6
3rd year	55.8	66.5	61.2	40.7	42.3	41.5

Reseeded Grass. Dry Matter: cwt per acre

Corrective dressing of K_2O: cwt per acre	Cut for hay N Single rate	Cut for hay N Double rate	Mean	Grazed Estimated from sampling cuts N Single rate	Grazed Estimated from sampling cuts N Double rate	Mean
Highfield						
5th year						
None				49.5	55.7	52.6
1.2				50.4	52.0	51.2
Mean				49.9	53.9	51.9
6th year						
Blocks 5 & 8				42.1*	42.1*	42.1*
Blocks 6 & 7	64.5	65.6	65.0	23.7*	36.4*	30.1*
7th year						
None				27.1	38.1	32.6
2.4				34.0	33.9	33.9
Mean				30.6	36.0	33.3
Fosters						
5th year						
None				40.9	34.9	37.9
1.2				38.2	44.0	41.1
Mean				39.5	39.4	39.5
6th year						
Blocks 5 & 7				27.7*	29.1*	28.4*
Blocks 8 & 9	66.7	68.5	67.6	21.7*	17.5*	19.6*
7th year						
None				30.3	35.1	32.7
2.4				38.2	30.4	34.3
Mean				34.3	32.7	33.5

*Aftermath grazing.

https://doi.org/10.23637/ERADOC-1-175

Permanent Grass. Dry Matter: cwt per acre

Highfield

Corrective dressing of K_2O: cwt per acre	Cut for hay N Single rate	Cut for hay N Double rate	Cut for hay Mean	Grazed Estimated from sample cuts: N Single rate	Grazed Estimated from sample cuts: N Double rate	Grazed Estimated from sample cuts: Mean
5th experimental year Blocks 9-12						
None				36.6	39.3	38.0
1.2				42.7	45.1	43.9
Mean				39.7	42.2	40.9
6th experimental year Blocks 5&8				32.4*	38.2*	35.3*
Blocks 6&7	51.0	60.7	55.9	25.3*	25.2*	25.2*
7th experimental year Blocks 1-4						
None				37.3	34.8	36.1
2.4				30.9	34.0	32.4
Mean				34.1	34.4	34.3

*Aftermath grazing.

GREEN MANURING EXPERIMENT

Woburn Stackyard - 1955, the 2nd year of revised scheme.

For details of treatments etc. see "Results of the Field Experiments" 1954, Section Bd/1.

Area of each plot: 0.0395 acre. Area harvested: Barley, 0.0395; Potatoes, 0.0237 acre.

Cultivations, etc.:

Green manures after potatoes: Trefoil at 30 lb per acre, ryegrass at 40 lb per acre, sown: Aug 3, 1954. Varieties: Trefoil - English; Ryegrass - Western Wolths.

Barley: "Fallow" and "early" green manure plots ploughed: Dec 22, 1954. "Late" green manure plots ploughed: Mar 14, 1955. Ground chalk at 20 cwt per acre applied: Mar 15. Nitrochalk applied, seed drilled at 2½ bushels per acre: Mar 18. Trefoil and Italian ryegrass undersown: Apr 26. Harvested: Aug 5. Variety: Herta.

Early potatoes: Straw applied, fallow plots ploughed: Sept 29, 1954. Trefoil plots patched: Nov 3, 1954. Trefoil and ryegrass plots ploughed: Mar 14, 1955. Nitrochalk and basal fertilizers applied: Apr 6. Potatoes mechanically planted: Apr 12. Earthed up: June 28. Lifted: July 26. Variety: Ulster Chieftain.

Standard errors per plot:

Barley, Grain: 2.43 cwt per acre or 7.0% (20 d.f.)

Potatoes, Total tubers: 0.368 tons per acre or 13.1% (18 d.f.)

Estimates of produce (roots and tops) of green manure crops:

cwt per acre

	Green manure	Ploughed in	Dry matter	Nitrogen
For Barley	Trefoil	Early	27.6	0.923
	Ryegrass	Early	29.6	0.519
	Trefoil	Late	15.6	0.514
	Ryegrass	Late	26.7	0.533
For Potatoes	Trefoil		20.6	0.594
	Ryegrass		33.9	0.505

https://doi.org/10.23637/ERADOC-1-175

Summary of Results

Early Potatoes, total tubers: tons per acre

Undersown green manures for potatoes	Straw: tons per acre		N: cwt per acre (including basal)		Dung to cabbages 1953: tons per acre		Mean
	None	1½	0.23	0.46	None	10	
Excluding plots fallow under old scheme							
	(±0.130)		(±0.130)		(±0.130)		(±0.092)
None	2.71	2.88	2.70	2.90	2.69	2.90	2.80
	(±0.184)		(±0.184)		(±0.184)		(±0.130)
Trefoil	3.01	2.92	2.86	3.08	2.64	3.29	2.97
Ryegrass	2.68	2.78	2.82	2.63	2.32	3.13	2.73
Straw: tons per acre			(±0.120)		(±0.130)		(±0.092)
None			2.66	2.89	2.42	3.14	2.78
1½			2.88	2.86	2.76	2.97	2.87
N: cwt per acre (including basal)							
0.23					2.51	3.02	2.77
0.46					2.67	3.08	2.87
Mean (±0.092)					2.59	3.05	2.82
Plots fallow under old scheme							
			(±0.260)		(±0.260)		(±0.184)
Straw: tons per acre							
None			2.34	2.76	2.38	2.72	2.55
1½			2.82	2.92	2.60	3.14	2.88
N: cwt per acre (including basal)							
0.23					2.48	2.68	2.58
0.46					2.51	3.18	2.84
Mean (±0.184)					2.49	2.93	2.71

Old scheme	Undersown green manures for potatoes				Mean
	None Fallow	None	Trefoil	Ryegrass	
		Excluding Fallow			
	2.71 (±0.130)	2.80 (±0.092)	2.97	2.73 (±0.130)	2.80

Barley, grain: cwt per acre

	Green manures: Ploughed in Early	Green manures: Ploughed in Late	Green manures: barley for potatoes None	Green manures: barley for potatoes Undersown	N: cwt per acre (including basal) 0.23	N: cwt per acre (including basal) 0.46	Dung to cabbages 1952: tons per acre None	Dung to cabbages 1952: tons per acre 10	Mean
Excluding plots fallow under old scheme									
Green manures after potatoes for barley	(±0.86)		(±0.86)		(±0.86)		(±0.86)		(±0.61)
Trefoil	40.5	40.2	40.3	40.4	39.5	41.1	38.9	41.8	40.3
Ryegrass	34.1	34.1	34.9	33.3	29.4	38.8	32.5	35.7	34.1
Green manures ploughed in									
Early			38.3	36.2	35.7	38.9	36.1	38.5	37.3
Late			36.8	37.5	33.2	41.1	35.4	39.0	37.2
Green manures in barley for potatoes									
None					35.4	39.8	35.5	39.7	37.6
Undersown					33.6	40.2	36.0	37.8	36.9
N: cwt per acre (including basal)									
0.23							33.3	35.6	34.5
0.46							38.1	41.8	40.0
Mean (±0.61)							35.7	38.7	37.2

Old scheme	Green manures after potatoes for barley: None Fallow	Trefoil	Ryegrass	Excluding fallow	Mean
	25.7	40.3	34.1		34.9
	(±0.86)	(±0.61)			

Plots fallow under old scheme

N: cwt per acre (including basal)	(±1.72)		(±1.22)
0.23	17.4	26.0	21.7
0.46	29.9	29.4	29.7
Mean (±1.22)	23.6	27.7	25.7

55/Bd/1.3

Barley, straw: cwt per acre

	Green manures: Ploughed in Early	Green manures: Ploughed in Late	Green manures: In barley for potatoes None	Green manures: In barley for potatoes Undersown	N: cwt per acre (including basal) 0.23	N: cwt per acre (including basal) 0.46	Dung to cabbages 1952: tons per acre None	Dung to cabbages 1952: tons per acre 10	Mean
Excluding plots fallow under old scheme									
Green manures after potatoes for barley									
Trefoil	45.6	44.8	45.6	44.7	42.2	48.1	43.1	47.2	45.2
Ryegrass	34.7	35.0	35.1	34.6	27.1	42.6	32.5	37.2	34.9
Green manures ploughed in									
Early			41.0	39.2	36.2	44.1	38.0	42.3	40.1
Late			39.7	40.1	33.1	46.7	37.6	42.2	39.9
Green manures in barley for potates									
None					36.2	44.5	37.5	43.2	40.4
Undersown					33.1	46.2	38.1	41.2	39.7
N: cwt per acre (including basal)									
0.23							33.0	36.3	34.7
0.46							42.6	48.1	45.4
Mean							37.8	42.2	40.0

Plots fallow under old scheme

Old scheme	Green manures after potatoes for barley: None Fallow	Trefoil Excluding fallow	Ryegrass Excluding fallow	Mean
	24.7	45.2	34.9	37.0

N: cwt per acre (including basal)			
0.23	14.8	23.1	19.0
0.46	28.4	32.5	30.4
Mean	21.6	27.8	24.7

55/Ba/1.4

55/Be/1.1

LEY AND ARABLE ROTATIONS

Woburn Stackyard - 1955, the 18th year.

For details of rotations and treatments etc., see "Results of the Field Experiments" 1939-47, Vol. 1, section Bf/1 with the following exceptions:-

In 1949 and subsequently rye replaced wheat.
In 1954 and 1955 the seeds hay plots were split into two after the first crop, for testing 0.15 v. 0.30 cwt N per acre applied as nitrochalk.
In 1955 each of the 16 plots of test potatoes was split into four for the application (in addition to the basal fertilizer) of all combinations of
Nitrogen: None; 0.56 cwt N per acre as sulphate of ammonia.
Potash: None; 0.84 cwt K_2O per acre as muriate of potash.

Cultivations, etc.:

Treatment crops

Ley rotations

Ley 1st year. Ploughed twice: Sept 30, 1954 and Feb 2, 1955. Basal fertilizers applied: Apr 29. Seed sown: Apr 30. Nitrochalk applied: July 5. Grazed 4 circuits: June 28 - July 2, July 18-26, Sept 26-29, Oct 15-26. Seeds mixture (sown at 40 lb per acre): 24 lb S24 Perennial Ryegrass, 12 lb S143 Cocksfoot, 6 lb S123 Late Flowering Red Clover, 3 lb S100 White Clover.

Ley 2nd year. Nitrochalk applied: May 9, 1955 and July 5. Grazed 7 circuits: Apr 30 - May 9, May 19-27, June 8-20, July 2-10, July 26 - Aug 3, Sept 29 - Oct 7, Oct 26 - Nov 3.

Ley 3rd year. Nitrochalk applied: May 11, 1955 and July 21. Grazed 6 circuits: May 9-17, May 31 - June 8, June 20-28, July 10-18, Sept 17-25, Oct 10-18.

Lucerne 1st year. Ploughed twice: Sept 30, 1954 and Feb 2, 1955. Basal fertilizers applied: Apr 29. Seed sown at 25 lb per acre: Apr 30. Cut twice: July 27 and Sept 16. Variety: Du Puits.

Lucerne 2nd year. Cut three times: June 13, July 27, Sept 16.

Lucerne 3rd year. Cut three times: June 13, July 27, Sept 16.

Arable rotations

Potatoes 1st Course. Ploughed twice: Sept 30, 1954 and Feb 2, 1955. Basal fertilizers applied, ridged, potatoes planted with dropper: Apr 19. Earthed up: June 28. Lifted: Sept 2. Variety: Majestic.

Rye 2nd Course. Ploughed: Oct 26, 1954. Seed drilled at $3\frac{1}{4}$ bushels per acre: Dec 20. Nitrochalk applied: Apr 29, 1955. Seeds hay mixture undersown on 4 plots: May 9. Harvested: Aug 25. Variety: King II.

Seed Hay 3rd Course. Seeds undersown in Rye: May 7, 1954. Basal nitrochalk applied: Apr 19, 1955. 1st cut: June 13. Nitrochalk applied: June 14. 2nd cut: Sept 16. Seeds mixture per acre: 27 lb S24 Perennial Ryegrass, 12 lb Montgomery Red clover, 3 lb Canadian Alsike Clover.

Sugar beet 3rd Course. Ploughed twice: Oct 1, 1954 and Feb 1, 1955. Rubbed seed drilled at 8 lb per acre: Apr 16. Basal nitrate of soda applied: Apr 18. Sprayed with systemic insecticide, ½ pint in 40 gallons per acre: June 10. Singled: June 22. Lifted: Oct 28. Variety: Klein E.

Test crops

Potatoes 1st test crop. Ploughed twice: Nov 5, 1954 and Feb 4, 1955. Ridged, dung, basal and treatment fertilizers applied: Apr 21. Potatoes hand planted: Apr 22. Earthed up: June 28. Sprayed with copper fungicide, 5 lb per acre: Aug 19. Sprayed with arsenicus compound, 1 gallon in 40 gallons per acre: Sept 27. Lifted: Oct 3. Variety: Majestic.

Barley 2nd test crop. Ploughed twice: Oct 28, 1954 and Feb 3, 1955. Ground chalk applied: Mar 14. Nitrochalk applied, seed drilled at 3⅓ bushels per acre: Mar 17. Harvested: Aug 15. Variety: Plumage Archer.

Standard errors per plot, Test Crops.

Potatoes, Total tubers.	Whole plot: 0.828 tons per acre or 10.8%	(4 d.f.)
	½ plot: 0.497 tons per acre or 6.5%	(4 d.f.)
	⅛ plot: 1.162 tons per acre or 15.2%	(24 d.f.)
Barley, Grain.	Whole plot: 3.25 cwt per acre or 10.6%	(4 d.f.)
	½ plot: 1.97 cwt per acre or 6.5%	(4 d.f.)

Note. Potato root eelworm was found in this experiment in 1955. On the treatment crop potatoes, several plots were very badly affected and the results are unreliable. The eelworm was present on some of the test crop potatoes but the yields were probably only slightly affected.

https://doi.org/10.23637/ERADOC-1-175

Summary of Results

Treatment crops

Ley, Sheep days of grazing per acre

1st year	2nd year	3rd year
533	1575	1358

Lucerne, yield of hay (at 85% dry matter): cwt per acre

	1st crop	2nd crop	3rd crop	Total
1st year				
No dung	8.8	7.0		15.8
Dung in 1953	10.8	8.8		19.6
Increase	+2.0	+1.8		+3.8
Previous Rotation				
Lucerne	8.1	8.8		16.9
Arable with Sugar beet	11.5	7.0		18.5
Mean	9.8	7.9		17.7
2nd year				
No dung	33.1	30.4	14.2	77.7
Dung in 1952	40.8	38.2	15.8	94.8
Increase	+7.7	+7.8	+1.6	+17.1
Previous Rotation				
Lucerne	34.5	32.9	15.0	82.4
Arable with Hay	39.4	35.7	15.0	90.1
Mean	37.0	34.3	15.0	86.3
3rd year				
No dung	27.1	29.3	11.0	67.4
Dung in 1951	33.5	32.6	10.2	76.3
Increase	+6.4	+3.3	-0.8	+8.9
Previous Rotation				
Lucerne	26.6	27.9	8.9	63.4
Arable with Sugar beet	34.0	34.0	12.3	80.3
Mean	30.3	31.0	10.6	71.9

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Treatment crops

	Potatoes		Rye	
	Total tubers: tons per acre	Percentage ware ($1\frac{5}{8}$" riddle)	Grain: cwt per acre	Straw: cwt per acre
No dung	3.89	43.4	33.3	32.5
Dung*	4.62	49.2	34.4	35.9
Increase	0.73	5.8	1.1	3.4
Previous Rotation				
Ley	7.72	76.5	36.2	35.6
Lucerne	5.86	62.9	32.4	33.6
Arable with Hay	1.92	23.4	33.7	33.3
Arable with Sugar beet	1.51	22.6	33.1	34.3
Mean	4.25	46.3	33.9	34.2

Hay

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

	1st crop	2nd crop	Total	2nd crop Resp. to N
No dung	50.8	5.3	56.1	-1.2
Dung in 1951	56.9	6.8	63.7	+0.4
Increase	+6.1	+1.5	+7.6	+1.6
Previous Rotation				
Ley	58.1	7.4	65.5	-1.1
Arable with Hay	49.6	4.8	54.4	+0.3
Mean	53.8	6.1	59.9	-0.4

Sugar beet

	Roots (washed): tons per acre	Sugar percentage	Total sugar: cwt per acre	Tops: tons per acre
No dung	9.20	18.1	33.4	6.70
Dung in 1951	12.58	18.6	46.7	8.35
Increase	3.38	0.5	13.3	1.65
Previous Rotation				
Lucerne	10.91	18.2	39.6	7.28
Arable with Sugar beet	10.86	18.5	40.4	7.78
Mean	10.89	18.3	40.0	7.53

*Dung applied: Potatoes:- for test crop potatoes in 1953.
Rye:- for test crop potatoes in 1952.

https://doi.org/10.23637/ERADOC-1-175

	Test Crop: Previous Rotation				
	Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
Potatoes, Total tubers: tons per acre					
Mean (±0.586)	8.86	8.46	7.20	6.09	7.65
No dung (±0.636)	8.09	7.15	6.42	4.92	6.64
Dung	9.63	9.78	7.97	7.25	8.66
Response to 15 tons dung per acre (±0.497)	+1.54	+2.63	+1.55	+2.33	+2.02 (±0.249)
Response to additional 0.56 cwt N per acre					(±0.411)
No dung (±0.822)	-1.89	+1.69	+1.52	+0.53	+0.47
Dung	+1.41	+0.69	+0.88	+0.25	+0.81
Response to additional 0.84 cwt K_2O per acre					(±0.411)
No dung (±0.822)	+0.15	+1.11	+0.38	+1.44	+0.78
Dung	-0.61	+2.41	+0.06	-0.02	+0.46
Potatoes, Percentage ware ($1\frac{5}{8}$" riddle)					
Mean	87.7	87.4	86.0	80.2	85.3
No dung	88.0	86.0	85.6	80.5	85.0
Dung	87.5	88.7	86.5	80.0	85.7
Response to 15 tons dung per acre	-0.5	+2.7	+0.9	-0.5	+0.7
Response to additional 0.56 cwt N per acre					
No dung	+1.0	-1.1	+1.5	+1.5	+0.7
Dung	+0.4	+2.5	+1.1	+1.1	+1.3
Response to additional 0.84 cwt K_2O per acre					
No dung	-1.1	+4.6	+4.0	+1.9	+2.4
Dung	-0.7	-0.6	-0.8	+2.1	0.0

https://doi.org/10.23637/ERADOC-1-175

Test Crop

Plots receiving no additional N or K

	Previous Rotation				
	Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
Potatoes, Total tubers: tons per acre					
Mean (±0.675)	9.33	6.54	6.57	5.80	7.06
No dung (±0.955)*	9.35	5.54	5.27	4.28	6.11
Dung	9.32	7.54	7.87	7.32	8.01
Response to 15 tons dung per acre (±1.122)	-0.03	+2.00	+2.60	+3.04	+1.90
Potatoes, Percentage ware ($1\frac{5}{8}$" riddle)					
Mean	88.0	86.1	84.8	78.4	84.3
No dung	88.0	84.0	82.8	78.5	83.3
Dung	88.0	88.2	86.6	78.4	85.3
Response to 15 tons dung per acre	0.0	+4.2	+3.8	-0.1	+2.0

*For use in comparisons other than vertical.

https://doi.org/10.23637/ERADOC-1-175

Test Crop

	Previous Rotation				
	Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
Barley, Grain: cwt per acre					
No dung (±2.50)*	32.2	31.0	25.7	22.3	27.8
Dung in 1954	37.5	37.2	30.8	27.6	33.3
Mean (±2.30)	34.9	34.1	28.3	24.9	30.5
Increase (±1.97)	5.3	6.2	5.1	5.3	5.5 (±0.99)
Barley, Straw: cwt per acre					
No dung	34.2	29.6	25.7	22.3	27.9
Dung in 1954	38.0	38.2	33.3	28.5	34.5
Mean	36.1	33.9	29.5	25.4	31.2
Increase	3.8	8.6	7.6	6.2	6.6

*For use in comparisons other than vertical.

https://doi.org/10.23637/ERADOC-1-175

55/Bf/1.1

WOBURN MARKET GARDEN EXPERIMENT

Organic Manures and Nitrogen, Lansome 1955 the 14th 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.

Note: The results for the 1955-56 leeks will be included in the 1956 report.

Design (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 'Nitro-Chalk'): None; 0.3 cwt per acre on plots receiving organic manures. 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 dressing 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.:

Spring cabbages 1954-55.

Organic manures spread and ploughed in: Sept 25, 1954. Ground chalk at 20 cwt per acre, Aldrin at 1½ cwt per acre and basal fertilizer applied: Sept 27. Cabbages planted and watered in: Sept 29. First dressing of 'Nitro-Chalk' applied: Mar 14, 1955. Second dressing of 'Nitro-Chalk' applied: Apr 13. Cut 8 times: June 3 - July 8. Variety: Durham Early.

Note: The cabbages were attacked by pigeons in winter. The plots without organic manures or 'Nitro-Chalk' were particularly badly damaged.

Globe beet 1955.

Organic manures applied and ploughed in: Apr 29. Ground chalk applied at 20 cwt per acre: May 3. Basal fertilizer and first dressing of 'Nitro-Chalk' applied: May 11. Seed drilled at 14 lb per acre: May 16. Singled: July 1-8. Second dressing of 'Nitro-Chalk' applied: July 15. Harvested: Aug 18 - Sept 8. Variety: Detroit.

Standard errors per plot.

Spring cabbages 1954-55, weight of headed: 1.21 tons per acre or 23.3% (16 d.f.)*

Globe beet 1955, saleable bulbs: 1.30 tons per acre or 23.4% (17 d.f.)

*1 missing value.

Summary of Results

Spring cabbages 1954-55

Organic manures	Level of manuring: tons per acre	N: cwt per acre None	0.3	0.6	0.9	Mean
Weight of headed: tons per acre						
			(±0.853)			(±0.603)
None		0.22(1)	2.80	5.01	4.03	1.51*
Dung	10	2.06(2)	5.49			3.77
	20	5.60	8.05			6.82
Sludge compost	10	3.01	5.84			4.43
	20	4.45	8.56			6.51
Sludge	10	4.65	5.57			5.11
	20	5.84	10.45			8.14
Vegetable compost	10	2.86	5.55			4.20
	20	4.30	9.18			6.74
Mean (±0.301)		4.10+	7.34+			5.18
Total produce: tons per acre						
None		3.01(1)	5.44	7.55	6.43	4.22*
Dung	10	6.05(2)	7.78			6.92
	20	8.44	10.09			9.27
Sludge compost	10	7.22	8.15			7.68
	20	8.26	10.50			9.38
Sludge	10	8.05	8.83			8.44
	20	10.50	12.07			11.29
Vegetable compost	10	5.95	8.14			7.04
	20	7.48	10.73			9.10
Mean		7.74+	9.54+			8.03
Percentage headed, (by number)						
None		0.2(1)	40.4	58.8	53.0	20.3*
Dung	10	27.0(2)	64.4			45.7
	20	58.4	75.4			66.9
Sludge compost	10	36.5	69.3			52.9
	20	50.9	78.2			64.6
Sludge	10	52.4	57.0			54.7
	20	52.3	84.9			68.6
Vegetable compost	10	34.5	60.6			47.6
	20	49.8	84.5			67.1
Mean		45.2+	71.8+			54.4

(1) Both plots receiving no organics or N, were badly damaged by birds.
(2) Includes one estimated value.
* Mean over None and 0.3 cwt N per acre only.
\+ Excluding 'No organics'.

https://doi.org/10.23637/ERADOC-1-175

55/Bf/1.3

Globe beet 1955

Organic manures	Level of manuring: tons per acre	N: cwt per acre None	0.3	0.6	0.9	Mean
Saleable bulbs: tons per acre						
			(±0.917)			(±0.648)
None		1.37	1.58	2.72	3.13	1.47*
Dung	10	6.34	4.38			5.36
	20	7.68	8.07			7.87
Sludge compost	10	4.82	6.54			5.68
	20	8.19	8.25			8.22
Sludge	10	4.31	5.55			4.93
	20	6.79	7.01			6.90
Vegetable compost	10	5.61	6.64			6.12
	20	6.22	5.81			6.01
Mean (±0.324)		6.24+	6.53+			5.55
Total produce: tons per acre						
None		2.78	2.76	4.74	5.54	2.77*
Dung	10	9.37	7.38			8.37
	20	11.21	11.68			11.45
Sludge compost	10	7.72	10.09			8.91
	20	11.80	12.01			11.91
Sludge	10	7.07	9.08			8.07
	20	10.41	11.44			10.92
Vegetable compost	10	8.44	9.90			9.17
	20	9.47	9.50			9.48
Mean		9.44+	10.14+			8.62
Plant number: thousands per acre						
None		50.0	40.7	59.1	59.7	45.4*
Dung	10	79.1	76.9			78.0
	20	83.0	75.3			79.2
Sludge compost	10	75.5	76.7			76.1
	20	82.9	80.9			81.9
Sludge	10	75.5	75.3			75.4
	20	82.1	85.3			83.7
Vegetable compost	10	81.8	77.5			79.6
	20	80.5	84.2			82.4
Mean		80.0+	79.0+			74.1

*Mean over None and 0.3 cwt N per acre only.
+Excluding 'No organics'.

https://doi.org/10.23637/ERADOC-1-175

55/Bg/1.1

IRRIGATION EXPERIMENT

The 5th year

The effects of irrigation and nitrogen - Woburn Butt Close 1955.

For details of cropping, treatments etc. see "Results of the Field Experiments" 1954, Section 54/Bg/1. The 4 irrigation treatments (0 A B C) are not necessarily applied to a particular crop in any one year. For particulars of the irrigations and their designations the annual reports should be consulted.

Area of each sub-plot: Cut grass, 0.0264, remainder, 0.0278 acre.
Area harvested: Cut grass, 0.0165, potatoes, 0.0155, sugar beet, 0.0176, barley, 0.0168 acre.

Rainfall and Irrigation: inches

Week ending	Rainfall	Irrigation: Potatoes A	B	C	Sugar beet A	B	C	Barley B & C	Cut Grass A	B	C
May 2	0.36									.75	.75
9	0.28							.50		.06	.33
16	0.81										
23	1.94										
30	1.34										
June 6	0.30										
13	1.50										
20	0.25										
27	0.07										
July 4	0.21	.50		.50	.38		.50	.59			.56
11	-	.60		.60	.62		.50	.30			.80
18	-	1.34		1.34	1.34		1.34		1.00		1.08
25	-		.57	.57		.50	.50		.50		.82
Aug 1	-		.50	.50		.79	.79		.50	1.00	.50
8	0.02		.75	.75		.62	.62		.50	.57	.84
15	0.33		.50	.50		.19	.19		.20		.67
22	0.30					.35	.35		.33	.50	.56
29	0.03		.50	.50		.50	.50		.75		
Sept 5	-		.54	.54		.63	.63		.75	.50	.50
12	0.49		.50	.50		.50	.50		.33	.33	.33
19	0.11										
26	0.95										
Oct 2	0.01										
9	0.41										
16	-										
23	1.14										
30	0.23										
Nov 6	0.69										
Total	11.77	2.44	3.86	6.30	2.34	4.08	6.42	1.39	4.86	3.71	7.74

Note: On barley 0 = A
B = C.

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Cultivations, etc.:

Potatoes. Ploughed: Sept 9, 1954. FYM applied: Jan 17, 1955. Ploughed: Jan 24. Fertilizers applied: Apr 18. Potatoes planted by machine: Apr 19. Earthed up: June 22. Sprayed with arsenious compound, 1 gallon in 40 gallons per acre: Sept 27. Lifted: Oct 7. Variety: Majestic.

Sugar beet. Ploughed: Oct 29, 1954. Ground chalk applied at 20 cwt per acre: Mar 15, 1955. Salt applied: Apr 14. Fertilizers applied: Apr 15. Seed drilled at 5.7 lb per acre (rubbed and graded): Apr 18. Sprayed with Parathion, ½ pint in 40 gallons per acre: June 10. Singled: June 20. Lifted: Nov 1. Variety: Klein E.

Barley. Ploughed: Dec 22, 1954. Fertilizers applied, seed drilled at 2½ bushels per acre: Mar 18. Sprayed with MCPA, low volume, at 2½ pints per acre: May 22. Harvested: Aug 4. Variety: Herta.

Cut grass. Nitrochalk applied: Apr 13. Basal fertilizer applied: Apr 20. Cut: May 12, June 2, June 24, July 28 (A and C plots only), Aug 26, Sept 28 (A, B and C plots only), Nov 6. Nitrochalk applied after each cut except the last. Variety: Cocksfoot S37.

Standard errors per plot:

Potatoes,	Total tubers,	whole plot:	1.959 tons per acre or 12.0%	(6 d.f.)
		sub plot:	0.703 tons per acre or 4.3%	(8 d.f.)
Sugar beet,	Total sugar,	whole plot:	4.80 cwt per acre or 11.6%	(6 d.f.)
		sub plot:	3.82 cwt per acre or 9.3%	(8 d.f.)
	Tops,	whole plot:	1.229 tons per acre or 11.6%	(6 d.f.)
		sub plot:	0.782 tons per acre or 7.4%	(8 d.f.)
Barley,	Grain,	whole plot:	1.99 cwt per acre or 5.5%	(8 d.f.)
		sub plot:	1.89 cwt per acre or 5.2%	(10 d.f.)
Cut grass,	Dry matter,	whole plot:	4.05 cwt per acre or 6.8%	(6 d.f.)
		sub plot:	2.76 cwt per acre or 4.6%	(8 d.f.)

https://doi.org/10.23637/ERADOC-1-175

Summary of Results

N: cwt per acre including basal	Irrigation 0	A	B	C	Mean
Potatoes, total tubers: tons per acre					
		(±1.167)*			
0.5	10.83	15.57	16.73	19.03	15.54
1.0	11.40	16.60	18.36	21.66	17.00
Mean (±1.131)	11.11	16.08	17.55	20.35	16.27
Difference (±0.574)	+0.57	+1.03	+1.63	+2.63	+1.46 (±0.287)
Potatoes, percentage ware (1⅝" riddle)					
0.5	80.2	87.9	92.1	91.2	87.8
1.0	80.9	89.4	90.4	92.8	88.4
Mean	80.6	88.6	91.2	92.0	88.1
Difference	+0.7	+1.5	-1.7	+1.6	+0.6
Sugar beet, roots (washed): tons per acre					
0.4	9.83	10.06	12.40	13.33	11.40
0.8	10.53	12.91	14.08	15.23	13.19
Mean	10.18	11.48	13.24	14.28	12.30
Difference	0.70	2.85	1.68	1.90	1.79
Sugar beet, sugar percentage					
0.4	16.7	16.9	16.5	16.5	16.6
0.8	16.9	17.4	16.5	16.8	16.9
Mean	16.8	17.1	16.5	16.6	16.8
Difference	0.2	0.5	0.0	0.3	0.3
Sugar beet, total sugar: cwt per acre					
		(±3.18)*			
0.4	32.8	34.1	40.8	43.9	37.9
0.8	35.6	45.2	46.5	51.6	44.7
Mean (±2.77)	34.2	39.6	43.6	47.7	41.3
Difference (±3.12)	2.8	11.1	5.7	7.7	6.8 (±1.56)
Sugar beet, tops: tons per acre					
		(±0.778)*			
0.4	7.55	8.38	8.55	11.00	8.87
0.8	9.63	11.95	12.56	15.33	12.37
Mean (±0.710)	8.59	10.17	10.56	13.17	10.62
Difference (±0.638)	2.08	3.57	4.01	4.33	3.50 (±0.319)

*for use in comparisons other than vertical.

N: cwt per acre including basal	Irrigation 0 & A	B & C	Mean
	Barley, grain: cwt per acre		
	(±0.98)*		
0.2	31.7	32.5	32.1
0.4	40.5	39.4	39.9
Mean (±0.81)	36.1	36.0	36.0
Difference (±1.09)	8.8	6.9	7.8 (±0.77)
	Barley, straw: cwt per acre		
0.2	30.6	32.3	31.4
0.4	44.2	46.9	45.6
Mean	37.4	39.6	38.5
Difference	13.6	14.6	14.2

	Irrigation 0	A	B	C	
No. of cuts	5	7	6	7	Mean
Level of N	Cut grass, Dry Matter: cwt per acre				
	(±2.59)*				
N_1	37.1	52.1	44.9	63.3	49.4
N_2	54.5	78.4	66.8	81.5	70.3
Mean (±2.34)	45.8	65.3	55.8	72.4	59.8
Difference (±2.25)	17.4	26.3	21.9	18.2	20.9 (±1.13)

*for use in comparisons other than vertical.

Cut Grass

N_1 = 0.15 cwt N per acre after each cut except the last

N_2 = 0.30 cwt N per acre after each cut except the last.

https://doi.org/10.23637/ERADOC-1-175