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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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The Plant Disease

Rothamsted Research

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when phenol is added to the soil. But there is also an unexpected chemical decomposition which has been studied in the Chemical Department by Mr. Sen Gupta, under Mr. Page; it appears that the small quantity of manganese oxide in the soil plays an important part here.

Serious efforts are also being made to control wart disease of potatoes. Sterilising agents have been found capable of destroying the organisms in a badly infested plot of land so that perfectly clean tubers could be grown; the various problems arising out of the practical application of the method are being studied by Dr. W. B. Brierley, Mr. W. A. Roach and Miss Glynne on plots of land at Ormskirk and at Hatfield.

THE PLANT IN DISEASE.

(ENTOMOLOGICAL, MYCOLOGICAL, INSECTICIDE AND FUNGICIDE DEPARTMENTS.)

Much damage to crops is caused by the attacks of insects and fungi. These pests can often be kept in check by spraying, but on the farm it would usually be cheaper, where possible, to enable the plant itself to resist the attacks. Both methods are being studied.

In the case of one disease—the Wart Disease of Potatoes—certain varieties are absolutely immune. Attempts are being made to find out the reason for this. Immunity might be due to something made in the leaf and distributed throughout the plant, or, on the other hand, it might result from some special characteristic of the lower part of the plant. In order to test these possibilities, Mr. Roach is building up new varieties of potatoes by grafting one sort on to another; he has grafted immunes on to susceptibles and *vice versa*; the resulting plants are then grown in infested soil. So far the substitution of a top from a susceptible plant on to an immune variety has caused no loss of immunity, nor has the substitution of the top from an immune to a susceptible variety conferred immunity. It does not appear, therefore, that immunity is the result of any action in the leaf.

Considerable attention has been paid by Dr. Davidson to the aphids attacking broad beans. It is shown that the rate of multiplication of the insect on the plant differs for the different varieties of bean, though unfortunately the most resistant of the beans has little commercial value. Attempts are therefore being made to breed a variety of high resistance and at the same time having a value to the farmer comparable with that of the present kinds. Even with the same variety, however, the power of resistance is affected by the dissolved substances in the plant tissues, and this can be modified by changes in the nutrients supplied to the plant. In both directions there seem to be possibilities of the control of this troublesome pest.

The usual history of this particular pest is that the asexual forms (which do the damage to the crop) continue throughout the Summer, and are then followed by sexual forms in October which produce eggs that lie dormant through the Winter and hatch out in the following April. Dr. Davidson has, however, shown