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## Report for 1931

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## Survey of Fungus Diseases at Rothamsted and Woburn

### Rothamsted Research

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it remained very wet inside with condensed moisture during winter months, while painted black it became very hot in summer though it was always dry inside.

## FUNGUS DISEASES OF CROPS ON EXPERIMENTAL PLOTS AT ROTHAMSTED AND WOBURN, 1931

M. D. GLYNNE

### WHEAT

MILDEW (*Erysiphe graminis* DC.) was first observed in June, and was most plentiful in July. It was generally slight, but in Little Hoos Top Dressing experiment at Rothamsted and in the New Rotation experiment on Stackyard field at Woburn the disease was moderate to plentiful.

WHITEHEADS (TAKE-ALL) (*Ophiobolus graminis* Sacc.) was first observed in May. The severity of the attack varied considerably from field to field and from plot to plot. It was more common on wheat grown continuously or in alternate years on the same land than when longer intervals occurred between each wheat crop. On Broadbalk the disease appeared to be rather more plentiful on the badly nourished plots 3—5 than on the others. It was considerably more plentiful at Woburn than at Rothamsted.

The permanent wheat plots on Stackyard Field, Woburn, showed such great differences in the incidence of disease on differently manured plots that a detailed survey was made which will be published later. On plots with a high degree of soil acidity the disease was absent or very much less than on those with a higher pH.

LOOSE SMUT (*Ustilago Tritici*. (Pers.) Jens.) This occurred on several plots of Broadbalk. At Woburn it was found on the Continuous Wheat in Stackyard Field and on the Green Manuring Experiment in Lansome Field. It was also present on the variety Square Heads Master, but not on Yeoman II in the Precision Wheat Experiment on Lansome. Its incidence was slight.

YELLOW RUST (*Puccinia glumarum*, (Schm.), Erikss. and Henn.) Was observed as slight in early June but increased as the season advanced. The attack varied from field to field, and from plot to plot, and on the whole was more abundant where the crop was heavy. In Woburn, on the Precision Wheat, it was more abundant on Square Heads Master than on Yeoman II, especially early in the season. It was very plentiful on Winter Wheat Var., Wilhelmina sown in July on Fosters Field, especially in September, when the leaves looked yellow with rust. In October, however, though the older leaves were still badly affected, the younger ones were green and appeared to be growing away from the disease.

BROWN RUST (*Puccinia triticina* Erikss). Very plentiful in September on Winter Wheat, var., Wilhelmina sown in July, in Fosters Field. In October the plants appeared to be growing away from the disease, as the young leaves were very much less badly affected than the old ones.

LEAF SPOT (*Septoria Tritici* Desm). Was found on all the wheat fields; its incidence was on the whole slight.

FOOT ROT (*Fusarium* sp.). Was found on the underground parts of the wheat plants as a white mycelium. Its incidence was very

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slight at Rothamsted, except on Hoos Field Wheat after Fallow, where it was present, though not plentiful.

At Woburn it was very slight on the Continuous Wheat on Stackyard, while on the Green Crops as Manures in the same field it was more plentiful, though still slight. It contrasted with Whiteheads, which was very plentiful on some plots of Continuous Wheat and very slight on the Green Crops as Manures.

#### OATS

MILDEW (*Erysiphe graminis*, DC.). Was found much more abundantly on the spring-sown than on the winter oats. The attack was especially heavy on the dark green, well-nourished plants. It was found fairly plentifully on Great Harpenden, Pastures and Broadbalk spring oats, and was present but not plentiful on the winter oats on Great Harpenden and Little Hoos fields.

LOOSE SMUT (*Ustilago Avenae* (Pers.), Jens.). Was found in the winter oats from June onwards. It was scattered through the crops and was fairly plentiful in Great Harpenden, in Little Hoos, and at Woburn in Lansome Field. It was not found on the spring oats.

CROWN RUST (*Puccinia Lolii* Niels). Was slight early in the season, and by August was fairly plentiful on the spring oats. It was also found in September and October fairly commonly on oats sown in Fosters Field in July.

LEAF SPOT (*Helminthosporium Avenae* (Bri. and Cav.), Eid.) Was found on both spring and winter oats at Rothamsted and Woburn, varying in quantity from slight to moderate. In no case did it appear to do much damage.

#### BARLEY

MILDEW (*Erysiphe graminis*, DC.). Was found on most of the barley, in greatest quantity on the plots receiving heavy application of nitrogenous manure.

WHITEHEADS (TAKE-ALL) (*Ophiobolus graminis*, Sacc.). Was observed on the Continuous barley in Stackyard Field at Woburn.

NET BLOTCH (*Pyrenophora teres* (Died.) Drechsl.). Was present in all the barley crops. It varied from slight to very plentiful on different fields at Rothamsted and Woburn.

BROWN RUST (*Puccinia anomala* Rostr.). Was generally fairly common. It was very heavy in September on barley sown in July in Fosters Field.

LEAF STRIPE (*Helminthosporium gramineum* Rabenh.). Was found on most of the barley crops at Rothamsted and Woburn, killing occasional plants. The loss due to the disease appeared to be slight.

While *H. gramineum* did not appear to cause much loss in the field, it did serious damage in many pot experiments. For work of this kind disinfection of seed is strongly recommended.

LEAF BLOTCH (*Rhynchosporium Secalis* (Oud.) Davis). Was found in most, but not all the barley fields. None was found on Long Hoos, Rotation; it was most common on the Continuous barley in Hoos. At Woburn it was moderate on the Continuous barley in Stackyard and in the Rotation Cake v. Corn in Lansome Field. On most other barley plots it was slight.



## RYE

ERGOT (*Claviceps purpurea* (Fr.) Tul.). A little was found in August on the commercial rye grown for seed in Great Harpenden Field.

BROWN RUST (*Puccinia secalina*, Grove). Was present but not very plentiful except on the rye sown in July in Fosters Field, where the attack was moderate.

LEAF BLOTCH (*Rhynchosporium Secalis* (Oud.) Davis). Was present in small quantity on Little Hoos and Great Harpenden Field at Rothamsted. On Butt Furlong Field at Woburn the attack was unusually severe.

## RYE GRASS

ERGOT (*Claviceps purpurea* (Fr.) Tul.). Was found occasionally on rye grass growing at the edge of Fosters Field.

CROWN RUST (*Puccinia Lolii*, Niels). Was common in September on rye grass in the forage plots on Fosters Field.

## GRASS PLOTS

CHOKER (*Epichloe typhina* (Fr.) Tul.). A detailed eye estimation of the amount of this disease was made on all plots on June 23rd, 1931, and checked on the following day. *Epichloe typhina* was found generally on *Agrostis* and very occasionally on *Dactylis glomerata*. It varied considerably from plot to plot, as has been observed for many years. Liming appeared to reduce the disease, and ammonium sulphate even after it had been discontinued for many years, appeared to increase the disease except in the limed parts. Plots 11-1 and 11-2, which receive treble ammonium salts, had little disease, but there was very little *Agrostis* in these plots except at the edges and these plants were considerably affected.

A potash deficiency has long been regarded as a predisposing cause for this disease. A careful comparison of comparable plots with and without potash 5-2 and 5-1, 7 and 8, 9 and 10, showed similar amounts of disease in the individuals of each pair of plots except in 9 and 10. Plot 10, which lacks potash, had more *Agrostis* and more *Epichloe* than 9, but the proportion of *Epichloe* to *Agrostis* appeared similar in each plot. This observation should be repeated over a number of years.

The distribution of the disease must necessarily be partly dependent on that of *Agrostis*, and this varies very much with manurial treatment. There is, however, some evidence which suggests that the distribution of Choker varies on plots in which the amount of *Agrostis* is similar. In order to assess the parts played by the distribution of *Agrostis*, the direct effect of manurial treatment and other factors, on the incidence of the disease considerably more data are needed.

## BROAD BEAN

(On Great Knott Field, Rothamsted)

CHOCOLATE SPOT (probably *Bacillus Lathyri* Manns and Taub.). Very common.

RUST (*Uromyces Fabae* (Pers.) de Bary). Very common.

GREY MOULD (*Botrytis cinerea*, Pers.). Very common, occasional plants apparently killed by it.



### SWEDE

FINGER-AND-TOE (*Plasmodiophora Brassicae* Woron.). Was found on Barnfield, but was not common.

MILDEW (*Erysiphe Polygoni*, DC.). Fairly common.

### MANGOLD

RUST (*Uromyces Betae* (Pers.) Tul.). Was found fairly frequently on Barnfield in October.

BLACK LEG (*Phoma Betae* (Oud.) Frank). Was found on Barnfield on young plants in June, in moderate quantity. Affected roots were found but were not common at harvest.

LEAF SCORCH (*possibly non-parasitic*). Was common on plots in Barnfield in October. It was on the whole more plentiful in plots which received nitrogen as manure than in those which did not.

### SUGAR BEET

CROWN GALL (*Bacterium tumefaciens* E.F. Sm. and Towns). Was found on a few roots at Rothamsted. It was uncommon, but occasionally well developed.

RUST (*Uromyces Betae* (Pers.) Tul.). Was found occasionally in the sugar beet at Rothamsted. The attack was slight.

LEAF SCORCH (*possibly non-parasitic*). Was common both at Rothamsted and Woburn. At Rothamsted, on Rotation II on Long Hoos, it was fairly evenly distributed, and was moderate to plentiful on every plot. The difference in manurial treatment did not appear to affect the incidence of the disease.

At Woburn, on the Manurial and Cultivation Experiments on Butt Furlong Field, it varied considerably from plot to plot. Counts were therefore made of the number of plants showing "scorch" on the micro-plots and on the plots in four blocks of the main experiment.

There was some indication on the main experiment that late application of manure and the addition of sulphate increased the disease and rotary tillage reduced it. On the micro-plots, however, the addition of sulphate did not appear to increase the disease, which was on an average greatest on the unmanured plot.

### REPORT ON INSECT PESTS OF THE ROTHAMSTED FARM, 1930-1931

By H. C. F. NEWTON

GENERAL. One of the most notable features on the Rothamsted farm this year was the almost complete absence of damage to the cruciferous crops by Flea-beetles (*Phyllotreta* spp.), although last year two, and in some parts of the fields three, sowings had to be made to get a plant.

Insect fluctuations and their causes are receiving an increasing amount of attention by entomologists. Very little is known about flea-beetle attacks, beyond the broad generalisation that a dry hot spell favours attack. Wet weather may be disastrous, in spite of general opinion to the contrary, provided the temperature be not too low. The attack, however, is not determined only by the weather prevailing at the time, but also by the character of the winter, for the damage is done by beetles that developed during the previous summer and survived the winter as adults.