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Experiments at Outside Centres

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REPLICATED EXPERIMENTS AT OUTSIDE CENTRES.
Grassland. New Hay. Effect of Basic Slag.
 (Basic Slag Committee.)

Mr. B. W. H. Pratt, Brooke, Norfolk, 1926-1928.

S.

I	L	H	C	M
II	H	C	M	L
III	C	M	L	H
IV	M	L	H	C

Seed sown 1925.
 SYSTEM OF REPLICATION: Latin Square.
 Area of each plot = $\frac{1}{4}$ acre.
 Soil: Calcareous boulder clay.
 TREATMENTS
 C = Control.
 L = Low soluble slag (37.3%).
 M = Medium soluble slag (60.9%).
 H = High soluble slag (86.8%).
 Slags applied at the rate of 100 lbs. P₂O₅ per acre in March, 1926.
 No manures in 1927 or 1928.

Actual Weights in lb.

Row.	1926				1927				1928			
	C	L	M	H	C	L	M	H	C	L	M	H
I	1194	1187	1367	1583	499	649	963	871	336	621	584	722
II	1154	1230	1227	1224	449	606	735	780	389	420	537	813
III	1317	1439	1086	1523	554	752	809	904	513	522	677	599
IV	1450	1241	1488	1595	607	790	841	999	430	560	680	720

Summary of Results.

Year.	Average Yield in cwts. per acre.						Per Cent.					
	Control.	Low Soluble.	Medium Soluble.	High Soluble.	Mean.	Standard Error.	Control.	Low Soluble.	Medium Soluble.	High Soluble.	Mean.	Standard Error.
1926	45.7	45.5	46.1	52.9	47.6	2.56	96.0	95.7	97.0	111.2	100.0	5.38
1927	18.8	25.0	29.9	31.7	26.4	1.06	71.4	94.7	113.4	120.4	100.0	4.01
1928	14.9	19.0	22.1	25.5	20.4	0.92	73.1	93.1	108.6	125.1	100.0	4.52
Total	79.4	89.5	98.1	110.1	94.4	—	—	—	—	—	—	—

- 1926. Significant response to high soluble slag only.
- 1927. Significant progressive increases up to medium soluble slag. The high soluble produced no further increase.
- 1928. Significant response to all grades of slag, which range themselves in order of citric solubility.
- 1926-28. Large seasonal falling off in yield. Effect on yield is least with the low soluble slag and greatest with the high soluble.

Grassland. Old Hay. Effect of Basic Slag. (Basic Slag Committee.)

Mr. E. Habberfield, Home Farm, Enmore, Somerset, 1926-1928.

I	L	C	H	M
II	H	M	L	C
III	M	H	C	L
IV	C	L	M	H

SYSTEM OF REPLICATION : Latin Square.

Area of each plot : $\frac{1}{4}$ acre.

Soil : Red clay, loam on sandstone.

TREATMENTS :

C = Control.

L = Low soluble slag (37.3%).

M = Medium soluble slag (60.9%).

H = High soluble slag (86.8%).

Slags applied at the rate of 100 lbs. P_2O_5 per acre in March, 1926.

Actual Weights in lb.

Rows.	1926				1927				1928			
	C	L	M	H	C	L	M	H	C	L	M	H
I	783	791	942	1149	837	685	906	995	223	244	321	377
II	804	1027	905	875	733	921	983	742	312	412	468	270
III	807	708	959	852	768	767	879	1046	308	304	416	355
IV	667	823	747	556	590	945	870	827	213	295	356	323

Summary of Results.

Year.	Average Yield per acre.						Per Cent.					
	Control.	Low Soluble.	Medium Soluble	High Soluble.	Mean.	Stand'rd Error.	Control.	Low Soluble.	Medium Soluble.	High Soluble.	Mean.	Stand'rd Error.
1926	27.3	29.9	31.7	30.6	29.9	2.15	91.4	100.0	106.1	102.5	100.0	7.20
1927	26.1	29.6	32.5	32.2	30.1	1.08	86.8	98.4	107.8	107.0	100.0	3.60
1928	9.4	11.2	13.9	11.8	11.6	0.86	81.3	96.6	120.1	102.0	100.0	7.38
Total	62.8	70.7	78.1	74.6	71.6	—	—	—	—	—	—	—

1926. No significant response to treatment.

1927. Significant progressive increase up to medium soluble slag. The high soluble produced no further increase in yield.

1928. Medium soluble slag gave significantly greater yield than the others, while all grades of slag did significantly better than Control.

1926-28. Poor yield in 1928. All grades of slag have improved the yield, but medium soluble slag has done rather better than high soluble.

Basic Slag on Arable Land.

(Basic Slag Committee.)

Mr. Hyatt, Andoversford, Glos., 1926-27.

1926 : Swedes (fed off on land). Sown June 2.

1927 : Oats (carted and weighed green). Harvested September 6.

I	C	S	H	M	L
II	L	C	S	H	M
III	S	H	M	L	C
IV	M	L	C	S	H
V	H	M	L	C	S

Soil : Loam on limestone (Lower Oolite).
 SYSTEM OF REPLICATION : Latin Square.
 Area of each plot : $\frac{1}{25}$ acre.

TREATMENTS :

- C = Control.
- L = Low soluble slag (37.3%).
- M = Medium soluble slag (60.9%).
- H = High soluble slag (86.8%).
- S = Superphosphate.

Rate : 100 lbs. P₂O₅ per acre, applied May, 1926.

Basal Manuring : F.Y.M. 12 loads per acre, 1 cwt. Sulphate of Ammonia and 1 cwt. Muriate of Potash per acre for Swedes in 1926. No further Manure applied in 1927.

Actual Weights in lb.

Row.	1926					1927*				
	C	L	M	H	S	C	L	M	H	S
I	724	923	1031	1067	1132	262	245	266	276	283
II	824	915	1037	1053	1123	300	295	284	311	303
III	745	881	977	886	1024	257	258	265	252	242
IV	683	722	879	947	1025	258	237	252	302	246
V	757	877	904	1035	929	262	290	256	264	267

Summary of Results.

	Average Yield.	Control.	Low Soluble.	Med. Soluble.	High Soluble.	Super-ph'sph'te	General Mean.	Standard Error.
1926	Per acre, tons ...	8.33	9.64	10.78	11.13	11.68	10.31	0.26
	Per cent. ...	80.8	93.5	104.5	108.0	113.3	100.0	2.53
1927	Grain, per acre, bush.	40.8	40.4	36.0	45.3	36.9	39.8	1.08
	Grain, per cent.	102.3	101.3	90.2	113.6	92.5	100.0	2.70*
	Straw, per acre, cwt.	15.8	15.2	14.9	17.5	14.8	15.7	0.42
	Straw, per cent. ...	101.1	97.2	95.1	111.8	94.7	100.0	2.70*

* The oats were carted and weighed green, but later samples were dried and threshed. From these the above yields of grain and straw were calculated, but the analysis of variance was performed on the original totals and the standard error thus obtained is appended as above to both grain and straw.

1926. Significant response to all grades of slag. Superphosphate plots did significantly better than medium and low soluble plots.

1927. Significant response to high soluble slag only.

Basic Slag on Arable Land. (Basic Slag Committee.)

Mr. Reeves, Matley Hyde, Stalybridge, Cheshire, 1926-28.

1926: Swedes (carted off). Roots and leaves weighed together. Sown May 19. Pulled November 9-13.

1927: Oats (cut as hay and weighed green). Harvested September 8.

1928: Seeds Hay. Cut June 22.

A B C D

H	L	M	C
L	H	C	M
M	C	H	L
C	M	L	H

Block D was badly damaged by stray cow in 1927 and was not weighed. Remainder treated as 3 randomised blocks of 4 plots each.

Soil: Millstone grit.

SYSTEM OF REPLICATION: Latin Square.

Area of each plot: .02875 acre.

Previous manuring: 2 tons per acre lime ashes (70.80% lime), 1 cwt. Sulphate of Ammonia and 4 cwts. Kainit per acre for oats in 1925.

TREATMENTS:

C = Control.

L = Low Soluble Slag (37.3%).

M = Medium Soluble Slag (60.9%).

H = High Soluble Slag (86.8%).

Slags applied at the rate of 100 lbs. P₂O₅ per acre in April, 1926. Basal Dressing: ½ cwt. Sulphate of Ammonia and ¼ cwt. Muriate of Potash per acre in 1926.

No manure in 1927 or 1928.

Actual Weights in lb.

Block.	1926				1927				1928			
	C	L	M	H	C	L	M	H	C	L	M	H
A	1019	918	1298	1069	472	400	365	372	158	155	185	163
B	1271	1246	1422	1327	360	382	427	382	218	190	212	198
C	1166	1175	1232	1378	409	364	448	381	146	189	165	176
D	1143	1164	1123	1313	—	—	—	—	155	184	170	191

Summary of Results.

Average Yield.		Control.	Low Soluble.	Med. Soluble.	High Soluble.	General Mean.	Standard Error.
1926	Swedes.						
	Tons per acre	17.85	17.48	19.70	19.75	18.85	0.52
	Per cent. ...	95.5	93.5	105.4	105.6	100.0	2.78
1927	Green Oats.						
	Cwt. per acre	128.5	118.6	128.4	117.5	123.2	7.41
	Per cent. ...	104.2	96.3	104.2	95.4	100.0	6.01
1928	Seeds Hay.						
	Cwt. per acre	52.6	55.7	56.8	56.5	55.4	1.38
	Per cent. ...	94.9	100.6	102.6	102.0	100.0	2.49

1926. Medium and high soluble slags show significant superiority over low.

1927. No significant response.

1928. Evidence of response to slags, which only approaches significance in the case of the medium soluble slag.

Potatoes : Effect of Sulphate of Ammonia and Sulphate of Potash, each in single and double dressings.

Mr. J. Luddington, Abbey Farm, Norfolk, 1928.

	A			B			C			
	N4 K0	N2 K0	N2 K4	N2 K0	N4 K2	N0 K0	N2 K0	N0 K4	N2 K2	
	N0 K4	N2 K2	N4 K2	N4 K4	N4 K0	N2 K4	N2 K4	N4 K4	N0 K0	
	N4 K4	N0 K0	N0 K2	N0 K2	N2 K2	N0 K4	N4 K0	N4 K2	N0 K2	
	N2 K2	N0 K2	N4 K0	N2 K2	N4 K2	N4 K0	N4 K4	N2 K2	N0 K2	
D	N4 K2	N2 K4	N0 K4	N2 K4	N2 K0	N0 K2	N0 K4	N2 K0	N2 K4	
	N4 K4	N2 K0	N0 K0	N4 K4	N0 K0	N0 K4	N0 K0	N4 K0	N4 K2	
	N0 K0	N0 K2	N4 K0	N2 K0	N2 K4	N4 K4	N0 K4	N2 K4	N4 K2	
	N0 K4	N2 K0	N2 K2	N4 K2	N0 K2	N4 K0	N0 K0	N0 K2	N4 K0	
	N4 K4	N4 K2	N2 K4	N2 K2	N0 K0	N0 K4	N2 K2	N2 K0	N4 K4	
		G			H			J		

VARIETY : Majestic.

Soil : Black fen overlying clay.

SYSTEM OF REPLICATION : 9 randomised blocks of 9 plots each.

Area of each plot : $\frac{1}{30}$ acre.

TREATMENTS :

S/Amm. and S/Pot. at the rate of 0, 2 and 4 cwts. per acre, in all combinations.

Upper figure = amount of S/Amm.

Lower figure = amount of S/Pot.

Basal Manuring 4 cwt. Superphosphate per acre.

Manures applied : April 24.

Planted April 24 ; lifted October 1-2.

Actual Weights in lb.

Quantities of		A	B	C	D	E	F	G	H	J
S/Amm.	S/Pot.									
0	0	157	230	201	246	226	203	286	181	201
0	2	215	219	233	184	209	254	217	162	192
0	4	258	267	209	192	197	217	187	288	180
2	0	329	250	295	270	271	379	254	276	254
2	2	261	301	289	257	281	269	232	228	230
2	4	263	374	180	259	312	240	239	240	204
4	0	273	323	222	271	311	172	300	313	276
4	2	309	286	244	299	327	297	308	286	260
4	4	268	238	265	289	314	248	258	283	306

(1) Summary of Average Yields.

Tons per acre.	No S/Amm.	2 cwt. S/Amm.	4 cwt. S/Amm.
No Potash ...	7.66	10.23	9.77
2 cwt. S/Pot....	7.48	9.32	10.38
4 cwt. S/Pot....	7.92	9.17	9.80

Potatoes, Abbey Farm, Norfolk (cont.)

(2) Summary of Significant Results.

Average Yield.	No S/Amm.	2 cwt. S/Amm.	4 cwt. S/Amm.	Mean.	Standard Error.
Tons per acre	7.69	9.57	9.98	9.08	0.26
Per cent.	84.7	105.4	109.9	100.0	2.87

Significant response to nitrogenous manure only. Potash produced no additional effect.

Potatoes : Effect of Superphosphate.

Mr. J. H. L. Luddington, Abbey Farm, Norfolk, 1928.

I	8	4	0	2
II	0	2	8	4
III	2	0	4	8
IV	4	8	2	0

Soil : Black fen overlying clay.

VARIETY : Majestic, planted April 24 ; lifted October 1-2.

SYSTEM OF REPLICATION : Latin Square.

Area of each plot : $\frac{1}{32}$ acre.

TREATMENT : Superphosphate at the rate of 0, 2, 4 and 8 cwt. per acre. Basal Manuring : 2 cwts. S/Pot. and 2 cwt. S/Amm. per acre. Manures applied April 24.

Actual Weights in lb.

Rows.	0	2	4	8
I	651	706	743	866
II	520	740	780	901
III	505	674	744	813
IV	593	693	804	940

Summary of Results.

Average Yield.	No Super.	2 cwts. Super.	4 cwt. Super.	8 cwt. Super.	Mean.	Standard Error.
Tons per acre	8.10	10.05	10.97	12.57	10.42	0.33
Per cent. ...	77.8	96.4	105.2	120.6	100.0	3.21

Significant response to all applications of Superphosphate.

Potatoes : Effect of Superphosphate.

Mr. G. Major, Newton Farm, Lincs., 1928.

I	0	2	8	4
II	4	0	2	8
III	8	4	0	2
IV	2	8	4	0

VARIETY : King Edward, planted April 9 ; lifted October 3-4.

SYSTEM OF REPLICATION : Latin Square.

Area of plot : $\frac{1}{32}$ acre.

TREATMENT : Superphosphate at the rate of 0, 2, 4 and 8 cwt. per acre ; Basal Manuring 4 cwt. S/Pot. and 4 cwt. S/Amm. per acre.

Manures applied April 9.

Actual Weights in lb.

Row.	0	2	4	8
I	1225	1259	1225	1271
II	1207	1197	1324	1169
III	1154	1159	1208	1287
IV	1168	1236	1156	1244

Summary of Results.

Average Yield.	No Super.	2 cwt. Super.	4 cwt. Super.	8 cwt. Super.	Mean.	Standard Error.
Tons per acre	16.98	17.32	17.55	17.75	17.40	0.27
Per cent. ...	97.6	99.6	100.8	102.0	100.0	1.54

The response to Superphosphate is small, only the 8 cwt. showing significant increase over control.

Sugar Beet : Comparison of Nitrogenous Fertilisers, Sulphate and Muriate of Ammonia.

Col. F. Wilson, Stanway Hall Farm, Colchester, 1927.

E.S.E.											
I			II			III			IV		
B	A	C	B	C	A	C	B	A	A	C	B

TREATMENTS :

A = Control.
 B = S/Amm. 2 cwt. with seed +1 cwt. Top Dressing per acre.
 C = M/Amm. equivalent of S/Amm.
 All plots had in addition a dressing of 3 cwt. Superphosphate. and 1½ cwt. Muriate of Potash per acre.

VARIETY : Klein Wanzleben.
 SYSTEM OF REPLICATION : 4 randomised blocks.
 AREA OF EACH PLOT : $\frac{1}{20}$ acre.
 Basal Manures applied May 1.
 Top dressing applied second week in June.
 Seed sown first week of May.
 No farmyard manure.
 Soil : Light sandy loam.

Actual Weights in lb.

Blocks.	A	B	C
I	750	896	705
II	935	983	991
III	921	854	753
IV	1008	1033	988

Summary of Results.

Average Yield.	Control.	S/Amm.	M/Amm.	General Mean.	Standard Error.
Tons per acre ...	8.07	8.41	7.67	8.05	0.30
Per cent. ...	100.2	104.5	95.3	100.0	3.47

No significant response to either treatment.

Sugar Beet : Comparison of Nitrogenous Fertilisers, Sulphate and Muriate of Ammonia, and Cyanamide.

Col. F. Wilson, Stanway Hall Farm, Colchester, 1928.

I	A	B	C	D	E
II	B	E	D	C	A
III	C	D	E	A	B
IV	D	A	B	E	C
V	E	C	A	B	D*

Soil : Light sandy loam.
 VARIETY : Klein Wanzleben.
 SYSTEM OF REPLICATION : Latin Square.
 Area of each plot : $\frac{1}{40}$ acre.
 A = Basal only, 4 cwt. Super and 2 cwt. S/Pot. per acre.
 B = Basal+40 Nitrogen as Cyanamide+20 lb. as Nitrate of Soda with seed.
 C = Basal+60 lb. of Nitrogen as Cyanamide.
 D = Basal+60 lb. of Nitrogen as Muriate of Ammonia.
 E = Basal+60 lb. of Nitrogen as Sulphate of Ammonia.
 Cyanamide applied May 3. Other manures May 30-31.
 Seed sown May 3. Lifted November 15.

* This plot discarded and a value calculated for it from the other 24.

Actual Yields in lb.

Row.	A	B	C	D	E
I	306	556	369	332	396
II	325	357	317	358	485
III	275	413	309	467	367
IV	453	389	335	418	324
V	346	397	572	464	503

Summary of Results.

Average Yield.	No Nitrogen.	Cyanamide Nit.Soda	Cyanamide alone.	M/Amm.	S/Amm.	General Mean.	Standard Error.
Tons per acre	6.09	7.54	6.79	7.28	7.41	7.00	0.26
Per cent.	86.7	107.4	96.7	103.7	105.5	100.0	3.74

Significant response to nitrogenous manures, except where all Nitrogen was applied as Cyanamide. This treatment was significantly below the mean of the others.

Experiments at other centres, carried out by the local workers on the lines of those described on the preceding pages.

Potatoes. Mr. E. J. Roberts, College Farm, Aber, Caernarvonshire, 1928.

Latin Square : Plots $\frac{1}{40}$ acre. Soil : Light gravelly loam.

Basal Manuring : 8 tons F.Y.M. in Autumn of 1927, 2 cwt. Sulphate of Ammonia and 2 cwt. Sulphate of Potash per acre.

Average Yield.	No Super-phosphate.	2 cwt. Super.	4 cwt. Super.	8 cwt. Super.	Mean.	Standard Error.
Tons per acre	15.78	15.62	16.12	16.03	15.89	0.36
Per cent. ...	99.3	98.3	101.5	100.9	100.0	2.27

No evidence of response to Superphosphate.

Potatoes. Mr. E. Arden, Owmbly, Cliff, Lincolnshire, 1928.

Latin square : Plots $\frac{1}{40}$ acre. Soil : Cliff Land (Oolitic Limestone).

Basal Manuring : 2 cwt. Sulphate of Ammonia, 2 cwt. Sulphate of Potash per acre. Manures applied April 23.

Average Yield.	No Super-phosphate.	2 cwt. Super.	4 cwt. Super.	8 cwt. Super.	Mean.	Standard Error.
Tons per acre ...	8.18	6.79	7.73	7.25	7.49	0.27
Per cent. ...	109.2	90.6	103.3	96.8	100.0	3.66

Significant depression due to the application of Superphosphate.

Sugar Beet. County School, Welshpool, Montgomeryshire, 1928.

Plots in triplicate : $\frac{1}{80}$ acre. Soil : School garden.
 Basal Manuring : 10 tons F.Y.M. 3 cwt. Superphosphate, 1 cwt. Muriate of Potash per acre.
 Manures applied May 10, except Nitrogenous, which were applied after singling (6 in. high) about June 20. Seed sown May 10. Lifted October 16.

Average Yield.	No Nitrogen.	Sulphate of Ammonia 2 cwt.	Muriate of Amm. = 2 cwt. Sulphate.	Mean.	Standard Error.
Roots, tons per acre ...	9.79	11.00	11.89	10.89	0.70
Roots, per cent. ...	89.8	101.0	109.2	100.0	6.45
Tops, tons per acre ...	14.00	18.90	20.67	17.86	1.00
Tops, per cent. ...	78.4	105.9	115.7	100.0	5.60

Significant response to Muriate with roots, and to Muriate and Sulphate with tops. The difference between the Sulphate and Muriate Plots is not significant.

Sugar Beet. South-Eastern Agricultural College, Wye, Kent, 1928.

Basal Manuring : 10 loads F.Y.M. in March, 4 cwt. Kainit (May 9) and 4 cwt. Superphosphate (May 19) per acre. Varieties : Dippe E and Strube's Green Top. Nitrogenous Manures applied May 19. Seed sown May 9. Roots lifted November 8. Plots in quadruplicate, each $\frac{1}{80}$ acre.

Average Yield in tons per acre.

Variety	No Nitrogen.	1 cwt. S/Amm.	Equiv. M/Amm.
Dippe	14.54	14.88	14.71
Strube	12.00	13.18	12.39

Sugar Percentage.

Variety.	No Nitrogen.	1 cwt. S/Amm.	Equiv. M/Amm.
Dippe	16.25	15.70	16.72
Strube	15.27	15.77	15.55