ROTHAMSTED RESEARCH

Report for 1982 - Part 1

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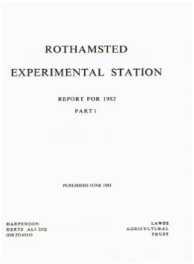

The Farms

R. Moffitt

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THE FARMS

R. MOFFITT

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Rothamsted and Woburn

General

The season was not as difficult as 1981. Once the extreme cold of January had passed the spring and summer were favourable but the autumn was very difficult. Although soil was late to dry out in the spring, sowing was then done under good conditions. A dry spell followed but later this changed and there was then adequate rainfall for crops.

Harvest was completed in good time although some laid crops, particularly barley and oats, caused difficulties. Generally although best yields did not approach those of 1981 there were few disappointments; in particular spring barley did better and taken overall the harvest was a better one.

October and November were very wet and both potato lifting and autumn sowing were frequently interrupted and done under poor conditions. All potatoes were lifted but some areas planned for winter corn were not sown. All ploughing was completed by the year's end but some fertilizers still had to be applied to Park Grass.

Weather

January rainfall was about average but it was a bitterly cold month with snow. The lowest temperature recorded was −19·8°C at Woburn on 14 January. Ploughing of stubbles was completed except for two small areas at Woburn where drainage work was planned.

February was better and although drier towards the end of the month it was also frosty and the ground did not dry sufficiently to permit a start on field work. Rainfall for the month was 44 mm, 8 mm less than average.

March was generally wet with nearly twice the average rainfall. At Rothamsted 85 mm of rain fell, 35 mm above average but at Woburn 90 mm were recorded, 45 mm above average. It was just possible to sow the first sowings of bean and barley sowing date

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experiments, but under poor conditions, and most spring sowings were not possible till the end of the month.

Apart from a short wet spell at the beginning of the month April was dry. Sowing resumed in good conditions and was completed at the end of the month. Potato planting was also finished. Only 23 mm rain fell, half the average.

May was initially dry but windy and crop spraying was difficult. Heavy rain at the end of the month brought rainfall up to the monthly average. At Rothamsted 64 mm fell, 12 mm above average although Woburn was drier with only 44 mm, 10 mm below average.

June, however, was wet with twice the average rainfall; 116 mm fell at Rothamsted and Woburn had nearly as much. The early part of the month was fine, silage making was completed and some early hay made but then it became very wet. There was no improvement until July which was drier than average. There were 44 mm of rain, compared with the monthly Rothamsted average of 63 mm. Woburn was drier with only 28 mm. Harvesting of winter barleys at both farms was done at the end of the month and the Woburn oilseed rape was also cut.

August began badly and harvesting of winter oats, many of which were laid, was difficult. Although the month was drier than average with 44 mm of rain compared with the average of 64 mm there were few prolonged dry periods and harvest was frequently interrupted.

September was at first dry and warm. Harvesting of cereals was completed on 5 September and potato lifting began. Cereal experiments requiring early drilling were sown although the ground was dry and preparing seedbeds difficult. Volunteer cereals did not germinate and where wheat was to be followed by barley or oats sowing was delayed in consequence. However there was a change at the end of the month which turned wet and brought the rainfall nearly up to the monthly average. At Rothamsted 51 mm were recorded, 7 mm less than average although Woburn had a little less.

October was very wet with about twice the average rainfall; 134 mm fell at Rothamsted compared with the average of 59 mm and at Woburn 81 mm fell compared with the monthly 30 year average of 54 mm. There were 2 days continuous rain from noon on the 20th to noon on the 22nd during which 38 mm were recorded. Potato lifting was frequently interrupted and sowing of winter cereals became difficult and at times impossible.

November was also wet with 105 mm of rain at Rothamsted, 34 mm above average. Potato lifting was eventually completed but some areas planned for winter cereals could not be sown. December was also wetter than average with 76 mm of rain (average 55 mm) and other than to complete ploughing of stubbles little field work was possible.

Field experiments

There were 4778 plots managed by the farm and yields were taken from 3948. This was less than 1981 partly due to fewer annual experiments and partly a simplification of the cereal variety experiments. In addition there were 1312 large plots and 1279 microplots managed by departments on which several operations were done by farm staff. This was also less than in 1981.

The Broadbalk 1982 crop was sown on 16 October. The crop was sprayed twice with propiconazole and leaf diseases were less than in 1981; pirimicarb was included as an aphicide in the second spray.

The best crop on Section O, the 31st consecutive crop, yielded 7·83 t ha^{-1} compared with 8·47 t ha^{-1} from the 30th consecutive crop on the same section last year. The best first wheat yielded 8·69 t ha^{-1} compared with 8·64 t ha^{-1} in 1981.

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The 1983 crop was sown under difficult conditions on 4 November. Germination was good however but rain immediately after sowing prevented application of chlortoluron pre-emergence herbicide. The variety Flanders was retained for a further year to maintain continuity.

Georgie was retained on Hoosfield. It was not sown until 29 March compared with 17 February last year. However the best plot yielded 6·95 t ha^{-1} compared with 6·12 t ha^{-1} in 1981. Leaf diseases were controlled by a seed dressing of ethirimol and a tridemorph spray.

Igri winter barley on the cultivation weedkiller experiment gave a mean yield of 6·58 t ha^{-1} (6·22 t ha^{-1} in 1981). Similar yields were obtained from tined, rotadug and direct drilled treatments all of which out-yielded ploughed treatments.

For the 1983 crop a comparison of a conventional subsoiler and a Paraplow has been introduced.

The recently enlarged programme of investigating the causes of variation in cereal yields continued.

There was increasing interest in field beans particularly winter beans and the experimental programme was considerable.

Crops

Of the 338 ha farmed (262 ha at Rothamsted and 76 ha at Woburn) cereal crops occupied 200·3 ha, potatoes 17·5 ha and beans 21·8 ha. There were small areas of oilseed rape, maize, peas and swedes. The remainder was in grass, fallow or used as headlands for access to field experiments.

Wheat. There were 70·8 ha at Rothamsted and 15·6 ha at Woburn all autumn sown.

The autumn of 1981 was unsettled and sowing was not completed until 6 November at Rothamsted and 13 November at Woburn. However, all crops survived the harsh 1981/82 winter well.

Most of the area was Avalon or Aquila but a small area of Norman was also grown. Flanders was still grown on some long-term experiments. However Avalon was disappointing and yielded about the same as the older variety Flanders. Norman looked well but unfortunately the seed stock was of poor germination resulting in a plant population which was less than intended which probably affected yield. Aquila performed well and consistently.

Much of the crop was sprayed with chlortoluron or methabenzthiazuron pre-emergence herbicide, but crops were rather weedier than last year. Few weeds germinated in a dry April and spraying at that time with a hormone weedkiller would have been ineffective. However, weeds germinated in the wet weather which followed by which time crops were too far advanced to spray. Cleavers in particular were a problem at harvest.

Wheats ripened earlier than usual particularly where there was take-all but after cutting these work was stopped and some spring barleys were cut as the better crops were not fit.

There was less leaf disease than in 1981 but most crops were sprayed at least once with a fungicide (either prochloraz, propiconazole or a mixture of tridemorph, carbendazim, maneb and captafol). However, after a number of years where cereal root diseases have not been serious, take-all was severe in second and subsequent wheats. Aphids were few and little spraying was required.

The experiment on factors limiting yield at Rothamsted was changed. The variety was changed from Hustler to Avalon and the experiment was split to compare a cereal following a break with a third cereal. There was much take-all following barley and by June 91·6% of the plants were infected compared with 6·5% in the wheat grown after a

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break. The mean yield following oats was 8·17 t ha^{-1} but following cereals only 5·02 t ha^{-1}. This compares with 8·29 t ha^{-1} of Hustler following potatoes in 1981.

In contrast to 1981 fungicide only had a small effect on yield. There was little difference in yields of September and October sown crops. However there was a benefit from increasing N from 150 kg ha^{-1} to 220 kg ha^{-1}. Nitrogen was applied in three doses and applying the bulk of the N in early/mid-March gave better yields than applying most in mid-April. However, April and early May were dry and N uptake may have been delayed.

In a series of experiments comparing variation between sites, the variety Avalon grown after potatoes gave a mean yield of 7·62 t ha^{-1} at Rothamsted, 7·99 t ha^{-1} on the heavy land at Woburn and 7·50 t ha^{-1} on the light land at Woburn. Last year at Woburn on light land Hustler gave a mean yield of 8·62 t ha^{-1}.

One of the best crops grown was at Woburn on a field at the Dairy Farm ploughed out of grass where in an experiment on nitrification inhibitors Aquila gave a mean yield of 9·32 t ha^{-1}.

In the variety trial Guardian, Longbow and Rapier did well. Aquila exceeded expectations and was consistent but Avalon and Norman were disappointing. In order to lessen the number of harvested plots the N test was discontinued.

The autumn of 1982 was the wettest since 1960 and extremely difficult. Most wheat was eventually sown but the late sown crops after potatoes were sown by fertilizer spreader and cultivated in. Some produced an acceptable plant but part failed. Generally those crops sown by 11 November grew satisfactorily but those sown after that date were poor. A few field experiments remained unsown at the year's end.

Barley. There were 72·8 ha at Rothamsted of which 26·8 ha were autumn sown. At Woburn there were 19 ha, 4·5 ha autumn sown.

Winter barley was sown in good time in the 1981 autumn, and as most of this followed another cereal an autumn herbicide, either chlortoluron or methabenzthiazuron was used to control weeds.

The main variety was Igri, with some Otter where a disease susceptible variety was required and one field of the six-row variety Gerbel was grown.

Most was sprayed twice with fungicide except on untreated experimental plots. Propiconazole was used for the first spray and prochloraz for the second. Much lodged but harvesting was done in good weather at the end of July. The best field yield was Gerbel which gave almost 7·5 t ha^{-1}. On rather poorer land field yields of Igri were 6·3 t ha^{-1}.

Because the factors limiting yield experiment has suffered from sparrow damage in previous years a protective net was used and was very successful. Following potatoes the mean yield was 7·62 t ha^{-1} but unlike the similar wheat experiment it benefited from early sowing. Sowing on 22 September gave 8·44 t ha^{-1} compared with 6·79 t ha^{-1} from sowing on 22 October. Fungicides, nitrogen timing and rates had little effect.

Spring barley varieties were Triumph and Atem although Georgie was retained on Hoosfield. Although most was not sown until April the moist summer suited the crop and it yielded better than last year. Some crops yielded as well as, if not better than, winter barley. Some spraying against mildew was done but generally amounts of disease were small. The exception was Koru in the variety trial which was badly infected with mildew. In this experiment the mean yield of all varieties was 6·97 t ha^{-1} at Rothamsted and 6·29 t ha^{-1} at Woburn. The best yield obtained was 7·78 t ha^{-1} from Triumph where 113 kg N ha^{-1} was applied, and larger applications of N did not increase yields further.

In an experiment comparing rates of P and K applied to the subsoil a mean yield of 7·54 t ha^{-1} was obtained and in another experiment where sowing date was included as part of a pest control experiment early sowing with the best insecticide treatment

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gave 7·74 t ha^{-1} compared with 5·47 t ha^{-1} when sown late and untreated. Sowing dates were 15 March and 16 April.

The 1983 crop was all sown by 30 October and germinated well although conditions on the heavy land of Warren Field at Woburn were not good and after sowing water frequently lay on the surface.

Oats. These are grown as a break crop and there were 13·8 ha of Peniarth at Rothamsted and 7·5 ha of Panema at Woburn, almost wholly winter sown. It is policy only to grow eelworm resistant varieties.

There was little disease but some lodging because poor spraying conditions made it difficult to accurately time the application of growth regulator.

Beans. There were 21·8 ha of winter and spring beans. The varieties were Throws MS and Minden. Almost all were grown at Rothamsted, as they do not suit the light land at Woburn well. Interest in winter beans was maintained and the experimental programme was large.

Following the successful experimental use of 'Benlate T' (benomyl+thiram) seed dressing on winter beans in 1981 all the farm crop was treated for 1982. However, flow characteristics were seriously affected and it was impossible to sow them through a conventional grain drill. It was just possible with a pneumatic drill which has a central feed hopper with a single large feed rotor but this sowed them rather shallowly. Consequently it was not possible to use simazine as a herbicide; propyzamide was used instead and mayweed was a problem weed. The crop grew well but was attacked by rust, which caused rapid leaf loss in late season and lessened yields. An experiment testing the effects of pests and pathogens gave few differences between treatments and a mean yield of only 3·0 t ha^{-1}. The best plot yield on any winter bean experiment was only 3·6 t ha^{-1}.

The spring crop, variety Minden, was sown in good time and grew well with few aphids and only one insecticide spray was necessary. This was fortunate as in late season the crop was over 2 m tall and spraying by tractor sprayer would have been impossible. Field experiments also suffered from rust and yielded around 4 t ha^{-1}. In an experiment where pathogens were fully controlled a yield of 4·4 t ha^{-1} was obtained compared with 3·66 t ha^{-1} from untreated plots. In an experiment which was distant from most experiments and unaffected by rust yields of up to 5·55 t ha^{-1} were obtained.

The winter crop for 1983 has all been sown, mostly using a triple disc direct drill with the front discs removed in order to achieve a sufficient sowing depth to permit the use of a mixture of propyzamide and simazine to control weeds. 'Benlate T' was not used as a seed dressing because of the sowing difficulties experienced for the 1982 crop.

Potatoes. There were 17·5 ha, 12 ha at Rothamsted and 5·5 ha at Woburn. The main varieties at Rothamsted were Pentland Crown and Désirée with a few King Edward. At Woburn some Cara and Pentland Crown were grown. Planting was uninterrupted by rain, and soil conditions were better than for some years. On Rothamsted soils clod was a problem as the ridges dried out but an inter-row rotavator with ridging bodies attached lessened the amount of clod present.

Emergence was slow particularly on one very heavy site which had to be irrigated at first but later this was unnecessary as there was then adequate rainfall. A mixture of linuron and paraquat was used to control weeds. A routine spray programme was maintained and there was little blight. Initially 'Dithane 945' (mancozeb) was used but 'Patafol Plus' (mancozeb+ofurace) was used for the later sprays.

At Woburn a long-term experiment was started to examine the problems of frequent potato cropping and further work on eelworm was initiated.

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Lifting at both farms was difficult and frequently interrupted but was eventually finished in November.

Yields were about the same as last year. Pentland Crown on the Ley Arable experiment on Highfield gave a mean yield of 49·8 t ha^{-1}, the best treatment yielding 62·4 t ha^{-1} total tubers. The yields for the comparison experiment on Fosters were 45·1 t ha^{-1} and 57·1 t ha^{-1} respectively.

The same variety in the subsoiling and deep PK experiment on Meadow gave a mean yield of 53·7 t ha^{-1}.

On the intensive potato experiment at Woburn Désirée gave 37·9 t ha^{-1} where nematodes were present but with nematode control using oxamyl the yield increased to 60·9 t ha^{-1}.

Oilseed Rape. There were 3·0 ha. Apart from a few microplots this was grown at Woburn on the long term cultivation experiment. It yielded 3·88 t ha^{-1} although despite intensive shooting pigeon damage was considerable, particularly on those areas not covered by snow. With extra N and full disease control 4·19 t ha^{-1} was obtained. It was combined direct in late July after desiccation.

Some rape is being grown at Rothamsted this year and there is an experimental programme on pest and disease control. This crop was direct drilled on 31 August following winter barley and winter wheat. Propyzamide was applied to control weeds.

Grass. The wet summer produced ample grass for stock. Haymaking was difficult but none was lost. The area devoted to hay is now much less and limited to fields either surplus to grazing or experimental needs. Most grass at Rothamsted is now ensiled but hay or silage is still made at Woburn as the small grass area does not warrant investment in equipment.

The lucerne at Woburn has established well and three cuts were made into hay successfully using an obsolete crimper following the mower. After harvest a further small field of 2·5 ha was sown on very light land.

Cattle

One hundred and fifty-nine fat cattle have been sold during the year but because of lessened grass acreage only 90 were bought.

Buildings

The ventilation of the Rothamsted potato store has been improved. Fan capacity has been increased and ventilation automated to allow better control of store temperature.

At Woburn the drainage of the yard has been improved and the most heavily used area regraded and concreted to improve access.

Staff

V. E. Goldring resigned from the Rothamsted farm staff. D. Hobbs and J. Pickles were appointed.

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