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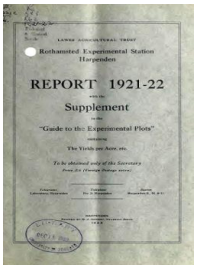
Report 1921-22 With the Supplement to the Guide to the Experimental Plots Containing the Yields per Acre Etc.



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Notes on the Seasons

Rothamsted Research

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THE CROP RESULTS.

OCTOBER, 1920, TO SEPTEMBER, 1921.

This was perhaps the most remarkable season we have had, almost every month giving some new record.

October, 1920, was a beautiful month; fine, sunny and dry, with gentle N.E. winds. The clock was changed on the night of Sunday, October 17th, thus facilitating morning work. Winter ploughing was pushed well forward and potato work was done in dry and comfortable conditions.

November also was dry (indeed some places were short of water), so that all corn sowing and root carting were readily completed.

After the middle of December there was much rain, but the weather continued mild; the arable land lay wet, but as against this the grain grew well and the bullocks remained out throughout January.

January of 1921 was the warmest January on record; on no less than 23 days in the month the maximum temperature rose to 48° or above. There was no frost that survived the morning sun, and indeed by the end of the month there had been only four or five really cold days since Christmas. On January 25th, at about 10 p.m. an arc of a lunar rainbow was seen in the north by Messrs. Bowden and Seabrook.

February was dry throughout, there being only 0.21 inches of rainfall against the average 2.02 inches. There had been no such dry February since 1895; it was, however, colder than January. The winter was one of the mildest within our recollection, much facilitating work in the gardens.

In March the weather turned cold, but the drought continued; there fell just over one inch of rain. The dry weather favoured the suppression of the black-bent grass in Broadbalk wheat, but it caused some injury to the spring sown corn. April began dry, but nearly half-an-inch of rain fell on the 13th, and the total fall for the month was only 0.55 ins. less than the average.

May, like April, had somewhat less than the average rainfall (.45 ins. less), but was beautifully warm.

June was the driest June for 100 years. The farm well ran dry about May 25th for the first time since it was made in 1913, and water had to be carted to the farm. The weather set in dry and hot, and continued like this all through the summer and autumn, making 1921 a year to be remembered as one of the best by all holiday makers.

The drought and hot weather continued right through August and September; the harvest was probably the earliest and the finest for weather we have had. Broadbalk was cut on July 27th, the earliest date since 1896. Many farmers cut and carted their corn on the same day.

The rapidity with which the harvest was cleared away allowed unusually good facilities for stubble cleaning. Good work was done with a Ransome tractor broadshare, which cut all tap roots of weeds, broke up the surface soil to a depth of 3 inches and left it ridged up. While the dry weather lasted the grass and other weeds were dying, and when rain came the weed seeds germinated

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and could be killed by cultivation. The hot dry autumn was expected to have a very beneficial effect on the soil, and we looked forward with great confidence to good fertility conditions in 1922.

The effects of this remarkable season on the crops were as follows :—

1.—Wheat promised to be the crop of the year. It looked well throughout the summer and responded to nitrogenous dressings. On our farm the yields did not come up to expectation, but generally the yield was excellent, the average for England and Wales being 35.3 bushels as against the 10 years' average of 30.7 bushels.

2.—Oats yielded satisfactorily.

3.—Barley came very short in the straw, but the yields were better than seemed likely. An increase of 9 bushels resulted from a top-dressing of 1 cwt. of sulphate of ammonia.

4.—Swedes failed entirely.

5.—Potatoes almost failed, giving only 2 or 3 tons per acre; there was much second growth.

6.—Mangolds were hampered by the summer drought, but grew well after harvest and finally yielded well.

7.—Clover sown in 1920 did well, the first cut especially being good. Throughout the country the seeds hay had usually yielded pretty well. The seeds sown in 1921, however, failed, so that we were constrained to keep some of the 1920 ley down till 1922—a practice which does not usually answer and was not successful on this occasion.

8.—The permanent grass, on the other hand, gave poor results.

Of the fertilisers nitrogen gave its usual increase as shown on p. 85.

Phosphates (superphosphate, basic slag, but not bone meal on our farm) produced a very visible effect by the middle of June in hastening the ripening processes in barley, the phosphate treated plants being well headed out, while those without phosphate were not; finally phosphates caused a distinct increase in crop (Little Hoos field).

Basic slag produced no visible effect on the grass land.

Potassic fertilisers had no visible effect on barley up to June.

It was remarkable during this season that the barley on the acid plot on Agdell field (No. 2 complete artificials and clover) showed no signs of the failure which had marked the wheat and swede crops.

OCTOBER, 1921, TO SEPTEMBER, 1922.

The drought continued throughout October; in many districts the water supply gave serious trouble. It was not till November that the rainfall began and then it was less than the average.

With the new year, however, conditions became different. January and February were both wet, and April was specially so. In addition the weather was bitterly cold, making everything very backward and causing damage to the winter corn.

In the gardens the bulbs had made a magnificent show and the fruit trees were full of blossom; this was probably associated with the complete ripening of the wood in the autumn of 1921.

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May was hot and dry, culminating in a very hot week near the end, and it looked as if we might have another 1921 summer, but June, though dry, was colder and less sunny, and the weather progressively deteriorated as the season advanced. The summer was a byword among farmers and holiday-makers. July was not only cold and sunless, but very wet as well, there being almost double the average rainfall (4.6 ins. instead of 2.4 ins.). August and September remained cold and sunless, and differed only in that August was not wetter than usual, while September had 50% more than the average rainfall. The harvest was much delayed; it had been one of the earliest on record in 1921; it was one of the latest and most protracted in 1922. Old farmers compared it with that of 1879; indeed some said it was worse. The comparison was ominous, for it foreshadowed suffering not only from the weather but from the severe financial crisis which set in, worse than any in the last 30 years. October was much drier and had more sunshine, but the winds were mostly cold; arrears of cultivations were, however, partly overcome.

The yields of crops were far better than might have been expected in view of the wretched weather conditions. Spring growth was poor, but later growth was very marked; indeed the results were so remarkable that we cannot help connecting them with the thorough baking given to the soil by the hot dry autumn of 1921. Taking the crops in detail, grass, while giving a poor yield of hay in June, made better growth afterwards, and the grazing results over the season were considerably more satisfactory than in 1921; thus on the permanent grass plots of Great Field the results were :—

	1921	*1922*
Yield of hay, cwt. per acre (end of June)	26.4	20
Live weight increase in sheep, lb. per acre (end of September) . . .	60 90	116

Barley made a splendid start as the March weather allowed an excellent seed-bed to be formed, but the young plants were seriously checked by the drought in May and June; some of them began to turn yellow as if the ripening processes were already beginning. The July rain caused a resumption of growth, but the absence of sun and the continued rain seriously interfered with ripening. In the end the yield of grain was normal,* but the quality was execrable; indeed, experienced barley buyers described the season as one of the worst for many years. Some of the results were :—

	Hoos Field 4a	Long Hoos	
	Barley	*Malting Barley*	
	Complete Manure	No Manure	Complete Manure
Yield . . .	31	25.8	32.6
Average for last 10 years . .	32	—	—
Value per quarter	—	36/-	31/-

* The average yields of cereals for England and Wales were lower than in 1921, and, in the case of the oats below the ten years' average.

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Unfortunately much of our barley heated in the stack, so that the projected experimental scheme could not be carried out.

Wheat suffered much from the cold spring, the May and June drought, the lack of sunshine in July and the wet harvest; it yielded miserably on our farm though the general average throughout the country was not low.

When we turn from these early sown grain crops to the late sown, late growing, big leaved crops which are not required to produce seed, the picture is much brighter.

Swedes and potatoes both gave record crops; mangolds also gave good yields; on the completely manured plots the yields in tons per acre were :—

	1922	1921	1920	1919	1918
Potatoes .	9	3½	4	5½	5
Swedes . .	30.4	Nil	17	9	Nil
Mangolds .	30.35	27.75	28.75	18.17	28.30

We can summarise the effects of the season by saying that vegetative growth was poor during the first part, but remarkably good during the second part, and we are disposed to connect this good growth with the hot dry fallowing of the previous autumn. Seed production, on the other hand, was very adversely affected, indeed few seasons of recent years have brought out so clearly the contrast between the two processes.

The effect of manures was interesting. Nitrogenous fertilisers acted on all crops. The increase produced by 1 cwt. sulphate of ammonia in the field experiments was remarkably close to that normally expected :—

INCREASES PRODUCED BY 1 CWT. SULPHATE OF AMMONIA IN THE FIELD EXPERIMENTS OF 1922.

	Usually expected	*Obtained in 1922*
Barley	6½ bush.	6¼ bush.*
Wheat	4½ ,,	3.7—5.0 bush.†
Potatoes	20 cwt.	20 cwt.
Swedes	20 ,,	20 ,,

* Taking the mean of all centres the value is 5½ bushels.
† For early and late dressings respectively.

Phosphates were curiously ineffective in 1922, even on the swede and barley crops where one would have expected them to act well. During the early part of the season the usual effects of stimulation of early growth were produced. Barley and swedes receiving phosphates both started earlier into growth, and the swedes were sooner ready for hoeing than where phosphate was withheld.

Potassic fertilisers, on the other hand, proved very effective. Even barley responded (which does not usually happen at Rothamsted), and the response was as marked as that of nitrogen (which is even more unusual). The effect on potatoes was very