ROTHAMSTED RESEARCH

Report for 1935

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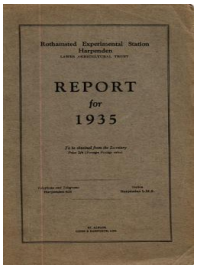

Fungus Diseases at Rothamsted and Woburn, 1935

Rothamsted Research

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WOBURN

The farm at Woburn was visited on July 13th, but no serious insect damage was seen.

FUNGUS AND OTHER DISEASES AT ROTHAMSTED AND WOBURN, 1935

MARY D. GLYNNE

WHEAT

Three diseases which had not previously been recorded on wheat in this country were found at Rothamsted in 1935.* Of these, *Cercosporella herpotrichoides* Fron. is considered one of the most important of the fungi causing foot-rot of wheat in certain parts of France and of the United States and has recently been recorded in Germany, Holland and Denmark; *Gibellina cerealis* Pass. causes "white straw" disease in wheat and is found in Italy and has recently been recorded in Oregon. *Ophiobolus herpotrichus* (Fr.) Sacc. occurs in several European countries with other fungi causing foot-rot in wheat and is generally regarded as a weak parasite of secondary importance. It has been found on wild grasses, but not previously on cereals in Great Britain and America.

Cercosporella herpotrichoides Fron. was observed in February, causing pale lesions with dark borders on the outer sheaths and leaf bases in Broadbalk and in the adjacent Pennells Piece. Spores were produced abundantly in a few days in the laboratory on material collected in the latter part of March, but hardly any were found in material collected at intervals subsequently. The lesions on sheath and stem were observed till harvest and were abundant among plants which had lodged but were also present on many which had not lodged. The disease was moderate on all Broadbalk plots and on Pennells Piece and was also recorded in certain other fields at Rothamsted.

White Straw Disease (*Gibellina cerealis* Pass.) was found affecting about twenty scattered plants on Hoos alternate wheat and fallow plot. One plant was also found on an adjacent plot of the soil exhaustion experiment.

Ophiobolus herpotrichus (Fr.) Sacc. was found in March in Pennells Piece on wheat stubble which had overwintered in the soil, but no evidence of parasitism was obtained.

Mildew (*Erysiphe graminis* DC.) was noted in February, and by the end of April was unusually plentiful on the nitrogenous manure and Precision experiments on Great Harpenden field. In June and July it was mostly slight or moderate and occasionally plentiful.

Whiteheads (Take-all) (*Ophiobolus graminis* Sacc.). As in many other districts, this disease was unusually common at Rothamsted this year. In Broadbalk it was first noted in March, and by harvest was moderate on several plots, notably the unmanured and that which receives only mineral manure. In Hoos exhaustion experiment, in which manuring has been practically discontinued

* Glynne, Mary D.—"Some New British Records of Fungi on Wheat. *Cercosporella herpotrichoides*, Fron., *Gibellina cerealis* Pass., and *Ophiobolus herpotrichus* (Fr.) Sacc." Trans. Brit. Myc. Soc., 1935, XX, p. 120-122.

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since 1901, it was particularly plentiful on those plots in which the previous manurial treatment would seem likely to leave the soil most exhausted. It was present but not plentiful, on a commercial crop grown in rotation on Long Hoos. At Woburn it was slight on the 6-Course rotation and moderate to plentiful on limed and unlimed plots of the alternate wheat and green manure experiment on Stackyard, an eye estimation of the latter suggesting that about 20 to 25 per cent. of the plants were affected. On Lansome, alternate wheat and green manure experiment, it was moderate with bad patches, particularly on the control, and on the old mustard plots which yielded very poor crops.

Loose Smut (*Ustilago Tritici* (Pers.) Rostr.) was very slight at Rothamsted and Woburn.

Yellow Rust (*Puccinia glumarum* (Schm.) Ekriss. and Henn.) was first noted in February and in March was moderate, and in some spots plentiful on the Precision wheat on Great Harpenden field, but in spite of its early appearance it did not seem more than usually abundant later in the season. It was slight to moderate on other wheat crops at Rothamsted, and rather less common at Woburn.

Brown Rust (*Puccinia triticina* Erikss.) was slight and occasionally moderate in incidence at Rothamsted, and slight at Woburn.

Foot Rot (*Fusarium* sp.) was occasional at Rothamsted and Woburn.

Leaf Spot (*Septoria Tritici* Desm.) was moderate at the end of January, causing leaf lesions in the alternate wheat and fallow crop on Hoos field and slight or absent in others. In March and April it varied from slight to moderate on other wheat crops at Rothamsted.

OATS

Mildew (*Erysiphe graminis* DC.) varied from slight to plentiful, being most abundant where growth was most luxuriant at Rothamsted.

Crown Rust (*Puccinia Lolii* Niels.) was slight on the commercial oats on Hoos field and moderate on the fumigation experiment on Pastures.

Leaf Spot (*Helminthosporium Avenae*. Eid.) was slight on both crops at Rothamsted. In November it was moderate on self-sown oats on Long Hoos field and was sporing freely. It was also found at the same time in a new crop of oats in the same field.

BARLEY

Mildew (*Erysiphe graminis* DC.) was moderate to plentiful in the late summer on most of the barley at Rothamsted, and was slight at Woburn.

Net Blotch (*Pyrenophora teres* Drechsl.) was only slight at Rothamsted and was not recorded at Woburn.

Brown Rust (*Puccinia anomala* Rostr.) was plentiful at Rothamsted in the late summer and was not recorded at Woburn.

Leaf Stripe (*Helminthosporium gramineum* Rabenh.) was slight in March on self-sown barley, but was not recorded elsewhere.

Leaf Blotch (*Rhynchosporium Secalis* (Oud.), Davis) which had

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not been found in 1933 or 1934, though fairly common in previous years, appeared this year in March and April on self-sown barley in a temporary rye grass ley on Hoos field. In the neighbouring continuous barley experiment the disease was fairly plentiful from June onwards, and in the adjacent nitrogenous manure experiment it was very abundant at the side nearest the temporary ley and slight at the opposite side. There was a distinct suggestion that the infection of these two crops may have been chiefly due to wind-borne spores from the self-sown barley in the temporary ley. In other barley crops at Rothamsted and on Stackyard at Woburn the disease was only slight.

RYE

Mildew (*Erysiphe graminis* DC.). A trace was noted on dead lower leaves in July at Rothamsted.

Brown Rust (*Puccinia secalina* Grove) was very slight in July at Rothamsted.

Leaf Blotch (*Rhynchosporium Secalis* (Oud.) Davis) was moderate to plentiful from May to July at Rothamsted. At the end of July it was found only on dead leaves.

GRASS PLOTS

Choke (*Epichloe typhina* (Fr.) Tul.) was a little less common on Agrostis than usual and was rare on Dactylis. This was possibly connected with the fact that 1935 was a "late season" and the stromata of the fungus may not have all been developed. As in previous years, the disease occurred most plentifully on the more acid plots, where also Agrostis was most common. Eggs and larvæ of the dipteron *Anthomyia spreta* Meig. were as usual found on the fungal stroma.

CLOVER

Downy Mildew (*Peronospora Trifoliorum* de Bary) was moderate in June and July at Woburn.

Rot (*Sclerotinia Trifoliorum* Erikss.) was rather plentiful in the winter of 1934 and early part of 1935 on Long Hoos 6-Course rotation and on Pastures field temporary ley. In both experiments bad patches were found on every plot. The disease was checked by frost in February, but patches in which the plants were dead or much damaged remained poor. The crop in Pastures made a better recovery than that in Long Hoos.

LUCERNE

Downy Mildew (*Peronospora Trifoliorum* de Bary) was slight at Woburn from May onwards.

BROAD BEAN

Chocolate Spot, characterised by lesions of limited area, is now regarded as due to *Botrytis* spp., which also causes lesions of unlimited area of the type previously recognised as *Botrytis* spp. Chocolate spot was first observed in the latter part of April on Little Hoos manuring experiment, and on Great Knott in a commercial crop. By the end of June it was plentiful on all plots of the manuring experiment and on the commercial crop, all except the young leaves being attacked. *Botrytis* spp. causing lesions unlimited in area

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varied in the manurial experiment from slight to moderate in plots which had received potash in the fertiliser either as potassium chloride or in dung, and from moderate to plentiful in plots which had received no potash ; potash deficiency thus appeared to result in a definite increase in the disease. The fungal attack increased, till by August 1st it was plentiful on all plots. The early attack would, however, be most likely to cause loss in crop. In Great Knott the disease was plentiful by the beginning of July, especially on the lower parts of the plants killing the older leaves and possibly causing considerable reduction in crop.

Rust (*Uromyces Fabae* (Pers.) de Bary) was slight on Little Hoos in mid-July and plentiful in all plots at the beginning of August. None was found on Great Knott in late July.

Aschochyta Fabae Speg. was found on the seeds of the crop from Little Hoos, and was fairly common in October on the leaves of self-sown plants in that field.

POTATO

Virus. Mosaic was slight at Rothamsted and Leaf Curl slight at Rothamsted and Woburn. Streak was moderate at Woburn about 10 per cent. of the plants being affected on Lansome, and about 30 per cent. on Butt Furlong.

Late blight (*Phytophthora infestans* (Mont.) de Bary) was fairly common at Rothamsted at harvest.

Early blight (*Alternaria Solani* (E. and M.) Sorauer, emend. Jones and Grout) was plentiful at harvest on the green leaves producing black patches which produced spores in damp chambers.

MANGOLD

Leaf Scorch (?physiological) and a Virus Mosaic were moderate on Long Hoos continuous cultivation experiment in October.

SUGAR BEET

Virus Mosaic was slight on Long Hoos 6-Course rotation experiment in October.

Crown Gall (*Bacterium tumefaciens* E.F. Sm. and Towns) was found on two or three roots at Rothamsted.

Rust (*Uromyces Betae* (Pers.) Tul.) was moderate in October on Little Hoos field.

Leaf Spot (*Ramularia beticola*) was found on one plant and (*Phyllosticta Betae*) occasionally on Little Hoos field.

Leaf Scorch (?physiological) was moderate on all sugar beet at Rothamsted.

Heart-rot, now ascribed to boron deficiency, was found fairly commonly in certain plots of the " nitrogen manure, spacing and date of sowing " experiment on Little Hoos field. It was more common on the early than on the late sown plots.

KALE

Downy Mildew (*Peronospora parasitica* (Pers.) Tul.) was moderate on a commercial crop in Fosters field, Rothamsted, and plentiful on Lansome field, Woburn, in a crop planted in August.

White Blister (*Cystopus candidus* (Pers.) de Bary) was slight at Rothamsted at the end of January.

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CARROT

Violet Root Rot (*Helicobasidium purpureum* (Tul.) Pat.) was found at harvest on a few roots on the experiment on Lansome field.

FARM REPORT, 1935

Weather

The year October, 1934, to September, 1935, was remarkable for the wide variations of rainfall from the monthly averages. Very wet spells alternated with very dry spells throughout the year. October and November were dry; December had an average of more than twice the normal rainfall for the month; January and March were dry, the latter providing 1.5 inches of rainfall below normal; in April the fall was just under 4 inches, twice the normal; late May and early June were very wet, and the early part of August very dry; the September rainfall totalled 4.47 inches, nearly twice the normal for the month. The total rainfall for the year amounted to 30 inches, 1.48 inches above the average.

The winter was abnormally mild, and frosts were almost entirely absent before Christmas. Frosts occurred after Christmas, but were neither severe nor prolonged. The mean temperature for the year was 2°F. above the normal of 48.1°F. In ten of the twelve months the mean temperature was above normal, the outstanding month being December, 1934, with an average of 7°F. above normal. The only two months in which the average was below normal were November, in which month the difference was only 0.1°F., and May, in which month the severe late frost occurred. On the night of May 16th, 1935, an unusually late and severe frost was experienced, 9° of frost being recorded.

In spite of the high average temperature, the total sunshine for the year was 19.4 hours below the 42-year average of 1,562.4 hours. Nine months showed a deficit; the greatest increase was provided by July which, with a total of 280 hours, gave almost 78 hours in excess of the normal.

Weather and Crops

The wet December severely interfered with the sugar beet lifting and prevented any ploughing. The dry January provided the opportunity to get most of the ploughing done, and spring corn-sowing was mainly carried out in March. The heavy rain in May and June made the grass grow ahead of the stock, and several fields, besides those originally shut for hay, were mown. The start of haymaking was delayed until June 21st by rain. Conditions during the making, however, were excellent, and in spite of the lateness in cutting, the hay was of good quality. Usually haymaking and root singling both demand labour at the same time, but this year all singling was finished by the time the cutting commenced.

Harvest commenced on July 31st, 1935, with spring oats. Conditions generally were good, though a wet spell at the end of August delayed the finish of harvest. Stubbles broke up well. The

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