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ROTHAMSTED
RESEARCH

Report for 1937

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Entomology

Rothamsted Research

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These new methods have proved very popular and are now adopted all over the British Empire and in many other countries of the world. The principle of randomisation introduced by Dr. Fisher, and his subsequent developments of factorial design and of "confounding," have been carried further by Mr. Yates. He has also worked out quasi-factorial and other designs which are being widely adopted in plant breeding and other work which necessitates the testing of a large number of varieties.

(2) Sampling problems such as crop estimation, forecasting, etc. Methods are being worked out experimentally for wheat and a beginning has been made with methods for potatoes and sugar beet.

(3) Methods of analysis have been designed to deal with data collected in various surveys; among these are the results of the Rothamsted Barley Conferences; the enquiry of the Potato Marketing Board on the blackening of potatoes when boiled; and others.

The work of this Department is widely known and attracts much attention from overseas countries. A constant stream of research workers come here for study: last year's group included students from Australia, China, India, Kenya and Iceland. Mr. Yates had a very successful lecture tour in the United States where his work has been attracting considerable attention because of its importance in agricultural planning and development.

MICROBIOLOGY DEPARTMENT

The investigations on biological purification of effluents from sugar beet and milk factories carried out during the past 11 years under the aegis of the Department of Scientific and Industrial Research will be completed during the present year (1938). The work has been done jointly by the Fermentation and General Microbiology Departments and it has proved of great value to the general work of both Departments.

The bacterial flora of some of the Rothamsted plots is shown to be affected not only by the manuring but also apparently by the crops. The protozoan fauna in the soils collected by the British East Greenland Expedition 1935-36 has also been studied.

ENTOMOLOGY

The work on insect population and insect activity has continued; light trap observations went on till February 1937, and were then stopped so as to allow the large numbers of results to be worked out. The number of insects caught during the night was fairly closely related to the minimum temperature; a rise of 4 or 5 degrees F. over the minimum temperature approximately doubled the catch independent of the time of the year or the species of insect. The maximum temperature, however, was much less important.

Work on certain special insects has been continued, notably midges, cabbage aphids and white flies. Much attention has been devoted to insect migration and it has been shown that some of the insects at any rate tended to migrate simultaneously in Europe and in North America. This work on migration will now be put on to a much sounder basis as a grant has been given from the Leverhulme Trustees for the appointment of additional staff.

Increasing attention has been devoted to soil insects and the Department will probably orient its work more and more in this direction for the next few years. Sterilisation of the soil kills all insects but recolonisation soon begins and the population may become three or four times as great as in the untreated soil: it rose as high as 450 millions per acre in one experimental plot.

Especial attention has been paid to the control of wire worms by insecticides and trapping. This work is done in association with the leading groups of heavy chemical manufacturers in the country, Imperial Chemical Industries Dyestuffs Group, and the Association of British Chemical Manufacturers.

Intensive studies on leather jackets are made in association with the Golf Green Research Station at St. Ives.

INSECTICIDES

Considerable developments have occurred during 1936-1937 and this work has now been much extended owing to the action of the Colonial Office and the Ministry of Agriculture in providing additional funds for the examination of British Empire products: Derris and other vegetable insecticides can now be investigated more expediently and more extensively than in the past.

The investigations on pyrethrum have now reached a stage where general conclusions and a full report become possible.

INVESTIGATIONS ON HONEY PRODUCTION

These fall into three groups:

- (1) Problems of honey production under healthy conditions;
- (2) Bee diseases;
- (3) Properties of honey, studied with a view to devising methods of detecting adulteration.

Separate reports are submitted on these subjects but attention should be drawn to the marked interest taken in this work by the honey producers who contributed considerably towards its expense in spite of the circumstance that most of them are only in a small way of business.

THE FARM

As far as possible any records likely to be of practical interest are taken. For some years past measurements have been made of the power consumed in the ordinary farm work of thrashing, grinding, chaff cutting, etc. Electric motors and oil engines have both been used so as to compare units of electricity with gallons of paraffin as sources of power, and to obtain some estimate of the incidental advantages associated with each. This work was done at the instance of the Royal Agricultural Society and paid for out of the grant made by them; it is now completed and the final report is being drawn up.

Experiments are also being commenced on the ploughing up of grassland with a view of studying some of the problems raised during the ploughing up programme of 1917 but left unsolved since.

On the commercial farm the method of rearing calves has been replaced by a much cheaper one which if satisfactory should prove of some value.