ROTHAMSTED RESEARCH

Report for 1937

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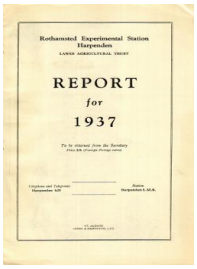

Special Group of Experiments

Rothamsted Research

Rothamsted Research (1938) *Special Group of Experiments ;* Report For 1937, pp 170 - 196 **- DOI: https://doi.org/10.23637/ERADOC-1-69**

EXPERIMENTS ON POULTRY MANURE

Centres.	Type of Experiment	No. of plots	Year
Rothamsted (see pp. 164 for details)	2aCR	48	4
Woburn (see pp. 167 for details)	2aCR	48	4
Lady Manner's School, Bakewell (A)	1C	16	4
Lady Manner's School, Bakewell (B)	1C	16	4
Grammar School, Burford	1C	16	4
St. Joseph's School, Castleford, Yorks	1C	16	2
Fakenham Secondary School, Norfolk	1C	16	4
County School, Godalming, Surrey	1C	16	4
Sailors' Orphan Homes School, Newlands, Hull	1C	16	4
A. G. Brightman, Esq., Maulden (A), Beds. J. W. Dallas, Esq., County Organiser	2R	24	2
A. G. Brightman, Esq., Maulden (B), Beds. J. W. Dallas, Esq., County Organiser	3	24	3
Norton New Council School, Doncaster, Yorks	1C	16	2
Council School, Oxted, Surrey	1	16	1
L. Pope, Esq., Pelton, Durham	1C	12	3
J. Martland, Ltd., Rufford, Ormskirk. J. J. Green, Esq., County Organiser	2CR	24	2
Church of England School, Staindrop, Darlington, Co. Durham	1C	16	4
J. W. Bonner, Esq., Steppingly, Beds. J. W. Dallas, Esq., County Organiser	2CR	24	4
County School, Welshpool, Montgomeryshire	1C	16	4
R. S. Maudlin, Esq., Wyboston. J. W. Dallas, Esq., County Organiser	2R	24	4

Experimental arrangements

(1) 2^2 factorial design. P.M, S/A.
4 × 4 Latin squares or randomised blocks.
* Basal manuring : 1.0 cwt. K_2O and 0.8 cwt. P_2O_5 per acre.

(1C) Cumulative : As (1) with treatments repeated on the same plots each year.

(2CR) Immediate, cumulative and residual effects. Manures S/A (S) and P.M. (M). Treatments as follows :

1st year ..	O	O	1S	1M	2S	2M
2nd year ..	2S	2M	1S	1M	O	O
3rd year ..	O	O	1S	1M	2S	2M
4th year ..	2S	2M	1S	1M	O	O

Randomised blocks.
* Basal manuring : 1.0 cwt. K_2O and 1.0 cwt. P_2O_5 per acre.

(2aCR) As (2CR) with soot.

(2R) As (2CR) for the first two years, but with no treatments in the third and fourth years.

(3) Immediate, cumulative and residual effects. Treatments as follows :

1st year ..	O	O	M	M	O	O	S	S
2nd year ..	O	M	O	M	O	S	O	S
3rd year ..	M	M	O	O	S	S	O	O
4th year ..	M	O	M	O	S	O	S	O

Randomised blocks.
* Basal manuring : 1.0 cwt. K_2O and 0.8 cwt. P_2O_5 per acre.
**Note.*—In all cases the mineral manures per plot were made up to 1.0 cwt. K_2O and 0.8 cwt. or 1.0 cwt. P_2O_5, using muriate of potash and superphosphate.

Rates of Manuring.

(1), (1C): N at the rate of O, 0.6 and 1.2 cwt. per acre.
(2CR), (2R): N at the rate of O, 0.4 and 0.8 cwt. per acre.
(3): N at the rate of O and 0.6 cwt. per acre.

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Place	Crop	Area Acres	Soil	Variety	Manures applied	Seed sown	Harvested	Previous Crop
Bakewell (A)	Potatoes	1/102	Limestone	Gladstone	May 7-11	May 7-11	Oct. 11-15	Ryegrass
Bakewell (B)	Ryegrass	1/102	Limestone	Westernwolths	June 4-9	June 11	Aug. 19	Mangolds
Burford	Potatoes	1/120	Limestone loam	Great Scot	April 22-28	April 12-15	Sept. 20-22	Swedes
Castleford	Potatoes	1/100	Heavy loam	Majestic & Great Scot	April 27-May 13	April 28-May 14	Oct. 5-27	Potatoes
Fakenham	Carrots	1/302	Sandy loam	James Scarlet Intermediate	May 10-11	May 17-19	Oct. 4-15	Peas
Godalming	Potatoes	1/239	Sandy	Red King	—	May 8	Aug. 10-11	
Hull	Cabbages	1/161	Heavy Alluvium	Utility	June 16	June 14	Oct.-Jan.	Swedes
Maulden (A)	Kale	1/73	Brown sand	Green Curled	—	July 20	Mar. 19-April 21	Potatoes
Maulden (B)	Runner Beans	1/75	Brown sand	Emperor	May 27	June 12	Aug. 27-Oct. 22	Potatoes
Norton	Cabbages	1/237	Light loam	Winningstadt	May 25	May 31	Sept.-Oct.	Potatoes
Oxted	Potatoes	1/161	Gault Clay	King Edward	May 24	May 31	Oct. 1	Potatoes
Pelton	Swedes	1/186	Medium loam	Perfection	April 30	May 3-4	Sept. 28-29	Beet
Rufford	Potatoes	1/80	Light loam	Arran Banner	April	April 23	Nov. 4	Potatoes
Staindrop	Potatoes	1/160	Good loam	Great Scot	April 29	April 29	Sept. 15	Swedes
Steppingley	Potatoes	1/50	Brown sand	Epicure	April 8	April 9	July 29	Runner Beans
Welshpool	Potatoes	1/160	Medium loam	Arran Banner	May 8	May 15	Oct. 12-20	Swedes
Wyboston	Clover	1/50	Silty Gravel	Broad Red	April 2, 1935	Spring 1936	June 24	Wheat

Cumulative Experiments Types 1 *and* 1C

Year of experiment	Place	Crop	No. N.	P.M.	S/A	S/A and P.M.	*Mean*	St. error
First	Oxted	Potatoes : tons per acre	2.58	2.32	3.02	3.20	*2.78*	±0.236
	Castleford	Potatoes : tons per acre	5.68	6.18	6.70	6.83	*6.35*	±0.216
Second	Norton	Cabbages, Saleable : tons per acre	10.52	16.31	12.91	15.50	*13.81*	±0.260
		Cabbages, Saleable %	76.8	93.7	84.8	94.6	*87.5*	±3.68
Third	Pelton	Swedes, roots : tons per acre	12.50	13.32	13.82	15.05	*13.67*	±1.21
		tops : tons per acre	4.54	4.92	5.41	5.75	*5.16*	±0.182
Fourth	Burford	Potatoes : tons per acre	6.36	6.74	6.04	6.54	*6.42*	±0.258
	Staindrop	Potatoes : tons per acre	3.90	6.45	8.89	9.58	*7.20*	±0.244
	Welshpool	Potatoes : tons per acre	8.11	11.09	10.00	11.80	*10.25*	±0.188
	Godalming	Potatoes : tons per acre	5.16	6.59	7.04	6.89	*6.42*	±0.245
	Bakewell (A)	Potatoes : tons per acre	5.86	5.72	6.69	6.88	*6.29*	±0.251
	Staindrop	Potatoes : percentage ware	93.5	95.1	96.4	96.9	*95.5*	±0.285
	Hull	Cabbages : tons per acre	11.14	13.75	12.66	13.54	*12.77*	±0.314
	Fakenham	Carrots, roots and tops : tons per acre	11.15	9.66	6.88	6.27	*8.49*	±0.630
	Bakewell (B)	Ryegrass (green) : tons per acre	7.45	7.96	7.77	8.24	*7.86*	±0.162

The standard errors apply to individual entries in the tables.

Conclusions

Poultry manure and sulphate of ammonia alone and in combination.

In the first-year experiment on potatoes at Oxted, sulphate of ammonia produced a significant increase on a poor crop, while poultry manure had no appreciable effect.

At Castleford, sulphate of ammonia gave a larger response in potatoes than poultry manure, though the difference did not reach significance.

In the fourth-year cumulative experiments on potatoes, there were significant responses to nitrogen at all centres except Burford. At Staindrop the responses in total produce were large for both sulphate of ammonia and poultry manure. Sulphate of ammonia gave significantly greater responses than poultry manure in both total produce and percentage ware. Sulphate of ammonia also proved superior to poultry manure at Godalming, though not significantly so, and at Bakewell (A), where poultry manure produced no response. At Welshpool, on the other hand, the response to poultry manure was significantly greater than that to sulphate of ammonia.

There were good responses to nitrogen in saleable cabbages at Doncaster, poultry manure giving a significantly greater response than sulphate of ammonia. Similar results were obtained for the percentage of saleable cabbages, except that the superiority of poultry manure over sulphate of ammonia was not significant. The results in the fourth-year experiment on cabbages at Hull were also similar, poultry manure proving significantly better than sulphate of ammonia. At Pelton, the response to nitrogen was significant in swedes tops but not in roots. In both cases sulphate of ammonia gave higher yields than poultry manure, but not significantly so.

At Fakenham, nitrogen produced a striking depression in the yields of carrots. The yields with sulphate of ammonia were significantly below those with poultry manure.

There was a significant increase to nitrogen in ryegrass at Bakewell, but the responses to the two forms did not differ significantly.

Experiments on residual effects

Type 2 R

Place	Crop	Treatments 1934	1935	1936 and 1937	P.M.	S/A	*Mean*	St. error
Wyboston	Clover hay : cwt. per acre (±2.25)	2N	ON	ON	70.2	69.1	*69.6*	
		1N	1N	ON	65.7	65.3	*65.5*	±1.59
		ON	2N	ON	74.1	70.4	*72.2*	
		Mean (±1.30)			*70.0*	*68.3*	*69.1*	
		1935	1936	1936-7				
		O	O	O	5.61[1]		*5.61*	
Maulden (A)	Kale : tons per acre (±0.931)	N	O	O	7.72	5.57	*6.64*	
		O	N	O	7.33	5.63	*6.48*	±0.658
		N	N	O	6.38	5.55	*5.96*	
		Mean (±0.538)			7.14	5.58	*6.17*	

Standard error : [1] ±0.658.

Conclusions

Residual Effects

There were no significant differences in the residual effects on red clover at Wyboston, though the plots which had previously received poultry manure gave somewhat better yields than those which had previously received sulphate of ammonia.

At Maulden (A), kale was grown as an unmanured catch crop following the 1936 crop of potatoes. There were indications of a residual effect of poultry manure, though this was not quite significant. There was no sign of a residual effect of sulphate of ammonia.

Experiments on immediate, cumulative and residual effects

Type 2 CR

Place	Year of experiment	Crop	1934 and 1936 / 1935 and 1937	2N / ON	1N / 1N	ON / 2N	*Mean*	St.error
Rufford	Second	Potatoes : tons per acre (±0.326)	PM	2.48	3.08	3.37	*2.98*	±0.188
			S/A	2.25	3.47	4.00	*3.24*	
			Mean (±0.231)	*2.36*	*3.28*	*3.68*	*3.11*	
Steppingley	Fourth	Potatoes : tons per acre (±0.262)	PM	2.23	3.10	3.94	*3.09*	±0.151
			S/A	1.79	2.54	3.38	*2.57*	
			Mean (±0.185)	*2.01*	*2.82*	*3.66*	*2.83*	

Conclusions

Immediate, cumulative and residual effects

At Rufford the potato crop was attacked by eelworm and the yields were poor. There were significant responses to the direct application of nitrogen, sulphate of ammonia giving higher yields than poultry manure, though the difference was not significant. The difference between the residual effects, if any, of poultry manure and sulphate of ammonia was small and not significant. In the fourth year experiment at Steppingley there were good responses to nitrogen in early potatoes. Poultry manure gave higher yields than sulphate of ammonia in all three types of application, the average difference being significant.

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Experiments on immediate, cumulative and residual effects

Type 3

Place	Crop	1935 1936 1937		N O O	N N O	O O N	O N N	*Mean*	
Maulden	Runner Beans : cwt. per acre	Pickings 1-3	PM	45.1	44.4	41.3	50.2	*45.2*	
			S/A	43.1	46.2	42.9	46.9	*44.8*	
		Pickings 4-6	PM	35.7	34.4	28.1	44.4	*35.6*	
			S/A	31.3	33.3	38.2	40.4	*35.8*	
		Pickings 7-9	PM	12.7	13.2	9.8	15.2	*12.7*	
			S/A	11.4	10.7	13.6	14.1	*12.4*	
	(±3.98)	Total	PM	93.5	92.0	79.2	109.8	*93.6*	±1.99
			S/A	85.8	90.2	94.7	101.4	*93.0*	
		Mean (±2.81)		*89.6*	*91.1*	*87.0*	*105.6*	*93.3*	

Conclusions

Immediate, cumulative and residual effects

The direct application of sulphate of ammonia produced a significant increase in total produce. The residual effects of the previous year's dressing were not significant. The direct effects of poultry manure were irregular, the plots receiving poultry manure for the first time this year giving anomalously low yields. On plots receiving manures this year, sulphate of ammonia gave slightly but not significantly higher yields than poultry manure, while on plots receiving no manure this year, the previous application of poultry manure gave slightly higher yields than the previous application of sulphate of ammonia.

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SUGAR BEET FERTILISER EXPERIMENTS

Factory Series

SYSTEM OF REPLICATION : 3 randomised blocks of 9 plots each with two degrees of freedom, representing second order interactions, confounded with block differences.

AREA OF EACH PLOT : Poppleton II : 1/50 acre. Bardney II and Wissington III : 1/80 acre. Wissington II and Rothamsted I* : 1/100 acre. Tunstall : 1/120 acre. Remainder : 1/40 acre.

TREATMENTS : 3 × 3 × 3 factorial design.
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.

VARIETIES : Brigg I : Johnson's P. Kidderminster I : Kuhn. Spalding : Kuhn P. King's Lynn II : Sharpes. Ely : Dippe W.I. Remainder : Kleinwanzleben E.

Mechanical and chemical analyses of soil samples from each experiment have been carried out.
* Area harvested : 1/250 acre.

Plant Density (mean values)

Station	Yield in tons per acre	Plants in thousands per acre	Distance in inches between rows	Weight of roots in lb. per plant
COARSE SANDS				
1 Allscott I	15.88	23.0	20.0	1.55
2 Bardney II	10.59	30.3	18.0	0.783
3 Brigg II	13.77	22.3	20.0	1.38
4 Bury I	10.30	27.8	20.0	0.830
5 Cantley I	10.21	33.8	18.0	0.677
6 Tunstall	7.50	56.7	21.0	0.296
7 Wissington II	13.00	26.1	18.0	1.12
FINE SANDS				
8 Brigg I	14.41	24.0	19.0	1.34
9 Bury II	10.36	22.8	21.0	1.02
10 Ipswich	10.66	30.4	19.0	0.785
11 Kidderminster I	11.17	25.7	21.0	0.974
12 King's Lynn II	12.45	27.8	20.0	1.00
13 Spalding	17.48	38.4	18.0	1.02
LIGHT LOAMS				
14 Allscott II	6.51	18.8	20.0	0.776
15 Bardney I	13.84	30.5	18.0	1.02
16 Cantley II	12.56	21.6	20.0	1.30
17 King's Lynn I	10.70	27.4	18.0	0.875
18 Newark I	13.67	31.0	18.0	0.988
19 Peterboro' I	7.13	22.9	19.5	0.697
20 Poppleton I	11.56	26.5	22.5	0.977
21 Poppleton II	11.72	24.1	22.5	1.09
22 Selby I	9.63	26.6	20.0	0.811
23 Wissington III	13.28	31.0	18.0	0.960
HEAVY LOAM				
24 Colwick	14.56	32.8	18.0	0.994
CLAY LOAMS				
25 Felstead I	9.78	23.8	22.5	0.920
26 Felstead II	11.53	25.7	22.5	1.00
27 Rothamsted I	12.01	31.3	20.0	0.860
28 Selby II	10.05	27.2	20.0	0.828
FENS				
29 Ely	11.39	33.6	21.0	0.759
30 Peterboro' II	11.59	24.7	19.5	1.05

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	Station	Soil	Previous crop	Date of sowing	Date of lifting	Farming notes
1	Allscott I ..	Light sandy loam	Potatoes	April 30	Nov. 9-10	Dung and 1 ton limestone for beet.
2	Bardney II ..	Coarse sandy loam	Wheat	May 4	Nov. 9-10	Late summer too dry.
3	Brigg II ..	Coarse sandy loam	Wheat	May 4	Dec. 1	
4	Bury I ..	Sandy	Clover	April 21	Dec. 2	Poor plant, game and wind damage.
5	Cantley I ..	Light sandy loam	Barley	April 23	Nov. 3-4	Late summer drought. Badly singled.
6	Tunstall ..	Medium fine sand	Rye	May 25*	Nov. 12	Storm washed, redrilled, too many plants left.
7	Wissington II	Poor sandy loam	Wheat	April 5	Oct. 26	
8	Brigg I ..	Coarse sandy loam	Wheat	May 18	Nov. 29	
9	Bury II ..	Light sandy loam	Oats	April 27	Oct. 25	" Beet tailings " ploughed in for beet.
10	Ipswich ..	Loam with coarse sand	Wheat	May 6	Nov. 23-30	Dung for beet.
11	Kidderminster I	Light sandy loam	Barley	April 26	Nov. 3-6	Slight aphis attack, drought in September.
12	King's Lynn II	Light sandy loam	Barley	May 11	Nov. 17	Dung for beet.
13	Spalding ..	Deep silt	Wheat	April 30	Oct. 19	Very good land. Dung for beet.
14	Allscott II ..	Light sandy loam	Oats	April 24, 26	Nov. 3	Dung and 8 cwt. lime for beet, very poor plant.
15	Bardney I ..	Coarse sandy loam	Barley	April 28	Nov. 9-10	
16	Cantley II ..	Fine sandy loam	Wheat	May 6	Dec. 6	Some wireworm damage.
17	King's Lynn I	Light sandy loam	Barley	May 6	Nov. 18	Damage by heavy rain in June.
18	Newark I ..	Light loam	Wheat	April 30	Dec. 10	Damaged by hail in July. All plots slagged before sampling.
19	Peterboro' I ..	Medium loam	Barley	April 23	Oct. 20	Dung for beet.
20	Poppleton I ..	Light sandy loam	Potatoes	May 5	Nov. 10-12	
21	Poppleton II	Light sandy loam	Wheat	May 6	Nov. 16-17	
22	Selby I ..	Light warp	Wheat	May 25*	Oct. 14-15	
23	Wissington III	Medium sandy loam	Barley	May 11	Nov. 15	
24	Colwick ..	Sandy loam	Potatoes	April 27	Nov. 8-10	Wireworm and aphis damage.
25	Felstead I ..	Sandy clay loam	Wheat	May 8	Oct. 14	
26	Felstead II ..	Clay loam	Oats	May 18	Nov. 13	Dung for beet.
27	Rothamsted I	Clay loam	Wheat	May 18	Nov. 24	
28	Selby II ..	Heavy warp	Wheat	May 19	Oct. 5-7	Factory "lime" for beet, very uneven plant.
29	Ely	Light fen	Wheat	May 6	Nov. 4-11	
30	Peterboro' II	Heavy fen	Wheat	May 6	Dec. 7	Dung for beet, partly flooded.

*Second sowing

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Sampling errors in sampling for sugar content

(10 *roots in each sample*)

Station	No. of Samples analysed per plot	Standard error per sample
5 Cantley I	2	0.237
7 Wissington II	4	0.322
23 Wissington III	4	0.317

Significant Responses

	N	P	K	Symbols
Total sugar (30)	+*	+*	+*	
Tops (24)	+*	+*	+	+=Positive, 0=No, —=negative } Significant Average Response
		Curvature		
Total sugar ..	—	0	0	
Tops	0	0	0	(30) No. of centres
	N×P	N×K	P×K	*=Significant differences between centres
Total sugar ..	0	+	0	
Tops	0	0	0	

Mean Responses per 1 *cwt. of* N, P_2O_5 *and* K_2O

	N		P		K	
	Average 1933-36	1937	Average 1933-36	1937	Average 1933-36	1937
Total Sugar—cwt.	+4.4	+6.5	+1.3	+1.9	+1.0	+2.3
Roots—tons ..	+1.59	+2.12	+0.36	+0.55	+0.18	+0.55
Tops—tons ..	+3.40	+3.75	+0.38	+0.56	+0.09	+0.34
Sugar %	−0.60	−0.39	+0.02	0.00	+0.22	+0.22
Plant number ..	+0.4	+0.4	+0.5	+0.3	+0.3	+0.6
Purity %	−0.7	0.0	+0.3	+0.1	+0.1	+0.3

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Main Effects and First Order Interactions

Total Sugar : cwt. per acre

Centre		P_0	P_1	P_2	K_0	K_1	K_2	*Mean*		P_0	P_1	P_2
1	N_0	48.8	50.8	46.2	51.0	46.5	48.3	*48.6*	K_0	52.4	50.0	52.8
	N_1	50.0	51.9	55.8	50.8	52.1	54.8	*52.6*	K_1	48.2	53.1	50.7
	N_2	51.9	52.7	55.0	53.5	53.5	52.6	*53.2*	K_2	50.0	52.3	53.4
	Mean	*50.2*	*51.8*	*52.3*	*51.7*	*50.7*	*51.9*	*51.4*	±2.14. *Means :*		±*1.24*	
2	N_0	31.9	33.2	33.4	31.9	34.9	31.8	*32.9*	K_0	34.4	34.6	37.3
	N_1	35.6	38.8	42.5	38.6	39.7	38.6	*39.0*	K_1	35.5	37.7	39.2
	N_2	36.6	39.3	40.6	35.8	37.9	42.9	*38.8*	K_2	34.2	39.0	40.1
	Mean	*34.7*	*37.1*	*38.9*	*35.4*	*37.5*	*37.8*	*36.9*	±2.10. *Means :*		±*1.21*	
3	N_0	42.7	41.2	40.8	38.5	43.0	43.1	*41.5*	K_0	42.1	50.7	47.9
	N_1	47.0	47.5	47.1	49.4	44.1	48.1	*47.2*	K_1	45.2	45.1	45.5
	N_2	48.5	49.9	53.3	52.7	48.7	50.3	*50.6*	K_2	50.9	42.8	47.9
	Mean	*46.1*	*46.2*	*47.1*	*46.9*	*45.3*	*47.2*	*46.4*	±2.74. *Means :*		±*1.58*	
4	N_0	28.5	27.7	28.4	24.8	28.1	31.8	*28.2*	K_0	23.8	31.5	31.0
	N_1	33.8	39.2	39.1	32.1	40.8	39.3	*37.4*	K_1	35.8	36.0	36.3
	N_2	31.9	40.3	37.7	29.4	39.2	41.3	*36.6*	K_2	34.7	39.7	37.9
	Mean	*31.4*	*35.7*	*35.1*	*28.8*	*36.0*	*37.5*	*34.1*	±2.30. *Means :*		±*1.33*	
5	N_0	31.1	34.2	30.0	30.3	32.2	32.8	*31.8*	K_0	29.1	32.8	33.4
	N_1	33.4	34.0	38.1	33.1	37.0	35.4	*35.2*	K_1	36.5	37.7	34.7
	N_2	38.9	36.1	33.4	32.0	39.7	36.8	*36.2*	K_2	37.8	33.8	33.3
	Mean	*34.5*	*34.8*	*33.8*	*31.8*	*36.3*	*35.0*	*34.4*	±2.44. *Means :*		±*1.41*	
	N_0	19.8	20.3	23.4	18.3	22.1	23.1	*21.2*	K_0	22.5	20.3	22.7
	N_1	28.7	26.3	27.4	22.8	28.1	31.5	*27.5*	K_1	27.2	27.8	25.8
	N_2	30.5	28.5	27.0	24.4	30.5	31.1	*28.7*	K_2	29.4	27.0	29.3
	Mean	*26.4*	*25.0*	*25.9*	*21.8*	*26.9*	*28.6*	*25.8*	±1.28. *Means :*		±*0.739*	
7	N_0	40.7	39.8	37.7	35.2	40.7	42.2	*39.4*	K_0	42.8	42.3	42.7
	N_1	45.1	46.1	51.7	44.5	46.9	51.6	*47.6*	K_1	45.8	43.3	45.1
	N_2	49.0	51.7	47.9	48.2	46.7	53.7	*49.5*	K_2	46.2	51.9	49.5
	Mean	*44.9*	*45.8*	*45.8*	*42.6*	*44.7*	*49.2*	*45.5*	±2.12. *Means :*		±*1.22*	
8	N_0	44.9	46.9	45.2	45.0	46.9	45.1	*45.7*	K_0	48.8	49.4	49.6
	N_1	50.4	50.7	52.3	50.9	50.7	51.8	*51.1*	K_1	49.3	49.0	51.7
	N_2	52.5	51.5	54.5	51.9	52.4	54.2	*52.8*	K_2	49.6	50.8	50.7
	Mean	*49.3*	*49.7*	*50.7*	*49.3*	*50.0*	*50.4*	*49.9*	±1.31. *Means :*		±*0.756*	
9	N_0	34.8	36.3	33.0	36.5	35.2	32.3	*34.7*	K_0	38.5	35.1	37.3
	N_1	36.3	35.3	40.5	38.4	34.7	39.0	*37.4*	K_1	38.5	34.9	37.2
	N_2	40.6	36.9	40.2	36.1	40.7	40.9	*39.2*	K_2	34.7	38.4	39.1
	Mean	*37.2*	*36.2*	*37.9*	*37.0*	*36.9*	*37.4*	*37.1*	±2.09. *Means :*		±*1.21*	
10	N_0	37.1	32.7	33.7	29.2	36.9	37.3	*34.5*	K_0	29.3	31.5	32.4
	N_1	35.6	34.9	32.8	30.9	33.0	39.3	*34.4*	K_1	39.0	34.8	34.0
	N_2	34.3	35.4	36.3	33.1	37.8	35.2	*35.4*	K_2	38.8	36.7	36.3
	Mean	*35.7*	*34.3*	*34.3*	*31.1*	*35.9*	*37.3*	*34.8*	±1.85. *Means :*		±*1.07*	

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Total Sugar: cwt. per acre

Centre		P_0	P_1	P_2	K_0	K_1	K_2	*Mean*
11	N_0	33.4	33.3	36.0	30.1	34.4	38.2	*34.2*
	N_1	31.0	45.3	42.0	34.9	37.4	46.0	*39.4*
	N_2	40.1	36.4	41.3	37.3	38.8	41.8	*39.3*
	Mean	*34.8*	*38.3*	*39.8*	*34.1*	*36.8*	*42.0*	*37.6*
12	N_0	38.5	41.5	39.3	38.1	41.7	39.5	*39.8*
	N_1	43.2	45.5	47.0	43.7	44.9	47.1	*45.2*
	N_2	49.6	45.6	50.7	49.6	45.0	51.3	*48.6*
	Mean	*43.8*	*44.2*	*45.7*	*43.8*	*43.9*	*46.0*	*44.6*
13	N_0	60.4	59.5	56.2	57.8	58.4	59.9	*58.7*
	N_1	54.4	60.0	59.9	54.9	59.1	60.2	*58.1*
	N_2	57.3	59.7	57.6	57.9	58.5	58.1	*58.2*
	Mean	*57.3*	*59.7*	*57.9*	*56.8*	*58.7*	*59.4*	*58.3*
14	N_0	9.8	21.1	29.7	15.3	24.5	20.9	*20.2*
	N_1	9.8	27.4	26.9	20.3	19.3	24.5	*21.4*
	N_2	13.0	29.4	25.2	18.4	15.8	33.4	*22.5*
	Mean	*10.9*	*26.0*	*27.3*	*18.0*	*19.9*	*26.3*	*21.4*
15	N_0	48.3	43.8	46.5	44.2	46.9	47.6	*46.2*
	N_1	49.1	51.7	47.7	52.4	46.8	49.3	*49.5*
	N_2	52.5	54.8	51.8	51.1	53.1	54.9	*53.0*
	Mean	*50.0*	*50.1*	*48.7*	*49.2*	*48.9*	*50.6*	*49.6*
16	N_0	41.5	39.8	44.3	41.7	41.4	42.4	*41.8*
	N_1	43.4	42.6	42.4	42.1	42.0	44.3	*42.8*
	N_2	48.4	45.3	42.1	42.1	45.2	48.6	*45.3*
	Mean	*44.4*	*42.6*	*42.9*	*42.0*	*42.9*	*45.1*	*43.3*
17	N_0	33.3	31.1	36.3	33.2	31.7	35.7	*33.5*
	N_1	32.7	43.7	38.1	36.9	40.9	36.8	*38.2*
	N_2	41.1	43.9	44.8	42.7	43.9	43.2	*43.3*
	Mean	*35.7*	*39.6*	*39.7*	*37.6*	*38.8*	*38.6*	*38.3*
18	N_0	45.2	44.0	47.6	44.1	44.8	47.8	*45.6*
	N_1	47.2	50.3	50.9	47.5	50.7	50.2	*49.5*
	N_2	55.1	54.4	52.1	53.9	52.7	55.0	*53.9*
	Mean	*49.2*	*49.6*	*50.2*	*48.5*	*49.4*	*51.0*	*49.7*
19	N_0	25.4	31.6	32.3	29.1	33.2	27.0	*29.8*
	N_1	24.5	32.0	28.5	27.9	30.1	27.0	*28.3*
	N_2	26.2	30.1	31.1	26.2	28.6	32.5	*29.1*
	Mean	*25.4*	*31.2*	*30.6*	*27.8*	*30.6*	*28.8*	*29.1*
20	N_0	32.7	39.2	37.5	37.7	39.6	32.1	*36.5*
	N_1	39.6	41.5	40.0	34.1	38.3	48.7	*40.4*
	N_2	39.3	34.8	40.0	36.0	38.6	39.5	*38.0*
	Mean	*37.2*	*38.5*	*39.2*	*35.9*	*38.8*	*40.1*	*38.3*

	P_0	P_1	P_2
K_0	30.9	34.4	37.0
K_1	33.0	38.1	39.4
K_2	40.6	42.5	42.9

± 2.82. *Means* : ± 1.63

	P_0	P_1	P_2
K_0	44.4	43.3	43.7
K_1	41.9	43.3	46.3
K_2	45.0	45.9	47.0

± 2.30. *Means* : ± 1.33

	P_0	P_1	P_2
K_0	53.7	59.7	57.1
K_1	57.6	59.0	59.3
K_2	60.6	60.4	57.2

± 2.00. *Means* : ± 1.15

	P_0	P_1	P_2
K_0	9.0	21.2	23.8
K_1	10.9	24.4	24.3
K_2	12.8	32.3	33.6

± 3.93. *Means* : ± 2.27

	P_0	P_1	P_2
K_0	52.6	48.0	47.1
K_1	49.6	48.3	48.9
K_2	47.8	54.1	49.9

± 2.67. *Means* : ± 1.54

	P_0	P_1	P_2
K_0	40.4	43.2	42.3
K_1	46.7	39.1	42.8
K_2	46.2	45.4	43.7

± 1.84. *Means* : ± 1.06

	P_0	P_1	P_2
K_0	34.8	39.5	38.5
K_1	34.8	41.8	39.8
K_2	37.5	37.4	40.9

± 2.52. *Means* : ± 1.45

	P_0	P_1	P_2
K_0	45.6	49.8	50.2
K_1	50.2	47.9	50.1
K_2	51.7	51.1	50.1

± 1.78. *Means* : ± 1.03

	P_0	P_1	P_2
K_0	25.4	30.3	27.6
K_1	26.7	31.6	33.5
K_2	23.9	31.8	30.8

± 2.08. *Means* : ± 1.20

	P_0	P_1	P_2
K_0	36.8	34.7	36.3
K_1	39.5	38.5	38.5
K_2	35.3	42.4	42.6

± 3.33. *Means* : ± 1.92

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Total Sugar: cwt. per acre

Centre		P_0	P_1	P_2	K_0	K_1	K_2	*Mean*		P_0	P_1	P_2
21	N_0	36.7	36.7	36.9	36.8	37.2	36.3	*36.8*	K_0	40.5	41.5	39.5
	N_1	42.2	39.9	39.9	41.6	41.3	39.1	*40.7*	K_1	40.9	40.2	40.2
	N_2	40.3	43.8	45.9	43.0	42.8	44.1	*43.3*	K_2	37.8	38.8	43.0
	Mean	*39.7*	*40.2*	*40.9*	*40.5*	*40.4*	*39.9*	*40.3*	±1.74. *Means :*		±*1.00*	
22	N_0	32.0	30.3	32.5	30.5	31.4	32.9	*31.6*	K_0	30.7	30.5	32.7
	N_1	29.2	33.4	32.8	31.1	33.8	30.5	*31.8*	K_1	33.0	33.8	33.9
	N_2	34.4	32.0	37.7	32.3	35.5	36.3	*34.7*	K_2	31.9	31.5	36.3
	Mean	*31.9*	*31.9*	*34.3*	*31.3*	*33.6*	*33.2*	*32.7*	±2.28. *Means :*		±*1.32*	
23	N_0	41.5	42.2	38.1	39.1	41.5	41.2	*40.6*	K_0	48.5	47.3	44.4
	N_1	45.4	49.8	51.2	49.4	49.4	47.5	*48.8*	K_1	47.1	49.5	48.9
	N_2	55.1	52.8	52.0	51.6	54.6	53.7	*53.3*	K_2	46.4	48.0	48.0
	Mean	*47.3*	*48.3*	*47.1*	*46.7*	*48.5*	*47.5*	*47.6*	±1.82. *Means :*		±*1.05*	
24	N_0	49.8	48.7	49.5	48.1	50.7	49.2	*49.3*	K_0	48.5	51.7	53.2
	N_1	51.0	51.6	55.5	51.1	55.0	52.0	*52.7*	K_1	51.8	52.7	54.3
	N_2	52.1	54.3	54.9	54.1	53.0	54.2	*53.8*	K_2	52.7	50.2	52.4
	Mean	*51.0*	*51.5*	*53.3*	*51.1*	*52.9*	*51.8*	*51.9*	±1.55. *Means :*		±*0.895*	
25	N_0	31.7	33.1	33.1	35.6	31.2	31.2	*32.6*	K_0	35.4	39.8	40.8
	N_1	36.5	39.9	39.2	38.3	39.0	38.2	*38.5*	K_1	36.4	38.8	39.2
	N_2	41.2	43.0	45.5	42.0	44.2	43.4	*43.2*	K_2	37.6	37.4	37.8
	Mean	*36.5*	*38.7*	*39.3*	*38.6*	*38.1*	*37.6*	*38.1*	±1.31. *Means :*		±*0.756*	
26	N_0	38.5	34.9	35.8	32.7	38.5	37.9	*36.4*	K_0	40.1	38.9	43.3
	N_1	43.0	38.2	46.3	43.2	42.0	42.3	*42.5*	K_1	43.4	37.3	44.1
	N_2	44.1	44.9	47.9	46.4	44.3	46.2	*45.6*	K_2	42.0	41.7	42.6
	Mean	*41.9*	*39.3*	*43.3*	*40.8*	*41.6*	*42.1*	*41.5*	±2.21. *Means :*		±*1.28*	
27	N_0	33.5	37.3	36.3	36.2	36.0	34.9	*35.7*	K_0	35.4	38.2	40.0
	N_1	39.0	42.4	39.2	38.6	41.5	40.6	*40.2*	K_1	35.6	43.6	35.1
	N_2	38.1	41.4	41.7	38.7	36.9	45.7	*40.4*	K_2	39.7	39.4	42.2
	Mean	*36.9*	*40.4*	*39.1*	*37.9*	*38.1*	*40.4*	*38.8*	±2.94. *Means :*		±*1.70*	
28	N_0	36.4	35.7	34.4	32.7	37.7	36.1	*35.5*	K_0	36.6	36.1	34.1
	N_1	39.1	36.1	37.8	36.2	38.8	38.0	*37.7*	K_1	38.4	38.2	36.3
	N_2	38.5	38.7	34.6	37.8	36.3	37.7	*37.3*	K_2	39.1	36.3	36.4
	Mean	*38.0*	*36.8*	*35.6*	*35.6*	*37.6*	*37.3*	*36.8*	±1.52. *Means :*		±*0.878*	
29	N_0	38.3	37.9	38.5	37.0	39.1	38.7	*38.2*	K_0	37.0	38.4	36.1
	N_1	40.1	40.9	41.2	40.9	41.0	40.3	*40.7*	K_1	37.7	39.2	40.3
	N_2	34.5	34.9	35.8	33.6	37.1	34.5	*35.1*	K_2	38.3	36.1	39.1
	Mean	*37.6*	*37.9*	*38.5*	*37.2*	*39.1*	*37.8*	*38.0*	±1.89. *Means :*		±*1.09*	
30	N_0	36.9	41.8	34.2	39.0	32.2	41.7	*37.6*	K_0	34.5	35.7	37.1
	N_1	35.3	37.0	36.6	36.6	31.5	40.8	*36.3*	K_1	28.8	35.8	31.2
	N_2	32.0	37.8	36.3	31.7	32.2	42.2	*35.4*	K_2	40.9	45.1	38.8
	Mean	*34.7*	*38.9*	*35.7*	*35.8*	*31.9*	*41.6*	*36.4*	±2.66. *Means :*		±*1.54*	

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Roots (washed) : tons per acre

Centre		P_0	P_1	P_2	K_0	K_1	K_2	*Mean*		P_0	P_1	P_2
1	N_0	15.13	15.47	13.99	15.59	14.27	14.74	*14.87*	K_0	16.24	15.11	16.25
	N_1	15.39	16.03	17.34	15.51	16.21	17.04	*16.25*	K_1	14.99	16.67	15.55
	N_2	16.25	16.28	17.00	16.50	16.72	16.30	*16.51*	K_2	15.53	16.01	16.53
	Mean	*15.59*	*15.93*	*16.11*	*15.87*	*15.74*	*16.03*	*15.88*				
2	N_0	8.99	9.43	9.49	9.04	9.99	8.87	*9.30*	K_0	10.16	10.09	10.70
	N_1	10.37	11.10	11.89	11.35	11.27	10.74	*11.12*	K_1	10.30	10.91	11.01
	N_2	10.76	11.63	11.63	10.56	10.97	12.49	*11.34*	K_2	9.66	11.15	11.29
	Mean	*10.04*	*10.72*	*11.00*	*10.32*	*10.74*	*10.70*	*10.59*				
3	N_0	12.53	12.23	11.98	11.40	12.61	12.72	*12.24*	K_0	12.71	15.18	14.13
	N_1	14.15	14.01	13.67	14.78	12.94	14.11	*13.94*	K_1	13.48	13.39	13.25
	N_2	14.38	15.09	15.91	15.84	14.57	14.97	*15.13*	K_2	14.87	12.75	14.17
	Mean	*13.69*	*13.77*	*13.85*	*14.01*	*13.37*	*13.93*	*13.77*				
4	N_0	8.56	8.31	8.49	7.43	8.49	9.44	*8.45*	K_0	7.28	9.58	9.52
	N_1	10.15	11.60	11.58	9.74	11.99	11.61	*11.11*	K_1	10.86	10.70	10.94
	N_2	9.88	12.34	11.82	9.21	12.03	12.81	*11.35*	K_2	10.45	11.97	11.43
	Mean	*9.53*	*10.75*	*10.63*	*8.79*	*10.83*	*11.29*	*10.30*				
5	N_0	9.27	9.74	8.85	8.99	9.40	9.47	*9.29*	K_0	8.92	9.94	10.17
	N_1	10.00	10.12	11.24	10.17	10.97	10.22	*10.45*	K_1	10.73	11.07	10.34
	N_2	11.52	10.96	10.16	9.88	11.77	10.99	*10.88*	K_2	11.13	9.81	9.73
	Mean	*10.26*	*10.27*	*10.08*	*9.68*	*10.71*	*10.23*	*10.21*				
6	N_0	5.68	5.82	6.64	5.39	6.23	6.52	*6.05*	K_0	6.82	6.27	6.86
	N_1	8.16	7.57	7.93	6.91	7.98	8.77	*7.89*	K_1	7.80	7.98	7.38
	N_2	9.11	8.50	8.11	7.64	8.95	9.12	*8.57*	K_2	8.32	7.64	8.45
	Mean	*7.65*	*7.30*	*7.56*	*6.65*	*7.72*	*8.14*	*7.50*				
7	N_0	11.45	11.24	10.61	10.08	11.47	11.75	*11.10*	K_0	12.37	12.19	12.50
	N_1	12.88	13.12	14.62	12.81	13.34	14.46	*13.54*	K_1	13.14	12.32	13.01
	N_2	14.24	14.77	14.11	14.18	13.67	15.27	*14.37*	K_2	13.05	14.61	13.82
	Mean	*12.85*	*13.04*	*13.11*	*12.35*	*12.83*	*13.83*	*13.00*				
8	N_0	12.95	13.29	13.04	13.19	13.37	12.73	*13.10*	K_0	14.16	14.42	14.78
	N_1	14.37	14.40	15.09	14.68	14.33	14.85	*14.62*	K_1	14.28	13.90	14.84
	N_2	15.26	15.12	16.13	15.49	15.32	15.69	*15.50*	K_2	14.14	14.50	14.64
	Mean	*14.19*	*14.27*	*14.75*	*14.45*	*14.34*	*14.43*	*14.41*				
9	N_0	9.55	10.22	9.28	10.24	9.91	8.90	*9.68*	K_0	10.91	9.94	10.65
	N_1	10.08	9.74	11.50	10.67	9.76	10.88	*10.44*	K_1	10.45	9.78	10.51
	N_2	11.28	10.31	11.29	10.60	11.07	11.21	*10.96*	K_2	9.55	10.54	10.90
	Mean	*10.30*	*10.09*	*10.69*	*10.50*	*10.25*	*10.33*	*10.36*				
10	N_0	11.12	9.79	9.95	8.85	10.79	11.22	*10.29*	K_0	8.95	9.82	9.81
	N_1	10.75	10.57	10.32	9.48	10.30	11.86	*10.55*	K_1	11.79	10.66	10.54
	N_2	10.78	11.11	11.52	10.25	11.90	11.26	*11.14*	K_2	11.90	11.00	11.45
	Mean	*10.88*	*10.49*	*10.60*	*9.53*	*11.00*	*11.45*	*10.66*				

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Roots (washed) : tons per acre

Centre		P_0	P_1	P_2	K_0	K_1	K_2	*Mean*		P_0	P_1	P_2
11	N_0	9.73	9.73	10.36	9.03	9.91	10.88	*9.94*	K_0	9.35	10.44	11.10
	N_1	9.25	13.42	12.35	10.41	11.26	13.35	*11.67*	K_1	9.79	11.28	11.85
	N_2	12.00	11.08	12.62	11.45	11.75	12.51	*11.90*	K_2	11.83	12.51	12.39
	Mean	*10.32*	*11.41*	*11.78*	*10.30*	*10.97*	*12.24*	*11.17*				
12	N_0	10.85	11.44	11.11	10.61	11.70	11.09	*11.13*	K_0	12.41	12.03	12.25
	N_1	12.13	12.47	13.04	12.07	12.44	13.14	*12.55*	K_1	11.86	11.89	13.04
	N_2	13.98	12.86	14.13	14.01	12.65	14.31	*13.66*	K_2	12.70	12.84	12.99
	Mean	*12.32*	*12.26*	*12.76*	*12.23*	*12.26*	*12.85*	*12.45*				
13	N_0	17.47	17.83	16.91	17.11	17.80	17.31	*17.41*	K_0	16.53	18.04	17.22
	N_1	16.23	17.69	17.78	16.63	17.49	17.58	*17.23*	K_1	17.13	17.66	18.19
	N_2	17.48	18.17	17.75	18.04	17.69	17.67	*17.80*	K_2	17.52	17.99	17.03
	Mean	*17.06*	*17.90*	*17.48*	*17.26*	*17.66*	*17.52*	*17.48*				
14	N_0	3.08	6.40	8.86	4.74	7.38	6.23	*6.11*	K_0	2.93	6.62	7.23
	N_1	3.13	8.18	8.20	6.29	5.90	7.32	*6.50*	K_1	3.45	7.47	7.38
	N_2	4.18	9.00	7.57	5.74	5.03	9.98	*6.92*	K_2	4.02	9.50	10.02
	Mean	*3.46*	*7.86*	*8.21*	*5.59*	*6.10*	*7.84*	*6.51*				
15	N_0	13.30	12.04	12.94	12.18	12.92	13.17	*12.76*	K_0	14.63	13.43	13.31
	N_1	13.66	14.28	13.49	14.79	13.09	13.55	*13.81*	K_1	13.84	13.55	13.58
	N_2	14.86	15.54	14.41	14.40	14.95	15.46	*14.94*	K_2	13.36	14.87	13.95
	Mean	*13.94*	*13.95*	*13.61*	*13.79*	*13.66*	*14.06*	*13.84*				
16	N_0	11.98	11.44	12.47	11.92	11.83	12.13	*11.96*	K_0	12.01	12.36	12.10
	N_1	12.58	12.27	12.13	12.14	11.98	12.87	*12.33*	K_1	13.23	11.40	12.53
	N_2	14.03	13.39	12.75	12.41	13.34	14.43	*13.39*	K_2	13.35	13.35	12.72
	Mean	*12.86*	*12.37*	*12.45*	*12.16*	*12.38*	*13.14*	*12.56*				
17	N_0	9.43	8.70	10.16	9.28	8.97	10.05	*9.43*	K_0	9.79	10.86	10.69
	N_1	9.20	12.03	10.65	10.16	11.39	10.33	*10.63*	K_1	9.81	11.61	11.13
	N_2	11.42	12.28	12.41	11.90	12.19	12.03	*12.04*	K_2	10.46	10.55	11.40
	Mean	*10.02*	*11.01*	*11.07*	*10.45*	*10.85*	*10.80*	*10.70*				
18	N_0	12.26	12.26	12.98	11.96	12.48	13.06	*12.50*	K_0	12.51	13.76	14.00
	N_1	12.99	14.02	13.96	13.29	13.94	13.75	*13.66*	K_1	13.86	13.41	13.71
	N_2	15.03	15.14	14.40	15.01	14.56	15.00	*14.86*	K_2	13.92	14.27	13.62
	Mean	*13.43*	*13.81*	*13.78*	*13.42*	*13.66*	*13.94*	*13.67*				
19	N_0	6.24	7.88	8.19	7.25	8.24	6.81	*7.43*	K_0	6.20	7.33	6.76
	N_1	5.98	7.75	7.03	6.70	7.44	6.62	*6.92*	K_1	6.48	7.76	8.38
	N_2	6.29	7.27	7.59	6.35	6.93	7.87	*7.05*	K_2	5.82	7.82	7.66
	Mean	*6.17*	*7.63*	*7.60*	*6.76*	*7.54*	*7.10*	*7.13*				
20	N_0	9.72	12.08	11.10	11.20	11.89	9.81	*10.97*	K_0	11.25	10.69	10.89
	N_1	12.18	12.52	11.86	10.66	11.52	14.37	*12.19*	K_1	11.78	11.67	11.54
	N_2	11.76	10.61	12.18	10.98	11.57	12.00	*11.52*	K_2	10.63	12.85	12.70
	Mean	*11.22*	*11.74*	*11.71*	*10.95*	*11.66*	*12.06*	*11.56*				

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Roots (washed) : tons per acre

Centre		P_0	P_1	P_2	K_0	K_1	K_2	*Mean*		P_0	P_1	P_2
21	N_0	10.48	10.80	10.47	10.41	10.89	10.45	*10.58*	K_0	11.77	12.06	11.29
	N_1	12.16	11.57	11.74	11.99	11.87	11.60	*11.82*	K_1	12.07	11.95	11.57
	N_2	12.01	13.01	13.28	12.71	12.83	12.76	*12.77*	K_2	10.80	11.37	12.64
	Mean	*11.55*	*11.79*	*11.83*	*11.70*	*11.86*	*11.60*	*11.72*				
22	N_0	9.29	9.11	9.45	8.96	9.36	9.53	*9.28*	K_0	8.95	9.11	9.89
	N_1	8.70	9.84	9.64	9.14	10.13	8.90	*9.39*	K_1	9.87	10.22	9.85
	N_2	10.27	9.87	10.47	9.84	10.44	10.32	*10.20*	K_2	9.44	9.49	9.82
	Mean	*9.42*	*9.61*	*9.85*	*9.32*	*9.98*	*9.58*	*9.63*				
23	N_0	11.30	11.67	10.52	10.85	11.30	11.34	*11.16*	K_0	13.63	13.41	12.42
	N_1	12.64	13.94	14.23	13.85	13.75	13.21	*13.60*	K_1	13.19	13.61	13.63
	N_2	15.69	14.93	14.63	14.76	15.36	15.13	*15.08*	K_2	12.82	13.52	13.33
	Mean	*13.21*	*13.51*	*13.13*	*13.15*	*13.47*	*13.22*	*13.28*				
24	N_0	13.79	13.60	13.73	13.31	14.13	13.69	*13.71*	K_0	13.61	14.32	14.91
	N_1	14.46	14.52	15.46	14.32	15.33	14.79	*14.81*	K_1	14.43	14.95	15.10
	N_2	14.67	15.35	15.43	15.22	15.01	15.22	*15.15*	K_2	14.89	14.21	14.61
	Mean	*14.31*	*14.49*	*14.87*	*14.28*	*14.83*	*14.57*	*14.56*				
25	N_0	8.07	8.48	8.49	9.12	8.00	7.92	*8.35*	K_0	9.20	10.29	10.61
	N_1	9.31	10.10	10.14	9.98	9.80	9.77	*9.85*	K_1	9.25	9.95	9.87
	N_2	10.64	11.17	11.59	11.00	11.26	11.14	*11.13*	K_2	9.57	9.52	9.74
	Mean	*9.34*	*9.92*	*10.07*	*10.03*	*9.69*	*9.61*	*9.78*				
26	N_0	10.61	9.68	10.12	9.23	10.56	10.63	*10.14*	K_0	11.33	10.75	12.13
	N_1	11.86	10.70	12.49	11.99	11.58	11.48	*11.68*	K_1	11.78	10.86	12.10
	N_2	11.95	12.75	13.60	12.99	12.60	12.71	*12.77*	K_2	11.31	11.51	11.99
	Mean	*11.47*	*11.04*	*12.07*	*11.40*	*11.58*	*11.61*	*11.53*				
27	N_0	10.30	11.33	11.24	11.23	11.06	10.59	*10.96*	K_0	11.08	11.80	12.55
	N_1	12.01	12.95	12.22	11.94	12.84	12.41	*12.40*	K_1	11.23	13.29	11.10
	N_2	11.89	12.88	13.22	12.26	11.72	14.02	*12.67*	K_2	11.90	12.08	13.04
	Mean	*11.40*	*12.39*	*12.23*	*11.81*	*11.87*	*12.34*	*12.01*				
28	N_0	10.09	9.78	9.47	9.08	10.55	9.71	*9.78*	K_0	10.10	9.77	9.44
	N_1	10.51	9.95	9.92	9.82	10.53	10.01	*10.13*	K_1	10.49	10.79	9.81
	N_2	10.45	10.60	9.65	10.41	10.01	10.28	*10.23*	K_2	10.46	9.76	9.78
	Mean	*10.35*	*10.11*	*9.68*	*9.77*	*10.36*	*10.00*	*10.05*				
29	N_0	11.14	11.31	11.34	11.19	11.20	11.40	*11.26*	K_0	10.96	11.70	11.11
	N_1	11.69	12.23	12.11	11.99	12.24	11.80	*12.01*	K_1	11.19	11.64	11.86
	N_2	10.78	10.70	11.19	10.59	11.25	10.83	*10.89*	K_2	11.47	10.90	11.67
	Mean	*11.21*	*11.41*	*11.55*	*11.26*	*11.56*	*11.35*	*11.39*				
30	N_0	11.42	13.10	11.15	12.00	10.63	13.04	*11.89*	K_0	10.65	11.48	11.77
	N_1	11.07	11.76	11.75	11.62	10.03	12.94	*11.53*	K_1	9.18	11.37	10.44
	N_2	10.38	12.06	11.60	10.28	10.33	13.44	*11.35*	K_2	13.05	14.07	12.30
	Mean	*10.96*	*12.31*	*11.50*	*11.30*	*10.33*	*13.14*	*11.59*				

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Tops : tons per acre

Centre		P_0	P_1	P_2	K_0	K_1	K_2	*Mean*		P_0	P_1	P_2
1	N_0	10.27	9.84	9.30	9.67	10.13	9.61	*9.80*	K_0	12.40	11.13	10.85
	N_1	13.99	12.69	11.51	11.94	12.89	13.35	*12.73*	K_1	13.55	12.46	11.19
	N_2	13.12	13.98	12.77	12.77	14.18	12.92	*13.29*	K_2	11.42	12.92	11.54
	Mean	*12.46*	*12.17*	*11.19*	*11.46*	*12.40*	*11.96*	*11.94*	±0.849. *Means :*		±0.490	
2	N_0	4.32	4.16	4.37	3.94	4.57	4.33	*4.28*	K_0	5.09	4.96	4.81
	N_1	5.23	5.34	5.39	5.67	4.80	5.49	*5.32*	K_1	4.86	4.94	4.83
	N_2	5.60	5.94	5.43	5.24	5.26	6.47	*5.66*	K_2	5.20	5.54	5.54
	Mean	*5.05*	*5.15*	*5.06*	*4.95*	*4.88*	*5.43*	*5.09*	±0.367. *Means :*		±0.212	
3	N_0	8.45	8.87	9.09	8.47	8.80	9.14	*8.80*	K_0	9.08	10.59	9.84
	N_1	9.79	9.47	9.84	9.80	9.10	10.21	*9.70*	K_1	9.03	10.23	10.62
	N_2	10.98	12.27	12.17	11.24	11.97	12.20	*11.80*	K_2	11.11	9.80	10.64
	Mean	*9.74*	*10.20*	*10.37*	*9.84*	*9.96*	*10.52*	*10.10*	±0.624. *Means :*		±0.360	
5	N_0	4.93	5.28	5.17	5.06	5.14	5.17	*5.12*	K_0	5.30	5.63	6.67
	N_1	4.61	5.49	6.53	5.87	4.98	5.79	*5.55*	K_1	5.25	5.25	5.94
	N_2	6.94	6.03	6.83	6.67	6.32	6.80	*6.60*	K_2	5.92	5.92	5.92
	Mean	*5.49*	*5.60*	*6.18*	*5.87*	*5.48*	*5.92*	*5.76*	±0.508. *Means :*		±0.293	
7	N_0	6.82	6.67	6.03	6.03	6.93	6.56	*6.51*	K_0	8.10	7.49	8.73
	N_1	8.45	8.04	7.88	8.43	7.97	7.97	*8.12*	K_1	8.67	7.55	8.34
	N_2	9.07	9.53	10.61	9.86	9.66	9.68	*9.73*	K_2	7.57	9.20	7.44
	Mean	*8.11*	*8.08*	*8.17*	*8.11*	*8.19*	*8.07*	*8.12*	±0.652. *Means :*		±0.376	
8	N_0	6.36	6.39	6.63	6.75	6.28	6.34	*6.46*	K_0	6.92	6.73	8.39
	N_1	6.99	6.47	7.57	6.35	6.34	8.33	*7.01*	K_1	6.71	6.85	7.21
	N_2	7.75	10.26	9.81	8.94	8.14	10.74	*9.27*	K_2	7.47	9.54	8.41
	Mean	*7.03*	*7.71*	*8.00*	*7.35*	*6.92*	*8.47*	*7.58*	±0.797. *Means :*		±0.460	
9	N_0	6.41	7.18	6.31	6.98	6.71	6.21	*6.63*	K_0	7.39	7.16	7.10
	N_1	7.24	6.58	7.90	6.95	7.08	7.70	*7.24*	K_1	7.35	6.75	7.67
	N_2	8.35	7.64	8.21	7.72	7.98	8.50	*8.07*	K_2	7.26	7.50	7.65
	Mean	*7.33*	*7.13*	*7.47*	*7.22*	*7.26*	*7.47*	*7.31*	±0.398. *Means :*		±0.230	
11	N_0	5.57	6.32	6.38	5.92	6.16	6.19	*6.09*	K_0	7.15	7.46	8.17
	N_1	6.84	7.97	7.79	7.61	7.41	7.58	*7.53*	K_1	6.88	7.16	8.71
	N_2	8.73	8.13	10.77	9.25	9.18	9.19	*9.21*	K_2	7.10	7.80	8.06
	Mean	*7.05*	*7.47*	*8.31*	*7.59*	*7.58*	*7.65*	*7.61*	±0.539. *Means :*		±0.311	
12	N_0	6.67	7.46	7.35	6.94	7.89	6.66	*7.16*	K_0	8.07	8.03	8.18
	N_1	8.24	7.41	8.46	7.20	8.85	8.05	*8.03*	K_1	8.63	7.40	9.75
	N_2	8.97	8.94	9.53	10.14	9.05	8.25	*9.15*	K_2	7.17	8.37	7.41
	Mean	*7.96*	*7.93*	*8.45*	*8.09*	*8.59*	*7.65*	*8.11*	±0.710. *Means :*		±0.410	
13	N_0	17.73	19.99	19.71	18.48	18.28	20.67	*19.14*	K_0	20.06	19.23	22.25
	N_1	20.67	21.08	19.64	21.01	21.08	19.30	*20.46*	K_1	18.28	21.63	22.25
	N_2	21.29	21.97	25.60	22.04	22.79	24.03	*22.95*	K_2	21.36	22.18	20.47
	Mean	*19.90*	*21.01*	*21.66*	*20.51*	*20.72*	*21.34*	*20.86*	±1.43. *Means :*		±0.826	

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Tops: tons per acre

Centre		P_0	P_1	P_2	K_0	K_1	K_2	*Mean*
14	N_0	5.41	8.81	11.21	7.58	9.39	8.46	*8.48*
	N_1	5.82	12.26	12.00	11.38	8.11	10.59	*10.03*
	N_2	7.67	13.05	11.41	11.09	8.19	12.85	*10.71*
	Mean	*6.30*	*11.38*	*11.54*	*10.02*	*8.56*	*10.63*	*9.74*
15	N_0	6.32	5.81	6.08	5.54	6.16	6.51	*6.07*
	N_1	6.99	7.29	7.70	8.21	7.36	6.40	*7.33*
	N_2	8.97	8.81	8.05	8.13	8.67	9.02	*8.61*
	Mean	*7.43*	*7.30*	*7.28*	*7.30*	*7.40*	*7.31*	*7.34*
16	N_0	7.13	7.29	6.44	6.81	7.08	6.96	*6.95*
	N_1	7.92	9.33	8.92	8.50	9.29	8.38	*8.72*
	N_2	9.63	9.00	9.98	9.90	9.56	9.15	*9.54*
	Mean	*8.22*	*8.54*	*8.45*	*8.40*	*8.64*	*8.16*	*8.40*
17	N_0	5.10	4.88	5.63	4.73	5.18	5.70	*5.20*
	N_1	5.81	7.18	7.10	6.40	6.97	6.72	*6.70*
	N_2	7.16	7.81	7.44	7.24	7.50	7.66	*7.47*
	Mean	*6.02*	*6.63*	*6.72*	*6.12*	*6.55*	*6.70*	*6.46*
18	N_0	5.74	5.67	6.02	5.82	5.57	6.04	*5.81*
	N_1	6.88	7.28	7.41	7.42	7.02	7.13	*7.19*
	N_2	8.13	7.98	8.09	8.85	8.35	7.00	*8.07*
	Mean	*6.92*	*6.98*	*7.17*	*7.36*	*6.98*	*6.72*	*7.02*
20	N_0	8.61	10.42	10.73	9.36	9.05	11.36	*9.92*
	N_1	11.92	12.90	13.47	11.87	12.22	14.21	*12.77*
	N_2	13.92	13.26	13.73	13.03	12.99	14.90	*13.64*
	Mean	*11.48*	*12.20*	*12.65*	*11.42*	*11.42*	*13.49*	*12.11*
21	N_0	7.17	7.04	6.65	6.05	7.61	7.19	*6.95*
	N_1	9.10	8.94	9.36	9.14	9.15	9.10	*9.13*
	N_2	11.04	10.57	10.82	10.33	10.73	11.38	*10.81*
	Mean	*9.10*	*8.85*	*8.94*	*8.50*	*9.16*	*9.22*	*8.96*
22	N_0	9.75	8.54	8.78	8.86	8.69	9.52	*9.02*
	N_1	9.55	11.16	10.73	9.78	11.88	9.78	*10.48*
	N_2	11.22	11.36	12.29	11.54	11.34	12.00	*11.63*
	Mean	*10.17*	*10.35*	*10.60*	*10.06*	*10.64*	*10.43*	*10.38*
23	N_0	5.14	5.19	4.17	4.46	4.90	5.14	*4.83*
	N_1	6.66	8.12	8.21	7.28	7.94	7.77	*7.66*
	N_2	11.58	10.96	10.48	11.08	10.12	11.81	*11.00*
	Mean	*7.79*	*8.09*	*7.62*	*7.61*	*7.65*	*8.24*	*7.83*
24	N_0	6.77	7.90	6.41	6.51	7.41	7.16	*7.03*
	N_1	8.03	7.45	8.32	7.64	7.96	8.19	*7.93*
	N_2	8.70	8.93	8.93	8.61	9.06	8.90	*8.86*
	Mean	*7.83*	*8.09*	*7.89*	*7.59*	*8.14*	*8.08*	*7.94*

	P_0	P_1	P_2
K_0	6.03	10.95	13.08
K_1	5.97	10.71	9.01
K_2	6.90	12.47	12.52

± 1.46. *Means :* ± 0.843

	P_0	P_1	P_2
K_0	7.88	7.13	6.88
K_1	7.65	6.96	7.58
K_2	6.75	7.82	7.36

± 0.641. *Means :* ± 0.370

	P_0	P_1	P_2
K_0	7.92	8.31	8.98
K_1	8.58	8.98	8.38
K_2	8.17	8.33	7.98

± 0.419. *Means :* ± 0.242

	P_0	P_1	P_2
K_0	5.96	6.38	6.03
K_1	5.87	6.65	7.13
K_2	6.23	6.85	7.01

± 0.373. *Means :* ± 0.215

	P_0	P_1	P_2
K_0	6.71	8.12	7.26
K_1	7.02	6.88	7.04
K_2	7.02	5.93	7.22

± 0.501. *Means :* ± 0.289

	P_0	P_1	P_2
K_0	11.67	11.34	11.24
K_1	10.21	11.35	12.70
K_2	12.57	13.90	14.00

± 0.566. *Means :* ± 0.327

	P_0	P_1	P_2
K_0	9.27	8.42	7.82
K_1	10.00	8.63	8.85
K_2	8.02	9.49	10.15

± 0.491. *Means :* ± 0.283

	P_0	P_1	P_2
K_0	9.55	9.98	10.64
K_1	10.64	10.70	10.56
K_2	10.33	10.38	10.59

± 0.751. *Means :* ± 0.434

	P_0	P_1	P_2
K_0	7.79	7.97	7.06
K_1	6.99	8.21	7.75
K_2	8.59	8.08	8.04

± 0.612. *Means :* ± 0.353

	P_0	P_1	P_2
K_0	7.70	7.73	7.32
K_1	7.86	8.32	8.25
K_2	7.93	8.22	8.09

± 0.457. *Means :* ± 0.264

https://doi.org/10.23637/ERADOC-1-69

Tops: tons per acre

Centre		P_0	P_1	P_2	K_0	K_1	K_2	*Mean*		P_0	P_1	P_2
25	N_0	2.89	2.50	3.37	3.18	2.87	2.71	*2.92*	K_0	4.08	3.60	4.50
	N_1	4.26	4.21	3.81	4.08	4.07	4.13	*4.09*	K_1	3.76	4.18	4.05
	N_2	5.15	5.39	4.97	4.92	5.05	5.55	*5.17*	K_2	4.47	4.31	3.60
	Mean	*4.10*	*4.03*	*4.05*	*4.06*	*4.00*	*4.13*	*4.06*	±0.325. *Means :*		±*0.188*	
26	N_0	6.76	6.31	6.15	6.31	5.86	7.04	*6.40*	K_0	8.91	9.15	7.97
	N_1	7.75	7.47	7.62	6.89	7.36	8.60	*7.62*	K_1	7.97	8.54	9.33
	N_2	11.04	13.83	11.78	12.83	12.62	11.20	*12.22*	K_2	8.67	9.91	8.25
	Mean	*8.52*	*9.20*	*8.52*	*8.68*	*8.61*	*8.95*	*8.75*	±0.872. *Means :*		±*0.503*	
27	N_0	8.24	8.41	9.23	8.91	8.58	8.39	*8.63*	K_0	9.91	11.92	11.79
	N_1	11.05	11.87	11.46	11.16	11.48	11.74	*11.46*	K_1	11.05	11.35	10.49
	N_2	13.08	13.78	13.99	13.56	12.84	14.45	*13.62*	K_2	11.40	10.79	12.39
	Mean	*10.79*	*11.35*	*11.56*	*11.21*	*10.96*	*11.53*	*11.23*	±0.612. *Means :*		±*0.353*	
29	N_0	23.24	22.48	22.19	23.50	21.22	23.19	*22.64*	K_0	22.88	24.40	24.97
	N_1	23.74	23.60	23.81	23.34	22.82	24.99	*23.72*	K_1	23.57	22.83	22.70
	N_2	24.87	25.55	27.13	25.41	25.05	27.08	*25.85*	K_2	25.40	24.40	25.47
	Mean	*23.95*	*23.88*	*24.38*	*24.08*	*23.03*	*25.09*	*24.07*	±0.987. *Means :*		±*0.570*	

https://doi.org/10.23637/ERADOC-1-69

Responses to fertilisers

*5 per cent significance. **1 per cent significance.

Station	Mean yield	Linear Response (response to the double dressing) N	P	K	St. error	Curvature (excess of extra response to second dressing over response to first dressing) N	P	K	St. error
TOTAL SUGAR : cwt. per acre									
COARSE SANDS									
1 Allscott I ..	*51.4*	+4.6*	+2.1	+0.2	±1.74	−3.4	−1.1	+2.2	±3.03
2 Bardney II ..	*36.9*	+5.9**	+4.2*	+2.4	±1.72	−6.3	−0.6	−1.8	±2.97
3 Brigg II	*46.4*	+9.1**	+1.0	+0.3	±2.24	−2.3	+0.8	+3.5	±3.87
4 Bury I	*34.1*	+8.4**	+3.7	+8.7**	±1.88	−10.0**	−4.9	−5.7	±3.25
5 Cantley I.. ..	*34.4*	+4.4*	−0.7	+3.2	±1.99	−2.4	−1.3	−5.8	±3.45
6 Tunstall	*25.8*	+7.5**	−0.5	+6.8**	±1.05	−5.1*	+2.3	−3.4	±1.81
7 Wissington II ..	*45.5*	+10.1**	+0.9	+6.6**	±1.73	−6.3	−0.9	+2.4	±3.00
Mean	*39.2*	*+7.1*	*+1.5*	*+4.0*		*−5.1*	*−0.8*	*−1.2*	
FINE SANDS									
8 Brigg I	*49.9*	+7.1**	+1.4	+1.1	±1.07	−3.7	+0.6	−0.3	±1.85
9 Bury II	*37.1*	+4.5*	+0.7	+0.4	±1.71	−0.9	+2.7	+0.6	±2.96
10 Ipswich	*34.8*	+0.9	−1.4	+6.2**	±1.51	+1.1	+1.4	−3.4	±2.62
11 Kidderminster I	*37.6*	+5.1*	+5.0*	+7.9**	±2.31	−5.3	−2.0	+2.5	±3.99
12 King's Lynn II..	*44.6*	+8.8**	+1.9	+2.2	±1.88	−2.0	+1.1	+2.0	±3.25
13 Spalding	*58.3*	−0.5	+0.6	+2.6	±1.63	+0.7	−4.2	−1.2	±2.83
Mean	*43.7*	*+4.3*	*+1.4*	*+3.4*		*−1.7*	*−0.1*	*0.0*	
LIGHT LOAMS									
14 Allscott II ..	*21.4*	+2.3	+16.4**	+8.3*	±3.21	−0.1	−13.8*	+4.5	±5.56
15 Bardney I ..	*49.6*	+6.8**	−1.3	+1.4	±2.18	+0.2	−1.5	+2.0	±3.78
16 Cantley II ..	*43.3*	+3.5*	−1.5	+3.1	±1.50	+1.5	+2.1	+1.3	±2.60
17 King's Lynn I ..	*38.3*	+9.8**	+4.0	+1.0	±2.06	+0.4	−3.8	−1.4	±3.56
18 Newark I ..	*49.7*	+8.3**	+1.0	+2.5	±1.46	+0.5	+0.2	+0.7	±2.52
19 Peterboro' I ..	*29.1*	—0.7	+5.2**	+1.0	±1.70	+2.3	−6.4*	−4.6	±2.94
20 Poppleton I ..	*38.3*	+1.5	+2.0	+4.2	±2.72	−6.3	−0.6	−1.6	±4.71
21 Poppleton II ..	*40.3*	+6.5**	+1.2	−0.6	±1.42	−1.3	+0.2	−0.4	±2.46
22 Selby I	*32.7*	+3.1	+2.4	+1.9	±1.86	+2.7	+2.4	−2.7	±3.22
23 Wissington III..	*47.6*	+12.7**	−0.2	+0.8	±1.49	−3.7	−2.2	−2.8	±2.57
Mean	*39.0*	*+5.4*	*+2.9*	*+2.4*		*−0.4*	*−2.3*	*−0.5*	
HEAVY LOAM									
24 Colwick	*51.9*	+4.5**	+2.3	+0.7	±1.27	−2.3	+1.3	−2.9	±2.19
CLAY LOAMS									
25 Felstead I ..	*38.1*	+10.6**	+2.8*	−1.0	±1.07	−1.2	−1.6	0.0	±1.85
26 Felstead II ..	*41.5*	+9.2**	+1.4	+1.3	±1.80	−3.0	+6.6	−0.3	±3.12
27 Rothamsted I ..	*38.8*	+4.7	+2.2	+2.5	±2.40	−4.3	−4.8	+2.1	±4.16
28 Selby II	*36.8*	+1.8	−2.4	+1.7	±1.24	−2.6	0.0	−2.3	±2.15
Mean	*38.8*	*+6.6*	*+1.0*	*+1.1*		*−2.8*	*0.0*	*−0.1*	
FENS									
29 Ely..	*38.0*	−3.1	+0.9	+0.6	±1.55	−8.1**	+0.3	−3.2	±2.67
30 Peterboro' II ..	*36.4*	−2.2	+1.0	+5.8*	±2.17	+0.4	−7.4	+13.6**	±3.76
Mean	*37.2*	*−2.6*	*+1.0*	*+3.2*		*−3.8*	*−3.6*	*+5.2*	
Mean	*40.3*	*+5.2*	*+1.9*	*+2.8*		*−2.4*	*−1.2*	*−0.2*	

https://doi.org/10.23637/ERADOC-1-69

Station	*Mean yield*	Linear Response (response to the double dressing) N	P	K	Curvature (excess of extra response to second dressing over response to first dressing) N	P	K
	ROOTS (washed) : tons per acre						
COARSE SANDS							
1 Allscott I	*15.88*	+1.64	+0.52	+0.16	−1.12	−0.16	+0.42
2 Bardney II	*10.59*	+2.04	+0.96	+0.38	−1.60	−0.40	−0.46
3 Brigg II	*13.77*	+2.89	+0.16	−0.08	−0.51	0.00	+1.20
4 Bury I	*10.30*	+2.90	+1.10	+2.50	−2.42	−1.34	−1.58
5 Cantley I	*10.21*	+1.59	−0.18	+0.55	−0.73	−0.20	−1.51
6 Tunstall	*7.50*	+2.52	−0.09	+1.49	−1.16	+0.61	−0.65
7 Wissington II	*13.00*	+3.27	+0.26	+1.48	−1.61	−0.12	+0.52
Mean	*11.61*	*+2.41*	*+0.39*	*+0.93*	*−1.31*	*−0.23*	*−0.29*
FINE SANDS							
8 Brigg I	*14.41*	+2.40	+0.56	−0.02	−0.64	+0.40	+0.20
9 Bury II	*10.36*	+1.28	+0.39	−0.17	−0.24	+0.81	+0.33
10 Ipswich	*10.66*	+0.85	−0.28	+1.92	+0.33	+0.50	−1.02
11 Kidderminster I ..	*11.17*	+1.96	+1.46	+1.94	−1.50	−0.72	+0.60
12 King's Lynn II	*12.45*	+2.53	+0.44	+0.62	−0.31	+0.56	+0.56
13 Spalding	*17.48*	+0.39	+0.42	+0.26	+0.75	−1.26	−0.54
Mean	*12.76*	*+1.57*	*+0.50*	*+0.76*	*−0.27*	*+0.05*	*+0.02*
LIGHT LOAMS							
14 Allscott II	*6.51*	+0.81	+4.75	+2.25	+0.03	−4.05	+1.23
15 Bardney I	*13.84*	+2.18	−0.33	+0.27	+0.08	−0.35	+0.53
16 Cantley II	*12.56*	+1.43	−0.41	+0.98	+0.69	+0.57	+0.54
17 King's Lynn I	*10.70*	+2.61	+1.05	+0.35	+0.21	−0.93	−0.45
18 Newark I	*13.67*	+2.36	+0.35	+0.52	+0.04	−0.41	+0.04
19 Peterboro' I	*7.13*	−0.38	+1.43	+0.34	+0.64	−1.49	−1.22
20 Poppleton I	*11.56*	+0.55	+0.49	+1.11	−1.89	−0.55	−0.31
21 Poppleton II	*11.72*	+2.19	+0.28	−0.10	−0.29	−0.20	−0.42
22 Selby I	*9.63*	+0.92	+0.43	+0.26	+0.70	+0.05	−1.06
23 Wissington III	*13.28*	+3.92	−0.08	+0.07	−0.96	−0.68	−0.57
Mean	*11.06*	*+1.66*	*+0.80*	*+0.60*	*−0.08*	*−0.80*	*−0.17*
HEAVY LOAM							
24 Colwick	*14.56*	+1.44	+0.56	+0.29	−0.76	+0.20	−0.81
CLAY LOAMS							
25 Felstead I	*9.78*	+2.78	+0.73	−0.42	−0.22	−0.43	+0.26
26 Felstead II	*11.53*	+2.63	+0.60	+0.21	−0.45	+1.46	−0.15
27 Rothamsted I	*12.01*	+1.71	+0.83	+0.53	−1.17	−1.15	+0.41
28 Selby II	*10.05*	+0.45	−0.67	+0.23	−0.25	−0.19	−0.95
Mean	*10.84*	*+1.89*	*+0.37*	*+0.14*	*−0.52*	*−0.08*	*−0.11*
FENS							
29 Ely	*11.39*	−0.37	+0.34	+0.09	−1.87	−0.06	−0.51
30 Peterboro' II	*11.59*	−0.54	+0.54	+1.84	+0.18	−2.16	+3.78
Mean	*11.49*	*−0.46*	*+0.44*	*+0.96*	*−0.84*	*−1.11*	*+1.64*
Mean	*11.64*	*+1.70*	*+0.55*	*+0.66*	*−0.54*	*−0.39*	*−0.05*

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Station	Mean yield	Linear Response (response to the double dressing) N	P	K	St. error	Curvature (excess of extra response to second dressing over response to first dressing) N	P	K	St. error
			TOPS : tons per acre						
COARSE SANDS									
1 Allscott I ..	*11.94*	+3.49**	−1.27	+0.50	±0.693	−2.37	−0.69	−1.38	±1.20
2 Bardney II ..	*5.09*	+1.38**	+0.01	+0.48	±0.299	−0.70	−0.19	+0.62	±0.519
3 Brigg II	*10.10*	+3.00**	+0.63	+0.68	±0.509	+1.20	−0.29	+0.44	±0.882
5 Cantley I ..	*5.76*	+1.48**	+0.69	+0.05	±0.415	+0.62	+0.47	+0.83	±0.718
7 Wissington II ..	*8.12*	+3.22**	+0.06	−0.04	±0.533	0.00	+0.12	−0.20	±0.922
Mean	*8.20*	*+2.51*	*+0.02*	*+0.33*		*−0.25*	*−0.12*	*+0.06*	
FINE SANDS									
8 Brigg I	*7.58*	+2.81**	+0.97	+1.12	±0.651	+1.71	−0.39	+1.98	±1.13
9 Bury II ..	*7.31*	+1.44**	+0.14	+0.25	±0.325	+0.22	+0.54	+0.17	±0.563
11 Kidderminster I	*7.61*	+3.12**	+1.26*	+0.06	±0.440	+0.24	+0.42	+0.08	±0.762
12 King's Lynn II..	*8.11*	+1.99**	+0.49	−0.44	±0.580	+0.25	+0.55	−1.44	±1.00
13 Spalding ..	*20.86*	+3.81**	+1.76	+0.83	±1.17	+1.17	−0.46	+0.41	±2.02
Mean	*10.29*	*+2.63*	*+0.92*	*+0.36*		*+0.72*	*+0.13*	*+0.24*	
LIGHT LOAMS									
14 Allscott II ..	*9.74*	+2.23	+5.24**	+0.61	±1.19	−0.87	−4.92*	+3.53	±2.06
15 Bardney I ..	*7.34*	+2.54**	−0.15	+0.01	±0.523	+0.02	+0.11	−0.19	±0.906
16 Cantley II ..	*8.40*	+2.59**	+0.23	−0.24	±0.342	−0.95	−0.41	−0.72	±0.592
17 King's Lynn I ..	*6.46*	+2.27**	+0.70*	+0.58	±0.305	−0.73	−0.52	−0.28	±0.527
18 Newark I ..	*7.02*	+2.26**	+0.25	−0.64	±0.409	−0.50	+0.13	+0.12	±0.708
20 Poppleton I ..	*12.11*	+3.72**	+1.17*	+2.07**	±0.462	−1.98*	−0.27	+2.07*	±0.800
21 Poppleton II ..	*8.96*	+3.86**	−0.16	+0.72	±0.401	−0.50	+0.34	−0.60	±0.694
22 Selby I	*10.38*	+2.61**	+0.43	+0.37	±0.613	−0.31	+0.07	−0.79	±1.06
23 Wissington III	*7.83*	+6.17**	−0.17	+0.63	±0.500	+0.51	−0.77	+0.55	±0.865
Mean	*8.69*	*+3.14*	*+0.84*	*+0.46*		*−0.59*	*−0.69*	*+0.41*	
HEAVY LOAM									
24 Colwick ..	*7.94*	+1.83**	+0.06	+0.49	±0.373	+0.03	−0.46	−0.61	±0.646
CLAY LOAMS ..									
25 Felstead I ..	*4.06*	+2.25**	−0.05	+0.07	±0.265	−0.09	+0.09	+0.19	±0.460
26 Felstead II ..	*8.75*	+5.82**	0.00	+0.27	±0.712	+3.38*	−1.36	+0.41	±1.23
27 Rothamsted I ..	*11.23*	+4.99**	+0.77	+0.32	±0.500	−0.67	−0.35	+0.82	±0.865
Mean	*8.01*	*+4.35*	*+0.24*	*+0.22*		*+0.87*	*−0.54*	*+0.47*	
FENS									
29 Ely	*24.07*	+3.21**	+0.43	+1.01	±0.806	+1.05	+0.57	+3.11*	±1.40
Mean	*9.45*	*+3.00*	*+0.56*	*+0.41*		*+0.03*	*−0.32*	*+0.38*	

https://doi.org/10.23637/ERADOC-1-69

Station	Mean	Linear Response (response to the double dressing) N	P	K	Curvature (excess of extra response to second dressing over response to first dressing) N	P	K
		SUGAR PERCENTAGE					
COARSE SANDS							
1 Allscott I	*16.21*	−0.24	+0.15	−0.10	+0.10	−0.19	+0.28
2 Bardney II	*17.44*	−0.52	+0.33	+0.47	−0.28	+0.27	−0.03
3 Brigg II	*16.88*	−0.25	+0.17	+0.20	−0.21	+0.29	−0.18
4 Bury I	*16.52*	−0.52	+0.04	+0.30	−0.78	−0.26	−0.30
5 Cantley I..	*16.82*	−0.50	+0.02	+0.70	+0.08	−0.36	−0.40
6 Tunstall	*17.17*	−0.77	−0.04	+1.10	−0.55	+0.14	−0.88
7 Wissington II	*17.52*	−0.51	−0.06	+0.55	−0.25	−0.22	+0.11
Mean	*16.94*	*−0.47*	*+0.09*	*+0.46*	*−0.27*	*−0.05*	*−0.20*
FINE SANDS							
8 Brigg I	*17.32*	−0.40	−0.17	+0.42	−0.50	−0.33	−0.36
9 Bury II	*17.90*	−0.03	−0.36	+0.51	−0.05	−0.02	−0.23
10 Ipswich	*16.31*	−0.89	−0.22	−0.02	+0.11	−0.22	−0.02
11 Kidderminster I.. ..	*16.84*	−0.69	+0.05	+0.58	−0.07	+0.19	+0.10
12 King's Lynn II	*17.90*	+0.01	+0.14	−0.02	−0.39	−0.42	+0.12
13 Spalding	*16.69*	−0.54	−0.23	+0.49	−0.46	−0.03	+0.21
Mean	*17.16*	*−0.42*	*−0.13*	*+0.33*	*−0.23*	*−0.14*	*−0.03*
LIGHT LOAMS							
14 Allscott II	*16.19*	−0.31	+0.84	+0.68	−0.03	−0.72	+0.28
15 Bardney I	*17.93*	−0.35	−0.05	+0.13	+0.05	−0.13	+0.05
16 Cantley II	*17.24*	−0.59	0.00	−0.06	−0.33	+0.06	−0.22
17 King's Lynn I	*17.89*	+0.21	+0.12	−0.14	−0.15	−0.20	+0.12
18 Newark I	*18.16*	−0.09	−0.09	+0.18	+0.11	+0.63	+0.24
19 Peterboro' I	*20.39*	+0.60	−0.36	−0.20	−0.24	−0.22	+0.08
20 Poppleton I	*16.54*	−0.12	+0.09	+0.19	+0.10	+0.47	−0.31
21 Poppleton II	*17.18*	−0.42	+0.09	−0.11	−0.06	+0.53	+0.39
22 Selby I	*16.96*	−0.12	+0.44	+0.47	+0.12	+1.08	+0.51
23 Wissington III	*17.93*	−0.50	−0.02	+0.19	0.00	+0.16	−0.29
Mean	*17.64*	*−0.17*	*+0.11*	*+0.13*	*−0.04*	*+0.17*	*+0.08*
HEAVY LOAM							
24 Colwick	*17.84*	−0.24	+0.11	−0.12	+0.18	+0.17	−0.06
CLAY LOAMS							
25 Felstead I	*19.51*	−0.14	−0.03	+0.30	−0.24	+0.03	−0.50
26 Felstead II	*18.00*	−0.02	−0.30	+0.31	−0.54	+0.56	+0.15
27 Rothamsted I	*16.13*	−0.37	−0.17	+0.39	−0.27	−0.55	+0.33
28 Selby II	*18.32*	+0.04	−0.02	+0.42	−0.90	+0.24	+0.42
Mean	*17.99*	*−0.12*	*−0.13*	*+0.36*	*−0.49*	*+0.07*	*+0.10*
FENS							
29 Ely	*16.62*	−0.84	−0.12	+0.18	−0.76	+0.18	−0.70
30 Peterboro' II	*15.69*	−0.27	−0.32	+0.01	−0.17	−0.04	+0.61
Mean	*16.16*	*−0.56*	*−0.22*	*+0.10*	*−0.46*	*+0.07*	*−0.04*
Mean	*17.33*	*−0.31*	*0.00*	*+0.27*	*−0.21*	*+0.04*	*−0.02*

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Station	Mean	Linear Response (response to the double dressing) N	P	K	Curvature (excess of extra response to second dressing over response to first dressing) N	P	K
	PLANT NUMBER : thousands per acre						
COARSE SANDS							
1 Allscott I	*23.0*	+1.1	+1.0	+1.1	−3.1	+0.8	+0.5
2 Bardney II	*30.3*	+1.3	+0.7	−0.1	−2.3	−1.1	−1.7
3 Brigg II	*22.3*	+0.9	+0.1	+0.3	−0.3	+0.9	−0.5
4 Bury I	*27.8*	+3.3	−0.2	+4.1	−5.9	−3.2	−3.5
5 Cantley I	*33.8*	+1.2	−0.5	+0.8	−0.6	+1.1	+2.2
6 Tunstall	*56.7*	+2.1	+1.2	+7.0	−12.5	−4.8	−4.8
7 Wissington II	*26.1*	+1.1	−1.3	+1.7	−1.1	+2.1	−0.9
Mean	*31.4*	*+1.6*	*+0.1*	*+2.1*	*−3.7*	*−0.6*	*−1.2*
FINE SANDS							
8 Brigg I	*24.0*	−1.5	+2.7	−0.2	+3.1	+2.5	+2.2
9 Bury II	*22.8*	0.0	+1.3	+0.9	+1.2	+0.9	−3.3
10 Ipswich	*30.4*	−1.0	+0.4	−0.1	+2.2	+0.4	−2.3
11 Kidderminster I	*25.7*	−1.6	−0.2	+0.6	+1.2	+0.2	−2.8
12 King's Lynn II	*27.8*	−0.2	−0.3	−0.3	+0.2	+0.5	−0.9
13 Spalding	*38.4*	−0.5	−0.9	−1.4	+0.7	+0.1	+3.4
Mean	*28.2*	*−0.8*	*+0.5*	*−0.1*	*+1.4*	*+0.8*	*−0.6*
LIGHT LOAMS							
14 Allscott II	*18.8*	+0.6	+9.1	+0.1	+1.2	−10.5	+2.7
15 Bardney I	*30.5*	+0.3	−2.5	+1.1	+1.7	+1.7	+2.1
16 Cantley II	*21.6*	−0.3	−0.9	−0.9	−0.3	+0.7	+0.7
17 King's Lynn I	*27.4*	+1.2	+1.0	+2.2	0.0	+0.6	+0.6
18 Newark I	*31.0*	+1.1	−1.2	+0.5	+3.3	+1.2	+0.3
19 Peterboro' I	*22.9*	−1.0	+0.5	−0.7	+1.2	−2.9	−1.9
20 Poppleton I	*26.5*	−0.3	+1.1	−0.2	−1.5	−4.3	−3.0
21 Poppleton II	*24.1*	−0.2	−0.7	+0.1	−0.4	−0.3	+0.1
22 Selby I	*26.6*	+0.2	+0.8	+1.2	−0.6	−0.4	+1.0
23 Wissington III	*31.0*	−0.5	+0.3	+0.3	−0.1	−0.1	−0.1
Mean	*26.0*	+0.1	+0.8	+0.4	+0.4	−1.4	+0.2
HEAVY LOAM							
24 Colwick	*32.8*	−0.6	−1.6	−1.0	−1.0	−0.4	+1.4
CLAY LOAMS							
25 Felstead I	*23.8*	+1.2	0.0	+1.4	−0.6	0.0	+1.8
26 Felstead II	*25.7*	−1.8	−0.9	−0.1	+1.2	−0.9	−0.3
27 Rothamsted I	*31.3*	+0.9	+0.9	+0.2	+2.5	−1.7	+2.8
28 Selby II	*27.2*	+0.2	−2.8	−1.3	+0.6	−2.4	−4.3
Mean	*27.0*	*+0.1*	*−0.7*	*0.0*	*+0.9*	*−1.2*	*0.0*
FENS							
29 Ely	*33.6*	+0.1	+0.8	−0.5	+0.9	+0.2	+0.3
30 Peterboro' II	*24.7*	+0.8	+2.4	+3.4	−1.2	−1.2	+3.0
Mean	*29.2*	*+0.4*	*+1.6*	*+1.4*	*−0.2*	*−0.5*	*+1.6*
Mean	*28.3*	*+0.3*	*+0.3*	*+0.7*	*−0.3*	*−0.7*	*−0.2*

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Station	Mean	Linear Response (response to the double dressing) N	P	K	Curvature (excess of extra response to second dressing over response to first dressing) N	P	K
		PERCENTAGE PURITY					
COARSE SANDS							
2 Bardney II	*87.7*	+0.4	+0.9	+1.6	+2.2	−2.9	0.0
4 Bury I	*91.2*	+0.5	0.0	0.0	−0.3	−0.8	+0.6
5 Cantley I	*91.0*	−0.8	−0.2	−0.3	−0.6	+0.6	−2.9
7 Wissington II	*90.9*	−0.4	+0.1	+0.1	0.0	+0.3	+0.5
Mean	*90.2*	*−0.1*	*+0.2*	*+0.4*	*+0.3*	*−0.7*	*−0.4*
FINE SANDS							
9 Bury II	*88.9*	+0.4	−0.8	+0.6	+0.8	−1.0	+0.2
11 Kidderminster I	*89.6*	−0.6	+0.3	+0.6	−1.0	+0.3	+0.6
12 King's Lynn II	*91.3*	−0.4	−0.1	+0.1	+0.6	+0.1	+0.1
13 Spalding	*87.4*	−0.8	−0.4	+1.2	−0.4	+1.4	+1.0
Mean	*89.3*	*−0.4*	*−0.2*	*+0.6*	*0.0*	*+0.2*	*+0.5*
LIGHT LOAMS							
15 Bardney I	*86.8*	−1.0	−0.6	+0.1	+3.0	0.0	+1.5
16 Cantley II	*90.5*	+0.1	+1.9	−0.8	+0.7	−0.1	+0.4
17 King's Lynn I	*90.8*	0.0	0.0	−0.1	−0.2	−0.2	+0.3
18 Newark I	*89.9*	+0.5	−0.1	0.0	+0.1	−0.3	+1.0
20 Poppleton I	*89.3*	−0.2	−0.4	+1.9	0.0	+0.8	+0.5
21 Poppleton II	*90.0*	+0.1	−0.1	0.0	−0.5	+1.1	+1.6
22 Selby I	*86.1*	+0.9	+1.0	+0.6	+0.7	+0.4	0.0
23 Wissington III	*90.2*	−0.9	+0.3	+0.1	+0.1	+0.7	−0.5
Mean	*89.2*	*−0.1*	*+0.2*	*+0.2*	*+0.5*	*+0.3*	*+0.6*
HEAVY LOAM							
24 Colwick	*89.4*	0.0	−0.4	+0.3	+1.2	0.0	+1.5
CLAY LOAMS							
25 Felstead I	*87.7*	+0.1	+0.4	−0.1	−0.3	+0.2	+0.5
26 Felstead II	*88.2*	+0.1	0.0	0.0	−0.5	+1.0	−0.2
28 Selby II	*86.4*	+1.9	+0.6	+1.6	−1.1	0.0	+1.6
Mean	*87.4*	*+0.7*	*+0.3*	*+0.5*	*−0.6*	*+0.4*	*+0.6*
FENS							
29 Ely	*92.0*	−0.2	+0.1	+0.3	+0.6	+0.3	+0.9
Mean	*89.3*	*0.0*	*+0.1*	*+0.4*	*+0.2*	*+0.1*	*+0.4*

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Station	Interactions: Interaction of linear responses (one half of the extra response to one fertiliser through the addition of a second) N×P	N×K	P×K	St. error	Interaction of linear responses (one half of the extra response to one fertiliser through the addition of a second) N×P	N×K	P×K
	TOTAL SUGAR: cwt. per acre				ROOTS (washed): tons per acre		
COARSE SANDS							
1 Allscott I	+2.8	+0.9	+1.5	±2.14	+0.94	+0.32	+0.50
2 Bardney II	+1.2	+3.6	+1.5	±2.10	+0.18	+1.05	+0.54
3 Brigg II	+3.4	−3.5	−4.4	±2.74	+1.04	−1.10	−1.06
4 Bury I	+3.0	+2.4	−2.0	±2.30	+1.00	+0.80	−0.63
5 Cantley I	−2.2	+1.2	−4.4	±2.44	−0.47	+0.32	−1.32
6 Tunstall	−3.5*	+1.0	−0.2	±1.28	−0.98	+0.18	+0.04
7 Wissington II	+1.0	−0.8	+1.7	±2.12	+0.36	−0.29	+0.32
Mean	*+0.8*	*+0.7*	*−0.9*		*+0.30*	*+0.18*	*−0.23*
FINE SANDS							
8 Brigg I	+0.8	+1.1	+0.2	±1.31	+0.39	+0.33	−0.06
9 Bury II	+0.7	+4.5*	+2.8	±2.09	+0.14	+0.98	+0.80
10 Ipswich	+2.7	−3.0	−2.8	±1.85	+0.96	−0.68	−0.66
11 Kidderminster I	−0.7	−1.8	−1.9	±2.82	0.00	−0.40	−0.60
12 King's Lynn II	+0.2	+0.2	+1.4	±2.30	−0.06	−0.09	+0.22
13 Spalding	+2.2	−0.9	−3.4	±2.00	+0.42	−0.28	−0.59
Mean	*+1.0*	*0.0*	*−0.6*		*+0.31*	*−0.02*	*−0.15*
LIGHT LOAMS							
14 Allscott II	−3.8	+4.7	+3.0	±3.93	−1.20	+1.38	+0.85
15 Bardney I	+0.5	+0.2	+3.8	±2.67	−0.04	+0.04	+0.96
16 Cantley II	−4.6*	+2.9	−2.2	±1.84	−0.88	+0.90	−0.36
17 King's Lynn I	+0.4	−1.0	−0.2	±2.52	+0.13	−0.32	+0.02
18 Newark I	−2.7	−1.3	−3.1	±1.78	−0.68	−0.56	−0.90
19 Peterboro' I	−1.0	+4.2	+2.4	±2.08	−0.32	+0.98	+0.64
20 Poppleton I	−2.1	+4.5	+3.9	±3.33	−0.48	+1.20	+1.22
21 Poppleton II	+2.7	+0.8	+3.1	±1.74	+0.64	0.00	+1.16
22 Selby I	+1.4	+0.8	+1.2	±2.28	+0.02	−0.04	−0.28
23 Wissington III	+0.2	0.0	+2.8	±1.82	−0.14	−0.06	+0.86
Mean	*−0.9*	*+1.6*	*+1.5*		*−0.30*	*+0.35*	*+0.42*
HEAVY LOAM							
24 Colwick	+1.6	−0.5	−2.5	±1.55	+0.41	−0.19	−0.79
CLAY LOAMS							
25 Felstead I	+1.4	+2.9*	−2.6	±1.31	+0.26	+0.67	−0.62
26 Felstead II	+3.2	−2.7	−1.3	±2.21	+1.07	−0.84	−0.06
27 Rothamsted I	+0.4	+4.2	−1.0	±2.94	+0.20	+1.20	−0.16
28 Selby II	−1.0	−1.7	−0.1	±1.52	−0.09	−0.38	−0.01
Mean	*+1.0*	*+0.7*	*−1.2*		*+0.36*	*+0.16*	*−0.21*
FENS							
29 Ely	+0.6	−0.4	+0.8	±1.89	+0.10	+0.02	+0.02
30 Peterboro' II	+3.5	+3.9	−2.4	±2.66	+0.74	+1.06	−0.94
Mean	*+2.0*	*+1.8*	*−0.8*		*+0.42*	*+0.54*	*−0.46*
Mean	*+0.4*	*+0.9*	*−0.1*		*+0.12*	*+0.21*	*−0.03*

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Station	Interaction of linear responses (one half of the extra response to one fertiliser through the addition of a second) N×P	N×K	P×K	St. error	Interaction of linear responses (one half of the extra response to one fertiliser through the addition of a second) N×P	N×K	P×K
	TOPS : tons per acre				SUGAR PERCENTAGE		
COARSE SANDS							
1 Allscott I	+0.31	+0.10	+0.84	±0.849	−0.08	−0.05	−0.04
2 Bardney II	−0.11	+0.42	+0.31	±0.367	+0.27	0.00	−0.22
3 Brigg II	+0.28	+0.14	−0.62	±0.624	−0.05	+0.09	−0.28
4 Bury I	—	—	—	—	−0.14	+0.04	0.00
5 Cantley I	−0.18	+0.01	−0.68	±0.508	−0.33	+0.04	−0.01
6 Tunstall	—	—	—	—	−0.12	+0.17	−0.19
7 Wissington II	+1.16	−0.36	−0.38	±0.652	−0.13	+0.04	+0.16
Mean	*+0.29*	*+0.06*	*−0.11*		*−0.08*	*+0.05*	*−0.08*
FINE SANDS							
8 Brigg I	+0.90	+1.10	−0.26	±0.797	−0.16	−0.08	+0.09
9 Bury II	−0.02	+0.78	+0.34	±0.398	+0.13	+0.42	−0.06
10 Ipswich	—	—	—	—	−0.18	−0.30	−0.28
11 Kidderminster I ..	+0.62	−0.16	−0.03	±0.539	−0.26	−0.28	−0.02
12 King's Lynn II	−0.06	−0.80	+0.06	±0.710	+0.12	+0.18	+0.22
13 Spalding	+1.16	−0.10	−1.54	±1.43	+0.26	−0.05	−0.42
Mean	*+0.52*	*+0.16*	*−0.29*		*−0.02*	*−0.02*	*−0.08*
LIGHT LOAMS							
14 Allscott II	−1.03	+0.44	−0.72	±1.46	+0.02	−0.12	−0.27
15 Bardney I	−0.34	−0.04	+0.80	±0.641	+0.25	+0.01	+0.12
16 Cantley II	+0.52	−0.45	−0.62	±0.419	−0.60	−0.06	−0.36
17 King's Lynn I	−0.12	−0.28	+0.36	±0.373	−0.08	+0.07	−0.10
18 Newark I	−0.16	−1.04	−0.18	±0.501	−0.06	+0.28	+0.06
19 Peterboro' I	—	—	—	—	+0.14	+0.11	−0.12
20 Poppleton I	−1.16	−0.06	+0.93	±0.566	−0.20	+0.22	−0.12
21 Poppleton II	+0.15	−0.04	+1.79**	±0.491	+0.17	+0.33	−0.36
22 Selby I	+1.02	−0.10	−0.42	±0.751	+0.60	+0.43	+1.02
23 Wissington III ..	−0.06	+0.02	+0.09	±0.612	+0.25	+0.07	−0.09
Mean	*−0.13*	*−0.17*	*+0.23*		*+0.05*	*+0.13*	*−0.02*
HEAVY LOAM							
24 Colwick	+0.30	−0.18	+0.27	±0.457	+0.02	+0.08	+0.10
CLAY LOAMS							
25 Felstead I	−0.33	+0.55	−0.64	±0.325	+0.15	+0.10	−0.08
26 Felstead II	+0.68	−1.18	+0.26	±0.872	−0.28	+0.16	−0.46
27 Rothamsted I	−0.04	+0.70	−0.44	±0.612	−0.08	+0.08	−0.23
28 Selby II	—	—	—	—	−0.30	−0.22	+0.02
Mean	*+0.10*	*+0.02*	*−0.27*		*−0.13*	*+0.03*	*−0.19*
FENS							
29 Ely	+1.66	+0.99	−1.01	±0.987	+0.14	−0.18	+0.21
30 Peterboro' II	—	—	—	—	+0.50	+0.34	+0.26
Mean	*+1.66*	*+0.99*	*−1.01*		*+0.32*	*+0.08*	*+0.24*
Mean	*+0.21*	*+0.02*	*−0.06*		*0.00*	*+0.06*	*−0.05*

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	Station	Interaction of linear responses (one half of the extra response to one fertiliser through the addition of a second) N×P	N×K	P×K	Interaction of linear responses (one half of the extra response to one fertiliser through the addition of a second) N×P	N×K	P×K
		PLANT NUMBER: thousands per acre			PERCENTAGE PURITY		
COARSE SANDS							
1	Allscott I	−0.1	−1.2	+0.1	—	—	—
2	Bardney II	+2.1	−1.7	+1.4	+0.2	−0.6	−0.9
3	Brigg II	+0.7	−1.6	+0.1	—	—	—
4	Bury I	+1.8	+1.6	−0.8	+0.5	+0.8	−0.6
5	Cantley I	−1.8	−1.8	−0.5	−1.2	0.0	−0.8
6	Tunstall	+0.7	−2.0	−0.8	—	—	—
7	Wissington II	+0.3	−0.2	+0.4	−0.4	−0.2	−0.2
	Mean	*+0.5*	*−1.0*	*0.0*	*−0.2*	*0.0*	*−0.6*
FINE SANDS							
8	Brigg I	+1.5	+2.4	+0.2	—	—	—
9	Bury II	+1.4	+0.8	−0.8	+0.2	+0.4	−0.1
10	Ipswich	+1.2	+0.7	−0.8	—	—	—
11	Kidderminster I	−1.4	−0.9	0.0	−0.6	−0.2	+0.2
12	King's Lynn II	−0.4	0.0	0.0	+0.4	0.0	+0.2
13	Spalding	−0.4	+0.9	−0.3	+0.1	−0.4	−1.5
	Mean	*+0.3*	*+0.6*	*−0.3*	*0.0*	*0.0*	*−0.3*
LIGHT LOAMS							
14	Allscott II	−3.4	+4.8	−1.8	—	—	—
15	Bardney I	+0.6	−1.9	−0.4	+0.6	−1.4	−0.4
16	Cantley II	0.0	0.0	−0.4	−1.6	+0.8	−0.2
17	King's Lynn I	+0.4	+1.0	+1.4	−0.1	−0.2	−0.4
18	Newark I	−0.2	+1.0	+0.3	0.0	−0.4	−0.6
19	Peterboro' I	+0.2	+0.2	+1.2	—	—	—
20	Poppleton I	−1.4	+2.4	+4.2	+0.2	+0.4	−0.4
21	Poppleton II	0.0	−1.1	+1.0	−0.2	+0.1	−0.3
22	Selby I	0.0	+0.1	−0.6	+0.3	0.0	+0.4
23	Wissington III	−0.8	+0.9	+1.3	−0.3	+0.2	+0.2
	Mean	*−0.5*	*+0.7*	*+0.6*	*−0.1*	*−0.1*	*−0.2*
HEAVY LOAM							
24	Colwick	−0.8	+1.2	−2.2	−0.2	+0.6	+0.6
CLAY LOAMS							
25	Felstead I	−0.9	+1.0	−0.3	+0.6	+0.8	0.0
26	Felstead II	+0.1	+1.6	+1.4	−0.2	0.0	−0.1
27	Rothamsted I	−1.5	−0.6	−0.6	—	—	—
28	Selby II	−0.2	−1.0	+4.0	−1.4	−0.4	−0.8
	Mean	*−0.6*	*+0.2*	*+1.1*	*−0.3*	*+0.1*	*−0.3*
FENS							
29	Ely	−0.5	+0.8	−0.4	0.0	−0.1	+0.3
30	Peterboro' II	−0.6	+0.6	−0.8	—	—	—
	Mean	*−0.6*	*+0.7*	*−0.6*	*0.0*	*−0.1*	*+0.3*
	Mean	*−0.1*	*+0.3*	*+0.2*	*−0.1*	*0.0*	*−0.3*

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Conclusions

Effects of sulphate of ammonia

The average response in total sugar to the double dressing of sulphate of ammonia was 5.2 cwt. per acre. This figure is considerably smaller than the mean response in 1936, but is about double the average response in the years 1933–1935.

The increases to sulphate of ammonia were significant at twenty of the thirty centres. Of the remaining centres, all showed positive responses except Spalding, which had the highest mean yield, Peterboro' I and the two fen soils, Ely and Peterboro' II. At Ely the depression due to sulphate of ammonia was almost significant. The additional response to the second dressing was smaller than the response to the first dressing at twenty of the twenty-six centres which showed a positive response, the falling off in response being significant at two centres.

Tops were weighed at twenty-four centres. The response to the double dressing of sulphate of ammonia was significant at the 1 per cent. level at all these centres except Allscott II, which also showed a positive response. Even on the fen soil at Ely, tops responded significantly to sulphate of ammonia. The average response was 3.0 tons per acre, as against an average of 2.4 tons per acre in the four previous seasons. As usual, there was no regular falling off in effectiveness at the higher level of application. At Poppleton I there was a significant negative curvature and at Felstead II a significant positive curvature.

The responses in total sugar and tops varied significantly from centre to centre. There was, however, no indication that the responses were correlated with the type of soil or with the mean yield, apart possibly from the failure of sulphate of ammonia to increase the total sugar on the two fen soils.

The effects of sulphate of ammonia on roots were similar to those on sugar, all centres showing an increase to the fertiliser except the two fen soils and Peterboro' I. Sulphate of ammonia also reduced the sugar percentage at twenty-six centres, the mean reduction being 0.31 per cent., somewhat smaller than the average in previous years. The effects on percentage purity were small. Plant numbers were increased on all the coarse sands, but elsewhere sulphate of ammonia had little effect on plant numbers.

Effects of superphosphate

Superphosphate increased the total sugar at twenty-three centres, the increase being significant at five centres. The average response to the double dressing was 1.9 cwt. per acre compared with an average of 1.2 cwt. for the four previous years. There was a very large response at Allscott II on poor soil. The response decreased at the higher level of application at all five centres which showed a clear response, the average curvature at these centres being significant. Superphosphate increased the yield of tops at eighteen of the twenty-four centres where tops were weighed, significant responses occurring at four centres. There was a significant negative curvature at Allscott II, which gave the largest response to superphosphate in tops, but at other centres there was no consistent falling off in response with the double dressing.

The responses in total sugar and tops varied significantly from centre to centre, but this result was due entirely to the large response at Allscott II ; if this centre is omitted the responses at remaining centres do not vary at all abnormally. It may be noted, however, that the largest responses to superphosphate in sugar all occurred at centres with moderate or low mean yields.

The average effects of superphosphate on percentage purity and plant number were small.

Effects of muriate of potash

The responses to muriate of potash were larger this year than in any previous year, the mean response over all centres being 2.8 cwt. of sugar per acre. All except two centres showed a positive response and seven centres gave significant responses. There was little indication on the average of a drop in effectiveness at the higher level of dressing, even amongst the centres which showed the largest responses. The large positive curvature at Peterboro' II was due to an anomalous depression of yield by the single dressing of muriate of potash. The responses in sugar per acre varied significantly from centre to centre. The depressions found in 1936 on the heavy and clay loams did not appear this year, but the average response to potash on these soils was only about a third of that on other types of soil.

Tops were increased at twenty out of twenty-four centres, the increase being significant at Poppleton I. There was no apparent falling-off in response with the double dressing.

The effects on roots were similar to those on sugar. Sugar percentage was increased at most centres. The average increase was 0.27 per cent, which is almost equal to the average increase in the four previous years. Percentage purities were increased by more than 1 per cent. at four centres, but the average effect over all centres which took this measurement was small. The effects on plant numbers were similarly small, apart from a striking increase of 7.0 thousands per acre on a very dense crop at Tunstall.

Interactions

There was a significant positive interaction in total sugar between sulphate of ammonia and muriate of potash on the average of all centres. Two centres, Bury II and Felstead I, gave individually significant positive interactions.

The other interactions were small and not significant.

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