ROTHAMSTED RESEARCH

Report for 1937

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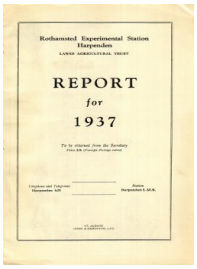

Fertilizer Effects of Salt

Rothamsted Research

Rothamsted Research (1938) *Fertilizer Effects of Salt ;* Report For 1937, pp 41 - 42 **- DOI: https://doi.org/10.23637/ERADOC-1-69**

The Fertilizer Effects of Salt

1. *Sugar beet.* Experiments on the manurial value of salt have been confined mainly to sugar beet : two, however, were made on celery and two on mangolds.

The results of 16 experiments in which salt was compared with muriate of potash are shown in Table XXVIII. In 10 of these experiments the comparison was made on an equivalent chloride basis, with dressings of salt varying from 1.0 to 2.5 cwt. per acre and of potash from 1.2 to 3.0 cwt. per acre. Salt proved consistently the more effective, the average response to 1 cwt. being 0.47 tons roots, while the corresponding dressing of 1.2 cwt. muriate of potash gave an average increase of 0.33 tons roots. Apart from this difference, the effects of the two minerals were generally similar ; where one gave a good response, the other did likewise.

TABLE XXVIII

Sugar Beet : Roots

Year	Place	Amount cwt. per acre		Mean yield roots (tons)	Increase to salt	Increase to potash	Increase to combined dressing	S.E of increase
		Salt	Muriate of potash					
1929	Rothamsted	1.4	1.7	7.42	+0.28	+0.12	+0.26	±0.112
	Colchester	3.9	1.6	6.73	+0.95	+0.57	—	±0.362
1930	Rothamsted	1.4	1.7	7.44	+0.27	+0.23	+0.07	±0.182
	Woburn	1.0	1.2	9.27	+0.52	+0.17	—	±0.396
	Wye	1.6	2.0	13.04	+0.44	+0.71	+0.69	±0.194
	Northampton	1.8	2.0	11.31	+1.77	+1.68	+1.46	±0.683
1931	Wye	1.1	1.6	11.11	+0.13	−0.36	−0.06	±0.239
1932	Colchester	1.5	2.0	5.63	+0.53	+0.22	+0.58	—
1934	Rothamsted	1.3	1.5	15.36	+0.39	+0.74	+0.88	±0.379
	Lincoln	5.0	2.0	10.38	+0.11	−0.18	+0.89	±1.12
	Doncaster	2.5	3.0	8.21	+1.51	+0.95	—	±0.279
	Wood Norton	1.5	1.8	14.55	+1.19	+0.67	+1.62	±0.740
1935	Mattersey	5	3	5.80	+1.74	+0.88	+2.38	±0.359
1936	Rothamsted	5	1	14.84	+1.04	−0.18	+0.58	—
1937	Rothamsted	5	1	14.08	+1.46	+0.21	+1.38	—
	Woburn	5	1	16.06	+0.63	+1.11	+0.65	—

In five of the remaining six experiments in the table, the dressing of salt was 5 cwt. per acre, while that of muriate of potash varied from 1 to 3 cwt. To compare equivalent dressings of the minerals from these experiments might be unfavourable to salt, since large dressings of a fertilizer frequently prove less effective per unit of the fertilizer than small dressings. At Lincoln (1934) neither dressing was effective. Both minerals produced significant increases in roots at Mattersey (1935), salt being superior to potash even on an equivalent chloride basis. At Rothamsted (1936 and 1937) salt gave good responses, although muriate of potash had little or no effect. At Woburn (1937), on the other hand, 1 cwt. muriate of potash per acre increased the roots by 1.11 tons, while 5 cwt. salt produced an increase of only 0.63 tons. The dressings in the only remaining experiment (Colchester 1929) were 3.9 cwt. salt and 1.6 cwt. muriate of potash. Salt gave the larger response.

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

The combined dressing was not in general so effective as the individual dressings. Where there was a clear response to minerals, the sum of the responses to the individual dressings of salt and muriate of potash was always greater than the response to the combined dressing.

The experiments do not provide sufficient material to determine whether salt is chiefly a light land fertilizer, because all the experiments except those at Rothamsted were on light or sandy soils. Salt, however, increased yields in all five experiments at Rothamsted. The contrast between the 1937 results at Rothamsted and at Woburn is striking, salt giving good increases at Rothamsted where muriate of potash had little effect, whereas with the same dressings at Woburn muriate of potash was the more effective.

Both salt and muriate of potash slightly, but fairly consistently, increased the sugar percentage. In the 10 experiments with small applications the equivalent dressings of the two minerals produced exactly the same average increase in sugar percentage, 0.21 for 1 cwt. salt or 1.2 cwt. muriate of potash. In the remaining experiments both minerals produced substantial increases in sugar percentage at Lincoln and Mattersey, but at other centres their effects were small.

The factory series of sugar beet experiments have shown that the addition of muriate of potash tends to increase the response to sulphate of ammonia. Little information has yet been obtained on the behaviour of salt in this respect. Three experiments contained salt and muriate of potash alone and in combination with a nitrogenous fertilizer. In no case, however, was the response to nitrogen appreciably affected by the presence of either salt or muriate of potash.

2. *Celery*. Experiments on celery were carried out at Mepal (Isle of Ely) in 1935 and 1936. In the first year there were significant increases in total produce of 0.43 tons per acre to 5 cwt. salt and of 0.89 tons per acre to 3 cwt. muriate of potash. Both minerals also produced a significant increase in the size of heads. The latter result is important commercially, the heads being graded by size when packed for market.

The effect of salt was strikingly different in 1936. Salt was applied in dry weather, six days before planting. No rain fell for some time afterwards. The salt decreased plant numbers by nearly 30 per cent. and yields of total produce by 16 per cent. Superphosphate visibly mitigated the salt damage, and to some extent this effect is also reflected in the yields of total produce. Under the same conditions muriate of potash produced a small but not significant increase in total yield and a significant increase in size of heads.

3. *Mangolds*. The effects of salt on mangolds are summarised on p. 43.

Mangolds

The classical experiments on Barnfield are made in the somewhat exceptional conditions of continuous growth of mangolds on the

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