ROTHAMSTED RESEARCH

Rothamsted Report for 1936

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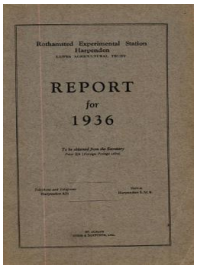

Experiments at Outside Centres

Rothamsted Research

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EXPERIMENTS AT OUTSIDE CENTRES

Barley. Tunstall, Suffolk, 1936. A. W. Oldershaw, Esq., County Organiser

5 × 5 Latin square. Plots : 1/56 acre.
TREATMENTS : Fifth year, no further chalk applied (see 1932 Report, p.208, for first year's dressings).
BASAL MANURING : ¾ cwt. nitrate of soda as top dressing applied early April.
SOIL : Poor sand. Variety : Plumage Archer. Seed sown : March 16. Harvested : Aug. 19-20. Previous crop : Sugar beet. (See 1935 Report, p.259.)
STANDARD ERROR PER PLOT : Total produce : 2.60 cwt. per acre or 6.22%.

Chalk tons per acre (1932)	TOTAL PRODUCE cwt. per acre	*Increase*	GRAIN† cwt. per acre	*Increase*
Mean	*41.8*		*17.0*	
0	Nil		Nil	
1	36.8		14.5	
2	40.6	*+3.8*	17.0	*+2.5*
3	43.9	*+3.3*	18.3	*+1.3*
4	45.9	*+2.0*	18.4	*+0.1*
St. errors	±1.16	±1.64		

†From bulked replicates.

Conclusions

The plots receiving no chalk in 1932 gave negligible yields of grain. There was a significant response in total produce to the higher (1932) dressings of chalk over the first dressing ; the grain yields, from bulked replicates only, indicate a falling off in response at the third and fourth dressings.

Potatoes—J. Morris, Esq., Honey Farm, Wimblington, Cambs., 1936

4 randomised blocks of 8 plots each. Third order interaction confounded. Plots : 1/60 acre.
TREATMENTS : 2^4 factorial design.
Sulph. amm. : None, 0.5 cwt. N per acre.
Superphosphate : None, 1.0 cwt. P_2O_5 per acre.
Sulph. pot. : None, 1.25 cwt. K_2O per acre.
Dung : None, 6½ tons.
BASAL MANURING : Nil.
SOIL : Light black land. Variety : Arran Banner. Manures applied : April 15. Potatoes planted : April 22. Lifted : Oct. 20. Previous crop : Seeds.
STANDARD ERROR PER PLOT : 1.26 tons per acre or 15.1%.
Mean Yield : TOTAL PRODUCE, *8.25* tons.

	Mean response	Differential responses: Sulph. amm. Absent	Sulph. amm. Present	Super. Absent	Super. Present	Sulph. pot. Absent	Sulph. pot. Present	Dung Absent	Dung Present
		TOTAL PRODUCE : tons per acre.							
Sulph. amm.	*+0.44*	—	—	+0.42	+0.46	+0.73	+0.14	−0.01	+0.88
Super.	*−0.39*	−0.40	−0.37	—	—	−0.35	−0.42	+0.03	−0.80
Sulph. pot.	*+0.45*	+0.74	+0.16	+0.49	+0.41	—	—	+0.93	−0.03
Dung ..	*+1.18*	+0.74	+1.63	+1.60	+0.76	+1.66	+0.70	—	—
St. Errors	*±0.445*	±0.630							

Conclusions

Significant response to dung.

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Potatoes. W. E. Morton, Esq., Gores Farm, Thorney, 1936

3 randomised blocks of 9 plots each, certain second order interactions being confounded with block differences.

PLOTS : 1/60 acre.

TREATMENTS : 3 × 3 × 3 factorial design.
Sulphate of ammonia : None, 0.3 cwt. and 0.6 cwt. N per acre.
Superphosphate : None, 0.75 cwt. and 1.50 cwt. P_2O_5 per acre.
Sulphate of potash : None, 0.75 cwt. and 1.50 cwt. K_2O per acre.

BASAL MANURING : Nil.

SOIL : Light black land. Variety : Majestic. Manures applied : April 22. Potatoes planted : April 24. Lifted : Oct. 28. Previous crop : Wheat.

SPECIAL NOTE : 1 cwt. of potatoes from each plot passed over a 1½ inch riddle to determine the percentage ware.

STANDARD ERRORS PER PLOT : Total produce : 0.830 tons per acre or 14.3%. Percentage ware : 7.16.

Main effects—Interactions of sulphate of ammonia with superphosphate and sulphate of potash

Sulphate of ammonia	Superphosphate (cwt. P_2O_5) 0.00	0.75	1.50	Sulphate of potash (cwt. K_2O) 0.00	0.75	1.50	*Mean*	*Increase*
TOTAL PRODUCE : tons per acre (±0.479. *Means : ±0.276. Increases : ±0.390*)								
0.0 cwt. N	4.03	4.78	5.39	3.28	5.78	5.14	*4.73*	
0.3 cwt. N	5.58	7.46	6.45	5.11	7.39	6.98	*6.49*	*+1.76*
0.6 cwt. N	4.57	6.57	7.48	4.05	7.52	7.05	*6.21*	*−0.28*
Mean ..	*4.73*	*6.27*	*6.44*	*4.15*	*6.90*	*6.39*	*5.81*	
Increase ..		*+1.54*	*+0.17*		*+2.75*	*−0.51*		
PERCENTAGE WARE : (±4.14. *Means : ±2.39. Increases : ±3.38*)								
0.0 cwt. N	74.4	77.7	68.5	68.7	71.7	80.3	*73.6*	
0.3 cwt. N	73.2	78.3	74.9	68.8	78.0	79.6	*75.5*	*+1.9*
0.6 cwt. N	74.5	76.7	81.5	69.1	81.8	81.8	*77.6*	*+2.1*
Mean ..	*74.0*	*77.6*	*75.0*	*68.9*	*77.2*	*80.6*	*75.5*	
Increase ..		*+3.6*	*−2.6*		*+8.3*	*+3.4*		

Interaction of sulphate of potash with superphosphate

Sulphate of potash	TOTAL PRODUCE tons per acre (±0.479) Superphosphate (cwt. P_2O_5) 0.00	0.75	1.50	PERCENTAGE WARE (±4.14) Superphosphate (cwt. P_2O_5) 0.00	0.75	1.50
0.00 cwt. K_2O	3.54	4.92	3.98	66.5	71.7	68.5
0.75 cwt. K_2O	5.82	6.88	7.98	79.6	80.6	71.4
1.50 cwt. K_2O	4.82	7.00	7.36	76.1	80.6	85.0

Conclusions

All three nutrients produced significant responses in yield, the falling-off in response at the higher level of dressing being significant for sulphate of ammonia and sulphate of potash and almost significant for superphosphate. There was a positive interaction between the effects of potash and superphosphate, the response to each being significantly greater with the double dressing of the other than with the zero dressing.

Sulphate of potash also gave a significant increase in percentage ware.

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Potatoes. W. E. Morton, Esq., Australia Farm, March, 1936

3 randomised blocks of 9 plots each, certain second order interactions being confounded with block differences. Plots : 1/60 acre.

TREATMENTS : 3 × 3 × 3 factorial design.
Sulph. amm. : None, 0.3, 0.6 cwt. N per acre.
Superphosphate : None, 0.75, 1.50 cwt. P_2O_5 per acre.
Sulph. pot : None, 0.75, 1.50 cwt. K_2O per acre.

BASAL MANURING : 12 loads dung on stubble followed by 1 ton of lime.

SOIL : Good quality Fenland near the clay. Variety : Majestic. Manures applied : April 22. Seed sown : April 23. Lifted : October 28. Previous crop : Wheat.

SPECIAL NOTE : 1 cwt. of potatoes from each plot was passed over a 1½ inch riddle to determine the percentage ware.

STANDARD ERRORS PER PLOT : Total produce : 0.786 tons per acre or 22.7%. Percentage ware : 3.39.

Main effects : Interactions of sulphate of ammonia with superphosphate and sulphate of potash

Sulphate of ammonia	Superphosphate (cwt. P_2O_5) 0.00	0.75	1.50	Sulphate of Potash (cwt. K_2O) 0.00	0.75	1.50	*Mean*	*Increase*
	TOTAL PRODUCE : tons per acre (±0.454. *Means :* ±0.262. *Increases :* ±0.370)							
0.0 cwt. N	1.68	2.34	3.02	2.65	2.04	2.35	*2.35*	
0.3 cwt. N	2.86	3.29	5.39	3.66	4.20	3.68	*3.85*	*+1.50*
0.6 cwt. N	2.96	4.30	5.36	3.33	4.70	4.59	*4.21*	*+0.36*
Mean	*2.50*	*3.31*	*4.59*	*3.21*	*3.65*	*3.54*	*3.47*	
Increase		*+0.81*	*+1.28*		*+0.44*	*−0.11*		
	PERCENTAGE WARE : (±1.96. *Means :* ±1.13. *Increases :* ±1.60)							
0.0 cwt. N	76.2	79.1	78.2	79.0	77.9	76.5	*77.8*	
0.3 cwt. N	77.9	75.9	80.7	78.3	79.2	77.0	*78.2*	*+0.4*
0.6 cwt. N	79.4	83.0	81.8	78.2	82.4	83.6	*81.4*	*+3.2*
Mean	*77.8*	*79.3*	*80.2*	*78.5*	*79.8*	*79.0*	*79.1*	
Increase		*+1.5*	*+0.9*		*+1.3*	*−0.8*		

Interaction of sulphate of potash with superphosphate

Sulphate of potash	TOTAL PRODUCE : tons per acre (±0.454) Superphosphate (cwt. P_2O_5) 0.00	0.75	1.50	PERCENTAGE WARE (±1.96) Superphosphate (cwt. P_2O_5) 0.00	0.75	1.50
0.00 cwt. K_2O	1.90	3.62	4.12	76.4	80.9	78.2
0.75 cwt. K_2O	3.02	3.23	4.70	80.3	78.9	80.3
1.50 cwt. K_2O	2.58	3.09	4.95	76.8	78.1	82.1

Conclusions

Sulphate of ammonia produced significant increases in both yield and percentage ware. Superphosphate significantly increased the yield, but the increases in percentage ware were not significant. The average responses to potash were not significant, but there were indications of a positive interaction between potash and sulphate of ammonia in both yield and percentage ware.

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Potatoes—G. Major, Esq., Newton Farm, Tydd, Wisbech, 1936

3 randomised blocks of 9 plots each, certain second order interactions being confounded with block differences. Plots: 1/60 acre.

TREATMENTS: 3×3×3 factorial design.
Sulph. amm.: None, 0.4 cwt. N., 0.8 cwt. N per acre.
Superphosphate: None, 0.7 cwt. P_2O_5, 1.4 cwt. P_2O_5 per acre.
Sulph. pot.: None, 1.0 cwt. K_2O, 2.0 cwt. K_2O per acre.
These treatments are on the same plots as in 1933.

BASAL MANURING: 10 loads of dung.

SOIL: Deep silt. Variety: King Edward. Manures applied: April 16. Potatoes planted: April 25. Lifted: Oct. 19. Previous crop: Peas. (Seed 1933 Report, p.175)

SPECIAL NOTE: The manurial treatments were established in 1933 and repeated on the same plots in 1936, no other manures having been used for the intervening crops. Dung was applied for the 1936 crop of potatoes.

STANDARD ERROR PER PLOT: 1.20 tons per acre or 9.22%.

Main effects: Interactions of sulphate of ammonia with superphosphate and sulphate of potash

Sulphate of ammonia	Superphosphate (cwt. P_2O_5) 0.0	0.7	1.4	Sulphate of potash (cwt. K_2O) 0.0	1.0	2.0	*Mean*	*Increase*
TOTAL PRODUCE: tons per acre: (±0.693. *Means* ±0.400. *Increase* ±0.566)								
0.0 cwt. N. ..	11.36	11.39	11.28	10.88	11.64	11.50	*11.34*	
0.4 cwt. N. ..	12.77	13.46	14.80	13.01	13.85	14.18	*13.68*	*+2.34*
0.8 cwt. N. ..	14.15	14.64	13.06	14.19	13.67	14.00	*13.95*	*+0.27*
Mean	*12.76*	*13.16*	*13.05*	*12.69*	*13.05*	*13.23*	*12.99*	
Increase		*+0.40*	*−0.11*		*+0.36*	*+0.18*		

Interaction of superphosphate with sulphate of potash

Sulphate of potash	TOTAL PRODUCE: tons per acre (±0.693) Superphosphate (cwt. P_2O_5) 0.0	0.7	1.4
0.0 cwt. K_2O ..	12.78	13.04	12.26
1.0 cwt. K_2O ..	12.72	12.46	13.97
2.0 cwt. K_2O ..	12.78	13.99	12.91

Conclusions

There was a significant response to sulphate of ammonia, the falling-off in response at the higher dressing being significant.

Potatoes—R. Starling, Esq., Little Downham, Ely, 1936

3 randomised blocks of 9 plots each, with two degrees of freedom, representing second order interactions, confounded with block differences. Error estimated from high order interactions.

PLOTS: 1/50 acre.

TREATMENTS: 3×3×3 factorial design.
Sulph. amm.: None, 0.5 cwt. N, 1.0 cwt. N per acre.
Superphosphate: None, 0·8 cwt. P_2O_5, 1·6 cwt. P_2O_5 per acre.
Sulph. pot.: None, 0·5 cwt. K_2O, 1·0 cwt. K_2O per acre.

BASAL MANURING: Nil.

SOIL: Black soil. Variety: Ninety-fold. Manures applied: March 20th. Potatoes planted: March 24th. Lifted June 29th. Previous crop: Wheat.

STANDARD ERROR PER PLOT: 0·608 tons per acre or 16·5%.

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Main effects : Interactions of sulphate of ammonia with superphosphate and sulphate of potash

Sulphate of ammonia	Superphospate (cwt. P_2O_5) 0.0	0.8	1.6	Sulphate of potash (cwt. K_2O) 0.0	0.5	1.0	*Mean*	*Increase*
TOTAL PRODUCE : tons per acre ($\pm$0.351. *Means* $\pm$*0.203. Increases* $\pm$ *0.287*)								
0.0 cwt. N.. ..	1.56	3.69	3.62	2.05	3.63	3.19	*2.96*	
0.5 cwt. N.. ..	2.48	4.32	5.20	3.50	4.38	4.13	*4.00*	*+1.04*
1.0 cwt. N.. ..	2.66	4.41	5.16	3.41	4.38	4.44	*4.08*	*+0.08*
Mean	*2.23*	*4.14*	*4.66*	*2.99*	*4.13*	*3.92*	*3.68*	
Increase		*+1.91*	*+0.52*		*+1.14*	*—0.21*		

Interaction of sulphate of potash with superphosphate

Sulphate of potash	TOTAL PRODUCE : tons per acre ($\pm$0.351) Superphosphate (cwt. P_2O_5) 0.0	0.8	1.6
0.0 cwt. K_2O ..	2.05	3.32	3.59
0.5 cwt. K_2O ..	2.42	4.58	5.39
1.0 cwt. K_2O ..	2.23	4.52	5.01

Conclusions

All three treatments produced significant increases in yield, the falling-off in response at the higher level of dressing being significant for superphosphate and sulphate of potash and almost significant for sulphate of ammonia.

Sugar Beet. Bracken Farm, Tunstall, Suffolk, 1936
A. W. Oldershaw, Esq., County Organiser

3 randomised blocks of 9 plots each. Plots : 0.02144 acre.
TREATMENTS : 3 × 3 factorial design.
No phosphate, superphosphate and slag (15.7% total P_2O_5) at the rate of 1.0 cwt. P_2O_5 per acre. No lime, limestones or dolomite at the rate of 2 tons per acre.
BASAL MANURING : 0.6 cwt. N as sulphate of ammonia and 1.2 cwt. K_2O as muriate of potash.
SOIL : Poor coarse sand with some flinty gravel. Variety : Johnstons British. Manures applied : Limestones : March 20. Artificials : April 21. Seed sown : May 4. Lifted : Nov. 24. Previous crop : Potatoes.
STANDARD ERROR PER PLOT : Total sugar : 4.18 cwt. per acre or 11.4%. Mean dirt tare : 0.067.

	None	Lime-stone	Dolo-mite	*Mean*	*Increase*	None	Lime-stone	Dolo-mite	*Mean*	*Increase*
	TOTAL SUGAR: cwt. per acre: ($\pm$2.41. *Means : $\pm$1.39. Increases : $\pm$1.96*)					ROOTS (washed) : tons per acre				
None	36.9	34.4	39.0	*36.8*		10.11	9.36	10.58	*10.02*	
Super	34.4	38.8	40.4	*37.9*	*+1.1*	9.56	10.56	11.16	*10.43*	*+0.41*
Slag	37.1	34.2	35.8	*35.7*	*—1.1*	9.93	9.25	9.88	*9.69*	*—0.33*
Mean	*36.1*	*35.8*	*38.4*	*36.8*		*9.87*	*9.72*	*10.54*	*10.04*	
Increase		*—0.3*	*+2.3*				*—0.15*	*+0.67*		
	SUGAR PERCENTAGE					PLANT NUMBER : thousands per acre				
None	18.27	18.34	18.44	*18.35*		28.3	29.5	31.1	*29.6*	
Super	17.98	18.36	18.05	*18.13*	*—0.22*	26.7	29.3	27.8	*27.9*	*—1.7*
Slag	18.70	18.50	18.14	*18.45*	*+0.10*	30.1	28.1	33.2	*30.5*	*+0.9*
Mean	*18.32*	*18.40*	*18.21*	*18.31*		*28.4*	*29.0*	*30.7*	*29.3*	
Increase		*+0.08*	*—0.11*				*+0.6*	*+2.3*		

Conclusions

No significant effects. The basal dressing of nitrogen and potash appears to have produced a large effect, the unmanured beet around the experimental area being practically a failure.

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Sugar Beet. W. Mackie, Esq., Holbrook, Suffolk, 1936

A. W. Oldershaw, Esq., County Organiser

3 randomised blocks of 9 plots each. Plots : 0.01405 acre.

TREATMENTS : 3 × 3 factorial design.
No phosphate, superphosphate and slag (15.7% total P_2O_5) at the rate of 1.0 cwt. P_2O_5 per acre. No lime, limestone or dolomite at the rate of 2 tons per acre.

BASAL MANURING : 18 loads of dung per acre, sulphate of ammonia at the rate of 0.6 cwt. N. and muriate of potash at the rate of 1.2 cwt. K_2O per acre.

SOIL : Fine sandy loam. Variety : Kleinwanzleben E. Manures applied : Limestones : March 25, Artificials : April 20. Seed sown : May 22. Lifted : Nov. 20. Previous crop : Oats.

STANDARD ERROR PER PLOT : Total sugar : 3.71 cwt. per acre or 10.6%. Mean dirt tare : 0.168.

	None	Lime-stone	Dolom-ite	*Mean*	*Increase*	None	Lime-stone	Dolom-ite	*Mean*	*Increase*
	TOTAL SUGAR: cwt. per acre: (±2.14. *Means : ±1.24. Increases : ±1.75*)					ROOTS (washed) : tons per acre.				
None ..	26.3	36.0	34.2	*32.2*		7.88	10.75	10.42	*9.68*	
Super. ..	33.0	38.6	39.0	*36.9*	*+4.7*	10.02	12.00	11.64	*11.22*	*+1.54*
Slag ..	31.3	39.8	37.9	*36.3*	*+4.1*	9.47	12.04	11.80	*11.10*	*+1.42*
Mean ..	*30.2*	*38.1*	*37.0*	*35.1*		*9.12*	*11.60*	*11.29*	*10.67*	
Increase ..		*+7.9*	*+6.8*				*+2.48*	*+2.17*		
	SUGAR PERCENTAGE					PLANT NUMBER : thousands per acre				
None ..	16.66	16.76	16.39	*16.60*		19.0	21.4	20.9	*20.4*	
Super. ..	16.42	16.09	16.72	*16.41*	*−0.19*	20.3	22.7	22.1	*21.7*	*+1.3*
Slag ..	16.56	16.50	16.06	*16.37*	*−0.23*	19.1	22.1	23.2	*21.5*	*+1.1*
Mean ..	*16.55*	*16.45*	*16.39*	*16.46*		*19.5*	*22.1*	*22.1*	*21.2*	
Increase ..		*−0.10*	*−0.16*				*+2.6*	*+2.6*		

Conclusions

Both the phosphate and limestone treatments produced significant increases in total sugar, but in neither case was the difference between the two qualities applied significant.

The phosphate and limestone treatments also increased plant number.

https://doi.org/10.23637/ERADOC-1-68

Sugar Beet. H. King, Esq., Shenstone, nr. Kidderminster, 1936
Kidderminster Beet Sugar Factory

3 randomised blocks of 9 plots each. Plots : 0.01697 acre.

TREATMENTS : 3 × 3 factorial design.
Superphosphate and slag (15.7% P_2O_5) at 1.0 cwt. P_2O_5 per acre.
Sulphate of ammonia and nitrate of soda at 0.6 cwt.N per acre.

BASAL MANURING : 2.4 cwt. of muriate of potash per acre.

SOIL : Reddish, sandy loam. Variety : Kleinwanzleben E. Manures applied : April 22. Seed sown : May 4. Lifted : Nov. 15. Previous crop : Wheat.

STANDARD ERRORS PER PLOT : Total sugar : 4.61 cwt. per acre or 18.3%. Tops : 1.17 tons per acre or 15.0%. Mean dirt tare : 0.071.

	None	Sulph. amm.	Nitr. soda	*Mean*	*Increase*	None	Sulph. amm.	Nitr. soda	*Mean*	*Increase*
	TOTAL SUGAR : cwt. per acre (±2.66. *Means : ±1.54. Increases : ±2.18*)					ROOTS (washed) : tons per acre				
None	13.3	24.4	20.1	*19.3*		3.95	7.15	5.85	*5.65*	
Super. ..	18.8	27.5	33.2	*26.5*	*+7.2*	5.44	7.96	9.53	*7.64*	*+1.99*
Slag	19.4	33.8	36.0	*29.7*	*+10.4*	5.70	9.80	10.42	*8.64*	*+2.99*
Mean	*17.2*	*28.6*	*29.8*	*25.2*		*5.03*	*8.30*	*8.60*	*7.31*	
Increase ..		*+11.4*	*+12.6*				*+3.27*	*+3.57*		
	TOPS : tons per acre (*±0.676. Means : ±0.390. Increases* ±0.551)					SUGAR PERCENTAGE				
None	5.03	8.09	6.96	*6.69*		16.97	17.00	17.03	*17.00*	
Super	5.52	8.72	9.94	*8.06*	*+1.37*	17.27	17.23	17.43	*17.31*	*+0.31*
Slag	5.42	9.69	10.38	*8.50*	*+1.81*	16.97	17.27	17.27	*17.17*	*+0.17*
Mean	*5.32*	*8.83*	*9.09*	*7.75*		*17.07*	*17.17*	*17.24*	*17.16*	
Increase ..		*+3.51*	*+3.77*				*+0.10*	*+0.17*		
	PLANT NUMBER : thousands per acre					PERCENTAGE PURITY				
None	29.5	28.7	26.6	*28.3*		90.0	87.4	89.2	*88.9*	
Super	33.1	28.0	26.7	*29.3*	*+1.0*	89.0	90.1	90.1	*89.7*	*+0.8*
Slag	31.7	35.9	31.1	*32.9*	*+4.6*	89.1	88.7	87.7	*88.5*	*−0.4*
Mean	*31.4*	*30.9*	*28.1*	*30.1*		*89.4*	*88.7*	*89.0*	*89.0*	
Increase ..		*−0.5*	*−3.3*				*−0.7*	*−0.4*		

Conclusions

There were significant responses in total sugar and tops to both nitrogen and phosphate. The differences between the effects of the different qualities of nitrogen or phosphate were not significant.

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Sugar Beet. Tunstall, Suffolk, 1936
A. W. Oldershaw, Esq., County Organiser

4 randomised blocks of 8 plots each. Plots : 0.01732 acre.
TREATMENTS : 2 × 2 × 2 factorial design.
Superphosphate : None, 0.5 cwt. P_2O_5 per acre.
Muriate of potash : None, 1.2 cwt. K_2O per acre.
Manures ploughed in (April 21) or broadcast after ploughing (April 22).
BASAL MANURING : 3 cwt. sulphate of ammonia applied after ploughing.
SOIL : Poor, rather coarse sand. Variety : Kleinwanzleben E. Seed sown : May 2. Lifted : Nov. 26. Previous crop : 7 years Lucerne.
STANDARD ERROR PER PLOT : Total sugar : 3.04 cwt. per acre or 4.52%. Mean dirt tare : 0.111.

	No super.	Super.	*Mean*	*Increase*	No super.	Super.	*Mean*	*Increase*
	TOTAL SUGAR : cwt. per acre (±1.07. *Means* : *±0.757. Increases* : *±1.07*)				ROOTS (washed) : tons per acre			
No potash ..	63.0	67.0	*65.0*		18.46	19.53	*19.00*	
Potash	68.9	69.8	*69.4*	*+4.4*	19.60	20.10	*19.85*	*+0.85*
Mean	*66.0*	*68.4*	*67.2*		*19.03*	*19.82*	*19.42*	
Increase		*+2.4*				*+0.79*		

SUGAR PERCENTAGE

	No super.	Super.	*Mean*	*Increase*
No potash	17.08	17.17	*17.12*	
Potash	17.56	17.37	*17.46*	*+0.34*
Mean	*17.32*	*17.27*	*17.29*	
Increase		*−0.05*		

Minerals	TOTAL SUGAR : cwt. per acre Ploughed	Broadcast	*St. errors*	ROOTS (washed) : tons p.a. Ploughed	Broadcast	SUGAR PERCENTAGE Ploughed	Broadcast
Super. ..	68.3	65.8		19.94	19.12	17.12	17.22
Potash ..	70.8	67.0	±1.52	20.11	19.09	17.59	17.52
Super. & Potash	71.2	68.4		20.45	19.76	17.42	17.32
*Mean	*70.1*	*67.1*	*±0.878*	20.17	19.32	17.38	17.35
*Increase ..		*−3.0*	*±1.24*		−0.85		−0.03

Conclusions

Both superphosphate and muriate of potash produced significant increases in total sugar. There was a negative interaction between these effects which reached the 5 per cent. level of significance.

Potash increased the sugar percentage.

Ploughing-in of minerals gave a significant increase of 3 cwt. of sugar per acre over broadcasting minerals after ploughing.

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Celery. A. S. Rickwood, Esq., Mepal, Isle of Ely, 1936

6 randomised blocks of 4 plots each. Second order interaction confounded. Plots; 1/100 acre.
TREATMENTS: 2^3 factorial design.
Superphosphate; None, 5 cwt. per acre.
Muriate of potash; None, 3 cwt. per acre.
Salt: None, 9 cwt. per acre.
BASAL MANURING; 12 tons dung per acre.
SOIL: Black fen. Manures applied; June 10. Planted; June 16, drills 4 ft. 6 ins. apart, plants 4 ins. apart in the rows. Harvested; March 18, 1937. Previous crop; Potatoes.
SPECIAL NOTE; The celery was divided on the field into four grades, according to the number of heads which could be packed in a crate. The mean grade was determined by assigning values 3, 1, -1, -3 to the four grades, 3 being the top grade.
STANDARD ERRORS PER PLOT: Total yield; 1.12 tons per acre or 8.30%. Mean grade; 0.2731.

Responses to fertilisers

Mean yields: Total: 13.52 *tons*; Mean grade: 1.280; Plant number: 25.7 *thousands*

	Mean response	Differential responses: Superphosphate Absent	Superphosphate Present	Muriate of Potash Absent	Muriate of Potash Present	Salt Absent	Salt Present
TOTAL YIELD; tons per acre. (±0.647. *Means:* ±*0.458*).							
Superphosphate ..	+*0.77*	—	—	+1.00	+0.55	+0.25	+1.30
Mur. pot.	+*0.41*	+0.63	+0.18	—	—	+1.10	−0.28
Salt	−*2.11*	−2.63	−1.58	−1.42	−2.80	—	—
MEAN GRADE; (±0.158. *Means:* ±*0.112*).							
Superphosphate ..	−*0.001*	—	—	−0.157	+0.155	+0.060	−0.062
Mur. pot.	+*0.292*	+0.136	+0.448	—	—	+0.289	+0.295
Salt	+*0.279*	+0.340	+0.218	+0.276	+0.282	—	—
PLANT NUMBER; thousands per acre.							
Superphosphate ..	+*1.7*	—	—	+2.6	+0.8	+0.1	+3.2
Mur. pot.	−*0.4*	+0.6	−1.3	—	—	+0.4	−1.2
Salt	−*5.8*	−7.4	−4.2	−5.0	−6.6	—	—

Conclusions

Salt produced a considerable decrease in plant number, which was repeated to a less extent in total produce. It was clearly evident on the field that the presence of superphosphate mitigated the decrease in plant population caused by salt. This effect, however, was much smaller and not significant in total produce. The average effects of superphosphate and muriate of potash on total produce were not significant. Muriate of potash and salt significantly increased the size of heads as measured by the mean grade, but superphosphate had no apparent effect on the size of heads.

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EXPERIMENTS CARRIED OUT BY LOCAL WORKERS

Hay. Redericks Farm, Harlow, 1936
H. W. Gardner, Esq., Hertfordshire Farm Institute, St. Albans

6 randomised blocks of 6 plots each. Certain interactions partially confounded with block differences. Plots; 1/50 acre.
TREATMENTS: 3 × 3 × 2 factorial design.
Phosphate: High soluble slag, superphosphate, mineral phosphate at the rate of 0, 0.75, 1.50 cwt. P_2O_5 per acre.
Muriate of potash; None, 0.5 cwt. K_2O per acre.
BASAL MANURING: Nil.
SOIL: Heavy loam. Manures applied; Dec. 18. Hay cut; July 28-30.
STANDARD ERRORS PER PLOT: 4.03 cwt. per acre or 9.16%.

Summary: cwt. per acre (±2.02*)

	Slag	Super.	Mineral phosphate	*Mean* (±1.17)	*Increase* (±1.65)
0		43.0[1]		*43.0*	
1	45.3	44.4	42.6	*44.1*	*+1.1*
2	42.2	44.6	47.3	*44.7*	*+0.6*
Mean (±1.43)	*43.8*	*44.5*	*45.0*	*43.9*	

Standard error; (1) ±1.17.

*This standard error applies to comparisons that are not confounded.

cwt. per acre (±1.65)	Phosphate (cwt. P_2O_5) 0.00	0.75	1.50	Slag	Super.	Mineral phosphate	*Mean* (±0.953)	*Increase* (±1.35)
No muriate of potash ..	42.6	46.3	44.1	43.8	44.3	44.8	*44.3*	
Muriate of potash	43.4	41.9	45.3	43.3	44.8	42.5	*43.5*	*−0.8*

Conclusions
No significant effects.

Hay—6th Season. Lady Manner's School, Bakewell, 1936

3 randomised blocks of 8 plots each. Plots 1/161 acre.
TREATMENTS; 2^3 factorial design.
Nitrate of soda; None, 2 cwt. per acre.
Superphosphate; None, 3 cwt. (13.7 P_2O_5) per acre.
Potash salt; None, 1 cwt. (30%) per acre.
BASAL MANURING; Nil.
SOIL: Limestone. Manures applied: Mar. 23-25. Hay cut: July 29. (See 1935 Report, p.262.)
STANDARD ERROR PER PLOT; 6.69 cwt. per acre or 11.1%.

Responses to fertilisers: cwt. per acre.
Mean yield: 60.3 *cwt.*

	Mean response (±2.73)	Differential responses (±3.86) Nitrate of soda Absent	Present	Superphosphate Absent	Present	Potash salt Absent	Present
Nitrate of soda	*+11.8*	—	—	+14.8	+8.8	+5.0	+18.6
Superphosphate	*+3.8*	+6.8	+0.8	—	—	+2.6	+5.0
Potash salt	*+6.0*	−0.8	+12.8	+4.8	+7.2	—	—

Conclusions

Significant responses to nitrate of soda and to potash salt in the presence of nitrate of soda. The response to superphosphate was not significant.

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Meadow Hay—5th Season. Lady Manner's School, Bakewell, 1936

4 randomised blocks of 9 plots each. Plots; 1/202 acre.
TREATMENTS; 3×2 factorial design.
No manure, 8 tons of compost, mixed artificials applied in 1933 and 1935, or in 1932, 1934 and 1936.
Mixed artificials consisted of 2 cwt. nitrate of soda, 3 cwt. superphosphate and 1 cwt. 30% potash salt per acre.
BASAL MANURING; Nil.
SOIL: Limestone. Manures applied: Mar. 27-April 3. Hay cut: Aug. 8-12. (See 1935 Report, p.262).
STANDARD ERROR PER PLOT; 3.49 cwt. per acre or 5.56%.

Summary of results: cwt. per acre (±1.74)

1932, 1934 and 1936 treatments	1933 and 1935 treatments Nil	NPK	Compost	*Mean* (±1.00)	*Increase* (±1.41)
Nil	50.0	57.5	60.2	*55.9*	
NPK	64.9	67.0	71.7	*67.9*	*+12.0*
Compost	64.4	65.2	64.4	*64.7*	*+8.8*
Mean (±1.00)	*59.8*	*63.2*	*65.4*	*62.8*	
Increase (±1.41) ..		*+3.4*	*+5.6*		

Conclusions

Of the 1936 treatments, complete artificals increased the yield of hay by 12.0 cwt. per acre and compost by 8.8 cwt., the extra increase given by complete artificials being significant. The 1935 treatments also produced a significant increase in yield, the increase due to compost being somewhat greater than that due to complete artificials. The difference in favour of compost was not significant, but it may be noted that in the 1935 experiment, compost produced a residual response while artificials did not.

Hay—3rd Season. Rowley Green Farm, Arkeley, Barnet, Herts, 1936
H. W. Gardner, Esq., Hertfordshire Farm Institute, St. Albans

6 randomised blocks of 6 plots each. Certain interactions partially confounded with block differences.
PLOTS; 1/50 acre.
TREATMENTS; 3× 2^2 factorial design.
Phosphate; None, high soluble slag and gafsa phosphate at the rate of 1 cwt. P_2O_5 per acre
Potash salt; None, 30% (0.5 cwt. K_2O) per acre.
Chalk; None, 75 cwt. per acre.
BASAL MANURING; Muriate of potash at the rate of 1 cwt. per acre.
SOIL: Acid Clay Chalk applied: Jan. 30, 1934. Minerals applied: Feb. 6, 1934. Hay cut: Aug. 6. (See 1935 Report, p.261).
STANDARD ERROR PER PLOT; 3.10 cwt. per acre or 8.68%.

Responses to fertilisers: cwt. per acre
Mean yield: 35.7 *cwt.*

	Mean response	Differential responses: Chalk Absent	Chalk Present	Potash Absent	Potash Present	No phosphate	Slag	Mineral phosphate
Chalk	*+8.6*[1]	—	—	+4.4[3]	+12.8[3]	+8.4[4]	+7.6[4]	+9.8[4]
Potash	*+1.4*[1]	−2.8[3]	+5.6[3]	—	—	+2.0[4]	+2.6[4]	−0.2[4]
Slag	*+0.3*[2]	+0.6[4]	0.0[4]	0.0[4]	+0.6[4]	—	—	—
Mineral phosphate	*−1.0*[2]	−1.6[4]	−0.3[4]	+0.2[4]	−2.1[4]	—	—	—

Standard errors; (1) ±1.03, (2) ±1.26, (3) ±1.55, (4) ±1.79.

Conclusions

There was a significant response to chalk applied in 1934 and a significant response to potash, applied in 1934, in the presence of chalk.
Observations were taken on the amount of White Clover and these showed a significant increase to chalk.

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Hay. Overhall Farm, Gilston, Herts, 1936
H. W. Gardner, Esq., Hertfordshire Farm Institute, St. Albans

4 randomised blocks of 8 plots each. Plots ; 1/50 acre.
TREATMENTS ; 4 × 2 factorial design.
Phosphate ; None, superphosphate, high soluble slag and mineral phosphate at the rate of 1 cwt. P_2O_5 per acre.
Muriate of potash ; None, 0.5 cwt. K_2O per acre.
BASAL MANURING ; Nil.
SOIL ; Chalky Boulder clay. Manures applied ; Dec. 18. Hay cut ; June 30.
STANDARD ERROR PER PLOT ; 1.60 cwt. per acre of 11.1%.

cwt. per acre (±0.800)	No phosphate	Super.	Slag	Mineral phosphate	*Mean (±0.400)*	*Increase (±0.566)*
No potash	13.6	14.4	13.1	12.7	*13.4*	
Potash	15.7	16.8	15.0	14.7	*15.6*	*+2.2*
Mean (±0.566) ..	*14.6*	*15.6*	*14.0*	*13.7*	*14.5*	
Increase (±0.800) ..		*+1.0*	*−0.6*	*−0.9*		

Conclusions

There was a significant response to potash. The response to phosphate was not significant.

Hay. Woodside Farm, Hatfield, Herts, 1936
H. W. Gardner, Esq., Hertfordshire Farm Institute, St. Albans

6 randomised blocks of 6 plots each. Certain interactions partially confounded with block differences. Plots ; 1/50 acre.
TREATMENTS ; 3 × 2² factorial design.
Phosphate ; None, high soluble slag and gafsa phosphate at the rate of 1 cwt. P_2O_5 per acre.
Muriate of potash ; None, 0.5 cwt. K_2O per acre.
Chalk ; None, 50 cwt. per acre.
BASAL MANURING ; Nil.
SOIL ; Loam. Chalk applied ; March 10. Minerals applied ; Feb. 22. Hay cut ; Aug. 18.
STANDARD ERROR PER PLOT ; 2.51 cwt. per acre or 8.88%.

Responses to fertilisers : cwt. per acre
Mean yield 28.2 cwt.

	Mean response	Chalk Absent	Chalk Present	Differential responses Potash Absent	Potash Present	No phosphate	Slag	Gafsa phosphate
Chalk	*+3.5*[1]	—	—	−1.8[3]	+8.6[3]	+3.4[4]	+4.0[4]	+3.2[4]
Potash	*−3.1*[1]	−8.2[3]	+2.2[3]	—	—	−5.8[4]	−0.8[4]	−2.8[4]
Slag	*0.0*[2]	−0.2[4]	+0.2[4]	−2.6[4]	+2.6[4]	—	—	—
Gafsa phosphate	*−0.8*[2]	−0.6[4]	−1.0[4]	−2.4[4]	+0.8[4]	—	—	—

Standard errors : (1) ±0.837, (2) ±1.02, (3) ±1.25, (4) ±1.45.

Conclusions

There was a large response to chalk when applied in the presence of potash, and a slight but not significant decrease in its absence. Potash produced a significant depression in yield in the absence of chalk. The responses to phosphate were not significant.

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Oats. S. H. Tarry, Esq., Hill End Farm, Hatfield, 1936
H. W. Gardner, Esq., Hertfordshire Farm Institute, St. Albans

4 randomised blocks of 8 plots each. Third order interaction confounded with block differences.
Plots : 1/112 acre.
TREATMENTS : 2^4 factorial design.
Sulphate of ammonia : None, 2 cwt. per acre.
Muriate of potash : None, 2 cwt. per acre.
Superphosphate : None, 4 cwt. per acre.
Chalk : None, 56 cwt. per acre.
SOIL : Light, acid. Variety : Golden Rain. Manures applied : March 13.
Seed sown : March 21. Harvested : Aug. 14. Previous crop : Old ley.
STANDARD ERROR PER PLOT : Grain : 2.62 cwt. per acre or 10.1 %.

Responses to Fertilisers

Mean Yields : Grain, 25.9 cwt. ; Straw, 48.8 cwt.

	Mean response	Differential Responses							
		Sulp. amm.		Superphosphate		Mur. pot.		Chalk	
		Absent	Present	Absent	Present	Absent	Present	Absent	Present
	GRAIN : cwt. per acre ($\pm$1.31. *Means : $\pm$0.926*).								
Sulphate ammonia	*+7.3*	—	—	+8.1	+6.6	+7.3	+7.4	+7.0	+7.7
Superphosphate ..	*+2.7*	+3.4	+2.0	—	—	+5.6	−0.2	+1.5	+3.9
Muriate potash ..	*+1.5*	+1.4	+1.6	+4.4	−1.4	—	—	+0.2	+2.8
Chalk	*+0.3*	−0.1	+0.6	−0.9	+1.5	−1.0	+1.6	—	—
	STRAW : cwt. per acre								
Sulphate ammonia	*+7.6*	—	—	+7.0	+8.2	+3.5	+11.8	+10.1	+5.2
Superphosphate ..	*+1.6*	+1.0	+2.2	—	—	−1.0	+4.2	+2.4	+0.8
Muriate potash ..	*+5.2*	+1.0	+9.3	+2.6	+7.8	—	—	+2.5	+7.8
Chalk	*+1.6*	+4.1	−0.8	+2.4	+0.8	−1.0	+4.3	—	—

Conclusions

Sulphate of ammonia produced significant increases in the yields of grain and straw. Superphosphate gave a significant increase in grain, but this appeared only on the plots without muriate of potash. The average response in grain to muriate of potash was not significant.
Chalk had no apparent effect on the grain yields.

Potatoes. Midland Agricultural College, Loughborough, 1936

4 × 4 Latin square. Plots : 1/49 acre.
TREATMENTS : 4 levels of a mixed fertiliser containing 1 part of sulphate of ammonia, 3 parts of superphosphate and 1 part of sulphate of potash.
BASAL MANURING : Farmyard manure at the rate of 30 tons per acre.
SOIL : Light loam. Variety : Kerr's Pink. Manures applied : April 21. Potatoes planted : May 6. Lifted : Oct. 8. Previous crop : 1 year seeds.
SPECIAL NOTE : Potatoes passed over a 1½ inch riddle to determine percentage ware.
STANDARD ERRORS PER PLOT : Total produce : 1.56 tons per acre or 14.9%. Percentage ware : 5.03.

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Artificials	Yield tons per acre	*Increase for each dressing*	Percentage ware	*Increase for each dressing*
Mean	*10.44*		*77.6*	
None	10.71		75.1	
4 cwt.	10.84	*+0.13*	79.9	*+4.8*
8 cwt.	10.46	*−0.38*	79.4	*−0.5*
12 cwt.	9.77	*−0.69*	75.9	*−3.5*
St. Errors	±0.780	*±1.10*	±2.52	*±3.56*

Conclusions

No significant effects.

Potatoes. Barnes Farm, Kings Langley, 1936
H. W. Gardner, Esq., Hertfordshire Farm Institute, St. Albans

3 randomised blocks of 9 plots each, certain second order interactions being confounded with block differences.

PLOTS : 1/188 acre.

TREATMENTS : 3 × 3 × 3 factorial design.
Sulphate of ammonia : None, 0.4 cwt. N, 0.8 cwt. N per acre.
Superphosphate : None, 0.4 cwt. P_2O_5, 0.8 cwt. P_2O_5 per acre.
Sulphate of potash : None, 0.8 cwt. K_2O, 1.6 cwt. K_2O per acre.

BASAL MANURING : Nil.

SOIL : Pebbly gravel. Variety : King Edward. Manures applied and potatoes planted : May 5. Lifted : Oct. 15. Previous crop : Derelict for several years.

SPECIAL NOTE : Potatoes passed over 1½ inch riddle to determine percentage ware.

STANDARD ERRORS PER PLOT : Total produce : 0.672 tons per acre or 24.0%. Percentage ware : 5.96.

Main effects : Interactions of sulphate of ammonia with superphosphate and sulphate of potash

Sulphate of ammonia	Superphosphate (cwt. P_2O_5) 0.0	0.4	0.8	Sulphate of potash (cwt. K_2O) 0.0	0.8	1.6	*Mean*	*Increase*
	TOTAL PRODUCE: tons per acre (±0.388. *Means: ±0.224. Increases ±0.317*)							
0.0 cwt. N	1.65	2.20	2.76	2.06	2.61	1.94	*2.20*	
0.4 cwt. N	2.37	3.31	3.10	2.86	3.42	2.50	*2.93*	*+0.73*
0.8 cwt. N	2.14	3.96	3.67	2.72	3.43	3.62	*3.26*	*+0.33*
Mean	*2.05*	*3.16*	*3.18*	*2.55*	*3.15*	*2.69*	*2.80*	
Increase		*+1.11*	*+0.02*		*+0.60*	*−0.46*		
	PERCENTAGE WARE (±3.44. *Means : ±1.99. Increases: ±2.81*)							
0.0 cwt. N	49.9	58.8	58.3	62.6	57.8	46.6	*55.7*	
0.4 cwt. N	53.6	63.3	64.4	62.2	61.4	57.6	*60.4*	*+4.7*
0.8 cwt. N	61.0	61.7	67.1	61.5	68.1	60.1	*63.2*	*+2.8*
Mean	*54.8*	*61.3*	*63.3*	*62.1*	*62.4*	*54.8*	*59.8*	
Increase		*+6.5*	*+2.0*		*+0.3*	*−7.6*		

Interaction of sulphate of potash with superphosphate

Sulphate of potash	TOTAL PRODUCE : tons per acre (±0.388) Superphosphate (cwt. P_2O_5) 0.0	0.4	0.8	PERCENTAGE WARE (±3.44) Superphosphate (cwt. P_2O_5) 0.0	0.4	0.8
0.0 cwt. K_2O	2.50	2.64	2.51	60.7	59.1	66.6
0.8 cwt. K_2O	1.84	3.53	4.09	57.7	65.4	64.2
1.6 cwt. K_2O	1.81	3.31	2.93	46.1	59.3	59.0

Conclusions

The crop was a very poor one and the standard errors are high. Sulphate of ammonia and superphosphate gave significant increases in both yield and percentage ware. The single dressing of sulphate of potash gave a barely significant increase in yield, but the additional dressing produced almost as great a decrease. In percentage ware the single dressing produced little effect, but the double dressing gave a substantial decrease, this decrease occurring chiefly on the plots without nitrogen.

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Potatoes. J. W. Marris, Esq., Carlton Cliff, Lincs., 1936
A. McVicar, Esq., County Organiser

5×5 Latin square. Plots: 1/80 acre.
TREATMENTS: Increasing levels of a mixed fertiliser consisting of 6 parts sulphate of ammonia, 6 parts 40% superphosphate, 5 parts sulphate of potash and 1 part steamed bone flour as shown.
BASAL MANURING: Nil.
SOIL: Cliff limestone. Variety: King Edward. Manures applied: April 22. Potatoes planted: April 24. Lifted: Oct. 13. Previous crop: Seeds.
SPECIAL NOTE: Potatoes passed over 1½ inch riddle to determine percentage ware.
STANDARD ERRORS PER PLOT: Total produce: 0.457 tons per acre or 7.5%; percentage ware: 1.64.

Artificials cwt. per acre	TOTAL PRODUCE tons per acre	*Increase for each dressing*	PERCENTAGE WARE	*Increase for each dressing*
Mean	*6.04*		*63.8*	
None	4.93		62.7	
4	5.91	*+0.98*	62.3	*−0.4*
8	6.49	*+0.58*	65.3	*+3.0*
12	6.35	*−0.14*	64.7	*−0.6*
16	6.54	*+0.19*	64.2	*−0.5*
St. errors	±0.204	*±0.288*	±0.733	*±1.04*

Conclusions

Significant responses to the mixed fertilizer in both yield and percentage ware, with a significant falling-off in response at the higher levels, there being no further increase in yield or percentage ware after the second dressing (8 cwt.).

Potatoes. H. Doulton, Esq., Ingham, Lincs., 1936
A. McVicar, Esq., County Organiser

5 × 5 Latin square. Plots: 1/80 acre.
TREATMENTS: Increasing levels of a mixed fertiliser consisting of 6 parts sulphate of ammonia, 6 parts 40% superphosphate, 5 parts sulphate of potash and 1 part steamed bone flour.
BASAL MANURING: Nil.
SOIL: Cliff limestone. Variety: King Edward. Manures applied: March 30. Potatoes planted: April 4-7. Lifted: Oct. 12-13. Previous crop: Seeds.
SPECIAL NOTE: Potatoes passed over 1½ inch riddle to determine percentage ware.
STANDARD ERRORS PER PLOT: Total produce: 0.474 tons per acre or 9.04%. Percentage ware: 2.52.

Artificials cwt. per acre	TOTAL PRODUCE acre	*Increase for each dressing*	PERCENTAGE WARE	*Increase for each dressing*
Mean	*5.25*		*79.9*	
0	3.62		75.8	
4	4.76	*+1.14*	77.7	*+1.9*
8	5.70	*+0.94*	80.8	*+3.1*
12	6.34	*+0.64*	83.2	*+2.4*
16	5.81	*−0.53*	81.9	*−1.3*
St. errors	±0.212	*±0.300*	±1.13	*±1.60*

Conclusions

Significant increases to the mixed fertiliser in both yield and percentage ware, with a significant decrease in responses at the higher levels, there being no further increments beyond the dressing of 12 cwt. per acre.

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Potatoes. Royston, Herts, 1936
H. W. Gardner, Esq., Hertfordshire Farm Institute, St. Albans

6 randomised blocks of 4 plots each. Second order interaction confounded. Plots; **1/290 acre.**
TREATMENTS; 2^3 factorial design.
Sulphate of ammonia; None, 3 cwt. per acre.
Superphosphate; None, 5 cwt. per acre.
Muriate of potash; None, 2 cwt. per acre.
BASAL MANURING; Nil.
SOIL; Chalky loam. Variety; King Edward. Manures applied; April 9. Potatoes planted; April 9. Lifted; Sept. 4 and 5. Previous crop; Oats.
STANDARD ERROR PER PLOT; Total produce; 0.724 tons per acre or 12.3%. Percentage ware; 9.64.

Responses to fertilisers: cwt. per acre

Mean yields: Total produce: 5.89 *tons;* Percentage ware: **63.6**

	Mean response	Differential responses: Sulph. amm. Absent	Sulph. amm. Present	Superphosphate Absent	Superphosphate Present	Mur. pot. Absent	Mur. pot. Present
TOTAL PRODUCE; tons per acre (±0.418. *Means:* ±*0.296*)							
Sulph. amm.	*+2.37*	—	—	+1.52	+3.22	+2.15	+2.60
Superphosphate	*+0.66*	−0.18	+1.51	—	—	+0.18	+1.14
Mur. pot.	*+0.97*	+0.74	+1.19	+0.48	+1.45	—	—
PERCENTAGE WARE (±5.57. *Means;* ±*3.94*)							
Sulph. amm.	*+2.3*	—	—	+1.0	+3.6	0.0	+4.6
Superphosphate	*+2.6*	+1.3	+3.9	—	—	+4.0	+1.2
Mur. pot.	*+9.3*	+7.0	+11.6	+10.7	+7.9	—	—

Conclusions

All three nutrients produced significant increases in total produce. The response to superphosphate, however, occurred only in the presence of sulphate of ammonia, the interaction between sulphate of ammonia and superphosphate being significant. Muriate of potash gave a significant increase in percentage ware.

Sugar Beet. G. F. Kingston, Esq., Midland Agricultural College, 1936

6 randomised blocks of 3 plots each. Plots: 1/36 acre.
TREATMENTS: No manure, 6 cwt. superphosphate and 2 cwt. muriate of potash before gyrotilling (Mar. 26), and after gyrotilling (April 6).
BASAL MANURING: 3 cwt. sulphate of ammonia after gyrotilling.
SOIL: Light, sandy loam. Variety: Kleinwanzleben E. Seed sown: April 24. Lifted: Nov. 11. Previous crop: wheat.
STANDARD ERRORS PER PLOT: Total sugar: 5.54 cwt. per acre or 9.37%. Tops: 1.68 tons per acre or 11.9%. Mean dirt tare: 0.137.

Minerals applied	TOTAL SUGAR cwt.	*Increase*	ROOTS (washed) Tons	*Increase*	TOPS Tons	*Increase*	SUGAR PERCENTAGE	*Increase*
Mean	*59.0*		*17.51*		*14.14*		*16.84*	
None	62.9		18.50		15.39		16.98	
Before—gyrotilling	54.9	*−8.0*	16.47	*−2.03*	13.42	*−1.97*	16.68	*−0.30*
After —gyrotilling	59.3	*−3.6*	17.57	*−0.93*	13.62	*−1.77*	16.86	*−0.12*
Standard Errors	±2.26	±*3.20*			±0.686	±*0.970*		

Conclusions

The yield of sugar was high. The reductions due to minerals in tops and total sugar are not significant.

https://doi.org/10.23637/ERADOC-1-68 *pp 17*

Sugar beet, G. Marratt, Esq., Holton-le-Moor, 1936
Brigg Sugar Factory
R. Hull, Esq., Midland Agricultural College

6 randomised blocks of 6 plots each. Certain interactions partially confounded with block differences. Plots 1/65 acre.

TREATMENTS : 3 × 2² factorial design.

Borax : None, 20, 40 lb. per acre applied before seeding or at singling, without artificials or with artificials.

The artificials consisted of 3 cwt. nitrate of soda, 4 cwt. superphosphate and 2 cwt. muriate of potash per acre.

BASAL MANURING : Nil.

SOIL : Sandy, on gravel. Variety ; Kleinwanzleben E. Manures applied ; April 6. Seed sown ; April 23. Lifted ; Oct. 27. Previous crop ; Beet.

STANDARD ERRORS PER PLOT : Total sugar ; 3.32 cwt. per acre or 9.92% : tops ; 1.32 tons per acre or 12.2%, mean dirt tare ; 0.1318.

	Borax None	Borax 20 lb.	Borax 40 lb.	*Mean*	*Increase*
TOTAL SUGAR ; cwt. per acre (±1.36. *Means :* ±0.962. *Increases :* ±1.36).					
At sowing	33.4[1]	33.3	32.3	*32.8*	
At singling		34.4	33.6	*34.0*	*+1.2*
No artificials	25.1	26.4	27.0	*26.2*[3]	
Artificials	41.7	41.3	38.9	*40.6*[3]	*+14.4*[5]
Mean	*33.4*	*33.8*	*33.0*	*33.4*	
Increase		*+0.4*	*−0.8*		
TOPS ; tons per acre (±0.539. *Means :* ±0.381. *Increases :* ±0.539).					
At sowing	11.12[2]	11.14	10.22	*10.68*	
At singling		11.02	10.34	*10.68*	*0.00*
No artificials	7.91	7.63	7.81	*7.78*[4]	
Artificials	14.33	14.52	12.74	*13.86*[4]	*+6.08*[6]
Mean	*11.12*	*11.08*	*10.28*	*10.82*	
Increase		*−0.04*	*−0.80*		

	Borax None	Borax 20 lb.	Borax 40 lb.	*Mean*	*Increase*
ROOTS ;(washed) ; tons per acre.					
At sowing	10.08	10.10	9.76	*9.93*	
At singling		10.18	10.30	*10.24*	*+0.31*
No artificials	7.65	7.95	8.32	*7.97*	
Artificials	12.51	12.32	11.73	*12.19*	*+4.22*
Mean	*10.08*	*10.14*	*10.03*	*10.08*	
Increase		*+0.06*	*−0.11*		
SUGAR PERCENTAGE					
At sowing	16.54	16.48	16.52	*16.50*	
At singling		16.84	16.32	*16.58*	*+0.08*
No artificials	16.38	16.56	16.24	*16.39*	
Artificials	16.69	16.76	16.60	*16.68*	*+0.29*
Mean	*16.54*	*16.66*	*16.42*	*16.54*	
Increase		*+0.12*	*−0.24*		

Standard errors ; (1) ±0.962, (2) +0.381, (3) ±0.785, (4) ±0.311, (5) ±1.11, (6) ±0.440.

	None	Borax 20 lb.	Borax 40 lb.	*Mean*	*Increase*
PLANT NUMBER ; thousands per acre					
At sowing ..	25.6	26.4	25.1	*25.8*	
At singling ..		26.0	25.8	*25.9*	*+0.1*
No artificials ..	23.1	24.8	24.4	*24.1*	
Artificials ..	28.1	27.6	26.5	*27.4*	*+3.3*
Mean	*25.6*	*26.2*	*25.4*	*25.8*	
Increase ..		*+0.6*	*−0.8*		

Conclusions

There was a large response to artificials in both total sugar and tops. Borax had no apparent effect on total sugar and produced a small but not significant decrease in tops. Borax was introduced into the experiment as a control for Heart Rot, which was present in the plots in 1935.

https://doi.org/10.23637/ERADOC-1-68

Sugar Beet. D. Allen, Esq., Friskney, 1936
Bardney Beet Sugar Factory
A. McVicar, Esq., County Organiser

4 randomised blocks of 4 plots each. Plots : 1/80 acre.
TREATMENTS : Singling with 8-in. hoe (A), set out to exactly 11 inches (B), selection of strongest plant within 3 inches of exact distance (11 inches) (C), selection of weakest plant within 3 inches of exact distance (11 inches) (D).
BASAL MANURING : 5 cwt. mixed artificials per acre.
SOIL : Silt. Variety : Kleinwanzleben E. Seed sown : April 20. Singled : May 21. Lifted : Nov. 2. Previous crop : Potatoes.
STANDARD ERRORS PER PLOT : Total sugar : 1.80 cwt. per acre or 4.60%. Tops : 0.907 tons per acre or 7.75%. Mean dirt tare : 0.112.

	TOTAL SUGAR Cwt.	*Increase*	ROOTS (washed) Tons	*Increase*	TOPS Tons	*Increase*	SUGAR PERCENT.	*Increase*	PLANT NUMBER Thous.	*Increase*
Mean ..	*39.2*		*11.87*		*11.70*		*16.52*		*27.2*	
A	40.4		12.47		11.73		16.25		29.3	
B	40.1	*−0.3*	11.98	*−0.49*	12.15	*+0.42*	16.72	*+0.47*	26.5	*−2.8*
C	39.2	*−1.2*	11.49	*−0.98*	11.08	*−0.65*	17.05	*+0.80*	26.8	*−2.5*
D	37.0	*−3.4*	11.54	*−0.93*	11.85	*+0.12*	16.08	*−0.17*	26.1	*−3.2*
St. Errors	±0.900	*±1.27*			±0.454	*±0.642*				

Conclusions—See below.

Sugar Beet. W. E. Auckland, Esq., Timberland, 1936
Bardney Beet Sugar Factory
F. Wakerley, Esq., County Organiser

4×4 Latin square. Plots : 1/80 acre.
TREATMENTS : Singling with 8 in. hoe (A), set out to exactly 11 inches (B), selection of strongest plant within 3 inches of exact distance (11 inches) (C), selection of weakest plant within 3 inches of exact distance (11 inches) (D).
BASAL MANURING : 8 cwt. compound fertiliser.
SOIL : Sandy. Variety : Strube. Manures applied : April 10. Seed sown : April 17. Lifted : Oct. 27. Previous crop : Potatoes.
STANDARD ERRORS PER PLOT : Total sugar : 1.68 cwt. per acre or 3.20%. Tops : 0.675 tons per acre or 5.07%. Mean dirt tare : 0.083.

	TOTAL SUGAR Cwt.	*Increase*	ROOTS (washed) Tons	*Increase*	TOPS Tons	*Increase*	SUGAR PERCENT.	*Increase*	PLANT NUMBER Thous.	*Increase*
Mean	*52.6*		*14.83*		*13.30*		*17.74*		*28.1*	
A	54.0		15.28		13.66		17.68		27.3	
B	54.2	*+0.2*	15.27	*−0.01*	13.05	*−0.61*	17.72	*+0.04*	29.0	*+1.7*
C ..	51.7	*−2.3*	14.60	*−0.68*	13.38	*−0.28*	17.70	*+0.02*	29.0	*+1.7*
D	50.7	*−3.3*	14.18	*−1.10*	13.09	*−0.57*	17.88	*+0.20*	27.2	*−0.1*
St. Errors	±0.840	*±1.19*			±0.338	*±0.478*				

Conclusions

There appeared to be little difference in the yield of sugar per acre between the use of an 8 inch hoe and singling to exactly 11 inches. Irregular spacing, whether by the selection of the strongest or the weakest plant within three inches of the exact eleven inches, gave a somewhat reduced yield, the reduction being most marked for the selection of the weakest plant.

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Sugar beet, M. A. Rice, Esq., Downham Market, 1936
Wissington Beet Sugar Factory

6 randomised blocks of 6 plots each. Certain interactions partially confounded with block differences. Plots ; 1/78 acre.
TREATMENTS : 3 × 3 × 2 factorial design.
Superphosphate : None, 0.5, 1.0 cwt. P_2O_5 per acre.
Potash : None, 0.6, 1.2 cwt. K_2O per acre as muriate of potash and potash salt.
BASAL MANURING ; Nil.
SOIL : Black fen over chalk. Variety ; Marsters. Manures applied ; April 16. Seed sown ; April 23. Lifted ; Dec. 19. Previous crop ; Potatoes.
STANDARD ERROR PER PLOT : Total sugar ; 4.46 cwt. per acre or 10.9% : mean dirt tare ; 0.1305.

Main effects

	Superphosphate (cwt. P_2O_5)			Potash (cwt. K_2O)			Muri- ate* of potash	Potash* salt
	0.0	0.5	1.0	0.0	0.6	1.2		
TOTAL SUGAR ; cwt. per acre (±1.29)	40.7	41.1	41.1	40.7	40.4	41.8	42.1	40.1
Increase (±1.82)		*+0.4*	*0.0*		*−0.3*	*+1.4*		*−2.0*
ROOTS (washed) ; tons per acre	13.46	13.60	13.57	13.35	13.49	13.79	14.10	13.18
Increase		*+0.14*	*−0.03*		*+0.14*	*+0.30*		*−0.92*
SUGAR PERCENTAGE ..	15.11	15.09	15.13	15.21	14.98	15.13	14.91	15.21
Increase		*−0.02*	*+0.04*		*−0.23*	*+0.15*		*+0.30*
PLANT NUMBER ; thous. per acre	21.8	21.6	22.4	21.4	21.8	22.5	22.2	22.1
Increase		*−0.2*	*+0.8*		*+0.4*	*+0.7*		*−0.1*

* Mean of single and double.

Interaction of potash quality with quantity

(K_2O)	TOTAL SUGAR ; cwt. per acre		ROOTS (washed) ; tons per acre		SUGAR PER-CENTAGE		PLANT NUMBER ; thousands per acre	
	Muriate of potash	Potash salt	Muriate of potash	Potash salt	Muriate of potash	Potash salt	Muriate of potash	Potash salt
0.0 ..	40.7[2]		13.35		15.21		21.4	
0.6 ..	41.3[1]	39.5[1]	13.93	13.05	14.81	15.16	21.9	21.8
1.2 ..	42.9[1]	40.6[1]	14.28	13.30	15.01	15.26	22.6	22.4

Standard errors ; (1) ±1.82, (2) ±1.29.

Interaction of potash with superphosphate

TOTAL SUGAR : cwt. per acre (±2.23*)

Superphosphate (cwt. P_2O_5)	Potash (cwt. K_2O) 0.0	0.6	1.2
0.0	39.2	38.1	44.8
0.5	38.3	42.5	42.4
1.0	44.5	40.7	38.1

* This standard error applies to comparisons that are not confounded.

Conclusions

No significant effects.

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Sugar beet, J. S. Fendick, Esq., Littleport, 1936
Wissington Beet Sugar Factory

6 randomised blocks of 6 plots each. Certain interactions partially confounded with block differences. Plots ; 1/92 acre.
TREATMENTS : 3 × 3 × 2 factorial design.
Superphosphate ; None, 0.5, 1.0 cwt. P_2O_5 per acre.
Potash ; None, 0.6, 1.2 cwt. K_2O per acre as muriate of potash and potash salt.
BASAL MANURING : Nil.
SOIL : Black fen. Variety ; Johnson's Perfection. Manures applied ; April 8. Seed sown ; May 2. Lifted ; Nov. 29. Previous crop ; Wheat.
STANDARD ERROR PER PLOT : Total sugar ; 4.08 cwt. per acre or 8.13% : mean dirt tare ; 0.1630.

Main effects

	Superphosphate (cwt. P_2O_5) 0.0	0.5	1.0	Potash (cwt. K_2O) 0.0	0.6	1.2	Muriate* of potash	Potash* salt
TOTAL SUGAR ; cwt. per acre (±1.18)	50.1	50.9	49.5	50.9	49.4	50.2	50.0	49.5
Increase (±1.67)		*+0.8*	*−1.4*		*−1.5*	*+0.8*		*−0.5*
ROOTS (washed) ; tons per acre	14.93	15.00	14.42	14.87	14.70	14.78	14.74	14.74
Increase		*+0.07*	*−0.58*		*−0.17*	*+0.08*		*0.0*
SUGAR PERCENTAGE ..	16.78	16.96	17.16	17.11	16.79	16.99	16.96	16.82
Increase		*+0.18*	*+0.20*		*−0.32*	*+0.20*		*−0.14*
PLANT NUMBER ; thous. per acre	26.0	26.2	24.9	25.6	26.0	25.6	25.6	26.0
Increase		*+0.2*	*−1.3*		*+0.4*	*−0.4*		*+0.4*

* Mean of single and double.

Interaction of potash quality with quantity

(cwt. K_2O)	TOTAL SUGAR cwt. per acre		ROOTS (washed) ; tons per acre		SUGAR PERCENTAGE		PLANT NUMBER thousands per acre	
	Muriate of potash	Potash salt	Muriate of potash	Potash salt	Muriate of potash	Potash salt	Muriate of potash	Potash salt
0.0	50.9[2]		14.87		17.11		25.6	
0.6	49.9[1]	48.8[1]	14.80	14.59	16.87	16.71	25.9	26.0
1.2	50.1[1]	50.3[1]	14.69	14.88	17.05	16.93	25.2	26.0

Standard errors ; (1) ±1.67 : (2) ±1.18.

Interaction of potash with superphosphate
TOTAL SUGAR : cwt. per acre (±2.04*)

Superphosphate (cwt. P_2O_5)	Potash (cwt. K_2O) 0.0	0.6	1.2
0.0	50.7	47.4	52.2
0.5	53.6	49.3	49.8
1.0	48.5	51.4	48.6

*This standard error applies to comparisons that are not confounded.

Conclusions
No significant effects.

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Sugar beet, F. Hartley, Esq., Upwell, Wisbech, 1936
Wissington Beet Sugar Factory

6 randomised blocks of 6 plots each. Certain interactions partially confounded with block differences. Plots ; 0.0111 acre.

TREATMENTS : 3 × 3 × 2 factorial design.
Superphosphate ; None, 0.5, 1.0 cwt. P_2O_5 per acre.
Potash ; None, 0.6, 1.2 cwt. K_2O per acre as muriate of potash and potash salt.

BASAL MANURING : Nil.

SOIL : Silt. Variety ; Marsters. Manures applied ; March 31. Seed sown ; April 2. Lifted ; Nov. 20. Previous crop ; Potatoes.

STANDARD ERROR PER PLOT : Total sugar ; 3.73 cwt. per acre or 5.60% : mean dirt tare ; 0.1971.

Main effects

	Superphosphate (cwt. P_2O_5) 0.0	0.5	1.0	Potash (cwt. K_2O) 0.0	0.6	1.2	Muriate of potash*	Potash salt*
TOTAL SUGAR ; cwt. per acre (±1.08)	66.4	67.9	65.2	65.9	65.4	68.3	67.2	66.4
Increase (±*1.53*)		*+1.5*	*−2.7*		*−0.5*	*+2.9*		*−0.8*
ROOTS) washed) ; tons per acre	20.72	20.84	20.42	20.32	20.47	21.20	20.93	20.74
Increase		*+0.12*	*−0.42*		*+0.15*	*+0.73*		*−0.19*
SUGAR PERCENTAGE ..	16.03	16.28	15.96	16.23	15.95	16.09	16.05	16.00
Increase		*+0.25*	*−0.32*		*−0.28*	*+0.14*		*−0.05*
PLANT NUMBER ; thous. per acre	30.9	31.9	31.6	30.5	31.7	32.2	32.0	32.0
Increase		*+1.0*	*−0.3*		*+1.2*	*+0.5*		*0.0*

*Mean of single and double.

Interaction of potash quality with quantity

(cwt. K_2O)	TOTAL SUGAR cwt. per acre: Muriate of potash	Potash salt	ROOTS (washed); tons per acre: Muriate of potash	Potash salt	SUGAR PERCENTAGE: Muriate of potash	Potash salt	PLANT NUMBER thousands per acre: Muriate of potash	Potash salt
0.0	65.9[2]		20.32		16.23		30.5	
0.6	64.6[1]	66.1[1]	20.21	20.72	15.96	15.94	31.6	31.8
1.2	69.9[1]	66.7[1]	21.65	20.75	16.13	16.05	32.3	32.1

Standard errors ; (1) ± 1.53, (2) ± 1.08.

Interaction of potash with superphosphate

TOTAL SUGAR : cwt. per acre (±1.86*)

Superphosphate (cwt. P_2O_5)	Potash (cwt. K_2O) 0.0	0.6	1.2
0.0	62.6	65.4	71.4
0.5	66.4	66.5	70.7
1.0	68.7	64.3	62.8

* This standard error applies to comparisons that are not confounded.

Conclusions

The yields of sugar per acre were high and the effects of the fertilisers were not significant.

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Sugar Beet. A. E. Bird, Esq., Scotter, Gainsborough, 1936
Brigg Beet Sugar Factory
A. McVicar, Esq., County Organiser

3 randomised blocks of 8 plots each. Plots : 1/50 acre.

TREATMENTS : No minerals, 5 cwt. superphosphate and 3 cwt. 30% potash salt, ploughed in : Jan. 10 ; Broadcast after winter ploughing : Jan. 27. Broadcast in spring : April 6. No dung, 10 tons dung per acre.

BASAL MANURING : 3 cwt. sulphate of ammonia per acre, applied on April 6.

SOIL : Sandy. Variety : Kleinwanzleben E. Seed sown : April 22. Lifted : Oct. 28. Previous crop : Wheat.

STANDARD ERRORS PER PLOT : Total sugar : 1.68 cwt. per acre, or 3.67%. Tops : 0.916 tons per acre or 8.11%. Mean dirt tare : 0.123.

Dung	No mins.	Ploughed in	Broadcast Jan.	Broadcast April	*Mean*	*Increase*	No mins.	Ploughed in	Broadcast Jan.	Broadcast April	*Mean*	*Increase*
	TOTAL SUGAR : cwt. per acre (±0.970)						ROOTS (washed) : tons per acre					
None	44.1	47.5	46.1	47.3	*46.2*[3]		12.26	13.15	12.80	13.16	*12.84*	
10 tons	46.0	45.1	45.7	45.0	*45.4*[3]	*−0.8*[1]	12.84	12.54	12.81	12.49	*12.67*	*−0.17*
Mean	*45.0*[1]	*46.3*[1]	*45.9*[1]	*46.2*[1]	*45.8*		*12.55*	*12.84*	*12.80*	*12.82*	*12.76*	
Increase		*+1.3*[2]	*+0.9*[2]	*+1.2*[2]				*+0.29*	*+0.25*	*+0.27*		
St. errors	(1) ±0.686, (2) ±0.970, (3) ±0.485											
	TOPS : tons per acre (±0.529)						SUGAR PERCENTAGE					
None	10.63	11.94	11.90	12.22	*11.67*[3]		17.97	18.07	18.03	17.98	*18.01*	
10 tons	12.06	10.21	10.54	10.88	*10.92*[3]	*−0.75*[1]	17.92	17.98	17.85	18.02	*17.94*	*−0.07*
Mean	*11.34*[1]	*11.08*[1]	*11.22*[1]	*11.55*[1]	*11.30*		*17.94*	*18.02*	*17.94*	*18.00*	*17.98*	
Increase		*−0.26*[2]	*−0.12*[2]	*+0.21*[2]				*+0.08*	*0.00*	*+0.06*		
St. errors	(1) ±0.374, (2) ±0.529, (3) ±0.264											

PLANT NUMBER : thousands per acre

Dung	No mins.	Ploughed in	Broadcast Jan.	Broadcast April	*Mean*	*Increase*
None	29.7	30.3	29.8	31.4	*30.3*	
10 tons	29.9	29.7	29.4	29.6	*29.6*	*−0.7*
Mean	*29.8*	*30.0*	*29.6*	*30.5*	*30.0*	
Increase		*+0.2*	*−0.2*	*+0.7*		

Conclusions

In the absence of dung, minerals produced significant increases in total sugar and tops. In the presence of dung there was no response to minerals in total sugar and a significant decrease to minerals in tops. There were no apparent differences in the effects of different methods of applying the minerals.

Sugar Beet. H. J. Shuttleworth, Esq., Langton, Wragby, Lincs., 1936
Bardney Beet Sugar Factory
A. McVicar, Esq., County Organiser

3 randomised blocks of 8 plots each. Plots : 1/40 acre.

TREATMENTS : No minerals, 5 cwt. superphosphate and 3 cwt. 30% potash salt, ploughed in (Jan. 24), broadcast after winter ploughing (Jan. 31), broadcast in spring (April 1). No dung, 10 tons dung per acre.

BASAL MANURING : 3 cwt. sulphate of ammonia per acre, applied on April 1.

SOIL : Heavy loam on gravel and sand. Variety : Kleinwanzleben E. Seed sown : April 9. Lifted : Oct. 28. Previous crop : Barley.

STANDARD ERRORS PER PLOT : Total sugar : 1.72 cwt. per acre or 3.80%. Tops : 0.729 tons per acre or 8.43% Mean dirt tare : 0.123.

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Dung	No mins.	Ploughed in	Broadcast Jan.	Broadcast April	*Mean*	*Increase*	No mins.	Ploughed in	Broadcast Jan.	Broadcast April	*Mean*	*Increase*
	TOTAL SUGAR : cwt. per acre (±0.993)						ROOTS (washed) : tons per acre					
None	40.3	44.6	46.6	45.2	*44.2*[3]		11.15	11.98	12.42	12.00	*11.89*	
10 tons	44.2	47.4	47.0	46.9	*46.4*[3]	*+2.2*[1]	12.10	12.62	12.85	12.53	*12.52*	*+0.63*
Mean	*42.2*[1]	*46.0*[1]	*46.8*[1]	*46.0*[1]	*45.3*		*11.62*	*12.30*	*12.64*	*12.26*	*12.21*	
Increase		*+3.8*[2]	*+4.6*[2]	*+3.8*[2]				*+0.68*	*+1.02*	*+0.64*		
St. errors	(1) ±0.702, (2) ±0.993, (3) ±0.496											
	TOPS : tons per acre (±0.421)						SUGAR PERCENTAGE					
None	7.86	7.84	8.13	8.14	*7.99*[3]		18.07	18.63	18.77	18.83	*18.58*	
10 tons	9.51	9.39	8.76	9.57	*9.31*[3]	*+1.32*[1]	18.27	18.77	18.30	18.70	*18.51*	*−0.07*
Mean	*8.68*[1]	*8.62*[1]	*8.44*[1]	*8.86*[1]	*8.65*		*18.17*	*18.70*	*18.54*	*18.76*	*18.54*	
Increase		*−0.06*[2]	*−0.24*[2]	*+0.18*[2]				*+0.53*	*+0.37*	*+0.59*		
St. errors	(1) ±0.298, (2) ±0.421, (3) ±0.210.											

PLANT NUMBER : thousands per acre

Dung	No mins.	Ploughed in	Broadcast January	Broadcast April	*Mean*	*Increase*
None	22.1	22.3	22.2	21.8	*22.1*	
10 tons	22.3	22.3	23.0	22.9	*22.6*	*+0.5*
Mean	*22.2*	*22.3*	*22.6*	*22.4*	*22.4*	
Increase		*+0.1*	*+0.4*	*+0.2*		

Conclusions

Minerals produced an average increase in total sugar of 4.1 cwt. per acre, the increase being somewhat greater in the absence of dung than in its presence, though not significantly so. There were no apparent differences in the effects of different methods of application, and no apparent effect of minerals on the tops.

Dung produced significant increases in both total sugar and tops.

Sugar Beet. G. L. Dodds, Esq., Habrough, Lincs., 1936
Brigg Beet Sugar Factory
A. McVicar, Esq., County Organiser

3 randomised blocks of 8 plots each. Plots : 1/50 acre.

TREATMENTS : No minerals, 5 cwt. superphosphate and 3 cwt. 30% potash salt, ploughed in (Dec. 16), broadcast after winter ploughing (Dec. 19), broadcast in spring (April 3). Ploughed 7 or 11 inches deep.

BASAL MANURING : 3 cwt. sulphate of ammonia per acre, applied on April 3.

SOIL : Sandy loam on deep sand. Variety : Kleinwanzleben E. Seed sown : April 27. Lifted : Oct. 30. Previous crop : Barley.

STANDARD ERRORS PER PLOT : Total sugar : 3.49 cwt. per acre or 5.95%. Tops : 0.994 tons per acre or 9.18%. Mean dirt tare : 0.110.

Plough-ing	No mins.	Ploughed in	Broadcast Dec.	Broadcast April	*Mean*	*Increase*	No mins.	Ploughed in	Broadcast Dec.	Broadcast April	*Mean*	*Increase*
	TOTAL SUGAR : cwt. per acre (±2.02)						ROOTS (washed) : tons per acre					
Shallow	56.1	60.8	58.7	58.7	*58.6*[3]		15.73	17.28	16.53	16.67	*16.55*	
Deep	62.2	58.6	57.5	57.0	*58.8*[3]	*+0.2*[1]	17.19	16.26	16.38	16.30	*16.53*	*−0.02*
Mean	*59.2*[1]	*59.7*[1]	*58.1*[1]	*57.8*[1]	*58.7*		*16.46*	*16.77*	*16.46*	*16.48*	*16.54*	
Increase		*+0.5*[2]	*−1.1*[2]	*−1.4*[2]				*+0.31*	*0.00*	*+0.02*		
St.errors	(1) ±1.43, (2) ±2.02, (3) ±1.01											
	TOPS : tons per acre (±0.574)						SUGAR PERCENTAGE					
Shallow	10.12	11.39	10.35	11.00	*10.72*[3]		17.83	17.60	17.75	17.60	*17.69*	
Deep	11.47	10.82	10.72	10.67	*10.92*[3]	*+0.20*[1]	18.08	18.03	17.57	17.50	*17.79*	*+0.10*
Mean	*10.80*[1]	*11.10*[1]	*10.54*[1]	*10.84*[1]	*10.82*		*17.96*	*17.82*	*17.66*	*17.55*	*17.74*	
Increase		*+0.30*[2]	*−0.26*[2]	*+0.04*[2]				*−0.14*	*−0.30*	*−0.41*		
St. errors	(1) ±0.406, (2) ±0.574, (3) ±0.287											

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PLANT NUMBER : thousands per acre

Plough-ing	No. mins.	Ploughed in	Broadcast Dec.	Broadcast April	*Mean*	*Increase*
Shallow	29.7	31.3	31.4	31.2	*30.9*	
Deep	30.8	31.8	30.1	29.9	*30.6*	*−0.3*
Mean	*30.2*	*31.6*	*30.8*	*30.6*	*30.8*	
Increase		*+1.4*	*+0.6*	*+0.4*		

Conclusions

The average effects of minerals and of depth of ploughing in total sugar and tops were small and not significant. There was, however, an interaction between them which reaches the 5 per cent. level in both total sugar and tops.

Sugar Beet. C. Coupland, Esq., East Kirkby, Lindsey County Council, 1936
Bardney Beet Sugar Factory
A. McVicar, Esq., County Organiser

3 randomised blocks of 8 plots each. Plots : 1/40 acre.

TREATMENTS : No minerals, 5 cwt. superphosphate and 3 cwt. 30% potash salt, ploughed in (Jan. 16), broadcast after winter ploughing (Jan. 31), broadcast in spring (April 8). Ploughed 7 or 10 inches deep.

BASAL MANURING : 3 cwt. sulphate of ammonia per acre, applied on April 8.

SOIL : Sandy loam. Variety : Kleinwanzleben E. Seed sown : May 1. Lifted : Nov. 5. Previous crop : wheat.

STANDARD ERRORS PER PLOT : Total sugar : 2.17 cwt. per acre or 6.62%. Tops : 0.713 tons per acre or 10.4%. Mean dirt tare : 0.105.

Plough-ing	No. mins.	Ploughed in	Broadcast Jan.	Broadcast April	*Mean*	*Increase*
	TOTAL SUGAR : cwt. per acre (±1.25)					
Shallow	25.5	34.8	37.1	34.0	*32.8*[3]	
Deep	25.2	33.9	37.8	33.4	*32.6*[3]	*−0.2*[1]
Mean	*25.4*[1]	*34.4*[1]	*37.4*[1]	*33.7*[1]	*32.7*	
Increase		*+9.0*[2]	*+12.0*[2]	*+8.3*[2]		
St. errors	(1) ±0.884, (2) ±1.25, ±(3) 0.625.					
	TOPS : tons per acre (±0.412)					
Shallow	6.87	6.62	6.78	6.77	*6.76*[3]	
Deep	7.24	6.74	7.23	6.74	*6.99*[3]	*+0.23*[1]
Mean	*7.06*[1]	*6.68*[1]	*7.00*[1]	*6.76*[1]	*6.87*	
Increase		*−0.38*[2]	*−0.06*[2]	*−0.30*[2]		
St. errors	(1) ±0.291, (2) 0.412, (3) ±0.206					

No. mins.	Ploughed in	Broadcast Jan.	Broadcast April	*Mean*	*Increase*
	ROOTS : (washed) : tons per acre				
7.60	10.04	10.61	9.60	*9.46*	
7.51	9.80	10.81	9.72	*9.46*	*0.00*
7.56	*9.92*	*10.71*	*9.66*	*9.46*	
	+2.36	*+3.15*	*+2.10*		
	SUGAR PERCENTAGE				
16.80	17.33	17.47	17.70	*17.32*	
16.77	17.27	17.50	17.20	*17.19*	*−0.13*
16.78	*17.30*	*17.48*	*17.45*	*17.26*	
	+0.52	*+0.70*	*+0.67*		

PLANT NUMBER : thousands per acre

Plough-ing	No. mins.	Ploughed in	Broadcast Jan.	Broadcast April	*Mean*	*Increase*
Shallow	23.1	21.7	23.0	20.8	*22.2*	
Deep	23.5	23.0	23.3	22.0	*22.9*	*+0.7*
Mean	*23.3*	*22.4*	*23.2*	*21.4*	*22.6*	
Increase		*−0.9*	*−0.1*	*−1.9*		

Conclusions

Minerals gave an average response of 9.8 cwt. total sugar per acre. The January application of minerals gave a somewhat higher yield than the April application, the difference being almost significant, and minerals broadcast after ploughing in January gave a significantly higher yield than minerals ploughed in in January. There were no apparent effects of minerals on tops and no effect of depth of ploughing.

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Sugar Beet. Harper Adams Agricultural College, Newport, Salop, 1936

5 randomised blocks of 5 plots each. Plots : 1/40 acre.

TREATMENTS : No phosphate (P) or potash (K), (A), PK applied immediately before winter ploughing (Dec. 14), (B), immediately after ploughing (Dec. 18), (C), 6 weeks before sowing, broadcast application (March 3) (D), 1 week before sowing, broadcast application (April 10) (E).

BASAL MANURING : 4 cwt. per acre 30% superphosphate and 2 cwt. per acre muriate of potash.

SOIL : Loamy sand. Variety : Kleinwanzleben E. Seed sown : April 17. Lifted : Dec. 10-14. Previous crop : Wheat.

STANDARD ERROR PER PLOT : Total sugar : 3.07 cwt. per acre or 4.60%. Mean dirt tare : 0.178.

	TOTAL SUGAR		ROOTS (washed)		SUGAR PERCENTAGE		PLANT NUMBER	
	cwt.	*Increase*	Tons	*Increase*		*Increase*	Thous.	*Increase*
Mean ..	*66.6*		*19.22*		*17.33*		*25.2*	
A ..	62.4		18.03		17.29		23.7	
B ..	66.8	*+4.4*	19.28	*+1.25*	17.34	*+0.05*	25.1	*+1.4*
C ..	66.8	*+4.4*	19.35	*+1.32*	17.26	*−0.03*	26.2	*+2.5*
D ..	68.3	*+5.9*	19.54	*+1.51*	17.47	*+0.18*	24.6	*+0.9*
E ..	68.8	*+6.4*	19.88	*+1.85*	17.31	*+0.02*	26.3	*+2.6*
St. Error	±1.37	*±1.94*						

Conclusions

Minerals produced a significant increase on total sugar, but the differences on the effect of method of application were not significant. Minerals also increased plant number.

Sugar Beet, J. Arden, Esq., Newton-on-Trent, 1936
A. McVicar, Esq., County Organiser

4 randomised blocks of 8 plots each. Certain interactions partially confounded with block differences. Plots ; 1/40 acre.

TREATMENTS ; 4×2^2 factorial design.
Mixed artificials ; None, 4 cwt., 8 cwt., 12 cwt. per acre.
Nitrate of soda ; None, 1 cwt. per acre applied as top dressing on June 6.
Time of lifting ; Early (Oct. 21), Late (Nov. 19).
The mixed artificials consisted of 3½ parts sulphate of ammonia, 3 parts nitrate of soda, 6½ parts superphosphate, 4 parts muriate of potash, and 1 part steamed bone flour.

BASAL MANURING ; Nil.

SOIL ; Sandy. Variety. Kleinwanzleben E. Manures applied ; April 14. Seed sown ; April 27. Previous crop ; Barley.

STANDARD ERRORS PER PLOT ; Total sugar ; 2.50 cwt. per acre or 4.03%. Tops ; 1.05 tons per acre or 6.95%. Mean dirt tare ; first lifting ; 0.0750, second lifting ; 0.0869.

Nitrate of soda	Early	Late	*Mean*	*Increase*	Early	Late	*Mean*	*Increase*	Early	Late	*Mean*	*Increase*
	TOTAL SUGAR ; cwt. per acre				ROOTS (washed) ; tons per acre				TOPS ; tons per acre			
None ..	57.7[1]	63.9[1]	*60.8*[2]		16.15	17.69	*16.92*		14.79[1]	13.28[1]	*14.04*[2]	
1 cwt. ..	60.8[1]	66.2[1]	*63.5*[2]	*+2.7*[1]	16.97	18.45	*17.71*	*+0.79*	17.11[1]	15.40[1]	*16.26*[2]	*+2.22*[1]
Mean ..	*59.2*[2]	*65.0*[2]	*62.2*		*16.56*	*18.07*	*17.32*		*15.95*[2]	*14.34*[2]	*15.15*	
Increase ..		*+5.8*[1]				*+1.51*				*−1.61*[1]		
Standard errors (1) ±0.884, (2) ±0.625									(1) ±0.371, (2) ±0.262			
	SUGAR PERCENTAGE				PLANT NUMBER ; thous. per acre							
None ..	17.86	18.08	*17.97*		28.6	27.6	*28.1*					
1 cwt. ..	17.91	17.96	*17.94*	*−0.03*	28.6	28.4	*28.5*	*+0.4*				
Mean ..	*17.88*	*18.02*	*17.95*		*28.6*	*28.0*	*28.3*					
Increase		*+0.14*				*−0.6*						

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	Mixed artificials : cwt. per acre 0	4	8	12	Mixed artificials : cwt. per acre 0	4	8	12
	TOTAL SUGAR : cwt. per acre (±1.25)				ROOTS (washed) : tons per acre			
No nit. soda ..	53.4	60.6	64.2	65.0	14.82	16.88	17.76	18.23
Nit. soda	58.7	62.4	65.8	67.1	16.47	17.45	18.12	18.79
Early	52.2	59.2	63.4	62.2	14.63	16.76	17.37	17.48
Late..	59.8	63.8	66.6	70.0	16.66	17.57	18.50	19.54
Mean	*56.0*[1]	*61.5*[1]	*65.0*[1]	*66.1*[1]	*15.64*	*17.16*	*17.94*	*18.51*
Increase		*+5.5*[2]	*+3.5*[2]	*+1.1*[2]		*+1.52*	*+0.78*	*+0.57*
Standard errors	(1) ±0.884, (2) ±1.25							
	TOPS : tons per acre (±0.525)				SUGAR PERCENTAGE			
No nit. soda ..	10.56	12.72	15.63	17.22	18.00	17.95	18.10	17.82
Nit. soda	13.02	14.88	17.39	19.74	17.82	17.90	18.18	17.85
Early	11.55	15.09	17.56	19.59	17.85	17.68	18.25	17.78
Late..	12.02	12.52	15.46	17.37	17.98	18.18	18.02	17.90
Mean	*11.79*[1]	*13.80*[1]	*16.51*[1]	*18.48*[1]	*17.91*	*17.93*	*18.14*	*17.84*
Increase		*+2.01*[2]	*+2.71*[2]	*+1.97*[2]		*+0.02*	*+0.21*	*−0.30*
Standard errors	(1) ±0.371, (2) ±0.525							
	PLANT NUMBER ; thous. per acre							
No nit. soda ..	27.2	28.7	28.3	28.3				
Nit. soda ..	28.0	29.1	28.4	28.4				
Early	27.6	29.7	28.8	28.2				
Late..	27.6	28.1	27.9	28.4				
Mean	*27.6*	*28.9*	*28.4*	*28.3*				
Increase		*+1.3*	*−0.5*	*−0.1*				

Conclusions

Mixed artificials significantly increased total sugar and tops, the response falling off at the higher levels of dressing with sugar but not with tops. Nitrate of soda significantly increased total sugar and tops. The increase in total sugar due to nitrate of soda was greater where it was applied alone than where mixed artificials were also applied, but the difference was not significant. The yield of tops was significantly lower with late lifting (November 19) than with early (October 21) but total sugar was significantly higher with late lifting, both roots and sugar percentage having increased from the early lifting.

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Sugar Beet. (1) J. Swift, Esq., Braintree, (2) Messrs. Baker Bros., Mundon, (3) R. Robertson, Esq., Wix, 1936

F. Knowles, Esq., East Anglian Institute of Agriculture

5×5 Latin square. Plots; (1) 1/61 acre, (2) 1/50 acre, (3) 1/50 acre.
TREATMENTS; No superphosphate or muriate of potash, superphosphate (P) at the rate of 4 cwt. and muriate of potash (K) at the rate of 3 cwt. per acre ploughed in in winter, broadcast after winter ploughing, ⅔ ploughed in in winter, remaining ⅓ broadcast in spring. All plots with PK received 4 cwt. sulphate of ammonia in spring.
BASAL MANURING; Nil.
SOIL; (1) Heavy chalky boulder clay, (2) Heavy, (3) Light loam. Variety; (1) Kleinwanzleben, (2) Johnson's Kuhn, (3) Kleinwanzleben E. Manures applied; (1) Nov. 5, Feb. 11, April 21, (2) Dec. 2, March 26, April 17, (3) Dec. 10, Jan. 22, April 25. Seed sown; (1) April 29, (2) April 20, (3) April 25. Lifted; (1) Oct. 29, (2) Oct. 2, (3) Oct. 20-22. Previous crop; (1) Wheat, (2) Potatoes, (3) Wheat.
STANDARD ERRORS PER PLOT; Roots (washed); (1) 0.762 tons per acre or 7.64%, (2) 0.747 tons per acre or 7.24%, (3) 0.830 tons per acre or 4.48%.

Roots (washed): tons per acre

	No PK	Sulphate of ammonia in spring; PK applied in Winter ploughed	Winter broadcast	Winter and Spring	Spring	*Mean*	Standard error
1	5.44	11.82	11.01	10.73	10.90	*9.98*	±0.341
2	6.64	11.82	11.33	10.75	11.04	*10.32*	±0.334
3	18.02	18.33	18.61	18.98	18.72	*18.53*	±0.371

Conclusions

At the first two centres there was a large average response in roots to sulphate of ammonia and minerals. At the third centre the mean yield was high and the average response was not significant. The differences due to the methods of application of the minerals were not significant.

Mangolds. Lower Titmore Green Farm, Stevenage, 1936

H. W. Gardner, Esq., Hertfordshire Farm Institute, St. Albans

5×5 Latin square. Plots: 1/83 acre.
TREATMENTS: Chalk at the rate of 0, 35, 70, 140, 210 cwt. per acre, applied in 1933.
BASAL MANURING: 5 cwts. I.C.I. No. 2:—N 10.3%; Sol. P_2O_5 10.3%; K_2O 20.7%.
SOIL: Gravelly loam. Chalk applied: May 30, 1933. Mangolds sown: April 25. Lifted: October 20. Previous crop: Hay. (See 1935 Report, p.263).
STANDARD ERRORS PER PLOT: Roots: 3.18 tons per acre or 11.8%.

Chalk cwt. per acre	ROOTS Tons per acre	*Increase for each dressing*	TOPS Tons per acre	*Increase for each dressing*	PLANT NO. Thousands per acre	*Increase for each dressing*
Mean	*26.86*		*2.95*		*17.1*	
None	17.22		1.99		14.9	
35	24.92	*+7.70*	2.71	*+0.72*	17.8	*+2.9*
70	29.12	*+4.20*	3.22	*+0.51*	17.8	*0.0*
140	31.49	*+2.37*	3.46	*+0.24*	17.6	*−0.2*
210	31.57	*+0.08*	3.39	*−0.07*	17.5	*−0.1*
St. Error	±1.42	*±2.01*				

Conclusions

There was again a large response to the 1933 dressings of chalk, and a significant falling-off in response at the higher levels of application.

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Mangolds. Hunsdon Lodge, Herts, 1936
H. W. Gardner, Esq., Hertfordshire Farm Institute, St. Albans

4 randomised blocks of 8 plots each. Plots ; 1/112 acre.
TREATMENTS ; Lime and chalk at the rate of 0, 21, 42, 63 cwt. CaO per acre, i.e., 0, ¾, 1½, 2¼ cwt. of the Hutchinson and McCleland lime requirement.
BASAL MANURING ; 2.4 cwt. I.C.I. No. 2 and 2.5 cwt. nitro-chalk per acre.
SOIL ; Silty gravelly loam. Variety ; Yellow Globe. Manures applied ; Feb. 15. Seed sown ; April 24. Lifted ; Oct. 27. Previous crop ; Wheat.
STANDARD ERROR PER PLOT ; Roots ; 4.13 tons per acre or 26.1%.*

cwt. per acre	ROOTS tons per acre (±2.06*) Chalk	Lime	*Mean Increase* *±1.46*	*±2.06*	TOPS tons per acre Chalk	Lime	*Mean*	*Increase*	PLANT NO. thousands per acre Chalk	Lime	*Mean*	*Increase*
0	9.74		*9.74*		1.91		*1.91*		10.8		*10.8*	
21	14.82	13.42	*14.12*	*+4.38*	2.84	2.36	*2.60*	*+0.69*	14.4	12.6	*13.5*	*+2.7*
42	18.38	16.86	*17.62*	*+3.50*	3.12	2.67	*2.90*	*+0.30*	16.1	14.8	*15.4*	*+1.9*
63	15.74	15.76	*15.75*	*−1.87*	3.14	2.79	*2.96*	*+0.06*	15.0	13.8	*14.4*	*−1.0*
Mean *(±1.19)*	*16.31*	*15.35*	*14.31*		*3.03*	*2.61*	*2.59*		*15.2*	*13.7*	*13.5*	
Difference *(±1.68)*		*+0.96*				*+0.42*				*+1.5*		

* Excluding plots receiving no chalk or lime.

Conclusions

The yields were very variable. The first dressing gave a significant increase in the yield of roots, but the additional increase to the second dressing was not significant and the third dressing gave a slightly smaller yield than the second dressing. Liming produced a large increase in plant number.

Kale. Midland Agricultural College, Loughborough, 1936

4 randomised blocks of 6 plots each. Plots : 1/40 acre.
TREATMENTS : 3 × 2 factorial design.
Nitrochalk : None, 3 and 6 cwt. per acre.
Unthinned and thinned.
BASAL MANURING : 15 tons farmyard manure, 3 tons waste beet lime, 10 cwt. basic slag (14% P_2O_5), 1½ cwt. muriate of potash.
SOIL : Light loam. Variety : Marrowstem. Seed sown : April 23. Nitrochalk applied : May 5. Harvested : Oct. 26-Nov. 4. Previous crop : Seeds.
SPECIAL NOTE : Thinned plants 8 ins. to 10 ins. apart. Unthinned were chopped out to 5 ins. or 6 ins. only in places where weeds were very thick. They were not singled.
STANDARD ERROR PER PLOT : 3.08 tons per acre, or 9.26%.

Tons per acre (±1.54)	Nitro-chalk (cwt.) None	3	6	*Mean (±0.889)*	*Increase (±1.26)*
Unthinned ..	33.50	35.19	39.87	*36.19*	
Thinned ..	26.69	30.69	33.75	*30.38*	*−5.81*
Mean (±1.09)	*30.10*	*32.94*	*36.81*	*33.28*	
Increase (±1.54)		*+2.84*	*+3.87*		

Conclusions

Nitro-chalk produced a significant increase in yield and thinning a significant decrease.

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Brussels sprouts. Braughing Bury Farm, Buntingford, 1936
H. W. Gardner, Esq. Hertfordshire Farm Institute, St. Albans

6 randomised blocks of 6 plots each. Certain interactions partially confounded with block differences. Plots ; 1/95 acre.

TREATMENTS ; 3×2×2 factorial design.
Sulphate of ammonia ; None, 3 cwt. per acre (in 2 doses) (N).
Phosphate ; None, superphosphate 16% (Su.) basic slag 14% (SL.) at the rate of 0.84 cwt. P_2O_5 per acre.
Muriate of potash ; None, 2 cwt. per acre (K).

BASAL MANURING ; Nil.

SOIL ; Heavy chalky loam. Variety ; Farmer's own selection. Manures applied ; May 11 and July 21. Planted ; May 24. Picked ; Oct. 22, Dec. 3, Jan. 19, March 2.

STANDARD ERROR PER PLOT (total of all pickings, saleable sprouts) ; 5.02 cwt. per acre or 14.0%.

Summary of results : cwt. per acre

Pickings	O	N	K	NK	SL	NSL	KSL	NKSL	Su	NSu	KSu	NKSu	*Mean*
1st	1.0	1.9	1.6	2.8	1.9	6.4	2.6	6.7	2.7	7.1	3.2	9.9	*4.0*
2nd	6.8	12.3	6.7	12.7	5.6	15.2	9.6	17.0	8.8	14.2	7.0	15.1	*10.9*
3rd	10.2	12.1	10.4	13.0	11.5	13.2	11.3	13.0	12.1	11.6	11.3	14.2	*12.0*
4th	7.1	11.2	6.5	9.7	7.9	10.4	6.7	11.7	8.4	11.0	7.8	11.1	*9.1*
Total saleable (±2.90) ..	*25.1*	*37.5*	*25.2*	*38.2*	*26.9*	*45.2*	*30.2*	*48.4*	*32.0*	*43.9*	*29.3*	*50.3*	*36 0*

Responses to fertilisers

Mean yield (total saleable) : 36.0 *cwt.*

	Mean response	Differential responses: Sulphate of ammonia Absent	Sulphate of ammonia Present	Muriate of potash Absent	Muriate of potash Present	No phosphate	Slag	Super.
Sulphate of ammonia	+*15.7*[1]	—	—	+13.2[3]	+18.0[3]	+12.6[4]	+18.2[4]	+16.4[4]
Muriate of potash ..	+*1.9*[1]	−0.5[3]	+4.3[3]	—	—	+0.4[4]	+3.3[4]	+1.9[4]
Slag	+*6.2*[2]	+3.4[4]	+9.0[4]	+4.8[4]	+7.7[4]	—	—	—
Super.	+*7.4*[2]	+5.5[4]	+9.2[4]	+6.6[4]	+8.2[4]	—	—	—

Standard errors ; (1) ±1.67, (2) ±2.05, (3) ±2.51, (4) ±2.90.

Conclusions

Sulphate of ammonia produced a large response in the total yield of saleable sprouts, the response being increased by the presence of potash or of either quality of phosphate, though not significantly so. The response appeared in each of the four individual pickings, but was greatest at the first picking.

Muriate of potash gave a significant increase in saleable sprouts at the first picking.

Both qualities of phosphate significantly increased total saleable sprouts, the increase being somewhat greater with superphosphate than with basic slag, though not significantly so. As with sulphate of ammonia, these increases appeared in each of the four pickings, but were greatest at the first picking.

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Brussels Sprouts. Aldenham, Herts, 1936

H. W. Gardner, Esq., Hertfordshire Farm Institute, St. Albans

4×4 Latin square. Plots; 1/76 acre.
TREATMENTS; No nitro-chalk (A), nitro-chalk at the rate of 2 cwt. per acre in July with an additional 2 cwt. after 1st and 2nd pickings (B), 4 cwt. per acre in July with an additional 2 cwt. after 1st picking (C) and 6 cwt. per acre in July (D).
BASAL MANURING; 20 tons dung per acre.
SOIL; Light gravelly loam. Variety; Carter's Market Gardener. Manures applied; mid July, Nov. 4 and Dec. 18. Planted; early May. Picked; Oct. 30, Dec. 11, Jan. 15 and Feb. 23. Previous crop; Wheat.
STANDARD ERROR PER PLOT; (total of all pickings, saleable sprouts); 4.39 cwt. per acre or 5.10%.

Summary of results, cwt. per acre

Pickings	A	B	C	D	*Mean*	*S.E.*
1st	11.1	12.8	15.4	20.0	*14.8*	
2nd	24.3	31.5	33.6	33.1	*30.6*	
3rd	15.2	18.0	19.8	18.7	*17.9*	
4th	21.3	23.4	24.1	21.9	*22.7*	
Total Saleable	*71.9*	*85.7*	*92.9*	*93.7*	*86.0*	*±2.20*
Increase		*+13.8*	*+21.0*	*+21.8*		*±3.11*

Conclusions

There was a large response to nitro-chalk. There was, however, no apparent response to the dressing given after the second picking in treatment (B).

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