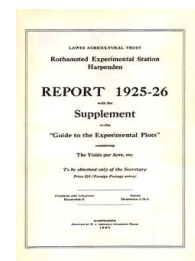


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ROTHAMSTED
RESEARCH

Report 1925-26 With the Supplement to the Guide to the Experimental Plots



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Manuring of Grassland

Rothamsted Research

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The effect of manures on quality is difficult to determine. Skilled salesmen have usually been unable to discriminate between potatoes grown with sulphate of potash and those grown with muriate of ammonia or potash. Cooking tests of the 1922 crops were in favour of the sulphate, and there is a common opinion that the sulphate is the better for giving quality.

Chemical examination of the tubers from the various plots has been made each year, but has so far thrown little light on this problem of quality. The percentage of dry matter in the tubers is highest on the unmanured plots; it is lowered by manuring with farmyard manure and still more by adding potassic fertilisers along with the dung. In absence of dung sulphate of potash has usually increased the amount of dry matter while the muriate has decreased it. The proportion of starch in the dry matter is much affected by seasonal factors and no consistent effect of fertilisers can be traced; farmyard manure lowered it in 1922 and 1924, but raised it in 1923, a year when it had but little effect on yield. Potassic fertilisers always increased the percentage of starch in absence of farmyard manure, but somewhat lowered the percentage in presence of farmyard manure; the sulphate was more effective than the muriate in absence of farmyard manure.

THE MANURING OF GRASSLAND.

The experiments on the manuring of grassland with basic slag have been continued both at Rothamsted and at certain outside centres. Three slags of different solubility were compared on new seeds ley, old hay, and grazing land, sheep being the animals used for grazing.

The results show that solubility is a fairly good criterion of effectiveness; the high soluble slag was better than the medium, and this better than the low soluble. Apparently the difference is not simply in the amount of phosphate present; an increase in the dressing of low soluble slag does not make it equal to the high soluble slag; the two slags behave as if they were different substances. The low soluble slag seems to have distinct value in moist conditions, but not in drier districts.

The experiment on new seeds ley was made at Brooke, near Norwich, and the one on old hay at Enmore, in Somerset; both were by the new methods. The results were, in tons per acre:—

Treatment.	New Hay : Norfolk.		Old Hay : Somerset.	
	Tons per acre.	Per cent.	Tons per acre	Per cent.
No Phosphate ...	2.28	100	1.37	100
Low Soluble Slag ...	2.28	100	1.49	109
Medium Soluble Slag ...	2.31	101	1.59	116
High Soluble Slag ...	2.65	116	1.53	112
Standard Error ...	—	5.4	—	7.1

The grazing experiments are more difficult to carry out, and the new methods cannot be used owing to the great difficulty of setting up an adequate number of replicate plots. The liability to

error is increased by the irregularities of the pasture, the inequalities among the sheep, and the fact that the land must be very closely grazed or the herbage becomes too coarse to nourish the sheep. This close grazing is very important; at one centre the sheep did worse on the slagged land than on the unmanured, simply because the grass grew too much for them. In consequence the grazing results are not as sharp as those on arable or hay land, where the errors are much smaller.

The Rothamsted grazing plots, which were set up in 1921, were re-dressed with similar slags in 1925. During the whole six years neither the Gafsa nor the low soluble slag had any action; the high soluble slag acted better. For these high soluble slags, however, their order of efficiency was not the same as the order of solubility. The results were :—

Average Yearly Live Weight Increase in Sheep. lb. per acre.

Description of Phosphate.	Composition.		Rothamsted Average for		Thrussington Average for 2 years, 1925-26.
	Total Phosphate.	Solubility.	4 years, 1922-25.	2 years, 1925-26.	
No Phosphate ...	—	—	124	149	170
Gafsa ...	—	—	123	151	185
Slag, Low Soluble ...	21.1	27.7	127	146	209
High Soluble ...	19.8	70.9	159	180	181
High Soluble ...	19.8	70.9	146	147	187
High Soluble ...	42.5	77.2	120	150	—
High Soluble ...	18.0	81.3	106	138	216
No Phosphate ...	—	—	107	136	—

Comparison of the Rothamsted results with those obtained elsewhere brings out the very interesting fact that grassland is not readily improved by slag if an acre of it yields some 200 lbs. live weight increase in sheep. The striking results are obtained on land giving only 50 or less lbs. increase per acre. The figures are :—

Centre.	Live Weight Increase, lb. per acre.				Number of Sheep carried per acre.			
	1925.		1926.		1925.		1926.	
	No Manure.	High Soluble Slag.	No Manure.	High Soluble Slag.	No Manure.	High Soluble Slag.	No Manure.	High Soluble Slag.
Fiddington ...	242	212	187	93	6.5	6.5	6.3	6.3
Thrussington ...	134	165	156	225	3.7	3.7	6.0	6.0
Rothamsted ...	81	103	190	196	6.6	6.6	6.1	6.1
Hebron ...	53	123	18	71	2.0	4.0	2.0	4.0

FERTILISER ACTION AND THE LAW OF DIMINISHING RETURNS.

Periodically a good deal is heard about the Law of Diminishing Returns, and farmers are reminded that the use of fertilisers, or any other improving agents, beyond a certain point is not economically sound, the extra yield obtained not paying the additional