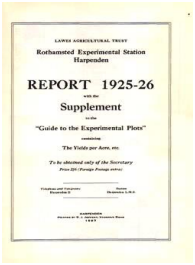
Report 1925-26 With the Supplement to the Guide to the Experimental Plots



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Influence of Weather on Yields

Rothamsted Research

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The Latin square is the more accurate but less widely applicable in fertiliser experiments. The plots are arranged with as many rows and columns as there are treatments. Each treatment appears once, and only once, in each row and each column. A surprisingly large number of arrangements are possible, but the selection is again deliberately at random and, as before, is effected by the shuffling and drawing of cards. The potassic fertiliser experiments on potatoes are an example (p. 138).

Two years' experience of these methods has satisfied us that they are practicable, though they are costly because they necessitate large numbers of plots: a single experiment may require some 50 to 80 plots. The additional accuracy, as compared with the older methods, is a great boon to the agricultural expert because it gives him much better material on which to base his advice to farmers. And it has the supreme advantage that the actual figures of crop yield have for the first time become definite scientific data, so that they can be related to other values such, for example, as meteorological data. Strict comparison can be made where previously only vague and general comparisons were possible.

THE INFLUENCE OF WEATHER ON CROP YIELDS AND FERTILISER ACTION.

The new methods outlined above for making field experiments, and studying the results, make it possible to discover with considerable precision the influence on crop yields of rain, temperature, sunshine, or any other meteorological factor that can be measured and expressed in figures. Dr. Fisher has already traced the connection between rainfall in the different months of the year and wheat yields under different fertiliser treatments: a similar investigation into barley yields has now been made. The effect of hours of sunshine on wheat yields has also been examined: the most striking effect is of autumn sunshine just before or just after the sowing of the crop: whether the benefit arises from the warming or the drying of the soil is not yet found. For the rest of the year, even in July, actual sunshine seems unimportant: the great weather factors seem to be the temperature and the rainfall.

Observation in the field has brought out several interesting facts: that nitrogenous fertilisers are affected less than any others by season (p. 17), that phosphates act better on swedes and turnips in a cold, wet year than in a good growing season (p. 18), that potassic fertilisers act better on potatoes in a dry spring than a wet one (p. 23). With fuller knowledge of these actions it would be possible to draw up schemes of manuring suitable to any specified kind of season. To some extent this has been done for potatoes. There are each year at Rothamsted a number of plots of potatoes receiving various manures. The highest yield shows little variation from year to year, being about 12 tons per acre whatever the season (excepting in 1921, the summer of exceptional drought). But the manurial treatment required to get it does vary: in some seasons potassic manures were the most important, and in others nitrogenous.

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