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Experiments at Rothamsted

Rothamsted Research

Rothamsted Research (1931) *Experiments at Rothamsted* ; Report For 1930, pp 150 - 154 - DOI: <https://doi.org/10.23637/ERADOC-1-63>

WOBURN

Rotation II., Six-Course, Stackyard Field, 1930.

For full particulars of experiment see Rothamsted Report p. 128.

Plots: 1/40th acre.

TREATMENTS:

N=4, 3, 2, 1 and 0 units of N, each with 2 units P₂O₅ and 2 units K₂O.
 K=4, 3, 2, 1 and 0 units of K₂O, each with 2 units N and 2 units P₂O₅.
 P=4, 3, 2, 1 and 0 units of P₂O₅, each with 2 units N and 2 units K₂O.
 1 unit of N=0.15 cwt. N per acre as Sulphate of Ammonia.
 1 unit of K=0.25 cwt. K₂O per acre as Muriate of Potash.
 1 unit of P=0.15 cwt. P₂O₅ per acre as Superphosphate.

C B—Barley (Plots 1-15).

Manures applied: Mar. 22nd. Seed sown: Mar. 28th. Harvested: Aug. 13th-14th. Variety: Plumage Archer.

Yield of grain in cwt. per acre.

Yield of straw in cwt. per acre.

N.W.

1	1K 20.7	2K 19.6	0N 13.6	1N 18.9	2P 22.1	5	1K 33.5	2K 32.9	0N 29.4	1N 35.6	2P 36.7
6	3K 21.1	0K 19.3	4N 23.0	1P 22.1	0P 22.0	10	3K 34.1	0K 33.3	4N 44.6	1P 37.6	0P 36.3
11	4K 20.4	2N 18.2	3N 20.7	3P 19.4	4P 20.5	15	4K 36.3	2N 36.8	3N 46.4	3P 37.6	4P 39.3

C S—Sugar Beet (Plots 31-45).

Manures applied: April 29th. Seed sown: April 30th. Lifted: Oct. 9th. Variety: Johnson P.

Washed Roots—tons per acre.

Tops—tons per acre.

N.W.

31	2N 3.20	1N 3.39	4P 3.45	1P 4.16	1K 4.12	35	2N 6.02	1N 4.61	4P 5.04	1P 6.29	1K 7.07
36	3N 3.87	4N 4.50	2P 3.91	4K 4.43	0K 4.18	40	3N 5.54	4N 6.27	2P 4.80	4K 6.80	0K 7.05
41	0N 3.41	3P 3.80	0P 4.11	2K 4.39	3K 4.14	45	0N 4.70	3P 5.64	0P 6.43	2K 7.34	3K 7.14

C P—Potatoes (Plots 61-75).

Manures applied: April 8th. Planted: April 10th. Lifted: Oct. 1st. Variety: Ally.

Yield of Roots in tons per acre.

N.W.

61	3K 11.83	1K 9.46	0N 8.23	4N 12.82	3P 9.90	65
66	2K 12.07	0K 11.16	2N 11.73	1P 11.83	0P 9.22	70
71	4K 12.66	3N 13.06	1N 11.17	4P 12.84	2P 10.74	75

REPLICATED EXPERIMENTS AT WOBURN
 FERTILIZER COMPARISON OF SULPHATE OF POTASH AND
 MAGNESIUM AND MINERAL POTASH
 FACTOR OF SUPERPHOSPHATE
 WT.—POTASHES 1930

Summary of Results.

1. Table showing increments in yield per cwt. of N, P₂O₅ and K₂O, together with the standard errors of the increments.

Crop.	N		P		K	
Barley—Grain, cwt.	13.7	± 2.3	-3.8	± 2.3	1.0	± 1.4
Straw, cwt.	27.5	± 3.8	4.0	± 3.8	2.6	± 2.3
Sugar Beet—Roots, tons	1.77	± 0.49	-1.12	± 0.49	0.21	± 0.29
Tops, tons	2.71	± 0.91	-2.29	± 0.91	-0.17	± 0.55
Potatoes— tons	7.38	± 2.39	3.54	± 2.39	2.15	± 1.43

2. Table showing the percentage increments in yield for N, P₂O₅ and K₂O, with their standard errors.

Crop.	N	P	K	Standard Error.
Barley—Grain	10.24	-2.83	1.29	± 1.70
Straw	11.23	1.64	1.80	± 1.54
Sugar Beet—Roots	6.76	-4.27	1.32	± 1.87
Tops	6.73	-5.67	-0.71	± 2.26
Potatoes	9.84	4.72	4.77	± 3.18

Significant results are in bold type. Negative sign means depression.

REPLICATED EXPERIMENTS AT WOBURN

Potatoes: Comparison of Sulphates of Potash and Magnesium and Mineral Potash.

Effect of Superphosphate.

WP—Lansome, 1930.

S.W.

—	—	—	M
O	S	K	—
—	K	—	—
S	—	M	O
—	—	O	S
K	M	—	—
—	—	—	—
M	O	S	K
IV.	III.	II.	I.

SYSTEM OF REPLICATION : Latin Square. Each plot divided into two sub-plots.
 AREA OF EACH WHOLE PLOT : 1/40th acre.

TREATMENTS :

O=No Potash or Magnesium.

M=Sulphate of Magnesium.

S=Sulphate of Potash.

K=Potash Mineral.

Sulphate of Potash and Potash Mineral at the rate of 0.6 cwt. K_2O per acre,
 Sulphate of Magnesium at the rate of 0.257 cwt. MgO per acre, equivalent to
 0.6 cwt. K_2O , Superphosphate at the rate of 0.5 cwt. P_2O_5 per acre applied to
 one out of each pair of sub-plots, indicated by the treatment symbol occurring
 on that half.

Land limed and dunged in 1929.

Manures applied : May 5th. Potatoes planted : May 6th.

Potatoes lifted : Sept. 30th-Oct. 1st. Variety : Ally.

Previous Crop : Potatoes followed by Fodder Crop (Rye, Vetches and Beans).

Actual weights in lb.

Column.	Superphosphate.				No Superphosphate.			
	O	M	S	K	O	M	S	K
I. ..	352.50	350.25	377.25	386.75	377.00	339.25	388.75	384.50
II. ..	358.00	315.75	305.00	291.00	319.75	336.25	338.25	306.75
III. ..	248.75	286.75	263.00	283.75	257.50	326.00	274.50	256.75
IV. ..	273.25	255.75	255.00	276.25	256.50	274.75	262.00	279.75

Summary of Results.

Average yield.	Tons per acre.				Per cent.			
	No Potash or Magn's'm	Sulphate of Magn's'm	Sulphate of Potash	Potash Mineral	No Potash	Sulphate of Magn's'm	Sulphate of Potash	Potash Mineral
Without Superphosphate ..	10.81	11.40	11.28	10.96	98.3	103.6	102.5	99.6
With Superphosphate ..	11.00	10.79	10.72	11.05	100.0	98.1	97.4	100.5

Mean 11.00 tons. Standard Error = 0.257 tons or 2.34 per cent.

No response to superphosphate, or to the potash or magnesium treatments.

WOBURN

Potatoes: Nitrogenous Fertilisers, Sulphate of Ammonia and Cyanamide.
Phosphatic Fertilisers, Superphosphate and Slag.
WP—Lansome, 1930.

N.W.

I.	C Sl	C P	S P	S Sl
II.	C P	C Sl	S Sl	S P
III.	S Sl	S P	C Sl	C P
IV.	S P	S Sl	C P	C Sl

SYSTEM OF REPLICATION: Latin Square.
AREA OF EACH PLOT: 1/45th acre.

TREATMENTS: Sulphate of Ammonia and Cyanamide at the rate of 0.2 cwt. N per acre, and Superphosphate and Slag (High Soluble) at the rate of 0.5 cwt. P₂O₅ per acre, in combination as follows:

C, Sl.=Cyanamide and Slag.
C, P=Cyanamide and Superphosphate.
S, Sl.=Sulphate of Ammonia and Slag.
S, P=Sulphate of Ammonia and Superphosphate.
Land limed and dunged, 1929. Manures applied: May 5th.
Potatoes planted: May 7th. Lifted: Sept. 30th. Variety: Ally.
Previous Crop: Potatoes followed by Fodder Crop (Rye, Vetches and Beans).

Actual weights in lb.

Row.	C, Sl	C, P	S, Sl	S, P
I. ..	653.25	619.50	604.75	577.50
II. ..	638.25	642.75	530.25	601.25
III. ..	522.25	591.50	572.75	618.75
IV. ..	565.75	559.00	512.00	470.25

Summary of Results.

Average yield.	Cyanamide Slag.	Cyanamide Super.	Sulph./Amm. Slag.	Sulph./Amm. Super.	Mean.	Standard Error.
Tons per acre	11.95	12.12	11.15	11.39	11.65	0.406
Per cent.	102.6	104.0	95.7	97.8	100.0	3.48

There is a small non-significant advantage of the plots treated with cyanamide over those treated with sulphate of ammonia. No difference between plots treated with slag and superphosphate.

WOBURN

Sugar Beet : Potassic and Chloride Dressings, Muriate of Potash, Mineral Potash, Agricultural Salt.

Effect of Superphosphate.

s.w.

W S—Lansome, 1930.

K	—	M	O
—	S	—	—
M	K	—	—
—	—	O	S
S	O	—	—
—	—	K	M
O	M	S	K
—	—	—	—

SYSTEM OF REPLICATION : Latin Square. Each plot divided into two sub-plots.
 AREA OF EACH WHOLE PLOT : 1/40th acre.
 TREATMENTS :
 O=No Salt, no Potash.
 M=Muriate of Potash.
 K=Potash Mineral.
 S=Salt to give same amount of Chloride as in Muriate of Potash.
 Superphosphate at the rate of 0.5 cwt. per acre water soluble P₂O₅ applied to one out of each pair of sub-plots, indicated by the treatment symbol occurring on that half.
 Land dunged and limed, 1929. Manures applied : May 2nd.
 Beet sown : May 3rd. Lifted : Oct. 7th-8th. Variety : Johnson's P.
 Previous Crop : Potatoes followed by Fodder Crop (Rye, Vetches and Beans).

IV. III. II. I.

Actual yields in lb.

Column.	Roots (dirty).				Tops.			
	O	M	K	S	O	M	K	S
I. } II. } III. } IV. } Super	381	373	362	358	193	205	243	195
I. } II. } III. } IV. } No Super	383	425	402	410	188	203	206	206
	393	413	446	426	183	195	219	225
	392	406	401	448	188	214	215	206
	397	343	314	430	209	200	132	193

Summary of Results.

Average yield in tons per acre.	No Salt, No Potash.	Muriate of Potash.	Salt.	Potash Mineral.	Mean.	Standard Error.
Roots (washed) { Tops {	No Super. 9.12 Super. 8.99	9.24 9.21	9.98 9.18	9.10 9.35	} 9.27	0.397
	No Super. 6.86 Super. 6.93	7.25 7.21	7.41 7.12	6.89 7.63		
Sugar percentage in roots {	No Super. 19.24 Super. 19.38	19.36 19.46	19.29 19.33	19.32 19.45	} 19.35	0.196

Average yield per cent.	No Salt, No Potash.	Muriate of Potash.	Salt.	Potash Mineral.	Mean.	Standard Error.
Roots (washed) { Tops {	No Super. 98.3 Super. 97.0	99.7 99.4	107.7 99.0	98.2 100.9	} 100.0	4.28
	No Super. 95.7 Super. 96.7	101.2 100.6	103.5 99.5	96.2 106.6		

The small response in roots to the application of salt in the absence of superphosphate is not significant. No response to muriate of potash, potash mineral or superphosphate. With tops there is a significant response to the potash and salt dressings but no differences between these, and no response to superphosphate.