ROTHAMSTED RESEARCH

Rothamsted Report for 1938

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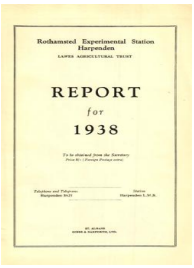

Experiments at Outside Centres

Rothamsted Research

Rothamsted Research (1939) *Experiments at Outside Centres ;* Rothamsted Report For 1938, pp 192 - 210 **- DOI: https://doi.org/10.23637/ERADOC-1-86**

EXPERIMENTS AT OUTSIDE CENTRES

Barley. E. M. Howard, Esq., Nocton, Lincoln, 1938

1st Year Residual Effects after Fertilizer Experiment on Sugar Beet (Factory Series)

3 randomized blocks of 9 plots each. Plots: 1/40 acre.

TREATMENTS: 3×3×3 factorial design.

See 1937 Report, page 175, *et seq.*, Bardney I experiment, No. 15. Treatments applied to 1937 sugar beet experiment:—

Sulphate of ammonia: None, 0.4 cwt., 0.8 cwt. N per acre.

Superphosphate: None, 0.5 cwt., 1.0 cwt. P_2O_5 per acre.

Muriate of potash: None, 0.6 cwt., 1.2 cwt. K_2O per acre.

BASAL MANURING: Nil.

SOIL: Coarse sandy loam. Variety: Spratt Archer. Seed sown: March 4 and 5. Harvested: Aug. 17.

STANDARD ERROR PER PLOT: Grain: 2.07 cwt. per acre or 10.2%.

Residual main effects—Interactions of sulphate of ammonia with superphosphate and muriate of potash

Sulphate of ammonia	Superphosphate (cwt. P_2O_5) 0.0	0.5	1.0	Muriate of potash (cwt. K_2O) 0.0	0.6	1.2	*Mean*	*Increase*
GRAIN: cwt. per acre (±1.19. *Means: ±0.690. Increases: ±0.976*)								
0.0 cwt. N	19.61	20.26	19.86	19.38	19.46	20.88	*19.91*	
0.4 cwt. N	19.96	20.98	20.87	22.96	19.17	19.68	*20.60*	*+0.69*
0.8 cwt. N	19.98	20.07	20.77	20.46	19.38	20.98	*20.27*	*−0.33*
Mean ..	*19.85*	*20.44*	*20.50*	*20.93*	*19.34*	*20.51*	*20.26*	
Increase ..		*+0.59*	*+0.06*		*−1.59*	*+1.17*		
STRAW: cwt. per acre								
0.0 cwt. N	21.97	21.43	20.37	20.37	21.03	22.37	*21.26*	
0.4 cwt. N	19.47	20.47	21.03	22.07	19.77	19.13	*20.32*	*−0.94*
0.8 cwt. N	20.97	21.00	20.90	21.33	20.23	21.30	*20.95*	*+0.63*
Mean ..	*20.80*	*20.97*	*20.77*	*21.26*	*20.34*	*20.93*	*20.84*	
Increase ..		*+0.17*	*−0.20*		*−0.92*	*+0.59*		

Residual interaction of muriate of potash with superphosphate

Muriate of potash	GRAIN: cwt. per acre (±1.19) Superphosphate (cwt. P_2O_5) 0.0	0.5	1.0	STRAW: cwt. per acre Superphosphate (cwt. P_2O_5) 0.0	0.5	1.0
0.0 cwt. K_2O	21.17	20.81	20.83	22.90	20.87	20.00
0.6 cwt. K_2O	18.32	19.94	19.75	19.90	20.67	20.47
1.2 cwt. K_2O	20.06	20.56	20.92	19.60	21.37	21.83

Conclusions

There was no sign of any residual effects of the three fertilizers.

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Mangolds. G. Ossenton, Esq., Mill Farm, High Halstow, Kent, 1938

3 randomized blocks of 9 plots each. Plots : 1/60 acre.

TREATMENTS : Sulphate of ammonia : None, 2 cwt., and 4 cwt. per acre, or 0, 0.4, 0.8 cwt. N per acre.

Treated town refuse* : None, 6 tons, and 12 tons per acre, or 0, 0.8, 1.6 cwt. N per acre.

Rape cake : None, 14 cwt., and 28 cwt. per acre, or 0, 0.8, 1.6 cwt. N per acre.

BASAL MANURING : 5 cwt. superphosphate and 2 cwt. sulphate of potash per acre.

SOIL : Medium loam. Variety : Orange Globe. Manures applied : April 7. Seed sown : April 15. Lifted : Nov. 11. Previous crop : Potatoes.

SPECIAL NOTE : *Town refuse screened, and fermented in silos.

STANDARD ERRORS PER PLOT : Total produce : 2.44 tons per acre or 10.0%. Plant number 1.24 thousands per acre or 5.06%.

Summary of results

	Dressings of Nitrogen: None	Single	Double	*Mean*	*Increase*
TOTAL PRODUCE : tons per acre (±1.41)					
Sulphate of ammonia		22.88	29.26	*26.07*[2]	
Treated town refuse	21.93[1]	22.71	24.06	*23.38*[2]	*−2.69*[3]
Rape cake ..		26.85	27.18	*27.02*[2]	*+0.95*[3]
Mean ..	*21.93*[1]	*24.15*[1]	*26.83*[1]	*24.30*	
Increase ..		*+2.22*[4]	*+2.68*[4]		
Standard errors : (1) ±0.813, (2) ±0.997, (3) ±1.41, (4) ±1.15.					
PLANT NUMBER : thousands per acre (±0.716)					
Sulphate of ammonia		24.4	23.5	*23.9*[2]	
Treated town refuse	23.8[1]	24.5	24.3	*24.4*[2]	*+0.5*[3]
Rape cake ..		26.3	26.7	*26.5*[2]	*+2.6*[3]
Mean ..	*23.8*[1]	*25.1*[1]	*24.8*[1]	*24.6*	
Increase ..		*+1.3*[4]	*−0.3*[4]		
Standard errors : (1) ±0.413, (2) ±0.506, (3) ±0.716, (4) ±0.584.					

Conclusions

It should be noted that sulphate of ammonia was applied at half rate per unit of N as compared with town refuse and rape cake.

The single dressing of the nitrogenous fertilizers gave an average increase of 2.2 tons roots per acre, and the double dressing a further increase of 2.7 tons per acre. There were no significant differences between the three forms of nitrogenous manure.

Rape cake produced a significant increase in plant number.

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Potatoes. Land Settlement Association, Siddlesham, near Chichester, 1938

3 randomized blocks of 9 plots each. Plots: 1/60 acre.
TREATMENTS: Sulphate of ammonia: None, 2 cwt. and 4 cwt. per acre or 0, 0.4, 0.8 cwt. N per acre.
Treated town refuse*: None, 6 tons and 12 tons per acre or 0, 1.2, 2.4, cwt. N per acre.†
Rape dust: None, 14 cwt. and 28 cwt. per acre, or 0, 0.8, 1.6 cwt. N per acre.
BASAL MANURING: 5 cwt. superphosphate and 3 cwt. sulphate of potash per acre.
SOIL: Fine sandy silt, clay subsoil. Variety: Majestic. Manures applied: April 22. Potatoes planted: May 5. Lifted: Oct. 10. Previous crop: Brassicas.
SPECIAL NOTES: Potatoes passed over a 1¾ inch riddle to determine percentage ware.
* Town refuse screened, and fermented in silos.
†It was intended that the single dressing of treated town refuse should be the same as that of rape namely 0.8 cwt. N per acre. On analysis, however, the nitrogen content was found to be higher than expected so that the actual dressings were as stated above.
STANDARD ERRORS PER PLOT: Total produce: 1.44 tons per acre or 14.4%. Percentage ware: 2.44.

Summary of results

	Dressings of Nitrogen None	Single	Double	*Mean*	*Increase*
	TOTAL PRODUCE: tons per acre (±0.831)				
Sulphate of ammonia		10.10	11.39	*10.74*[2]	
Treated town refuse	9.21[1]	8.77	10.82	*9.80*[2]	*−0.94*[3]
Rape dust		11.19	10.23	*10.71*[2]	*−0.03*[3]
Mean	*9.21*[1]	*10.02*[1]	*10.81*[1]	*10.01*	
Increase		*+0.81*[4]	*+0.79*[4]		
Standard errors	(1) ±0.480, (2) ±0.588, (3) ±0.831, (4) ±0.679.				
	PERCENTAGE WARE (±1.41)				
Sulphate of ammonia		90.5	91.5	*91.0*[2]	
Treated town refuse	90.8[1]	90.2	91.9	*91.0*[2]	*0.0*
Rape dust		92.3	88.7	*90.5*[2]	*−0.5*[3]
Mean	*90.8*[1]	*91.0*[1]	*90.7*[1]	*90.8*	
Increase		*+0.2*[4]	*−0.3*[4]		
Standard errors	(1) ±0.813, (2) ±1.00, (3) ±1.41, (4) ±1.15.				

Conclusions

It should be noted that sulphate of ammonia was applied at half rate per unit of N as compared with town refuse and rape.

The double dressing of nitrogen gave a significantly higher mean yield than the no manure plots. There were no significant differences in yield between the three forms of nitrogenous manures. There were no significant results in the percentage ware.

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Potatoes. A. W. Oldershaw Esq., Tunstall, Suffolk, 1938
East Suffolk County Council

3 randomized blocks of 9 plots each. Plots : 1/60 acre.
TREATMENTS: Sulphate of ammonia: None, 2 cwt. and 4 cwt. per acre, or 0, 0.4, 0.8 cwt. N per acre.
Treated town refuse*: None, 6.4 tons and 12.8 tons per acre, or 0, 0.8, 1.6 cwt. N per acre.
Rape dust : None, 14 cwt. and 28 cwt. per acre, or 0, 0.8, 1.6 cwt. N per acre.
BASAL MANURING : 5 cwt. superphosphate and 3 cwt. sulphate of potash per acre.
SOIL : Very poor sand. Variety : Arran Banner. Manures applied : April 21-23. Potatoes planted : April 28. Lifted : Oct. 24. Previous crop : Sugar beet.
SPECIAL NOTE : * Town refuse screened, and fermented in silos.
STANDARD ERRORS PER PLOT : Total produce : 0.651 tons per acre or 5.72%. Percentage ware : 1.40. Percentage diseased ware to total ware : 1.80.

Summary of results

	Dressing of Nitrogen None	Single	Double	*Mean*	*Increase*
TOTAL PRODUCE : tons per acre (±0.375)					
Sulphate of ammonia		11.86	12.96	*12.41*[2]	
Treated town refuse	9.78[1]	10.87	10.86	*10.86*[2]	*−1.55*[3]
Rape dust		12.44	14.22	*13.33*[2]	*+0.92*[3]
Mean	*9.78*[1]	*11.72*[1]	*12.68*[1]	*11.39*	
Increase		*+1.94*[4]	*+0.96*[4]		
Standard errors	(1) ±0.217, (2) ±0.265, (3) ±0.375,			(4) ±0.306.	
PERCENTAGE WARE (±0.808)					
Sulphate of ammonia		88.2	90.1	*89.2*[2]	
Treated town refuse	86.9[1]	87.3	88.4	*87.8*[2]	*−1.4*[3]
Rape dust		89.8	92.7	*91.2*[2]	*+2.0*[3]
Mean	*86.9*[1]	*88.4*[1]	*90.4*[1]	*88.6*	
Increase		*+1.5*[4]	*+2.0*[4]		
Standard errors	(1) ±0.467, (2) ±0.572, (3) ±0.808,			(4) ±0.660.	
PERCENTAGE DISEASED WARE (±1.04)					
Sulphate of ammonia		5.47	10.52	*8.00*[2]	
Treated town refuse	5.80[1]	6.12	8.63	*7.38*[2]	*−0.62*[3]
Rape dust		10.48	11.63	*11.06*[2]	*+3.06*[3]
Mean	*5.80*[1]	*7.36*[1]	*10.26*[1]	*7.81*	
Increase		*+1.56*[4]	*+2.90*[4]		
Standard errors	(1) ±0.600, (2) ±0.735, (3) ±1.04,			(4) ±0.848.	

Conclusions

It should be noted that sulphate of ammonia was applied at half rate per unit of N as compared with town refuse and rape dust.

The increased dressings produced significantly higher yields except that the double dressing of town refuse gave the same yield as the single dressing. The percentage ware and percentage diseased ware were significantly higher with the double dressing.

Town refuse gave 1.5 tons less and rape 0.9 tons per acre more total produce than sulphate of ammonia, these differences being significant.

Similar results were obtained in percentage ware and percentage diseased ware.

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Potatoes. W. E. Morton, Esq., Australia Farm, March, 1938

3 randomized blocks of 9 plots each. Certain interactions partially confounded with block differences. Plots : 1/60 acre.

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

BASAL MANURING : Nil.

SOIL : Variable. Fine silt to heavy clay on sandy subsoil. Variety : Doon Star (once grown). Manures applied : April 20. Potatoes planted : April 22. Lifted : Nov. 3. Previous crop : Wheat.

SPECIAL NOTE : 1 cwt. of potatoes from each plot was passed over a 1¾ inch riddle to determine the percentage ware.

STANDARD ERROR PER PLOT : Total produce : 0.816 tons per acre or 9.74%. Percentage ware : 3.13.

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 (±0.471. *Means : ±0.272. Increases : ±0.385*)								
0.0 cwt. N	7.25	7.69	7.40	7.13	7.22	7.98	*7.45*	
0.3 cwt. N	7.62	8.20	9.46	8.12	7.87	9.29	*8.43*	*+0.98*
0.6 cwt. N	8.12	9.78	9.89	9.23	9.39	9.16	*9.26*	*+0.83*
Mean ..	*7.66*	*8.56*	*8.92*	*8.16*	*8.16*	*8.81*	*8.38*	
Increase ..		*+0.90*	*+0.36*		*0.00*	*+0.65*		
PERCENTAGE WARE : (±1.81. *Means : ±1.04. Increases : ±1.47*)								
0.0 cwt. N ..	88.1	89.0	88.0	86.1	88.8	90.2	*88.4*	
0.3 cwt. N ..	91.0	90.6	91.8	89.0	92.2	92.3	*91.1*	*+2.7*
0.6 cwt. N ..	93.8	91.2	92.9	93.5	91.9	92.5	*92.6*	*+1.5*
Mean ..	*91.0*	*90.3*	*90.9*	*89.5*	*91.0*	*91.7*	*90.7*	
Increase ..		*−0.7*	*+0.6*		*+1.5*	*+0.7*		

Interaction of sulphate of potash with superphosphate

Sulphate of potash	TOTAL PRODUCE : tons per acre (±0.471) Superphosphate (cwt. P_2O_5) 0.00	0.75	1.50	PERCENTAGE WARE (±1.81) Superphosphate (cwt. P_2O_5) 0.00	0.75	1.50
0.00 cwt. K_2O	7.48	7.92	9.08	89.6	88.7	90.3
0.75 cwt. K_2O	7.55	8.71	8.22	93.5	91.4	88.0
1.50 cwt. K_2O	7.95	9.03	9.46	89.8	90.7	94.5

Conclusions

Sulphate of ammonia and superphosphate produced significant increases in total yield, the increases to the double dressings being 1.8 tons per acre and 1.3 tons per acre respectively. The extra increase to the second dressing of sulphate of ammonia was practically the same as the increase to the first dressing, both being significant. There was a considerable, though not significant falling off in response at the higher level of application of superphosphate. Sulphate of ammonia gave an increase of 0.9 tons per acre in the absence of superphosphate and 2.5 tons per acre with the double dressing of superphosphate, though the interaction did not reach significance. The response in total produce to the double dressing of sulphate of potash was not significant.

The double dressing of sulphate of ammonia gave a significant increase in the percentage ware of 4.2. The increase in percentage ware to sulphate of potash was not significant, while superphosphate had no apparent effect.

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Sugar Beet. Tunstall, Suffolk, 1938

A. W. Oldershaw, Esq., County Organizer

4 randomized blocks of 6 plots each. Plots : 0.0130 acre.
TREATMENTS : 3 × 2 factorial design.
No manure, superphosphate and basic slag (1.0 cwt. P_2O_5 per acre).
Manures ploughed in or harrowed in.
BASAL MANURING : 3 cwt. nitrate of soda and 3 cwt. muriate of potash per acre.
SOIL : Poor sand. Variety : Kleinwanzleben E. Manures applied : May 7. Seed sown : May 7.
Lifted : Nov. 23. Previous crop : Barley.
STANDARD ERRORS PER PLOT : Total sugar : 2.63 cwt. per acre or 16.2%. Tops : 0.702 tons per acre or 15.0%. Plant number : 3.28 thousands per acre or 8.14%.

Summary of results

	Ploughed	Harrowed	*Mean*	*Increase*	Ploughed	Harrowed	*Mean*	*Increase*
	TOTAL SUGAR : cwt. per acre (±1.32)				ROOTS (washed) : tons per acre			
None	16.1[1]		*16.1*[1]		5.09		*5.09*	
Super.	17.1	16.8	*17.0*[1]	*+0.9*[2]	5.39	5.27	*5.33*	*+0.24*
Slag	13.6	17.5	*15.6*[1]	*−0.5*[2]	4.53	5.62	*5.08*	*−0.01*
Mean (±0.930) ..	*15.4*	*17.2*	*16.2*		*4.96*	*5.44*	*5.16*	
Increase (±1.32)		*+1.8*				*+0.48*		
	TOPS : tons per acre (±0.351)				SUGAR PERCENTAGE			
None	4.60[3]		*4.60*[3]		15.74		*15.74*	
Super.	4.40	4.51	*4.46*[3]	*−0.14*[4]	15.75	15.90	*15.82*	*+0.08*
Slag	4.39	5.51	*4.95*[3]	*+0.35*[4]	15.00	15.45	*15.22*	*−0.52*
Mean (±0.248) ..	*4.40*	*5.01*	*4.67*		*15.38*	*15.68*	*15.60*	
Increase (±0.351)		*+0.61*				*+0.30*		

Standard Errors : (1) ±0.930, (2) ±1.32, (3) ±0.248, (4) ±0.351.

	Ploughed	Harrowed	*Mean*	*Increase*
	PLANT NUMBER : thousands per acre (±1.64)			
None	35.8[1]		*35.8*[1]	
Super.	38.3	42.3	*40.3*[1]	*+4.5*[2]
Slag	39.5	42.1	*40.8*[1]	*+5.0*[2]
Mean (±1.16) ..	*38.9*	*42.2*	*39.0*	
Increase (±1.64) ..		*+3.3*		

Standard Errors : (1) ±1.16, (2) ±1.64.

Conclusions

The yields were poor and the standard errors high. There were no significant results in sugar or tops.

Both forms of phosphate resulted in a significant increase in the plant number though there was no difference as between superphosphate and basic slag.

Harrowing the manures in increased the plant number by 3.3 thousands per acre over ploughing them in, the increase being almost significant.

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Sugar Beet. Tunstall, Suffolk, 1938

A. W. Oldershaw, Esq., County Organizer

5 × 5 Latin square. Plots: 0.0129 acre.
TREATMENTS: Seventh year, no further chalk applied (see 1932 Report, p. 208, for first year's dressings).
BASAL MANURING: 3 cwt. nitrate of soda, 3 cwt. superphosphate, 3 cwt. muriate of potash per acre.
SOIL: Poor sand. Variety: Kleinwanzleben E. Seed sown: May 7. Lifted: Nov. 23. Previous crop: Clover.
STANDARD ERRORS PER PLOT: Total sugar: 4.39 cwt. per acre or 10.1%. Tops: 0.836 tons per acre or 9.09%.

Summary of results

Chalk tons per acre (1932)	TOTAL SUGAR Cwt.	*Increase*	ROOTS (washed) Tons	*Increase*	TOPS Tons	*Increase*	SUGAR PERCENTAGE	*Increase*	PLANT NUMBER Thous.	*Increase*
Mean	*43.7*		*12.50*		*9.19*		*17.48*		*39.3*	
0	*		*		*		—		*	
1	50.0		14.24		11.34		17.52		48.1	
2	55.9	*+5.9*	15.91	*+1.67*	11.43	*+0.09*	17.56	*+0.04*	51.7	*+3.6*
3	56.7	*+0.8*	16.26	*+0.35*	11.83	*+0.40*	17.42	*−0.14*	49.9	*−1.8*
4	56.0	*−0.7*	16.08	*−0.18*	11.35	*−0.48*	17.40	*−0.02*	46.6	*−3.3*
St. errors	±1.96	*±2.77*			±0.374	*±0.529*				

* The yields on the plots with no chalk were negligible.

Conclusions

The higher dressings of chalk in 1932 gave significantly higher yields of sugar than the first dressing. There was a falling off in response at the two highest dressings.

The yields of tops were practically the same at all dressings.

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EXPERIMENTS CARRIED OUT BY LOCAL WORKERS

Hay. 2nd Season. Burford Grammar School, Burford, Oxfordshire, 1938

5 × 5 Latin square. Plots : 1/160 acre.

TREATMENTS : No slag, slag at the rate of ⅓ cwt. and 1 cwt. P_2O_5 per acre. The object of this experiment is to compare annual dressings of ⅓ cwt. P_2O_5 with dressings of 1 cwt. every third year.

BASAL MANURING : Nil.

SOIL : Stone brash. Phosphate applied : April 29. Hay cut : June 27. (See 1937 Report p. 205).

STANDARD ERROR PER PLOT : 4.00 cwt. per acre or 9.70%.

Cwt. P_2O_5 1937 / 1938	*Mean*	0 / 0	⅓ / ⅓	0 / 1	1 / 0
HAY : cwt. per acre	*41.3*	41.0[1]	43.1[2]	40.0[2]	41.1[2]

Standard errors : (1) ±1.26, (2) ±1.79.

Conclusions

No significant effects.

Hay. 8th Season. Lady Manner's School, Bakewell, 1938

3 randomized blocks of 8 plots each. Plots : 1/138 acre.

TREATMENTS : 2^3 factorial design.
Nitrate of soda : None, 2 cwt. per acre.
Superphosphate 13.7% : None, 3 cwt. per acre.
Potash salt 30% : None, 1 cwt. per acre.

BASAL MANURING : Nil.

SOIL : Limestone. Manures applied : March 1-3. Hay cut : August 2. (See 1937 Report p. 206).

STANDARD ERROR PER PLOT : 3.63 cwt. per acre or 8.79%.

Responses to fertilizers : cwt. per acre

Mean yield : 41.2 *cwt.*

	Mean response (±*1.49*)	Differential responses (±2.11) Nitrate of soda Absent	Nitrate of soda Present	Superphosphate Absent	Superphosphate Present	Potash salt Absent	Potash salt Present
Nitrate of soda	+*11.5*	—	—	+13.6	+9.5	+7.2	+15.8
Superphosphate	+*4.6*	+6.6	+2.6	—	—	+4.2	+5.0
Potash salt	+*4.4*	+0.1	+8.7	+4.0	+4.8	—	—

Conclusions

There was a large response to nitrate of soda of 11.5 cwt. per acre. Superphosphate and potash salt also gave significant responses of 4.6 and 4.4 cwt. per acre respectively.

Potash salt gave a significant response of 8.7 cwt. per acre in the presence of nitrate of soda, while its response in the absence of nitrate of soda was nil, the interaction being significant.

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Meadow Hay. 7th Season. Lady Manner's School, Bakewell, 1938

4 randomized blocks of 9 plots each. Plots : 1/203 acre.
TREATMENTS : 3 × 3 factorial design.
No manure, 8 tons compost, mixed artificials applied in 1932, 1934, 1936, 1938, or in 1933, 1935, 1937.
Mixed artificials consisted of 2 cwt. nitrate of soda, 3 cwt. 13.7% superphosphate and 1 cwt. 30% potash salt per acre.
BASAL MANURING : Nil.
SOIL : Limestone. Manures applied : March 4-10. Hay cut : July 21. (See 1937 Report p. 206).
STANDARD ERROR PER PLOT : 3.34 cwt. per acre or 9.06%.

Summary of results, cwt. per acre (±1.67)

1932, 1934, 1936 and 1938 treatments	1933, 1935 and 1937 treatments Nil	NPK	Compost	*Mean* (±0.964)	*Increase* (±1.36)
Nil	24.9	27.9	33.6	*28.8*	
NPK	36.7	42.6	48.9	*42.7*	*+13.9*
Compost	36.8	37.9	42.4	*39.0*	*+10.2*
Mean (±0.964)	*32.8*	*36.1*	*41.6*	*36.9*	
Increase (±1.36) ..		*+3.3*	*+8.8*		

Conclusions

Complete artificials applied in 1938 increased the yield of hay by 13.9 cwt. per acre, while compost applied in 1938 gave an increase of 10.2 cwt. per acre, the extra increase due to artificials being significant.

Artificials and compost applied in 1937 gave significant increases in yield of 3.3 and 8.8 cwt. per acre respectively, the increase due to compost being significantly greater than that due to artificials.

Kale. Lady Manner's School, Bakewell, 1938

4 × 4 Latin square. Plots 1/102 acre.
TREATMENTS : None, 2 cwt., 4 cwt. and 6 cwt. per acre equal parts of nitrate of soda and sulphate of ammonia.
BASAL MANURING : Superphosphate 5 cwt. per acre and sulphate of potash 2 cwt. per acre.
SOIL : Limestone. Variety : Marrow Stem. Manures applied : May 12-16. Seed sown : May 13-16. Singled : 6 inches apart. Cut : Nov. 14-Dec. 14. Previous crop : Potatoes.
STANDARD ERROR PER PLOT : 2.03 tons per acre or 9.52%.

Summary of results

	Sulphate of ammonia and nitrate of soda (cwt.) 0	2	4	6	*Mean*
Tons per acre (±1.02)	17.20	20.59	22.97	24.32	*21.27*
Increase (±1.44) ..		*+3.39*	*+2.38*	*+1.35*	

Conclusions

There was a significant response to nitrogen, with a slight but not significant falling-off in response at the higher levels of application.

https://doi.org/10.23637/ERADOC-1-86

Kale. Midland Agricultural College, Loughborough, 1938

4 randomized blocks of 6 plots each in each of the two experiments. Plots : 1/50 acre.

TREATMENTS : 3 × 2 factorial design.
1st experiment : Nitrate of soda : None, 2 and 4 cwt. per acre as top dressing. Unthinned and thinned.
2nd experiment : Nitro-chalk : None, 2 and 4 cwt. per acre as top dressing. Unthinned and thinned.

BASAL MANURING : 25 tons farmyard manure, 6 cwt. slag, 2 cwt. 30% potash salt, 1 cwt. nitro-chalk per acre. 1 cwt. nitrate of lime given after sowing during drought period.

SOIL : Light loam. Variety : Marrowstem. Seed sown : April 21. Nitrate of soda applied : June 21. Nitro-chalk applied : June 23-25. Thinned : June 21 and 23-25. Harvested : 1st experiment, Dec. 28-Jan. 17 ; 2nd experiment, Nov. 28-Dec. 16. Previous crop : Wheat.

SPECIAL NOTE : On the thinned plots the plants were set out to 10 inches ; elsewhere no thinning of any kind was done.

STANDARD ERRORS PER PLOT : 1st experiment, 2.71 tons per acre or 8.07% ; 2nd experiment, 2.20 tons per acre or 5.95%.

EXPERIMENT I

Tons per acre (±1.36)	Nitrate of soda (cwt.) 0	2	4	*Mean (±0.782)*	*Increase (±1.11)*
Unthinned ..	34.45	32.81	34.69	*33.98*	
Thinned ..	32.89	31.80	34.61	*33.10*	*−0.88*
Mean (±0.958)	*33.67*	*32.30*	*34.65*	*33.54*	
Increase (±1.35)		*−1.37*	*+2.35*		

EXPERIMENT II

Tons per acre (±1.10)	Nitro-chalk (cwt.) 0	2	4	*Mean (±0.635)*	*Increase (±0.898)*
Unthinned ..	38.44	36.25	38.83	*37.84*	
Thinned ..	35.94	36.02	36.48	*36.15*	*—1.69*
Mean (±0.778)	*37.19*	*36.13*	*37.66*	*36.99*	
Increase (±1.10)		*—1.06*	*+1.53*		

Conclusions

Thinning gave small though not significant decreases in yield. The top dressing did not produce any significant increases, probably due to the high yields consequent on the heavy basal manuring.

Potatoes. Burford Grammar School, Burford, Oxfordshire, 1938

3 randomized blocks of 9 plots each. Plots : 1/173 acre.

TREATMENTS : The object of this experiment is to compare full dressings every third year with one-third dressings every year of artificial and equivalent organic fertilizers.
Artificials : Sulphate of ammonia, superphosphate and muriate of potash.
Organic fertilizer : Dried blood, steamed bone flour.
Full dressing contains : N 0.8 cwt. per acre.
P_2O_5 1.0 cwt. per acre.
K_2O 1.0 cwt. per acre.

BASAL MANURING : Nil.

SOIL : Stonebrash. Variety : Great Scot. Manures applied : April 29-May 2. Potatoes planted : April 19-21. Lifted : Sept. 19-21. Previous crop : Swedes and Beetroot.

STANDARD ERRORS PER PLOT : Total produce : 1.11 tons per acre or 12.4%. Percentage ware : 1.36.

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1937 1938	None None	Org. None	Art. None	⅓ org. ⅓ org.	⅓ art. ⅓ art.	None Org.	None Art.	*Mean*
TOTAL PRODUCE : tons per acre (±0.641)								
	8.39[1]	9.54	9.11	9.03	9.34	8.98	9.41	*8.95*
Increase (±0.740)		*+1.15*	*+0.72*	*+0.64*	*+0.95*	*+0.59*	*+1.02*	
PERCENTAGE WARE : (±0.787)								
	95.6[2]	96.5	95.6	95.4	96.6	94.8	96.5	*95.8*
Increase (±0.908)		*+0.9*	*0.0*	*−0.2*	*+1.0*	*−0.8*	*+0.9*	

Standard errors : (1) ±0.370, (2) ±0.454.

Conclusions

The plots which have not yet received any fertilizer yielded less (but barely significantly so) than those receiving fertilizers, but there were no significant differences between these latter.

Sugar Beet. J. E. Barrick, Esq., Caistor, 1938
Brigg Beet Sugar Factory

6 × 6 Latin square. Plots : 1/93 acre.
TREATMENTS : Nitrogen at the rate of 0.0 and 0.7 cwt. N per acre, comparing sulphate of ammonia, nitrate of soda, nitro-chalk, cyanamide and nitrate of lime.
BASAL MANURING : Superphosphate and muriate of potash.
SOIL : Sand. Variety : Kleinwanzleben E. Manures applied : April 4. Seed sown : April 19. Lifted : November 4. Previous crop : Wheat.
STANDARD ERRORS PER PLOT : Total sugar : 3.70 cwt. per acre or 12.4%. Tops : 1.50 tons per acre or 14.2%. Mean dirt tare : 0.149.

Summary of results

	No nitrogen	Sulphate of ammonia	Nitrate of soda	Nitro-chalk	Cyana-mide	Nitrate of lime	*Mean*
TOTAL SUGAR : cwt. per acre (±1.51)	22.0	32.0	36.8	32.1	24.7	31.9	*29.9*
Increases (±2.14)		*+10.0*	*+14.8*	*+10.1*	*+2.7*	*+9.9*	
ROOTS (washed) : tons per acre	6.33	9.20	10.82	9.37	7.18	9.36	*8.71*
Increases		*+2.87*	*+4.49*	*+3.04*	*+0.85*	*+3.03*	
TOPS : tons per acre (±0.612)	6.04	10.22	14.22	11.56	8.67	12.68	*10.56*
Increases (±0.865) ..		*+4.18*	*+8.18*	*+5.52*	*+2.63*	*+6.64*	
SUGAR PERCENTAGE ..	17.4	17.4	17.0	17.1	17.2	17.1	*17.2*
Increases		*0.0*	*−0.4*	*−0.3*	*−0.2*	*−0.3*	
PLANT NUMBER : Thous. per acre	22.7	24.5	25.3	24.4	23.1	24.5	*24.1*
Increases		*+1.8*	*+2.6*	*+1.7*	*+0.4*	*+1.8*	

Conclusions

All forms of nitrogen produced large increases in sugar per acre except cyanamide, for which the increase was small and not significant. Nitrate of soda gave a significantly higher yield of sugar than any of the other fertilizers. All forms of nitrogen gave significant increases in tops, nitrate of soda giving the greatest increase and cyanamide the smallest. The effects on plant number were also similar to those on sugar. The soil was acid, pH 5.4.

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Sugar Beet, W. H. Waldock, Esq., Pode Hole, Spalding, 1938

Spalding Beet Sugar Factory

4 × 4 Latin square. Plots : 1/49 acre.
TREATMENTS : Nitrogen at the rate of 0.0 and 0.8 cwt. N per acre, comparing sulphate of ammonia, nitrate of soda and nitro-chalk.
BASAL MANURING : 4 cwt. of complete fertilizer providing 0.5 cwt. N, 0.5 cwt. P_2O_5, 0.6 cwt. K_2O.
SOIL : Heavy silt on clay. Variety : Johnson's Perfection. Manures applied : April 4. Seed sown : April 6, redrilled May 5. Lifted : November 9. Previous crop : Bulbs.
STANDARD ERROR PER PLOT : Total Sugar : 2.40 cwt. per acre or 11.0%. Tops : 0.759 tons per acre or 11.4%. Mean dirt tare : 0.064.

Summary of results

	No nitrogen	Sulphate of ammonia	Nitrate of soda	Nitro-chalk	*Mean*
TOTAL SUGAR : cwt. per acre (±1.20)	21.6	21.5	22.5	21.4	*21.8*
Increases (±*1.70*)		*−0.1*	*+0.9*	*−0.2*	
ROOTS (washed) : tons per acre ..	6.73	6.69	7.25	6.84	*6.88*
Increases		*−0.04*	*+0.52*	*+0.11*	
TOPS : tons per acre (±0.380) ..	6.29	6.83	7.02	6.58	*6.68*
Increases (±*0.537*)		*+0.54*	*+0.73*	*+0.29*	
SUGAR PERCENTAGE	16.0	16.0	15.5	15.6	*15.8*
Increases		*0.0*	*−0.5*	*−0.4*	
PLANT NUMBER : thous. per acre	34.6	35.0	35.0	35.0	*34.9*
Increases		*+0.4*	*+0.4*	*+0.4*	

Conclusions

In the very dry season the basal dressing of nitrogen was apparently sufficient for the needs of the crop, so that no effects of treatments were observed.

Sugar Beet. Cleyfield Estate Company, Cockley Cley, Swaffham, Norfolk, 1938

Wissington Beet Sugar Factory

5 × 5 Latin square. Plots : 1/140 acre.
TREATMENTS : None, muriate of potash, kainit (both 1.25 cwt. K_2O per acre), salt (4.75 cwt. per acre), and muriate of potash with salt.
BASAL MANURING : 4 cwt. sulphate of ammonia, 6 cwt. 16% superphosphate per acre.
SOIL : Sand. Variety : Kleinwanzleben E. Manures applied : April 8. Seed sown : April 13. Lifted : Oct. 25. Previous crop : Rye.
STANDARD ERROR PER PLOT : Total sugar : 2.65 cwt. per acre or 10.6%. Mean dirt tare : 0.075.

	TOTAL SUGAR Cwt.	*Increase*	ROOTS (washed) Tons	*Increase*	SUGAR PERCENTAGE	*Increase*	PLANT NUMBER Thous.	*Increase*
Mean	*25.1*		*8.36*		*14.98*		*33.7*	
Nil	19.5		6.68		14.60		32.5	
Muriate of potash ..	26.2	*+6.7*	8.58	*+1.90*	15.22	*+0.62*	36.3	*+3.8*
Salt	24.7	*+5.2*	8.37	*+1.69*	14.72	*+0.12*	33.2	*+0.7*
Muriate of pot. & salt	28.3	*+8.8*	9.33	*+2.65*	15.16	*+0.56*	33.4	*+0.9*
Kainit	26.9	*+7.4*	8.85	*+2.17*	15.18	*+0.58*	32.9	*+0.4*
St. Errors	±1.19	±*1.68*						

Conclusions

The three treatments, muriate of potash, salt and kainit, all produced significant increases in sugar but there were no significant differences between the responses. The effect of salt was greater in the absence of muriate of potash than in its presence, but not significantly so.

The increase in sugar percentage due to salt was less than the increases due to the other treatments.

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Sugar Beet. Mrs. F. A. Noble, Panton, Wragby, 1938
Bardney Beet Sugar Factory

4 × 4 Latin square. Plots : 1/40 acre.

TREATMENTS : 2 × factorial design.
Compound manure : 5 and 10 cwt. per acrs.
Salt : None and 3 cwt. per acre.
Compound manure contained 6.6% N, 4.39% Sol. P_2O_5, 0.69% Insol. P_2O_5 and 10% K_2O

BASAL MANURING : 10 loads dung.

SOIL : Light loam. Variety : Marsters. Manures applied : April 8. Seed sown : April 13
Lifted : November 2. Previous crop : Wheat.

STANDARD ERRORS PER PLOT : Total sugar : 1.33 cwt. per acre or 3.75%. Tops : 0.580 tons per acre or 9.46%. Mean dirt tare : 0.077.

Main effects and interactions of salt with compound manure

	Compound manure 5 cwt.	10 cwt.	*Mean*	*Increase*	Compound manure 5 cwt.	10 cwt.	*Mean*	*Increase*
	TOTAL SUGAR : cwt. per acre (±0.665. *Means* : ±0.470. *Increases* : ±0.665)				ROOTS (washed) : tons per acre			
None	30.3	39.4	*34.8*		7.78	10.21	*9.00*	
Salt	33.2	39.2	*36.2*	*+1.4*	8.59	10.10	*9.34*	*+0.34*
Mean	*31.8*	*39.3*	*35.5*		*8.18*	*10.16*	*9.17*	
Increase		*+7.5*				*+1.98*		
	TOPS : tons per acre (±0.290. *Means* : ±0.205. *Increases* : ±0.290)				SUGAR PERCENTAGE			
None	4.95	7.07	*6.01*		19.40	19.25	*19.32*	
Salt	5.52	6.98	*6.25*	*+0.24*	19.30	19.45	*19.38*	*+0.06*
Mean	*5.24*	*7.02*	*6.13*		*19.35*	*19.35*	*19.34*	
Increase		*±1.67*				*0.00*		

	Compound manure 5 cwt.	10 cwt.	*Mean*	*Increase*
	PLANT NUMBER : thous. per acre			
None	28.8	31.0	*29.9*	
Salt	28.9	30.8	*29.8*	*−0.1*
Mean	*28,8*	*30.9*	*29.8*	
Increase		*+2.1*		

Conclusions

The 10 cwt. dressing of compound manure produced a significant increase in total sugar of 7.5 cwt. per acre over the 5 cwt. dressing. Salt produced a significant increase of 2.9 cwt. per acre in sugar when applied with the 5 cwt. dressing of compound manure, but with the 10 cwt. dressing salt produced no response in sugar. The larger dressing of fertilizer gave a significant increase in tops of 1.78 tons per acre, while the effect of salt was not significant.

https://doi.org/10.23637/ERADOC-1-86

Sugar Beet. F. Bridges, Esq., Sleaford, 1938

Newark Beet Sugar Factory

5 × 5 Latin squares. Two identical Latin squares, one of which received a dressing of dung. Plots : 1/41 acre.

TREATMENTS : Compound manure at the rate of 0, 6, 9, 12 and 15 cwt. per acre. Compound manure contained 6.62%N, 4.39% soluble P_2O_5, 0.69% insoluble P_2O_5 and 10% K_2O.

BASAL MANURING : 10 loads dung per acre to one Latin square.

SOIL : Medium loam : Variety : Sharpe's Kleinwanzleben E. Seed sown : April 27. Manures applied : April 4. Lifted : Nov. 16. Previous crop : wheat.

STANDARD ERRORS PER PLOT : Area with dung : Total sugar : 2.96 cwt. per acre or 6.79%. Tops : 0.906 tons per acre or 8.18%. Area with no dung : Total sugar : 1.62 cwt. per acre or 5.04%. Tops : 0.511 tons per acre or 5.55%. Mean dirt tare : Area with dung : 0.086. Area with no dung : 0.106.

Summary of results

Area with dung

Compound manure cwt.	TOTAL SUGAR Cwt.	*Increase*	ROOTS (washed) Tons	*Increase*	TOPS Tons	*Increase*	SUGAR PERCENTAGE	*Increase*	PLANT NUMBER Thous.	*Increase*
Mean	*43.6*		*12.14*		*11.07*		*17.97*		*25.4*	
None	40.4		10.95		8.24		18.42		24.8	
6	44.5	*+4.1*	12.27	*+1.32*	10.57	*+2.33*	18.12	*−0.30*	26.1	*+1.3*
9	43.6	*−0.9*	12.04	*−0.23*	11.65	*+1.08*	18.12	*0.00*	25.2	*−0.9*
12	45.8	*+2.2*	12.78	*+0.74*	12.47	*+0.82*	17.88	*−0.24*	24.9	*−0.3*
15	43.9	*−1.9*	12.69	*−0.09*	12.44	*−0.03*	17.24	*−0.64*	25.3	*+0.4*
St. Errors	±1.32	*±1.87*			±0.405	*±0.573*				

Area with no dung

Compound manure cwt.	TOTAL SUGAR Cwt.	*Increase*	ROOTS (washed) Tons	*Increase*	TOPS Tons	*Increase*	SUGAR PERCENTAGE	*Increase*	PLANT NUMBER Thous.	*Increase*
Mean	*32.3*		*9.11*		*9.21*		*17.70*		*22.8*	
None	27.2		7.70		7.15		17.68		22.3	
6	32.0	*+4.8*	9.12	*+1.42*	8.66	*+1.51*	17.52	*−0.16*	23.8	*+1.5*
9	32.6	*+0.6*	9.34	*+0.22*	9.71	*+1.05*	17.48	*−0.04*	22.9	*−0.9*
12	36.2	*+3.6*	10.03	*+0.69*	10.32	*+0.61*	18.04	*+0.56*	23.6	*+0.7*
15	33.3	*−2.9*	9.36	*−0.67*	10.20	*−0.12*	17.80	*−0.24*	21.6	*−2.0*
St. Errors	±0.725	*±1.03*			±0.229	*±0.324*				

Conclusions

There was a significant response in sugar to the fertilizer, with a significant falling off in response at the higher dressings. Tops showed similar results. The response in sugar to the fertilizer was greater on the undunged plots than on the dunged plots, though this difference did not reach significance. The dunged plots were significantly more variable than the undunged plots.

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Sugar Beet. A. Hodgson, Esq., Tattershall, 1938

Bardney Beet Sugar Factory

5 × 5 Latin square. Plots : 1/49 acre.

TREATMENTS : Compound manure at the rates of 0, 6, 9, 12 and 15 cwt per acre. Compound manure contained 6.62% N, 4.39% Sol. P_2O_5, 0.69% Insol. P_2O_5 and 10% K_2O.

BASAL MANURING : 12 loads farmyard manure per acre.

SOIL : Sand over gravel. Variety : Strube E. Manures applied : March 24. Seed sown : April 18. Lifted : Nov. 10. Previous crop : Wheat.

STANDARD ERRORS PER PLOT : Total sugar : 2.36 cwt per acre or 4.96%. Tops : 1.32 tons per acre or 8.30%. Mean dirt tare : 0.057.

Summary of results

Compound manure cwt.peracre	TOTAL SUGAR Cwt.	*Increase*	ROOTS (washed) Tons	*Increase*	TOPS Tons	*Increase*	SUGAR PER-CENTAGE	*Increase*	PLANT NUMBER Thous.	*Increase*
Mean	*47.6*		*13.97*		*15.93*		*17.02*		*23.8*	
0	44.8		13.09		13.67		17.12		23.7	
6	50.2	*+5.4*	14.44	*+1.35*	15.22	*+1.55*	17.38	*+0.26*	24.2	*+0.5*
9	48.6	*−1.6*	14.29	*−0.15*	16.19	*+0.97*	17.02	*−0.36*	23.9	*−0.3*
12	46.3	*−2.3*	13.70	*−0.59*	16.19	*0.00*	16.88	*−0.14*	23.7	*−0.2*
15	47.9	*+1.6*	14.32	*+0.62*	18.39	*+2.20*	16.72	*−0.16*	23.3	*−0.4*
St. Errors	±1.06	*±1.50*			±0.590	*±0.834*				

Conclusions

6 cwt. of compound manure gave a significant increase of 5.4 cwt. per acre in total sugar. Larger amounts of fertilizer proved less effective, the mean yield of sugar for the 9, 12 and 15 cwt. dressings being significantly below that for the 6 cwt. dressing.

There was a significant increase in the yield of tops, with no sign of a falling-of in response at the higher levels of application.

Both sugar percentage and plant number show a tendency to decrease with increasing levels of fertilizer.

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Sugar Beet. E. L. Nickols, Esq., Pinchbeck, Spalding, 1938

Spalding Beet Sugar Factory

4 × 4 Latin square with split plots. Sub-plots : 1/93 acre.

TREATMENTS : Nil, 3 cwt. per acre sulphate of ammonia, 4 cwt. per acre superphosphate, 1½ cwt. per acre muriate of potash. Plots split for early and late liftings.

BASAL MANURING : 1 cwt. sulphate of ammonia, 2 cwt. superphosphate and 1 cwt. muriate of potash per acre.

SOIL : Silt. Variety : Johnsons. Manures applied : April 18. Seed sown : May 5. Lifted : Oct. 26 and Nov. 29. Previous crop : Oats.

STANDARD ERRORS PER PLOT : Total sugar : Whole plot : 2.74 cwt. per acre or 10.7%. Sub-plot : 2.47 cwt. per acre or 9.61%.

Summary of results

	No manure	Sulphate of ammonia	Super-phosphate	Muriate of potash	*Mean*	*Increase*
TOTAL SUGAR : cwt. per acre (±1.24*)						
Lifted Oct. 25	23.2	23.2	21.2	22.2	*22.4*[1]	
Lifted Nov. 29	31.2	28.9	25.5	30.3	*29.0*[1]	*+6.6*[2]
Mean (±1.37)	*27.2*	*26.0*	*23.4*	*26.2*	*25.7*	
Increase (±1.94) ..		*−1.2*	*−3.8*	*−1.0*		
ROOTS (washed) : tons per acre						
Lifted Oct. 25	6.85	6.88	6.08	6.54	*6.59*	
Lifted Nov. 29	9.27	8.52	7.51	9.05	*8.59*	*+2.00*
Mean	*8.06*	*7.70*	*6.80*	*7.80*	*7·59*	
Increase		*−0.36*	*−1.26*	*−0.26*		
SUGAR PERCENTAGE						
Lifted Oct. 25	17.0	16.9	17.4	17.0	*17.1*	
Lifted Nov. 29	16.8	17.0	17.0	16.8	*16.9*	*−0.2*
Mean	*16.9*	*17.0*	*17.2*	*16.9*	*17.0*	
Increase		*+0.1*	*+0.3*	*0.0*		
PLANT NUMBER : thousands per acre						
Lifted Oct. 25	28.7	28.6	28.2	27.7	*28.3*	
Lifted Nov. 29	26.4	26.3	25.9	25.1	*25.9*	*−2.4*
Mean	*27.6*	*27.4*	*27.0*	*26.4*	*27.1*	
Increase		*−0.2*	*−0.6*	*−1.2*		

Standard errors : (1) ±0.618, (2) ±0.874.

* For comparisons involving the difference of times of lifting.

Conclusions

The later lifting gave a significant increase in sugar of 6.6 cwt. per acre. There were no significant effects of the fertilizers. The weights of tops were recorded for two rows per half plot, but the results were too irregular to be included.

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Sugar Beet. C. H. Cole, Esq., Uggeshall, Suffolk, 1938

Cantley Beet Sugar Factory

4 × 4 Latin square with split plots. Sub-plots : 1/111 acre.
TREATMENTS : Nil, 3 cwt. sulphate of ammonia, 4 cwt. superphosphate, 1½ cwt. muriate of potash. Plots split for early and late liftings.

BASAL MANURING : Humanure 4 tons per acre.

SOIL : Light loam. Variety : Kleinwanzleben E. Manures applied : May 3. Seed sown : May 5. Lifted : Nov. 1 and Dec. 16. Previous crop : Barley.

STANDARD ERRORS PER PLOT : Total sugar : whole plot : 1.80 cwt. per acre or 6.83% ; sub-plot : 2.43 cwt. per acre or 9.20%. Tops : whole plot : 0.735 tons per acre or 8.11% ; sub-plot : 0.760 tons per acre or 8.38%. Mean dirt tare : 1st lifting : 0.164, 2nd lifting : 0.132.

Summary of results

	No manure	Sulphate of ammonia	Super-phosphate	Muriate of potash	*Mean*	*Increase*
TOTAL SUGAR : cwt. per acre (±1.22*)						
Lifted Nov. 1	25.0	22.2	22.7	23.3	*23.3*[1]	
Lifted Dec. 16	30.2	29.0	28.5	30.1	*29.4*[1]	*+6.1*[2]
Mean (±0.900)	*27.6*	*25.6*	*25.6*	*26.7*	*26.4*	
Increase (±1.27)		*−2.0*	*−2.0*	*−0.9*		
ROOTS (washed) : tons per acre						
Lifted Nov.1	7.80	7.02	7.48	7.29	*7.39*	
Lifted Dec. 16	9.00	8.88	8.90	9.05	*8.96*	*+1.57*
Mean	*8.40*	*7.95*	*8.19*	*8.17*	*8.18*	
Increase		*—0.45*	*—0.21*	*—0.23*		
TOPS : tons per acre (±0.380*)						
Lifted Nov. 1	7.48	8.46	11.01	8.67	*8.90*[3]	
Lifted Dec. 16	8.13	8.61	11.47	8.75	*9.24*[3]	*+0.34*[4]
Mean (±0.368)	*7.80*	*8.53*	*11.24*	*8.71*	*9.07*	
Increase (±0.520)		*+0.73*	*+3.44*	*+0.91*		
SUGAR PERCENTAGE						
Lifted Nov. 1	16.0	15.8	15.2	16.0	*15.8*	
Lifted Dec. 16	16.8	16.4	16.0	16.6	*16.4*	*+0.6*
Mean	*16.4*	*16.1*	*15.6*	*16.3*	*16.1*	
Increase		*−0.3*	*−0.8*	*−0.1*		
PLANT NUMBER : thousands per acre						
Lifted Nov. 1	34.3	32.9	34.5	31.3	*33.2*	
Lifted Dec. 16	36.1	36.0	36.3	37.0	*36.4*	*+3.2*
Mean	*35.2*	*34.5*	*35.4*	*34.2*	*34.8*	
Increase		*−0.7*	*+0.2*	*−1.0*		

Standard errors : (1) ±0.608, (2) ±0.860, (3) ±0.190, (4) ±0.269.
*For comparisons involving the difference of times of lifting.

Conclusions

The later lifting gave a significant increase in sugar of 6.1 cwt. per acre, and also a small though not significant increase in tops. The only significant effect of the fertilizers was an increase of 3.4 tons per acre in tops due to superphosphate.

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Sugar Beet. F. W. White, Esq., Balderton, 1938
Newark Beet Sugar Factory and Nottinghamshire Agricultural Education Committee

6 × 6 Latin square. Plots : 1/41 acre.

TREATMENTS : No manure, superphosphate and basic slag (0.72 cwt. P_2O_5), applied in January or April. As an extra treatment a higher dressing of basic slag (0.95 cwt. P_2O_5) was applied in January.

BASAL MANURING : Nil.

SOIL : Sand and gravel. Variety : Dippe. Manures applied : Jan. 6 and April 21. Seed sown : April 22. Lifted : Nov. 11-18. Previous crop : Wheat.

STANDARD ERRORS PER PLOT : Total sugar : 2.97 cwt. per acre or 7.33%. Tops : 0.716 tons per acre or 5.38%. Mean dirt tare : 0.122.

Summary of results

Cwt. P_2O_5	No manure	Superphosphate 0.72 applied Jan.	Superphosphate 0.72 applied Apr.	Basic slag 0.72 applied Jan.	Basic slag 0.72 applied Apr.	Basic slag 0.95 applied Jan.	S.E.
TOTAL SUGAR : cwt. per acre	39.4	40.9	39.1	41.8	39.6	42.7	±1.21
Increase		*+1.5*	*−0.3*	*+2.4*	*+0.2*	*+3.3*	*±1.71*
ROOTS (washed) : tons per acre	11.65	12.11	11.42	11.89	11.66	12.46	
Increase		*+0.46*	*−0.23*	*+0.24*	*+0.01*	*+0.81*	
TOPS : tons per acre	13.33	13.63	13.02	12.83	13.46	13.58	±0.292
Increase		*+0.30*	*−0.31*	*−0.50*	*+0.13*	*+0.25*	*±0.413*
SUGAR PERCENTAGE	16.85	16.85	17.13	17.60	16.98	17.12	
Increase		*0.00*	*+0.28*	*+0.75*	*+0.13*	*+0.27*	
PLANT NUMBER : thous. per acre	26.9	27.0	26.8	26.9	26.3	27.4	
Increase		*+0.1*	*−0.1*	*0.0*	*−0.6*	*+0.5*	

Conclusions

The increases in total sugar for the January applications of minerals were not significant, while there was no apparent response to the April application. There was no apparent difference between superphosphate and basic slag.

The effects of the minerals on tops were negligible.

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Sugar Beet. W. Everard, Esq., Leverton, 1938
Bardney Beet Sugar Factory

6×6 Latin square. Plots: 1/80 acre.

TREATMENTS: Nil and 0.7 cwt. N per acre. Comparing sulphate of ammonia, nitrate of soda, nitro-chalk, nitrate of lime and calcium cyanamide.

BASAL MANURING: Superphosphate and muriate of potash.

SOIL: Silt. Manures applied: April 28. Variety: Johnson's. Seed sown: April 29. Lifted: November 18. Previous crop: Wheat.

STANDARD ERRORS PER PLOT: Total sugar: 2.08 cwt. per acre or 9.69%. Tops: 0.813 tons per acre or 9.99%. Mean dirt tare: 0.195.

Summary of Results

	No nitrogen	Sulphate of ammonia	Nitrate of soda	Nitro-chalk	Cyana-mide	Nitrate of lime	*Mean*
TOTAL SUGAR: cwt. per acre (±0.849)	20.2	22.2	21.9	21.1	22.2	21.5	*21.5*
Increases (±*1.20*)		*+2.0*	*+1.7*	*+0.9*	*+2.0*	*+1.3*	
ROOTS (washed): tons per acre	6.05	6.66	6.77	6.29	6.63	6.34	*6.46*
Increases		*+0.61*	*+0.72*	*+0.24*	*+0.58*	*+0.29*	
TOPS: tons per acre (±0.332)	6.47	7.54	9.15	8.46	8.84	8.34	*8.13*
Increases (±*0.469*)		*+1.07*	*+2.68*	*+1.99*	*+2.37*	*+1.87*	
SUGAR PERCENTAGE	16.67	16.60	16.52	16.83	16.72	16.65	*16.66*
Increases		*−0.07*	*−0.15*	*+0.16*	*+0.05*	*−0.02*	
PLANT NUMBER: thous. per acre	26.9	27.1	27.5	27.2	27.2	27.4	*27.2*
Increases		*+0.2*	*+0.6*	*+0.3*	*+0.3*	*+0.5*	

Conclusions

All forms of nitrogen produced increases in sugar per acre though none of them were significant. All forms of nitrogen gave significant increases in tops, nitrate of soda and cyanamide giving significantly higher yields than sulphate of ammonia.

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