ROTHAMSTED RESEARCH

Yields of the Field Experiments 1950

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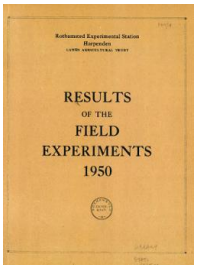

Short-term Experiments

Rothamsted Research

Rothamsted Research (1951) *Short-term Experiments ;* Yields Of The Field Experiments 1950, pp 55 - 84 **- DOI: https://doi.org/10.23637/ERADOC-1-185**

50/Ca/1.1

WHEAT

Control of "Eyespot"

Sulphate of ammonia, seed rates and spraying - Little Hoos 1950.

System of replication: 3 x 3 x 3 x 2 design in 6 blocks of 9 plots, certain three factor interactions and the effect of spraying being confounded with block differences. Three extra plots with no sulphate of ammonia were added to each block.

Area of each plot: 0.0797 acre.

Treatments: All combinations of
Sulphate of ammonia: Rates: $1\frac{1}{2}$, 3, $4\frac{1}{2}$ cwt per acre (N_1, N_2, N_3)
Times of application: First week in March and at 5 weekly intervals (T_1, T_2, T_3)
Rate of sowing: $1\frac{1}{2}$, $2\frac{1}{2}$, $3\frac{1}{2}$ bushels per acre (R_1, R_2, R_3)
Spraying: 3 blocks sprayed with 12% B.O.V. at 100 gallons per acre, beginning of March.
The 3 plots per block receiving no sulphate of ammonia were sown one at each seed rate.

Basal Manuring: 3 cwt superphosphate and 1 cwt muriate of potash per acre drilled across the plots.

Cultivations, etc.: Ploughed: Oct 14-16. Harrowed: Oct 15-17. Seed drilled and harrowed in: Nov 1. Basal fertilizers applied: Nov 2. Sprayed with 12% B.O.V: Mar 3. First application of sulphate of ammonia: Mar 10. Ring rolled: Apr 3. Second application of sulphate of ammonia: Apr 14. Third application: May 17. Harvested: Aug 8. Variety: Squareheads Master 13/4. Previous crop: Wheat.

Standard errors per plot:

Grain:	unsprayed blocks:	2.86 cwt per acre or 15.3%	(19 d.f.)
	sprayed blocks:	2.29 cwt per acre or 14.5%	(19 d.f.)
Straw:	unsprayed blocks:	3.75 cwt per acre or 14.4%	(19 d.f.)
	sprayed blocks:	2.53 cwt per acre or 11.1%	(19 d.f.)

https://doi.org/10.23637/ERADOC-1-185

Summary of Results

Grain: cwt per acre

	Unsprayed					Sprayed					Effect of Spraying
	R_1	R_2	R_3		Mean	R_1	R_2	R_3		Mean	
		(±1.65)			(±0.95)		(±1.32)			(±0.76)	(±1.22)*
T_1	16.2	20.3	21.3		19.3	16.6	16.2	18.6		17.1	-2.2
T_2	20.7	20.7	21.8		21.1	17.8	18.5	21.3		19.2	-1.9
T_3	18.4	19.5	21.1		19.7	13.0	18.0	16.8		15.9	-3.8
Mean	18.4	20.2 (±0.95)	21.4		20.0	15.8	17.6 (±0.76)	18.9		17.4	
	N_1	N_2	N_3			N_1	N_2	N_3			
		(±1.65)					(±1.32)				
T_1	15.6	21.7	20.5			14.4	19.4	17.6			
T_2	19.3	21.6	22.3			19.8	18.8	18.9			
T_3	20.5	17.1	21.3			14.9	16.9	16.0			
	N_0	N_1	N_2	N_3		N_0	N_1	N_2	N_3		
		(±1.65)			(±0.82)		(±1.32)			(±0.66)	(±1.06)*
R_1	14.7	17.7	18.4	19.3	17.5	8.1	16.3	15.4	15.7	13.9	-3.6
R_2	14.4	18.4	20.8	21.3	18.7	11.7	16.1	19.2	17.5	16.1	-2.6
R_3	14.2	19.4	21.2	23.6	19.6	13.8	16.8	20.5	19.3	17.6	-2.0
Mean	14.4	18.5 (±0.95)	20.1	21.4	18.6	11.2	16.4 (±0.76)	18.3	17.5	15.9	
Effect of Spraying		(±1.22)*				-3.2	-2.1	-1.8	-3.9		

*Standard error for use in testing differences between effects of spraying only.

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Straw: cwt per acre

	Unsprayed					Sprayed					Effect of spraying
	R_1	R_2	R_3		Mean	R_1	R_2	R_3		Mean	
		(±2.17)			(±1.25)		(±1.46)			(±0.84)	(±1.51)*
T_1	24.3	29.3	31.6		28.4	25.7	24.3	26.4		25.4	-3.0
T_2	29.0	30.0	33.1		30.7	26.9	26.8	30.4		28.0	-2.7
T_3	24.7	26.1	27.5		26.1	21.6	24.3	22.9		23.0	-3.1
Mean	26.0	28.5	30.7		28.4	24.7	25.1	26.6		25.5	
		(±1.25)					(±0.84)				
	N_1	N_2	N_3			N_1	N_2	N_3			
		(±2.17)					(±1.46)				
T_1	22.7	31.7	30.7			20.5	28.7	27.1			
T_2	25.9	31.5	34.7			27.0	28.6	28.4			
T_3	26.7	22.9	28.9			19.9	24.2	24.8			
	N_0	N_1	N_2	N_3		N_0	N_1	N_2	N_3		
		(±2.17)			(±1.08)		(±1.46)			(±0.73)	(±1.31)*
R_1	18.8	23.4	25.8	28.8	24.2	12.7	22.8	24.9	26.5	21.7	-2.5
R_2	18.8	25.5	29.6	30.4	26.1	14.6	21.5	27.5	26.3	22.5	-3.6
R_3	18.5	26.4	30.7	35.1	27.7	18.0	23.1	29.1	27.5	24.4	-3.3
Mean	18.7	25.1	28.7	31.4	26.0	15.1	22.5	27.2	26.8	22.9	
		(±1.25)					(±0.84)				
Effect of Spraying		(±1.51)*				-3.6	-2.6	-1.5	-4.6		

* Standard error for use in testing differences between effects of spraying only.

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WHEAT

Residual effect of dung - Sawyers III 1950.

System of replication: 4 randomized blocks of 12 plots each.

Area of each plot: 0.0394 acre.

Treatments:
Dung: None, 5, 10, 15 tons per acre applied to potatoes 1948-9.
Methods of application: Ploughed in, in winter (1948); ploughed in, in spring (1949); placed in ridges (1949).

Basal manuring: 2 cwt sulphate of ammonia per acre.

Cultivations, etc.: Ploughed: Oct 18-24. Harrowed, seed drilled: Nov 3. Harrowed in: Nov 4. Harrowed and tractor rolled: Mar 28. Sulphate of ammonia applied: May 2. Sprayed with D.N.O.C: May 18. Harvested: Aug 12. Variety: Bersee. Previous crop: Potatoes.

Standard error per plot: Grain: 2.70 cwt per acre or 10.1% (35 d.f.)

Summary of Results

Method of application	Dung applied to potatoes 1948-9: tons per acre 0	5	10	15	Mean
	Grain: cwt per acre				
			(±1.35)		(±0.78)
Ploughed in, in winter		25.6	27.4	27.3	26.7
Ploughed in, in spring		26.7	26.5	27.2	26.8
Placed in ridges		24.7	27.5	28.6	26.9
Mean (±0.78)	26.3	25.7	27.1	27.7	26.7
	Straw: cwt per acre				
Ploughed in, in winter		33.5	36.4	38.6	36.2
Ploughed in, in spring		35.5	34.0	39.7	36.4
Placed in ridges		33.9	36.4	39.8	36.7
Mean	34.5	34.3	35.6	39.3	35.9

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Wireworm Experiment (1)

Residual effects of insecticides - Little Hoose 1950.

System of replication: 3 randomized blocks of 9 plots each.

Area of each plot: 0.0269 acre.

Treatments - applied 1948.
None
D.D. injected 400 lb per acre.
Ethylene Dibromide 41% solution, injected 15 gallons per acre.
D.D.T. dust combine drilled, ¾ cwt per acre.
Gammexane: broadcast, 2 cwt per acre; combine drilled, ¾ cwt per acre; applied as seed dressing.

Basal Manuring: 1½ cwt superphosphate per acre combine drilled; 2½ cwt sulphate of ammonia per acre as top dressing.

Cultivations, etc.: Ploughed: Oct 13-17. Springtined, seed and superphosphate drilled, harrowed in: Oct 31 - Nov 1. Harrowed: Mar 31. Rolled: Apr 3. Sulphate of ammonia applied: May 3. Sprayed with D.N.O.C.: May 11. Harvested: Aug 10. Variety: Squareheads Master 13/4. Previous crop: Wheat.

Standard errors per plot:
Grain: 2.16 cwt per acre or 13.6% (18 d.f.)
Straw: 3.26 cwt per acre or 12.9% (18 d.f.)

Summary of Results

	Treatments applied in 1948							
	Untreated	D.D Injected	Ethylene Dibromide Injected	D.D.T. Dust Drilled	Gammexane Broadcast	Gammexane Drilled	Dusted seed	Mean
	Grain: cwt per acre							
Mean (±1.25)	15.5(1)	16.9	18.8	18.0	16.1	15.0	11.7	15.9
Increase (±1.44)		1.4	3.3	2.5	0.6	-0.5	-3.8	
	Straw: cwt per acre							
Mean (±1.88)	25.0(2)	27.0	27.8	27.1	25.8	23.0	20.9	29.2
Increase (±2.17)		2.0	2.8	2.1	0.8	-2.0	-4.1	

Standard errors (1) ±0.72
(2) ±1.09

Note: Wireworm counts were made on all plots and are available.

WHEAT

Wireworm Experiment (2)

Residual effect of Gammexane - Little Hoos 1950.

System of replication: 3 incomplete randomized blocks of 6 plots each.

Area of each plot: 0.0269 acre.

Treatments 1948 and 1949: None, seed dusted with gammexane dressing in 1948 only, in 1949 only, and in 1948 and 1949. Gammexane dust $\frac{1}{4}$, $\frac{1}{2}$, and 1 cwt per acre in 1948, combine drilled with seed (filler added where necessary to make total dressing of 1 cwt per acre).

Basal manuring: $1\frac{1}{2}$ cwt superphosphate per acre, combine drilled; $2\frac{1}{2}$ cwt sulphate of ammonia per acre as top dressing.

Cultivations, etc.: Ploughed: Oct 13-17. Springtined, seed and superphosphate drilled, harrowed in: Oct 31 - Nov 1. Harrowed: Mar 31. Rolled: Apr 3. Sulphate of ammonia applied: May 3. Sprayed with D.N.O.C.: May 11. Harvested: Aug 10. Variety: Squareheads Master 13/4. Previous crop: Wheat.

Standard errors per plot:
Grain: 2.55 cwt per acre or 22.0% (9 d.f.)
Straw: 3.91 cwt per acre or 21.1% (9 d.f.)

Note: Wireworm counts were made on all plots and are available.

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Summary of Results

1948 / 1949	Untreated: Un-treated	Untreated: Dusted Seed	Dusted Seed: Un-treated	Dusted Seed: Dusted Seed	Gammexane dust cwt per acre: ¼	½	1	Mean	Difference
			Grain: cwt per acre						
		(±1.47)				(±1.88)			
	11.4	11.5	8.1	7.6	13.3	15.7	17.2		
Mean		9.7				15.4		11.6	5.7(±1.28)
			Straw: cwt per acre						
		(±2.26)				(±2.89)			
	18.7	19.8	14.7	13.0	20.0	22.8	24.6		
Mean		16.5				22.5		18.5	6.0(±1.95)

50/Ca/4.2

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50/Ca/5

WHEAT

Late application of nitrogen - West Barnfield I 1950.

System of replication: 4 randomized blocks of 4 plots each.

Area of each plot: 0.0187 acre.

Treatments:
Nitrochalk: None, none but plots walked over as for broadcasting, $1\frac{1}{2}$, 3 cwt per acre applied as a top dressing.

Basal manuring: $1\frac{3}{4}$ cwt sulphate of ammonia and 1 cwt superphosphate per acre.

Cultivations, etc.: Ploughed: Sept 15-19. Rolled and springtine harrowed: Oct 14. Harrowed: Oct 15. Seed and superphosphate drilled and harrowed in: Oct 17. Harrowed: Mar 28. Rolled: Mar 31. Sulphate of ammonia drilled: May 3. Sprayed with low volume 2, 4-D: May 18. Nitrochalk applied by hand: June 28. Harvested: Aug 14. Variety: Squareheads Master 13/4. Previous crop: Wheat.

Standard errors per plot.
Grain: 2.59 cwt per acre or 10.0% (9 d.f.)
Straw: 8.25 cwt per acre or 16.3% (9 d.f.)

Summary of Results

	Nitrochalk: cwt per acre as top dressing				
	None	None plots walked over	$1\frac{1}{2}$	3	Mean
	cwt per acre				
Grain (±1.30)	24.5	27.6	25.9	25.5	25.9
Straw (±4.12)	49.0	51.7	51.3	50.6	50.7

Note

Analytical results showing increases in crude protein due to late nitrogen are given on page 116 of the Station's Annual Report for 1950.

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BARLEY

Late application of nitrogen - Long Hoos V 1950.

System of replication: 4 randomized blocks of 3 plots each.

Area of each plot: 0.0192 acre.

Treatments:
Nitrochalk: None, 1½, 3 cwt per acre applied as a top dressing.

Basal manuring: 1½ cwt sulphate of ammonia per acre.

Cultivations, etc.: Ploughed: Sept 27-Oct 3. Springtine harrowed: Mar 8 and 11. Harrowed: Mar 13. Sulphate of ammonia drilled: Mar 14. Seed drilled, harrowed in and ring rolled: Mar 16. Sprayed with high volume 2, 4-D: May 12. Nitrochalk applied by hand: June 27. Harvested: Aug 8. Variety: Plumage Archer. Previous crop: Beans.

Standard errors per plot:
Grain: 1.51 cwt per acre or 6.6% (6 d.f.)
Straw: 2.16 cwt per acre or 7.4% (6 d.f.).

Summary of Results

	Nitrochalk: cwt per acre as top dressing			Mean
	None	1½	3	
	cwt per acre			
Grain (±0.76)	22.7	22.7	23.1	22.9
Straw (±1.08)	28.2	29.6	29.5	29.1

Note

Analytical results showing increases in crude protein due to late nitrogen are given on page 116 of the Station's Annual Report for 1950.

https://doi.org/10.23637/ERADOC-1-185

SPRING OATS

Late application of nitrogen - Great Harpenden II 1950.

System of replication: 4 randomized blocks of 3 plots each.

Area of each plot: 0.0192 acre.

Treatments:
Nitrochalk: None, 1½, 3 cwt per acre as a top-dressing.

Basal Manuring: 2 cwt sulphate of ammonia, and 1¼ cwt superphosphate per acre.

Cultivations, etc.: Ploughed: Sept 12-30, and again Dec 6-8. Springtine harrowed both ways: Mar 14-15. Sulphate of ammonia drilled: Mar 18. Seed and superphosphate drilled and harrowed in: Mar 21-22. Ring rolled: Mar 25. Nitrochalk applied by hand: June 27. Harvested: Aug 10. Variety: Sun II. Previous crop: Wheat.

Standard errors per plot:
Grain: 2.16 cwt per acre or 7.2% (6 d.f.)
Straw: 2.06 cwt per acre or 3.8% (6 d.f.)

Summary of Results

	Nitrochalk: cwt per acre as top dressing			Mean
	None	1½	3	
	cwt per acre			
Grain (±1.08)	31.4	30.0	28.8	30.1
Straw (±1.03)	53.9	54.1	53.0	53.7

Note

Analytical results showing increases in crude protein due to late nitrogen are given on page 116 of the Station's Annual Report for 1950.

SPRING BEANS

Fertilizer placement - West Barnfield II 1950.

System of replication: 2 randomized blocks of 16 plots each.

Area of each plot: 0.0137 acre. Area harvested: 0.0110 acre.

Treatments: None (quadruplicate plots) and all combinations of:
Levels of fertilizer: 2.3, 4.6 cwt per acre granular compound fertilizer (14% P_2O_5, 14% K_2O).
Methods of placement: Drilled beside seed (duplicate plots). Broadcast before ploughing (E); broadcast on seed bed and harrowed in (L); half broadcast before ploughing, half drilled; half broadcast on seed beed and harrowed in, half drilled.

Basal manuring: None.

Cultivations, etc: Ploughed: Sept 15.19. "E" fertilizers applied: Mar 7. Ploughed: Mar 8. Harrowed twice, "L" fertilizers applied: Mar 10. Beans and fertilizers drilled: Mar 11. Harrowed in: Mar 13. Harrowed: Apr 20. Harvested: Aug 12. Previous crop: Wheat.

Standard errors per plot:
Yield, dry matter: 2.02 cwt per acre or 11.7% (20 d.f.)
Plant number: 8.06 thousands per acre or 6.9% (20 d.f.)

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Summary of Results

Compound Fertilizer Cwt per acre	Drilled	Broad-cast before plough-ing	Broad-cast on seed bed	Broad-cast before plough-ing and drilled	Broad-cast on seed bed and drilled	Mean	
	Yield, dry matter: cwt per acre						
None	(±1.01)			(±1.43)		14.5	(±0.71)
2.3	19.1	17.4	15.5	16.9	17.5	17.6	(±0.58)
4.6	18.7	17.4	14.4	20.4	21.9	18.6	
Mean (±1.01)	18.9(1)	17.4	15.0	18.7	19.7	17.2	

Standard error (1) ±0.71

	Plant number: thousands per acre						
None	(±4.0)			(±5.7)		113	(±2.9)
2.3	132	108	142	117	116	124	(±2.3)
4.6	112	111	113	113	121	114	
Mean (±4.0)	122(2)	109	128	115	118	118	

Standard error (2) ±2.9

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WINTER BEANS

Fertilizer placement - West Barnfield II 1950.

System of replication: 2 randomized blocks of 16 plots each.

Area of each plot: 0.0152 acre. Area harvested: 0.0121 acre.

Treatments: None (quadruplicate plots) and all combinations of:
Levels of fertilizer: 3.2, 6.4 cwt per acre granular compound fertilizer (13% P_2O_5, 13% K_2O).
Methods of placement: Drilled 3" below soil surface and 2" to side of seed (duplicate plots); broadcast on the plough furrow and cultivated in (E); broadcast on seed bed and harrowed in (L); half broadcast on the plough furrow and cultivated in, half drilled; half broadcast on seed bed and harrowed in, half drilled.

Basal manuring: None.

Cultivations, etc: Ploughed: Sept 15-19. "E" fertilizers applied: Sept 30. Rolled and springtined: Oct 10. Disc and tooth harrowed: Oct 12. "L" fertilizers applied, beans and fertilizers drilled: Oct 12. Harrowed in: Oct 14. Harrowed: Apr 20. Harvested: July 31. Previous crop: Wheat.

Standard errors per plot:
Yield, dry matter: 1.14 cwt per acre or 5.9% (20 d.f.)
Plant number: 8.61 thousands per acre or 6.6% (20 d.f.)

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Summary of Results

Compound Fertilizer Cwt per acre	Drilled	Broad-cast on plough furrow	Broad-cast on seed bed	Broad-cast on plough furrow and drilled	Broad-cast on seed bed and drilled	Mean	
	Yield, dry matter: cwt per acre						
None	(±0.57)			(±0.80)		15.3	(±0.40)
3.2	20.4	19.2	16.6	19.8	20.2	19.4	(±0.33)
6.4	22.2	22.4	20.0	22.7	22.2	21.9	
Mean (±0.57)	21.3 (1)	20.8	18.3	21.3	21.2	19.3	
	Standard error (1) ±0.40						
	Plant number: thousands per acre						
None	(±4.3)			(±6.1)		127	(±3.0)
3.2	132	122	128	135	128	130	(±2.5)
6.4	130	136	121	129	145	132	
Mean (±4.3)	131 (2)	129	125	132	136	130	
	Standard error (2) ±3.0						

POTATOES

Application of dung - Sawyers I 1950.

System of replication: 4 randomized blocks of 12 plots each, plots being split into 2 for the application of N, P and K, the three 2-factor interactions being confounded with whole plot differences and certain high order interactions being confounded with block differences.

Area of each sub-plot: 0.0175 acre. Area harvested: 0.0140 acre.

Treatments: All combinations of:

Whole plots. Dung: None, 5, 10, 15 tons F.Y.M. per acre.
Method of application: Ploughed in, in winter (W); ploughed in, in spring (S); or placed in the ridges (R).

Sub-plots Sulphate of ammonia: None, 0.6 cwt N per acre.
Superphosphate: None, 0.6 cwt P_2O_5 per acre.
Muriate of potash: None, 1.0 cwt K_2O per acre.

Basal Manuring: None.

Cultivations etc: Dung applied to "W" plots: Oct 24. Ploughed all plots: Oct 24-25. Dung applied to "S" plots: Mar 6. Ploughed all plots: Mar 9. Disced both ways and harrowed: Mar 29. Ring rolled: Mar 30. Ridged: Apr 11. Dung applied to "R" plots, artificials applied in the ridges, planted and covered in: Apr 11-13. Ring rolled ridges: Apr 14. Harrowed: May 11. Grubbed: May 24. Earthed up: June 29. Hand pulled weeds: various days July 30-Aug 24. Sprayed with Perenox: Aug 2-3. Sprayed with Copperman: Aug 23-24. Sprayed with 15% B.O.V. to kill off haulm: Sept 25 and 28. Lifted: Oct 27-29. Variety: Majestic. Previous crop: Wheat.

Standard errors per plot: Total clean tubers:
Whole plot: 0.727 tons per acre or 5.2% (32 d.f.)
Sub-plot: 1.16 tons per acre or 8.4% (29 d.f.)

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Summary of Results

Total clean tubers: tons per acre

	Dung: tons per acre 0	5	10	15	Mean
Mean (±0.210)	11.12	13.76	15.20	15.34	13.86
Method of application		(±0.363)			(±0.210)
Ploughed in, in winter		13.26	15.37	14.99	14.54
Ploughed in, in spring		13.86	15.61	15.23	14.90
Placed in ridges		14.16	14.61	15.80	14.86
Sulphate of ammonia		(±0.316)*			
None	10.31	12.89	14.11	14.14	12.86
0.6 cwt per acre N	11.93	14.63	16.29	16.55	14.85
Response to N (±0.473)	1.62	1.74	2.18	2.41	1.99 (1)
Superphosphate		(±0.316)*			
None	11.55	13.47	14.72	14.70	13.61
0.6 cwt per acre P_2O_5	10.69	14.05	15.68	15.98	14.10
Response to P (±0.473)	-0.86	0.58	0.96	1.28	0.49 (1)
Muriate of potash		(±0.316)*			
None	9.09	12.72	15.04	15.08	12.98
1.0 cwt per acre K_2O	13.15	14.80	15.36	15.61	14.73
Response to K (±0.473)	4.06	2.08	0.32	0.53	1.75 (1)

Standard error (1) ±0.236

*Standard error for comparisons other than vertical.

https://doi.org/10.23637/ERADOC-1-185

Total clean tubers: tons per acre

	Method of application of dung		
	Ploughed in, in winter	Ploughed in, in spring	Placed in ridges
Sulphate of ammonia		(±0.316)*	
None	13.43	13.83	13.87
0.6 cwt per acre N	15.65	15.97	15.85
Response to N (±0.473)	2.22	2.14	1.98
Superphosphate		(±0.316)*	
None	13.95	14.48	14.46
0.6 cwt per acre P_2O_5	15.13	15.32	15.26
Response to P (±0.473)	1.18	0.84	0.80
Muriate of potash		(±0.316)*	
None	14.29	14.13	14.41
1.0 cwt per acre K_2O	14.79	15.67	15.31
Response to K (±0.473)	0.50	1.54	0.90

*Standard error for comparisons other than vertical

Responses to treatments (±0.316)**

Response to:	Sulphate of ammonia		Superphosphate		Muriate of potash	
	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.
Sulphate of ammonia	-	-	1.87	2.11	1.69	2.29
Superphosphate	0.37	0.61	-	-	0.23	0.75
Muriate of potash	1.43	2.05	1.49	2.01	-	-

**Standard error of horizontal difference between two responses: ±0.420

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Percentage Ware

	Dung: tons per acre 0	5	10	15	Mean
Mean	89.30	90.39	91.38	92.66	90.93
Method of application					
Ploughed in, in winter		91.18	91.79	91.51	91.49
Ploughed in, in spring		89.91	91.46	92.85	91.41
Placed in ridges		90.08	90.89	93.62	91.53
Sulphate of ammonia					
None	89.38	91.09	90.97	92.42	90.96
0.6 cwt per acre N	89.22	89.68	91.79	92.90	90.90
Response to N	-0.16	-1.41	0.82	0.48	-0.06
Superphosphate					
None	90.17	90.44	91.65	93.15	91.35
0.6 cwt per acre P_2O_5	88.43	90.33	91.11	92.18	90.51
Response to P	-1.74	-0.11	-0.54	-0.97	-0.84
Muriate of potash					
None	88.08	89.43	91.18	91.98	90.17
1.0 cwt per acre K_2O	90.52	91.34	91.58	93.34	91.70
Response to K	2.44	1.91	0.40	1.36	1.53

Percentage Ware

	Method of application of dung		
	Ploughed in, in winter	Ploughed in, in spring	Placed in ridges
Sulphate of ammonia			
None	91.38	91.69	91.42
0.6 cwt per acre N	91.61	91.12	91.64
Response to N	0.23	-0.57	0.22
Superphosphate			
None	91.86	92.32	91.06
0.6 cwt per acre P_2O_5	91.12	90.49	92.00
Response to P	-0.74	-1.83	0.94
Muriate of potash			
None	90.69	91.05	90.85
1.0 cwt per acre K_2O	92.29	91.77	92.21
Response to K	1.60	0.72	1.36

Responses to treatments

Response to:	Sulphate of ammonia		Superphosphate		Muriate of potash	
	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.
Sulphate of ammonia	-	-	-0.45	0.33	1.27	-1.39
Superphosphate	-1.23	-0.45	-	-	-1.93	0.25
Muriate of potash	2.86	0.20	0.44	2.62	-	-

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POTATOES

Time of planting and fertilizers - Sawyers I 1950.

System of replication: 4 randomized blocks of 16 plots each, certain high order interactions being confounded with block differences.

Area of each plot: 0.0218 acre. Area harvested: 0.0146 acre.

Treatments: All combinations of:-
Time of planting: Mar 31, Apr 21, May 12, May 31.
Dung: None, 15 tons FYM per acre ploughed in, in spring.
Sulphate of ammonia: None, 0.6 cwt N per acre.
Superphosphate: None, 0.6 cwt P_2O_5 per acre.
Muriate of potash: None, 1.0 cwt K_2O per acre.

Cultivations, etc.:
Whole experiment: Ploughed: Oct 24-25. Dung applied: Mar 9. Ploughed: Mar 10. Disced both ways: Mar 29. Ring rolled: Mar 30. Hand pulled weeds: July 30-Aug 14. Sprayed with Perenox: Aug 2-3. Sprayed with Copposan: Aug 23-24. Lifted: Oct 17-18. Variety: Majestic. Previous crop: Wheat.
1st planting; Ridged, applied artificials, potatoes planted and covered in: Mar 31. Rolled down ridges: Apr 3. Harrowed ridges: May 11. Grubbed: May 25. Earthed up: June 28.
2nd planting; Ridged: Apr 20. Applied artificials, potatoes planted and covered in: Apr 21. Rolled ridges: Apr 24. Harrowed ridges: May 11. Grubbed: May 25. Earthed up: June 28.
3rd planting; Ridged, applied artificials potatoes planted and covered in: May 11. Rolled ridges: May 12. Earthed up: June 30.
4th planting; Cultivated: May 18. Ridged, applied artificials, potatoes planted and covered in: May 31. Grubbed: July 13. Earthed up: July 15.

Standard error per plot:
Total clean tubers: 1.44 tons per acre or 13.4% (35 d.f.)

https://doi.org/10.23637/ERADOC-1-185

Summary of Results

Total clean tubers: tons per acre

	Time of planting				
	March 31st	April 21st	May 12th	May 31st	Mean
Mean (±0.360)	12.14	11.00	10.55	9.18	10.72
No Dung (±0.509)	9.73	9.09	8.86	7.70	8.84
Dung	14.56	12.90	12.23	10.65	12.59
Response to Dung (±0.720)	4.83	3.81	3.37	2.95	3.75(1)
No Nitrogen (±0.509)	10.70	10.16	9.65	8.09	9.65
Nitrogen	13.59	11.83	11.44	10.26	11.78
Response to Nitrogen (±0.720)	2.89	1.67	1.79	2.17	2.13(1)
No Phosphate (±0.509)	12.05	10.33	10.05	8.35	10.19
Phosphate	12.24	11.66	11.05	10.01	11.24
Response to Phosphate (±0.720)	0.19	1.33	1.00	1.66	1.05(1)
No Potash (±0.509)	9.65	9.99	9.31	8.63	9.39
Potash	14.64	12.00	11.78	9.73	12.04
Response to Potash (±0.720)	4.99	2.01	2.47	1.10	2.65(1)

Standard Error (1) ±0.360

Responses to treatments (±0.509)

Response to	Dung		Nitrogen		Phosphate		Potash	
	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.
Dung	-	-	4.04	3.44	4.20	3.28	5.74	1.74
Nitrogen	2.43	1.83	-	-	1.68	2.58	1.83	2.43
Phosphate	1.51	0.59	0.60	1.50	-	-	0.88	1.22
Potash	4.64	0.64	2.34	2.94	2.47	2.81	-	-

https://doi.org/10.23637/ERADOC-1-185

Percentage ware

	Time of planting				
	March 31st	April 21st	May 12th	May 31st	Mean
Mean	86.71	86.42	88.88	84.37	86.60
No Dung	84.52	87.04	87.36	80.20	84.78
Dung	88.90	85.81	90.40	88.54	88.41
Response to Dung	4.38	-1.23	3.04	8.34	3.63
No Nitrogen	85.24	89.16	88.69	82.58	86.42
Nitrogen	88.19	83.69	89.08	86.16	86.78
Response to Nitrogen	2.95	-5.47	0.39	3.58	0.36
No Phosphate	87.06	85.34	89.08	85.02	86.62
Phosphate	86.36	87.51	88.69	83.71	86.57
Response to Phosphate	-0.70	2.17	-0.39	-1.31	-0.05
No Potash	84.05	86.36	88.28	81.91	85.15
Potash	89.38	86.49	89.49	86.82	88.04
Response to Potash	5.33	0.13	1.21	4.91	2.89

Responses to Treatments

Response to	Dung		Nitrogen		Phosphate		Potash	
	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.
Dung	-	-	6.22	1.04	2.26	5.00	5.82	1.44
Nitrogen	2.95	-2.23	-	-	-2.68	3.40	2.35	-1.63
Phosphate	-1.43	1.31	-3.10	2.98	-	-	-0.75	0.63
Potash	5.08	0.70	4.88	0.90	2.20	3.58	-	-

https://doi.org/10.23637/ERADOC-1-185

POTATOES

Methods of planting and fertilizers - Rothamsted Great Knott I and Woburn Butt Close 1950

System of replication: 4 × 2 × 2 design in 4 randomized blocks of 8 plots each, a high order interaction being confounded with block differences, plus 2 extra plots per block without fertilizer.

Area of each plot: 0.028 acre. Area harvested: 0.014 acre

Treatments: All combinations of
Compound granular fertilizer (7% N, 7% P_2O_5, 10.5% K_2O): 8, 16 cwt per acre.
Method of placement: A - Broadcast fertilizer on the flat, ridge, plant by dropper into ridges; B - Broadcast on the flat, plant by dropper on the flat, ridge; C - Ridge, broadcast on ridges, plant by hand in furrows, split back ridges (standard method); D - Ridge, broadcast on ridges, split back ridges, plant by dropper into ridge.

Depth of planting: Shallow; Deep.

The two plots per block receiving no fertilizer were planted by Method C, one at each depth.

Basal manuring: Rothamsted - 10-12 tons dung and compost per acre.
Woburn - None

Cultivations, etc.:

Rothamsted

Ploughed: Sept 8-12. Dung applied: Feb 6. Ploughed: various days: Feb 6-27. Cultivated: Mar 28-29. Disced: Mar 30. Fertilizers applied A and B plot: Apr 13. Potatoes planted and covered in on B plots: Apr 4. Ridged A, C and D plots: Apr 17. Fertilizers applied C and D plots, potatoes planted A, C and D plots and rolled ridges: Apr 21. Harrowed ridges: May 17. Grubbed: June 2. Earthed up: June 30. Weeded: various days, July 10-31. Sprayed with Perenox: July 31. Sprayed with Coppesan: Aug 21. Sprayed with 15% B.O.V. to kill off haulm: Sept 27. Lifted: Oct 12. Variety: Majestic. Previous crop: Linseed.

Woburn

Ploughed: Sept 7-9, Oct 25-27 and Jan 2-6. Springtined: Mar 31. Fertilizers applied, potatoes planted and covered in, all plots: May 1-2. Rolled ridges: May 15-17. Harrowed and weeded: May 30-31. Grubbed: June 9-16. Ridged: June 26-27. Sprayed with Perenox: Aug 4. Sprayed with Coppesan: Aug 8. Weeded: Sept 4. Sprayed with 15% B.O.V. to kill off haulm: Oct 2-3. Lifted: Oct 12. Variety: Majestic. Previous crop: Wheat.

https://doi.org/10.23637/ERADOC-1-185

Standard errors per plot:
Total tubers, Rothamsted: 0.840 tons per acre or 5.6% (19 d.f.)
Woburn: 0.851 tons per acre or 5.8% (19 d.f.)

Summary of Results

Placement of fertilizers / Planting of potatoes	On Flat: In ridges A	On Flat: On flat B	No Fertilizer: In furrows C	On Ridges: In furrows C	On Ridges: In ridges D	Mean
Total tubers: tons per acre. Rothamsted						
Mean (±0.297)	15.33	15.77	15.10	14.10	15.12	15.09
Fertilizer cwt per acre						
8	16.06	16.30		14.95	16.16	15.87
16 (±0.420)	14.60	15.25		13.26	14.09	14.30
Difference (±0.594)	-1.46	-1.05		-1.69	-2.07	-1.57 (±0.297)
Planting						
Shallow	14.78	15.88	14.79	13.61	15.19	14.85
Deep (±0.420)	15.88	15.67	15.40	14.60	15.06	15.32
Difference (±0.594)	1.10	-0.21	0.61	0.99	-0.13	0.47 (±0.266)
Total tubers: tons per acre. Woburn						
Mean (±0.301)	14.55	15.29	7.82	14.35	14.92	13.38
Fertilizer cwt per acre						
8	13.42	14.34		13.98	13.77	13.88
16 (±0.426)	15.68	16.24		14.71	16.07	15.67
Difference (±0.602)	2.26	1.90		0.73	2.30	1.79 (±0.301)
Planting						
Shallow	14.56	14.52	8.19	14.46	14.95	13.34
Deep (±0.426)	14.53	16.06	7.45	14.24	14.89	13.43
Difference (±0.602)	-0.03	1.54	-0.74	-0.22	-0.06	0.09 (±0.269)
Percentage Ware. Woburn						
Mean	92.4	92.8	92.9	94.0	92.7	93.0
Fertilizer cwt per acre						
8	91.9	92.2		93.4	92.0	92.4
16	93.0	93.4		94.6	93.4	93.6
Difference	1.1	1.2		1.2	1.4	1.2
Planting						
Shallow	91.9	93.0	92.0	93.2	92.3	92.5
Deep	93.0	92.7	93.8	94.8	93.0	93.5
Difference	1.1	-0.3	1.8	1.6	0.7	1.0

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KALE

Fertilizer placement - Stackyard 1950.

System of replication: 3 randomized blocks of 8 plots each.

Area of each plot: 0.0152 acre. Area harvested: 0.00505 acre.

Treatments: None (duplicate plots) together with all combinations of:
Compound Granular PK fertilizer (14% P_2O_5, 14% K_2O): 2.75, 5.50 cwt per acre.
Methods of placement: Broadcast during preparation of seedbed and worked in by cultivators and harrows; drilled in a band 2" to side of seed and 3" below the soil surface; half dressing broadcast as above and half drilled beside the seed.

Basal manuring: 4 cwt sulphate of ammonia per acre.

Cultivations, etc.: Ploughed: Sept 20-22 and again Dec 8-10. 18 cwt ground chalk per acre applied: Mar 12. Springtined: Mar 16 and again Mar 22. Fertilizer broadcast and harrowed in: Mar 24. Rolled, seed and fertilizer drilled: Mar 25. Sulphate of ammonia drilled: Mar 27. Harrowed in: Mar 28. Sprayed with Arkotine: Apr 21 and again May 2. Hoed: May 19 and 24. Harvested: Dec 4, 7, 12, 16, 19 and 21. Variety: Thousand Head. Previous crop: Mixed cereals.

Standard errors per plot:
Yield: 3.43 tons per acre or 13.3%.(15 d.f.)
Plant number: 9.74 thousands per acre or 17.6%.(15 d.f.)

https://doi.org/10.23637/ERADOC-1-185

Summary of Results

Method of Placement

Compound fertilizer cwt per acre	Broadcast	Drilled	Broadcast Drilled	Mean
	Yield: tons per acre (±1.98)			
None				25.03 (±1.40)
2.75	26.93	26.81	25.19	26.31 (±1.14)
5.50	26.22	25.81	26.02	26.02
Mean (±1.40)	26.58	26.31	25.60	25.88
Difference (±2.80)	-0.71	-1.00	0.83	-0.29 (±1.62)
	Plant number: thousands per acre (±5.62)			
None				55.3 (±3.97)
2.75	64.9	44.1	57.4	55.4 (±3.25)
5.50	63.4	52.7	48.7	55.0
Mean (±3.97)	64.2	48.4	53.0	55.2
Difference (±7.95)	-1.5	8.6	-8.7	-0.4 (±4.59)

https://doi.org/10.23637/ERADOC-1-185

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LUCERNE

Fertilizer placement - Long Hoos IV 1950

System of replication: 3 randomized blocks of 12 plots each.

Area of each plot: 0.00798 acre. Area harvested: 0.00644 acre.

Treatments: No fertilizer (duplicate plots); no fertilizer but plots drilled over (duplicate plots); and all combinations of:

Granular PK compound fertilizer (10% P_2O_5, 20% K_2O): 2.5, 5.0 cwt per acre.
Method of placement: Broadcast during preparation of seed bed, drilled in bands 3" below soil surface and 2" to side of seed; half broadcast during preparation of seed bed and half to be broadcast on surface next year; half drilled beside seed, and half to be drilled beside rows of plants next year.
It will be noted that for 1950 there are duplicate plots per block with 2.5 cwt per acre fertilizer broadcast or drilled.

Basal dressing: 10 cwt ground chalk per acre

Cultivations, etc.: Springtined: Mar 8 and again Mar 11. Ground chalk applied: Mar 10. Fertilizers broadcast: Mar 23. Harrowed, seed and fertilizers drilled: Mar 27. Rolled: Mar 28. Ring rolled: Mar 29. Dusted with B.H.C.: May 4. Weeded: June 21-23. First cut: Aug 9. Second cut: Oct 12. Variety: Du Puits. Previous crop: Wheat.

Standard errors per plot:
Dry Matter, 1st cut: 2.43 cwt per acre or 10.5% (26 d.f.)
2nd cut: 1.13 cwt per acre or 7.3% (26 d.f.)

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Summary of Results

Lucerne, Dry Matter: cwt per acre

Method of placement	Compound Fertilizer: cwt per acre None	1.25	2.5	5.0	Mean
		1st cut			
	(a)	(b)	(a)	(b)	(c)
Broadcast	22.5+	27.3	25.0	25.8	25.8*
Drilled	21.4+	22.8	20.1	23.4	21.6*
Mean	22.0(c)	25.0(a)	22.5(c)	24.6(a)	23.1
Difference	-1.1(b)	-4.5(d)	-4.9(b)	-2.4(d)	-4.2(a)*
		2nd cut			
	(a)	(b)	(a)	(b)	(c)
Broadcast	15.5+	15.2	15.7	16.5	15.8*
Drilled	14.9+	15.6	15.0	16.2	15.5*
Mean	15.2(c)	15.4(a)	15.4(c)	16.3(a)	15.5
Difference	-0.6(b)	0.4(d)	-0.7(b)	-0.3(d)	-0.3(a)*

Standard errors	1st cut	2nd cut
(a)	0.99	0.46
(b)	1.41	0.65
(c)	0.70	0.33
(d)	1.99	0.92

+See Treatment descriptions.
*Excluding no fertilizer.

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PERMANENT GRASS

Fertilizer placement - Highfield 1950

System of replication: 3 randomized blocks of 6 plots each

Area of each plot: 0.0137 acre

Treatments: No fertilizer; no fertilizer but plots drilled over;
and all combinations of:-
Compound granular PK fertilizer (13% P_2O_5, 15% K_2O): 3.2, 6.4 cwt per acre.
Method of placement: Broadcast; drilled in bands 10" apart and 3" deep.

Basal manuring: 3 cwt sulphate of ammonia per acre

Cultivations, etc.:
Fertilizer broadcast and drilled: Apr 4. Sulphate of ammonia applied: Apr 6. 1st cut: June 8. 2nd cut: Aug 2.

Standard errors per plot:
Dry matter, 1st cut: 2.26 cwt per acre or 8.4% (10 d.f.)
2nd cut: 1.36 cwt per acre or 11.4% (10 d.f.)

https://doi.org/10.23637/ERADOC-1-185

Summary of Results

Grass Dry Matter: cwt per acre

Method of Placement	Compound Fertilizer cwt per acre None	3.2	6.4	Mean	Difference of levels
1st Cut					
		(±1.31)		(±0.92)	(±1.85)
Broadcast	25.2+	29.7	28.9	29.3*	-0.8
Drilled	23.5+	25.4	28.0	26.7*	2.6
Mean (±0.92)	24.4	27.6	28.5	26.8	0.9 (±1.31)
Difference (±1.85)	-1.7	-4.3	-0.9	-2.6* (±1.31)	
2nd Cut					
		(±0.79)		(±0.56)	(±1.11)
Broadcast	11.7+	11.8	12.5	12.1*	0.7
Drilled	11.8+	12.2	11.7	11.9*	-0.5
Mean (±0.56)	11.7	12.0	12.1	11.9	0.1 (±0.79)
Difference (±1.11)	0.1	0.4	-0.8	-0.2* (±0.79)	

+see Treatment descriptions.

*excluding no fertilizer.