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Minor Elements in Plant Nutrition

Rothamsted Research

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The effect of superphosphate is as marked as that of nitrogen and the response continues even to the larger dressing. On the light peaty fen, potash also produces a marked increase but on the clay fen its effect is less. The early potatoes on the silt soil at Wisbech were less responsive but still gave definite responses to superphosphate and sulphate of ammonia.

At one fen centre, Wimblington, March, on a light fen soil, the effect of adding dung was tested. Sulphate of potash gave marked responses even in the presence of dung; sulphate of ammonia was less effective. The dressing of 2½ cwt. each of sulphate of ammonia and sulphate of potash with superphosphate proved nearly as effective as 8 tons of dung per acre. The increases were :

	Mean Effect.	Dung Absent.	Dung Present.
Sulphate of ammonia, 2½ cwt.	0.56 tons	0.29	0.83
Sulphate of potash, 2½ cwt.	3.80 "	4.93	2.68
Dung 8 tons	5.00 "	—	—
Standard errors	±0.177	±0.250	

The investigations on the quality of potatoes begun in 1929 in association with Messrs. Lyons have now been transferred almost entirely to their laboratories, but a few key determinations continue to be made here so as to facilitate linking up with their work.

MINOR ELEMENTS IN PLANT NUTRITION

The investigations on boron are still being continued by Dr. Brenchley and Miss Warington.

Manganese is needed by plants, though only in small amounts; in its absence they become liable to certain diseases such as grey speck disease of oats. Chemical examination shows that the determining soil factor is not the actual amount of manganese present, but the proportion that exists in the exchangeable form and the tenacity with which it is held.

Molybdenum salts have been found to cause symptoms that look very much like those of Virus disease. This observation is being followed up in the Plant Pathological and Botanical Departments. Mr. W. A. Roach at East Malling has shown that some fruit tree stocks can take up molybdenum from the soil and others cannot.

ORGANIC MANURES

(1) *The Use of Straw as Manure.*

With the increasing tendency to break away from fixed rotations the systematic return of the straw to the land in the form of farmyard manure is becoming more and more difficult and two alternative methods are being compared with farmyard manure at Rothamsted: in one the straw is rotted artificially before being applied; in the other it is ploughed direct into the land but artificials are added to furnish the necessary food for the micro-organisms effecting the decomposition. The effect is then observed in the year of application and in each of the four succeeding years. For each manure there are thus five plots under each crop in each year, one of which has received the manure during the year, another received it one year ago, while others had it two, three, and four years ago. The straw ploughed in with the appropriate artificials proved at least as useful as farmyard