ROTHAMSTED RESEARCH

Yields of the Field Experiments 1956

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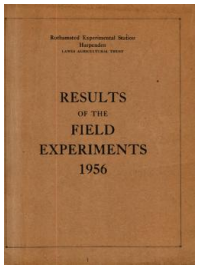

Default Title

Rothamsted Research

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Rothamsted Experimental Station
Harpenden
LAWES AGRICULTURAL TRUST

RESULTS
OF THE
FIELD
EXPERIMENTS
1956

https://doi.org/10.23637/ERADOC-1-176

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Lawes Agricultural Trust

RESULTS

of the

FIELD

EXPERIMENTS

1956

The summaries given in this report are similar to those contained in the appendices to the Annual Reports of the Station before the war. This year's report includes only experiments conducted at Rothamsted and Woburn. The design and supervision of these experiments are the responsibility of the Field Plots Committee (present members: F. Yates (Chairman), H. V. Garner (Secretary), F. C. Bawden, G. W. Cooke, J. R. Moffatt, C. A. Thorold, R. G. Warren, D. J. Watson).

Price: 5/-

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Index 1956

Classical Experiments*

Long Term Experiments

Short Term Experiments*

*At Rothamsted unless otherwise stated.

P. T. O.

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56/A/1.1

WHEAT - BROADBALK 1956

The 113th year

For history, treatments etc., see "Details of the Classical and Long Term Experiments" 1956.

Cultivations, etc.:

Cropped sections. Ground chalk and dung applied: Sept 6, 1955. Ploughed: Sept 7 - 14. Autumn fertilizers applied: Sept 29. Seed drilled at 2¾ bushels per acre: Nov 2. Spring fertilizers applied: May 9 - 10, 1956. Second dressing of nitrate of soda applied to plot 16: May 24. Harvested: Sept 1 - 4. Variety: Squareheads Master 13/4.

Fallow section. (IB) Ploughed: Sept 7 - 14, 1955, May 12 - 15, 1956 and July 17 - 18.

Summary of Results

Grain (at 85% dry matter): cwt per acre

Section	III	IV	VA	VB	II	IA	
Years after fallow	1	2	Unlimed 3	Limed 3	4	5	Mean
2A	27.3	22.3	22.7	19.5	22.6	18.1	23.0
2B	27.4	24.4	23.3	21.5	20.2	19.7	23.4
3	17.1	8.4	8.1	6.9	8.6	11.6	10.4
5	20.9	10.3	10.0	8.4	13.1	14.9	13.4
6	24.0	16.7	13.2	11.8	15.8	15.3	17.1
7	22.3	22.2	18.1	14.2	18.0	19.1	19.6
8	21.4	23.6	21.2	17.2	19.2	20.8	20.8
9	21.1	15.0	13.1	15.2	12.2	11.7	15.4
10	14.9	14.4	9.5	9.2	8.1	13.7	11.8
11	13.0	13.4	9.4	7.3	10.6	13.2	11.4
12	15.4	17.4	10.1	10.6	12.1	17.5	14.0
13	22.4	20.5	17.7	11.8	16.2	17.3	18.3
14	15.5	18.4	15.6	8.8	10.4	15.7	14.2
15	22.2	19.0	14.2	9.9	15.6	15.5	17.1
16	21.2	18.6	14.1	12.9	15.4	14.5	17.0
17	22.5	16.4	11.8	13.2	13.9	16.8	16.3
18	16.1	8.9	6.6	7.2	6.0	6.3	9.3
19	19.3	15.6	12.6	10.2	13.7	15.9	15.0
20	-	-	-	-	8.6	14.7	10.2

Mean dry matter % as threshed: 80.7

https://doi.org/10.23637/ERADOC-1-176

Straw (at 85% dry matter): cwt per acre

Section	III	IV	VA	VB	II	IA	
Years after fallow	1	2	Unlimed 3	Limed 3	4	5	Mean
2A	56.6	43.2	42.9	41.2	43.9	33.8	45.7
2B	51.2	45.3	40.7	41.0	38.7	35.9	43.5
3	27.5	14.1	14.6	12.6	13.0	13.3	16.8
5	30.0	19.4	21.9	19.4	20.4	20.2	22.5
6	36.6	28.8	26.1	22.7	22.4	21.2	27.6
7	38.7	37.9	33.6	28.9	29.5	27.0	33.9
8	34.4	42.0	38.2	32.7	29.1	33.1	35.1
9	32.7	25.8	22.2	24.2	19.2	16.0	24.7
10	25.0	21.9	18.8	17.1	15.6	20.2	20.1
11	25.6	23.8	23.2	20.2	18.2	21.2	22.3
12	27.1	28.4	26.6	20.2	19.7	28.0	24.8
13	37.1	32.5	31.0	25.3	26.5	27.4	30.8
14	26.0	29.8	23.9	21.8	16.3	25.1	23.8
15	38.7	32.7	31.1	28.0	27.9	27.2	31.9
16	39.1	31.4	27.1	26.0	25.5	24.4	30.2
17	36.0	27.5	25.4	25.9	21.4	22.2	27.3
18	30.9	16.3	15.3	20.5	10.2	10.5	18.3
19	33.4	29.0	27.5	23.2	22.6	23.7	27.4
20	-	-	-	-	16.6	19.8	17.4

Mean dry matter % as threshed: 80.6

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56/A/2

BARLEY - HOOSFIELD 1956

The 105th year

For history, treatments etc., see "Details of the Classical and Long Term Experiments", 1956.

Cultivations, etc.: Dung applied, all plots ploughed: Oct 16 - 19, 1955. Fertilizers applied: Mar 24 - 26, 1956. Seed drilled at 3 bushels per acre: Apr 3. Sprayed with 3 lb DNOC in 80 gallons per acre: May 28. Harvested: Sept 8. Variety: Plumage Archer.

Summary of Results

Plot	Grain (at 85% dry matter): cwt per acre	Straw (at 85% dry matter): cwt per acre
1 0	6.0	5.3
2 0	7.8	6.7
3 0	8.0	6.8
4 0	9.9	9.1
5 0	10.2	9.6
1 A	11.6	11.1
2 A	12.5	13.1
3 A	15.5	15.0
4 A	21.6	19.7
5 A	24.7	22.9
1 AA	14.4	14.1
2 AA	17.4	18.9
3 AA	19.4	18.9
4 AA	20.1	20.7
1 AAS	18.2	19.8
2 AAS	18.6	19.6
3 AAS	22.0	21.3
4 AAS	21.8	25.2
1 C	15.4	15.6
2 C	19.0	16.1
3 C	19.1	16.9
4 C	19.3	16.6
7 - 1	12.9	11.3
7 - 2	26.2	28.9
6 - 1	5.8	6.4
6 - 2	8.3	7.3
1 N	14.6	15.8
2 N	16.0	12.8
Mean dry matter % as threshed:	81.5	81.1

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56/A/3

WHEAT AFTER FALLOW - HOOSFIELD 1956

Without manure 1851 and since

For history, treatments etc. see "Details of the Classical and Long Term Experiments" 1956.

Cultivations, etc.:
Cropped plots. Ploughed: Sept 28, 1955. Seed drilled at 3 bushels per acre: Nov 2. Harvested: Sept 1, 1956. Variety: Squareheads Master 13/4.
Fallowed plots. Ploughed: Sept 28, 1955, May 15, 1956 and Aug 23.

Summary of Results

Mean yields (at 85% dry matter): cwt per acre

Plot	A2	A3	A4	
No. of years of fallow	1	1	3	Mean
Grain	10.2	11.3	10.7	10.7
Straw	15.3	17.1	16.0	16.1

Mean dry matter % as threshed, Grain: 80.5
Straw: 81.9

WINTER BEANS - AGDELL 1956

For history, treatments etc. see "Details of the Classical and Long Term Experiments" 1956. In 1956 a crop of winter sown beans was grown without manure.

Area of plot harvested: 0.0458 acres.

Cultivations, etc.:
Ploughed: Oct 8 - 10, 1955. Seed drilled at 275 lbs per acre: Oct 29. Combine harvested: Oct 4 - 6. Variety: S.Q.Giant.

Summary of Results

Grain (at 85% dry matter): cwt per acre

Manure to turnips 1948	None since 1848		Mineral manure No nitrogen		Complete mineral and nitrogenous manure		
Plot	5	6	3	4	1	2	
rotation	Fallow	Clover	Fallow	Clover	Fallow	Clover	Mean
	8.8	5.2	26.2	20.0	18.2	19.2	16.3

Mean dry matter % as harvested: 73.7

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56/A/4.1

MANGOLDS AND SUGAR BEET - BARNFIELD

The 81st and 11th years

For history, treatments etc., see "Details of the Classical and Long Term Experiments" 1956.

A corrective chalk dressing was applied to Series A and AC (excluding plot 9) at 5 tons of $CaCO_3$ per acre under the new liming scheme introduced in spring 1956.

The following areas were sprayed with trichloracetic acid:

First application to S half of plot 1N, S half of series O.
1st and 2nd applications: to N half of plot 1N, N half of series O.
3rd application to plot 9.

In June the plant was very irregular and backward on certain plots owing to the spring drought. It was decided to abandon these plots (no yields were recorded) and keep the land free of weeds by surface cultivations.

Cultivations, etc.: Dung applied: Nov 15 - 17, 1955. Ploughed: Nov 29 - Dec 1. Sprayed with TCA, sodium salt, at 20 lb in 90 gallons per acre: Mar 8 and again Mar 24, 1956. Ground chalk applied: Mar 29 and Apr 7. Fertilizers applied: Apr 11 - 17. Sugar beet seed drilled at 16 - 20 lb per acre: Apr 18. Mangolds seed drilled at 8 lb per acre: Apr 19. Singled: June 5 - 19. Abandoned crop on part of field: June 26. Top dressed remaining plots: June 29. 3rd application of TCA, sodium salt, at 20 lb in 80 gallons per acre: July 16. Lifted: Mangolds, Nov 22 - 26. Sugar beet, Nov 26 - 29. Varieties: Mangolds - Yellow Globe, Sugar beet - Klein E.

Cultivations to discarded areas after June 26:-
Thistle bar: June 26 - 28, July 6 - 7, July 13, Aug 9, Aug 22.
Springtine: Sept 25.

https://doi.org/10.23637/ERADOC-1-176

Summary of Results

Strip	Cross Dressing O	N	A	AC	C
		Mangolds, roots: tons per acre			
1	19.75	32.23	30.78	30.69	25.22
2	19.89	34.54	30.26	31.40	26.27
4		(a) 21.39*			
		(b) 22.28*			
5		19.05			
6		17.44			
7		20.18			
8					
9					
		Mangolds, leaves: tons per acre			
1	2.88	4.32	6.03	5.59	3.93
2	3.74	4.89	4.64	5.59	3.66
4		(a) 2.76*			
		(b) 3.52*			
5		2.39			
6		1.98			
7		2.49			
8					
9					
		Mangolds, plant number: thousands per acre			
1	18.0	19.8	18.2	17.4	16.4
2	21.4	19.8	18.9	17.6	19.2
4		(a) 20.9*			
		(b) 20.9*			
5		21.2			
6		20.9			
7		21.2			
8					
9					

*No nitrate of soda. Nitrogen applied as calcium and potassium nitrates.

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Strip	Cross Dressing 0	N	A	AC	C
	Sugar Beet, roots (washed): tons per acre				
1	9.50	12.18	12.80	12.57	12.96
2	10.25	13.48	13.36	14.64	13.47
4		(b) 8.02*			
5		7.58			
6		5.84			
7		8.46			
8					
9					
	Sugar Beet, tops: tons per acre				
1	7.43	12.11	13.14	14.80	9.09
2	8.60	13.92	12.16	14.95	10.36
4		(b) 8.16*			
5		7.23			
6		6.40			
7		6.79			
8					
9					
	Sugar Beet, plant number: thousands per acre				
1	21.1	21.6	22.3	20.7	22.1
2	25.8	23.2	22.5	20.5	22.2
4		(b) 22.5*			
5		24.5			
6		23.3			
7		23.1			
8					
9					
	Sugar Beet, sugar percentage				
1	18.7	18.3	18.3	17.5	18.7
2	18.0	18.0	17.7	16.7	18.4
4		(b) 18.6*			
5		17.9			
6		18.4			
7		18.3			
8					
9					

*No nitrate of soda. Nitrogen applied as calcium and potassium nitrates.

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56/A/5

HAY - THE PARK GRASS PLOTS 1956

The 101st year

For history, treatments etc. see "Details of the Classical and Long Term Experiments" 1956.

Cultivations, etc.: Lime applied: Nov 29, 1955. Mineral fertilizers applied: Dec 16. Supplementary ground chalk applied: Jan 4, 1956. Nitrogenous fertilizers applied: 1st dressing - Mar 22, 2nd dressing - Apr 16. Cut twice: July 12 and Nov 19 - 24.

Note: Because of the low CaO content of the lime used at the normal treatment rates, additional dressings of ground chalk were later applied to make up the deficiencies.

Summary of Results

Yield of Hay: cwt per acre

Plot	Not limed 1st Crop	Not limed 2nd Crop	Not limed Total	Limed 1st Crop	Limed 2nd Crop	Limed Total
1	1.5	4.6	6.1	7.9	5.5	13.4
2	7.7	6.1	13.8	7.1	4.4	11.5
3	7.3	6.0	13.3	7.7	3.0	10.7
4-1	15.5	9.2	24.7	15.7	10.4	26.1
4-2	5.7	10.4	16.1	22.3	9.6	31.9
5-1	7.0	4.5	11.5			
5-2	15.0	8.8	23.8			
6	20.6	12.4	33.0			
7	21.5	14.5	36.0	27.9	14.1	42.0
8	21.0	10.6	31.6	17.0	11.0	28.0
9	34.2	18.1	52.3	34.2	11.6	45.8
10	21.6	14.5	36.1	25.5	11.1	36.6
11-1	37.8	31.5	69.3	36.5	21.1	57.6
11-2	45.0	28.0	73.0	47.1	26.5	73.6
12	12.6	6.0	18.6			
13	23.2	13.2	36.4	18.7	12.0	30.7
14	41.7	22.9	64.6	34.5	17.5	52.0
15	15.2	10.2	25.4	27.0	19.6	46.6
16	24.7	16.9	41.6	28.7	19.1	47.8
17	23.2	16.0	39.2	19.6*	13.6*	33.2*
18	0.8	9.4	10.2	15.7+	4.4+	20.1+
				17.4*	7.5*	24.9*
19	19.7	17.0	36.7	20.6*	14.0*	34.6*
				23.3+	16.6+	39.9+
20	27.0	17.2	44.2	24.4*	12.4*	36.8*
				27.9+	17.0+	44.9+

*Heavy liming
+Light liming

Note: The second crop was carted green; hay yields were estimated from the dry matter.

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56/A/6

BARLEY - EXHAUSTION LAND HOOSFIELD 1956

For history, treatments etc., see "Details of the Classical and Long Term Experiments" 1956.

Cultivations, etc.: Ploughed: Sept 12 - 23, 1955 and again Nov 21. 'Nitro-Chalk' applied at 3½ cwt per acre: Mar 26, 1956. Seed drilled at 3 bushels per acre: Apr 3. Sprayed with MCPA, at 3 pints in 40 gallons per acre: May 17. Harvested: Aug 30. Variety: Plumage Archer.

Note. The NE halves of plots 1 and 2 (by the side land) were fallowed to reduce the weed infestation. (Ploughed: Sept 23, 1955, Nov 22, May 15, 1956, Aug 23.)

Summary of Results

Manuring to potatoes 1876 - 1901*	Yields (at 85% dry matter): cwt per acre Grain	Straw
1 Unmanured	8.7	11.1
2 Unmanured after dung 1876 - 81	11.5	12.8
3 Dung	20.7	21.3
4 Dung	20.8	20.7
5 Ammonium salts	9.4	11.8
6 Nitrate of soda	9.8	12.4
7 Ammonium salts and complete minerals	22.1	22.1
8 Nitrate of soda and complete minerals	21.1	19.3
9 Superphosphate	22.4	22.4
10 Complete minerals	23.9	25.7

*For certain changes see history.

Mean dry matter % as threshed:	80.4	79.2

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56/A/7

CLOVER - ROTHAMSTED GARDEN 1956

The 103rd year

For history, etc. see "Details of the Classical and Long Term Experiments" 1956. Starting in 1956, muriate of potash at 2 cwt per acre was applied to one half of the plot.

Cultivations, etc.:
Resowed all blank patches: Sept 7, 1955 and again Apr 21, 1956.
Muriate of potash applied: May 24. Cut twice: July 19 (only a few old plants surviving) and Sept 27 (almost all new plants).

Summary of Results

Dry matter: cwt per acre

Muriate of potash: cwt per acre	Cuts 1st	2nd	Total
None	0.4	0.8	1.2
2	0.4	3.8	4.2

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56/A/8

WHEAT AND BARLEY - WOBURN STACKYARD 1956

For history, treatments etc., for both experiments see "Details of the Classical and Long Term Experiments" 1956.

The land was bare fallowed in 1956 and sprayed with TCA (trichloracetic acid) to control grasses (Holcus mollis & Agrostis gigantea). The two halves of each plot were sprayed separately at different times. Ground chalk was applied to certain areas at 7.5 and 15 cwt $CaCO_3$ per acre.

A soil survey of the experimental area was made.

Cultivations etc.:

Wheat

Ploughed: Sept 26, 1955. Half of each plot sprayed with TCA, 20 lb in 40 gallons per acre: Nov 30, 1955 and again Mar 28, 1956. Ploughed across plots: June 18 - 20. Remaining half plots sprayed with TCA at 20 lb in 40 gallons per acre: July 26 and again Sept 26. Ground chalk applied: Aug 15.

Barley

Ploughed: Sept 7 - 25, 1955. Half of each plot sprayed with TCA, 20 lb in 40 gallons per acre: Dec 1, 1955 and again on Mar 28, 1956. Ploughed across plots: June 18 - 20. Remaining half plots sprayed with TCA at 20 lb in 40 gallons per acre: July 25 and again Sept 26. Ground chalk applied: Aug 15.

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56/Ba/1.1

THREE COURSE ROTATION EXPERIMENT

5th year of revised scheme

For history, treatments, etc., see "Details of the Classical and Long Term Experiments" 1956.

Area of each plot (acres): Potatoes (sub plot), 0.0092; barley, 0.0200; sugar beet, 0.0205.

Cultivations, etc.:

Potatoes.

Straw applied, all plots ploughed: Dec 2, 1955. Fertilizers applied: Apr 7, 1956. Potatoes machine planted: Apr 12. Earthed up: June 23. Sprayed with copper fungicide, 3 lb in 80 gallons per acre: July 25. Sprayed with sulphuric acid, 20% BOV at 80 gallons per acre: Sept 13. Lifted: Oct 11. Variety: Majestic.

Barley.

Straw applied, all plots ploughed: Dec 2, 1955. Ground chalk applied at 20 cwt per acre: Dec 7. Fertilizers applied, seed drilled at 3 bushels per acre: Mar 15, 1956. Sprayed with MCPA, 3 pints in 40 gallons per acre: May 15. Harvested: Aug 24. Variety: Plumage Archer.

Sugar beet.

Straw applied, all plots ploughed: Dec 2, 1955. Seed drilled at 18 lb per acre: Mar 29, 1956. Fertilizers applied: Mar 30. Singled: June 1 - 5. Lifted: Dec 6. Variety: Klein E.

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Summary of Results

Potatoes

Treatments applied: 1953 and 1955		1956	0		0.4N		St + 0.2N		St + 0.6N		K_s		K_s + 0.4N	
			-	K	-	K	-	K	-	K	-	K	-	K
1950	1951	1952 1954 & 1956	Total tubers: tons per acre											
	Ar	0			9.94	9.85								
		0.4N	11.98	10.72										
Ar		0			8.63	9.51								
		0.4N	10.79	10.72										
	St1 St2	0			9.65	10.38			11.59	12.17			10.04	10.09
		0.4N	11.40	12.37			11.54	13.39			11.88	13.29		
St1 St2		0			9.21	10.62								
		0.4N	10.72	12.37										
		St+ 0.2N			9.65	11.11								
		St+ 0.6N	11.30	12.08										
		K_s			8.83	10.28								
		K_s+ 0.4N	12.90	13.43										
	Ad	0			9.75	8.83			10.09	9.12			12.12	11.06
Ad		0.4N	10.91	10.72										
		St+ 0.6N	10.14	11.01										
		K_s+ 0.4N	12.90	13.63										

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56/Ba/1.3

Potatoes

Treatments applied: 1950	1951	1953 and 1955 / 1956	1952 1954 & 1956	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
				Percentage Ware ($1\frac{1}{2}$" riddle)											
	Ar	0				85.9	84.2								
		0.4N		86.4	88.1										
Ar		0				87.8	87.1								
		0.4N		87.6	87.6										
	St1 St2	0				85.8	87.1			88.0	88.6			87.2	89.2
		0.4N		85.3	82.1			88.9	88.8			88.8	87.4		
St1 St2		0				85.8	88.0								
		0.4N		86.7	87.0										
		St + 0.2N				87.1	85.3								
		St + 0.6N		85.9	89.1										
		K_s				85.5	82.0								
		K_s + 0.4N		86.9	85.4										
	Ad	0				82.9	88.4			85.9	87.8			88.8	88.3
Ad		0.4N		85.8	88.1										
		St+ 0.6N		86.5	83.6										
		K_s+ 0.4N		89.9	91.7										

Barley

Treatments applied: 1950	1951	1953 and 1955 / 1952 1954 & 1956	0	0.4N	St + 0.2N	St + 0.6N	K_s	K_s + 0.4N
Grain (at 85% dry matter): cwt per acre								
	Ar	0		28.1				
		0.4N	28.9					
Ar		0		26.3				
		0.4N	29.5					
	St1 St2	0		28.8		29.6		28.5
		0.4N	30.9		30.9		29.8	
St1 St2		0		27.5				
		0.4N	30.5					
		St+ 0.2N		30.2				
		St+ 0.6N	30.5					
		K_s		28.3				
		K_s+ 0.4N	30.4					
	Ad	0		26.3		30.2		27.7
Ad		0.4N	29.5					
		St+ 0.6N	29.3					
		K_s+ 0.4N	27.5					
Straw (at 85% dry matter): cwt per acre								
	Ar	0		30.5				
		0.4N	28.5					
Ar		0		27.5				
		0.4N	30.1					
	St1 St2	0		29.3		31.6		33.6
		0.4N	30.5		31.9		31.7	
St1 St2		0		26.6				
		0.4N	34.5					
		St+ 0.2N		29.9				
		St+ 0.6N	36.2					
		K_s		28.9				
		K_s+ 0.4N	31.9					
	Ad	0		25.4		32.5		27.0
Ad		0.4N	27.0					
		St+ 0.6N	32.5					
		K_s+ 0.4N	26.4					

Mean dry matter % as harvested Grain: 79.0
Straw: 76.7

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Sugar Beet

Treatments applied: 1950	1951	1953 and 1955 / 1952 / 1954 & 1956	0	0.4N	St + 0.2N	St + 0.6N	K_s	K_s + 0.4N
Roots (washed): tons per acre								
	Ar	0		8.88				
		0.4N	11.85					
Ar		0		9.10				
		0.4N	12.08					
	St1 St2	0		10.54		10.48		9.38
		0.4N	11.57		14.21		11.55	
St1 St2		0		9.21				
		0.4N	11.81					
		St+ 0.2N		9.58				
		St+ 0.6N	12.13					
		K_s		9.60				
		K_s+ 0.4N	11.87					
	Ad	0		9.80		8.84		9.91
Ad		0.4N	12.31					
		St+ 0.6N	13.05					
		K_s+ 0.4N	11.00					
Sugar Percentage								
	Ar	0		18.1				
		0.4N	18.4					
Ar		0		18.0				
		0.4N	18.1					
	St1 St2	0		18.2		17.8		18.7
		0.4N	18.6		17.8		18.1	
St1 St2		0		18.1				
		0.4N	18.2					
		St+ 0.2N		18.5				
		St+ 0.6N	18.3					
		K_s		18.0				
		K_s+ 0.4N	18.6					
	Ad	0		18.1		18.4		18.1
Ad		0.4N	18.2					
		St+ 0.6N	18.1					
		K_s+ 0.4N	17.8					

https://doi.org/10.23637/ERADOC-1-176

Sugar Beet

Treatments applied: 1950	1951	1953 and 1955 / 1952 1954 & 1956	0	0.4N	St + 0.2N	St + 0.6N	K_s	K_s + 0.4N
Total sugar: cwt per acre								
	Ar	0		32.2				
		0.4N	43.6					
Ar		0		32.7				
		0.4N	43.8					
	St1 St2	0		38.4		37.2		35.1
		0.4N	43.0		50.6		41.9	
St1 St2		0		33.3				
		0.4N	42.9					
		St+ 0.2N		35.5				
		St+ 0.6N	44.4					
		K_s		34.6				
		K_s+ 0.4N	44.3					
	Ad	0		35.5		32.5		35.9
Ad		0.4N	44.8					
		St+ 0.6N	47.1					
		K_s+ 0.4N	39.1					
Tops: tons per acre								
	Ar	0		7.08				
		0.4N	9.47					
Ar		0		6.48				
		0.4N	9.22					
	St1 St2	0		7.75		7.97		5.81
		0.4N	8.34		9.71		10.96	
St1 St2		0		7.20				
		0.4N	9.76					
		St+ 0.2N		7.79				
		St+ 0.6N	10.00					
		K_s		7.44				
		K_s+ 0.4N	9.41					
	Ad	0		7.31		6.09		7.73
Ad		0.4N	9.95					
		St+ 0.6N	11.70					
		K_s+ 0.4N	10.19					

https://doi.org/10.23637/ERADOC-1-176

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 & 1956						
		Plant number: thousands per acre						
	Ar	0		31.0				
		0.4N	29.6					
Ar		0		30.1				
		0.4N	30.4					
	St1 St2	0		31.1		30.0		30.9
		0.4N	31.3		30.3		29.8	
St1 St2		0		31.1				
		0.4N	30.3					
		St+ 0.2N		30.1				
		St+ 0.6N	30.3					
		K_s		31.4				
		K_s+ 0.4N	30.7					
	Ad	0		30.4		30.8		30.6
Ad		0.4N	30.4					
		St+ 0.6N	31.2					
		K_s+ 0.4N	30.2					

https://doi.org/10.23637/ERADOC-1-176

FOUR COURSE ROTATION EXPERIMENT

2nd year of revised scheme

For history, treatments etc., see "Details of the Classical and Long Term Experiments", 1956.

Area of each sub plot (acres): Potatoes, 0.0120; barley, 0.0129; beans (whole plot), 0.0244; wheat, 0.0129.

Area harvested (acres): Potatoes, 0.0093; barley, 0.0057; beans, 0.0097; wheat, 0.0056.

Note: The winter sown beans were badly thinned by frost and the crop was resown in spring.

Cultivations, etc.:

Potatoes. Ploughed: Sept 9, 1955 and Nov 17. Fertilizers applied broadcast on flat: Apr 7, 1956. Machine planted: Apr 11. Earthed up: June 26. Sprayed with copper fungicide, 3 lb in 80 gallons per acre: July 25. Sprayed with sulphuric acid 20% BOV: Sept 13. Lifted: Oct 10. Variety: Majestic.

Barley. Ploughed: Oct 11, 1955. Fertilizers applied, seed drilled at 3 bushels per acre: Mar 15, 1956. Sprayed with MCPA at 3 pints in 40 gallons per acre: May 15. Combine harvested: Sept 8. Variety: Plumage Archer.

Beans. Ploughed: Sept 23, 1955. Fertilizers applied: Oct 14. Seed drilled at 300 lb per acre: Oct 17. Whole block ploughed: Apr 11, 1956. Seed drilled at 200 lb per acre: Apr 12. Combine harvested: Oct 10. Variety: Spring Tick.

Wheat. Ploughed: Sept 24 - 26, 1955. Seed drilled at 2¾ bushels per acre: Oct 18. Potash and phosphate fertilizers applied: Oct 26. Nitrogen treatments applied: Apr 24, 1956. Sprayed with MCPA at 3 pints in 40 gallons per acre: May 22. Combine harvested: Sept 8. Variety: Yeoman.

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Summary of Results

Previous Manure	Treatment Year applied	P_2O_5: cwt per acre	Potatoes: Total tubers: tons per acre — N: cwt per acre 0.2	0.6	Mean	Diff.	Potatoes: Percentage Ware ($1\frac{1}{2}$" riddle) — N: cwt per acre 0.2	0.6	Mean	Diff.	Barley: Grain (at 85% dry matter): cwt per acre — N: cwt per acre None	0.4	Mean	Diff.
Dung	1954	0.24	9.69	12.97	11.33	+3.28	84.4	79.7	82.1	- 4.7	19.5	27.5	23.5	+ 8.0
	1953		8.19	9.68	8.94	+1.49	83.6	87.0	85.3	+ 3.4	15.9	26.8	21.4	+10.9
	1952		9.18	13.20	11.19	+4.02	87.8	78.4	83.1	- 9.4	22.8	28.3	25.6	+ 5.5
	1951		8.22	11.01	9.62	+2.79	85.1	84.5	84.8	- 0.6	20.1	26.3	23.2	+ 6.2
	1950		9.25	11.79	10.52	+2.54	87.8	82.2	85.0	- 5.6	16.7	26.6	21.6	+ 9.9
Adco (straw compost)	1954	0.12	9.11	10.11	9.61	+1.00	90.3	86.4	88.4	- 3.9	22.0	29.1	25.6	+ 7.1
	1953		8.42	9.99	9.21	+1.57	87.2	82.7	85.0	- 4.5	26.9	18.9	22.9	- 8.0
	1952		8.19	10.10	9.15	+1.91	83.7	87.0	85.4	+ 3.3	19.8	25.5	22.6	+ 5.7
	1951		7.68	9.37	8.53	+1.69	87.1	81.5	84.3	- 5.6	16.5	24.6	20.6	+ 3.1
	1950		8.48	10.91	9.70	+2.43	90.9	81.1	86.0	- 9.8	17.3	29.6	23.4	+12.3
Straw	1954	0.24	10.69	14.25	12.47	+3.56	85.2	84.4	84.8	- 0.8	20.3	29.7	25.0	+ 9.4
	1953		8.40	11.39	9.90	+2.99	82.9	83.3	83.1	+ 0.4	20.1	30.8	25.4	+10.7
	1952		9.09	9.90	9.50	+0.81	86.5	85.0	85.8	- 1.5	19.5	33.2	26.4	+13.7
	1951		8.59	11.09	9.84	+2.50	83.2	71.9	77.6	-11.3	11.8	30.7	21.2	+18.9
	1950		9.88	11.86	10.87	+1.98	83.6	86.2	84.9	+ 2.6	17.6	27.9	22.8	+10.3
Super-phosphate	1954	0.24	7.76	11.25	9.51	+3.49	86.1	82.9	84.5	-33.2	18.4	26.9	22.6	+ 8.5
	1953		9.32	11.01	10.17	+1.69	83.0	87.6	85.3	+ 4.6	20.9	26.3	23.6	+ 5.4
	1952		7.96	10.60	9.28	+2.64	84.3	87.8	86.1	+ 3.5	18.1	27.1	22.6	+ 9.0
	1951		8.63	10.79	9.71	+2.16	84.3	86.6	85.5	+ 2.3	12.7	26.0	19.4	+13.3
	1950		6.65	9.44	8.05	+2.79	86.6	85.4	86.0	- 1.2	16.5	28.3	22.4	+11.8
Rock phosphate	1954	None	6.39	8.31	7.35	+1.92	83.1	87.1	85.1	+ 4.0	20.3	24.4	22.4	+ 4.1
	1953		7.58	9.32	8.45	+1.74	92.7	82.4	87.6	-10.3	14.8	26.0	20.4	+11.2
	1952		5.94	7.78	6.86	+1.84	85.5	85.6	85.6	+ 0.1	9.1	21.7	15.4	+12.6
	1951		6.32	8.53	7.43	+2.21	87.0	91.0	89.0	+ 4.0	15.9	26.9	21.4	+11.0
	1950		6.00	5.84	5.92	-0.16	85.1	72.6	78.9	-12.5	14.3	25.0	19.6	+10.7

Mean dry matter % as harvested — 73.2

45

56/Ba/2.2

Previous Treatment			Wheat Grain (at 85% dry matter): cwt per acre				Beans Grain (at 85% dry matter): cwt per acre
Manure	Year applied	P_2O_5: cwt per acre	N: cwt per acre None	0.4	Mean	Diff.	
Dung	1954	0.24	15.3	20.3	17.8	+ 5.0	23.4
	1953		9.4	15.7	12.6	+ 6.3	23.4
	1952		6.5	13.0	9.8	+ 6.5	22.5
	1951		9.4	15.4	12.4	+ 6.0	22.9
	1950		6.2	13.5	9.8	+ 7.3	25.6
Adco (straw compost)	1954	0.12	8.1	12.2	10.2	+ 4.1	25.4
	1953		13.5	17.8	15.6	+ 4.3	26.3
	1952		13.7	18.3	16.0	+ 4.6	24.8
	1951		8.6	13.7	11.2	+ 5.1	25.7
	1950		14.5	12.6	13.6	- 1.9	24.8
Straw	1954	0.24	12.9	20.7	16.8	+ 7.8	21.8
	1953		11.4	15.6	13.5	+ 4.2	25.0
	1952		16.5	21.6	19.0	+ 5.1	24.4
	1951		9.4	17.3	13.4	+ 7.9	24.6
	1950		9.1	18.1	13.6	+ 9.0	23.9
Super-phosphate	1954	0.24	3.2	7.6	5.4	+ 4.4	22.4
	1953		2.5	12.9	7.7	+10.4	24.8
	1952		7.0	18.1	12.6	+11.1	22.2
	1951		3.5	10.3	6.9	+ 6.8	24.0
	1950		6.2	7.9	7.0	+ 1.7	23.7
Rock phosphate	1954	None	3.2	14.5	8.8	+11.3	20.3
	1953		5.6	18.6	12.1	+13.0	15.2
	1952		7.3	11.0	9.2	+ 3.7	18.7
	1951		3.2	7.9	5.6	+ 4.7	21.0
	1950		8.7	9.4	9.0	+ 0.7	15.2
Mean dry matter % as harvested:					74.1		54.4

https://doi.org/10.23637/ERADOC-1-176

56/Ba/3.1

SIX COURSE ROTATION EXPERIMENT

The 27th year

Seasonal effects of fertilizers - Rothamsted Long Hoos IV and Woburn Stackyard 1956.

For history, treatments etc., see "Details of the Classical and Long Term Experiments", 1956.

Area of each plot: Rothamsted, 0.0250 acres. Woburn, 0.0266 acres.

Cultivations, etc.:

Rothamsted

Sugar beet.
Ploughed: Sept 6, 1955 and Nov 24. Fertilizers applied, seed drilled at 18 lb per acre: Mar 29, 1956. Singled: May 24 - 30. Lifted: Dec 5. Variety: Klein E.

Barley.
Sugar beet tops spread: Nov 22, 1955. Ploughed: Nov 24. Ground chalk applied at 20 cwt per acre: Dec 2. Seed drilled at 3 bushels per acre: Mar 14, 1956. Fertilizers applied: Mar 15. Clover seed undersown: Apr 23. Harvested: Sept 12. Variety: Plumage Archer.

Clover.
Seed undersown in barley at 40 lb per acre: Apr 26, 1955. Autumn fertilizers applied: Oct 27. Sulphate of ammonia applied: Apr 9, 1956. Cut: July 13. Variety: Late flowering Montgomery Red.

Wheat.
Ploughed: July 28, 1955 and Oct 12. Autumn fertilizers applied: Oct 17. Seed drilled at 2¾ bushels per acre: Oct 18. Sulphate of ammonia applied: Apr 24, 1956. Harvested: Aug 22. Variety: Yeoman.

Potatoes.
Ploughed: Sept 6, 1955 and Oct 17. Ridged: Mar 26, 1956. Fertilizers applied, potatoes planted: Mar 27. Earthed up: June 23. Sprayed with copper fungicide at 3 lb in 80 gallons per acre: July 25. Sprayed with sulphuric acid, 20% BOV, 80 gallons per acre: Sept 13. Lifted: Oct 8. Variety: Majestic.

Rye.
Ploughed: Oct 3, 1955. Ground chalk applied at 20 cwt per acre: Oct 4. Autumn fertilizers applied: Oct 15. Seed drilled at 3 bushels per acre: Oct 17. Sulphate of ammonia applied: Apr 24, 1956. Harvested: Aug 21. Variety: King II.

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Woburn

Sugar beet.
Ploughed: Sept 1, 1955 and Dec 12. Fertilizers applied: Apr 6, 1956. Seed drilled at 12 lb per acre: Apr 9. Re-drilled thin places: May 12. Dusted with 5% DDT: May 19. Sprayed with parathion, ½ pint in 40 gallons per acre: May 25. Singled: June 6 - 7. Lifted: Oct 23. Variety: Klein E.
Note: The DDT and parathion were applied to control leaf miner (Pegomyia beta).

Barley.
Beet tops spread, ploughed: Oct 31, 1955. Fertilizers applied: Mar 13. Seed drilled at 2½ bushels per acre: Mar 15. Sprayed with MCPA, 2 pints in 20 gallons per acre: May 7. Harvested: Aug 14. Variety: Herta.

Clover.
Autumn fertilizers applied: Oct 13, 1955. Undersown crop failed during winter. Whole block ploughed: Mar 9, 1956. Sulphate of ammonia applied: Mar 27. Seed drilled at 40 lb per acre: Mar 28. Cut: July 6. Variety: Crimson Clover.

Wheat.
Ploughed: July 19, 1955. Autumn fertilizers applied: Oct 12, 1955. Seed drilled at 3 bushels per acre: Oct 15. Sulphate of ammonia applied: Apr 26, 1956. Sprayed with DNOC, 6 lb in 80 gallons per acre: May 1. Harvested: Aug 23. Variety: Yeoman.

Potatoes.
Ploughed: Sept 1, 1955 and Dec 12. Ridged, fertilizers applied, potatoes planted: Apr 4, 1956. Earthed up: June 18. Sprayed with copper fungicide, 5 lb in 40 gallons per acre: July 23. Sprayed with arsenious compound, 1 gallon in 40 gallons per acre: Sept 4. Lifted: Oct 4. Variety: Majestic.

Rye.
Ploughed: Oct 6, 1955. Ground chalk applied at 20 cwt per acre: Oct 13. Seed drilled at 2½ bushels per acre: Oct 15. Seed re-drilled at 2½ bushels per acre: Nov 16. Sulphate of ammonia applied: Apr 24, 1956. Harvested: Aug 23. Variety: King II.
Note: A poor plant was obtained from the first sowing because of a defective drill.

Note: In 1956 at Woburn the nitrogen levels were doubled on all crops except clover.

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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	11.59	10.76	25.3	34.0
Response to: N	+5.27	+8.97	+16.9	+23.6
P	-2.55	+2.21	-0.3	-1.0
K	+0.07	+0.64	-3.7	-2.7
Mean dry matter % as harvested:			80.9	
	Sugar Beet, sugar percentage		Barley, straw: cwt per acre *	
Mean	18.4	18.1	26.9	29.2
Response to: N	-0.4	0.0	+26.3	+25.1
P	0.0	-0.1	+0.5	-1.2
K	+0.1	+0.2	-6.4	-2.3
Mean dry matter % as harvested:			81.4	
	Sugar Beet, total sugar: cwt per acre		Clover, hay, dry matter: cwt per acre	
Mean	42.6	38.9	21.3	19.1
Response to: N	+18.5	+32.1	+5.3	-5.5
P	-9.1	+7.7	-11.7	+12.4
K	+0.6	+2.6	-2.5	+12.9
Mean dry matter % as harvested:			79.7	
	Sugar Beet, tops: tons per acre		Wheat, grain: cwt per acre *	
Mean	9.22	6.41	27.7	19.1
Response to: N	+6.32	+8.08	+6.1	+11.3
P	-4.37	+2.65	+5.7	-1.0
K	-0.31	+0.46	+1.6	-0.2
Mean dry matter % as harvested:			78.1	
	Sugar Beet, plant number: thousands per acre		Wheat, straw: cwt per acre *	
Mean	28.1	**	37.6	23.2
Response to: N	-2.1		+14.5	+10.9
P	-3.7		+10.5	-2.5
K	+1.1		-0.6	-1.2
Mean dry matter % as harvested:			79.9	

*(at 85% dry matter) **not recorded.

https://doi.org/10.23637/ERADOC-1-176 *pp 28*

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

	Rothamsted	Woburn	Rothamsted	Woburn
	Potatoes, total tubers: tons per acre		Rye, grain: cwt per acre	
			*	
Mean	9.03	10.87	28.8	30.7
Response to: N	+6.19	+5.33	+19.1	+15.5
P	+1.83	+2.61	+2.0	+1.9
K	+0.42	-0.04	-4.7	-5.7
Mean dry matter % as harvested:			76.6	
	Potatoes, percentage ware		Rye, straw: cwt per acre	
	(1)	(2)	*	
Mean	91.0	83.3	36.4	35.1
Response to: N	+7.3	+6.2	+23.1	+17.6
P	-17.1	-13.8	+2.3	+0.6
K	+0.2	-9.8	-6.9	-6.4
Mean dry matter % as harvested:			80.7	

*(at 85% dry matter)

Riddle: (1) $1\frac{1}{2}$"; (2) $1\frac{5}{8}$".

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DEEP CULTIVATION ROTATION EXPERIMENT

The 13th year

Deep ploughing, fertilizers and dung - Long Hoos I and II 1956.

For treatments etc. see "Details of the Classical and Long Term Experiments" 1956.

Area of each plot: 0.0312 acres. Area harvested:
Barley, spring oats, 0.0265 acres; ley, 0.0275 acres;
wheat, 0.0188 acres.

Termination of Experiment. Series 1 and 2, due to carry sugar beet and potatoes in 1956, were terminated. They completed the two cycles of the 6 course rotation in 1955 and were sown with barley this year.

Cultivations, etc.:

Barley

Ploughed: Dec 22, 1955. Ground chalk at 20 cwt per acre applied: Jan 3, 1956. Basic slag and sulphate of ammonia applied: Mar 10. Seed drilled at 3 bushels per acre: Mar 14. Seeds for 1 year ley undersown: Apr 24. Harvested: Aug 29. Variety: Plumage Archer.

Ley

Seeds undersown: Apr 26, 1955. Cut: June 21, 1956. Seeds mixture 18 lb S24 perennial ryegrass, 8 lb Montgomery red clover, 2 lb American Alsike clover.

Wheat

"Deep" plots ploughed: Oct 5, 1955. "Shallow" plots ploughed: Oct 6. Seed drilled at $2\frac{3}{4}$ bushels per acre; Oct 25. Sulphate of ammonia applied: Apr 30, 1956. Sprayed with MCPA, 3 pints in 40 gallons per acre: May 15. Combine harvested: Aug 29. Variety: Yeoman.

Oats

Ploughed: Nov 1, 1955. Ground chalk at 20 cwt per acre applied: Dec 2. Sulphate of ammonia applied: Mar 10, 1956. Seed drilled at 4 bushels per acre: Mar 13. Sprayed with MCPA, 3 pints in 40 gallons per acre: May 15. Harvested: Aug 30. Variety: Star.

Standard errors per plot:

Barley, Grain (at 85% D.M.):	1.81 cwt per acre or 6.4% (4 d.f.)
Ley, Hay:	3.38 cwt per acre or 15.1% (4 d.f.)
Wheat, Grain (at 85% D.M.):	1.08 cwt per acre or 3.9% (4 d.f.)
Spring Oats, Grain (at 85% D.M.):	0.945 cwt per acre or 3.9% (4 d.f.)

https://doi.org/10.23637/ERADOC-1-176

Summary of Results

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.
Barley									
Grain (at 85% dry matter): Mean yield 28.2 cwt per acre									
	(±0.90)				(±1.28)				
Ploughing deep-shallow	0.0	-	-	+0.3	-0.3	+0.9	-0.9	+0.1	-0.1
Dung	+1.8	+2.1	+1.5	-	-	+1.1	+2.5	+2.4	+1.2
Phosphate	-0.2	+0.7	-1.1	-0.9	+0.5	-	-	-0.7	+0.3
Potash	+0.3	+0.4	+0.2	+0.9	-0.3	-0.2	+0.8	-	-
Straw (at 85% dry matter): Mean yield 34.9 cwt per acre									
Ploughing deep-shallow	+3.1	-	-	+3.2	+3.0	+2.3	+3.9	+1.8	+4.4
Dung	+6.6	+6.7	+6.5	-	-	+6.1	+7.1	+9.5	+3.7
Phosphate	+0.3	-0.5	+1.1	-0.2	+0.8	-	-	+1.3	-0.7
Potash	+1.3	0.0	+2.6	+4.2	-1.6	+2.3	+0.3	-	-
Ley									
Hay: Mean yield 22.3 cwt per acre									
	(±1.69)				(±2.39)				
Ploughing deep-shallow	+1.4	-	-	+1.4	+1.4	0.0	+2.8	-0.4	+3.2
Dung	+3.9	+3.9	+3.9	-	-	+3.3	+4.5	+3.4	+4.4
Phosphate	-0.8	-2.2	+0.6	-1.4	-0.2	-	-	-1.2	-0.4
Potash	+1.3	-0.5	+3.1	+0.8	+1.8	+0.9	+1.7	-	-
Wheat*									
Grain (at 85% dry matter): Mean yield 27.7 cwt per acre									
	(±0.54)				(±0.76)				
Ploughing deep-shallow	+3.6	-	-	+5.2	+2.0	+3.5	+3.7	+3.0	+4.2
Dung	+2.5	+4.1	+0.9	-	-	+1.4	+3.6	+4.2	+0.8
Phosphate	+0.7	+0.6	+0.8	-0.4	+1.8	-	-	+0.4	+1.0
Potash	+1.3	+0.7	+1.9	+3.0	-0.4	+1.0	+1.6	-	-

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

Mean dry matter % as harvested:
- Barley, grain: 76.8
- straw: 73.7
- Wheat, grain: 73.3

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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.
Spring Oats									
Grain (at 85% dry matter): Mean yield 24.2 cwt per acre									
	(±0.47)				(±0.67)				
Ploughing deep-shallow	-1.8	-	-	-1.9	-1.7	-0.8	-2.8	-2.1	-1.5
Dung	+1.3	+1.2	+1.4	-	-	+2.3	+0.3	+2.0	+0.6
Phosphate	+2.0	+3.0	+1.0	+3.0	+1.0	-	-	+1.6	+2.4
Potash	+2.7	+2.4	+3.0	+3.4	+2.0	+2.3	+3.1	-	-
Straw: Mean yield 41.3 cwt per acre									
Ploughing deep-shallow	+1.3	-	-	+2.8	-0.2	+3.5	-0.9	+1.2	+1.4
Dung	+2.8	+4.3	+1.3	-	-	+1.5	+4.1	+3.2	+2.4
Phosphate	+1.2	+3.4	-1.0	-0.1	+2.5	-	-	+0.5	+1.9
Potash	+2.9	+2.8	+3.0	+3.3	+2.5	+2.2	+3.6	-	-

Mean dry matter % as harvested:
Spring oats, grain: 79.2

https://doi.org/10.23637/ERADOC-1-176

LEY AND ARABLE ROTATIONS

Highfield and Fosters Field 1956 - the 8th year.

For details of treatments, rotations, etc., see "Details of the Classical and Long Term Experiments" 1956.

Rates of application of supplementary (corrective) potash (K_2O: cwt per acre)

Crop	Year of cycle	Rate	
Cut grass	"1st treatment"	3.0	(3 years previous cutting)
	"2nd treatment"	1.5	(received supplement in 1955)
	"3rd treatment"	1.5	(received supplement in 1955)
Lucerne	"1st treatment"	3.0	(3 years previous lucerne)
	"2nd treatment"	1.0	(received supplement in 1955)
	"3rd treatment"	1.0	(received supplement in 1955)
Permanent and Reseeded	"1st treatment"	1.2	(1 previous hay crop taken)
Remainder		None	

Cultivations, etc.:

HIGHFIELD

1st year Treatment Crops

Cut grass. Ploughed twice: Sept 8, 1955 and Nov 29. 1st dressing of supplementary K applied: Mar 9, 1956. Basal PK and 'Nitro-Chalk' applied: Apr 17. Seed sown at 33 lb per acre: Apr 19. 2nd dressing of supplementary K applied: July 11. Cut 4 times: July 10, Aug 9, Sept 6, Nov 12. 'Nitro-Chalk' applied after each cut except the last.

Grazed ley. Ploughed twice: Sept 8, 1955 and Nov 29. Basal PK applied: Apr 17, 1956. 'Nitro-Chalk' applied: Apr 18. Seed sown at 44 lb per acre: Apr 19. 'Nitro-Chalk' applied: Aug 23. Grazed: 7 - 8 circuits, July 5 - Nov 1.

Lucerne. Ploughed twice: Sept 8, 1955 and Nov 29. 1st dressing of supplementary K applied: Mar 9, 1956. Basal PK applied: Apr 17. Seed drilled at 28 lb per acre: Apr 19. 2nd dressing of supplementary K applied: Aug 3. Cut twice: Aug 3, Nov 9. Variety: Du Puits.

Hay. Seeds undersown in barley at 28 lb per acre: Apr 25, 1955. Basal PK applied: Dec 5. 'Nitro-Chalk' applied: Mar 20, 1956. Cut: June 27.

2nd year Treatment Crops

Cut grass. Basal PK applied: Dec 6, 1955. Supplementary K applied: Mar 9, 1956. 'Nitro-Chalk' applied: Mar 15 and after each cut except the last. Cut 6 times: May 16, June 20, July 10, Aug 9, Sept 6, Nov 12.

Grazed ley. Basal PK applied: Dec 6, 1955. 'Nitro-Chalk' applied: May 7, 1956 and Aug 23. Grazed: 9 circuits, Apr 24 - Oct 28.

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Lucerne. Basal PK applied: Dec 6, 1955. Supplementary K applied: Mar 9, 1956. Cut 3 times: June 21, Aug 2, Nov 9.
Potatoes. Ploughed twice: June 11, 1955 and Oct 14. Ridged: Mar 26, 1956. Basal PK applied: Mar 27. Sulphate of ammonia and dung applied, potatoes planted: Mar 29. For later cultivations see Potato Test Crop.

3rd year Treatment Crops

Cut grass. Basal PK applied: Dec 6, 1955. Supplementary K applied: Mar 9, 1956. 'Nitro-Chalk' applied: Mar 15 and after each cut except the last. Cut 6 times: May 16, June 20, July 10, Aug 9, Sept 6, Oct 18.
Grazed ley. Basal PK applied: Dec 6, 1955. 'Nitro-Chalk' applied: May 7, 1956 and Aug 23. Grazed: 8 circuits, Apr 28 - Oct 5.
Lucerne. Basal PK applied: Dec 6, 1955. Sprayed with TCA (Sodium trichloracetate), 20 lb in 90 gallons per acre: Mar 8, 1956. Supplementary K applied: Mar 9. Cut 3 times: June 21, Aug 3, Oct 18.
Oats. Ploughed: Oct 14, 1955. 'Nitro-Chalk' applied, seed drilled at $3\frac{1}{2}$ bushels per acre with basal PK: Mar 13, 1956. Combine harvested: Sept 15. Variety: Sun II.

1st Test Crop, Wheat

Ploughed after oats: Sept 8, 1955. Ploughed leys: Oct 25 - 27. Seed drilled at $2\frac{3}{4}$ bushels per acre with basal PK: Nov 1. 'Nitro-Chalk' applied: Apr 25, 1956. Sprayed with MCPA, 3 pints in 40 gallons per acre: May 22. Combine harvested: Sept 17. Variety: Yeoman.

2nd Test Crop, Potatoes

Ploughed twice: Sept 8, 1955 and Nov 29. Ridged: Mar 26, 1956. Basal PK applied: Mar 27. Dung, sulphate of ammonia and additional P and K applied, potatoes planted: Mar 29. Earthed up: June 22. Sprayed with copper fungicide, 5 lb in 40 gallons per acre: July 25. Sprayed with sulphuric acid, 20% BOV at 80 gallons per acre: Sept 13. Lifted: Oct 12. Variety: Majestic.

3rd Test Crop, Barley

Ploughed: Oct 14, 1955. Ground chalk applied to blocks 9 and 12: Dec 5. 'Nitro-Chalk' applied: Mar 13, 1956. Seed drilled at 2 bushels per acre with basal PK: Mar 14. Combine harvested: Sept 15 - 17. Variety: Proctor.

Permanent grasses. Basal PK applied to all plots: Dec 6, 1955.
6th year reseeded, 6th experimental year of permanent grass, Blocks 9-12.
Blocks 9 and 12. Ground chalk applied: Dec 5, 1955. 'Nitro-Chalk' applied to reseeded grass: May 30, 1956 and Sept 7. 'Nitro-Chalk' applied to permanent grass: June 4 and Aug 27. Grazed: 8 circuits, May 6 - Nov 3.
Blocks 10 and 11. 'Nitro-Chalk' to reseeded grass: May 28, 1956 and Sept 3. 'Nitro-Chalk' to permanent grass: May 30 and Aug 27. Grazed: 8 circuits, May 6 - Oct 30.

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7th year reseeded, 7th experimental year of permanent grass, Blocks 5-8.
Blocks 5 and 8. Supplementary K applied: Mar 9, 1956. 'Nitro-Chalk' applied: Mar 20. Cut for hay, 'Nitro-Chalk' applied: June 27. Grazed aftermath: 4 circuits, July 21 - Oct 22.
Blocks 6 and 7. 'Nitro-Chalk' applied: May 24 - 26, 1956 and Aug 23. Grazed: 8 circuits, May 2 - Oct 30.

8th year reseeded, 8th experimental year of permanent grass, Blocks 1-4. 'Nitro-Chalk' applied: Mar 18, 1956 and Aug 27 - Sept 3. Grazed: 8-9 circuits, Apr 24 - Nov 7.

FOSTERS

1st year Treatment Crops

Cut grass. Ploughed twice: Sept 7, 1955 and Nov 28. 1st dressing of supplementary K applied: Mar 8, 1956. Basal PK applied: Mar 17. 'Nitro-Chalk' applied: Mar 18. Seed sown at 33 lb per acre: Mar 19. 2nd dressing of supplementary K applied: July 12. Cut 4 times: July 11, Aug 8, Sept 8, Nov 12. 'Nitro-Chalk' applied after each cut except the last.

Grazed ley. Ploughed twice: Sept 8, 1955 and Nov 29. Basal PK applied: Apr 17, 1956. 'Nitro-Chalk' applied: Apr 18. Seed sown at 44 lb per acre: Apr 19. 'Nitro-Chalk' applied: Aug 24. Grazed: 5 circuits, July 6 - Oct 19.

Lucerne. Ploughed twice: Sept 7, 1955 and Nov 28. 1st dressing of supplementary K applied: Mar 8, 1956. Basal PK applied: Apr 17. Seed drilled at 28 lb per acre: Apr 19. 2nd dressing of supplementary K applied: Aug 2. Cut twice: Aug 1 and Nov 9. Variety: Du Puits.

Hay. Seeds undersown in barley at 28 lb per acre: Apr 25, 1955. Basal PK applied: Dec 5. 'Nitro-Chalk' applied: Mar 20, 1956. Cut: June 25.

2nd year Treatment Crops

Cut grass. Basal PK applied: Dec 5, 1955. Supplementary K applied: Mar 8, 1956. 'Nitro-Chalk' applied: Mar 14 and after each cut except the last. Cut 6 times: May 16, June 20, July 11, Aug 8, Sept 8, Nov 12.

Grazed ley. Basal PK applied: Dec 5, 1955. 'Nitro-Chalk' applied: May 7, 1956 and Aug 25. Grazed: 7-8 circuits, Apr 25 - Oct 23.

Lucerne. Basal PK applied: Dec 6, 1955. Supplementary K applied: Mar 8, 1956. Cut 3 times: June 22, July 31, Nov 9.

Potatoes. Ploughed twice: June 11, 1955 and Oct 14. Ridged: Mar 26, 1956. Basal PK applied: Mar 27. Sulphate of ammonia and dung applied, potatoes planted: Mar 28. For later cultivations see Potato Test Crop.

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3rd year Treatment Crops

Cut grass. Basal PK applied: Dec 5, 1955. Supplementary K applied: Mar 8, 1956. 'Nitro-Chalk' applied: Mar 14 and after each cut except the last. Cut 6 times: May 16, June 20, July 11, Aug 8, Sept 8, Oct 19.

Grazed ley. Basal PK applied: Dec 5, 1955. 'Nitro-Chalk' applied: May 7, 1956 and Aug 24. Grazed: 7 circuits, Apr 29 - Oct 15.

Lucerne. Basal PK applied: Dec 5, 1955. Supplementary K applied: Mar 8, 1956. Cut 3 times: June 22, July 31, Oct 19.

Oats. Ploughed: Oct 13, 1955. 'Nitro-Chalk' applied, seed drilled at 3½ bushels per acre with basal PK: Mar 13, 1956. Combine harvested: Sept 14. Variety: Sun II.

1st Test Crop, Wheat

Ploughed after oats: Sept 7, 1955. Ploughed leys: Oct 27. Seed drilled at 2¾ bushels per acre with basal PK: Nov 1. 'Nitro-Chalk' applied: Apr 25, 1956. Sprayed with MCPA, 3 pints in 40 gallons per acre: May 17. Combined harvested: Sept 4. Variety: Yeoman.

2nd Test Crop, Potatoes

Ploughed twice: Sept 7, 1955 and Nov 28. Ridged: Mar 26, 1956. Basal PK applied: Mar 27. Dung, sulphate of ammonia and additional P and K applied, potatoes planted: Mar 27 - 28. Earthed up: June 22. Sprayed with copper sulphate, 5 lb in 40 gallons per acre: July 24. Sprayed with sulphuric acid, 20% BOV at 80 gallons per acre: Sept 13. Lifted: Oct 9. Variety: Majestic.

3rd Test Crop, Barley

Ploughed: Oct 13, 1955. 'Nitro-Chalk' applied: Mar 13, 1956. Seed drilled at 2 bushels per acre with basal PK: Mar 14. Combine harvested: Sept 14. Variety: Proctor.

Note: One block received a basal dressing of sulphate of ammonia in error.

Permanent grasses. Basal PK applied to all plots: Dec 5, 1955.

6th year reseeded grass, Blocks 6, 10, 11, 12.
'Nitro-Chalk' applied: May 14, 1956 and Aug 25. Grazed: 7 circuits, May 3 - Oct 27.

7th year reseeded grass, Blocks 5, 7, 8, 9.
Blocks 5 and 7. Supplementary K applied: Mar 8, 1956. 'Nitro-Chalk' applied: Mar 20. Cut for hay, 'Nitro-Chalk' applied: June 25. Grazed aftermath: 4 circuits, July 28 - Oct 7.
Blocks 8 and 9. 'Nitro-Chalk' applied: May 14, 1956 and Aug 24. Grazed: 7 circuits, May 3 - Oct 19.

8th year reseeded grass, Blocks 1, 2, 3, 4.
'Nitro-Chalk' applied: May 14, 1956 and Aug 29 - Sept 3. Grazed: 8-9 circuits, Apr 25 - Oct 31.

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Standard errors per ¼ plot. Test Crops.

Wheat, grain (at 85% dry matter).	Highfield:	1.78	cwt per acre or 5.5% (13 d.f.)
	Fosters:	1.36	cwt per acre or 3.8% (13 d.f.)
Potatoes, total tubers.	Highfield ¼ plot:	1.507	tons per acre or 9.4% (14 d.f.)
	⅛ plot:	1.134	tons per acre or 7.1% (20 d.f.)
	Fosters ¼ plot:	0.531	tons per acre or 3.7% (14 d.f.)
	⅛ plot:	1.011	tons per acre or 7.1% (20 d.f.)
Barley, grain (at 85% dry matter).	Highfield:	2.73	cwt per acre or 8.0% (15 d.f.)
	Fosters:	1.64	cwt per acre or 4.2% (15 d.f.)

Summary of Results

Wheat 1st test crop

N: cwt per acre	Treatment crops 1953-1955: Lucerne	Ley	Cut Grass	Arable with hay	Mean
Grain (at 85% dry matter): cwt per acre					
Highfield					
Mean	34.2	36.2	20.4	39.7	32.6
To test crop					
0.3	34.8	36.9	21.4	38.2	32.8
0.6	33.7	35.4	19.5	41.1	32.4
Difference (±1.26)	-1.1	-1.5	-1.9	+2.9	-0.4 (± 0.63)
To treatment crops					
Single rate		36.3	22.2	39.2	32.6
Double rate		36.1	18.7	40.1	31.6
Difference (±1.26)		-0.2	-3.5	+0.9	-1.0 (± 0.73)
Fosters					
Mean	41.7	36.1	33.8	30.5	35.5
To test crop					
0.3	40.4	34.6	32.0	27.1	33.5
0.6	43.0	37.6	35.7	34.0	37.6
Difference (±0.96)	+2.6	+3.0	+3.7	+6.9	+4.1 (± 0.48)
To treatment crops					
Single rate		35.2	33.4	28.8	32.5
Double rate		37.0	34.3	32.3	34.5
Difference (±0.96)		+1.8	+0.9	+3.5	+2.0 (± 0.56)

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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 1954: tons per acre: None	Arable with hay only: Dung to potatoes 1954: tons per acre: 12	Arable with hay only: Mean
Grain (at 85% dry matter): cwt per acre						
Highfield						
To test crop	(± 0.73)		(± 0.51)	(± 1.26)		(± 0.89)
0.3	32.0	32.4	32.2	37.0	39.3	38.2
0.6	33.2	30.9	32.0	39.3	42.9	41.1
Mean	32.6	31.6	32.1	38.2	41.1	39.7
	(± 0.51)			(± 0.89)		
To previous treatment crops				(± 1.26)		(± 0.89)
Single rate				37.9	40.4	39.2
Double rate				38.5	41.8	40.1
Mean				38.2	41.1	39.7
				(± 0.89)		
Mean dry matter % as harvested: 81.6						
Fosters						
To test crop	(± 0.56)		(± 0.39)	(± 0.96)		(± 0.68)
0.3	30.2	32.3	31.2	26.7	27.6	27.1
0.6	34.8	36.8	35.8	32.6	35.3	34.0
Mean	32.5	34.5	33.5	29.6	31.5	30.5
	(± 0.39)			(± 0.68)		
To previous treatment crops				(± 0.96)		(± 0.68)
Single rate				28.2	29.3	28.8
Double rate				31.0	33.6	32.3
Mean				29.6	31.5	30.5
				(± 0.68)		
Mean dry matter % as harvested: 71.4						

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Wheat 1st test crop

N: cwt per acre	Treatment crops 1953-1955 Lucerne	Ley	Cut Grass	Arable with hay	Mean
Straw (at 85% dry matter): cwt per acre					
Highfield					
Mean	24.2	37.1	15.3	26.7	25.8
To test crop					
0.3	24.8	37.3	15.0	28.9	26.5
0.6	23.6	37.0	15.6	24.5	25.2
Difference	-1.2	-0.3	+0.6	-4.4	-1.3
To treatment crops					
Single rate		36.3	17.2	25.8	26.4
Double rate		38.0	13.4	27.6	26.3
Difference		+1.7	-3.8	+1.8	-0.1
Fosters					
Mean	26.2	27.5	22.0	21.2	24.2
To test crop					
0.3	27.1	26.7	20.4	18.9	23.3
0.6	25.3	28.3	23.6	23.4	25.2
Difference	-1.8	+1.6	+3.2	+4.5	+1.9
To treatment crops					
Single rate		27.0	22.9	18.6	22.8
Double rate		27.9	21.2	23.7	24.3
Difference		+0.9	-1.7	+5.1	+1.5

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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 1954: tons per acre: None	Arable with hay only: Dung to potatoes 1954: tons per acre: 12	Arable with hay only: Mean
Straw (at 85% dry matter): cwt per acre						
Highfield						
To test crop						
0.3	26.4	27.8	27.1	26.7	31.2	28.9
0.6	26.5	24.9	25.7	24.8	24.2	24.5
Mean	26.4	26.3	26.4	25.8	27.7	26.7
To previous treatment crops						
Single rate				26.1	25.6	25.8
Double rate				25.4	29.8	27.6
Mean				25.8	27.7	26.7
Mean dry matter % as harvested: 84.6						
Fosters						
To test crop						
0.3	21.0	23.0	22.0	17.1	20.8	18.9
0.6	24.6	25.6	25.1	24.8	21.9	23.4
Mean	22.8	24.3	23.6	21.0	21.4	21.2
To previous treatment crops						
Single rate				18.8	18.5	18.6
Double rate				23.2	24.2	23.7
Mean				21.0	21.4	21.2
Mean dry matter % as harvested: 83.4						

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

	Treatment crops 1952-1954				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
Mean	15.64	17.86	14.81	15.54	15.96
N: cwt per acre					
0.5	16.13	17.89	14.74	15.18	15.98
1.0	15.15	17.82	14.87	15.90	15.94
Difference (±1.066)	-0.98	-0.07	+0.13	+0.72	-0.04 (± 0.533)
Dung: tons per acre					
None	13.10	16.62	13.38	13.92	14.25
12	18.19	19.10	16.23	17.16	17.67
Difference (±1.066)	+5.09	+2.48	+2.85	+3.24	+3.42 (± 0.533)
P_2O_5: cwt per acre*					
0.9	15.75	17.99	14.47	15.12	15.83
1.8	15.54	17.72	15.14	15.96	16.09
Difference (±0.567)	-0.21	-0.27	+0.67	+0.84	+0.26 (± 0.284)
K_2O: cwt per acre*					
0.9	14.53	17.47	13.65	14.40	15.01
1.8	16.75	18.25	15.96	16.67	16.91
Difference (±0.567)	+2.22	+0.78	+2.31	+2.27	+1.90 (± 0.284)
Fosters					
Mean	14.23	14.76	13.37	14.70	14.27
N: cwt per acre					
0.5	14.22	14.40	13.62	14.18	14.10
1.0	14.24	15.12	13.12	15.22	14.43
Difference (±0.375)	+0.02	+0.72	-0.50	+1.04	+0.33 (± 0.188)
Dung: tons per acre					
None	12.95	14.28	12.01	13.37	13.15
12	15.51	15.24	14.73	16.03	15.38
Difference (±0.375)	+2.56	+0.96	+2.72	+2.66	+2.23 (± 0.188)
P_2O_5: cwt per acre*					
0.9	14.44	14.79	12.94	14.53	14.17
1.8	14.02	14.73	13.80	14.87	14.36
Difference (±0.505)	-0.42	-0.06	+0.86	+0.34	+0.19 (± 0.253)
K_2O: cwt per acre*					
0.9	13.65	14.41	13.13	14.68	13.97
1.8	14.81	15.11	13.61	14.72	14.56
Difference (±0.505)	+1.16	+0.70	+0.48	+0.04	+0.59 (± 0.253)

*Including basal dressing

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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						
N: cwt per acre	(±0.533)		(1) and (2)		(1) and (2)	
0.5	13.88	18.09	16.07	15.90	15.02	16.95
1.0	14.63	17.25	15.60	16.27	15.01	16.87
Dung: tons per acre			(1) and (2)		(1) and (2)	
None			14.09	14.42	12.51	15.99
12			17.58	17.76	17.51	17.82

Lucerne rotation only	K_2O: cwt per acre*		Mean
	0.9	1.8	
P_2O_5: cwt per acre*	(3) and (4)		
0.9	14.87	16.63	15.75
1.8	14.19	16.88	15.54
Mean	14.53	16.75	15.64

	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	(± 0.188)		(1) and (2)		(1) and (2)	
0.5	13.04	15.17	14.08	14.13	13.82	14.38
1.0	13.27	15.58	14.27	14.58	14.11	14.74
Dung: tons per acre			(1) and (2)		(1) and (2)	
None			13.18	13.13	12.59	13.71
12			15.17	15.58	15.34	15.41

Lucerne rotation only	K_2O: cwt per acre*		Mean
	0.9	1.8	
P_2O_5: cwt per acre*	(3) and (4)		
0.9	13.80	15.09	14.44
1.8	13.49	14.54	14.02
Mean	13.65	14.81	14.23

*Including basal dressing.

Highfield	Fosters
(1) ±0.284	(1) ±0.253 for use in horizontal and interaction comparisons.
(2) ±0.427	(2) ±0.223 for use in all others.
(3) ±1.066	(3) ±0.375 for use only in testing the PK interaction.
(4) ±0.854	(4) ±0.445 for use in all other comparisons.

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

	Treatment crops 1952-1954				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
Mean	77.3	74.3	69.6	67.5	72.2
N: cwt per acre					
0.5	80.6	75.3	69.5	70.8	74.0
1.0	74.0	73.3	69.7	64.2	70.3
Difference	-6.6	-2.0	+0.2	-6.6	-3.7
Dung: tons per acre					
None	74.7	75.1	71.7	67.6	72.3
12	79.9	73.5	67.5	67.4	72.1
Difference	+5.2	-1.6	-4.2	-0.2	-0.2
P_2O_5: cwt per acre*					
0.9	79.9	73.7	69.2	65.6	72.1
1.8	74.6	75.0	70.0	69.4	72.2
Difference	-5.3	+1.3	+0.8	+3.8	+0.1
K_2O: cwt per acre*					
0.9	78.0	70.6	70.0	66.0	71.2
1.8	76.6	78.0	69.2	69.0	73.2
Difference	-1.4	+7.4	-0.8	+3.0	+2.0
Fosters					
Mean	91.2	89.3	89.7	91.0	90.3
N: cwt per acre					
0.5	91.4	89.7	90.2	91.8	90.8
1.0	90.9	88.9	89.1	90.3	89.8
Difference	-0.5	-0.8	-1.1	-1.5	-1.0
Dung: tons per acre					
None	90.3	91.3	89.6	90.8	90.5
12	92.0	87.3	89.8	91.4	90.1
Difference	+1.7	-4.0	+0.2	+0.6	-0.4
P_2O_5: cwt per acre*					
0.9	92.2	88.4	89.4	91.2	90.3
1.8	90.1	90.2	89.9	90.9	90.2
Difference	-2.1	+1.8	+0.5	-0.3	-0.1
K_2O: cwt per acre*					
0.9	90.4	89.3	90.3	90.1	90.0
1.8	91.9	89.3	89.0	92.0	90.6
Difference	+1.5	0.0	-1.3	+1.9	+0.6

*Including basal dressing.

https://doi.org/10.23637/ERADOC-1-176 *pp 43*

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

Highfield

	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
N: cwt per acre						
0.5	74.7	73.4	75.0	73.1	73.9	74.2
1.0	69.8	70.8	69.2	71.4	68.4	72.2
Dung: tons per acre						
None			73.0	71.5	71.8	72.7
12			71.2	72.9	70.5	73.6

Lucerne rotation only	K_2O: cwt per acre* 0.9	1.8	Mean
P_2O_5: cwt per acre*			
0.9	81.0	78.9	79.9
1.8	75.0	74.2	74.6
Mean	78.0	76.6	77.3

Fosters

	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
N: cwt per acre						
0.5	90.9	90.7	90.4	91.2	90.6	91.0
1.0	90.0	89.5	90.2	89.3	89.5	90.1
Dung: tons per acre						
None			90.9	90.0	90.6	90.3
12			89.7	90.5	89.4	90.8

Lucerne rotation only	K_2O: cwt per acre* 0.9	1.8	Mean
P_2O_5: cwt per acre*			
0.9	90.5	94.0	92.2
1.8	90.4	89.8	90.1
Mean	90.4	91.9	91.2

*Including basal dressing.

https://doi.org/10.23637/ERADOC-1-176 *pp 44*

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

	Treatment crops 1951-1953				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
Mean	31.5	33.2	35.9	36.8	34.3
N: cwt per acre					
None	32.8	33.9	35.4	39.7	35.4
0.2	30.2	32.5	36.4	34.0	33.3
Difference (±1.93)	-2.6	-1.4	+1.0	-5.7	-2.1 (± 0.97)
Dung to potatoes 1955: tons per acre					
None	30.6	32.6	37.2	35.9	34.1
12	32.3	33.8	34.6	37.7	34.6
Difference (±1.93)	+1.7	+1.2	-2.6	+1.8	+0.5 (± 0.97)
Fosters					
Mean	36.7	38.8	40.3	39.8	38.9
N: cwt per acre					
0.2	36.6	39.3	41.6	39.9	39.3
0.4	36.9	38.4	39.1	39.7	38.5
Difference (±1.16)	+0.3	-0.9	-2.5	-0.2	-0.8 (± 0.58)
Dung to potatoes 1955: tons per acre					
None	38.2	38.9	40.3	40.5	39.5
12	35.3	38.7	40.4	39.1	38.4
Difference (±1.16)	-2.9	-0.2	+0.1	-1.4	-1.1 (± 0.58)

	Highfield		Fosters	
	N: cwt per acre		N: cwt per acre	
	None	0.2	0.2	0.4
Dung to potatoes 1955: tons per acre	(±0.97)		(±0.58)	
None	36.4	31.8	39.6	39.4
12	34.5	34.7	39.1	37.6

Mean dry matter % as harvested:
Highfield: 79.3
Fosters: 80.3

https://doi.org/10.23637/ERADOC-1-176

Barley 3rd test crop. Straw: cwt per acre

	Treatment crops 1951-53				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield*					
Mean	38.4	37.5	33.5	35.4	36.2
N: cwt per acre					
None	38.1	33.9	33.9	33.1	34.8
0.2	38.7	41.1	33.1	37.8	37.7
Difference	+0.6	+7.2	-0.8	+4.7	+2.9
Dung to potatoes 1955: tons per acre					
None	35.8	36.8	31.2	34.2	34.5
12	41.1	38.2	35.8	36.7	37.9
Difference	+5.3	+1.4	+4.6	+2.5	+3.4
Fosters					
Mean	27.7	30.0	28.2	29.6	28.9
N: cwt per acre					
0.2	26.5	28.5	28.0	29.5	28.1
0.4	29.0	31.5	28.5	29.6	29.6
Difference	+2.5	+3.0	+0.5	+0.1	+1.5
Dung to potatoes 1955: tons per acre					
None	27.7	29.1	28.1	30.1	28.8
12	27.8	30.9	28.4	29.0	29.0
Difference	+0.1	+1.8	+0.3	-1.1	+0.2

	Highfield		Fosters	
	N: cwt per acre		N: cwt per acre	
	None	0.2	0.2	0.4
Dung to potatoes 1955: tons per acre				
None	33.5	35.5	28.2	29.3
12	36.0	39.8	28.1	30.0

Mean dry matter % as harvested:
Highfield: 73.7
Fosters: 84.0

*At 85% dry matter.

https://doi.org/10.23637/ERADOC-1-176

Treatment crops Arable and Hay rotation

(values based on Mean of 2 sub plots only)

	Highfield N: cwt per acre applied in 1956			Fosters N: cwt per acre applied in 1956		
	Single rate	Double rate	Mean	Single rate	Double rate	Mean
Hay (dry matter): cwt per acre						
No dung	50.7	59.2	55.0	41.4	48.3	44.9
Dung in 1954	61.0	55.4	58.2	39.6	57.0	48.3
Mean	55.8	57.3	56.6	40.5	52.7	46.6
Potatoes, total tubers: tons per acre						
No dung	11.78	13.14	12.46	12.77	12.17	12.47
Dung in 1956	17.46	18.91	18.19	14.35	15.14	14.74
Mean	14.62	16.03	15.32	13.56	13.66	13.61
Potatoes, percentage ware ($1\frac{1}{2}$" riddle)						
No dung	64.2	73.0	68.6	92.2	89.3	90.8
Dung in 1956	71.1	74.2	72.6	88.6	90.4	89.5
Mean	67.7	73.6	70.6	90.4	89.9	90.2
	Oats					
	None	0.2		0.2	0.4	
Grain (at 85% dry matter): cwt per acre						
No dung	30.6	30.0	30.3	33.6	38.7	36.2
Dung in 1955	32.4	30.2	31.3	37.1	34.4	35.8
Mean	31.5	30.1	30.8	35.3	36.6	36.0
Straw: cwt per acre						
No dung	32.7	28.7	30.7	25.0	24.2	24.6
Dung in 1955	25.8	31.2	28.5	25.5	33.3	29.4
Mean	29.2	29.9	29.6	25.3	28.7	27.0

Highfield, Oats, Mean dry matter % as harvested Grain: 78.3 Straw: 85.7
Fosters, Oats, Mean dry matter % as harvested Grain: 81.5 Straw: 84.7

https://doi.org/10.23637/ERADOC-1-176

Cut grass. Dry Matter: cwt per acre

1st year	Corrective dressing of K_2O: cwt per acre	Highfield N: to previous 3 test crops		Highfield Dung to potatoes 1954: tons per acre		Highfield Mean	Fosters N: to previous 3 test crops		Fosters Dung to potatoes 1954: tons per acre		Fosters Mean
		Single rate	Double rate	None	12		Single rate	Double rate	None	12	
N(1) to cut grass (4 cuts)											
Single rate		55.7	56.7	55.7	56.7	56.2	36.4	40.7	37.7	39.4	38.5
Double rate		63.4	61.9	60.8	64.5	62.7	46.2	49.3	48.6	46.8	47.7
N to test crops											
Single rate				59.0	60.1	59.5			41.4	41.2	41.3
Double rate				57.5	61.1	59.3			44.9	45.0	45.0
Mean				58.2	60.6	59.4			43.1	43.1	43.1

		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 (6 cuts)	1.5	60.6	86.9	73.8	54.2	73.3	63.7
3rd year (6 cuts)	1.5	65.1	86.2	75.7	63.2	77.9	70.6

(1) 0.15 v. 0.3 cwt N as 'Nitro-Chalk' for every cut.

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Lucerne. Dry matter: cwt per acre

1st year (2 cuts)	Corrective dressing of K_2O: cwt per acre	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 1954							
None		43.0	48.0	45.5	32.9	35.7	34.3
12 tons		45.1	48.6	46.8	32.2	33.0	32.6
Mean		44.1	48.3	46.2	32.6	34.4	33.5
2nd year (3 cuts)	1.0			88.0			90.1
3rd year (3 cuts)	1.0			96.6			105.4

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

	Highfield N: cwt per acre (yearly) 0.15	Highfield N: cwt per acre (yearly) 0.30	Highfield Mean	Fosters N: cwt per acre (yearly) 0.15	Fosters N: cwt per acre (yearly) 0.30	Fosters Mean
1st year	20.7	19.8	20.3	15.4	18.2	16.8
2nd year	25.0	29.5	27.2	25.0	23.0	24.0
3rd year	29.8	30.6	30.2	21.1	24.3	22.7

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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	Cut for hay Mean	Grazed Estimated from sampling cuts N Single rate	Grazed Estimated from sampling cuts N Double rate	Grazed Estimated from sampling cuts Mean
Highfield							
6th exptl. year Blocks 9-12	None				32.5	33.6	33.0
7th exptl. year Blocks 6 and 7	None				25.0	33.3	29.1
Blocks 5 and 8	1.2	59.8	63.2	61.5	19.9*	25.9*	22.9*
8th exptl. year Blocks 1-4	None				23.5	28.8	26.2
Fosters							
6th exptl. year Blocks 6, 10-12	None				17.2	18.5	17.8
7th exptl. year Blocks 8 and 9	None				13.0	17.0	15.0
Blocks 5 and 7	1.2	33.1	37.7	35.4	16.2*	21.6*	18.9*
8th exptl. year Blocks 1-4	None				24.5	21.4	22.9

Permanent Grass. Dry matter: cwt per acre

Highfield							
6th exptl. year Blocks 9-12	None				31.4	31.9	31.6
7th exptl. year Blocks 6 and 7	None				21.7	25.0	23.4
Blocks 5 and 8	1.2	39.6	43.9	41.7	25.1*	26.6*	25.8*
8th exptl. year Blocks 1-4	None				24.7	29.1	26.9

*Aftermath grazing.

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56/Bd/1.1

GREEN MANURING EXPERIMENT

Woburn Stackyard - 1956, the 3rd year of the revised scheme.

For history, treatments etc, see "Details of the Classical and Long Term Experiments" 1956.

Note: In 1955 the green manure crops undersown in the barley failed; these were resown after the barley was cut.

The straw treatment due to be applied after harvest was given only to the "fallow" (i.e. not undersown) plots, the application of straw to the green manure plots being postponed until later.

Area of each plot: 0.0395 acres. Area harvested: Potatoes, 0.0237; barley, 0.0395 acres.

Cultivations, etc.:

Green manures after barley: Trefoil at 30 lb per acre, ryegrass at 40 lb per acre, resown: Sept 6, 1955. Varieties: Trefoil-English; Ryegrass-Western Wolths.

Early Potatoes: Straw applied to "fallow" plots only: Sept 27, 1955. "Fallow" plots ploughed: Sept 28. Straw applied to trefoil and ryegrass plots: Dec 8. "Fallow" plots ploughed: Jan 5, 1956. All plots ploughed: Mar 6. Basal fertilizers applied: Mar 19. 'Nitro-Chalk' applied: Mar 21. Potatoes mechanically planted: Mar 24. Earthed up: June 1. Lifted: July 25. Variety: Ulster Chieftain.

Green manures after early potatoes: Trefoil at 30 lb per acre, ryegrass at 40 lb per acre, sown: July 29, 1955. Varieties: Trefoil-English; Ryegrass-Western Wolths.

Barley: "Fallow" and "early" green manure plots ploughed: Nov 17, 1955 and Jan 7, 1956. All plots ploughed including "late" green manure plots: Mar 7. Ground chalk at 20 cwt per acre applied: Mar 9. 'Nitro-Chalk' applied: Mar 16. Seed drilled at $2\frac{1}{2}$ bushels per acre: Mar 17. Trefoil and ryegrass undersown: Apr 23. Harvested: Aug 15. Variety: Herta.

Standard errors per plot:

Potatoes, Total tubers: 0.967 tons per acre or 12.3% (18 d.f.)

Barley, Grain: 2.64 cwt per acre or 8.8% (20 d.f.)

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

	Green manure	Ploughed in	Dry matter	Nitrogen
For Early Potatoes	Trefoil		5.9	0.187
	Ryegrass		6.9	0.153
For Barley	Trefoil	Early	17.4	0.572
	Ryegrass	Early	11.8	0.347
	Trefoil	Late	4.9	0.183
	Ryegrass	Late	7.2	0.218

Erratum to "Results of the Field Experiments" 1955 page 55/Bd/1.2.

Excluding plots fallow under old scheme:

S.E. of straw × N table should read (±0.130) not (±0.120).

https://doi.org/10.23637/ERADOC-1-176

Summary of Results

Early Potatoes, total tubers: tons per acre

	Straw: tons per acre		N: cwt per acre (including basal)		Dung to cabbages 1952: tons per acre		Mean
	None	1½	0.23	0.46	None	10	
Excluding plots fallow under old scheme							
Undersown green manures for potatoes	(±0.342)		(±0.342)		(±0.342)		(±0.242)
None	7.69	7.94	7.88	7.74	6.94	8.69	7.81
	(±0.484)		(±0.484)		(±0.484)		(±0.342)
Trefoil	8.71	7.65	8.24	8.11	7.24	9.12	8.18
Ryegrass	8.25	7.61	7.83	8.03	7.16	8.70	7.93
Straw: tons per acre			(±0.342)		(±0.342)		(±0.242)
None			8.33	7.84	7.02	9.15	8.08
1½			7.60	7.97	7.12	8.45	7.78
N: cwt per acre (including basal)							
0.23					7.08	8.84	7.96
0.46					7.05	8.76	7.91
Mean (±0.242)					7.07	8.80	7.93
Plots fallow under old scheme							
Straw: tons per acre			(±0.684)		(±0.684)		(±0.484)
None			7.14	7.88	6.60	8.42	7.51
1½			7.18	8.12	6.70	8.60	7.66
N: cwt per acre (including basal)							
0.23					6.14	8.19	7.16
0.46					7.16	8.84	8.00
Mean (±0.484)					6.65	8.52	7.58

Old scheme	Undersown green manures for potatoes: None	None	Trefoil	Ryegrass	Mean
	Fallow	Excluding Fallow			
	7.58 (±0.342)	7.81 (±0.242)	8.18 (±0.342)	7.93	7.86

https://doi.org/10.23637/ERADOC-1-176

Barley, grain: cwt per acre

	Green manures: Ploughed in Early	Ploughed in Late	In barley for potatoes: None	In barley for potatoes: Undersown	N: cwt per acre (including basal) 0.23	N: cwt per acre (including basal) 0.46	Dung to cabbages 1953: tons per acre None	Dung to cabbages 1953: tons per acre 10	Mean
Excluding plots fallow under old scheme									
Green manures after potatoes for barley	(±0.93)		(±0.93)		(±0.93)		(±0.93)		(± 0.66)
Trefoil	29.1	30.3	31.5	27.9	28.3	31.1	28.4	31.0	29.7
Ryegrass	32.1	33.0	33.3	31.8	31.4	33.7	31.8	33.4	32.6
Green manures ploughed in									
Early			32.2	29.0	29.4	31.8	30.4	30.8	30.6
Late			32.6	30.7	30.3	33.0	29.8	33.5	31.7
Green manures in barley for potatoes									
None					31.5	33.3	32.2	32.6	32.4
Undersown					28.2	31.5	28.0	31.7	29.9
N: cwt per acre (including basal)									
0.23							28.3	31.4	29.9
0.46							31.9	32.9	32.4
Mean (±0.66)							30.1	32.2	31.1

Plots fallow under old scheme

Old scheme	Green manures after potatoes for barley: None Fallow	Trefoil	Ryegrass	Mean
		Excluding fallow		
	25.6	29.7	32.6	30.0
	(± 0.93)	(± 0.66)		

N: cwt per acre (including basal)	(±1.87)		(± 1.32)
0.23	24.8	22.5	23.6
0.46	28.2	26.8	27.4
Mean (±1.32)	26.5	24.6	25.6

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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 1953: tons per acre None	Dung to cabbages 1953: tons per acre 10	Mean
Excluding plots fallow under old scheme									
Green manures after potatoes for barley									
Trefoil	23.1	25.1	25.9	22.2	22.6	25.5	22.0	26.1	24.1
Ryegrass	25.3	26.7	27.0	25.0	25.5	26.5	25.4	26.7	26.0
Green manures ploughed in									
Early			26.2	22.2	23.0	25.4	23.5	24.9	24.2
Late			26.7	25.1	25.2	26.7	23.9	27.9	25.9
Green manures in barley for potatoes									
None					25.6	27.4	25.5	27.4	26.5
Undersown					22.6	24.7	21.9	25.4	23.6
N: cwt per acre (including basal)									
0.23							22.3	25.9	24.1
0.46							25.1	27.0	26.0
Mean							23.7	26.4	25.1

Plots fallow under old scheme

Old scheme	Green manures after potatoes for barley: None Fallow	Trefoil Excluding fallow	Ryegrass Excluding fallow	Mean
	21.2	24.1	26.0	24.3

N: cwt per acre (including basal)			
0.23	20.4	18.6	19.5
0.46	22.8	22.9	22.9
Mean	21.6	20.8	21.2

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56/Bd/1.5

LEY AND ARABLE ROTATIONS

Woburn Stackyard 1956 - the 19th year.

For history, treatments etc., see "Details of the Classical and Long Term Experiments", 1956.

In 1956 carrots replaced sugar beet as the 3rd course of the arable rotation. Sugar beet replaced potatoes as the 1st test crop. The seeds hay split plot test of N after the first crop was discontinued.

Cultivations, etc.:

Treatment crops

Ley rotations

Ley 1st year. Ploughed twice: Sept 23, 1955 and Oct 28. Basal fertilizers applied, seed sown: Apr 16, 1956. 2nd dressing 'Nitro-Chalk' applied: Aug 29. Grazed 6 circuits: June 25 - 29, July 25 - Aug 2, Aug 19 - 29, Sept 14 - 22, Oct 9 - 17, Nov 2 - 10. Seeds mixture (sown at 40 lb per acre) 20 lb S24 Perennial Ryegrass, 11 lb S143 Cocksfoot, 6 lb Late Flowering Red Clover, 3 lb S100 White Clover.

Ley 2nd year. Basal potash applied: Apr 13, 1956. 'Nitro-Chalk' applied: May 20 and Sept 3. Grazed 8 circuits: May 4 - 12, May 20 - 28, June 17 - 25, July 7 - 15, Aug 8 - 17, Sept 6 - 14, Oct 1 - 9, Oct 25 - Nov 2.

Ley 3rd year. Basal potash applied: Apr 13, 1956. 'Nitro-Chalk' applied: May 16 and Sept 5. Grazed 9 circuits: Apr 26 - May 4, May 12 - 20, June 9 - 17, June 29 - July 7, July 17 - 25, Aug 2 - 11, Aug 29 - Sept 6, Sept 22 - Oct 1, Oct 17 - 25.

Lucerne 1st year. Ploughed twice: Sept 23, 1955 and Oct 28. Basal fertilizers applied, seed sown at 25 lb per acre: Apr 16, 1956. Dusted with 5% DDT: May 5. Sprayed with DDT emulsion, 3 pints per acre: May 7 and June 2. Cut twice: Aug 8 and Nov 16. Variety: Du Puits.

Lucerne 2nd year. Basal potash applied: Apr 13, 1956. Cut 3 times: June 21, Aug 8, Nov 16.

Lucerne 3rd year. Basal potash applied: Apr 13, 1956. Cut 3 times: June 21, Aug 8, Nov 16.

Arable rotations

Potatoes 1st course. Ploughed twice: Sept 23, 1955 and Oct 28. Basal fertilizers applied: Apr 11, 1956. Ridged, potatoes planted: Apr 13. Earthed up: June 22. Sprayed with copper fungicide, 5 lb in 40 gallons per acre: July 23. Sprayed with arsenious compound, 1 gallon in 40 gallons per acre: Sept 4. Lifted: Oct 4 - 5. Variety: Majestic.

Rye 2nd course. Ploughed: Sept 3, 1955. Seed drilled at 3 bushels per acre: Oct 15. 'Nitro-Chalk' applied: Apr 16, 1956. Seeds hay mixture undersown on 4 plots: Apr 20. Harvested: Aug 22. Variety: King II.

https://doi.org/10.23637/ERADOC-1-176

Seeds hay 3rd course. Seeds undersown in rye: May 9, 1955. Basal fertilizers applied: Apr 9, 1956. 1st cut: June 21. 'Nitro-Chalk' applied: June 22. 2nd cut: Nov 16. Seeds mixture per acre: 19 lb S24 Perennial Ryegrass, 9 lb Late Flowering Red Clover, 2 lb Alsike American.

Carrots 3rd course. Ploughed twice: Sept 6, 1955 and Dec 12. Basal fertilizer applied, seed drilled at 6 lb per acre: Apr 13, 1956. Singled: June 21 - 26. Lifted: Nov 8. Variety: James' Scarlet Intermediate.

Test crops

Sugar beet 1st test crop. Ploughed: Nov 9 - 11, 1955. Dung applied, ploughed: Mar 8, 1956. Basal and treatment fertilizers applied, rubbed seed drilled at 12 lb per acre: Apr 9. Sprayed with DDT emulsion, 3 pints in 40 gallons: May 7. Singled: June 1 - 5. Lifted: Oct 22 - 26. Variety: Klein E.

Barley 2nd test crop. Ploughed: Oct 29, 1955. Ground chalk applied: Dec 8. Potash applied to equalise treatment dressings to 1955 potatoes: Jan 16, 1956. 'Nitro-Chalk' applied: Mar 13. Seed drilled at 2½ bushels per acre: Mar 16. Additional 'Nitro-Chalk' applied: Apr 19. Harvested: Aug 21. Variety: Herta.

Note. The change of 1st test crop from potatoes to sugar beet, was decided on in spring, and the application of dung necessitated a second ploughing; this gave poor seed bed conditions after the leys and the yield of sugar beet after lucerne was possibly depressed as a result.

Standard errors per plot. Test Crops.

Sugar beet. Total sugar.	Whole plot:	3.36 cwt per acre or 6.2%	(3 d.f.)
	½ plot:	3.88 cwt per acre or 7.2%	(4 d.f.)
	⅛ plot:	3.41 cwt per acre or 6.3%	(24 d.f.)
Tops.	Whole plot:	0.758 tons per acre or 5.0%	(3 d.f.)
	½ plot:	0.856 tons per acre or 5.7%	(4 d.f.)
	⅛ plot:	1.786 tons per acre or 11.8%	(24 d.f.)
Barley. Grain	Whole plot:	2.24 cwt per acre or 6.3%	(4 d.f.)
	½ plot:	1.90 cwt per acre or 5.4%	(4 d.f.)

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

Page Bf/1.4. Potatoes 1947. Date sown should read 'May 12" not "Apr 12".

Page Bf/1.16. Barley 1947. Order of crops previous to potatoes, for grain and straw tables should read "Lucerne, Arable with sugar beet, Arable with hay, Ley" and not as shown.

https://doi.org/10.23637/ERADOC-1-176

Summary of Results

Treatment crops

Ley, sheep days of grazing per acre

1st year	2nd year	3rd year
1212	1746	2073

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

	1st crop	2nd crop	3rd crop	Total
1st year				
Dung in 1954: tons per acre				
None	10.5	4.8		15.3
15	11.5	6.9		18.4
Difference	+1.0	+2.1		+3.1
Previous rotation				
Lucerne	10.4	5.7		16.1
Arable with hay	11.6	6.0		17.6
Mean	11.0	5.8		16.8
2nd year				
Dung in 1953: tons per acre				
None	27.4	23.6	9.7	60.7
15	33.5	27.7	11.7	72.9
Difference	+6.1	+4.1	+2.0	+12.2
Previous rotation				
Lucerne	28.6	25.3	10.3	64.2
Arable with sugar beet	32.3	26.0	11.1	69.4
Mean	30.4	25.6	10.7	66.7
3rd year				
Dung in 1952: tons per acre				
None	30.4	24.5	9.7	64.6
15	37.3	28.0	11.9	77.2
Difference	+6.9	+3.5	+2.2	+12.6
Previous rotation				
Lucerne	31.5	24.3	10.2	66.0
Arable with hay	36.2	28.2	11.4	75.8
Mean	33.8	26.2	10.8	70.8

https://doi.org/10.23637/ERADOC-1-176

Treatment crops

	Potatoes		Rye	
	Total tubers: tons per acre	Percentage ware	Grain: cwt per acre	Straw: cwt per acre
Dung: tons per acre				
None	13.58	90.5	41.2	46.3
15*	14.43	88.9	42.6	49.9
Difference	+0.85	-1.6	+1.4	+3.6
Previous rotation				
Ley	15.40	89.6	44.4	50.5
Lucerne	14.07	90.4	42.0	48.5
Arable with hay	13.32	89.8	39.5	44.0
Arable with sugar beet	13.22	89.2	41.7	49.5
Mean	14.00	89.7	41.9	48.1

Hay

Yield (at 85% dry matter): cwt per acre

	1st crop	2nd crop	Total
Dung in 1952: tons per acre			
None	48.2	20.7	68.9
15	50.3	24.0	74.3
Difference	2.1	3.3	5.4
Previous rotation			
Lucerne	48.9	23.7	72.6
Arable with hay	49.6	21.0	70.6
Mean	49.2	22.4	71.6

Carrots

	Roots (washed): tons per acre	Tops: tons per acre
Dung in 1952: tons per acre		
None	15.43	4.52
15	17.85	4.94
Difference	2.42	0.42
Previous rotation		
Ley	19.40	5.67
Arable with sugar beet	13.88	3.79
Mean	16.64	4.73

*Dung applied: Potatoes - for test crop potatoes in 1954.
Rye - for test crop potatoes in 1953.

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1st Test Crop

	Previous rotation				
	Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
Sugar beet, roots (washed): tons per acre					
Mean	16.82	15.05	14.80	15.71	15.59
Dung: tons per acre					
None	15.55	13.41	12.15	13.29	13.60
15	18.10	16.70	17.44	18.13	17.59
Difference	+2.55	+3.29	+5.29	+4.84	+3.99
Response to additional 0.72 cwt N per acre					
No dung	+0.33	-0.85	-0.61	+0.81	-0.08
Dung 15 tons per acre	+0.53	+0.01	+0.51	+0.94	+0.49
Response to additional 0.9 cwt K_2O per acre					
No dung	+0.79	+1.79	+1.38	-0.71	+0.81
Dung 15 tons per acre	+0.45	+1.23	+0.39	-0.85	+0.31
Sugar beet, sugar percentage					
Mean	16.9	17.4	17.4	18.0	17.4
Dung: tons per acre					
None	17.1	17.4	17.6	18.0	17.6
15	16.6	17.3	17.2	18.0	17.3
Difference	-0.5	-0.1	-0.4	0.0	-0.3
Response to additional 0.72 cwt N per acre					
No dung	-0.4	-0.4	-1.0	-0.8	-0.6
Dung 15 tons per acre	-0.4	-0.4	-0.2	-0.5	-0.4
Response to additional 0.9 cwt K_2O per acre					
No dung	+0.4	0.0	+0.3	-0.2	+0.1
Dung 15 tons per acre	0.0	+0.2	+0.2	-0.4	0.0

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1st Test Crop

	Previous rotation				
	Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
Sugar beet, total sugar: cwt per acre					
Mean (±2.38)	56.7	52.3	51.4	56.5	54.2
Dung: tons per acre					
None (±3.07)*	53.2	46.7	42.9	47.9	47.7
15	60.2	57.9	59.9	65.2	60.8
Difference (±3.88)	+7.0	+11.2	+17.0	+17.3	+13.1 (± 1.94)
Response to additional 0.72 cwt N per acre		(±2.41)			(± 1.21)
No dung	-0.3	-3.9	-4.5	+0.8	-2.0
Dung 15 tons per acre	+0.7	-1.6	+0.8	+1.5	+0.3
Response to additional 0.9 cwt K_2O per acre		(±2.41)			(± 1.21)
No dung	+3.7	+6.3	+5.5	-3.2	+3.0
Dung 15 tons per acre	+1.3	+5.2	+2.0	-4.0	+1.1
Sugar beet, tops: tons per acre					
Mean (±0.536)	17.15	15.59	16.26	11.33	15.08
Dung: tons per acre					
None (±0.686)*	16.64	15.31	14.75	9.98	14.17
15	17.66	15.88	17.78	12.69	16.00
Difference (±0.856)	+1.02	+0.57	+3.03	+2.71	+1.83 (± 0.428)
Response to additional 0.72 cwt N per acre		(±1.263)			(± 0.631)
No dung	+3.57	+1.60	+2.85	+2.36	+2.59
Dung 15 tons per acre	+3.35	+1.08	+1.88	+1.79	+2.03
Response to additional 0.9 cwt K_2O per acre		(±1.263)			(± 0.631)
No dung	+2.14	+1.04	+0.95	+0.11	+1.06
Dung 15 tons per acre	+0.45	-0.74	-1.19	-1.67	-0.79

*For use in comparisons other than vertical.

https://doi.org/10.23637/ERADOC-1-176

1st Test Crop

Plots receiving no additional N or K

Dung: tons per acre	Previous Rotation: Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
Sugar beet, roots (washed): tons per acre					
Mean	16.26	14.81	14.58	15.81	15.36
None	14.83	13.42	12.22	13.76	13.56
15	17.68	16.20	16.92	17.87	17.17
Difference	+2.85	+2.78	+4.70	+4.11	+3.61
Sugar beet, sugar percentage					
Mean	16.9	17.5	17.5	18.5	17.6
None	17.1	17.5	17.9	18.4	17.7
15	16.7	17.5	17.1	18.7	17.5
Difference	-0.4	0.0	-0.8	+0.3	-0.2
Sugar beet, total sugar: cwt per acre					
Mean (±2.83)	54.8	51.7	50.9	58.7	54.0
None (±4.01)*	50.5	46.8	43.8	50.6	47.9
15	59.2	56.6	58.0	66.8	60.2
Difference (±5.53)	+8.7	+9.8	+14.2	+16.2	+12.3
Sugar beet, tops: tons per acre					
Mean (±0.913)	14.75	14.42	15.33	10.62	13.78
None (±1.291)*	13.58	13.62	13.19	8.91	12.32
15	15.92	15.22	17.47	12.33	15.24
Difference (±1.768)	+2.34	+1.60	+4.28	+3.42	+2.92

*For use in comparisons other than vertical.

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2nd Test Crop

Dung in 1955: tons per acre	Previous Rotation: Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
Barley, grain: cwt per acre					
None (±1.85)*	36.3	35.1	33.7	31.3	34.1
15	35.6	41.7	36.1	32.5	36.5
Mean (±1.58)	35.9	38.4	34.9	31.9	35.3
Difference (±1.90)	-0.7	+6.6	+2.4	+1.2	+2.4 (± 0.95)
Barley, straw: cwt per acre					
None	30.1	29.2	28.3	26.0	28.4
15	32.3	33.0	29.1	27.5	30.5
Mean	31.2	31.1	28.7	26.8	29.4
Difference	+2.2	+3.8	+0.8	+1.5	+2.1

*For use in comparisons other than vertical.

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WOBURN MARKET GARDEN EXPERIMENT

Organic manures and nitrogen - Lansome 1956 the 15th year.

For treatments etc. see "Details of the Classical and Long Term Experiments" 1956.

In 1956 the spring cabbages failed because of bird damage and were replaced by early potatoes; in future early potatoes will take the place of spring cabbages in the rotation. The treatments are unaltered except that early potatoes receive N in one dose only.

Note: the results for the 1956-57 leeks will be included in the 1957 report.

Area of each plot: 0.0125 acre.

Cultivations, etc.:

Leeks 1955-56.
Organic manures applied, all plots ploughed: July 22, 1955. 'Nitro-Chalk' and basal fertilizers applied: Aug 15. Planted: Aug 17. Second dressing of 'Nitro-Chalk' applied: Oct 21. Harvested: Mar 8 - Apr 11, 1956. Variety: Musselburgh.

Early potatoes (replacement for spring cabbage).
Organic manures spread and ploughed in: Sept 20, 1955. Aldrin (for cutworm) at 1½ cwt per acre, basal fertilizers applied: Sept 22. Spring cabbages (Durham Early) planted: Sept 27. Crop remnants ploughed in: Mar 6, 1956. All 'Nitro-Chalk' applied: Mar 20. Planted: Mar 23. Ridged: May 19. Lifted: July 24. Variety: Arran Pilot.

Globe beet.
Organic manures applied: Apr 25, 1956. Ploughed: Apr 26. Ground chalk at 20 cwt per acre, basal fertilizers and 'Nitro-Chalk' applied: Apr 27. Seed drilled at 14 lb per acre: Apr 28. 5% DDT dust at 20 lb per acre applied: May 9. Sprayed with DDT, 3 pints in 20 gallons per acre: May 23. Singled: June 6 - 18. Second dressing of 'Nitro-Chalk' applied: June 18. Harvested: July 30 - Aug 28. Variety: Detroit.

Standard errors per plot:

Leeks 1955-56.	Saleable produce: 0.262 tons per acre or 10.6% (17 d.f.)
Early potatoes.	Total tubers: 0.609 tons per acre or 7.5% (17 d.f.)
Globe beet.	Saleable bulbs: 1.97 tons per acre or 31.3% (17 d.f.)

https://doi.org/10.23637/ERADOC-1-176

Summary of Results

Leeks 1955-56

Organic manures	Level of manuring: tons per acre	N: cwt per acre None	0.3	0.6	0.9	Mean
Saleable produce: tons per acre			(±0.185)			(±0.131)
None		1.75	1.80	2.03	1.35	1.77*
Dung	10	2.57	2.81			2.69
	20	3.35	3.71			3.53
Sludge compost	10	2.51	2.19			2.35
	20	2.35	2.88			2.61
Sludge	10	1.85	1.97			1.91
	20	1.80	2.23			2.02
Vegetable compost	10	2.51	2.59			2.55
	20	3.28	3.73			3.50
Mean (±0.065)		2.53+	2.76+			2.46
Percentage saleable, (by number)						
None		93.7	93.9	95.4	85.6	93.8*
Dung	10	96.2	95.0			95.6
	20	96.1	96.4			96.2
Sludge compost	10	97.5	95.2			96.3
	20	95.3	98.0			96.6
Sludge	10	93.1	95.8			94.4
	20	94.7	93.2			94.0
Vegetable compost	10	95.1	94.8			95.0
	20	97.7	97.1			97.4
Mean		95.7+	95.7+			95.0

Early Potatoes

Total tubers: tons per acre			(±0.431)			(±0.305)
None		5.23	6.04	7.89	8.03	5.64*
Dung	10	8.76	8.70			8.73
	20	8.86	10.06			9.46
Sludge compost	10	7.84	8.15			8.00
	20	8.69	7.96			8.32
Sludge	10	7.60	8.29			7.94
	20	7.32	7.41			7.36
Vegetable compost	10	7.78	8.98			8.38
	20	9.42	8.72			9.07
Mean (±0.152)		8.28+	8.53+			8.09

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

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Globe beet

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						
			(±1.392)			(±0.984)
None		1.75	2.20	3.32	0.92	1.98*
Dung	10	5.82	7.26			6.54
	20	10.27	11.11			10.69
Sludge compost	10	6.65	4.00			5.32
	20	8.28	9.18			8.73
Sludge	10	4.44	3.25			3.84
	20	5.42	6.47			5.95
Vegetable compost	10	5.98	8.12			7.05
	20	10.14	11.23			10.68
Mean (±0.492)		7.12+	7.58+			6.29
Total produce (whole plants): tons per acre						
None		4.60	4.24	6.26	3.06	4.42*
Dung	10	9.84	12.38			11.11
	20	17.28	19.47			18.38
Sludge compost	10	11.87	9.01			10.44
	20	15.60	17.60			16.60
Sludge	10	9.21	8.05			8.63
	20	12.22	13.26			12.74
Vegetable compost	10	9.61	14.21			11.91
	20	17.12	18.56			17.84
Mean		12.84+	14.07+			11.67
Plant number: thousands per acre						
None		77.7	69.1	76.4	93.6	73.4*
Dung	10	64.4	80.4			72.4
	20	92.4	100.6			96.5
Sludge compost	10	79.8	105.4			92.6
	20	82.5	83.4			83.0
Sludge	10	93.9	114.9			104.4
	20	97.6	110.6			104.1
Vegetable compost	10	66.2	94.8			80.5
	20	82.6	81.4			82.0
Mean		82.4+	96.4+			87.4

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

https://doi.org/10.23637/ERADOC-1-176 *pp 66*

56/Bg/1.1

IRRIGATION EXPERIMENT

The 6th year

The effects of irrigation and nitrogen - Woburn Butt Close 1956.

For details of cropping, treatments etc. see "Details of the Classical and Long Term Experiments" 1956.

Area of each sub-plot: Cut grass, 0.0264; remainder, 0.0278 acres.
Area harvested (acres): Potatoes, 0.0155; sugar beet, 0.0176; barley, 0.0168; cut grass, 0.0165.

Rainfall and Irrigation: inches

Week ending	Rain-fall	Potatoes A & C	Sugar beet B & C	Barley B & C	Cut grass A	Cut grass B	Cut grass C
May 7	.04						.52
14	.10			1.12		.50	.50
21	-			.50			.50
28	.10			.50	1.00	.50	.75
June 4	.51			.50		.50	.52
11	1.11		.87				
18	.93						
25	.07						
July 2	.18	.50				.50	.50
9	1.27		.50		1.00		
16	.73						.57
23	1.09						
30	.73						
Aug 6	1.56						
13	.71						
20	.98						
27	.46						
Sept 3	1.03						
10	1.05						
17	.06						
24	.21						
Oct 1	.24						
Total	13.16	0.50	1.37	2.62	2.00	2.00	3.86

Note: On sugar beet and barley 0 = A, B = C; on potatoes 0 = B, A = C.

https://doi.org/10.23637/ERADOC-1-176

Cultivations, etc.:

Potatoes. Ploughed: Aug 18, 1955. Dung applied: Nov 21. Ploughed: Nov 23. Fertilizers applied: Mar 26, 1956. Potatoes planted by machine: Mar 28. Earthed up: June 20. Sprayed with copper fungicide, 5 lb in 40 gallons per acre: July 23. Sprayed with arsenious compound, 1 gallon in 40 gallons per acre: Aug 31. Lifted: Oct 6. Variety: Majestic.

Sugar beet. Ploughed: Oct 7, 1955. Ground chalk applied at 20 cwt per acre: Dec 8. Salt applied: Mar 26, 1956. Fertilizers applied, seed drilled at 12 lb per acre (rubbed and graded): Apr 6. Sprayed with Parathion against leaf miner, 8 oz in 40 gallons per acre: May 25. Singled: May 31. Lifted: Nov 21. Variety: Klein E.

Barley. Ploughed: Nov 24, 1955. Fertilizers applied: Mar 12, 1956. Seed drilled at $2\frac{1}{2}$ bushels per acre: Mar 15. Harvested: Aug 14. Variety: Herta.

Cut grass. Basal fertilizer applied: Jan 12, 1956. 1st application of 'Nitro-Chalk': Mar 12. Cut 6 times (all plots): May 28, June 22, July 17, Aug 13, Sept 7 and Nov 19. 'Nitro-Chalk' applied after each cut except the last. Variety: Cocksfoot S37.

Standard errors per plot:

Potatoes.	Total tubers,	whole plot:	1.115 tons per acre or 7.4%	(8 d.f.)
		sub plot:	0.757 tons per acre or 5.0%	(10 d.f.)
Sugar beet.	Total sugar,	whole plot:	2.34 cwt per acre or 3.8%	(8 d.f.)
		sub plot:	2.70 cwt per acre or 4.4%	(10 d.f.)
	Tops,	whole plot:	1.017 tons per acre or 9.4%	(8 d.f.)
		sub plot:	0.969 tons per acre or 8.9%	(10 d.f.)
Barley.	Grain,	whole plot:	2.40 cwt per acre or 8.0%	(8.d.f.)
		sub plot:	2.18 cwt per acre or 7.3%	(10 d.f.)
Cut grass.	Dry matter,	whole plot:	5.66 cwt per acre or 7.5%	(6 d.f.)
		sub plot:	3.75 cwt per acre or 5.0%	(8 d.f.)

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Summary of Results

N: cwt per acre including basal	Irrigation 0 & B	Irrigation A & C	Mean	Irrigation 0 & B	Irrigation A & C	Mean
	Potatoes					
	total tubers: tons per acre (± 0.505)*			percentage ware ($1\frac{5}{8}$" riddle)		
0.5	14.20	14.76	14.48	88.4	87.6	88.0
1.0	15.64	16.06	15.85	89.6	92.4	91.0
Mean	14.92 (± 0.455)	15.41	15.16	89.0	90.0	89.5
Difference	1.44 (± 0.437)	1.30	1.37 (± 0.309)	1.2	4.8	3.0

N: cwt per acre including basal	Irrigation 0 & A	Irrigation B & C	Mean	Irrigation 0 & A	Irrigation B & C	Mean
	Sugar Beet					
	roots (washed): tons per acre			sugar percentage		
0.4	16.24	15.06	15.65	18.6	18.3	18.5
0.8	18.54	17.46	18.00	18.2	18.6	18.4
Mean	17.39	16.26	16.83	18.4	18.5	18.4
Difference	+2.30	+2.40	+2.35	-0.4	+0.3	-0.1
	total sugar: cwt per acre (±1.23)*			tops: tons per acre (± 0.501)*		
0.4	60.3	55.3	57.8	10.21	9.35	9.78
0.8	67.4	65.2	66.3	12.45	11.48	11.96
Mean	63.8 (±0.95)	60.2	62.0	11.33 (± 0.415)	10.41	10.87
Difference	7.1 (±1.56)	9.9	8.5 (±1.10)	2.24 (± 0.560)	2.13	2.18 (± 0.396)

*for use in comparisons other than vertical.

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N: cwt per acre including basal	Irrigation 0 & A	Irrigation B & C	Mean	Irrigation 0 & A	Irrigation B & C	Mean
	Barley					
	grain: cwt per acre			straw: cwt per acre		
	(±1.16)*					
0.2	24.6	29.1	26.8	20.2	30.6	25.4
0.4	31.2	34.7	32.9	26.4	41.2	33.8
Mean	27.9	31.9	29.9	23.3	35.9	29.6
	(±0.98)					
Difference	6.6	5.6	6.1	6.2	10.6	8.4
	(±1.26)		(±0.89)			

Level of N	Irrigation 0	A	B	C	Mean
	Cut grass, dry matter: cwt per acre (Total of 6 cuts)				
	(±3.61)*				
1	55.7	61.8	63.8	72.0	63.3
2	81.4	83.0	84.3	99.7	87.1
Mean (±3.26)	68.6	72.4	74.1	85.8	75.2
Difference (±3.06)	25.7	21.2	20.5	27.7	23.8 (±1.53)

*for use in comparisons other than vertical.

Cut grass. Levels of N

1 = 0.15 cwt N per acre in spring and after each cut except the last.
2 = 0.30 cwt N per acre in spring and after each cut except the last.

https://doi.org/10.23637/ERADOC-1-176

WINTER WHEAT

The effects of crop sequences, varieties, seed rates, nitrogen and sulphuric acid spray on the incidence of Eyespot (Cercosporella herpotrichoides) - Long Hoos I, II and III, 1956. The 3rd (final) year.

Details of treatments and crop sequences etc., are as stated in "Results of the Field Experiments" 1954, Section 54/Ca/2.1, modified as follows:

1. Seed rates in 1955 and 1956,
   Holdfast: 1½, 3 bushels per acre
   Cappelle: 2, 4 bushels per acre.
2. In 1956 only, 8 of the 16 blocks were sprayed with sulphuric acid (12½% BOV in 80 gallons per acre).

Area of each plot: 0.0146 acres. Area harvested: 0.0095 acres.

Basal dressing in spring: 1 cwt per acre of compound granular fertilizer (12% N, 12% P_2O_5, 15% K_2O) combine drilled with seed.

Note: In 1956 each plot was reduced in length to allow the growing of a small area of winter oats but these failed and were abandoned.

Cultivations, etc.: Ploughed: Oct 5, 1955. Seed combine drilled: Oct 26. Acid spray applied: Mar 14, 1956. Nitrochalk applied: Mar 16, May 10. Sprayed with MCPA, 3 pints in 40 gallons per acre: May 15. Combine harvested: Sept 1.

Standard errors per plot: Grain (at 85% dry matter): cwt per acre.
Block: 1.27 cwt per acre or 4.0% (6 d.f.)
Plot: 1.83 cwt per acre or 5.8% (23 d.f.)

Note (1) Germination on the Holdfast plots was very uneven.
(2) Records of incidence of disease (Eyespot and Take-All), estimates of % area lodged, and counts of plant, shoot and straw numbers were made.
(3) In 1955 the potatoes (Majestic) received 10 tons dung and 12 cwt compound fertilizer (7% N, 7% P_2O_5, 10½% K_2O) per acre.

https://doi.org/10.23637/ERADOC-1-176

Summary of Results

Grain (at 85% dry matter): cwt per acre

Previous rotation 1954	1955	Spray: None	Spray: Sulphuric acid	Diff.	Seed Rate: Single	Seed Rate: Double	Diff.	N: cwt per acre 0.46	N: cwt per acre 0.93	Diff.	Mean
Holdfast		(±1.10)		(± 1.56)	(±1.01)*		(± 1.29)	(±1.01)*		(± 1.29)	(± 0.78)
Wheat	wheat	18.8	18.6	-0.2	18.5	18.9	+0.4	16.0	21.4	+5.4	18.7
Potatoes	wheat	24.2	23.3	-0.9	21.6	25.8	+4.2	21.2	26.2	+5.0	23.7
Wheat	potatoes	29.6	25.7	-3.9	23.8	31.6	+7.8	26.0	29.4	+3.4	27.7
Beans	potatoes	37.0	32.7	-4.3	31.6	38.2	+6.6	34.6	35.2	+0.6	34.9
Mean		27.4	25.1	-2.3 (± 0.78)	23.9	28.6	+4.7 (± 0.65)	24.4	28.0	+3.6 (± 0.65)	26.2 (± 0.32)
								(±0.65)**		(± 1.10)	
					Seed rate Single			22.4	25.3	+2.9	
						Double		26.5	30.8	+4.3	
					Difference (±1.10)			+4.1	+5.5	+1.4	(± 1.56)
Cappelle		(±1.10)		(± 1.56)	(±1.01)*		(± 1.29)	(±1.01)*		(± 1.29)	(± 0.78)
Wheat	wheat	24.2	20.8	-3.4	23.6	21.4	-2.2	20.4	24.7	+4.3	22.5
Potatoes	wheat	35.6	36.0	+0.4	34.7	36.9	+2.2	31.2	40.4	+9.2	35.8
Wheat	potatoes	39.6	39.3	-0.3	36.6	42.3	+5.7	37.6	41.3	+3.7	39.5
Beans	potatoes	49.3	49.8	+0.5	47.0	52.1	+5.1	48.4	50.7	+2.3	49.6
Mean		37.2	36.5	-0.7 (± 0.78)	35.5	38.2	+2.7 (± 0.65)	34.4	39.3	+4.9 (± 0.65)	36.8 (± 0.32)
								(±0.65)**		(± 1.10)	
					Seed rate Single			33.0	38.0	+5.0	
						Double		35.8	40.6	+4.8	
					Difference (±1.10)			+2.8	+2.6	-0.2	(± 1.56)

Mean dry matter % as harvested: 73.8

*for use in comparisons other than horizontal

**for use in diagonal comparisons only

Note. The standard errors are for use only in comparisons within the same variety.

56/Ca/1.2

WINTER WHEAT

Control of wheat bulb fly by insecticides - Pennell's Piece 1956.

Design: 5 randomized blocks of 6 plots each.

Area of each plot: 0.00643 acres. Area harvested: 0.00621 acres.

Treatments: Insecticides:-

None (2 plots per block).	(0)
4% Dieldrin dust at 1 cwt per acre combine drilled with seed.	(1)
4% Dieldrin dust at 1 cwt per acre broadcast on surface.	(2)
Sprayed early with Parathion 0.1% v/v at 100 gallons per acre.	(3)
Sprayed late with Parathion 0.1% v/v at 100 gallons per acre.	(4)

Basal dressing: 3 cwt 'Nitro-Chalk' per acre.

Note: all seed dressed with organo-mercurial fungicide.

Cultivations, etc.:
Ploughed: Sept 5, 1955. Seed drilled at 2 bushels per acre: Nov 1. Dieldrin dust broadcast: Feb 16, 1956. Sprayed with Parathion: '3' plots - Mar 8, '4' plots - Apr 12. 'Nitro-Chalk' applied: Apr 30. Combine harvested: Sept 4. Variety: Cappelle. Previous crop: Bare fallow.

Standard error per plot:
Grain (at 85% dry matter): 4.29 cwt per acre or 9.2% (21 d.f.)

Counts of numbers of plants, tillers, damaged tillers and of wheat bulb fly larvae were made.

Summary of Results

Grain (at 85% dry matter): cwt per acre

	Insecticides 0	1	2	3	4	Mean
Mean (±1.92)	43.9(1)	47.3	52.5	46.1	47.2	46.8
Increase (±2.35)		3.4	8.6	2.2	3.3	

(1) ±1.36

Mean dry matter % as harvested: 69.8

https://doi.org/10.23637/ERADOC-1-176

WINTER WHEAT

Seed rates in relation to control of wheat bulb fly - Long Hoos VII the 3rd (final) year.

Design: 4 4×4 squares with treatments on rows in 1954 and on columns in 1955.

Area of each plot: 0.0151 acres. Area harvested: 0.0050 acres.

Treatments to spring wheat 1954 and to winter wheat 1955.
Bare fallow.
Seed rates: $\frac{1}{3}$; 1; 3 bushels per acre.

Basal dressings per acre for 1956 crop: 1 cwt compound granular fertilizer (12% N, 12% P_2O_5, 15% K_2O) combine drilled with seed; 0.8 cwt N as "Nitro-Chalk".

Cultivations, etc.:
Ploughed: Sept 14, 1955. Seed combine drilled (all at $2\frac{3}{4}$ bushels per acre): Oct 28. 'Nitro-Chalk' applied: Apr 30, 1956.
Combine harvested: Aug 31. Variety: Cappelle.

Note: seed treated with organo-mercurial fungicide only.

Standard errors per plot. Grain (at 85% dry matter):
Row: 1.94 cwt per acre or 5.7% (9 d.f.)
Column: 2.65 cwt per acre or 7.8% (9 d.f.)
Plot: 2.03 cwt per acre or 6.0% (27 d.f.)

Records were made of:
Number of wheat bulb fly larvae, weight per ear, number of grains per ear and plant number.

https://doi.org/10.23637/ERADOC-1-176

Summary of Results

Grain (at 85% dry matter): cwt per acre

1954 Treatments		1955 Treatments: Fallow	Seed rate: bushels per acre ⅓	1	3	Mean
		(1) (2) (3) and (4)				(± 0.97)
Seed rate: bushels per acre	Fallow	50.4	37.1	37.7	36.2	40.4
	⅓	47.7	30.8	28.4	23.3	32.6
	1	47.3	28.1	27.8	20.5	30.9
	3	47.5	31.1	26.6	23.1	32.1
Mean (±1.32)		48.2	31.8	30.1	25.8	34.0

(1) ±1.59 for use in horizontal comparisons only.
(2) ±1.31 for use in vertical comparisons only.
(3) ±1.79 for use in diagonal comparisons only.
(4) ±1.01 for use in interaction comparisons only.

Mean dry matter % as harvested: 74.9

https://doi.org/10.23637/ERADOC-1-176

WINTER WHEAT

Varieties, seed rates, levels and times of application of N - Woburn, Roadpiece 1956, the 3rd year.

Design: 4 randomized blocks of 8 plots each, certain high order interactions being confounded with block differences. In addition each block contained 2 plots with no nitrogen, the variety × seed rate interaction being confounded.

Area of each plot: 0.0182 acres. Area harvested: 0.0138 acres.

Treatments: All combinations of:-
Varieties: Holdfast; Cappelle.
Seed rates: Holdfast, 1½; 3 bushels per acre.
Cappelle, 2; 4 bushels per acre.
Nitrogen: 0.5; 1.0 cwt N per acre applied as 'Nitro-Chalk'.
Time of application of N: half dressing in March and again in May; whole dressing mid March; mid April; mid May.

Basal dressing: 1 cwt per acre compound granular fertilizer (12% N, 12% P_2O_5, 15% K_2O) combine drilled with seed.

Cultivations, etc.: Ploughed: Sept 29, 1955. Combine drilled: Oct 26. March top dressing applied: Mar 8, 1956. April top dressing applied: Apr 12. All plots sprayed with DNOC at 8 lb in 90 gallons per acre: May 1. May top dressing applied: May 17. Combine harvested: Sept 13. Previous crop: Wheat.

Standard error per plot.
Grain (at 85% dry matter): 1.82 cwt per acre or 17.6% (12 d.f.)

Note (1) The experiment is a repetition on the same plots of the ones carried out in 1955 and 1954 (see "Results of the Field Experiments" 55/Ca/4 and 54/Ca/7.)

(2) The crop was severely and irregularly infested with weeds particularly twitch(Agrostis gigantea) and Mayweed (Matricaria).

(3) Records of incidence of disease (Take-all and Eyespot) and weeds and counts of plant, shoot and ear numbers were made.

https://doi.org/10.23637/ERADOC-1-176 *pp 76*

Summary of Results

Grain (at 85% dry matter): cwt per acre

	T_1	T_2	T_3	T_4	Mean	
Mean (±0.65)	12.1	12.8	14.7	6.9	11.6	
		(±0.91)				
V_1	10.7	10.2	12.8	6.8	10.1	
V_2	13.5	15.5	16.5	6.9	13.1	
Difference (±1.29)	+2.8	+5.3	+3.7	+0.1	+3.0	(±0.65)
R_1	10.1	12.0	11.9	4.7	9.7	
R_2	14.0	13.7	17.5	9.0	13.6	
Difference (±1.29)	+3.9	+1.7	+5.6	+4.3	+3.9	(±0.65)
N_1	11.2	10.9	10.6	7.8	10.1	
N_2	12.9	14.8	18.7	5.9	13.1	
Difference (±1.29)	+1.7	+3.9	+8.1	-1.9	+3.0	(±0.65)

	R_1	R_2	N_0	N_1	N_2	Mean
			(±0.65)	(± 0.46)		
Mean			5.3	10.1	13.1	10.3
	(± 0.65)		(±0.91)	(± 0.65)		(±0.41)
V_1	9.0	11.2	5.1	8.7	11.6	9.1
V_2	10.3	15.9	5.5	11.6	14.6	11.6
R_1			5.3	8.4	10.9	8.8
R_2			5.3	11.8	15.3	11.9

Mean dry matter % as harvested: 78.7

Treatments

V_1 Holdfast
V_2 Cappelle

R_1, R_2 1½, 3 bushels per acre
R_1, R_2 2, 4 bushels per acre

N_0 No N
N_1 0.46 cwt N per acre
N_2 0.93 cwt N per acre

T_1 'Nitro-Chalk' half in March half in May
T_2 'Nitro-Chalk' all in mid March
T_3 'Nitro-Chalk' all in mid April
T_4 'Nitro-Chalk' all in mid May

The V × R table does not include the plots receiving no nitrogen.

https://doi.org/10.23637/ERADOC-1-176

SPRING WHEAT

Rates and times of application of nitrogen - Rothamsted (R) Little Hoos and Woburn (W) Stackyard, Series C.

Design (each field): 22 treatments arranged in 4 blocks of 13 plots each, the control and 3 of the treatments occurring in every block, the other 18 treatments occurring in 2 blocks. The total amounts of N applied per block were equal.

Area of each plot: 0.0212 acres. Area harvested: 0.0141 acres.

Treatments: None, and all combinations of:-
Nitrogen: 0.3; 0.6; 0.9 cwt N per acre as 'Nitro-Chalk'.
Times of application: All in seed bed (S); all as early top dressing (E); all as late top dressing (L); $\frac{1}{2}$ S & $\frac{1}{2}$ E; $\frac{1}{2}$ S & $\frac{1}{2}$ L; $\frac{1}{2}$ E & $\frac{1}{2}$ L; $\frac{1}{3}$ S, $\frac{1}{3}$ E & $\frac{1}{3}$ L.

Basal dressing:
Rothamsted: 1 cwt superphosphate per acre combine drilled with seed.
Woburn: 1 cwt compound fertilizer (16% P_2O_5, 16% K_2O) per acre combine drilled with seed.

Cultivations, etc.:
Little Hoos (R). Ploughed: Oct 14, 1955 and Jan 24, 1956. Seed bed 'Nitro-Chalk' applied, seed combine drilled at $2\frac{3}{4}$ bushels per acre: Mar 17. Early 'Nitro-Chalk' top dressing applied: Apr 16. Sprayed with DNOC 6 lb in 90 gallons per acre: May 4. Late 'Nitro-Chalk' top dressing applied: May 17. Combine harvested: Sept 20. Variety: Koga II. Previous crop: Potatoes.
Stackyard (W). Ploughed: Nov 12, 1955. Seed bed 'Nitro-Chalk' applied: Mar 14, 1956. Seed combine drilled at 3 bushels per acre: Mar 16. Early 'Nitro-Chalk' top dressing applied: Apr 16. Late 'Nitro-Chalk' top dressing applied: May 16. Sprayed with MCPA, 3 pints in 20 gallons per acre: May 31. Combine harvested: Sept 12. Variety: Peko. Previous crop: Wheat.

Standard errors per plot. Grain (at 85% dry matter): cwt per acre.
Little Hoos (R): 1.87 cwt per acre or 5.7% (27 d.f.)
Stackyard (W): 1.53 cwt per acre or 7.1% (27 d.f.)

https://doi.org/10.23637/ERADOC-1-176 *pp 78*

Summary of Results

Grain (at 85% dry matter): cwt per acre

Rothamsted Little Hoos

N: cwt per acre	Time of application S	E	L	½S½E	½S½L	½E½L	⅓S⅓E⅓L	Mean
			(±1.41)				(±0.94)	(±0.47)
None								26.3 (1)
0.3	32.6	31.0	33.1	33.7	33.1	30.7	31.6	32.2
0.6	35.6	36.4	34.4	31.0	33.4	32.6	34.3	34.0
0.9	34.2	33.3	32.9	34.4	33.5	32.5	36.0	34.1
Mean (±0.78)	34.1	33.6	33.5	33.0	33.3	31.9	34.0 (2)	32.9

(1) ±0.94 (2) ±0.54

Mean dry matter % as harvested: 80.2

Woburn Stackyard Field

N: cwt per acre	Time of application S	E	L	½S½E	½S½L	½E½L	⅓S⅓E⅓L	Mean
			(±1.15)				(±0.77)	(±0.38)
None								11.4 (1)
0.3	19.6	18.0	18.3	19.4	18.5	20.7	20.6	19.4
0.6	23.6	21.6	20.7	24.9	24.0	22.4	25.0	23.4
0.9	23.0	22.0	22.8	25.8	25.0	23.8	25.1	24.1
Mean (±0.64)	22.1	20.5	20.6	23.4	22.5	22.3	23.5 (2)	21.5

(1) ±0.77 (2) ±0.44

Mean dry matter % as harvested: 68.0

Time of application

S In seedbed.
E Early top dressing.
L Late top dressing.

https://doi.org/10.23637/ERADOC-1-176

SPRING WHEAT

Varieties and levels of nitrogen - Little Hoos 1956.

Design: 3 randomized blocks of 8 plots each, plots being split into 2 for the application of nitrogen.

Area of each sub plot: 0.0101 acres. Area harvested: 0.0067 acres.

Treatments: All combinations of:
Whole plots. Varieties: Atle (1); Atson (2); Bersee (3), Koga II (4); Miana (5); Peko (6); Progress (7); Svenno (8).
Sub plots. Nitrogen: 0.3; 0.6 cwt N per acre applied as 'Nitro-Chalk'.

Basal dressing: 1 cwt superphosphate per acre combine drilled with seed.

Cultivations, etc.: Ploughed: Oct 14, 1955 and again Jan 24, 1956. 'Nitro-Chalk' applied, seed combine drilled at 2¾ bushels per acre: Mar 19. Sprayed with DNOC at 6 lb in 90 gallons: May 4. Combine harvested: Sept 20. Previous crop: Potatoes.

Standard errors per plot, Grain (at 85% dry matter):
Whole plot: 1.74 cwt per acre or 5.7% (14 d.f.)
Sub plot: 1.76 cwt per acre or 5.8% (16 d.f.)

Summary of Results

Grain (at 85% dry matter): cwt per acre

N: cwt per acre	Variety 1	2	3	4	5	6	7	8	Mean
				(±1.24)*					
0.3	29.5	32.2	24.6	33.5	25.3	34.3	30.6	28.7	29.8
0.6	29.9	33.8	26.9	33.2	26.6	33.5	31.2	32.0	30.9
Mean (±1.01)	29.7	33.0	25.8	33.4	25.9	33.9	30.9	30.3	30.4
Difference (±1.43)	+0.4	+1.6	+2.3	-0.3	+1.3	-0.8	+0.6	+3.3	+1.1
									(±0.51)

*for use in comparisons other than vertical.

Mean dry matter % as harvested: 80.5

https://doi.org/10.23637/ERADOC-1-176 *pp 80*

BARLEY

Rates and times of application of nitrogen - Rothamsted (R) Little Hoos and Woburn (W) Stackyard, Series C.

Design (each field): 22 treatments arranged in 4 blocks of 13 plots each, the control and 3 treatments occurring in every block, the other 18 treatments occurring in 2 blocks. The total amounts of N applied per block were equal.

Area of each plot: 0.0212 acres. Area harvested: 0.0141 acres.

Treatments: None and all combinations of:-
Nitrogen: N_1; N_2; N_3 applied as 'Nitro-Chalk'.
Times of application: All in seedbed (S); all as early top dressing (E); all as late top dressing (L); $\frac{1}{2}$ S & $\frac{1}{2}$ E; $\frac{1}{2}$ S & $\frac{1}{2}$ L; $\frac{1}{2}$ E & $\frac{1}{2}$ L; $\frac{1}{3}$ S, $\frac{1}{3}$ E & $\frac{1}{3}$ L.
Where N_1; N_2; N_3 =

Little Hoos (R): 0.23; 0.46; 0.69 cwt N per acre.
Stackyard (W): 0.3; 0.6; 0.9 cwt N per acre.

Basal dressing:
Rothamsted: 1 cwt superphosphate per acre combine drilled with seed.
Woburn: Ground chalk to part area. 1 cwt compound fertilizer (16% P_2O_5, 16% K_2O) per acre combine drilled with seed.

Cultivations, etc.:
Little Hoos (R). Ploughed: Oct 14, 1955 and Jan 24, 1956. Seed combine drilled at 2 bushels per acre: Mar 17. Seed bed 'Nitro-Chalk' applied: Mar 19. Early 'Nitro-Chalk' top dressing applied: Apr 16. Sprayed with DNOC 6 lb in 90 gallons per acre: May 4. Late 'Nitro-Chalk' top dressing applied: May 17. Combine harvested: Sept 20. Variety: Herta. Previous crop. Potatoes.
Stackyard (W). Ploughed: Nov 12, 1955. Seed bed 'Nitro-Chalk' applied; seed combine drilled at 2 bushels per acre: Mar 16, 1956. Early 'Nitro-Chalk' top dressing applied: Apr 12. Late 'Nitro-Chalk' top dressing: May 16. Sprayed with MCPA, 3 pints in 20 gallons per acre: May 31. Combine harvested: Sept 8. Variety: Herta. Previous crop: Wheat.

Standard errors per plot. Grain (at 85% dry matter):
Little Hoos (R): 2.50 cwt per acre or 6.3% (27 d.f.)
Stackyard (W): 2.56 cwt per acre or 11.8% (27 d.f.)

https://doi.org/10.23637/ERADOC-1-176

Summary of Results

Grain (at 85% dry matter): cwt per acre

Rothamsted Little Hoos

N: cwt per acre	Time of application S	E	L	½S½E	½S½L	½E½L	⅓S⅓E⅓L	Mean
			(±1.88)				(±1.25)	(±0.63)
None								32.8(1)
0.23	37.1	39.6	36.8	38.9	39.5	38.9	38.3	38.4
0.46	42.7	42.4	39.8	41.3	41.0	42.2	39.3	41.0
0.69	41.9	38.1	40.7	41.7	40.1	42.0	41.7	41.0
Mean (±1.05)	40.6	40.0	39.1	40.6	40.2	41.1	39.7(2)	39.6

(1) ±1.25 (2) ±0.72

Mean dry matter % as harvested: 79.8

Woburn Stackyard Field

N: cwt per acre	Time of application S	E	L	½S½E	½S½L	½E½L	⅓S⅓E⅓L	Mean
			(±1.93)				(±1.28)	(±0.64)
None								9.6(1)
0.3	16.4	17.2	19.0	17.7	18.5	18.9	19.8	18.4
0.6	22.2	24.9	21.4	20.8	24.4	26.2	22.4	23.1
0.9	26.7	26.8	28.6	27.0	25.6	23.2	28.1	26.8
Mean (±1.07)	21.8	23.0	23.0	21.8	22.9	22.8	23.4(2)	21.8

(1) ±1.28 (2) ±0.74

Mean dry matter % as harvested: 77.3

Time of application
- S In seedbed
- E Early top dressing
- L Late top dressing

https://doi.org/10.23637/ERADOC-1-176

SPRING OATS

Varieties and levels of nitrogen - Pastures 1956.

Design: 3 randomized blocks of 8 plots each, plots being split into 2 for the application of nitrogen.

Area of each sub plot: 0.0101 acres. Area harvested: 0.0067 acres.

Treatments: All combinations of:
Whole plots. Varieties: Blenda (1); Deva (2); Flamande (3); Milford (4); Opus (5); Palu (6); Sun II (7); de Wattines (8).
Sub plots. Nitrogen: None; 0.36 cwt N per acre applied as 'Nitro-Chalk'.

Basal dressing: 4 cwt compound granular fertilizer (9% N, 9% P_2O_5, 15% K_2O) per acre.

Cultivations, etc.: Ploughed: Nov 15 - Dec 3, 1955. Basal fertilizer applied: Mar 13, 1956. 'Nitro-Chalk' applied: Mar 20. Seed drilled at 3½ bushels per acre: Mar 22. Grass seed undersown at 30 lb per acre: Apr 26. Combine harvested: Sept 15. Previous crop: Barley.

Standard errors per plot, Grain (at 85% dry matter):
Whole plot: 1.79 cwt per acre or 7.5% (14 d.f.)
Sub plot: 1.19 cwt per acre or 5.0% (16 d.f.)

Summary of Results

Grain (at 85% dry matter): cwt per acre

N: cwt per acre (including basal)	Variety 1	2	3	4	5	6	7	8	Mean
				(±1.14)*					
0.36	22.9	24.2	26.9	12.9	19.1	25.6	25.4	26.5	22.9
0.72	23.6	25.6	26.9	14.1	20.2	30.2	25.3	29.9	24.5
Mean (±1.03)	23.2	24.9	26.9	13.5	19.7	27.9	25.3	28.2	23.7
Difference (±0.97)	+0.7	+1.4	0.0	+1.2	+1.1	+4.6	-0.1	+3.4	+1.6
									(±0.34)

*for use in comparisons other than vertical.

Mean dry matter % as harvested: 75.2

https://doi.org/10.23637/ERADOC-1-176 *pp 83*

SPRING BEANS

The control of Aphids (Aphis Fabae) by time of sowing and spraying - Great Knott I 1956.

Design: 4 × 4 Latin square, plots being split into 4 for the application of sprays.

Area of each sub plot: 0.0194 acres. Area harvested: 1st sowing, 0.0097; later sowings, 0.0194 acres.

Treatments. All combinations of:-
Whole plots. Times of sowing: Mar 10 (A); Apr 3 (B); Apr 24 (C); May 15 (D).
Sub plots. Spray: None; June 22; July 11; June 22 and July 11.

The insecticide spray was Metasystox, 12 oz. in 80 gallons per acre.

Basal dressing: 7 cwt compound granular fertilizer (10% P_2O_5, 20% K_2O) per acre.

Cultivations, etc.: Ploughed: Nov 26, 1955 and Jan 18, 1956. Basal fertilizer applied: Mar 6. Seed drilled at 200 lb per acre: Mar 10, Apr 3, Apr 24, May 15. Sprayed with miscible DDT: June 2. Sprayed with Metasystox, early application: June 22. Late spray application: July 11. Combine harvested: A - Oct 5; B & C - Oct 15; D - Oct 29. Variety: Spring Tick. Previous crop: Barley.

Standard errors per plot. Grain (at 85% dry matter):
Whole plot: 1.08 cwt per acre or 4.8% (6 d.f.)
Sub plot: 1.24 cwt per acre or 5.4% (36 d.f.)

Note: Counts of aphids were made at weekly intervals from early June to end of September: the infestation was very light on all plots.

Summary of Results

Grain (at 85% dry matter): cwt per acre

Time of Spraying	Time of Sowing Mar 10	Apr 3	Apr 24	May 15	Mean
	(1) & (2)				(± 0.31)
None	26.7	26.9	20.9	13.7	22.1
June 22	28.5	29.5	21.6	13.9	23.4
July 11	27.6	28.9	22.1	12.9	22.9
June 22 and July 11	26.1	28.3	20.7	14.7	22.4
Mean (±0.54)	27.2	28.4	21.3	13.8	22.7

(1) ±0.62 for use in vertical and interaction comparisons.
(2) ±0.76 for use in horizontal and diagonal comparisons.

Mean dry matter % as harvested	72.3	70.9	54.6	43.1	60.2

https://doi.org/10.23637/ERADOC-1-176 *pp 84*

56/Cd/2.1

SPRING BEANS

Control of weeds by spraying and cultivations - Great Field 1 1956.

Design: 4 randomized blocks of 7 plots each, 2 blocks being sprayed and 2 unsprayed.

Area of each plot: 0.0194 acres. Area harvested: 0.0139 acres.

Treatments: All combinations of:-
Spraying (on blocks): None; DNBP 5 pints in 80 gallons per acre.
Treatment cultivations:

	Additional cultivations	
With inter-row cultivations	None	(1)
	Harrowed once	(2)
	Harrowed three times	(3)
	Mechanical weeder once	(4)
	Mechanical weeder three times	(5)
Without inter-row cultivations	Harrowed as required	(6)
	Mechanical weeder as required	(7)

Basal dressing: 6 cwt compound granular fertilizer (10% P_2O_5, 20% K_2O) per acre.

Cultivations, etc.: Ploughed: Nov 15, 1955. Basal fertilizer applied: Mar 13, 1956. Seed drilled at 200 lb per acre: Mar 14.
Appropriate blocks sprayed with DNBP, 5 pints in 80 gallons per acre: May 7. Inter-row cultivated: Treatments (2), (3), (4), (5) - May 23, (1) - June 6. Combine harvested: Oct 12. Variety: Spring Tick.
Previous crop: Barley.
Additional treatment cultivations:
(2) and (4): Apr 27.
(3), (5) and (6): Apr 27, May 4, May 9.
(7): Apr 27, May 4 (twice), May 9.

Standard error per plot:
Grain (at 85% dry matter): 1.52 cwt per acre or 7.1% (12 d.f.)

https://doi.org/10.23637/ERADOC-1-176

Summary of Results

Grain (at 85% dry matter): cwt per acre

Spray	Treatment cultivations 1	2	3	4	5	6	7	Mean
				(±1.07)*				
None	21.3	20.6	18.8	17.9	20.7	21.1	19.1	19.9
DNBP	20.6	23.2	23.2	25.0	22.7	22.5	21.7	22.7
Mean (±0.76)	21.0	21.9	21.0	21.4	21.7	21.8	20.4	21.3
Diff. (±1.52)+	-0.7	+2.6	+4.4	+7.1	+2.0	+1.4	+2.6	+2.8

*for use in horizontal comparisons only.

+for use in the comparison of two differences only.

Mean dry matter % as harvested: 73.9

Treatment cultivations:

(1) None — With inter-row cultivations
(2) Harrowed once — " " " " "
(3) Harrowed three times — " " " " "
(4) Mechanical weeder once — " " " " "
(5) Mechanical weeder three times — " " " " "
(6) Harrowed as required — Without inter-row cultivations
(7) Mechanical weeder as required — " " " " " "

https://doi.org/10.23637/ERADOC-1-176 *pp 86*

SPRING BEANS

Flower drop - hormone sprays - Great Field I 1956.

Design: 4 randomized blocks of 6 plots each.

Area of each plot: 0.0064 acres. Area harvested: 0.0046 acres.

Treatments: Hormone sprays
None (2 plots per block) (0)
2; 4 applications of 4-chlorophenoxyacetic acid (1) & (2)
2; 4 applications of ∝(2, 4, 5 trichlorophenoxy) propionic acid (3) & (4)

The sprays were applied at a concentration of 5 p.p.m.

Basal dressing: 6 cwt compound granular fertilizer (10% P_2O_5, 20% K_2O) per acre.

Cultivations, etc.: Ploughed: Nov 10 - 15, 1955. Basal fertilizer applied: Mar 13, 1956. Seed drilled at 200 lb per acre: Mar 14. All plots (except control) sprayed with hormone sprays at approx. 150 gallons followed by 250 gallons per acre: June 18 and June 25. Appropriate plots sprayed again with hormone sprays at 350 gallons per acre: July 4 and July 10. Combine harvested: Oct 12. Variety: Spring Tick. Previous crop: Barley.

Standard error per plot:
Grain (at 85% dry matter): 1.61 cwt per acre or 6.6% (16 d.f.)

Note: Counts of numbers of pods were made.

Summary of Results

Grain (at 85% dry matter): cwt per acre

	Treatment 0	1	2	3	4	Mean
Mean (±0.80)	24.4 (1)	25.7	27.0	23.0	22.7	24.5
Increase (±0.99)		+1.3	+2.6	-1.4	-1.7	

(1) ±0.57

Mean dry matter % as harvested: 72.7

https://doi.org/10.23637/ERADOC-1-176

BEANS

Time of sowing, spraying, P and K - Rothamsted (R) Great Harpenden II and Woburn (W) Broadmead I 1956.

Design: 3 blocks of 4 whole plots each split into 3, with spraying on pairs of whole-plots and PK partially confounded.

Area of each sub-plot: Rothamsted, 0.0283 acres; Woburn, 0.0337 acres.
Area harvested: Rothamsted, 0.0088 acres; Woburn, 0.0105 acres.

Treatments. All combinations of:
Time of sowing: Autumn; spring.
Spray: None; "Metasystox" at 2 pints in 80 gallons per acre.
Phosphate: None; 0.5; 1.0 cwt P_2O_5 per acre as superphosphate.
Potash: None; 1.0; 2.0 cwt K_2O per acre as muriate of potash.

Basal dressing: None.

Note. At Woburn the autumn sown beans failed because of bird damage.

Cultivations, etc.:
Rothamsted. Ploughed: Oct 3, 1955. Fertilizers applied for autumn beans, seed drilled at 300 lb per acre: Oct 18. Fertilizers applied for spring beans: Mar 7, 1956. Spring beans sown at 200 lb per acre: Mar 10. Appropriate plots sprayed: June 23. Combine harvested: Oct 4. Previous crop: Barley.
Woburn. Ploughed: Oct 21, 1955. Fertilizers applied for winter beans: Nov 1. Ground chalk at 18 cwt per acre applied: Nov 14. Seed drilled at 275 lb per acre: Nov 15. Fertilizers applied for spring beans: Mar 20, 1956. Seed drilled at 200 lb per acre: Mar 22. Appropriate plots sprayed: June 26. Combine harvested: Oct 23. Variety: Winter-S.Q.Giant, Spring-Albyn.

Standard errors per plot. Grain (at 85% dry matter): cwt per acre.

Great Harpenden II (R),	whole plot:	3.06 cwt per acre or 17.3%	(4 d.f.)
	sub plot:	2.59 cwt per acre or 14.6%	(12 d.f.)
Broadmead I (W), Spring beans	sub plot:	2.28 cwt per acre or 13.7%	(4 d.f.)

https://doi.org/10.23637/ERADOC-1-176

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Summary of Results

Great Harpenden II (Rothamsted)

Grain (at 85% dry matter): cwt per acre

	Sown Autumn	Sown Spring	Difference	P_2O_5: cwt per acre None	0.5	1.0	K_2O: cwt per acre None	1.0	2.0	Mean
					(± 1.06)*			(± 1.06)*		
Spray										
None	17.9	16.1	-1.8	17.5	17.6	15.8	15.7	17.6	17.7	17.0
Metasystox	19.0	17.8	-1.2	17.9	18.8	18.5	15.6	20.6	19.0	18.4
Difference	+1.1	+1.7	+0.6	+0.4	+1.2	+2.7	-0.1	+3.0	+1.3	+1.4
			(± 3.53)		(± 1.49)**			(± 1.49)**		
					(1) & (2)			(1) & (2)		
Sown										
Autumn				17.8	19.6	17.8	15.0	20.4	19.9	18.4
Spring				17.6	16.8	16.5	16.3	17.8	16.8	17.0
Mean				17.7	18.2	17.2	15.7	19.1	18.3	17.7
					(± 0.75)			(± 0.75)		
Difference				-0.2	-2.8	-1.3	+1.3	-2.6	-3.1	-1.4
(± 2.15)										(± 1.77)

Mean dry matter % as harvested: 72.2

*For use in horizontal comparisons only

**For use only in testing the difference of two differences

(1) ±1.52 for use in diagonal comparisons only
(2) ±1.06 for use in horizontal comparisons only

56/Cd/4.2

56/Cd/4.3

Broadmead I (Woburn)

Spring beans

Grain (at 85% dry matter): cwt per acre

Spray	P_2O_5: cwt per acre None	0.5	1.0	K_2O: cwt per acre None	1.0	2.0	Mean
	(± 1.32)*			(± 1.32)*			
None	15.4	15.7	15.0	10.9	15.4	19.9	15.4
Metasystox	20.6	17.5	15.6	14.0	17.0	22.7	17.9
Mean (±0.93)	18.0	16.6	15.3	12.5	16.2	21.3	16.7
Difference (±1.86)**	5.2	1.8	0.6	3.1	1.6	2.8	2.5

*For use in horizontal comparisons only

**For use only in testing the difference of 2 differences

Mean dry matter % as harvested: 66.5

https://doi.org/10.23637/ERADOC-1-176 *pp 90*

56/Ce/1

POTATOES

Placement of nitrogen and potash - West Barnfield I 1956.

Design: 4 randomized blocks of 18 plots each.

Area of each plot: 0.0140 acres. Area harvested: 0.0057 acres.

Treatments: None (2 plots per block) and all combinations of:-
Nitrogen: 0.5; 1.0 cwt N per acre as sulphate of ammonia.
Potash: 0.75; 1.5 cwt K_2O per acre as sulphate of potash.
Methods of placement: Broadcast on flat before planting; Fertilizer placed 3" to side and 1" below seed at planting.

Basal dressing: 1.0 cwt P_2O_5 per acre as superphosphate placement drilled.

Cultivations, etc.: Ploughed: Nov 1, 1955. Broadcast fertilizers applied: Apr 11, 1956. Potatoes machine planted with placed fertilizers: Apr 12. Earthed up: June 28. Sprayed with copper fungicide, 5 lb in 40 gallons per acre: July 24. Sprayed again at 5 lb in 90 gallons per acre: Aug 25. Sprayed with sulphuric acid, 20% B.O.V.: Sept 14. Lifted: Oct 16 - 20. Variety: King Edward. Previous crop: Wheat.

Standard error per plot:
Total tubers: 0.750 tons per acre or 6.4% (52 d.f.)

Summary of Results

Total tubers: tons per acre

K_2O: cwt per acre	N: cwt per acre				Mean
	Broadcast		Placed		
	0.5	1.0	0.5	1.0	
	(± 0.375)				(± 0.187)
Broadcast					
0.75	10.28	12.55	9.94	10.81	10.90
1.5	12.06	14.34	11.82	12.86	12.77
Placed					
0.75	11.68	12.98	12.23	12.43	12.33
1.5	12.77	14.48	13.48	14.32	13.76
Mean (±0.187)	11.70	13.59	11.87	12.61	12.44 (±0.094)
No N or K_2O					6.72 (±0.265)
General mean					11.80

https://doi.org/10.23637/ERADOC-1-176

POTATOES

Control of virus spread by insecticide - Great Knott III 1956.

Design: 5 × 5 Latin square.

Area of each plot: 0.0602 acres. Area harvested: 0.0120 acres.

Treatments: No insecticide; high; low volume spraying of DDT emulsion, 2 lb active ingredient per acre per application.
High volume: 80 gallons per acre. 4; 6 times applied during season.
Low volume: 25 gallons per acre. 4; 6 times applied during season.

Infector plants: 6 leaf roll and 6 virus Y infected plants planted in each plot.

Note: The tractor used for spraying was driven over all plots on each occasion always passing over the same rows. Yields were taken from the undamaged rows and an estimate of the loss of the yield due to tractor damage was made from an area of 0.0602 acres.

Basal dressing per acre: 8 tons dung; $10\frac{1}{2}$ cwt compound granular fertilizer (9% N, 9% P_2O_5, 15% K_2O).

Cultivations, etc.: Dung applied: Sept 24, 1955. Ploughed: Sept 26. Basal fertilizers applied on the flat: Apr 4, 1956. Potatoes machine planted: Apr 7 - 10. Earthed up: June 26. Sprayed with copper fungicide, 3 lb in 80 gallons per acre: Aug 8. Sprayed with sulphuric acid, 20% BOV: Sept 13. Lifted: Oct 23 - 24. Variety: Majestic. Previous crop: Wheat.

Dates of DDT sprayings (both high and low volume):
4 times: June 14; June 26; July 12; Aug 8.
6 times: May 30 and Aug 29 in addition to above dates.

Standard error per plot:
Total tubers: 1.25 tons per acre or 8.9% (12 d.f.)

Note: Aphid counts were made and tuber samples taken to assess virus spread.

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Summary of Results

	Number of sprayings with DDT					
		High volume		Low volume		
	None	4	6	4	6	Mean
Total tubers: tons per acre						
Mean (±0.559)	13.35	13.97	14.62	14.41	13.63	14.00
Increase (±0.791)		+0.62	+1.27	+1.06	+0.28	
Percentage ware ($1\frac{1}{2}$" riddle)						
Mean	76.2	80.4	75.1	79.1	78.8	77.9
Increase		+4.2	-1.1	+2.9	+2.6	

Estimated loss of yield in damaged rows due to

6 passages of the tractor: 6.4%

Estimated loss of yield in whole crop due to

6 passages of the tractor along 4 rows out of 8: 3.2%

https://doi.org/10.23637/ERADOC-1-176

56/Ce/3.1

POTATOES

The control of blight by copper and sulphuric sprays - Great Knott III. 1956.

Design: 4 × 4 Latin square, plots being split into 2 for determination of the effect of tractor damage.

Area of each sub plot: 0.0140 acres.

Treatments:

Whole Plots: No spray; copper fungicide sprayed twice; sulphuric acid, sprayed to destroy haulm; copper fungicide and sulphuric acid sprayed as above. The tractor used for spraying was driven over all the plots on each occasion.

Sub plots: 4 rows damaged by two passages of the tractor during copper spray operations were compared with 4 undamaged rows.

Basal dressing per acre: 8 tons dung; $10\frac{1}{2}$ cwt compound granular fertilizer (9% N, 9% P_2O_5, 15% K_2O).

Cultivations, etc.: Dung applied, ploughed in: Sept 28, 1955. Basal fertilizer applied on flat: Apr 4, 1956. Potatoes machine planted: Apr 5 - 6. Earthed up: June 25. Fungicide treatment 3 lb in 80 gallons per acre applied: Aug 15 and again at 5 lb in 90 gallons per acre: Aug 25. Sprayed with sulphuric acid 20% B.O.V., 80 gallons per acre: Sept 17. Lifted: Oct 22. Previous crop: Wheat.

Standard errors per plot: Total tubers.
Whole plot: 0.938 tons per acre or 6.0% (6 d.f.)
Sub plot: 0.801 tons per acre or 5.1% (12 d.f.)

Note: Estimates were made of the rate of bulking, destruction of foliage by blight, amount of blight on the tubers.

https://doi.org/10.23637/ERADOC-1-176

Summary of Results

	Spray				
	None	Copper fungicide	Sulphuric acid	Copper fungicide and sulphuric acid	Mean
Total tubers: tons per acre					
		(±0.548)*			
Undamaged rows	14.65	18.26	14.73	16.79	16.11
Damaged rows	14.10	16.12	14.46	16.57	15.31
Mean (±0.469)	14.38	17.19	14.60	16.68	15.71
Difference (±0.566)	-0.55	-2.14	-0.27	-0.22	-0.80 (±0.283)
Percentage ware (1½" riddle)					
Undamaged rows	87.5	85.9	87.2	88.6	87.3
Damaged rows	85.6	86.0	84.6	88.8	86.2
Mean	86.6	85.9	85.9	88.7	86.8
Difference	-1.9	+0.1	-2.6	+0.2	-1.1

*For use in comparisons other than vertical.

https://doi.org/10.23637/ERADOC-1-176

POTATOES

Dung, N, P and K - Rothamsted (R) Great Field II and Woburn (W) Butt Close 1956.

Design (each field): 4 randomized blocks of 16 plots each, a high order interaction being confounded with block differences.

Area of each plot: 0.0200 acres. Area harvested: 0.0133 acres.

Treatments: All combinations of:-
Dung: None; 5; 10; 20 tons per acre ploughed in.
N: None; 0.9 cwt N per acre as sulphate of ammonia.
P: None; 0.75 cwt P_2O_5 per acre as superphosphate.
K: None; 1.5 cwt K_2O per acre as muriate of potash.

Basal dressing: None

Cultivations, etc.:
Great Field II (R).
Ploughed: Nov 12, 1955. Dung applied, ploughed: Apr 9, 1956. Fertilizers applied: Apr 20. Potatoes machine planted: Apr 23. Earthed up: June 30. Sprayed with copper fungicide, 5 lb in 40 gallons per acre: July 24. Sprayed again at 3 lb in 80 gallons: Aug 14. Sprayed with sulphuric acid, 20% BOV, 80 gallons per acre: Sept 24. Lifted: Oct 15 - 16. Variety: Majestic. Previous crop: Wheat.
Butt Close (W).
Ploughed: Nov 9, 1955. Dung applied: Apr 17 - 18, 1956. Ploughed: Apr 19. Fertilizers applied: Apr 20. Potatoes machine planted: Apr 23. Earthed up: June 21. Sprayed with copper fungicide, 5 lb in 40 gallons per acre: July 23. Sprayed with sodium arsenite, 1 gallon in 40 gallons per acre: Sept 1. Lifted: Oct 1. Variety: Majestic. Previous crop: Barley.

Standard errors per plot. Total tubers: tons per acre.
Great Field II (R): 0.960 tons per acre or 6.6% (29 d.f.)
Butt Close (W): 1.47 tons per acre or 13.1% (30 d.f.)

Notes:
Great Field II (R). The yields of total tubers were adjusted to allow for tractor damage to some of the rows during spraying.
Butt Close (W). The crop was infested by potato root eelworm (Heterodera Rostochiensis), the symptoms being more severe on the plots receiving no dung or 5 tons per acre. No adjustment was made.

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Summary of Results

Total tubers: tons per acre

	Dung: tons per acre None	5	10	20	Mean
Great Field (Rothamsted)					
Mean (±0.240)	12.62	14.20	15.43	15.89	14.54
		(±0.339)			
N: cwt per acre					
None	11.77	13.09	14.69	15.51	13.76
0.9	13.48	15.33	16.17	16.27	15.31
Difference (±0.480)	+1.71	+2.24	+1.48	+0.76	+1.55 (±0.240)
P_2O_5: cwt per acre					
None	11.33	13.01	14.41	14.84	13.40
0.75	13.91	15.41	16.46	16.95	15.68
Difference (±0.480)	+2.58	+2.40	+2.05	+2.11	+2.28 (±0.240)
K_2O: cwt per acre					
None	11.88	13.39	14.92	15.72	13.98
1.5	13.37	15.03	15.94	16.06	15.10
Difference (±0.480)	+1.49	+1.64	+1.02	+0.34	+1.12 (±0.240)
Butt Close (Woburn)					
Mean (±0.368)	9.33	10.50	11.59	13.60	11.25
		(±0.520)			
N: cwt per acre					
None	6.25	6.98	8.28	11.80	8.33
0.9	12.40	14.02	14.90	15.40	14.18
Difference (±0.736)	+6.15	+7.04	+6.62	+3.60	+5.85 (±0.368)
P_2O_5: cwt per acre					
None	9.02	10.28	11.52	13.63	11.11
0.75	9.64	10.72	11.66	13.57	11.40
Difference (±0.736)	+0.62	+0.44	+0.14	-0.06	+0.29 (±0.368)
K_2O: cwt per acre					
None	8.75	10.95	11.62	14.17	11.37
1.5	9.90	10.05	11.56	13.04	11.14
Difference (±0.736)	+1.15	-0.90	-0.06	-1.13	-0.23 (±0.368)

https://doi.org/10.23637/ERADOC-1-176

Percentage Ware

	Dung: tons per acre None	5	10	20	Mean
Great Field (Rothamsted)(1)					
Mean	88.7	88.6	84.9	86.3	87.1
N: cwt per acre					
None	89.2	90.0	86.5	89.7	88.8
0.9	88.3	87.2	83.3	82.9	85.4
Difference	-0.9	-2.8	-3.2	-6.8	-3.4
P_2O_5: cwt per acre					
None	89.6	88.8	86.7	87.0	88.0
0.75	87.8	88.4	83.0	85.6	86.2
Difference	-1.8	-0.4	-3.7	-1.4	-1.8
K_2O: cwt per acre					
None	88.5	88.3	85.0	86.4	87.1
1.5	88.9	88.8	84.7	86.2	87.2
Difference	+0.4	+0.5	-0.3	-0.2	+0.1
Butt Close (Woburn)(2)					
Mean	69.1	76.7	79.4	82.9	77.0
N: cwt per acre					
None	58.5	66.8	72.7	79.2	69.3
0.9	79.6	86.6	86.1	86.6	84.7
Difference	+21.1	+19.8	+13.4	+7.4	+15.4
P_2O_5: cwt per acre					
None	70.1	75.5	79.3	82.9	76.9
0.75	68.1	77.9	79.5	82.9	77.1
Difference	-2.0	+2.4	+0.2	0.0	+0.2
K_2O: cwt per acre					
None	67.5	77.1	77.6	82.1	76.1
1.5	70.7	76.3	81.3	83.7	78.0
Difference	+3.2	-0.8	+3.7	+1.6	+1.9

Riddle (1) $1\frac{1}{2}$" (2) $1\frac{3}{8}$".

https://doi.org/10.23637/ERADOC-1-176

Total tubers: tons per acre

Response to	Responses to treatments cwt per acre N None	N 0.9	P_2O_5 None	P_2O_5 0.75	K_2O None	K_2O 1.5
Great Field (Rothamsted)			(± 0.339)			
N	-	-	+0.72	+2.38	+1.50	+1.60
P_2O_5	+1.45	+3.11	-	-	+1.80	+2.76
K_2O	+1.07	+1.17	+0.64	+1.60	-	-
Butt Close (Woburn)			(± 0.520)			
N	-	-	+5.88	+5.82	+5.49	+6.21
P_2O_5	+0.32	+0.26	-	-	+1.15	-0.57
K_2O	-0.60	+0.12	+0.62	-1.10	-	-

Percentage Ware

Response to	Responses to treatments cwt per acre N None	N 0.9	P_2O_5 None	P_2O_5 0.75	K_2O None	K_2O 1.5
Great Field (Rothamsted)(1)						
N	-	-	-1.9	-4.9	-3.9	-2.9
P_2O_5	-0.3	-3.3	-	-	-2.2	-1.4
K_2O	-0.4	+0.6	-0.3	+0.5	-	-
Butt Close (Woburn)(2)						
N	-	-	+17.0	+13.8	+16.5	+14.3
P_2O_5	+1.8	-1.4	-	-	+ 2.2	- 1.8
K_2O	+3.1	+0.9	+ 4.0	0.0	-	-

Riddle (1) $1\frac{1}{2}$" (2) $1\frac{5}{8}$".

https://doi.org/10.23637/ERADOC-1-176

POTATOES

Control of skin spot (Cospora pustulans) by fungicides - Great Knott III 1956.

Design: 3 randomized blocks of 15 plots each.

Area of each plot: 0.0140 acres. Area harvested: 0.0070 acres.

Treatments:

None (3 plots per block).

PCNB, 20% Parachloronitro benzene dust applied: to seed at 3 oz. per cwt (S); to furrows before planting at 300 lb per acre (F); (S) and (F).

Calomel, 4% dust applied: to seed at 12 oz. per cwt (S); to furrows before planting at 100 lb per acre (F); (S) and (F).

Nomersan, 10% Thiram dust applied: to seed at 3 oz. per cwt (S); to furrows before planting at 100 lb per acre (F); (S) and (F).

Griseofulvin applied: to seed as 50% glycerol paste at 0.6 g. per tuber (S); to furrows before planting as 0.4% suspension at 100 gallons per acre (F); to foliage as 0.04% suspension at 50 gallons per acre (L).

Basal dressing: 8 tons dung per acre ploughed in; 10½ cwt compound granular fertilizer (9% N, 9% P_2O_5, 15% K_2O) per acre before ridging.

Cultivations, etc.: Dung applied, ploughed in: Sept 28, 1955. Basal fertilizer applied on flat: Apr 4, 1956. Ridged: Apr 16. Potatoes hand planted: Apr 17. Earthed up: June 29. Sprayed with copper fungicide, 5 lb in 40 gallons per acre: July 23. Sprayed again at 3 lb in 80 gallons per acre: Aug 15. Sprayed with sulphuric acid, 20% BOV, 80 gallons per acre: Sept 12. Lifted: Oct 9. Variety: Majestic. Previous crop: Wheat.

Standard error per plot:

Total tubers: 1.12 tons per acre or 7.5% (30 d.f.)

Note: Emergence counts and records of incidence of root browning and skin spot (Oospora pustulans), black scurf and stem canker (Corticium solani) and common scab (Actinomyces scabies) were made.

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Summary of Results

Method of Application	Fungicide None	P	C	N	A	Mean
Total tubers: tons per acre						
			(± 0.649)			(± 0.324)
S		13.67	14.73	15.31	12.95	14.16
F		14.31	16.77	14.97	16.07	15.53 (1)
SF		14.69	14.97	14.50		14.72 (2)
L					15.48	15.48
Mean (±0.375)	15.11	14.22	15.49	14.92	14.83	14.92

(1) ±0.375 (2) ±0.649

Percentage ware ($1\frac{1}{2}$" riddle)						
S		88.1	84.1	91.4	80.5	86.0
F		85.3	87.2	86.2	88.0	86.7
SF		90.1	85.9	86.5		87.5
L					87.5	87.5
Mean	86.2	87.9	85.7	88.0	85.3	86.6

Fungicide

P = PCNB (Parachloronitro benzene) 20% dust.
C = Calomel 4% dust.
N = Nomersan 10% thiram dust.
A = Griseofulvin.

Methods of application

S = Seed treated.
F = Applied to furrows before planting.
L = Applied as spray to foliage.

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SUGAR BEET

Dung, N, P, K and Salt - Rothamsted (R) Great Field II and Woburn (W) Butt Close 1956.

Design (each field): 4 randomized blocks of 16 plots each, certain high order interactions being confounded with block differences.

Area of each plot: Rothamsted, 0.0158 acres; Woburn, 0.0167 acres.
Area harvested: Rothamsted, 0.0106 acres; Woburn, 0.0110 acres.

Treatments. All combinations of:
Dung: None; 5; 10; 20 tons per acre ploughed in.
N: None; 0.9 cwt N per acre as sulphate of ammonia.
P: None; 0.75 cwt P_2O_5 per acre as superphosphate.
K: None; 1.5 cwt K_2O per acre as muriate of potash.
Salt: None; 5 cwt per acre agricultural salt.

Basal dressing:
Rothamsted: Ground chalk at various rates to bring plots to uniform pH.
Woburn: Ground chalk at 10 cwt per acre.

Cultivations, etc.:
Great Field (R). Ploughed: Nov 12, 1955. Salt applied: Apr 5, 1956. Dung applied, all plots ploughed: Apr 9. Ground chalk applied: Apr 11. Fertilizers applied, seed drilled at 18 lb per acre: Apr 20. Singled: June 13 - 16. Lifted: Dec 12 - 19. Variety: Klein E. Previous crop: Wheat.
Butt Close (W). Ploughed: Nov 9, 1955. Salt applied: Apr 11, 1956. Dung applied, all plots ploughed: Apr 18 - 19. Ground chalk applied: Apr 19. Fertilizers applied: Apr 23. Seed drilled at 12 lb per acre: Apr 26. Sprayed with parathion, $\frac{1}{2}$ pint in 40 gallons per acre: May 25. Singled: June 11 - 14. Lifted: Nov 21 - 23. Variety: Klein E. Previous crop: Wheat.

Standard errors per plot.
Great Field (R). Total sugar, 4.50 cwt per acre or 9.7% (32 d.f.)
Butt Close (W). Total sugar, 6.27 cwt per acre or 12.0% (32 d.f.)
Great Field (R). Tops, 2.46 tons per acre or 10.0% (32 d.f.)
Butt Close (W). Tops, 1.12 tons per acre or 10.9% (32 d.f.)

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Summary of Results

Roots (washed): tons per acre

	Dung: tons per acre None	5	10	20	Mean
Great Field II (Rothamsted)					
Mean	12.58	14.29	15.59	15.98	14.61
N: cwt per acre					
None	12.72	13.90	15.28	16.03	14.48
0.9	12.44	14.69	15.89	15.93	14.74
Difference	-0.28	+0.79	+0.61	-0.10	+0.26
P_2O_5: cwt per acre					
None	10.59	12.43	14.73	14.54	13.08
0.75	14.56	16.15	16.44	17.42	16.14
Difference	+3.97	+3.72	+1.71	+2.88	+3.06
K_2O: cwt per acre					
None	12.44	13.60	15.73	15.78	14.39
1.5	12.71	14.98	15.44	16.18	14.83
Difference	+0.27	+1.38	-0.29	+0.40	+0.44
Salt: cwt per acre					
None	12.28	13.46	14.87	15.50	14.03
5.0	12.87	15.13	16.30	16.47	15.19
Difference	+0.59	+1.67	+1.43	+0.97	+1.16
Butt Close (Woburn)					
Mean	12.65	14.60	14.89	15.82	14.49
N: cwt per acre					
None	10.19	13.13	13.36	14.80	12.87
0.9	15.11	16.07	16.41	16.84	16.11
Difference	+4.92	+2.94	+3.05	+2.04	+3.24
P_2O_5: cwt per acre					
None	12.47	13.88	14.87	16.13	14.33
0.75	12.84	15.33	14.91	15.51	14.65
Difference	+0.37	+1.45	+0.04	-0.62	+0.32
K_2O: cwt per acre					
None	12.42	13.31	14.99	15.52	14.06
1.5	12.88	15.90	14.78	16.12	14.92
Difference	+0.46	+2.59	-0.21	+0.60	+0.86
Salt: cwt per acre					
None	11.84	12.97	14.38	15.23	13.60
5.0	13.46	16.24	15.40	16.41	15.38
Difference	+1.62	+3.27	+1.02	+1.18	+1.78

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Sugar percentage

	Dung: tons per acre None	5	10	20	Mean
	Great Field II (Rothamsted)				
Mean	15.9	16.1	15.8	15.9	16.0
N: cwt per acre					
None	16.2	16.5	16.2	16.2	16.3
0.9	15.6	15.7	15.4	15.7	15.6
Difference	-0.6	-0.8	-0.8	-0.5	-0.7
P_2O_5: cwt per acre					
None	15.8	16.2	15.9	16.0	16.0
0.75	16.0	16.0	15.7	15.9	15.9
Difference	+0.2	-0.2	-0.2	-0.1	-0.1
K_2O: cwt per acre					
None	15.9	16.2	15.9	15.8	15.9
1.5	16.0	16.1	15.8	16.0	16.0
Difference	+0.1	-0.1	-0.1	+0.2	+0.1
Salt: cwt per acre					
None	16.0	16.0	15.7	16.0	15.9
5.0	15.8	16.3	15.9	15.8	16.0
Difference	-0.2	+0.3	+0.2	-0.2	+0.1
	Butt Close (Woburn)				
Mean	18.1	18.2	18.0	17.9	18.1
N: cwt per acre					
None	18.0	18.2	18.2	18.2	18.2
0.9	18.1	18.2	17.9	17.6	17.9
Difference	+0.1	0.0	-0.3	-0.6	-0.3
P_2O_5: cwt per acre					
None	18.2	18.3	18.0	18.0	18.1
0.75	17.9	18.1	18.0	17.9	18.0
Difference	-0.3	-0.2	0.0	-0.1	-0.1
K_2O: cwt per acre					
None	18.0	18.1	17.9	18.2	18.0
1.5	18.2	18.3	18.1	17.6	18.1
Difference	+0.2	+0.2	+0.2	-0.6	+0.1
Salt: cwt per acre					
None	18.3	18.2	18.0	18.0	18.1
5.0	17.9	18.2	18.0	17.8	18.0
Difference	-0.4	0.0	0.0	-0.2	-0 1

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Total sugar: cwt per acre

	Dung: tons per acre None	5	10	20	Mean
Great Field II (Rothamsted)					
Mean	40.2	46.1	49.3 (± 1.59)	50.9	46.6
N: cwt per acre					
None	41.4	46.1	49.6	51.8	47.2
0.9	39.0	46.1	48.9	50.1	46.0
Difference (±2.25)	-2.4	0.0	-0.7	-1.7	-1.2 (± 1.12)
P_2O_5: cwt per acre					
None	33.7	40.4	47.0	46.4	41.9
0.75	46.7	51.8	51.6	55.5	51.4
Difference (±2.25)	+13.0	+11.4	+4.6	+9.1	+9.5 (± 1.12)
K_2O: cwt per acre					
None	39.6	44.0	49.9	50.0	45.9
1.5	40.8	48.1	48.7	51.8	47.4
Difference (±2.25)	+1.2	+4.1	-1.2	+1.8	+1.5 (± 1.12)
Salt: cwt per acre					
None	39.5	43.0	46.6	49.7	44.7
5.0	40.9	49.2	51.9	52.2	48.5
Difference (±2.25)	+1.4	+6.2	+5.3	+2.5	+3.8 (± 1.12)
Butt Close (Woburn)					
Mean	45.7	53.2	53.6 (± 2.22)	56.6	52.3
N: cwt per acre					
None	36.7	47.9	48.6	54.0	46.8
0.9	54.8	58.5	58.7	59.2	57.8
Difference (±3.14)	+18.1	+10.6	+10.1	+5.2	+11.0 (± 1.57)
P_2O_5: cwt per acre					
None	45.4	50.8	53.5	57.8	51.9
0.75	46.1	55.6	53.7	55.4	52.7
Difference (±3.14)	+0.7	+4.8	+0.2	-2.4	+0.8 (± 1.57)
K_2O: cwt per acre					
None	44.8	48.1	53.6	56.4	50.7
1.5	46.7	58.3	53.6	56.7	53.8
Difference (±3.14)	+1.9	+10.2	0.0	+0.3	+3.1 (± 1.57)
Salt: cwt per acre					
None	43.2	47.1	51.9	54.8	49.3
5.0	48.3	59.3	55.3	58.4	55.3
Difference (±3.14)	+5.1	+12.2	+3.4	+3.6	+6.0 (± 1.57)

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Tops: tons per acre

	Dung: tons per acre None	5	10	20	Mean
Great Field II (Rothamsted)					
Mean	21.52	23.71	24.84 (± 0.869)	28.52	24.65
N: cwt per acre					
None	20.34	21.05	22.99	26.57	22.74
0.9	22.69	26.37	26.69	30.48	26.56
Difference (±1.229)	+2.35	+5.32	+3.70	+3.91	+3.82 (± 0.614)
P_2O_5: cwt per acre					
None	19.07	21.93	23.80	27.32	23.03
0.75	23.96	25.49	25.88	29.73	26.27
Difference (±1.229)	+4.89	+3.56	+2.08	+2.41	+3.24 (± 0.614)
K_2O: cwt per acre					
None	21.02	22.84	24.32	28.57	24.19
1.5	22.02	24.57	25.36	28.47	25.11
Difference (±1.229)	+1.00	+1.73	+1.04	-0.10	+0.92 (± 0.614)
Salt: cwt per acre					
None	20.96	21.17	23.11	27.33	23.14
5.0	22.08	26.25	26.57	29.72	26.15
Difference (±1.229)	+1.12	+5.08	+3.46	+2.39	+3.01 (± 0.614)
Butt Close (Woburn)					
Mean	9.43	9.89	10.50 (± 0.398)	11.44	10.32
N: cwt per acre					
None	7.27	8.30	8.81	9.74	8.53
0.9	11.60	11.49	12.18	13.13	12.10
Difference (±0.562)	+4.33	+3.19	+3.37	+3.39	+3.57 (± 0.281)
P_2O_5: cwt per acre					
None	9.05	9.72	10.68	11.56	10.25
0.75	9.82	10.07	10.31	11.32	10.38
Difference (±0.562)	+0.77	+0.35	-0.37	-0.24	+0.13 (± 0.281)
K_2O: cwt per acre					
None	9.70	9.56	10.58	11.21	10.26
1.5	9.16	10.23	10.42	11.66	10.37
Difference (±0.562)	-0.54	+0.67	-0.16	+0.45	+0.11 (± 0.281)
Salt: cwt per acre					
None	8.92	9.35	10.28	10.95	9.87
5.0	9.95	10.44	10.71	11.92	10.76
Difference (±0.562)	+1.03	+1.09	+0.43	+0.97	+0.89 (± 0.281)

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Plant number: thousands per acre

	Dung: tons per acre None	5	10	20	Mean
Great Field II (Rothamsted)					
Mean	27.0	27.4	26.5	25.6	26.6
N: cwt per acre					
None	27.6	27.4	27.0	25.8	27.0
0.9	26.4	27.4	26.1	25.4	26.3
Difference	-1.2	0.0	-0.9	-0.4	-0.7
P_2O_5: cwt per acre					
None	27.5	28.0	26.5	25.8	26.9
0.75	26.5	26.9	26.6	25.4	26.3
Difference	-1.0	-1.1	+0.1	-0.4	-0.6
K_2O: cwt per acre					
None	26.3	27.5	26.5	25.6	26.5
1.5	27.7	27.3	26.6	25.6	26.8
Difference	+1.4	-0.2	+0.1	0.0	+0.3
Salt: cwt per acre					
None	27.1	27.0	27.0	25.8	26.7
5.0	26.9	27.8	26.1	25.3	26.5
Difference	-0.2	+0.8	-0.9	-0.5	-0.2

Butt Close (Woburn)

Not recorded.

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Roots (washed): tons per acre

K_2O: cwt per acre	Salt: cwt per acre	Dung: tons per acre None	5	10	20
Great Field II (Rothamsted)					
None	None	11.51	12.52	14.75	15.76
1.5	None	13.06	14.40	14.98	15.24
None	5.0	13.38	14.69	16.71	15.81
1.5	5.0	12.36	15.57	15.90	17.13
Butt Close (Woburn)					
None	None	11.84	12.21	14.16	15.10
1.5	None	11.85	13.73	14.60	15.36
None	5.0	13.00	14.40	15.83	15.95
1.5	5.0	13.92	18.07	14.97	16.87

Sugar percentage

K_2O: cwt per acre	Salt: cwt per acre	Dung: tons per acre None	5	10	20
Great Field II (Rothamsted)					
None	None	15.9	16.0	15.7	16.1
1.5	None	16.2	15.9	15.7	16.0
None	5.0	15.9	16.3	16.0	15.6
1.5	5.0	15.8	16.2	15.8	16.0
Butt Close (Woburn)					
None	None	18.2	18.0	18.0	18.2
1.5	None	18.4	18.4	18.1	17.8
None	5.0	17.8	18.2	17.8	18.2
1.5	5.0	18.0	18.2	18.2	17.5

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Total sugar: cwt per acre

K_2O: cwt per acre	Salt: cwt per acre	Dung: tons per acre None	5	10	20
Great Field II (Rothamsted)					
		(± 2.25)			
None	None	36.8	40.2	46.3	50.6
1.5	None	42.3	45.8	47.0	48.8
None	5.0	42.4	47.9	53.5	49.5
1.5	5.0	39.4	50.5	50.4	54.9
Butt Close (Woburn)					
		(± 3.14)			
None	None	43.1	43.7	50.8	55.1
1.5	None	43.3	50.6	53.0	54.5
None	5.0	46.5	52.5	56.4	57.8
1.5	5.0	50.1	66.0	54.3	58.9

Tops: tons per acre

K_2O: cwt per acre	Salt: cwt per acre	Dung: tons per acre None	5	10	20
Great Field II (Rothamsted)					
		(± 1.229)			
None	None	19.33	20.51	21.45	27.87
1.5	None	22.59	21.83	24.77	26.78
None	5.0	22.70	25.17	27.20	29.28
1.5	5.0	21.45	27.32	25.94	30.17
Butt Close (Woburn)					
		(± 0.562)			
None	None	9.24	9.38	10.42	11.64
1.5	None	8.59	9.33	10.14	10.26
None	5.0	10.17	9.75	10.73	10.78
1.5	5.0	9.73	11.13	10.69	13.06

Plant number: thousands per acre

K_2O: cwt per acre	Salt: cwt per acre	Dung: tons per acre None	5	10	20
Great Field II (Rothamsted)					
None	None	26.5	27.4	27.6	26.1
1.5	None	27.7	26.6	26.5	25.5
None	5.0	26.2	27.6	25.4	25.0
1.5	5.0	27.7	28.1	26.8	25.7

Butt Close (Woburn)
not recorded.

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Response to	Responses to treatments cwt per acre: N None	N 0.9	P_2O_5 None	P_2O_5 0.75	K_2O None	K_2O 1.5	Salt None	Salt 5.0
Roots (washed): tons per acre								
Great Field II (Rothamsted)								
N	-	-	+0.05	+0.47	-0.29	+0.31	+0.41	+0.11
P_2O_5	+2.86	+3.28	-	-	+2.69	+3.45	+3.04	+3.10
K_2O	-0.11	+0.99	+0.06	+0.82	-	-	+0.79	+0.09
Salt	+1.32	+1.02	+1.14	+1.20	+1.52	+0.82	-	-
Butt Close (Woburn)								
N	-	-	+3.75	+2.73	+3.71	+2.77	+3.57	+2.91
P_2O_5	+0.82	-0.20	-	-	+0.26	+0.36	+0.41	+0.21
K_2O	+1.33	+0.39	+0.81	+0.91	-	-	+0.55	+1.17
Salt	+2.10	+1.44	+1.87	+1.67	+1.46	+2.08	-	-
Sugar percentage								
Great Field II (Rothamsted)								
N	-	-	-0.7	-0.7	-0.9	-0.5	-0.8	-0.6
P_2O_5	-0.1	-0.1	-	-	-0.1	-0.1	-0.1	-0.1
K_2O	-0.2	+0.2	0.0	0.0	-	-	0.0	0.0
Salt	-0.1	+0.1	0.0	0.0	0.0	0.0	-	-
Butt Close (Woburn)								
N	-	-	-0.2	-0.2	-0.2	-0.2	-0.4	0.0
P_2O_5	-0.1	-0.1	-	-	-0.2	0.0	-0.2	0.0
K_2O	0.0	0.0	-0.1	+0.1	-	-	+0.1	-0.1
Salt	-0.4	0.0	-0.3	-0.1	-0.1	-0.3	-	-
Total sugar: cwt per acre								
Great Field II (Rothamsted)								
				(± 1.59)				
N	-	-	-1.5	-0.9	-3.6	+1.2	-1.0	-1.4
P_2O_5	+9.2	+9.8	-	-	+8.2	+10.8	+9.4	+9.6
K_2O	-0.9	+3.9	+0.2	+2.8	-	-	+2.5	+0.5
Salt	+4.0	+3.6	+3.7	+3.9	+4.8	+2.8	-	-
Butt Close (Woburn)								
				(± 2.22)				
N	-	-	+13.1	+8.9	+12.7	+9.3	+11.8	+10.2
P_2O_5	+2.9	-1.3	-	-	+0.2	+1.4	+0.9	+0.7
K_2O	+4.8	+1.4	+2.5	+3.7	-	-	+2.2	+4.0
Salt	+6.9	+5.3	+6.2	+6.0	+5.2	+7.0	-	-

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Response to	Responses to treatments cwt per acre: N None	N 0.9	P_2O_5 None	P_2O_5 0.75	K_2O None	K_2O 1.5	Salt None	Salt 5.0
Tops: tons per acre								
Great Field II (Rothamsted)								
				(± 0.869)				
N	-	-	+2.94	+4.70	+3.87	+3.77	+3.84	+3.80
P_2O_5	+2.36	+4.12	-	-	+2.95	+3.53	+1.91	+4.57
K_2O	+0.97	+0.87	+0.63	+1.21	-	-	+1.70	+0.14
Salt	+3.03	+2.99	+1.68	+4.34	+3.79	+2.23	-	-
Butt Close (Woburn)								
				(± 0.398)				
N	-	-	+3.73	+3.41	+3.85	+3.29	+4.26	+2.88
P_2O_5	+0.29	-0.03	-	-	+0.51	-0.25	+0.87	-0.61
K_2O	+0.38	-0.18	+0.48	-0.28	-	-	-0.59	+0.79
Salt	+1.57	+0.19	+1.62	+0.14	+0.19	+1.57	-	-
Plant number: thousands per acre								
Great Field II (Rothamsted)								
N	-	-	-0.7	-0.5	-0.8	-0.4	-0.5	-0.7
P_2O_5	-0.7	-0.5	-	-	-0.2	-1.0	-0.4	-0.8
K_2O	+0.1	+0.5	+0.7	-0.1	-	-	-0.4	+1.0
Salt	-0.1	-0.3	0.0	-0.4	-0.9	+0.5	-	-
Butt Close (Woburn)								
Not recorded								

https://doi.org/10.23637/ERADOC-1-176

LUCERNE

Single and repeated applications of potash - Great Harpenden II 1956, the second year.

Design: 6 randomized blocks of 8 plots each.

Area of each plot: 0.0147 acres.

Treatments: (For the 3 years 1955 - 57)
None (2 plots per block).
Single dressings in 1955: 1; 2; 3 cwt K_2O per acre as muriate of potash.
Annual dressings: 0.33; 0.66; 1.0 cwt K_2O per acre as muriate of potash.

Note: In spring 1955 all the potash dressings were given in the seed bed. Subsequent annual applications are applied as top dressings.

Basal dressing 1956: 3 tons ground chalk per acre.

Cultivations, etc.: Annual potash dressings applied: Nov 8, 1955. Ground chalk applied: Mar 12, 1956. Cut and weighed green: three times - June 11, July 24, Oct 24.

Standard errors per plot. Dry matter:

1st cut:	2.15 cwt per acre or 7.4%	(36 d.f.)
2nd cut:	2.50 cwt per acre or 9.4%	(36 d.f.)
3rd cut:	0.972 cwt per acre or 5.8%	(36 d.f.)
Total of 3 cuts:	3.89 cwt per acre or 5.4%	(36 d.f.)

Note: For the first year's results, see "Results of the Field Experiments" 1955, Section Ce/1.

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Summary of Results

Dry matter: cwt per acre

	K_2O: cwt per acre						
		Applied 1955			Applied annually 1955 and 1956		
	None	1.0	2.0	3.0	0.33	0.66	1.0	Mean
1st cut								
	(± 0.62)				(± 0.88)			
Mean	27.2	29.7	30.8	31.9	27.6	29.8	29.8	29.3
Increase (±1.08)		2.5	3.6	4.7	0.4	2.6	2.6	
2nd cut								
	(± 0.72)				(± 1.02)			
Mean	25.5	26.0	28.1	27.6	25.9	26.7	27.1	26.5
Increase (±1.25)		0.5	2.6	2.1	0.4	1.2	1.6	
3rd cut								
	(± 0.28)				(± 0.40)			
Mean	16.0	16.8	17.6	17.3	16.4	17.1	17.3	16.8
Increase (±0.49)		0.8	1.6	1.3	0.4	1.1	1.3	
Total of 3 cuts								
	(± 1.12)				(± 1.59)			
Mean	68.7	72.5	76.5	76.8	69.8	73.6	74.2	72.6
Increase (±1.95)		3.8	7.8	8.1	1.1	4.9	5.5	

1st cut, Mean dry matter % as cut: 24.2
2nd cut, Mean dry matter % as cut: 23.0
3rd cut, Mean dry matter % as cut: 24.5
Total of 3 cuts, Mean dry matter % as cut: 23.9

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56/Ch/1

KALE

Placement of nitrogen, phosphate and potash - W.Barnfield I 1956.

Design: 4 randomized blocks of 10 plots each.

Area of each plot: 0.00909 acres. Area harvested: 0.00727 acres.

Treatments: None (2 plots per block) and all combinations of
Fertilizer: P; K; PK; NPK.
Method of application: Broadcast in seed bed; drilled in band 2" to side of seed and 2" below soil surface

where N = 0.4 cwt N per acre as sulphate of ammonia
P = 0.6 cwt P_2O_5 per acre as superphosphate
K = 1.0 cwt K_2O per acre as muriate of potash

In addition top dressings were applied:-

To "NPK" plots: 0.8 cwt N per acre as sulphate of ammonia
To all other plots: 1.2 cwt N per acre as sulphate of ammonia.

Basal dressing: None.

Cultivations, etc.: Ploughed: Nov 1, 1955. Broadcast fertilizers applied, seed drilled at 6 lb per acre with sideband fertilizer: Apr 17, 1956. Sprayed with miscible DDT, 3 pints in 40 gallons: May 11. Top dressing applied: June 22. Cut (by blocks): Dec 3, 10, 14 and 20. Variety: Marrowstem. Previous crop: Wheat.

Standard error per plot:
Yield: 2.00 tons per acre or 7.9% (28 d.f.)

Summary of Results

Yield: tons per acre

N top dressing: cwt per acre		1.2			0.8	
Treatment at sowing	None	P	K	PK	NPK	Mean
Method of application			(± 0.999)			
Broadcast		24.28	22.90	28.04	28.04	25.81
Drilled		26.67	19.84	30.55	31.03	27.02
Mean (±0.707)	20.49	25.47	21.37	29.30	29.53	25.23
Difference (±1.413)		+2.39	-3.06	+2.51	+2.99	+1.21 (± 0.707)

https://doi.org/10.23637/ERADOC-1-176 *pp 114*

56/Ci/1.1

GRASS

Rates and times of application of nitrogenous fertilizers - Long Hoos 1, 2, 3, 1956.

Design: 4 randomized blocks of 16 plots each.

Area of each plot: 0.0075 acres. Area harvested: 0.0045 acres.

Treatments: None (4 plots per block) together with all combinations of:-

Materials and methods of application

Applied in one single dressing

Formalized casein	12.2% N
Casein	12.6% N
Ammonium sulphate	21.0% N

applied in 3 dressings of one third the single rate each

Ammonium sulphate	21.0% N
Urea	43.5% N
Calcium nitrate	15.5% N

Rates of application

0.75; 1.5 cwt N per acre.

Basal dressing: 5 cwt compound granular fertilizer (10% P_2O_5, 20% K_2O) per acre.

Cultivations, etc.: Ploughed: Sept 19, 1955. Basal fertilizer applied, single dressings and first partial dressings of nitrogen applied, seed drilled at 50 lb per acre: Apr 10, 1956. Sprayed with MCPA, 3 pints in 40 gallons per acre: May 22. Second and third partial dressings applied: July 11, Aug 10. Cut: three times - July 10, Aug 9, Oct 23. Variety: New Zealand H1 Ryegrass. Previous crop: Wheat.

Note: The ryegrass seed was sown in drills 7" apart and cross drilled.

Standard errors per plot. Grass dry matter:

1st cut	1.51 cwt per acre	or 15.2%	(48 d.f.)
2nd cut	1.22 cwt per acre	or 10.6%	(46 d.f.)*
3rd cut	1.40 cwt per acre	or 9.3%	(48 d.f.)
Total of 3 cuts	2.47 cwt per acre	or 6.8%	(48 d.f.)

*2 missing values.

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Summary of Results

Dry Matter: cwt per acre

Level of N in fertilizer: cwt per acre	Fertilizer: Single dressing F	C	A	Repeated dressing A	U	N	Mean
1st Cut (±0.75)							
None							2.8 (±0.38)
0.75	3.4	17.2	16.7	8.4	8.2	9.0	10.5 (±0.31)
1.50	4.1	19.9	20.2	10.8	13.1	16.6	14.1
Mean (±0.53)	3.7	18.6	18.5	9.6	10.7	12.8	9.9
Diff. (±1.07)	0.7	2.7	3.5	2.4	4.9	7.6	3.6 (±0.44)
2nd Cut (±0.61)							
None							3.4 (±0.30)
0.75	9.6	8.5	10.2*	14.3*	12.8	12.8	11.4 (±0.25)
1.50	15.2	15.5	16.5	19.6	16.9	18.5	17.0
Mean (±0.43)	12.4	12.0	13.3	16.9	14.9	15.7	11.5
Diff. (±0.86)	5.6	7.0	6.3	5.3	4.1	5.7	5.6 (±0.35)
3rd Cut (±0.70)							
None							4.9 (±0.35)
0.75	16.6	8.4	8.9	18.2	20.6	17.6	15.1 (±0.29)
1.50	25.8	13.4	15.5	26.7	26.0	23.0	21.7
Mean (±0.49)	21.2	10.9	12.2	22.5	23.3	20.3	15.0
Diff. (±0.99)	9.2	5.0	6.6	8.5	5.4	5.4	6.6 (±0.40)
Total of 3 cuts (±1.24)							
None							11.2 (±0.62)
0.75	29.7	34.2	35.8	41.0	41.6	39.5	37.0 (±0.50)
1.50	45.1	48.8	52.2	57.1	56.0	58.1	52.9
Mean (±0.87)	37.4	41.5	44.0	49.0	48.8	48.8	36.5
Diff. (±1.75)	15.4	14.6	16.4	16.1	14.4	18.6	15.9 (±0.71)

*Includes 1 estimated value.

Treatments

F = Formalized casein 12.2% N
C = Casein 12.6% N
A = Ammonium sulphate 21.0% N
U = Urea 43.5% N
N = Calcium nitrate 15.5% N

Mean dry matter % as cut:

1st cut: 20.1
2nd cut: 21.2
3rd cut: 19.9
Total of 3 cuts: 20.4

https://doi.org/10.23637/ERADOC-1-176

CHEMICAL ANALYSES OF ORGANIC MATERIALS, USED IN THE THREE COURSE ROTATION AND MARKET GARDEN EXPERIMENTS 1956

Material	Percentage dry matter in sample	Percentage in dry matter			
		Organic matter	N	P_2O_5	K_2O
Three Course Rotation, Rothamsted					
Wheat Straw	86.6	92.8	0.52	1.60	1.55
Market Garden Experiment, Woburn					
Sewage Sludge					
1a	51.6	44.9	2.32	3.92	0.21
1b	52.6	22.2	1.80	1.21	0.12
2	78.8	41.3	2.43	3.37	0.19
3	54.4	40.2	2.60	3.49	0.16
Sludge Straw Compost					
1	34.4	42.4	2.09	2.61	0.48
2	39.0	44.4	2.29	2.75	0.93
3	41.6	43.2	2.41	3.51	0.72
Vegetable Compost					
1	24.0	50.3	2.25	4.42	2.52
2	27.8	49.4	2.64	4.01	3.15
3	25.3	56.7	2.59	3.96	2.53
Farmyard Manure					
1	27.0	53.1	2.34	1.79	1.63
2	19.2	57.4	4.14	4.18	3.13
3	27.7	56.8	2.54	3.53	3.66

Note. Samples applied: 1 - July 1955; 2 - September 1955; 3 - April 1956.

Samples of sewage sludge 1a and 1b represent two batches used to provide the requisite amount.

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METEOROLOGICAL RECORDS ROTHAMSTED 1956

(Departure from long period means in brackets)

Month	Total sunshine: hours	Mean temperature: °F Air(1)	Dew point	In ground 1 ft.	In ground 4 ft.	Ground(2) frosts	Total rainfall: in. 1/1000 acre gauge	Rain(3) days	Drainage through 20 in. soil: in.	Wind(4) m.p.h.
Jan.	53 (+1)	37.5 (+0.2)	34.7	37.5	43.3	18	4.63 (+2.13)	26	3.92	5.3
Feb.	72 (+3)	29.3 (-9.0)	27.9	34.0	40.7	26	0.68 (-1.25)	14	0.32	5.9
Mar.	137 (+19)	42.5 (+1.2)	36.0	40.0	40.4	14	1.03 (-0.88)	8	0.42	6.3
Apr.	167 (+10)	43.3 (-2.5)	35.9	44.3	43.2	18	1.15 (-0.79)	9	0.22	5.4
May	229 (+34)	53.6 (+1.7)	43.5	53.4	46.9	2	0.63 (-1.54)	8	0.00	4.9
June	143 (-59)	54.5 (-2.8)	48.0	55.5	50.7	0	3.93 (+1.76)	16	1.66	5.1
July	159 (-37)	60.1 (-0.6)	54.4	60.5	54.2	0	2.54 (0.00)	13	0.35	4.7
Aug.	151 (-34)	56.3 (-3.9)	51.7	57.3	55.9	0	5.34 (+2.77)	24	2.42	4.1
Sept.	98 (-48)	57.7 (+1.7)	53.5	56.9	55.5	0	2.28 (-0.09)	15	1.23	4.5
Oct.	100 (-4)	48.1 (-0.8)	44.2	50.1	54.1	3	1.85 (-1.14)	17	0.65	4.3
Nov.	56 (-6)	41.4 (-1.1)	38.6	42.5	49.5	12	0.86 (-1.97)	16	0.19	5.1
Dec.	12 (-33)	41.3 (+2.6)	39.7	41.5	46.3	8	3.86 (+1.30)	22	3.23	4.9
Year*	1377 (-154)	47.1 (-1.1)	42.3	47.8	48.4	101	28.78 (+0.30)	188	14.61	5.0

(1) Mean of maximum and minimum.
(2) Number of nights grass minimum was 30°F or less.
(3) Number of days rainfall was 0.01 in. or more.
(4) At 2 metres above ground level.

*Mean or total.

56/E/2.1

METEOROLOGICAL RECORDS WOBURN 1956

Month	Total sunshine: hours	Mean Temperature: °F Air(1)	Mean Temperature: °F In ground 1 ft.	Grass minimum: °F	Total rainfall: in. 8" gauge	Rain(2) days
January	63	37.6	37.5	29.5	3.98	21
February	66	29.1	33.6	22.1	0.54	11
March	150	42.6	40.6	29.1	0.77	7
April	149	43.1	45.0	29.8	1.35	8
May	225	53.4	54.2	37.3	0.43	5
June	139	54.4	57.1	43.7	2.48	17
July	163	60.3	62.1	49.7	3.69	13
August	146	56.5	58.1	46.6	4.19	22
September	99	57.4	56.9	47.5	2.16	11
October	108	48.0	49.6	38.2	1.50	15
November	67	41.6	41.9	32.7	0.75	11
December	20	38.4	41.0	34.3	2.93	21
Year*	1395	46.9	48.1	36.7	24.77	162

(1) Mean of maximum and minimum.

(2) Number of days rainfall was 0.01 in. or more.

*Mean or total.

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CONVERSION FACTORS

Factors for the Conversion of Imperial to Metric Units

1 inch (in.)	= 2·540 centimetres (cm)
1 foot (ft) (=12 in.)	= 30·48 cm
1 yard (yd) (=3 ft)	= 0·9144 metre (m)
1 square yard (yd²)	= 0·8361 m²
1 acre (ac) (=4840 yd²)	= 0·4047 hectare (ha)
1 ounce (oz)	= 28·35 grams (g)
1 pound (lb)	= 0·4536 kilogram (kg)
1 hundredweight (cwt) (=112 lb)	= 50·80 kg
1 ton (=2240 lb)	= 1016 kg = 1·016 metric tons (tonnes) (t)
1 pint	= 0·5682 litre (l)
1 gallon (gal) (=8 pints)	= 4·546 litres
1 fluid ounce = 1/20 pint	= 0·02841 litre = 28·41 ml
1 cubic foot	= 28·32 litres

To convert	*Multiply by*
oz ac^{-1} to g ha^{-1}	70·06
lb ac^{-1} to kg ha^{-1}	1·121
cwt ac^{-1} to kg ha^{-1}	125·5
cwt ac^{-1} to t ha^{-1}	0·1255
ton ac^{-1} to kg ha^{-1}	2511
ton ac^{-1} to t ha^{-1}	2·511
gal ac^{-1} to l ha^{-1}	11·233

The following factors are accurate to about 2 parts in 100:

1 lb ac^{-1} = 1·1 kg ha^{-1}
1 gal ac^{-1} = 11 litres ha^{-1}
1 ton ac^{-1} = 2·5 t ha^{-1}

In general reading of the text there will be no great inaccuracy in regarding:

1 lb = 0·5 kg
1 lb ac^{-1} = 1 kg ha^{-1}

Temperatures

To convert °F into °C subtract 32 and multiply by $\frac{5}{9}$ (0.556)
To convert °C into °F multiply by $\frac{9}{5}$ (1·8) and add 32

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CONVERSION FACTORS

Factors for the Conversion of Metric to Imperial Units

1 centimetre (cm)	=	0·3937 inch (in.) = 0·03281 ft
1 metre (m)	=	1·094 yards (yd)
1 square metre (m^2)	=	1·196 square yards (yd^2)
1 hectare (ha)	=	2·471 acres (ac)
1 gram (g)	=	0·03527 ounce (oz)
1 kilogram (kg)	=	2·205 pounds (lb)
1 kg	=	0·01968 hundredweight (cwt) = 0·0009842 ton
1 metric ton (tonne) (t)	=	0·9842 ton
1 litre	=	1·760 pints = 0·2200 gallon (gal)

1 litre = 1000 millilitres (ml) = 35·20 fluid ounces = 0·03531 cubic foot (ft^3)

To convert	*Multiply by*
g ha^{-1} to oz ac^{-1}	0·01427
kg ha^{-1} to lb ac^{-1}	0·8921
kg ha^{-1} to cwt ac^{-1}	0·007966
t ha^{-1} to cwt ac^{-1}	7·966
kg ha^{-1} to tons ac^{-1}	0·0003983
t ha^{-1} to tons ac^{-1}	0·3983
l ha^{-1} to gal ac^{-1}	0·08902

Plant nutrients

Plant nutrients are best stated in terms of amounts of the elements (P, K, Na, Ca, Mg, S); the old 'oxide' terminology (P_2O_5, K_2O, Na_2O, CaO, MgO, SO_3) is still used in work involving fertilisers and liming since Regulations require statements of P_2O_5, K_2O, etc.

For quick conversions

(accurate to within 2%) the following factors may be used:

$2\frac{1}{3} \times P = P_2O_5$	$\frac{3}{7} \times P_2O_5 = P$
$1\frac{1}{5} \times K = K_2O$	$\frac{5}{6} \times K_2O = K$
$1\frac{2}{5} \times Ca = CaO$	$\frac{7}{10} \times CaO = Ca$
$1\frac{2}{3} \times Mg = MgO$	$\frac{3}{5} \times MgO = Mg$

For accurate conversions:

To convert	*Multiply by*	*To convert*	*Multiply by*
P_2O_5 to P	0·4364	P to P_2O_5	2·2915
K_2O to K	0·8301	K to K_2O	1·2047
CaO to Ca	0·7146	Ca to CaO	1·3994
MgO to Mg	0·6031	Mg to MgO	1·6581

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