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Report 1921-22 With the Supplement to the Guide to the Experimental Plots Containing the Yields per Acre Etc.



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Crops and Crop Production

Rothamsted Research

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- LII. W. A. ROACH. "*Studies in the Varietal Immunity of Potatoes to Wart Disease (SYNCHYTRIUM ENDOBIOTICUM SCHILB., PERC.)*." Part I.—*The Influence of the Foliage on the Tuber as shown by Grafting*. *Annals of Applied Biology*, 1923. Vol. X. pp. 142-146.

Grafting experiments of a preliminary nature have been carried out to throw light on the functions of the various organs of the potato plant in rendering the tubers immune or susceptible to Wart Disease (*Synchytrium endobioticum* Schilb., Perc.).

Composite plants were built up by grafting in the following ways:—

3	plants of the type	Immune	grafted on	Immune
3	"	"	Susceptible	"
4	"	"	Immune	"
2	"	"	Susceptible	"

The results indicate that the character of the foliage has no influence on the immunity or the susceptibility of tubers to Wart Disease.

It follows that no compound synthesised in the leaves is likely to be responsible for separating potatoes into "immunes" and "susceptibles." The investigation is being continued with the view of finding, if possible, the chemical differences corresponding with the biological differences between immune and susceptible varieties.

TECHNICAL PAPERS.

CROPS AND CROP PRODUCTION.

- LIII. E. J. RUSSELL. "*The Barley Crop. A Study in Modern Agricultural Chemistry*." *Journal Inst. Brewing*, 1922. Vol. XXVIII. pp. 697-717.

Barley, like wheat, flourishes best in relatively dry conditions, and the map showing its distribution in England and Wales is much like an inversion of the rainfall map. In Norfolk it occupies no less than 15% of the land in cultivation and in other counties of low rainfall it occupies between 9% and 14%; in the wetter counties, however, it occupies much less. The yield is chiefly determined by the quantity of nitrogen supplied. When barley is grown year after year on the same ground at Rothamsted the yield steadily falls off for some reason which cannot yet be found. This falling off is less with farmyard manure than with artificial fertilisers. In ordinary farm practice there is no indication of falling yields, but rather the contrary; given adequate manuring, however, the yield is still limited by the season and the strength of the straw.

It is often stated that the quality or malting value of the barley is inversely related to the nitrogen content of the grain, and where large differences are concerned this is generally true. But on any given farm it does not appear that the nitrogen content is much affected by the manuring so long as the conditions are not profoundly altered; the valuation also is not influenced in any regular way.

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High malting value seems to be associated with favourable conditions during the second part of the plant life when vigorous growth is followed by good ripening. These conditions almost necessitate a low nitrogen content since nitrogen assimilation occurs mainly in the early part of the plant life; if there is vigorous growth afterwards it is mainly an accumulation of non-nitrogenous material. In these conditions, therefore, low nitrogen content would be related to malting value. But a low nitrogen percentage might equally result from a low nitrogen intake in the early life of the plant, and in this case there would be no necessary relationship with malting value.

LIV. E. J. RUSSELL. "*Report on the Experiments on the Influence of Soil, Season and Manuring on the Quality and Growth of Barley, 1922.*" *Journal Inst. Brewing*, 1923. Vol. XXIX. pp. 624-654.

Experiments have been made on a uniform plan on a number of farms known to grow barley well. The yields are given on p. 104, as also are the percentages of nitrogen and the values assigned by the maltsters. As this is the first year of the experiments, no conclusions are drawn; the following results, however, were obtained:—

Nitrogenous manure (sulphate of ammonia) produced its usual effect of increasing the yield by about 5 bush. for 1 cwt. sulphate of ammonia, excepting only in two or three readily explained cases. The valuation was usually unaltered, but in one case it was increased and in two cases reduced.

Phosphates were ineffective at several centres on heavy soils where they would normally be expected to act. On the very light sand they apparently depressed the crop. We believe this to be a true effect attributable to the well-known action of phosphates in accelerating maturation. If this is confirmed by later observations it will necessitate a modification in the manurial treatment of barley on light land.

Contrary to our expectation in this bad season, potassic fertiliser was without effect on the valuation, although it had in several cases a marked effect in increasing yield.

The indication of this season's experiments are that a farmer can vary his manurial treatment within the limits of usual practice without influencing the maltsters' valuation.

The nitrogen content was usually related to maltsters' valuations when the barleys from different farms were compared, but the relationship was much less marked (only about half) when the barleys from differently manured plots on the same farm were compared. This result agrees with that already recorded above.

FERTILISERS.

ORGANIC MANURES.

LV. E. H. RICHARDS and G. C. SAWYER. "*Further Experiments with Activated Sludge.*" *Journal of the Society of Chemical Industry*, 1922. Vol. XLI. pp. 62T-71T.

If activated sludge is aerated for a short period in an ammoniacal solution there is no loss of nitrogen, any nitrogen not