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Report for 1933

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Grey Mould (*Botrytis* sp.) was plentiful in July on both fields, killing the leaves, so that by mid-July about 20 per cent. of the plants on Long Hoos appeared dead.

Rust. (*Uromyces Fabae* (Pers.) de Bary) was very slight.

POTATOES

(Variety Ally.) All the potatoes appeared healthy in June and July. At Rothamsted the tops, however, died early, possibly owing to the dry season.

Stem Canker (*Corticium Solani* Bourd. and Galz.) was moderate on Butt Furlong in the Six Course Rotation at Woburn.

Black Leg (*Bacillus phytophthorus* Appel) was rare; only one affected plant was found at Woburn.

SUGAR BEET

On the whole very healthy.

Black Leg. A little was found on Pastures Field, Rothamsted, and on Lansome field, Woburn.

MANGOLDS

Black Leg. Early in June blackened main roots were detected in some of the young seedlings.

Mosaic (possibly Virus). A leaf Mosaic was very common on the mature crop and varied in incidence from 3 to 70 per cent. on different plots. It was clear that the disease had spread from centres of infection, advancing apparently independently of manurial treatment from one plot to the next. In general the plots receiving nitrogen were much more affected than those without, but there was little Mosaic on the dunged plot next to the no-nitrogen strip. Evidence is inconclusive as to how far the distribution of the Mosaic is fortuitous.

SWEDFS

Brown Rot (Physiological or Bacterial). The crop appeared healthy till the autumn, when it was found that about 30 per cent. were affected by internal browning.

FARM REPORT, 1933

Weather.—The outstanding feature of the year October, 1932, to September, 1933, was the abnormally hot and dry weather. The total rainfall was only 22.48 inches, compared with the 80-year average of 28.70 inches. The two periods in which the droughts were most severe were the three winter months November, December and January, when only 4.488 inches fell as against the average of 7.760 inches; and the five summer months April to August, when only 5.629 inches fell, less than half the 80-year average of 11.685 inches. This seriously affected the growth of late spring crops and of grass. October, with 4.842 inches, was 1.783 inches above the average, making the conditions very unfavourable for root-lifting. The break in the drought in September helped the kale crop and the grassland considerably, but the rain was too late to help the root crops.

The total sunshine for the year, 1,812 hours, was 255 hours above the 40-year average, and of this excess, the four months June to September yielded 170 hours. March gave the biggest monthly increase of 80 hours. The only months showing a decrease of more than 4 hours were November and May with 18 and 34 hours deficit, respectively.

The mean temperature for the year was nearly 2°F. above the normal of 48°F., the mean for every month except October and January being above the 55-year average. The warmest months were March, July, August and September, while January was cold and dry.

Effect of weather on crops

The remarkably hot and dry season had a depressing effect on the growth and subsequent yields of all crops other than corn crops.

The kale in Great Knott made very little growth during the summer months, most of the growth being made after the break of the drought in September. The yield was only about 15 tons per acre instead of the usual yield of about 25 tons per acre.

There was a marked increase in the percentage of seed and chat potatoes on all the potato experiments, with a resultant low total yield. Two strips of non-experimental potatoes which had received a dressing of dung yielded a normal crop of about 8 tons per acre.

The sugar beet remained stunted throughout its growth and the yields were very low. This was due to the small size of the roots produced and not to a lessened number of plants. The dung which was dug into the sugar beet microplots on Pastures field hardly decomposed at all, for at lifting time it appeared in much the same condition as when it was applied.

Park Grass plots yielded only one crop of hay instead of the usual two crops, and the one crop was below the average yield from all plots. In Agdell field seeds sown under barley made very little growth. The ground was ploughed up and sown with spring beans in 1934. The seeds in the 4-course rotation gave a poor yield, while the clover in the 6-course rotation failed completely and was ploughed up and sown with tares.

The farm hay crop failed almost entirely, but this was partly due to the fields being grazed until quite late in spring before being shut for hay. The grazing land also suffered badly and no growth took place after the end of June. By July many of the fields presented a very brown and parched appearance and additional feeding had to be given to some of the stock. The topping of the pastures seemed to have a detrimental rather than a beneficial effect, owing to the dry period immediately following this operation. The attempt at measuring the feeding values of grass mixtures in Sawyers I had soon to be abandoned.

All corn crops were well up to the average, wheat yielding an average of about 23 cwt., oats 18 cwt., and beans 20 cwt. per acre. Conditions were ideal for harvesting, and much of the corn was not stoked, but was threshed straight from the field. The corn crops ripened earlier than usual. Harvesting commenced on July 25th, and was finished by August 21st. The crops were also of better quality than they have been for the past few seasons, the barley being sold instead of being fed to pigs, as is usual.

The early harvest and suitable weather conditions were ideal for autumn cleaning operations, and several of the fields were shallow ploughed with the tractor immediately after harvest.

Cropping, 1932-33.

Dung was applied to Great Knott for kale this year, at 20 tons per acre. The eastern 8 acres were dunged and down with rye in autumn and folded off with sheep in April, while the rest of the field was stubble cleaned in autumn and dressed with dung in spring. Drilling took place on April 26th, 2 cwt. of sulphate of ammonia being applied before drilling and 1 cwt. as a top dressing in June.

The seedlings on a large part of the field were badly damaged by flea beetle and had to be resown. The plants on the part which was left were rather thin and had to be hand-hoed to keep down weeds until the kale grew away. One of the great advantages of kale is that hand-hoeing is unnecessary if a good plant is established, and if much hand-hoeing has to be done much of the advantage of kale over other root crops is lost. An experiment carried out on the farm in 1932 showed that both thinning and intensive inter-row cultivation of kale significantly reduce the yield of green material. The part of the crop which was affected most by the flea beetle was that following the rye folded off, and this was probably due to the difficulty in obtaining a suitable tilth for the small seeds after the folding.

Beans were sown in Little Hoos field after spring oats, in Long Hoos V after wheat, and in Long Hoos VII after sheep keep. The crops in Little Hoos were very irregular and that after wheat was remarkably poor, but after the folded green crop a good yield was obtained.

Most of Pastures field was devoted to experiments on potatoes, sugar beet, wheat, barley and forage. Victor wheat was sown on the 4 acres nearest the wood after pigs had run over the bean stubble of last year's crop.

Two small strips of non-experimental potatoes were grown in Long Hoos IV and Pennel's Piece. Both these strips were dunged and were planted with Dunbar Cavalier potatoes. The crop was good considering the dry year, and the quality, from the culinary point of view, was well above that of the Ally used for the experiments. The better price obtained for the Dunbar Cavalier reflected this difference in quality.

Sections I, II, III of Long Hoos were sown with Marvellous spring oats and undersown with Westernwold's ryegrass and trefoil. The yield of oats was not very high, but the quality was good.

Foster's field was sown with Victor wheat and the southern half was undersown with Westernwold's ryegrass and trefoil. The wheat was an excellent crop of good quality. The undersown seeds made almost no growth owing to the heaviness of the wheat crop, the late seeding and the dry season.

Great Harpenden field contained three crops. Eight and a half acres were under Plumage Archer barley, 2 acres under linseed and 2 acres under brussels sprouts.

Nearly every field on the farm is at present heavily infested with wireworm, which is causing great damage to the crops. Investigations are to be commenced into possible methods of control and eradication.

Classical and other Experiments

Broadbalk was sown on October 18th, section V being fallowed. The wheat grew well despite the season, and ripened about a fortnight earlier than usual. It was cut by July 28th, and the field was imme-

diately tractor-ploughed. The effect of the previous year's fallow on Section II was very marked, but Section I, in its second year after fallow, appeared no better than the other sections.

Barnfield, after an early winter ploughing, worked down to a nice tilth and was sown on April 13th. Germination was slow, and the plants made little headway during the summer. The final yield, however, was better than was at one time expected. Carting conditions were rather unfavourable, but the land was ploughed up immediately afterwards to benefit from the winter frosts.

Hoos field barley plots were fallowed this year preparatory to returning to the narrow spacing of rows and the one variety of seed. For the past four years the barley has been sown in rows 18 inches apart, two varieties of seed being used. The wide spacing enabled the weeds to be kept in check, but with the return to the narrow 6 inch spacing after only a one year's fallow, it is doubtful whether the cleaning effect of the fallow will persist long. Plumage Archer will be the variety sown next year.

A new 3-course rotation (potatoes, barley, sugar beet) has been started in Long Hoos VI to compare the effects of ploughing in chaffed straw with straw rotted by the Adco process. The effect of two different green manuring crops ploughed under in spring is being compared with no winter cropping. This experiment should prove of great interest, for it will show to what extent the fertility of the land can be maintained by straw and artificials, and under what conditions green manuring gives the best results.

Market gardening crops were introduced into the experimental programme this year for the first time, the crop under test being Brussels sprouts. Dried poultry manure was tested against sulphate of ammonia for its nitrogen effect, and against superphosphate for its phosphate effect. The plants were put in during a rather dry period and had to be watered in. The average yield of about 30 cwt. per acre is considered quite satisfactory. Poultry manure was also tested on several other crops.

Livestock

Pigs. The chief development with livestock has been the establishment of a set of pig pens to develop a technique of an animal experiment that satisfies the requirements of modern statistical analysis. There are three blocks each containing three pens. Each pig is fed individually on its own ration by an arrangement of trough enclosures, one for each pig, leading from the main pen. This enables all types of ration to be distributed equally over all the groups of pens instead of all the pigs on one treatment being in the same pen. Any peculiarity of a group is thus distributed equally over all the rations instead of being associated with one particular ration.

Cattle. In October, 1932, the stock consisted of 7 cows and 100 crossbred store cattle and calves. The cows are put to a polled Angus bull, and the policy of buying in other black polled calves to put on to the cows as they calve has been continued. In the year October, 1932—September, 1933, over 60 calves were reared. For the first winter after weaning the calves remain in covered yards, and the second winter is spent out. They are usually finished off on grass in summer.

Sheep. The experimental programme commenced in 1931 has continued along the same lines. In the autumn of 1932, we put 49 of our home-bred Half-bred ewe lambs to the tup, and of these only 13 lambed. The rams used were a Southdown and a Half-bred ram lamb. It remains to be seen whether the ewe lambs which reared lambs will prove better mothers in future.

The result of the first lambing (1933) of the Dorset Horn cross Cheviot gimmers is given in the 1932 Report. We were not successful in getting these gimmers to take the Dorset Horn ram during the summer, but the same ram will again be run with them in the summer of 1934.

All the ewes and ewe lambs possessing four well-developed teats were again put to a ram with the same characteristic. A ram lamb of our own breeding was used this year, as the progeny of the two rams descended from the Bell flock were weakly and of poor conformation.

The result of the 1933 flushing experiment appeared in the 1932 Report. In the autumn of 1933, another experiment on the same lines was commenced. Any differences between the treatments will not be seen until the 1934 lambing, and the results will appear in the next Report.

STAFF

E. C. Wallis came in December, 1933, as a voluntary assistant, and has now been transferred to the staff as Farm Recorder. J. T. Moon was here for a short time in the summer as voluntary worker to help with the livestock experimental work, and has since obtained a post in Kenya.

At the local ploughing match our two horsemen, F. Stokes and A. Lewis, secured 2nd and 3rd prizes respectively for their work.

METEOROLOGICAL OBSERVATIONS

Meteorological observations have been systematically made at Rothamsted for many years; these records are being used in the Statistical Department in interpreting crop records. The Station has co-operated in the Agricultural Meteorological Scheme since its inauguration by the Ministry of Agriculture in 1926, and possesses all the equipment required of a Crop-Weather Station. The observations taken under this scheme include:

OBSERVATIONS TAKEN ONCE DAILY: 9 a.m. G.M.T.

Temperatures—maximum and minimum (screen), solar maximum, grass minimum.

Rain (inches) and *Sunshine* (hours and minutes by Campbell-Stokes recorder) during the previous 24 hours.

OBSERVATIONS TAKEN THRICE DAILY: 9 a.m., 3 p.m., and 9 p.m. G.M.T.

Temperatures—wet and dry bulb (screen), 4 inches and 8 inches under bare soil.

Wind—direction and force (continuously recording anemobiograph).

Weather—(Beaufort letters).

Visibility.