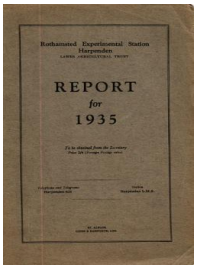
ROTHAMSTED RESEARCH

Report for 1935

Full Table of Content



The Plant in Disease : Control of Disease

Rothamsted Research

Rothamsted Research (1936) *The Plant in Disease : Control of Disease ;* Report For 1935, pp 119 - 123 **- DOI: https://doi.org/10.23637/ERADOC-1-67**

LII. H. L. RICHARDSON. "*The Nitrogen Cycle in Grassland Soils.*" Transactions of the Third International Congress of Soil Science, 1935, Vol. I, pp. 219-221.

In normal grassland soils the equilibrium levels of ammonia and nitrogen are low, the level of ammonia being consistently above that of nitrate. These equilibrium values show no clear seasonal changes or effects of long-continued manurial treatments. They are rapidly restored after the addition of nitrogenous fertilisers. Added ammonia nitrogen appears to be absorbed by the herbage no less rapidly than nitrate nitrogen. Incubation experiments on soil from the Park Grass plots showed that the amount of mineralisable nitrogen rose to a maximum in early spring and fell to a minimum in late summer, unless the summer were unusually dry.

THE PLANT IN DISEASE: CONTROL OF DISEASE

(Departments of Entomology, Insecticides and Fungicides, and Plant Pathology)

(*a*) INSECTS AND THEIR CONTROL

LIII. C. B. WILLIAMS and P. S. MILNE. "*A Mechanical Insect Trap.*" Bulletin of Entomological Research, 1935, Vol. XXVI, pp. 543-551.

The trap consists of two nets in the mouth of which are electric fans which blow a current of air and the insects therein into the nets. The arm bearing the two nets revolves slowly and the level can be altered.

LIV. C. B. WILLIAMS and F. J. KILLINGTON. "*Hemerobiidae and Chrysopidae* (*Neur.*) *in a Light Trap at Rothamsted Experimental Station.*" Transactions of the Society for British Entomology, 1935, Vol. II, pp. 145-150.

A list of the species of two families of Neuroptera captured in the light trap together with an analysis of their sexes, times of appearance during the year and times of flight during the night.

LV. C. B. WILLIAMS, "*The Times of Activity of Certain Nocturnal Insects, chiefly Lepidoptera, as indicated by a Light Trap.*" Transactions of the Royal Entomological Society of London, 1935, Vol LXXXIII, pp. 523-555.

The paper contains a description of the light trap with its bottle-changing mechanism which enables the insects to be sorted according to the time of night that they enter the trap. Tabulations are given showing the time of flight at night of about eighty species of Lepidoptera, as well as some species of other orders and also certain families and orders. The results obtained in two years are shown to be very similar.

LVI. C. B. WILLIAMS. "*Further Evidence for the Migration of Butterflies.*" Bulletin de la Société Royale Entomologique d'Egypte, 1935, pp. 250-261.

A collection of about thirty records of directional movements of butterflies in various parts of the world published as evidence of migration.

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LVII. H. F. BARNES. "*On the Gall Midges Injurious to the Cultivation of Willows.* II. *The So-called 'Shot Hole' Gall Midges* (Rhabdophaga *spp*)." Annals of Applied Biology, 1935, Vol. XXII, pp. 86-105.

Previous workers assumed that only one species of gall midge was responsible for "shot hole" damage on willows. In this paper four species, three of which are described for the first time, are recognised. Their bionomics have been worked out. All the species reproduced by means of unisexual families while three of them are single brooded, the remaining species having two broods a year. All the species are restricted to one species of cultivated willow. Certain parasites which attack the midges are recorded.

LVIII. H. F. BARNES. "*Studies of Fluctuations in Insect Populations. IV. The Arabis Midge,* Dasyneura arabis (*Cecidomyidae*)." Journal of Animal Ecology, 1935, Vol. IV, pp. 119-126.

The bionomics of this species are given. The dates of emergence and the number of generations during the period 1928-34 have shown the constancy with which the minor variations caused by differences in weather conditions become levelled out by the end of each year. Delayed fertilisation of the females is shown to send up the numbers of males in the ensuing family. In addition as the season advances the percentage of males decreases.

LIX. H. F. BARNES. "*Studies of Fluctuations in Insect Populations. V. The Leaf-curling Pear Midge,* Dasyneura pyri (*Cecidomyidae*)." Journal of Animal Ecology, 1935, Vol. IV, pp. 244-253.

The dates of emergence and number of generations of this species during the period of 1928-1933 are given. A limitation of generations by the length of the season in which new growth can be found on pear trees is suggested. The parasite *Misocyclops marchali* is recorded as attacking the second and ensuing generations of the midge but in no case the first generation of the year. The sex ratios of the various generations of the midge varies, as the season advances so the percentage of males increases. This is exactly the reverse of what happens in *Dasyneura arabis* (see Paper No LVIII). This can be explained on the hypothesis that the further developed the eggs are at the time of entry of the sperm the more males result.

LX. H. F. BARNES. "*Studies of Fluctuations in Insect Populations. VI. Discussion on Results of Studies I-V.*" Journal of Animal Ecology, 1935, Vol. IV, pp. 254-263.

Additional data on the wheat blossom midges and the button top midge of willows brings the published information complete up to 1935. It is shown that the major fluctuations in numbers of gall midges are caused by the action of weather on the insect, the host plant, and the insects' parasites. The whole series of studies is discussed from this view point.

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LXI. J. MARSHALL. "*The Location of Olfactory Receptors in Insects : a Review of Experimental Evidence.*" Transactions of the Royal Entomological Society of London, 1935, Vol. LXXXIII, pp. 49-72.

LXII. J. MARSHALL. "*On the Sensitivity of the Chemoreceptors on the Antenna and Fore-tarsus of the Honey-bee,* Apis mellifica L." Journal of Experimental Biology, 1935, Vol XII, pp. 17-26.

LXIII. H. L. A. TARR. "*Studies on European Foul Brood o Bees. I. A Description of Strains of* Bacillus alvei *obtained from different Sources and of another Species occurring in Larvae affected with this Disease.*" Annals of Applied Biology, 1935, Vol. XXII, pp. 709-718.

Strains of *Bacillus alvei* from four countries have been studied in detail, and certain differences were found with respect to the ability of these organisms to produce acid from a series of fermentable carbon compounds. It has been suggested that these variations might form a basis for differentiating strains of this organism. The characteristics of another spore forming bacillus which appears to take the place of *B. Alvei* in certain cases of European foul brood have been described in detail. The various theories which have been presented in an attempt to explain the etiology of this disease are briefly discussed.

LXIV. F. TATTERSFIELD and J. T. MARTIN. "*The Problem of the Evaluation of Rotenone-containing Plants.* 1. Derris Elliptica *and* Derris Malaccensis." Annals of Applied Biology, 1935, Vol. XXII, pp. 578-605.

Seven samples of *Derris* root have been examined chemically, and the following determinations carried out : rotenone (crude and and recrystallised), ether extract, methoxyl content, and dehydro compounds. The importance of using standard methods of analysis is stressed.

Insecticide tests have been carried out and comparisons made between pairs of samples tested on the same day.

When comparisons were made between pairs belonging to different species of *Derris*, the determinations of rotenone by the present methods, ether extract or methoxyl content did not express accurately the relative insecticidal potencies of the pairs of samples. When comparisons were made between pairs of the same species, all these determinations appeared to give a closer measure of their relative activities.

The estimation of the dehydro compounds, or of rotenone plus the dehydro compounds in the resin, gave a better assessment of the relative potencies than the other determinations, whether comparisons were made between samples of the same, or of different species. Further work on other samples is, however, needed.

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LXV. F. TATTERSFIELD. "*Fish-Poison Plants as Insecticides. A Review of Recent Work.*" The Empire Journal of Experimental Agriculture, **1936**, Vol. IV, pp. **136-144**.

The insecticidal importance of the various crystalline derivatives isolated from fish-poison plants, and the difficulties met with in the chemical evaluation of these insecticidal plants are briefly discussed. The relative importance of several species of *Derris*, *Lonchocarpus*, and *Tephrosia* is discussed.

(*b*) VIRUS DISEASES.

LXVI. J. CALDWELL. "*Physiology of Virus Diseases in Plants. VII. Experiments on Purifications of the Virus of Yellow Mosaic of Tomato.*" Annals of Applied Biology, **1935**, Vol. XXII, pp. **60-85**.

Purification by Vinson and Petre's method, slightly modified, gave an infective material that always contained organic nitrogen, and was active over a *p*H range from **2.0** to **10.5** ; but there was no evidence that the virus could be recovered pure in crystalline form. Various methods used to purify the virus still further are described.

LXVII. J. CALDWELL. "*On the Interaction of Two Strains of a Plant Virus. Experiments on Induced Immunity in Plants.*" Proceedings of the Royal Society, B, **1935**, Vol. CXVII, pp. **120-139**.

Two strains of the Yellow Mosaic Virus of tomato have been isolated, of which one, although not apparently an attenuated form of the other, immunises host plants against the second. The types of interaction which may occur when two viruses are present simultaneously in the one host are discussed and differentiated.

LXVIII. G. SAMUEL, R. J. BEST and J. G. BALD. "*Further Studies on Quantitative Methods with Two Plant Viruses.*" Annals of Applied Biology, **1935**, Vol. XXII, pp. **508-524**.

The arrangement of experiments for the comparison of several virus samples is discussed and suitable methods suggested. The amount of inoculum, provided enough is used to cover the eaf, does not affect the number of lesions produced by the spatula technique ; but the conditions to which test plants were subjected shortly before inoculation had a considerable effect. The *p*H and electrolyte content of the inocula influence the number of lesions. The optimum *p*H for tomato spotted wilt is from **6.0—8.5**, for tobacco mosaic (with concentration **0.05—0.2** M) about **7.0**. The influence of oxidising and reducing agents on the virus of spotted wilt is further discussed.

LXIX. M. A. HAMILTON. "*Further Experiments on the Artificial Feeding of* Myzus persicae (*Sulz*)." Annals of Applied Biology, **1935**, Vol. XXII, pp. **243-258**.

A method is described for the feeding of *M. persicae* on media containing a radioactive indicator. By this means it was shown that *M. persicae* picks up the indicator from the medium and transmits to a leaf, on which it is fed later, a constant proportion of the amount imbibed. Evidence is given to show that the virus probably behaves as does the radioactive indicator.

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(*c*) FUNGUS DISEASES.

LXX. M. D. GLYNNE. "*Incidence of Take-all on Wheat and Barley on Experimental Plots at Woburn.*" Annals of Applied Biology, 1935, Vol. XXII, pp. 225-235.

Surveys made in 1931, 1932 and 1933 of the incidence of Take-all, *Ophiobolus graminis* Sacc. in the continuous wheat and barley manurial experiments at Woburn Experimental Station showed the disease was present in varying amount in most plots; the percentage being usually higher in wheat than in barley and little or no disease occurring in plots with a *p*H value of 5 or less. In wheat Take-all appeared to increase in each plot until 35 per cent. of the plants were infected and then to decrease.

TECHNICAL AND OTHER PAPERS

GENERAL.

LXXI. E. J. RUSSELL. "*Jacob G. Lipman and Soil Science.*" Soil Science, 1935, Vol. 40, pp. 3-7.

LXXII. R. K. SCHOFIELD and G. W. SCOTT BLAIR. "*The Infuence of the Proximity of a Solid Wall on the Consistency of Viscous and Plastic Materials.*" Journal of Physical Chemistry, 1935, Vol. XXXIX, pp. 973-981.

Measurements have been made of the rate of flow of an aqueous paste of barium sulphate through tubes differing considerably both in radius and length under a series of pressure heads. The results show that for tubes of the same radius and under the same pressure gradient, the rate of flow is independent of the length of the tube; from which it is concluded that under the conditions of these experiments, this material shows no progressive breakdown with time under shear, as suggested by Ambrose and Loomis for bentonite.

For different radii, however, curves for $V/\pi R^3$ against PR/2L were obtained which, as previously recorded, do not coincide as they should if at every point in the tube the velocity gradient depends only on the shearing stress.

The hypothesis previously advanced that the proximity of the wall of the tube causes a sheath of material to shear more easily than does the bulk of the material, appears therefore to be the only one at present that accounts for the facts.

The case of this barium sulphate paste is particularly interesting, as the particles are roughly cubical in form, and the thickness of the modified layer is many times the average particle diameter.

LXXIII. C. B. WILLIAMS and G. A. EMERY. "*A Photographic Moonlight Recorder.*" Journal of Scientific Instruments, 1935, Vol. XII, pp. 111-115.

An apparatus in which a cylindrical lens produces a line image of the moon on a strip of photographic paper. The lens is moved by clockwork to follow the moon's apparent movement across the sky and the sensitised strip is darkened when the moon is shining. The apparatus can also be used, with some adjustments, as a sunshine recorder.

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