ROTHAMSTED RESEARCH

Report for 1927-28

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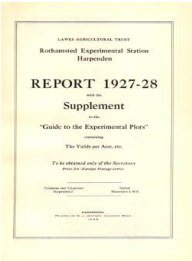

Entomology

Rothamsted Research

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Nothing is known of the nature of virus except that it is not a recognisable organism; the name is entirely non-committal and is used to denote the agent causing these particular diseases. Virus is often contained in extracted plant juice, and certain of its properties have been studied, *e.g.*, its reaction towards alcohol, temperature and ageing, but the problem is rendered difficult by the circumstance that a virus disease apparently may not in all cases be a single disease, but a complex caused by two or more viruses closely related, but differing in stability or other property. A virus may not be specific to one plant: the foliage of potatoes suffering from mosaic will infect tomato plants, though that of healthy potato plants will not. Other solanaceous hosts may also be infected with the virus of potato mosaic, but not the non-solanaceous hosts tested. Two viruses mixed may give a disease different from that caused by either: the aucuba mosaic of tomato *plus* potato mosaic causes a Tomato Streak Disease; Miss Jarrett has shown that the mottled type of Streak Disease *plus* potato mosaic also gives a Streak Disease.

These investigations are further complicated by the great difficulty of getting healthy plants for experiments: plants may have a virus disease, but show no symptoms. With certain viruses, intracellular bodies have been found in the cells of diseased plants, but their nature and significance are still uncertain.

ENTOMOLOGY.

In the Entomology Department the main work has been the study of certain insect pests and possible methods for their control. In nature, control is largely effected by parasites, and this fact has led to the investigation of the extent to which some of our insect pests are parasitised in the field. Special attention has been devoted to the parasites of Frit fly and of certain injurious Gall Midges with reference to the species involved and their economic status.

Preliminary trials by Dr. Davidson on the effects of certain substances, absorbed by the roots of plants, on sap-sucking insects have led to further exploration of its possibilities. In conjunction with Mr. Henson, Dr. Davidson has shown that broad beans watered with suitable concentrations of pyridene could be rapidly freed from aphis attack. Aphides infesting such plants failed to multiply to any appreciable extent and rapidly died. On control plants without pyridene, infestation was constant and multiplication rapid. The effects of pyridene on the plants, in the lowest effective concentrations, was noticeable in a reduction in the dry weights of those plants, but the subject is one requiring much fuller investigation. Dr. Barnes has studied the life-histories and parasites of injurious gall-midges affecting osier willows, meadow foxtail and wheat, with a view to discovering possible means of their control. In the case of species infesting osier willows, evidence of significant varietal differences in susceptibility to attack is receiving attention, both under experimental and field conditions.

Grants from the Empire Marketing Board for the purpose of controlling noxious weeds by insects, have led to work being undertaken on this subject in conjunction with the New Zealand Government and the Cawthron Institute at Nelson. The bramble

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is a serious menace in New Zealand, and the possibility of controlling it has been attempted by the shipment of consignments of the beetle (*Corœbus rubi*) from the South of France to that country. Gorse is another pest plant, and very large numbers of the weevil *Apion ulicis,* have been sent to control it. Ragwort is a third pest, and many thousand pupæ and eggs of the moth *Tyria jacobæ* have been shipped to New Zealand. Before being sent out, the insects are tested at Rothamsted on all likely plants growing under British conditions; in New Zealand they are further tested before liberation, so that the possibility of danger is reduced to a minimum.

This work has now been carried beyond the research stage, and methods have been evolved for the regular transmission to New Zealand of the insects concerned. The scheme in future is to be centralised and further developed under the special facilities available at the laboratory of the Imperial Bureau of Entomology at Farnham Royal, and the co-operation of Rothamsted will consequently terminate.

Dr. Handschin has devised apparatus for studying the movements of insects in the soil in response to changes of temperature and humidity, with greater refinement than was hitherto possible. His work on the subject is being continued on his return to Basle, and will be further elaborated before any publication of the results is made.

INSECTICIDES.

The investigations carried out under the direction of Dr. F. Tattersfield in collaboration first with Mr. C. T. Gimingham and now with Dr. Hobson, have, for their general purpose, the discovery of new and improved substances for killing the insect pests of fruit and other trees. Much of the work is done in the laboratory and insectary, but as soon as a promising substance is found it is tested in the open on growing trees, so as to find out how far it would be effective in practice.

Insecticides fall into two great groups: those used in winter against the eggs, which are generally laid by the parent on the tree to be attacked, and those used in summer against the young animal as soon as possible after it hatches out. The eggs, being more resistant than the young animal, need a stronger poison: fortunately, the tree is then resting and is devoid of leaves so that it can tolerate substances that would injure it later on: hence winter washes must and can, without harm, be fairly potent.

The older winter washes were made up of caustic soda, or lime and sulphur; more recently tar distillates have come into use and these are now standardised sufficiently well for practical purposes. Being by-products they are likely to change if the method of treating coal should alter. Other winter washes are sought at Rothamsted, the work being done on systematic and fundamental lines, finding out what chemical groups are most

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