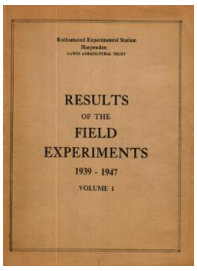
Yields of the Field Experiments 1939-1947 Volume 1



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Yields of the Field Experiments 1939-1947 Volume 1 - Results

Rothamsted Research

Rothamsted Research (1948) *Yields of the Field Experiments 1939-1947 Volume 1 - Results ;* Yields Of The Field Experiments 1939-1947 Volume 1, pp 1 - 170 **- DOI: https://doi.org/10.23637/ERADOC-1-145**

Rothamsted Experimental Station
Harpenden
LAWES AGRICULTURAL TRUST

RESULTS
OF THE
FIELD
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1939 - 1947
VOLUME 1

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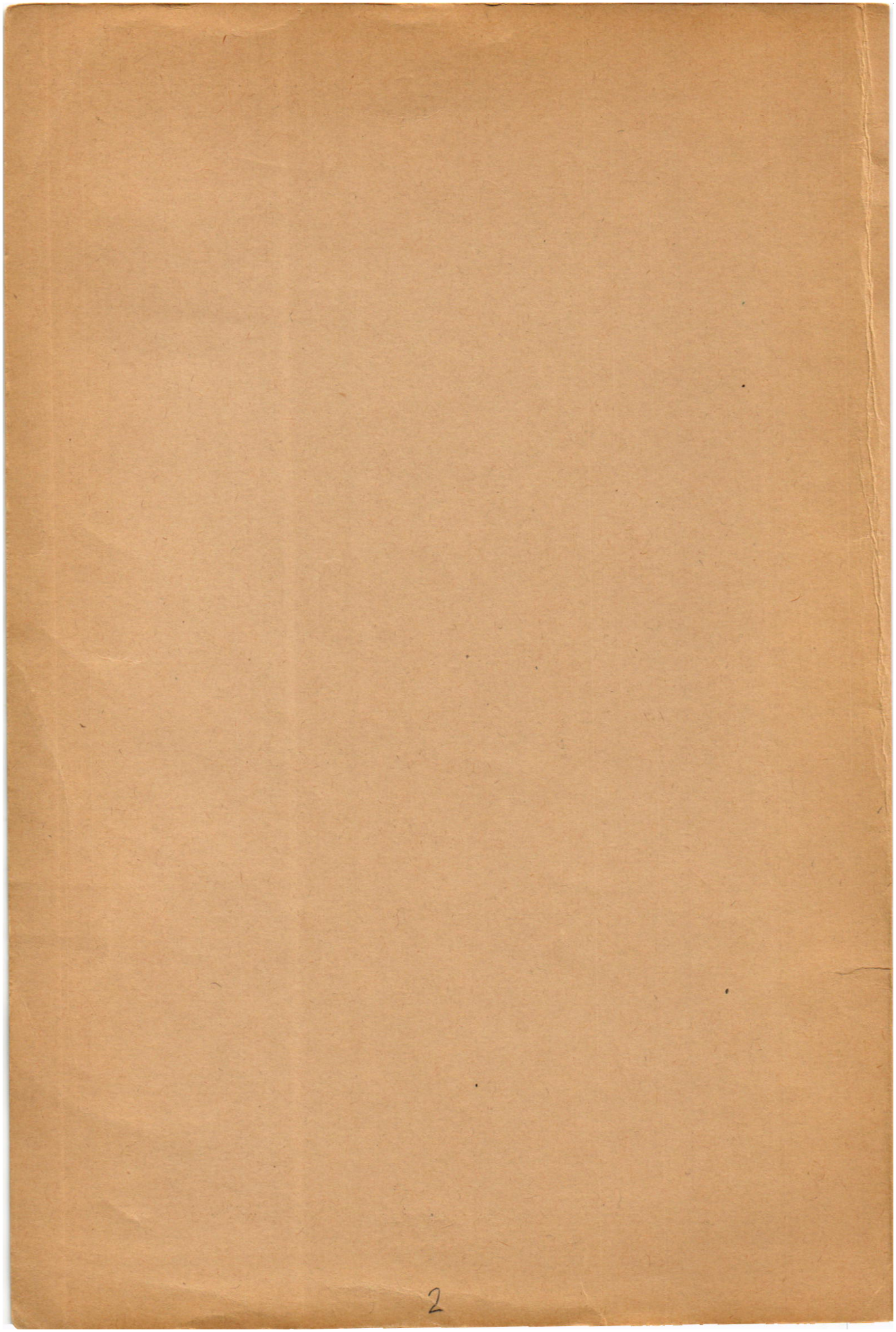

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Rothamsted Experimental Station

Harpenden

Lawes Agricultural Trust

RESULTS

of the

FIELD

EXPERIMENTS

1939 - 1947

Vol. I. Classical and Long-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).

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Classical Experiments*

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Miscellaneous Data

*All except A/7 at Rothamsted.

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WHEAT - BROADBALK

The first experimental crop of wheat on Broadbalk was sown in the autumn of 1843 for harvesting in 1844, and wheat has been grown each year ever since. The plot treatments varied until 1852 when the present system of manuring was established.

The general purpose of the experiment was to determine over a long period of years the manurial requirements of wheat, testing dung alone and a number of combinations of the ash constituents of crops (compounds of phosphorus, potassium, sodium and magnesium), together with several forms of nitrogen compounds. One plot running the whole length of the field was assigned to each of the treatments tested. Several varieties, some of them now out of cultivation, have been used during the experiment, but since 1899 Squareheads Master or the very similar Red Standard has been sown.

Weeds have always been a problem on Broadbalk, but in spite of this, continuous cropping was maintained until the harvest of 1925, except that half of every plot was fallowed in 1904 and the remainder in 1905, and this process was repeated in 1914 and 1915. In 1926 it was decided that more systematic methods must be tried and a system of regular bare fallowing was introduced. The field was divided into five equal sections so that every year a part of each of the original ½ acre plots could be under fallow and the remainder under crop. From 1926-29 two sections were cropped yearly, leaving three fallow; in 1930 the whole field was cropped and then in 1931 the present arrangement was begun under which one section of the field is fallowed every year. In each year therefore, the yields of every treatment are obtained for the 1st, 2nd, 3rd and 4th years after fallow.

Since 1943 it has been necessary to hand weed wild oats before harvesting.

https://doi.org/10.23637/ERADOC-1-145

Treatments
Symbols and amounts per acre

0	Unmanured
N_1, N_2, N_3	Sulphate of ammonia, 43 lb.N, 86 lb.N, 129 lb.N
N_1', N_2'	Nitrate of soda, 43 lb.N, 86 lb.N
P	Superphosphate, 65 lb. P_2O_5
K	Sulphate of potash, 98 lb. K_2O
S	Sulphate of soda, 366 lb.
M	Sulphate of magnesia, 280 lb.
C	Complete mineral manure, consisting of superphosphate (65 lb. P_2O_5), sulphate of potash (98 lb. K_2O), sulphate of soda (100 lb.) and sulphate of magnesia (100 lb.)
C'	As C but without the superphosphate
D	Farmyard manure, 14 tons
R	Rape cake (castor bean meal from 1940 onwards), 1889 lb.

Dung is ploughed-in in autumn. Rape cake and minerals are applied in autumn on the seed bed. 21.5 lb. N per acre of the N_1, N_2 and N_3 treatments is applied in autumn and the remainder of the dressing in spring, except that Plot 15 receives its full dressing in autumn. Nitrate of soda ~~is applied~~ is applied in spring, there being two applications at intervals of a month on plot 16. Plot 2A was unmanured before 1885.

The experiment is discussed, and early departures from the present manuring scheme are described by Sir John Russell and D.J.Watson in "The Rothamsted Field Experiments in the growth of wheat", Imp.Bureau Soil Sci.Tech.Comm. No.40.

Investigations by the Soil Microbiology Department are described by B.N.Singh, "The effect of artificial fertilizers and dung on the numbers of amoebae in Rothamsted soils", J.Gen.Microbiol. 3, (1949), 204.

Weed surveys have been made annually by the Botany Department.

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Wheat - Broadbalk

The present fallowing cycle and the preceding fallows are shown in the diagram below. (C = crop, F = fallow). The sections (I to V) are numbered in order from the upper (western) end of the field. Preparatory to the first fallow the field was harvested in five separate sections (1925).

Year	I	II	III	IV	V	Year	I	II	III	IV	V
1926	F	F	F	C	C	1931,-36,-41,-46	F	C	C	C	C
1927	F	F	F	C	C	1932,-37,-42,-47	C	F	C	C	C
1928	C	C	F	F	F	1933,-38,-43,-48	C	C	C	C	F
1929	C	C	F	F	F	1934,-39,-44,-49	C	C	C	F	C
1930	C	C	C	C	C	1935,-40,-45,-50	C	C	F	C	C

Plot 20 extends over sections I and II only.

Crop Notes

Crop Year	Date sown	Date harvested	Variety
1939	Oct. 26	Aug. 18	Red Standard
1940	Oct. 25	Aug. 8	Squareheads Master
1941	Oct. 25	Aug. 20	Squareheads Master
1942	Oct. 24	Aug. 15	Red Standard
1943	Oct. 15	Aug. 4	Red Standard
1944	Oct. 16	Aug. 5	Red Standard
1945	Nov. 8	Aug. 12	Red Standard
1946	Oct. 20	Aug. 16	Squareheads Master 13/4
1947	Oct. 31	Aug. 8	Squareheads Master 13/4

In 1941 there was a considerable amount of lodging, particularly on plots 2A, 2B, 8, 12, 14 and 16.

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Years after fallow	Total Grain: cwt. per acre 1	2	3	4	Mean	Total Straw: cwt. per acre 1	2	3	4	Mean
96th season, 1939										
Plot **Section**	V	II	I	III		V	II	I	III	
2A D	24.1	18.5	15.7	19.7	19.5	62.7	40.1	43.0	42.8	47.2
2B D	26.1	23.5	15.7	18.1	20.8	64.2	51.6	48.9	47.8	53.1
3 O	16.7	7.7	8.7	8.9	10.5	29.7	17.0	16.4	19.1	20.6
5 C	18.6	9.9	9.3	7.8	11.4	36.1	24.9	21.9	19.2	25.5
6 N_1C	22.5	13.8	10.9	11.8	14.8	45.3	33.9	29.5	54.5	40.8
7 N_2C	26.4	19.3	13.5	15.8	18.8	55.8	43.4	39.8	37.7	44.2
8 N_3C	20.8	21.6	11.8	12.5	16.7	59.0	54.7	62.9	52.9	57.4
9 $N_1'C$	24.1	16.2	11.3	14.0	16.4	53.5	35.2	28.5	29.8	36.8
10 N_2	20.2	19.6	14.4	17.1	17.8	38.8	35.6	33.4	32.4	35.0
11 N_2P	18.6	18.9	13.4	15.8	16.7	36.6	35.7	28.8	30.4	32.9
12 N_2PS	21.2	20.4	14.8	16.4	18.2	42.4	40.1	32.7	32.3	36.9
13 N_2PK	23.1	17.5	14.4	15.3	17.6	55.2	42.1	33.8	35.2	41.6
14 N_2PM	24.6	19.9	14.1	17.1	18.9	52.7	35.3	29.1	32.4	37.4
15 N_2*C	17.8	16.5	12.7	12.8	15.0	37.1	34.3	28.8	29.3	32.4
16 $N_2'C$	25.4	18.5	11.8	13.5	17.3	69.4	48.9	43.6	44.9	51.7
17 N_2 and C in (C)	13.7	10.1	5.6	7.9	9.3	31.6	24.4	18.8	21.8	24.2
18 alternate (N_2) years	22.5	17.1	14.6	13.5	16.9	43.8	3821	34.8	25.9	35.6
19 R	21.8	17.5	12.4	16.2	17.0	42.6	32.6	27.1	29.2	32.9
20 N_2C'	–	19.3	13.2	–	16.2	–	42.6	32.7	–	37.6
97th season, 1940										
Plot **Section**	IV	V	II	I		IV	V	II	I	
2A D	33.1	31.9	27.7	15.4+	27.0	55.7	44.6	42.2	39.3	45.4
2B D	37.0	29.0	32.3	23.8+	30.5	57.8	42.4	46.5	43.3	47.5
3 O	21.5	13.6	12.6	15.4	15.8	28.6	18.7	16.7	18.3	20.6
5 C	25.5	12.7	14.4	16.3	17.2	38.8	17.0	17.9	22.6	24.1
6 N_1C	30.5	17.1	17.8	20.8	21.6	47.3	25.6	23.6	28.2	31.2
7 N_2C	34.6	21.1	24.4	26.7	26.7	61.7	35.2	37.7	42.4	44.2
8 N_3C	32.2	27.1	27.4	29.9	29.2	61.8	51.7	47.5	55.3	54.1
9 $N_1'C$	31.7	19.0	20.9	26.3	24.5	50.7	30.3	33.0	43.4	39.4
10 N_2	14.8	18.4	17.5	19.8	17.6	26.0	24.3	21.9	27.8	25.0
11 N_2P	27.9	19.0	20.0	20.9	22.0	41.4	31.5	25.3	30.0	32.0
12 N_2PS	32.9	20.3	22.9	25.5	25.4	48.1	29.8	30.9	36.2	36.2
13 N_2PK	35.7	17.8	22.5	24.0	25.0	59.7	33.3	33.6	37.7	41.1
14 N_2PM	34.4	18.7	22.1	24.3	24.9	54.9	30.2	30.4	36.2	37.9
15 N_2*C	32.6	15.1	22.6	25.8	24.0	51.8	25.1	33.3	38.3	37.1
16 $N_2'C$	33.8	26.8	29.6	27.6	29.4	60.8	40.1	43.0	45.3	47.3
17 N_2 and C in (N_2)	33.7	25.2	26.2	28.6	28.4	56.4	39.1	39.3	42.2	44.2
18 alternate (C^2) years	24.4	11.0	11.5	12.2	14.8	33.5	17.1	17.3	15.3	20.8
19 R	34.2	19.0	21.0	20.7	23.7	52.3	28.5	29.3	31.6	35.4
20 N_2C'	–	–	20.4	23.0	21.7	–	–	25.4	33.4	29.4

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Wheat - Broadbalk

Plot	Section	Total Grain: cwt. per acre — Years after fallow 1	2	3	4	Mean	Total Straw† : cwt. per acre — 1	2	3	4	Mean
		98th season, 1941									
		III	IV	V	II		III	IV	V	II	
2A	D	16.8	13.7	14.4	9.5	13.6	40.1	26.6	25.0	25.4	29.3
2B	D	19.2	16.0	16.2	9.1	15.1	41.8	30.8	28.3	25.7	31.6
3	0	14.3	4.5	6.6	4.7	7.5	23.9	7.6	8.7	7.8	12.0
5	C	14.9	5.0	7.2	5.9	8.2	23.3	10.3	12.4	10.0	14.0
6	N_1C	15.7	9.6	9.8	7.6	10.7	29.1	16.1	15.2	14.0	18.6
7	N_2C	17.1	14.2	12.6	11.3	13.8	39.7	31.7	27.2	22.2	30.2
8	N_3C	20.9	14.3	13.1	16.2	16.1	46.2	37.6	32.1	35.0	37.7
9	$N_1'C$	17.8	12.1	11.9	11.6	13.4	34.6	22.8	22.2	22.8	25.6
10	N_2	13.8	14.3	12.5	12.2	13.2	26.6	27.2	19.6	17.4	22.7
11	N_2P	16.7	14.5	10.9	11.1	13.3	30.2	26.1	19.4	18.0	23.4
12	N_2PS	18.2	16.0	14.1	13.8	15.5	35.0	27.0	23.6	20.2	26.4
13	N_2PK	19.3	14.5	9.9	11.3	13.8	28.1	28.0	22.1	18.6	24.2
14	N_2PM	19.7	16.7	11.8	12.3	15.1	34.4	28.3	22.3	13.4	25.8
15	N_2*C	18.4	12.0	5.6	9.8	11.4	36.7	20.1	11.7	14.2	20.7
16	$N_2'C$	21.7	15.9	14.9	15.7	17.0	49.7	36.2	31.7	31.0	37.2
17	N_2 and C in alternate years	15.6	5.7	4.0	4.1	7.4	35.5	8.4	6.2	6.4	14.1
18	(N_2)	18.8	12.2	12.4	10.1	13.4	31.8	21.3	21.6	18.0	23.2
19	R	18.0	13.5	9.3	9.2	12.5	29.9	22.7	13.3	11.6	19.4
20	N_2C'				11.6	11.6				19.6	19.6

Plot	Section	I	III	IV	V		I	III	IV	V	
		99th season, 1942									
2A	D	20.7	23.7	24.5	27.9	24.2	52.2	43.2	45.1	43.6	46.0
2B	D	19.6	26.8	28.6	26.6	25.4	53.5	43.2	45.1	42.4	47.3
3	0	15.7	10.1	15.9	15.0	14.2	22.7	13.5	20.1	18.6	18.7
5	C	21.6	11.7	16.7	17.0	16.8	34.7	15.5	23.7	20.7	23.6
6	N_1C	25.1	16.3	18.6	21.5	20.4	42.3	22.7	26.7	29.4	30.3
7	N_2C	28.9	23.0	27.1	26.4	26.4	43.3	33.9	37.1	36.4	39.0
8	N_3C	25.8	25.7	28.8	24.8	26.3	52.4	39.8	41.6	39.7	43.4
9	$N_1'C$	27.1	20.5	17.8	18.0	20.8	45.2	29.1	24.3	24.0	30.6
10	N_2	22.9	23.4	18.5	17.2	20.5	32.2	28.6	22.8	21.4	26.2
11	N_2P	18.2	21.3	17.9	16.6	18.5	29.2	28.2	23.1	31.2	27.9
12	N_2PS	24.5	24.4	25.4	21.0	23.8	37.0	36.3	29.7	26.3	32.3
13	N_2PK	23.0	22.7	23.3	23.8	24.5	48.5	31.3	33.1	32.9	36.4
14	N_2PM	25.0	22.4	25.0	22.3	23.7	35.4	32.2	32.2	28.6	32.1
15	N_2*C	28.6	20.9	23.7	21.2	23.6	49.8	33.5	33.5	32.6	37.4
16	$N_2'C$	28.1	25.6	24.3	23.5	25.4	46.6	36.2	35.5	33.9	38.0
17	N_2 and C in alternate years	23.8	22.2	25.8	24.0	25.2	43.4	31.6	37.2	34.7	36.7
18	(N_2)	21.6	10.4	11.5	13.6	14.3	29.6	14.6	15.5	22.1	20.4
19	R	31.1	22.2	23.0	24.7	25.2	42.7	29.7	33.1	33.3	34.7
20	N_2C'	24.0				24.0	35.0				35.0

† Includes straw, cavings and chaff. * Sulphate of ammonia applied in autumn.

https://doi.org/10.23637/ERADOC-1-145

Years after fallow	Total Grain: cwt. per acre 1	2	3	4	Mean	Total Straw†: cwt. per acre 1	2	3	4	Mean
100th season, 1943										
Plot Section	**II**	**I**	**III**	**IV**		**II**	**I**	**III**	**IV**	
2A D	28.5	20.0	15.9	6.6	17.7	62.5	49.8	41.0	46.8	50.0
2B D	29.7	21.4	23.1	14.4	22.2	65.9	57.5	48.6	49.4	55.4
3 O	25.0	13.4	10.1	8.6	14.3	37.9	17.6	14.2	11.1	20.2
5 C	24.9	12.3	11.0	8.8	14.2	43.3	17.6	17.3	14.1	23.1
6 N_1C	25.0	17.0	14.7	13.3	17.5	46.3	28.2	26.1	25.3	31.5
7 N_2C	28.5	26.1	21.7	21.3	24.4	54.4	50.7	44.8	43.9	48.4
8 N_3C	27.3	23.6	20.5	18.9	22.6	58.7	60.0	54.3	54.3	56.8
9 $N_1'C$	26.5	20.8	16.4	16.5	20.0	46.8	40.5	32.8	33.1	38.3
10 N_2	24.1	25.1	20.6	19.0	22.2	36.4	41.2	34.3	31.0	35.7
11 N_2P	23.8	24.7	19.6	19.3	21.8	36.2	42.4	30.7	30.9	35.0
12 N_2PS	25.8	23.4	21.7	22.9	23.4	44.2	43.3	36.2	40.5	41.0
13 N_2PK	30.0	21.3	19.5	20.3	22.8	53.7	47.5	38.7	42.3	45.6
14 N_2PM	26.4	25.1	20.9	21.6	23.5	41.1	45.9	35.4	38.0	40.1
15 N_2*C	26.5	22.2	19.1	19.5	21.8	45.1	41.9	37.3	36.0	40.1
16 $N_2'C$	33.2	25.6	28.7	23.5	27.8	56.1	52.2	50.8	43.5	50.6
17 N_2 and C in (C) alternate (N_2) years	23.3	11.4	9.7	8.5	13.2	36.4	17.3	14.4	12.5	20.2
18 N_2 and C in (C) alternate (N_2) years	27.8	22.1	22.2	22.2	23.6	45.3	38.1	39.9	39.8	40.8
19 R	28.9	23.6	19.1	20.2	23.0	43.6	37.8	31.5	35.3	37.0
20 N_2C'	23.2	19.9			21.6	36.2	37.2			36.7
101st season, 1944										
Plot Section	**V**	**II**	**I**	**III**		**V**	**II**	**I**	**III**	
2A D	29.8	22.7	16.6	15.8	21.2	62.4	48.5	41.8	36.4	47.3
2B D	29.2	27.5	22.5	23.2	25.6	53.3	51.6	50.0	48.8	50.9
3 O	18.6	8.3	7.9	9.1	11.0	21.4	12.1	12.1	12.0	14.4
5 C	20.2	9.0	9.1	10.2	12.1	29.3	11.8	11.8	14.1	16.8
6 N_1C	25.1	11.7	14.9	13.1	16.2	38.7	18.7	22.9	19.2	24.9
7 N_2C	29.5	19.3	22.8	20.6	23.0	46.3	36.9	38.6	33.9	38.9
8 N_3C	29.9	23.6	24.9	27.0	26.4	54.5	44.4	53.2	45.4	49.4
9 $N_1'C$	23.9	13.9	15.4	19.8	18.2	35.1	22.2	23.2	31.3	28.0
10 N_2	16.2	18.4	17.4	17.6	17.4	26.2	27.4	29.4	25.2	27.0
11 N_2P	15.8	15.7	14.2	13.8	14.9	25.4	26.1	27.8	24.6	26.0
12 N_2PS	22.6	16.5	17.2	16.6	18.2	36.9	25.3	31.8	27.0	30.2
13 N_2PK	28.7	20.1	20.2	17.7	21.7	46.7	36.6	41.0	31.9	39.0
14 N_2PM	27.2	16.0	17.3	15.6	19.0	42.9	27.9	31.5	26.6	32.2
15 N_2*C	25.8	19.3	20.7	20.1	21.5	45.8	32.0	40.9	31.7	37.6
16 $N_2'C$	31.4	23.4	23.7	26.5	26.2	51.6	30.8	36.8	37.1	39.1
17 N_2 and C in (N_2) alternate (C) years	26.9	18.9	19.2	20.0	21.2	44.3	28.2	31.1	29.2	33.2
18 N_2 and C in (N_2) alternate (C) years	27.2	8.9	6.1	7.7	12.5	42.1	9.2	8.5	10.6	17.6
19 R	29.3	18.1	16.1	15.4	19.7	50.9	28.4	23.4	27.5	32.6
20 N_2C'		20.7	13.9		17.3		33.4	21.3		27.4

†Includes straw, cavings and chaff. * Sulphate of ammonia applied in autumn.

https://doi.org/10.23637/ERADOC-1-145

Wheat - Broadbalk

Plot	Section	Total Grain: cwt. per acre — Years after fallow 1	2	3	4	Mean	Total Straw†: cwt. per acre — 1	2	3	4	Mean
		102nd season, 1945									
		IV	V	II	I		IV	V	II	I	
2A	D	25.1	28.9	23.1	12.3	22.4	44.7	46.1	43.3	47.7	45.4
2B	D	23.4	31.0	25.0	17.5	24.2	52.5	49.0	46.5	52.5	50.1
3	0	14.6	11.6	6.5	7.6	10.1	22.1	14.6	10.8	12.0	14.9
5	C	20.9	14.9	9.9	10.5	14.0	34.0	17.6	13.3	15.5	20.1
6	N_1C	23.5	18.9	11.4	13.7	16.9	40.2	30.7	19.4	22.1	28.1
7	N_2C	23.3	20.8	16.1	22.3	20.6	42.0	36.2	29.5	43.4	37.8
8	N_3C	24.0	27.8	22.5	25.2	24.9	43.9	49.4	40.9	55.2	47.4
9	$N_1'C$	15.2	15.4	13.2	14.7	14.6	30.3	25.1	22.5	27.6	26.4
10	N_2	14.6	21.7	15.3	13.7	16.3	24.4	31.8	24.1	24.8	26.3
11	N_2P	14.2	17.5	13.9	16.2	15.4	29.5	26.2	22.9	29.2	27.0
12	N_2PS	18.5	22.0	16.9	16.8	18.6	36.0	34.2	27.6	31.5	32.3
13	N_2PK	23.3	22.3	15.1	15.4	19.0	45.1	40.2	27.9	31.9	36.3
14	N_2PM	16.0	23.8	14.4	14.4	17.2	38.4	39.1	25.1	29.5	33.0
15	N_2*C	22.4	20.0	17.7	18.4	19.6	41.2	33.3	30.6	36.4	35.4
16	$N_2'C$	21.0	23.6	20.8	20.4	21.4	41.8	41.5	39.3	43.4	41.5
17, 18	N_2 and C in alternate years	16.6	10.3	7.7	9.2	11.0	29.9	15.9	12.4	15.1	18.3
	(N_2)	20.8	16.5	17.2	16.4	17.7	38.3	26.5	28.4	28.4	32.9
19	R	23.2	18.0	14.9	16.3	18.1	41.1	27.3	25.2	28.3	30.4
20	N_2C'			13.6	15.2	14.4			28.1	28.6	28.4
		103rd season, 1946									
		III	IV	V	II		III	IV	V	II	
2A	D	31.7	15.4+	20.0	17.9	21.2	71.6	55.1+	55.7	45.1	56.9
2B	D	29.3	18.2+	21.0	22.2	22.7	75.5	52.2+	48.3	48.6	56.2
3	0	18.7	7.3	7.3	7.3	10.2	35.9	16.0	14.6	15.9	20.6
5	C	20.4	9.2	9.7	10.0	12.3	40.0	22.0	19.7	24.3	26.5
6	N_1C	24.4	9.8	9.9	8.8	13.2	53.6	29.2	25.8	26.8	33.8
7	N_2C	26.4	15.9	15.3	14.4	18.0	63.9	41.2	38.1	36.4	44.9
8	N_3C	31.4	20.2	20.1	17.0	22.2	72.0	59.9	57.7	52.6	60.6
9	$N_1'C$	26.6	18.2	14.6	12.1	17.9	52.8	40.3	34.2	31.9	39.8
10	N_2	25.6	19.5	12.3	16.9	18.6	51.8	40.8	33.9	33.1	39.9
11	N_2P	20.2	15.2	15.2	14.5	16.3	39.3	44.2	34.1	32.1	37.4
12	N_2PS	22.4	15.3	11.9	16.0	16.4	45.3	37.7	34.0	33.2	37.6
13	N_2PK	29.0	17.4	14.9	14.7	19.0	62.0	44.0	39.6	38.0	45.9
14	N_2PM	25.3	20.9	16.8	15.1	19.5	47.8	45.5	41.4	32.6	41.8
15	N_2*C	25.3	17.9	15.5	14.7	18.4	58.1	38.5	32.8	34.5	41.0
16	$N_2'C$	31.9	20.6	19.2	16.2	22.0	67.6	53.3	47.9	43.1	53.0
17, 18	N_2 and C in alternate years	24.5	19.1	19.6	15.9	19.8	60.6	42.2	46.5	36.0	46.3
	(C)	18.9	9.7	7.9	3.3	10.0	42.3	20.5	18.3	10.2	22.8
19	R	24.3	18.1	17.0	13.3	18.2	50.3	39.4	37.6	27.7	38.8
20	N_2C'				11.1	11.1				28.1	28.1

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Years after fallow	Total Grain: cwt. per acre 1	2	3	4	Mean	Total Straw† : cwt. per acre 1	2	3	4	Mean
	104th season, 1947									
Plot Section	I	III	IV	V		I	III	IV	V	
2A D	19.1	14.6	19.4	14.6	16.9	28.3	19.7	25.9	20.7	23.6
2B D	20.6	16.9	15.0	14.5	16.8	31.9	25.7	20.3	20.6	24.6
3 O	10.1	4.4	5.7	4.9	6.3	12.0	5.3	7.3	6.7	7.8
5 C	16.5	6.2	9.5	7.9	10.0	24.3	9.1	12.8	12.9	14.8
6 N_1C	19.0	9.0	8.8	7.3	11.0	25.0	13.2	15.6	13.8	16.9
7 N_2C	22.3	12.5	7.8	7.1	12.4	28.4	18.1	13.9	15.6	19.0
8 N_3C	20.7	16.7	12.4	11.5	15.3	34.3	23.6	22.3	23.0	25.8
9 $N_1'C$	15.1	9.4	6.5	6.9	9.5	25.5	11.3	10.0	11.2	14.5
10 N_2	8.1	8.1	5.3	4.1	6.4	16.7	11.5	7.7	6.6	10.6
11 N_2P	9.4	9.8	5.8	4.0	7.2	22.9	12.0	7.5	8.1	12.6
12 N_2PS	13.0	10.0	7.1	5.5	8.9	23.9	14.0	11.5	13.6	15.8
13 N_2PK	22.2	9.7	6.7	6.1	11.2	30.8	15.0	12.2	11.3	17.3
14 N_2PM	14.5	10.7	7.3	6.6	9.8	25.3	17.5	11.1	12.5	16.6
15 N_2*C	20.5	11.3	9.1	7.0	12.0	29.2	20.6	13.5	11.6	18.7
16 $N_2'C$	19.2	13.6	11.3	11.1	13.8	28.5	19.3	19.4	18.8	21.5
17 N_2 and C in (C)	14.6	5.0	5.6	6.4	7.9	21.7	9.7	8.4	9.7	12.4
18 alternate (N_2) years	16.1	10.3	14.9	15.3	14.2	21.2	15.2	19.6	19.4	18.8
19 R	15.7	10.0	8.5	10.2	11.1	21.6	15.1	15.9	16.9	17.4
20 N_2C'	9.7				9.7	15.0				15.0

†Includes straw, cavings and chaff

*Sulphate of ammonia applied in autumn

+Yields from small areas left after cutting green wheat and wild oats. (only happened in 1940 and 1946)

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BARLEY - HOOSFIELD

Experiments on barley grown continuously on the same land were begun on Hoosfield in 1852, the general purpose being the same as on Broadbalk. On Hoosfield however the mineral manures in various combinations were laid on strips running lengthways along the field, and these were crossed at right angles by strips of various nitrogenous manures, to give plots of approximately 1/6 acre - one for each treatment. Dung alone was applied to a plot outside this factorial arrangement.

Since 1919, Plumage Archer has been the variety grown, except that from 1929 to 1932 Plumage Archer and Spratt Archer were grown in strips running through all the plots. Weeds have been troublesome on Hoosfield, as on Broadbalk, and it was found necessary to fallow the whole field in 1912, 1933 and 1943. Commencing in 1944 a yearly spraying with DNOC (dinitro-ortho-cresol) was given in late May or early June to check broad-leaved weeds, but wild oat (Avena fatua) has become a serious pest in recent years and hand pulling is regularly carried out.

Weed surveys have been made by the Botany Department.

Treatments

Symbols and amounts per acre

Cross Dressings

0	Unmanured
A	Sulphate of ammonia, 43 lb. N
AA	Nitrate of soda, 43 lb. N
AAS	Nitrate of soda, 43 lb. N; silicate of soda, 400 lb.
C	Rape cake (castor bean meal from 1940 onwards), 1,000 lb.

Strip Dressings

P	Superphosphate, 65 lb. P_2O_5
K	Sulphate of potash, 98 lb. K_2O
S	Sulphate of soda, 100 lb.
M	Sulphate of magnesia, 100 lb.

Plot Dressings

D	Farmyard manure, 14 tons
D'	Unmanured, following farmyard manure 1852-71
F	Unmanured, following furnace ash 1852-1933
N'	Nitrate of soda, 43 lb. N
N''	Nitrate of soda, 43 lb. N, following double dressing 1852-57

Dung is ploughed in in winter; all other manures are broadcast in spring during the preparation of the seedbed.

Crop Notes

Year	Sown	Harvested	Year	Sown	Harvested
1939	Mar. 10	Aug. 25	1944	Mar. 29	Aug. 18
1940	Mar. 12	Aug. 6	1945	Mar. 9	Aug. 8
1941	Mar. 17	Aug. 25	1946	Mar. 25	Aug. 23
1942	Mar. 29	Aug. 15	1947	Apr. 17	Aug. 19

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Total grain: cwt. per acre

Plot	Cross Dressing	Strip Dressing	1939	1940	1941	1942	1944	1945	1946	1947
1	0	0	9.2	6.4	2.1	8.8	14.8	11.2	10.2	5.4
2	0	P	12.5	9.4	4.4	11.1	22.7	11.7	10.3	6.7
3	0	KSM	12.0	7.8	3.3	12.0	17.9	18.1	11.8	8.3
4	0	PKSM	14.7	10.9	4.7	14.9	27.8	21.1	13.3	9.1
5	0	PK	11.9	6.8	3.8	14.9	28.6	20.8	13.4	10.8
1	A	0	17.1	12.2	5.7	9.4	10.4	15.6	15.0	7.1
2	A	P	20.7	15.8	8.5	8.0	15.3	22.9	14.4	9.0
3	A	KSM	18.4	13.5	6.6	10.2	11.8	21.9	15.6	11.8
4	A	PKSM	24.9	14.4	12.2	12.2	21.1	22.0	16.0	12.5
5	A	PK	22.2	18.2	8.5	9.0	13.9	14.8	22.4	17.4
1	AA	0	16.5	13.9	5.5	6.0	12.1	18.1	19.6	7.7
2	AA	P	24.3	20.8	8.8	9.9	21.3	25.0	16.4	12.0
3	AA	KSM	18.0	14.3	6.8	10.8	11.4	24.2	18.8	11.5
4	AA	PKSM	24.6	21.2	12.2	14.9	24.4	28.7	22.5	13.4
1	AAS	0	19.8	19.5	7.1	9.6	14.4	18.4	23.3	11.0
2	AAS	P	24.5	20.5	8.2	10.2	24.4	24.0	20.0	17.4
3	AAS	KSM	22.4	19.4	8.4	12.8	12.4	22.6	12.5	13.6
4	AAS	PKSM	26.2	23.2	12.9	16.2	26.5	26.8	24.8	16.6
1	C	0	21.0	16.6	7.7	7.4	16.4	19.4	14.7	14.6
2	C	P	21.4	16.6	7.6	7.5	28.5	27.4	17.9	18.6
3	C	KSM	19.6	16.8	9.5	10.3	22.1	24.9	40.5	16.7
4	C	PKSM	24.1	19.3	10.6	13.2	28.5	27.5	38.9	16.1
7-1		D'	15.3	9.7	4.2	13.8	25.4	23.6	14.0	10.5
7-2		D	32.8	20.8	7.6	12.7	30.9	36.6	32.6	21.0
6-1		0	10.9	6.3	2.1	8.7	17.8	14.6	8.1	6.9
6-2		F	10.4	5.3	1.9	6.9	15.1	13.2	11.1	8.1
1		N'	17.4	14.8	7.1	8.1	13.1	18.5	17.8	12.9
2		N"	21.4	17.8	7.8	8.0	17.8	23.1	17.8	19.6

https://doi.org/10.23637/ERADOC-1-145

X
Vertical lines

Barley - Hoosfield

A/2 3

Barley - Hoosfield

Total straw: cwt. per acre

Plot	Cross Dressing	Strip Dressing	1939	1940	1941	1942	1944	1945	1946	1947
1	0	0	11.8	8.6	8.2	10.9	14.8	12.1	9.8	5.0
2	0	P	12.3	7.3	7.1	10.8	18.2	10.8	9.4	6.4
3	0	KSM	19.0	9.6	9.9	15.2	17.4	17.0	13.0	8.3
4	0	PKSM	20.0	13.7	12.1	19.5	23.2	18.1	14.8	9.1
5	0	PK	15.5	9.9	14.7	19.0	27.8	19.9	14.4	10.0
1	A	0	21.1	18.8	18.5	16.1	11.6	15.8	15.4	5.7
2	A	P	23.0	20.7	21.5	16.6	14.9	25.9	16.5	9.5
3	A	KSM	23.0	16.1	18.7	17.8	12.7	24.7	21.5	13.4
4	A	PKSM	25.0	20.9	19.3	23.1	21.6	31.0	22.2	10.6
5	A	PK	29.1	28.7	25.2	29.8	24.0	39.2	31.4	20.0
1	AA	0	27.2	27.6	18.9	19.9	15.3	25.7	22.4	9.6
2	AA	P	27.9	24.7	25.2	22.1	21.2	30.0	22.4	14.5
3	AA	KSM	25.1	21.2	23.8	20.7	13.1	28.4	25.3	15.4
4	AA	PKSM	25.7	24.5	21.8	27.6	22.4	32.0	28.0	11.1
1	AAS	0	28.3	26.0	22.2	26.3	19.8	30.4	27.1	12.6
2	AAS	P	27.8	29.0	21.5	25.2	24.6	32.1	26.7	15.0
3	AAS	KSM	27.2	22.4	22.3	27.0	15.9	32.4	20.1	13.0
4	AAS	PKSM	27.5	25.4	21.7	28.2	27.3	35.2	31.9	12.7
1	C	0	25.7	25.1	21.5	21.6	18.1	29.4	24.1	15.2
2	C	P	25.4	23.9	21.0	21.4	26.9	32.0	23.6	17.8
3	C	KSM	23.0	21.1	21.5	24.3	24.0	29.3	61.5	15.4
4	C	PKSM	25.8	23.1	20.1	27.2	32.6	33.4	52.3	26.0
7-1		D'	21.0	16.0	13.2	16.6	23.9	23.5	17.9	11.8
7-2		D	41.4	35.6	32.2	31.7	32.5	45.2	47.3	21.4
6-1		0	14.1	10.1	7.9	13.8	18.7	14.5	10.7	8.4
6-2		F	13.9	6.4	7.8	11.4	13.8	13.5	11.3	8.3
1		N'	24.0	23.4	22.8	23.3	16.6	26.8	21.7	13.9
2		N"	28.5	25.4	22.7	24.8	19.8	29.3	21.8	18.2

35.6
X

N

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WHEAT AFTER FALLOW - HOOSFIELD

Comparison of a Three-Year Fallow with a One-Year Fallow

The land has been unmanured since 1851. There are two ½-acre strips, each divided into four parts, and the strips are fallowed in alternate years. In 1932 and after, one quarter of the strip in crop has also been fallowed, different quarters being selected in successive years, thus providing in every year from 1934 onwards a comparison of the effect of a three-year fallow with the effect of a one-year fallow. Half the experiment is under wheat after a one-year fallow, so that continuity with previous results is maintained.

Cropping of strips A and B

C = Crop. F = Fallow.

Year	A1	A2	A3	A4	B1	B2	B3	B4
1932, 40	F	C	C	C	F	F	F	F
1933, 41	F	F	F	F	C	C	F	C
1934, 42	C	F	C	C	F	F	F	F
1935, 43	F	F	F	F	C	C	C	F
1936, 44	C	C	F	C	F	F	F	F
1937, 45	F	F	F	F	F	C	C	C
1938, 46	C	C	C	F	F	F	F	F
1939, 47	F	F	F	F	C	F	C	C

Crop Notes

Crop Year	Date Sown	Date Harvested	Variety
1939	Oct. 24	Aug. 24	Red Standard
1940	Oct. 23	Aug. 8	Squareheads Master
1941	Oct. 28	Aug. 21	Squareheads Master
1942	Oct. 21	Aug. 17	Sherriffs "Stand Up"
1943	Oct. 15	Aug. 3	Squareheads Master
1944	Oct. 8	Aug. 10	Red Standard
1945	Oct. 30	Aug. 11	Red Standard
1946	Oct. 15	Aug. 16	Squareheads Master 13/4
1947	Oct. 18	Aug. 12	Squareheads Master 13/4

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Yields: cwt per acre

Year	Total Grain After 1 year fallow		After 3 years fallow	Mean	Total Straw* After 1 year fallow		After 3 years fallow	Mean
1939	B3 12.5	B4 9.7	B1 11.2	11.1	B3 20.1	B4 16.2	B1 19.6	18.6
1940	A2 11.4	A3 12.2	A4 12.3	12.0	A2 17.9	A3 16.3	A4 18.2	17.5
1941	B4 6.9	B1 7.9	B2 9.3	8.0	B4 10.9	B1 12.0	B2 14.8	12.6
1942	A3 12.4	A4 10.6	A1 14.1	12.4	A3 16.3	A4 16.0	A1 20.0	17.4
1943	B1 14.9	B2 16.5	B3 19.7	17.0	B1 21.6	B2 23.9	B3 29.3	24.9
1944	A4 13.6	A1 17.4	A2 15.0	15.3	A4 18.2	A1 23.9	A2 20.4	20.8
1945	B2 11.2	B3 9.5	B4 9.9	10.2	B2 18.0	B3 16.7	B4 16.6	17.1
1946	A1 11.1	A2 9.9	A3 11.2	10.7	A1 23.1	A2 21.4	A3 26.0	23.5
1947	B3 6.2	B4 5.3	B1 8.9	6.8	B3 8.5	B4 8.1	B1 11.6	9.4

*Includes straw, cavings and chaff.

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CROPS GROWN IN ROTATION - AGDELL FIELD

The experiment, which began in 1848, compares two crop rotations, one with clover and the other with fallow, and the effect of mineral manure with and without nitrogen applied to the root crops.

Area of each plot, 2/5 acre.

Rotations: Turnips or swedes, barley, clover or beans, wheat.
Turnips or swedes, barley, fallow, wheat.

Until 1904, half of each plot of turnips was fed on the land, the remainder being carted off. Subsequently all the roots were carted.

Treatments and rates of dressing.

Applied to the root crops only (all amounts per acre):
None;

Mineral manure, with no nitrogen: Superphosphate, 84 lb. P_2O_5; Sulphate of potash, 245 lb. K_2O; sulphate of soda, 100 lb; sulphate of magnesia, 200 lb.

Complete mineral and nitrogeneous manure: As above, together with sulphate of ammonia, 43 lb. N and 2,000 lb. castor bean meal or rape dust. ~~per acre.~~

Crop Notes.

Year	Crop	Sown	Harvested	Variety
1939	Wheat	Oct. 27, 1938	Aug. 15	Red Standard
1940	Turnips	May 31	Nov. 28	Bruce
1941	Barley	March 19	Sept. 10	Plumage Archer
1942	Clover	May 9, 1941	June 29	Montgomery Red
1943	Wheat	Oct. 15, 1942	Aug. 2	Red Standard
1944	Swedes	June 23	Nov. 5	Mixed seed
1945	Barley	March 9	Aug. 14	Plumage Archer
1946	Clover	April 6, 1945	June 24	Montgomery Red
1947	Winter wheat	Nov. 6, 1946	Aug. 12	Squareheads Master 13/4
1947	Spring wheat	April 18	Aug. 21	Atle

In 1940 the turnips, especially those on plots 1 and 2, were badly attacked by Finger and Toe disease.

In 1944 three varieties of swedes and eleven varieties of turnips were sown in strips down each plot. The turnips on all plots failed, as did also the swedes on plots 5 and 6; all plots were attacked by disease, plots 3 and 4 less severely than the rest.

In 1947 the wheat wintered badly, and it was decided to resow all of plots 1, 3 and 5 and the west side of plots 2, 4 and 6 with spring wheat.

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Produce per acre

Year	Crop		O Unmanured since 1848 5 Fallow	O Unmanured since 1848 6 Clover or beans	M Mineral Manure No nitrogen 3 Fallow	M Mineral Manure No nitrogen 4 Clover or beans	C Complete mineral and nitrogenous manure 1 Fallow	C Complete mineral and nitrogenous manure 2 Clover or beans
	Twenty-third Course							
1936	Roots (Turnips)	tons	1.22	0.47	2.69	2.55	5.63	3.26
1937	Barley							
	Grain	cwt.	0.5	0.3	3.1	0.5	0.6	1.0
	Straw*	cwt.	3.4	2.1	2.5	4.7	2.7	3.4
1938	Clover hay	cwt.	-	8.3	-	29.1	-	26.4
1939	Wheat							
	Grain	cwt.	14.9	11.9	18.2	22.2	12.8	20.9
	Straw*	cwt.	26.3	19.9	32.9	36.6	24.9	33.2
	Twenty-fourth Course							
1940	Root (Turnips)	tons	0.52	0.14	3.96	5.09	2.76	2.71
1941	Barley							
	Grain	cwt.	7.4	3.2	9.6	11.5	10.3	4.2
	Straw*	cwt.	11.9	10.8	16.6	20.2	12.9	18.6
1942	Clover hay	cwt.	-	10.0	-	39.9	-	32.9
1943	Wheat							
	Grain	cwt.	19.7	17.7	24.7	27.4	21.2	27.1
	Straw*	cwt.	30.3	29.2	39.4	41.7	34.6	42.4
	Twenty-fifth Course							
1944	Roots (Swedes)	tons	Failed		5.26	5.01	3.53	2.09
1945	Barley							
	Grain	cwt.	12.4	9.5	19.8	20.9	24.9	20.6
	Straw*	cwt.	11.4	10.1	21.5	16.7	25.1	24.9
1946	Clover hay	cwt.	-	7.4	-	44.9	-	25.0
1947	Winter wheat							
	Grain	cwt.	-	7.0	-	16.0	-	12.3
	Straw*	cwt.	-	13.3	-	24.9	-	17.3
1947	Spring wheat							
	Grain	cwt.	12.8	10,4	20.3	18.6	18.5	16.8
	Straw*	cwt.	15.8	15.1	26.2	25.0	22.3	19.3

*Includes straw, cavings and chaff.

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MANGOLDS AND SUGAR BEET - BARNFIELD

Experiments on root crops have been conducted on Barnfield since 1843. White turnips were grown from 1843-1848, followed by swedes until 1870 except for three years 1853-1855 when the crop was barley. Sugar beet was grown from 1871-1875 and then in 1876 the field was established under mangolds, variety Yellow Globe, with practically the present scheme of manuring. Since 1946 four rows of sugar beet, variety Klein E, have been drilled on each plot in order to compare the growth of mangolds and sugar beet under a wide range of fertilizer treatments. The leaves of the crops are spread and ploughed in on their respective plots.

Area of each plot, 1/7 to 1/5 acre.

Symbols and amounts per acre.

Cross Dressings

0	Unmanured
N	Nitrate of soda, 86 lb. N
A	Sulphate of ammonia, 86 lb. N
C	Rape cake, (castor bean meal from 1940 onwards) 2000 lb.

Strip Dressings

P	Superphosphate, 65 lb. P_2O_5
K	Sulphate of potash, 245 lb. K_2O
S	Sodium chloride, 200 lb.
M	Sulphate of magnesia, 200 lb.
Ca	Calcium chloride, 190 lb; potassium nitrate, 570 lb; calcium nitrate, 100 lb.
D	Farmyard manure, 14 tons

Treatments

Strip		Strip		Cross Dressings
1	D	6	PK	0
2	DPK	7	PSM	N
4	PKSM	8	0	A
5	P	9	NKSM	AC
				C

From 1904 onwards, plot 4N has been divided, 4(a) receiving the dressing NPKSM, 4(b) receiving the dressing NPCa.

Dung is ploughed down in winter. The mineral manures, castor bean meal, and one third of the sulphate of ammonia and nitrate of soda are applied after the first cultivation but before the seed is drilled. The remaining two-thirds of the nitrogenous fertilizers are applied as a top-dressing about the time of singling.

https://doi.org/10.23637/ERADOC-1-145 *pp 22*

Crop Notes

Year	Date sown	Date lifted	Year	Date sown	Date lifted
1939	May 9	Nov. 11	1944	May 3	Nov. 16
1940	May 10	Nov. 21	1945	April 18	Oct. 26
1941	April 18	Nov. 25	1946(1)	May 3	Nov. 20
1942	May 1	Dec. 7	1946(2)	May 3	Nov. 11
1943	April 27	Nov. 5	1947(1)	May 16	Oct. 31
			1947(2)	May 16	Oct. 30

(1) Mangolds
(2) Sugar beet

Investigations by the Soil Microbiology Department are described by A.V.Garcia, "Contribuicoes para o connecimento da Microbiologia do solo. Estudos sobre as bacterias autoctones e amibas de tres talhoes do campo experimental de Barnfield", Anais do Instituto Superior de Agronomia 18. (1951) 1, and by B.N.Singh, "The effect of artificial fertilizers and dung on the numbers of amoebae in Rothamsted soils", J.Gen.Microbiol., 3, (1949) 204.

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Mangolds and Sugar Beet - Barnfield

Mangolds

Strip	Dressing	Roots: tons per acre Cross Dressing 0	N	A	AC	C	Leaves: tons per acre Cross Dressing 0	N	A	AC	C
1939											
1	D	10.86	18.69	16.87	23.55	22.18	3.17	4.63	4.30	5.39	5.23
2	DPK	14.07	22.14	19.06	28.67	24.00	3.46	5.03	4.65	6.09	5.00
4	PKSM	3.62	18.05	15.42	25.60	18.99	1.20	4.09	3.54	5.71	3.72
4(b)	PCa		17.76					4.82			
5	P	3.69	19.18	10.16	12.00	12.45	1.17	4.50	3.50	4.06	3.74
6	PK	3.07	17.41	15.91	23.09	17.76	0.95	4.34	3.25	5.62	3.72
7	PSM	3.51	19.35	18.19	23.90	20.76	1.10	4.63	3.70	4.92	4.29
8	0	2.29	9.71	6.48	10.03	10.31	0.92	3.57	2.90	3.91	3.98
9	NKSM	17.10	-	-	-	-	3.68	-	-	-	-
1940											
1	D	15.03	25.82	20.64	23.65	23.77	2.44	4.61	4.30	4.62	3.78
2	DPK	18.11	30.35	27.17	30.61	26.37	2.82	6.03	5.40	5.75	4.17
4	PKSM	4.43	21.81	18.51	28.19	22.65	1.13	4.38	3.47	5.21	3.86
4(b)	PCa		21.85					4.56			
5	P	4.64	19.91	12.69	15.60	14.64	0.91	2.92	2.91	4.17	3.29
6	PK	4.33	20.67	16.31	26.09	20.24	0.86	2.84	2.41	4.43	3.17
7	PSM	3.87	22.42	18.52	21.48	21.79	0.99	4.29	3.93	5.71	4.75
8	0	5.53	17.73	10.30	12.11	13.22	1.02	3.90	3.20	4.01	3.49
9	NKSM	19.54	-	-	-	-	3.02	-	-	-	-
1941											
1	D	3.63	13.97	12.10	18.17	15.68	0.87	4.27	3.54	4.37	3.80
2	DPK	4.49	17.28	19.35	22.67	20.60	1.29	4.45	4.41	5.02	4.04
4	PKSM	0.12	8.54	9.40	19.39	17.12	0.08	2.90	2.91	4.15	3.02
4(b)	PCa		6.03					2.18			
5	P	0.24	8.30	8.48	11.22	12.39	0.18	2.06	2.76	3.57	3.12
6	PK	0.43	8.59	12.42	15.29	15.16	0.25	1.91	2.50	3.72	2.87
7	PSM	0.16	6.47	10.20	18.57	15.89	0.12	1.65	2.55	4.06	3.26
8	0	0.70	3.50	2.61	3.06	2.97	0.34	1.54	1.46	0.91	1.16
9	NKSM	11.81	-	-	-	-	2.56	-	-	-	-
1942											
1	D	10.38	25.31	20.02	24.00	21.09	1.83	3.13	3.30	3.47	2.35
2	DPK	15.55	31.06	29.16	32.34	27.36	2.10	4.45	4.09	4.67	3.35
4	PKSM	1.64	24.04	22.56	31.08	24.95	0.32	3.60	2.84	4.28	2.30
4(b)	PCa		22.93					4.31			
5	P	1.97	17.43	8.40	6.40	9.92	0.66	2.45	2.94	1.66	2.69
6	PK	1.14	20.81	18.62	23.46	19.62	0.34	2.98	1.88	3.74	2.01
7	PSM	0.75	22.25	17.77	18.74	19.94	0.10	3.77	2.54	3.03	3.33
8	0	2.40	15.78	8.61	6.10	8.17	0.78	4.13	2.69	2.45	2.79
9	NKSM	20.98	-	-	-	-	2.84	-	-	-	-

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Mangolds

Strip Dressing	Roots: tons per acre Cross Dressing 0	N	A	AC	C	Leaves: tons per acre Cross Dressing 0	N	A	AC	C
1943										
1 D	12.58	25.71	19.14	30.08	28.10	3.71	6.43	4.89	7.36	4.67
2 DPK	14.14	22.34	21.55	32.26	25.69	3.91	6.39	6.65	6.90	5.70
4 PKSM	2.28	11.24	12.79	29.92	18.27	1.08	7.12	4.53	6.97	5.82
4(b)PCa		13.36					6.36			
5 P	3.13	12.89	11.69	12.44	14.07	1.32	5.33	3.47	5.70	5.21
6 PK	2.18	17.64	15.84	27.85	19.47	0.66	4.21	3.62	6.17	3.47
7 PSM	1.86	17.85	13.72	22.91	23.06	0.68	6.09	4.67	6.17	5.43
8 0	1.82	17.52	10.85	11.47	12.21	1.05	5.26	4.21	7.88	5.24
9 NKSM	19.97	-	-	-	-	4.57	-	-	-	-
1944										
1 D	8.59	14.62	13.79	14.09	10.34	3.77	5.24	4.89	5.63	5.82
2 DPK	9.85	12.40	13.85	20.86	18.34	4.01	5.43	4.40	7.58	6.56
4 PKSM	1.48	8.06	6.76	16.30	9.53	0.76	4.31	3.91	6.51	4.40
4(b)PCa		9.16					3.96			
5 P	0.91	3.61	1.96	4.98	5.45	1.08	2.89	2.57	3.28	3.87
6 PK	1.27	7.16	8.31	19.66	14.17	1.13	4.26	4.99	5.99	3.62
7 PSM	1.31	4.70	4.88	16.27	14.18	0.95	3.16	3.28	6.19	4.75
8 0	0.44	5.69	2.67	5.71	5.21	0.61	3.87	2.59	4.35	4.06
9 NKSM	12.25	-	-	-	-	4.33	-	-	-	-
1945										
1 D	12.18	22.31	17.82	30.10	25.36	3.65	3.74	5.48	4.89	4.70
2 DPK	14.06	21.36	17.59	34.63	26.68	3.69	5.95	4.26	6.02	4.89
4 PKSM	3.61	16.99	18.09	32.45	20.52	1.52	5.82	6.21	7.12	4.09
4(b)PCa		15.57					5.33			
5 P	3.02	9.19	11.51	15.11	15.66	0.95	2.84	2.91	4.48	2.96
6 PK	3.20	14.41	14.47	33.32	24.51	1.20	5.31	3.89	5.21	3.06
7 PSM	2.98	10.43	13.53	21.36	20.83	0.81	3.96	5.02	4.53	4.45
8 0	3.19	12.16	8.06	13.41	15.51	1.08	5.19	4.01	2.76	3.43
9 NKSM	22.91	-	--	-	-	4.35	-	-	-	-
1946										
1 D	8.16	19.30	14.73	12.09	16.12	1.49	4.77	4.87	4.31	4.84
2 DPK	9.13	20.00	17.97	13.31	18.92	2.72	6.14	5.19	5.82	4.28
4 PKSM	2.14	12.76	8.72	16.20	13.50	7.29	4.87	2.98	4.01	3.77
4(b)PCa		15.35					4.72			
5 P	1.14	10.47	3.20	13.70	11.51	3.82	3.77	1.76	2.91	2.42
6 PK	1.50	9.02	8.97	28.85	13.54	3.57	2.25	3.28	4.48	3.57
7 PSM	1.46	12.02	8.58	11.19	9.75	3.28	3.65	2.52	4.50	2.40
8 0	1.46	4.03	2.71	12.69	13.33	3.07	1.49	2.25	2.25	3.33
9 NKSM	8.48	-	-	-	-	3.25	-	-	-	-

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A/5.5

Mangolds and Sugar Beet - Barnfield

Strip Dressings		Roots: tons per acre Cross Dressings 0	N	A	AC	C	Leaves: tons per acre Cross Dressings 0	N	A	AC	C
1947					Mangolds						
1	D	6.41	11.29	10.91	10.01	10.01	1.79	2.10	1.91	2.18	2.79
2	DPK	9.54	14.39	12.29	12.87	13.15	1.44	3.11	2.62	3.45	2.40
4	PKSM	3.10	10.57	7.29	7.86	9.84	1.44	2.62	2.25	2.45	2.45
4(b)	PCa		11.52					2.18			
5	P	1.93	8.60	1.63	2.64	3.69	0.69	1.83	0.64	0.83	1.57
6	PK	2.27	7.76	6.07	7.36	6.88	0.61	2.45	1.61	2.23	2.35
7	PSM	1.89	8.22	7.11	5.25	4.49	0.59	2.37	1.93	1.83	1.57
8	0	0.57	0.71	0.42	3.51	3.67	0.44	0.59	0.49	0.98	1.13
9	NKSM	3.67	-	-	-	-	1.79	-	-	-	-
1946					Sugar beet						
		Roots (washed): tons per acre					Tops: tons per acre				
2	DPK	6.01	7.24	6.41	13.28	9.20	5.82	12.48	8.71	15.71	12.09
4	PKSM	1.27		5.06	8.54	6.80	2.69		4.26	10.42	5.97
4(b)	PCa		8.12					9.39			
5	P	1.24	7.19	1.59	11.11	6.95	3.91	10.86	2.50	10.62	5.24
6	PK	1.17	6.39	4.89	9.59	10.13	2.40	9.54	3.77	15.02	7.93
7	PSM	1.43	7.66	5.50	6.12	8.32	3.62	6.85	5.63	12.09	12.87
8	0	0.38	2.79	2.10	8.12	7.24	1.50	4.11	2.50	11.35	11.06
1947											
1	D	6.28	7.65	7.60	6.34	8.02	4.65	6.41	6.46	5.48	7.19
2	DPK	4.92	7.05	5.65	6.26	8.24	5.97	6.56	5.72	5.58	6.70
4	PKSM	1.90		5.59	6.53	6.23	1.22		5.33	7.29	4.70
4(b)	PCa		7.49					5.48			
5	P	2.28	5.65	1.90	3.01	4.06	1.03	6.80	2.50	3.13	3.91
6	PK	1.35	5.66	4.04	6.84	6.20	1.32	6.46	2.54	7.00	4.21
7	PSM	1.75	5.87	4.43	3.88	4.64	1.47	7.05	3.82	5.28	4.26
8	0	1.55	1.86	0.49	1.38	1.28	1.37	2.50	1.17	3.23	3.57

No Sugar beet was grown on strip 1 in 1946.

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HAY - THE PARK GRASS PLOTS

Long period effects of fertilizers and manures on the yield and botanical composition of meadow hay

This field has been under grass for centuries. The experimental treatments were first applied in 1856. Until 1874 the aftermath was grazed by sheep, but since then a second cut of hay has been taken in late summer, and no stock has been admitted.

In 1903 most of the plots were divided, the southern halves receiving 18 cwt. of ground lime per acre, every fourth year.

Most plots are $\frac{1}{4}$ acre, but the sizes range from $\frac{1}{2}$ to $^1/_{12}$ acre.

The experiment is discussed, and early departures from the present manuring system described, by R.O.Cashen, J.Agric.Sci., 37, (1947), 1.

Plot		Treatments (all amounts per acre)
1	N_1	Sulphate of ammonia (43 lb.N); (with dung (14 tons) also, 1856-63).
2	0	Unmanured, following dung (14 tons), 1856-63.
3	0	Unmanured.
4-1	P	Superphosphate (65 lb. P_2O_5).
4-2	N_2P	Sulphate of ammonia (86 lb.N), superphosphate (65 lb. P_2O_5).
5-1	0	Unmanured, following ammonium salts (86 lb.N), 1856-97.
5-2	PK	Superphosphate (65 lb. P_2O_5), sulphate of potash (245 lb. K_2O), following ammonium salts (86 lb.N) 1856-97.
6	PKM	Complete minerals as Plot 7, following ammonium salts (86 lb. N), 1856-68.
7	PKM	Complete minerals: Superphosphate (65 lb. P_2O_5). Sulphate of potash (245 lb. K_2O). Sulphate of soda (100 lb.) Sulphate of magnesia (100 lb.)
8	PM	Complete minerals without sulphate of potash.
9	N_2PKM	Complete minerals, with sulphate of ammonia (86 lb. N).
10	N_2PM	Complete minerals, without sulphate of potash; with sulphate of ammonia (86 lb. N).

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Plot		
11-1	N_3PKM	Complete minerals, with sulphate of ammonia (129 lb. N).
11-2	N_3PKMS	As plot 11-1, with silicate of soda (400 lb.) since 1862.
12	C	Unmanured.
13	DF	Dung (14 tons) in 1905 and every fourth year since (omitted in 1917), fish guano (6 cwt.) in 1907 and every fourth year since; following complete minerals with ammonium salts (86 lb. N), 1856-1904.
14	N_2'PKM	Complete minerals, with nitrate of soda (86 lb. N).
15	PKM	Complete minerals, following nitrate of soda (86 lb. N), 1858-63.
16	N_1'PKM	Complete minerals, with nitrate of soda (43 lb. N).
17	N_1'	Nitrate of soda (43 lb. N).
18	N_2KM	Complete minerals without superphosphate, with sulphate of ammonia (86 lb. N); following minerals and ammonium salts supplying the constituents of 1 ton of hay, 1865-1904.
19	D	Dung (14 tons) in 1905 and every fourth year since except 1917, following nitrate of soda (43 lb. N), superphosphate (65 lb. P_2O_5) and sulphate of potash (142 lb. K_2O), 1872-1904.
20	D;C	Dung (14 tons) in 1905 and every fourth year since except in 1917; in each intervening year nitrate of soda (27 lb. N), superphosphate (33 lb. P_2O_5) and sulphate of potash (49 lb. K_2O); following superphosphate (66 lb. P_2O_5) and nitrate of potash (327 lb.), 1872-1904.

Ground lime was applied to the southern portion (limed) of the plots at the rate of 2,000 lb. per acre in the winters of 1903-4, 1907-8, 1915-16, 1923-24, 1927-28, 1931-32, 1935-36, 1939-40, 1943-44 and at the rate of 2,500 lb. per acre in the winter of 1920-21, except on plots 18, 19 and 20, where part received light liming and part heavy liming as follows (weights in lb. per acre):-

Plot	Light liming (LL)	Heavy Liming (HL)
18	3,951	6,788
19	570	3,150
20	570	2,772

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Hay - Park Grass

Dung and lime are applied in winter, minerals as early in spring as possible, and nitrogenous fertilizers in March. On plots 11-1, 11-2 and 16 the nitrogenous fertilizer is given in two dressings one month apart.

Dates of cutting

Year	1st cut	2nd cut	Year	1st cut	2nd cut
1939	July 1	Sept. 28	1944	June 21	Nov. 22
1940	June 20	Jan. 1941	1945	June 19	Nov. 9
1941	June 25	Oct. 1	1946	June 22	Dec. 24
1942	June 10	Sept. 19	1947	June 13	Sept. 2
1943	June 21	Nov. 25			

The second crop is carted green, and hay yields are estimated from the dry matter.

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Yield of hay: cwt. per acre

Plot	1939 Not limed 1st Crop	1939 Not limed 2nd Crop	1939 Not limed Total	1939 Limed 1st Crop	1939 Limed 2nd Crop	1939 Limed Total	1940 Not limed 1st Crop	1940 Not limed 2nd Crop	1940 Not limed Total	1940 Limed 1st Crop	1940 Limed 2nd Crop	1940 Limed Total
1	8.4	16.8	25.2	20.4	11.8	32.2	10.6		10.6	16.0		16.0
2	13.0	11.4	24.4	13.8	9.0	22.8	13.0		13.0	14.5		14.5
3	11.1	9.9	21.0	12.8	6.5	19.3	13.6		13.6	14.5		14.5
4-1	19.0	14.4	33.4	17.7	10.6	28.3	14.7		14.7	16.0		16.0
4-2	12.2	20.2	32.4	29.6	12.0	41.6	14.1		14.1	27.9		27.9
5-1	9.5	9.1	18.6	-	-	-	9.6		9.6	-		-
5-2	20.9	12.9	33.8	-	-	-	21.9		21.9	-		-
6	32.9	20.9	53.8	-	-	-	22.4		22.4	-		-
7	35.5	23.6	59.1	41.1	26.2	67.3	24.2		24.2	33.3		33.3
8	20.7	12.0	32.7	14.3	10.9	25.2	16.5		16.5	19.4		19.4
9	32.8	26.6	59.4	54.0	22.5	76.5	36.7	3.8	40.5	39.3	1.2	40.5
10	23.8	17.2	41.0	43.6	19.0	62.6	16.7		16.7	31.1	1.2	32.3
11-1	25.6	29.2	54.8	54.8	31.8	86.6	31.3	18.2	49.5	48.9	6.6	55.5
11-2	36.1	28.0	64.1	56.8	35.2	92.0	40.8	17.8	58.6	51.6	9.4	61.0
12	15.0	9.6	24.6	-	-	-	11.5		11.5			
13	37.5	23.4	60.9	32.0	20.5	52.5	27.7	2.0	29.7	24.1	0.9	25.0
14	52.4	23.1	75.5	52.3	19.1	71.4	51.5	2.6	54.1	48.6	1.1	49.7
15	20.0	15.1	35.1	31.1	17.8	48.9	18.0		18.0	28.5		28.5
16	39.5	19.4	58.9	37.4	19.4	56.8	35.7	1.6	37.3	39.3	0.6	39.9
17	17.8	12.9	30.7	21.8	9.0	30.8	19.8		19.8	25.9		25.9
18	12.1	17.1	29.2	29.5*	9.6*	39.1*	6.8	2.9	9.7	24.3*		24.3*
				25.7†	8.2†	33.9†				20.2†		20.2†
19	25.0	18.1	43.1	26.7*	17.4*	44.1*	27.2		27.2	23.8*		23.8*
				25.8†	16.0†	41.8†				23.4†		23.4†
20	37.6	19.2	56.8	36.1*	22.4*	58.5*	33.5		33.5	38.4*		38.4*
				33.2†	18.1†	51.3†				35.0†		35.0†

* Heavy liming.

† Light liming.

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Hay - Park Grass

Yield of hay: cwt. per acre

Plot	1941 Not limed 1st Crop	1941 Not limed 2nd Crop	1941 Not limed Total	1941 Limed 1st Crop	1941 Limed 2nd Crop	1941 Limed Total	1942 Not limed 1st Crop	1942 Not limed 2nd Crop	1942 Not limed Total	1942 Limed 1st Crop	1942 Limed 2nd Crop	1942 Limed Total
1	6.7	6.3	13.0	18.5	5.5	24.0	5.8	4.0	9.8	15.0	4.1	19.1
2	11.4	6.6	18.0	11.7	5.8	17.5	4.0	1.8	5.8	7.3	1.2	8.5
3	9.8	7.1	16.9	12.5	11.9	24.4	3.3	0.6	3.9	5.8	0.6	6.4
4-1	17.3	6.4	23.7	14.7	7.3	22.0	8.5	0.9	9.4	8.7	1.4	10.1
4-2	10.8	4.6	15.4	23.7	4.0	27.7	15.0	4.8	19.8	27.2	3.6	30.8
5-1	6.5	6.2	12.7	-	-	-	7.5	1.4	8.9	-	-	-
5-2	12.8	8.8	21.6	-	-	-	13.6	4.6	18.2	-	-	-
6	21.4	13.8	35.2	-	-	-	8.1	4.8	12.9	-	-	-
7	27.8	20.3	48.1	31.4	14.6	46.0	25.5	4.8	30.3	35.4	3.0	38.4
8	19.4	15.8	35.2	13.6	13.4	27.0	12.2	2.6	14.8	9.7	1.9	11.6
9	15.8	6.7	22.5	39.4	16.6	56.0	46.6	13.8	60.4	40.2	3.8	44.0
10	13.1	14.1	27.2	28.7	10.6	39.3	11.8	7.4	19.2	29.4	4.6	34.0
11-1	9.4	24.0	33.4	45.0	24.3	69.3	35.6	25.1	60.7	45.8	6.4	52.2
11-2	31.2	29.2	60.4	50.5	34.0	84.5	46.6	23.8	70.4	54.2	8.4	62.6
12	11.4	8.5	19.9	-	-	-	7.2	2.8	10.0	-	-	-
13	29.2	32.6	61.8	25.2	20.6	45.8	32.6	3.1	35.7	21.8	2.1	23.9
14	52.6	16.3	68.9	50.8	9.2	60.0	52.4	6.5	58.9	46.9	6.0	52.9
15	19.3	9.6	28.9	29.9	7.7	37.6	14.7	2.8	17.5	23.6	1.2	24.8
16	30.8	10.7	41.5	33.9	8.3	42.2	33.3	3.6	36.9	35.2	3.4	38.6
17	19.3	7.0	26.3	21.4	3.8	25.2	12.5	5.2	17.7	22.2	2.9	25.1
18	7.2	12.8	20.0	22.1*	7.2*	29.3*	7.8	4.5	12.3	21.3*	1.6*	22.9*
				21.1†	7.0†	28.1†				24.3†	2.2†	26.5†
19	30.9	15.5	46.4	28.9*	14.7*	43.6*	22.5	5.1	27.6	23.5*	4.9*	28.4*
				31.3†	17.9†	49.2†				25.5†	2.9†	28.4†
20	30.4	14.6	45.0	31.9*	13.8*	45.7*	34.0	4.2	38.2	37.7*	2.9*	40.6*
				28.9†	11.0†	39.9†				40.7†	4.9†	45.6†

* Heavy liming.

† Light liming.

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Yield of hay: cwt. per acre

Plot	1943 Not limed 1st Crop	1943 Not limed 2nd Crop	1943 Not limed Total	1943 Limed 1st Crop	1943 Limed 2nd Crop	1943 Limed Total	1944 Not limed 1st Crop	1944 Not limed 2nd Crop	1944 Not limed Total	1944 Limed 1st Crop	1944 Limed 2nd Crop	1944 Limed Total
1	8.4	-	8.4	13.8	-	13.8	0.7	-	0.7	5.4	-	5.4
2	11.4	-	11.4	9.9	-	9.9	3.8	-	3.8	2.0	-	2.0
3	10.9	-	10.9	9.8	-	9.8	3.5	-	3.5	2.8	-	2.8
4-1	11.9	-	11.9	11.6	-	11.6	5.6	-	5.6	3.4	-	3.4
4-2	13.8	0.5	14.3	28.7	1.6	30.3	0.5	-	0.5	10.7	3.0	13.7
5-1	8.4	0.5	8.9	-	-	-	3.4	1.4	4.8	-	-	-
5-2	14.2	1.9	16.1	-	-	-	7.4	3.4	10.8	-	-	-
6	22.6	2.4	25.0	-	-	-	18.3	4.6	22.9	-	-	-
7	27.5	2.5	30.0	33.7	1.1	34.8	16.8	6.5	23.3	32.0	6.9	38.9
8	22.9	1.1	24.0	17.0	0.5	17.5	8.9	2.4	11.3	6.5	1.0	7.5
9	54.7	9.1	63.8	43.7	3.5	47.2	24.0	15.9	39.9	28.2	6.4	34.6
10	22.5	4.4	26.9	33.7	3.0	36.7	7.6	7.2	14.8	18.2	4.0	22.2
11-1	61.9	15.5	77.4	54.4	9.8	64.2	18.5	31.5	50.0	48.6	12.2	60.8
11-2	73.9	13.8	87.7	56.7	11.9	68.6	37.2	25.8	63.0	45.3	15.6	60.9
12	16.7	10.6	17.3	-	-	[illegible]	6.5	-	6.5	-	-	-
13	30.9	4.9	35.8	28.8	1.8	30.6	17.5	4.8	22.3	20.8	-	20.8
14	47.4	3.0	50.4	46.1	2.1	48.2	30.7	6.9	37.6	12.1	4.0	16.1
15	17.8	-	17.8	27.6	-	27.6	4.5	2.8	7.3	7.7	1.4	9.1
16	31.5	-	31.5	33.8	0.5	34.3	15.5	3.2	18.7	18.2	3.6	21.8
17	16.8	-	16.8	19.1	-	19.1	4.2	-	4.2	3.9	1.1	5.0
18	15.7	1.9	17.6	36.2*	-	36.2*	5.0	4.1	9.1	19.0*	2.1*	21.1*
				29.8†	-	29.8†				12.7†	2.5†	15.2†
19	25.1	-	25.1	19.1*	-	19.1*	11.9	6.8	18.7	9.7*	4.4*	14.1*
				21.8†	-	21.8†				11.4†	4.2†	15.6†
20	38.0	1.1	39.1	33.7*	0.5*	34.2*	20.3	5.5	25.8	17.4*	2.9*	20.3*
				38.4†	2.0†	40.4†				23.0†	3.6†	26.6†

* Heavy liming.

† Light liming.

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Hay - Park Grass

Yield of hay: cwt per acre

Plot	1945 Not limed 1st Crop	1945 Not limed 2nd Crop	1945 Not limed Total	1945 Limed 1st Crop	1945 Limed 2nd Crop	1945 Limed Total	1946 Not limed 1st Crop	1946 Not limed 2nd Crop	1946 Not limed Total	1946 Limed 1st Crop	1946 Limed 2nd Crop	1946 Limed Total
1	6.0	4.0	10.0	17.7	2.2	19.9	13.6	6.4	20.0	20.3	3.7	24.0
2	11.8	-	11.8	10.5	-	10.5	12.9	3.0	15.9	14.2	2.3	16.5
3	11.9	-	11.9	11.1	-	11.1	12.3	3.6	15.9	12.8	1.8	14.6
4-1	17.2	1.2	18.4	16.0	0.6	16.6	16.5	3.3	19.8	14.3	3.8	18.1
4-2	15.9	1.5	17.4	26.9	1.5	28.4	19.2	6.1	25.3	43.5	7.9	51.4
5-1	6.7	1.4	8.1	-	-	-	7.3	2.4	9.7	-	-	-
5-2	16.6	3.9	20.5	-	-	-	11.7	5.8	17.5	-	-	-
6	33.5	11.5	45.0	-	-	-	26.2	11.2	37.4	-	-	-
7	30.4	10.0	40.4	48.8	10.1	58.9	22.5	11.0	33.5	52.2	11.9	64.1
8	26.8	5.6	32.4	19.7	3.8	23.5	20.2	8.4	28.6	13.8	6.5	20.3
9	38.2	15.5	53.7	42.2	4.0	46.2	19.5	24.2	43.7	40.5	11.5	52.0
10	30.9	6.9	37.8	34.1	3.4	37.5	18.5	13.4	31.9	30.6	9.0	39.6
11-1	30.0	19.1	49.1	53.5	7.0	60.5	30.6	3.4	34.0	48.1	20.6	68.7
11-2	44.8	23.0	67.8	54.9	10.8	65.7	32.0	3.2	35.2	52.5	2.0	54.5
12	16.8	2.8	19.6	-	-	-	11.1	6.0	17.1	-	-	-
13	37.9	9.1	47.0	52.3	13.8	66.1	24.4	14.2	38.6	36.7	10.4	47.1
14	49.7	11.8	61.5	52.8	6.8	59.6	52.5	12.9	65.4	54.7	11.4	66.1
15	22.0	8.2	30.2	30.2	6.5	36.7	21.3	7.4	28.7	25.9	5.6	31.5
16	17.5	6.2	23.7	34.6	7.9	42.5	35.8	9.3	45.1	37.7	10.8	48.5
17	28.0	7.5	35.5	26.0	5.2	31.2	24.9	7.1	32.0	23.2	5.8	29.0
18	17.0	4.0	21.0	33.2*	-	33.2*	6.5	13.8	20.3	21.9*	3.8*	25.7*
				32.0†	-	32.0†				19.5†	6.7†	26.2†
19	40.3	10.1	50.4	38.8*	5.0*	43.8*	28.7	10.9	39.6	27.4*	7.4*	34.8*
				41.2†	5.5†	46.7†				31.9†	8.2†	40.1†
20	38.6	5.2	43.8	40.6*	3.1*	43.7*	43.5	10.7	54.2	46.6*	7.2*	53.8*
				42.7†	8.8†	51.5†				51.1†	11.9†	63.0†

* Heavy liming.

† Light liming.

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Yield of hay: cwt per acre

	1947					
	Not Limed			Limed		
Plot	1st Crop	2nd Crop	Total	1st Crop	2nd Crop	Total
1	9.0	3.9	12.9	23.2	6.0	29.2
2	18.4	1.1	19.5	21.2	4.2	25.4
3	19.1	1.4	20.5	20.4	2.1	22.5
4-1	24.8	2.6	27.4	23.4	3.4	26.8
4-2	15.4	5.9	21.3	19.9	7.8	27.7
5-1	13.3	1.6	14.9	-	-	-
5-2	28.2	5.0	33.2	-	-	-
6	40.3	8.9	49.2	-	-	-
7	41.2	8.2	49.4	51.4	9.2	60.6
8	29.4	6.0	35.4	24.6	4.6	29.2
9	20.2	22.2	42.4	30.1	9.0	39.1
10	18.0	10.8	28.8	26.4	8.5	34.9
11-1	9.8	22.2	32.0	44.1	11.9	56.0
11-2	18.3	30.9	49.2	52.1	17.2	69.3
12	22.1	3.0	25.1	-	-	-
13	33.8	7.6	41.4	43.2	13.1	56.3
14	45.8	13.8	59.6	40.2	12.0	52.2
15	33.5	6.0	39.5	45.3	7.0	52.3
16	34.9	9.5	44.4	41.2	9.5	50.7
17	23.1	7.4	30.5	26.9	6.8	33.7
18	15.5	3.9	19.4	32.4*	10.5*	42.9*
				28.9†	9.8†	38.7†
19	29.8	6.6	36.4	33.8*	5.2*	39.0*
				33.6†	5.2†	38.8†
20	41.9	8.0	49.9	42.9*	7.1*	50.0*
				37.4†	9.9†	47.3†

* Heavy liming.

† Light liming.

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A/6.9

Hay - Park Grass

Botanical Composition per cent. 1st Crop

Sp. No.	Plot 1 1939 U	Plot 1 1939 L	Plot 1 1940 U	Plot 1 1940 L	Plot 1 1947 U	Plot 1 1947 L	Plot 1 1948 U	Plot 1 1948 L	Plot 2 1949 U	Plot 2 1949 L	Plot 4[1] 1949 U	Plot 4[1] 1949 L
1	52.4	3.7	24.1	3.2	76.0	1.1	75.3	1.5	10.0	0.5	2000	0.4
3	0.2	4.0	0.2	4.0	0.2	1.4	0.1	2.5	9.6	4.1	2.2	2.4
4	0.7	2.4	0.9	5.6	0.3	6.0	0.2	1.4	1.1	0.4	3.4	1.1
5	0.1	2.2	0.1	0.8	0.2	4.2	-	3.0	0.4	0.2	7.3	0.1
6	-	2.2	-	2.4	-	1.3	-	1.7	0.2	1.5	0.9	2.7
7	-	34.7	-	27.7	0.3	27.4	0.2	12.1	3.5	22.5	5.5	18.1
8	-	-	-	-	-	-	-	-	1.8	3.9	0.5	1.8
9	-	-	-	0.1	-	-	-	-	-	-	0.1	-
11	0.8	13.0	0.2	12.2	2.0	15.9	3.2	18.3	7.9	7.5	7.1	4.9
12	40.9	15.2	72.2	19.3	14.0	6.1	15.6	15.4	15.5	7.4	9.1	3.6
13	-	-	-	-	-	-	-	-	0.1	-	0.3	1.1
14	-	3.5	0.1	3.3	-	5.9	-	5.8	3.3	2.0	6.7	4.5
15	-	-	-	-	-	-	-	-	-	0.1	0.3	-
16	0.2	2.3	0.2	2.5	-	1.3	-	1.3	0.1	1.0	0.9	1.6
17	-	0.2	-	0.9	-	0.3	-	0.3	-	0.3	0.5	1.8
51	-	1.5	-	1.7	-	1.9	-	2.0	2.2	2.4	3.0	7.3
52	-	0.5	-	0.6	-	1.2	-	2.4	9.4	9.9	3.8	7.7
53	-	-	-	-	-	-	-	-	-	-	2.4	-
54	-	0.1	-	0.2	-	0.6	-	0.2	3.6	4.8	2.3	4.9
55	-	-	-	-	-	-	-	-	0.4	0.7	2.9	2.5
101	-	1.1	-	1.2	-	1.1	-	0.8	0.9	2.8	3.8	2.3
104	-	0.2	-	0.1	-	0.3	-	0.6	0.2	0.3	0.4	-
105	-	-	-	-	-	-	-	-	0.1	-	-	-
106	-	-	-	-	-	-	-	-	-	0.6	-	-
109	-	-	-	-	0.2	-	1.9	0.1	-	-	-	-
110	-	-	-	-	-	-	-	-	0.6	0.1	0.9	2.1
111	-	-	-	-	-	-	-	-	-	0.3	-	-
114	-	0.1	-	-	-	0.4	0.1	0.1	3.2	0.2	1.1	-
116	-	0.5	-	0.8	-	0.1	-	0.4	0.1	0.3	0.1	0.3
117	2.1	-	-	-	-	-	-	-	1.6	-	-	-
118	-	0.9	-	-	-	0.9	-	2.0	0.5	1.7	0.2	2.2
119	-	1.1	-	1.7	-	0.5	--	1.7	1.9	1.2	3.8	3.4
120	0.4	4.7	0.7	1.4	0.5	0.7	0.8	2.0	1.3	2.5	1.6	3.6
123	-	-	-	-	-	-	-	-	-	0.1	-	-
124	-	0.1	-	-	-	0.8	-	1.3	12.5	8.7	11.0	6.3
125	-	-	-	-	-	-	-	0.2	-	-	-	-
126	-	0.5	-	0.5	-	0.5	-	1.0	0.4	0.5	0.6	0.1
127	-	-	-	-	-	0.8	-	-	-	0.2	-	0.7
129	-	3.5	-	6.6	0.6	10.7	-	19.8	5.7	10.2	8.5	9.7
130	-	-	-	0.1	-	-	-	-	-	0.1	0.1	0.3
131	-	-	-	0.1	-	-	-	-	-	-	-	-
134	2.0	1.7	0.8	2.8	5.7	8.5	2.5	2.1	1.4	0.5	5.8	2.1
136	0.2	0.1	0.5	0.2	-	0.1	0.1	-	0.4	0.5	0.9	0.4
137	-	-	-	-	-	-	-	-	0.1	-	-	-

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Botanical Composition per cent. 1st Crop

Sp. No.	Plot 3 1939 U	1939 L	1940 U	1940 L	1941 L	1947 U	1947 L	1948 U	1948 L	Plot 5¹ 1949	Plot 5² 1949
1	7.7	1.2	12.1	2.0	1.4	8.4	1.1	15.6	0.8	17.8	7.1
2	-	-	-	-	-	-	-	-	-	0.7	-
3	2.0	3.3	2.6	7.0	4.1	2.4	2.8	7.9	6.2	0.3	9.1
4	1.7	0.3	2.8	0.9	0.3	5.1	2.6	0.6	0.7	1.1	0.1
5	-	0.2	0.7	0.6	-	0.6	0.1	0.1	0.1	0.5	1.8
6	0.3	2.0	0.2	2.0	1.2	0.6	1.9	0.2	1.2	-	-
7	5.2	16.1	5.7	18.2	18.9	3.4	13.5	2.7	13.4	0.5	3.5
8	3.1	4.9	0.9	1.5	3.2	4.7	3.6	0.2	1.0	-	-
9	0.1	-	-	-	-	-	-	-	-	-	-
10	0.1	-	0.3	0.1	0.1	-	-	-	-	-	-
11	3.0	3.1	3.5	3.7	3.7	12.1	3.5	4.5	3.3	4.1	4.7
12	11.3	4.7	19.4	7.7	8.5	10.4	3.0	16.6	4.1	55.8	11.5
14	3.5	1.8	4.6	3.1	2.6	5.3	5.0	4.3	2.5	0.7	4.1
15	-	0.1	0.1	-	-	-	-	-	-	-	-
16	-	1.3	0.1	2.2	1.8	0.3	1.6	0.2	2.1	0.7	2.6
17	-	0.3	0.1	0.7	1.2	-	0.8	-	0.3	-	-
51	0.5	1.9	0.7	2.3	3.5	2.7	2.5	0.9	2.0	-	16.8
52	4.4	10.9	6.3	13.7	9.6	3.3	5.0	3.8	7.0	3.1	5.2
54	1.6	4.7	2.2	7.0	4.1	4.9	7.5	2.3	6.4	-	1.1
55	0.1	0.3	0.3	0.3	0.5	0.1	0.2	0.3	0.7	-	1.3
56	-	-	-	-	-	-	-	-	-	-	2.1
101	0.1	2.8	0.1	1.9	1.1	1.1	8.6	0.1	3.0	-	0.3
104	0.2	0.2	0.1	0.1	0.3	0.6	0.4	0.2	0.2	-	-
105	0.1	-	0.1	-	-	-	-	0.2	-	0.2	0.1
106	-	0.8	-	0.2	0.3	-	0.1	-	0.1	-	-
109	-	0.1	-	-	-	-	-	0.3	-	-	-
110	14.6	12.6	9.1	4.1	9.8	5.0	13.4	5.6	11.7	-	-
111	-	-	-	0.3	0.1	-	0.2	-	0.4	-	-
114	2.2	0.3	1.6	-	0.1	5.7	0.9	1.6	0.1	2.0	0.1
115	-	-	-	-	-	-	-	-	-	-	0.6
116	0.3	0.6	0.3	0.6	0.4	-	0.2	0.1	0.2	-	0.3
117	-	-	0.1	-	-	0.1	-	1.1	-	0.6	-
118	1.1	3.7	0.4	3.8	3.2	0.7	2.1	0.9	2.1	1.7	0.9
119	1.4	0.7	1.9	0.8	1.0	0.9	0.5	1.3	1.0	1.6	12.8
120	2.9	1.5	1.3	0.4	0.4	0.6	0.5	1.0	2.0	2.0	5.4
122	-	-	0.1	0.1	-	-	-	-	-	-	-
123	-	-	-	-	-	-	0.1	0.1	-	0.4	-
124	18.2	9.5	12.3	7.0	6.4	12.0	8.8	17.9	12.5	1.6	0.1
126	0.1	0.2	0.2	0.4	-	0.3	0.5	0.1	0.2	-	-
127	0.3	0.1	-	-	-	0.4	0.3	0.1	-	-	-
129	11.8	7.7	6.3	5.3	9.7	3.7	6.2	6.2	13.0	2.4	0.9
130	0.1	0.3	0.3	0.6	0.6	-	0.4	0.1	0.2	-	-
131	-	-	-	0.1	-	-	-	-	-	-	-
132	-	0.1	0.6	0.1	0.1	-	-	-	-	-	-
133	-	-	0.1	-	-	-	-	0.3	-	-	-
134	1.3	1.2	0.2	0.3	1.4	3.7	1.8	2.4	1.3	1.0	5.7
136	0.3	0.4	0.6	0.8	0.3	0.3	0.2	0.1	0.2	1.2	1.8
137	0.4	0.1	1.7	0.1	0.1	0.6	0.1	0.1	-	-	-

https://doi.org/10.23637/ERADOC-1-145

X

A/6.11

Hay - Park Grass

Botanical Composition per cent. 1st Crop

Sp. No.	Plot 4/2 1947 U	1947 L	1949 U	1949 L	Plot 10 1939 U	1939 L	1940 U	1940 L	1947 U	1947 L	1948 U	1948 L
1	68.8	1.8	36.2	2.2	30.4	0.9	33.9	2.1	31.3	1.9	51.9	1.9
3	0.2	32.4	0.7	24.3	0.1	63.8	0.1	50.3	0.4	25.2	0.3	28.6
4	14.5	4.6	10.0	1.2	43.7	0.9	31.5	2.9	52.4	11.3	10.3	1.8
5	-	2.3	-	2.5	1.1	3.5	0.9	7.6	5.4	2.7	5.1	4.1
7	-	-	-	0.3	-	-	-	-	-	0.1	-	-
11	-	0.1	-	0.3	0.1	0.2	0.1	0.1	0.1	0.6	0.3	-
12	9.6	29.8	35.4	57.4	0.7	22.2	2.1	26.3	2.6	43.7	10.2	54.5
14	4.8	1.0	17.5	0.1	23.9	0.2	31.3	0.2	6.6	0.6	21.6	0.5
X16	-	5.3	-	6.3	-	6.0	-	6.2	0.1	3.3	-	3.4
51	-	0.1	-	-	-	-	0.1	-	-	-	-	-
101	-	0.6	-	0.1	-	-	-	-	-	-	-	-
112	0.8	-	-	-	-	-	-	-	-	-	-	-
116	-	-	-	0.1	-	-	-	-	-	-	-	-
117	-	0.8	-	0.4	-	-	-	-	-	1.0	-	-
119	-	0.2	-	0.8	-	-	-	-	-	0.2	-	0.7
126	-	-	-	-	-	0.3	-	-	-	0.5	-	0.4
127	-	-	-	-	-	-	-	-	-	0.1	-	-
129	-	-	-	0.1	-	-	-	-	-	0.4	-	-
134	1.3	20.6	0.2	3.9	-	2.0	-	4.3	1.1	8.4	0.3	5.0
135	-	0.4	-	-	-	-	-	-	-	-	-	-

V

https://doi.org/10.23637/ERADOC-1-145

Botanical Composition per cent. 1st Crop

Sp. No.	Plot 6 1949 U	Plot 7 1939 U	Plot 7 1939 L	Plot 7 1940 U	Plot 7 1940 L	Plot 7 1947 U	Plot 7 1947 L	Plot 7 1948 U	Plot 7 1948 L	Plot 15 1949 U	Plot 15 1949 L
1	2.5	7.2	0.1	3.1	0.2	4.7	0.1	3.8	0.4	2.8	0.4
3	6.1	1.2	15.6	6.1	22.9	4.5	15.7	8.2	13.2	18.5	6.8
4	2.2	1.5	0.1	2.6	0.1	6.7	0.3	3.6	0.3	1.7	0.3
5	2.2	1.5	11.0	3.1	10.9	4.0	19.2	2.4	11.7	0.6	13.9
6	0.1	0.5	2.2	0.6	2.5	0.8	2.1	1.0	2.5	0.2	0.2
7	3.1	1.8	5.9	1.8	2.7	1.2	3.9	1.1	5.2	1.1	12.6
9	0.2	-	2.2	0.2	7.3	-	0.2	0.2	2.1	-	1.1
11	11.8	21.8	18.9	26.3	13.8	20.8	20.7	15.7	13.2	8.4	4.4
12	5.3	7.7	2.6	6.5	1.2	4.1	1.0	4.6	1.0	7.0	3.7
13	-	-	1.6	-	0.4	0.2	3.9	0.3	3.3	-	-
14	2.6	1.0	1.4	5.8	0.9	1.8	0.6	2.8	1.2	1.4	1.6
15	-	-	-	-	-	-	-	-	0.2	-	-
16	1.7	1.1	1.5	1.7	1.3	2.1	1.3	2.6	1.2	0.5	1.2
17	-	-	5.6	0.3	9.3	0.2	2.0	0.3	1.1	-	0.4
51	20.7	28.8	13.1	8.8	6.4	11.4	5.2	11.3	15.6	22.3	13.4
52	2.6	2.3	0.1	2.6	-	0.3	-	0.5	-	0.9	-
54	5.3	4.6	1.4	4.9	2.1	4.3	0.1	4.6	3.4	1.7	2.8
55	2.2	3.9	7.8	3.0	5.7	1.6	3.8	3.4	6.2	2.8	16.5
56	0.5	-	-	-	-	-	-	-	-	-	-
101	0.8	0.8	1.2	1.0	1.2	1.3	3.2	0.7	1.9	0.4	1.8
104	-	-	0.1	-	-	-	0.1	-	-	-	0.1
111	-	0.8	-	2.3	-	-	-	-	-	-	-
113	-	-	0.2	-	-	-	-	-	0.3	-	-
114	4.1	1.4	0.2	2.0	0.1	4.4	0.1	1.4	0.1	1.1	0.4
115	0.6	1.4	1.2	4.8	4.4	1.1	4.6	1.0	4.5	-	3.2
117	0.1	-	-	0.1	-	-	-	0.2	-	-	-
118	1.1	0.1	0.7	-	1.6	-	-	-	0.3	-	-
119	8.9	2.8	0.2	1.2	0.1	7.6	0.3	14.0	1.0	10.0	1.2
120	5.5	4.0	0.8	3.1	0.1	7.0	1.5	4.3	0.5	7.6	1.4
124	0.2	0.4	-	-	-	0.1	-	-	-	0.3	-
126	0.2	-	1.7	0.1	3.3	0.1	1.6	0.4	1.9	0.1	1.9
127	0.3	0.1	-	-	0.1	0.9	3.5	1.0	2.6	-	0.3
129	7.4	1.6	1.0	1.3	0.5	5.4	1.8	6.5	4.6	9.7	9.6
130	-	-	0.1	-	0.1	0.1	0.1	-	0.1	-	0.1
134	1.5	1.3	1.5	5.6	0.8	2.3	3.1	2.2	0.4	0.8	0.6
136	0.2	0.4	-	1.1	-	0.1	-	0.2	-	0.1	0.1
138	-	-	-	-	-	0.9	-	1.7	-	-	-

https://doi.org/10.23637/ERADOC-1-145

Hay - Park Grass

Botanical Composition per cent. 1st Crop

Sp. No.	Plot 8 1939 U	1939 L	1940 U	1940 L	1941 U	1941 L	1947 U	1947 L	1948 U	1948 L	Plot 16 1949 U	1949 L
1	5.9	0.8	4.0	1.3	2.4	0.7	4.2	0.9	3.0	1.3	2.3	0.2
3	0.4	1.5	0.8	2.8	0.4	1.5	1.1	2.7	3.6	2.7	22.5	10.9
4	1.2	1.0	2.3	1.4	2.8	0.9	5.8	5.6	2.4	1.4	4.2	0.2
5	10.8	11.6	5.4	9.5	4.8	8.2	12.4	8.3	14.2	14.7	22.0	19.4
6	1.8	4.2	1.7	3.5	0.7	2.4	1.4	2.0	0.5	2.1	0.6	0.6
7	3.5	16.1	3.6	14.7	4.3	20.5	1.7	16.7	1.9	11.3	5.8	15.3
8	0.2	1.5	0.1	0.7	-	1.4	0.2	2.4	0.1	0.9	-	-
9	-	0.1	-	-	-	-	-	-	-	-	0.2	0.6
10	-	-	-	0.1	-	-	-	-	-	-	-	-
11	4.5	4.7	3.7	4.7	2.9	4.8	10.9	6.2	12.6	5.6	9.8	13.4
12	9.5	4.6	11.6	6.8	23.6	8.7	4.6	1.5	5.2	2.1	6.2	14.4
13	-	4.0	0.1	1.6	-	2.1	6.3	6.3	0.4	6.9	-	-
14	6.2	3.5	7.8	3.6	4.3	2.4	6.5	4.2	7.4	2.1	1.1	-
15	0.2	0.3	0.2	0.2	-	0.1	0.3	-	0.1	-	-	-
16	0.7	1.1	0.6	1.3	0.7	1.8	1.4	1.7	1.1	1.5	0.4	0.5
17	0.7	1.1	0.6	3.0	0.3	3.2	0.3	1.7	0.1	0.8	0.1	0.4
51	1.6	0.8	0.3	0.5	0.6	0.6	0.4	0.8	0.6	1.5	11.7	8.5
52	4.3	5.4	6.1	6.2	3.1	5.2	1.8	2.1	3.3	5.9	-	-
54	8.1	8.6	17.9	17.3	6.2	8.5	6.5	7.3	2.7	3.5	-	0.7
55	0.5	0.1	0.9	-	1.8	0.2	0.5	0.1	0.7	0.1	0.2	0.4
101	2.3	0.8	2.7	0.8	1.4	0.6	9.8	4.0	5.7	2.1	0.2	0.4
104	0.5	0.5	0.2	0.1	0.7	0.8	0.4	0.3	0.1	0.4	-	-
105	0.2	-	0.1	-	0.1	0.1	0.1	-	0.1	-	-	-
107	-	0.8	-	-	-	-	-	-	-	-	-	-
111	-	-	-	1.0	-	1.1	-	0.6	-	0.6	-	-
113	-	-	-	-	-	-	-	-	-	-	-	1.5
114	0.7	0.1	0.9	-	0.6	0.1	2.1	0.1	0.8	0.2	0.7	0.4
115	0.1	0.1	-	-	-	-	-	-	-	-	-	0.9
116	0.2	0.6	0.3	0.4	0.3	0.5	-	0.2	0.1	0.2	-	-
117	0.2	0.1	0.2	0.1	1.5	0.1	0.2	0.1	0.4	0.2	-	-
118	2.2	3.5	0.9	4.6	1.4	5.6	0.7	4.7	0.9	3.6	-	-
119	4.3	0.8	3.4	0.7	6.3	1.4	4.1	1.2	6.9	4.0	3.9	1.1
120	4.0	5.4	2.8	1.7	2.1	2.6	1.0	1.0	2.0	2.5	-	-
124	4.4	3.2	2.0	1.6	3.0	1.5	4.9	3.4	4.5	5.6	-	-
126	0.2	-	0.4	0.1	0.3	0.2	0.4	0.2	0.1	0.1	0.9	3.3
127	-	-	-	-	-	0.1	-	0.7	-	0.9	0.7	1.4
129	13.0	10.7	11.1	6.8	18.6	9.9	10.0	9.5	15.0	13.1	6.3	5.3
130	0.3	0.3	0.5	0.8	0.3	0.6	0.2	0.6	0.3	0.2	-	-
131	-	-	-	0.1	-	-	-	-	-	-	-	-
132	-	-	-	-	-	0.1	-	-	-	-	-	-
134	6.8	1.8	4.0	1.4	2.5	1.2	5.7	2.6	2.9	1.8	0.2	0.2
136	0.5	0.3	2.8	0.6	2.0	0.3	0.2	0.3	0.3	0.1	-	-
138	-	-	-	-	-	-	0.2	-	-	-	-	-

N

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Botanical Composition per cent. 1st Crop
Plot 9

Sp. No.	1939 U	1939 L	1940 U	1940 L	1941 U	1947 U	1947 L	1948 U	1948 L
1	2.0	0.8	5.3	2.6	5.6	23.8	3.4	7.8	4.3
3	0.1	69.4	0.1	55.0	-	0.8	31.8	-	38.1
4	3.2	0.7	0.3	2.4	8.0	15.7	12.4	0.4	4.2
5	0.3	14.3	0.9	21.9	0.2	4.3	13.2	0.6	14.7
6	-	-	-	-	-	-	-	-	0.1
7	-	-	-	0.2	-	-	0.5	-	0.5
9	-	0.1	-	1.0	-	-	0.1	-	0.1
11	-	4.3	-	4.1	0.2	0.2	12.5	-	11.6
12	0.1	1.9	0.1	4.7	0.1	0.1	2.8	0.1	4.3
14	94.1	2.5	93.3	2.1	85.1	51.3	3.4	90.6	2.5
16	-	4.4	-	2.1	-	0.1	3.8	-	9.4
17	-	-	-	0.1	-	-	-	-	-
51	-	0.8	-	0.7	-	-	6.0	-	3.5
55	-	-	-	-	0.1	-	-	-	-
112	-	-	-	-	-	1.6	-	0.5	-
113	-	0.1	-	0.2	-	-	0.1	-	-
114	-	-	-	-	-	-	0.8	-	0.1
115	-	0.2	-	2.0	-	-	1.4	-	1.5
119	-	-	-	-	-	-	0.2	-	0.5
124	-	-	-	-	-	0.1	-	-	-
126	-	0.5	-	0.6	-	0.1	4.8	-	3.3
127	-	-	-	-	-	-	0.3	-	0.1
129	0.1	-	-	-	-	0.1	0.2	-	0.1
134	0.1	-	-	0.3	0.7	1.8	2.3	-	1.1

https://doi.org/10.23637/ERADOC-1-145

Hay - Park Grass

Botanical Composition per cent. 1st Crop

Sp. No.	Plot 11[1] 1947 U	Plot 11[1] 1947 L	Plot 11[1] 1949 U	Plot 11[1] 1949 L	Plot 11[2] 1947 U	Plot 11[2] 1947 L	Plot 11[2] 1949 U	Plot 11[2] 1949 L	Plot 12 1949 U	Plot 17 1949 U	Plot 17 1949 L
1	4.5	0.8	-	-	44.1	0.2	5.3	-	3.5	1.2	0.6
3	1.0	78.9	0.1	82.0	0.8	70.2	0.3	57.5	7.6	14.5	7.3
4	0.8	0.7	-	-	0.1	0.1	-	-	3.4	8.7	0.8
5	0.3	2.9	-	2.3	12.7	11.3	0.8	17.5	0.8	-	1.7
6	-	-	-	-	-	-	-	-	0.2	-	1.5
7	-	-	-	-	-	-	-	-	4.1	1.7	20.5
8	-	-	-	-	-	0.1	-	-	6.0	0.6	0.7
9	-	0.1	-	-	-	-	-	-	-	-	0.7
11	-	2.5	-	4.9	-	7.8	-	10.3	8.8	25.4	21.1
12	0.2	-	-	0.4	0.2	-	0.1	-	19.4	9.4	22.3
13	-	-	-	-	-	-	-	-	1.7	-	0.8
14	81.1	7.6	99.6	3.5	40.8	2.4	92.8	1.6	2.8	8.4	2.1
15	-	-	-	-	-	-	-	-	-	0.6	2.4
16	-	4.5	--	5.1	0.1	6.3	-	10.6	0.2	-	0.1
17	-	-	-	-	-	0.1	-	-	-	-	0.6
51	-	-	-	-	-	0.1	-	-	1.1	0.1	-
52	-	-	-	-	-	-	-	-	7.4	-	2.8
54	0.2	-	-	-	-	-	-	-	4.6	-	-
55	-	-	-	-	-	-	-	-	0.2	-	-
101	-	-	-	-	-	-	-	-	0.7	0.4	2.1
104	-	-	-	-	-	-	-	-	0.1	0.1	0.1
105	-	-	-	-	-	-	-	-	0.2	-	-
109	-	-	-	-	-	-	-	-	0.1	-	-
111	-	-	-	-	-	-	-	-	0.2	-	-
112	11.9	-	0.3	-	-	-	-	-	-	-	-
114	-	0.1	-	-	-	-	-	-	1.3	0.4	0.1
115	-	-	-	-	-	0.1	-	0.1	-	-	0.2
116	-	-	-	-	-	-	-	-	0.1	-	-
117	-	-	-	-	-	-	-	-	0.9	-	0.4
118	-	-	-	-	-	-	-	-	1.7	-	-
119	-	-	-	-	-	-	-	-	1.8	1.2	1.0
120	-	-	-	-	-	-	-	-	1.8	5.5	1.4
123	-	-	-	-	-	-	-	-	0.1	-	-
124	-	-	-	-	-	-	-	-	10.0	4.0	1.7
126	-	1.6	-	0.5	-	1.3	-	1.3	0.2	1.4	0.6
127	-	-	-	-	-	-	-	-	0.1	-	0.5
129	-	-	-	-	-	-	-	-	6.8	14.0	5.6
130	-	-	-	-	-	-	-	-	0.1	-	-
134	-	0.3	-	1.3	1.2	-	0.7	1.1	1.0	0.6	0.2
136	-	-	-	-	-	-	-	-	0.6	-	0.1
137	-	-	-	-	-	-	-	-	0.4	1.8	-

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Botanical Composition per cent. 1st Crop
Plot 13

Sp. No.	1944 U	1944 L	1945 U	1945 L	1946 U	1946 L	1947 U	1947 L	1948 U	1948 L
1	8.4	-	6.3	-	8.0	0.1	10.9	-	15.7	0.2
3	56.7	5.8	46.0	6.8	32.5	8.6	27.6	13.7	31.9	10.4
4	4.8	0.5	4.9	0.3	15.5	1.2	14.2	0.8	6.3	0.3
5	0.9	5.9	2.1	7.0	1.4	10.9	2.1	14.2	3.4	25.9
6	0.1	-	-	-	-	-	-	-	-	0.1
7	-	-	-	0.2	-	0.4	0.1	0.7	-	0.3
9	0.1	0.1	-	0.1	-	0.1	-	-	-	0.1
11	6.7	8.6	5.6	7.8	6.8	27.5	9.8	24.2	9.1	21.5
12	3.6	1.1	3.4	1.6	6.0	1.1	4.5	1.0	4.0	0.9
13	-	-	-	-	-	-	-	0.1	-	-
14	2.7	1.8	4.5	2.1	5.7	5.4	6.2	5.3	2.5	4.4
15	0.1	-	-	-	-	-	-	-	-	-
16	1.3	1.4	0.8	1.9	0.1	1.4	0.9	2.3	0.9	1.8
17	0.4	1.2	0.1	8.2	0.1	5.8	0.2	4.6	0.1	1.2
51	0.3	31.0	0.5	26.6	0.2	4.4	0.7	6.3	0.5	7.9
52	-	0.2	-	0.3	-	0.1	-	-	-	-
54	-	7.3	-	6.0	0.1	2.4	0.1	1.2	-	2.4
55	-	2.6	-	4.0	-	0.8	-	-	-	0.3
101	-	0.9	-	2.1	0.1	1.0	0.6	2.3	0.1	2.2
104	0.3	0.5	-	0.2	0.1	0.1	0.1	0.2	0.1	0.2
105	0.2	-	0.6	-	0.6	0.1	0.2	-	0.1	-
113	0.2	2.0	-	-	-	0.3	-	0.2	-	0.7
114	0.9	-	1.6	0.2	1.0	0.1	2.0	-	0.8	0.1
115	0.2	-	1.3	-	-	-	-	-	-	-
117	-	-	-	-	0.4	-	-	-	-	-
119	0.6	0.2	3.0	0.5	2.9	0.4	3.8	0.5	4.0	0.3
120	0.3	4.0	-	0.4	0.5	0.4	0.7	1.6	0.2	0.7
123	0.2	-	-	-	-	-	-	-	-	-
124	-	0.9	0.3	1.2	0.4	1.3	0.3	1.5	1.7	1.3
126	0.3	6.2	0.7	3.6	1.0	4.1	0.9	5.4	1.5	3.2
127	-	0.5	-	2.2	-	1.0	-	0.4	0.3	1.3
129	6.2	16.2	12.1	14.5	14.0	19.3	10.3	10.8	14.7	11.5
130	0.5	0.7	0.4	0.9	0.9	0.4	0.7	0.2	0.2	-
131	-	0.1	-	-	-	-	0.2	-	-	-
134	3.9	0.3	5.8	1.3	1.7	1.3	2.9	2.5	1.9	0.8
136	0.1	-	-	-	-	-	-	-	-	-

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Hay - Park Grass

Botanical Composition per cent. 1st Crop

Plot 14

Sp. No.	1939 U	1939 L sun	1939 L shade	1940 U	1940 L sun	1940 L shade	1941 U	1941 L sun	1941 L shade	1947 U	1947 L sun	1947 L shade	1948 U	1948 L sun	1948 L shade
1	-	-	0.1	0.1	0.1	0.2	-	-	0.1	0.5	0.2	1.0	0.6	0.1	0.4
3	53.1	23.9	13.7	49.1	18.5	12.4	59.2	23.1	18.5	27.6	10.5	5.0	31.8	12.1	6.7
4	-	-	0.4	-	-	0.5	-	-	0.5	0.2	0.3	0.5	0.6	-	0.2
5	31.1	48.2	12.4	30.9	52.0	13.1	28.9	44.5	18.7	36.8	43.6	27.1	36.2	45.0	34.7
6	-	-	0.6	-	0.1	0.6	-	0.2	0.4	-	0.1	1.2	0.2	0.5	1.1
7	0.6	0.9	12.6	0.1	0.7	11.9	0.1	0.8	14.4	0.5	3.9	12.6	1.4	5.3	11.6
9	0.1	0.4	0.3	-	0.1	0.6	0.1	0.3	0.6	-	-	-	0.3	-	-
11	6.3	4.3	1.0	5.7	6.0	1.9	7.2	7.2	1.1	14.5	10.7	5.2	14.2	13.6	5.0
12	0.2	4.8	38.0	0.1	5.3	36.6	-	11.4	34.6	-	9.0	27.1	-	13.4	27.4
14	0.2	-	0.2	-	-	0.1	-	-	-	0.8	-	0.3	-	-	2.3
15	-	-	0.1	-	-	-	-	-	0.1	-	-	-	-	-	-
16	1.2	1.9	3.6	0.3	1.0	1.6	0.7	1.3	3.1	3.9	2.9	222	4.7	2.9	2.9
17	3.5	7.3	3.1	9.8	10.5	2.3	1.5	3.9	1.5	0.3	0.5	0.9	2.4	1.0	1.0
51	1.6	5.6	12.1	0.7	1.5	15.0	0.3	4.0	4.9	3.3	13.2	12.2	2.1	3.2	3.6
54	-	-	-	-	-	-	-	-	0.1	-	-	0.1	-	-	0.3
55	-	-	0.3	-	-	-	-	-	-	-	-	0.3	-	-	0.5
101	-	-	0.1	-	-	0.1	-	-	-	-	0.1	0.1	-	-	-
107	-	-	-	-	-	-	-	0.3	-	-	-	-	-	-	-
113	0.6	1.2	0.6	1.3	2.3	1.9	0.8	0.1	0.6	5.3	0.8	0.3	0.2	0.7	0.5
114	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-
116	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-
119	-	-	0.2	-	-	0.1	-	-	-	-	-	0.1	-	-	0.1
120	-	-	-	-	-	0.1	-	-	-	0.2	-	-	-	-	-
126	0.1	0.2	0.2	0.6	0.9	0.7	0.7	2.0	0.6	3.0	2.9	3.6	3.2	1.1	1.7
127	-	-	-	-	-	-	-	-	-	-	0.9	-	-	0.5	-
129	0.1	-	-	-	-	0.2	-	0.1	-	1.1	0.3	0.1	1.6	-	-
134	1.3	1.3	0.3	1.3	1.0	0.1	0.5	0.8	0.2	2.0	0.1	0.1	0.4	0.6	-

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Botanical Composition per cent. 1st Crop

Sp. No.	Plot 18 1946 U	1946 LL	1946 HL	1948 U	1948 LL	1948 HL	Plot 19 1946 U	1946 LL	1946 HL	1948 U	1948 LL	1948 HL
1	74.6	2.0	1.4	76.9	3.4	1.2	8.1	2.8	0.1	11.8	4.3	0.4
2	-	-	3.1	-	-	-	-	-	-	-	-	-
3	1.8	2.9	2.9	0.1	2.8	3.8	13.1	18.3	19.7	6.2	25.2	16.7
4	4.2	2.3	0.2	0.8	0.8	-	9.1	2.7	0.1	7.3	1.5	-
5	-	10.1	10.3	0.5	24.6	25.0	9.8	6.4	13.9	5.7	5.5	14.3
6	-	-	-	-	-	-	1.4	0.5	2.4	1.7	3.0	3.1
7	-	1.0	0.7	-	3.2	0.8	0.5	1.7	2.7	0.9	1.9	5.4
9	-	0.4	0.1	-	0.3	0.1	-	0.5	0.1	-	0.2	0.3
11	-	12.5	36.5	1.3	35.0	48.3	3.6	4.4	4.3	3.3	10.9	13.6
12	12.5	9.8	5.1	8.9	6.8	2.2	4.6	2.5	3.3	9.8	5.0	4.5
13	-	-	-	-	0.1	-	2.4	-	4.1	1.1	0.4	5.7
14	0.5	0.3	0.3	-	0.2	-	2.7	2.0	0.4	1.3	1.7	-
15	-	0.1	0.1	-	0.1	0.1	-	-	-	-	-	0.3
16	--	1.1	1.0	-	0.8	1.1	0.2	0.9	1.4	0.6	0.9	1.9
17	0.1	0.6	0.3	-	0.2	0.2	0.5	1.0	1.3	0.5	1.8	0.7
18	-	1.6	-	-	2.6	0.1	-	-	-	-	-	-
51	-	0.1	1.4	-	-	0.5	9.5	10.5	13.2	13.5	7.4	7.5
52	-	-	-	-	-	-	-	-	2.6	1.1	-	1.7
54	-	0.4	0.1	-	0.1	0.1	0.4	1.2	0.8	0.2	-	0.5
55	-	0.1	-	-	-	-	0.9	2.9	1.5	2.7	1.0	0.7
101	-	-	-	-	-	-	5.9	10.4	2.2	5.7	7.9	4.0
104	-	0.6	0.1	-	0.1	-	0.3	0.4	0.1	0.2	-	-
105	-	-	-	-	-	-	-	-	-	0.2	-	-
107	-	0.2	-	-	-	-	-	-	-	-	-	-
111	-	-	-	-	0.1	-	-	-	-	-	-	-
113	-	-	-	-	-	-	-	0.4	0.1	-	-	-
114	-	0.1	-	-	0.3	0.1	0.4	0.4	0.2	0.3	0.4	-
115	-	1.5	2.4	-	0.6	1.6	0.1	1.5	1.7	1.0	0.4	1.1
117	-	-	0.4	-	-	-	-	-	-	-	-	-
119	-	0.1	0.5	-	0.2	-	6.3	5.4	1.9	10.2.	5.2	2.3
120	-	10.2	0.9	-	3.5	--	-	0.7	1.8	-	1.0	1.4
123	-	-	-	-	-	-	0.3	-	-	-	-	-
124	-	0.1	-	-	0.1	-	0.1	-	-	0.4	-	-
126	-	22.6	23.4	0.2	8.9	10.8	1.3	2.5	1.7	0.6	0.6	1.0
127	-	1.5	3.4	-	1.2	2.6	-	0.1	0.8	-	0.4	2.9
129	0.1	17.3	4.5	-	3.8	1.0	15.8	14.2	16.3	11.8	10.4	9.7
130	-	-	-	-	-	-	0.9	1.8	0.9	0.2	0.7	-
131	-	-	-	-	-	-	-	-	-	0.2	-	-
134	6.2	0.5	0.9	11.2	0.2	0.4	1.8	3.9	0.4	1.3	2.3	0.3
136	-	-	-	-	-	-	-	-	-	0.2	-	-
138	-	-	-	0.1	-	-	-	-	-	-	-	-

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Hay - Park Grass

Botanical Composition per cent. 1st Crop
Plot 20

Sp. No.	1946 U	1946 LL	1946 HL	1948 U	1948 LL	1948 HL
1	2.9	1.5	0.1	4.1	2.5	0.1
3	33.9	18.0	12.6	39.2	21.8	17.6
4	1.3	3.2	0.7	1.1	1.9	0.2
5	9.9	26.9	15.5	15.1	21.7	17.4
6	1.5	2.3	2.6	4.0	1.9	3.3
7	2.6	4.0	9.1	0.7	3.0	6.8
9	-	0.3	0.2	0.2	0.1	0.2
11	10.3	7.9	4.3	14.6	14.4	14.2
12	4.8	3.6	9.4	3.7	2.8	4.8
13	0.5	-	0.5	-	-	-
14	3.0	2.9	1.4	1.0	5.7	1.6
15	0.1	0.2	0.2	-	0.1	0.8
16	0.3	0.3	1.2	1.3	0.4	3.0
17	0.9	4.0	3.6	1.3	3.9	4.3
51	5.5	4.8	7.1	4.3	2.1	8.8
52	0.3	-	0.4	0.1	-	-
54	-	-	0.6	-	0.1	0.2
55	-	0.7	3.0	0.6	2.8	0.8
101	5.0	1.2	1.9	1.2	1.9	1.3
104	0.1	0.2	0.3	-	0.3	-
113	0.7	2.7	0.7	0.5	-	0.3
114	0.2	0.1	0.1	-	-	-
115	-	-	0.6	0.1	--	0.2
117	-	-	0.3	-	-	0.4
119	1.7	1.8	3.7	0.4	1.8	2.7
120	-	1.9	2.8	-	0.7	0.2
126	1.3	2.6	3.0	0.7	1.1	2.3
127	3.7	0.2	3.1	3.3	1.1	3.8
129	3.2	6.7	6.3	0.9	6.2	4.1
130	1.2	0.5	3.0	0.1	0.3	0.1
134	5.1	1.5	1.7	1.5	1.4	0.5

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Botanical Composition per cent. 1st Crop

Plot	1939 Gram-ineae	1939 Legum-inosae	1939 Other orders	1939 Dom. Sp.	1940 Gram-ineae	1940 Legum-inosae	1940 Other orders	1940 Dom. Sp.
1 U	95.3	-	4.7	117 134	98.0	-	2.0	ND
1 L	83.4	2.1	14.5	120	82.0	2.5	15.5	129
3 U	37.9	6.7	55.4	124	53.1	9.6	37.3	124 110
3 L	39.4	17.8	42.8	110	49.8	23.2	27.0	124 129
7 U	45.3	39.7	15.0	120	58.1	19.3	22.6	134 115
7 L	68.7	22.4	8.9	126	73.6	14.2	12.2	115 126
8 U	45.6	14.4	40.0	129	42.4	25.3	32.3	129
8 L	56.2	14.8	29.0	129	55.2	24.0	20.8	129 118
9 U	99.9	-	0.1	ND	100.0	-	-	-
9 L	98.4	0.8	0.8	126	96.2	0.7	3.1	115
10 U	100.0	-	-	-	99.9	0.1	-	-
10 L	97.6	-	2.4	134	95.7	-	4.3	134
14 U	96.3	1.6	2.1	134	96.0	0.7	3.3	113 134
14 L Sun	91.7	5.6	2.7	134	94.3	1.5	4.2	134 113
14 L Shade	86.1	12.5	1.4	ND	81.9	15.0	3.1	113
18 U	98.6	0.1	1.3	134	98.3	0.1	1.6	ND
18 LL	68.9	0.2	30.9	126	62.2	0.2	37.6	126
18 HL	73.6	0.3	26.1	126	61.9	0.4	37.7	126
19 U	65.6	19.9	14.5	ND	80.6	7.0	12.4	ND
19 LL	59.1	26.3	14.6	ND	84.1	3.9	12.0	ND
19 HL	72.8	19.0	8.2	ND	87.4	6.7	5.9	ND
20 U	84.4	9.0	6.6	134	83.6	5.9	10.5	ND
20 LL	65.5	23.4	11.1	ND	84.7	5.4	9.9	ND
20 HL	68.1	15.6	16.3	ND	79.2	7.0	13.8	ND

U - Unlimed; L - Limed; LL - Light lime; HL - Heavy lime; ND - None Dominant

Columns headed "Dom. Sp." give the code numbers of the dominant non-gramineous or leguminous species.

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Hay - Park Grass

Botanical Composition per cent. 1st Crop

Plot	1941 Gram-ineae	1941 Legum-inosae	1941 Other orders	1941 Dom. Sp.	1942 Gram-ineae	1942 Legum-inosae	1942 Others orders	1942 Dom. Sp.
1 U	95.9	0.2	3.9	ND	96.7	0.1	3.2	ND
1 L	73.4	3.7	22.9	ND	72.6	3.5	23.9	ND
3 U	46.8	12.4	40.8	ND	48.1	8.0	43.9	110
3 L	47.0	17.7	35.3	129 110	52.2	11.1	36.7	129
7 U	22.8	28.5	48.7	ND	67.4	9.8	22.8	ND
7 L	63.2	25.7	11.1	ND	63.9	11.4	24.7	ND
8 U	47.2	11.7	41.1	129	40.4	6.9	52.7	129
8 L	58.7	14.5	26.8	129 118	64.8	9.9	25.3	ND
9 U	99.2	0.1	0.7	ND	99.6	-	0.4	ND
9 L	98.9	0.3	0.8	ND	94.6	0.1	5.3	ND
10 U	98.3	-	1.7	ND	99.4	0.1	0.5	ND
10 L	98.6	0.1	1.3	ND	90.7	-	9.3	ND
14 U	97.6	0.3	2.1	ND	94.7	0.3	5.0	ND
14 L Sun	92.6	4.1	3.3	126	91.7	0.9	7.4	ND
14 L Shade	93.5	5.0	1.5	ND	91.9	3.7	4.4	ND
18 U	96.7	0.1	3.2	134	90.3	-	9.7	ND
18 LL	57.1	0.3	42.6	ND	62.7	0.7	36.6	126
18 HL	59.7	0.1	40.2	ND	62.7	0.4	36.9	ND
19 U	82.3	5.9	11.8	ND	77.7	2.4	19.9	ND
19 LL	86.7	4.3	9.0	ND	79.5	1.5	19.0	ND
19 HL	90.8	4.2	5.0	ND	94.7	0.5	4.8	ND
20 U	86.1	6.1	7.8	ND	67.0	3.3	29.7	ND
20 LL	82.4	3.7	13.9	ND	81.7	0.6	17.7	ND
20 HL	90.8	2.3	6.9	ND	87.0	1.1	11.9	ND

U - Unlimed; L - Limed; LL - Light lime; HL - Heavy lime; ND - None Dominant

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Botanical Composition per cent. 1st Crop

Plot	1943 Gram-ineae	1943 Legum-inosae	1943 Other orders	1943 Dom. Sp.	1944 Gram-ineae	1944 Legum-inosae	1944 Other orders	1944 Dom. Sp.
1 U	99.0	-	1.0	ND	96.5	0.2	3.3	120
1 L	70.3	2.5	27.2	129	65.7	2.0	32.3	ND
3 U	54.2	8.2	37.6	ND	60.7	5.3	34.0	ND
3 L	41.3	12.7	46.0	110	28.4	17.3	54.3	110
7 U	54.0	19.4	26.6	114	38.2	31.9	29.9	ND
7 L	71.1	16.6	12.3	ND	52.3	34.3	13.4	ND
8 U	46.6	14.6	38.8	ND	35.0	16.8	48.2	ND
8 L	48.3	19.6	32.1	ND	46.4	20.2	33.4	ND
9 U	100.0	-	-	-	100.0	-	-	-
9 L	97.9	0.1	2.0	ND	95.8	-	4.2	115
10 U	99.8	0.1	0.1	ND	99.8	0.1	0.1	ND
10 L	98.7	-	1.3	ND	93.5	-	6.5	134
13 U	not sampled				85.8	0.3	13.9	129
13 L					26.4	41.1	32.5	129
14 U	98.1	0.5	1.4	ND	98.3	0.6	1.1	ND
14 L Sun	97.1	1.3	1.6	ND	93.8	4.0	2.2	ND
14 L Shade	95.1	2.6	2.3	ND	94.9	2.5	2.6	126
18 U	98.7	0.1	1.2	134	80.2	0.3	19.5	134
18 LL	78.8	0.1	21.1	126	43.2	0.9	55.9	ND
18 HL	85.9	0.4	13.7	126	64.1	0.6	35.3	126
19 U	75.5	7.7	16.8	ND	62.4	8.0	29.6	ND
19 LL	79.7	4.5	15.8	ND	67.6	10.7	21.7	ND
19 HL	79.0	9.3	11.7	ND	76.7	5.6	17.7	ND
20 U	91.7	2.3	6.0	ND	88.6	2.8	8.6	ND
20 LL	90.1	1.4	8.5	115	84.0	1.1	14.9	ND
20 HL	83.8	1.5	14.7	ND	78.4	2.7	18.9	ND

U - Unlimed; L - Limed; LL - Light lime; HL - Heavy lime; ND - None Dominant

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Hay - Park Grass

Botanical Composition per cent. 1st Crop

Plot	1945 Gram-ineae	1945 Legum-inosae	1945 Others orders	1945 Dom. Sp.	1946 Gram-ineae	1946 Legum-inosae	1946 Other orders	1946 Dom. Sp.
1 U	95.1	0.1	4.8	109	98.5	-	1.5	ND
1 L	53.2	6.9	39.9	129	64.8	6.2	29.0	ND
3 U	52.8	12.4	34.8	110 124	45.6	14.0	40.4	124
3 L	28.3	20.9	50.8	ND	27.2	21.0	51.8	124
7 U	26.1	40.1	33.8	120	28.6	25.9	45.5	ND
7 L	60.7	20.4	18.9	ND	65.4	15.5	19.1	127
8 U	31.7	17.5	50.8	129. 124 120	27.3	16.0	56.7	124
8 L	33.2	24.2	42.6	ND	33.0	24.0	43.0	124 129
9 U	100.0	-	-	-	99.6	-	0.4	ND
9 L	89.7	3.4	6.9	115	95.6	0.2	4.2	ND
10 U	100.0	-	-	-	99.6	0.1	0.3	134
10 L	97.5	-	2.5	134	93.3	-	6.7	134
13 U	73.7	0.5	25.8	129	76.0	0.3	23.6	129
13 L	36.1	36.9	27.0	129	62.5	7.7	29.8	129
14 U	97.7	1.6	0.7	126	92.5	2.1	5.4	113 126
14 L	90.2	6.6	3.2	126	87.6	9.2	3.2	126
14 L	92.4	4.4	3.2	126	89.8	7.4	2.8	126
18 U	83.9	-	16.1	134	93.7	-	6.3	134
18 LL	52.4	0.1	47.5	126 129	44.7	0.6	54.7	126
18 HL	62.3	1.2	36.5	126 127	61.9	1.5	36.6	126
19 L	52.9	16.3	30.8	ND	56.0	10.8	33.2	129
19 LL	50.2	22.5	27.3	129	43.7	14.6	41.7	129
19 HL	70.0	15.4	14.6	ND	53.9	18.0	28.1	129
20 L	65.4	18.4	16.2	119	72.1	5.7	22.2	134
20 LL	65.3	12.5	22.2	119	74.9	5.6	19.5	129
20 HL	57.3	13.1	29.6	119	61.5	11.1	27.4	129

U - Unlimed; L - Limed; LL - Light lime; HL - Heavy lime; ND - None Dominant

https://doi.org/10.23637/ERADOC-1-145 *pp 50*

Botanical Composition per cent. 1st Crop 1947

Plot	Gram-ineae	Legum-inosae	Other orders	Dom. Sp.	Plot	Gram-ineae	Legum-inosae	Other orders	Dom. Sp.
1 U	93.1	-	6.9	134	2 U	58.0	10.7	31.3	124
1 L	70.9	3.7	25.4	129	2 L	58.6	15.4	26.0	ND
3 U	53.3	11.0	35.7	124	4^1_1U	46.8	13.5	39.7	134
3 L	39.5	15.2	45.3	110	4^1_1L	42.0	21.2	36.8	124
7 U	51.2	17.7	31.1	119	4^2_2U	97.9	-	2.1	ND
				120	4^2_2L	77.4	0.1	22.5	134
7 L	71.0	9.1	19.9	115					
8 U	50.8	9.2	40.0	129	5^1_2	72.8	1.1	26.1	ND
				101	5^2	49.1	11.0	39.9	119
8 L	60.2	10.3	29.5	129					
9 U	96.4	-	3.6	134	6	59.6	16.3	24.1	119
9 L	83.9	6.0	10.1	126					
10 U	98.8	-	1.2	134	11^1_1U	87.8	0.2	12.0	112
10 L	89.4	-	10.6	134	11^1_1L	98.0	-	2.0	126
13 U	76.6	0.7	22.7	129	11^2_2U	98.8	-	1.2	134
13 L	66.9	7.5	25.6	129	11^2_2L	98.4	0.1	1.5	126
14 U	85.1	3.3	11.6	113	12	53.2	8.5	38.3	124
14 L Sun	81.6	13.2	5.2	126					
14 L Shade	83.2	12.6	4.2	126					
18 U	93.4	-	6.6	134	15 U	61.9	14.1	24.0	129
18 LL	65.3	0.7	34.0	126	15 L	62.1	11.6	26.3	129
				127					
18 HL	64.7	1.6	33.7	126					
19 U	50.7	17.0	32.3	119	16 U	68.2	13.0	18.8	ND
19 LL	51.2	9.9	38.9	ND	16 L	72.3	7.5	20.2	129
19 HL	60.5	13.5	26.0	129					
20 U	68.6	8.5	22.9	134	17 U	69.7	0.1	30.2	129
20 LL	70.2	4.4	25.4	129	17 L	76.3	2.7	21.0	119
20 HL	52.4	10.3	37.3	127					

U - Unlimed; L - Limed; LL - Light lime; HL - Heavy lime; ND - None Dominant

https://doi.org/10.23637/ERADOC-1-145

Hay - Park Grass

A/6.25

Botanical Composition per cent. 1st Crop

Plot	1948 Gram-ineae	Legum-onosae	Other orders	Plot	1949 Gram-ineae	Legum-inosae	Other orders
1 U	94.7	-	5.3	2 U	53.6	15.4	31.0
1 L	63.3	4.6	32.1	2 L	51.4	17.8	30.8
3 U	53.0	7.2	39.8	4_1^1U	46.7	14.4	38.9
3 L	35.8	16.1	48.1	4^1L	44.3	22.4	33.3
7 U	46.6	19.8	33.6	4_2^2U	99.8	-	0.2
7 L	56.5	25.3	18.2	4^2L	94.7	-	5.3
8 U	52.5	7.3	40.2	5_2^1	82.2	3.0	14.8
8 L	53.4	11.1	35.5	5^2	44.6	26.5	28.9
9 U	99.5	-	0.5	6	37.7	31.3	31.0
9 L	89.9	3.5	6.6				
10 U	99.7	-	0.3	11_1^1U	99.7	-	0.3
10 L	93.8	-	6.2	11^1L	98.2	-	1.8
13 U	73.8	0.5	25.7	11_2^2U	99.4	-	0.6
13 L	67.0	10.6	22.4	11^2L	97.5	-	2.5
14 U	92.4	2.0	5.6	12	58.5	13.4	28.1
14 L Sun	93.8	3.2	2.9	1			
14 L Shade	93.4	4.3	2.3				
				15 U	42.2	27.8	30.0
				15 L	46.6	32.7	20.7
18 U	88.5	-	11.5	16 U	75.3	11.9	12.8
18 LL	80.9	0.1	19.0	16 L	76.0	9.6	14.4
18 HL	82.9	0.6	16.5				
19 U	50.3	17.4	32.3	17 U	70.6	0.1	29.3
19 LL	62.1	8.5	29.4	17 L	83.2	2.8	14.0
19 HL	66.9	10.4	22.7				
20 U	86.3	5.0	8.7				
20 LL	80.3	4.9	14.8				
20 HL	74.2	9.9	15.9				

These results have not been previously published. Sampling was discontinued in 1950.

U - Unlimed; L - Limed; LL - Light lime; HL - Heavy lime; ND - None Dominant

N

https://doi.org/10.23637/ERADOC-1-145

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WHEAT AND BARLEY - WOBURN STACKYARD

These are two almost identical, but distinct experiments which were for many years carried out on similar lines to those on Broadbalk and Hoosfield at Rothamsted. The field was under continuous wheat and barley from 1877 to 1926, and the treatments and results for this period are given in the 1928 Station Report p.103. From 1927-1940 no manures were applied, wheat and barley being grown each year except 1927, 28, 34, 35 when the field was fallowed. Results for 1929 to 1938 are given annually in the Station Reports in the sections devoted to Woburn. In 1941 and 42 a top dressing of 2 cwt. sulphate of ammonia was applied.

In 1943 a new scheme was started. The plots were divided into sets of three according to their previous manurial treatments (omitting plots 2, 5 and 8 of each crop, which were so acid as to give negligible crops). In 1943 the wheat was so weedy that it was ploughed up and the land fallowed for the rest of the season. In 1947 and 1948 the field was fallowed and no treatments were applied.

Area of one whole plot, ½ acre.

The experiments are discussed by H. H. Mann, "The influence of fallowing on the yield of wheat or barley on very exhausted land", J. Agric. Sci., 33, (1943), 207.

Treatments

In the present system of manuring, of each set of three plots one receives a top-dressing of nitrochalk at 2 cwt. per acre (N1), one at 4 cwt. (N2), and the third at 6 cwt. (N3). The dressings rotate in cyclical order.

Summary of treatments 1877-1926 (plots arranged in the present sets of three)

Plot 1 Unmanured
3 Nitrate of Soda; 3a, (2N) since 1877; 3b, (1N) since 1907 only.
3aa, as 3a with lime in 1921; 3bb, as 3b with lime in 1921
7 Unmanured

4a Minerals; 4b, as 4a with lime in 1915
6 Minerals and Nitrate of Soda, (1N)
9a, 9b Minerals and, in alternate years, Nitrate of Soda (1N)

10a Superphosphate and Nitrate of Soda (1N)
10b Rape cake (1N)
11a Sulphate of Potash and Nitrate of Soda (1N)
11b Dung (4N)

N

https://doi.org/10.23637/ERADOC-1-145

2 Sulphate of Ammonia (1N); 2a unlimed, 2aa, limed in 1905, 09, 10, 11, 2b, limed in 1897 2bb limed in 1897 and 1905

5 Minerals and Sulphate of Ammonia (1N); 5a, unlimed 5aa, limed in 1905 and 1916 5b, limed in 1905

8 Minerals and, in alternate years, Sulphate of Ammonia (2N); 8a, 8b unlimed, 8aa and 8bb limed in 1905 and 1918

N provides 25 lb. per acre of Ammonia

Crop Notes

Wheat-Red Standard

Year	Sown	Harvested
1939	17.10.38	Aug. 15
1940	2 .11.39	Aug. 17
1941	15.10.40	Aug. 19
1942	19.11.41	Aug. 17
1943		Ploughed in, May 6
1944	27.9.43	Aug. 15
1945	23.10.44	Aug. 2
1946	2. 10.45	Aug. 22

Barley - Plumage Archer

Year	Sown	Harvested
1939	Feb.27	Aug. 17
1940	Mar. 9	Aug. 8
1941	Mar.18	Sept.10
1942	Apr.13	Sept. 4
1943	Mar.12	Aug. 27
1944	Mar. 8	Sept. 4
1945	Mar. 6	Aug. 2
1946	Mar.13	Aug. 15

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Wheat and Barley - Woburn Stackyard

Yields of Wheat (lb. per acre)

Plot	Grain 1939	Straw	Grain 1940	Straw	Grain 1941	Straw	Grain 1942	Straw
1	450	976	294	609			213	680
2a	85	341	Nil	81	Nil	Nil	Nil	Nil
2aa	416	993	8	147	77	242	Nil	Nil
2b	263	847	98	214	113	255	Nil	Nil
2bb	337	674	278	459	528	1117	48	161
3a	289	632	447	721	935	1865	302	893
3b	155	386	239	506	641	1123	325	675
4	480	1124			975	2522	671	1396
5a	652	1362	201	423	258	610	79	417
5b	575	1030	217	602	1016	1815	171	364
6	435	1019	695	1362	1347	2246	797	2043
7	367	761	402	932	680	1909	334	901
8a	101	222	36	81	Nil	Nil	Nil	Nil
8aa	625	1117	355	649	69	177	67	419
8b	218	444	73	113	56	177	Nil	Nil
8bb	621	1194	218	452	278	661	173	706
9a	344	1052	544	1171	1115	2421	764	1929
9b	560	1194	474	919	919	1800	526	1339
10a	272	597	186	273			382	598
10b	289	554	231	446			371	888
11a	363	950	591	880	1197	2148	828	1516
11b	443	1312	918	1720	1211	2807	1168	2732

Yields of plots damaged by rabbits, or otherwise invalidated, are omitted.

https://doi.org/10.23637/ERADOC-1-145

A/7.4

Yields of Barley (lb. per acre)

Plot	Grain 1939	Straw 1939	Grain 1940	Straw 1940	Grain 1941	Straw 1941	Grain 1942	Straw 1942
1	385	1071	21	350	284	896	194	483
2a	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
2aa	367	1316	24	453	284	933	146	435
2b	341	877	24	325	442	1017	363	827
2bb	349	910	24	340	566	1200	151	384
3a	361	747	20	373	412	850	411	762
3aa	363	887	24	302	234	600	185	556
3b	593	1266	20	390	420	933	383	823
3bb	259	755	24	208	142	367	125	384
4a	337	976	12	234	691	1203	417	894
4b	228	929	12	226	304	1138	404	890
5a	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
5aa	175	774	Nil	Nil	Nil	Nil	323	762
5b	417	885	28	655	606	1057	560	947
6	717	1342	12	250	924	1484	1086	1384
7	368	1028	19	372	388	721	246	586
8a	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
8aa	435	1065	20	468	Taken with 8bb		658	1313
8b	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
8bb	577	1113	20	500	686	1242	483	1100
9a	727	1412	37	677	1006	1675	975	1600
9b	572	1417	79	744	862	1500	1281	1583
10a	345	932	17	280	297	744	204	504
10b	288	1212	17	280	192	686	136	620
11a	444	967	76	543	676	1496	915	1393
11b	668	1635	135	912	886	876	1405	1909

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Wheat and Barley - Woburn Stackyard

New system of Manuring - Yields, (lb. per acre).
Plots arranged in their groups of three.

Wheat

Plot	Grain 1944	Straw	Grain 1945	Straw	Grain 1946	Straw
1	N2 1980	4887	N1 737	1334	N3	
3	N1 2259	5411	N3 1466	2559	N2 469	1927
7	N3 2494	5794	N2 841	2140	N1	
4	N3 2104	4371	N2 664	1558	N1	
6	N1 2318	5539	N3 1377	2689	N2 379	1862
9	N2 3625	6782	N1 601	1229	N3 744	2205
10a	N2 2250	5645	N1 587	1151	N3 569	2446
10b	N3 2109	4960	N2 833	1635	N1	
11a	N1 2504	7917	N3 1693	3183	N2 425	2014
11b(1)	N3 1872	4829	N2 1451	2841	N1 372	1598
11b(2)	N1 2452	6079	N3 1591	3037	N2 585	2354
11b(3)	N2 1689	4421	N1 762	1524	N3 750	2384

Yield of plots damaged by rabbits, or otherwise invalidated, are omitted.

Barley

Plot	1943 Grain	Straw	1944 Grain	Straw	1945 Grain	Straw	1946 Grain	Straw
1	N1 87	311	N3 906	1766	N2 539	1839	N1 209	1123
3	N2 328	863	N1 529	1037	N3 908	2015	N2 419	1456
7	N3 458	977	N2 549	1115	N1 533	1594	N3 879	1958
4	N3 519	1051	N2 1343	1936	N1 676	2053	N3 862	1944
6	N1 551	1144	N3 821	1535	N2 1019	2717	N1 513	1683
9	N2 928	1661	N1 988	2152	N3 1020	2144	N2 1018	2686
10a	N3 107	422	N2 404	1122	N1 304	1393	N3 308	1447
10b	N1 99	1045	N3 635	1929	N2 519	2081	N1 226	1101
11a	N2 702	1764	N1 668	2227	N3 857	2143	N2 780	2195
11b(1)	N2 1237	2537	N1 896	2530	N3 1006	2959	N2 757	2482
11b(2)	N3 800	2075	N2 604	2067	N1 727	2285	N3 1253	3279
11b(3)	N1 606	2475	N3 1192	2545	N2 1087	2628	N1 1178	2586

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TWO COURSE ROTATION EXPERIMENT

Long Hoos (begun in 1942)

Cumulative Effects of Agricultural Salt

The experiment was designed to test the cumulative effects of agricultural salt and muriate of potash, and to compare two methods of application of the salt.

The rotation is 1st year Sugar beet, 2nd year Barley.

There are 2 series (one for each crop in any particular year), each consisting of 4 blocks of 12 plots each. Area of each plot in acres:

Series	Total	Sugar Beet Harvested	Barley
1	0.0219	0.0190	0.0207
2	0.0200	0.0173	0.0189

Treatments: all combinations of

(1) Agricultural salt (rates for sugar beet): None (0), 2½ cwt. (Na 1), 5 cwt. (Na 2) and 7½ cwt. (Na 3) per acre.

(2) Muriate of potash: None (0), the equivalent of half the single dressing of salt (K1) (approximately 1 cwt. K_2O per acre), the equivalent of the double dressing of salt (K2), applied to sugar beet at sowing.

(3) Time of application of salt: in seed bed before sowing (A), before ploughing during the winter (B).

(4) Salt applied to sugar beet only (0), salt repeated at half rate on barley (R).

The following interactions are partially confounded with block differences:-

(A-B) x R; (3-2+1-0) Na x (A-B); (3-2+1-0) Na x R;

and the interactions of these with K.

Basal dressings, applied to all plots at sowing:

Barley: 0.3 cwt. N per acre as sulphate of ammonia
Sugar beet: 0.8 cwt. N per acre as sulphate of ammonia
0.6 cwt. P_2O_5 per acre as superphosphate.

Crop Notes

	Sugar beet: Sown	Klein E Lifted	Barley: Sown	Plumage Archer Harvested
1942	April 25	Dec. 2	(Series 2 grew preliminary wheat)	
1943	April 14	Nov.12	March 13	Aug. 10
1944	April 22	Oct.26, Nov.23	March 8	Aug. 10
1945	April 12	Nov. 5	March 27	Aug. 8
1946	April 15	Nov. 22	March 21	Aug. 14
1947	April 25	Oct. 30	April 11	Aug. 11

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In 1942, 1943, samples were taken at intervals from one end of each plot for physiological and chemical study. The yields given are corrected for the reduced area per plot. In 1944, 12 of the 48 plots of sugar beet were lifted Oct. 26th. This had an appreciable effect on tops and sugar percentage, which have been adjusted by means of a regression. There was no effect on the other results.

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Two Course Rotation Experiment

Sugar Beet

Muriate of potash K_2O cwt. per acre	Salt cwt.	Year 1942	1943	1944	1945	1946	1947
		Roots (washed): tons per acre					
0.0	0	14.98	15.46	8.51	16.18	15.34	5.92
	2.5	16.95	17.60	10.96	17.96	17.71	9.04
	5.0 (a)	17.12	17.63	10.61	17.15	16.86	9.33
	7.5	16.72	16.68	9.69	16.86	16.32	9.23
	Mean (b)	16.44	16.84	9.94	17.04	16.56	8.38
1.0	0	14.73	16.97	8.04	16.97	15.19	7.48
	2.5	16.08	17.03	11.25	16.88	17.08	8.50
	5.0 (a)	16.86	17.12	10.53	17.34	17.61	9.99
	7.5	17.61	16.08	11.34	16.39	17.16	9.74
	Mean (b)	16.32	16.80	10.29	16.90	16.76	8.93
2.0	0	15.68	16.87	9.34	16.57	16.93	7.54
	2.5	16.28	16.45	10.96	17.12	17.56	8.72
	5.0 (a)	16.65	16.91	10.28	17.55	17.21	9.26
	7.5	17.28	16.87	11.24	16.21	17.02	10.20
	Mean (b)	16.47	16.78	10.46	16.86	17.18	8.93
Salt applied Winter	2.5	16.04	17.43	10.71	17.27	17.66	8.60
	5.0 (d)	16.58	17.32	10.09	17.21	17.35	9.59
	7.5	17.10	16.23	11.10	16.63	16.24	10.08
	Mean (e)	16.57	16.99	10.63	17.04	17.08	9.42
In seed bed	2.5	16.83	16.62	11.40	17.37	17.24	8.91
	5.0 (d)	17.17	17.12	10.86	17.48	17.11	9.47
	7.5	17.31	16.86	10.41	16.35	17.43	9.36
	Mean (e)	17.10	16.87	10.89	17.07	17.26	9.25
Mean	0	15.13	16.43	8.63	16.57	15.82	6.98
	2.5	16.44	17.03	11.06	17.32	17.45	8.75
	5.0 (c)	16.88	17.22	10.47	17.35	17.23	9.53
	7.5	17.20	16.54	10.76	16.49	16.83	9.72
	Mean	16.41	16.81	10.23	16.93	16.83	8.74
Standard errors (28 d.f. in 1942, 22 d.f. in other years)	(a)	0.517	0.577	0.503	0.384	0.427	
	(b)	0.259	0.289	0.251	0.192	0.213	
	(c)	0.299	0.333	0.290	0.222	0.247	
	(d)	0.395	0.441	0.384	0.294	0.326	
	(e)	0.239	0.266	0.232	0.177	0.197	
	Per plot	1.035	1.154	1.005	0.769	0.854	
	%age	6.3	6.9	9.8	4.5	5.1	

https://doi.org/10.23637/ERADOC-1-145

Sugar Beet

	Salt cwt. per acre	Year 1942	1943	1944	1945	1946	1947
		Sugar Percentage					
Muriate of potash K_2O cwt. per acre 0.0	0	18.19	18.44	16.24	18.03	17.04	19.34
	2.5	18.02	18.84	16.93	18.47	17.04	20.42
	5.0 (a)	18.54	18.85	17.02	18.81	17.14	21.07
	7.5	18.31	18.81	16.60	18.57	17.18	20.40
	Mean (b)	18.27	18.74	16.70	18.47	17.10	20.31
1.0	0	18.19	18.48	16.62	18.49	16.96	20.86
	2.5	18.30	18.97	16.84	18.46	16.79	20.48
	5.0 (a)	18.16	18.72	16.76	18.38	17.29	20.58
	7.5	17.98	18.60	16.66	18.64	17.16	20.54
	Mean (b)	18.16	18.69	16.72	18.49	17.05	20.62
2.0	0	18.26	18.78	16.68	18.57	17.49	20.48
	2.5	18.53	18.83	16.92	18.83	17.38	20.76
	5.0 (a)	18.38	18.84	16.78	18.58	17.21	20.43
	7.5	18.26	18.60	16.89	18.70	16.98	21.03
	Mean (b)	18.35	18.76	16.82	18.67	17.26	20.68
Salt applied Winter	2.5	18.30	19.00	16.85	18.64	17.08	20.33
	5.0 (d)	18.34	18.85	16.72	18.53	17.10	20.76
	7.5	18.08	18.61	16.83	18.63	17.10	20.94
	Mean (e)	18.24	18.82	16.80	18.60	17.09	20.68
In seed bed	2.5	18.27	18.76	16.94	18.53	17.05	20.78
	5.0 (d)	18.37	18.76	16.98	18.65	17.33	20.63
	7.5	18.28	18.73	16.60	18.65	17.12	20.38
	Mean (e)	18.31	18.75	16.84	18.61	17.17	20.60
Mean	0	18.21	18.57	16.51	18.36	17.16	20.23
	2.5	18.28	18.88	16.90	18.59	17.07	20.55
	5.0 (c)	18.36	18.80	16.85	18.59	17.21	20.69
	7.5	18.18	18.67	16.72	18.64	17.11	20.66
	Mean	18.26	18.73	16.74	18.54	17.14	20.54
Standard errors (28 d.f. in 1942, 21 d.f. in 1944, 22 d.f. in other years)	(a)	0.180		0.220	0.165	0.262	
	(b)	0.090		0.110	0.082	0.131	
	(c)	0.104		0.127	0.095	0.151	
	(d)	0.137		0.168	0.126	0.200	
	(e)	0.083		0.102	0.076	0.121	
	Per plot	0.360		0.441	0.329	0.524	

https://doi.org/10.23637/ERADOC-1-145

Two Course Rotation Experiment

Sugar Beet

Muriate of potash K_2O cwt. per acre	Salt cwt. per acre	Year 1942	1943	1944	1945	1946	1947
		Total sugar: cwt. per acre					
0.0	0	54.5	57.0	27.2	58.3	52.3	23.7
	2.5	61.1	66.3	36.6	66.3	60.2	37.2
	5.0 (a)	63.5	66.5	36.1	64.5	57.9	39.5
	7.5	61.2	62.7	32.2	62.7	56.0	37.9
	Mean (b)	60.1	63.1	33.0	63.0	56.6	34.6
1.0	0	53.6	62.7	27.1	62.8	51.5	31.3
	2.5	58.8	64.6	37.4	62.3	57.5	35.1
	5.0 (a)	61.2	64.1	35.8	63.8	60.9	41.1
	7.5	63.3	59.8	37.7	61.1	58.8	40.4
	Mean (b)	59.2	62.8	34.5	62.5	57.2	37.0
2.0	0	57.3	63.3	31.6	61.5	59.2	31.1
	2.5	60.4	62.0	37.1	64.4	61.0	36.5
	5.0 (a)	61.1	63.9	34.5	65.2	59.2	38.4
	7.5	63.1	62.8	37.9	60.6	57.8	42.9
	Mean (b)	60.5	63.0	35.3	62.9	59.3	37.2
Salt applied Winter	2.5	58.6	66.2	35.8	64.3	60.3	35.4
	5.0 (d)	60.8	65.3	34.1	63.9	59.4	40.0
	7.5	61.8	60.3	37.3	61.7	55.5	42.5
	Mean (c)	60.4	63.9	35.7	63.3	58.4	39.3
In seed bed	2.5	61.6	62.4	38.3	64.4	58.9	37.2
	5.0 (d)	63.1	64.3	36.9	65.1	59.3	39.4
	7.5	63.3	63.2	34.6	61.3	59.7	38.3
	Mean (e)	62.6	63.3	36.6	63.6	59.3	38.3
Mean	0	55.1	61.0	28.6	60.9	54.3	28.7
	2.5	60.1	64.3	37.0	64.3	59.6	36.3
	5.0 (c)	61.9	64.8	35.5	64.5	59.3	39.7
	7.5	62.5	61.8	35.9	61.5	57.5	40.4
	Mean	59.9	63.0	34.3	62.8	57.7	36.3
Standard errors (28 d.f. in 1942, 22 d.f. in other years)	(a)	1.85	2.17	1.74	1.52	1.91	2.50
	(b)	0.92	1.08	0.87	0.76	0.96	1.25
	(c)	1.07	1.25	1.00	0.87	1.10	1.44
	(d)	1.41	1.66	1.32	1.16	1.46	1.91
	(e)	0.85	1.00	0.80	0.71	0.88	1.15
	Per plot	3.69	4.34	3.47	3.03	3.82	5.00
	%age	6.2	6.9	10.1	4.8	6.6	13.8

N

https://doi.org/10.23637/ERADOC-1-145

Sugar Beet

Muriate of potash K_2O cwt. per acre	Salt cwt. per acre	1942	1943	1944	1945	1946	1947
		Tops: tons per acre					
0.0	0	10.06	9.55	10.69	12.20	17.05	4.59
	2.5	11.23	10.76	13.20	11.82	18.01	6.94
	5.0 (a)	10.56	11.55	13.01	11.80	17.71	7.23
	7.5	11.42	11.60	12.52	12.74	17.21	7.01
	Mean (b)	10.82	10.86	12.36	12.14	17.50	6.44
1.0	0	10.41	10.62	12.40	11.89	17.73	5.81
	2.5	12.19	11.10	13.80	13.58	17.73	6.40
	5.0 (a)	10.20	10.50	11.98	12.43	16.65	7.66
	7.5	13.30	10.74	14.27	12.20	18.18	7.26
	Mean (b)	11.53	10.74	13.11	12.52	17.57	6.78
2.0	0	10.43	10.24	11.70	11.76	17.31	5.83
	2.5	11.74	10.17	12.06	12.05	16.93	6.59
	5.0 (a)	11.42	10.34	11.49	11.49	17.07	7.30
	7.5	11.77	11.12	12.63	11.45	16.49	7.48
	Mean (b)	11.34	10.47	11.97	11.69	16.95	6.80
Salt applied Winter	2.5	11.55	10.49	12.69	12.08	17.83	6.63
	5.0 (d)	10.58	10.80	12.47	11.62	17.54	7.52
	7.5	12.17	11.06	13.89	11.91	17.48	7.62
	Mean (e)	11.43	10.78	13.02	11.87	17.62	7.26
In seed bed	2.5	11.88	10.87	13.34	12.89	17.29	6.65
	5.0 (d)	10.87	10.79	11.86	12.19	16.75	7.27
	7.5	12.17	11.25	12.39	12.35	17.10	6.88
	Mean (e)	11.64	10.97	12.53	12.48	17.05	6.93
Mean	0	10.30	10.14	11.59	11.95	17.36	5.41
	2.5 (c)	11.72	10.68	13.02	12.48	17.56	6.64
	5.0	10.73	10.80	12.16	11.91	17.14	7.40
	7.5	12.17	11.15	13.14	12.13	17.29	7.25
	Mean	11.23	10.69	12.48	12.12	17.34	6.68
Standard errors (28 d.f. in 1942, 21 d.f. in 1944, 22 d.f. in other years)	(a)	0.569	0.600	0.680	0.382	0.813	0.353
	(b)	0.334	0.300	0.340	0.191	0.407	0.177
	(c)	0.386	0.346	0.392	0.221	0.470	0.204
	(d)	0.511	0.458	0.519	0.292	0.621	0.270
	(e)	0.309	0.277	0.314	0.176	0.375	0.163
	Per plot	1.338	1.200	1.359	0.764	1.627	0.707
	%age	11.9	11.2	10.9	6.3	9.4	10.6

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Two Course Rotation Experiment — Ba/1.7

	Salt cwt. per acre	Sugar Beet 1942	1943	1944	1945	1946*	1947
		Plant Number: thousands per acre					
Muriate of potash K_2O cwt. per acre							
0.0	0	25.9	23.5	27.7	27.6		16.3
	2.5	25.3	25.6	29.1	28.5		19.5
	5.0 (a)	26.0	25.3	27.8	28.4		19.1
	7.5	26.3	24.5	24.6	28.1		19.1
	Mean (b)	25.9	24.7	27.3	28.2		18.5
1.0	0	25.2	23.9	27.9	28.3		19.2
	2.5	23.4	24.5	27.7	27.7		19.7
	5.0 (a)	27.4	24.1	29.2	28.6		21.2
	7.5	27.3	22.6	26.7	27.9		20.6
	Mean (b)	25.8	23.8	27.9	28.1		20.2
2.0	0	24.8	25.1	27.8	28.2		18.1
	2.5	24.5	22.7	27.7	27.9		18.8
	5.0 (a)	27.1	24.0	28.5	27.6		19.7
	7.5	26.5	23.5	27.7	27.0		22.1
	Mean (b)	25.7	23.8	27.9	27.7		19.7
Salt applied Winter	2.5	24.8	24.1	28.3	27.8		18.8
	5.0 (d)	27.3	24.3	28.7	27.8		19.6
	7.5	26.5	23.8	26.2	27.9		21.4
	Mean (e)	26.2	24.1	27.7	27.8		19.9
In seed bed	2.5	24.0	24.4	28.0	28.3		19.8
	5.0 (d)	26.3	24.6	28.4	28.6		20.4
	7.5	26.9	23.2	26.4	27.4		19.8
	Mean (e)	25.7	24.1	27.6	28.1		20.0
Mean	0	25.3	24.1	27.8	28.0		17.9
	2.5	24.4	24.3	28.2	28.0		19.3
	5.0 (c)	26.8	24.5	28.5	28.2		20.0
	7.5	26.7	23.5	26.3	27.7		20.6
	Mean	25.8	24.1	27.7	28.0		19.5
In seed bed	2.5	24.0	24.4	28.0	28.3		19.8
	5.0 (d)	26.3	24.6	28.4	28.6		20.4
	7.5	26.9	23.2	26.4	27.4		19.8
	Mean (e)	25.7	24.1	27.6	28.1		20.0
Standard errors (28 d.f. in 1942, 22 d.f. in other years)	(a)	0.93	1.00	0.94	0.56		
	(b)	0.46	0.50	0.47	0.28		
	(c)	0.54	0.58	0.55	0.32		
	(d)	0.71	0.76	0.72	0.43		
	(e)	0.43	0.46	0.44	0.26		
	Per plot	1.86	2.00	1.89	1.12		
	%age	7.2	8.3	6.8	4.0		

* The plant numbers were not counted in 1946.

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Barley

	Salt applied in previous year cwt. per acre	1943	1944	1945	1946	1947
			Grain: cwt. per acre			
Muriate of potash applied in previous year K_2O cwt. per acre	0	24.0	30.0	27.1	32.6	23.1
	2.5	24.9	31.1	27.8	31.9	23.9
	5.0 (a)	23.8	30.2	27.5	33.0	22.1
0.0	7.5	23.7	29.8	26.5	32.0	21.7
	Mean (b)	24.1	30.3	27.2	32.4	22.7
	0	22.5	30.3	26.4	34.3	23.0
	2.5	26.9	29.6	29.4	32.7	26.3
1.0	5.0 (a)	22.7	30.5	26.6	35.5	22.4
	7.5	26.6	30.1	29.5	32.4	24.7
	Mean (b)	24.7	30.1	28.0	33.7	24.1
	0	23.3	29.4	26.1	32.8	23.7
	2.5	25.7	30.7	28.0	33.0	24.1
2.0	5.0 (a)	23.9	29.4	27.2	33.3	22.7
	7.5	26.4	30.7	29.3	31.9	23.6
	Mean (b)	24.8	30.0	27.6	32.8	23.5
Salt in current year	2.5	24.4	30.8	27.6	33.2	23.4
	5.0 (c)	22.7	30.0	26.4	33.4	22.7
None	7.5	26.1	29.8	28.7	31.3	24.5
	Mean (d)	24.4	30.2	27.6	32.6	23.5
	2.5	27.3	30.1	29.1	31.9	26.2
	5.0 (c)	24.2	30.1	27.8	34.5	22.0
Half Rate	7.5	25.1	30.5	28.2	32.9	22.2
	Mean (d)	25.5	30.2	28.4	33.1	23.5
Salt applied Winter	2.5	25.1	30.0	27.9	32.7	25.4
	5.0 (c)	23.2	30.0	26.8	34.3	22.4
Winter	7.5	27.2	30.5	29.5	32.4	21.7
	Mean (d)	25.2	30.2	28.1	33.1	23.2
	2.5	26.6	31.0	28.9	32.4	24.2
	5.0 (c)	23.8	30.1	27.4	33.5	22.3
In seed bed	7.5	23.9	29.8	27.4	31.8	25.0
	Mean (d)	24.8	30.3	27.9	32.6	23.8
Mean	0	23.3	29.9	26.5	33.2	23.3
	2.5	25.8	30.5	28.4	32.5	24.8
	5.0 (e)	23.5	30.0	27.1	33.9	22.4
	7.5	25.6	30.2	28.4	32.1	23.3
	Mean	24.5	30.1	27.6	32.9	23.4
Standard errors (22 d.f.)	(a)	0.92	0.68	0.66	1.43	0.82
	(b)	0.46	0.34	0.33	0.72	0.41
	(c)	0.71	0.52	0.50	1.09	0.63
	(d)	0.43	0.32	0.31	0.66	0.38
	(e)	0.53	0.40	0.38	0.83	0.47
	Per plot	1.85	1.37	1.31	2.86	1.64
	%age	7.5	4.6	4.8	8.7	7.0

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Barley

Salt applied in previous year cwt. per acre		Year 1943	1944	1945	1946	1947
		Straw: cwt. per acre				
Muriate of potash applied in previous year K_2O cwt. per acre						
0.0	0	27.9	28.9	31.7	36.5	21.2
	2.5	25.7	28.9	33.0	36.6	22.0
	5.0 (a)	25.8	27.3	32.7	36.3	21.1
	7.5	24.6	28.4	30.2	37.5	20.9
	Mean (b)	26.0	28.4	31.9	36.7	21.3
1.0	0	23.9	28.9	32.2	36.2	22.2
	2.5	29.4	28.4	34.3	38.3	24.4
	5.0 (a)	24.3	28.4	32.2	39.0	21.8
	7.5	27.6	29.2	34.8	37.3	24.3
	Mean (b)	26.3	28.7	33.4	37.7	23.2
2.0	0	24.8	27.4	31.0	38.0	22.1
	2.5	27.1	29.0	32.9	37.8	22.7
	5.0 (a)	25.4	27.6	32.8	37.7	21.5
	7.5	27.8	27.6	34.5	38.6	23.0
	Mean (b)	26.3	27.9	32.8	38.0	22.3
Salt in current year						
None	2.5	25.7	29.1	32.6	37.9	22.2
	5.0 (c)	24.5	28.3	32.4	37.9	22.0
	7.5	27.2	28.3	34.1	37.7	23.8
	Mean (d)	25.8	28.6	33.0	37.8	22.7
Half rate	2.5	29.1	28.5	34.1	37.3	23.8
	5.0 (c)	25.8	27.3	32.7	37.4	21.0
	7.5	26.2	28.5	32.2	37.8	21.6
	Mean (d)	27.0	28.1	33.0	37.5	22.1
Salt applied Winter						
Winter	2.5	26.9	28.4	33.1	37.2	23.0
	5.0 (c)	24.8	28.2	32.5	38.6	22.1
	7.5	27.8	29.0	34.4	38.5	20.5
	Mean (d)	26.5	28.5	33.4	38.1	21.9
In seed bed	2.5	27.9	29.2	33.7	37.9	23.1
	5.0 (c)	25.5	27.4	32.6	36.7	20.8
	7.5	25.6	27.8	31.9	37.1	24.9
	Mean (d)	26.4	28.1	32.7	37.2	22.9
Mean	0	25.5	28.4	31.6	36.9	21.8
	2.5	27.4	28.8	33.4	37.6	23.0
	5.0 (e)	25.2	27.8	32.6	37.7	21.5
	7.5	26.7	28.4	33.2	37.8	22.7
	Mean	26.2	28.4	32.7	37.5	22.3
Standard errors (22 d.f.)	(a)			0.80	1.25	
	(b)			0.39	0.62	
	(c)			0.61	0.95	
	(d)			0.37	0.58	
	(e)			0.46	0.72	
	Per plot			1.61	2.50	
	%age			4.9	6.7	

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https://doi.org/10.23637/ERADOC-1-145

THREE COURSE ROTATION EXPERIMENT

Long Hoos (begun in 1933)

The effects of straw compost, of straw ploughed in with fertilizers, and of magnesium sulphate

There are three series each of 24 plots, and the three crops of the rotation, potatoes, barley and sugar beet rotate on each series. The plots receive the same dressings every other year so that the direct and residual effects of manures can be measured. Area of each plot, 0.02 acre.

Treatments and rates of dressing (per acre)

	Straw tons	Compost tons	Sulphate of Ammonia cwt.	Super-phosphate cwt.	Muriate of potash cwt.
No organic manure (Art.)	-	-	2.0	2.2	0.8
Compost in Autumn (Adco)	-	5.0	-	-	0.8
Straw, ploughed in in autumn, artificials in spring (St_1)	2.5	-	2.0	2.2	0.8
Straw, ploughed in in autumn, artificials half in autumn, half in spring (St_2)	2.5	-	2.0[1]	2.2	0.8[2]

1. For sugar beet the half-dressing applied in spring is 1.3 cwt. Nitrate of Soda;
2. Until 1946 the spring half-dressing to potatoes was 0.4 cwt. Sulphate of potash.

These four treatments are applied to three plots of each crop each year.

Magnesium Sulphate: 2.5 cwt. per acre applied to one of three replicate plots of each treatment in each crop section.

In addition to the above dressings, the potatoes receive a basal dressing of 2 cwt. sulphate of ammonia, 2.2 cwt. superphosphate and 0.8 cwt. muriate of potash. The sugar beet receive 1.3 cwt. nitrate of soda, 1.1 cwt. super-phosphate and 0.4 cwt. muriate of potash.

Details of the experiment are as given in the 1933 Station Report, pp. 118-119 except that no comparisons of winter green manuring crops are now made and that commencing in 1943, a yearly dressing of megnesium sulphate has been applied as detailed above. Results for 18 years are discussed in the Station Report for 1951, p. 135.

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Crop Notes

Potatoes (after Sugar beet). Barley (after Potatoes). Sugar beet (after Barley)

	Variety	Planted	Lifted	Variety	Sown	Harvested	Variety	Sown	Lifted
1939	Ally	Apr. 17	Sept. 18	Plumage Archer	Mar. 7	Aug. 18	Kuhn	Apr. 24	Oct. 25
1940	"	Apr. 26	Sept. 24	"	Mar. 9	Aug. 5	"	May 3	Oct. 17
1941	"	Apr. 28	Oct. 3	"	Mar. 25	Sept. 2	"	Apr. 30	Oct. 25
1942	Majestic	" 21	Oct. 3	"	Mar. 25	Aug. 17	Klein E	Apr. 24	Oct. 26
1943	"	Apr. 8	Sept. 17	"	Mar. 3	Aug. 7	"	Apr. 14	Oct. 14
1944	"	Mar. 28	Sept. 28	"	Mar. 7	Aug. 12	"	Apr. 22	Oct. 24
1945	"	Mar. 30	Sept. 24	"	Mar. 26	Aug. 11	"	Apr. 12	Oct. 19
1946	"	Apr. 1	Oct. 3	"	Mar. 21	Aug. 21	"	Apr. 15	Oct. 22
1947	"	Apr. 30	Sept. 27	"	Apr. 11	Aug. 11	"	Apr. 26	Oct. 17

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Potatoes. Total tubers: tons per acre

	Treatments applied same year					Treatments applied previous year				
	Art	Adco	St_1	St_2	Mean	Art	Adco	St_1	St_2	Mean
Mean Yields										
1939	11.02	10.14	12.41	11.03	11.15 ±0.219	8.87	8.55	10.32	10.51	9.56 ±0.219
		±0.439					±0.439			
1940	8.05	7.32	8.37	8.23	7.99 ±0.092	6.14	6.91	6.96	6.92	6.73 ±0.092
		±0.183					±0.183			
1941	11.08	9.16	12.33	11.16	10.93 ±0.326	8.68	10.31	9.48	10.50	9.74 ±0.326
		±0.652					±0.652			
1942	9.66	8.48	10.21	9.71	9.52 ±0.162	6.79	7.20	8.80	8.52	7.83 ±0.162
		±0.324					±0.324			
1943	8.20	7.05	8.53	8.93	8.18 ±0.094	5.56	5.79	6.93	6.80	6.27 ±0.094
		±0.188					±0.188			
1944	10.10	9.92	10.74	10.55	10.33 ±0.251	8.68	9.15	9.62	9.81	9.32 ±0.251
		±0.502					±0.502			
1945	11.21	10.05	11.67	11.69	11.16 ±0.234	9.14	8.91	10.83	10.24	9.78 ±0.234
		±0.467					±0.467			
1946	10.88	10.10	12.43	12.27	11.42 ±0.183	8.45	8.65	9.95	9.64	9.17 ±0.183
		±0.367					±0.367			
1947	7.56	6.07	7.33	7.07	7.01 ±0.281	5.51	6.45	5.78	6.29	6.01 ±0.281
		±0.562					±0.562			
Responses to Magnesium Sulphate										
1943	-0.04	0.42	-1.31	0.17	-0.19 ±0.200	0.22	-1.03	-1.09	-0.34	-0.56 ±0.200
		±0.399					±0.399			
1944	1.70	-0.62	-0.22	0.68	0.38 ±0.532	-0.66	-1.28	1.20	1.00	0.06 ±0.532
		±1.06					±1.06			
1945	0.31	1.33	-0.06	0.51	0.52 ±0.496	-1.32	1.21	-0.38	0.13	0.09 ±0.496
		±0.992					±0.992			
1946	-0.65	-0.98	2.18	-0.19	0.09 ±0.389	0.11	0.44	-0.55	-0.22	-0.06 ±0.389
		±0.778					±0.778			
1947	0.20	0.34	0.38	-0.18	0.19 ±0.596	0.04	-0.23	-0.62	0.20	-0.15 ±0.596
		±1.19					±1.19			

Standard errors per plot

		d.f.
1939	0.760 tons per acre or 7.3%	16
1940	0.318 tons per acre or 4.3%	16
1941	1.13 tons per acre or 10.9%	16
1942	0.561 tons per acre or 6.5%	16
1943	0.326 tons per acre or 4.5%	8
1944	0.869 tons per acre or 8.8%	8
1945	0.810 tons per acre or 7.7%	8
1946	0.635 tons per acre or 6.2%	8
1947	0.974 tons per acre or 15.0%	8

σ^2 betwee plots

σ_e^2 plots & years

https://doi.org/10.23637/ERADOC-1-145 *pp 72*

Barley Grain: cwt. per acre

	Treatments applied same year					Treatments applied previous year				
	Art	Adco	St_1	St_2	Mean	Art	Adco	St_1	St_2	Mean
Mean Yields										
1939	39.9	30.8	35.4	32.2	34.6 ±1.00	33.9	29.1	29.2	32.7	31.2 ±1.00
		±2.00					±2.00			
1940	29.0	29.4	28.5	29.5	29.1 ±0.640	28.3	24.6	26.5	29.0	27.1 ±0.640
		±1.28					±1.28			
1941	28.9	21.8	27.9	25.1	25.9 ±0.385	22.2	19.7	24.2	23.0	22.3 ±0.385
		±0.771					±0.771			
1942	32.1	26.0	27.4	28.6	28.5 ±0.909	26.9	26.2	27.3	24.3	26.2 ±0.909
		±1.82					±1.92			
1943	32.3	25.8	30.5	29.8	29.6 ±0.434	25.2	24.3	24.8	26.1	25.1 ±0.434
		±0.867					±0.867			
1944	35.5	31.4	33.0	34.7	33.6 ±0.769	31.3	32.2	29.9	31.0	31.1 ±0.769
		±1.54					±1.54			
1945	33.2	27.3	32.1	32.8	31.4 ±1.03	25.0	25.3	27.6	28.7	26.6 ±1.03
		±2.07					±2.07			
1946	34.6	33.5	29.7	32.2	32.5 ±0.768	29.2	28.8	27.9	29.9	29.0 ±0.768
		±1.54					±1.54			
1947	27.4	20.6	26.7	23.7	24.6 ±0.546	19.7	16.9	18.6	20.0	18.8 ±0.546
		±1.09					±1.09			
Responses to Magnesium Sulphate										
1943	1.1	4.8	0.1	0.2	1.6 ±0.920	-4.3	0.2	1.9	-2.5	-1.2 ±0.920
		±1.84					±1.84			
1944	0.6	1.2	-0.6	1.9	0.8 ±1.63	-3.3	-2.9	0.8	2.2	-0.8 ±1.63
		±3.26					±3.26			
1945	-2.2	-1.5	2.2	-2.2	-0.9 ±2.19	-0.5	-7.9	-0.8	-0.9	-2.5 ±2.19
		±4.39					±4.39			
1946	0.9	-0.4	1.2	-2.1	0.3 ±1.63	2.3	4.9	-1.2	-2.1	1.0 ±1.63
		±3.26					±3.26			
1947	-4.4	-2.3	-0.1	1.7	-1.3 ±1.16	2.4	1.4	-5.9	1.1	-0.3 ±1.16
		±2.31					±2.31			

Standard errors per plot

		d.f.
1939	3.47 cwt. per acre or 10.6%	16
1940	2.22 cwt. per acre or 7.9%	15*
1941	1.34 cwt. per acre or 5.5%	16
1942	3.15 cwt. per acre or 11.5%	16
1943	1.50 cwt. per acre or 5.5%	8
1944	2.66 cwt. per acre or 8.2%	8
1945	3.58 cwt. per acre or 12.4%	8
1946	2.66 cwt. per acre or 8.7%	8
1947	1.89 cwt. per acre or 8.7%	8

*One missing plot.

https://doi.org/10.23637/ERADOC-1-145

Three Course Rotation Experiment

Ba/2.5

Barley. Straw: cwt. per acre

	Treatments applied same year					Treatments applied previous year				
	Art	Adco	St_1	St_2	Mean	Art	Adco	St_1	St_2	Mean
					Mean Yields					
1939	50.4	36.5	44.4	40.1	42.8	37.5	35.2	33.9	37.2	36.0
1940	38.4	31.8	33.4	31.6	33.8	30.3	26.5	27.4	30.0	28.6
1941	37.3	26.0	34.9	29.2	31.8	27.4	24.4	27.6	28.5	27.0
1942	35.7	26.0	29.9	30.0	30.4	26.5	26.8	27.0	25.0	26.3
1943	34.4	24.4	31.9	29.7	30.1	24.2	24.7	24.8	26.6	25.1
1944	33.5	29.0	29.7	31.6	31.0	29.8	30.1	28.8	29.7	29.6
1945	37.4	27.2	36.1	34.1	33.7	26.5	29.0	29.3	30.5	28.8
1946	40.4	37.5	38.0	36.9	38.2	29.4	30.7	31.7	32.8	31.2
1947	26.5	22.3	27.2	22.8	24.7	20.0	18.5	20.0	21.0	19.9
					Responses to Magnesium Sulphate					
1943	-0.1	3.6	3.5	0.3	1.8	-4.3	2.1	1.1	-4.8	-1.5
1944	0.5	0.8	-7.5	2.4	-1.0	-4.3	-2.5	-0.7	-0.7	-2.0
1945	-2.0	0.0	2.0	-2.9	-0.7	-1.3	-9.1	-2.7	1.3	-3.0
1946	0.8	0.5	1.7	-5.4	-0.6	-2.6	3.3	5.2	0.4	1.6
1947	-4.4	-4.5	-1.0	-0.1	-2.5	-0.2	2.7	-3.2	0.5	-0.1

https://doi.org/10.23637/ERADOC-1-145 *pp 74*

Sugar Beet. Roots (washed): tons per acre

	Treatments applied same year					Treatments applied previous year				
	Art	Adco	St_1	St_2	Mean	Art	Adco	St_1	St_2	Mean
Mean Yields										
1939	14.00	12.21	13.01	13.63	13.21	12.11	11.36	11.93	13.07	12.12
1940	10.47	9.45	9.95	11.41	10.32	10.14	9.43	9.59	9.49	9.66
1941	11.53	10.43	10.86	11.61	11.11	10.09	10.36	10.24	10.63	10.33
1942	14.24	10.02	13.52	13.08	12.72 ±0.357	11.87	10.49	11.37	11.09	11.20 ±0.357
		±0.714					±0.714			
1943	14.32	11.50	13.00	12.30	12.78 ±0.403	12.10	11.17	10.43	12.40	11.52 ±0.403
		±0.806					±0.806			
1944	8.87	8.43	7.48	7.90	8.17 ±0.525	7.73	7.81	7.91	8.36	7.95 ±0.525
		±1.05					±1.05			
1945	13.99	12.04	12.77	12.86	12.92 ±0.448	12.37	11.26	13.01	11.47	12.03 ±0.448
		±0.897					±0.897			
1946	14.50	12.16	12.51	13.36	13.13 ±0.156	12.33	11.50	12.17	12.42	12.10 ±0.156
		±0.311					±0.311			
1947	10.89	7.99	10.02	9.63	9.63 ±0.370	9.09	8.97	9.29	8.94	9.07 ±0.370
		±0.741					±0.741			
Responses to Magnesium Sulphate										
1943	-0.74	0.60	0.06	-1.14	-0.30 ±0.855	-0.17	0.26	-2.66	0.12	-0.61 ±0.855
		±1.71					±1.71			
1944	3.00	-3.07	0.10	0.38	0.10 ±1.11	1.91	-1.06	1.02	-1.60	0.06 ±1.11
		±2.23					±2.23			
1945	-0.46	-0.38	-0.23	-0.10	-0.29 ±0.951	-0.07	0.85	-0.22	2.11	0.24 ±0.951
		±1.90					±1.90			
1946	-0.98	0.68	-0.11	0.85	0.11 ±0.330	0.39	0.47	0.17	-0.68	0.09 ±0.330
		±0.661					±0.661			
1947	3.55	-2.61	-0.44	1.36	0.60 ±0.786	1.09	-0.97	-0.33	-0.48	-0.17 ±0.786
		±1.57					±1.57			

Standard errors per plot

	d.f.
1942 1.24 tons per acre or 10.3%	16
1943 1.40 tons per acre or 11.5%	8
1944 1.82 tons per acre or 22.6%	8
1945 1.55 tons per acre or 12.5%	8
1946 0.539 tons per acre or 4.3%	8
1947 1.28 tons per acre or 13.7%	8

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Three Course Rotation Experiment

Ba/2.7

Sugar Beet. Total Sugar: cwt. per acre

	Treatments applied same year					Treatments applied previous year				
	Art	Adco	St_1	St_2	Mean	Art	Adco	St_1	St_2	Mean
Mean Yields										
1939	51.4	45.7	48.9	50.2	49.0 ±0.987	44.2	42.8	43.3	47.7	44.5 ±0.987
		±1.97					±1.97			
1940	44.2	40.1	41.9	48.9	43.8 ±1.23	42.6	39.9	41.3	40.1	41.0 ±1.23
		±2.47					±2.47			
1941	46.3	42.7	43.7	47.2	45.0 ±1.13	40.5	41.4	41.0	42.4	41.3 ±1.13
		±2.26					±2.26			
1942	51.5	36.4	49.2	48.0	46.3 ±1.27	42.1	38.1	42.0	40.7	40.7 ±1.27
		±2.54					±2.54			
1943	52.8	41.8	48.1	44.9	46.9 ±1.38	44.9	40.8	38.5	46.1	42.6 ±1.38
		±2.75					±2.75			
1944	29.6	28.0	24.2	26.1	27.0 ±1.79	26.0	26.5	26.7	27.9	26.8 ±1.79
		±3.57					±3.57			
1945	56.5	48.4	52.9	52.4	52.6 ±1.83	50.6	45.2	51.8	46.8	48.6 ±1.83
		±3.66					±3.66			
1946	52.5	45.0	46.3	49.1	48.2 ±0.566	45.3	42.2	44.0	46.4	44.5 ±0.566
		±1.13					±1.13			
1947	45.7	33.3	43.0	40.2	40.5 ±1.64	38.7	37.1	38.8	37.2	37.9 ±1.64
		±3.29					±3.29			
Responses to Magnesium Sulphate										
1943	-2.5	3.0	-0.9	-3.5	-1.0 ±2.92	-2.7	0.6	-9.4	0.5	-2.8 ±2.92
		±5.84					±5.84			
1944	10.6	-11.8	-0.3	2.3	0.02 ±3.79	6.3	-4.6	2.7	2.3	0.17 ±3.79
		±7.57					±7.57			
1945	-1.0	-0.1	-0.9	0.0	-0.5 ±3.88	1.0	6.7	-2.1	8.4	3.5 ±3.88
		±7.77					±7.77			
1946	-3.2	2.8	-0.9	4.1	0.7 ±1.20	1.7	3.5	0.4	-2.2	0.8 ±1.20
		±2.40					±2.40			
1947	14.9	-10.4	-1.8	7.8	2.6 ±3.48	6.0	-5.1	-3.7	-1.9	-1.2 ±3.48
		±6.97					±6.97			

Standard errors per plot			d.f.
1939	3.42 cwt. per acre	or 7.3%	16
1940	4.27 cwt. per acre	or 10.1%	16
1941	3.91 cwt. per acre	or 9.0%	16
1942	4.40 cwt. per acre	or 10.1%	16
1943	4.77 cwt. per acre	or 10.7%	8
1944	6.18 cwt. per acre	or 23.0%	8
1945	6.34 cwt. per acre	or 12.5%	8
1946	1.96 cwt. per acre	or 4.2%	8
1947	5.69 cwt. per acre	or 14.5%	8

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Sugar Beet. Sugar Percentage

	Treatments applied same year					Treatments applied previous year				
	Art	Adco	St_1	St_2	Mean	Art	Adco	St_1	St_2	Mean
Mean Yields										
1939	18.35	18.71	18.78	18.38	18.56	18.27	18.83	18.12	18.25	18.37
1940	21.10	21.25	21.03	21.46	21.21 ±0.162	20.98	21.19	21.53	21.10	21.20 ±0.162
		±0.325					±0.325			
1941	20.10	20.48	20.11	20.32	20.25 ±0.113	20.08	19.96	20.00	19.99	20.01 ±0.113
		±0.227					±0.227			
1942	18.08	18.17	18.22	18.35	18.20 ±0.096	17.75	18.19	18.48	18.38	18.20 ±0.096
		±0.192					±0.192			
1943	18.43	18.18	18.52	18.28	18.35 ±0.086	18.52	18.30	18.47	18.60	18.47 ±0.086
		±0.171					±0.171			
1944	16.67	16.48	16.13	16.40	16.43 ±0.063	16.85	16.93	16.86	16.68	16.83 ±0.063
		±0.126					±0.126			
1945	20.21	20.11	20.74	20.39	20.36 ±0.087	20.47	20.05	19.91	20.38	20.20 ±0.087
		±0.174					±0.174			
1946	18.13	18.52	18.51	18.38	18.38 ±0.082	18.36	18.37	18.10	18.68	18.38 ±0.082
		±0.165					±0.165			
1947	20.97	20.91	21.44	20.86	21.04	21.26	20.63	20.88	20.76	20.88
Responses to Magnesium Sulphate										
1943	0.09	0.30	-0.43	0.27	0.06 ±0.182	-0.83	-0.23	0.21	0.01	-0.21 ±0.182
		±0.364					±0.364			
1944	0.28	-1.14	-0.40	0.79	-0.12 ±0.134	-0.08	-0.70	-0.44	0.37	-0.21 ±0.134
		±0.268					±0.268			
1945	0.25	0.60	-0.01	0.14	0.24 ±0.184	0.51	1.42	-0.46	-0.06	0.35 ±0.184
		±0.368					±0.368			
1946	0.11	0.08	-0.20	0.39	0.10 ±0.175	0.12	0.80	-0.10	0.10	0.23 ±0.175
		±0.349					±0.349			
1947	0.00	0.36	0.04	0.05	0.11	0.69	-0.61	-1.24	0.14	-0.25

Standard errors per plot

		d.f.
1940	0.562	16
1941	0.393	16
1942	0.333	16
1943	0.297	8
1944	0.219	8
1945	0.301	8
1946	0.285	8

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Three Course Rotation Experiment

Ba/2.9

Sugar Beet. Tops: tons per acre

	Treatments applied same year					Treatments applied previous year				
	Art	Adco	St_1	St_2	Mean	Art	Adco	St_1	St_2	Mean
Mean Yields										
1939	15.09	11.40	12.83	12.52	12.96	12.33	10.24	12.08	12.22	11.72
1940	8.16	6.46	7.35	8.06	7.51 ±0.245	6.80	6.74	6.32	6.42	6.57 ±0.245
		±0.491					±0.491			
1941	11.91	8.64	9.32	10.87	10.18 ±0.337	8.26	9.57	8.47	9.15	8.86 ±0.337
		±0.675					±0.675			
1942	11.39	7.32	10.14	9.79	9.66 ±0.332	8.87	7.93	8.35	7.80	8.24 ±0.332
		±0.663					±0.663			
1943	11.52	8.43	8.74	8.74	9.36 ±0.512	7.72	8.27	6.25	8.15	7.60 ±0.512
		±1.02					±1.02			
1944	10.35	9.08	8.57	9.17	9.29 ±0.346	8.09	7.77	7.20	9.07	8.03 ±0.346
		±0.693					±0.693			
1945	9.42	6.47	7.70	6.64	7.56 ±0.158	6.31	6.13	7.30	6.98	6.68 ±0.158
		±0.315					±0.315			
1946	13.84	10.54	11.39	11.96	11.93 ±0.585	10.80	11.03	9.16	10.49	10.37 ±0.585
		±1.17					±1.17			
1947	6.12	4.38	5.56	5.83	5.47 ±0.140	4.44	4.96	4.87	5.05	4.83 ±0.140
		±0.280					±0.280			
Responses to Magnesium Sulphate										
1943	-1.40	0.68	-0.83	-0.32	-0.47 ±1.09	-0.06	-0.15	-0.81	-0.07	-0.27 ±1.09
		±2.17					±2.17			
1944	1.22	-1.36	1.98	-1.44	0.10 ±0.735	2.05	0.16	0.16	-0.54	0.46 ±0.735
		±1.47					±1.47			
1945	-2.07	-0.93	-1.17	-0.18	-1.09 ±0.334	-0.49	-0.02	2.51	0.65	0.66 ±0.334
		±0.668					±0.668			
1946	-0.87	-1.00	-1.41	1.40	-0.47 ±1.24	-0.35	-0.47	-0.88	-0.60	-0.58 ±1.24
		±2.48					±2.48			
1947	1.14	-0.71	-0.47	-0.31	-0.09 ±0.297	0.10	0.54	0.49	-0.95	0.04 ±0.297
		±0.594					±0.594			

Standard errors per plot

		d.f.
1939	1.13 tons per acre or 9.2%	16
1940	0.850 tons per acre or 12.1%	16
1941	1.17 tons per acre or 12.3%	16
1942	1.15 tons per acre or 12.8%	16
1943	1.77 tons per acre or 20.9%	8
1944	1.20 tons per acre or 13.8%	8
1945	0.546 tons per acre or 7.7%	8
1946	2.03 tons per acre or 18.2%	8
1947	0.485 tons per acre or 9.4%	8

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FOUR COURSE ROTATION EXPERIMENT

Great Hoos (begun in 1930)

Residual Values of Humic and Phosphatic Fertilizers

The five treatments compared in this experiment are dung, Adco compost, straw with artificials, superphosphate and rock phosphate (Gafsa), the cropping following a Norfolk Rotation (potatoes, barley, ryegrass, wheat). There are four series (one for each crop in any particular year), each consisting of twenty-five plots.

Dung and Adco each supply 50 cwt. per acre of organic matter. The quantity of straw applied is equal to that used in making the Adco. The nutrient content of the three humic fertilizers is equalized by adding sulphate of ammonia, muriate of potash and superphosphate, to raise the applications to 1.8 cwt. N per acre, 1.2 cwt. P_2O_5 per acre and 3.0 cwt. K_2O per acre. The phosphatic fertilizers are applied at the rate of 1.2 cwt. P_2O_5 per acre, together with sulphate of ammonia and muriate of potash at the above rates.

Any given plot receives always the same treatment, but the treatment is applied to the plot only once in five years (except that the sulphate of ammonia and muriate of potash accompanying the phosphatic fertilizers are applied one fifth annually.) Thus each treatment is applied to one plot of each series every year, according to a Latin square scheme. In this way the residual effects of fertilizers are measured in every crop, and the period of the manurial cycle differs from that of the crop rotation.

Area of each plot, 0.024 acre.

Details of the experiment are as given in the 1932 Report, pp. 127-8, with the following alterations:-

1. From 1935 onwards, clover ryegrass ley was replaced by ryegrass alone, sown in autumn after ploughing barley stubble, with fertilizers applied as on wheat.

2. From 1942 onwards, each plot of the potato crop was split, a random half of each receiving an additional 0.4.cwt. N per acre as sulphate of ammonia each year.

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Nutrients provided by organic fertilizers: cwt. per acre

Year	Manure as F.Y.M. N	P_2O_5	K_2O	Manure as Adco N	P_2O_5	K_2O	Manure as Straw Organic Matter	N	P_2O_5	K_2O
1939	1.782	1.344*	4.503	1.646	1.520*	1.189	123.75	0.862	0.480	2.652
1940	1.520	0.830	2.155	1.562	1.240*	1.330	139.88	1.008	0.520	2.699
1941	1.775	0.471	1.802	1.260	0.877	0.538	106.74	0.573	0.183	1.526
1942	1.410	0.700	2.373	1.378	0.890	0.506	118.96	9.615	0.208	1.229
1943	1.526	0.645	2.193	1.282	0.840	0.474	133.23	0.832	0.270	1.506
1944	1.202	0.409	1.925	1.313	0.706	0.572	100.00	0.657	0.178	0.765
1945	1.524	0.492	2.712	0.995	0.555	0.622	82.00	0.297	0.088	0.684
1946	1.802	0.710	2.418	1.461	1.031	0.892	124.90	0.683	0.379	1.447
1947	1.588	0.748	1.560	1.585	1.169	0.911	123.00	0.849	0.261	1.546

* No application of artificials necessary.

Crop Notes

Crop year	1939	1940	1941	1942	1943	1944	1945	1946	1947
Potatoes. Variety: 1939-41, Ally; 1942-47, Majestic. Previous crop: Wheat									
Planted	Apr. 17	Apr. 26	Apr. 30	Apr. 21	Apr. 8	Mar. 25	Mar. 30	Mar. 30	Apr. 29
Harvested	Sept.19	Sept.24	Oct. 3	Oct. 3	Sept.15	Sept.28	Sept.25	Oct. 4	Sept.30
Barley. Variety: Plumage Archer. Previous crop: Potatoes									
Sown	Mar. 7	Mar. 11	Mar. 18	Mar. 25	Mar. 2	Mar. 6	Mar. 27	Mar. 20	Apr. 12
Harvested	Aug. 23	Aug. 6	Sept. 2	Aug. 17	Aug. 7	Aug. 12	Aug. 14	Aug. 21	Aug. 14
Ryegrass. Variety: Western Wolths. Previous crop: Barley									
Sown	Sept.13	Apr.13[1]	Oct. 30	Nov. 1	Sept.24	Sept.30	Sept.13	Sept.17	Apr. 12[3]
Harvested	June 6	June 22	Failed[2]	June 20	June 14	June 14	June 13	June 14	Aug. 21
Wheat. Variety: 1939-45 Yeoman. 1946/47 Squareheads Master. Previous crop: Ryegrass									
Sown	Oct. 24	Oct. 21	Oct. 29	Oct. 27	Oct. 10	Oct. 4	Oct. 26	Oct. 15	Oct. 24
Harvested	Aug. 14	Aug. 6	Aug. 22	Aug. 12	Aug. 3	Aug. 12	Aug. 13	Aug. 21	Aug. 18

(1) First sowing of ryegrass failed.
(2) Barley sown to replace ryegrass, which failed.
Sown: Apr 22. Cut for hay: July 23. Variety: Kenia.
(3) Wet season prevented autumn sowing of ryegrass.

https://doi.org/10.23637/ERADOC-1-145

Four Course Rotation Experiment Ba/3.3

Potatoes. Total tubers: tons per acre

Manure	Year of cycle	1939	1940	1941	1942	1943	1944	1945	1946	1947
Manure as F.Y.M.	1	5.28	4.95	3.02	9.08	6.90	10.68	9.60	7.29	6.13
	2	3.52	4.34	2.53	6.12	6.20	7.85	8.14	7.03	5.47
	3	4.03	3.01	2.69	6.56	5.48	11.69	7.27	5.54	5.84
	4	2.82	4.80	1.92	6.77	5.38	8.05	8.87	5.06	5.05
	5	4.16	3.79	2.42	3.82	5.46	8.97	6.11	6.38	4.30
Manure as Adco	1	4.14	4.87	1.86	7.77	8.34	12.49	11.82	9.24	6.05
	2	3.70	2.91	2.38	5.39	4.77	9.66	7.72	7.26	5.59
	3	2.25	2.91	2.04	4.28	4.72	8.55	6.80	6.60	4.56
	4	3.12	2.93	1.30	4.57	5.13	7.97	7.01	7.04	5.21
	5	2.46	2.05	1.75	5.15	5.26	9.63	7.08	6.18	5.13
Manure as Straw	1	3.59	7.18	4.42	10.22	7.13	12.60	12.83	9.13	6.57
	2	4.07	5.11	2.77	6.85	5.97	8.21	9.00	6.37	4.36
	3	4.23	3.45	3.00	7.93	6.62	6.88	8.43	7.20	4.55
	4	4.22	2.51	1.88	4.07	5.81	8.80	8.15	6.19	5.66
	5	3.48	3.50	2.76	6.73	4.92	10.02	7.79	6.64	5.07
Super-Phosphate	1	5.63	5.66	4.03	6.90	8.51	9.98	9.27	9.19	6.48
	2	5.72	4.58	4.14	4.46	6.29	10.86	9.45	7.58	5.63
	3	4.45	4.67	2.24	9.14	7.28	9.53	9.27	7.39	6.36
	4	3.98	3.56	2.76	7.23	8.40	11.06	9.84	8.41	5.98
	5	4.76	4.98	2.64	7.31	6.85	8.03	10.01	8.02	6.17
Gafsa Rock Phosphate	1	3.37	2.44	2.41	4.06	5.30	8.62	9.31	7.18	4.04
	2	2.22	3.37	2.26	5.57	6.58	9.60	7.67	6.41	5.41
	3	3.59	4.58	2.45	5.83	7.01	6.63	8.13	6.85	5.26
	4	3.81	2.29	2.85	4.13	5.88	8.72	7.93	6.24	5.47
	5	2.90	3.28	1.93	7.52	5.55	5.27	8.48	8.35	4.90

https://doi.org/10.23637/ERADOC-1-145 *pp 82*

Potatoes. Total tubers: tons per acre. Effect of additional nitrogen

Manures	Year of Cycle	1942 Additional N Without	With	Mean	N Effect	1943 Additional N Without	With	Mean	N Effect
Manure as F.Y.M.	1	9.08	10.34	9.71	1.26	6.90	7.28	7.09	0.38
	2	6.12	8.31	7.22	2.19	6.20	7.99	7.10	1.79
	3	6.56	8.04	7.30	1.48	5.48	6.15	5.82	0.67
	4	6.77	7.08	6.92	0.31	5.38	7.99	6.68	2.61
	5	3.82	4.65	4.24	0.83	5.46	7.72	6.59	2.26
Manure as Adco	1	7.77	7.16	7.46	-0.61	8.34	9.20	8.77	0.86
	2	5.39	7.81	6.60	2.42	4.77	6.59	5.68	1.82
	3	4.28	4.61	4.44	0.33	4.72	6.62	5.67	1.90
	4	4.57	6.09	5.33	1.52	5.13	4.83	4.98	-0.30
	5	5.15	5.24	5.20	0.09	5.26	6.68	5.97	1.42
Manure as Straw	1	10.22	11.73	10.98	1.51	7.13	9.31	8.22	2.18
	2	6.85	9.67	8.26	2.82	5.97	7.63	6.80	1.66
	3	7.93	7.52	7.72	-0.41	6.62	8.03	7.32	1.41
	4	4.07	4.02	4.04	-0.05	5.81	7.95	6.88	2.14
	5	6.73	7.16	6.94	0.43	4.92	6.43	5.68	1.51
Super-Phosphate	1	6.90	8.31	7.60	1.41	8.51	10.41	9.46	1.90
	2	4.46	5.65	5.06	1.19	6.29	8.22	7.26	1.93
	3	9.14	10.04	9.59	0.90	7.28	8.58	7.93	1.30
	4	7.23	7.85	7.54	0.62	8.40	9.10	8.75	0.70
	5	7.31	7.19	7.25	-0.12	6.85	7.48	7.16	0.63
Gafsa Rock Phosphate	1	4.06	3.74	3.90	-0.32	5.30	5.63	5.46	0.33
	2	5.57	7.81	6.69	2.24	6.58	5.80	6.19	-0.78
	3	5.83	4.98	5.40	-0.85	7.01	8.19	7.60	1.18
	4	4.13	6.52	5.32	2.39	5.88	6.14	6.01	0.26
	5	7.52	5.64	6.58	-1.88	5.55	6.31	5.93	0.76

https://doi.org/10.23637/ERADOC-1-145

Four Course Rotation Experiment

Potatoes. Total tubers: tons per acre. Effect of additional nitrogen

Manures	Year of Cycle	1944 Additional N Without	With	Mean	N Effect	1945 Additional N Without	With	Mean	N Effect
Manure as F.Y.M.	1	10.68	12.72	11.70	2.04	9.60	12.77	11.18	3.17
	2	7.85	8.03	7.94	0.18	8.14	12.27	10.20	4.13
	3	11.69	12.09	11.89	0.40	7.27	10.50	8.88	3.23
	4	8.05	8.80	8.42	0.75	8.87	10.71	9.79	1.84
	5	8.97	11.90	10.44	2.93	6.11	8.03	7.07	1.92
Manure as Adco	1	12.49	10.96	11.72	-1.53	11.82	13.69	12.76	1.87
	2	9.66	11.10	10.38	1.44	7.72	9.62	8.67	1.90
	3	8.55	9.54	9.04	0.99	6.80	8.92	7.86	2.12
	4	7.07	8.69	8.33	0.72	7.01	9.27	8.14	2.26
	5	9.63	10.13	9.88	0.50	7.08	8.07	7.58	0.99
Manure as Straw	1	12.60	13.90	13.25	1.30	12.83	9.95	11.39	-2.88
	2	8.21	9.25	8.73	1.04	9.00	8.39	8.70	-0.61
	3	6.88	7.11	7.00	0.23	8.43	11.60	10.02	3.17
	4	8.80	9.14	8.97	0.34	8.15	9.52	8.84	1.37
	5	10.02	10.29	10.16	0.27	7.79	10.49	9.14	2.70
Super-Phosphate	1	9.98	10.99	10.48	1.01	9.27	9.82	9.54	0.55
	2	10.86	11.90	11.38	1.04	9.45	10.83	10.14	1.38
	3	9.53	10.80	10.16	1.27	9.27	10.49	9.88	1.22
	4	11.06	12.09	11.58	1.03	9.84	10.52	10.18	0.68
	5	8.03	9.03	8.53	1.00	10.01	10.56	10.28	0.55
Gafsa Rock Phosphate	1	8.62	9.34	8.98	0.72	9.31	8.46	8.88	-0.85
	2	9.60	12.05	10.82	2.45	7.67	7.88	7.78	0.21
	3	6.63	8.60	7.62	1.97	8.13	8.99	8.56	0.86
	4	8.72	8.13	8.42	-0.59	7.93	8.09	8.01	0.16
	5	5.27	7.42	6.34	2.15	8.48	6.98	7.73	-1.50

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Potatoes, Total tubers: tons per acre. Effect of additional nitrogen

Manures	Year of Cycle	1946 Additional N Without	1946 Additional N With	1946 Mean	1946 N Effect	1947 Additional N Without	1947 Additional N With	1947 Mean	1947 N Effect
	1	7.29	8.65	7.97	1.36	6.13	8.06	7.10	1.93
Manure	2	7.03	8.80	7.92	1.77	5.47	6.55	6.01	1.08
as	3	5.54	8.00	6.77	2.46	5.84	6.36	6.10	0.52
F.Y.M.	4	5.06	8.63	6.84	3.57	5.05	5.97	5.51	0.92
	5	6.38	6.79	6.58	0.41	4.30	5.39	4.84	1.09
	1	9.24	9.18	9.21	-0.06	6.05	6.01	6.03	-0.04
Manure	2	7.26	8.78	8.02	1.52	5.59	5.42	5.50	-0.17
as	3	6.60	8.58	7.59	1.98	4.56	5.89	5.22	1.33
Adco	4	7.04	7.09	7.06	0.05	5.21	5.94	5.58	0.73
	5	6.18	7.53	6.86	1.35	5.13	4.65	4.89	-0.48
	1	9.13	9.93	9.53	0.80	6.57	6.35	6.46	-0.22
Manure	2	6.37	10.66	8.52	4.29	4.36	5.80	5.08	1.44
as	3	7.20	9.09	8.14	1.89	4.55	6.74	5.64	2.19
Straw	4	6.19	7.26	6.72	1.07	5.66	6.43	6.04	0.77
	5	6.64	8.52	7.58	1.88	5.07	6.34	5.70	1.27
	1	9.19	10.08	9.64	0.89	6.48	7.41	6.94	0.93
	2	7.58	9.78	8.68	2.20	5.63	5.59	5.61	-0.04
Super-	3	7.39	7.99	7.69	0.60	6.36	6.40	6.38	0.04
Phosphate	4	8.41	8.18	8.30	-0.23	5.98	5.34	5.66	-0.64
	5	8.02	7.51	7.76	-0.51	6.17	5.62	5.90	-0.55
	1	7.18	6.17	6.68	-1.01	4.04	4.70	4.37	0.66
Gafsa	2	6.41	6.01	6.21	-0.40	5.41	5.65	5.53	0.24
Rock	3	6.85	6.61	6.73	-0.24	5.26	5.21	5.24	-0.05
Phosphate	4	6.24	6.20	6.22	-0.04	5.47	5.18	5.32	-0.29
	5	8.35	7.02	7.68	-1.33	4.90	4.79	4.84	-0.11

https://doi.org/10.23637/ERADOC-1-145

Four Course Rotation Experiment

Barley Grain: cwt. per acre

Manure	Year of Cycle	1939	1940	1941	1942	1943	1944	1945	1946	1947
Manure as F.Y.M	1	26.3	27.6	18.4	35.0	27.4	35.8	29.8	26.9	22.6
	2	25.9	32.5	14.6	24.1	23.3	29.4	21.8	24.2	16.2
	3	22.8	24.2	12.5	21.6	17.9	25.2	19.0	25.1	15.3
	4	23.7	20.7	15.3	22.0	19.6	23.0	19.2	22.5	13.3
	5	21.5	22.6	12.2	16.3	16.1	27.2	17.6	23.8	14.6
Manure as Adco	1	31.5	36.5	17.3	28.4	32.4	31.6	31.5	30.2	19.0
	2	26.1	28.1	13.8	18.6	22.7	30.3	22.4	25.2	13.8
	3	20.6	24.3	12.6	18.9	16.4	24.9	18.1	21.6	15.3
	4	20.5	18.5	10.4	17.0	20.9	27.6	16.6	24.5	13.4
	5	22.4	27.5	11.0	13.9	16.3	27.5	14.8	21.8	14.5
Manure as Straw	1	23.7	34.5	25.5	32.0	32.2	34.8	38.4	34.3	24.0
	2	24.5	27.3	15.1	26.6	23.1	28.2	24.8	27.2	16.5
	3	20.8	27.1	12.0	19.2	20.8	28.1	19.6	25.6	19.1
	4	23.8	26.0	12.6	17.2	21.6	26.0	16.8	24.3	14.1
	5	26.3	24.2	12.6	21.4	13.4	25.1	20.0	24.8	15.8
Super-phosphate	1	32.2	30.2	25.1	25.4	27.8	29.2	26.2	28.6	23.7
	2	32.3	30.8	24.8	27.2	25.3	28.6	26.3	22.8	22.6
	3	31.7	31.1	25.9	26.4	30.0	26.7	24.2	27.2	22.6
	4	31.7	31.3	22.0	28.6	28.3	27.5	22.7	29.1	22.0
	5	33.0	29.7	21.7	29.2	22.7	29.4	26.6	29.2	20.4
Gafsa Rock Phosphate	1	29.0	33.2	18.7	13.1	23.7	28.8	20.0	29.3	20.6
	2	29.8	34.5	15.0	27.7	24.6	28.0	21.4	28.9	17.4
	3	32.9	31.0	17.3	27.9	24.1	28.8	26.2	23.3	20.6
	4	31.5	30.4	22.3	22.8	20.9	28.1	21.2	30.3	19.9
	5	26.5	32.1	16.9	30.4	26.1	29.9	23.4	27.4	19.4

https://doi.org/10.23637/ERADOC-1-145

Barley Straw: cwt. per acre

Manure	Year of Cycle	1939	1940	1941	1942	1943	1944	1945	1946	1947
Manure as F.Y.M.	1	32.2	28.5	23.0	37.5	30.1	33.3	33.8	29.6	21.9
	2	28.8	25.3	23.2	22.2	23.8	29.1	23.7	28.4	17.5
	3	26.1	24.7	19.8	20.4	19.4	23.5	21.0	26.4	16.0
	4	27.6	22.0	20.8	20.7	19.0	22.8	20.9	28.4	13.5
	5	28.2	24.7	18.4	16.5	15.8	25.0	17.2	29.5	16.6
Manure as Adco	1	39.7	35.7	27.0	31.0	34.0	31.4	37.4	40.0	20.5
	2	32.0	29.2	21.2	23.9	21.8	26.4	25.6	29.4	14.3
	3	24.6	24.5	23.0	22.3	16.7	23.5	21.1	22.8	15.6
	4	26.5	27.7	17.0	23.6	21.8	26.4	21.8	33.2	14.3
	5	24.7	28.2	20.5	15.8	17.6	23.1	18.7	28.2	16.3
Manure as Straw	1	27.2	37.8	32.1	35.8	33.9	34.1	34.4	42.0	23.8
	2	29.0	27.7	21.6	25.6	22.6	26.8	27.8	34.0	17.7
	3	24.4	27.8	20.0	19.7	22.4	25.9	28.4	30.5	18.7
	4	27.8	26.4	18.9	21.1	20.7	23.6	25.4	30.0	15.7
	5	27.6	24.7	21.3	16.9	14.9	22.1	20.7	26.9	16.3
Super-phosphate	1	35.9	35.2	30.6	30.6	28.3	26.9	31.6	36.4	24.7
	2	39.6	32.3	30.8	26.5	28.0	28.2	25.4	28.2	22.6
	3	34.1	33.4	29.8	20.4	28.7	25.5	29.4	34.4	23.7
	4	33.7	32.9	29.7	28.0	27.6	24.0	29.4	32.5	22.7
	5	34.7	30.3	31.8	27.3	26.0	24.9	29.3	38.2	21.1
Gafsa Rock Phosphate	1	33.3	37.9	29.1	22.8	26.0	25.6	26.5	36.5	24.0
	2	36.8	39.8	29.2	31.3	27.4	26.2	25.1	34.7	18.9
	3	37.1	37.5	28.5	29.5	26.3	26.5	27.8	29.1	22.8
	4	37.3	32.3	*	23.4	24.1	25.1	29.4	35.5	22.6
	5	36.2	34.8	32.0	29.9	26.7	28.2	25.1	36.4	23.0

* Recorded yield obviously incorrect.

https://doi.org/10.23637/ERADOC-1-145

Four Course Rotation Experiment

Ryegrass: cwt. per acre dry matter

Manure	Year of Cycle	1939	1940	1941	1942	1943	1944	1945	1946	1947
	1	20.4	19.4	7.0	18.8	16.5	19.4	17.3	33.3	6.7
Manure	2	10.9	11.4	9.7	9.5	12.7	10.2	13.1	22.8	3.2
as	3	10.8	7.1	5.5	7.3	10.5	11.4	11.5	20.8	3.3
F.Y.M.	4	8.5	9.1	6.5	9.0	8.9	8.2	11.8	12.3	3.2
	5	9.5	9.1	5.8	5.6	8.6	9.6	9.6	16.2	3.2
	1	14.4	16.9	10.1	9.4	17.8	18.7	25.3	31.9	6.7
Manure	2	10.2	9.9	6.7	5.8	10.6	13.3	14.0	27.6	3.5
as	3	8.8	7.6	5.6	9.0	9.6	9.0	11.5	18.9	3.5
Adco	4	7.2	8.9	5.4	6.1	8.3	9.1	8.1	16.5	1.2
	5	8.1	8.5	3.6	6.2	8.8	9.8	10.4	15.5	3.9
	1	40.5	28.1	14.3	21.5	29.3	16.4	39.2	59.1	12.4
Manure	2	11.0	8.8	4.4	8.6	9.4	10.7	13.2	21.7	3.7
as	3	9.2	12.1	6.6	11.4	11.4	10.6	12.5	23.5	5.0
Straw	4	9.3	9.8	7.0	9.6	8.3	11.8	10.6	15.5	4.4
	5	9.2	9.3	6.9	7.1	8.1	9.6	8.5	14.0	3.1
	1	22.5	18.4	10.0	13.5	14.2	12.6	22.0	39.7	11.2
	2	23.3	12.9	10.0	15.6	18.1	12.0	20.0	33.7	7.8
Super-	3	17.0	14.8	9.4	10.8	15.1	14.3	22.3	34.0	4.3
phosphate	4	20.2	10.9	11.6	7.1	13.7	15.4	19.2	36.7	6.9
	5	20.5	13.3	7.5	11.0	17.1	12.6	18.3	35.9	6.6
	1	17.7	7.8	9.0	6.2	16.6	12.8	20.8	31.6	7.2
Gafsa	2	16.1	12.0	9.3	9.7	17.7	8.5	18.7	31.4	5.8
Rock	3	16.1	10.7	8.4	3.6	14.8	10.4	19.2	32.3	8.4
Phosphate	4	18.5	11.5	6.7	10.2	15.4	11.2	16.9	37.1	5.4
	5	24.9	10.4	5.4	15.6	11.8	8.9	18.3	29.0	7.2

In 1941 the ryegrass failed and the plots were resown with barley, which was cut for hay.

https://doi.org/10.23637/ERADOC-1-145 *pp 88*

Wheat Grain: cwt. per acre

Manure	Year of Cycle	1939	1940	1941	1942	1943	1944	1945	1946	1947
Manure as F.Y.M.	1	23.9	26.0	18.0	19.9	24.9	14.1	24.6	22.5	12.7
	2	19.3	20.1	16.4	17.8	20.0	7.8	22.2	17.3	11.2
	3	15.4	16.3	15.4	19.0	15.6	12.1	17.9	12.0	10.4
	4	16.2	17.4	12.5	14.6	15.0	8.2	19.4	14.6	7.8
	5	14.6	18.1	14.1	14.9	14.0	7.9	18.1	17.3	8.9
Manure as Adco	1	19.3	26.3	17.7	22.9	24.0	14.1	27.5	22.7	12.8
	2	17.0	18.9	15.1	18.5	14.9	10.4	19.4	19.1	11.1
	3	16.4	16.3	15.6	17.4	15.9	9.2	19.3	14.4	9.1
	4	12.6	16.3	13.7	23.4	15.8	11.6	16.9	12.2	9.2
	5	17.4	16.8	12.1	15.1	12.7	9.9	15.6	12.6	7.3
Manure as Straw	1	23.9	28.7	24.4	16.9	28.4	18.9	30.3	28.7	11.3
	2	17.4	19.1	13.7	13.9	17.0	6.4	20.0	14.1	11.2
	3	15.8	18.2	14.0	18.2	16.1	12.1	20.8	16.4	10.6
	4	17.4	25.7	16.2	18.1	16.2	7.3	17.7	12.6	10.3
	5	14.3	18.8	11.9	18.4	14.0	7.6	17.4	14.7	8.9
Super-Phosphate	1	22.7	18.8	16.5	20.6	21.4	9.4	22.1	15.9	8.6
	2	21.4	19.3	17.4	17.8	17.9	10.2	21.0	12.0	11.3
	3	19.4	21.8	17.9	20.1	22.2	11.0	22.1	16.0	9.0
	4	19.2	21.9	18.1	19.5	21.6	11.3	22.6	16.2	10.9
	5	21.3	21.4	18.9	21.0	21.4	9.5	23.4	17.9	10.2
Gafsa Rock	1	19.6	24.7	16.1	18.9	20.4	12.8	19.2	15.7	9.0
	2	22.5	21.6	14.5	19.9	20.2	17.1	21.2	17.7	7.5
	3	16.9	23.6	19.1	19.9	19.6	15.5	21.1	20.5	6.7
	4	21.7	21.6	18.0	22.0	21.0	15.9	21.9	16.1	2.4
	5	19.8	22.2	18.2	18.8	18.2	12.6	16.9	15.8	9.2

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Four Course Rotation Experiment

Wheat Straw: cwt. per acre

Manure	Year of Cycle	1939	1940	1941	1942	1943	1944	1945	1946	1947
	1	33.6	36.7	22.2	32.7	38.0	27.5	35.9	43.1	16.8
Manure	2	26.9	25.7	20.1	24.6	28.5	12.1	31.2	35.3	13.4
as	3	20.9	21.5	17.3	26.5	20.3	16.5	24.7	27.4	15.8
F.Y.M.	4	26.3	24.9	14.4	20.9	26.1	11.7	25.7	34.3	10.0
	5	27.2	21.0	15.8	23.2	18.3	10.8	25.7	32.4	10.8
	1	36.4	36.2	24.4	32.1	36.6	23.6	41.4	43.5	22.2
Manure	2	23.3	22.4	17.4	25.0	25.3	14.7	27.1	36.4	17.7
as	3	25.0	21.4	19.5	22.6	29.7	13.2	26.2	28.7	12.2
Adco	4	26.6	21.3	16.9	32.5	22.2	13.7	22.1	24.9	13.3
	5	25.8	21.1	13.9	21.9	22.5	13.9	20.2	25.5	10.0
	1	35.8	40.9	34.7	25.1	44.6	29.8	49.8	50.7	24.6
Manure	2	23.7	21.6	16.9	20.4	29.9	8.8	27.4	28.2	13.2
as	3	35.6	23.2	17.0	24.9	22.4	16.5	29.7	32.3	13.4
Straw	4	24.4	31.7	18.1	24.4	22.5	10.3	26.1	27.0	14.5
	5	20.9	22.0	15.2	24.5	19.3	10.8	23.9	28.9	11.3
	1	33.0	24.3	20.4	27.8	33.2	12.9	30.3	30.1	15.1
	2	33.2	25.8	22.2	26.0	31.0	12.7	30.3	23.9	16.4
Super-	3	34.5	28.2	21.1	32.3	30.4	14.7	30.6	31.3	13.0
phosphate	4	27.7	30.5	22.0	26.6	32.7	13.9	33.2	30.7	14.4
	5	32.3	27.1	22.6	31.8	28.7	12.7	32.1	37.2	14.9
	1	27.3	31.3	20.7	23.6	30.3	16.9	30.1	30.5	16.1
Gafsa	2	29.9	27.3	18.0	28.1	35.7	20.8	29.6	35.4	9.5
Rock	3	35.9	29.5	22.8	26.3	28.7	16.7	31.3	39.3	9.8
Phosphate	4	30.3	28.7	21.4	28.8	33.4	18.4	32.4	32.5	4.5
	5	32.6	31.7	21.2	25.8	26.7	14.7	24.0	31.1	12.8

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Ba/4.1

SIX COURSE ROTATION EXPERIMENT

ROTHAMSTED, Long Hoos IV, and WOBURN, Stackyard Field, Series B.

Experiment begun in 1930 (Rothamsted) and 1929 (Woburn)

Seasonal effects of N, P_2O_5 and K_2O

The six crops of the rotation are sugar beet, barley, clover hay, wheat, potatoes and rye. Both at Rothamsted and Woburn there are fifteen plots under each crop in any year, and each plot receives one of the three common fertilizers, sulphate of ammonia, superphosphate and muriate of potash, at one of five levels. The rates of application of fertilizers are

N and P_2O_5: 0.00, 0.15, 0.30, 0.45, 0.60 cwt. per acre

K_2O: 0.00, 0.25, 0.50, 0.75, 1.00 cwt. per acre

Plots do not receive the same treatment throughout, but on each plot the fifteen treatments follow one another in a definite order in successive years, and in this way cumulative effects of treatments are avoided.

Area of each plot: Rothamsted 0.025 acre Woburn 0.0271 acre. 0.027

Details of the experiment are as given in the 1932 Report, p.131, except that since 1934 the forage crop has been replaced by rye, harvested as a mature crop, and that the green manure crops are now omitted. Since 1934 lime has been applied at the rate of 10 cwt. per acre at two stages in the rotation: immediately after the removal of the potato crop and before sowing barley.

The increments given in the following tables are linear regressions of yield on quantity of fertilizer.

Crop Notes

	ROTHAMSTED			WOBURN		
	Variety	Sown	Harvested	Variety	Sown	Harvested
Sugar beet						
1939	Kuhn	Apr. 22	Oct. 24	Kuhn	May 4	Nov. 14
1940	"	May 3	Nov. 26	"	" 6	" 19
1941	"	Apr. 30	" 3	"	Apr. 29	Dec. 12
1942	Klein E.	" 24	Oct. 23	"	" 22	" 9
1943	" "	" 14	" 14	Klein E.	" 17	" 17
1944	" "	" 21	" 20	" "	May 4	" 18
1945	" "	" 12	" 18	" "	" 3	Nov. 28
1946	" "	" 13	" 22	" "	Apr. 16	Oct. 12
1947	" "	" 26	" 16	" "	May 3	" 17

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	ROTHAMSTED			WOBURN		
	Variety	Sown	Harvested	Variety	Sown	Harvested
Barley						
1939	Plumage Archer	Mar. 7	Aug.16	Plumage	Mar. 1	Aug.30
1940	" "	" 9	" 3	Archer	" 9	" 30
1941	" "	" 25	Sep. 2	"	" 17	" 27
1942	" "	" 25	Aug.17	"	Apr. 1	" 13
1943	" "	" 2	" 7	"	Mar. 4	Jul.29
1944	" "	" 6	" 8	"	" 14	Aug.28
1945	" "	" 26	" 6	"	" 5	" 2
1946	" "	" 20	" 15	"	" 19	" 22
1947	" "	Apr.12	" 8	"	Apr.17	" 6
Clover						
1939	Crimson Clover	Apr.24*	Jul.28	Broad Red	31.3.38, 14.9.38	Jun. 9
1940	Montgomery Red	23.4.39	Jun.17	" "	17.4.39	" 20
1941	" "	May 3*	Aug.25	" "	6.5.40	Jul.10
1942	" "	9.5.41	Jun.27	" "	5.5.41	Jun.26
1943	" "	7.5.42	Jul.15	" "	20.5.42	" 7
1944	" "	Mar.27	" 28	" "	16.4.43	" 5
1945	Crimson Clover	12.9.44	Jun.13	" "	Mar. 7*	Aug. 3
1946	Montgomery Red	28.3.45	" 22	Montgomery	23.4.45	Jul.22
1947	" "	15.4.46	" 18	Red	2.5.46	Jun.17
* Second sowing; first sowing failed						
Wheat						
1939	Yeoman	22.10.38	Aug.12	Yeoman	31.10.38	Aug.14
1940	"	21.10.39	" 6	"	1.11.39	" 12
1941	"	29.10.40	" 22	"	28.10.40	" 14
1942	"	27.10.41	" 12	"	21.11.41	" 19
1943	"	10.10.42	" 2	Eaten by rats		
1944	"	4.10.43	" 3	Yeoman	11.10.43	Aug.10
1945	"	26.10.44	" 6	Crop failed		
1946	"	17.10.45	" 9	Yeoman	15.10.45	Aug.21
1947	"	18.10.46	" 5	Squareheads Master	5.11.46	" 6
Potatoes						
1939	Ally	Apr.17	Sep.18	Ally	Apr.12	Sep.8
1940	"	" 26	" 23	"	Mar.30	Sep.17
1941	"	" 29	Oct.2	"	Apr.17	Oct.3
1942	Majestic	" 21	" 2	Majestic	" 16	" 1
1943	"	" 9	Sep.17	"	" 12	Sep.20
1944	"	Mar.28	" 29	"	May 5	Oct.3
1945	"	" 29	" 22	"	Apr 24	" 4
1946	"	" 29	Oct.2	"	" 24	" 3
1947	"	May 2	Sep.29	"	May 12	" 2
Rye						
1939		8.11.38	Aug.12		31.10.38	Aug.11
1940		23.10.39	" 3		1.11.39	" 2
1941		29.10.40	" 14		22.10.40	" 7
1942		28.10.41	" 4		21.11.41	" 1
1943		13.10.42	Jul.24		10.11.42	Jul.29
1944		2.10.43	" 22		12.10.43	" 30
1945		2.11.44	" 30		10.11.44	Aug.3
1946		16.10.45	Aug.1		5.10.45	" 19
1947		18.10.46	Jul.29		6.11.46	Jul.29

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Mean yields and increments in yield per cwt. of N, P_2O_5 and K_2O

Sugar Beet

	ROTHAMSTED				WOBURN			
	Mean Yield	N	P_2O_5	K_2O	Mean Yield	N	P_2O_5	K_2O
Roots (Washed): tons per acre								
1939	9.98	2.16	-1.07	2.03	8.76	3.75	-1.71	0.44
1940	8.25	3.64	-2.67	-0.24	5.84	2.40	-0.39	0.79
1941	9.30	4.17	0.47	0.83	7.87	3.11	-1.19	0.81
1942	12.48	0.76	-0.35	0.39	6.78	-0.24	-5.33	1.53
1943	12.21	7.36	-1.29	-1.05	7.54	9.52	-0.98	-1.52
1944	6.45	-1.25	2.75	2.26	11.56	4.53	1.60	-1.24
1945	12.44	5.06	-2.01	0.38	12.75	6.47	-2.47	3.12
1946	11.18	3.71	-0.99	-0.16	5.11	2.97	-2.83	0.33
1947	6.80	-1.88	2.55	0.62	8.06	-1.23	1.93	0.26
Sugar Percentage								
1939	17.86	1.00	-0.20	1.33	18.25	-0.05 / 0.05	0.18	-0.10
1940	19.25	-0.25	0.75	0.04	18.66	-1.52	-0.13	0.07
1941	19.52	-0.01	0.81	0.77	18.35	-0.71	-0.52	0.20
1942	17.92	-2.87	1.46	0.90	17.88	-0.59	-0.97	-0.04
1943	18.56	-1.16	0.45	-0.03	17.67	-1.27	-0.40	-0.44
1944	16.58	-1.79	2.63	1.32	17.76	-0.35	-0.09	0.26
1945	19.24	1.07	-0.27	0.42	17.98	-0.41	0.57	0.56
1946	18.10	-0.85	-0.16	0.36	19.50	0.11	0.82	0.80
1947	19.22	-0.65	-1.76	0.26	20.06	0.10	0.53	1.01
Total Sugar: cwt. per acre								
1939	35.7	9.6	-4.1	9.9	32.0	13.5	-5.9	1.4
1940	31.8	13.3	-8.9	-0.9	21.7	7.0	-1.6	3.0
1941	36.3	16.3	3.3	4.8	28.9	10.3	-5.2	3.3
1942	44.7	-4.4	2.6	3.5	24.2	-1.5	-20.0	5.2
1943	45.3	24.4	-4.0	-4.0	26.6	31.5	-4.1	-6.0
1944	21.4	-6.3	12.5	9.4	41.1	15.2	5.6	-3.9
1945	47.9	21.6	-8.5	2.6	45.9	22.0	-7.6	12.4
1946	40.4	11.4	-4.0	0.2	19.9	11.7	-10.3	2.2
1947	26.2	-8.4	7.4	2.8	32.3	-4.7	8.6	2.6
Tops: tons per acre								
1939	11.01	3.40	-1.00	-0.32	5.73	2.42	-0.52	-0.62
1940	4.81	2.25	-0.98	-0.25	2.93	0.98	-0.65	0.42
1941	8.92	8.18	-0.22	-0.86	6.03	4.47	-1.41	0.52
1942	12.73	9.99	-3.08	-1.28	2.78	-0.51	-1.66	0.49
1943	6.94	8.75	1.82	-0.93	3.62	3.71	1.84	-0.28
1944	9.31	3.95	0.35	1.84	5.95	1.37	3.61	-2.70
1945	10.46	7.20	1.22	1.06	4.82	3.49	-0.73	1.94
1946	9.98	8.97	2.33	0.10	3.27	2.80	-1.65	-0.46
1947	4.28	1.37	1.63	0.04	3.56	0.93	1.00	0.21

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Mean yields and increments in yield per cwt. of N, P_2O_5 and K_2O

	ROTHAMSTED				WOBURN			
	Mean Yield	N	P_2O_5	K_2O	Mean Yield	N	P_2O_5	K_2O
Barley Grain: cwt. per acre								
1939	38.3	18.5	7.1	-1.9	21.6	8.1	-6.7	7.1
1940	30.4	19.6	-3.9	-0.2	22.3	13.9	9.9	-0.3
1941	28.5	11.7	6.0	-1.6	16.4	5.4	2.1	-4.9
1942	31.0	21.3	-3.7	1.4	25.0	22.4	8.5	-1.0
1943	32.4	10.6	2.3	0.6	15.1	15.7	0.5	2.2
1944	30.8	13.7	3.8	-0.9	19.4	9.5	-5.4	7.1
1945	30.7	10.9	2.7	2.2	16.0	12.7	-3.5	-5.4
1946	33.0	7.1	-6.3	0.4	24.0	8.9	-1.1	-1.3
1947	27.5	14.7	-5.2	-3.8	18.4	26.7	5.1	-1.0
Barley Straw: cwt. per acre								
1939	41.8	17.1	9.5	0.6	32.7	20.1	-3.6	-8.4
1940	31.6	24.5	2.7	0.6	21.7	33.9	8.5	0.1
1941	30.4	16.0	10.9	-2.6	21.7	8.7	-2.8	-0.8
1942	31.8	26.9	-2.5	4.4	34.0	38.5	6.0	-3.6
1943	33.6	17.4	1.7	-1.0	30.7	31.7	-4.9	8.4
1944	29.7	20.2	8.0	-0.9	19.0	16.4	-6.1	4.8
1945	33.1	6.6	0.7	0.3	21.0	20.5	1.3	-4.1
1946	43.5	22.6	-7.3	0.5	24.6	15.4	-2.9	-4.4
1947	26.1	19.9	-4.3	-2.0	16.9	19.9	-2.7	-5.2
Clover Hay. Dry matter: cwt. per acre								
1939	22.3	9.4	4.7	2.9	25.1	-12.3	13.7	-1.7
1940	39.6	9.5	5.1	2.3	42.5	1.5	4.8	4.1
1941	19.8	6.4	-0.3	-0.4	21.0	-7.7	3.6	-4.5
1942	23.5	4.7	-4.3	-4.7	21.6	-7.4	11.5	3.7
1943	40.4	9.3	-14.5	6.6	15.6	20.7	-2.9	-4.4
1944	15.6	6.2	0.3	6.2	6.6	11.6	-3.9	1.8
1945	36.3	4.9	-1.4	-0.9	27.5	12.5	1.3	5.9
1946	31.9	21.3	13.8	-6.6	55.0	4.7	-8.7	-2.3
1947	32.0	1.8	-2.5	0.7	23.9	12.1	-2.9	1.7
Potatoes: Total tubers, tons per acre								
1939	8.10	1.31	2.60	2.35	6.86	6.39	0.57	-0.03
1940	6.72	1.38	3.01	2.12	7.07	5.20	2.68	1.00
1941	9.24	5.79	0.63	0.64	8.52	9.63	-4.29	-0.83
1942	9.47	1.95	-0.33	3.71	8.46	4.72	4.03	-0.25
1943	8.50	4.29	0.15	2.50	5.90	3.55	1.07	-1.15
1944	10.07	6.38	2.05	0.84	9.98	2.07	4.97	-2.10
1945	9.55	3.79	-0.95	3.59	10.61	5.46	-2.05	0.90
1946	10.75	7.97	-1.73	2.49	6.60	6.35	-1.79	-2.51
1947	5.69	1.52	1.61	1.29	6.51	1.42	-1.02	2.90

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Six Course Rotation Experiment

	ROTHAMSTED				WOBURN			
	Mean Yield	N	P_2O_5	K_2O	Mean Yield	N	P_2O_5	K_2O
Wheat. Grain: cwt. per acre								
1939	27.7	0.7	-5.8	0.2	23.3	-1.1	9.7	-3.1
1940	27.7	11.7	-1.5	-1.6	18.7	16.6	-7.1	0.2
1941	19.3	6.1	-10.2	-4.3	19.5	11.4	10.7	1.4
1942	37.2	10.5	2.8	-1.4	10.8	10.5	13.4	-3.6
1943	36.8	3.9	-0.5	3.8	(Crop eaten by rats in barn)			
1944	41.1	11.9	-1.5	-1.6	9.9	6.3	0.6	1.2
1945	25.8	12.3	2.1	1.2		(Crop failed)		
1946	29.2	13.8	12.7	-2.4	13.4	16.5	1.7	2.7
1947	25.1	10.1	-0.4	0.5	9.5	8.2	-7.3	5.3
Wheat Straw: cwt. per acre								
1939	48.0	22.7	-1.1	-0.3	35.5	8.7	20.2	-6.3
1940	34.1	23.9	-1.9	-1.6	32.3	28.5	-5.7	-2.2
1941	24.3	9.5	-11.3	-3.3	31.3	24.2	17.6	3.3
1942	44.8	14.8	3.5	-1.0	20.7	13.9	11.6	0.0
1943	49.0	5.1	-1.7	3.9	(Crop eaten by rats in barn)			
1944	52.8	15.4	-14.1	-1.5	29.7	10.5	-3.2	6.5
1945	36.8	22.9	0.7	1.8		(Crop failed)		
1946	47.3	19.3	18.7	-3.5	22.4	25.9	-2.1	6.6
1947	27.5	15.0	0.9	-1.6	15.4	14.8	-7.3	6.5
Rye Grain: cwt. per acre								
1939	22.1	19.9	1.2	0.0	15.7	11.2	0.5	0.7
1940	26.8	11.1	-0.3	0.1	20.3	13.6	1.7	-0.3
1941	16.7	10.5	0.3	-4.0	18.9	5.1	-3.7	1.0
1942	27.8	24.4	-0.3	-2.0	23.7	33.8	-4.5	-3.6
1943	32.2	27.5	-7.1	1.5	8.7	13.3	2.7	0.0
1944	31.0	15.9	-1.5	-2.6	17.1	17.6	3.1	0.4
1945	25.7	12.9	-0.9	2.3	14.2	11.5	-1.1	-1.7
1946	29.4	10.4	-3.1	0.4	14.8	9.1	-2.9	-3.5
1947	15.8	9.8	1.5	1.2	14.9	21.3	2.7	-2.0
Rye Straw: cwt. per acre								
1939	42.8	32.9	7.7	-2.1	33.3	28.6	-6.1	3.5
1940	36.7	19.5	-0.6	-1.3	37.7	30.3	-1.9	3.2
1941	25.3	17.1	2.2	-1.9	36.3	15.1	-0.5	5.0
1942	36.5	24.3	2.3	1.6	42.2	53.2	-6.3	-5.9
1943	47.0	32.7	-9.9	2.9	25.5	28.9	7.4	-6.8
1944	62.3	11.6	2.8	-3.0	37.8	31.3	2.3	0.7
1945	32.7	14.7	0.7	1.6	29.1	26.5	5.1	-0.2
1946	55.7	17.5	-5.9	-2.5	26.3	16.3	1.7	-3.3
1947	21.8	11.4	1.6	-2.4	18.3	26.9	-8.9	3.3

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LONG PERIOD CULTIVATION EXPERIMENT

Long Hoos V, 1934-39

This experiment was completed in 1939. The results were reported by E.W.Russell and B.A.Keen in "Studies in Soil Cultivation - X. The results of a six-year cultivation experiment". J.Agric.Sci., 31, (1941), 326.

The experiment was designed to compare the effects on crop yield and weed infestation of continued ploughing, rotary cultivation with the Simar implement and stirring the soil with a cultivator, and also to investigate the value of cyanamide as a weed-killer. The crops grown in rotation were wheat, mangolds, barley, there being four blocks of twelve plots each under each crop. The twelve treatments were made up of all combinations of:-

Ploughing (P), Simaring (S) or Cultivating (C)
Shallow cultivation (4 ins.) (Sh) or deep cultivation (8 ins.) (D)
Cyanamide (Cy) or Nitrochalk (N)

On two of the four blocks the treatments were continued on the same plots in successive years, while on the other two blocks cycles of cultivations and manuring were used.

Area of each plot, 0.015 acre.

A basal dressing of 0.75 cwt. P_2O_5 per acre (as superphosphate) and 1.0 cwt. K_2O per acre (as muriate of potash) was given to all plots growing mangolds.

Details of the experiment are as given in the 1934 Report, p. 175.

Crop Notes

	Wheat	Mangolds	Barley
Variety	Wilhelmina	Yellow Globe	Plumage Archer
Previous crop	Barley	Wheat	Mangolds
Date sown	24/10/38	April 25	March 20
Harvested	Aug. 18	Oct. 25	Aug. 29

Standard errors per plot:
Wheat Grain, 0.950 cwt. per acre or 3.6%, 11 d.f.
Mangolds Roots, 1.539 tons per acre or 6.6%, 11 d.f.
Barley Grain, 1.313 cwt. per acre or 6.9%, 11 d.f.

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1939

1938 / 1939	Continuous P P	Continuous S S	Continuous C C	Mean	Cycle A C P	Cycle A P S	Cycle A S C	Cycle B S P	Cycle B C S	Cycle B P C	Mean
Wheat Grain: cwt. per acre											
		±0.67		±0.39		±0.95			±0.95		±0.39
N D	31.3	25.0	24.3	26.9	22.5	27.3	21.4	29.3	26.6	22.8	25.0
Sh	28.6	26.5	22.8	26.0	27.6	26.6	24.7	27.5	25.0	22.3	25.6
Cy D	29.8	23.8	23.6	25.7	27.6	25.9	26.6	29.5	23.7	25.8	26.5
Sh	25.4	24.5	26.6	25.5	29.3	26.2	24.6	23.7	21.0	23.9	24.8
Wheat Straw: cwt. per acre											
N D	45.4	36.5	34.0	38.6	52.9	51.6	41.9	46.7	40.7	34.6	44.7
Sh	42.5	39.4	34.0	38.6	43.8	44.7	43.8	42.1	39.5	33.4	41.2
Cy D	46.3	36.6	35.0	39.3	41.5	45.4	40.7	44.8	34.3	38.0	40.8
Sh	43.7	35.6	40.7	40.0	45.0	39.3	42.7	34.3	31.3	38.8	38.6
Mangolds Roots: tons per acre											
		±1.09		±0.63		±1.54			±1.54		±0.63
N D	24.98	22.29	23.56	23.61	25.30	25.19	23.85	28.26	23.21	27.16	25.50
Sh	26.20	23.21	21.88	23.76	26.46	23.50	24.72	24.20	21.94	26.99	24.64
Cy D	24.46	23.30	23.07	23.61	28.03	23.74	23.91	29.48	25.30	22.63	25.52
Sh	24.93	21.13	19.01	21.69	24.72	26.99	24.96	22.87	21.12	24.61	24.21
Mangolds Tops: tons per acre											
N D	5.72	5.37	6.15	5.75	6.27	5.57	6.04	5.80	5.28	6.62	5.93
Sh	5.86	5.98	5.69	5.84	5.75	6.04	5.80	5.57	4.87	6.44	5.74
Cy D	6.09	5.92	5.69	5.90	5.75	5.80	5.80	7.08	5.69	5.11	5.87
Sh	6.56	5.51	5.40	5.82	5.46	6.04	5.98	5.80	4.99	5.57	5.64
Barley Grain: cwt. per acre											
		±0.93		±0.54		±1.31			±1.31		±0.54
N D	19.8	22.6	17.1	19.8	23.6	21.5	19.2	23.6	22.6	18.8	21.6
Sh	22.6	18.6	15.7	19.0	22.1	24.1	19.9	24.7	16.4	20.4	21.3
Cy D	23.6	20.6	16.4	20.2	23.1	21.7	20.5	25.2	20.1	21.7	22.0
Sh	21.5	16.2	14.1	17.3	22.5	19.2	16.8	19.3	18.0	20.8	19.4
Barley Straw: cwt. per acre											
N D	24.3	26.2	22.0	24.2	25.1	23.7	23.8	28.6	25.0	24.1	25.0
Sh	27.2	23.2	16.8	22.4	22.1	25.8	27.7	28.7	21.9	23.7	25.0
Cy D	25.7	24.6	21.6	24.0	27.4	24.1	25.3	28.1	22.8	25.3	25.5
Sh	25.2	20.0	17.5	20.9	25.1	22.6	21.5	24.8	18.6	22.8	22.6

Standard errors are based on 11 d.f.

N

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Long Period Cultivation Experiment

Mean of Nitrochalk and Cyanamide
1939

1938 / 1939	Continuous P P	Continuous S S	Continuous C C	Mean	Cycle A C P	Cycle A P S	Cycle A S C	Cycle B S P	Cycle B C S	Cycle B P C	Mean
Wheat Grain: cwt. per acre											
		±0.48		±0.27		±0.67			±0.67		±0.27
D	30.6	24.4	24.0	26.3	25.0	26.6	24.0	29.4	25.2	24.3	25.8
Sh	27.0	25.5	24.7	25.7	28.4	26.4	24.6	25.6	23.0	23.1	25.2
Mean	28.8	25.0	24.4	26.1	26.7	26.5	24.3	27.5	24.1	23.7	25.5
		±0.34				±0.48			±0.48		
Wheat Straw: cwt. per acre											
D	45.8	36.6	34.5	39.0	47.2	48.5	41.3	45.8	37.5	36.3	42.8
Sh	43.1	37.5	37.4	39.3	44.4	42.0	43.2	38.2	35.4	36.1	39.9
Mean	44.4	37.0	36.0	39.2	45.8	45.2	42.2	42.0	36.4	36.2	41.3
Mangolds: Roots: tons per acre											
		±0.77		±0.44		±1.09			±1.09		±0.44
D	24.72	22.80	23.32	23.61	26.66	24.46	23.88	28.87	24.26	24.90	25.50
Sh	25.56	22.17	20.44	22.72	25.59	25.24	24.84	23.54	21.53	25.80	24.42
Mean	25.14	22.48	21.88	23.17	26.12	24.85	24.36	26.20	22.90	25.35	24.96
		±0.54				±0.77			±0.77		
Mangolds Tops: tons per acre											
D	5.90	5.64	5.92	5.82	6.01	5.68	5.92	6.44	5.48	5.86	5.90
Sh	6.21	5.74	5.54	5.83	5.60	6.04	5.89	5.68	4.93	6.00	5.69
Mean	6.06	5.69	5.73	5.83	5.80	5.86	5.90	6.06	5.20	5.93	5.79
Barley Grain: cwt. per acre											
		±0.66		±0.38		±0.93			±0.93		±0.38
D	21.7	21.6	16.8	20.0	23.4	21.6	19.8	24.4	21.4	20.2	21.8
Sh	22.0	17.4	14.9	18.1	22.3	21.6	18.4	22.0	17.2	20.6	20.4
Mean	21.8	19.5	15.8	19.0	22.8	21.6	19.1	23.2	19.3	20.4	21.1
		±0.46				±0.66			±0.66		
Barley Straw: cwt. per acre											
D	25.0	25.4	21.8	24.1	26.2	23.9	24.6	28.4	23.9	24.7	25.3
Sh	26.2	21.6	17.2	21.7	23.6	24.2	24.6	26.8	20.2	23.2	23.8
Mean	25.6	23.5	19.5	22.9	24.9	24.0	24.6	27.6	22.0	24.0	24.5

Standard errors are based on 11 d.f.

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DEEP CULTIVATION ROTATION EXPERIMENT

Long Hoos I and II (begun in 1944)

(1) To compare deep ploughing (about 12 inches) with shallow ploughing (about 6 inches).

(2) A test of dung ploughed in at different depths.

(3) To compare ploughing in mineral fertilizers (superphosphate and muriate of potash) at different depths with applying them in the seed bed.

The crops of the six course rotation are sugar beet, barley, one year seeds, wheat, potatoes, oats. There are six series, one for each crop of the rotation. Each series has 16 main plots for the ploughing, dung, P and K treatments. The main plots are divided into two to test the depth of application of mineral fertilizers to sugar beet and potatoes. Each plot receives the same treatment throughout the experiment.

System of replication: 2 blocks of 8 plots each in each series, the four-factor interaction of main plot treatments being confounded with block differences.

Area of each whole plot: 0.0132 acre, before rejecting edge rows.

Treatments

Whole plots: All combinations of:-

(1) Shallow (6") v. Deep (12") ploughing. Ploughing treatments on stubbles in Autumn for sugar beet and potatoes, on seeds aftermath for wheat.

	Sugar Beet	Potatoes
(2) No dung v. dung ploughed in	10 tons	20 tons
(3) No phosphate v. superphosphate	0.6 cwt. P_2O_5	0.8 cwt. P_2O_5
(4) No potash v. muriate of potash	0.6 cwt. K_2O	1.0 cwt. K_2O

(all amounts per acre)

Half plots (Sugar beet and potatoes only):-

Minerals (PK combinations) ploughed in v. minerals in seed bed.

Basal manuring: Applied in the ridges for potatoes, as a top dressing to wheat and in the seed bed for other crops.

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Basal Manuring (continued)

	Sugar beet	Barley	Ley	Wheat	Potatoes	Spring Oats
Sulphate of Ammonia (cwt. N per acre)	0.8	0.3	-	0.5	0.6	0.2
Basic Slag (cwt. P_2O_5 per acre)	-	0.6	-	-	-	-

Non-experimental Cultivations: These are carried out over the whole of any series, with the proviso that they must not be deeper than 6 inches except that deep ploughed plots may be worked to a depth of below 6 inches for the root crops.

Cropping: Series	Preliminary years 1944	1945	Years of complete cropping 1946	1947
1	Potatoes	Spring oats	Sugar beet	Barley
2	Sugar beet	Barley	Ley	Wheat
3	(Barley)	(Ley)	Wheat	Potatoes
4	(Wheat)	(Barley)	Potatoes	Spring oats
5	(Wheat)	Potatoes	Spring oats	Sugar beet
6	(Wheat)	Sugar beet	Barley	Ley

(Non-experimental crops in brackets)

The Physics Department has made observations on crop development from 1944 onwards.

Crop Notes

	Sugar beet	Barley	Ley	Wheat	Potatoes	Spring oats
1944						
Sown	Apr.20				Apr.5	
Harvested	Oct.19				Sep.27	
1945						
Sown	Apr.13	Mar.26			Apr.4	Mar.22
Harvested	Oct.22	Aug.11			Sep.25	Aug.16
1946						
Sown	Apr.13	Mar.21	27.3.45	Oct.16	May 1	Mar 21
Harvested	Oct.24	Aug.13	Jun.24	Aug.12	Oct.1	Aug.6
1947						
Sown	Apr.25	Apr.12	16.4.46	Oct.18	May 2	Apr.11
Harvested	Nov.1	Aug.11	Jun.10	Aug.1	Sep.30	Aug.5
Variety	Klein E	Plumage Archer	Mixture given below	Yeoman	Majestic	Star

Seeds mixture (all amounts per acre): 18 lb. Perennial ryegrass, 6 lb. late flowering red clover, 2 lb. Alsike clover.

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Sugar Beet

Roots (washed): tons per acre

	Mean yield	Standard errors per whole plot	Standard errors per split plot
1944	10.83	0.890 or 8.2 %, 9 d.f.	1.70 or 15.3 %, 7 d.f.
1945	15.20	1.03 or 6.8 %, 6 d.f.	0.781 or 5.1 %, 7 d.f.
1946	16.21	1.19 or 7.4 %, 10 d.f.	1.61 or 9.7 %, 7 d.f.
1947	10.08	0.658 or 6.5 %, 4 d.f.	0.418 or 4.1 %, 7 d.f.

Responses to treatments

	Mean	Ploughing: Shallow	Ploughing: Deep	Dung: Abs.	Dung: Pres.	Phosphate: Abs.	Phosphate: Pres.	Potash: Abs.	Potash: Pres.
1944									
Ploughing	±0.44				±0.63				
deep-shallow	0.39	-	-	0.45	0.33	0.59	0.19	0.90	-0.12
Dung	1.00	1.06	0.94	-	-	0.68	1.32	1.48	0.52
Phosphate	0.51	0.71	0.31	0.19	0.83	-	-	0.47	0.55
Potash	0.98	1.49	0.47	1.46	0.50	0.94	1.02	-	-
1945									
Ploughing	±0.52				±0.73				
deep-shallow	0.53	-	-	0.80	0.26	1.04	0.02	0.65	0.41
Dung	1.00	1.27	0.73	-	-	1.23	0.77	1.50	0.50
Phosphate	0.61	1.12	0.10	0.84	0.38	-	-	0.34	0.88
Potash	0.21	0.33	0.09	0.71	-0.29	-0.06	0.48	-	-
1946									
Ploughing	±0.60				±0.85				
deep-shallow	0.64	-	-	0.72	0.56	0.13	1.15	0.73	0.55
Dung	0.91	0.99	0.83	-	-	2.06	-0.24	1.49	0.33
Phosphate	0.44	-0.07	0.95	1.59	-0.71	-	-	0.13	0.75
Potash	0.79	0.88	0.70	1.37	0.21	0.48	1.10	-	-
1947									
Ploughing	±0.33				±0.47				
deep-shallow	3.24	-	-	3.20	3.28	3.45	3.03	3.31	3.17
Dung	2.23	2.19	2.27	-	-	2.19	2.27	2.65	1.81
Phosphate	0.01	0.22	-0.20	-0.03	0.05	-	-	0.65	-0.63
Potash	0.20	0.27	0.13	0.62	-0.22	0.84	-0.44	-	-

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Deep Cultivation Rotation Experiment

Ploughing: The plough used for deep cultivations was a Ransome Solotrac giving a depth of 12 inches at least, except in 1944 when a Massey Harris Grub Breaker was used. This could not be made to cut a 12 inch deep furrow at all satisfactorily, the actual depth in that year being 9-12 inches. Until 1947 the whole of the seeds area was ploughed 6" deep after the hay was carted, the deep ploughing being carried out subsequently at the same time as the stubbles were deep ploughed for roots. In autumn 1946 the second ploughing of the seeds could not be carried out owing to wet conditions, so there was no test of deep ploughing on wheat in 1947. In summer 1947 the deep and shallow ploughing treatments were carried out directly on the hay stubble and this will be continued.

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Deep Cultivation Rotation Experiment

Sugar Beet

Roots (washed): tons per acre

Time of application of mineral fertilizers

		Superphosphate			Potash			
		None	Ploughed in	In seed bed	None	Ploughed in	In seed bed	Mean
Standard errors:		(a)	(b) & (c)		(a)	(b) & (c)		
1944								
	Shallow	10.28	10.73	11.25	9.89	11.37	11.41	10.64
	Deep	10.87	11.97	10.39	10.79	12.05	10.46	11.03
	No dung	10.23	10.20	10.61	9.60	11.22	10.88	10.32
	Dung	10.92	12.50	10.99	11.08	12.16	10.99	11.33
	Mean	10.58	11.35	10.81	10.34	11.70	10.94	10.83
1945								
	Shallow	14.37	15.54	15.43	14.76	15.28	14.91	14.93
	Deep	15.41	15.89	15.13	15.42	15.38	15.64	15.46
	No Dung	14.28	15.35	14.89	14.34	15.13	14.98	14.70
	Dung	15.50	16.09	15.68	15.84	15.53	15.57	15.69
	Mean	14.89	15.72	15.28	15.09	15.33	15.28	15.21
1946								
	Shallow	15.93	15.93	15.78	15.45	16.46	16.20	15.89
	Deep	16.05	17.03	16.97	16.18	16.51	17.23	16.53
	No dung	14.96	17.12	15.99	15.07	16.14	16.74	15.75
	Dung	17.02	15.85	16.77	16.56	16.83	16.69	16.66
	Mean	15.99	16.48	16.38	15.82	16.49	16.72	16.21
1947								
	Shallow	8.35	8.86	8.27	8.32	9.17	8.01	8.46
	Deep	11.79	11.50	11.70	11.63	12.04	11.48	11.69
	No dung	8.97	9.12	8.78	8.65	9.99	8.55	8.96
	Dung	11.16	11.24	11.19	11.30	11.23	10.93	11.19
	Mean	10.07	10.18	9.98	9.97	10.61	9.74	10.08

Standard errors:	(a)	(b)	(c)
1944	0.44	0.85	0.74
1945	0.52	0.39	0.58
1946	0.60	0.80	0.83
1947	0.33	0.21	0.36

Standard errors (b) are for use in horizontal comparisons only, (a) and (c) for all other comparisons.

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Sugar Beet
Sugar Percentage

	Mean	Standard errors per whole plot	Standard errors per split plot
1944	15.73	0.371, 9 d.f.	0.398, 7 d.f.
1945	19.09	0.728, 7 d.f.	1.12, 7 d.f.
1946	15.59	0.480, 10 d.f.	0.500, 7 d.f.

Responses to treatments

	Mean	Ploughing: Shallow	Ploughing: Deep	Dung: Abs.	Dung: Pres.	Phosphate: Aba.	Phosphate: Pres.	Potash: Abs.	Potash: Pres.
1944									
Ploughing	±0.19					±0.26			
deep shallow	0.05	-	-	-0.24	0.34	-0.11	0.21	0.11	-0.01
Dung	-0.25	-0.54	0.04	-	-	-0.22	-0.28	-0.23	-0.27
Phosphate	0.13	-0.03	0.29	0.16	0.10	-	-	0.28	-0.02
Potash	0.38	0.44	0.32	0.40	0.36	0.53	0.23	-	-
1945									
Ploughing	±0.36					±0.51			
deep-shallow	0.34	-	-	-0.17	0.85	0.18	0.50	0.40	0.28
Dung	-0.19	-0.70	0.32	-	-	-0.25	-0.13	0.02	-0.40
Phosphate	-0.31	-0.47	-0.15	-0.37	-0.25	-	-	-0.45	-0.17
Potash	0.39	0.45	0.33	0.60	0.18	0.25	0.53	-	-
1946									
Ploughing	±0.24					±0.34			
deep shallow	0.16	-	-	-0.11	0.43	0.16	0.16	-0.24	0.56
Dung	-0.28	-0.55	-0.01	-	-	0.08	-0.64	-0.06	-0.50
Phosphate	0.33	0.33	0.33	0.69	-0.03	-	-	0.20	0.46
Potash	0.26	-0.14	0.66	0.48	0.04	0.13	0.39	-	-
1947									
Ploughing									
deep shallow	-0.31	-	-	-0.24	-0.38	-0.53	-0.09	-0.15	-0.47
Dung	-0.01	0.06	-0.08	-	-	-0.10	0.08	-0.23	0.21
Phosphate	-0.01	-0.23	0.21	-0.10	0.08	-	-	-0.10	0.08
Potash	0.32	0.48	0.16	0.10	0.54	0.23	0.41	-	-

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Deep Cultivation Rotation Experiment

Sugar Beet

Sugar percentage

Time of application of mineral fertilizers

	Superphosphate			Potash			
	None	Ploughed in	In seed bed	None	Ploughed in	In seed bed	Mean
Standard errors:	(a)	(b) &	(c)	(a)	(b) &	(c)	
1944							
Shallow	15.72	15.70	15.67	15.48	15.93	15.92	15.70
Deep	15.61	15.88	15.92	15.60	15.78	16.04	15.76
No dung	15.77	15.92	15.94	15.65	16.07	16.03	15.85
Dung	15.55	15.67	15.64	15.42	15.64	15.93	15.60
Mean	15.66	15.79	15.79	15.54	15.86	15.98	15.73
1945							
Shallow	19.16	18.62	18.76	18.70	18.67	19.62	18.92
Deep	19.34	19.39	18.97	19.10	19.77	19.08	19.26
No dung	19.38	18.87	19.13	18.89	19.01	19.96	19.19
Dung	19.12	19.14	18.60	18.90	19.43	18.74	19.00
Mean	19.25	19.01	18.86	18.90	19.22	19.35	19.09
1946							
Shallow	15.34	15.50	15.84	15.58	15.52	15.35	15.51
Deep	15.51	16.06	15.60	15.34	15.99	16.00	15.67
No dung	15.38	16.04	16.10	15.49	16.05	15.88	15.73
Dung	15.47	15.52	15.34	15.43	15.46	15.47	15.45
Mean	15.42	15.78	15.72	15.46	15.76	15.68	15.59
1947							
Shallow	20.47	20.03	20.45	20.11	20.38	20.82	20.36
Deep	19.94	20.14	20.17	19.97	20.10	20.16	20.05
No dung	20.26	20.14	20.17	20.16	20.07	20.44	20.21
Dung	20.16	20.02	20.45	19.92	20.40	20.54	20.20
Mean	20.21	20.08	20.31	20.04	20.24	20.49	20.20

Standard errors:	(a)	(b)	(c)
1944	±0.19	±0.20	±0.23
1945	±0.36	±0.56	±0.54
1946	±0.24	±0.25	±0.30

Standard errors (b) are for use in horizontal comparisons only, (a) and (c) for all other comparisons.

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Sugar Beet

Total sugar: cwt. per acre

Standard errors

	Mean yield	per whole plot	per sub-plot
1944	34.1	3.32 or 9.8%, 9 d.f.	6.23 or 17.7%, 7 d.f.
1945	58.0	3.87 or 6.7%, 8 d.f.	4.37 or 7.5% 7 d.f.
1946	50.5	4.54 or 9.0%, 10 d.f.	5.54 or 10.8%, 7 d.f.
1947	40.7	2.37 or 5.8%, 4 d.f.	1.26 or 3.1%, 7 d.f.

Responses to treatments

	Mean	Ploughing: Shallow	Ploughing: Deep	Dung: Absent	Dung: Present	Phosphate: Absent	Phosphate: Present	Potash: Absent	Potash: Present
1944									
Ploughing	±1.66					±2.35			
deep-shallow	1.4	-	-	1.0	1.8	1.6	1.2	3.1	-0.3
Dung	2.6	2.2	3.0	-	-	1.7	3.5	4.2	1.0
Phosphate	2.0	2.2	1.8	1.1	2.9	-	-	2.2	1.8
Potash	3.9	5.6	2.2	5.5	2.3	4.1	3.7	-	-
1945									
Ploughing	±1.94					(±2.74)			
deep-shallow	3.2	-	-	2.7	3.7	4.7	1.7	3.7	2.7
Dung	3.4	2.9	3.9	-	-	4.2	2.6	5.7	1.1
Phosphate	1.5	3.0	0.0	2.3	0.7	-	-	-0.2	3.2
Potash	1.9	2.4	1.4	4.2	-0.4	0.2	3.6	-	-
1946									
Ploughing	±2.27					(±3.21)			
deep-shallow	2.5	-	-	2.0	3.0	0.9	4.1	1.4	3.6
Dung	1.8	1.3	2.3	-	-	6.4	-2.8	4.4	-0.8
Phosphate	2.5	0.9	4.1	7.1	-2.1	-	-	1.0	4.0
Potash	3.3	2.2	4.4	5.9	0.7	1.8	4.8	-	-
1947									
Ploughing	(±1.19)					(±1.68)			
deep-shallow	12.4	-	-	12.5	12.3	12.8	12.0	12.9	11.9
Dung	9.0	9.1	8.9	-	-	8.6	9.4	10.1	7.9
Phosphate	0.1	0.5	-0.3	-0.3	0.5	-	-	2.5	-2.3
Potash	1.4	1.9	0.9	2.5	0.3	3.8	-1.0	-	-

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Deep Cultivation Rotation Experiment

Sugar Beet

Total sugar: cwt. per acre

	Time of application of mineral fertilizers						
	Superphosphate			Potash			
	None	Ploughed in	In seed bed	None	Ploughed in	In seed bed	Mean
Standard error	(a)	(b) and (c)		(a)	(b) and (c)		Mean
1944							
Shallow	32.3	33.7	35.3	30.6	36.2	36.3	33.4
Deep	33.9	38.3	33.1	33.7	38.1	33.7	34.8
No dung	32.3	32.7	34.0	30.1	36.1	35.0	32.8
Dung	34.0	39.3	34.4	34.3	38.1	35.0	35.4
Mean	33.1	36.0	34.2	32.2	37.2	35.0	34.1
1945							
Shallow	54.8	57.9	57.9	55.2	57.1	58.1	56.4
Deep	59.6	61.7	57.4	58.9	60.9	59.6	59.6
No dung	55.1	57.9	57.0	54.2	57.5	59.3	56.3
Dung	59.3	61.7	58.3	59.9	60.5	58.3	59.6
Mean	57.2	59.8	57.6	57.0	59.0	58.8	58.0
1946							
Shallow	48.8	49.6	49.9	48.1	51.0	49.8	49.3
Deep	49.7	54.6	53.1	49.6	52.8	55.2	51.8
No dung	46.1	54.8	51.6	46.7	51.8	53.4	49.6
Dung	52.5	49.3	51.5	51.1	52.0	51.6	51.4
Mean	49.3	52.1	51.5	48.9	51.9	52.5	50.6
1947							
Shallow	34.2	35.5	33.9	34.5	37.4	33.4	34.4
Deep	47.0	46.3	47.2	46.4	48.4	46.3	46.9
No dung	36.3	36.7	35.3	34.9	40.0	34.8	36.2
Dung	44.9	45.0	45.7	45.0	45.8	44.8	45.1
Mean	40.6	40.9	40.5	39.9	42.9	39.8	40.7

Standard errors:	(a)	(b)	(c)
1944	1.66	3.12	2.76
1945	1.94	2.18	2.48
1946	2.27	2.77	3.00
1947	1.19	0.63	1.27

Standard errors (b) are for use in horizontal comparisons only, (a) and (c) for all other comparisons.

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https://doi.org/10.23637/ERADOC-1-145

Sugar Beet

Tops: tons per acre

	Mean Yield	Standard errors per whole plot	Standard errors per sub-plot
1944	16.85	1.32 or 7.9%, 9 d.f.	1.75 or 10.2%, 7 d.f.
1945	16.05	1.27 or 7.9%, 8 d.f.	1.32 or 8.2%, 7 d.f.
1946	18.89	1.08 or 5.7%, 7 d.f.	1.37 or 7.3%, 7 d.f.
1947	7.00	0.281 or 4.0%, 4 d.f.	0.612 or 8.6%, 7 d.f.

Responses to treatments

	Mean	Ploughing: Shallow	Ploughing: Deep	Dung: Abs.	Dung: Pres.	Phosphate: Abs.	Phosphate: Pres.	Potash: Abs.	Potash: Pres
Ploughing	±0.66				±0.93				
deep-shallow	-0.18	-	-	-0.70	0.34	-0.50	0.14	0.03	-0.39
Dung	1.82	1.30	2.34	-	-	1.43	2.21	3.01	0.63
Phosphate	-0.01	-0.33	0.31	-0.40	0.38	-	-	-0.25	0.23
Potash	1.92	2.13	1.71	3.11	0.73	1.68	2.16	-	-
1945									
Ploughing	±0.63				±0.90				
deep-shallow	1.66	-	-	1.20	2.12	1.02	2.30	2.28	1.04
Dung	1.05	0.59	1.51	-	-	1.36	0.74	1.16	0.94
Phosphate	0.44	-0.20	1.08	0.75	0.13	-	-	0.03	0.85
Potash	0.13	0.75	-0.49	0.24	0.02	-0.28	0.54	-	-
1946									
Ploughing	±0.54				±0.76				
deep-shallow	0.04	-	-	1.74	-1.66	0.44	-0.36	1.07	-0.99
Dung	1.60	3.30	-0.10	-	-	0.25	2.95	1.43	1.77
Phosphate	-0.40	0.00	-0.80	-1.75	0.95	-	-	-0.16	-0.64
Potash	0.07	1.10	-0.96	-0.10	0.24	0.31	-0.17	-	-
1947									
Ploughing	±0.14				±0.20				
deep-shallow	1.73	-	-	1.84	1.62	2.21	1.25	1.61	1.85
Dung	1.69	1.80	1.58	-	-	1.90	1.48	2.22	1.16
Phosphate	0.16	0.64	-0.32	0.37	-0.05	-	-	0.68	-0.36
Potash	0.19	0.07	0.31	0.72	-0.34	0.71	-0.33	-	-

https://doi.org/10.23637/ERADOC-1-145

Deep Cultivation Rotation Experiment — Bc/1.11

Sugar Beet

Tops: tons per acre

Time of application of mineral fertilizers

	Superphosphate None	Superphosphate Ploughed in	Superphosphate In seed bed	Potash None	Potash Ploughed in	Potash In seed bed	Mean
Standard errors:	(a)	(b) and (c)		(a)	(b) and (c)		
1944							
Shallow	17.11	16.00	17.56	15.88	17.28	18.74	16.94
Deep	16.61	16.77	17.07	15.91	17.44	17.80	16.76
No dung	16.14	14.94	16.55	14.39	16.68	18.32	15.94
Dung	17.57	17.82	18.08	17.40	18.04	18.22	17.76
Mean	16.86	16.38	17.32	15.90	17.36	18.27	16.85
1945							
Shallow	15.32	15.21	15.03	14.84	15.79	15.39	15.22
Deep	16.34	17.31	17.52	17.12	16.14	17.13	16.88
No dung	15.15	15.99	15.80	15.40	15.46	15.83	15.52
Dung	16.51	16.53	16.75	16.57	16.47	16.70	16.58
Mean	15.83	16.26	16.28	15.98	15.96	16.26	16.05
1946							
Shallow	18.87	18.34	19.38	18.32	19.37	19.45	18.87
Deep	19.30	19.30	17.71	19.38	19.09	17.76	18.90
No dung	18.96	17.61	16.80	18.14	18.73	17.33	18.08
Dung	19.21	20.02	20.30	19.57	19.74	19.87	19.69
Mean	19.09	18.82	18.55	18.85	19.23	18.60	18.88
1947							
Shallow	5.82	6.72	6.20	6.10	6.59	5.76	6.14
Deep	8.03	7.20	8.22	7.72	7.89	8.16	7.87
No dung	5.97	6.04	6.65	5.80	6.77	6.26	6.16
Dung	7.87	7.88	7.77	8.02	7.70	7.66	7.85
Mean	6.92	6.96	7.21	6.91	7.24	6.96	7.00

Standard errors:	(a)	(b)	(c)
1944	0.66	0.88	0.90
1945	0.63	0.66	0.79
1946	0.54	0.68	0.73
1947	0.14	0.31	0.26

Standard errors (b) are for use in horizontal comparisons only, (a) and (c) for all other comparisons.

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Sugar Beet

Plant number: thousands per acre

	Mean yield	Standard errors per whole plot	Standard errors per split plot
1944	26.4	1.59 or 6.0%, 9 d.f.	0.990 or 3.7%, 7 d.f.
1945	26.4	1.55 or 5.9%, 9 d.f.	1.25 or 4.7%, 7 d.f.
1946	24.4	0.912 or 3.7%, 7 d.f.	0.760 or 3.1%, 7 d.f.
1947	23.1		

	Mean	Responses to treatments: Ploughing Shallow	Ploughing Deep	Dung Abs.	Dung Pres.	Phosphate Abs.	Phosphate Pres.	Potash Abs.	Potash Pres.
1944									
Ploughing	±0.80					±1.12			
deep-shallow	1.2	-	-	0.7	1.7	1.0	1.4	2.7	-0.3
Dung	-0.8	-1.3	-0.3	-	-	-1.4	-0.2	-0.9	-0.7
Phosphate	-0.2	-0.4	0.0	-0.8	0.4	-	-	0.2	-0.6
Potash	0.5	2.0	-1.0	0.4	0.6	0.9	0.1	-	-
1945									
Ploughing	±0.78					±1.10			
deep-shallow	0.3	-	-	1.0	-0.4	-0.1	0.7	0.4	0.2
Dung	-0.2	0.5	-0.9	+0.9	-	-0.1	-0.3	-0.4	0.0
Phosphate	1.2	0.8	1.6	1.3	1.1	-	-	0.6	1.8
Potash	-0.4	-0.3	-0.5	-0.6	-0.2	-1.0	0.2	-	-
1946									
Ploughing	±0.46					±0.65			
deep-shallow	-0.2	-	-	0.3	-0.7	-0.4	0.0	-0.6	0.2
Dung	0.2	0.7	-0.3	-	-	1.2	-0.8	-0.7	1.1
Phosphate	-0.1	-0.3	0.1	0.9	-1.1	-	-	-0.2	0.0
Potash	1.0	0.6	1.4	0.1	1.9	0.9	1.1	-	-
1947									
Ploughing deep-shallow	0.2	-	-	-0.6	1.0	0.5	-0.1	-1.0	1.4
Dung	1.2	0.4	2.0	-	-	0.9	1.5	1.1	1.3
Phosphate	0.5	0.8	0.2	0.2	0.8	-	-	0.7	0.3
Potash	1.7	0.5	2.9	1.6	1.8	1.9	1.5	-	-

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Deep Cultivation Rotation Experiment

Sugar Beet

Plant number: thousands per acre
Time of application of mineral fertilizers

	Superphosphate			Potash			
	None	Ploughed in	In seed bed	None	Ploughed in	In seed bed	Mean
Standard errors:	(a)	(b) & (c)		(a)	(b) & (c)		
1944							
Shallow	26.0	25.5	25.6	24.8	26.6	27.0	25.8
Deep	27.0	26.9	27.0	27.4	27.2	25.8	27.0
No dung	27.2	26.3	26.5	26.6	27.1	26.9	26.8
Dung	25.8	26.1	26.2	25.6	26.7	25.9	26.0
Mean	26.5	26.2	26.3	26.1	26.9	26.4	26.4
1945							
Shallow	25.98	26.47	27.08	26.43	25.93	26.45	26.38
Deep	25.74	27.59	27.34	26.81	25.74	26.94	26.67
No dung	25.90	26.90	27.51	26.95	26.20	26.31	26.65
Dung	25.73	27.06	26.81	26.49	25.56	27.08	26.30
Mean	25.81	26.93	27.26	26.62	25.83	26.64	26.42
1946							
Shallow	24.6	24.6	24.0	24.1	25.1	24.5	24.4
Deep	24.2	24.5	24.2	23.5	24.8	25.2	24.3
No dung	23.8	25.2	24.3	24.2	24.7	23.9	24.3
Dung	25.0	24.0	23.9	23.5	25.1	25.8	24.5
Mean	24.4	24.6	24.1	23.8	24.9	24.8	24.4
1947							
Shallow	22.6	23.3	23.5	22.8	23.7	22.7	23.0
Deep	23.1	21.8	24.9	21.8	25.1	24.3	23.2
No dung	22.4	21.5	23.7	21.8	23.7	22.8	22.5
Dung	23.3	23.5	24.7	22.8	25.1	24.1	23.7
Mean	22.9	22.5	24.2	22.3	24.4	23.5	23.1

Standard errors:	(a)	(b)	(c)
1944	0.80	0.50	0.87
1945	0.78	0.62	0.90
1946	0.46	0.38	0.53

Standard errors (b) are for use in horizontal comparisons only, (a) and (c) for all other comparisons.

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Barley - Residual Effects

Grain: cwt. per acre

	Mean yield	Standard error per plot
1945	29.2	1.43 or 4.9%, 7 d.f.
1946	36.4	1.79 or 4.9%, 7 d.f.
1947	31.2	0.903 or 2.9%, 4 d.f.

Responses to treatments

	Mean	Ploughing Shallow	Ploughing Deep	Dung Abs.	Dung Pres.	Phosphate Abs.	Phosphate Pres.	Potash Abs.	Potash Pres.
		Grain: cwt. per acre							
1945									
Ploughing	±0.71				±1.01				
deep-shallow	-0.6	-	-	-0.9	-0.3	0.1	-1.3	-1.5	0.3
Dung	1.3	1.0	1.6	-	-	0.3	2.3	2.4	0.2
Phosphate	0.8	1.5	0.1	-0.2	1.8	-	-	0.3	1.3
Potash	0.7	-0.2	1.6	1.8	-0.4	0.2	1.2	-	-
1946									
Ploughing	±0.90				±1.27				
deep-shallow	0.4	-	-	0.6	0.2	1.2	-0.4	1.0	-0.2
Dung	1.3	1.5	1.1	-	-	1.0	1.6	2.4	0.2
Phosphate	0.7	1.5	-0.1	0.4	1.0	-	-	0.6	0.8
Potash	0.0	0.6	-0.6	1.1	-1.1	-0.1	0 1	-	-
1947									
Ploughing	±0.45				±0.64				
deep-shallow	2.4	-	-	2.4	2.4	2.3	2.5	2.4	2.4
Dung	0.9	0.9	0.9	-	-	0.3	1.5	0.7	1.1
Phosphate	0.0	-0.1	0.1	-0.6	0.6	-	-	0.4	-0.4
Potash	0.4	0.4	0.4	0.2	0.6	0.8	0.0	-	-

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Deep Cultivation Rotation Experiment

Barley - Residual Effects

Straw: cwt. per acre

	Mean Yield	Standard error per plot
1945	32.7	2.36 or 7.2%, 7 d.f.
1946	43.4	2.33 or 5.4%, 7 d.f.
1947	31.2	

		Ploughing		Dung		Phosphate		Potash	
	Mean	Shallow	Deep	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.
		Straw: cwt. per acre							
Ploughing	±1.18				±1.67				
deep-shallow	-0.7	-	-	-1.2	-0.2	0.4.	-1.8.	-3.1	.1.7
Dung	3.3	2.8	3.8	-	-	2.8	3.8	4.3	2.3
Phosphate	-0.1	1.0	-1.2	-0.6	0.4	-	-	-0.6	0.4
Potash	1.7	-0.7	4.1	2.7	0.7	1.2	2.2	-	-
1946									
Ploughing	±1.16				±1.64				
deep-shallow	0.8	-	-	3.2	-1.6	2.5	-0.9	2.6	-1.0
Dung	5.1	7.5	2.7	-	-	6.1	4.1	10.4	-0.2
Phosphate	0.9	2.6	-0.8	1.9	-0.1	-	-	0.4	1.4
Potash	1.1	2.9	-0.7	6.4	-4.2	0.6	1.6	-	-
1947									
Ploughing deep-shallow	2.4	-	-	2.3	2.5	1.8	3.0	3.4	1.4
Dung	1.7	1.6	1.8	-	-	0.8	2.6	1.2	2.2
Phosphate	-0.8	-1.4	-0.2	-1.7	0.1	-	-	-0.4	-1.2
Potash	0.8	1.8	-0.2	0.3	1.3	1.2	0.4	-	-

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https://doi.org/10.23637/ERADOC-1-145

Wheat

Straw: cwt. per acre

Hay: cwt. per acre - Residual effects

	1946	1947
Mean yield	82.2	54.2
Standard error per plot	3.54 or 4.3% (6 d.f.)	2.82 or 5.2% (4d.f.)

Responses to treatments

	Mean	Ploughing Shallow	Ploughing Deep	Dung Abs.	Dung Pres.	Phosphate Abs.	Phosphate Pres.	Potash Abs.	Potash Pres.
1946									
Ploughing	±1.77	-		2.9	1.1	±2.519	-3.7	-1.9	0.1
deep-shallow	-0.9	-	-	-2.9	1.1	1.9	-3.7	-1.9	0.1
Dung	3.8	1.8	5.8	-	-	3.4	4.2	3.1	4.5
Phosphate	1.3	4.1	-1.5	0.9	1.7	-	-	-1.5	4.1
Potash	1.5	0.5	2.5	0.8	2.2	-1.3	4.3	-	-
1947									
Ploughing	±1.41					±1.99			
deep-shallow	0.5	-	-	-1.7	2.7	-1.4	2.4	2.0	-1.0
Dung	-1.0	-3.2	1.2	-	-	-1.3	-0.7	-1.1	-0.9
Phosphate	0.7	-1.2	2.6	0.4	1.0	-	-	1.2	0.2
Potash	1.7	3.2	0.2	1.6	1.8	2.2	1.2	-	-

https://doi.org/10.23637/ERADOC-1-145

Potatoes

Ware tubers: tons per acre

	Mean yield	Standard errors per whole plot	Standard errors per split plot
1944	10.82	0.863 or 8.0%, 9 d.f.	1.10 or 9.9%, 7 d.f.
1945	11.01	0.917 or 8.3%, 7 d.f.	0.531 or 4.8%, 7 d.f.
1946	11.30	0.640 or 5.7%, 6 d.f.	1.08 or 9.4%, 7 d.f.
1947	5.66	0.538 or 9.5%, 4 d.f.	0.397 or 6.8%, 7 d.f.

Responses to treatments

	Mean	Ploughing		Dung		Phosphate		Potash	
		Shallow	Deep	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.
1944									
Ploughing	±0.43					±0.61			
deep-shallow	0.17	-	-	-0.01	0.35	-0.69	1.03	0.26	0.08
Dung	1.27	1.09	1.45	-	-	1.29	1.25	1.29	1.25
Phosphate	0.38	-0.48	1.24	0.40	0.36	-	-	0.33	0.43
Potash	1.16	1.25	1.07	1.18	1.14	1.11	1.21	-	-
1945									
Ploughing	±0.46					±0.65			
deep-shallow	1.44	-	-	1.72	1.16	2.30	0.58	1.70	1.18
Dung	3.29	3.57	3.01	-	-	3.18	3.40	3.99	2.59
Phosphate	0.49	1.35	-0.37	0.38	0.60	-	-	-0.10	1.08
Potash	1.09	1.35	0.83	1.79	0.39	0.50	1.68	-	-
1946									
Ploughing	±0.32					±0.45			
deep-shallow	0.86	-	-	0.41	1.31	1.17	0.55	0.27	1.45
Dung	1.46	1.01	1.91	-	-	1.64	1.28	1.12	1.80
Phosphate	0.32	0.63	0.01	0.50	0.14	-	-	-0.23	0.87
Potash	0.69	0.10	1.28	0.35	1.03	0.14	1.24	-	-
1947									
Ploughing	±0.27					±0.38			
deep-shallow	0.04	-	-	0.01	0.07	0.34	-0.26	-0.46	0.54
Dung	1.64	1.61	1.67	-	-	1.61	1.67	2.41	0.87
Phosphate	0.16	0.46	-0.14	0.13	0.19	-	-	0.11	0.21
Potash	1.05	0.55	1.55	1.82	0.28	1.00	1.10	-	-

https://doi.org/10.23637/ERADOC-1-145

Deep Cultivation Rotation Experiment

Wheat

	Mean yield	Standard error per plot
	Grain: cwt. per acre	
1946	29.0	3.56 or 12.3%, 13 d.f.
1947	26.8	2.25 or 8.4%, 4 d.f.
	Straw: cwt. per acre	
1946	48.0	7.43 or 15.5%, 13 d.f.
1947	32.3	

Responses to treatments

1946		Grain	Straw
Response to deep ploughing (deep-shallow)		2.2(±1.78)	1.1(±3.71)

1947 Residual Effects	Mean	Dung Abs.	Dung Pres.	Phosphate Abs.	Phosphate Pres.	Potash Abs.	Potash Pres.
	Grain: cwt. per acre						
	±1.12			±1.59			
Dung	1.5	-	-	2.1	0.9	1.7	1.3
Phosphate	-0.9	-0.3	-1.5	-	-	-2.9	1.1
Potash	-0.1	0.1	-0.3	-2.1	1.9	-	-
	Straw: cwt. per acre						
Dung	3.2	-	-	3.7	2.7	3.6	2.8
Phosphate	-0.9	-0.4	-1.4	-	-	-3.9	2.1
Potash	-0.5	-0.1	-0.9	-3.5	2.5	-	-

There was no test of deep ploughing in this year.

https://doi.org/10.23637/ERADOC-1-145

Potatoes

Percentage Ware

	Mean	Standard errors per whole plot	Standard errors per split plot
1944	78.1	1.07, 9 d.f.	1.43, 7 d.f.
1945	96.3	0.404, 5 d.f.	0.310, 7 d.f.
1946	95.3	1.17, 7 d.f.	1.87, 7 d.f.

Responses to treatments

	Mean	Ploughing Shallow	Ploughing Deep	Dung Abs.	Dung Pres.	Phosphate Abs.	Phosphate Pres.	Potash Abs.	Potash Pres.
1944									
Ploughing deep-shallow	0.6	-	-	0.7	0.5	-0.9	2.1	1.6	-0.4
Dung	2.6	2.7	2.5	-	-	1.4	3.8	3.0	2.2
Phosphate	-3.0	-4.5	-1.5	-4.2	-1.8	-	-	-6.1	0.1
Potash	-2.4	-1.4	-3.4	-2.0	-2.8	-5.5	0.7	-	-
1945									
Ploughing	±0.20				±0.29				
deep-shallow	1.0	-	-	1.2	0.8	0.9	1.1	1.0	1.0
Dung	0.5	0.7	0.3	-	-	0.6	0.4	0.7	0.3
Phosphate	-0.5	-0.6	-0.4	-0.4	-0.6	-	-	-0.4	-0.6
Potash	0.6	0.6	0.6	0.8	0.4	0.7	0.5	-	-
1946									
Ploughing	±0.58				±0.83				
deep-shallow	0.5	-	-	0.5	0.5	0.8	0.2	1.0	0.0
Dung	-0.4	-0.4	-0.4	-	-	0.3	-1.1	-0.2	-0.6
Phosphate	-1.6	-1.3	-1.9	-0.9	-2.3	-	-	-1.7	-1.5
Potash	0.7	1.2	0.2	0.9	0.5	0.6	0.8	-	-
1947									
Ploughing deep-shallow	-0.3	-	-	-0.8	0.2	-0.4	-0.2	-0.7	0.1
Dung	2.2	1.7	2.7	-	-	2.1	2.3	3.6	0.8
Phosphate	-0.8	-0.9	-0.7	-0.9	-0.7	-	-	-1.0	-0.6
Potash	+2.2	+1.8	+2.6	+3.6	+0.8	2.0	2.4	—	—

https://doi.org/10.23637/ERADOC-1-145

Deep Cultivation Rotation Experiment

Potatoes

Ware tubers: tons per acre

Time of application of mineral fertilizers

	Superphosphate None (a)	Superphosphate Ploughed in (b) & (c)	Superphosphate In seed bed (b) & (c)	Potash None (a)	Potash Ploughed in (b) & (c)	Potash In seed bed (b) & (c)	Mean
Standard errors							
1944							
Shallow	10.98	11.01	9.97	10.11	11.33	11.38	10.73
Deep	10.29	10.89	12.16	10.37	10.98	11.90	10.91
No dung	9.99	10.24	10.52	9.59	10.56	11.00	10.18
Dung	11.28	11.66	11.61	10.89	11.76	12.29	11.46
Mean	10.64	10.95	11.06	10.24	11.16	11.64	10.82
1945							
Shallow	9.62	10.76	11.17	9.61	10.86	11.07	10.29
Deep	11.92	11.16	11.93	11.32	11.47	12.82	11.73
No dung	9.18	9.22	9.88	8.47	9.94	10.58	9.37
Dung	12.36	12.69	13.22	12.46	12.39	13.32	12.66
Mean	10.77	10.96	11.55	10.47	11.16	11.95	11.01
1946							
Shallow	10.56	10.87	11.51	10.83	10.10	11.75	10.88
Deep	11.73	11.21	12.27	11.10	12.22	12.53	11.73
No dung	10.33	10.06	11.59	10.40	10.04	11.46	10.57
Dung	11.96	12.03	12.18	11.52	12.28	12.81	12.03
Mean	11.14	11.04	11.89	10.96	11.16	12.14	11.30
1947							
Shallow	5.40	5.47	6.26	5.36	5.36	6.46	5.63
Deep	5.75	5.20	6.01	4.90	5.71	7.19	5.68
No dung	4.77	4.57	5.23	3.93	5.04	6.45	4.84
Dung	6.38	6.11	7.04	6.34	6.03	7.20	6.48
Mean	5.58	5.34	6.13	5.13	5.54	6.82	5.66

Standard errors:	(a)	(b)	(c)
1944	0.43	0.55	0.58
1945	0.46	0.27	0.50
1946	0.32	0.54	0.50
1947	0.27	0.20	0.30

Standard errors (b) are for use in horizontal comparisons only, (a) and (c) for all other comparisons.

N

https://doi.org/10.23637/ERADOC-1-145

Bc/1.21

Deep Cultivation Rotation Experiment

Potatoes
Percentage ware

Time of application of mineral fertilizers

	Superphosphate			Potash			
	None	Ploughed in	In seed bed	None	Ploughed in	In seed bed	Mean
Standard errors:	(a)	(b) & (c)		(a)	(b) & (c)		
1944							
Shallow	80.0	76.3	74.8	78.5	76.9	77.8	77.8
Deep	79.2	77.4	78.1	80.2	76.2	77.4	78.5
No dung	77.8	76.4	75.7	77.8	75.7	76.1	76.8
Dung	81.5	77.3	77.2	80.8	77.4	78.6	79.4
Mean	79.6	76.8	76.4	79.3	76.6	77.4	78.2
1945							
Shallow	96.0	95.3	95.6	95.4	95.6	96.4	95.7
Deep	97.0	96.8	96.4	96.5	96.8	97.3	96.8
No dung	96.2	95.8	95.9	95.6	96.0	96.9	96.1
Dung	96.8	96.2	96.2	96.3	96.5	96.8	96.5
Mean	96.5	96.0	96.0	96.0	96.2	96.8	96.3
1946							
Shallow	95.7	94.5	94.3	94.5	95.9	95.3	95.0
Deep	96.5	95.6	93.6	95.5	95.9	95.4	95.6
No dung	95.9	96.0	94.2	95.0	95.9	96.0	95.5
Dung	96.2	94.1	93.8	94.9	96.0	94.6	95.1
Mean	96.0	95.0	94.0	95.0	96.0	95.3	95.3
1947							
Shallow	93.8	93.2	92.5	92.4	93.9	94.6	93.3
Deep	93.4	92.6	92.7	91.7	94.0	94.6	93.0
No dung	92.5	91.8	91.4	90.2	93.3	94.4	92.1
Dung	94.6	94.0	93.8	93.9	94.6	94.8	94.3
Mean	93.6	92.9	92.6	92.1	93.9	94.6	93.2

Standard errors:	(a)	(b)	(c)
1944	0.54	0.72	0.74
1945	0.20	0.16	0.23
1946	0.58	0.94	0.88

Standard errors (b) are for use in horizontal comparisons only, (a) and (c) for all other comparisons.

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Spring Oats - Residual Effects

1945	16.8	1.12 or 6.6%, 6 d.f.	28.0 1.21 or 4.3%, 7 d.f.
1946	41.9	1.86 or 4.4%, 5 d.f.	57.3 2.72 or 4.8%, 5 d.f.
1947	28.9	1.97 or 6.8%, 4 d.f.	35.3

Responses to treatments

	Mean	Ploughing Shallow	Ploughing Deep	Dung Abs.	Dung Prcs.	Phosphate Abs.	Phosphate Prcs.	Potash Abs.	Potash Prcs.
Grain: cwt. per acre									
1945									
Ploughing	±0.56					±0.79			
deep-shallow	-0.9	-	-	-0.3	-1.5	-1.8	0.0	-0.9	-0.9
Dung	1.6	2.2	1.0	-	-	1.4	1.8	0.8	2.4
Phosphate	±0.6	-0.3	1.5	0.4	0.8	-	-	1.2	0.0
Potash	0.3	0.3	0.3	-0.5	1.1	0.9	-0.3	-	-
1946									
Ploughing	±0.93					±1.32			
deep-shallow	0.6	-	-	2.0	-0.8	1.1	0.1	-0.9	2.1
Dung	2.5	3.9	1.1	-	-	3.4	1.6	4.4	0.6
Phosphate	1.8	2.3	1.3	2.7	0.9	-	-	2.6	1.0
Potash	-0.3	-1.8	1.2	1.6	-2.2	0.5	-1.1	-	-
1947									
Ploughing	±0.98					±1.39			
deep-shallow	-1.5	-	-	-0.6	-2.4	-1.8	-1.2	-0.8	-2.2
Dung	80.8	1.7	-0.1	-	-	2.5	-0.9	2.2	-0.6
Phosphate	1.0	0.7	1.3	2.7	-0.7	-	-	0.8	1.2
Potash	-0.6	0.1	-1.3	0.8	-2.0	-0.8	-0.4	-	-
Straw: cwt. per acre									
1945									
Ploughing	±0.60					±0.86			
deep-shallow	-0.1	-	-	0.8	-1.0	0.4	-0.6	-0.2	0.0
Dung	1.5	2.4	0.6	-	-	0.3	2.7	1.4	1.6
Phosphate	-1.6	-1.1	-2.1	-2.8	-0.4	-	-	-0.1	-3.1
Potash	1.2	1.1	1.3	1.1	1.3	2.7	-0.3	-	-
1946									
Ploughing	±1.36					±1.92			
deep-shallow	0.2	-	-	0.3	0.1	-1.5	1.9	0.8	-0.4
Dung	6.5	6.6	6.4	-	-	9.0	4.0	7.9	5.1
Phosphate	2.6	0.9	4.3	5.1	0.1	-	-	2.0	3.2
Potash	-0.3	0.3	-0.9	1.1	-1.7	-0.9	0.3	-	-
1947									
Ploughing									
deep-shallow	-2.4	-	-	-1.7	-3.1	-2.3	-2.5	-2.8	-2.0
Dung	1.4	2.1	0.7	-	-	2.1	0.7	2.8	0.0
Phosphate	-0.6	-0.5	-0.7	0.1	-1.3	-	-	-0.7	-0.5
Potash	0.5	0.1	0.9	1.9	-0.9	0.4	0.6	-	-

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GRAZING EXPERIMENT

Highfield (begun in 1937)

The residual manurial value of feeding stuffs consumed on grassland

The experiment consisted of 3 blocks each of 3 plots. Each year one block began a new three-year cycle. In the first year of each cycle all three plots of the block were grazed with cattle only, additional feeding stuffs being fed on one plot. In the following winter or early spring another plot of each block received fertilizers estimated to be equivalent to the residual manurial value of the feeding stuffs consumed on the first plot in the previous year. The third plot of each block received neither feeding stuff nor fertilizer. In the second and third years of the cycle each of the plots was grazed by cattle and sheep which were weighed regularly.

Area of each plot, 5 acres.

Details of the design of the experiment are as given in the 1937 Station Report, pp. 24-27.

In order to obtain a single measure of the yield of a plot, the amount of starch equivalent produced on each plot in each year has been calculated. In this way it is possible to include in a single figure the energy value of the food required to produce the observed live-weight increases, together with the energy value required to maintain the animals. The calculations are based upon the tables of average composition given by Woodman, H.E., in "Rations for Livestock", Min. of Agric. and Fish. Bull. No. 48. H.M.S.O., 1948.

A full report of the experiment is given by Boyd, D.A., Crowther, E.M., Moffatt, J.R. and Yates, F. in a paper entitled "A grazing experiment on residual manurial value of feeding stuffs consumed on grass". J.R.A.S.E., 110, (1949), 104-114.

Herbage analyses were made by the Botany Department.

Amounts of Feeding Stuffs and Fertilizers applied

		Feeding Stuffs cwt. per acre					Fertilizers cwt. per acre		
Year	Plot	1st Period	2nd Period	Total	Year	Plot	N	P_2O_5	K_2O
1938	4	3.00	5.98	8.98					
1938	2	3.38	6.74	10.12	1939	6	0.17	0.06	0.07
1939	7	3.06	3.78*	8.24	1939	3	0.19	0.07	0.07
1940	4	3.24	4.80	8.04	1940	8	0.17	0.05	0.05
1941	2	4.00	8.91	12.91	1941	6	0.16	0.05	0.06
1942	7	2.89	5.11	8.00	1942	3	0.25	0.09	0.09
1943	4	3.80	4.31	8.11	1943	8	0.16	0.06	0.05
1944	2	3.35	7.40	10.75	1944	6	0.17	0.07	0.07
1945	7	4.52	4.52	9.03	1945	3	0.25	0.09	0.10
1946	4	3.65	5.54	9.19	1946	8	0.18	0.07	0.06
					1947	6	0.19	0.08	0.07

*Plus 1.41 second-period ration fed during first period.
Feeding stuffs; equal parts of flaked maize and undecorticated cotton cake (1st period) or decorticated groundnut cake (2nd period).

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Starch Equivalent: lb. per acre

	Plot	1	2	3	5	4	6	9	7	8
		No Manure	Cake 1938,41, 44	Equivalent Manures	No Manure	Cake 1938,40, 43,46	Equivalent Manures	No Manure	Cake 1939,42, 45	Equivalent Manures
1937	Cattle	779	763	710	544	576	594	672	629	616
	Sheep	116	142	117	134	112	101	86	119	79
1938	Cattle							639	648	613
	Sheep							653	670	664
1939	Cattle	864	1033	985	917	1022	1059			
	Sheep	746	724	807	746	774	848			
1940	Cattle	680	847	719				769	993	963
	Sheep	601	560	631				646	650	625
1941	Cattle				747	1108	792	1027	976	950
	Sheep				598	713	629	702	655	652
1942	Cattle	780	849	768	775	813	783			
	Sheep	716	852	811	822	656	838			
1943	Cattle	870	872	1086				882	1195	1163
	Sheep	689	728	936				908	999	863
1944	Cattle				1182	1017	1408	1074	1399	945
	Sheep				716	551	674	622	680	591
1945	Cattle	811	1231	1037	1079	1006	1174			
	Sheep	445	680	743	696	624	731			
1946	Cattle	1296	1627	1312				1254	1799	1489
	Sheep	646	631	568				712	689	690
1947	Cattle				1549	1042	1625	1397	1694	1290
	Sheep				464	543	582	383	420	556

Bd/1.2

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Highfield Grazing Experiment

Bd/1.3

Live weight increase: lb. per acre

Plot		1 No Manure	2 Cake 1938,41, 44	3 Equivalent Manures	5 No Manure	4 Cake 1938,40, 43,46	6 Equivalent Manures	9 No Manure	7 Cake 1939,42, 45	8 Equivalent Manures
1937	Cattle	181	176	151	105	118	126	140	118	114
	Sheep	3	13	6	14	6	4	0	9	-1
1938	Cattle							126	130	114
	Sheep							105	115	111
1939	Cattle	193	274	231	205	237	242			
	Sheep	114	100	123	115	107	130	148	235	229
1940	Cattle	135	178	133				84	111	96
	Sheep	91	74	95				217	192	180
1941	Cattle				128	214	147	91	74	72
	Sheep				89	79	101			
1942	Cattle	154	177	133	160	193	144			
	Sheep	104	145	127	135	96	124			
1943	Cattle	222	221	263				237	312	300
	Sheep	69	84	108				108	113	79
1944	Cattle				332	296	404	315	398	236
	Sheep				54	30	19	52	31	29
1945	Cattle	175	276	237	209	210	219			
	Sheep	38	54	68	74	53	67			
1946	Cattle	276	339	264				278	388	328
	Sheep	62	59	48				66	63	56
1947	Cattle				343	215	373	319	378	290
	Sheep				46	81	73	38	48	90

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Bd/1.4

Grazing days per acre

	Plot	1 No Manure	2 Cake 1938,41, 44	3 Equivalent Manures	5 No Manure	4 Cake 1938,40, 43,46	6 Equivalent Manures	9 No Manure	7 Cake 1939,42 45	8 Equivalent Manures
1937	Cattle	74	74	74	62	63	63	66	66	66
	Sheep	74	74	74	65	65	65	62	62	62
1938	Cattle							83	83	83
	Sheep							253	253	253
1939	Cattle	107	110	114	113	120	126			
	Sheep	344	356	342	343	362	379			
1940	Cattle	96	122	112				121	126	126
	Sheep	288	303	314				361	312	312
1941	Cattle				119	153	147	145	145	145
	Sheep				358	457	358	434	434	434
1942	Cattle	115	121	121	106	102	117			
	Sheep	339	355	366	338	316	374			
1943	Cattle	96	96	125				97	129	129
	Sheep	288	288	373				348	385	385
1944	Cattle				113	92	127	93	125	99
	Sheep				346	285	389	286	369	303
1945	Cattle	92	133	112	131	115	149			
	Sheep	198	293	303	268	257	301			
1946	Cattle	122	155	132				108	165	133
	Sheep	259	259	267				309	307	319
1947	Cattle				154	106	149	123	155	123
	Sheep				218	202	238	180	193	191

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GREEN MANURING EXPERIMENT

Woburn Stackyard (begun in 1936)

The experiment was designed to test the effects on kale of leys and green manures ploughed-in in mid-season, and also the effects of dung, straw and sulphate of ammonia. A barley crop tests the residual effects of these treatments.

The rotation was 1st year, green manure crops followed by kale, 2nd year barley. The leys and green manures were clover, ryegrass, tares and mustard: the tares and mustard were grown on the same plots every second year, but the clover and ryegrass alternately. A crop of hay was taken from the ley plots each year until 1940 and again in 1942; in other years all green material was buried.

There are 40 plots under each of the test crops, and until 1943 the experiment consisted of a single replicate (for each crop) of a 5×2^3 factorial design with all combinations of the following treatments, applied to kale;

Leys and green manures: Fallow (F), clover (C), ryegrass (R), tares (T) and mustard (M). The clover and ryegrass are undersown in the barley and the other green manures are sown after the barley stubble has been ploughed.

Dung: None, 10 tons per acre (D)
Straw: None, 1.5 tons per acre (S)
Sulphate of ammonia: 0.4, 0.8 cwt. N per acre (N)

A basal dressing of 3 cwt. superphosphate and 1 cwt. muriate of potash per acre is applied.

In 1944 and succeeding years a top dressing of sulphate of ammonia (0.3 cwt. N per acre in 1944, 0.4 cwt. N per acre thereafter) has been applied to half the plots under barley so that the experiment is now in half replicate according to the identity $I \equiv (R+C-T-M-F)$ DSNA, where A represents the top dressing of sulphate of ammonia.

From 1946 onwards, a further dressing of sulphate of ammonia (0.4 cwt. N per acre) has been applied to the fallow and all ley and green manure crops, on those plots which receive the top dressing when under barley. Also from 1946 onwards, cabbages replaced the kale (which had failed in several years), and the green manures were changed, tares being replaced by lupins and mustard by rape.

Full details of the original design are given in the 1936 Report, p. 203.

Owing to an error in the chain used, the plot area has been given previously as 0.0367 acre. The correct value is 0.0379 acre. Consequently the yields given in the Station Reports for 1936-38 should be multiplied by 0.968.

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Crop Notes

	Test Year			
	1939	1940	1941	1942
Leys and Green Manures				
Clover and Ryegrass				
undersown	31.3.38	19.4.39	3.5.40	5.5.41
cut	June 8	June 3		June 2
Tares sown	6.10.38	Apr.23(1)	16.10.40	Apr.20(2)
Mustard sown	6.10.38	Apr.23(1)	Mar 24(1)	Apr.15(1)
Manures ploughed in	June 16	June 20	May 23	June 13
Kale (Thousand Head)				
Sown	June 21	June 26		June 16
Cut	Feb.1940	Feb.1941	Failed(3)	Feb and Mar.1943
Cabbages (January King)				
Transplanted				
Cut				
Barley (Plumage Archer)				
Sown	Mar.1	Mar.4	Mar.14	Apr.1
Harvested	Aug.29	Aug.26	Aug.26	Aug.19

(1) Second sowing. First sowing failed and was ploughed in
(2) Maple peas, replacing tare crop which failed
(3) First sowing destroyed by flea beetle; second sowing by pigeons

https://doi.org/10.23637/ERADOC-1-145 *pp 129*

Be/1.3

Green Manuring Experiment

Crop Notes

Test Year

	1943	1944	1945	1946	1947
Clover and Ryegrass undersown				23.4.45	2.5.46
	(Leys and green manures were ploughed in after failure of the kale.)				
Lupins sown				Apr.15	Apr.16
Rape sown				Apr.15(1)	Apr.16
Manures ploughed in				June 18	June 28
Kale (Thousand Head)					
Sown			(Fallow)		
Cut	Failed(4)	Failed(4)			
Cabbages (January King)					
Transplanted				July 22(5)	July 12(5)
Cut				Jan. & Mar.1947	Dec.Feb.& Mar.1948
Barley (Plumage Archer)					
Sown	Mar.17	Mar.9	Mar.6	Mar.18	Apr.18
Harvested	Aug.20	Sept.9	Aug.3	Aug.23	Aug.12

(1) Second sowing. First sowing failed and was ploughed in.
(4) Crop failed due to attack of flea beetle.
(5) Gaps were filled in by further transplanting during subsequent two months.

N

https://doi.org/10.23637/ERADOC-1-145 *pp 130*

Kale

Be/1.4

Means

Leys and green manures:	None	Tares	Clover	Mustard	Rye-grass	Mean
Manures	Total weight: tons per acre					
			1939			
			±0.418			±0.187
No dung	4.54	4.62	6.31	4.57	3.61	4.73
Dung	5.87	6.27	8.27	6.11	4.38	6.18
No straw	5.49	5.92	7.57	5.27	4.21	5.69
Straw	4.92	4.96	7.02	5.41	3.77	5.22
Sulphate of ammonia						
0.4 cwt.N per acre	4.56	4.69	6.58	4.79	2.44	4.61
0.8 cwt.N per acre	5.85	6.20	8.01	5.89	5.55	6.30
Mean ±0.296	5.20	5.44	7.29	5.34	3.99	5.46
			1940			
			±0.562			±0.251
No dung	6.16	5.54	5.62	4.59	3.43	5.07
Dung	7.09	7.24	8.04	6.85	5.52	6.95
No straw	6.73	6.53	6.86	6.08	5.07	6.26
Straw	6.52	6.24	6.80	5.35	3.88	5.76
Sulphate of ammonia						
0.4 cwt.N per acre	5.46	5.25	6.95	5.07	4.18	5.38
0.8 cwt.N per acre	7.79	7.52	6.71	6.36	4.77	6.63
Mean ±0.397	6.62	6.39	6.83	5.72	4.47	6.01
			1942			
			±0.725			±0.324
No dung	8.73	9.11	11.18	9.08	5.88	8.80
Dung	11.46	11.92	13.61	11.54	10.02	11.71
No straw	9.74	9.53	11.92	10.18	8.28	9.93
Straw	10.45	11.49	12.87	10.43	7.62	10.57
Sulphate of ammonia						
0.4 cwt.N per acre	9.01	9.63	12.67	8.52	5.63	9.09
0.8 cwt.N per acre	11.17	11.40	12.12	12.10	10.27	11.41
Mean ±0.513	10.09	10.51	12.40	10.31	7.95	10.25

Note: The kale failed in 1941, 1943 and 1944. The land was fallowed in 1945.

Standard errors per plot

1939 0.84 or 15.3%
1940 1.12 or 18.7%
1942 1.45 or 14.1%

These are based on 16 d.f.

N

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Green Manuring Experiment

Be/1.5

Cabbages

Leys and green manures:	None	Lupins	Clover	Rape	Rye-grass	Means Mean
Manures	Total weight: tons per acre					
			1946 ±0.721			±0.322
No dung	2.96	3.27	4.68	3.20	2.46	3.31
Dung	4.80	4.09	6.67	4.44	3.78	4.76
No straw	3.52	4.29	5.90	4.27	2.84	4.16
Straw	4.24	3.06	5.45	3.37	3.41	3.91
Sulphate of ammonia						
0.4 cwt.N per acre	4.08	2.92	5.22	2.93	2.58	3.55
0.8 cwt.N per acre	3.68	4.44	6.12	4.71	3.66	4.52
Sulphate of ammonia to green manures.						
None	3.10	3.87	6.24	2.43	3.46	3.82
0.4 cwt.N per acre	4.66	3.48	5.10	5.20	2.79	4.25
Mean ±0.510	3.88	3.68	5.67	3.82	3.12	4.03
			1947 ±0.430			±0.192
No dung	3.76	2.36	1.20	1.83	1.87	2.20
Dung	4.40	3.11	1.11	2.36	2.04	2.60
No straw	4.32	2.42	1.21	2.05	2.35	2.47
Straw	3.83	3.06	1.10	2.14	1.56	2.34
Sulphate of ammonia						
0.4 cwt.N per acre	3.38	2.43	0.97	1.96	1.94	2.14
0.8 cwt.N per acre	4.77	3.04	1.34	2.22	1.98	2.67
Sulphate of ammonia to gree manures.						
None	3.95	2.92	1.12	2.07	1.85	2.38
0.4 cwt.N per acre	4.20	2.56	1.19	2.12	2.06	2.43
Mean ±0.304	4.08	2.74	1.16	2.09	1.96	2.40

Standard errors per plot

1946 1.44 or 35.7%
1947 0.86 or 35.8%

These are based on 9 d.f.

N

https://doi.org/10.23637/ERADOC-1-145

Be/1.6

Cabbages

Leys and green manures:	None	Lupins	Clover	Rape	Rye-grass	Mean
			Means			
Manures Plant number: thousands per acre						
			1946			
			±0.80			±0.36
No dung	16.8	16.0	16.0	16.4	15.6	16.2
Dung	16.2	15.7	16.0	16.9	16.2	16.2
No straw	16.1	17.0	15.8	16.9	15.7	16.3
Straw	16.8	14.7	16.2	16.5	16.1	16.1
Sulphate of ammonia						
0.4 cwt.N per acre	16.7	16.0	16.5	16.5	16.6	16.5
0.8 cwt.N per acre	16.3	15.7	15.5	16.8	15.3	15.9
Sulphate of ammonia to green manures.						
None	16.8	16.4	15.6	16.6	16.8	16.4
0.4 cwt.N per acre	16.1	15.4	16.4	16.7	15.1	15.9
Mean ±0.61	16.5	15.9	16.0	16.7	15.9	16.2
			1947			
			±0.76			±0.34
No dung	17.1	16.9	15.6	15.8	15.5	16.2
Dung	17.4	17.6	14.9	15.1	16.0	16.2
No straw	17.3	17.4	14.7	16.1	16.9	16.5
Straw	17.2	17.2	15.7	14.9	14.6	15.9
Sulphate of ammonia						
0.4 cwt.N per acre	16.4	17.6	15.7	16.4	16.0	16.4
0.8 cwt.N per acre	18.1	16.9	14.7	14.6	15.6	16.0
Sulphate of ammonia to green manures.						
None	16.7	17.7	14.4	14.9	15.8	15.9
0.4 cwt.N per acre	17.8	16.9	16.0	16.1	15.7	16.5
Mean ±0.548	17.3	17.3	15.2	15.5	15.8	16.2

Standard errors per plot.

1946 1.60 or 9.9%
1947c 1.52 or 9.4%

These are based on 9 d.f.

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Green Manuring Experiment

Be/1.7

Differential Responses

Kale. Total weight: tons per acre

Response to	Mean	Dung Abs.	Dung Pres.	Straw Abs.	Straw Pres.	Sulphate of Ammonia to Kale cwt.N per acre 0.4	0.8	to Barley and Green crops Abs.	Pres.
1939	±0.264			±0.374					
Dung	1.45	-	-	0.90	2.00	1.88	1.02		
Straw	-0.48	-1.03	0.07	-	-	-0.70	-0.26		
Sulph.of Amm.	1.69	2.12	1.26	1.47	1.91	-	-		
1940	±0.355			±0.502					
Dung	1.88	-	-	1.76	2.00	2.43	1.33		
Straw	-0.50	-0.62	-0.38	-	-	-1.45	0.45		
Sulph.of Amm.	1.25	1.80	0.70	0.30	2.20	-	-		
1942	±0.458			±0.648					
Dung	2.91	-	-	3.06	2.76	3.34	2.48		
Straw	0.64	0.79	0.49	-	-	0.33	0.95		
Sulph.of Amm.	2.32	2.75	1.89	2.01	2.63	-	-		

Cabbages. Total weight: tons per acre

1946	±0.456			±0.651					
Dung	1.45	-	-	1.76	1.14	2.54	0.36	1.43	1.47
Straw	-0.26	0.05	-0.57	-	-	-0.12	-0.40	-1.40	0.88
Sulph.of Amm.	0.98	2.07	-0.11	1.12	0.84	-	-	1.60	0.36
Sulph.of Amm. to Green crops	0.43	0.41	0.45	-0.71	1.57	1.05	-0.19	-	-
1947	±0.272			±0.389					
Dung	0.40	-	-	0.24	0.56	0.39	0.41	0.53	0.27
Straw	-0.13	-0.29	0.03	-	-	0.14	-0.40	0.03	-0.29
Sulph.of Amm.	0.53	0.52	0.54	0.80	0.26	-	-	0.44	0.62
Sulph.of Amm. to Green crops	0.04	0.17	-0.09	±0.20 +0.20	-0.12	-0.05	0.13	-	-

Cabbages. Plant Number: thousands per acre

1946	±0.51			±0.72					
Dung	0.0	-	-	-0.1	0.1	0.7	-0.7	-0.4	0.4
Straw	-0.2	-0.3	-0.1	-	-	0.1	-0.5	-1.2	0.8
Sulph.of Amm. to Cabbages	-0.5	0.2	-1.2	-0.2	-0.8	-	-	-1.4	0.4
Sulph.of Amm. to Green crops	-0.5	-0.9	-0.1	-1.5	+0.5	-1.4	0.4	-	-
1947	±0.48			±0.69					
Dung	0.0	-	-	-0.6	0.6	0.6	-0.6	0.4	-0.4
Straw	-0.5	-1.1	0.0	-	-	-1.1	0.0	-0.6	-0.5
Sulph.of Amm. to Cabbages	-0.4	0.1	-1.0	-1.0	0.1	-	-	-0.8	-0.1
Sulph.of Amm. to Green crops	0.6	1.0	0.2	0.5	0.7	0.3	0.9	-	-

https://doi.org/10.23637/ERADOC-1-145

Barley

Grain: cwt. per acre

Means

Leys and green manures before kale:	None	Tares	Clover	Mustard	Rye-grass	Mean
Manures applied to previous kale			1939			
			±1.16			±0.52
No dung	12.8	15.1	18.7	13.8	14.1	14.9
Dung	15.8	15.9	20.6	17.0	18.4	17.5
No straw	12.4	15.1	19.9	16.2	16.2	16.0
Straw	16.2	15.9	19.5	14.6	16.5	16.6
Sulphate of Ammonia						
0.4 cwt.N per acre	15.0	15.0	20.9	14.2	13.5	15.7
0.8 cwt.N per acre	13.6	16.0	18.4	16.7	19.1	16.8
Mean ±0.82	14.3	15.5	19.7	15.4	16.3	16.3
			1940			
			±1.53			±0.68
No dung	10.5	11.0	13.4	10.6	7.7	10.7
Dung	13.7	15.0	16.1	11.9	11.9	13.8
No straw	10.8	12.4	13.7	12.1	9.3	11.6
Straw	13.3	13.7	15.8	10.4	10.4	12.7
Sulphate of Ammonia						
0.4 cwt. N per acre	9.6	11.8	15.3	11.1	9.1	11.4
0.8 cwt. N per acre	14.5	14.2	14.1	11.3	10.6	13.0
Mean ±1.08	12.0	13.0	14.7	11.2	9.8	12.2
			1941			
			±0.86			±0.38
No dung	11.0	11.5	12.5	10.1	11.4	11.3
Dung	12.9	12.6	14.7	11.7	14.4	13.3
No straw	12.3	11.5	13.8	11.0	12.8	12.3
Straw	11.6	12.6	13.6	10.7	13.0	12.3
Sulphate of Ammonia						
0.4 cwt.N per acre	11.7	10.7	12.0	9.5	12.5	11.3
0.8 cwt.N per acre	12.2	13.4	15.3	12.3	13.3	13.3
Mean ±0.61	12.0	12.0	13.7	10.8	12.9	12.3

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Green Manuring Experiment

Barley

Grain: cwt. per acre

Means

Leys and green manures before kale:	None	Tares	Clover	Mustard	Rye-grass	Mean
			1942			
Manures applied to previous kale			±0.84			±0.37
No dung	9.0	8.3	7.1	8.1	9.8	8.5
Dung	11.2	12.1	10.7	10.3	12.0	11.3
No straw	9.6	8.9	8.1	9.4	9.8	9.2
Straw	10.6	11.4	9.7	9.0	12.0	10.5
Sulphate of Ammonia						
0.4 cwt.N per acre	9.0	10.4	8.3	9.6	11.1	9.7
0.8 cwt.N per acre	11.3	10.0	9.5	8.8	10.7	10.1
Mean ±0.59	10.1	10.2	8.9	9.2	10.9	9.9
			1943			
			±1.76			±0.79
No dung	7.4	11.0	9.9	7.1	6.6	8.4
Dung	13.1	11.4	11.2	13.2	11.2	12.0
No straw	9.1	12.3	11.6	8.7	8.8	10.1
Straw	11.5	10.1	9.5	11.6	9.0	10.3
Sulphate of Ammonia						
0.4 cwt.N per acre	10.2	12.0	10.4	8.9	9.6	10.2
0.8 cwt.N per acre	10.4	10.4	10.7	11.3	8.2	10.2
Mean ±1.24	10.3	11.2	10.6	10.1	8.9	10.2
			1944			
			±1.06			±0.48
No dung	9.9	10.1	8.6	8.2	7.0	8.8
Dung	8.6	10.5	8.1	8.7	12.0	9.6
No straw	9.6	10.4	7.4	8.6	7.9	8.8
Straw	8.9	10.2	9.3	8.4	11.1	9.6
Sulphate of Ammonia						
0.4 cwt.N per acre	10.0	10.6	7.5	9.3	9.2	9.3
0.8 cwt.N per acre	8.5	10.0	9.3	7.7	9.8	9.1
Sulphate of Ammonia applied to Barley						
None	7.3	9.4	6.5	7.9	9.8	8.2
0.3 cwt.N per acre	11.2	11.2	10.3	9.1	9.2	10.2
Mean ±0.75	9.2	10.3	8.4	8.5	9.5	9.2

N

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Barley

Grain: cwt. per acre

Means

Leys and green manures before kale	None	Tares	Clover	Mustard	Rye-grass	Mean
			1945			
			±0.60			±0.27
No dung	13.4	15.4	13.2	13.6	13.2	13.8
Dung to kale	16.7	15.2	15.8	18.2	14.2	16.0
No straw	16.3	14.3	14.1	15.5	13.7	14.8
Straw to kale	13.8	16.3	14.8	16.3	13.7	15.0
Sulph.of Amm.to kale						
0.4 cwt.N per acre	16.2	15.4	14.1	15.8	13.2	14.9
0.8 cwt.N per acre	13.9	15.2	14.9	16.0	14.2	14.8
Sulph.of Amm.to Barley						
None	10.9	10.7	10.3	9.6	9.8	10.3
0.4 cwt.N per acre	19.2	19.9	18.6	22.2	17.6	19.5
Mean ±0.42	15.0	15.3	14.5	15.9	13.7	14.9
			1946			
			±0.90			±0.40
No dung	10.5	9.4	9.8	10.6	9.9	10.0
Dung to kale in 1943*	9.6	10.5	10.2	9.8	9.8	10.0
No straw	10.5	9.5	11.4	9.6	8.4	9.9
Straw to kale in 1943*	9.6	10.4	8.6	10.8	11.3	10.1
Sulph.of Amm.to kale in 1943*						
0.4 cwt.N per acre	10.3	10.4	8.4	11.6	7.8	9.7
0.8 cwt.N per acre	9.8	9.5	11.6	8.8	11.8	10.3
Sulph.of Amm.to Barley						
None	5.5	6.4	4.4	6.8	5.8	5.8
0.4 cwt.N per acre	14.6	13.5	15.7	13.6	13.8	14.2
Mean ±0.63	10.0	10.0	10.0	10.2	9.8	10.0

*The Kale crop of 1945 failed and therefore no manures were applied.

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Green Manuring Experiment Be/1.11

Barley

Grain: cwt. per acre

Means

Leys and green manures before cabbages	None	Lupins	Clover	Rape	Rye-grass	Mean
			1947			
			±0.96			±0.43
No dung	14.2	15.2	12.0	14.2	13.1	13.7
Dung to cabbages	18.3	17.8	16.2	18.0	16.6	17.4
No straw	16.5	16.1	14.0	16.1	14.8	15.5
Straw to cabbages	16.1	16.8	14.2	16.1	14.9	15.6
Sulphate of ammonia to Cabbages						
0.4 cwt.N per acre	16.2	16.0	13.4	16.3	15.9	15.6
0.8 cwt.N per acre	16.4	16.9	14.9	15.9	13.9	15.6
Sulphate of ammonia to Barley						
None	14.3	14.3	13.1	13.8	13.2	13.7
0.4 cwt.N per acre	18.3	18.6	15.1	18.5	16.6	17.4
Mean ±0.68	16.3	16.5	14.1	16.1	14.9	15.6

Barley

Straw: cwt. per acre

Means

Leys and green manures before kale:	None	Tares	Clover	Mustard	Rye-grass	Mean
			1943			
No dung	8.9	12.5	14.2	8.8	8;9	10.7
Dung to kale	15.8	14.2	17.2	17.4	15.0	15.9
No straw	11.1	14.5	17.1	11.9	11.6	13.2
Straw to kale	13.6	12.2	14.3	14.4	12.3	13.4
Sulphate of ammonia to kale						
0.4 cwt.N per acre	12.4	13.5	15.2	12.2	11.7	13.0
0.8 cwt.N per acre	12.2	13.1	16.2	14.1	12.2	13.6
Mean	12.3	13.3	15.7	13.1	12.0	13.3

N

https://doi.org/10.23637/ERADOC-1-145 *pp 138*

Barley

Straw: cwt. per acre

Means

Leys and green manures before kale:	None	Tares	Clover	Mustard	Rye-grass	Mean
			1944			
			±0.97			±0.43
No dung	12.3	12.8	11.0	10.6	8.4	11.0
Dung to kale	12.4	15.4	10.8	10.1	14.7	12.7
No straw	12.5	13.5	10.2	10.3	9.9	11.3
Straw to kale	12.1	14.8	11.6	10.3	13.2	12.4
Sulphate of ammonia to kale						
0.4 cwt. N per acre	12.6	15.1	10.5	11.1	11.4	12.1
0.8 cwt. N per acre	12.1	13.1	11.3	9.6	11.7	11.6
Sulphate of ammonia to barley						
None	9.8	13.2	8.3	9.7	12.2	10.6
0.3 cwt.N per acre	14.8	15.1	13.5	10.9	10.9	13.0
Mean ±0.69	12.3	14.1	10.9	10.3	11.6	11.8
			1945			
			±1.18			±0.53
No dung	15.3	16.2	14.6	14.5	13.8	14.9
Dung to kale	20.8	18.7	18.8	19.5	16.1	18.8
No straw	18.6	16.8	16.3	16.8	14.8	16.7
Straw to kale	17.5	18.1	17.1	17.2	15.1	17.9
Sulphate of ammonia to kale						
0.4 cwt.N per acre	19.0	18.6	15.9	17.3	14.1	17.0
0.8 cwt.N per acre	17.1	16.3	17.5	16.7	15.8	16.7
Sulphate of ammonia to barley						
None	13.4	12.1	12.3	10.7	11.7	12.0
0.4 cwt.N per acre	22.7	22.8	21.1	23.3	18.2	21.6
Mean ±0.84	18.0	17.4	16.7	17.0	15.0	16.8

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Green Manuring Experiment Be/1.13

Barley

Straw: cwt. per acre

Means

Leys and green manures before kale(1)	None	Tares(2)	Clover	Mustard(3)	Rye-grass	Mean
			1946			
No dung	14.1	12.9	13.6	14.2	11.4	13.2
Dung to kale in 1943*	16.0	17.8	15.2	14.0	12.9	15.2
No straw	14.6	14.1	15.1	14.0	11.2	13.8
Straw to kale in 1943*	15.4	16.6	13.8	14.2	13.1	14.6
Sulphate of ammonia to kale 1943*						
0.4 cwt.N per acre	14.4	15.6	13.8	15.4	11.2	14.1
0.8 cwt.N per acre	15.7	15.1	15.0	12.7	13.1	14.3
Sulphate of ammonia to barley						
None	8.6	10.4	9.4	10.2	7.5	9.2
0.4 cwt.N per acre	21.4	20.3	19.4	17.9	16.8	19.2
Mean	15.0	15.3	14.4	14.1	12.2	14.2
			1947			
			±0.78			±0.35
No dung	14.4	15.6	12.4	14.8	14.4	14.3
Dung to cabbages	19.1	18.2	16.4	18.7	18.1	18.1
No straw	16.7	16.9	13.7	17.3	16.0	16.1
Straw to cabbages	16.8	16.9	15.1	16.2	16.5	16.3
Sulphate of ammonia to cabbages						
0.4 cwt.N per acre	16.6	16.3	13.7	16.3	17.0	16.0
0.8 cwt.N per acre	16.9	17.5	15.0	17.1	15.5	16.4
Sulphate of ammonia to barley						
None	14.3	15.2	13.3	14.4	15.3	14.5
0.4 cwt.N per acre	19.2	18.6	15.5	19.1	17.2	17.9
Mean ±0.55	16.8	16.9	14.4	16.7	16.2	16.2

* The kale crop of 1945 failed and therefore no manures were applied.

Note. The following changes in headings are applicable to the 1947 barley results.

1. Cabbages replaced Kale. 2. Lupins replaced Tares. 3. Rape replaced Mustard.

Standard errors per plot.

Grain: cwt. per acre				Straw: cwt. per acre	
1939	2.32 or 14.3%	1945	1.21 or 8.1%	1944	1.94 or 16.4%
1940	3.06 or 25.1%	1946	1.79 or 17.9%	1945	2.37 or 14.1%
1941	1.72 or 14.0%	1947	1.93 or 12.4%	1947	1.56 or 9.6%
1942	1.67 or 16.9%				
1943	3.51 or 34.3%				
1944	2.13 or 23.2%				

These are based on 16. d.f., 1939-1943
9 d.f., 1944-1947

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Differential Responses

Barley. Grain: cwt. per acre

Response to	Mean	Dung Abs.	Dung Pres.	Straw Abs.	Straw Pres.	Sulphate of Ammonia cwt. N per acre 0.4.	Sulphate of Ammonia cwt. N per acre 0.8	to Barley Abs.	to Barley Pres.
1939	±0.74			±1.04					
Dung	2.6	-	-	3.2	2.0	3.6	1.6		
Straw	0.6	1.2	0.0	-	-	0.5	0.7		
Sulph.of Amm.	1.0	2.0	0.0	0.9	1.1	-	-		
1940	±0.97			±1.37					
Dung	3.1	-	-	3.6	2.6	3.8	2.4		
Straw	1.1	1.6	0.6	-	-	0.6	1.6		
Sulph.of Amm.	1.6	2.3	0.9	1.1	2.1	-	-		
1941	±0.54			±0.77					
Dung	2.0	-	-	1.9	2.1	2.7	1.3		
Straw	0.0	-0.1	0.1	-	-	0.3	-0.3		
Sulph.of Amm.	2.0	2.7	1.3	2.3	1.7	-	-		
1942	±0.53			±0.75					
Dung	2.8	-	-	3.2	2.4	3.4	2.2		
Straw	1.3	1.7	0.9	-	-	1.0	1.6		
Sulph.of Amm.	0.4	0.9	-0.1	0.1	0.7	-	-		
1943	±0.98			±1.39					
Dung	3.6	-	-	5.1	2.1	4.7	2.5		
Straw	0.2	1.7	-1.3	-	-	2.2	-1.8		
Sulph.of Amm.	0.0	1.1	-1.1	2.0	-2.0	-	-		
1944	±0.67			±0.95					
Dung	0.8	-	-	2.1	-0.5	0.7	0.9	0.8	0.8
Straw	0.8	2.1	-0.5	-	-	1.5	0.0	0.7	0.8
Sulph.of Amm.	-0.3	-0.4	-0.2	0.5	-1.0	-	-	-0.6	0.0
Sulph.of Amm. to Barley	2.0	2.0	2.1	2.0	2.1	1.8	2.4	-	-
1945	±0.38			±0.54					
Dung	2.3	-	-	2.7	1.9	3.1	1.5	1.7	2.9
Straw	0.2	0.6	-0.2	-	-	0.1	0.3	0.2	0.2
Sulph.of Amm.	-0.1	0.7	-0.9	-0.2	0.0	-	-	-1.0	0.8
Sulph.of Amm. to Barley	9.2	8.6	9.8	9.2	9.2	8.3	10.1	-	-
1946	±0.57			±0.81					
Dung	-0.1	-	-	0.1	-0.2	0.5	-0.6	-0.1	0.0
Straw	0.2	0.4	0.1	-	-	-0.7	1.2	1.0	-0.5
Sulph.of Amm.	0.6	1.2	0.1	-0.3	1.5	-	-	1.7	-0.5
Sulph.of Amm. to Barley	8.5	8.4	8.6	9.2	7.8	9.6	7.4	-	-
1947	±0.61			±0.87					
Dung	3.6	-	-	3.9	3.3	5.0	2.2	2.5	4.7
Straw	0.1	0.4	-0.2	-	-	0.3	-0.1	-1.5	1.7
Sulph.of Amm.	0.0	1.4	-1.4	0.2	-0.2	-	-	0.4	-0.4
Sulph.of Amm. to Barley	3.7	2.6	4.8	2.1	5.3	4.1	3.3	-	-

All treatments were applied to the previous Kale (or Cabbage) unless otherwise stated.

https://doi.org/10.23637/ERADOC-1-145

Green Manuring Experiment Be/1.15

Differential Responses

Barley. Straw: cwt. per acre

Response to	Mean	Dung Abs.	Dung Pres.	Straw Abs.	Straw Pres.	Sulphate of Ammonia cwt. N per acre 0.4	0.8	to Barley Abs.	to Barley Pres.
1943									
Dung	5.2	-	-	7.2	3.2	5.6	4.8		
Straw	0.1	2.1	-1.9	-	-	1.7	-1.5		
Sulph. of Amm.	0.6	1.0	0.2	2.2	-1.0	—	-		
1944	±0.61			±0.87					
Dung	1.6	-	-	3.3	-0.1	1.5	1.8	0.8	2.4
Straw	1.1	2.8	-0.6	-	-	2.2	0.0	1.1	1.2
Sulph.of Amm.	-0.6	-0.8	-0.4	0.5	-1.7	-	-	-1.3	0.1
Sulph.of Amm.to Barley	2.4	1.6	3.2	2.4	2.4	1.7	3.1	-	-
1945	±0.75			±1.07					
Dung	3.9	-	-	4.7	3.1	5.1	2.7	3.8	4.0
Straw	0.3	1.1	-0.5	-	-	0.2	0.4	-0.5	1.1
Sulph.of Amm.	-0.3	0.9	-1.5	-0.4	-0.2	-	-	-1.3	0.7
Sulph.of Amm.to Barley	9.6	9.5	9.7	8.8	10.4	8.6	10.6	-	-
1946	±								
Dung	2.0	-	-	2.1	1.8	2.6	1.3	1.3	2.6
Straw	0.8	1.0	0.7	-	-	0.5	1.1	1.7	0.0
Sulph.of Amm.	0.2	0.9	-0.4	-0.1	0.5	-	-	1.1	-0.7
Sulph.of Amm.to Barley	9.9	9.3	10.6	10.8	9.1	10.8	9.1	-	-
1947	±0.49			±0.71					
Dung	3.8	-	-	3.0	4.6	4.9	2.7	3.1	4.5
Straw	0.2	-0.6	1.0	-	-	0.0	0.4	-0.7	1.1
Sulph.of Amm.	0.4	1.5	-0.7	0.2	0.6	-	-	2.0	-1.2
Sulph.of Amm.to Barley	3.4	2.7	4.1	2.5	4.3	5.0	1.8	-	-

All treatments were applied to the previous Kale (or Cabbage) unless otherwise stated.

N

https://doi.org/10.23637/ERADOC-1-145 *pp 142*

No replica within years

3 yrs on each series: from each plot take mean

lin Regr

Rem = within-plot errors

Treatment totals x Series → between plot errs

But also replica within years for first 5 years

https://doi.org/10.23637/ERADOC-1-145

LEY AND ARABLE ROTATIONS EXPERIMENT

Woburn, Stackyard, Series D (begun in 1938)

The purpose of the experiment is to test the value of a three year ley, three years of lucerne and an arable rotation with a one year ley, as means of building up soil fertility, in comparison with a rotation without leys. The effects of these crop sequences are measured by the yields of two following crops of potatoes and barley, which may be termed the indicator crops. Each rotation therefore has five courses. The rotations compared are:-

(1) Three year ley
(2) Three years of lucerne
(3) Potatoes, wheat, one year ley* } Potatoes, barley
(4) Potatoes, wheat, kale

There are five series, one for each course of the five year rotation, so that all courses of every rotation are represented every year. Each series has eight main plots, on four of which the same rotation continues throughout the experiment. On the other four plots, ley and arable rotations alternate.

Each main plot is divided into two sub-plots, one of which receives dung at the rate of 15 tons per acre applied to the indicator crop of potatoes only. The same sub-plots receive dung throughout the experiment. All plots are liberally manured with inorganic fertilizers.

Details are as given in the 1938 Report pp. 135-137, except that owing to the unsatisfactory crops obtained on the kale plots in the years 1938-44 it was decided to substitute sugar beet for kale as from 1945.

Owing to an error in the chain used, the sub-plot area has been given previously as 0.0390 acre. The correct value is 0.0403 acre. Consequently the yields given in the Station Report for 1938 should be multiplied by 0.968. The correct values for 1938 are included in this Report.

* The one year ley will be referred to as "hay", to distinguish from the three year ley. The geological term "series" is used to denote the area under each crop in a rotation experiment. However, in this experiment the word "block" is used with the same meaning.

N

https://doi.org/10.23637/ERADOC-1-145

Crop Notes

Bf/1.2

First three years of each Rotation

Previous crop - Barley

Rotation 1. Ley

Grass Mixture

	lb.per acre		lb.per acre
Perennial Ryegrass	14	Wild White Clover	2
Cocksfoot	8	Italian Ryegrass (1941 and onwards only)	10
Late Flowering Red Clover	4		

First year	Block		Sown	First year Grazed by sheep	Second year Grazed by sheep	Third year Grazed by sheep
1938	3	Cycle 1	May 20	Aug. 3 - Sept.14 2 grazings = 16 days	Apr. 13 - Oct. 17 9 grazings = 108 days	Apr. 27 - Oct. 16 4 grazings = 55 days
1939	5		May 4	Aug. 16 - Oct.20 3 grazings = 28 days	Apr. 17 - Oct. 25 5 grazings = 119 days	May 5 - Oct. 26 4 grazings = 94 days
1940	4		May 6	Aug. 26 - Nov. 2 2 grazings = 30 days	May 5 - Oct. 18 4 grazings = 65 days	May 27 - Sept. 19 4 grazings = 38 days
1941	2		May 14	No grazing[1]	May 19 - Sept. 14 4 grazings = 46 days	Aug. 31 - Oct. 1 3 grazings = 17 days[2]
1942	1		May 15	Aug. 24 - Sept.8 1 grazing, on half plots	Sept.8[3] - Oct. 20 3 grazings = 21 days	June 21[3] - Oct. 27 4 grazings = 46 days
1943	3	Cycle 2	Apr.28	Oct. 20 1 grazing[4]	July 12 - Nov. 5 4 grazings = 44 days	May 26 - Sept. 29 4 grazings = 70 days
1944	5		May 8	July 28 - Nov.13 4 grazings = 34 days	June 11 - Oct. 28 4 grazings = 62 days	May 9 - Nov. 19 6 grazings = 95 days
1945	4		May 7	Aug. 10 - Oct.15 2 grazings = 41 days	May 25 - Nov. 3 5 grazings = 85 days	May 21 - Oct. 19 4 grazings = 48 days
1946	2		May 1	Aug. 15 - Nov.10 3 grazings = 24 days	May 5 - Oct. 15 4 grazings = 51 days	
1947	1		May 1	Oct. 3 - 11 1 grazing = 9 days		

1. Owing to an unfavourable season, and because the wrong quantity of manure was applied.
2. Prior to the grazings there was one cut of hay on June 22.
3. The sheep were put on late owing to war conditions.
4. There was one cut, on July 15, to get rid of annual weeds.

https://doi.org/10.23637/ERADOC-1-145 *pp 145*

Ley and Arable Rotations Experiment

Rotation 2. Lucerne

Variety: Provence 1939-1944, Grim 1945, Argentine 1946.

First year	Block	First year: Sown	First year: 1st cut	First year: 2nd cut	Second year: 1st cut	Second year: 2nd cut	Second year: 3rd cut	Third year: 1st cut	Third year: 2nd cut	Third year: 3rd cut
1938	3 (1st cycle)	May 20	Sept.14	-	July 6	Aug.18	Nov.13	July 10	Sept. 4	Dec. 22
1939	5 (1st cycle)	May 4	Aug. 19	Nov.13	July 10	Sept.4	-	June 17	Aug. 12	Dec. 22
1940	4 (1st cycle)	May 6*	Sept.4	-	June 24	Aug.12	Dec.22	June 26	Sept.16	-
1941	2 (1st cycle)	May 14	Aug. 12	-	June 26	Sept.16	-	June 7	Aug. 31	-
1942	1 (1st cycle)	May 15	Sept.16	-	June 7	Aug.31	-	June 6	Aug. 8	-
1943	3 (2nd cycle)	May 6	-	-	June 6	Sept.4	-	June 8	Aug. 13	Nov. 12
1944	5 (2nd cycle)	May 9	Sept.12	-	June 8	Aug.13	Nov.12	June 25	Sept.16	Dec. 10
1945	4 (2nd cycle)	May 7	Aug. 13	Nov.12	June 26	Sept.16	-	June 11	July 31	Oct. 3
1946	2 (2nd cycle)	May 1	Sept.16	-	June 26	July 31	-			
1947	1 (2nd cycle)	May 7	Oct. 3	-						

*Bad patches reseeded June 11.

Rotations 3 and 4. First year - Potatoes, second year - Wheat, third year - Hay (Rot.3) and Kale or Sugar Beet (Rot.4).

Varieties:

Potatoes - Majestic
Wheat - Red Standard
Grass mixture - 16 lb. Italian Ryegrass and 10 lb. Broad Red Clover, 1940-44.
24 lb. " " " 12 lb. " " " 1945.
24 lb. " " " 12 lb. Montgomery Red Clover, 1946.
Kale - Thousand Head
Sugar Beet- Kleinwanzleben E.

First year	Block	1st year Potatoes: Sown	Potatoes: Harvested	Second year Wheat: Sown	Wheat: Harvested	Third year Hay (Rot.3): Sown	Hay (Rot.3): 1st cut	Hay (Rot.3): 2nd cut	Kale (Rot.4): Sown	Kale (Rot.4): Harvested
1938	3 (1st cycle)	Apr.23	Sept.22	31.10.38	Aug. 14	27.4.39	June 20		May 6	Dec.30
1939	5 (1st cycle)	Apr.25	Sept.12	2.11.39	Aug. 12	3.5.40	June 17	Aug. 12	Apr.29	Dec.16
1940	4 (1st cycle)	Apr.26	Sept.20	16.10.40	Aug. 14	5.5.41	June 25	Sept.16	Apr.22	Dec.29
1941	2 (1st cycle)	Apr.24	Oct. 15	24.3.42*	Sept.15	20.5.42	1 cut, date unknown		Crop failed	
1942	1 (1st cycle)	Apr.21	Oct. 5	(Eaten by rats)		16.4.43	June 6	Sept.12	May 9*	7.2.45
1943	3 (2nd cycle)	May 13	Sept.22	11.10.43	Aug. 10	9.5.44	June 8	Aug. 13	Sugar beet May 3	Nov.26
1944	5 (2nd cycle)	Apr.28	Sept.20	May 10*	Aug. 10	10.5.45	June 24	Sept.16	May 2	Oct.12
1945	4 (2nd cycle)	Apr.27	Oct. 2	2.10.45	Aug. 22	19,5.46	June 11	July 31	May 2	Oct.17
1946	2 (2nd cycle)	Apr.26	Oct. 8	6.11.46	Aug. 6					
1947	1 (2nd cycle)	May 12	Oct.10							

*Second sowing, first sowing failed.

https://doi.org/10.23637/ERADOC-1-145

Bf/1.4

Indicator Crops - Potatoes and Barley

Fourth and fifth years of rotations

Varieties: Potatoes - Majestic; Barley - Plumage Archer

Year	Block	Potatoes	Sown	Harvested	Block	Barley	Sown	Harvested
1938	4	Prior to	Apr. 22	Sept.30	5		Mar. 9 Mar.19	Aug.25 Aug 25
1939	2	rotations	Apr. 24	Sept.20	4		Mar. 2	Aug.30
1940	1		Apr. 12	Sept.25	2	Prior to	Mar.21	Aug.30
1941	3	Fourth year	Apr. 18	Nov. 7	1	rotations	Mar.17	Aug.27
1942	5	of Cycle 1	Apr. 17	Oct. 9	3	Fifth year	Apr.13	Aug.19
1943	4	of	Apr. 14	Sept.23	5	of Cycle 1	Mar. 4	Aug.25
1944	2	rotations	Apr. 27	Oct. 2	4	of	Mar.14	Aug.30
1945	1		Apr. 26	Oct.11	2	rotations	Mar. 2	Aug.10
1946	3	Fourth year	Apr. 29	Oct. 6	1		Mar.20	Aug.23
1947	5	of Cycle 2	Apr. 12	Oct. 2	3	Fifth year of Cycle 2	Apr.17	Aug.12

Rotation 1. Ley

Sheep-days of grazing per acre

First Cycle

Block 3			Block 5			Block 4		
1938	1939	1940	1939	1940	1941	1940	1941	1942
596	3667	2103	1135	1898	2062	645	1347	1344
Block 2			Block 1					
1941	1942	1943	1942	1943	1944			
None	1833	453	721	429	1050			

Second Cycle

Block 3			Block 5			Block 4		
1943	1944	1945	1944	1945	1946	1945	1946	1947
143	955	1910	764	1695	3101	1146	2787	1840
Block 2			Block 1					
1946	1947		1947					
811	1840		387					

https://doi.org/10.23637/ERADOC-1-145

Ley and Arable Rotations Experiment

Rotation 2. Lucerne

Yields obtained during first three years of each rotation

Hay (85% dry matter), tons per acre

First Cycle

First year	Block	First year			Second year				Third year			
Crops:		1st	2nd	Total	1st	2nd	3rd	Total	1st	2nd	3rd	Total
1938	3	0.61	-	0.61	0.81	0.54	0.14	1.49	1.86	0.78	-	2.64
1939	5	0.34	0.08	0.42	1.36	0.73	-	2.09	1.48	1.26	0.12	2.87
1940	4	1.05	-	1.05	1.51	0.97	0.11	2.59	2.03	0.83	-	2.86
1941	2	0.39	-	0.39	2.05	0.53	-	2.58	1.67	0.64	-	2.31
1942	1	0.32	-	0.32	1.29	0.77	-	2.06	1.96	1.58	-	3.54

Second Cycle

First year	Block	First year			Second year				Third year			
1943	3	1st	2nd	Total	1st	2nd	3rd	Total	1st	2nd	3rd	Total
No dung		Not cut		-	1.58	0.86	-	2.44	1.84	1.36	0.10	3.30
Dung (1941)				-	1.48	0.87	-	2.35	1.76	1.10	0.06	2.92
Mean				-	1.53	0.86	-	2.39	1.80	1.23	0.08	3.11
Increase				-	-0.10	0.01	-	-0.09	-0.08	-0.26	-0.04	-0.38
Previous rotation:												
Lucerne				-	1.42	0.77	-	2.19	1.68	1.22	0.09	2.99
Arable				-	1.64	0.96	-	2.60	1.92	1.23	0.07	3.22
1944	5											
No dung		0.94	-	0.94	1.43	1.24	0.20	2.87	2.26	2.08	0.04	4.38
Dung (1942)		1.00	-	1.00	1.50	1.28	0.24	3.02	2.54	1.90	0.10	4.54
Mean		0.97	-	0.97	1.46	1.26	0.22	2.94	2.40	1.99	0.07	4.46
Increase		0.06	-	0.06	0.07	0.04	0.04	0.15	0.28	-0.18	0.06	0.16
Previous rotation:												
Lucerne		1.08	-	1.08	1.87	1.38	0.26	3.51	2.28	2.04	0.06	4.38
Arable		0.85	-	0.85	1.06	1.14	0.18	2.38	2.52	1.94	0.08	4.54
1945	4											
No dung		0.74	0.05	0.79	1.44	1.18	-	2.62	1.96	0.77	0.06	2.78
Dung (1943)		0.70	0.04	0.74	1.76	1.25	-	3.01	2.04	1.02	0.04	3.10
Mean		0.72	0.04	0.76	1.60	1.22	-	2.82	2.00	0.89	0.05	2.94
Increase		-0.04	-0.01	-0.05	0.32	0.07	-	0.39	0.08	0.26	-0.02	0.32
Previous rotation:												
Lucerne		0.84	0.04	0.88	1.76	1.20	-	2.96	2.12	0.96	0.05	3.13
Arable		0.60	0.06	0.66	1.44	1.24	-	2.68	1.87	0.83	0.06	2.75

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Lucerne Hay, tons per acre

First year	Block	First year			Second Cycle (continued) Second year				Third year			
		1st	2nd	Total	1st	2nd	3rd	Total	1st	2nd	3rd	Total
1946	2											
	No dung	0.53	-	0.53	0.64	0.25	-	0.89				
	Dung (1944)	0.51	-	0.51	0.72	0.34	-	1.06				
	Mean	0.52	-	0.52	0.68	0.29	-	0.97				
	Increase	-0.02	-	-0.02	0.08	0.09	-	0.17				
	Previous rotation:											
	Lurcerne	0.62	-	0.62	0.48	0.31	-	0.79				
	Arable	0.42	-	0.42	0.88	0.28	-	1.16				
1947	1											
	No dung	0.10	-	0.10								
	Dung (1945)	0.07	-	0.07								
	Mean	0.09	-	0.09								
	Increase	-0.03	-	-0.03								
	Previous rotation:											
	Lucerne	0.09	-	0.09								
	Arable	0.08	-	0.08								

https://doi.org/10.23637/ERADOC-1-145

Ley and Arable Rotations Experiment

Rotations 3 and 4

First year - Potatoes, total tubers in tons per acre; percentage ware

	Total tubers	% ware	Total tubers	% ware	Total tubers	% ware	Total tubers	% ware
	1938 - Block 3		1939 - Block 5		1940 - Block 4		1941 - Block 2	
No dung					9.71	87.0	12.06	82.3
Dung*					11.50	89.1	12.19	80.6
Mean	12.77	92.2	11.13	85.4	10.61	88.0	12.12	81.4
Increase	-	-	-	-	1.79	2.1	0.13	-1.7
			(Second cycle)					
	1942 - Block 1		1943 - Block 3		1944 - Block 5		1945 - Block 4	
No dung	9.24	75.8	7.76	75.7	12.18	86.0	11.71	86.4
Dung*	9.59	75.5	9.53	80.7	13.33	86.0	13.28	88.9
Mean	9.41	75.6	8.64	78.2	12.75	86.0	12.50	87.6
Increase	0.35	-0.3	1.77	5.0	1.15	0.0	1.57	2.5
Previous rotation:								
Ley			10.48	82.6	12.54	86.8	11.66	88.6
Lucerne			8.28	76.8	13.26	86.1	13.82	87.6
Arable with hay			8.74	82.4	12.75	85.1	12.56	89.5
Arable with kale			7.08	70.9	12.46	86.2	11.94	85.2
	1946 - Block 2		1947 - Block 1					
No dung	8.04	87.2	6.11	91.9				
Dung*	9.13	87.6	6.24	90.4				
Mean	8.58	87.4	6.18	91.2				
Increase	1.09	0.4	0.13	-1.5				
Previous rotation:								
Ley	10.21	89.2	6.90	91.6				
Lucerne	8.69	89.2	6.67	92.0				
Arable with hay	7.32	86.8	5.32	91.0				
Arable with kale	8.12	84.3	5.81	90.1				

*Dung was applied two years previously, e.g. in 1938 on Block 4.

https://doi.org/10.23637/ERADOC-1-145

Rotations 3 and 4

Second year - Wheat, grain and straw in cwt. per acre

	Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw
				First Cycle				
	1939 - Block 3		1940 - Block 5		1941 - Block 4		1942 - Block 2	
No dung					8.7	14.3	Crop complete failure	
Dung*					9.5	16.2		
Mean	12.9	22.5	15.2	24.2	9.1	15.2		
Increase	-	-	-	-	0.8	1.9		
	1943 - Block 1							
	Crop eaten by rats							
				Second cycle				
	1944 - Block 3		1945 - Block 5		1946 - Block 4		1947 - Block 2	
No dung	9.1	23.3	13.7	30.2	10.8	18.0	7.7	14.8
Dung*	11.3	27.8	14.0	25.8	12.6	24.2	8.8	14.8
Mean	10.2	25.6	13.8	28.0	11.7	21.1	8.2	14.8
Increase	2.2	4.5	0.3	-4.4	1.8	6.2	1.1	0.0
Previous rotation:								
Ley	14.1	32.1	15.2	33.4	12.1	21.5	9.6	18.4
Lucerne	10.6	24.3	15.0	26.0	12.7	21.9	8.6	13.5
Arable with hay	11.2	27.6	11.0	22.2	8.6	14.2	5.5	10.5
Arable with kale	5.0	18.1	14.2	30.4	13.3	26.8	9.3	16.8

* The dung was applied three years previously, e.g. in 1938 on block 4, etc.

https://doi.org/10.23637/ERADOC-1-145

Ley and Arable Rotations Experiment

Rotation 3

Third year - Hay, yield (85% dry matter) in tons per acre

	First Crop	Second Crop	Total	First Crop	Second Crop	Total	First Crop	Second Crop	Total
				First cycle					
	1940 - Block 3			1941 - Block 5					
	0.78	-	0.78	1.31	0.33	1.64			
	1942 - Block 4			1943 - Block 2			1944 - Block 1		
No dung	1.85	0.22	2.07	1.04	-	1.04	1.02	0.37	1.38
Dung*	2.10	0.21	2.31	1.12	-	1.12	1.02	0.34	1.36
Mean	1.98	0.21	2.19	1.08	-	1.08	1.02	0.35	1.37
Increase	0.25	-0.01	0.24	0.08	-	0.08	-	-0.03	-0.02
				Second cycle					
	1945 - Block 3			1946 - Block 5			1947 - Block 4		
No dung	1.32	0.33	1.65	2.64	1.12	3.76	1.76	0.32	2.07
Dung*	1.62	0.39	2.01	2.80	1.16	3.96	1.89	0.23	2.12
Mean	1.47	0.36	1.83	2.72	1.14	3.86	1.82	0.27	2.10
Increase	0.30	0.06	0.36	0.16	0.04	0.20	0.13	-0.09	0.05
Previous rotation:									
Ley	1.27	0.30	1.57				2.18	0.40	2.59
Lucerne				2.86	1.20	4.06			
Arable with hay	1.68	0.42	2.10	2.58	1.07	3.65	1.46	0.14	1.60

*Dung was applied four years previously, e.g. in 1938 on Block 4 etc.

https://doi.org/10.23637/ERADOC-1-145 *pp 152*

Rotation 4

Third year - Kale, in tons per acre, Cycle 1 or

Sugar Beet, clean beet and tops in tons per acre, total sugar in cwt. per acre and sugar percentage, Cycle 2.

Cycle 1. Kale

Block	1940 3	1941 5	1942 4	1943 2	1944 1
No dung			7.15	Crop	4.94
Dung‡			7.62	failed	4.27
Mean	7.34	9.35	7.38		4.60
Increase			0.47		-0.67

Cycle 2. Sugar Beet.

	1945 - Block 3				1946 - Block 5			
	Clean beet	Tops	Total Sugar	Sugar %	Clean beet	Tops	Total sugar	Sugar %
No dung	6.2	2.8	21.9	17.47	7.29	7.29	27.9	19.14
Dung‡	7.9	3.4	27.2	17.20	8.12	7.45	31.7	19.53
Mean	7.0	3.1	24.6	17.34	7.70	7.37	29.8	19.34
Increase	1.7	0.6	5.3	-0.27	0.83	0.16	3.8	0.39
Previous rotation:								
Ley					8.16	7.88	31.2	19.10
Lucerne	7.2	3.0	25.4	17.60				
Arable with kale	6.9	3.1	23.6	17.08	7.24	6.86	28.3	19.57

‡Dung was applied four years previously, e.g. in 1938 on Block 4, etc.

	1947 - Block 4			
No dung	4.97	2.88	20.7	20.82
Dung	8.63	4.82	35.4	20.52
Mean	6.80	3.85	28.1	20.67
Increase	3.66	1.94	14.7	-0.30
Previous rotation:				
Ley				
Lucerne	7.42	4.21	30.9	20.82
Arable with kale	6.18	3.49	25.3	20.52

https://doi.org/10.23637/ERADOC-1-145

Ley and Arable Rotations Experiment

Yields of Indicator Crops

Potatoes - effect of dung in current year

	Total tubers, tons per acre		Percentage ware	
Prior to rotations				
	1938 - Block 4	1939 - Block 2	(1938)	(1939)
No dung	11.41	10.89		85.2
Dung	15.47	12.52		88.6
Mean	13.44	11.69	89.2	86.9
Increase	4.06 (±0.32)	1.63 (±0.11)		3.4 (±1.45)

1940 - Block 1

	After Hay	After Kale	Mean	After Hay	After Kale	Mean
		±0.64[1]			±2.0[1]	
No dung	8.23	6.75	7.49	82.0	76.6	79.3
Dung	9.83	7.85	8.84	82.4	79.5	81.0
Mean ±0.59	9.02	7.30	8.16	±1.70 82.2	78.0	80.1
Resp. ±0.50	1.60	1.10	1.35	±2.36 0.4	2.9	1.7
			±0.36			±1.67

Fourth year of cycles

	Previous crop rotation					Previous crop rotation				
	Ley	Lucerne	Arable with Hay	Arable with Kale	Mean	Ley	Lucerne	Arable with Hay	Arable with Kale	Mean
1941 - Block 3			±0.45[1]					±1.47[1]		
No dung	15.19	11.15	11.82	9.35	11.88	87.6	84.1	83.4	82.2	84.3
Dung	14.38	14.23	14.40	12.19	13.80	86.2	85.0	84.2	86.6	85.5
Mean ±0.41	14.79	12.69	13.11	10.76	12.84	±1.32 86.9	84.6	83.8	84.4	84.9
Resp. ±0.37	-0.80	3.08	2.58	2.84	1.93	±1.27 -1.4	0.9	0.8	4.4	1.2
					±0.18					±0.64
1942 - Block 5			±0.37[1]					±1.16[1]		
No dung	13.70	13.22	12.52	10.83	12.57	87.0	85.0	85.0	81.4	84.6
Dung	14.66	15.40	14.75	13.14	14.49	87.4	86.1	87.2	84.2	86.2
Mean ±0.35	14.18	14.31	13.64	11.98	13.53	±0.97 87.2	85.6	86.1	82.8	85.4
Resp. ±0.26	9.96	2.18	2.23	2.31	1.92	±1.27 0.4	1.1	2.2	2.8	1.6
					±0.13					±0.64

Standard errors (1) for comparisons other than vertical ones.

https://doi.org/10.23637/ERADOC-1-145 *pp 154*

Potatoes - effect of dung in current year.

Fourth year of cycles (continued)

Total tubers, tons per acre

	Previous crop rotation: Ley	Lucerne	Arable with Hay	Arable with Kale	Mean
1943 - Block 4			±0.68[1]		
No dung	8.84	9.76	8.08	7.43	8.53
Dung	10.31	13.52	9.50	10.63	10.99
Mean ±0.40	9.58	11.64	8.79	9.03	9.76
Resp.±1.11	1.47	3.76	1.42	3.20	2.46
					±0.56
1944 - Block 2			±0.61[1]		
No dung	12.08	13.20	10.56	11.22	11.76
Dung	13.04	14.64	11.76	12.24	12.92
Mean ±0.57[1]	12.56	13.92	11.16	11.73	12.34
Resp.±0.45	0.96	1.44	1.20	1.02	1.16
					±0.22
1945 - Block 1			±0.78[1]		
No dung	13.28	12.96	12.46	11.06	12.44
Dung	13.32	12.68	11.89	12.48	12.59
Mean ±0.39	13.30	12.82	12.18	11.77	12.52
Resp.±1.35	0.04	-0.28	-0.57	1.42	0.15
					±0.68
1946 - Block 3			±0.92[1]		
No dung	11.37	9.59	8.94	8.32	9.56
Dung	13.28	11.50	11.93	8.88	11.40
Mean ±0.86	12.32	10.54	10.44	8.60	10.48
Resp.±0.69	1.91	1.91	2.99	0.56	1.84
					±0.35
1947 - Block 5			±0.38[1]		
No dung	8.42	8.74	6.28	8.03	7.87
Dung	9.06	9.62	8.11	8.86	8.91
Mean ±0.35	8.74	9.18	7.20	8.44	8.39
Resp.±0.28	0.64	0.88	1.83	0.83	1.04
					±0.14

Percentage ware

	Previous crop rotation: Ley	Lucerne	Arable with Hay	Arable with Kale	Mean
			±2.60[1]		
	80.4	79.8	76.6	71.4	77.0
	81.3	87.1	83.6	81.4	83.4
±1.14	80.8	83.4	80.1	76.4	80.2
±4.67	0.9	7.3	7.0	10.0	6.4
					±2.34
			±0.91[1]		
	89.4	87.5	86.2	82.2	86.3
	89.4	89.0	88.1	85.5	88.0
±0.82	89.4	88.2	87.2	83.8	87.2
±0.76	0.0	1.5	1.9	3.3	1.7
					±0.38
			±1.55[1]		
	87.0	86.8	84.7	85.0	85.9
	86.8	85.0	85.8	83.2	85.2
±0.71	86.9	85.9	85.2	84.1	85.6
±2.76	-0.2	-1.8	1.1	-1.8	-0.7
					±1.38
			±0.52[1]		
	90.2	89.1	87.6	89.7	89.2
	90.6	92.3	90.8	93.2	91.7
±0.47	90.4	90.7	89.2	91.4	90.4
±0.46	0.4	3.2	3.2	3.5	2.5
					±0.23
			±0.64[1]		
	93.3	92.8	92.4	93.2	92.9
	94.1	93.2	93.2	94.0	93.6
±0.53	93.7	93.0	92.8	93.6	93.3
±0.70	0.8	0.4	0.8	0.8	0.7
					±0.35

Standard errors (1) for comparisons other than vertical ones.

In 1946 and 1947 read "Arable with sugar beet" for "Arable with kale".

https://doi.org/10.23637/ERADOC-1-145 *pp 155*

Ley and Arable Rotations Experiment

Potatoes

Standard errors per plot

		d.f.	Total tubers tons per acre	Total tubers % of mean	Percentage ware
1938 - Block 4	Whole plot	7	0.68	5.08	
	Sub-plot	7	0.64	4.79	
1939 - Block 2	Whole plot	7	1.00	8.52	1.49
	Sub-plot	7	0.22	1.86	2.90
1940 - Block 1	Whole plot	6	1.18	14.5	3.40
	Sub-plot	6	0.72	8.75	3.34
Fourth year of cycles					
1941 - Block 3	Whole plot	4	0.57	4.47	1.87
	Sub-plot	4	0.37	2.86	1.27
1942 - Block 5	Whole plot	4	0.49	3.62	1.38
	Sub-plot	4	0.26	1.95	1.27
1943 - Block 4	Whole plot	4	0.57	5.82	1.61
	Sub-plot	4	1.11	11.3	4.67
1944 - Block 2	Whole plot	4	0.80	6.51	1.17
	Sub-plot	4	0.45	3.65	0.76
1945 - Block 1	Whole plot	4	0.55	4.40	1.00
	Sub-plot	4	1.35	10.8	2.76
1946 - Block 3	Whole plot	4	1.21	11.5	0.66
	Sub-plot	4	0.69	6.6	0.46
1947 - Block 5	Whole plot	4	0.50	6.0	0.75
	Sub-plot	4	0.28	3.3	0.70

https://doi.org/10.23637/ERADOC-1-145 *pp 156*

Barley - residual effect of dung applied to potatoes in the previous year.

	Grain, cwt. per acre.			Straw, cwt. per acre.	
	1938 - Block 5	1939 - Block 4		(1938)	(1939)
No dung		15.3			23.1
Dung		16.2			28.6
Mean	7.66	15.8		12.6	25.8
Response		0.9	(±0.22)		5.5 (±1.08)

1940 - Block 2

No dung	6.4		7.9	
Dung	8.5		11.4	
Mean	7.5		9.7	
Response	2.1	(±0.80)	3.5	(±1.02)

1941 - Block 1

	Crop previous to potatoes					
	Hay	Kale	Mean	Hay	Kale	Mean
	±1.16[1]			±1.28[1]		
No dung	7.0	10.6	8.8	10.0	13.2	11.6
Dung	7.6	9.7	8.6	10.1	14.2	12.2
Mean ±0.87	7.3	10.1	8.7	±1.03 10.1	13.7	11.9
Resp. ±1.56	0.6	-0.9	-0.2	±1.52 0.1	1.0	0.6
			±1.10			±1.07

Standard errors (1) for comparisons other than vertical ones

https://doi.org/10.23637/ERADOC-1-145

Ley and Arable Rotations Experiment

Barley - residual effect of dung applied to potatoes in previous year.

Fifth years of cycles

	Grain, cwt. per acre — Crop previous to potatoes					Straw, cwt. per acre — Crop previous to potatoes				
	Ley	Lucerne	Arable with Hay	Arable with Kale	Mean	Ley	Lucerne	Arable with Hay	Arable with Kale	Mean
1942 - Block 3			±2.27[1]					±2.46[1]		
No dung	18.6	22.6	13.3	9.5	16.0	21.7	26.2	16.3	12.1	19.1
Dung	21.8	21.3	18.1	17.8	19.8	25.0	25.7	21.7	20.7	23.3
Mean ±1.42	20.2	21.9	15.7	13.7	17.9	±1.82	23.4	26.0	19.0	16.4	21.2
Resp. ±3.55	3.2	-1.3	4.8	8.3	3.8	±3.31	3.3	-0.5	5.4	8.6	4.2
					±1.78						±1.66
1943 - Block 5			±2.96[1]					±3.34[1]		
No dung	13.2	14.9	14.0	22.7	16.2		23.8	24.1	20.7	34.7	25.8
Dung	12.8	14.5	17.4	16.2	15.2		19.2	22.8	26.7	23.6	23.1
Mean ±2.28	13.0	14.7	15.7	19.4	15.7	±2.19	21.5	23.4	23.7	29.2	24.4
Resp. ±3.79	-0.4	-0.4	3.4	-6.5	-1.0	±5.05	-4.6	-1.3	6.0	-11.1	-2.7
					±1.90						±2.52
1944 - Block 4			±3.24[1]					±4.38[1]		
No dung	18.1	22.5	19.0	24.2	21.0		22.7	20.1	21.8	23.2	21.9
Dung	15.7	19.7	23.0	17.4	18.9		19.2	23.5	29.2	20.8	23.2
Mean ±2.21	16.9	21.1	21.0	20.8	20.0	±2.78	20.9	21.8	25.5	22.0	22.6
Resp. ±4.76	-2.4	-2.8	4.0	-6.8	-2.1	±6.77	-3.5	3.4	7.4	-2.4	1.3
					±2.38						±3.38
1945 - Block 2			±2.07[1]							
No dung	13.2	17.6	11.6	13.7	14.0		15.3	18.9	11.9	14.8	15.2
Dung	11.1	20.0	14.5	15.4	15.2		13.8	20.9	16.8	17.8	17.3
Mean ±1.17	12.2	18.8	13.0	14.6	14.6		14.6	19.9	14.4	16.3	16.2
Resp. ±3.43	-2.1	2.4	2.9	1.7	1.2		-1.5	2.0	4.9	3.0	2.1
					±1.72						
1946 - Block 1			±1.44[1]					±1.80[1]		
No dung	17.4	18.8	14.0	14.1	16.1		20.4	23.7	17.0	19.2	20.1
Dung	16.4	16.4	15.6	15.7	16.0		18.5	20.1	19.6	19.8	19.5
Mean ±0.80	16.9	17.6	14.8	14.9	16.0	±0.44	19.4	21.9	18.3	19.5	19.8
Resp. ±2.40	-1.0	-2.4	1.6	1.6	-0.1	±3.48	-1.9	-3.6	2.6	0.6	-0.6
					±1.20						±1.74

Standard errors (1) for comparisons other than vertical ones.

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https://doi.org/10.23637/ERADOC-1-145

Barley - residual effect of dung applied to potatoes in the previous year.

Grain, cwt. per acre — Straw, cwt. per acre

Fifth years of cycles (continued)

	Crop previous to potatoes					Crop previous to potatoes				
	Ley	Lucerne	Arable with Hay	Arable with Sugar Beet	Mean	Ley	Lucerne	Arable with Hay	Arable with Sugar Beet	Mean
1947 - Block 3			±1.21[1]							
No dung	15.5	12.5	12.3	10.4	12.7	15.8	15.4	13.3	14.9	14.8
Dung	18.7	16.5	15.6	12.1	15.7	21.0	20.3	18.6	17.3	19.3
Mean ±0.99	17.1	14.5	14.0	11.2	14.2	18.4	17.8	16.0	16.1	17.1
Resp. ±1.39	3.2	4.0	3.3	1.7	3.0 ±0.69	5.2	4.9	5.3	2.4	4.5

Standard errors (1) for comparisons other than vertical ones

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Ley and Arable Rotations Experiment

Barley

Standard errors per plot

		Barley - Grain			Barley - Straw		
		d.f.	cwt. per acre	% of mean	d.f.	cwt. per acre	% of mean
1938 - Block 5	Whole plot	7	1.79	23.4	7	2.62	20.8
	Sub-plot	8	1.67	21.8	8	1.50	11.9
1939 - Block 4	Whole plot	7	1.55	9.85	7	1.29	4.98
	Sub-plot	6*	0.44	2.76	6*	2.17	8.39
1940 - Block 2	Whole plot	7	2.34	31.5	7	2.35	24.3
	Sub-plot	7	1.60	21.5	7	2.04	21.1
1941 - Block 1	Whole plot	6	1.74	20.0	6	2.06	17.4
	Sub-plot	6	2.21	25.4	6	2.15	18.2
Fifth year of cycles							
1942 - Block 3	Whole plot	4	2.01	11.2	4	2.57	12.1
	Sub-plot	4	3.55	19.9	4	3.31	15.6
1943 - Block 5	Whole plot	4	3.22	20.5	4	3.09	12.7
	Sub-plot	4	3.79	24.1	4	5.05	20.6
1944 - Block 4	Whole plot	4	3.12	15.6	4	3.93	17.4
	Sub-plot	4	4.76	23.9	4	6.77	30.0
1945 - Block 2	Whole plot	4	1.65	11.3			
	Sub-plot	4	3.43	23.4			
1946 - Block 3	Whole plot	4	1.13	7.0	4	0.62	3.15
	Sub-plot	4	2.40	15.0	4	3.48	17.6
1947 - Block 3	Whole plot	4	1.39	9.8			
	Sub-plot	4	1.39	9.8			

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* One missing sub-plot.

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https://doi.org/10.23637/ERADOC-1-145

MARKET GARDEN EXPERIMENT

Woburn, Lansome Field (begun in 1942)

The use of heavy dressings of organic manures for making a market garden soil, and the effect of sulphate of ammonia.

The four crops follow a two-year rotation, each of the two "series" into which the area is divided bearing two crops in a year, while the series carry different crops at any one season, except that in the first year the whole area was under winter cabbage.

System of replication: 2 series, each consisting of 4 randomized blocks of 10 plots each, certain interactions being partially confounded with block differences.

Area of each plot: 0.0125 acre. (In 1943, peas and beet 0.0105 acre)

Cropping:

1st year	Globe beet (sown April, lifted July)
	Winter cabbage (transplanted August, cut December-March)
2nd year	Peas (sown March-April, pulled June-July)
	Leeks (transplanted July, lifted January-March)

Treatments

Organic manures: Dung, sewage sludge compost (composted town refuse in 1942 and 1943), sewage sludge (West Middlesex) and vegetable compost, each at 15 and 30 tons per acre.

Organics were applied at 4 and 8 tons per acre to winter cabbage in the first year.

Sulphate of ammonia:

With organic manures: None, 0.6 cwt. N per acre
In absence of organics: None, 0.6, 1.2, 1.8 cwt. N per acre

Basal manuring:

Superphosphate, 0.4 cwt. P_2O_5 per acre (triple superphosphate in 1945 and 1946).
Muriate of potash, 0.5 cwt. K_2O per acre.

In 1943, 3200 lb. per acre carbonate of lime was applied to winter cabbage.

Time of application of manures:

Organic manures and basal dressings are given in a single dose in early spring before sowing peas and beet, except that in the first year the winter cabbage received a reduced dressing of organics and the full amount of basal manures. The sulphate of ammonia is divided between crops as follows (cwt. N per acre):

	With organics	In the absence of organics
Globe beet and peas	0, 0.2	0, 0.2, 0.4, 0.6
Cabbage and leeks	0, 0.4	0, 0.4, 0.8, 1.2

In the first year, the winter cabbage received the whole dressing of sulphate of ammonia.

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Crop Notes

Winter Cabbage

Previous crop: Globe Beet (Cabbage in 1942)

Year	Series	Variety	Planted out	Harvested
1942	A	Christmas Cabbage	Aug. 13	Nov. 20 - Feb. 17
1943	B	January King	Sept. 2	Dec. 2 - March 16
1944	A	January King	Aug. 23	March 14, April 9
1945	B	January King	July 24 and Aug. 10	Dec. 1 - March 6
1946	A	Christmas Drumhead and Savoy	Aug. 12	Nov. 11 - 15
1947	B	Failed, owing to dry weather.		

Leeks (Cabbage in 1942)

Previous crop: Peas (Cabbage in 1942)

1942	B	January King[1]	Sept. 21	March 19
1943	A	Musselburgh	Aug. 6 - 20	March 6
1944	B	Musselburgh	July 18, 28	Feb. 22 - April 13
1945	A	Musselburgh	Aug. 7-14	March 5-12
1946	B	Musselburgh	Aug. 10, 30	May 15-20
1947	A	Musselburgh	July 18	Feb. 12-27

Globe Beet. Variety: Crimson Globe

Previous crop: Leeks (Cabbage in 1942)

Year	Series	Sown	Harvested
1943	B	April 27	July 19 - August 20
1944	A	April 16	July 24 - August 14
1945	B	April 20	July 5 - 30
1946	A	April 3	July 24 - August 6
1947	B	May 27	August 8 - 13

Peas. Variety: Kelvedon Wonder

Previous crop: Winter Cabbage

1943	A	May 4[2]	July 12 - 14
1944	B	April 11	July 5 - 11
1945	A	April 4, 18	June 25 - July 17
1946	B	March 25, May 13[3]	July 6, 23 - 30
1947	A	April 25	June 26 - 30

(1) No leek plants available

(2) First sowing, April 10, failed

(3) Two sowings, March 15 and April 20, failed

N

https://doi.org/10.23637/ERADOC-1-145 *pp 163*

Market Garden Experiment Bg/1.3

Globe Beet and Peas

Organic Manures t.p.a.		Sulphate of Ammonia, cwt. N per acre: Globe Beet Total produce[1]: tons/acre None	0.2	Mean	Globe Beet Bulbs[2]: tons/acre None	0.2	Mean	Peas Green peas: cwt./acre None	0.2	Mean
1943		(Series B) ±1.246		±0.881				(Series A) ±4.37		±3.09
0		2.65	3.53	3.09				22.1	16.7	19.4
D	15	7.56	3.56	5.56				30.4	28.9	29.7
D	30	8.06	8.80	8.43				15.4	27.7	21.5
CTR	15	4.91	5.81	5.36				24.3	17.7	21.0
CTR	30	5.43	7.86	6.64				21.6	30.1	25.8
SS	15	5.29	5.11	5.20				20.1	28.3	24.2
SS	30	6.98	6.66	6.82				31.8	26.9	29.3
VC	15	5.46	6.92	6.19				15.4	23.8	19.6
VC	30	8.34	7.24	7.79				29.4	33.0	31.2
Mean		6.50[3]	6.49[3]	5.86[4]				23.5[3]	27.0[3]	24.0[4]
S.E. per plot		1.763 or 30.1%						6.18 or 25.8%		
1944		(Series A) ±0.775		±0.548				(Series B) ±2.61		±1.84
0		1.33	1.10	1.21				11.2	7.1	9.1
D	15	4.15	4.26	4.21				9.3	8.0	8.7
D	30	3.07	5.77	4.42				8.3	14.2	11.2
CSS	15	2.71	1.51	2.11				10.6	9.9	10.2
CSS	30	1.96	5.01	3.48				10.4	11.2	10.8
SS	15	2.94	3.78	3.36				11.2	10.8	11.0
SS	30	4.90	4.13	4.52				7.3	8.9	8.1
VC	15	1.21	2.99	2.10				4.9	13.6	9.3
VC	30	4.68	5.76	5.22				9.8	11.5	10.6
Mean		3.20[3]	4.15[3]	3.22[4]				9.0[3]	11.0[3]	10.2[4]
S.E. per plot		1.09% or 33.0%						3.68 or 36.1%		

(1) Excludes totally unmarketable produce and includes tops
(3) Excludes "No organic manure".
(4) Mean of all plots.

All standard errors have 17 d.f.

Symbols: 0 No organic manure CTR Composted town refuse
D Dung CSS Composted sewage sludge
SS Sewage sludge VC Vegetable compost

N

https://doi.org/10.23637/ERADOC-1-145

Globe Beet and Peas

Sulphate of Ammonia, cwt. N per acre

Organic Manures t.p.a.		Globe Beet Total produce[1]: tons/acre			Globe Beet Bulbs[2]: tons/acre			Peas Green peas: cwt/acre		
		None	0.2	Mean	None	0.2	Mean	None	0.2	Mean
1945		(Series B) ±0.748		±0.529	(Series B) ±0.457		±0.323	(Series A) ±7.79		±5.51
0		3.03	4.91	3.97	1.51	2.73	2.12	48.3	37.8	43.0
D	15	6.28	5.79	6.03	3.51	3.32	3.41	46.2	42.9	44.5
D	30	6.24	7.02	6.63	3.45	3.63	3.54	38.0	47.8	42.9
CSS	15	6.12	4.55	5.33	3.41	2.85	3.13	46.4	32.7	39.6
CSS	30	5.30	6.55	5.93	2.91	3.52	3.22	43.6	50.0	46.8
SS	15	5.40	5.95	5.68	2.87	3.29	3.08	41.8	49.9	45.8
SS	30	7.20	5.67	6.44	3.81	3.18	3.50	44.3	49.2	46.8
VC	15	5.80	5.13	5.46	3.25	3.16	3.21	46.5	38.7	42.6
VC	30	7.46	7.11	7.28	4.13	3.95	4.04	50.4	50.9	50.6
Mean		6.23[3]	5.97[3]	5.68[4]	3.42[3]	3.36[3]	3.15[4]	44.6[3]	45.2[3]	43.9[4]
S.E. per plot		1.058 or 18.6%			0.646 or 20.5%			11.02 or 25.1%		
1946					(Series A) ±0.648		±0.458	(Series B) ±8.61		±6.09
0					0.51	0.88	0.69	20.2	37.6	28.9
D	15				2.32	2.77	2.55	35.5	31.6	33.6
D	30				4.01	3.64	3.82	40.2	36.6	38.4
CSS	15				0.97	1.44	1.21	38.6	36.8	37.7
CSS	30				1.95	1.63	1.79	33.6	18.2	25.9
SS	15				1.22	1.23	1.22	33.1	37.7	35.4
SS	30				1.32	2.32	1.82	36.6	30.2	33.4
VC	15				1.31	1.55	1.43	54.0	40.1	47.0
VC	30				3.01	2.90	2.96	32.1	30.4	31.2
Mean					2.01[3]	2.18[3]	1.84[4]	38.0[3]	32.7[3]	33.7[4]
S.E. per plot					0.916 or 49.7%			12.18 or 36.1%		

(1) Excludes totally unmarketable produce and includes tops.
In 1946 many plants went to seed.
(2) Excludes unmarketable produce.
(3) Excludes "No organic manure".
(4) Mean of all plots.

All standard errors have 17 d.f.

Symbols: 0 No organic manure
D Dung
CSS Composted sewage sludge
SS Sewage sludge
VC Vegetable compost

N

https://doi.org/10.23637/ERADOC-1-145

Market Garden Experiment

Bg/1.5

Globe Beet and Peas

Organic Manures t.p.a.		Sulphate of Ammonia, cwt. N per acre: Globe Beet Total produce[1]: tons/acre None	0.2	Mean	Globe Beet Bulbs[2]: tons/acre None	0.2	Mean	Peas Green peas cwt/acre None	0.2	Mean
1947		(Series B) ±0.520		±0.368	(Series B) ±0.310		±0.219	(Series A) ±2.71		±1.92
0		1.43	0.86	1.14	0.87	0.46	0.66	22.3	17.1	19.7
D	15	3.35	2.90	3.12	1.57	1.52	1.54	27.4	25.7	26.6
D	30	5.52	5.25	5.39	3.02	3.04	3.03	26.9	27.0	26.9
CSS	15	1.67	2.63	2.15	0.97	1.38	1.18	28.6	25.8	27.2
CSS	30	3.41	2.53	2.97	1.91	1.24	1.57	26.4	23.4	24.9
SS	15	0.92	1.12	1.02	0.54	0.63	0.58	25.6	21.0	23.3
SS	30	0.60	1.12	0.86	0.20	0.62	0.41	25.0	27.0	26.0
VC	15	2.61	3.18	2.90	1.51	1.74	1.63	23.2	17.9	20.5
VC	30	3.19	3.23	3.21	1.87	1.75	1.81	27.8	26.2	27.0
Mean		2.66[3]	2.74[3]	2.34[4]	1.45[3]	1.49[3]	1.28[4]	26.4[3]	24.2[3]	24.3[4]
S.E. per plot		0.736 or 31.4%			0.438 or 34.2%			3.83 or 15.8%		

(1) Excludes totally unmarketable produce and includes tops.
(2) Excludes unmarketable produce
(3) Excludes "No organic manure"
(4) Mean of all plots

All standard errors have 17 d.f.

Yields on plots without organic Manure

	Sulphate of Ammonia, cwt.N per acre: None	0.2	0.4	0.6	S.E.
	Globe Beet Total produce: tons per acre				
1943	2.65	3.53	2.78	4.16	±1.246
1944	1.33	1.10	1.89	3.25	±0.775
1945	3.03	4.91	3.70	4.35	±0.748
1947	1.43	0.86	0.48	0.89	±0.520
	Bulbs: tons per acre				
1945	1.51	2.73	2.17	2.31	±0.457
1946	0.51	0.88	1.35	0.51	±0.648
1947	0.87	0.46	0.29	0.47	±0.310
	Peas Green peas: cwt. per acre				
1943	22.1	16.7	16.7	19.9	±4.37
1944	11.2	7.1	10.1	16.2	±2.61
1945	48.3	37.8	39.6	33.4	±7.79
1946	20.2	37.6	28.4	23.0	±8.61
1947	22.3	17.1	20.4	21.4	±2.71

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N

Winter Cabbage

Sulphate of Ammonia, cwt.N per acre

Organic Manures t.p.a.[1]		None	0.6	Mean	None	0.6	Mean	None	0.6	Mean
		Total produce: tons/acre			Plant number thousands per acre			Total produce tons/acre		
1942		(Series A) ±1.046		±0.740	(Series A) ±0.82		±0.58	(Series B) ±0.300		±0.212
0		5.27[a]	7.68[a]	6.48[b]	17.5[c]	18.2[c]	17.9[d]	1.30[e]	2.51[e]	1.91[f]
D	4	5.96[a]	7.91[a]	6.94[b]	17.6[c]	18.5[c]	18.0[d]	2.33[e]	2.19[e]	2.26[f]
D	8	7.63[a]	8.90[a]	8.27[b]	18.1[c]	18.4[c]	18.3[d]	2.30[e]	2.66[e]	2.48[f]
CTR	4	7.66	7.15	7.40	18.3	18.6	18.4	2.16	2.39	2.27
CTR	8	7.43	9.79	8.61	18.2	19.4	18.8	2.16	2.29	2.22
SS	4	8.75	9.60	9.18	18.8	19.1	19.0	2.14	2.43	2.28
SS	8	8.55	7.48	8.02	16.7	17.2	17.0	1.99	2.50	2.24
Mean		7.45[2]	8.46[2]	7.69[3]	17.9[2]	18.5[2]	18.2[3]	2.21[2]	2.41[2]	2.23[3]
S.E. per plot		1.479 or 19.2%			1.16 or 6.4%			0.424 or 19.0%		

Standard errors for D figures only: (a) 0.740 (b) 0.523 (c) 0.58 (d)0.41
(e) 0.212 (f) 0.150

(1) Since there was no crop of globe beet and peas, organics and all the Sulphate of Ammonia (0.6 cwt. N per acre) were applied to the cabbages. No vegetable compost was available: instead dung was applied, so that the number of dunged plots was twice that in subsequent years.

(2) Excludes "No organic manure".

(3) Mean of all plots.

All standard errors have 17 d.f.

Symbols: 0 No organic manure.
D Dung
SS Sewage sludge
VC Vegetable compost
CTR Composted town refuse

https://doi.org/10.23637/ERADOC-1-145 *pp 167*

Winter Cabbage and Leeks

Sulphate of Ammonia, cwt. N per acre

Organic Manures t.p.a.[4]		Winter Cabbage (Series B) Total produce: tons/acre			Winter Cabbage (Series B) Plant number: thous./acre			Leeks (Series A) Total produce: tons/acre			Leeks (Series A) Plant number: thous./acre		
		None	0.4	Mean	None	0.4	Mean	None	0.4	Mean	None	0.4	Mean
1943		±0.336		±0.238	±0.67		±0.47	±0.270		±0.191	±0.99		±0.70
O		1.26	2.94	2.10	15.2	16.6	15.9	1.23	1.96	1.60	41.9	43.7	42.8
D	15	2.86	3.24	3.05	16.3	17.3	16.8	1.25	1.86	1.56	44.6	44.3	44.4
D	30	3.12	4.04	3.58	17.0	16.1	16.6	2.40	2.00	2.20	45.0	44.2	44.6
CTR	15	2.73	2.88	2.81	17.4	15.9	16.7	1.57	1.46	1.52	43.6	45.4	44.5
CTR	30	2.01	3.16	2.58	13.6	17.4	15.5	0.96	1.65	1.31	41.3	42.5	41.9
SS	15	2.81	3.32	3.07	16.2	17.1	16.6	1.92	1.92	1.92	44.4	44.6	44.5
SS	30	3.61	3.04	3.32	16.7	17.3	17.0	1.50	1.38	1.44	43.7	43.1	43.4
VC	15	3.09	3.27	3.18	17.6	16.0	16.8	2.04	1.82	1.93	45.5	43.2	44.4
VC	30	3.57	3.50	3.54	17.1	17.8	17.4	1.57	2.07	1.82	43.5	44.7	44.1
Mean		2.98[2]	3.31[2]	3.00[3]	16.5[2]	16.9[2]	16.6[3]	1.65[2]	1.77[2]	1.70[3]	44.0[2]	44.0[2]	43.9[3]
S.E. per plot		0.475 or 15.8%			0.95 or 5.7%			0.382 or 22.4%			1.41 or 3.2%		

(2) Excludes "No organic manure"

(3) Mean of all plots.

(4) Organics applied to previous crop of globe beet and peas.

All standard errors have 17 d.f.

Symbols: O No organic manure. SS Sewage sludge. CTR Composted town refuse.
D Dung. VC Vegetable compost.

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Bg/1.7

2

Winter Cabbage and Leeks

Organic Manures t.p.a.[1]		Sulphate of Ammonia, cwt. N per acre: Winter Cabbage (Series A) Total produce: tons/acre None	0.4	Mean	Winter Cabbage (Series A) Plant number: thous./acre None	0.4	Mean	Leeks (Series B) Total produce: tons/acre None	0.4	Mean	Leeks (Series B) Plant number: thous./acre None	0.4	Mean
1944		±0.417		±0.295	±0.76		±0.54	±0.479		±0.339	±3.34		±2.36
0		0.49	1.51	1.00	13.7	16.3	15.0	1.54	0.94	1.24	27.1	29.0	28.0
D	15	1.17	3.41	2.29	16.0	18.6	17.3	2.39	1.58	1.98	34.8	31.2	33.0
D	30	1.53	3.92	2.72	16.9	17.9	17.4	3.34	3.44	3.39	35.8	36.2	36.0
CSS	15	0.68	1.98	1.33	15.2	18.0	16.6	1.50	2.53	2.01	29.2	34.5	31.9
CSS	30	0.78	2.08	1.43	14.0	16.0	15.0	1.71	1.24	1.47	28.7	26.1	27.4
SS	15	2.17	4.09	3.13	14.9	16.8	15.8	1.59	1.01	1.30	31.7	28.0	29.9
SS	30	4.27	4.32	4.29	15.9	17.0	16.4	0.77	1.69	1.23	29.1	26.8	28.0
VC	15	0.91	2.28	1.60	17.0	17.0	17.0	1.67	1.97	1.82	32.1	32.7	32.4
VC	30	1.17	2.88	2.03	14.8	17.0	15.9	3.21	2.68	2.95	35.2	36.0	35.6
Mean		1.59[2]	3.12[2]	2.28[3]	15.6[2]	17.3[2]	16.3[3]	2.02[2]	2.02[2]	1.89[3]	32.1[2]	31.4[2]	31.2[3]
S.E. per plot		0.589 or 25.8%			1.07 or 6.6%			0.678 or 35.8%			4.73 or 15.2%		

(1) Organics applied to previous crop of globe beet and peas.

(2) Excludes "No organic manure".

(3) Mean of all plots.

All standard errors have 17 d.f.

Symbols: 0 No organic manure. SS Sewage sludge. CSS Composted sewage sludge
D Dung VC Vegetable compost.

Bg/1.8

Winter Cabbage and Leeks

Organic Manures t.p.a.[1]		Sulphate of Ammonia, cwt. N per acre: None	0.4	Mean	None	0.4	Mean	None	0.4	Mean	None	0.4	Mean
		Winter Cabbage (Series B) Total produce: tons/acre			Plant number: thous./acre			Leeks (Series A) Total produce: tons/acre			Plant number: thous./acre		
1945		±0.956		±0.676	±1.00		±0.71	±0.213		±0.151	±2.48		±1.75
0		4.26	6.67	5.47	16.5	16.8	16.6	1.17	1.20	1.18	47.6	41.6	44.6
D	15	7.82	7.34	7.58	19.2	17.6	18.4	1.73	1.33	1.53	44.8	41.7	43.2
D	30	6.97	7.53	7.25	17.5	16.2	16.8	1.80	1.26	1.53	42.5	38.4	40.4
CSS	15	5.85	6.95	6.40	17.6	17.4	17.5	1.43	1.09	1.26	43.7	42.6	43.2
CSS	30	6.77	9.30	8.04	18.2	17.5	17.8	1.25	1.13	1.19	41.1	35.5	38.3
SS	15	6.74	7.54	7.14	16.5	15.8	16.2	1.07	0.88	0.98	38.1	33.9	36.0
SS	30	8.57	8.95	8.76	17.5	17.5	17.5	1.49	1.25	1.37	39.6	35.4	37.5
VC	15	6.01	7.23	6.62	16.9	17.3	17.1	1.39	1.31	1.35	45.4	41.8	43.6
VC	30	7.97	8.97	8.47	17.3	17.6	17.4	1.97	1.47	1.72	43.1	36.8	40.0
Mean		7.09[2]	7.98[2]	7.42[3]	17.6[2]	17.1[2]	17.3[3]	1.52[2]	1.21[2]	1.33[3]	42.3[2]	38.3[2]	40.9[3]
S.E. per plot		1.352 or 18.4%			1.42 or 8.2%			0.301 or 22.6%			3.50 or 8.6%		

(1) Organics applied to previous crop of globe beet and peas.

(2) Excludes "No organic manure".

(3) Mean of all plots

All standard errors have 17 d.f.

Symbols: 0 No organic manure. SS Sewage sludge. CSS Composted sewage sludge.
D Dung VC Vegetable compost.

Bg/1.9

Winter Cabbage and Leeks

Organic Manures t.p.a.[1]		Sulphate of Ammonia, cwt. N per acre: None	0.4	Mean	None	0.4	Mean	None	0.4	Mean	None	0.4	Mean
		Winter Cabbage (Series A) Total produce: tons/acre			Plant number: thous./acre			Leeks (Series B) Total produce: tons/acre			Plant number: thous./acre		
1946		±0.404		±0.286	±0.32		±0.22	±0.391		±0 276	±1.17		±0.83
0		1.45	2.27	1.86	17.5	17.9	17.7	1.91	2.10	2.01	42.6	40.6	41.6
D	15	2.38	4.00	3.19	17.3	18.1	17.7	2.75	2.74	2.74	40.3	43.6	41.9
D	30	2.56	4.81	3.69	17.8	17.9	17.8	3.76	3.88	3.82	43.8	39.9	41.8
CSS	15	1.47	3.72	2.60	17.1	18.0	17.5	2.42	3.06	2.74	43.3	42.4	42.8
CSS	30	2.06	3.55	2.80	17.3	18.0	17.7	2.27	3.19	2.73	42.2	37.8	40.0
SS	15	2.62	4.49	3.56	17.5	17.8	17.7	2.82	2.82	2.82	43.7	44.5	44.1
SS	30	4.47	5.99	5.23	17.5	17.2	17.4	4.09	3.71	3.90	40.6	43.7	42.2
VC	15	1.17	2.82	1.99	17.8	16.5	17.2	2.61	3.58	3.10	43.3	42.3	42.8
VC	30	2.25	2.92	2.58	16.8	17.9	17.4	3.42	3.03	3.23	40.3	46.2	43.3
Mean		2.37[2]	4.04[2]	3.10[3]	17.4[2]	17.7[2]	17.6[3]	3.02[2]	3.25[2]	2.94[3]	42.2[2]	42.3[2]	42.5[3]
S.E. per plot		0.572 or 18.5%			0.45 or 2.6%			0.553 or 18.8%			1.66 or 3.9%		

(1) Organics applied to previous crop of globe beet and peas.

(2) Excludes "No organic manure".

(3) Mean of all plots.

All standard errors have 17 d.f.

Symbols: 0 No organic manure. SS Sewage sludge. CSS Composted sewage sludge.
D Dung VC Vegetable compost.

Bg/1.10

Market Garden Experiment Bg/1.11

Winter Cabbage and Leeks

Organic Manures t.p.a.[1]			Sulphate of Ammonia, cwt. N per acre: Leeks Total produce: tons/acre None	0.4	Mean	Leeks Plant number; thous./acre None	0.4	Mean
1947			±0.197		±0.140	±0.80		±0.57
0			1.68	1.82	1.75	42.5	42.6	42.6
D	15		1.80	1.92	1.86	42.2	40.6	41.4
D	30		2.24	2.03	2.13	42.9	42.8	42.8
CSS	15		1.92	1.74	1.83	42.5	42.1	42.3
CSS	30	(Cabbage failed)	1.97	2.01	1.99	42.4	42.6	42.5
SS	15		1.93	1.79	1.86	42.5	42.6	42.5
SS	30		1.93	1.87	1.90	43.2	43.7	43.5
VC	15		1.81	1.88	1.84	43.5	42.6	43.0
VC	30		2.01	2.32	2.16	42.7	44.4	43.6
Mean			1.95[2]	1.94[2]	1.89[3]	42.7[2]	42.7[2]	42.6[3]
S.E. per plot			0.279 or 14.8%			1.14 or 2.7%		

(1) Organics applied to previous crop or globe beet and peas.

(2) Excludes "No organic manure".

(3) Mean of all plots

All standard errors have 17 d.f.

Symbols: 0 No organic manure. CTR Composted town refuse.
D Dung. SS Sewage sludge.
VC Vegetable compost.

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Yields on plots without organic manure

	Sulphate of Ammonia, cwt. N per acre									
	None	0.4	0.8	1.2	S.E.	None	0.4	0.8	1.2	S.E.
	Total produce: tons per acre					Plant number: thous. per acre				
1942[4]	Winter Cabbage									
Series A	5.27	7.68	8.37	5.33	±1.046	17.5	18.2	19.4	17.1	±0.82
Series B	1.30	2.51	2.16	1.70	±0.300	No figures available				
1943	1.26	2.94	3.03	2.57	±0.336	15.2	16.6	16.9	16.1	±0.67
1944	0.49	1.51	3.38	2.62	±0.417	13.7	16.3	17.8	15.7	±0.76
1945	4.26	6.67	6.88	8.33	±0.956	16.5	16.8	16.7	18.4	±1.00
1946	1.45	2.27	2.75	4.23	±0.404	17.5	17.9	17.9	17.6	±0.32
	Leeks									
1943	1.23	1.96	1.90	1.56	±0.270	41.9	43.7	44.2	44.0	±0.99
1944	1.54	0.94	1.17	1.93	±0.479	27.1	29.0	28.1	31.0	±3.34
1945	1.17	1.20	1.21	1.17	±0.213	47.6	41.6	41.8	42.5	±2.48
1946	1.91	2.10	2.01	2.69	±0.391	42.6	40.6	46.4	43.1	±1.17
1947	1.68	1.82	1.85	1.24	±0.197	42.5	42.6	42.0	41.8	±0.80

(4) The dressings of nitrogen in 1942 were None, 0.6, 1.2, 1.8 cwt. per acre, since no globe beet or peas were grown.

All standard errors have 17 d.f.

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CHEMICAL ANALYSES OF FERTILIZERS

Three, Four and Six Course Rotations, 1939-1947

Crop Year[1]		% N Nitrate of soda	% Total P_2O_5 Super-phosphate	% Total P_2O_5 Mineral[2]	% K_2O Sulphate of potash[3]	% K_2O Muriate of potash
1939	a		17.0	25.9		53.2
	b	16.0	16.9		49.5	52.2
1940	a		16.8	25.9		52.2
	b	15.7	17.9		50.3	53.9
1941	a		18.9	25.7		57.0
	b	15.7	18.0		49.8	53.8
1942	a		20.0	25.7		53.8
	b	16.1	20.3		49.9	53.7
1943	a		20.3	26.4		53.7
	b	15.9	20.4		49.8	57.4
1944	a		19.6[4]	27.0		57.7
	b	16.1	19.6		49.8	57.4
1945	a		19.2	33.2		57.8
	b	16.2	18.8		51.2	57.1
1946	a		19.0	33.3		60.6
	b	15.8	19.6		50.7	59.9
1947		15.6	19.9	33.1		60.2

Analysis of Sulphate of ammonia 21% N assumed.

1. b refers to spring dressings in the 3-Course Rotation Experiment; a to all other dressings in the 3-, 4- and 6-Course Rotation Experiments. "Crop year 1939" includes 1938 autumn sowings.

2. Mineral phosphate (used in 4-Course only); Gafsa 1939-44, Moroccan 1945-47.

3. Sulphate of potash, applied in spring to potatoes in 3-Course until 1946, replaced by Muriate of potash in 1947.

4. 18.86 for Superphosphate in 4-Course.

N

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Chemical Analysis of Manures used in Three and Four Course Rotations.

1939-47

Wheat Straw to Three and Four Course Rotations

Crop Year	% Organic Matter	% N	% P_2O_5	% K_2O
1939	83.65	0.603	0.311	1.614
1940	77.00	0.541	0.244	1.600
1940 b	84.30	0.537	0.194	1.382
1941	82.87	0.445	0.142	1.185
1942	79.08	0.409	0.138	0.817
1943	84.02	0.525	0.170	0.950
1944	81.00	0.532	0.144	0.620
1945	82.40	0.299	0.088	0.688
1946	81.41	0.450	0.250	0.954
1947	80.38	0.555	0.171	1.011

Adco Compost to Three and Four Course Rotations

1939	12.74	0.398	0.316	0.339
1940	13.73	0.404	0.235	0.332
1941	15.79	0.398	0.277	0.170
1942	14.44	0.398	0.257	0.146
1943	19.00	0.487	0.319	0.180
1944	20.10	0.528	0.284	0.230
1945	21.80	0.434	0.242	0.271
1946	18.04	0.527	0.372	0.322
1947	15.90	0.504	0.372	0.290

Dung to Four Course Rotation

1939	16.45	0.500	0.273	0.709
1940	17.62	0.435	0.164	0.414
1941	14.65	0.520	0.138	0.528
1942	18.08	0.510	0.253	0.858
1943	23.26	0.710	0.300	1.020
1944	35.20	0.846	0.288	1.355
1945	29.65	0.904	0.292	1.608
1946	14.29	0.515	0.203	0.691
1947	14.26	0.453	0.213	0.445

* 'b' refers to 3-Course Spring dressings

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