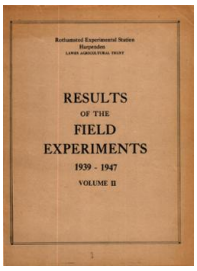
Yields of the Field Experiments 1939-1947 Volume 2



Full Table of Content

Yields of the Field Experiments 1939-1947 Volume 2 - Results

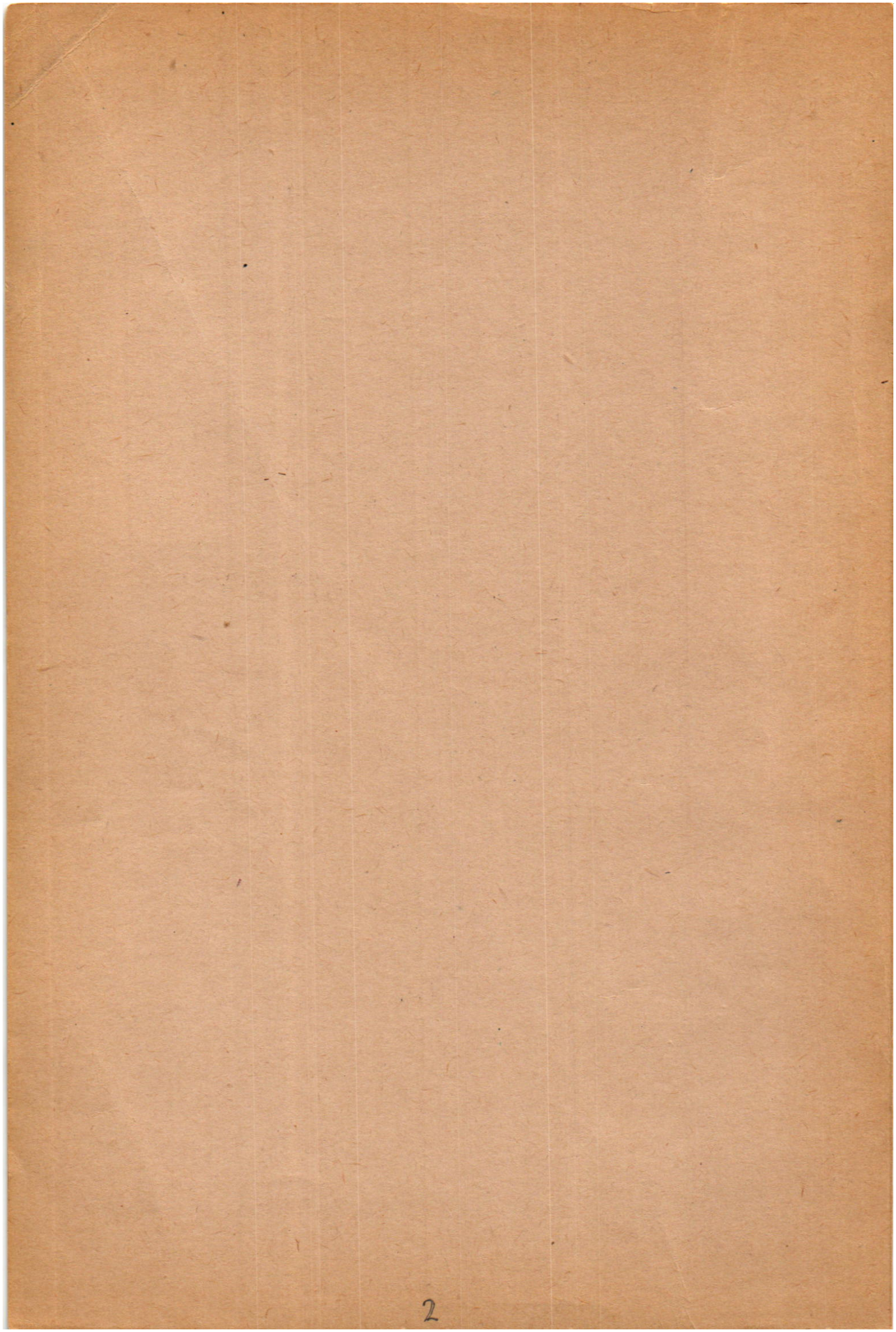
Rothamsted Research

Rothamsted Research (1948) *Yields of the Field Experiments 1939-1947 Volume 2 - Results ;* Yields Of The Field Experiments 1939-1947 Volume 2, pp 1 - 194 **- DOI: https://doi.org/10.23637/ERADOC-1-186**

Rothamsted Experimental Station
Harpenden
LAWES AGRICULTURAL TRUST

RESULTS
OF THE
FIELD
EXPERIMENTS
1939 - 1947
VOLUME II

https://doi.org/10.23637/ERADOC-1-186



https://doi.org/10.23637/ERADOC-1-186

Rothamsted Experimental Station

Harpenden

Lawes Agricultural Trust

RESULTS

of the

FIELD

EXPERIMENTS

1939 - 1947

Vol. II. Short Term Experiments

The summaries given in this report are similar to those given in the appendices to the Annual Reports of the Station before the war. Only experiments conducted at Rothamsted and Woburn are included. The design and supervision of these experiments are the responsibility of the Field Plots Committee (Members during the period covered by this report: E.M.Crowther (Chairman), H.V.Garner (Secretary), D.J.Finney, J.R.Moffatt, R.G.Warren, D.J.Watson, F.Yates).

Price: 10/-

https://doi.org/10.23637/ERADOC-1-186

CONTENTS

Short Term Experiments

Miscellaneous Data

https://doi.org/10.23637/ERADOC-1-186

INDEX

https://doi.org/10.23637/ERADOC-1-186

1942 Rothamsted

Wheat	Varieties and Nitrogen	K/4
Barley	Various Organics	G/11
Oats	Newly Ploughed Grassland	F/3
Potatoes	Various Organics	G/5
Potatoes	Phosphate Series	J/1
Potatoes	Cultivations and Fertilizers	N/7
Mangolds	Three Organics	H/5
Turnips	Phosphate Series	J/7
Swedes	Phosphate Series	J/9
Flax	Fertilizers (Flax Series)	R/1

Woburn

Sugar Beet Seed	Fertilizers	P/17
Carrots	Fertilizers (Carrot Series)	Q/2
Lettuce	Cultivations and Nitrogen	S/1
Spring Cabbage	Fertilizers	T/3

1943 Rothamsted

Wheat	Phosphate Series	J/9
Wheat	Control of Eyespot	K/6
Wheat	Phosphates	K/30
Barley	Various Organics	G/12
Barley	Three Organics	H/6
Potatoes	Various Organics	G/6
Potatoes	Phosphate Series	J/2
Potatoes	Cultivations and Fertilizers	N/7
Swedes	Phosphate Series	J/12
Flax	Fertilizers (Flax Series)	R/1
Kok-Saghyz	Fertilizers and Spacings	U/1

Woburn

Sugar Beet	Cultivations and Nitrogen	P/20
Sugar Beet Seed	Fertilizers	P/17
Lettuce	Cultivations and Fertilizers	S/3
Spring Cabbage	Fertilizers	T/3

1944 Rothamsted

Wheat	Eyespot Treatments	K/9
Wheat	Control of Eyespot	K/15
Wheat	Phosphates	K/30
Barley	Various Organics	G/12
Barley	Phosphate Series	J/2
Barley	Phosphate Series	J/12
Barley	Fertilizer Placement	L/1
Beans	Three Organics	H/7
Beans	Varieties, Sowings and Nitrogen	M/5
Potatoes	Various Organics	G/7
Potatoes	Phosphate Series	J/3
Sugar Beet	Fertilizers and Virus Infection	P/24
Swedes	Phosphate Series	J/14
Flax	Fertilizers (Flax Series)	R/1

https://doi.org/10.23637/ERADOC-1-186

1944 Woburn

Wheat	Control of Take-All	K/27
Sugar Beet	Cultivations and Nitrogen	P/22
Sugar Beet	Deep Cultivations	P/27
Lettuce	Cultivations and Fertilizers	S/5

1945 Rothamsted

Wheat	Three Organics	H/8
Wheat	Eyespot Treatments	K/9
Wheat	Control of Eyespot	K/17
Wheat	Effect of Eyespot	K/20
Barley	Various Organics	G/13
Barley	Phosphate Series	J/3
Barley	Phosphate Series	J/14
Barley	Fertilizer Placement	L/3
Beans	Fertilizers	M/1
Beans	Varieties and Sowings	M/8
Potatoes	Various Organics	G/8
Potatoes	Control of Virus Diseases	N/10
Potatoes	Fertilizer Placement Series	N/17
Hay	Fertilizer Placement	L/1

Woburn

Barley	Control of Take-All	K/27

1946 Rothamsted

Wheat	Various Organics	G/13
Wheat	Eyespot Treatments	K/9
Wheat	Control of Eyespot	K/21
Beans	Fertilizers	M/1
Beans	Varieties and sowings	M/11
Potatoes	Various Organics	G/9
Potatoes	Control of Virus Diseases	N/12
Potatoes	Cultivations	N/14
Potatoes	Fertilizer Placement Series	N/18
Sugar Beet	Three Organics	H/9

Woburn

Barley	Control of Take-All	K/27

1947 Rothamsted

Wheat	Various Organics	G/14
Wheat	Control of Eyespot	K/21
Spring Sown Cereals		K/32
Potatoes	Various Organics	G/10
Potatoes	Three Organics	H/11
Potatoes	Control of Virus Diseases	N/13
Potatoes	Cultivations and Manuring	N/15
Potatoes	Fertilizer Placement Series	N/19
Sugar Beet	Fertilizer Placement Series	P/1

Five small experiments made in 1940 on the effects of poison gas contamination of various crops are not reported.

Where basal manuring is not included in the description of an experiment, none was applied.

https://doi.org/10.23637/ERADOC-1-186

https://doi.org/10.23637/ERADOC-1-186

CROPPING OF NEWLY PLOUGHED GRASSLAND

A series of three experiments.

1. Great Knott II, 1939-40

Six crops were grown in 1939. Superphosphate was tested on all of them, potash on beans and potatoes only. In 1940 wheat was grown, testing sulphate of ammonia and the residual effects of the previous crops and fertilizers. Two fumigants, naphthalene and calcium sulphide, were used against wireworm in 1939 and their effects on the six crops were also measured.

Design; 24 randomized plots, each split into three for fumigants in 1939 and for sulphate of ammonia in 1940, the sub-plots under beans and potatoes in 1939 being split again into two for potash. In 1940 the experiment was treated as two randomized blocks of 12 plots each.

Area of each sub-plot ($\frac{1}{3}$ whole plot); 0.0248 acre.

First Season, 1939

Crops; Spring wheat, barley, oats, flax, spring beans, potatoes.

Treatments

Superphosphate; None, 1 cwt. P_2O_5 per acre

Sulphate of potash (to potatoes); None, 1 cwt. K_2O per acre

Muriate of potash (to beans); None, 0.5 cwt. K_2O per acre

Fumigants; None, napthalene (15 cwt. per acre), calcium sulphide (350 lb. per acre). Fumigants applied before ploughing in February.

Basal Manuring; 0.4 cwt. N per acre as sulphate of ammonia, to potatoes.

Crop Notes

Grass, 11 years old, ploughed; Feb. 1-13. Rolled; Feb. 13. Harrowed; Feb. 20 - Mar.4

Crop	Variety	Sown	Harvested
Spring wheat	Red Marvel	March 10	August 28
Barley	Plumage Archer	March 3	August 28
Oats	Star	March 3	August 14
Flax	Liral Monarch	April 11	September 13
Beans	Spring	March 3	August 28
Potatoes	Ally	May 20	September 22

Wireworms; Three sample estimates of the wireworm populations were made from series of 6" square soil samples. The first series was of 11 random samples from the field, the others were of one sample from each sub-plot.

https://doi.org/10.23637/ERADOC-1-186 *pp 10*

F/2

Cropping of Newly Ploughed Grassland

Second Season, 1940

Wheat

Treatments

Residual effects of 1939 cropping, and of superphosphate and sulphate of potash.

Sulphate of ammonia: None, 0.2, 0.4 cwt. N per acre, applied as a top dressing.

Crop Notes

Variety: Wilma. Seed sown: Nov. 10, 1939. Harvested: Aug.12.

https://doi.org/10.23637/ERADOC-1-186

2. West Barnfield, 1940-41

and

3. Appletree, 1941-42

Eight crops were grown in the first year, testing sulphate of ammonia (on potatoes and sugar beet only in 1940), superphosphate, muriate of potash and salt. In the following year the direct effect of sulphate of ammonia and the residuals of the different crops and fertilizers were investigated, the test crops being wheat in 1941 and oats in 1942.

Design; 4 randomized blocks of 8 plots each, every plot being split into four for fertilizer treatments in the first season, two out of each four sub-plots receiving sulphate of ammonia in the second season. Certain interactions confounded with block differences.

Area of each sub-plot; 0.0167 acre.

First Seasons, 1940 and 1941

Crops; Wheat, barley, oats, beans, flax, potatoes, sugar beet, hay.

Treatments

Sulphate of ammonia;

To potatoes and sugar beet in 1940 and 1941; None, 0.6 cwt. N per acre.

To all other crops in 1941 only; None, 0.3 cwt. N per acre

Superphosphate; None, 0.6 cwt., P_2O_5 per acre

Muriate of potash; None, 0.75 cwt. K_2O per acre

Agricultural salt; None, 3 cwt. per acre.

No fertilizers were applied to the permanent grass left unploughed to provide the experimental hay crops; instead, the four artificials were applied directly to the second-year cereal crops.

Crop Notes

West Barnfield. Grass, 12 years old, ploughed: Oct. 10-20, 1939. Rolled: Oct. 21. Springtine harrowed: Nov. 13

Appletree. Grass, many years old, ploughed: Oct. 18-24, 1940. 1 ton per lime applied and disc harrowed: Nov. 30.

https://doi.org/10.23637/ERADOC-1-186

F/4

Cropping of Newly Ploughed Grassland

Crop	Variety	Sown	Harvested
		1940	
Wheat	Wilma	20/11/39	August 13
Barley	Plumage Archer	March 13	August 5
Oats	Star	March 22	August 5
Beans	Spring	March 22	August 13
Flax	Liral Monarch	March 22	July 18
Potatoes	Arran Banner	April 27	September 24
Sugar Beet	Klein E	May 3	October 15
Hay			June 17
		1941	
Wheat	Wilhelmina	4/12/40	August 27
Barley	Plumage Archer	March 22	August 27
Oats	Star	March 22	August 26
Beans	Spring	March 22	August 27
Flax	Liral Prince	April 17	August 20
Potatoes	Arran Banner	April 30	October 16
Sugar Beet	Klein E	April 26	October 30
Hay			June 30 and November

Second Seasons, 1941 and 1942

Wheat or Oats

Treatments

Residual effects of first seasons' cropping and of superphosphate, muriate of potash and salt.

Sulphate of ammonia: None, 0.3 cwt. N per acre

The plots that were under hay in the first seasons received all their artificials in the seed bed for wheat or oats.

Half the sugar beet and potato plots received 0.6 cwt. N per acre in 1940, but there was no residual effect of this treatment.

Crop Notes

Year	Crop	Variety	Sown	Harvested
1941	Wheat	Wilhemina	November 26	August 30
1942	Oats	Star	March 27	August 20

One plot which had carried flax in 1940 was damaged by an oil bomb in the autumn of 1940, and new soil was added.

https://doi.org/10.23637/ERADOC-1-186

	Standard Errors per sub-plot (4 d.f.)		per split sub-plot (6 d.f.)	
	per acre	%	per acre	%
Wheat, grain	2.07 cwt.	10.8		
Barley, grain	3.14 "	10.2		
Oats, grain	1.07 "	3.1		
Flax, seed	1.45 "	15.0		
Flax, straw	5.47 "	15.3		
Beans, grain	2.51 "	13.5	4.27 cwt.	22.9
Potatoes, total tubers	0.55 tons	7.6	0.91 tons	12.5

Fumigants	Superphosphate Absent	Superphosphate Present	Mean	Superphosphate Absent	Superphosphate Present	Mean
	Grain; cwt. per acre			Straw; cwt. per acre		
Spring Wheat						
	±1.47		±1.04			
None	20.5	16.3	18.4	37.4	25.6	31.5
Napthalene	20.5	20.7	20.6	30.1	32.0	31.0
Calcium Sulphide	19.5	17.8	18.6	32.6	32.0	32.3
Mean	20.2	18.3	19.2	33.4	29.9	31.6
Barley						
	±2.22		±1.57			
None	33.0	27.5	30.2	32.5	24.8	28.6
Naphthalene	32.4	26.5	29.4	29.4	26.6	28.0
Calcium Sulphide	32.6	32.0	32.3	31.1	34.3	32.7
Mean	32.7	28.7	30.7	31.0	28.6	29.8
Oats						
	±0.753		±0.533			
None	36.2	35.2	35.7	34.1	35.5	34.8
Naphthalene	33.7	33.8	33.8	32.6	34.0	33.3
Calcium Sulphide	35.5	31.4	33.4	32.8	34.3	33.6
Mean	35.1	33.5	34.3	33.2	34.6	33.9
Flax						
	±1.03		±0.725	±3.87		±2.74
None	9.3	10.8	10.0	35.6	41.5	38.6
Naphthalene	9.1	10.0	9.6	32.4	37.1	34.8
Calcium Sulphide	7.2	11.6	9.4	26.4	41.8	34.1
Mean	8.5	10.8	9.7	31.5	40.1	35.8

Standard errors shown are for use in vertical comparisons, and have 4 d.f.

https://doi.org/10.23637/ERADOC-1-186 *pp 14*

F/6

Cropping of Newly Ploughed Grassland

Great Knott, 1939

	Superphosphate Absent	Superphosphate Present	Potash Absent	Potash Present	Mean
	Spring Beans: Grain, cwt. per acre				
	±1.78[a]		±2.14[b]		±1.26[a]
None	16.9	17.1	18.7	15.3	17.0
Naphthalene	21.7	19.7	20.9	20.6	20.7
Calcium sulphide	17.4	19.2	19.4	17.1	18.3
Mean	18.7	18.7	19.7	17.7	18.7
			±1.23		
	Spring Beans: Straw, cwt. per acre				
None	23.5	20.8	22.6	21.7	22.2
Naphthalene	23.8	22.5	23.5	22.7	23.1
Calcium sulphide	22.5	24.1	24.1	22.5	23.3
Mean	23.3	22.5	23.4	22.3	22.9
	Potatoes: Total tubers, tons per acre				
	±0.392[a]		±0.456[b]		±0.277[a]
None	7.25	8.29	7.39	8.16	7.78
Naphthalene	7.17	7.06	6.64	7.59	7.12
Calcium sulphide	6.26	7.71	6.53	7.44	6.98
Mean	6.89	7.69	6.85	7.73	7.29
			±0.263[b]		
	Potatoes: Percentage Ware				
None	86.8	89.9	89.1	87.6	88.3
Naphthalene	86.8	88.4	87.4	87.8	87.6
Calcium sulphide	84.1	89.0	85.2	88.0	86.6
Mean	85.9	89.1	87.2	87.8	87.5

Standard errors
(a) For fumigant comparisons, 4 d.f.
(b) For potash comparisons, 6 d.f.

Wireworm Population: thousands per acre

Before fumigation.

July, 1938: 253 (±59)
Aug. 11-24, 1938: 112 (±16)

After fumigation	No fumigant	Napthalene	Calcium sulphide	Mean
April 18-26, 1939	298	312 ±60	326	312

These standard errors have 46 d.f.

https://doi.org/10.23637/ERADOC-1-186

Cropping of Newly Ploughed Grassland

Great Knott, 1940

	Standard Errors per whole plot (11 d.f.) per acre	%	per sub-plot (24 d.f.) per acre	%	per split sub-plot (12 d.f.) per acre	%
Wheat, grain	3.25 cwt.	8.3	3.38 cwt.	8.6	3.18 cwt.	7.8
Wheat, straw	4.79 cwt.	10.1	4.08 cwt.	8.6	4.03 cwt.	7.8

Crops in 1939	cwt. N per acre 1940 0.0	0.2	0.4	cwt. P_2O_5 per acre 1939 0.0	1.0	Mean	Response to potash 1939
			Grain: cwt. per acre				
		±1.69[a]		±2.30		±1.62	±1.30[b]
Wheat	35.1	39.6	40.4	37.2	39.6	38.4	-
Barley	36.6	37.4	38.3	39.9	34.9	37.4	-
Oats	39.3	36.5	40.8	37.2	40.5	38.8	-
Flax	39.4	38.6	41.4	35.0	44.6	39.8	-
Beans*	39.7	39.8	39.5	42.2	37.2	39.8	0.9
Potatoes*	38.3	41.7	41.8	39.6	41.6	40.6	0.5
Mean	38.1	38.9	40.4	38.5	39.7	39.1	0.7
		±0.69[a]		±0.94			±0.92[b]
			Straw: cwt. per acre				
		±2.04[a]		±3.39		±2.40	±1.65[b]
Wheat	40.9	45.4	46.4	43.1	45.3	44.2	-
Barley	41.2	42.6	45.4	45.4	40.7	43.0	-
Oats	46.0	41.9	50.5	44.2	48.1	46.2	-
Flax	45.2	45.0	50.5	40.2	53.7	47.0	-
Beans*	48.7	51.3	49.9	56.0	43.9	50.0	1.3
Potatoes*	47.9	56.5	53.3	47.9	57.2	52.6	0.5
Mean	45.0	47.2	49.4	46.2	48.2	47.2	0.9
		±0.83[a]		±1.38			±1.17[b]

cwt. P_2O_5	Grain: cwt.per acre cwt.N per acre 1940 0.0	0.2	0.4	Mean	Straw: cwt.per acre cwt.N per acre 1940 0.0	0.2	0.4	Mean
		±0.98[a]		±0.94		±1.18[a]		±1.38
0.0	36.7	38.9	39.9	38.5	43.5	46.5	48.5	46.2
1.0	39.4	39.0	40.8	39.7	46.5	47.9	50.2	48.2
Response to Phosphate	2.7	0.1 ±1.23	0.9	1.2 ±1.33	3.0	1.4 ±1.69	1.7	2.0 ±1.95

Standard errors: (a) for nitrogen comparisons, 24 d.f.
(b) for residual potash comparisons, 12 d.f.
The other standard errors have 11 d.f.

* Except for the last column, these figures are for half-plots which received no potash in 1939, and so are comparable with the yields from the wheat, barley, oats and flax plots.

15

https://doi.org/10.23637/ERADOC-1-186

F/8

Cropping of Newly Ploughed Grassland

2. West Barnfield, 1940

Standard errors per sub-plot

		%			%
Wheat, grain	1.53 cwt./acre	5.4	Flax		
straw	1.40 " "	4.0	total produce	3.46 cwt./acre	7.5
Barley, grain	1.23 " "	3.4	deseeded straw	2.20 " "	8.0
straw	1.00 " "	2.8	scutched fibre	0.743 " "	15.5
Oats, grain	1.50 " "	4.1	scutching rug	0.720 " "	9.8
straw	2.75 " "	6.0	seed and chaff	0.974 " "	8.1
Beans, grain	1.52 " "	10.0	Sugar beet		
straw	0.821 " "	4.2	total sugar	3.86 " "	7.8
Potatoes tubers			roots (washed)	0.864 tons/acre	6.8
total	0.740 " "	8.2	tops	0.433 " "	3.3
% ware	2.69		sugar %	0.462	

All standard errors are based on 6 d.f. except those for potatoes and sugar beet, which are based on 8 d.f.

Mean yields and responses to fertilizers

	Mean	N	P	K	S	Standard errors
Wheat						
Grain, cwt. per acre	28.3		1.8	3.9	1.4	±0.76
Straw, " " "	34.8		1.3	3.2	0.2	±0.70
Barley						
Grain, " " "	36.4		1.0	1.7	1.8	±0.62
Straw, " " "	35.6		0.3	0.8	0.5	±0.50
Oats						
Grain, " " "	36.7		-1.1	0.3	0.3	±0.75
Straw, " " "	46.2		-2.8	3.2	3.4	±1.38
Beans						
Grain, " " "	15.2		0.3	1.8	0.0	±0.76
Straw, " " "	19.4		0.9	1.2	0.4	±0.41
Flax						
Total produce, cwt. per acre	46.0		1.0	1.4	-0.1	±1.73
Deseeded straw, " " "	27.3		0.6	1.2	0.7	±1.10
Scutched fibre " " "	4.8		0.1	1.3	1.1	±0.37
Scutching rug, " " "	7.4		0.2	-0.4	0.6	±0.36
Seed and chaff, " " "	12.0		0.1	-0.1	-0.6	±0.49
Potatoes,						
Total tubers, tons per acre	9.02	0.87	0.38	2.37	0.04	±0.370
Percentage ware	86.0	0.2	-2.1	5.6	1.2	±1.34
Sugar Beet						
Total sugar, cwt. per acre	49.9	-0.3	0.8	0.7	4.1	±1.93
Roots (washed), tons per acre	12.67	0.23	0.27	0.15	0.72	±0.432
Sugar percentage	19.66	-0.45	-0.16	0.09	0.55	±0.231
Tops, tons per acre	13.22	1.10	0.20	0.76	1.01	±0.216
Hay,, cwt. per acre	47.1					

https://doi.org/10.23637/ERADOC-1-186 *pp 17*

West Barnfield, 1941

Wheat

Standard Errors

(a) Excluding hay plots

Per whole plot

Grain, 1.09 cwt. per acre or 3.4%, 18 d.f.
Straw, 2.02 cwt. per acre or 4.7%, 18 d.f.

Per sub-plot

Grain, 1.93 cwt. per acre or 5.9%, 56 d.f.
Straw, 2.94 cwt. per acre or 6.9%, 56 d.f.

(b) Hay plots only

Per sub-plot
Grain, 0.922 cwt. per acre or 3.0%, 8 d.f.
Straw, 1.55. cwt. per acre or 3.4%, 8 d.f.

Mean yields and responses

1940 Crop	Grain: cwt. per acre Mean	Responses Direct N	Residual effects P	K	S	Straw: cwt. per acre Mean	Responses Direct N	Residual effects P	K	S
	±0.55		±0.97			±1.01		±1.47		
Wheat	30.9	-0.3	0.2	1.4	-0.3	39.7	1.9	2.0	2.6	0.1
Oats	31.2	0.5	1.5	2.4	0.4	38.1	1.3	1.1	4.7	0.1
Barley	31.6	1.7	1.3	0.2	0.9	39.7	3.5	2.1	2.2	2.0
Beans	33.0	0.0	0.4	1.6	-0.4	43.7	1.7	1.6	2.9	-0.2
Flax	33.5	2.6	0.5	1.5	0.0	45.8	5.2	1.7	1.0	1.3
Sugar beet	34.0	1.4	0.4	0.5	-0.5	45.2	3.0	0.6	1.2	-0.3
Potatoes	33.9	-0.2	-0.7	1.2	0.1	45.4	1.1	0.8	1.6	-0.1
Mean	32.6	0.8	0.5	1.3	0.0	42.5	2.5	1.4	2.3	0.4
			±0.37					±0.56		
		Direct effects					Direct effects			
Hay	30.5	0.3	1.2	1.9	0.2	45.7	1.4	-0.1	1.4	2.9
			±0.46					±0.77		

https://doi.org/10.23637/ERADOC-1-186

F/10

Cropping of Newly Ploughed Grassland

3. Appletree, 1941

Standard Errors per Sub-plot

Crop		%	Crop		%
Wheat, grain	1.40 cwt./acre	4.9	Flax		
straw	2.96 " "	8.8	total produce	3.21 cwt./acre	6.0
Barley, grain	2.04 " "	7.3	deseeded straw	2.07 " "	5.4
straw	1.76 " "	4.6	scutched fibre	0.803 " "	13.6
Oats, grain	1.24 " "	5.1	scutching rug	1.95 " "	14.6
straw	2.19 " "	5.4	seed and chaff	1.21 " "	20.4
Beans, grain	2.79 " "	19.5	Sugar beet		
straw	4.48 " "	18.1	total sugar	1.95 " "	5.7
Potatoes			roots (washed)	0.506 " "	5.0
total tubers	0.604tons/acre	7.0	tops	1.49 tons/acre	7.3
% ware	2.21		sugar %	0.542	

All standard errors are based on 8 d.f.

Mean yields and responses to fertilizers

	Mean	Response to N	Response to P	Response to K	Standard errors
Wheat Grain, cwt. per acre	28.5	-0.4	1.2	2.1	-0.9 ±0.70
Straw, cwt. per acre	33.7	1.8	-0.1	5.2	1.1 ±1.48
Barley Grain, " " "	27.9	0.7	0.2	2.3	1.2 ±1.02
Straw, " " "	38.0	3.1	-1.4	3.8	3.0 ±0.88
Spring Oats Grain, " " "	24.2	-0.1	0.2	1.3	-0.2 ±0.62
Straw, " " "	40.9	0.4	1.3	1.3	4.4 ±1.09
Spring Beans Grain, " " "	14.3	1.9	1.5	1.7	-1.1 ±1.40
Straw " " "	24.7	3.7	-1.8	2.8	3.3 ±2.24
Flax Total produce, cwt. per acre	53.6	-0.1	-6.0	0.5	-1.4 ±1.60
Deseeded straw, " " "	38.3	-0.7	-3.3	0.3	0.2 ±1.04
Scutched fibre, " " "	5.9	0.0	0.2	-0.3	-0.4 ±0.40
Scutching rug, " " "	13.4	1.1	-1.1	0.3	-0.8 ±0.97
Seed and chaff " " "	5.9	0.3	-0.8	-0.6	-0.4 ±0.60
Sugar beet Total sugar," " "	34.3	-0.1	2.2	5.7	6.3 ±0.97
Roots(washed), tons per acre	10.10	0.10	0.65	1.55	1.68 ±0.253
Sugar percentage	16.92	-0.22	0.05	0.30	0.29 ±0.271
Tops, tons per acre	20.46	2.96	1.83	2.17	3.74 ±0.746
Potatoes Total tubers, tons per acre	8.59	0.28	0.40	1.86	-0.22 ±0.302
Percentage ware	86.3	-0.6	1.2	0.7	-1.3 ±1.11
Hay 1st Crop, cwt. per acre	23.7				
2nd Crop, " " "	32.5				

https://doi.org/10.23637/ERADOC-1-186

Appletree Field, 1942

Standard Errors — Spring Oats

(a) Excluding hay plots

Per whole plot:

Grain, 3.17 cwt. per acre or 20.4%, 18 d.f.
Straw, 6.04 cwt. per acre or 23.8%, 18 d.f.

Per sub-plot:

Grain, 3.51 cwt. per acre or 22.6%, 56 d.f.
Straw, 5.06 cwt. per acre or 19.9%, 56 d.f.

(b) Hay plots only

Per sub-plot

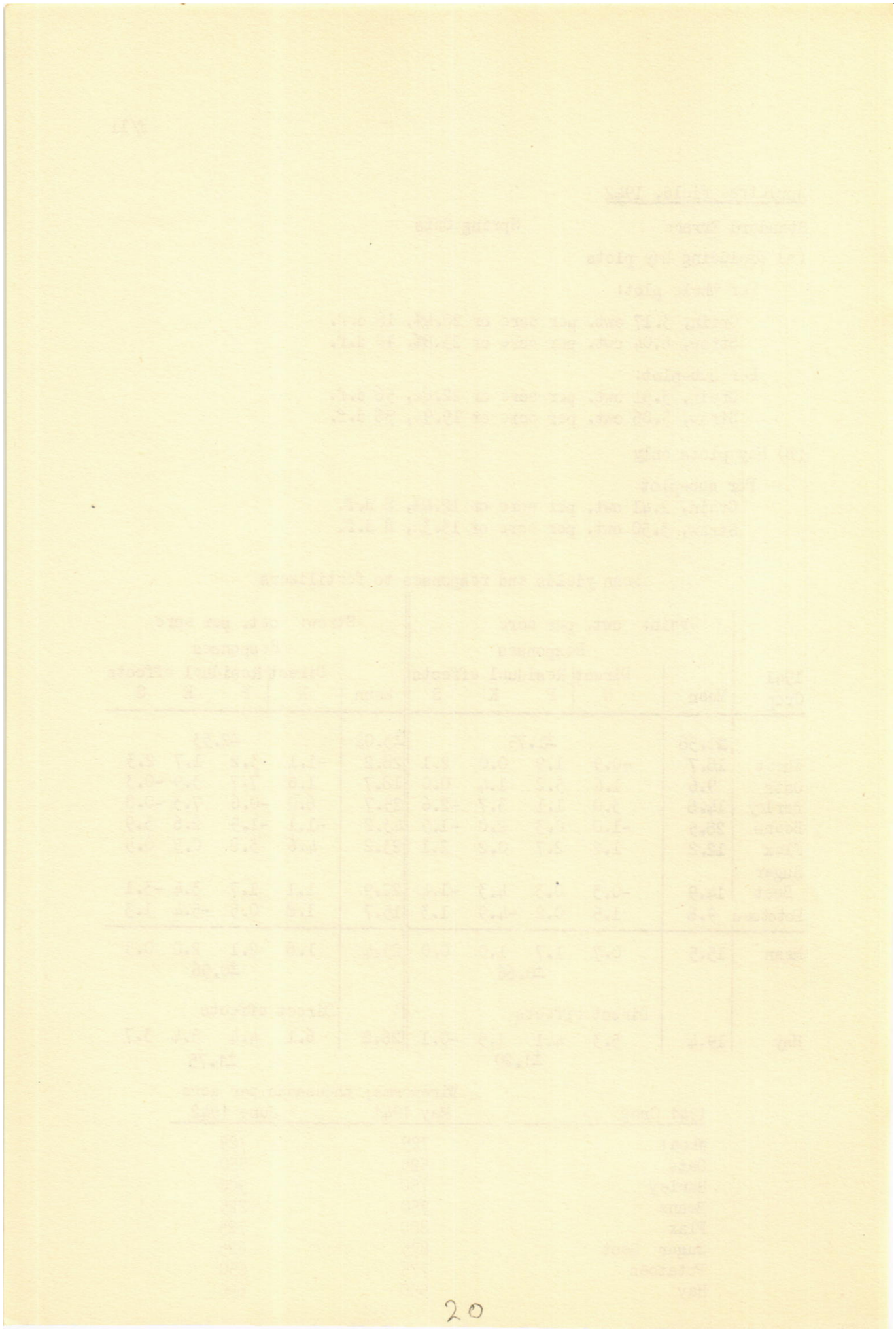
Grain, 2.41 cwt. per acre or 12.4%, 8 d.f.
Straw, 3.50 cwt. per acre or 13.3%, 8 d.f.

Mean yields and responses to fertilizers

1941 Crop	Grain: cwt. per acre Mean	Responses Direct N	Residual effects P	K	S	Straw: cwt. per acre Mean	Responses Direct N	Residual effects P	K	S
	±1.58		±1.75			±3.02		±2.53		
Wheat	18.7	-0.9	1.9	0.0	2.1	28.2	-1.1	3.2	1.7	2.3
Oats	9.6	1.4	5.2	1.4	0.0	18.7	1.6	7.7	3.9	-0.3
Barley	14.8	3.0	1.1	3.7	-2.6	25.7	6.0	-0.6	7.3	-0.8
Beans	28.5	-1.0	0.3	2.0	-1.5	43.2	-1.1	-1.5	2.6	3.9
Flax	12.2	1.2	2.7	0.2	2.1	23.2	4.6	3.8	0.5	0.5
Sugar Beet	14.9	-0.3	0.3	4.3	-1.4	22.9	1.1	1.7	3.4	-3.1
Potatoes	9.8	1.5	0.2	-4.9	1.3	15.7	1.8	0.5	-5.4	1.3
Mean	15.5	0.7	1.7	1.0	0.0	25.4	1.8	2.1	2.0	0.5
			±0.66					±0.96		
		Direct effects					Direct effects			
Hay	19.4	5.3	4.1	1.5	-0.1	26.2	6.1	4.4	5.4	3.7
			±1.20					±1.75		

1941 Crop	Wireworms; thousands per acre May 1941	June 1942
Wheat	725	725
Oats	525	550
Barley	750	900
Beans	950	225
Flax	800	725
Sugar Beet	875	625
Potatoes	775	650
Hay	550	650

https://doi.org/10.23637/ERADOC-1-186



https://doi.org/10.23637/ERADOC-1-186

DIRECT AND RESIDUAL EFFECTS OF VARIOUS ORGANIC MANURES

A series of two-year experiments, one of which was started every year from 1940 to 1948. See also "Results of the Field Experiments", 1948 and 1949.

In the first year, the experiment tests the effect of various organic manures, sulphate of ammonia, superphosphate and muriate of potash on potatoes, and in the second year tests the residual effects of the previous year's organic manures on a corn crop.

Design; 5 x 5 lattice square in three replicates. In 1940 and 1947 the plots were split into two for applications of nitrogen and potash, and in 1941-46 the plots were split into four for applications of nitrogen, phosphate and potash, in each year the highest-order interaction of artificials being confounded with differences between whole plots.

First Season

Potatoes.

Area of each whole plot; 1940, 0.025 acre

1941-46, 0.030 acre

1947, 0.019 acre

Organic manures; Of the 25 main plots in each replicate, 3 received no organic manure, and the remaining 22 were treated with 11 different organics each at single and double rates. In 1940 there were only 9 different organics, fermented and pulverised town refuse being broadcast before ridging or applied in the ridges. In all other cases organic manures were applied in the ridges.

The fresh normal dung was applied at 8 tons per acre (single dressing) and the other dungs at equivalent rates based on equal amounts of concentrates and hay used in making them. From 1942 onwards the sludges were applied at 5 tons per acre of dry matter (single dressing). "Stored dung" had been kept for 4 months (bullock boxes) and 12 months (straw bale yards and commercial dung).

Artificial fertilizers;

Sulphate of ammonia; None, 0.6 cwt. N per acre

Superphosphate; None, 0.6 cwt. P_2O_5 per acre (None in 1940 and 1947)

Muriate of potash; None, 1.0 cwt. K_2O per acre.

https://doi.org/10.23637/ERADOC-1-186

G/2

Effects of various organics

Basal manuring; 1940, Superphosphate, 0.6 cwt. P_2O_5 per acre

1941-46 None

1947, Superphosphate, 0.6 cwt. P_2O_5 per acre

Crop Notes.

Year	Previous Crop	Date Planted	Date Lifted	Year	Previous crop	Date Planted	Date Lifted
1940	Wheat	May 15	September 30	1944	Wheat	April 17	October 4
1941	Wheat	May 15	October, 15	1945	Barley	April 25	October 5
1942	Barley	May 9	October 23	1946	Linseed	May 9	October 13
1943	Wheat	May 4	September 29	1947	Barley	May 24	October 9

Variety; 1940-42, Arran Banner; 1943-47, Majestic.

In 1944 on 11 sub-plots varying amounts of King Edward seed were used instead of Majestic, so that the yields on these plots were lower than they would have been with a full plant of Majestic. The yield of each row of these plots was determined separately, and the total yield of the sub-plot adjusted so as to represent a full plant of Majestic.

Second Season

1941-45, Barley. 1946 and 1947, Wheat.

Area of each plot; 1941, 0.035 acre

1942-47 0.028 acre.

Basal manuring; 1941, None

1942-46, 0.2 cwt. N per acre as sulphate of ammonia

1947, 0.4 cwt. N per acre as sulphate of ammonia.

Crop Notes.

	1941	1942	1943	1944	1945	1946	1947
Sown	March 31	March 26	March 4	March 9	March 14	27/10/45	5/11/46
Harvested	Sept.19	Aug. 20	Aug. 12	Aug. 16	Aug. 17	Aug.21	Aug. 9
Variety:	Barley,	Plumage Archer		Wheat, Bersee			

https://doi.org/10.23637/ERADOC-1-186

Potatoes. Great Harpenden, 1940 (Direct effects)

Total tubers: tons per acre

Level of manuring		Mean Yield 1	Mean Yield 2	Responses N 1	Responses N 2	Responses K 1	Responses K 2
Treatments, tons/acre (single dressing)		±0.385		±0.560		±0.560	
No organic manure		7.52[a]		0.40[b]		1.53[b]	
Dung: Fresh normal	8.0	8.15	8.90	0.69	0.46	0.01	0.04
Fresh strawy	7.6	8.37	9.21	0.62	1.72	0.28	-0.38
Stored normal	5.2	8.77	9.14	0.86	0.16	0.18	0.34
Stored strawy	5.2	8.61	9.49	0.84	0.43	1.70	0.29
Ferm. town refuse (in ridges)	8.0	7.60	8.32	-0.21	0.73	1.64	0.59
Ferm. town refuse (broadcast)	8.0	7.23	7.73	1.19	0.51	1.38	-0.03
Pulv. town refuse (in ridges)	8.0	8.15	8.13	0.73	0.79	1.41	0.32
Pulv. town refuse (broadcast)	8.0	7.50	7.07	0.02	1.36	2.37	2.00
Screened dust	8.0	7.93	7.46	1.13	0.53	-0.15	0.54
Controlled tip refuse: Luton	8.0	7.87	7.01	-0.44	-0.63	1.03	1.92
Wheathampstead	8.0	7.30	7.52	-0.67	-0.59	3.04	1.02

Averages over two levels of organic manures

	Mean Yield	Responses N	Responses K
	±0.272	±0.396	
No organic manure	7.52[a]	0.40[b]	1.53[b]
Dung: Fresh normal	8.52	0.58	0.02
Fresh strawy	8.79	1.17	-0.05
Stored normal	8.96	0.51	0.26
Stored strawy	9.05	0.64	1.00
Ferm. town refuse (in ridges)	7.96	0.26	1.12
Ferm. town refuse (broadcast)	7.48	0.85	0.68
Pulv. town refuse (in ridges)	8.14	0.76	0.86
Pulv. town refuse (broadcast)	7.28	0.69	2.18
Screened dust	7.70	0.83	0.20
Controlled tip refuse: Luton	7.44	0.54	1.48
Wheathampstead	7.41	-0.63	2.03
Mean	8.00		

Standard errors: (a) 0.222 (b) 0.307

Standard errors per plot: per whole plot, 0.667 tons per acre or 8.3%, 24 d.f.

per sub-plot, 0.647 tons per acre or 8.1%, 29 d.f.

https://doi.org/10.23637/ERADOC-1-186

G/4

Effects of various organics

Potatoes. Little Hoos, 1941. (Direct effects)

Total tubers: tons per acre

Level of manuring		Mean yield 1	Mean yield 2	Responses to N 1	Responses to N 2	Responses to P 1	Responses to P 2	Responses to K 1	Responses to K 2
Treatments, tons/acre (single dressing)		±0.391		±0.646		±0.646		±0.646	
No organic manure		4.76[a]		1.59[c]		0.69[c]		2.39[c]	
Dung: Fresh normal	8.0	8.12	10.10	0.45	1.57	1.19	0.50	-0.33	0.26
Fresh strawy	8.8	8.05	10.45	1.78	2.05	0.99	-0.61	-0.65	0.74
Stored normal	4.7	7.74	8.63	3.30	2.88	0.23	-0.29	0.92	0.31
Stored strawy	5.8	7.57	7.91	3.51	2.46	1.10	-1.13	0.70	0.95
Fermented town refuse	8.0	5.60	7.08	1.85	3.03	0.76	0.81	2.32	0.65
Pulverized town refuse	8.0	6.37	6.70	2.69	1.67	0.21	0.79	2.34	1.50
Screened dust		5.64	5.41	3.22	2.64	1.20	0.80	3.13	2.19
Sewage sludge: W.Middlesex	4.0	5.96	6.92	1.72	2.34	-0.90	0.44	3.58	4.53
Birmingham	4.0	6.01	6.34	1.66	1.44	-0.07	0.49	3.37	4.14
Sludge and town refuse	8.0	7.13	7.40	2.41	2.91	-0.19	1.05	2.32	1.26
Bracken compost*	8.0	7.36[b]		2.43[d]		-0.23[d]		0.63[d]	
Improved bracken compost*	8.0	8.04[b]		2.60[d]		0.22[d]		0.69[d]	

*No double dressing. The improved bracken compost received 20 lb. sulphate of ammonia and 20 lb. calcium carbonate for each ton of fresh bracken.

Averages over two levels of organic manures

	Mean yield	Responses to N	Responses to P	Responses to K
	±0.276		±0.457	
No organic manure	4.76[a]	1.59[c]	0.69[c]	2.39[c]
Dung: Fresh normal	9.11	1.01	0.84	-0.04
Fresh strawy	9.25	1.92	0.19	0.04
Stored normal	8.18	3.09	-0.03	0.62
Stored strawy	7.74	2.98	-0.02	0.82
Fermented town refuse	6.34	2.44	0.78	1.48
Pulverized town refuse	6.54	2.18	0.50	1.92
Screened dust	5.52	2.93	1.00	2.66
Sewage sludge: W.Middlesex	6.44	2.03	-0.23	4.06
Birmingham	6.18	1.55	0.21	3.76
Sludge and town refuse	7.26[b]	2.66[d]	0.43[d]	1.79[d]
Bracken compost	7.36[b]	2.43[d]	-0.23[d]	0.63[d]
Improved bracken compost	8.04[b]	2.60[d]	0.22[d]	0.69[d]
Mean	7.00			

Standard errors: (a) 0.226, (b) 0.391, (c) 0.362, (d) 0.646

Standard errors per plot: per whole plot, 0.677 tons per acre or 9.7%, 24 d.f.
per sub-plot, 1.06 tons per acre or 15.1%, 87 d.f.

https://doi.org/10.23637/ERADOC-1-186 *pp 25*

Potatoes. Long Hoos I and II, 1942 (Direct effects)

Total tubers: tons per acre.

Level of manuring		Mean Yield 1	Mean Yield 2	Responses N 1	Responses N 2	Responses P 1	Responses P 2	Responses K 1	Responses K 2
Treatments, tons/acre (single dressing)		±0.597		±0.701		±0.701		±0.701	
No organic manure		11.62[a]		2.62[b]		0.30[b]		1.63[b]	
Dung: Fresh normal	8.0	12.84	14.02	2.60	1.97	-0.05	1.44	1.48	1.17
Fresh strawy	8.6	12.94	13.52	1.92	1.87	0.36	1.45	1.29	-0.05
Stored normal	5.7	12.89	14.12	2.37	2.81	-1.17	0.73	1.03	1.55
Stored strawy	7.1	12.73	13.04	2.14	2.12	0.57	-0.93	0.68	0.81
Composted town refuse	8.0	11.27	12.43	2.57	0.94	2.26	1.07	0.45	0.67
Pulverized town refuse	8.0	11.79	11.47	2.95	1.36	0.87	0.96	1.33	1.64
Sewage sludge: W.Middlesex	10.2	13.15	12.46	1.74	1.56	1.15	0.47	2.13	0.51
Birmingham	7.4	11.74	12.47	2.30	0.18	0.42	0.51	1.87	0.52
Rotherham	7.9	11.49	11.94	2.87	1.09	0.76	0.25	0.51	2.11
Huddersfield	5.6	12.38	10.58	1.27	0.63	0.47	0.66	1.29	1.54
Bracken compost	8.0	13.35	14.43	1.35	2.21	1.83	-0.08	0.13	0.01

Averages over two levels of organic manure

	Mean Yield	Responses N	Responses P	Responses K
	±0.422		±0.496	
No organic manure	11.62[a]	2.62[b]	0.30[b]	1.63[b]
Dung: Fresh normal	13.43	2.28	0.70	1.32
Fresh strawy	13.23	1.90	0.90	0.62
Stored normal	13.50	2.59	-0.22	1.29
Stored strawy	12.88	2.13	-0.18	0.74
Composted town refuse	11.85	1.76	1.66	0.56
Pulverized town refuse	11.63	2.16	0.92	1.48
Sewave sluge: W.Middlesex	12.80	1.65	0.81	1.32
Birmingham	12.10	1.24	0.46	1.20
Rotherham	11.72	1.98	0.50	1.31
Huddersfield	11.48	0.95	0.56	1.42
Bracken compost	13.89	1.78	0.88	0.07
Mean	12.48			

Standard errors: (a) 0.344, (b) 0.384

Standard error per plot: per whole plot, 1.93 tons per acre or 8.2%, 24 d.f.
per sub-plot, 1.15 tons per acre or 9.2%, 87 d.f.

https://doi.org/10.23637/ERADOC-1-186 *pp 26*

G/6

Effects of various organics

Potatoes. Sawyers II, 1943. (Direct effects)

Total tubers: tons per acre

Level of manuring		Mean Yield 1	Mean Yield 2	Responses N 1	Responses N 2	Responses P 1	Responses P 2	Responses K 1	Responses K 2
Treatments, tons/acre (single dressing)		±0.458		±0.439		±0.439		±0.439	
No organic manure		4.42[a]		0.64[b]		1.24[b]		2.75[b]	
Dung: Normal (bullock boxes)	8.0	8.06	8.24	1.15	1.23	0.87	0.44	0.05	1.05
Strawy (bullock boxes)	8.3	7.51	8.04	2.02	1.24	0.86	1.36	0.28	-0.54
Rich (calves)	8.0	8.62	8.43	0.97	1.16	1.21	-0.21	0.66	-0.04
Poor (straw-fed cattle)	8.0	6.68	6.66	1.72	1.98	1.29	1.49	0.25	0.22
Composted town refuse	8.0	5.34	4.86	1.15	0.15	0.90	1.04	2.33	1.59
Pulverized town refuse	8.0	4.33	3.99	0.63	0.28	1.23	1.09	0.69	1.14
Straw sludge compost	8.0	5.66	5.85	1.14	0.83	0.81	0.64	3.39	2.98
Sewage sludge: W.Middlesex	12.3	5.47	5.57	0.92	0.33	0.43	-0.51	3.04	2.28
Birmingham	7.2	2.75	3.58	0.10	0.94	0.65	0.83	1.63	0.88
Harpenden	17.5	5.80	5.95	0.74	0.21	0.01	-0.03	3.73	2.28
Bracken compost	8.0	8.31	10.06	1.32	1.58	1.41	0.38	0.14	-0.51

Averages over two levels of organic manure

	Mean Yield	Responses N	Responses P	Responses K
	±0.324		±0.310	
No organic manure	4.42[a]	0.64[b]	1.24[b]	2.75[b]
Dung: Normal (bullock boxes)	8.15	1.19	0.66	0.55
Strawy (bullock boxes)	7.78	1.63	1.11	-0.13
Rich (calves)	8.52	1.06	0.50	0.31
Poor (straw-fed cattle)	6.67	1.85	1.39	0.24
Composted town refuse	5.10	0.65	0.97	1.96
Pulverized town refuse	4.16	0.46	1.16	0.92
Straw sludge compost	5.76	0.98	0.72	3.18
Sewage sludge: W.Middlesex	5.52	0.62	-0.04	2.66
Birmingham	3.16	0.52	0.74	1.26
Harpenden	5.88	0.48	-0.01	3.00
Bracken compost	9.18	1.45	0.90	-0.18
Mean	6.12			

Standard errors: (a) 0.264, (b) 0.240

Standard error per plot: per whole plot, 0.793 tons per acre or 12.9%, 24 d.f.
per sub-plot, 0.716 tons per acre or 11.7%, 87 d.f.

https://doi.org/10.23637/ERADOC-1-186

Potatoes. Sawyers I, 1944. (Direct effects)

Total tubers: tons per acre.

Level of manuring		Mean Yield 1	Mean Yield 2	Responses N 1	Responses N 2	Responses P 1	Responses P 2	Responses K 1	Responses K 2
Treatments, tons/acre (single dressing)		±0.466		±0.556		±0.566		±0.566	
No organic manure		9.42[a]		0.93[b]		-0.29[b]		4.54[b]	
Dung:									
Normal (bullock boxes)	8.0	13.35	13.37	0.62	0.79	-0.17	0.16	1.01	-0.69
Strawy (bullock boxes)	9.3	13.37	14.21	1.16	0.47	-0.43	0.62	0.87	0.50
Normal (straw bale yards)	13.0	13.66	14.64	1.77	1.40	0.52	-0.88	0.68	0.58
Stored (straw bale yards)	7.0	11.81	11.63	0.76	2.05	0.80	-0.40	2.45	1.65
Stored strawy (")	9.2	11.95	13.52	1.07	0.48	0.10	1.62	1.89	1.50
Straw sludge compost: Fresh	8.0	10.70	11.90	1.30	-0.81	-1.15	-0.14	2.89	2.23
Stored	5.2	11.08	10.95	3.01	0.95	-0.53	-0.07	4.62	3.98
Sewage sludge: W.Middlesex	6.5	11.09	10.32	0.90	0.62	0.17	-0.52	4.43	4.40
Enfield	5.6	8.89	9.28	0.52	-0.74	0.12	0.15	3.28	3.40
Bracken compost	8.0	13.19	12.14	-0.84	-0.74	0.73	-0.10	0.35	-1.41
Peat	2.0	9.09	9.37	1.06	1.33	-1.23	-0.07	5.29	5.66

Averages over two levels of organic manure

	Mean Yield	Responses N	Responses P	Responses K
	±0.330		±0.393	
No organic manure	9.42[a]	0.93[b]	-0.29[b]	4.54[b]
Dung: Normal (bullock boxes)	13.36	0.71	0.00	0.16
Strawy (bullock boxes)	13.79	0.82	0.10	0.69
Normal (straw bale yards)	14.16	1.58	-0.17	0.63
Stored (straw bale yards)	11.72	1.41	0.20	2.05
Stored strawy (")	12.74	0.77	0.86	1.70
Straw sludge compost: Fresh	11.30	0.25	-0.65	2.56
Stored	11.01	1.98	-0.31	4.29
Sewage Sludge: West Middlesex	10.70	0.76	-0.17	4.41
Enfield	9.08	-0.11	0.13	3.34
Bracken compost	12.67	-0.79	0.31	-0.53
Peat	9.23	1.19	-0.65	5.48
Mean	11.51			

Standard errors: (a) 0.269, (b) 0.304

Standard error per plot: per whole plot, 0.808 tons per acre or 7.0%, 24 d.f.
per sub-plot, 0.908 tons per acre or 7.9%, 87 d.f.

https://doi.org/10.23637/ERADOC-1-186

G/8

Effects of various organics

Potatoes. Sawyers III, 1945. (Direct effects)

Total tubers: tons per acre

Level of manuring		Mean Yield 1	Mean Yield 2	Responses N 1	Responses N 2	Responses P 1	Responses P 2	Responses K 1	Responses K 2
Treatments, tons/acre (single dressing)		±0.378		±0.446		±0.446		±0.446	
No organic manure		5.76[a]		0.83[b]		0.74[b]		5.41[b]	
Dung:									
(Bullock boxes) Normal	8.0	11.80	13.13	2.17	1.18	1.12	0.37	1.26	-0.04
Strawy	9.5	11.79	13.04	2.69	1.54	0.65	0.45	0.92	0.72
(Straw Bale yards) Normal	9.6	12.18	13.42	1.98	1.11	1.71	0.35	1.76	0.16
Strawy	10.2	10.50	12.40	1.71	2.63	0.37	1.45	1.58	0.66
Stored strawy	7.9	10.44	13.52	2.72	2.78	1.12	0.67	2.63	1.52
Straw Sludge compost: Epsom	7.0	8.21	8.97	1.96	1.67	0.24	0.55	4.35	3.05
Andover	7.0	7.38	8.67	1.53	0.45	0.19	0.28	5.56	3.82
Sewage sludge: W.Middlesex	9.7	7.25	7.55	0.54	0.84	0.71	0.13	6.67	7.76
Stockport	5.5	7.10	7.84	1.15	0.20	0.53	0.16	5.74	6.67
Bracken compost	8.0	10.94	13.92	1.72	2.24	1.11	0.50	2.11	0.86
Peat	2.0	5.48	6.79	1.26	0.92	0.15	1.27	5.89	5.80

Averages two levels of organic manure

	Mean Yield	Responses N	Responses P	Responses K
	±0.267		±0.315	
No organic manure	5.76[a]	0.83[b]	0.74[b]	5.41[b]
Dung:				
(Bullock boxes) Normal	12.46	1.68	0.74	0.61
Strawy	12.42	2.12	0.55	0.82
(Straw bale yards) Normal	12.80	1.54	1.03	0.96
Strawy	11.45	2.17	0.91	1.12
Stored strawy	11.98	2.75	0.90	2.08
Straw sludge compost: Epsom	8.59	1.82	0.40	3.70
Andover	8.02	0.99	0.24	4.69
Sewage sludge: W.Middlesex	7.40	0.69	0.42	7.22
Stockport	7.46	0.68	0.34	6.20
Bracken compost	12.43	1.98	0.80	1.48
Peat	6.14	1.09	0.71	5.84
Mean	9.58			

Standard errors: (a) 0.218, (b) 0.244

Standard error per plot: per whole plot, 0.654 tons per acre or 6.8%, 24 d.f.
per sub-plot, 0.728 tons per acre or 7.6%, 87 d.f.

https://doi.org/10.23637/ERADOC-1-186 *pp 29*

Potatoes. Great Knott, 1946 (Direct effects)

Total tubers: tons per acre

Level of manuring		Mean Yield 1	Mean Yield 2	Responses N 1	Responses N 2	Responses P 1	Responses P 2	Responses K 1	Responses K 2
Treatments, tons/acre (single dressing)		±0.612		±0.665		±0.665		±0.665	
No organic manure		8.75[a]		0.90[b]		-0.02[b]		3.17[b]	
Dung:									
Normal (bullock boxes)	8.0	10.59	12.14	0.16	2.25	1.27	1.26	0.35	0.32
Strawy (bullock boxes)	9.0	11.37	10.76	1.05	2.77	1.36	1.72	1.46	0.32
Normal (straw bale yards)	10.1	10.87	11.34	0.13	1.82	0.87	1.17	0.46	-0.31
Strawy (straw bale yards)	8.9	10.41	11.63	2.21	2.08	-0.95	0.01	0.51	0.65
Straw sludge compost:									
Fresh	8.0	9.77	10.54	1.17	1.27	-0.29	-0.43	2.13	1.41
Stored	8.0	10.21	11.16	1.38	2.36	0.60	0.04	1.55	1.59
Liquid sludge compost	8.0	10.82	12.09	2.31	1.78	-0.40	-0.66	1.89	0.12
Wet sludge	8.3	10.11	10.13	1.29	0.18	-1.49	-0.22	3.34	5.03
Dried sludge	6.2	9.85	9.75	0.53	-1.06	0.68	1.95	5.08	5.86
Bracken compost	8.0	11.94	13.03	1.72	1.06	1.05	-0.14	0.27	0.40
Peat	2.0	8.16	8.45	0.05	0.83	-0.37	-0.12	3.61	3.81

Averages over two levels of organic manures

	Mean Yield	Responses N	Responses P	Responses K
	±0.433		±0.470	
No organic manure	8.75[a]	0.90[b]	-0.02[b]	3.17[b]
Dung: Normal (bullock boxes)	11.37	1.20	1.26	0.34
Strawy (bullock boxes)	11.06	1.91	1.54	0.89
Normal (straw bale yards)	11.10	0.97	1.02	0.07
Strawy (straw bale yards)	11.02	2.15	-0.02	0.58
Straw sludge compost: Fresh	10.16	1.22	-0.36	1.77
Stored	10.69	1.87	0.32	1.57
Liquid sludge compost	11.46	2.04	-0.53	1.01
Wet sludge	10.12	0.74	-0.85	4.19
Dried sludge	9.80	-0.26	1.31	5.47
Bracken compost	12.48	1.40	0.46	0.34
Peat	8.30	0.45	-0.24	3.71
Mean	10.4			

Standard errors: (a) 0.353, (b) 0.364

Standard error per plot: per whole plot, 1.06 tons per acre or 10.1%, 24 d.f.
per sub-plot, 1.09 tons per acre or 10.4%, 87 d.f.

https://doi.org/10.23637/ERADOC-1-186 *pp 30*

G/10

Effects of various organics

Potatoes, Great Harpenden II, 1947 (Direct effects)

Total tubers: tons per acre

Level of manuring		Mean Yield 1	Mean Yield 2	Responses N 1	Responses N 2	Responses K 1	Responses K 2
Treatments, tons/acre (single dressing)		±0.328		±0.385		±0.385	
No organic manure		7.27[a]		0.60[b]		0.98[b]	
Dung:							
(Bullock boxes)							
Stored normal	5.4	8.13	8.46	0.90	1.23	-0.30	1.00
Stored strawy	4.8	7.58	8.37	0.73	0.21	0.25	-0.45
(Straw-bale yards)							
Fresh normal	8.7	8.29	7.71	0.71	0.46	0.86	-0.64
Fresh strawy	10.8	8.69	8.17	0.36	-0.93	0.60	-0.39
Stored normal	6.8	7.94	9.00	0.40	0.85	0.52	0.56
Stored strawy	7.8	8.32	8.98	1.11	0.18	-0.42	-0.23
Fresh, low feeding	10.8	8.07	7.91	0.38	1.08	0.61	-1.00
Fresh, low feeding, with sulph.amm.	10.8	8.14	8.80	0.33	-0.72	0.35	-0.25
(Sunken yard) Stored commercial	8.0	8.67	9.12	0.46	-0.41	0.32	0.15
Bracken compost	8.0	7.79	8.94	1.04	1.42	1.26	0.89
Straw with sulph. amm.*	2.0	6.90	4.85	-0.43	-1.35	1.13	0.50

*Single dressing, 2 tons of straw and 0.3 cwt. N per acre

Averages over two levels of organic manure

	Mean Yield	Responses N	Responses K
	±0.232	±0.272	
No organic manure	7.27[a]	0.60[b]	0.98[b]
Dung:			
(Bullock boxes)			
Stored normal	8.30	1.06	0.35
Stored strawy	7.97	0.47	-0.10
(Straw-bale yards)			
Fresh normal	8.09	0.58	0.11
Fresh strawy	8.43	-0.28	0.11
Stored normal	8.47	0.62	0.54
Stored strawy	8.65	0.64	-0.32
Fresh, low feeding	7.99	0.73	-0.20
Fresh, low feeding, with sulph.amm.	8.47	-0.19	0.05
(Sunken yard) Stored commercial	8.90	0.03	0.24
Bracken compost	8.36	1.23	1.07
Straw with sulphate of ammonia	5.88	-0.89	0.81
Mean	8.03		

Standard errors (a) 0.189, (b) 0.211

Standard error per plot: per whole plot, 0.567 tons per acre or 7.1%, 50 d.f.
per sub-plot, 0.445 tons per acre or 5.5%, 29 d.f.

https://doi.org/10.23637/ERADOC-1-186 *pp 31*

Barley. Great Harpenden, 1941 (Residual effects)

Level of manuring	Grain: cwt. per acre 1	2	Mean	Straw: cwt. per acre 1	2	Mean
	±1.57		±1.11	±1.15		±0.81
No organic manure	20.1[a]		20.1[b]	20.7[b]		20.7[b]
Dung: Fresh normal	23.2	24.5	23.9	23.4	26.3	24.8
Fresh strawy	22.8	24.6	23.7	23.1	25.0	24.0
Stored normal	23.3	22.7	23.0	22.7	26.0	24.4
Stored strawy	19.6	20.8	20.2	21.4	23.7	22.6
Fermented town refuse (in ridges)	20.4	22.9	21.6	20.9	23.6	22.2
Fermented town refuse (broadcast)	20.5	21.4	21.0	21.7	23.5	22.6
Pulverized town refuse (in ridges)	20.7	21.7	21.2	24.0	24.3	24.2
Pulverized town refuse (broadcast)	22.1	21.0	21.6	22.2	23.3	22.8
Screened dust	20.0	18.2	19.1	21.3	20.7	21.0
Controlled tip refuse: Luton	19.0	20.0	19.5	20.6	22.1	21.3
Wheathampsted	21.5	22.3	21.9	21.0	22.3	21.6
Mean			21.4			22.6

Standard errors: (a) 0.906, (b) 0.664

Standard error per plot: Grain, 2.45 cwt. per acre or 11.5%, 24 d.f.
Straw, 1.72 cwt. per acre or 7.6%, 24 d.f.

Barley. Little Hoose, 1942 (Residual effects)

Level of manuring	Grain: cwt. per acre 1	2	Mean	Straw: cwt. per acre 1	2	Mean
	±1.52		±1.07	±1.20		±0.85
No organic manure	24.4[c]		24.4[c]	23.7[e]		23.7[e]
Dung: Fresh normal	28.0	30.4	29.2	26.5	27.3	26.9
Fresh strawy	27.0	30.8	28.9	25.0	29.1	27.0
Stored normal	25.1	28.3	26.7	24.0	25.4	24.7
Stored strawy	25.8	29.6	27.7	27.1	27.8	27.4
Fermented town refuse	26.3	27.6	27.0	24.7	25.2	25.0
Pulverized town refuse	23.7	24.2	24.0	21.8	23.5	22.6
Screened dust	19.3	22.7	21.0	19.6	22.4	21.0
Sewage sludge: W.Middlesex	24.7	26.6	25.6	23.5	25.8	24.6
Birmingham	27.0	31.3	29.2	25.1	28.9	27.0
Composted sludge & town refuse	22.2	25.8	24.0[d]	21.6	23.6	22.6[f]
Bracken compost	25.6		25.6[d]	22.8		22.8[f]
Improved bracken compost	24.2		24.2[d]	23.0		23.0[f]
Mean			26.0			24.6

Standard errors: (c) 0.88, (d) 1.52, (e) 0.69, (f) 1.20

Standard error per plot: Grain, 2.63 cwt. per acre or 10.1%, 24 d.f.
Straw, 2.08 cwt. per acre or 8.5%, 24 d.f.

https://doi.org/10.23637/ERADOC-1-186 *pp 32*

G/12

Effects of various organics

Barley. Long Hocs I and II, 1943 (Residual effects)

Level of manuring	Grain: cwt.per acre 1	2	Mean	Straw: cwt.per acre 1	2	Mean
	±1.29		±0.91			
No organic manure	20.6[a]		20.6[a]	24.1		24.1
Dung: Fresh normal	20.7	25.6	23.2	24.0	28.7	26.4
Fresh strawy	23.2	25.4	24.3	26.5	30.7	28.6
Stored normal	22.9	24.3	23.6	26.1	27.9	27.0
Stored strawy	21.5	23.7	22.6	24.1	28.9	26.5
Composted town refuse	20.5	22.8	21.6	23.0	26.6	24.8
Pulverized town refuse	21.6	21.7	21.6	24.7	24.7	24.7
Sewage sludge: W.Middlesex	27.9	26.9	27.4	30.3	30.4	30.4
Birmingham	23.4	24.9	24.2	27.5	27.0	27.2
Rotherham	21.1	22.5	21.8	25.3	26.8	26.0
Huddersfield	27.8	28.9	28.4	30.1	33.3	31.7
Bracken compost	24.2	22.8	23.5	26.5	25.1	25.8
Mean			23.4			26.8

Standard error (a) 0.74

Standard error per plot: Grain: 2.23 cwt. per acre or 9.5%, 24 d.f.

Barley. Sawyers II, 1944 (Residual effects)

Level of manuring	Grain: cwt. per acre 1	2	Mean	Straw: cwt. per acre 1	2	Mean
	±1.27		±0.90	±1.06		±0.75
No organic manure	21.6[b]		21.6[b]	22.7[c]		22.7[c]
Dung: Normal (bullock boxes)	25.1	26.5	25.8	26.0	28.0	27.0
Strawy (bullock boxes)	22.4	24.7	23.6	23.1	26.2	24.6
Rich (calves)	27.6	28.2	27.9	27.8	29.6	28.7
Poor (straw-fed cattle)	24.4	24.0	24.2	24.7	26.8	25.8
Composted town refuse	24.9	22.3	23.6	22.6	22.3	22.4
Pulverized town refuse	21.8	24.0	22.9	23.4	25.0	24.2
Straw sludge compost	23.8	24.2	24.0	24.6	27.7	26.2
Sewage sludge: W.Middlesex	24.8	23.1	24.0	25.9	23.5	24.7
Birmingham	21.4	23.6	22.5	22.8	24.0	23.4
Harpenden	23.9	24.2	24.0	23.0	24.6	23.8
Bracken compost	23.1	24.2	23.6	25.7	26.2	26.0
Mean			23.9			24.9

Standard errors: (b) 0.73, (c) 0.61.

Standard errors per plot: Grain, 2.20 cwt. per acre or 9.2%, 24 d.f.
Straw, 1.83 cwt. per acre or 7.4%, 24 d.f.

https://doi.org/10.23637/ERADOC-1-186 *pp 33*

Barley. Sawyers I, 1945 (Residual effects)

Level of manuring	Grain: cwt.per acre 1	2	Mean	Straw: cwt.per acre 1	2	Mean
	±0.60		±0.42	±1.34		±0.95
No organic manure	30.8[a]		30.8[a]	38.7[b]		38.7[b]
Dung: Normal (bullock boxes)	32.5	33.7	33.1	42.0	44.7	43.4
Strawy (bullock boxes)	33.4	33.2	33.3	43.1	44.7	43.9
Normal (straw bale yards)	33.2	34.4	33.8	39.9	46.2	43.0
Stored (straw bale yards)	30.3	31.9	31.1	39.9	41.4	40.6
Stored strawy (")	31.7	33.2	32.4	41.1	41.3	41.2
Straw sludge compost: Fresh	32.6	32.8	32.7	45.8	42.0	43.9
Stored	33.3	32.2	32.8	41.9	42.6	42.2
Sewage sludge: W.Middlesex	33.0	32.3	32.6	43.6	45.2	44.4
Enfield	31.9	31.2	31.6	41.9	42.3	42.1
Bracken compost	32.3	33.2	32.8	42.4	44.7	43.6
Peat	30.9	31.2	31.0	41.0	39.6	40.3
Mean			32.3			42.1

Standard errors: (a) 0.35, (b) 0.77

Standard errors per plot: Grain, 10.4 cwt.per acre or 3.2%, 24 d.f.
Straw, 2.32 cwt.per acre or 5.5%, 24 d.f.

Wheat. Sawyers III, 1946 (Residual effects)

Level of manuring	Grain: cwt.per acre 1	2	Mean	Straw: cwt.per acre 1	2	Mean
	±1.02		±0.72	±1.45		±1.02
No organic manure	37.0[c]		37.0[c]	44.7[d]		44.7[d]
Dung: Normal (bullock boxes)	43.0	47.0	45.0	50.4	55.0	52.7
Strawy (bullock boxes)	42.3	47.9	45.1	48.4	57.4	52.9
Normal (straw-bale boxes)	44.2	45.4	44.8	51.1	57.5	54.3
Strawy (straw-bale boxes)	41.8	46.0	43.9	48.0	54.4	51.2
Stored strawy (")	40.2	42.6	41.4	47.7	50.4	49.0
Straw sludge compost: Epsom	40.3	42.6	41.4	47.5	50.1	48.8
Andover	40.9	41.4	41.2	47.3	49.9	48.6
Sewage sludge: W.Middlesex	40.1	41.3	40.7	49.6	52.1	50.8
Stockport	40.9	39.1	40.0	48.6	50.2	49.4
Bracken compost	39.4	43.2	41.3	48.3	53.4	50.8
Peat	38.9	38.0	38.4	46.0	47.5	46.8
Mean			41.5			49.8

Standard errors: (c) 0.59, (d) 0.84.

Standard errors per plot: Grain, 1.77 cwt. per acre or 4.3%, 24 d.f.
Straw, 2.50 cwt. per acre or 5.0%, 24 d.f.

https://doi.org/10.23637/ERADOC-1-186 *pp 34*

G/14

Effects of various organics

Wheat. Great Knott II, 1947 (Residual effects)

Level of manuring	Grain: cwt.per acre 1	2	Mean	Straw: cwt.per acre 1	2	Mean
	±1.64		±1.16			
No organic manure	26.0[a]		26.0[a]	23.6		23.6
Dung: Normal (bullock boxes)	26.2	25.9	26.0	22.9	22.0	22.4
Strawy (bullock boxes)	28.8	23.3	26.0	24.9	23.0	24.0
Normal (straw-bale yards)	24.7	24.0	24.4	21.4	23.0	22.2
Strawy (straw-bale yards)	24.6	27.9	26.2	24.8	25.4	25.1
Straw sludge compost: Fresh	24.5	25.2	24.8	21.8	24.5	23.2
Stored	26.2	30.1	28.2	22.4	26.2	24.3
Liquid sludge compost	25.1	25.5	25.3	23.1	24.9	24.0
Sewage sludge: Wet	24.1	24.1	24.1	21.7	22.0	21.8
Dried	25.6	24.2	24.9	25.1	23.6	24.4
Rotted bracken	25.8	25.9	25.8	24.4	24.7	24.6
Peat	21.4	27.4	24.4	20.3	24.1	22.2
Mean			25.5			23.5

Standard error (a) 0.95

Standard error per plot: Grain, 2.84 cwt.per acre or 11.1%, 24 d.f.

https://doi.org/10.23637/ERADOC-1-186

DIRECT AND RESIDUAL EFFECTS OF THREE ORGANIC MANURES

Great Harpenden, 1940 - 1947

and

Woburn, Butt Furlong, 1940 - 1941

These two experiments were identical in design. They tested the effects of fermented town refuse and screened dust (each applied before or after ploughing) and of dung, and also of sulphate of ammonia and muriate of potash.

Design; 4 randomized blocks of 12 plots each. Plots split for application of artificials and for the early and late applications of town refuse and screened dust. Certain interactions confounded with differences between whole plots.
Area of each sub-plot; Rothamsted, 0.01 acre; Woburn, 0.007 acre.

Treatments

Whole plots Organic manures; Dung, fermented town refuse and screened dust applied as follows (1) None
(2) 8 tons per acre every year except 1947
(3) 16 tons per acre in even years only
(4) 16 tons per acre in odd years only except 1947,
except that at Woburn the rates were 10 and 20 tons per acre

Sub-plots Time of application; Town refuse and screened dust applied before and after ploughing. (Town refuse in 1940 and 1941 only).
Sulphate of ammonia; None, 0.6 cwt. N per acre every year except 1947
Muriate of potash; None, and as follows (amounts in cwt. K_2O per acre), 1.0 in 1940, 0.5 every year from 1942 to 1946.
Each treatment was always applied to the same plot.
In 1947 none of the above treatments were applied, but muriate of potash was applied as a whole-plot treatment at these rates; None, and 1.2 cwt. K_2O per acre.

Basal Manuring; 1940, 0.6 cwt. P_2O_5 per acre as superphosphate
1941-44 and 1946, 0.4 cwt. P_2O_5 per acre as superphosphate
1947, 0.6 cwt. N per acre as sulphate of ammonia
0.5 cwt P_2O_5 per acre as superphosphate

https://doi.org/10.23637/ERADOC-1-186 *pp 36*

H/2

Effects of Three Organics

Crop Notes

Year (Rothamsted)	Crop	Variety	Sown	Harvested	
1940	Sugar Beet	Kleinwanzleben E	May 20	Dec. 2	Previous Crop, Wheat
1941	Mangolds	Yellow Globe	Apr. 24	Oct. 18	
1942	Mangolds	Yellow Globe	May 2	Nov. 16	
1943	Barley	Plumage Archer	March 2	Aug. 5	
1944	Beans	Garton's Giant	29/10/43	Aug. 2	
1945	Wheat	Jubilegem	25/10/44	Aug. 3	
1946	Sugar Beet	Klein	March 15	Nov. 19	
1947	Potatoes	Majestic	May 7	Sept. 30	
(Woburn)					
1940	Sugar Beet	Kleinwanzleben	April 25	Oct. 29	Previous crop barley
1941	Mangolds	Yellow Globe	May 7	Nov. 12	

https://doi.org/10.23637/ERADOC-1-186

Sugar Beet - Rothamsted, 1940

Organic manures tons per acre	None	Dung 8	Dung 16	Town refuse 8	Town refuse 16	Screened Dust 8	Screened Dust 16	Mean
Roots washed: tons per acre								
Mean yield	11.49	12.26	12.67	11.64	11.21	12.22	11.57	11.71
Early-late applicn. of organics				0.02	-0.08	-0.01	0.51	0.11
Response to N	1.25	1.60	2.18	1.23	1.31	1.69	2.57	1.51
Response to K	-0.15	-0.70	0.06	-0.51	0.37	-1.24	0.16	-0.23
Sugar Percentage								
Mean yield	17.92	17.84	17.59	18.19	18.04	17.92	17.96	17.92
Early-late applicn. of organics				-0.40	0.08	-0.06	-0.25	-0.16
Response to N	-0.32	-0.40	-0.10	0.07	-0.29	-0.40	0.02	-0.25
Response to K	0.17	0.50	0.08	0.25	0.09	-0.06	0.26	0.18
Total sugar: cwt. per acre								
Mean yield ±1.70	41.2[a]	43.7	44.6	42.3	40.4	43.8	41.6	42.0
Early-late applicn. of organics ±1.92				-0.8	-0.2	-0.2	1.3	0.0[c]
Response to N ±1.92	3.8[b]	4.8	7.4	4.7	4.1	5.1	9.3	4.8[d]
Response to K ±1.92	-0.1[b]	-1.3	0.3	-1.3	1.5	-4.6	1.0	0.4[d]
Tops: tons per acre								
Mean yield ±0.360	8.31[e]	8.92	10.50	8.58	7.55	8.69	8.39	8.54
Early-late applicn. of organics ±0.500				0.17	-0.08	-0.11	0.35	0.08[g]
Response to N ±0.500	2.63[f]	2.54	3.12	2.38	1.91	3.24	3.16	2.68[h]
Response to K ±0.500	0.23[f]	0.33	0.25	0.23	0.61	-0.16	-0.30	0.20[h]
Plant number: thousands per acre								
Mean yield	28.5	29.2	29.4	29.7	30.1	29.5	29.8	29.1
Early-late applicn. of organics				-1.1	-0.6	0.1	-0.1	-0.4
Response to N	0.1	0.1	0.1	0.2	0.2	-1.0	-0.3	0.0
Response to K	0.9	-0.2	0.4	-0.2	0.1	-0.2	0.0	0.5

Standard errors: (a) 0.692, (b) 0.782, (c) 0.958, (d) 0.553, (e) 0.147, (f) 0.204, (g) 0.250, (h) 0.144

	Per whole plot	Sub-plot
Total sugar, cwt. per acre	3.39 or 8.1%, 38 d.f.	2.71 or 6.5%, 30 d.f.
Tops, tons per acre	0.719 or 8.4%, 38 d.f.	0.707 or 8.3%, 30 d.f.

https://doi.org/10.23637/ERADOC-1-186

H/4

Effects of Three Organics

Mangolds - Rothamsted, 1941

Tons per acre 1941	None	Dung 0	Dung 8	Dung 16	Town refuse 0	Town refuse 8	Town refuse 16	Screened Dust 0	Screened Dust 8	Screened Dust 16	Mean
		Roots; tons per acre									
Mean yield ±1.78	20.26[a]	26.62	22.70	26.40	23.35	26.89	28.90	24.43	21.99	23.70	23.81
Early-late applicn. of organics ±1.93						-2.31	-1.36		-2.71	-0.56	-1.74[c]
Response to N ±1.93	5.15[b]	6.56	7.94	8.87	2.26	4.68	5.80	5.62	7.79	3.55	5.71[d]
Response to residual K ±1.93	-1.17[b]	2.72	4.82	-1.57	-0.47	1.50	1.29	-2.34	-2.25	-2.54	-0.20[d]
		Plant number; thousands per acre									
Mean ±1.93	13.3[e]	16.5	13.9	18.9	15.2	18.2	19.3	15.7	15.6	15.9	15.8
Early-late applicn. of organics ±1.53						-3.4	-1.2		-1.2	-0.8	-1.7[g]
Response to N ±1.53	1.0[f]	-0.8	1.4	1.6	-0.8	2.0	1.0	0.6	-1.2	-2.2	0.4[h]
Response to residual K ±1.53	-1.1[f]	0.8	3.0	0.2	0.5	0.3	0.9	-1.5	1.3	-1.1	0.1[h]

Standard errors; (a) 1.03 (b) 1.12 (c) 0.97 (a) 0.56 (e) 1.11 (f) 0.88
(g) 0.76 (h) 0.43

Per whole plot

Sub-plot

Roots, tons per acre 3.56 or 14.9%, 35 d.f. 2.73 or 11.5%, 34 d.f.

Plant no., thous. per acre 3.86 or 24.5%, 35 d.f. 2.11 or 13.4%, 34 d.f.

Direct organic treatments were confounded with residual organic treatments; see treatment details.

38

Mangolds - Rothamsted, 1942

Tons per acre 1942	None	Dung 0	Dung 8	Dung 16	Town refuse 0	Town refuse 8	Town refuse 16	Screened dust 0	Screened dust 8	Screened dust 16	Mean
				Roots; tons per acre							
Mean yield ±1.35	20.51[a]	23.34	27.91	31.23	22.87	26.78	26.74	22.30	24.40	25.06	24.33
Early-late applicn. of dust ±1.86									0.45	2.08	1.26[c]
Response to N ±1.86	2.63[b]	4.14	4.66	6.35	-0.99	4.90	4.64	2.62	6.99	3.20	3.70[d]
Response to K ±1.86	1.66[b]	3.75	2.31	3.40	6.50	0.61	2.70	-1.40	3.37	2.60	2.41[d]
				Plant number; thousands per acre							
Mean ±1.00	19.3[e]	18.5	19.1	16.1	18.0	17.8	19.0	19.0	19.5	17.1	18.5
Early-late applicn. of dust ±1.41									-0.1	0.3	0.1[g]
Response to N ±1.41	-0.8[f]	-0.2	0.0	0.1	0.2	0.1	-0.1	-2.3	-0.7	-3.2	-0.7[h]
Response to K ±1.86	-1.3[f]	2.0	-0.8	-1.4	-1.4	-0.1	1.9	-1.2	1.5	1.8	-0.2[h]

Standard errors; (a) 0.779 (b) 1.07 (c) 0.930 (d) 0.537 (e) 0.58 (f) 0.81 (g) 0.70 (h) 0.41

	Per whole plot	Sub-plot
Roots, tons per acre	2.70 or 11.1%, 35 d.f.	2.63 or 10.8%, 25 d.f.
Plant no., thous. per acre	2.16 or 11.7%, 35 d.f.	1.99 or 10.8%, 25 d.f.

Direct organic treatments were confounded with residual organic treatments; see treatment details.

Barley - Rothamsted, 1943

Tons per acre 1943	None	Dung 0	Dung 8	Dung 16	Town refuse 0	Town refuse 8	Town refuse 16	Screened dust 0	Screened dust 8	Screened dust 16	Mean
Grain, cwt. per acre											
Mean yield ±1.16	31.2[a]	37.7	36.4	38.9	33.6	34.7	36.4	33.9	32.3	31.2	34.1
Early-late applicn. of dust ±1.54									1.4	1.4	1.4[c]
Resp. to N ±1.54	10.6[b]	5.8	6.6	6.3	10.4	9.3	4.0	10.6	10.0	9.2	8.7[d]
Resp. to K ±1.54	0.0[b]	-0.4	0.1	3.4	0.6	-1.1	-1.3	0.2	0.5	-0.8	0.1[d]
Straw, cwt. per acre											
Mean yield	37.0	47.1	45.6	45.2	38.7	39.6	41.6	38.2	38.0	40.4	40.4
Early-late applicn. of dust									-1.6	-1.6	-1.6
Response to N	14.1	14.2	9.9	11.5	13.7	13.1	10.8	15.6	15.0	12.6	13.2
Response to K	1.6	2.2	1.1	1.4	0.5	-1.7	-1.6	0.2	0.1	1.4	0.7

Standard errors (a) 0.67 (b) 0.89 (c) 0.77 (d) 0.44

	Per whole plot	Sub-plot
Grain cwt. per acre	2.32 or 6.8%, 35 d.f.	2.18 or 6.4%, 25 d.f.

Direct organic treatments were confounded with residual organic treatments; see treatment details.

Q4

Beans - Rothamsted, 1944

Tons per acre 1944	None	Dung 0	Dung 8	Dung 16	Town refuse 0	Town refuse 8	Town refuse 16	Screened dust 0	Screened dust 8	Screened dust 16	Mean
Grain, cwt. per acre											
Mean yield ±1.18	11.0[a]	23.3	25.4	26.3	14.2	13.2	14.2	13.5	15.1	16.7	16.2
Early-late applicn. of dust ±1.61									-0.5	1.4	0.5[c]
Response to N ±1.61	-0.6[b]	2.5	-0.2	1.5	-1.6	2.7	1.4	2.9	0.2	-0.5	0.6[d]
Response to K ±1.61	8.7[b]	2.8	0.2	0.6	7.4	7.8	7.5	6.4	7.8	7.8	6.2[d]
Straw, cwt. per acre											
Mean yield ±0.82	12.7[e]	19.4	20.4	21.2	14.4	13.3	15.5	14.4	15.4	17.3	15.8
Early-late applicn. of dust ±1.75									-0.7	1.2	0.2[g]
Response to N ±1.75	-0.5[f]	1.1	-0.6	-0.1	-1.3	-0.8	0.6	1.5	-0.6	-0.9	-0.3[h]
Response to K ±1.75	6.3[f]	2.1	-0.8	-0.8	3.2	5.9	3.4	4.4	3.3	2.7	3.5[h]

Standard errors; (a) 0.68 (b) 0.93 (c) 0.80 (d) 0.47 (e) 0.48 (f) 1.01
(g) 0.88 (h) 0.51

	Per whole plot	Sub-plot
Grain, cwt. per acre	2.36 or 14.6%, 35 d.f.	2.28 or 14.1%, 25 d.f.
Straw, cwt. per acre	1.65 or 10.5%, 35 d.f.	2.48 or 15.7%, 25 d.f.

Direct organic treatments were confounded with residual organic treatments; see treatment details.

H/8

Effects of Three Organics

Wheat - Rothamsted 1945

Tons per acre 1945	None	Dung 0	Dung 8	Dung 16	Town refuse 0	Town refuse 8	Town refuse 16	Screened dust 0	Screened dust 8	Screened dust 16	Mean
Grain, cwt. per acre											
Mean yield ±1.14	31.1[a]	37.1	36.5	37.5	30.8	33.5	35.0	34.3	33.7	32.9	33.7
Early-late applicn. of dust ±1.40								0.8	-0.6	-0.9	-0.2[c]
Response to N ±1.40	11.1[b]	6.7	9.0	7.4	7.6	6.3	5.2	10.4	9.2	9.0	8.7[d]
Response to K ±1.40	0.3[b]	-2.0	0.3	0.6	2.8	0.1	0.9	2.4	0.5	-0.5	0.5[d]
Straw, cwt. per acre											
Mean yield ±1.94	45.8[e]	57.2	55.2	57.2	48.2	50.3	50.8	51.3	50.0	48.4	50.5
Early-late applicn. of dust ±1.83								1.9	-1.0	-0.3	0.2[g]
Response to N ±1.83	15.6[f]	13.0	14.7	13.4	14.4	14.4	10.4	17.2	15.3	16.1	14.6[h]
Response to K ±1.83	-0.4[f]	-2.0	0.3	-0.6	1.1	-0.8	0.6	1.6	-0.5	1.4	0.0[h]

Standard errors (a) 0.66 (b) 0.81 (c) 0.70 (d) 0.41 (e) 1.12 (f) 1.06 (g) 0.92
(h) 0.53

	Per whole plot	Sub-plot
Grain, cwt. per acre	2.29 or 6.8%, 34 d.f.	1.99 or 5.9%, 25 d.f.
Straw, cwt. per acre	3.89 or 7.7%, 34 d.f.	2.59 or 5.1%, 25 d.f.

Direct organic treatments were confounded with residual organic treatments; see treatment details.

42

https://doi.org/10.23637/ERADOC-1-186

Sugar Beet - Rothamsted, 1946

Tons per acre 1946	None	Dung 0	Dung 8	Dung 16	Town refuse 0	Town refuse 8	Town refuse 16	Screened dust 0	Screened dust 8	Screened dust 16	Mean
Roots (washed) - tons per acre											
Mean yield ±0.49	12.07[a]	16.23	15.36	15.68	14.78	14.22	15.09	15.12	15.16	15.50	14.44
larly-late applicn. of dust ±0.76								-0.09	-1.84	1.70	-0.08[b]
Response to N ±0.76	2.93[b]	4.66	5.88	3.33	2.13	3.85	4.02	3.68	4.06	3.46	3.66[c]
Response to K ±0.76	0.90b	-0.44	0.98	1.15	0.47	-0.13	2.30	-0.27	-2.63	-0.88	0.27c
Total Sugar - cwt. per acre **											
Mean yield	39.3	55.0	50.2	54.2	49.0	47.6	51.4	52.1	52.8	52.8	48.6
Response to N	9.6	13.4	16.9	6.9	6.1	10.3	12.5	11.8	14.4	12.9	11.2
Sugar Percentage **											
Mean	16.48	17.05	16.43	17.05	16.86	16.90	17.26	16.90	17.18	17.00	16.84
Response to N	-0.49	-0.58	0.26	-0.64	-0.32	-0.55	-0.79	0.35	0.03	-0.23	-0.36

Standard errors (a) 0.28 (b) 0.43 (c) 0.22

Direct organic treatments were confounded with residual organic treatments; see treatment details

43

** The samples taken from each plot for analysis were bulked so that only the above comparisons were possible.

H/9

Effects of Three Organics

Sugar Beet - Rothamsted 1946

Tons per acre 1946	None	Dung 0	Dung 8	Dung 16	Town refuse 0	Town refuse 8	Town refuse 16	Screened Dust 0	Screened Dust 8	Screened Dust 16	Mean
Tops - tons per acre											
Mean yield ±0.82	9.00d	9.78	11.56	11.72	11.57	11.51	10.64	9.59	11.75	9.39	10.38
Early-late applicn. of dust ±1.29								2.17	2.27	-1.76	0.90e
Response to N ±1.29	4.87e	4.55	5.45	4.24	3.18	6.23	5.11	4.85	0.23	-0.73	3.97f
Response to K ±1.29	-0.33e	-0.31	2.10	-0.22	-0.13	-1.18	0.38	-0.29	-1.69	-1.45	-0.31f
Plant number - thousands per acre											
Mean yield ±0.68	32.0 g	31.2	31.1	30.5	31.4	31.4	30.8	31.2	32.4	31.4	31.5
Early-late applicn. of dust ±0.61								1.2	-0.1	0.8	0.6h
Response to N ±0.61	-1.0h	-1.9	-0.6	-1.4	-1.3	0.0	-0.6	-1.4	-0.9	-1.6	-1.1j
Response to K ±0.61	0.5h	0.5	-0.8	0.7	0.5	0.5	-1.0	-0.8	-0.9	-0.5	-0.1j

Standard errors (d) 0.47 (e) 0.75 (f) 0.37 (g) 0.39 (h) 0.35 (j) 0.18

		Standard errors per whole plot	Sub-plot
Roots (washed)	tons per acre	0.99 or 6.8%, 34 d.f.	1.07 or 7.4%, 25 d.f.
Tops	tons per acre	1.64 or 15.8%, 32 d.f,	1.82 or 17.6%, 23 d.f.
Plant number	thousands per acre	1.36 or 4.3%, 34 d.f.	0.86 or 2.7%, 25 d.f.

Direct organic treatments were confounded with residual organic treatments; see treatment details.

Potatoes - Rothamsted 1947

Tons per acre 1946	None	Dung 0	Dung 8	Dung 16	Town Refuse 0	Town Refuse 8	Town Refuse 16	Screened Dust 0	Screened Dust 8	Screened Dust 16	Mean
				Total tubers, tons per acre							
Mean yield ±0.230	7.12a	9.23	9.27	9.32	7.90	7.20	7.86	7.91	7.74	8.28	8.01
Response to residual N ±0.376	-0.47[b]	0.49	0.00	0.29	-0.57	-0.10	-0.45	0.84	-0.17	-0.75	-0.15[d]
Response to residual K ±0.376	0.71[b]	0.05	0.64	-0.16	0.52	0.58	-0.85	0.58	1.14	0.89	0.60[d]
Response to direct K ±0.476	1.82c	0.09	0.22	0.66	2.07	2.40	0.77	1.30	1.83	0.45	1.27[a]

45

Standard errors; (a) 0.133 (b) 0.217 (c) 0.266 (d) 0.108

Per whole plot
0.459 or 5.7%, 24 d.f.

Sub-plot
0.532 or 6.6%, 25 d.f.

All treatments were residual this year, except for the direct application of potash.

H/11

H/12

Effects of Three Organics

Sugar Beet - Woburn, 1940

Tons per acre 1940	None	Dung 10	Dung 20	Town refuse 10	Town refuse 20	Screened dust 10	Screened dust 20	Mean
Roots washed: tons per acre								
Mean yield	12.54	14.97	16.24	11.75	11.83	13.27	12.84	13.01
Early-late application of organics				0.48	1.43	1.29	0.77	0.99
Response to N	3.97	3.21	2.23	5.64	6.62	5.16	4.54	4.27
Response to K	0.24	-0.44	0.60	-0.11	1.52	0.13	0.42	0.30
Sugar percentage								
Mean yield	18.50	18.58	18.41	18.77	18.62	18.47	18.55	18.53
Early-late application of organics				0.39	-0.48	-0.30	0.38	0.00
Response to N	-0.15	-0.13	-0.53	0.48	-0.49	-0.48	-0.10	-0.18
Response to K	0.15	0.20	0.00	0.32	-0.17	0.10	0.06	0.12
Total sugar: cwt. per acre								
Mean yield ±2.57	46.4a	55.6	59.8	44.2	43.7	48.7	47.6	48.2
Early-late application of organics ±3.12				2.3	4.3	3.8	3.6	3.5c
Response to N ±3.12	14.4[b]	11.6	6.5	22.3	23.3	17.9	16.6	15.4d
Response to K ±3.12	1.2[b]	-0.8	2.1	0.4	5.2	1.1	1.9	1.4d
Tops: tons per acre								
Mean yield ±0.494	7.02e	9.01	10.19	6.88	7.42	7.18	7.32	7.51
Early-late application of organics ±0.653				-0.55	1.48	1.18	0.33	0.61g
Response to N ±0.653	2.60f	3.33	2.47	3.51	4.31	2.34	3.41	2.91h
Response to K ±0.653	0.38f	0.72	1.40	0.11	1.63	0.55	-0.11	0.55h

Standard errors: (a) 1.05, (b) 1.28, (c) 1.56, (d) 0.902, (e) 0.202
(f) 0.266 (g) 0.326 (h) 0.188

	Per whole plot	Sub-plot
Total sugar, cwt. per acre	5.14 or 10.7%, 38 d.f.	4.42 or 9.2%, 30 d.f.
Tops, tons per acre	0.989 or 13.2%, 38 d.f.	0.923 or 12.3%, 30 d.f.

There was a very even stand, and so the plants were not counted.

https://doi.org/10.23637/ERADOC-1-186

Mangolds - Woburn 1941

Tons per acre 1941	None	Dung 0	Dung 10	Dung 20	Town refuse 0	Town refuse 10	Town refuse 20	Screened Dust 0	Screened Dust 10	Screened Dust 20	Mean
					Roots, tons per acre						
Mean yield ±1.22	9.56a	9.93	13.08	14.60	11.40	10.18	13.18	8.69	9.42	9.27	10.70
Early-late applicn. organics ±0.954						-0.12	-2.80		0.96	-0.94	-0.73[c]
Response to N ±0.954	5.16[b]	6.64	6.16	4.28	6.60	5.44	7.22	6.22	5.36	4.72	5.68[d]
Response to residual K ±0.954	0.12[b]	-0.68	-1.16	0.04	1.68	-0.12	-1.46	0.08	0.56	0.32	-0.03[d]

Standard errors; (a) 0.704 (b) 0.551 (c) 0.477 (d) 0.276

Per whole plot	Sub-plot
2.44 or 22.8%, 35 d.f.	1.35 or 12.6%, 25 d.f.

Direct organic treatments were confounded with residual organic treatments; see treatment details.

47

H/13

https://doi.org/10.23637/ERADOC-1-186

PHOSPHATE SERIES

The experiments in this section J form part of a country-wide series of about 250 similar experiments on the effects of various kinds of phosphate. Results for the whole series are given in Ministry of Supply Permanent Records of Research and Development, 11.108 and 11.109

POTATOES

Long Hoos I 1942

Design: 4 randomized blocks of 12 plots.

Area of each plot: 0.0175 acre

Treatments

None, superphosphate at 0.25, 0.50, 0.75 and 1.00 cwt. P_2O_5 per acre, high temperature phosphates (Chem. Dept Ref. Nos. P 347, 348, 349), each at 0.50 and 1.00 cwt. P_2O_5 per acre.

Basal manuring: Sulphate of ammonia: 0.6 cwt. N per acre
Muriate of potash: 1.0 cwt. K_2O per acre

Crop Notes

Potatoes planted: May 4. Harvested Nov.10. Variety: Arran Banner. Previous crop, Barley.

Standard error per plot: Total tubers, 1.21 tons per acre or 8.8%, 34 d.f.

Total tubers, tons per acre. Mean yield: 13.78 tons per acre

cwt. P_2O_5 per acre	None	0.25	0.50	0.75	1.00	Mean
				±0.605		±0.428
Superphosphate		14.18	14.25	14.36	13.79	14.02[b]
H.T. P347			14.00		13.05	13.53
H.T. P348			14.23		12.57	13.40
H.T. P349			14.01		14.01	14.01
Mean ± 0.302	13.45[a]		14.12		13.36	13.78[c]

Standard error (a) 0.428

Means (b) of 0.5 and 1.0 P_2O_5 levels only, (c) of all plots.

https://doi.org/10.23637/ERADOC-1-186

J/2

POTATOES AND BARLEY

Sawyers 1943-1944

Design: 8 randomized blocks of 6 plots each.

Area of each plot: 1943: 0.0133 acre
1944: 0.0125 acre

1943 - Potatoes

Treatments

None, superphosphate at 0.33 and 0.66 cwt. P_2O_5 per acre, high temperature phosphate, basic slag and super slag product all at 0.50 cwt. P_2O_5 per acre.

Basal manuring: Sulphate of ammonia: 0.6 cwt. N per acre
Muriate of potash: 1.0 cwt. K_2O per acre

Crop Notes

Potatoes planted: May 4. Harvested: Sept.30. Variety: Majestic
Previous crop, Wheat.

Standard error per plot. Total tubers: 0.969 tons per acre or 9.7%, 20 d.f.

	Superphosphate 0	0.33	0.66	High temp. Phos.	Basic Slag	Super Slag	Mean
			±0.396				
Total tubers, tons per acre	9.48	10.08	10.08	10.24	9.86	10.04	9.96

1944 - Barley

Basal manuring: Sulphate of ammonia: 0.2 cwt. N per acre

Crop Notes

Seed sown: March 9. Harvested: Aug.14-16. Variety: Plumage Archer

Standard errors per plot:
Grain: 2.65 cwt. per acre or 11.2%, 35 d.f.
Straw: 2.72 cwt. per acre or 11.1%, 35 d.f.

Residual effects of

	Superphosphate 0	0.33	0.66	High temp. Phos.	Basic Slag	Super Slag	Mean
			±0.94				
Grain cwt. per acre	24.2	23.3	23.8	23.7	23.6	23.6	23.7
			±0.96				
Straw cwt. per acre	25.0	23.7	24.8	24.8	24.0	25.3	24.6

https://doi.org/10.23637/ERADOC-1-186 *pp 51*

POTATOES AND BARLEY

Sawyers I 1944 - 1945

Design; 6 randomized blocks of 8 plots each.

Area of each plot: 1944: 0.0111 acre
1945: 0.0104 acre

1944 - Potatoes

Treatments

Phosphates: None, superphosphate, high temperature phosphate, and basic Bessemer slag
Levels: 0.33 and 0.66 cwt. P_2O_5 per acre

Basal manuring: Sulphate of ammonia: 0.6 cwt N per acre
Muriate of potash: 1.0 cwt K_2O per acre

Crop Notes

Potatoes planted: April 14-17. Lifted: Sept. 29
Variety: Majestic Previous crop, Wheat

Standard error per plot: Total tubers: 0.97 tons per acre or 8.4%, 36 d.f.

Total tubers: tons per acre

Cwt. P_2O_5 per acre	0.33	0.66	Mean
		±0.40	±0.28
No phosphate			10.76
Superphosphate	12.13	11.27	11.70
H.T.P.	11.88	12.32	12.10
Bessemer slag	11.21	11.91	11.56
Mean ±0.23	11.74	11.83	11.53[a]

Mean (a) of all plots.

https://doi.org/10.23637/ERADOC-1-186

J/4

Potatoes and Barley - Sawyer's

1945 - Barley

Basal manuring: Sulphate of ammonia: 0.2 cwt. N per acre

Seed sown: March 14. Harvested: Aug.17
Variety: Plumage Archer

Standard errors per plot:
Grain: 1.88 cwt. per acre or 5.9%, 36 d.f.
Straw: 2.50 cwt. per acre or 6.6%, 36 d.f.

Residual effects

Cwt. P_2O_5	No phosphates	Super	H.T.P.	Basic Bessemer Slag	Mean
		Grain: cwt. per acre			
		±0.77			±0.44
0.33		31.5	31.3	30.2	31.0
0.66		32.5	33.1	32.7	32.8
Mean ±0.54	31.0	32.0	32.2	31.4	31.7[a]
		Straw: cwt. per acre			
			±1.02		±0.59
0.33		37.8	37.9	35.2	37.0
0.66		40.5	38.7	37.9	39.0
Mean ±0.72	38.6	39.2	38.3	36.6	38.1[a]

Means (a) of all plots.

https://doi.org/10.23637/ERADOC-1-186

TURNIPS

Appletree 1941

Design; 4 randomized blocks of 12 plots each
Area of each plot; 0.00055 acre

Treatments

Types of phosphate; Superphosphate, Basic slag, High temperature phosphates RR1 and RR3F, Metaphosphate

Levels; None, 0.5, 1.0 cwt P_2O_5 per acre

Basal manuring; 0.4 cwt N per acre as Sulphate of ammonia and 0.5 cwt. K_2O as Muriate of potash

Crop Notes

Sown, Sept. 4 Harvested, Dec.17 Variety, Green Globe

Previous crop, Permanent grass

Standard error per plot, 1.196 tons per acre or 10.2%, 34 d.f.

Roots; tons per acre

Cwt.P_2O_5 per acre	None	0.5	1.0	Mean
		±0.598		±0.423
Superphosphate		12.11	12.80	12.46
Basic slag		11.67	12.05	11.86
H.T. RR1		12.48	12.07	12.28
H.T. RR3F		11.79	12.80	12.30
Metaphosphate		11.79	12.05	11.92
Mean ±0.267	9.57[a]	11.97	12.36	11.73[b]

Standard error (a) 0.423

Mean (b) of all plots.

https://doi.org/10.23637/ERADOC-1-186

J/6

TURNIPS

Appletree 1941

Design; 4 randomized blocks of 10 plots each

Area of each plot; 0.00055 acre

Treatments

Types of phosphate; Superphosphate, Florida, Curacao, Gafsa

Levels; None, 0.25 (Superphosphate only), 0.5, 1.0 cwt. P_2O_5 per acre

Basal manuring; 0.6 cwt. N per acre as Sulphate of ammonia and 0.5 cwt. K_2O per acre as Muriate of potash.

Crop Notes

Sown, Sept. 4 Harvested, Dec.17 Variety, Green Globe

Previous crop, Permanent Grass

Standard error per plot, 1.064 tons per acre or 10.8%, 27 d.f.

Roots; tons per acre

Cwt. P_2O_5 per acre	None	0.25	0.5	1.0	Mean
			±0.532		
Superphosphate		9.34	10.92	11.22	11.07[b]
Florida			9.12	9.72	9.42
Gafsa			10.15	10.19	10.17
Curacao			10.25	9.44	9.84
Mean ±0.266	8.33[a]		10.11	10.14	9.87[c]

Standard error (a) 0.532

Means (b) of 0.5 and 1.0 P_2O_5 levels only, (c) of all plots.

https://doi.org/10.23637/ERADOC-1-186 *pp 55*

TURNIPS

Deacon's Field 1942

Design; 4 randomized blocks of 20 plots each

Area of each plot; 0.0024 acre

Treatments

None, 0.3 and 0.6 cwt. P_2O_5 each of superphosphate, basic slag, calcium metaphosphate, "Metaphos" and triple superphosphate.

Triple superphosphate only; Powdered and granular

Broadcast and placed below drills

Basal manuring; 3 cwt. sulphate of ammonia and 1 cwt. muriate of potash per acre

Crop Notes

Sown, Aug. 18 Lifted, December. Variety, Pomeranian White. Previous crop (in 1942), Spring Wheat

Standard errors per plot: Roots, 0.449 tons per acre or 14.9%, 60 d.f.

Tops, 0.865 tons per acre or 13.0%, 60 d.f.

https://doi.org/10.23637/ERADOC-1-186 *pp 56*

J/8

Turnips - Deacon's

P_2O_5, cwt. per acre	Roots, tons per acre			Tops, tons per acre		
	0.3	0.6	Mean	0.3	0.6	Mean
	±0.224		±0.159	±0.432		±0.306
None			2.96[a]			6.62[b]
Superphosphate	3.15	3.22	3.19	6.32	6.65	6.49
Basic slag	2.66	2.95	2.81	6.56	6.93	6.74
Calcium metaphosphate	2.90	2.99	2.95	6.74	6.93	6.84
"Metaphos"	2.74	2.95	2.84	5.67	6.79	6.23
Triple superphosphate	2.92[a]	3.28[a]	3.10[c]	6.63[b]	6.80[b]	6.72[d]
Mean	2.89	3.15	3.01[e]	6.48	6.81	6.64[e]

Means of 2 levels of triple superphosphate

	Broadcast	Below drills	Mean	Broadcast	Below drills	Mean
	±0.158		±0.112	±0.305		±0.216
Powdered	2.83	3.05	2.94	6.34	6.82	6.58
Granular	3.09	3.41	3.25	6.56	7.14	6.85
Mean	2.96[a]	3.23[a]	3.10	6.45[b]	6.98[b]	6.72

Standard errors (a) 0.112 (b) 0.216 (c) 0.079 (d) 0.153

Means (e) of all plots

https://doi.org/10.23637/ERADOC-1-186 *pp 57*

SWEDES AND WHEAT

Delharding 1942 - 1943

Design; 5 x 5 Lattice square in 3 replicates

Area of each plot: 1942 0.0100 acre
1943 0.0125 acre

1942 - Swedes

Treatments

None, superphosphate at 0.25, 0.50, 0.75 and 1.00cwt. P_2O_5 per acre and the following fertilizers at 0.50 and 1.00 cwt. P_2O_5 per acre, Bessemer slag, Curacao rock phosphate (65% through 100 mesh), Curacao rock phosphate (85% through 100 mesh), Gafsa rock phosphate (85% through 100 mesh), metaphosphate, high temperature phosphates A, B, C and D.

Basal manuring: Sulphate of ammonia: 0.4 cwt. N per acre
Muriate of potash: 0.5 cwt. K_2O per acre

Crop Notes

Seed sown: May 22 Harvested: Nov. 4-9
Variety: Magnificent Previous crop, Permanent grass

Standard errors per plot:
Roots, 1.38 tons per acre or 12.1%, 24 d.f.

Plant numbers, 2.89 thousands per acre or 14.2%, 24 d.f.

About one-third of the roots in this experiment were body rotted as a result of infection with Bacterium carotovorium; half the roots were in some measure affected.

https://doi.org/10.23637/ERADOC-1-186

J/10

Swedes and Wheat - Delharding

1942 - Swedes

Cwt. P_2O_5 per acre	0.25	0.50	0.75	1.00	Mean
		Roots tons per acre			
		±0.800			±0.565
No phosphatic fertilizer		8.03[a]			8.03[a]
Superphosphate	10.19	11.01	10.81	12.83	11.92[c]
Bessemer slag		10.96		13.75	12.36
Curacao rock phosphate (coarse)		10.95		12.35	11.65
Curacao rock phosphate (fine)		11.24		13.14	12.19
Gafsa rock phosphate (fine)		10.98		14.02	12.50
Metaphosphate		9.96		12.10	11.03
High temperature phosphate A		10.77		13.33	12.05
High temperature phosphate B		12.02		13.07	12.54
High temperature phosphate C		11.12		11.67	11.39
High temperature phosphate D		11.92		13.87	12.89
Mean ±0.253		11.09		13.01	11.45[d]
		Plant number thousands per acre			
		±1.67			±1.18
No phosphatic fertilizer		19.6[b]			19.6[b]
Superphosphate	20.3	21.4	21.5	21.8	21.6[c]
Bessemer slag		20.7		21.1	20.9
Curacao rock phosphate (coarse)		20.4		20.8	20.6
Curacao rock phpsphate (fine)		20.1		21.2	20.6
Gafsa rock phosphate (fine)		20.7		20.4	20.6
Metaphosphate		19.8		19.0	19.4
High temperature phosphate A		19.9		20.8	20.4
High temperature phosphate B		20.4		19.7	20.0
High temperature phosphate C		20.0		18.9	19.4
High temperature phosphate D		20.1		20.8	20.4
Mean ±0.528		20.4		20.5	20.3[d]

Standard errors (a) 0.462, (b) 0.963

Means (c) of 0.5 and 1.0 cwt. P_2O_5 levels only, (d) of all plots.

https://doi.org/10.23637/ERADOC-1-186

1943 - Wheat

Basal manuring: Sulphate of ammonia, 0.45 cwt. N per acre

Crop Notes

Seed sown: Nov. 19. Harvested: Aug. 9 Variety: Wilma

Standard errors per plot:
Grain: 1.66 cwt. per acre or 5.6%, 24 d.f.
Straw: 2.48 cwt. per acre or 4.2%, 24 d.f.

Cwt. P_2O_5 per acre		0.25	0.50	0.75	1.00	Mean
Grain: cwt. per acre						
			±0.956			±0.676
No phosphatic fertilizer			27.6[a]			27.6[a]
Superphosphate		29.4	29.7	29.1	30.0	29.8[c]
Bessemer slag			29.7		30.3	30.0
Curacao rock phosphate (coarse)			29.8		30.6	30.2
Curacao rock phosphate (fine)			29.0		30.2	29.6
Gafsa rock phosphate (fine)			29.5		32.4	31.0
Metaphosphate			29.5		30.9	30.2
High temperature phosphate A			28.7		30.4	29.6
High temperature phosphate B			28.7		31.6	30.2
High temperature phosphate C			28.2		28.0	28.1
High temperature phosphate D			29.9		30.6	30.2
Mean	±0.302		29.3		30.5	29.6[d]
Straw: cwt. per acre						
			±1.43			±1.01
No phosphatic fertilizer			55.6[b]			55.6[b]
Superphosphate		57.6	58.9	59.7	58.0	58.4[c]
Bessemer slag			57.6		57.4	57.5
Curacao rock phosphate (coarse)			53.9		60.6	57.2
Curacao rock phosphate (fine)			58.9		59.6	59.2
Gafsa rock phosphate (fine)			55.1		60.9	58.0
Metaphosphate			60.5		61.9	61.2
High temperature phosphate A			59.0		60.6	59.8
High temperature phosphate B			58.9		61.7	60.3
High temperature phosphate C			57.8		59.9	58.8
High temperature phosphate D			59.0		61.2	60.1
Mean	±0.453		58.0		60.2	58.6[d]

Standard errors: (a) 0.553 (b) 0.826

Means (c) of 0.5 and 1.0 cwt. P_2O_5 levels only, (d) of all plots

https://doi.org/10.23637/ERADOC-1-186

SWEDES AND BARLEY

Sawyers II 1943-1944

Design: 5 x 5 lattice square in 3 replicates.

Area of each plot: 0.00979 acre

1943 - Swedes

Treatments

None, superphosphate and high temperature phosphate at 0.16, 0.33, 0.66 and 1.00 cwt. P_2O_5 per acre, basic slag (Bessemer), super slag product, super-lime product, super-serpentine product, super-mineral phosphate (cold mix), super-mineral phosphate (hot mix), Morocco mineral phosphate, all at 0.33 and 0.66 cwt. P_2O_5 per acre.

Basal manuring. Sulphate of ammonia: 0.4 cwt. N per acre
Muriate of potash: 0.5 cwt. K_2O per acre

The crop failed, after three sowings, because of attack by flea beetle. The 1944 results are not included in the published report on the Phosphate Series (see page J/1).

https://doi.org/10.23637/ERADOC-1-186

1944 - Barley

Basal Manuring: Sulphate of ammonia. 0.2 cwt. N per acre

Crop Notes

Seed sown: March 9. Harvested Aug. 14 Variety: Plumage Archer

Standard errors per plot:
Grain: 2.52 cwt. per acre or 8.9%, 24 d.f.
Straw: 1.54 cwt. per acre or 6.0%, 24 d.f.

	Cwt. P_2O_5 per acre 0.16	0.33	0.66	1.00	Mean
Grain: cwt. per acre		±1.45			±1.03
No phosphatic fertilizer					27.5[a]
Superphosphate	29.3	27.3	28.6	29.9	28.0[g]
High temperature phosphate	29.1	27.1	29.1	30.1	28.1[g]
Basic slag (Bessemer)		30.4	28.4		29.4
Super slag product		27.9	26.9		27.4
Super lime product		28.5	30.1		29.3
Super serpentine product		28.9	27.0		28.0
Super min.phosph. (cold mix)		29.1	28.1		28.6
Super min.phosp. (hot mix)		28.4	29.3		28.8
Morroco min. phosph.		28.6	25.4		27.0
Mean	29.2[b]	28.5[c]	28.1[c]	30.0[b]	28.4[h]
Straw: cwt. per acre		±0.89			±0.63
No phosphatic fertilizer					24.5[d]
Superphosphate	25.1	24.5	26.7	27.0	25.6[g]
High temperature phosphate	25.7	23.3	26.4	27.6	24.8[g]
Basic slag (Bessemer)		26.1	25.9		26.0
Super slag product		23.5	25.1		24.3
Super lime product		25.5	27.5		26.5
Super serpentine product		29.3	24.3		26.8
Super min.phosph. (cold mix)		27.3	26.3		26.8
Super min.phosph. (hot mix)		25.8	24.4		25.1
Morroco min.phosph.		25.9	22.0		24.0
Mean	25.4[e]	25.7[f]	25.4[f]	27.3[e]	25.5[h]

Standard errors (a) 0.84, (b)1.03, (c) 0.48, (d) 0.51, (e) 0.63 (f) 0.30

Means (g) of 0.33 and 0.66 P_2O_5 levels only, (h) of all plots

61

https://doi.org/10.23637/ERADOC-1-186

J/14

SWEDES AND BARLEY

Sawyers I 1944 - 1945

Design: 8 x 8 Latin square.

Area of each plot: 1944 0.00556 acre
1945 0.00602 acre

1944 - Swedes

Treatments

Phosphates: None, superphosphate, high temperature phosphate and basic Bessemer slag
Levels: 0.33 and 0.66 cwt. P_2O_5 per acre

Basal manuring: Sulphate of ammonia: 0.4 cwt. N per acre
Muriate of potash: 0.5 cwt. K_2O per acre

Crop Notes

Seed sown: June 2. Harvested: Nov. 23
Variety: New Magnificent Previous crop, Wheat

Standard errors per plot: Roots, 0.962 tons per acre or 9.0%, 43 d.f.
Tops, 0.302 tons per acre or 14.9%, 43 d.f.
Plant number, 1.90 thousands per acre or 6.0%, 43 d.f.

Cwt. P_2O_5 per acre	Roots: tons per acre			Tops: tons per acre			Plant No. thous. per acre		
	0.33	0.66	Mean	0.33	0.66	Mean	0.33	0.66	Mean
	±0.34		±0.24	±0.11		±0.076	±0.67		±0.48
No phosphates			6.41			1.38			27.6
Superphosphate	11.45	13.16	12.30	2.03	2.48	2.26	32.2	33.2	32.7
H.T.P.	10.83	13.23	12.03	1.81	2.46	2.14	32.5	33.1	32.8
Bessemer Slag	11.11	12.80	11.96	2.01	2.63	2.32	32.6	33.0	32.8
Mean	11.13	13.06	10.67[a]	2.92	2.52	2.02[a]	32.4	33.1	31.5[a]
	±0.20			±0.062			±0.39		

Means (a) of all plots

https://doi.org/10.23637/ERADOC-1-186 *pp 63*

1945 - Barley

Basal manuring: Sulphate of ammonia: 0.2 cwt. N per acre

Crop Notes

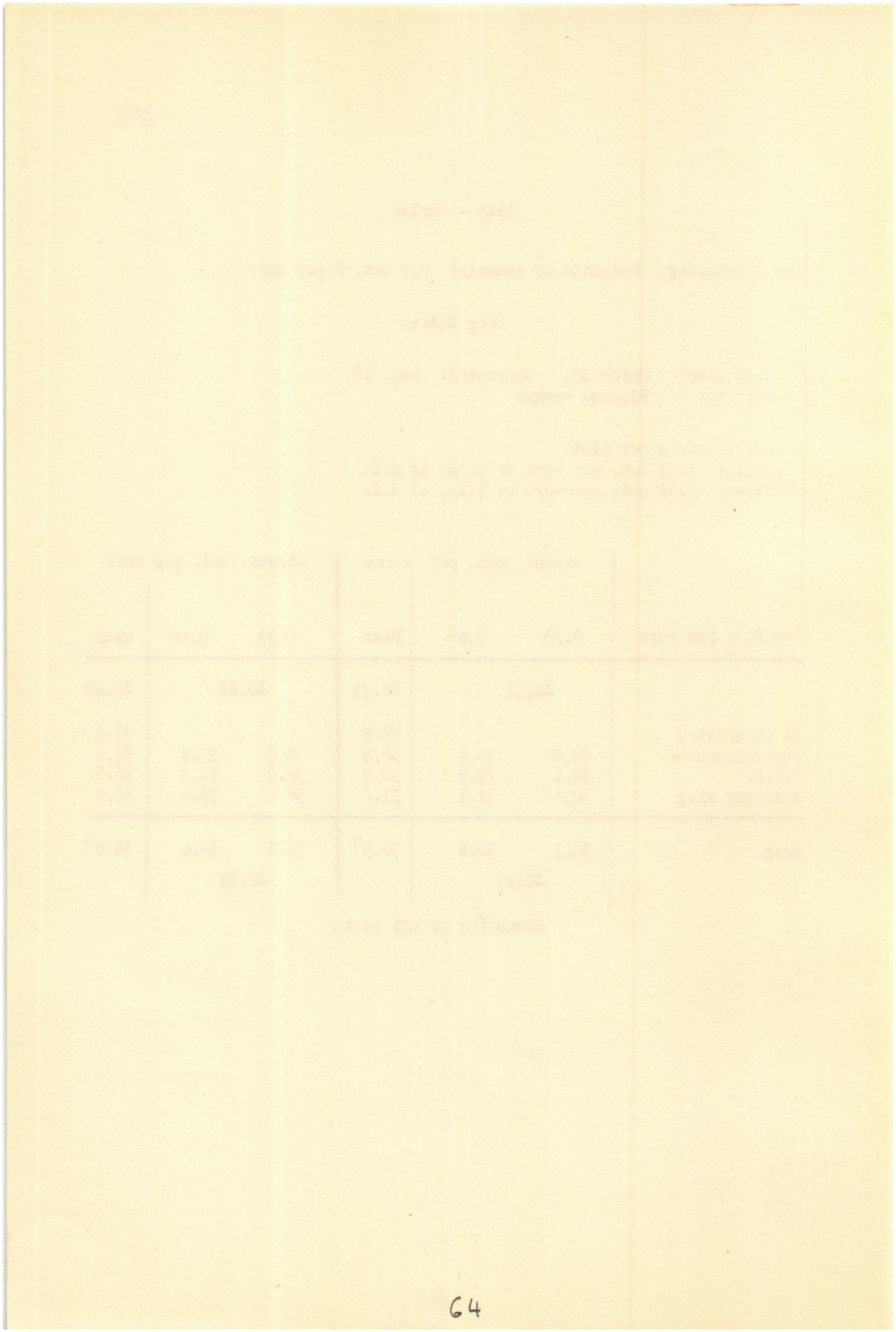
Seed sown: March 15. Harvested: Aug. 18
Variety: Plumage Archer

Standard errors per plot:
Grain: 1.31 cwt. per acre or 4.3%, 43 d.f.
Straw: 1.92 cwt. per acre or 5.2%, 43 d.f.

	Grain: cwt. per acre			Straw: cwt. per acre		
Cwt. P_2O_5 per acre	0.33	0.66	Mean	0.33	0.66	Mean
	±0.46		±0.33	±0.68		±0.48
No phosphates			29.9			37.5
Superphosphate	30.8	30.9	30.8	36.5	35.9	36.2
H.T.P.	30.4	29.9	30.2	36.0	37.3	36.6
Bessemer slag	30.8	31.1	31.0	36.4	36.0	36.2
Mean	30.7	30.6	30.5[a]	36.3	36.4	36.6[a]
	±0.27			±0.39		

Means (a) of all plots

https://doi.org/10.23637/ERADOC-1-186



https://doi.org/10.23637/ERADOC-1-186

WHEAT

Observations on the incidence of Cercosporella herpotrichoides Fron. (Eyespot), and other diseases and pests, were taken on all wheat experiments, of which some were ordinary variety and fertilizer trials and some were specially laid down to test the effects of various treatments for the control of Eyespot.

The figures for percentage Eyespot infection are transformed to degrees for the purpose of analysis, and the mean percentages shown are derived from the transformed data.

Pennell's Piece and West Barnfield, 1941

Effects of rates and times of application of sulphate of ammonia on yield and extent of lodging of three varieties of wheat.

Design: 3 randomized blocks of 3 plots each, the plots being split into 3 for different rates and times of application of fertilizer, with confounding according to a Greco-Latin design.

Area of each sub-plot: Pennell's Piece, 0.0667 acre: W. Barnfield 0.0250 acre.

Treatments

Varieties; Desprez 80, Wilma, Red Standard

Sulphate of ammonia; 0.0, 0.3, 0.6 cwt. N per acre

Times of application of S/A; Early (early March), half early and half late, and late (middle May).

Crop Notes

	Pennell's Piece	West Barnfield
Sown	Oct. 26	Nov. 27
Harvested	Aug. 21	Sept. 1
Previous crop	Wheat	Spring oats

A third experiment of the same type was carried out at Woburn, but on account of bird damage and other causes, yields were very irregular; experimental errors were too high to allow any reliable results to be presented.

https://doi.org/10.23637/ERADOC-1-186

K/2

Wheat - Pennell's Piece and W.Barnfield, 1941

Pennell's Piece

Variety	Desprez 80	Wilma	Red Standard	Mean
Grain, cwt. per acre ±0.65	18.4	15.0	14.4	15.9
Straw, cwt. per acre ±1.13	30.4	34.3	37.6	34.1
% Lodging in August	4	23	49	25
Percentage Eyespot at harvest	76	76	85	79
Cwt. N. per acre	0.0	0.3	0.6	Mean
Grain, cwt. per acre ±0.65	11.9	16.3	19.7	15.9
Straw, cwt. per acre ±1.13	26.5	34.0	41.7	34.1
% Lodging in August	22	20	34	25
Percentage Eyespot at harvest	79	81	79	79

Nitrogen applied	Early	Half early, half late	Late	Mean
Grain, cwt. per acre ±0.65	15.8	16.4	15.6	15.9
Straw, cwt. per acre ±1.13	35.3	33.8	33.1	34.1
% Lodging in August	36	18	21	25
Percentage Eyespot at harvest	83	79	75	79

Standard errors per plot (pooled whole-plot and sub-plot errors)

Grain	1.95 cwt. per acre or 12.2%, 14 d.f.
Straw	3.39 cwt. per acre or 10.0%, 14 d.f.

https://doi.org/10.23637/ERADOC-1-186

West Barnfield

Variety	Desprez 80	Wilma	Red Standard	Mean
Grain, cwt. per acre ±0.88	27.0	27.4	23.2	25.8
Straw, cwt. per acre ±1.77	30.6	36.5	34.5	33.9
% Lodging in August	0	34	72	35
Percentage Eyespot at harvest		None		
Cwt. N per acre	0.0	0.3	0.6	Mean
Grain, cwt. per acre ±0.88	24.7	26.7	26.0	25.8
Straw, cwt. per acre ±1.77	30.6	34.1	37.0	33.9
% Lodging in August	28	37	41	35
Percentage Eyespot at harvest		None		
Nitrogen applied	Early	Half early, half late	Late	Mean
Grain, cwt. per acre ±0.88	25.2	26.2	26.2	25.8
Straw, cwt. per acre ±1.77	34.4	34.0	33.1	33.9
% Lodging in August	36	34	36	35
Percentage Eyespot at harvest		None		

Standard errors per plot (pooled whole plot and sub-plot errors)

Grain 2.63 cwt. per acre or 10.2%, 13 d.f.

Straw 5.31 cwt. per acre or 15.7%, 13 d.f.

https://doi.org/10.23637/ERADOC-1-186 *pp 68*

K/4

WHEAT

Pennell's Piece, 1942

Effects of two rates of application of sulphate of ammonia to ten varieties of wheat.

Design; 4 randomized blocks of 10 plots each, the plots being split into two for rate of application of fertilizer.

Area of each plot; Plots of varying sizes in the different blocks, from 0.004 to 0.006 acre per sub-plot.

Treatments

Varieties; Red Standard, Desprez 80, Rampton Rivett, Steadfast, Holdfast, Garton's 60, Juliana, Little Joss, Cotes d'Or, Vilmorin.

Sulphate of ammonia; 0.4, 0.8 cwt. N per acre.

Basal Manuring; 3 cwt. per acre superphosphate.

Crop Notes

Sown; Nov. 27. Harvested; Aug. 17.

Previous crop; Wheat.

https://doi.org/10.23637/ERADOC-1-186

Variety	Grain: cwt. per acre Mean	Response to N	Straw: cwt. per acre Mean	Response to N
	±1.14	±1.60		
Red Standard	25.9	-0.6	46.2	3.6
Desprez 80	32.5	4.3	43.6	7.9
Rampton Rivett	26.6	4.1	60.3	-2.6
Steadfast	27.1	1.5	45.4	6.9
Holdfast	27.8	6.3	45.4	9.2
Garton's 60	27.3	1.4	40.8	-0.7
Juliana	30.1	1.7	48.5	3.8
Little Joss	25.0	1.2	48.2	-0.5
Cotes d'Or	27.1	2.3	44.8	6.0
Vilmorin	33.2	3.2	55.4	9.5
Mean	28.3	2.5	47.9	4.3
		±0.51		

	Percentage Eyespot Transformed Mean	Response to N	Percentage Eyespot Mean	Response to N
	±2.33	±4.41		
Red Standard	26.5	2.2	20	3
Desprez 80	21.9	-2.6	14	-4
Rampton Rivett	20.2	-5.6	12	-6
Steadfast	21.4	-4.4	13	-5
Holdfast	29.2	0.4	24	0
Garton's 60	24.4	-3.1	17	-4
Juliana	27.0	-6.9	21	-10
Little Joss	25.2	-4.8	18	-6
Cotes d'Or	27.1	3.6	21	5
Vilmorin	21.4	-3.6	13	-5
Mean	24.4	-2.5	17	-3
		±1.39		

Standard errors per Plot:

Grain, per whole plot, 2.28 cwt. per acre or 8.1%, 27 d.f.
per sub-plot, 2.27 cwt. per acre or 8.0%, 28 d.f.

Transformed Percent: Eyespot

per whole plot, 4.66, 27 d.f.
per sub-plot, 6.24, 28 d.f.

https://doi.org/10.23637/ERADOC-1-186

K/6

WHEAT

Foster's 1943

Effect on the yield and Eyespot infection of sulphuric acid spraying on four varieties, sulphate of ammonia applied in early and late spring, and time of sowing.

Design; 8 randomized blocks of 8 plots each, the plots being split in half for applications of sulphate of ammonia. Spraying effects and certain high-order interactions confounded with block differences.

Area of each sub-plot; 0.0125 acre.

Treatments

On blocks; Untreated, sprayed with sulphuric acid (100 gallons per acre 10% B.O.V.) immediately after second sowing date and before emergence of plants (S), sprayed with sulphuric acid as above after raking off stubble (RS), inoculated with stubble raked off blocks receiving the RS treatment (I).

On plots;

Varieties: Red Standard (R), Juliana (W), Vilmorin (V), Desprez 80 (D).
Time of sowing: Early (Oct.), late (Nov.)

On sub-plots;

Sulphate of ammonia: None, 0.6 cwt. N per acre
Time of application of S/A: Early spring (E), late spring (L), half early and half late (EL).

Crop Notes

Stubble raked off RS plots and spread on I plots, Sept. 17.
Seed sown, Oct. 9 or Nov. 13. Harvested: Aug. 6
Previous crop: Barley.

Standard errors per plot:

Grain: Per block, 1.86 cwt. per acre or 10.5%, 4 d.f.
per whole plot, 1.58 cwt. per acre or 9.0%, 27 d.f.
per sub-plot, 1.41 cwt. per acre or 8.0%, 18 d.f.

Straw: Per block, 0.81 cwt. per acre or 3.3%, 4 d.f.
per whole plot, 2.42 cwt per acre or 9.9%, 27 d.f.
per sub-plot, 2.38 cwt. per acre or 9.8%, 18 d.f.

Transformed Percent. Eyespot: per block 2.22, 4 d.f.
per whole plot, 4.58, 27 d.f.
per sub-plot, 11.67, 18 d.f.

https://doi.org/10.23637/ERADOC-1-186

Grain, cwt. per acre

	Mean	Variety R	W	V	D	Late-Early Sowing	O	I	S	RS
	(a)&(b)	(c)&(d)				(c)&(d)	(c)&(d)			
O	14.0	14.2	13.9	13.2	14.9	-0.7	12.6	13.1	14.6	15.9
E	20.0	19.8	18.1	20.9	21.3	-1.3	18.3	18.3	22.2	21.4
L	17.4	17.8	17.3	16.7	17.7	-0.1	14.8	16.9	18.2	19.7
EL	19.2	20.6	17.8	18.0	20.5	-2.0	16.3	19.2	19.7	21.6
		±0.40				±0.40				
Mean	17.7	18.1	16.8	17.2	18.6	-1.0				
Late-Early Sowing		±0.79								
		0.0	-2.4	-0.6	-1.0					
	±1.32	±0.79				±0.79				
O	15.5	16.7	14.8	14.5	16.0	-0.3				
I	16.9	18.6	15.0	15.3	18.5	-0.8				
S	18.7	18.4	17.8	18.5	19.9	-1.7				
RS	19.6	18.5	19.5	20.6	19.9	-1.3				

(a) 0.25 (c) 0.50 for use in comparisons of E v. L and O v. EL only
(b) 0.98 (d) 1.95 for use in all other within-block comparisons

Straw, cwt. per acre

	Mean	R	W	V	D	Late-Early Sowing	O	I	S	RS
	(a)&(b)	(c)&(d)				(c)&(d)	(c)&(d)			
O	18.5	20.3	18.9	16.4	18.7	-0.3	19.2	17.7	18.3	19.1
E	30.0	32.8	29.4	29.4	28.3	-1.3	30.3	27.7	30.7	31.1
L	22.1	23.7	22.6	20.8	21.2	-0.2	20.2	22.0	22.3	23.7
EL	26.8	31.6	24.9	24.1	26.5	-2.5	25.3	27.3	26.0	28.6
		±0.60				±0.60				
Mean	24.3	27.1	23.9	22.7	23.7	-1.1				
Late-Early Sowing		±1.21								
		-1.5	-1.4	-0.6	-1.0					
	±0.57	±1.21				±1.21				
O	23.8	28.3	23.5	21.2	22.0	-1.5				
I	23.7	27.4	21.2	21.7	24.4	-1.4				
S	24.3	25.8	24.5	23.2	23.7	-1.0				
RS	25.6	26.8	26.5	24.6	24.7	-0.6				

Standard Errors

(a) 0.42 (c) 0.84 for use in vertical comparisons of E v. L and O v. EL only.
(b) 0.59 (d) 1.18 for use in all other within-block comparisons

Standard errors shown for the block treatments O, I, S, RS are for use in within-block comparisons, except for the S.E.'s shown for the means of these treatments.

https://doi.org/10.23637/ERADOC-1-186 *pp 72*

K/8

Wheat - Foster's 1943

Transformed Percentage Eyespot

	Mean	Variety R	W	V	D	Late Early Sowing	Late-Early Sowing O	I	S	RS
	(a)&(b)		(c)&(d)			(c)&(d)		(c)&(d)		
O	49.2	52.7	49.6	49.4	45.2	2.1	51.9	49.3	46.8	49.0
E	53.7	55.0	55.0	53.1	51.6	1.4	55.5	54.4	50.7	54.1
L	50.5	51.0	49.8	48.1	53.2	1.0	54.0	48.9	49.7	49.5
EL	52.2	56.0	53.4	50.6	48.8	3.0	54.8	52.7	49.1	52.2
			±1.15			±1.15				
Mean	51.4	53.7	52.0	50.3	49.7	1.8				
Late-Early Sowing		3.4	±2.29 2.1	1.4	0.6					
	±1.57		±2.29			±2.29				
O	54.1	59.4	52.6	52.9	51.4	-0.1				
I	51.3	52.6	53.0	49.4	50.3	0.2				
S	49.1	50.8	49.8	48.4	47.4	3.1				
RS	51.2	52.0	52.5	50.6	49.7	4.1				

Standard errors

(a) 2.06 (c) 4.12 for use in vertical comparisons of E v. L and O v. EL only

(b) 1.38 (d) 2.75 for use in all other within -block comparisons

Percentage Eyespot

	Mean	R	W	V	D	Late-Early Sowing	O	I	S	RS
O	57.3	63.3	58.0	57.7	50.3	3.6	62.0	57.5	53.2	57.0
E	65.0	67.1	67.1	64.0	61.4	2.4	67.9	66.2	59.8	65.7
L	59.5	60.3	58.3	55.4	64.2	1.6	65.5	56.8	58.2	57.8
EL	62.5	68.7	64.5	59.7	56.7	5.2	66.8	63.3	57.2	62.5
Mean	61.0	65.0	62.2	59.2	58.2	3.2				
Late-Early Sowing		5.5	3.6	2.3	1.0					
O	65.7	74.1	63.2	63.7	61.0	-0.2				
I	60.8	63.2	63.8	57.7	59.2	0.3				
S	57.2	60.0	58.3	56.0	54.2	5.4				
RS	60.7	62.2	63.0	59.7	58.2	7.0				

Standard errors shown for the block treatments O, I, S, RS are for use in within-block comparisons, except for the S.E. shown for the means of these treatments.

https://doi.org/10.23637/ERADOC-1-186 *pp 73*

WHEAT

Little Knott, 1944-1946

The interrelationship of Eyespot infection, time of sowing, and sulphate of ammonia for four varieties.

Design; 4 randomized blocks of 8 plots each, plots split for sulphate of ammonia, with certain interactions confounded with block differences.

Area of each sub-plot; 0.0167 acre.

Treatments

To blocks in 1944 season only; Inoculation; none, inoculated with stubble infected with Eyespot.
To blocks in 1946 only; none, sulphuric acid spray in March (100 gal. per acre 12½% B.O.V.)
To whole plots; Varieties, Red Standard (R), Wilma (W), Vilmorin (V), Desprez 80 (D). Time of sowing; Early, Late.
To sub-plots; Sulphate of Ammonia, none, 0.8 cwt. N per acre applied in Mid-March (E), Mid-May (L), half-early and half-late (EL).

Crop Notes

	Early Sown	Late	Harvested	
1944	20/10/43	16/11/43	Aug. 11	(Previous crop, Wheat)
1945	25/10/44	30/11/44	Aug. 21	
1946	13/10/45	7/11/45	Aug. 24	

Standard errors;		per whole plot	sub-plot (cwt. per acre)
1944	Grain	2.98 or 9.1%, 13 d.f.	2.51 or 7.6%, 20 d.f.
	Straw	4.43 or 8.6%, 13 d.f.	4.50 or 8.8%, 20 d.f.
	Transformed % Eyespot	2.43, 13 d.f.	4.16, 20 d.f.
1945	Grain	2.19 or 6.7%, 13 d.f.	1.87 or 5.7%, 19 d.f.
	Straw	2.83 or 4.7%, 13 d.f.	2.45 or 4.0%, 19 d.f.
	Transformed % Eyespot	5.73, 13 d.f.	7.34, 20 d.f.
1946	Grain	2.56 or 8.1%, 12 d.f.	2.35 or 7.4%, 18 d.f.
	Straw	3.79 or 6.3%, 13 d.f.	2.63 or 4.4%, 20 d.f.
	Transformed % Eyespot	6.73, 12 d.f.	5.38, 18 d.f.

https://doi.org/10.23637/ERADOC-1-186

K/10

Wheat - Little Knott, 1944-46

Grain, cwt. per acre

Time of applicn. of N	Mean	R	W	V	D	Late-early sowing	Inocn. effect	Spraying effect
	(a)&(b)			1944 (c)&(d)		(c)&(d)	(c)&(d)	(c)&(d)
0	32.9	35.5	30.3	31.7	34.0	-3.9	1.3	
E	32.7	34.9	32.6	31.5	31.7	-5.6	-0.8	
L	33.2	35.5	32.1	32.3	33.1	-5.9	-1.9	
EL	32.6	32.9	31.5	32.5	33.4	-3.4	2.0	
				1945				
0	31.9	31.0	30.8	30.6	35.3	0.2	0.3	
E	32.5	31.7	28.7	35.1	34.4	-1.6	1.9	
L	33.6	35.0	29.9	33.9	35.7	-0.9	0.6	
EL	33.5	32.7	28.3	35.4	37.7	-0.7	1.1	
				1946				
0	29.9	27.6	32.4	27.5	32.2	1.3	-4.3	1.3
E	31.2	26.3	40.5	30.9	26.9	-2.9	1.3	-1.1
L	33.0	30.3	39.3	32.4	30.1	-3.7	-1.7	-2.3
EL	31.9	29.7	35.1	33.2	29.6	-1.2	-0.2	-0.7

Variety	Mean	Late-early sowing	Inoculation effect	Spraying effect
		1944		
	±1.05	±2.11	±2.11	
R	34.7	1.0	-3.0	
W	31.6	-3.8	-0.6	
V	32.0	-13.2	-0.8	
D	33.0	-3.1	4.9	
Mean	32.8	-4.8		
		1945		
	±0.77	±1.55	±1.55	
R	32.6	3.3	0.3	
W	29.4	-0.1	1.1	
V	33.8	2.2	-0.5	
D	35.8	-8.4	3.2	
Mean	32.9	-0.7		
		1946		
	±0.91	±1.81	±1.81	±1.81
R	28.4	2.5	-0.5	1.7
W	36.8	-0.3	-1.3	0.9
V	31.0	-1.0	-1.4	1.0
D	29.8	-7.6	-1.7	-6.4
Mean	31.5	-1.6		

Standard errors;

	1944	1945	1946
(a)	0.63	0.47	0.59
(b)	0.87	0.64	0.76
(c)	1.26	0.94	1.18
(d)	1.73	1.28	1.52

(a) and (c) are for use in vertical comparisons E v. L and 0 v. EL, (b) and (d) are for use in all other comparisons

Inoculation and spraying effects were confounded with block differences; the standard errors quoted are for use in vertical comparisons.

https://doi.org/10.23637/ERADOC-1-186

Straw, cwt. per acre

Time of applicn. of N	Mean	R	W	V	D	Late-early sowing	Inocn. effect	Spraying effect
	(a)&(b)		1944 (c)&(d)			(c)&(d)	(c)&(d)	(c)&(d)
0	51.5	53.9	53.1	44.1	55.0	-7.0	1.4	
E	51.5	53.0	59.4	44.0	49.5	-7.3	-2.8	
L	52.4	54.7	55.0	45.5	54.6	-10.1	-4.1	
EL	49.8	50.0	51.3	45.6	52.3	-10.0	3.3	
			1945					
0	54.9	54.9	56.4	54.3	54.0	- 0.2	4.2	
E	62.8	64.2	64.6	62.2	60.2	- 3.2	-2.0	
L	60.2	62.6	61.8	59.4	57.2	0.6	1.0	
EL	63.4	63.6	63.8	65.0	61.2	- 1.2	4.6	
			1946					
0	54.1	54.2	55.0	53.8	53.3	- 0.8	2.8	0.2
E	60.6	62.0	68.1	58.8	53.7	- 8.9	2.7	1.7
L	62.6	65.3	63.6	62.3	59.0	- 6.4	-0.1	-1.8
EL	62.0	62.4	65.3	60.4	60.1	- 5.5	3.9	-2.1

Variety	Mean	Late-early sowing	Inoculation effect	Spraying effect
		1944		
	±1.57	±3.14	±3.14	
R	52.8	0.4	-2.9	
W	54.6	-8.1	-0.5	
V	44.8	-19.8	0.2	
D	52.8	- 6.9	1.1	
Mean	51.2	- 8.6		
		1945		
	±1.00	±2.00	±2.00	
R	61.4	1.4	2.7	
W	61.7	-2.6	3.0	
V	60.2	-0.1	1.7	
D	58.2	-2.9	0.5	
Mean	60.4	-1.0		
		1946		
	±1.34	±2.68	±2.68	±2.68
R	61.0	-5.3	2.4	-0.9
W	63.0	-4.4	4.2	0.2
V	58.8	-7.3	1.7	3.3
D	56.6	-4.7	1.3	-4.5
Mean	59.8	-5.5		

Standard errors;

	1944	1945	1946
(a)	1.13	0.61	0.66
(b)	1.36	0.83	1.06
(c)	2.25	1.22	1.32
(d)	2.72	1.66	2.11

(a) and (c) are for use in vertical comparisons E v. L and O v. EL

(b) and (d) are for use in all other comparisons

Inoculation and spraying effects were confounded with block differences; the standard errors quoted are for use in vertical comparisons.

https://doi.org/10.23637/ERADOC-1-186

K/12

Wheat - Little Knott 1944-46

Transformed Percentage Eyespot infection at harvest

Time of applicn. of N	Mean	R	W	V	D	Late-early Sowing	Inocn. effect	Spraying effect
				1944				
	(a)&(b)	(c)&(d)				(c)&(d)	(c)&(d)	(c)&(d)
0	19.8	19.7	23.3	20.2	16.1	-2.7	23.8	
E	16.6	20.7	17.8	16.0	12.0	-0.6	21.6	
L	19.3	23.0	20.6	14.9	18.8	-5.2	26.4	
EL	17.2	21.3	17.1	15.3	14.9	-2.3	26.5	
				1945				
0	21.5	32.3	30.0	26.2	9.6	-21.2	12.1	
E	26.3	32.7	32.7	25.7	14.3	-17.9	3.3	
L	22.6	29.6	25.6	24.2	10.8	-16.4	1.1	
EL	24.7	33.2	35.9	14.9	14.7	-20.8	11.4	
				1946				
0	25.1	29.9	25.4	22.1	22.9	- 7.3	-3.9	-14.4
E	25.5	32.8	20.2	27.5	21.6	-16.3	-4.5	-8.7
L	22.2	33.3	18.6	18.7	18.2	-13.2	-1.2	-10.3
EL	24.1	29.0	23.8	23.4	20.2	-5.0	1.6	-5.0

Variety	Mean	Late-early sowing	Inocn. effect	Spraying effect
		1944		
	±0.86	±1.72	±1.72	
R	21.2	-3.8	28.8	
W	19.7	-1.8	31.4	
V	16.6	-3.5	19.1	
D	15.4	-1.7	19.1	
Mean	18.2	-2.7		
		1945		
	±2.03	±4.05	±4.05	
R	32.0	-25.5	8.9	
W	31.0	-19.7	12.1	
V	22.8	-20.1	6.1	
D	12.4	-11.1	0.7	
Mean	24.5	-19.1		
		1946		
	±2.38	±4.76	±4.76	±4.76
R	31.2	-14.1	3.1	-15.5
W	22.0	-12.2	1.8	-6.8
V	22.9	-9.0	-1.8	-3.8
D	20.7	-6.6	-11.1	-12.3
Mean	24.2	-10.4		

Standard Errors;

	1944	1945	1946
(a)	1.04	1.83	1.35
(b)	0.95	1.93	1.93
(c)	2.08	3.67	2.69
(d)	1.91	3.86	3.87

(a) and (c) are for use in vertical comparisons E v. L and 0 v. EL
(b) and (d) are for use in all other comparisons.

Inoculation and spraying effects were confounded with block differences; the standard errors quoted are for use in vertical comparisons

https://doi.org/10.23637/ERADOC-1-186

Percentage Eyespot at harvest

Time of applicn. of N	Mean	R	W	V	D	Late-early sowing	Inocn. effect	Spraying effect
				1944				
0	11.5	11.4	15.6	11.9	7.7	-3.0	25.9	
E	8.2	12.5	9.3	7.6	4.3	-0.6	20.1	
L	10.9	15.2	12.4	6.6	10.4	-5.6	27.8	
EL	8.7	13.2	8.6	7.0	6.6	-2.3	25.1	
				1945				
0	17.1	28.6	25.0	19.5	2.8	-27.2	15.8	
E	19.6	29.2	29.2	18.9	6.1	-24.4	4.6	
L	14.8	24.4	18.7	16.8	3.5	-20.0	1.4	
EL	17.4	30.0	34.3	6.6	6.4	-26.9	15.0	
				1946				
0	18.0	24.9	18.4	14.1	15.1	-9.7	-5.2	-19.2
E	18.6	29.3	11.9	21.3	13.6	-21.9	-6.1	-11.8
L	14.2	30.2	1[illegible].2	10.3	9.8	-16.0	-1.4	-12.5
EL	16.6	23.5	16.2	15.8	11.9	-6.4	2.1	-6.4

Variety	Mean	Late-early sowing	Inoculation effect	Spraying effect
			1944	
R	13.1	-4.5	32.4	
W	11.4	-2.0	33.0	
V	8.2	-3.4	18.0	
D	7.1	-1.5	16.8	
Mean	9.8	-2.8		
			1945	
R	28.1	-38.7	13.9	
W	26.5	-29.7	18.4	
V	15.0	-24.5	7.6	
D	4.6	-8.0	0.5	
Mean	17.1	-24.8		
			1946	
R	26.8	-21.6	4.7	-23.8
W	14.0	-14.6	2.1	-8.2
V	15.1	-11.1	-2.2	-4.7
D	12.5	-7.6	-12.7	-14.0
Mean	16.8	-13.5		

https://doi.org/10.23637/ERADOC-1-186

K/14

Wheat - Little Knot 1944-46

Percentage Area Lodged at Harvest

Time of applicn. of N	Mean	R	W	V	D	Late-early sowing	Inocn. effect	Spraying effect
				1944				
0	0.8	3.0	0	0	0	-1.5	1.5	
E	0.3	1.2	0	0	0	0.6	0.6	
L	0.2	1.0	0	0	0	-0.5	0.5	
EL	0.6	2.5	0	0	0	-0.8	1.2	
				1945				
0	9.8	33.2	6.2	0.0	0.0	-19.0	8.0	
E	19.2	41.2	24.0	11.5	0.0	-34.1	10.4	
L	15.1	38.8	18.8	2.5	0.2	-27.7	7.4	
EL	13.7	38.5	6.2	8.8	1.2	-25.8	3.6	
				1946				
0	13.1	26.2	23.8	1.8	0.5	-15.7	-3.7	-9.9
E	16.2	44.2	8.2	0.0	12.5	-27.5	-6.3	-20.7
L	10.2	38.0	2.2	0.2	0.5	-18.3	-5.3	-17.7
EL	22.2	39.2	34.5	15.0	0.2	-24.7	7.5	-23.3

Variety	Mean	Late-early sowing	Inocn. effect	Spraying effect
		1944		
R	2.0	-2.1	3.9	
W	0	0	0	
V	0	0	0	
D	0	0	0	
Mean	0.5	-0.6		
		1945		
R	38.0	-67.4	9.1	
W	13.8	-27.4	18.6	
V	5.6	-11.1	1.1	
D	0.4	-0.8	0.5	
Mean	14.4	-26.7		
		1946		
R	37.0	-39.7	11.1	-31.7
W	17.2	-32.1	-9.6	-24.6
V	4.2	-8.3	-2.3	-8.5
D	3.4	-6.1	-6.9	-6.9
Mean	15.4	-21.5		

https://doi.org/10.23637/ERADOC-1-186

WHEAT

Hoosfield, 1944

Effects of time of sowing, sulphate of ammonia and sulphuric acid spraying, on yield and Eyespot infection.

Design; 4 randomized blocks of 8 plots each, the plots being split into two for different rates of application of sulphate of ammonia

Area of each sub-plot; 0.0164 acre

Treatments

On blocks

Time of sowing: Early (Oct. 19), late (Nov. 5)

On whole plots

Time and rate of spraying; None, November (at single and double rates).

February, early March, late March, April (all at single rate).

Rates of spraying: 100 galls. per acre 12.5% or 22.2% B.O.V.

On sub-plots

Sulphate of ammonia: 0.6, 1.2 cwt. N per acre as top dressing in Spring

Crop Notes

Harvested; Aug. 16. Variety; Red Standard

Previous crop; Wheat

Standard errors per plot:

Grain;

per whole plot	1.49 cwt. per acre or 6.7%, 16 d.f.
per sub-plot	3.28 cwt. per acre or 14.7%, 24 d.f.

Straw;

per whole plot	2.03 cwt. per acre or 7.5%, 16 d.f.
per sub-plot	3.70 cwt. per acre or 13.7%, 24 d.f.

Transformed Percentage Eyespot at harvest

per whole plot	3.41, 16 d.f.
per sub-plot	3.48, 24 d.f.

https://doi.org/10.23637/ERADOC-1-186 *pp 80*

K/16

Wheat - Hoosfield 1944

	Mean	Response to N	Late-early sowing	Mean	Response to N	Late-early sowing
	Grain; cwt. per acre			Straw; cwt. per acre		
Time of spraying	±0.74	±2.32	±1.49	±1.02	±2.62	±2.03
None	23.2[a]	4.3[b]	3.2[c]	28.8[d]	6.0[e]	3.5[f]
November	24.4	2.4	0.4	29.9	5.0	2.9
Nov.(double rate)	24.1	1.9	-0.8	30.2	4.7	-0.4
February	20.7	8.5	-1.2	24.0	9.8	0.2
Early March	22.4	4.1	-0.7	26.0	5.4	1.1
Late March	22.9	3.1	1.8	26.7	4.5	2.9
April	18.4	0.5	0.4	22.3	2.4	1.9
Time of sowing		±1.16			±1.31	
Early	22.0	5.2		26.1	6.8	
Late	22.8	2.0		28.0	4.1	
		±0.82			±0.93	
Mean	22.4	3.6		27.1	5.4	
	Transformed % Eyespot			% Eyespot at harvest		
Time of Spraying	±1.71	±2.46	±3.41			
None	35.5[g]	-2.0[h]	-5.7[j]	33.7	-3.2	-9.4
November	32.5	0.1	2.9	28.9	0.2	4.7
Nov. (double rate)	29.7	-2.1	1.9	24.6	-3.1	2.9
February	21.4	0.8	-5.6	13.3	0.9	-6.6
Early March	24.4	3.5	0.4	17.0	4.6	0.5
Late March	29.2	3.5	-1.7	23.8	5.2	-2.5
April	38.0	5.0	-3.6	37.8	8.5	-6.2
Time of sowing		±1.23				
Early	31.8	-0.7		27.8	-1.1	
Late	29.7	2.4		24.6	3.6	
		±0.87				
Mean	30.8	0.8		26.2	1.2	

Standard Errors (a) 0.53 (b) 1.64 (c) 1.05 (d) 0.72 (e) 1.85 (f) 1.44
(g) 1.21 (h) 1.74 (j) 2.41

Standard errors shown in the "Late-Early sowing" columns are only for use in vertical comparisons.

https://doi.org/10.23637/ERADOC-1-186

Pennell's Piece and Exhaustion Land 1945

Control of Eyespot by burning and spraying.

Design; Pennell's Piece, 3 randomized blocks of 8 plots each, plots split for sulphate of ammonia.

Exhaustion Land, 2 randomized blocks of 8 plots each, plots split for sulphate of ammonia.

Area of each plot; Pennell's Piece, 0.0125, 0.0094 and 0.0062 acres in different blocks.

Exhaustion Land, 0.0167 acre.

Treatments

None, stubble burnt with flame gun, sprayed with sulphuric acid in October, February, early March, late March and April.
Sulphate of ammonia: 0.6 and 1.2 cwt. N per acre on split plots as top dressing in March.

Crop Notes

Pennell's Piece

Stubble burnt with flame gun: Oct. 11 and Nov. 2. Seed sown; Oct.27. Harvested; Aug. 20. Variety; Red Standard. Previous crop; Wheat

Exhaustion Land

Seed sown; Oct. 30. Stubble burnt with flame gun; Nov. 2.
Harvested; Aug. 15. Variety; Red Standard. Previous crop; Wheat.

Standard errors per plot: Pennell's Piece: Grain, per whole plot 2.35 cwt. or 9.6%, 15 d.f.
per split plot .24 cwt. or 21.4%, 17 d.f.
Straw. per whole plot 5.64 cwt. or 9.7%, 15 d.f.
per split plot 6.11 cwt. or 10.5%, 17 d.f.
Transf. % Eyespot at harvest, per whole plot 8.1%, 15 d.f.
per split plot 17.53, 17 d.f.

Exhaustion Land: Grain, per whole plot 1.31 cwt. or 4.9%, 8 d.f.
per split plot 1.48 cwt. or 5.5%, 9 d.f.
Straw, per whole plot 2.44 cwt. or 5.2%, 8 d.f.
per split plot 2.29 cwt. or 4.9%, 9 d.f.
Transf. % Eyespot at harvest, per whole plot 5.60, 8 d.f.
per split plot 3.43, 9 d.f.

https://doi.org/10.23637/ERADOC-1-186 *pp 82*

K/18

Wheat - Pennell's Piece and Exhaustion Land, 1945

Pennell's Piece

	None	Stubble burnt	Sprayed with sulphuric acid: October	February	E.March	L.March	April	Mean
Grain: cwt. per acre								
Mean	±1.36	22.2[a]	24.2	25.9	25.7	25.4	25.8	24.4
Response to N	±4.27	0.4[b]	-4.3	-2.0	3.6	-3.9	4.4	-0.4[c]
Straw: cwt. per acre								
Mean	±3.25	57.1[d]	58.2	62.6	59.0	55.5	53.6	58.3
Response to N	±4.98	12.8[e]	11.4	5.2	9.3	3.4	22.5	10.6[f]
Transformed Percentage Eyespot								
Mean	±4.7	43.6[g]	39.1	37.1	35.4	35.8	36.2	38.8
Response to N	±4.3	-4.9[h]	-2.6	-4.8	20.0	4.7	-2.7	0.7[j]
Percentage Eyespot								
Mean		47.5	39.8	36.3	33.5	34.2	34.8	39.3
Response to N		-8.7	-4.5	-8.1	32.3	7.7	-4.4	1.2
Percentage area lodged at harvest								
Mean		69.2	67.8	46.2	39.5	49.2	54.2	57.1
Response to N		-15.9	11.0	11.0	52.4	28.3	-8.3	8.2

Standard errors (a) 0.96 (b) 3.02 (c) 1.51 (d) 2.30 (e) 3.52 (f)1.76 (g) 3.3
(h)10.1 (j) 5.1

82

Exhaustion Land

		None	Stubble burnt	Sprayed with sulphuric acid: October	February	E.March	L.March	April	Mean
				Grain; cwt. per acre					
Mean	±0.93	26.2[a]	28.5	26.5	27.0	27.6	29.2	24.4	26.9
Response to N	±1.48	4.0[b]	2.2	6.2	3.8	-1.0	3.5	1.8	3.1[c]
				Straw; cwt. per acre					
Mean	±1.73	48.2[d]	49.8	52.0	45.2	44.0	47.0	38.5	46.6
Response to N	±2.29	5.6[e]	5.9	5.6	4.5	0.2	6.8	5.8	5.0[f]
				Transformed Percentage Eyespot					
Mean	±3.96	33.8[g]	31.8	26.6	20.4	21.7	26.7	29.7	28.1
Response to N	±3.43	-4.8[h]	2.1	5.6	-1.4	1.5	-6.1	-1.0	-1.1[j]
				Percentage Eyespot					
Mean		31.0	27.8	20.0	12.2	13.7	20.1	24.6	22.1
Response to N		-7.6	3.3	7.9	-1.6	1.7	-8.6	-1.5	-1.6

Standard Errors (a) 0.66 (b) 1.04 (c) 0.52 (d) 1.22 (e) 1.62 (f) 0.81 (g) 2.80 (h) 2.42 (j) 1.21.

K/20

WHEAT

Little Knott 1945

Effect of Eyespot disease on the yield of wheat.

Design; 6 randomized blocks of 3 plots each.

Area of each plot: 0.0227 acre

Treatments

Not inoculated.
Inoculated with "Eyespot" at light rate
Stubble put on plots Nov. 1st., and spread Nov. 6th
Inoculated at heavy rate.
3 boxes of infected plants put on each plot Oct. 31st.,
3 more boxes put on each plot Nov. 1st., stubble put on plots Nov.1st and spread Nov. 6th.

Crop Notes

Seed sown; Oct. 25th Harvested; Aug. 22 Variety; Red Standard.
Previous crop: Wheat

Standard errors per plot:
Grain, 0.715 cwt. per acre or 2.4%, 10 d.f.
Straw, 1.33 cwt. per acre or 2.3%, 10 d.f.
Transformed Percent. Eyespot at harvest 4.32, 10 d.f.

	Inoculation			
	None	Light	Heavy	Mean
Grain: cwt. per acre ±0.30	26.9	31.3	30.1	29.5
Straw: cwt. per acre ±0.54	55.3	57.8	57.6	56.9
Percentage Eyespot in April	54.7	53.8	46.0	51.5
Transformed Percent.Eyespot at harvest ±1.76	59.3	46.0	47.5	50.9
Percentage Eyespot at harvest	74.0	51.8	54.3	60.2
Percentage area lodged at harvest	94.8	70.8	69.2	78.3

https://doi.org/10.23637/ERADOC-1-186

WHEAT

Little Knott, 1946-1948

The effects of depth and rate of sowing, of sulphate of ammonia, and of spraying, on yield and Eyespot infection.

Design; 3×3×3 in 6 blocks of 9 plots each, certain three-factor interactions and the effect of spraying being confounded with block differences.

Area of each plot; 0.0152 acre

Treatments

Rate of sowing; $1\frac{1}{2}$, $2\frac{1}{2}$ or $3\frac{1}{2}$ (1946), and 1, 2, 3 (1947) bushels per acre (R_0, R_1, R_2)

Depth of sowing; Approximately $\frac{1}{2}$", $1\frac{1}{2}$", 3" (1946), and $\frac{3}{4}$", $1\frac{1}{2}$", $2\frac{1}{2}$" (1947) (D_0, D_1, D_2)

Sulphate of ammonia; None, 0.4, 0.8 (1946) and None, 0.3, 0.6 (1947), cwt. N per acre applied as top dressing in March.

Spraying; 3 blocks sprayed each year with sulphuric acid in autumn before germination and again in March, each time with 100 gals. per acre $12\frac{1}{2}$% B.O.V.

Basal Manuring; None in 1946, 3 cwt. per acre superphosphate and 1 cwt. per acre muriate of potash in 1947.

Crop Notes

	Sown	Harvested	
1946	15.10.45	Aug. 24	(Previous crop, Wheat)
1947	21.10.46	Aug. 6	

Variety, Squareheads Master 13/4

See also 1948 Report of Field Experiments, 48/Ca/1

Standard errors per plot;

	1946	1947	
Grain, cwt. per acre	1.95 or 7.2%	2.09 or 8.0%	All
Straw, cwt. per acre	5.00 or 7.4%	3.83 or 10.4%	with
Transformed Percent.			24 d.f.
Eyespot	8.15	6.18	

https://doi.org/10.23637/ERADOC-1-186

K/22

Wheat - Little Knott 1946-48

1946

Grain: cwt. per acre

	±0.79				
	R0	R1	R2	Mean ±0.46	Effect of spraying ±0.92(1)
D0	27.4	26.4	26.9	26.9	1.0
D1	26.8	27.1	26.4	26.8	2.3
D2	26.5	27.2	28.1	27.3	2.1
	N0	N1	N2		
D0	27.1	26.7	26.9		
D1	26.6	27.2	26.6		
D2	26.0	29.1	26.7		
R0	26.5	27.4	26.7	26.9	1.5
R1	26.9	27.6	26.2	26.9	2.5
R2	26.2	28.0	27.3	27.1	1.5
Mean ±0.46	26.5	27.7	26.7	27.0	
Effect of spraying ±0.92(1)	0.0	2.3	3.1		

Straw: cwt. per acre

	±2.04				
	R0	R1	R2	Mean ±1.18	Effect of spraying ±2.36(1)
D0	65.8	68.3	67.5	67.2	1.3
D1	69.7	64.8	67.1	67.2	2.0
D2	68.9	68.2	67.4	68.2	-0.3
	N0	N1	N2		
D0	62.6	68.4	70.7		
D1	62.1	69.9	69.5		
D2	62.4	69.6	72.4		
R0	66.3	67.9	70.2	68.1	1.5
R1	61.3	69.8	70.1	67.1	-1.1
R2	69.6	70.2	72.4	67.4	1.6
Mean ±1.18	62.4	69.3	70.9	67.5	
Effect of spraying ±2.36 (1)	1.8	1.0	0.2		

(1) S.E. only for comparison between effects.

8C

1946

Transformed Percent. Eyespot at harvest

	±3.33 R0	R1	R2	Mean ±1.92	Effect of spraying ±3.85(1)
D0	38.8	58.4	52.4	49.9	-19.8
D1	48.4	49.?	51.0	49.5	-22.7
D2	43.1	43.7	44.6	43.8	-19.6
	N0	N1	N2		
D0	46.2	46.5	56.9		
D1	46.4	51.1	51.2		
D2	41.4	41.4	48.6		
R0	41.3	37.5	51.7	43.5	-12.6
R1	47.9	49.4	54.0	50.4	-26.7
R2	44.8	52.2	51.0	49.3	-22.8
Mean ±1.92	44.7	46.3	52.2	47.7	
Effect of spraying ±3.85(1)	-18.7	-20.6	-22.8		

Percentage Eyespot at harvest

	R0	R1	R2	Mean	Effect of spraying
D0	39	73	63	59	-34
D1	56	57	60	58	-38
D2	47	48	49	48	-34
	N0	N1	N2		
D0	52	53	70		
D1	52	61	61		
D2	44	44	56		
R0	44	37	62	47	-21
R1	55	58	65	59	-45
R2	50	62	60	57	-38
Mean	49	52	62	55	
Effect of spraying	-32	-35	-37		

(1) S.E. only for comparison between effects.

https://doi.org/10.23637/ERADOC-1-186

K/24

Wheat - Little Knott 1946-48

1946

Percentage Area Lodged

	R0	R1	R2	Mean	Effect of spraying
D0	54	79	79	71	-60
D1	56	61	80	66	-70
D2	48	60	67	58	-60
	N0	N1	N2		
D0	66	69	79		
D1	57	68	73		
D2	42	55	77		
R0	55	37	66	53	-74
R1	59	68	74	67	-73
R2	52	84	87	76	-42
Mean	55	64	76	65	
Effect of spraying	-79	-68	-45		

1947

Grain: cwt. per acre

	R0	±0.85 R1	R2	Mean ±0.49)	Effect of spraying ±0.99(1)
D0	24.3	26.9	27.2	26.1	2.1
D1	24.5	25.5	26.3	25.5	0.9
D2	25.4	26.8	27.0	26.4	1.8
	N0	N1	N2		
D0	23.3	26.9	28.3		
D1	22.0	26.0	28.3		
D2	24.0	26.7	28.4		
R0	22.3	25.1	26.9	24.7	1.9
R1	24.0	26.9	28.4	26.4	1.2
R2	23.1	27.7	29.8	26.8	1.8
Mean ±0.49	23.1	26.5	28.3	26.0	
Effect of spraying ±0.99 (1)	0.5	2.8	1.5		

(1) S.E. only for comparison between effects.

https://doi.org/10.23637/ERADOC-1-186

1947

Straw: cwt. per acre

	R0	±1.56 R1	R2	Mean ±0.90	Effect of spraying ±1.81(1)
D0	35.1	38.0	37.5	36.9	-0.1
D1	36.8	35.0	37.2	36.3	-1.3
D2	35.6	36.7	38.0	36.8	-1.6
	N0	N1	N2		
D0	32.5	37.8	40.3		
D1	30.7	37.6	40.7		
D2	31.7	37.1	41.5		
R0	31.8	35.9	39.7	35.8	-1.6
R1	32.3	37.5	40.0	36.6	-1.9
R2	30.7	39.2	42.8	37.6	0.6
Mean ±0.90	31.6	37.5	40.8	36.7	
Effect of spraying ±1.81(1)	-1.5	0.3	-1.7		

Transformed Percent. Eyespot at harvest

	R0	±2.52 R1	R2	Mean ±1.46	Effect of spraying ±2.91(1)
D0	28.7	28.7	25.9	27.8	-7.0
D1	31.2	25.1	24.2	26.8	-8.3
D2	26.4	23.0	22.4	23.9	-6.4
	N0	N1	N2		
D0	24.9	28.6	29.8		
D1	24.3	27.8	28.4		
D2	22.0	21.8	27.9		
R0	27.5	27.9	30.9	28.8	-9.9
R1	24.4	26.6	25.8	25.6	-4.2
R2	19.3	23.8	29.3	24.2	-7.6
Mean ±1.46	23.7	26.1	28.7	26.2	
Effect of spraying ±2.91(1)	-7.5	-6.6	-7.5		

(1) S.E. only for comparison between effects.

89

K/26

Wheat - Little Knott 1946-48

1947

Percentage Eyespot at harvest

	R0	R1	R2	Mean	Effect of spraying
D0	23.1	23.1	19.1	21.8	-3.1
D1	26.8	18.0	16.8	20.3	-4.0
D2	19.8	15.3	14.5	16.4	-2.0
	N0	N1	N2		
D0	17.7	22.9	24.7		
D1	16.9	21.8	22.6		
D2	14.0	13.8	21.9		
R0	21.3	21.9	26.4	23.2	-6.3
R1	17.1	20.0	18.9	18.7	-1.0
R2	10.9	16.3	23.9	16.8	-2.8
Mean	16.2	19.4	23.1	19.5	
Effect of spraying	-2.8	-2.5	-3.8		

Percentage Area Covered by Weeds

	R0	R1	R2	Mean	Effect of spraying
D0	70.0	53.3	49.2	57.5	-47.2
D1	78.3	41.7	40.8	53.6	-38.3
D2	57.5	61.7	42.5	53.9	-40.0
	N0	N1	N2		
D0	45.0	65.8	61.7		
D1	45.8	55.0	60.0		
D2	37.5	62.5	61.7		
R0	56.7	74.2	75.0	68.6	-31.7
R1	36.7	60.0	60.0	52.2	-48.9
R2	35.0	49.2	48.3	44.2	-45.0
Mean	42.8	61.1	61.1	55.0	
Effect of spraying	-30.0	-44.4	-51.1		

https://doi.org/10.23637/ERADOC-1-186

WINTER WHEAT AND BARLEY

Woburn Stackyard, Series C, 1944-46

Control of "Take-All" (Ophiobolus)

Design; 4 randomized blocks of 12 plots each, certain interactions being confounded with block differences.

Area of each plot: 0.02 acre

Crops; Winter wheat in 1944, barley in 1945 and 1946.

Treatments

Inoculations: None, inoculated with "Take-All" in December 1943.
Time of ploughing: Early (early autumn) and late - (February) with stubble cleaning during winter where trefoil was not grown.
Straw: None, 30 cwt. per acre ploughed in on plots which were ploughed early.
Trefoil: None, trefoil undersown in preceding crop on plots which were to be ploughed late.
Sulphate of ammonia: None, 0.4 cwt. N per acre applied either to trefoil soon after preceding corn crop was cut or to straw when ploughed in. None, 0.4 cwt. N per acre applied to present crop at sowing (as top dressing in 1944 only).
Superphosphate and sulphate of potash: 0.4 cwt. P_2O_5 per acre and 0.5 cwt. K_2O per acre, applied to blocks 1 and 3 at sowing time.

Of the above treatments the wheat crop in 1944 received only three: inoculation with "Take-All", late application of sulphate of ammonia (as a top dressing) and application of superphosphate and sulphate of potash (in seed-bed).

Basal manuring: 8 cwt. per acre carbonate of lime.

Crop Notes

		Sown	Harvested	Variety	Trefoil undersown
1944	Wheat	24.9.43	Aug.9	Red Standard	May 15
1945	Barley	Mar.2	Aug.10	Plumage Archer	Mar.2
1946	Barley	Mar.19	Aug.23	Plumage Archer	

Previous year, Fallow (the experiment was begun in 1943 season but was ploughed up on account of weeds)

Standard errors per plot:

Wheat 1944: grain, 2.70 cwt. per acre or 15.2%, 36 d.f.
straw, 7.13 " " " " 16.1%, 36 d.f.

Barley 1945 grain, 1.88 cwt. per acre or 15.2%, 14 d.f.
straw, 2.51 " " " " 17.3%, 14 d.f.
Transformed % Take-All, 7.53, 14 d.f.

Barley 1946 grain, 1.40 cwt. per acre or 14.7%, 14 d.f.
Transformed % Take-All, 6.72, 14 d.f.

https://doi.org/10.23637/ERADOC-1-186 *pp 92*

K/28

Winter Wheat and Barley, 1944-46

Differential Responses

	Mean effect	Ploughed Early	Ploughed Late	Inoculation Abs.	Inoculation Pres.	N Abs.	N Pres.	PK Abs.	PK Pres.
1944 Wheat Grain, cwt. per acre. Mean yield, 17.7									
	±0.78					±1.10			
Inoculation	-0.3			-	-	-1.9	1.4	-0.8	0.2
N top-dressing	2.3			0.6	3.9	-	-	3.3	1.3
1944 Wheat Straw, cwt. per acre. Mean yield, 44.3									
	±2.06					±2.91			
Inoculation	2.9			-	-	0.4	5.4	2.5	3.1
N top-dressing	4.0			1.5	6.4	-	-	6.1	1.9
1945 Barley Grain, cwt. per acre. Mean yield, 12.3									
	±0.54				±0.77				
Late-early plough.	3.7	-		2.6	4.8	4.6	2.7	3.0	4.3
Inoculation	0.8	-0.3	1.8	-	-	0.8	0.8	0.9	0.7
N at sowing	5.1	6.1	4.2	5.1	5.1	-	-	4.9	5.2
1945 Barley Straw, cwt. per acre. Mean yield, 14.5									
	±0.72					±1.03			
Late-early plough.	2.2	-	-	1.8	2.5	3.4	0.8	2.0	2.3
Inoculation	0.3	0.0	0.7	-	-	0.1	0.5	-0.8	1.5
N at sowing	4.9	6.2	3.6	4.7	5.1	-	-	5.0	4.8
1945 Barley. Transformed % Take-All. Mean, 31.7									
	±2.17					±3.07			
Late-early plough.	-6.3	-	-	-4.5	-8.0	-6.1	-6.4	-12.3	-0.2
Inoculation	3.4	5.1	1.6	-	-	1.9	4.9	3.7	3.1
N at sowing	-13.5	-13.3	-13.6	-15.0	-12.0	-	-	-12.0	-15.0
1945 Barley. Percentage Take-All. Mean, 28									
Late-early plough.	-10	-	-	6	-13	-10	-8	-19	0
Inoculation	5	9	2	-	-	3	6	6	5
N at sowing	-21	-22	-20	-22	-19	-	-	-19	-22
1946 Barley Grain, cwt. per acre. Mean yield, 9.5									
	±0.40					±0.57			
Late-early plough.	3.9	-	-	3.8	4.0	3.4	4.4	2.5	5.3
Inoculation	-0.5	-0.6	-0.5	-	-	-1.2	0.1	-0.9	-0.2
N at sowing	3.4	2.9	3.9	2.7	4.1	-	-	3.3	3.5
1946 Barley. Transformed % Take-All. Mean, 33.0									
	±1.94					±2.74			
Late-early plough.	-0.2	-	-	1.8	-2.4	3.6	-4.0	-2.8	2.4
Inoculation	-1.4	0.7	-3.5	-	-	-1.6	-1.2	-3.6	0.9
N at sowing	-7.2	-3.4	-11.0	-7.4	-7.0	-	-	-7.6	-6.7
1946 Barley. Percentage Take-All. Mean, 30									
Late-early plough.	0	-	-	3	-3	6	-6	-5	4
Inoculation	-2	1	-5	-	-	-3	-2	-6	2
N at sowing	-12	-6	-18	-12	-11	-	-	-13	-11

https://doi.org/10.23637/ERADOC-1-186 *pp 93*

Differential Responses

	Ploughed early			Ploughed late		
	No straw or S/A	Straw	Straw and S/A	No trefoil or S/A	Trefoil	Trefoil and S/A
1945 Barley Grain, cwt. per acre						
		±1.33			±1.33	
Inoculation	-1.1	-0.1	0.2	3.6	-0.2	2.0
N at sowing	6.6	4.9	6.7	3.6	4.0	4.8
PK	-2.0	-0.8	3.1	-1.0	2.0	3.2
Mean ±0.66	12.3	8.8	10.4	13.1	14.2	15.3
1945 Barley Straw, cwt. per acre						
		±1.77			±1.77	
Inoculation	0.4	-0.4	0.0	1.3	-0.9	1.3
N at sowing	5.6	6.4	6.8	3.0	3.9	3.7
PK	-1.3	0.0	2.7	-1.2	1.1	2.2
Mean ±0.89	14.4	12.6	13.2	15.1	15.0	16.5
1945 Barley. Transformed % Take-All						
		±5.32			±5.32	
Inoculation	0.3	6.9	8.1	-0.1	4.5	0.5
N at sowing	-11.5	-11.9	-16.5	-9.3	-14.0	-17.6
PK	-16.0	-9.6	-2.0	6.1	-6.9	9.4
Mean ±2.66	33.2	38.6	32.6	34.4	24.4	26.8
1945 Barley. Percentage Take-All						
Inoculation	0	12	13	0	6	1
N at sowing	-19	-20	-26	-15	-18	-24
PK	-25	-16	-3	10	-9	14
Mean	30	39	29	32	17	20
1946 Barley Grain, cwt. per acre						
		±0.99			±0.99	
Inoculation	-1.0	-1.0	0.1	0.5	-0.6	-1.3
N at sowing	3.7	3.7	1.3	6.1	3.2	2.3
PK	1.1	0.4	0.9	2.4	4.5	3.9
Mean ±0.49	6.5	6.3	10.0	7.6	12.5	14.2
1946 Barley. Transformed % Take-All						
		±4.75			±4.75	
Inoculation	5.0	0.0	-3.0	-8.2	-1.0	-1.3
N at sowing	-3.0	-7.2	0.0	-9.9	-11.9	-9.3
PK	-4.8	-8.4	-8.4	-4.1	-4.3	2.5
Mean ±2.38	34.3	36.3	28.8	36.2	30.5	32.0
1946 Barley. Percentage Take-All						
Inoculation	8	0	-4	-14	-1	-2
N at sowing	-5	-12	0	-16	-18	-17
PK	-8	-14	-13	-6	-7	4
Mean	32	35	23	35	26	28

The PK main effect was confounded with blocks. Standard errors quoted for PK effects are for use in comparisons only.

https://doi.org/10.23637/ERADOC-1-186

K/30

WHEAT

Delharding 1943 - 1944

Effects of basic slag and triple superphosphate, powdered or granular, broadcast or drilled.

Design; 4 randomized blocks of 12 plots each.

Area of each plot: 0.0250 acre.

Treatments:

Levels of phosphate: None, 0.3, 0.6 cwt. P_2O_5 per acre
Types of phosphate: Basic slag, powdered or granular triple superphosphate.
Method of application: Drilled with seed or broadcast. In 1943 the powdered triple superphosphate was drilled at rates of 0.27 and 0.52 cwt. P_2O_5 per acre, the balance of the dressings being broadcast, and basic slag was broadcast only.

Ground chalk; In 1943 only, 39 cwt. per acre applied to blocks I and III.

Basal Manuring; Sulphate of ammonia, 2 cwt. per acre as top dressing in spring.

Crop Notes

	Sown	Harvested	Variety	
1943	Nov.13	Aug.10	Wilma.	Previous crop, Oats
1944	Nov. 3	Aug.10	Wilma.	

Standard errors per plot: 1943 Grain, 2.09 cwt. per acre or 9.9%, 24 d.f.
Straw, 3.29 cwt. per acre or 7.5%, 23 d.f.
1944 Grain, 2.01 cwt. per acre or 9.4%, 26 d.f.
Straw, 2.99 cwt. per acre or 7.6%, 26 d.f.

1943
Grain: cwt. per acre

		Cwt. P_2O_5 per acre 0	0.3	0.6	Mean	Without Chalk	With Chalk
Basic slag	±1.04		21.1	20.3	20.7[a]	21.4	20.1
Triple super. (powdered)	±0.74		20.6	22.5	21.6[b]	22.0	21.1
Triple super. (granular)	±0.74		20.7	22.9	21.8[b]	22.5	21.1
Mean	±0.47	19.8[a]	20.7	22.2	21.2		-
Without chalk	±0.66	21.4[c]	21.0	23.2	-	-	-
With chalk		18.2[c]	20.5	21.3	-	-	-

Triple Super.	Powdered	Granular	Cwt. P_2O_5 per acre 0.3	0.6	Mean ±0.52
Broadcast ±0.74	22.3	22.0	21.3	23.0	22.2
Drilled	20.8	21.6	20.0	22.4	21.2
Mean ±0.52	21.6	21.8	20.6	22.7	21.7

Standard errors (a) 0.74 (b) 0.52 (c) 1.04

94

1943

Straw: cwt. per acre

	Cwt. P_2O_5 per acre 0	0.3	0.6	Mean	Without Chalk	With Chalk
Basic slag ±1.64		43.3	41.6	42.4[d]	43.0	41.9
Triple super. (powdered) ±1.16		42.9	45.4	44.2[e]	45.7	42.6
Triple super (granular) ±1.16		44.3	47.6	46.0[e]	47.4	44.4
Mean ±0.74	39.2[d]	43.5	45.5	43.7	-	-
Without chalk ±1.04	42.6[f]	45.9	45.8	-	-	-
With chalk	35.9[f]	41.2	45.3	-	-	-

Triple Super.	Powdered	Granular	Cwt. P205 per acre 0.3	0.6	Mean ±0.82
Broadcast ±1.16	45.2	44.8	43.0	47.0	45.0
Drilled	43.1	47.1	44.2	46.0	45.1
Mean ±0.82	44.2	46.0	43.6	46.5	45.0

Standard errors (d) 1.16 (e) 0.82 (f) 1.64

Note: Standard errors referring to "with and without chalk" apply to interactions only and not to main effects of chalk.

1944

	None	Super. Powd.	Super. Gran.	Basic Slag	Mean		
Grain: cwt. per acre ±0.71					±0.41		
Broadcast		20.8	20.9	20.4	20.7		
Drilled		23.4	22.8	22.1	22.7		
Cwt. P205 per acre						Broadcast	drilled
0.3		21.4	21.8	20.1	21.1	19.8 ±0.58	22.4
0.6		22.8	22.0	22.4	22.4	21.7	23.0
Mean	19.4 (±0.71)	22.1	21.9 ±0.50	21.2	21.4		
Straw: cwt. per acre ±1.06					±0.61		
Broadcast		37.7	37.8	38.8	38.1		
Drilled		42.3	43.2	39.6	41.7		
Cwt. P205 per acre						Broadcast	drilled
						±0.86	
0.3		38.6	39.9	38.1	38.9	36.4	41.4
0.6		41.4	41.2	40.4	41.0	39.8	42.2
Mean	34.9 (±1.06)	40.0	40.5 ±0.75	39.2	39.2		

A similar experiment was carried out on white turnips in 1942 on Deacon's Field, but the results are unreliable owing to the late sowing of the crop.

https://doi.org/10.23637/ERADOC-1-186

K/32

SPRING SOWN CEREALS

Long Hoos V, 1947

Comparison of barley, spring oats and two varieties of wheat, and of the effects on them of four levels of sulphate of ammonia, of superphosphate and of muriate of potash.
Similar experiments were made in 1948 and 1949.

Design; 4 randomized blocks of four plots each, each plot being split into 4, crop differences and certain first-order interactions of artificials being confounded with differences between whole plots.

Area of each sub-plot; 0.0150 acre.

Treatments

Crops: Oats (S.84), wheat (Atle and Bersee) and barley (Plumage Archer).
Sulphate of ammonia: None, 0.3, 0.6, 0.9 cwt. N per acre.
Superphosphate : None, 0.6 cwt. P_2O_5 per acre.
Muriate of potash: None, 0.6 cwt. K_2O per acre

Crop Notes

All seed drilled: April 12. Harvested: oats, Aug. 7; barley, Aug.12: Atle wheat, Aug.18; Bersee wheat, Aug.20.
Previous crop: Beans.

Standard errors: Grain
per whole plot, 1.26 cwt. per acre or 4.8%, 6 d.f.
per sub-plot, 1.30 cwt. per acre or 5.0%, 24 d.f.

https://doi.org/10.23637/ERADOC-1-186 *pp 97*

	Grain: cwt. per acre				Straw: cwt. per acre			
	Oats	Wheat (Atle)	Wheat (Bersee)	Barley	Oats	Wheat (Atle)	Wheat (Bersee)	Barley
Mean	26.0	22.5	27.2	29.2	37.7	27.5	33.5	28.7
Sulphate of ammonia		(a) and (b)						
None	20.5	19.1	23.9	26.3	31.6	21.9	25.3	24.8
0.3 cwt. N per acre	25.2	22.1	26.7	29.3	38.2	26.6	32.0	28.1
0.6 cwt. N per acre	28.3	24.2	29.0	31.3	38.9	30.4	36.4	30.7
0.9 cwt. N per acre	29.9	24.5	29.1	30.0	42.1	20.9	40.3	31.3
		±0.65						
Response to P	1.8	-0.7	1.2	1.0	0.6	-0.7	0.3	0.6
Response to K	0.3	-1.1	0.8	2.4	-0.3	-0.6	0.2	1.7

Standard Errors (a) ±0.65 for vertical comparisons only

(b) ±0.85 for all other comparisons

97

K/33

https://doi.org/10.23637/ERADOC-1-186

BARLEY AND HAY

Roadpiece 1944-1945

Effects in the first year of sulphate of ammonia, superphosphate, compound fertilizer of equivalent composition and methods of fertilizer placement; and in the second year the residual effects of the previous year's cropping and manuring.

Design; 4 randomized blocks of 10 plots each.

Area of each plot; 1944, 0.0250 acre
1945, 0.0274 acre

First Season 1944

Barley

Treatments

Sulphate of ammonia; None, 0.3 cwt. N per acre
Superphosphate; None, 0.6 cwt P_2O_5 per acre
Compound fertilizer; None, 0.3 cwt. N and 0.6 cwt. P_2O_5 per acre
Method of fertilizer placement; Drilled or broadcast.

Crop Notes

Seed sown; March 16. Harvested; August 17
Variety; Plumage Archer. Previous crop; Permanent Grass

Standard errors per plot:
Grain: 1.02 cwt. per acre or 4.4%, 28 d.f.
Straw: 0.88 cwt. per acre or 3.4%, 28 d.f.

Second Season 1945

Hay

Basal manuring; Sulphate of ammonia, 0.4 cwt. N per acre

Seed sown in barley: April 27, 1944. Cut: June 27.

Standard error per plot:
Hay: 2.40 cwt. per acre or 3.3%, 28 d.f.

https://doi.org/10.23637/ERADOC-1-186 *pp 100*

L/2

Barley and Hay - Roadpiece

Barley

	None	Sulph. amm.	Super.	Sulph. amm. & Super.	Equivalent compd. fert.	Mean
		Grain: cwt. per acre				
			±0.51			±0.26
Broadcast		19.9	21.6	23.4	24.8	22.4
Drilled		18.8	25.4	27.1	28.0	24.8
Mean ±0.36	20.5	19.4	23.5	25.2	26.4	23.0
Effect of drilling ±0.72		-1.1	3.8	3.7	3.2	2.4[a]
		Straw: cwt. per acre				
			±0.44			±0.22
Broadcast		23.6	24.8	25.8	27.4	25.4
Drilled		24.1	26.2	28.6	29.3	27.0
Mean ±0.31	23.5	23.8	25.5	27.2	28.4	25.7
Effect of drilling ±0.62		0.5	1.4	2.8	1.9	1.6[b]

Residual effects

Hay: cwt. per acre

			±1.20			±0.60
Broadcast		69.7	71.7	74.2	74.1	72.4
Drilled		70.4	72.1	73.4	74.0	72.5
Mean ±0.85	72.8	70.0	71.9	73.8	74.0	72.5
Effect of drilling ±1.70		0.7	0.4	-0.8	-0.1	0.1[c]

Standard errors (a) 0.36 (b) 0.31 (c) 0.85

https://doi.org/10.23637/ERADOC-1-186 *pp 101*

Long Hoos V, 1945

Effects of sulphate of ammonia, nitrate of soda, and ammonium nitrate at 4 levels, and method of placement of fertilizer.

Design; 3 randomized blocks of 12 plots each, plots split for method of placement.

Area of each sub-plot; 0.0154 acre.

Treatments

Nitrogenous fertilizers: None, sulphate of ammonia, nitrate of soda, ammonium nitrate.
Levels of fertilizer: 0.3, 0.6, 0.9 cwt. N per acre.
Methods of placement: Broadcast before sowing, drilled with seed.

Basal manuring: Superphosphate, 0.5 cwt. P_2O_5 per acre drilled.

Crop Notes

Seed sown: March 24. Harvested: August 9.
Variety: Plumage Archer. Previous crop: Barley.

Standard errors:
Grain, per whole plot: 1.20 cwt. per acre or 3.9%, 24 d.f.
per sub plot: 1.56 cwt. per acre or 5.1%, 27 d.f.
Straw, per whole plot: 1.47 cwt. per acre or 4.4%, 24 d.f.
per sub plot: 1.79 cwt. per acre or 5.3%, 27 d.f.

	Grain: cwt. per acre					
	Cwt. N per acre				Method of placement	
	None	0.3	0.6	0.9	Mean	Drilled	Broadcast
		±0.69			±0.40	±0.54	
Sulphate of ammonia		30.1	34.6	36.0	33.6	33.3	33.8
Nitrate of soda	22.9	30.4	32.6	33.6	32.2	31.5	33.0
Ammonium nitrate		31.4	33.7	34.1	33.1	32.7	33.4
Mean	22.9	30.6	33.6	34.6	30.4	32.5	33.4
		±0.40				±0.31	
Drilled		30.2	33.7	33.6	32.5		
Broadcast		31.0	33.6	35.5	33.4		
		±0.54			±0.31		
	Straw: cwt. per acre					
		±0.85			±0.49	±0.65	
Sulphate of ammonia		31.5	39.5	40.4	37.1	37.6	36.7
Nitrate of soda	22.5	33.6	37.8	40.4	37.3	36.7	37.8
Ammonium nitrate		34.7	38.4	40.8	38.0	38.7	37.2
Mean	22.5	33.3	38.6	40.5	33.7	37.7	37.2
		±0.49				±0.37	
Drilled		33.3	39.3	40.5	37.7		
Broadcast		33.3	37.9	40.6	37.2		
		±0.65			±0.37		

https://doi.org/10.23637/ERADOC-1-186 *pp 102*

https://doi.org/10.23637/ERADOC-1-186

BEANS

For a discussion of all experiments on beans see
D.A. Boyd, G.W. Cooke, H.V.Garner and J.R. Moffatt,
Rothamsted Experiments on Field Beans, J.R.A.S.E. 113(1952), 55.

Long Hoos III 1939
Long Hoos I and III 1945
Deacon's Field 1946

Effects of dung, nitro-chalk (and its time of application in 1945 and 1946), superphosphate and muriate of potash (and their method of application in 1946) and in 1939 the effect of borax.

Designs;

1939: 8 x 8 Latin square. Certain interactions confounded with rows and columns.

1945: 4 randomized blocks of 8 plots each. The plots receiving nitro-chalk were split for time of application.

1946: 8 randomized blocks of 8 plots each. The plots receiving nitro-chalk were split for time of application. Certain high order interactions confounded with block differences.

Area of each whole plot; 1939 and 1946: 0.0200 acre
1945: 0.0192 acre

Treatments

All years: Dung: None, 10 tons per acre (D)
Nitro-chalk: None, 0.4 cwt. N per acre (N)
Superphosphate: None, 0.6 cwt. P_2O_5 per acre (P)
Muriate of potash: None, 1.0 cwt. K_2O per acre (K)

1939: Borax: None (B_0), 10 lb. (B_1), 20 lb. (B_2)
40 lb. (B_3) per acre.

1945: The nitro-chalk was applied to the split plots in autumn and spring.

1946: The nitro-chalk was applied to the sub-plots at the time of sowing and in the spring. The superphosphate and muriate of potash were drilled with the seed or broadcast at sowing.

Crop Notes

	1939	1945	1946 Early	1946 Late
Seed sown	Nov. 17-18	Sept. 29 - Oct.10	Oct. 10-11	Mar. 27
Harvested	Aug. 16	July 31- Aug. 1	Aug. 23	Aug. 23
Variety		Garton's Winter	Giant	
Previous Crop	Wheat		Wheat	

Standard errors (cwt. per acre)

	Per whole plot	sub-plot
1939 Grain	1.70 or 6.6%, 25 d.f.	
1945 Grain	2.34 or 9.8%, 13 d.f.	2.91 or 12.1%, 8 d.f.
1945 Straw	3.74 or 11.6%, 13 d.f.	2.94 or 9.0%, 8 d.f.
1946 Grain	2.52 or 17.1%, 31 d.f.	2.87 or 19.5%, 48 d.f.

https://doi.org/10.23637/ERADOC-1-186 *pp 104*

M/2
Beans

Long Hoos, 1939

Mean yields: Grain, 26.0 cwt. per acre. Straw, 25.3 cwt. per acre

Differential responses

	Mean response	0	D	0	N	0	P	0	K
				Grain: cwt. per acre					
	±0.42			±0.60					
D	0.41	-	-	3.3	5.0	4.0	4.4	4.7	3.6
N	0.7	-0.2	1.6	-	-	1.4	0.0	0.3	1.0
P	-1.1	-1.3	-1.0	-0.4	-1.8	-	-	-1.0	-1.2
K	1.8	2.4	1.3	1.5	2.2	2.0	1.8	-	-
				Straw: cwt. per acre					
D	2.8	-	-	3.2	2.4	3.0	2.6	2.8	2.8
N	1.4	1.8	1.0	-	-	1.8	1.0	1.6	1.2
P	0.4	0.6	0.2	0.8	0.0	-	-	0.8	-0.1
K	1.2	1.2	1.2	1.4	1.0	1.7	0.8	-	-

Response to borax

	Mean yield	Response to D	N	P*	K
	Grain: cwt. per acre				
	±0.42	±0.85			
B_0	25.5	3.4	1.2	-1.0	2.9
B_1	26.9	5.4	1.3	-1.4	2.7
B_2	25.8	4.5	0.3	-1.1	1.9
B_3	25.6	3.5	0.0	-0.8	-0.1
	Straw: cwt. per acre				
B_0	25.0	3.7	1.6	0.2	0.8
B_1	25.3	3.0	1.0	0.7	2.1
B_2	25.3	2.0	1.5	0.6	0.7
B_3	25.6	2.4	1.2	0.1	1.3

* The $(B_0 - B_1 + B_2 - B_3) \times P$ interaction was confounded with columns. The figures shown have been adjusted so as to make this interaction zero.

https://doi.org/10.23637/ERADOC-1-186

Long Hoos, 1945

Differential responses

	Mean Resp.	Dung Abs.	Dung Pres.	Nitrochalk Abs.	Nitrochalk Pres.	Superphos. Abs.	Superphos. Pres.	Mur.pot. Abs.	Mur.pot. Pres.
Grain: Mean yield, 23.9 cwt. per acre									
	±0.83				±1.17				
Dung	3.5	-	-	3.3	3.7	4.2	2.8	3.8	3.2
Nitrochalk	0.4	0.2	0.6	-	-	0.2	0.6	1.7	-0.9
Super.	0.4	1.1	-0.3	0.2	0.6	-	-	0.5	0.3
Mur.pot.	1.0	1.3	0.7	2.3	-0.3	1.1	0.9	-	-
Straw: Mean yield, 32.4 cwt. per acre									
	±1.32				±1.87				
Dung	2.9	-	-	2.8	3.0	3.0	2.8	3.9	1.9
Nitrochalk	0.6	0.3	0.7	-	-	1.5	-0.3	1.1	0.1
Super.	1.6	1.7	1.5	2.5	0.7	-	-	1.4	1.8
Mur.pot.	0.1	1.1	-0.9	0.6	-0.4	-0.1	0.3	-	-

Responses, Spring minus Autumn application of Nitrochalk

	Mean Resp.	Dung Abs.	Dung Pres.	Superphos. Abs.	Superphos. Pres.	Mur.pot. Abs.	Mur.pot. Pres.
Grain: Mean effect, -0.9 cwt. per acre							
	±2.06			±2.91			
Dung	-2.3	-	-	-4.4	-0.2	-1.1	-3.5
Super	1.6	-0.5	3.7	-	-	0.9	2.3
Mur.pot.	0.7	1.9	-0.5	0.0	1.4	-	-
Straw: Mean effect, 0.5 cwt. per acre							
	±2.08			±2.94			
Dung	-3.2	-	-	-3.8	-2.6	-3.9	-2.5
Super	-3.7	-4.3	-3.1	-	-	-3.1	-4.3
Mur.pot.	2.4	1.7	3.1	3.0	1.8	-	-

https://doi.org/10.23637/ERADOC-1-186 *pp 106*

Deacon's Field, 1946

Grain: cwt. per acre

Mean yield, 14.7

Differential Responses

	Mean response	Dung Abs.	Dung Pres.	Nitrochalk Abs.	Nitrochalk Pres.	Superphos. Abs.	Superphos. Pres.	Muriate of Potash Abs.	Muriate of Potash Pres.	Time of Sowing Spring	Time of Sowing Autumn
	±0.63					±0.89					
Dung	1.9	-	-	2.6	1.2	2.6	1.2	2.4	1.4	0.7	3.1
Nitrochalk	1.3	2.0	0.6	-	-	2.1	0.5	0.0	2.6	1.6	1.0
Superphosphate	-0.6	0.1	-1.3	0.2	-1.4	-	-	-1.3	0.1	-0.7	-0.5
Muriate of potash	0.6	1.1	0.1	-0.7	1.9	-0.1	1.3	-	-	0.3	0.9
Autumn-Spring sowing	2.4	1.2	3.6	2.7	2.1	2.3	2.5	2.1	2.7	-	-
Time of application of Nitrochalk:											
Autumn - Spring	2.0 ±0.72	0.2	3.8	-	-	0.3 ±1.03	3.7	1.6	2.4	6.4	-2.4

	Phosphate alone	Potash alone	Phosphate and Potash
Winter beans: Drilled - Broadcast (±2.52)	2.6	0.4	3.2

BEANS

Great Harpenden 1944

Effects of spacing, time of sowing, method of sowing and nitrate of soda on two varieties.

Design; 4 randomized blocks of 12 plots each, with certain treatment interactions confounded between blocks.

Area of each plot: 0.0250 acre.

Treatments

Varieties: Garton's Giant Winter and N.I.A.B. No.7 Winter.
Spacing: 9 inch and 18 inch, or broadcast at equivalent rates.
Method of sowing: Drilled, broadcast and covered in by ploughing ('broadcast'), sown in the furrows and covered in by ploughing ('ploughed in').
Time of sowing: Oct. 26 ('early'), Nov. 19 ('late')
Nitrate of soda: None, 2½ cwt. per acre as spring top dressing.
The 16 drilled plots failed and were re-sown with spring beans, for which the treatments tested were spacing, method of sowing and nitrate of soda. The results for winter and spring sowing have been treated as separate experiments.

Basal manuring: Superphosphate: 5 cwt per acre
Muriate of potash: 1.5 cwt per acre

Crop Notes

Harvested: Aug 2-3. Previous Crop, Wheat and beans

Standard errors per plot:

Winter beans:	Grain:	1.61 cwt. per acre or 14.0%,	14 d.f.
	Straw:	1.21 cwt. per acre or 11.2%,	12 d.f.
Spring beans:	Grain:	0.65 cwt. per acre or 12.7%,	6 d.f.
	Straw:	1.40 cwt. per acre or 13.2%,	6 d.f.

https://doi.org/10.23637/ERADOC-1-186 *pp 108*

M/6

Beans - Great Harpenden 1944

Differential Responses

Winter Beans

	Mean	Garton	N.I.A.B.	Early	Late	Spacing 18"	Spacing 9"	Ploughing	Broad-cast	Nitrate of soda Abs.	Nitrate of soda Pres.
Grain: Mean yield, 11.5 cwt. per acre							±0.80				
N.I.A.B. - Garton	-4.3	-	-	-5.1	-3.5	-3.4	-5.2	-4.6	-4.0	(-2.9	-5.7)
Late - Early	-2.8	-3.6	-2.0	-	-	-3.7	-1.9	-3.8	-1.8	-2.8	-2.8
9" - 18" spacing	3.4	4.3	2.5	2.5	4.3	-	-	3.7	3.1	3.5	3.3
Broadcast-Ploughing	-0.9	-1.2	-0.6	-1.9	0.1	-0.6	-1.2	-	-	0.0	-1.8
Nitrate of Soda	0.8	(2.2	-0.6)	0.8	0.8	0.9	0.7	1.7	-0.1	-	-
	±0.57										
Straw: Mean yield, 10.8 cwt. per acre							±0.60				
N.I.A.B. - Garton	-3.4	-	-	-3.7	-3.1	-2.4	-4.4	-3.4	-3.4	(-2.2	-4.6)
Late - Early	-2.7	-3.0	-2.4	-	-	-2.6	-2.8	-3.4	-2.0	-3.2	-2.2
9" - 18" spacing	2.8	3.8	1.8	2.9	2.7	-	-	3.4	2.2	2.4	3.2
Broadcast-Ploughing	-0.3	-0.3	-0.3	-1.0	0.4	0.3	-0.9	-	-	0.5	-1.1
Nitrate of Soda	0.7	(1.9	-0.5)	0.2	1.2	0.3	1.1	1.5	-0.1	-	-
	±0.43										

The interaction shown in ( ) is a block difference

https://doi.org/10.23637/ERADOC-1-186

Differential Responses

Spring Beans

	Mean	Spacing 18"	Spacing 9"	Ploughing	Broadcast	Nitrate of Soda Absent	Nitrate of Soda Present
Grain:	Mean yield, 5.1 cwt. per acre						
	±0.32			±0.46			
9" - 18" spacing	2.2	-	-	2.5	1.9	2.6	1.8
Broadcast-Ploughing	-1.3	-1.0	-1.6	-	-	-0.9	-1.7
Nitrate of Soda	0.2	0.6	-0.2	0.6	-0.2	-	-
Straw:	Mean yield, 10.6 cwt. per acre						
	±0.70			±0.99			
9" - 18" spacing	3.3	-	-	4.6	2.0	3.7	2.9
Broadcast-Ploughing	-0.8	0.5	-2.1	-	-	-0.5	-1.1
Nitrate of Soda	1.2	1.6	0.8	1.5	0.9	-	-

601

M/7

https://doi.org/10.23637/ERADOC-1-186 pp 110

M/8

BEANS

Long Hoos I and III 1945

Effect of time of sowing, of three seeding rates, of spacing and of method of sowing on two varieties.

Design; 8 randomized blocks of 8 plots each.
Certain interactions confounded with block differences.

Area of each plot: 0.0200 acre

Treatments

Applied to blocks:
Varieties: Garton's Giant Winter and N.I.A.B. No. 7 Winter.
Time of sowing: Sept. 22-29 (early) and Oct. 20 - Nov. 1 (late)

Applied to plots:
Rates and methods of sowing: Broadcast before ploughing, 3 cwt. and 4½ cwt. per acre. Seed dropped in furrow during ploughing at 1.5 cwt. per acre, rows 9 and 18 inches apart, and at 3 cwt. per acre, rows 9 and 18 inches apart.

Basal manuring:

Nitro-chalk:	2.5 cwt. per acre
Superphosphate:	3.5 cwt. per acre
Muriate of potash:	2.0 cwt. per acre

Crop Notes

Harvested: Aug. 4 Previous crop, Wheat

Standard errors per plot: Garton's: Grain 2.05 cwt. per acre or 9.7%, 18 d.f.
N.I.A.B.: Grain 2.11 cwt. per acre or 15.4%, 8 d.f.

Result of germination test: N.I.A.B. 60%; Garton's 94%
Purity of sample: N.I.A.B. 91%; Garton's 99%
Thousand corn weights: N.I.A.B. 582 grm; Garton's 595 grm.

https://doi.org/10.23637/ERADOC-1-186 *pp 111*

Grain: cwt. per acre

Method	Seed rate cwt./acre	Row Spacing	Garton's Early Sown	Garton's Late Sown	Garton's Mean	N.I.A.B. Early	N.I.A.B. Late Sown
			±1.45		±1.02	±1.50	
Furrows	1½	9"	17.5	15.0	16.2	8.2	
"	1½ (hoed)	18"	18.2[a]	15.8[a]	17.0[b]	9.0[e]	
"	3	9"	22.4	23.1	22.8	15.6	
"	3 (hoed)	18"	26.3[a]	21.6[a]	24.0[b]	16.5[c]	Failed
Broadcast	3	-	26.2	20.3	23.2	14.2	
"	4½	-	23.9	24.7	24.3	20.9	
	Mean		22.4	19.7	21.1	13.7	

Seed rate per acre in furrow	Garton's (Early and Late) Spacing 9"	Garton's (Early and Late) Spacing 18"	Garton's Mean	N.I.A.B. (Early only) Spacing 9"	N.I.A.B. (Early only) Spacing 18"	N.I.A.B. Mean
cwt.	±1.02	±0.72	±0.59	±1.50	±1.06	±0.86
1½	16.2	17.0	16.8	8.2	9.0	8.7
3	22.8	24.0	23.6	15.6	16.5	16.0
Mean	19.5[b]	20.5[d]	20.2	11.9[c]	12.8[e]	12.3

Standard errors (a) 1.02 (b) 0.72 (c) 1.06 (d) 0.51 (e) 0.75

M/10

Beans - Long Hoos 1945

Grain: cwt. per acre (continued)

Seed rate per acre	Gartons		Mean	N.I.A.B.	
	Early	Late		Early	Late
cwt.					
1½	18.0f	15.5f	16.8g	8.7h	
3	25.3b	21.6b	23.5d	15.7e	Failed
4½	23.9j	24.7j	24.3a	20.9k	

Standard errors (a) 1.02 (b) 0.72 (d) 0.51 (e) 0.75
(f) 0.84 (g) 0.59 (h) 0.86 (j) 1.45 (k) 1.49

https://doi.org/10.23637/ERADOC-1-186

BEANS

Long Hoos V 1946

Effects of time of sowing, two seed rates and method of sowing on four varieties.

Design; 4 randomized blocks of 8 plots each, certain interactions being confounded with block differences.

Area of each plot: 0.0286 acre.

Treatments

Applied to blocks:
Time of sowing: Oct. 5-9 (early), Nov. 5-8 (late)
Applied to plots:
Varieties: Giant (once grown), Essex strain, Lincolnshire strain, Fa7 (twice grown from N.I.A.B.)
Method of sowing: Seed broadcast before ploughing or dropped in furrows during ploughing with 18" spacing between rows.
Seed rate: 2 cwt. per acre, 3 cwt. per acre.

Basal manuring: Dung: 10 tons per acre
Superphosphate: 2 cwt. per acre
Muriate of potash: 1 cwt. per acre.

Crop Notes

Harvested: Aug. 9 Previous crop, Barley

Standard errors per plot: Grain: 1.61 cwt. per acre or 7.8%, 10 d.f.

Straw: 2.23 cwt. per acre or 5.3%, 10 d.f.

https://doi.org/10.23637/ERADOC-1-186

M/12

Beans - Long Hoos 1946

Differential Responses

Grain, cwt. per acre

	Variety				Seed rate		Sowing		Mean
	Giant	Essex	Lincs.	Fa7	2 cwt.	3 cwt.	Late	Early	
		±1.14			±0.81		±0.81		±0.57
Broadcast - ploughed in	-1.5	-0.5	0.3	0.7	0.0	-0.4	-1.2	0.7	-0.2
Seed rate, 3 cwt.-2 cwt.	-0.9	2.2	4.2	1.8	-	-	1.7	1.8	1.8
Early - late sowing	4.6	-0.6	-0.4	2.2	1.4	1.5	-	-	1.5
Mean ±0.57	21.3	19.7	21.8	20.3					20.8

Straw, cwt. per acre

		±1.58			±1.12		±1.12		±0.79
Broadcast - ploughed in	0.3	1.1	2.5	4.1	1.2	2.7	1.7	2.2	2.0
Seed rate, 3 cwt.-2 cwt.	2.5	3.3	6.4	2.5	-	-	3.6	3.8	3.7
Early - late sowing	9.2	4.9	7.7	7.5	7.2	7.4	-	-	7.3
Mean ±0.79	42.2	41.0	44.6	40.4					42.0

https://doi.org/10.23637/ERADOC-1-186

POTATOES

From 1940 onwards, regular observations were made on aphis populations on potato experiments by the Plant Pathology Department.

POTATOES AND BARLEY

Long Hoos II, 1939-40

Effect in the first year of fresh and stored dungs made with normal and with additional litter, of sulphate of ammonia, superphosphate and sulphate of potash on potatoes, and in the second year the residual effects on barley of the previous year's manuring.

Design: 4 randomized blocks of 12 plots each, plots split into 3 for sulphate of ammonia. In 1940 the sub-plots were not harvested separately.

1939 - Potatoes

Area of each sub-plot, neglecting edge rows: 0.0125 acre.

Treatments

Dung: None,
4 kinds of dung, each derived from an equal weight of feeding stuffs, but with differences in the quantity of litter and time of storage.

Fresh dung, normal litter (6 lb. per head per day)	15.0	tons	per acre
Fresh dung, double litter	14.5	"	" "
Stored dung (4 months), normal litter	9.3	"	" "
Stored dung (4 months), double litter	12.0	"	" "

Sulphate of ammonia: None, 0.4 cwt., 0.8 cwt. N per acre
Superphosphate: None, 0.8 cwt. P_2O_5 per acre
Sulphate of potash: None, 1.6 cwt. K_2O per acre.

Crop Notes

Planted: May 18. Lifted: Sept.22. Variety: Ally. Previous crop: Wheat.

Standard errors, total tubers:
Per whole plot, 0.942 tons per acre or 9.7%, 29 d.f.
Per sub-plot, 0.899 tons per acre or 9.3%, 56 d.f.

1940 - Barley

Area of each plot: 0.0482 acre.

Residual effects of dungs, superphosphate and muriate of potash applied to previous crop of potatoes.

Sown: April 8. Harvested: Aug.20. Variety: Plumage Archer.

Standard error per plot, grain, 2.71 cwt. per acre or 8.7%, 29 d.f.

https://doi.org/10.23637/ERADOC-1-186 *pp 116*

N/2

Potatoes and Barley - Long Hoos

Potatoes, 1939

	Super-phosphate		Sulphate of potash		Sulphate of ammonia cwt. N per acre			Mean
	Absent	Present	Absent	Present	0	0.4	0.8	
	Total Tubers, tons per acre							
Yields	±0.192		±0.192			±0.130		
Mean	9.28	10.07	9.46	9.89	8.45	10.08	10.50	9.68
Sulphate of ammonia (cwt. N per acre)	±0.183[a]		±0.183[a]					
0	8.31	8.59	8.56	8.35				
0.4	9.74	10.41	9.72	10.43				
0.8	9.78	11.22	10.10	10.89				
Responses to:	±0.408		±0.408			±0.275[a]		±0.288
Presence of dung	4.48	2.86	4.59	2.75	3.75	3.22	4.03	3.67
	±0.471		±0.471			±0.318[a]		±0.333
Fresh-stored dung	0.24	0.22	0.36	0.09	0.90	-0.11	-0.11	0.23
Double-single litter	0.12	-0.03	-0.50	0.60	0.65	-0.30	-0.19	0.05
	Percentage Ware							
Mean	88.5	89.5	88.7	89.3	87.4	89.6	90.0	89.0
Sulphate of ammonia (cwt. N per acre)								
0	87.3	87.6	87.4	87.4				
0.4	89.4	89.9	89.3	89.9				
0.8	89.0	91.0	89.5	90.5				
Responses to								
Presence of dung	4.2	2.9	5.1	2.0	4.2	2.9	3.6	3.5
Fresh-stored dung	-0.2	0.5	-0.3	0.5	0.3	0.1	0.0	0.2
Double-single litter	-0.2	0.1	-0.3	0.1	0.3	0.0	-0.4	0.0

(a) For use in comparisons involving differences between levels of nitrogen.

https://doi.org/10.23637/ERADOC-1-186 *pp 117*

Barley, 1940

Residual effects

	Superphosphate Absent	Superphosphate Present	Sulph. potash Absent	Sulph. potash Present	Litter with dung Normal	Litter with dung Add'l	Mean
			Grain; cwt. per acre				
	±0.55		±0.55				
Mean	32.3	30.1	31.4	30.9			31.2
	±1.17		±1.17				±0.83
Response to dung	3.0	3.2	4.1	2.2			3.1
Dung:	±0.96		±0.96		±0.96		±0.68
Fresh	34.3	32.1	33.9	32.5	33.2	33.2	33.2
Stored	32.2	30.2	31.6	30.8	31.0	31.5	31.2
Litter with dung:							
Normal	33.3	30.8	33.1	31.1			32.1
Additional	33.2	31.5	32.5	32.2			32.4
			Straw; cwt. per acre				
Mean	38.5	37.3	38.1	37.6			37.9
Response to dung	4.2	4.6	5.4	3.3			4.4
Dung:							
Fresh	40.3	40.7	41.6	39.4	40.4	40.6	40.5
Stored	39.4	36.8	38.3	38.0	38.0	38.2	38.1
Litter with dung:							
Normal	40.4	38.1	40.0	38.5			39.2
Additional	39.4	39.4	39.8	39.0			39.4

https://doi.org/10.23637/ERADOC-1-186 *pp 118*

N/4

POTATOES

Great Harpenden 1940

Effects of normal, intensive cultivation before and after planting, intensive hoeing and grubbing, of low level and high level manuring, and of applying artificials in the bouts or broadcast before bouting.

Design: 6 randomized blocks of 8 plots each, certain interactions partially confounded with block differences.

Area of each plot: 0.0200 acre

Treatments

Cultivations: Normal, intensive cultivation before and after planting, intensive hoeing and grubbing.

Levels of Manuring: Low - 0.3 cwt. N per acre as sulphate of ammonia
0.3 cwt. P_2O_5 per acre as superphosphate
0.5 cwt. K_2O per acre as muriate of potash
High - 15 tons per acre dung, and artificials as for the low level but at twice the rate.

The artificials were applied with seed in the bouts or broadcast before bouting.

Crop Notes

Potatoes planted: May 2. Lifted: Sept 25. Variety: Arran Banner.
Previous crop: Wheat.

Standard error per plot: Total tubers: 0.731 tons per acre or 8.6%, 27 d.f.

https://doi.org/10.23637/ERADOC-1-186

Cultivation	Artificials applied With seed	Broadcast	Level of manuring Low	High	Mean
	Total tubers: tons per acre				
		±0.298			±0.211
Normal	8.82	9.08	7.66	10.23	8.95
Intensive cultivation	8.32	7.72	7.19	8.86	8.02
Intensive hoeing	8.68	8.56	7.62	9.62	8.62
Intensive cultivation and hoeing	8.52	7.88	6.92	9.48	8.20
	±0.211				
Low manuring	7.54	7.16			
High manuring	9.63	9.46			
Mean ±0.149	8.58	8.31	7.35	9.55	8.45
	Percentage Ware				
Normal	94.0	94.4	93.6	94.8	94.2
Intensive cultivation	94.2	94.6	93.8	95.0	94.4
Intensive hoeing	93.6	94.3	93.9	94.0	94.0
Intensive cultivation and hoeing	94.0	93.6	93.5	94.2	93.8
Low manuring	93.5	93.9			
High manuring	94.4	94.6			
Mean	94.0	94.2	93.7	94.5	94.1

https://doi.org/10.23637/ERADOC-1-186 *pp 120*

N/6

POTATOES

Great Harpenden, 1940

Design: Variety Trial. 4 x 4 Latin square.

Area of each plot (only 3 rows out of 10 harvested): 0.0075 acre.

Varieties: Ally, Arran Banner, Dunbar Rover, Gladstone.

Basal Manuring: 16 tons dung per acre, 0.6 cwt. N per acre as sulphate of ammonia, 0.6 cwt. P_2O_5 per acre as superphosphate and 1.0 cwt. K_2O per acre as muriate of potash.

Crop Notes

Planted: May 1. Lifted: Oct. 2. Previous crop: Wheat.

Potatoes were passed through a $1\frac{3}{4}$ inch riddle to determine percentage ware.

Standard Error per plot: Total tubers, 0.907 tons per acre or 9.7%, 6 d.f.

Variety	Total tubers, tons per acre	Percentage ware
	±0.454	
Ally	9.73	92.0
Arran Banner	10.51	95.1
Dunbar Rover	8.27	92.8
Gladstone	9.06	91.9
Mean	9.39	93.0

https://doi.org/10.23637/ERADOC-1-186 *pp 121*

POTATOES

Foster's 1942 and Sawyer's 1943

Effects of autumn and spring ploughing, of intensity of cultivation, of dung, of sulphate of ammonia and of muriate of potash and in 1943 of superphosphate.

Design: 4 randomized blocks of 12 plots each. Three interactions were confounded with block differences.

Area of each plot: 1942 0.0167 acre
1943 0.0150 acre

Treatments

Time of ploughing: Autumn, spring.

Cultivations: Shallow (6") ploughing followed by minimum grubbing and ridges appropriate to 6" ploughing depth, deep (9") ploughing followed by minimum grubbing and ridges appropriate to 6" ploughing depth, and deep (9") ploughing followed by intensive grubbing and ridges appropriate to 9" ploughing depth.

Dung: None, 16 tons per acre.

Sulphate of ammonia: None, 0.6 cwt. N per acre.

Muriate of potash: None, 1.0 cwt. K_2O per acre. In 1943 only, 0.6 cwt. P_2O_5 per acre as superphosphate was applied to the plots which received this potash, and the combined treatment is referred to as "minerals".

Basal Manuring: 0.6 cwt. P_2O_5 per acre as superphosphate in 1942 only.

Crop Notes

	1942	1943
Potatoes planted	April 24	April 16
Lifted	Oct. 10	Sept. 22.
Variety	Arran Banner	Majestic.

Standard errors per plot:
Total tubers, tons per acre.
1942, 0.712 or 4.6%, 11 d.f.
1943, 0.712 or 8.6%, 11 d.f.

https://doi.org/10.23637/ERADOC-1-186 *pp 122*

N/8

Potatoes - Foster's and Sawyer's

Total tubers, tons per acre

1942 - Foster's

Ploughing	6" deep	9" deep	9" + deep intensive grubbing	Mean
Mean yields:		±0.252		
Autumn	15.77	16.16	15.03	15.66
Spring	15.24	15.16	14.76	15.05
Mean ±0.178	15.50	15.66	14.90	15.35
Resp. to nitrogen:		±0.503		
Autumn	2.99	2.24	2.28	2.50
Spring	4.34	2.10	1.55	2.66
Mean ±0.356	3.66	2.17	1.92	2.58 ±0.206
Resp. to potash:		±0.503		
Autumn	1.47	1.78	1.01	1.42
Spring	0.83	-0.18	1.38	0.68
Mean ±0.356	1.15	0.80	1.20	1.05 ±0.206
Resp. to dung:		±0.503		
Autumn	2.55	2.68	3.22	2.82
Spring	1.10	1.84	2.13	1.69
Mean ±0.356	1.82	2.26	2.68	2.25 ±0.206

	No nitrogen	Nitrogen	No potash	Potash
No dung	12.93	15.53	13.37	15.10
Dung	15.19	17.77	16.30	16.67

https://doi.org/10.23637/ERADOC-1-186

Total tubers, tons per acre
1943 - Sawyer's

Ploughing	6" deep	9" deep	9" + deep intensive grubbing	Mean
Mean Yields:		±0.252		
Autumn	8.02	8.56	7.85	8.14
Spring	8.53	8.20	8.43	8.39
Mean ±0.178	8.28	8.38	8.14	8.26
Resp. to nitrogen:		±0.504		
Autumn	0.94	2.82	1.30	1.69
Spring	0.64	1.78	1.72	1.38
Mean ±0.356	0.79	2.30	1.51	1.53 ±0.206
Resp. to minerals		±0.504		
Autumn	3.25	1.88	1.95	2.36
Spring	1.41	1.48	1.09	1.33
Mean ±0.356	2.33	1.68	1.52	1.84 ±0.206
Resp. to dung:		±0.504		
Autumn	2.74	3.98	3.89	3.54
Spring	3.88	3.18	3.21	3.42
Mean ±0.356	3.31	3.58	3.55	3.48 ±0.206

	No nitrogen	Nitrogen	No dung	Dung
No minerals	6.75	7.94	5.04	9.65
Minerals	8.25	10.12	8.01	10.36

https://doi.org/10.23637/ERADOC-1-186

N/10

POTATOES

Sawyers III 1945

Effect of time of planting, chitted seed, dung and sulphate of ammonia.

Design: 4 randomized blocks of 8 plots each, certain interactions being confounded with block differences.

Area of each plot: 0.0188 acre.

Treatments

Times of planting: March 30, April 20, May 11, June 1.
Seed: Not chitted, chitted.
Dung: None, 15 tons per acre at first planting, adjusted for change in weight of dung at subsequent plantings.
Sulphate of ammonia: None, 0.6 cwt. N per acre.

Actual rates of application of dung per acre were 15 tons March 30, 12.5 tons April 20, 9.5 tons May 11, 7.0 tons June 1.

In spite of the basal dressing of 2 cwt. per acre of muriate of potash the 4 plots of the 1st planting where no dung was applied showed severe symptoms of potash deficiency at the end of July. This led to the early death of the haulm and may partially account for the lower yield of these plots. Corresponding plots of the second planting showed similar though less severe symptoms later in the season.

One tuber infected with severe Mosaic virus was planted in the Southern half of each plot, and one tuber infected with Leaf Roll virus in the Northern half. Samples of tubers from plants near these infected tubers were taken on two occasions to measure the rate of spread of this virus infection.

This and the next two experiments, and similar ones in later years, are discussed by Broadbent, Gregory and Tinsley, "The influence of Planting Date and Manuring on Virus Diseases," Ann. Appl. Biol. 39 (1952), 509.

Basal manuring 0.6 cwt. P_2O_5 per acre as superphosphate
1.0 cwt. K_2O per acre as muriate of potash.

Crop Notes

Lifted: Oct 2. Variety: Majestic. Previous crop: Barley.

Standard error per plot: Total tubers, 0.670 tons per acre or 7.1%, 11 d.f.

https://doi.org/10.23637/ERADOC-1-186

Total tubers, tons per acre

Differential responses

	Mean	Chitting Absent	Chitting Present	Dung Absent	Dung Present	Sulph.amm. Absent	Sulph.amm. Present
	±0.237			±0.335			
Chitting	0.70	-	-	0.42	0.98	0.86	0.54
Dung	4.16	3.88	4.44	-	-	4.45	3.87
Sulph.amm.	1.50	1.66	1.34	1.79	1.21.	-	-

Time of planting		30 March	20 April	11 May	1 June	Mean
				±0.335		±0.168
Not chitted		10.02	10.85	8.96	6.63	9.12
Chitted		10.27	10.90	10.11	7.99	9.82
No dung		7.24	8.64	7.54	6.13	7.40
Dung		13.05	13.11	11.53	8.49	11.54
No sulph.amm.		9.08	9.80	8.84	7.15	8.72
Sulph.amm.		11.21	11.95	10.23	7.47	10.22
Mean	±0.237	10.15	10.87	9.54	7.31	9.47

https://doi.org/10.23637/ERADOC-1-186

N/12

POTATOES

Great Knott II. 1946

Effects of dung, sulphate of ammonia, superphosphate and muriate of potash, and of time of planting.

Design: 8 randomized blocks of 8 plots each, certain high order interactions being confounded with block differences.

Area of each plot: 0.0133 acre.

Treatments

Times of planting: April 10, April 30, May 20, June 7.
Dung: None, 15 tons per acre at first planting and reduced amounts for the later plantings to allow for wastage on storage.
Sulphate of ammonia: None, 0.6 cwt. N per acre.
Superphosphate: None, 0.6 cwt. P_2O_5 per acre.
Muriate of potash: None, 1.0 cwt. K_2O per acre.

One tuber infected with Severe Mosaic virus was planted in the northern half of each plot, and one tuber infected with Leaf Roll virus in the southern half. Samples of tubers from plants near these infected tubers were taken to measure the rate of spread of the virus infection (see previous experiment for reference).

Crop Notes

Lifted: Oct. 12-14. Variety: Majestic. Previous crop: Linseed.

Standard error per plot: Total tubers, 1.03 tons per acre or 9.8%, 32 d.f.

Time of planting	Mean	Dung		Sulphate of ammonia		Super-phosphate		Muriate of potash	
		Abs.	Pres.	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.
		Total tubers: tons per acre							
	±0.26				±0.37				
1	11.56	9.62	13.49	10.62	12.50	11.47	11.64	10.79	12.32
2	10.64	8.84	12.44	10.03	11.26	10.36	10.91	10.25	11.04
3	10.35	8.94	11.76	9.60	11.11	10.12	10.59	9.89	10.81
4	9.43	7.87	10.98	9.19	9.67	9.15	9.71	9.24	9.60
					±0.18				
Mean	10.49	8.81	12.66	9.85	11.13	10.27	10.70	10.04	10.93

https://doi.org/10.23637/ERADOC-1-186 *pp 127*

POTATOES

Great Harpenden II, 1947

Effects of dung, sulphate of ammonia, muriate of potash and time of planting.

Design: 4 randomized blocks of 8 plots each, the third order interaction being confounded with block differences.

Area of each plot: 0.0133 acre.

Treatments

Times of planting: May 5, May 27.
Dung: None, 15 tons per acre.
Sulphate of ammonia: None, 0.6 cwt. N per acre.
Muriate of potash: None, 1.0 cwt. K_2O per acre.

One tuber infected with Severe Mosaic virus and one tuber infected with Leaf Roll virus were planted in different halves of each plot. Samples of tubers from plants near these infected tubers were taken to measure the rate of spread of infection (see previous experiment but one, for reference).

Basal manuring: 0.6 cwt. P_2O_5 per acre as superphosphate.

Crop notes.

Lifted: Oct 8. Variety: Majestic. Previous crop: Barley.

Standard error per plot: Total tubers, 0.490 tons per acre or 6.6%, 18 d.f.

Total tubers, tons per acre. Mean yield, 7.44

Differential Responses.

	Mean	Dung		Sulphate of ammonia		Muriate of potash		Time of planting	
		Abs.	Pres.	Abs.	Pres.	Abs.	Pres.	Early	Late
	±0.173				±0.245				
Dung	0.75	-	-	1.07	0.43	1.58	-0.08	+1.57	-0.07
Sulphate of ammonia	0.61	0.93	0.29	-	-	0.35	0.87	0.74	0.48
Muriate of potash	-0.03	0.80	-0.86	-0.29	0.23	-	-	-0.04	-0.02
Time of planting (Early-Late)	0.36	-0.46	1.18	0.23	0.49	0.35	0.37	-	-

https://doi.org/10.23637/ERADOC-1-186 *pp 128*

N/14

POTATOES

Great Knott II 1946

Effects of deep and shallow tillage between rows, of earthing up and of mulching with straw. Notes on the development of the crop and its condition at harvest were made by the Physics Dept.

Design: 4 randomized blocks of 5 plots each.

Area of each plot: 0.0111 acre.

Treatments.

All four combinations of deep (4-6 inches) and shallow tillage between rows, with and without earthing up; also shallow cultivation until the crop was well through ground, then mulching with 3 tons per acre of chaffed straw between the rows.

Basal manuring: 5 cwt. superphosphate, 2 cwt. muriate of potash and 4 cwt. sulphate of ammonia per acre.

Crop Notes.

Planted: April 15. Lifted: Oct. 15. Variety, Majestic. Previous crop: Linseed.

Standard errors per plot:

Total tubers, tons per acre	0.692 or 5.6%,	12 d.f.
% ware	2.518	12 d.f.

		Shallow intertillage			Deep intertillage		
		Mulched	Not earthed	Earthed up	Not earthed	Earthed up	Mean
Total tubers, tons per acre	±0.346	12.45	11.66	12.96	12.44	12.40	12.38
% Ware,	±1.26	83.4	79.7	82.1	82.0	80.4	81.5
The following figures are % of Ware.							
% Green		26.7	39.3	15.5	24.0	19.0	24.9
% Blight		3.5	5.0	8.6	12.8	6.3	7.0
% Scurf		3.2	6.2	7.8	4.4	13.3	7.0
% Scab		44.6	42.9	36.2	34.9	34.2	38.6

https://doi.org/10.23637/ERADOC-1-186 *pp 129*

POTATOES

Great Harpenden I, 1947

Effects of deep and shallow intertillage between rows, of earthing up, of mulching with straw and of applying artificials before and after ridging.

Design: 4 randomized blocks of 10 plots each.

Area of each plot: 0.0098 acre.

Treatments.

Cultivations: All four combinations of deep (4-6 inches) and shallow intertillage between rows, with and without earthing up; also shallow cultivation until crop was well through ground, then mulching with 3 tons per acre of chaffed straw between the rows.

Application of fertilizers: Broadcast before ridging, applied in the bouts.

It was intended to treat two of the four blocks with sulphuric acid spray before lifting to kill haulm, but since no blight was present this year this treatment comparison was not made.

Crop Notes

Planted: May 6. Lifted: October 7. Variety: Majestic. Previous crop: Barley.

Standard errors per plot:
Total tubers, 0.607 tons per acre or 7.2%, 27 d.f.
Percentage ware, 0.372, 27 d.f.

https://doi.org/10.23637/ERADOC-1-186 *pp 130*

N/16

Potatoes - Gt. Harpenden 1947

	Shallow intertillage			Deep intertillage		
	Mulched	Not earthed up	Earthed up	Not earthed up	Earthed up	Mean
	Total tubers, tons per acre					
Artificials applied:			±0.304			±0.136
before ridging	8.63	8.64	8.15	7.10	8.71	8.24
after ridging	8.03	8.82	9.11	8.63	8.15	8.55
Mean ±0.215	8.33	8.73	8.63	7.86	8.43	8.39
	Percentage Ware					
Artificials applied:			±0.19			±0.08
before ridging	98.0	97.4	98.0.	97.5	98.2	97.8
after ridging	97.9	97.4	98.2	97.6	98.0	97.8
Mean ±0.13	98.0	97.4	98.1	97.6	98.1	97.8
	Light greening, % of ware					
Artificials applied:						
before ridging	20.5	16.0	19.0	24.0	20.2	20.0
after ridging	16.2	24.2	17.5	22.8	16.2	19.4
Mean	18.4	20.1	18.2	23.4	18.2	19.7
	Severe greening, % of ware					
Artificials applied:						
before ridging	12.5	15.5	5.2	20.8	10.2	12.8
after ridging	9.8	19.2	13.2	13.5	17.5	14.6
Mean	11.1	17.4	9.2	17.1	13.9	13.8

https://doi.org/10.23637/ERADOC-1-186 *pp 131*

POTATOES

Sawyers III, 1945

Fertilizer Placement. One of a country-wide series of about 60 similar experiments. A report on the whole series has been published by G.W.Cooke, Placement of Fertilizer for potatoes and row crops, J.Agric.Sci. 39 (1950), 96 and 359.

Design: 6 randomized blocks of 8 plots each, certain high order interactions being partially confounded with block differences.

Area of each plot: 0.0143 acres.

Treatments

Levels of fertilizer: None, 4.26, 8.36, 11.68 cwt per acre of National Compound No.1.

Methods of placement: Broadcast over ridges, applied in band in contact with seeds, in band 2 inches below seed, in bands 2 inches on either side of seed.

Crop Notes

Potatoes planted: May 12. Lifted: Oct. 3. Variety: Majestic.
Previous crop: Barley.

Standard error per plot: Total tubers, 1.15 tons per acre of 12.9%, 30 d.f.

Total tubers: tons per acre

Compound fertilizer cwt. per acre	Broadcast	Band contact with seed	Band 2" below seed	Bands 2" either side of seed	Mean
		±0.67			±0.33
None					4.93
4.26	8.73	8.95	7.80	8.14	8.41
8.36	10.95	11.44	9.67	11.46	10.88
11.68	12.22	10.50	11.76	11.17	11.41
Mean ±0.38	10.64	10.30	9.75	10.26	8.91

https://doi.org/10.23637/ERADOC-1-186 *pp 132*

N/18

POTATOES

Great Knott II. 1946

Fertilizer Placement Series.

Design: 6 randomized blocks of 8 plots each, certain high order interactions being partially confounded with block differences.

Area of each plot: 0.0133 acre.

Treatments.

Levels of fertilizer: None, 4.60, 9.96, 13.84 cwt. per acre of National Compound No.1. (7% N; 7% P_2O_5; 9% K_2O).
Methods of placement: Broadcast before bouting, broadcast after bouting, drilled in band in contact with seed, drilled in two bands, 2 inches on either side of, and 2 inches below, seed.

The plots receiving no fertilizer but due for drilling in two bands received one stroke with cultivator tines.

Crop Notes

Potatoes planted: April 15. Lifted: Oct. 12-14. Variety: Majestic. Previous crop; Linseed.

Standard error per plot: Total tubers, 0.77 tons per acre or 7.0%, 29 d.f.

Total tubers: tons per acre

Compound fertilizer cwt. per acre.	Broadcast before ridging	Broadcast after ridging	Band contact with seed	Side bands	Mean
		±0.44			±0.22
None		7.02[a]		7.93	7.25
4.60	9.52	10.28	10.05	10.36	10.05
9.96	11.91	12.40	13.30	13.04	12.66
13.84	12.74	14.84	14.11	14.45	14.04
Mean ±0.26	11.39[*]	12.51[*]	12.49[*]	12.62[*]	11.00

Standard error (a) 0.26

[*]Mean excluding yield at zero level of fertilizer.

https://doi.org/10.23637/ERADOC-1-186

POTATOES

Great Harpenden II, 1947

Fertilizer Placement Series.

Design: 3 randomized blocks of 16 plots each.

Area of each plot: 0.0123 acre.

Treatments

Levels of fertilizer: None, 5, 10, 15 cwt. per acre of National Compound No.1 (7% N, 7% P_2O_5, 10.5% K_2O).
Methods of placement: Broadcast before ridging, broadcast after ridging, drilled in band in contact with seed, drilled in 2 bands 2 inches either side of, and 2 inches below, seed.

Crop Notes.

Potatoes planted: May 12. Lifted: Oct.10. Variety: Majestic.
Previous crop: Barley.

Standard error per plot: Total tubers, 0.635 tons per acre or 7.4%, 33 d.f.

Total tubers: tons per acre

Compound fertilizer cwt. per acre	Broadcast before ridging	Broadcast after ridging	Band in contact with seed	Side bands	Mean
			±0.367		±0.183
None					6.88
5	8.06	9.00	8.54	9.29	8.72
10	8.88	9.50	8.00	10.07	9.11
15	9.98	9.41	9.03	9.78	9.55
Mean ±0.212	8.97	9.30	8.52	9.71	8.57

The mean percentage ware was 97.3%.

https://doi.org/10.23637/ERADOC-1-186

https://doi.org/10.23637/ERADOC-1-186

SUGAR BEET

Great Harpenden II, 1947

Design; Fertilizer Placement Series. 3 randomized blocks of 16 plots each.

Area of each plot; 0.00808 acre.

Treatments

Levels of fertilizer: None, $4\frac{1}{2}$, 9 cwt. per acre of National Granular Compound No. 2 (9% N, 7.5% P_2O_5, 4.5% K_2O).

Methods of placement: Broadcast on flat and harrowed in, drilled in band in contact with seed, drilled in band 2 inches below seed, drilled in 2 bands 1 inch either side of and 1 inch below seed, drilled in 2 bands 2 inches either side of and 2 inches below seed.

Crop Notes

Seed drilled: May 10. Lifted: Nov. 11. Variety: Klein E. Previous crop: Barley.

Standard errors per plot:

Roots (washed), 1.21 tons per acre or 15.7%, 45 d.f.
Tops, 0.894 tons per acre or 14.9%, 45 d.f.
Sugar percentage, 0.565, 45 d.f.
Total sugar, 5.02 cwt. per acre or 17.2%, 45 d.f.
Plant number, 2.10 thousand per acre or 10.9%, 45 d.f.

https://doi.org/10.23637/ERADOC-1-186 *pp 136*

P/2
Sugar Beet - Gt. Harpenden 1947

Fertilizer cwt/acre	Broadcast	Contact with seed	Band 2" below seed	1" below and 1½" either side of seed	2" below and 2" either side of seed	Mean
Roots (washed): tons per acre			±0.698			±0.285
None						6.51[a]
4½	6.76[b]	7.57	8.82	9.58	8.67	8.03
9	7.95[b]	7.51	8.71	8.62	8.53	8.21
Mean ±0.494	7.35[a]	7.54	8.77	9.10	8.60	7.71

Standard errors (a) 0.349 (b) 0.494

Sugar Percentage			±0.326			±0.133
None						19.02[c]
4½	18.70[d]	18.87	19.35	19.14	19.00	18.96
9	18.55[d]	18.63	18.88	19.27	18.68	18.76
Mean ±0.231	18.62[c]	18.75	19.11	19.21	18.84	18.90

Standard errors (c) 0.163 (d) 0.231

Total sugar: cwt. per acre			±2.90			±1.18
None						24.8[e]
4½	25.3[f]	28.8	34.1	36.7	33.1	30.6
9	29.5[f]	28.0	32.9	33.2	31.9	30.8
Mean ±2.05	27.4[e]	28.4	33.5	35.0	32.5	29.2

Standard errors (e) 1.45 (f) 2.05

Tops: tons per acre			±0.516			±0.211
None						4.30[g]
4½	5.25[h]	5.56	6.76	6.67	6.50	6.00
9	6.17[h]	6.70	7.74	7.70	8.16	7.11
Mean 0.365	5.71[g]	6.13	7.25	7.18	7.33	5.99

Standard errors (g) 0.258 (h) 0.365

Plant number: thousands per acre			±1.21			±0.496
None						18.3[j]
4½	22.2[k]	18.6	19.1	21.0	18.7	20.3
9	21.3[k]	15.2	15.4	17.2	21.6	18.7
Mean ±0.858	21.7[j]	16.9	17.3	19.1	20.2	19.2

Standard errors (j) 0.607 (k) 0.858

https://doi.org/10.23637/ERADOC-1-186

SUGAR BEET

Long Hoos and Woburn Lansome, 1939

Effects of nitrogenous and mineral fertilizers.

Design; 5 × 5 lattice square design with 6 replicates at Rothamsted and 3 replicates at Woburn.

Area of each plot:
Rothamsted; 0.0111 acre
Woburn; 0.0133 acre

Treatments

Nitrogenous fertilizers: None, nitrate of soda, nitrate of lime, sulphate of ammonia and muriate of ammonia (0.6 cwt. N per acre).

Mineral fertilizers: None, high grade muriate of potash, high grade sulphate of potash (both at 2.0 cwt. K_2O per acre), salt (2.5 cwt. per acre) and sulphate of soda (6.9 cwt. per acre).

Basal manuring: Superphosphate; 0.5 cwt. P_2O_5 per acre.

Crop Notes

	Rothamsted	Woburn
Seed sown	May 8	May 10
Harvested	Nov 11	Oct.30-Nov.9
Variety	Kleinwanzleben	Kleinwanzleben
Previous crop	Wheat	Barley

Standard errors per plot
Sugar percentage: Rothamsted 0.390, 120 d.f.
Woburn 0.329, 120 d.f.
Total sugar: Rothamsted 3.24 cwt. per acre or 7.1%, 72 d.f.
Woburn 3.13 cwt. per acre or 7.2%, 72 d.f.

https://doi.org/10.23637/ERADOC-1-186

P/4

Sugar Beet - Long Hoos & Lansome, 1939

Rothamsted

	None	Nitr. sod.	Nitr. lime	Sulph. amm.	Mur. amm.	Mean
Roots (washed): tons per acre						
None	11.80	13.83	13.88	13.19	14.09	13.35
Mur. pot.	11.42	14.03	14.22	13.03	13.55	13.25
Salt	11.51	14.10	14.28	13.12	14.08	13.42
Sulph. pot.	12.12	14.50	13.34	13.41	12.96	13.27
Sulph. sod.	11.26	14.44	14.36	14.03	14.08	13.63
Mean	11.62	14.18	14.01	13.36	13.75	13.38
Sugar percentage						
			±0.159			±0.071
None	16.88	16.58	16.97	16.79	17.02	16.85
Mur. pot.	16.99	17.01	17.07	17.11	17.06	17.05
Salt	17.04	17.30	17.19	17.10	16.84	17.09
Sulph. pot.	17.07	16.79	17.00	17.02	17.10	17.00
Sulph. sod.	16.88	17.17	16.73	16.68	17.02	16.90
Mean	16.97	16.97	16.99	16.94	17.01	16.98
Total sugar: cwt. per acre						
			±1.32			±0.59
None	39.4	46.0	46.9	44.6	46.8	44.7
Mur. pot.	39.2	47.7	47.1	44.4	47.3	45.1
Salt	38.3	48.4	48.1	46.8	47.6	45.8
Sulph. pot.	40.0	48.9	45.7	45.7	45.0	45.1
Sulph. sod.	38.7	49.3	48.1	47.3	48.4	46.4
Mean	39.1	48.1	47.2	45.8	47.0	45.4
Tops: tons per acre						
None	12.79	17.48	17.83	17.06	18.56	16.74
Mur. pot.	12.19	19.27	20.33	17.44	17.03	17.25
Salt	11.82	18.13	18.05	16.59	18.51	16.62
Sulph. pot.	11.89	18.63	16.43	16.32	17.40	16.13
Sulph. sod.	11.67	16.60	17.90	17.30	18.99	16.49
Mean	12.07	18.02	18.11	16.94	18.10	16.65
Plant number: thousands per acre						
None	29.3	30.3	29.0	29.5	29.7	29.6
Mur. pot.	29.9	30.4	30.6	30.9	29.6	30.3
Salt	30.6	30.3	29.4	30.1	30.3	30.1
Sulph. pot.	30.0	30.4	29.2	29.9	30.1	29.9
Sulph. sod.	29.5	30.0	30.2	29.4	30.3	29.9
Mean	29.9	30.3	29.7	30.0	30.0	30.0

https://doi.org/10.23637/ERADOC-1-186

Woburn

	None	Nitr. sod.	Nitr. lime	Sulph. amm.	Mur. amm.	Mean
Roots (washed): tons per acre						
None	9.32	13.83	13.56	12.33	12.50	12.31
Mur. pot.	8.44	13.66	13.12	13.53	13.66	12.48
Salt	9.61	13.50	14.50	13.29	12.99	12.78
Sulph. pot.	8.27	13.39	14.42	11.61	13.96	12.33
Sulph. sod.	9.43	14.34	13.95	12.70	13.74	12.83
Mean	9.01	13.75	13.91	12.69	13.37	12.55
Sugar percentage						
			±0.190			±0.085
None	16.84	17.16	17.06	17.15	17.39	17.12
Mur. pot.	17.48	17.88	17.02	17.51	17.44	17.47
Salt	17.60	17.29	17.29	17.26	17.51	17.39
Sulph. pot.	17.11	17.33	17.18	17.09	17.56	17.25
Sulph. sod.	17.25	16.96	17.05	17.22	17.58	17.21
Mean	17.26	17.32	17.12	17.25	17.50	17.29
Total sugar: cwt. per acre						
			±1.80			±0.80
None	31.1	48.1	45.2	42.5	44.6	42.3
Mur. pot.	27.5	51.0	43.2	46.8	46.5	43.0
Salt	33.1	48.7	47.1	46.3	47.5	44.6
Sulph. pot.	27.1	47.3	48.3	43.2	48.4	42.8
Sulph. sod.	32.0	49.7	46.8	44.1	47.9	44.1
Mean	30.2	49.0	46.1	44.6	47.0	43.4
Tops: tons per acre						
None	8.36	12.91	13.67	11.79	12.06	11.76
Mur. pot.	7.15	13.07	15.00	12.43	11.87	11.90
Salt	8.47	12.13	14.16	12.41	12.13	11.86
Sulph. pot.	6.51	12.23	12.12	9.99	12.37	10.64
Sulph. sod.	7.15	13.27	12.30	10.87	12.89	11.30
Mean	7.53	12.72	13.45	11.50	12.26	11.49
Plant number: thousands per acre						
None	37.0	35.5	37.0	37.3	36.7	36.7
Mur. pot.	37.0	36.9	36.7	36.2	37.0	36.8
Salt	37.5	36.2	36.2	38.0	37.6	37.1
Sulph. pot.	37.8	37.4	36.8	35.7	37.6	37.1
Sulph. sod.	37.8	37.2	36.7	36.4	37.9	37.2
Mean	37.4	36.6	36.7	36.7	37.4	37.0

https://doi.org/10.23637/ERADOC-1-186 *pp 140*

P/6

SUGAR BEET

Long Hoos and Woburn Lansome, 1939

Effects of powdered and granulated fertilizer, of placing the fertilizer above the seed, below the seed or broadcast and of normal and intensive cultivation on seed bed. These and the next four experiments are discussed by E.W.Russell, B.A.Keen and H.H.Mann, "Studies in Soil Cultivation", J.Agric.Sci., 32, (1942), 330.

Design; 7 x 7 Latin square. Columns split for normal and intensive cultivation.

Area of each sub-plot;
Rothamsted; 0.00172 acre
Woburn; 0.00198 acre

Treatments

Fertilizer: Powdered, granular.
Placed: Above seed, below seed, broadcast on seed bed.
Cultivation: Intensive, normal hoeing between rows.
Complete fertilizer contained 6.2% nitrogen, 6.4% water soluble phosphoric acid and 7.5% potash, and was applied at the rate of 10 cwt. per acre.

Crop Notes

	Seed sown	Harvested	Variety	Previous crop
Rothamsted	May 23	Nov. 28	Kühn	Wheat
Woburn	May 12	Nov. 17	Kleinwanzleben	Barley

Standard errors:
Rothamsted, Total sugar, per whole plot; 2.61 cwt. per acre or 7.35%, 30 d.f
per half column; 1.21 cwt. per acre or 3.42%, 6 d.f.
Woburn, Total sugar, per whole plot; 3.61 cwt. per acre or 8.39%, 30 d.f
per half column; 1.48 cwt. per acre or 3.44%, 6.d.f.

Cultivation	Roots (washed) tons per acre	Sugar Percentage	Total sugar cwt.per acre	Tops tons per acre
		Rothamsted		
			±0.457	
Normal	10.48	17.02	35.6	14.67
Intensive	10.36	17.07	35.4	14.52
		Woburn		
			±0.559	
Normal	11.29	17.81	40.2	9.51
Intensive	12.95	17.68	45.8	11.56

https://doi.org/10.23637/ERADOC-1-186 *pp 141*

Fertilizer	Placed: Broadcast	Placed: Above seed	Placed: Under seed	Mean	Placed: Broadcast	Placed: Above seed	Placed: Under seed	Mean
				Rothamsted				
	Roots (washed): tons per acre				Total sugar: cwt. per acre			
						±0.986		±0.569
None				9.32				31.6a
Powdered	11.00	11.06	10.08	10.71	37.9	38.1	34.2	36.7
Granular	10.84	10.71	9.93	10.49	37.4	36.1	33.4	35.6
Mean	10.92	10.88	10.00	10.42	37.6[b]	37.1[b]	33.8[b]	35.5
Standard error (a) 0.986. (b) 0.697								
	Sugar percentage				Tops: tons per acre			
None				16.91				11.76
Powdered	17.25	17.23	16.97	17.15	14.60	15.51	15.15	15.09
Granular	17.28	16.86	16.82	16.99	15.12	14.95	15.08	15.05
Mean	17.26	17.04	16.90	17.05	14.86	15.23	15.12	14.60
				Woburn				
	Roots (washed): tons per acre				Total sugar: cwt. per acre			
						±1.36		±0.785
None				8.64				30.3[a]
Powdered	11.58	12.56	13.19	12.44	40.6	44.5	47.6	44.2
Granular	11.57	13.75	13.56	12.96	41.0	49.0	48.1	46.0
Mean	11.58	13.16	13.38	12.12	40.8[d]	46.8[d]	47.8[d]	43.0
Standard error (c) 1.36 (d) 0.962								
	Sugar percentage				Tops: tons per acre			
None				17.62				7.63
Powdered	17.55	17.71	18.06	17.77	10.23	11.46	10.95	10.88
Granular	17.72	17.84	17.72	17.76	10.70	11.34	11.44	11.16
Mean	17.64	17.78	17.89	17.75	10.46	11.40	11.20	10.54

https://doi.org/10.23637/ERADOC-1-186

P/8

SUGAR BEET

Great Harpenden, 1940
Woburn Butt Furlong, 1940
Little Hoos, 1941

Effects of sulphate of ammonia, superphosphate, muriate of potash and agricultural salt in all experiments, and of intensive cultivation at Woburn and Rothamsted in 1940, and of "gapping" at Rothamsted in 1940 and 1941, and of early and late cultivation at Rothamsted in 1941. These experiments form part of the countrywide Factory Sugar Beet Series of about 280 similar experiments. A report on the whole series is in preparation.

Designs; Woburn and Rothamsted 1940: 4 randomized blocks of 8 plots each, certain interactions being confounded between blocks. At Rothamsted, one quarter replicate of all treatment combinations.

Rothamsted 1941: 8 randomized blocks of 8 plots each, certain interactions being confounded between blocks. One quarter replicate of all treatment combinations.

Area of each plot;
Woburn 1940: 0.00463 acre.
Rothamsted 1940: 0.0152 acre.
Rothamsted 1941: 0.00952 acre.

Treatments

All experiments:
Sulphate of ammonia: None, 0.8 cwt. N per acre.
Superphosphate: None, 1.0 cwt. P_2O_5 per acre (P)
Muriate of potash: None, 1.2 cwt. K_2O per acre (K)
Agricultural salt: None, 5 cwt. per acre.

Woburn and Rothamsted 1940:
Cultivation: Normal and intensive (C).

Rothamsted 1940 and 1941:
Gapping: One third of each plot had applied to them one of four levels of artificial "gappiness". Of the plants remaining after singling a proportion was removed at random, the four levels being: None, 1/6, 1/3, 1/2.

Rothamsted 1941:
Early cultivation: Normal, additional cultivation before singling.
Late cultivation: Normal, additional cultivation after singling.

https://doi.org/10.23637/ERADOC-1-186 *pp 143*

Crop Notes

	Seed sown	Harvested	Variety	Previous crop
Woburn, 1940	April 25	October 31	Kleinwanzleben E.	Barley
Rothamsted, 1940	May 20	December 9	Kleinwanzleben E.	Wheat
Rothamsted, 1941	May 6	Dec. 4-16	Kleinwanzleben E.	Wheat

Standard errors per plot:

	d.f.	Roots (washed) tons per acre	%	Sugar Percentage	Total Sugar cwt. per acre	%	Tops tons per acre	%	Plant no. thous. per acre	%
Woburn 1940	13	1.47	9.0	0.554	5.11	8.5	1.53	15.5	1.70	4.9
Rothamsted 1940:										
"ungapped"	13	2.18	18.2	0.308	7.71	18.1	1.93	19.0	1.83	6.3
"gapped"	13	1.26		0.471	4.38		1.35			
Rothamsted 1941:										
"ungapped"	26	0.595	6.3	0.198	2.12	6.3	0.973	11.6	1.43	4.6
"gapped"	22	0.864		0.223	3.06		1.02			

https://doi.org/10.23637/ERADOC-1-186

P/10

Sugar Beet - Factory Series

Rothamsted 1940

	Mean Resp.	Differential Responses: Sulph. amm. Abs.	Sulph. amm. Pres.	Super Abs.	Super Pres.	Mur. Potash Abs.	Mur. Potash Pres.	Salt Abs.	Salt Pres.	Cultivation Norm.	Cultivation Int.
Roots (washed), tons per acre. Mean yield, 11.94											
	±0.769					±1.09					
Sulph. amm.	2.83	-	-	2.89	2.77	2.03	3.63	1.91	3.75	3.90	1.76
Super.	-0.29	-0.23	-0.35	-	-	-0.51	-0.07	0.15	-0.73	0.93	-1.51
Mur. Pot.	-0.48	-1.28	0.32	-0.70	-0.26	-	-	-0.39	-0.57	-1.56	0.60
Salt	-0.97	-1.89	-0.05	-0.53	-1.41	-0.88	-1.06	-	-	-1.86	-0.08
Int. Cultn.	0.47	1.54	-0.60	1.69	-0.75	-0.61	1.55	-0.42	1.36	-	-
Sugar Percentage. Mean, 17.82											
	±0.109					±0.154					
Sulph. amm.	-0.10	-	-	-0.17	-0.03	-0.11	-0.09	-0.11	-0.09	-0.09	-0.11
Super.	0.17	0.10	0.24	-	-	0.03	0.31	0.22	0.12	0.17	0.17
Mur. Pot.	0.11	0.10	0.12	-0.03	0.25	-	-	0.10	0.12	0.34	-0.12
Salt	0.19	0.18	0.20	0.24	0.14	0.18	0.20	-	-	0.22	0.16
Int. Cultn.	0.06	0.07	0.05	0.06	0.06	0.29	-0.17	0.09	0.03	-	-
Total Sugar, cwt. per acre. Mean yield, 42.5											
	±2.72					±3.85					
Sulph. amm.	9.9	-	-	9.9	9.9	6.9	12.9	6.5	13.3	13.7	6.1
Super.	-0.6	-0.6	-0.6	-	-	-1.7	0.5	1.1	-2.3	3.7	-4.9
Mur. Pot.	-1.5	-4.5	1.5	-2.6	-0.4	-	-	-1.1	-1.9	-4.8	1.8
Salt	-3.0	-6.4	0.4	-1.3	-4.7	-2.6	-3.4	-	-	-6.2	0.2
Int. Cultn.	1.9	5.7	-1.9	6.2	-2.4	-1.4	5.2	-1.3	5.1	-	-
Tops, tons per acre. Mean yield, 10.15											
	±0.684					±0.967					
Sulph. amm.	5.02	-	-	4.78	5.26	4.54	5.50	4.52	5.52	5.17	4.87
Super.	-0.38	-0.62	-0.14	-	-	0.09	-0.85	-0.39	-0.37	0.27	-1.03
Mur. Pot.	-0.16	-0.64	0.32	0.31	-0.63	-	-	0.44	-0.76	-0.96	0.64
Salt	-0.38	-0.88	0.12	-0.39	-0.37	0.22	-0.98	-	-	-1.09	0.33
Int. Cultn.	1.05	1.20	0.90	1.70	0.40	0.25	1.85	0.34	1.76	-	-
Plant number, thousands per acre. Mean, 40.2											
	±0.65					±0.91					
Sulph. amm.	-0.2	-	-	0.5	-0.9	-1.0	0.6	0.7	-1.1	1.0	-1.4
Super.	-0.3	0.4	-1.0	-	-	-4.7	4.1	-0.2	-0.4	0.1	-0.7
Mur. Pot.	-0.3	-1.1	0.5	-4.7	4.1	-	-	0.6	-1.2	-2.9	2.3
Salt	-0.3	0.6	-1.2	-0.2	-0.4	0.6	-1.2	-	-	0.0	-0.6
Int. Cultn.	1.1	2.3	-0.1	1.5	0.7	-1.5	3.7	1.4	0.8	-	-

The above figures derive from the "ungapped" portions of plots.

https://doi.org/10.23637/ERADOC-1-186

P/11

Effects of Artificial Gapping

Proportion of plants removed	Roots (washed), tons/acre	Sugar percentage	Total Sugar, cwt./acre	Tops, tons/acre	Plant number, thous./acre
None	12.19	17.82	43.4	10.39	28.5
1/6	12.46	17.75	44.2	10.29	24.7
1/3	12.02	17.53	42.2	10.42	20.6
1/2	8.81	17.49	30.7	8.57	16.3
	±0.444	±0.166	±1.55	±0.478	

The (0 + 1/6 - 1/3 - 1/2), (0 - 1/6 - 1/3 + 1/2) and (0 - 1/6 + 1/3 - 1/2) gapping effects were confounded with the treatment interactions PK, PC, KC respectively in the "gapped" portion of the experiment.

https://doi.org/10.23637/ERADOC-1-186

P/12

Sugar Beet - Factory Series

Woburn 1940

Differential Responses

	Mean Resp.	Sulph. amm. Abs.	Sulph. amm. Pres.	Super Abs.	Super Pres.	Mur. Potash Abs.	Mur. Potash Pres.	Salt Abs.	Salt Pres.	Cultivation Norm.	Cultivation Int.
Roots (washed), tons per acre. Mean yield 16.37											
	±0.529					±0.735					
Sulph. amm.	5.56	-	-	4.82	6.30	5.56	5.56	5.34	5.78	7.10	4.02
Super.	-0.31	-1.05	0.43	-	-	-0.97	0.35	-0.01	-0.61	0.45	-1.07
Mur. Pot.	-0.81	-0.81	-0.81	-1.47	-0.15	-	-	-1.12	-0.50	-1.56	-0.06
Salt	0.11	-0.11	0.33	0.41	-0.19	-0.20	0.42	-	-	-0.18	0.40
Int. Cultn.	0.76	2.30	-0.78	1.52	0.00	0.01	1.51	0.47	1.05	-	-
Sugar Percentage. Mean 18.29											
	±0.196					±0.277					
Sulph. amm.	-0.23	-	-	-0.15	-0.31	-0.25	-0.21	-0.24	-0.22	-0.62	0.16
Super.	0.38	0.46	0.30	-	-	0.47	0.29	0.45	0.31	0.33	0.43
Mur. Pot.	0.45	0.43	0.47	0.54	0.36	-	-	0.49	0.41	0.24	0.66
Salt	0.02	0.01	0.03	0.09	-0.05	0.06	-0.02	-	-	0.08	-0.04
Int. Cultn.	-0.02	-0.41	0.37	-0.07	0.03	-0.23	0.19	0.04	-0.08	-	-
Total Sugar, cwt. per acre. Mean yield 59.8											
	±1.81					±2.56					
Sulph. amm.	19.6	-	-	17.1	22.1	19.4	19.8	18.8	20.4	24.1	15,1
Super.	-0.1	-2.6	2.4	-	-	-2.0	1.8	1.4	-1.6	2.3	-2.5
Mur. Pot.	-1.5	-1.7	-1.3	-3.4	0.4	-	-	-2.5	-0.5	-5.1	2.1
Salt	0.5	-0.3	1.3	2.0	-1.0	-0.5	1.5	-	-	-0.4	1.4
Int. Cultn.	3.0	7.5	-1.5	5.4	0.6	-0.6	6.6	2.1	3.9	-	-
Tops, tons per acre. Mean yield 9.84											
	±0.541					±0.765					
Sulph. amm.	4.76	-	-	4.16	5.36	4.56	4.96	3.64	5.88	5.69	3.83
Super.	-0.29	-0.89	0.31	-	-	-0.92	0.34	0.00	-0.58	0.39	-0.97
Mur. Pot.	-0.83	-1.03	-0.63	-1.46	-0.20	-	-	-0.84	-0.82	-1.44	-0.22
Salt	0.83	-0.29	1.95	1.12	0.54	0.82	0.84	-	-	0.36	1.30
Int. Cultn.	0.81	1.74	-0.12	1.49	0.13	0.20	1.42	0.34	1.28	-	-
Plant number, thousands per acre. Mean 34.5											
	±0.60					±0.85					
Sulph. amm.	-2.2	-	-	-2.3	-2.1	-1.5	-2.9	-2.6	-1.8	-1.3	-3.1
Super.	1.0	0.9	1.1	-	-	1.1	0.9	1.3	0.7	0.6	1.4
Mur. Pot.	-0.5	0.2	-1.2	-0.4	-0.6	-	-	-0.7	-0.3	0.2	-1.2
Salt	-0.6	-1.0	-0.2	-0.3	-0.9	-0.8	-0.4	-	-	-1.2	0.0
Int. Cultn.	-1.6	-0.7	-2.5	-2.0	-1.2	-0.9	-2.3	-2.2	-1.0	-	-

https://doi.org/10.23637/ERADOC-1-186 *pp 147*

Rothamsted 1941
Differential Responses

	Mean Resp.	Sulph. amm. Abs.	Sulph. amm. Pres.	Super Abs.	Super Pres.	Mur. Potash Abs.	Mur. Potash Pres.	Salt Abs.	Salt Pres.	Cultivation None	Cultivation Early	Cultivation None	Cultivation Late
Roots (washed), tons per acre. Mean yield 9.38													
	±0.149						±0.210						
Sulph. amm.	3.88	-	-	3.58	4.18	3.77	3.99	3.45	4.32	4.10	3.67	3.50	4.27
Super.	0.22	-0.08	0.52	-	-	0.21	0.23	0.06	0.38	-0.19	0.64	-0.05	0.50
Mur. Pot.	0.42	0.31	0.53	0.41	0.43	-	-	0.84	0.00	0.59	0.25	0.60	0.24
Salt	0.46	0.03	0.90	0.30	0.62	0.89	0.04	-	-	0.52	0.41	0.46	0.47
Cult. Early	0.70	0.91	0.49	0.29	1.12	0.87	0.53	0.76	0.65	-	-	0.73	0.67
Cult. Late	-0.30	-0.69	0.08	-0.58	-0.03	-0.12	-0.48	-0.31	-0.29	-0.27	-0.33	-	-
Sugar percentage. Mean, 17.77													
	±0.049						±0.070						
Sulph. amm.	0.01	-	-	0.05	-0.04	0.05	-0.04	-0.04	0.06	0.06	-0.05	0.08	-0.07
Super.	0.02	0.06	-0.03	-	-	0.05	-0.02	0.09	-0.06	0.06	-0.02	0.13	-0.10
Mur. Pot.	0.10	0.14	0.05	0.13	0.07	-	-	0.21	-0.02	0.18	0.02	0.08	0.11
Salt	0.19	0.14	0.24	0.27	0.12	0.31	0.08	-	-	0.16	0.23	0.31	0.08
Cult. Early	-0.03	0.03	-0.08	0.01	-0.07	0.05	-0.11	-0.06	0.00	-	-	-0.07	0.01
Cult. Late	0.05	0.13	-0.02	0.17	-0.06	0.04	0.07	0.17	-0.06	0.02	0.09	-	-
Total Sugar, cwt. per acre. Mean yield, 33.3													
	±0.53						±0.75						
Sulph. amm.	13.8	-	-	12.8	14.8	13.5	14.2	12.1	15.5	14.7	12.9	12.6	15.1
Super.	0.8	-0.2	1.8	-	-	0.8	0.8	0.3	1.2	-0.7	2.3	0.1	1.5
Mur. Pot.	1.6	1.3	2.0	1.7	1.6	-	-	3.3	-0.1	2.3	0.9	2.2	1.0
Salt	2.0	0.3	3.8	1.6	2.5	3.7	0.3	-	-	2.1	1.9	2.2	1.8
Cult. Early	2.4	3.3	1.6	0.9	3.9	3.2	1.7	2.5	2.3	-	-	2.4	2.4
Cult. Late	-1.0	-2.3	0.3	-1.7	-0.3	-0.4	-1.6	-0.8	-1.2	-1.0	-1.0	-	-

The above figures derive from the "ungapped" portions of plots.

P/13

Rothamsted 1941

Differential Responses

	Mean Resp.	Sulph. amm. Abs.	Sulph. amm. Pres.	Super Abs.	Super Pres.	Mur. Potash Abs.	Mur. Potash Pres.	Salt Abs.	Salt Pres.	Cultivation None	Cultivation Early	Cultivation None	Cultivation Late
Tops, tons per acre. Mean yield, 8.39													
	±0.243						±0.344						
Sulph. amm.	5.44	-	-	5.58	5.30	5.47	5.42	5.30	5.59	5.35	5.54	5.19	5.70
Super.	-0.36	-0.22	-0.50	-	-	-0.37	-0.35	-0.46	-0.25	-0.45	-0.26	-0.83	0.11
Mur. Pot.	0.52	0.54	0.50	0.51	0.53	-	-	0.80	0.25	0.69	0.35	0.49	0.55
Salt	0.26	0.11	0.41	0.16	0.36	0.54	-0.01	-	-	0.20	0.33	0.34	0.18
Cult. Early	0.78	0.69	0.87	0.69	0.87	0.95	0.61	0.72	0.84	-	-	0.80	0.76
Cult. Late	-0.20	-0.46	0.05	-0.68	0.27	-0.24	-0.17	-0.13	-0.28	-0.18	-0.23	-	-
Plant number, thousands per acre. Mean, 31.0													
	±0.36						±0.50						
Sulph. amm.	-0.4	-	-	-0.4	-0.4	-0.3	-0.5	-0;8	0.0	0.2	-0.9	0.0	-0.7
Super.	0.4	0.4	0.4	-	-	0.7	0.1	0.7	0.0	-0.1	0.8	-0.1	0.8
Mur. Pot.	0.2	0.3	0.1	0.5	-0.1	-	-	0.0	0.4	0.3	0.2	-0.1	0.5
Salt	-0.5	-0.9	-0.1	-0.2	-0.8	-0.7	-0.3	-	-	-0.6	-0.4	-1.0	0.0
Cult. Early	-1.1	-0.5	-1.6	-1.5	-0.8	-1.0	-1.1	-1.2	-1.0	-	-	-0.8	-1.4
Cult. Late	0.3	0.7	0.0	-0.1	0.8	0.0	0.6	-0.2	0.8	0.6	0.0	-	-

The above figures derive from the "ungapped" portions of plots

Effects of Artificial Gapping

Proportion of plants removed	Roots (washed), tons per acre	Sugar percentage	Total Sugar, cwt. per acre	Tops, tons per acre	Plant number, thous. per acre
None	10.42	17.83	37.1	9.42	31.3
1/6	9.45	17.81	33.6	9.22	26.7
1/3	8.82	17.68	31.2	8.78	23.1
1/2	7.99	17.60	28.1	8.45	19.0
	±0.216	±0.056	±0.77	±0.254	

SUGAR BEET

Woburn Butt Close 1941

Effects of early and late weeding, hoeing and pulling weeds and of sulphate of ammonia.

Design; 6 randomized blocks of 6 plots each. Certain interactions confounded between blocks.

Area of each plot; 0.00333 acre.

Treatments

Weeding: Early (before singling), late (after singling), early and late.
Method: pulled, hoed.
Sulphate of ammonia: None, 0.8 cwt. N per acre.

Basal manuring: 1.0 cwt. P_2O_5 per acre as superphosphate, 1.2 cwt. K_2O per acre as sulphate of potash and 5 cwt. salt per acre.

Crop Notes

Sown, May 9. Lifted, Nov. 12. Variety, Kleinwanzleben E. Previous crop, Barley.

Standard errors per plot:
Roots (washed): 0.869 tons per acre or 7.4%, 19 d.f.
Sugar percentage: 0.493, 19 d.f.
Total sugar: 3.95 cwt. per acre or 8.5%, 19 d.f.
Tops: 1.08 tons per acre or 9.2%, 19 d.f.

https://doi.org/10.23637/ERADOC-1-186 *pp 150*

P/16

Sugar Beet - Butt Close 1941

Time of weeding	Early	Late	Early and Late	Mean	No nitrogen	Nitrogen
Roots (washed): tons per acre						
		±0.355		±0.205	±0.290	
Pulled	11.45	10.90	11.96	11.44	9.02	13.86
Hoed	12.09	11.52	12.32	11.98	10.17	13.79
No nitrogen	9.66	8.37	10.74	9.59		
Nitrogen	13.88	14.05	13.54	13.83		
Mean ±0.251	11.77	11.21	12.14	11.71		
Sugar percentage						
		±0.201		±0.116	±0.164	
Pulled	19.99	20.13	19.92	20.01	20.10	19.94
Hoed	19.83	19.85	19.54	19.74	19.70	19.78
No nitrogen	20.03	19.87	19.80	19.90		
Nitrogen	19.79	20.11	19.66	19.86		
Mean ±0.142	19.91	19.99	19.73	19.88		
Total sugar: cwt. per acre						
		±1.61		±0.931	±1.32	
Pulled	45.7	43.9	47.7	45.8	36.2	55.3
Hoed	47.9	45.7	48.2	47.2	40.0	54.5
No nitrogen	38.6	33.2	42.5	38.1		
Nitrogen	55.0	56.4	53.3	54.9		
Mean ±1.14	46.8	44.8	47.9	46.5		
Tops: tons per acre						
		±0.441		±0.255	±0.360	
Pulled	9.80	11.10	11.99	10.96	7.69	14.23
Hoed	11.96	12.54	12.63	12.38	8.93	15.83
No nitrogen	7.72	7.97	9.24	8.31		
Nitrogen	14.04	15.67	15.38	15.03		
Mean ±0.312	10.88	11.82	12.31	11.67		

https://doi.org/10.23637/ERADOC-1-186

SUGAR BEET SEED

Woburn Butt Close 1942

Woburn Lansome 1943

Effects of dung, sulphate of ammonia, superphosphate, muriate of potash and salt, and of time of application of sulphate of ammonia.

Design: 4 randomized blocks of 8 plots each, certain interactions being confounded between blocks. One half replicate of all treatment combinations.

Area of each plot 1942: 0.0118 acre
1943: 0.0103 acre.

Treatments

Dung: None, 10 tons per acre.
Sulphate of ammonia: None, 0.4 cwt. N per acre.
Superphosphate: None, 0.6 cwt. P_2O_5 per acre.
Muriate of potash: None, 0.75 cwt. K_2O per acre.
Agricultural salt: None, 3.0 cwt. per acre.
Time of application of sulphate of ammonia: Early (applied at transplanting), Late (top dressing; June 3 in 1942, May 17 in 1943).

Crop Notes

1942: Seed sown in seed bed: 21/7/41. Stocklings planted out: March 19. Cut: Sept 14. Variety: Mother seed of Klein E.
1943: Stocklings planted: Feb. 26. Harvested Sept. 3. Variety: Kleinwanzleben E.

Standard errors per plot:

Dressed seed: 1942: 2.68 cwt. per acre or 19.7%, 13 d.f.
1943: 2.18 cwt. per acre or 19.7%, 13 d.f.

Percentage germination in 6 days, 1942: 5.88, 13 d.f.
1943: 6.66, 13 d.f.
Percentage final germination, 1942: 5.44, 13 d.f.
1943: 5.80, 13 d.f.

https://doi.org/10.23637/ERADOC-1-186 *pp 152*

1942, Differential responses

Resp. to	Mean	Dung Absent	Dung Present	Sulph.amm. Absent	Sulph.amm. Present	Super Absent	Super Present	Mur.pot. Absent	Mur.pot. Present	Salt Absent	Salt Present
Dressed Seed, cwt. per acre, Mean yield, 13.6											
	±0.95					±1.34					
Dung	3.8	--	-	3.8	3.8	2.9	4.7	4.9	2.7	3.9	3.7
Sulph.amm.	2.4	2.4	2.4	-	-	0.7	4.1	1.9	2.9	1.2	3.6
Super.	0.4	-0.5	1.3	-1.3	2.1	-	-	1.3	-0.5	1.0	-0.2
Mur.pot.	0.7	1.8	-0.4	0.2	1.2	1.6	-0.2	-	-	1.0	0.4
Salt	1.6	1.7	1.5	0.4	2.8	2.2	1.0	1.9	1.3	-	-
Percentage germination in 6 days: Mean 74.5											
	±2.08					±2.94					
Dung	2.9	-	-	5.7	0.1	1.3	4.5	3.1	2.7	2.3	3.5
Sulph.amm.	-3.1	-0.3	-5.9	-	-	-2.9	-3.3	-6.9	0.7	-4.9	-1.3
Super.	-0.7	-2.3	0.9	-0.5	-0.9	-	-	-1.6	0.2	-1.4	0.0
Mur.pot.	0.1	0.3	-0.1	-3.7	3.9	-0.8	1.0	-	-	-2.3	2.5
Salt	1.1	0.5	1.7	-0.7	2.9	0.4	1.8	-1.3	3.5	-	-
Final percentage germination: Mean 79.0											
	±1.92					±2.72					
Dung	3.1	-	-	5.3	0.9	1.8	4.4	2.5	3.7	1.3	4.9
Sulph.amm.	-1.9	0.3	-4.1	-	-	-1.0	-2.8	-5.2	1.4	-3.7	-0.1
Super.	-0.7	-2.0	0.6	0.2	-1.6	-	-	-0.8	-0.6	-2.0	0.6
Mur.pot.	0.1	-0.5	0.7	-3.2	3.4	0.0	0.2	-	-	-2.2	2.4
Salt	1.1	-0.7	2.9	-0.7	2.9	-0.2	2.4	-1.2	3.4	-	-

Application of sulph.amm.	Seed cwt.per acre	Percentage germination in 6 days	final
	±0.95	±2.08	±1.92
Early	14.7	70.8	75.6
Late	14.9	75.1	80.5

1943 Differential responses

Resp. to	Mean	Dung		Sulph.amm.		Super		Mur.pot.		Salt	
		Absent	Present	Absent	Present	Absent	Present	Absent	Present	Absent	Present
Dressed Seed, cwt. per acre Mean yield, 11.1											
	±0.77					±1.09					
Dung	-1.0	-	-	-0.4	-1.6	-0.1	-1.9	-0.9	-1.1	-1.2	-0.8
Sulph.amm.	1.9	2.5	1.3	-	-	1.9	1.9	2.0	1.8	1.0	2.8
Super.	-0.1	0.8	-1.0	-0.1	-0.1	-	-	-0.9	0.7	-0.3	0.1
Mur.pot.	0.5	0.6	0.4	0.6	0.4	-0.3	1.3	-	-	0.8	0.2
Salt	1.5	1.3	1.7	0.6	2.4	1.3	1.7	1.8	1.2	-	-
Germination Percentage in Six Days: Mean 75.4											
	±2.36					±3.34					
Dung	1.8	-	-	4.6	-1.0	3.4	0.2	2,7	0.9	2.2	1.4
Sulph.amm.	-0.6	2.2	-3.4	-	-	2.2	-3.4	0.2	-1.4	-0.1	-1.1
Super.	1.0	2.6	-0.6	3.8	-1.8	-	-	1.4	0.6	2.9	-0.9
Mur.pot.	-0.2	0.7	-1.1	0.6	-1.0	0.2	-0.6	-	-	0.9	-1.3
Salt	0.0	0.4	-0.4	0.5	-0.5	1.9	-1.9	1.1	-1.1	-	-
Germination Percentage Final: Mean 79.3											
	±2.05					±2.90					
Dung	1.3	-	-	4.0	-1.4	2.5	0.1	2.1	0.5	2.1	0.5
Sulph.amm.	-1.7	1.0	-4.4	-	-	0.7	-4.1	-1.1	-2.3	-0.6	-2.8
Super.	1.1	2.3	-0.1	3.5	-1.3	-	-	0.7	1.5	2.2	0.0
Mur.pot.	0.2	1.0	-0.6	0.8	-0.4	-0.2	0.6	-	-	1.9	-1.5
Salt	-0.1	0.7	-0.9	1.0	-1.2	1.0	-1.2	1.6	-1.8	-	-

Application of sulph.amm.	Seed cwt.per acre	Percentage germination six days	Percentage germination final
	±0.77	±2.36	±2.05
Early	13.0	77.2	80.5
Late	11.0	73.0	76.4

P/20

SUGAR BEET

Woburn Butt Furlong 1943

Effects of weeding and levels of nitrogen.

Design: 6 randomized blocks of 6 plots each, certain interactions being confounded with block differences. Notes on the development of the crop were made by the Physics Dept.

Area of each plot: 0.0033 acre.

Treatments

Weeding: Minimum, early intensive (up to 2 or 3 weeks after singling), continuous intensive (throughout season).
Weeds removed by: Pulling, hoeing.
Sulphate of ammonia: None, 0.4, 0.8 cwt. N per acre.

Basal manuring: 3 cwt. agricultural salt per acre.

Crop Notes

Sown: April 13. Lifted: Nov. 23. Variety: Kleinwanzleben E.
previous crop: Barley.

Standard errors per plot: Roots (washed) 0.973 tons per acre or 9.0%, 13 d.f.
Tops, 0.964 tons per acre or 15.9%, 13 d.f.

https://doi.org/10.23637/ERADOC-1-186

Weeding	Sulph.amm.cwt. N per acre 0	0.4	0.8	Weeds Pulled	Hoed	Mean
Roots (washed): tons per acre						
		±0.520		±0.397		±0.281
Minimum	6.26	8.89	12.87	9.89	8.79	9.34
Early intensive	8.72	12.18	13.38	11.25	11.61	11.43
Continuous intensive	9.56	11.77	14.03	11.96	11.61	11.79
Mean	8.18	10.95	13.43	11.03	10.67	10.85
		±0.281		±0.230		
Pulled	8.55	10.87	13.68			
Hoed ±0.397	7.81	11.03	13.17			
Tops: tons per acre						
		±0.515		±0.394		±0.279
Minimum	3.82	5.15	7.77	5.96	5.20	5.58
Early intensive	4.53	6.36	7.52	6.00	6.27	6.14
Continuous intensive	4.88	6.67	8.01	6.14	6.90	6.52
Mean	4.41	6.06	7.77	6.03	6.12	6.08
		±0.279		±0.228		
Pulled ±0.394	4.78	5.89	7.43			
Hoed	4.04	6.23	8.10			
Sugar Percentage						
Minimum	18.97	19.14	19.32	19.10	19.18	19.14
Early intensive	18.69	19.24	18.50	18.84	18.79	18.81
Continuous intensive	19.20	19.06	18.91	18.89	19.22	19.06
Mean	18.95	19.15	18.91	18.94	19.06	19.00
Pulled	18.98	19.12	18.73			
Hoed	18.93	19.17	19.10			
Total Sugar: cwt. per acre						
Minimum	23.8	34.0	49.7	37.8	33.7	35.8
Early intensive	32.6	46.9	49.5	42.4	43.6	43.0
Continuous intensive	36.7	44.9	53.1	45.2	44.6	44.9
Mean	31.0	41.9	50.8	41.8	40.6	41.2
Pulled	32.5	41.6	51.2			
Hoed	29.6	42.3	50.3			

https://doi.org/10.23637/ERADOC-1-186 pp 156

P/22

SUGAR BEET

Woburn - Butt Close 1944

Effects of intensive hoeing and of sulphate of ammonia. Notes on the development of the crop were made by the Physics Dept.

Design: 2 randomized blocks of 9 plots each.

Area of each plot (after rejecting edge rows): 0.0033 acre.

Treatments

Hoeing: Till singling, till 2 weeks after singling, throughout the season.
Sulphate of ammonia: None, 0.4 and 0.8 cwt. per acre.

Basal Manuring: 3 cwt. agricultural salt per acre

Crop Notes

Sown: April 29. Lifted: Dec. 4. Variety: Klein. Previous crop: Barley.

Standard errors per plot: Roots (washed), 1.41 tons per acre or 9.0%, 8 d.f.
Sugar percentage, 0.550, 8 d.f.
Total sugar, 5.20 cwt. per acre or 9.6%, 8 d.f.
Tops, 1.46 tons per acre or 10.0%, 8 d.f.

https://doi.org/10.23637/ERADOC-1-186

Hoeing	Sulph.amm.cwt. N per acre 0	0.4	0.8	Mean
Roots (washed): tons per acre				
		±1.03		±0.58
Till singling	14.00	15.54	16.27	15.27
Till 2 weeks after singling	14.73	15.80	17.34	15.96
Throughout season	14.60	16.67	16.00	15.76
Mean ±0.58	14.44	16.00	16.54	15.66
Sugar Percentage				
		±0.39		±0.22
Till singling	16.68	17.48	17.22	17.13
Till 2 weeks after singling	17.16	17.52	16.85	17.18
Throughout season	17.05	17.84	17.24	17.38
Mean ±0.22	16.96	17.61	17.10	17.22
Total sugar: cwt. per acre				
		±3.7		±2.1
Till singling	47.0	54.2	56.1	52.4
Till 2 weeks after singling	50.6	55.4	58.3	54.8
Throughout season	49.7	59.5	55.2	54.8
Mean ±2.1	49.1	56.4	56.5	54.0
Tops: tons per acre				
		±1.0		±0.60
Till singling	11.32	12.39	14.40	12.70
Till 2weeks after singling	14.60	16.00	16.81	15.80
Throughout season	15.33	14.60	16.21	15.39
Mean ±0.60	13.75	14.33	15.81	14.63

https://doi.org/10.23637/ERADOC-1-186

P/24

SUGAR BEET

Sawyers 1944

Effect of virus infection and manuring of seed crop on the subsequent crop of beet.

Design: 8 randomized blocks of 8 plots, certain second and third order interactions being confounded with block differences.

Area of each plot: 0.0033 acre.

Treatments.

(a) Applied to the seed crop from which the seed for this experiment was grown in 1943
Sulphate of ammonia: None, 0.8 cwt. N per acre
Superphosphate: None, 1.0 cwt. P_2O_5 per acre
Muriate of potash: None, 1.2 cwt. K_2O per acre
Agricultural Salt: None, 5 cwt. per acre
Virus: Not infected and infected
(b) Applied in the seed bed in 1944
Complete fertilizer: None, 17 cwt. per acre containing:-
Sulphate of ammonia: 0.8 cwt. N per acre
Superphosphate: 1.0 cwt. P_2O_5 per acre
Muriate of potash: 1.2 cwt. K_2O per acre
Agricultural Salt: 5 cwt. per acre.

Crop Notes

Sown: May 9. Lifted: Nov. 23. Variety: Kleinwanzleben E. Previous Crop: Wheat.

Standard errors per plot: Roots (washed) (adjusted for plant number) 0.89 tons per acre or 14.9%, 18 d.f.
Sugar Percentage, 0.477, 19 d.f.
Total sugar (adjusted for plant number) 2.61 cwt. per acre or 15.3%, 18 d.f.
Tops (adjusted for plant number) 1.60 tons per acre or 9.6%, 18 d.f.
Plant number, 2.65 thousands per acre or 10.4%, 19 d.f.

The effects of the (a) treatments have been adjusted for variations in the plant numbers on the assumption that, since the seed-rate for the beet crop was constant, these variations are not caused by the treatments. The effects of the (b) treatment are not so adjusted.

https://doi.org/10.23637/ERADOC-1-186

Differential Responses to Fertilizers and Infection

Response to	Mean	Sulph. of amm. Abs.	Sulph. of amm. Pres.	Super-phosphate Abs.	Super-phosphate Pres.	Mur. of pot. Abs.	Mur. of pot. Pres.	Salt Abs.	Salt Pres.	Virus infection Abs.	Virus infection Pres.	Comp. fert. Abs.	Comp. fert. Pres.
Roots (washed) tons per acre Mean yield 5.97													
	±0.22												
Sulph. of amm.	0.32	-	-	0.84	-0.20	0.55	0.09	-0.43	1.07	0.35	0.29	0.40	0.24
Superphosphate	-0.12	0.40	-0.64	-	-	-0.23	-0.01	-0.30	0.06	0.19	-0.43	-0.05	-0.19
Mur. of pot.	0.18	0.41	-0.05	0.07	0.29	-	-	-0.10	0.46	0.13	0.23	0.05	0.31
Salt	-0.11	-0.86	0.64	-0.29	0.07	-0.39	0.17	-	-	-0.10	-0.12	-0.17	-0.05
Virus infection	-0.44	-0.41	-0.47	-0.13	-0.75	-0.49	-0.39	-0.43	-0.45	-	-	-0.17	-0.71
Comp. fert. ±0.37	1.23[a]	1.31	1.15	1.30	1.16	1.10	1.36	1.17	1.29	1.50	0.96	-	-
Sugar Percentage Mean 14.26													
	±0.12								±0.17				
Sulph. of amm.	0.12	-	-	0.27	-0.03	0.03	0.21	0.06	0.18	0.22	0.02	0.21	0.03
Superphosphate	-0.01	0.14	-0.16	-	-	0.38	-0.40	-0.04	0.02	0.13	-0.15	0.06	-0.08
Mur. of pot.	-0.18	-0.27	-0.09	0.21	-0.57	-	-	-0.16	-0.20	-0.20	-0.16	-0.16	-0.20
Salt	0.17	0.11	0.23	0.14	0.20	0.19	0.15	-	-	0.16	0.18	0.10	0.24
Virus infection	0.00	0.10	-0.10	0.14	-0.14	-0.02	0.02	-0.01	0.01	-	-	0.01	-0.01
Comp. fert.	-0.38	-0.29	-0.47	-0.31	-0.45	-0.36	-0.40	-0.45	-0.31	-0.37	-0.39	-	-
Total Sugar, cwt. per acre Mean yield 17.0													
	±0.65								±0.92				
Sulph. of amm.	1.0	-	-	2.6	-0.6	1.5	0.5	-1.2	3.2	1.2	0.8	1.4	0.6
Superphosphate	-0.8	0.8	-2.4	-	-	-0.7	-0.9	-1.2	-0.4	0.3	-1.9	-0.6	-1.0
Mur. of pot.	0.3	0.8	-0.2	0.4	0.2	-	-	-0.4	1.0	0.1	0.5	0.0	0.6
Salt	-0.1	-2.3	2.1	-0.5	0.3	-0.8	0.6	-	-	-0.1	-0.1	-0.4	0.2
Virus infection	-1.2[b]	-1.0	-1.4	-0.1	-2.3	-1.4	-1.0	-1.2	-1.2	-	-	-0.4	-2.0
Comp. fert. ±1.07	3.0	3.4	2.6	3.2	2.8	2.7	3.3	2.7	3.3	3.8	2.2	-	-

Standard errors (a) 0.26 (b) 0.76

https://doi.org/10.23637/ERADOC-1-186

Differential Responses to Fertilizers and Infection

	Mean	Sulph. of amm. Abs.	Sulph. of amm. Pres.	Super phosphate Abs.	Super phosphate Pres.	Mur. of pot. Abs.	Mur. of pot. Pres.	Salt Abs.	Salt Pres.	Virus infection Abs	Virus infection Pres.	Comp. fert Abs.	Comp. fert Pres.
Tops, tons per acre. Mean Yield 16.68													
	±0.40							±0.57					
Sulph. of amm.	0.80	–	–	0.57	1.03	0.86	0.74	-1.25	2.85	0.99	0.61	0.59	1.01
Superphosphate	-0.15	-0.38	0.08	–	–	0.16	-0.46	-1.16	0.86	0.25	-0.55	-0.25	-0.05
Mur. of pot.	0.62	0.68	0.56	0.93	0.31	–	–	0.23	1.01	0.62	0.62	0.14	1.10
Salt	-0.46	-2.51	1.59	-1.47	0.55	-0.85	-0.07	–	–	-0.53	-0.39	-0.87	-0.05
Virus infection	-1.10	-0.91	-1.29	-0.70	-1.50	-1.10	-1.10	-1.17	-1.03	–	–	-0.45	-1.75
Comp.fert. ±0.65	7.66 [a]	7.45	7.87	7.56	7.76	7.18	8.14	7.25	8.07	8.31	7.01	–	–
Plant Number, thousands per acre. Mean 25.5													
	±0.66							±0.94					
Sulph. of amm.	-0.5	–	–	0.5	-1.5	-0.2	-0.8	-0.7	-0.3	-0.5	-0.5	-1.1	0.1
Superphosphate	0.9	1.9	-0.1	–	–	0.8	1.0	0.4	1.4	0.7	1.1	1.4	0.4
Mur. of pot.	-0.8	-0.5	-1.1	-0.9	-0.7	–	–	-1.4	-0.2	-0.2	-1.4	-1.4	-0.2
Salt	0.0	-0.2	0.2	-0.5	0.5	-0.6	0.6	–	–	0.2	-0.2	0.4	-0.4
Virus infection	0.0	0.0	0.0	-0.2	0.2	0.6	-0.6	0.2	-0.2	–	–	0.4	-0.4
Comp. fert.	-2.7	-3.3	-2.1	-2.2	-3.2	-3.3	-2.1	-2.3	-3.1	-2.3	-3.1	–	–

Standard error: (a) 0.46.

SUGAR BEET

Woburn Butt Close 1944

Effects of deep cultivation by hand. Notes on the development of the crop were made by the Physics Dept.

Design: 4 x 4 Latin square.

Area of each plot: 0.00155 acre.

Treatments

No cultivation beyond ordinary ploughing; digging by hand one spit deep; digging by hand two spits deep, leaving the lower spit in situ; digging by hand two spits deep, bringing the lower spit to the surface.

Crop Notes.

Sown: May 1. Lifted: Nov 27. Variety: Kleinwanzleben. Previous crop, Barley.

Standard Errors per plot:

Roots (washed):	1.24 tons per acre or 8.6%, 6 d.f.
Sugar percentage:	0.461, 6 d.f.
Total sugar:	5.29 cwt. per acre or 10.9%, 6 d.f.
Tops:	2.59 tons per acre or 14.8%, 6 d.f.

Hand digging	Roots (washed) tons per acre	Sugar Percentage	Total sugar cwt per acre	Tops Tons per acre
	±0.62	±0.23	±2.6	±1.30
No land digging	13.90	17.13	47.6	16.21
1 Spit deep	14.40	16.51	47.6	17.86
2 Spits deep	14.55	16.96	49.3	17.50
2 Spits, bringing lower to surface	15.05	16.58	49.9	18.29
Mean	14.48	16.79	48.6	17.47

https://doi.org/10.23637/ERADOC-1-186

Q/1

CARROTS

Woburn Lansome 1939 (6th year)

The effects of sulphate of ammonia, poultry manure, soot, rape dust and dung.

Design; 4 randomized blocks of 12 plots each.

Area of each plot; 0.00588 acre.

Treatments

None: Sulphate of ammonia at 0.4 and 0.8 cwt. N per acre (half in seed bed and half as top dressing) Poultry manure, soot and rape dust all at 0.8 cwt. N per acre: dung ploughed-in at 0.8 and 1.6 cwt. N per acre every second year including 1939, and every second year excluding 1939, and at 0.8 cwt. N per acre every year.

Basal manuring; superphosphate and muriate of potash applied to give a total of 1.0 cwt. P_2O_5 and 1.0 cwt. K_2O, per acre, including the P_2O_5 and K_2O in the organic fertilizer.

Crop Notes

Sown: May 22. Harvested: Oct. 27 and Nov. 11. Variety, Cooper's Early Market. Previous crop, kale (see 1938 Station Report, p.164).

Standard error per plot: 2.41 tons per acre or 20.5%, (34 d.f.)

Mean Yields: tons per acre

None	Sulphate of ammonia		Poultry Manure	Soot	Rape dust	
	0.4	0.8	0.8	0.8	0.8	cwt. N per acre
±0.852			±1.20			
10.56	11.04	11.88	13.83	12.92	13.03	

Dung						
1938	0.8	1.6	0.8	0	0 cwt. N	Mean of
1939	0	0	0.8	0.8	1.6 per acre	all plots
			±1.20			
	10.19	11.35	11.74	11.36	12.45	11.74

https://doi.org/10.23637/ERADOC-1-186

Q/2

CARROTS

Woburn - Lansome 1941

Woburn - Butt Close 1942

Effects of sulphate of ammonia, superphosphate, muriate of potash and agricultural salt. These two experiments form part of a country wide series of 25 similar experiments.

Design; 4 randomized blocks of 8 plots each, the third order interaction being confounded with block differences.

Area of each plot, 0.00875 acre.

Treatments

Sulphate of ammonia:	1941, None, 0.4 cwt. N per acre.
	1942, None, 0.3 cwt. N per acre.
Superphosphate:	1941, None, 0.8 cwt. P_2O_5 per acre.
	1942, None, 0.6 cwt. P_2O_5 per acre.
Muriate of potash:	1941, None, 1.0 cwt. K_2O per acre.
	1942, None, 0.9 cwt. K_2O per acre.
Agricultural salt:	1941 and 1942: None, 3.0 cwt. per acre.

Crop Notes

	Seed sown	Harvested	Variety	Previous crop
1941	June 23	Oct. 21, 31, Nov. 4,12*	Cooper's Early Market	Oats
1942	April 14	Aug. 27, Sept. 3, Oct. 20 - Nov. 12	Cooper's Intermediate	Sugar beet

*On each day a strip was taken through all plots.

Standard errors per plot:

1941 Total roots: 0.655 tons per acre or 12.6%, 12 d.f.
1942 1sts: 5.39 tons per acre or 23.5%, 14 d.f.
2nds: 0.590 tons per acre or 52.5%, 14 d.f.

Note: 2nds consisted mostly of splits together with the smalls.

https://doi.org/10.23637/ERADOC-1-186 *pp 164*

Q/3

1941 Differential responses; tons per acre

	Mean	Sulph. amm. Abs.	Sulph. amm. Pres.	Super Abs.	Super Pres.	Mur. Pot. Abs.	Mur. Pot. Pres.	Salt Abs.	Salt Pres.
				Total Roots. Mean yield: 5.21 tons per acre					
	±0.231					±0.327			
Sulph. amm.	2.11	-	-	2.42	1.80	2.32	1.90	1.92	2.30
Super	0.11	0.42	-0.20	-	-	0.25	-0.03	0.57	-0.35
Mur. pot.	-0.22	-0.01	-0.43	-0.08	-0.36	-	-	-0.40	-0.04
Salt	0.38	0.19	0.57	0.84	-0.08	0.20	0.56	-	-
				1942					
				1sts: Mean yield, 22.92 tons per acre					
	±1.91					±2.70			
Sulph. amm.	0.52	-	-	-1.20	2.24	4.17	-3.13	-0.35	1.39
Super.	0.11	-1.61	1.83	-	-	-2.40	2.62	2.30	-2.08
Mur. pot.	1.51	5.16	-2.14	-1.00	4.02	-	- -	1.29	1.73
Salt	4.22	3.35	5.09	6.41	2.03	4.00	4.44	-	-
				2nds: Mean yield, 1.12 tons per acre					
	±0.209					±0.296			
Sulph. amm.	0.14	-	-	0.05	0.23	0.18	0.10	-0.13	0.41
Super.	-0.12	-0.21	-0.03	-	-	-0.11	-0.13	0.22	-0.46
Mur. pot.	-0.03	0.01	-0.07	-0.02	-0.04	-	-	-0.10	0.04
Salt	0.42	0.15	0.69	0.76	0.08	0.35	0.49	-	-

https://doi.org/10.23637/ERADOC-1-186

https://doi.org/10.23637/ERADOC-1-186

FLAX

Long Hoos 1942
Long Hoos 1943
Sawyers I 1944

Effects of sulphate of ammonia, superphosphate, muriate of potash and agricultural salt (the latter in 1942 and 1943 only). These three experiments form part of a country wide series of 39 similar experiments.

Designs; 1942, 1943: 4 randomized blocks of 8 plots each, the third order interactions being confounded with block differences.
1944: 4 randomized blocks of 8 plots each.

Area of each plot: 1942, 0.0141 acre
1943, 0.0196 acre
1944, 0.0200 acre

Treatments

All years:	Sulphate of ammonia:	None, 0.2 cwt. N per acre
	Superphosphate:	None, 0.5 cwt. P_2O_5 per acre
	Muriate of potash:	None, 0.75 cwt. K_2O per acre
1942,1943:	Agricultural salt:	None, 3.00 cwt. per acre.

Crop Notes

	Seed sown	Harvested (hand pulled)	Variety	Previous crop
1942	April 13	July 15-20	Liral Monarch	Barley
1943	March 29	July 9-15	Liral Monarch	Sugar beet
1944	April 10	July 24-27	Liral Prince	Wheat

Standard errors per plot:

	1942		1943		1944	
	cwt. per acre	%	cwt. per acre	%	cwt. per acre	%
Total produce	3.76	16.5	2.66	8.2	2.06	5.6
Seed	0.669	28.9	0.305	8.5	0.68	18.2
Scutched flax Retted	-	-	-	-	0.44	11.7
Scutched flax Green	0.525	17.8	0.802	17.6	0.49	8.7
All based on	14 d.f.		14 d.f.		21 d.f.	

https://doi.org/10.23637/ERADOC-1-186

R/2

Flax

1942 Differential Responses, cwt. per acre

	Mean	Sulph. of amm. Abs.	Sulph. of amm. Pres.	Superphosphate Abs.	Superphosphate Pres.	Mur. of Pot. Abs.	Mur. of Pot. Pres.	Salt Abs.	Salt Pres.
Total produce. Mean yield 22.74 cwt. per acre									
	±1.33				±1.88				
Sulph. amm.	2.58	-	-	3.29	1.87	0.84	4.32	1.47	3.69
Super.	0.36	1.07	-0.35	-	-	00.44	0.28	1.23	-0.51
Mur. pot.	0.20	-1.54	1.94	0.28	0.12	-	-	2.66	-2.26
Salt	2.02	0.91	3.13	2.89	1.15	4.48	-0.44	-	-
Seed. Mean yield 2.31 cwt. per acre									
	±0.237				±0.335				
Sulph. amm.	-0.07	-	-	-0.14	0.00	-0.44	0.30	-0.50	0.36
Super.	0.37	0.30	0.44	-	-	0.20	0.54	0.58	0.16
Mur. pot.	-0.09	-0.46	0.28	-0.26	0.08	-	-	-0.18	0.00
Salt	0.25	-0.18	0.68	0.46	0.04	0.16	0.34	-	-
Scutched flax (green) Mean yield 2.94 cwt. per acre									
	±0.185				±0.262				
Sulph. amm.	0.77	-	-	0.61	0.93	0.57	0.97	0.57	0.97
Super.	0.20	0.04	0.36	-	-	0.06	0.34	0.38	0.02
Mur. pot.	-0.20	-0.40	0.00	-0.34	-0.06	-	-	0.33	-0.73
Salt	0.44	0.24	0.64	0.62	0.26	0.97	-0.09	-	-

1943

	Mean	Sulph. of amm. Abs.	Sulph. of amm. Pres.	Superphosphate Abs.	Superphosphate Pres.	Mur. of Pot. Abs.	Mur. of Pot. Pres.	Salt Abs.	Salt Pres.
Total produce. Mean yield 32.2 cwt. per acre									
	±0.940				±1.33				
Sulph. amm.	3.7	-	-	5.2	2.2	3.2	4.2	3.2	4.2
Super.	1.3	2.8	-0.2	-	-	2.4	0.2	-0.1	2.7
Mur. pot.	-1.7	-2.2	-1.2	-0.6	-2.8	-	-	-1.7	-1.7
Salt	1.1	0.6	1.6	-0.3	2.5	1.1	1.1	-	0
Seed. Mean yield 3.59 cwt. per acre									
	±0.108				±0.153				
Sulph. amm.	0.38	-	-	0.54	0.22	0.36	0.40	0.39	0.37
Super.	0.06	0.22	-0.10	-	-	0.20	-0.08	-0.07	0.19
Mur. pot.	-0.16	-0.18	-0.14	-0.02	-0.30	-	-	-0.13	-0.19
Salt	0.19	0.20	0.18	0.06	0.32	0.22	0.16	-	-
Scutched flax (green) Mean yield 4.57 cwt. per acre									
	±0.284				±0.402				
Sulph. amm.	0.38	-	-	0.32	0.44	0.11	0.65	0.06	0.70
Super.	0.21	0.15	0.27	-	-	0.50	-0.08	0.13	0.29
Mur. pot.	0.05	-0.22	0.32	0.34	-0.24	-	-	0.03	0.07
Salt	-0.09	-0.41	0.23	-0.17	-0.01	-0.11	-0.07	-	-

https://doi.org/10.23637/ERADOC-1-186 *pp 168*

1944. Differential Responses, cwt. per acre

	Mean	Sulph. of amm. Abs.	Sulph. of amm. Pres.	Superphosphate Abs.	Superphosphate Pres.	Mur. of Pot. Abs.	Mur. of Pot. Pres.
Total produce. Mean yield 37.0 cwt. per acre							
	±0.73			±1.03			
Sulph. amm.	1.7	-	-	1.1	2.3	1.7	1.7
Super.	-1.0	-1.6	-0.4	-	-	1.2	-3.2
Mur. of Pot.	1.1	1.1	1.1	3.3	-1.1	-	-
Seed. Mean yield 3.72 cwt. per acre							
	±0.24			±0.34			
Sulph. amm.	-0.04	-	-	0.25	-0.33	0.14	-0.22
Super.	0.36	0.65	0.07	-	-	0.33	0.39
Mur. of Pot.	0.52	0.70	0.34	0.49	0.55	-	-
Scutched flax (retted) Mean yield 3.74 cwt. per acre							
	±0.15			±0.21			
Sulph. amm.	0.18	-	-	0.24	0.12	0.35	0.01
Super.	-0.34	-0.28	-0.40	-	-	-0.21	-0.47
Mur. of Pot.	-0.10	0.07	-0.27	0.03	-0.23	-	-
Scutched flax (Green) Mean yield 5.58 cwt. per acre							
	±0.17			±0.24			
Sulph. amm.	0.20	-	-	-0.10	0.50	0.15	0.25
Super.	-0.23	-0.53	0.07	-	-	0.03	-0.49
Mur. of Pot.	0.08	0.03	0.13	0.34	-0.18	-	-

https://doi.org/10.23637/ERADOC-1-186 *pp 169*

https://doi.org/10.23637/ERADOC-1-186

LETTUCE

Woburn Butt Close 1942

Effects of intensity of weedings, of pulling and hoeing weeds, of basal nitrogen in inorganic or in organic form, and of top dressing. Notes on the development of the crop were made by the Physics Department.

Design; 4 randomized blocks of 8 plots each, certain high order interactions being confounded with block differences.

Area of each plot, 0.00287 acre.

Treatments

Weeding: Light, intensive.
Removal of weeds: Pulling, hoeing.
Nitrogen in seed bed: None, 0.6 cwt. N per acre
Form of nitrogen: Inorganic (nitrochalk), organic (hoof meal).
Top dressing: None, 0.2 cwt. N per acre (nitrochalk).

The difference between the light and intensively weeded plots was an extra weeding for the latter.

Basal Manuring: Superphosphate 0.5 cwt. P_2O_5 per acre, muriate of potash 0.5 cwt. K_2O per acre.

Crop Notes

Sown: May 20. Cut: Aug. 4 and 12. Variety: All the Year Round. Previous crop: Sugar beet.

Standard errors per Plot: Total weight: 29.4 cwt. per acre or 20.1%, 13 d.f.
Total number: 2.97 thousands per acre or 11.1%, 13 d.f.

Differential responses

	Mean response	Weeding		Removal of weeds		Seed-bed nitrogen		Seedbed nitrogen		Top dressing	
		Light	Intensive	Hoeing	Pulling	None		Inorganic	Organic	None	
Total weight, cwt. per acre: Mean 146.6											
	±10.4				±14.7						
A	34.9	-	-	34.2	35.6	28.7	41.1	confounded		46.7	23.1
B	14.9	14.2	15.6	-	-	-5.4	35.2	18.0[b]	52.4[b]	-7.4	37.2
C	13.8	7.6	20.0	-6.5	34.1[b]	-	-	-	-	47.0	-19.4[b]
D	22.0[a]	confounded		4.8[b]	39.2[b]	-	-	-	-	39.6[b]	4.4
E	-33.7	-21.9	-45.5	-56.0	-11.4	-0.5	-66.9	-49.3[b]	-84.5[b]	-	-

A = Intensive - light weeding
B = Pulling - hoeing
C = Nitrogen in seed-bed
D = Seedbed nitrogen organic v.inorganic
E = Top dressing nitrogen

Standard errors (a) 14.7 (b) 20.8

https://doi.org/10.23637/ERADOC-1-186 *pp 171*

S/2

Lettuce - Woburn 1942

Differential Responses

	Mean response	Weeding: Light	Weeding: Intensive	Hoeing	Pulling	Seedbed nitrogen: None	Seedbed nitrogen: Nitrogen	Seedbed nitrogen: Inorganic	Seedbed nitrogen: Organic	Top dressing: None	Top dressing: Dressing
	±1.05						±1.48				
A	1.9	-	-	1.9	1.9	2.3	1.5	confounded[d]		2.9	0.9
B	0.5	0.5	0.5	-	-	-1.3	2.3	1.7[d]	2.9[d]	-1.6	2.6
C	-0.6[c]	-0.2	-1.0	-2.4[d]	1.2[d]	-	-	-	-	1.5[d]	-2.7[d]
D	2.1	confounded		1.5	2.7	-	-	-	-	2.2	2.0
E	-2.8	-1.8	-3.8	-4.9	-0.7	-0.7	-4.9	-4.8[d]	-5.0[d]	-	-

Plant number (thousands per acre): Mean 26.7

A = Intensive - light weeding
B = Pulling - hoeing
C = Nitrogen in seed-bed
D = Seedbed nitrogen organic v. inorganic
E = Top dressing nitrogen

Standard errors (c) 1.48 (d) 2.09

https://doi.org/10.23637/ERADOC-1-186 *pp 172*

LETTUCE

Woburn Butt Close 1943

The effect of dung, of sulphate of ammonia and of method and intensity of weeding. Notes on the development of the crop were made by the Physics Dept.

Design; 2 randomized blocks of 8 plots each, the third order interaction being confounded with block differences.

Area of each plot: 0.00287 acre.

Treatments

Dung: None, 15 tons per acre.
Sulphate of ammonia: None, 0.6 cwt. N per acre
Weeding: Normal (on 3 days) or intensive (on 5 days).
Method of weeding: Hoeing or pulling.

Crop Notes

Sown: Mar 29. Cut: June 21-29, July 5-14. Variety: All the Year Round.
Previous crop: Potatoes.

Note: Some of the plants in the first cutting were attacked by Botrytis.

Standard errors per plot:
Total weight: 0.86 tons per acre or 7.6%, 9 d.f.
Weight of first cutting: 1.01 tons per acre or 10.0%, 9 d.f.
Plant number, first cutting: 3.30 thousands per acre or 8.4%, 9 d.f.

Differential Responses

	Mean	Cultivations Normal	Cultivations Intensive	Weeding Hoeing	Weeding Pulling
Total weight: tons per acre. Mean yield 11.28					
	±0.43			±0.61	
Dung	1.06				
Nitrogen	4.67				
Intensive - Normal Cultivation	2.02			1.48	2.56
Hoeing - Pulling	0.88	1.42	0.34		
Total weight cut before June 29th: tons per acre. Mean yield 10.05					
	±0.50			±0.71	
Dung	1.33				
Nitrogen	5.59				
Intensive - Normal Cultivation	2.61			1.88	3.34
Hoeing - Pulling	1.09	1.82	0.36		

https://doi.org/10.23637/ERADOC-1-186 *pp 173*

S/4

Lettuce - Woburn 1943

Differential Responses

	Mean	Cultivations Normal	Cultivations Intensive	Weeding Hoeing	Weeding Pulling
Total number cut before June 29th: thousands per acre. Mean yield 39.4					
	±1.65			±2.33	
Dung	1.9				
Nitrogen	7.8				
Intensive - Normal Cultivation	5.0			3.5	6.5
Hoeing - Pulling	2.6	4.1	1.1		
Percentage number over 400 gms. Mean 9.5					
Dung	3.2				
Nitrogen	15.0				
Intensive - Normal Cultivation	7.5			7.3	7.8
Hoeing - Pulling	2.7	3.0	2.5		

https://doi.org/10.23637/ERADOC-1-186

LETTUCE

Woburn Butt Furlong 1944

Effects of cultivation under various manurial conditions (dung, hoof meal and sulphate of ammonia). Notes on the development of the crop were made by the Physics Department.

Design; 2 randomized blocks of 8 plots each, the 3rd order interaction being confounded with blocks.

Area of each plot, 0.00307 acre.

Treatments

Dung: None, 15 tons per acre (surface mulch)
Nitrogen: Hoof meal or sulphate of ammonia, 0.6 cwt. N per acre.
Method of removing weeds: Pulling or hoeing.
Weeding: Continuous intensive May and June, or early intensive May only

Crop Notes

Sown: April 14. Cut: July 8 to Aug. 4. Variety All the Year Round.
Previous crop: Sugar beet.

Standard errors per plot: Total Weight, 0.53 tons per acre or 6.3%, 9 d.f.
Total number, 3.14 thousands per acre or 10.5%,9 d.f.

	Differential Responses				
	Mean	Dung		Intensive Weeding	
		Absent	Present	Early	Continuous
Total weight.	**Mean yield 11.79 tons per acre**				
	±0.36		±0.52		
Response to dung	1.04	-	-	-0.59	2.66
Continuous - Early weeding	4.94	3.32	6.57	-	-
Hoof meal - Sulph. amm.	-0.84				
Pulling - Hoeing	-0.90				
Total number.	**Mean yield 41.9 thousands per acre**				
	±2.2		±3.2		
Response to dung	1.8	-	-	-2.1	5.7
Continuous - Early weeding	11.3	7.4	15.3	-	-
Hoof meal - Sulph. amm.	-0.8				
Pulling - Hoeing	-2.1				
Percentage total weight.	**Class I Lettuce. Mean 21.5**				
Response to dung	-0.1	-	-	-4.5	4.3
Continuous - early weeding	10.3	5.9	14.7	-	-
Hoof meal - Sulph. amm.	-7.3				
Pulling - Hoeing	-4.7				

Class I lettuces weigh over $\frac{3}{4}$ lb. each.

https://doi.org/10.23637/ERADOC-1-186 *pp 175*

S/6
Lettuce - Woburn 1944

	Differential Responses				
		Dung		Intensive Weeding	
	Mean	Absent	Present	Early	Continuous
Percentage total weight cut before July 19. Mean 92.3					
Response to dung	3.1	-	-	2.1	4.1
Continuous - Early weeding	-8.6	-9.6	-7.6	-	-
Hoof Meal - Sulph. amm.	-0.8				
Pulling - Hoeing	5.5				

https://doi.org/10.23637/ERADOC-1-186 *pp 176*

KALE

Woburn - Lansome 1937-39

The residual effects of Lupins as green manure.

Design; 4 × 4 Latin square.

Area of each plot, 0.0102 acre.

Treatments

Lupins were grown over the whole area in 1937.
0 = Whole plant removed.
R = Tops removed, roots only buried.
TR = Whole plants buried.
2TR= Whole plants and additional tops from plots receiving treatment (R) buried.
These treatments were applied to kale sown in 1937. This kale crop was a failure on account of drought. Kale was grown again in 1938 and 1939 without further treatments.

Crop Notes

1938. Sown: March 29. Harvested: Jan. 19, 1939. Variety: Thousand Head.
1939. Sown: May 23. Harvested: Jan. 26, 1940. Variety: Thousand Head

Standard errors per plot:
1938. 0.697 tons per acre or 8.4%, 6 d.f.
1939. 0.796 tons per acre or 18.7%, 6 d.f.

Treatment	Nitrogen content of buried lupins. lb. per acre (1937) As tops	As roots	Total
0	-	-	-
R	-	11.9	11.9
TR	106.6	11.6	118.2
2TR	216.9	11.6	228.5

Total produce, tons per acre

	1938	1939
	±0.348	±0.398
0	6.74	3.50
R	7.20	3.51
TR	8.68	4.73
2TR	10.76	5.31
Mean	8.35	4.26

https://doi.org/10.23637/ERADOC-1-186

T/2

KALE

Woburn Butt Furlong 1938-39

The effect of roots and tops of mustard, tares and lupins used as green manures.

Design; 4 randomized blocks of 15 plots each.

Area of each plot, 0.00478 acre.

Treatments

Green manures: Fallow, Mustard, Lupins, Tares. Plants pulled up after growing (0), plants cut and removed, but roots left in ground (R), plants ploughed in as grown (TR), plants ploughed in and additional tops from (R) plots also buried (2TR).

Crop Notes

1939. Green manures sown, April 21. Ploughed-in, July 4. Cut, Feb. 23, 1940. Kale sown, July 5. Variety, Thousand Head. Previous crop, Kale.

Standard error per plot; 0.444 tons per acre or 10.3%, 44 d.f.

Green manures, nitrogen content lb. per acre (1939)

	R	TR	2TR
Fallow		13.2	(from weeds)
Mustard	4.2	36.0	73.8
Lupins	14.5	91.8	159.8
Tares	16.5	58.5	94.0

1939, Total produce, tons per acre

	0	R	TR	2TR	Mean
		±0.222			±0.111
Fallow		4.20[a]			4.20[a]
Mustard	3.44	3.02	3.72	4.88	3.76
Lupins	3.48	4.23	5.73	6.31	4.94
Tares	3.30	3.79	4.93	5.14	4.29
Mean ±0.128	3.41	3.68	4.79	5.44	4.30

Standard error (a) 0.128

For 1938 yields, see 1938 Station Report, p. 163.

https://doi.org/10.23637/ERADOC-1-186

SPRING CABBAGE

Woburn Lansome 1942
Woburn Butt Close 1943

Effects of various waste organic manures and sulphate of ammonia, and of different times of application of sulphate of ammonia.

Design; 4 randomized blocks of 14 plots each.

Area of each plot, 0.00155 acre.

Treatments

Hoof meal, de-tanned leather waste (two types, L & M), erinoid casein plastic waste and sulphate of ammonia, each at rates of 0.6 and 1.2 cwt. N per acre.
Sulphate of ammonia applied in one dose at the time of planting out, in one dose in early spring, or in 2 equal doses one at the time of planting out and one in early spring.

Crop Notes

	Planted	Cut	Variety	Previous crop
1942	16/10/41	June 24 - July 13	Sutton's Early Giant	Carrots
1943	16/10/42	May	Flower of Spring	Potatoes

In 1943, very considerable damage was done by hares and rabbits; the results given are based on two blocks only, and from these two plots were missing.

Standard error per plot: 1942. Total produce, 0.846 tons per acre or 33.3%, 40 d.f.
1943. Total produce, 1.10 tons per acre or 30.4%, 12 d.f.

Total produce: tons per acre

cwt. N per acre	None	Hoof meal	Leather waste L	Leather waste M	Casein waste	Sulphate of ammonia: Planting time	Sulphate of ammonia: Early spring	Sulphate of ammonia: Both times
	1942. Mean yield: 2.54 tons per acre							
					±0.423			
0.6		3.74	1.88	2.23	2.33	2.59	3.32	2.39
1.2		2.55	2.17	1.49	2.34			4.95
Mean ±0.299	1.81	3.14	2.02	1.86	2.34			3.67
	1943. Mean yield 3.61 tons per acre							
					±0.778			
0.6		2.45	3.04	4.21[a]	1.83[a]	2.74	5.06	4.56
1.2		3.64	3.27	3.92	2.64			7.70
Mean ±0.550	2.76	3.04	3.16	4.06[b]	2.24[b]			6.13

Standard errors: (a) 1.10, (b) 0.635

https://doi.org/10.23637/ERADOC-1-186 *pp 179*

https://doi.org/10.23637/ERADOC-1-186

KOK - SAGHYZ

Hoosfield 1943

Effects of fertilizers and spacing. Taraxacum kok-saghyz is a dandelion found wild at an altitude of 7,000 feet in Kazakstan and cultivated in Russia as a source of latex. The rubber content of the roots is about 4% and 200 lb. per acre of rubber has been obtained in Russia.

Design; 12 randomized blocks of 4 plots each, certain interactions being confounded between blocks.

Area of each plot: For early harvesting, 0.00055 acre; for late harvesting, 0.00179 acre.

Treatments

Sulphate of ammonia: None, 0.6 cwt. N per acre (0.2 cwt. N in Autumn and 0.4 cwt. N in Spring).
Superphosphate: None, 0.6 cwt. P_2O_5 per acre
Muriate of potash: None, 1.0 cwt. K_2O per acre.
Spacings (applied to blocks): 18" between rows, 4" in row (i.e. between adjacent plants)
18" between rows, 8" in row.
12" between rows, 12" in row.

Crop Notes

Seed sown: Oct. 16. This sowing was not successful and the crop was resown on March 22. Harvested: Sept. 7 ('Early') and Nov. 8 ('Late'). Previous crop, Ryegrass.

Standard errors: between blocks, applicable to spacings:
Roots (early harvest) 1.56 cwt. per acre or 20.5%, 6 d.f.
Roots (late harvest) 1.64 cwt. per acre or 16.2%, 6 d.f.
applicable to artificials:
Roots (early harvest) 1.47 cwt. per acre or 19.4%, 18 d.f.
Roots (late harvest) 3.63 cwt. per acre or 35.9%, 18 d.f.
Plant number (early harvest) 9.51 thousands per acre or 19.9%, 18 d.f.
Plant number (late harvest) 7.27 thousands per acre or 16.1%, 18 d.f.

The seed used for the second sowing had been soaked and kept at 0°C for 14 days. This treatment increased the field germination (50% germination in 2 days compared with 5 days for untreated seed).

https://doi.org/10.23637/ERADOC-1-186

U/2

Kok-Saghyz

Differential Responses

	Mean	Sulph. amm. Abs.	Sulph. amm. Pres.	Superphosphate Abs.	Superphosphate Pres.	Mur. Pot. Abs.	Mur. Pot. Pres.
Roots, early harvest, cwt. per acre. Mean, 7.6							
	±0.42			±0.59			
Sulphate of ammonia	0.0			0.0	0.0	-1.3	1.3
Superphosphate	0.1	0.1	0.1			-0.4	0.6
Muriate of Potash	0.9	-0.4	2.2	0.4	1.4		
Roots, late harvest, cwt. per acre. Mean, 10.1							
	±1.05			±1.48			
Sulphate of ammonia	0.5			-0.8	1.8	0.4	0.6
Superphosphate	-0.4	-1.7	0.9			-0.6	-0.2
Muriate of Potash	0.1	0.0	0.2	-0.1	0.3		
Plant number, early harvest, thousands per acre. Mean, 47.9							
	±2.75			±3.88			
Sulphate of ammonia	-4.2			-0.6	-7.8	-4.4	-4.0
Superphosphate	0.5	4.1	-3.1			-2.6	3.6
Muriate of Potash	4.6	4.4	4.8	1.5	7.7		
Plant number, late harvest, thousands per acre. Mean, 45.1							
	±2.10			±2.97			
Sulphate of ammonia	-8.2			-9.1	-7.3	-5.9	-10.5
Superphosphate	1.9	1.0	2.8			-0.6	4.4
Muriate of Potash	2.2	4.5	-0.1	-0.3	4.7		

Spacing	Roots, cwt. per acre Early	Roots, cwt. per acre Late	Plant no., thous. per acre Early	Plant no., thous. per acre Late
	±0.78	±0.82		
18" between rows, 4" in row	7.6	9.5	48.2	47.0
18" between rows, 8" in row	6.7	9.9	40.8	40.1
12" between rows, 12" in row	8.5	10.9	54.7	48.3

The first spacing involved a seed-rate per unit area double that of the other two spacings.

https://doi.org/10.23637/ERADOC-1-186 *pp 182*

CLOVER

Great Knott 1937-39

Second year residual effect of dung, ploughed-in in January or applied in the ridges, and of straw, sulphate of ammonia, superphosphate and sulphate of potash. The manures were applied to the potato crop of 1937.

Design; 4 randomized blocks of 18 plots each, certain interactions being confounded with block differences.

Area of each plot: 0.0250 acre

Treatments

Applied to potatoes in 1937.
- Dung: None, 15 tons per acre, either ploughed-in in January or stored and applied in the ridges in May.
- Straw: None, 40 cwt. per acre (chaffed) ploughed-in in January, except when applied with the dung in May in which case the straw and dung were mixed and stored.
- Sulphate of ammonia: None, 0.4, 0.8 cwt. N per acre.
- Superphosphate: None, 0.8 cwt. P_2O_5 per acre.
- Sulphate of potash: None, 1.6 cwt. K_2O per acre.

Basal manuring: None, 1 cwt. per acre sulphate of ammonia in 1938.

Crop Notes

Clover undersown in oats: June 7, 1938. Clover cut: July 28, 1939.
Variety: Montgomery Red. Previous crop: Spring oats.

Standard error per plot: 4.36 cwt. per acre or 11.8%, 43 d.f.

For yields of potatoes in 1937 and oats in 1938, see Station Reports for 1937, p.155 and 1938, p.145.

https://doi.org/10.23637/ERADOC-1-186

V/2

Clover

Green Clover, cwt. per acre

Dung	Sulphate of ammonia cwt. N 0.0	0.4	0.8	Straw cwt. 0	40	Super cwt. P_2O_5 0.0	0.8	Sulph. pot. cwt. K_2O 0.0	1.6	Mean
	±1.54			±1.26		±1.26		±1.26		±0.89
None	36.8	38.4	36.1	36.5	37.6	37.1	37.1	36.2	37.9	37.1
Ploughed in	36.9	37.9	37.1	37.9	36.7	37.3	37.4	37.3	37.4	37.3
In ridges	38.3	35.2	34.7	35.7	36.5	35.8	36.3	35.1	37.0	36.1
Mean	37.3	37.2	36.0	36.7	36.9	36.7	36.9	36.2	37.4	36.8
	±0.89			±0.73		±0.73		±0.73		

Sulph. amm. cwt. N	Straw cwt. 0	40	Super cwt. P_2O_5 0.0	0.8	Sulph. pot. cwt. K_2O 0.0	1.6
	±1.26		±1.26		±1.26	
0.0	36.9	37.8	37.8	36.9	36.5	38.2
0.4	37.1	37.2	36.9	37.4	36.5	37.9
0.8	36.1	35.8	35.5	36.4	35.7	36.2

Straw cwt.	Super cwt. P_2O_5 0.0	0.8	Sulph. pot. cwt. K_2O 0.0	1.6	Super cwt. P_2O_5	Sulph. pot. cwt. K_2O 0.0	1.6
	±1.03		±1.03			±1.03	
0	37.5	35.9	34.8	38.6	0.0	37.0	36.5
40	35.9	37.9	37.6	36.3	0.8	35.4	38.4

https://doi.org/10.23637/ERADOC-1-186 *pp 184*

LUCERNE

Woburn Stackyard 1937-1940

Influence of dung on effectiveness of inoculation. In some soils the bacteria necessary to the formation of the nitrogen-producing root nodules in lucerne are absent, and are introduced by inoculation.

Design; 6 randomized blocks of 2 plots each, the plots being split for different applications of dung.

Area of each sub-plot: 0.0100 acre.

Treatments

(applied in 1937)
Inoculated and not inoculated.
Dung: None, 5 tons, 20 tons per acre.

Basal manuring; 1939 and 1940: None.

Crop Notes

Cut; 1939, July 6, Aug. 18, Nov. 15; 1940, June 27, Sept. 3.

Standard errors:
Per whole plot, 1939: 4.52 cwt. per acre or 5.7%, 5 d.f.
1940: 6.54 cwt. per acre or 10.3%, 5 d.f.
Per sub plot: 1939: 6.87 cwt. per acre or 8.6%, 20 d.f.
1940: 10.50 cwt. per acre or 16.6%, 20 d.f.

Hay, cwt. per acre

Dung, tons per acre	None	5	20	Mean
	1939			
		±2.81		±1.85[a]
Not inoculated	77.6	78.8	81.0	79.1
Inoculated	78.0	80.2	82.8	80.3
Mean ±1.98	77.8	79.5	81.9	79.8
	1940			
		±4.29		±2.67[a]
Not inoculated	57.7	58.5	65.4	60.5
Inoculated	61.8	67.7	68.5	66.0
Mean ±3.03	59.8	63.1	67.0	63.2

(a) For use in vertical comparisons only. The other standard errors quoted are for use in comparisons between levels of dung.

https://doi.org/10.23637/ERADOC-1-186 *pp 185*

https://doi.org/10.23637/ERADOC-1-186

METEOROLOGICAL RECORDS

Rothamsted, 1939-47

	Total hours of sunshine	Mean Temperature (°F) Air (1)	Mean Temperature (°F) 1 foot in ground	Ground Frosts (2)	Rainfall total (in.) (3)	Rain days (4)	Drainage through 20 in. soil (in.)
1939							
Jan.	46	39.0	38.4	10	55.72	23	5.43
Feb.	106	41.1	39.1	13	0.95	13	0.15
Mar.	96	40.9	40.4	9	1.74	14	0.51
Apr.	165	46.7	46.2	10	2.91	14	1.37
May	159	50.7	50.9	3	1.83	7	1.12
June	205	56.5	57.5	0	2.07	12	0.13
July	158	59.3	59.5	0	2.14	18	0.23
Aug.	152	60.9	61.1	0	3.22	13	1.28
Sept.	142	57.9	59.2	0	1.42	9	0.37
Oct.	90	46.4	48.6	5	4.72	21	2.87
Nov.	38	46.9	46.0	3	4.49	20	3.85
Dec.	44	36.0	39.3	18	1.50	11	1.06
Year	1400	48.5	48.8	71	32.71	175	18.39
1940							
Jan.	87	28.5	32.5	27	4.01	10	0.37
Feb.	22	34.7	33.8	14	1.86	18	3.55
Mar.	127	41.6	39.9	13	2.75	14	1.66
Apr.	124	47.1	45.5	11	1.82	16	0.07
May	225	53.9	54.1	5	2.01	12	0.30
June	270	60.5	60.9	0	0.89	5	-
July	190	58.5	60.1	0	2.39	16	0.03
Aug.	191	60.0	60.5	0	0.22	2	-
Sept.	171	55.1	55.9	1	1.16	9	-
Oct.	94	48.6	49.0	3	3.40	17	1.46
Nov.	77	43.2	43.1	9	7.86	20	7.23
Dec.	41	37.5	37.4	17	1.49	13	1.02
Year	1616	47.4	47.7	100	29.87	152	15.70

(1) Mean of Maximum and Minimum Temperatures

(2) Number of nights grass minimum was 30°F or less

(3) Area of rain gauge, 1/1000 acre

(4) Number of days rainfall was 0.01 inches or more

https://doi.org/10.23637/ERADOC-1-186 *pp 187*

Meteorological Records - Rothamsted
Z/1.2

	Total hours of sunshine	Mean Temperature (°F) Air	Mean Temperature (°F) 1 foot in ground	Ground Frosts	Rainfall total (in)	Rain days	Drainage through 20 in. soil (in.)
1941							
Jan.	41	32.4	34.8	18	2.46	18	2.41
Feb.	61	37.6	36.2	16	2.52	17	2.02
Mar.	109	40.5	39.7	15	2.92	12	1.99
Apr.	96	43.4	42.7	10	1.50	8	0.62
May	131	47.4	47.7	12	2.15	10	0.65
June	201	58.7	58.1	0	1.23	7	0.50
July	226	63.4	64.6	0	5.42	14	2.27
Aug.	166	57.7	59.3	0	4.42	24	1.89
Sept.	105	57.7	58.3	0	0.70	3	-
Oct.	108	49.7	51.6	5	1.09	15	0.20
Nov.	37	42.6	43.5	9	2.73	17	1.85
Dec.	48	40.4	41.7	16	1.51	12	1.21
Year	1330	47.6	48.2	101	28.64	157	15.61
1942							
Jan.	43	31.6	35.0	23	3.02	16	1.17
Feb.	39	30.8	32.7	25	0.84	6	1.07
Mar.	73	40.3	37.7	17	1.68	11	1.44
Apr.	221	47.9	46.1	4	1.65	8	0.69
May	194	51.5	51.8	4	2.96	13	0.36
June	226	57.9	58.8	1	0.30	2	-
July	155	60.0	60.2	0	2.30	14	0.01
Aug.	147	61.6	61.0	0	2.46	19	0.33
Sept.	121	56.7	57.8	0	1.45	12	-
Oct.	85	51.0	51.6	2	4.01	19	2.48
Nov.	67	40.6	42.7	14	1.40	12	1.12
Dec.	44	42.5	42.7	10	3.11	23	2.50
Year	1416	47.7	48.2	100	25.18	155	11.18
1943							
Jan.	49	40.0	38.6	12	4.93	23	4.61
Feb.	79	41.1	40.4	14	1.18	10	1.01
Mar.	137	43.3	41.6	20	0.62	6	-
Apr.	156	51.0	49.0	4	1.09	14	-
May	245	54.0	54.1	3	2.54	10	0.70
June	207	57.4	59.6	0	1.55	10	0.01
July	193	61.2	61.4	0	1.60	10	-
Aug.	176	61.2	61.5	0	2.24	17	-
Sept.	146	55.9	57.1	1	1.96	12	0.27
Oct.	95	51.1	51.8	0	3.42	18	2.21
Nov.	75	41.8	43.5	12	1.48	20	0.88
Dec.	54	37.5	38.2	14	1.58	13	1.37
Year	1612	49.6	49.7	80	24.17	163	11.06

https://doi.org/10.23637/ERADOC-1-186

	Total hours of sunshine	Mean Temperature (°F) Air	1 foot in ground	Ground Frosts	Rainfall total (in.)	Rain days	Drainage through 20 in. soil (in.)
1944							
Jan.	47	40.9	40.1	13	1.64	12	1.20
Feb.	51	36.8	38.1	17	1.13	17	0.34
Mar.	112	40.1	38.9	22	0.21	8	-
Apr.	137	49.4	47.9	4	2.06	9	0.87
May	230	52.0	52.5	8	0.71	5	-
June	172	55.9	57.4	1	1.76	14	-
July	118	61.7	61.3	0	1.58	12	0.02
Aug.	197	63.8	63.3	0	2.89	13	0.93
Sept.	139	54.4	56.2	1	2.74	14	1.09
Oct.	89	48.3	49.9	1	3.70	19	2.41
Nov.	58	42.6	43.2	14	3.75	21	3.17
Dec.	67	36.8	38.8	18	1.78	16	1.42
Year	1418	48.6	49.0	99	23.92	160	11.44
1945							
Jan.	49	31.4	33.9	26	2.32	18	1.87
Feb.	70	44.0	40.6	8	2.11	13	2.00
Mar.	152	45.6	43.4	13	0.68	8	-
Apr.	180	49.8	49.8	7	1.36	12	-
May	168	54.0	54.0	3	2.31	12	0.44
June	201	57.7	59.2	0	2.29	16	0.11
July	181	61.5	61.8	0	2.83	10	1.35
Aug.	147	60.1	60.4	0	1.38	11	-
Sept.	66	57.7	57.3	0	2.24	12	0.29
Oct.	106	52.5	52.3	1	3.00	11	1.99
Nov.	41	44.3	45.6	5	0.40	9	0.07
Dec.	50	39.4	40.3	16	3.23	17	2.79
Year	1411	49.9	49.9	79	24.15	149	10.91
1946							
Jan.	65	36.7	36.9	21	2.52	11	2.03
Feb.	79	42.1	40.9	7	2.81	19	1.99
Mar.	99	39.9	38.6	20	1.58	6	1.00
Apr.	204	48.9	48.5	11	1.06	8	-
May	168	49.1	50.8	3	2.49	15	0.51
June	155	55.6	55.6	0	2.65	21	0.33
July	218	61.3	63.0	0	2.21	10	0.32
Aug.	151	58.4	59.6	0	3.97	21	1.39
Sept.	110	56.9	56.2	0	3.85	18	2.27
Oct.	85	49.5	51.3	4	1.58	12	0.40
Nov.	42	45.3	45.5	3	5.73	20	5.29
Dec.	73	35.5	37.8	24	2.25	20	2.03
Year	1449	48.4	48.7	93	32.70	181	17.56

https://doi.org/10.23637/ERADOC-1-186

Meteorological Records - Rothamsted

Z/1.4

	Total hours of sunshine	Mean Temperature (°F) Air	1 foot in ground	Ground Frosts	Rainfall total (in.)	Rain days	Drainage through 20 in. soil (in.)
1947							
Jan.	71	33.9	36.2	24	1.63	16	1.50
Feb.	34	27.1	33.1	26	1.75	11	0.02
Mar.	69	38.7	36.2	15	5.10	25	4.47
Apr.	162	47.3	45.3	6	2.21	14	0.65
May	186	56.1	53.1	0	1.26	12	0.23
June	202	59.9	61.1	0	2.49	12	0.25
July	158	63.1	62.9	0	1.62	13	0.18
Aug.	271	65.5	66.9	0	0.09	5	-
Sept.	164	59.5	60.9	0	1.44	10	-
Oct.	107	50.5	52.2	3	0.10	8	-
Nov.	74	43.9	45.3	10	1.21	19	-
Dec.	27	40.7	40.9	8	3.18	21	2.35
Year	1523	49.2	49.5	92	22.08	166	9.65

	Averages* for 46 years	61 years	86 years
Jan.	52	37.6	2.46
Feb.	70	38.5	1.91
Mar.	119	41.2	1.92
Apr.	153	45.4	1.98
May	199	51.9	2.15
June	204	57.2	2.24
July	199	60.7	2.59
Aug.	188	60.1	2.57
Sept.	150	55.8	2.43
Oct.	106	48.7	3.03
Nov.	64	42.2	2.71
Dec.	44	38.5	2.64
Year	1549	48.1	28.64

*For period ending in 1938

https://doi.org/10.23637/ERADOC-1-186 *pp 190*

METEOROLOGICAL RECORDS

Woburn, 1939-47

	Total hours of sunshine	Mean Temperature (°F) Air	Grass minimum	1 foot in ground	Ground frosts	Rainfall total (in.)	Rain days
1939							
Jan.	42.2	39.2	32.5	39.0	6	4.26	22
Feb.	106.2	41.6	33.0	40.2	11	0.72	10
Mar.	94.0	41.8	33.9	41.9	7	1.74	15
Apr.	176.7	47.0	34.4	48.7	10	3.41	19
May	172.6	51.0	38.8	53.8	2	1.26	7
June	217.6	56.4	43.9	61.6	0	2.92	14
July	160.5	60.0	49.8	62.5	0	2.28	23
Aug.	153.1	60.9	50.0	62.6	0	3.43	14
Sept.	130.8	57.4	45.8	60.1	1	0.54	9
Oct.	94.9	46.2	34.3	48.5	8	3.83	20
Nov.	40.6	47.2	37.8	46.0	3	3.59	21
Dec.	40.8	36.0	28.5	39.1	16	1.91	14
Year	1430.0	48.7	38.6	50.3	64	29.89	188
1940							
Jan.	65.9	27.3	19.2	31.8	27	2.14	10
Feb.	24.7	34.9	28.2	34.2	12	1.83	18
Mar.	135.8	42.6	31.7	41.5	14	2.93	15
Apr.	122.4	47.4	34.9	47.4	9	2.46	16
May	227.0	53.8	38.1	57.3	5	1.57	12
June	258.1	59.8	44.5	64.3	0	1.22	7
July	180.7	58.6	45.7	62.2	0	3.14	18
Aug.	191.1	59.8	44.2	64.2	1	0.11	2
Sept.	170.0	54.8	37.9	57.5	5	0.96	9
Oct.	96.3	47.8	35.4	48.7	10	2.67	13
Nov.	83.1	43.5	34.1	43.3	8	7.16	20
Dec.	39.2	37.4	28.9	37.6	10	1.41	16
Year	1594.3	47.3	35.2	49.2	101	27.60	156
1941							
Jan.	33.4	32.0	26.5	34.6	20	2.78	24
Feb.	66.9	37.9	29.4	37.8	18	2.06	18
Mar.	104.0	40.1	29.7	40.5	16	3.21	13
Apr.	98.0	43.1	32.8	44.1	10	1.67	11
May	133.3	47.2	35.2	50.4	12	2.03	11
June	220.0	59.0	46.8	61.3	0	1.52	8
July	227.6	63.5	49.4	67.7	0	2.56	18
Aug.	176.1	58.1	47.8	59.0	0	3.78	24
Sept.	109.1	57.1	44.5	59.1	1	0.70	6
Oct.	119.3	49.7	39.1	50.7	7	1.67	14
Nov.	40.4	43.2	35.0	43.1	7	2.32	17
Dec.	36.8	40.9	32.3	41.5	10	1.22	10
Year	1364.9	47.6	37.4	49.1	101	25.52	174

https://doi.org/10.23637/ERADOC-1-186 *pp 191*

Z/2.2 Meteorological Records - Woburn

	Total hours of sunshine	Mean Temperature (°F) Air	Grass minimum	1 foot in ground	Ground frosts	Rainfall total (in.)	Rain days
1942							
Jan.	36.0	31.6	25.3	34.3	23	2.32	13
Feb.	46.0	31.3	24.3	33.1	25	0.79	10
Mar.	73.5	40.6	31.5	39.8	17	1.33	13
Apr.	233.0	47.8	35.1	48.3	5	1.19	7
May	227.3	51.9	41.3	54.8	4	2.53	14
June	232.5	58.2	44.5	63.0	0	0.28	3
July	175.4	60.2	51.0	62.9	0	2.46	15
Aug.	139.1	61.8	51.0	53.0	0	1.37	16
Sept.	140.3	56.9	45.3	58.7	0	0.88	13
Oct.	98.8	51.0	41.5	51.3	1	2.27	15
Nov.	63.2	40.4	31.8	42.0	12	1.80	12
Dec.	51.4	43.6	36.0	42.9	5	2.27	19
Year	1516.5	47.9	38.2	50.3	92	19.49	150
1943							
Jan.	47.3	40.4	32.5	39.3	9	3.87	22
Feb.	74.5	41.7	32.7	40.5	7	0.84	11
Mar.	134.7	42.7	29.3	42.6	20	0.83	6
Apr.	158.7	50.2	38.0	50.9	4	1.36	12
May	250.1	53.8	38.9	56.1	1	2.20	10
June	221.3	57.7	45.5	61.9	0	1.74	11
July	205.7	61.4	47.5	65.2	0	0.65	10
Aug.	177.4	61.6	48.8	63.8	0	1.76	14
Sept.	153.7	56.0	43.0	57.6	3	1.35	9
Oct.	105.9	50.7	39.1	50.9	1	2.25	13
Nov.	74.1	41.8	32.1	42.3	13	1.14	17
Dec.	49.8	37.0	28.4	37.5	20	1.10	10
Year	1653.2	49.6	38.0	50.7	78	19.09	145
1944							
Jan.	50.4	42.1	33.2	40.7	8	1.34	13
Feb.	51.4	37.2	29.2	38.1	16	1.09	17
Mar.	116.6	40.6	28.6	40.3	20	0.20	9
Apr.	143.6	50.1	39.0	50.1	0	2.52	10
May	223.5	52.3	39.5	55.9	3	1.94	9
June	170.7	56.4	45.7	60.6	0	1.59	17
July	126.3	61.9	53.0	63.2	0	2.00	13
Aug.	193.8	63.2	52.9	65.6	0	2.20	11
Sept.	146.3	54.4	42.9	55.6	1	1.99	14
Oct.	90.7	48.6	38.5	49.1	2	3.15	20
Nov.	55.0	42.8	33.2	42.6	13	3.33	21
Dec.	57.1	37.1	29.0	38.3	16	0.98	10
Year	1425.4	48.9	38.7	50.0	79	22.33	164

https://doi.org/10.23637/ERADOC-1-186

	Total hours of sunshine	Mean Temperature (°F) Air	Grass minimum	1 foot in ground	Ground frosts	Rainfall total (in.)	Rain days
1945							
Jan.	41.8	31.5	24.3	33.8	24	1.75	17
Feb.	79.1	44.8	35.2	42.2	6	1.52	13
Mar.	150.2	46.0	33.5	45.4	8	0.80	10
Apr.	180.3	49.6	36.1	52.9	7	0.78	12
May	183.1	54.8	44.0	56.6	3	1.85	15
June	204.2	58.0	47.5	61.5	0	2.21	16
July	190.1	62.2	51.0	64.6	0	1.95	9
Aug.	148.3	60.1	49.4	62.5	0	1.30	15
Sept.	69.3	57.9	49.4	58.2	0	2.04	15
Oct.	114.4	52.9	41.1	53.0	2	2.65	10
Nov.	34.6	44.4	37.9	46.2	4	0049	8
Dec.	49.2	40.0	32.1	40.3	12	3.31	18
Year	1445.6	50.2	40.1	51.5	66	20.65	158
1946							
Jan.	56.5	37.0	28.9	37.1	19	1.47	9
Feb.	74.6	42.5	35.2	41.7	6	1.98	17
Mar.	98.9	40.3	31.0	39.8	12	1.32	9
Apr.	202.8	49.2	35.9	50.9	8	1.23	10
May	166.3	50.2	37.5	53.2	4	2.07	14
June	163.4	55.8	45.9	58.0	0	3.57	20
July	223.5	61.8	49.1	64.7	0	1.44	10
Aug.	161.1	58.3	46.3	60.7	0	3.38	20
Sept.	121.0	57.2	46.9	57.0	0	2.66	18
Oct.	88.6	48.8	39.3	51.2	7	1.65	11
Nov.	40.2	46.1	38.5	45.7	2	4.89	21
Dec.	63.9	35.6	26.6	36.9	19	2.08	19
Year	1460.8	48.6	38.5	49.7	77	28.24	178
1947							
Jan.	65.7	34.0	26.9	36.1	21	1.61	15
Feb.	32.6	26.6	23.5	32.4	26	1.61	12
Mar.	76.1	38.2	31.0	36.7	12	4.72	25
Apr.	160.8	47.2	35.4	47.0	6	1.70	13
May	192.3	56.2	42.7	56.0	0	1.01	14
June	195.4	60.0	45.7	63.6	0	1.46	17
July	163.1	63.4	51.5	65.5	0	1.15	11
Aug.	267.2	64.9	45.5	69.9	0	0.04	2
Sept.	159.4	59.2	44.6	61.5	2	1.02	12
Oct.	120.0	49.8	35.3	51.1	9	0023	7
Nov.	81.8	44.5	35.4	44.3	10	1.32	16
Dec.	32.0	40.9	33.7	40.4	8	2.60	18
Year	1546.4	48.7	37.6	50.4	94	18.47	162

https://doi.org/10.23637/ERADOC-1-186 *pp 193*

192 sides

194 sides

https://doi.org/10.23637/ERADOC-1-186