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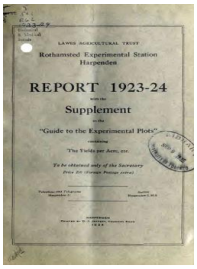
Report for 1923-1924 With the Supplement to the Guide to the Experimental Plots Containing the Yields per Acre Etc.



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Rothamsted Research

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BOOKS PUBLISHED DURING 1923-4.

J. Davidson. "*A List of British Aphides*" (including notes on their synonymy, their recorded distriution and food-plants in Britain, and a food-plant index). Longmans, Green & Co. (in the press).

This work has been prepared owing to the great economic importance of aphides in relation to farm, garden and orchard crops, and their possible association with so-called mosaic diseases. Buckton's *Monograph on British Aphides* was published about 45 years ago, and since that time many more species have been recorded and the nomenclature has undergone drastic changes.

In the present work the species are placed in accordance with the more recent nomenclature. It is divided into four sections. Section 1 deals with the species in alphabetical order together with their food-plants and distribution in Britain. Section 2 deals with the genera, including critical notes. Section 3 is a food-plant index, forming a key to Section 1, and Section 4 a bibliography of 360 titles.

The work is intended to be a reference list and to serve as a general guide to the identification of the species of aphides.

R. A. Fisher. "*Statistical Methods for Research Workers.*" Oliver and Boyd, Edinburgh (in the press).

The wide increase in the employment of statistical methods, especially in scientific research, has been accompanied by exceptionally rapid progress in recent years in the solution of the mathematical problems which confront the statistician. Most of the mathetical problems which confront the statistician. Most of the mathematical researches of the author have been undertaken in direct response to the needs of the laboratory worker, and with a view to the development of statistical methods adequate to the practical requirements of biological and agricultural research.

The aim of the book is to provide the non-mathematical scientific worker with the detailed application of precise statistical methods, which have been available hitherto only in specialised mathematical publications. The methods are illustrated throughout with numerical examples, drawn from recent scientific literature, giving the methods of computation in detail. New mathematical tables have been specially calculated for rendering the crucial tests simple and exact.

THE CROP RESULTS.
OCTOBER, 1922, TO SEPTEMBER, 1923.

The outstanding features of the season October 1922 to September 1923, were the sunless spring and the earliness and severity of the autumn frosts of 1923.

The year commenced favourably; October was unusually dry; it had the lowest rainfall figures for this month (0.787in. against an average of 3.06in.) since our records began, so the ploughing and drilling were got well forward. The dry weather continued into November, and with the help of night frosts which

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broke down the newly turned furrows, everything was in favour of winter sowing. December was fairly mild; the first part of the month was dry but the second half was very wet, there being nearly 3in. of rain during this period. This precipitation, although unwelcome at the time, added appreciably to the stores of underground water, which had been seriously depleted by the drought of 1921, and not restored by the rainfall of 1922. Winter corn looked well and the young clover still maintained a satisfactory plant. January 1923 was dry, only 1.50 in. of rain being registered against an average of 2.41in. for this month. The sunshine and mean air temperature were both above the average, but the ground temperatures were not, and seventeen ground frosts were experienced in this month.

A change came in February. There was more than double the normal rainfall and the month was practically lost as far as field work and threshing was concerned. The wet spell continued into March, and not until its last few days could work on the land be resumed. The weather had not been unduly cold; the mean air temperature was, in fact, above the average both for February and March. Wheat and oats had made no progress in the sodden conditions of the two months, but when the water got away, they tillered out rapidly. A dry and dull April saw most of the spring sowings made under favourable conditions, a warm spell at the end of the month giving the barley a good start. May was drier than usual, but cold sunless weather set in with occasional frosts. The barley kept going better than might have been expected, but clover coming into bloom was severely checked. June was a month of warm droughty weather although actually duller than either April or May—the hours of bright sunshine being no less than 86 below the monthly average. The deep rooting crops came on fairly well, but barley gave signs of needing rain before the month was out. For each of the five months, February-June inclusive, there had been a deficiency of sunshine which amounted on the average to no less than 1½ hours per day. Naturally the soil temperature was lower than usual, and although the rainfall had not been high, the evaporation was reduced because of the lack of sunshine, and this led to a slightly greater percolation of water through the 60in. gauge. Warmer and much brighter weather came in July, the nights being for the first time warm. The striking feature of the month was the exceedingly heavy thunder showers on the night of the 9th, which, with the falls occurring on the following day, brought down 2¼ ins. of rain. Fortunately, our corn was not lodged, although elsewhere heavy crops of oats were badly laid over a wide area in the track of the storm. Hay was got in under good conditions and crops were satisfactory: the clover hay averaged 28 cwts. per acre over the farm and meadow hay yielded 35 cwts. on the manured land of Great Field. August was the best month of the year. The daily average of 11 hours of sunshine for the first fortnight caused some wilting of the shallow rooted crops, but refreshing rains came later in the month. The harvest weather was perfect for oats and wheat, but a little rain fell

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before the barley was cut. The Broadbalk field was cleared by August 28th, and stubble cultivation was put in hand at once. Wheat yielded satisfactorily on Great Knott field, where it had been well done (37½ bu.), but on Great Harpenden field, where the record root crops of the previous year had exhausted the land, the yield was disappointing (24 bu.). Oats did fairly well and proved responsive to manures, a dressing of 1 cwt. of sulphate of ammonia and 2 cwt. of superphosphate increasing the crop from 26.4 bu. to 37.3 bu. per acre; while 2 cwt. sulphate of ammonia and 2 cwt. superphosphate pushed up the yield to 46.5 bu. The barley suffered from the drought in June, and the extraordinary lack of sunshine in spring and early summer: it yielded as well as could be expected—40 bu. on the better land, and 32 bu. on poorer tilths—while the quality was good and distinctly better than in 1922.

September was a favourable month, harvest was completed and ploughing continued. October set in wet, however, and 1¾in. of rain was recorded in excess of the average. Root lifting was badly hindered, and the hand digging of potato plots was exceptionally slow and difficult. November brought cold drying weather, and frosts occurred on 23 nights during the month. They were exceptionally severe on the nights of the 25th and 26th, when 18 and 19 degrees of frost respectively were recorded on the grass: practically all unharvested mangolds and potatoes were lost.

In spite of the lack of sunshine, the mangolds on Barn field did well and exceeded their average yield, but a large number of the plants rotted. Swedes, in spite of adequate manuring, were only a fair crop (14 tons); a good plant was obtained, but the bulbs failed to fill out. The sheep on the grazing plots did well; there was plenty of keep and bigger live weight increases per acre were obtained than in either of the previous seasons.

OCTOBER, 1923, TO SEPTEMBER, 1924.

The season 1923-24 was distinguished by its wetness and by one of the most protracted harvests of recent years. The rainfall of 36.51in. exceeded the average by 7.96in., only two wetter seasons (1903 and 1912) having been recorded since readings were commenced at this station in 1853. It is interesting to note that the twentieth century, though only in its early stages, has already produced three years that have been wetter than anything known to the Victorians—wetter even than the notorious year, 1879. Under the wet conditions, weeds got ahead, in many cases smothering the legitimate crop, and produced one of the foulest seasons for many years.

The season opened badly for farm work. October was very wet and drilling was hindered. The frosts and dry weather of November enabled all the winter corn to be sown by the 21st, but December and January were both difficult months for late sown cereals; very little flag was made and there was a loss of plant. The land was saturated with water and impossible to

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work until the hard dry weather of February, with a rainfall of 0.714in. only, against the 71 year average of 1.889in. for this month, brought the furrow into a splendid condition for the spring working. The complete change in the soil condition effected by the February weather is well illustrated by a comparison of the drain-gauge figures for this month and January. In January the drainage through all three gauges was in excess of the rainfall in consequence of the saturated state of the soil in December and the early snow-drifts on the gauges in January: the rain was 2.90in. and the drainage (60in. gauge) 3.20in.; while the February rain was 0.71in. and the drainage (60in. gauge) only 0.09in. Only 12.2 per cent. of the rain had percolated in February against an average of 75 per cent. for this month. However, the dryness of the February brought no relief to the struggling cereal crops.

The weather in March was well suited to cultivation: there were long spells of brilliant sunshine (no less than 56 per cent. over the average), a low rainfall, but with ground frosts each night except for a period of six days towards the end. In consequence barley was drilled under particularly favourable conditions in the latter half of the month. This was a general experience, many heavy land farmers never having seen spring corn go in so well. The frosts continued beyond the middle of April, and made the spring one of the latest within living memory. Later in April came milder and better weather; clover began to fill up after the long winter, barley made a good start, but winter corn was still backward, and oats in particular had lost much plant. With May the ground became much warmer, and by the end of the month the 12in. soil thermometer had risen by 10° F. to 58.8° F. May was, however, persistently wet. There were only 7 days on which no rain fell, and the total fall of 4.63in. was 2.58in. in excess of the monthly average. Weeds grew fast in the corn, and barley was checked by the wet conditions and the lack of sunshine. Rain continued during the first half of June and seriously interfered with hoeing, the very foul condition of Broadbalk being largely due to this cause. The second half of the month was warm and less wet. Clover promised excellent crops all over the farm, but some had been laid by the storms. Grass was growing too fast for the sheep on the grazing plots, although the stocking was heavier than in previous years. The first half of July contained the only period during the whole year that could properly be described by the name of summer—the nine days, July 8th-16th. The backward plants of wheat came on surprisingly well and gave promise of a fair crop. Hay making proceeded without any serious check, the coming of the fine spell at hay time being one of the few good features of the season. Crops were large, the unmanured meadow hay on Great field yielding 32 cwt., while the clover on Long Hoos averaged 42 cwt. per acre.

With the passing of the 9 fine days wet weather set in again; the aftermaths freshened up rapidly and regular plants of swedes and mangolds showed excellent promise although the mangolds needed sun.

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August, though not wetter than the normal, was showery and sunless; ripening of the cereals was slow and uneven and cutting was later than usual. Wheat continued to improve, but weeds got ahead and filled up the bottom of the crop. September did nothing to improve what promised to be a difficult harvest; the rainfall of 3.42in. was nearly 1in. in excess of the average and there was little sunshine or drying weather. The bulk of the harvest was secured during the month, but much was in bad condition for early threshing. October, with 4.28in. of rain, had more than the normal rainfall by 1.14in., and with the shortening days and damp misty weather the labour involved in securing the remainder of the harvest was excessive. Cutting finished on October 17th.

Although wheat and barley were not much below the average in yield, the quality was poor and much of the barley was fit only for feeding purposes. Winter oats had lost much plant in the severe weather; they became very foul in summer and yielded badly.

Swedes and potatoes promised big yields, and in spite of the dull weather, the mangolds on Barn field were up to the average. The digging of potatoes and the lifting of the roots was in no way helped by the weather, for both November and December were considerably wetter than the average. On the other hand the absence of serious frosts enabled the roots to be got in without loss. Swedes with complete artificials yielded 26 tons per acre, second only to the excellent crop of 1922. Potatoes yielded 9½ tons with dung and complete artificials, the crop being practically free from disease, although a rather large proportion of the produce was of seed size.

It was commonly complained that the year was sunless, but in this respect it was over its full course no worse than usual: for the whole of the calendar year the deficiency from the average was only 50 hours. The unfortunate character of the season was its persistent wetness. From July 17th to the end of the year there were only two occasions (August 10th and 11th) when the state of the ground at 9 a.m. was recorded as dry; on all other mornings it was wet or damp. The previous year was by no means sunny, yet the ground was recorded as dry on 24 occasions in the three months beginning on July 17th.

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