ROTHAMSTED RESEARCH

Report for 1929

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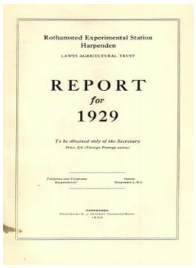

Effect of Weather on Wheat and Barley

Rothamsted Research

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RELATION OF WEATHER CONDITIONS TO YIELD OF WHEAT AND BARLEY.

The Statistical Department is investigating the relationships between weather and crop yield under different fertiliser treatments. Of the weather factors, rainfall is at Rothamsted the most important in determining total yield, both the amount and distribution having great effect. For wheat, winter rainfall is harmful: for barley it is beneficial at Rothamsted, but not, apparently, on the lighter soils of East Anglia. Spring rainfall, January and February on light soils in East Anglia, and March and April on the heavy soil at Rothamsted, is harmful to barley but not to wheat, July rainfall benefits barley but not usually wheat. The effects, however, depend on the manurial treatment, and indeed one of the practical results of the investigation is to show the kind of treatment that would be most effective in seasons of various characters.

Up to the time of ripening, temperature is less important so far as the total growth is concerned, and hours of sunshine still less. Plant physiological work in the laboratories has partly explained the relatively small effect of temperature on the total growth of the plant: it appears that low temperatures tend to increase the size of the leaf but to reduce the amount of plant substance each unit area can make, while the higher temperatures tend to reduce the size of the leaf but to increase the amount of plant substance made by each unit area: as a result of this compensating action the yield varies less than might be expected from changes in temperature.

The position is altered however as soon as ripening begins: vegetative growth then slackens greatly or entirely ceases. High temperature hastens the setting in of this change, and if it comes early it may cut short a period of very active growth, so lowering the yield: for example, high temperatures in May and June reduce the yield of barley.

LOSSES FROM ARABLE LAND.

Weeds. Of all losses of arable crops those due to weeds are the most serious: there is no surer way of reducing yields than by allowing weeds to grow. Fallowing is a recognised method of keeping weeds down, but it is complicated by the fact that weed seeds can lie in the ground for some time without germinating. Dr. Brenchley and Miss K. Warington show that many of them have a period of natural dormancy during which they will not germinate even if the conditions are favourable. Poppy *(Papaver rhoeas)* for example has a long dormancy period and can survive for several years, so that it cannot be eliminated even in a whole year fallow: black bent *(Alopecurus agrestis)* has a short dormancy and can be eradicated by a short fallow. Comparatively few weeds germinate freely throughout the year, most of them do it best in autumn rather than in spring or summer.

Soil Acidity. The great importance of soil acidity has stimulated chemists to devise methods for measuring it and one of these, the quinhydrone method, has come into general use because of its convenience and simplicity. Dr. Crowther and Miss Heintze have found a serious flaw in it that has hitherto not been suspected. Some soils from the Gold Coast had been sent for a report on their

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