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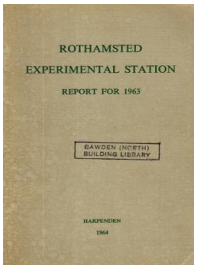
Rothamsted Report for 1963

Full Table of Content



The Farms : Rothamsted

J. R. Moffatt

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THE FARMS

J. R. MOFFATT

ROTHAMSTED

The season was extremely difficult. Wintry weather started in mid-November, but during a fine spell in mid-December wheat drilling was finished. A heavy fall of snow at the end of December and a spell of 74 consecutive nights of frosts prevented land work until April, so all spring sowings were several weeks late. Except for a few short fine spells, the summer was generally dull and cool, and most of the haymaking was delayed until the end of July, but crops grew well. The dull wet August caused much of the barley to lodge and delayed harvest until September.

In a fine spell in October most of the root crops were harvested in good conditions, and most of the wheat experiments were drilled. A very wet November delayed the completion of these two operations until mid-December. Ploughing was well forward and would have been finished but for a spell of frosty weather just before Christmas.

The rainfall for the year was about average, but the hours of sunshine were below average in every month except January, and the total deficit was 238 hours.

The Effect of Weather on Crops

Many of the stubbles were ploughed in the dry weather in October 1962, and ploughing after potatoes and beet was done until it was stopped in late November by a spell of wintry weather which gave a fall of snow and 14 ground frosts. This weather lasted well into December, and there were 5 days with over 12° of frost. In a short fine spell about the middle of the month, wheat drilling was finished and a little more ploughing was done, but when the long spell of frost started just before Christmas there were still about 50 acres to plough.

Snow on 26 December and a blizzard on 30 December together gave 11 in. and there were deep drifts. Frosts became more severe; there were 30° on 24 January, followed by 3 nights of 25° or more, and there were 74 consecutive night frosts. For a long period the frosts lasted throughout the day, and despite a few slight day-time thaws, there was still a blanket of snow several inches deep at the end of February. The night frosts ended on 4 March, and after 3 days' continuous thaw ploughing started. After 1 day's work a mild, wet spell prevented further work until 22 March, so that in a spell of 92 days only 1 day's land work was done. The rainfall in March was 4·07 in. in 19 days, nearly twice the normal.

The wet spell lasted well into April, but the ploughing and chain-harrowing of grassland was completed by 10 April. Seedbed preparations and drilling started on 8 April, but rain caused further interruptions, and corn drilling was finished on 26 April, about 3 weeks later than usual.

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In May the weather was mainly dull, cold and windy, and though this interrupted spraying with herbicides, potato planting was not much hindered and finished on 17 May. The drilling of kale and swedes, in the third week of May, finished the season's sowings.

In June the weather was very mixed; a week of fine and hot but windy weather ended with a thunderstorm on 7 June; another two hot days ended with another storm when 1·48 in. rain fell in about an hour. After another 3 hot days the weather worsened, and the second half of the month was dull and cool, with strong winds and a lot of light rain. The total of 3·88 in. of rain was 1·71 in. above normal. A lot of silage was made early in the month, but hay cutting was delayed by the wet spell. The heavy storm on 9 June did not damage the cereals, but it battered the grass saved for hay and caused serious erosion on fallow ground, especially Barnfield, Broadbalk fallow and between potato rows in Great Harpenden I. The sugar-beet, kale and potato ground had to be cultivated to break the hard cap formed.

Dull and showery weather in early July prevented haymaking, and most of the season's hay was cut and made in a 12-day spell of fine weather at the end of the month. All main-crop potatoes were sprayed early in the month when the weather favoured the spread of blight.

August was one of the dullest on record, with sunshine 64 hours below average, and it was also cool and wet. Rain fell on 20 days, giving a total of 3·38 in., and prevented any harvesting.

Harvest began on 13 September, when hope of cutting some of the badly laid barley crops had almost been abandoned. However, in a week of fine and hot weather these laid crops dried out well and were harvested with very little loss, though some loads had as much as 24% water. During the whole of harvest only a few loads did not need drying. The spring wheat ripened slowly and was barely ripe when cutting finished on 28 September. Straw baling and carting kept pace with the combines, and finished on 1 October.

The winter beans were slow to ripen, and the spring tics continued growing throughout August. They averaged over 6 ft tall and ripened slowly. At the end of October the beans on the upper pods were green and soft, but as those at the lowest parts of the stem were ripe and starting to shed, cutting started.

Potatoes bulked well in the latter part of their growing season, and conditions were excellent for lifting in the 3 weeks of dry weather in October. A late cut of grass from several fields was made into silage during this spell, and the small area of sugar beet was lifted. Most of the winter wheat experiments were drilled during this period.

In early November potato lifting continued, some more wheat was drilled and the last of the spring beans were combined very wet. In a 3-week spell of wet and windy but exceptionally mild weather, potato lifting was possible on only 4 days. The swedes were lifted during this spell. Rain fell on 22 days and totalled 4·64 in., 1·84 in. above average.

December brought an immediate improvement; potato lifting restarted and was finished about the middle of the month, and the non-experimental areas of winter wheat following potatoes were worked and drilled. Ploughing was well forward and would have been finished before the end

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of the year had the ground not been frozen by several hard frosts. There were 19 days without rain, and the monthly total of 0·72 in. was the least of the year; there were 23 ground frosts, 12 of 10° or over, the hardest being 25° on Christmas Eve.

Field Experiments

There were 2,656 full-scale field plots and several hundred microplots. Other experiments were planned, but were abandoned because of the very late start to spring work. All the spring crops were sown late, and though early growth was slow, later growth was rapid. The hard winter severely damaged two winter-bean experiments and parts had to be discarded. The winter wheat on experiments drilled in late November or December 1962 had not appeared above the ground when the snow melted in early March. The only winter wheat to be lodged was a sub-plot on Broadbalk; no spring wheat was lodged. Many barley plots were badly lodged, and this slowed down cutting, but a new tanker combine adapted for field-plot work worked very satisfactorily. Nearly all the potato plots, and the sugar beet and swedes, were lifted under good conditions.

On Broadbalk drilling was delayed as very little Black Grass (*Alopecurus myosuroides*) germinated in the dry October 1962. It germinated in November 1962, but wet weather prevented drilling until the end of the month, and even then conditions were only fair. The plants had not appeared above ground before the snow fell, and when it melted in early March very little wheat was showing. The plant was very uneven, probably reflecting different depths of snow during the hard frosts. In addition to Section Ia, Section Vb was sprayed with CMPP/2,4-D for the first time, with dramatic results. Usually one of the weediest parts of the field, after the spraying it gave a nice clean crop, although in its fifth consecutive year with wheat. Weeds were also unimportant on Section Ia, but on the rest of the field they were more luxuriant or numerous than usual, probably from lack of competition with the wheat in early spring. Most of the plots in Section II after fallow were damaged by wheat-bulb fly (*Leptohylemia coarctata*), plots 10–18 much more than the others. On plots 10, 11, 12 and 14 the crop was so thin and the weeds so luxuriant that the plots were cut green to prevent seeding. About half of plot 19 Section IV was discarded because of a heavy infestation with creeping soft grasses (*Holcus mollis*) and (*Agrostis stolonifera*). There were very few wild oats (*Avena ludoviciana*), and hand pulling on four occasions took only 32 hours; a few patches of creeping thistles (*Cirsium arvense*) were hand-pulled. There was one odd occurrence; the whole of the unsprayed part of plot 8, Section I (minerals and 6 cwt/acre sulphate of ammonia), was lodged, whereas on the unsprayed part the crop stood well. There was no other lodging on Broadbalk.

On Hoosfield Half Acre the old and new varieties Squarehead's Master 13/4 and Cappelle were grown to compare their behaviour on infertile soil. Cappelle yielded more than the Squarehead's Master 13/4 on 2 plots and slightly less on the third. Squarehead's Master 13/4 and Rothwell Perdix were sown in mid-October 1963.

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Hoosfield barley plots were sprayed in autumn 1962 with dalapon to control couch (*Agropyron repens*). Ploughing was done in late spring, but drilling was delayed to get an early germination of wild oats (*Avena fatua*) and very few germinated after sowing. At the first hand pulling only 12 plants were found and the second pulling took 6 hours, but there were very few wild oats. The dung plot was partly lodged and yielded well; the plots without nitrogen or without minerals were thin and backward and yielded little.

The Exhaustion Land was sprayed with dalapon against couch (*Agropyron repens*) and was not ploughed until spring. Proctor barley replaced the Plumage Archer grown in past years. The few wild oats (*Avena fatua*) were hand-pulled. The crop grew well and yields were above average.

The grass on the Park Grass plots grew slowly in spring. The storms in early June laid the plots getting most sulphate of ammonia and made cutting difficult. Cutting was delayed by bad weather until 27 June when the grass was stemmy, and the hay was not baled until 9 July. The yield of the 1st and 2nd cut was about average. Moles were less active than usual.

Patches of the 1-year-old cocksfoot in the Ley–Arable experiment in Highfield and Fosters were damaged by the hard winter. Highfield plots were sprayed with paraquat and 2 weeks later were rotary cultivated to a depth of 3 in. and resown. This method was easy and successful. The less severely damaged plots on Fosters were left, and they recovered well.

The 3-year-old cocksfoot on plots in Agdell was also damaged and was killed by paraquat, but was not resown.

The plan to grow potatoes and mangolds on split plots on Barnfield, the classical mangold experiment, was abandoned because of the late season. Three rows of Majestic potatoes were grown on strip 4 to continue the investigation on skin spot, and the rest of the field was fallowed.

Cropping

The acreage farmed decreased by 11 acres, by the sale of Deacons, our only rented field, to a sports club. Of the 451 acres farmed, 285 were under arable crops or fallow, 105 under short-term leys or lucerne–grass mixtures and 62 under permanent grass. The main crops were wheat (108 acres), barley (86 acres), beans (26 acres), potatoes (33 acres), and kale, sugar beet and swedes (8 acres). Twenty-two acres were fallowed.

The basic three-course rotation of wheat, barley and either roots or beans was varied to provide sites for current and future field experiments. Potatoes were the main root crop, as only a little kale was needed and sugar beet is unsuited to our heavy land. The balance of the root break was sown to beans, which make little demand on labour and are harvested with cereal-harvesting machinery. Several fields are kept acid or deficient in phosphorus or potash to provide sites for fertiliser experiments. Some of these do not give worthwhile arable crops and are kept under long-term leys or fallow. Experiments needing fertile ground were sited in fields normally in the three-course rotation.

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Crops

Wheat. Most of the Cappelle winter wheat was drilled late in autumn 1962, and only the small areas sown early were through the ground before snow fell. A lot was still not through when the snow cleared in early March, and after emerging, growth was slow and uneven. The crop recovered rapidly later, and most areas looked as though sufficient nitrogen had been given. The Jufy I spring wheat looked well throughout the season. All crops were slow to ripen, and the Jufy I was only just ripe when cut at the end of September. Winter wheat yields ranged from 30 to 46 cwt/acre and spring wheat from 26 to 44 cwt/acre. Most of the grain is dull and of poor quality. Mildew (*Erysiphe graminis*) was severe on late-sown spring wheat, and take-all (*Ophiobolus graminis*) was severe in some crops and present in some where cereals were not grown in 1962.

In an experiment comparing winter and spring-sown varieties, the newer stiff-straw winter varieties yielded more than Squarehead's Master 13/4 at all levels of nitrogen and responded more to increasing levels of nitrogen. The two spring varieties yielded almost as well as the late-sown winter ones under the unusual growing conditions of 1963. Prestige, grown as a winter wheat, yielded as well as Cappelle, but as a spring wheat, yielded much less than the true spring varieties, probably because of its greater susceptibility to mildew.

Barley. The Proctor barley made good growth all the season and looked well until the end of July, though there was little sign of ripening. In the heavy rain in August large areas lodged, but the fine spell in the middle of September enabled them to be cut with little loss. The grain was badly stained, and some had started to grow. An unusually severe attack of mildew (*Erysiphe graminis*) probably affected yields, which ranged between 26 and 40 cwt/acre. In one experiment two mildew-resistant varieties yielded about 6 cwt/acre more than Proctor, which was severely attacked. Resistant varieties will be grown in future.

Oats. Only a very small area of Condor spring oats was grown.

Beans. The experimental areas of winter beans had not appeared through the ground before the snow, and though this protected most of them, there was frost damage where the snow was thin, and on these areas only a few plants came through the ground. The areas were therefore irregular and weedy, even where sprayed with simazine.

The spring beans drilled in mid-April germinated rapidly and grew well throughout the summer. Spraying with "Metasystox" or menazon prevented damage by aphids. The spring tics continued to grow well into the autumn and then began to lodge. They ripened slowly and unevenly and, as the stem and leaves dried very slowly, harvesting was a slow and tedious job. Simazine controlled weeds so well that inter-row cultivations were not needed, and some of the stubbles were only tine-cultivated before being sown with winter wheat. The grain was of poor quality and will be

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fit only for cattle food. The average yield was 20 cwt/acre. A small area of Herz Freya grew less vigorously, ripened earlier and more uniformly, and yielded 32 cwt/acre.

Sugar beet, kale and swedes. Only a small area of each of these crops was grown. They grew vigorously during the summer, and the sugar beet and swedes were harvested under good conditions. There were no bolters. Many leaf miner (*Pegomyia betae*) eggs were laid on the beet, but spraying with DDT prevented serious damage. A heavy infestation of black aphids (*Aphis fabae*) late in July was controlled by a menazon spray. The average sugar-beet yield was 15½ tons/acre of washed beet with a sugar content of 16%. The estimated yield of kale, which is being cut and fed to stock, is 20 tons/acre.

Potatoes. The seedbed for all non-experimental and most experimental areas of potatoes was prepared by a single rotary cultivation direct on the ploughing. This is now our standard practice, as an excellent seedbed is quickly prepared with a single passage of the tractor. As much of the land was not ploughed until late spring and had not been broken up by frost, no other implement would have produced the seedbed in 1963. Results of experiments done in 1962 and 1963 show that the application of fertiliser before rotavating gives yields as large as placing the fertiliser, and this method is now used whenever practicable. Planting started on 4 May and finished on 17 May. The plots on the two Ley–Arable experiments were planted late with chitted seed; these emerged first, made outstanding growth throughout the summer and yielded 14½ tons/acre. Both King Edward and Majestic made good top growth throughout June and July, but did not bulk as rapidly as usual; on one experiment King Edward only increased from 4 to 6 tons/acre between 29 July and 20 August. Blight developed early in July; the Majestic were sprayed twice and the King Edward four times. Menazon was included in the last spray on most areas because of a very heavy aphid infestation, but this was too late to prevent damage.

The haulm was burnt off with concentrated BOV in September, and though lifting started on 7 October it did not finish until mid-December. The Majestic yielded 14 tons/acre and the King Edward 11 tons/acre total produce; the proportion of discards will be large, because many of the Majestic are badly cracked and the King Edwards are affected by blight and slugs.

Grassland. Grass did not begin to grow until the end of March, and though it grew well throughout April, there was no spring flush. The grazing of the Ley–Arable experiments started on 7 May, several weeks later than usual. There was ample grass for the stock throughout the summer. Conditions were excellent at the start of silage making in the last week of May, but towards the end heavy storms made the grass wet and delayed the finish until 11 June. The grass was cut with a mower and allowed to wilt before being picked up by forage harvester, but rain was so frequent and heavy that some of it had to be tedded to shake off the water

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before being picked up. This wet grass caused the silage to heat more than usual.

Cutting for hay followed, but progress was slow because of storm damage. Rain soon stopped cutting, which did not start again until 18 July, when most of the grass was stemmy and some so badly battered by rain that it could be cut only by forage harvester. A crimper was used immediately after cutting, and the grass dried rapidly and was baled in good condition; the hay was carted immediately after baling. The quality was poor because of the stage the crop had reached, but cattle are eating it readily; the yield of 60 cwt/acre was above average. The lucerne–cocksfoot mixture sown in May gave a light crop in July; bruising accelerated the drying of the lucerne stems and enabled the crop to be baled 4 days later. The second cut was heavy and it, with the final cuts from the Park Grass plots and several other experiments, was made into silage in early October.

Livestock

Cattle. Twenty-five of the most forward cattle were brought into covered yards early in December and were fed on silage, brock potatoes and kale, with a little hay and straw, and a small allowance of home-produced concentrates. The rest were yarded later in the month. The forward cattle were sold fat from the yard, but the 30 smaller ones were turned out in early April, and were fed with silage for a short time, as there was little grass. These smaller cattle gained 1·3 lb/head per day in the 160 days from 1 November 1962, but in the 30 days following turning out they lost an average of 45 lb each, or 1·55 lb/head per day. In the following 19 days they gained weight rapidly, and by the end of May had made good their loss. Fourteen young Hereford–cross bullocks were bought early in March and were fed on hay and potatoes outside. They gained weight evenly at 1·57 lb/head per day throughout spring and early summer. After a slow start there was ample grass throughout the season for the stock, which were sold regularly. A further 18 cattle were bought in the summer and 39 forward beats were transferred from Woburn for finishing. Altogether 121 cattle were sold fat during the year.

Seventy-four cattle were bought in autumn 1963; at the end of the year 24 were in yards and the rest were being fed outside on silage, kale, potatoes and hay.

The treatment in autumn 1962 with an organophosphorus insecticidal wash against warble fly was very successful, and the young cattle were treated in autumn 1963.

Sheep. In October 1962, 158 ewes were put to Suffolk tups after being flushed on a seeds ley. Because of the bad weather they were fed hay in November and silage from mid-December at 2 lb/head per day. Some brock potatoes were also readily eaten. The snow was so thick that a snowplough was used to clear an area so that the flock could move about and be fed. Concentrates were fed for 6 weeks before lambing started.

Lambing was disappointing, as there were 19 barren ewes, 4 died with

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