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Report for 1978 - Part 1

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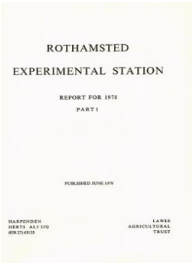
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REPORT FOR 1978
PART I

The Farms

R. Moffitt

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THE FARMS

R. MOFFITT

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ROTHAMSTED AND WOBURN

The season was generally favourable for most crops with above average rainfall in the first half of the year. This particularly favoured crops on the light land at Woburn. There were however some difficult periods; spring sowing was protracted because of rain, and harvest was late.

The autumn was exceptionally dry and will be remembered for a long time. This was particularly helpful for field work but the soil dried out so much that germination of some crops was patchy. Some seed did not germinate until the rains in December.

General

January was mild at first with cold weather later in the month. Severe gales caused damage to buildings. The last of the ploughing was done and the application of PK manures to experimental grassland was completed.

February was less wet and started with a mild spell, but turned cold at the end of the month. Little field work was possible.

March began with mild weather and the drilling of cereals and beans began, but rain with sleet and snow later in the month stopped work. Rainfall at Rothamsted was nearly twice normal (80 mm compared with the average of 48·2 mm), although Woburn suffered less.

April had slightly more than average rain at Rothamsted and slightly less at Woburn, but was cold. Spring sowing was finished on 19 April and winter cereals top dressed. A start was made planting potatoes but soil conditions were not good.

May began with cool weather and rain, interrupting potato planting and making the spraying of cereals for weed control difficult.

June was dull with above average rainfall at Rothamsted where 87 mm was recorded but was less wet at Woburn with 54 mm. Silage was made at Rothamsted in the early part of the month, but haymaking in late June was difficult at both farms and was not finished until July. July also had less sunshine than usual with below average temperatures.

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August improved with near average sunshine and less rain than usual but temperatures were still below normal.

Harvest consequently was late and frustrating as crops ripened slowly. On more than one occasion harvesting was stopped as the grain was soft. Much drying was needed. Cereal harvest finished at Rothamsted on 16 September and at Woburn on the 11.

The months of September, October and November were exceptionally dry with above average temperatures. September rainfall was about half normal and in October only 5 mm of rain was recorded at Rothamsted and 3 mm at Woburn. Both winter and spring beans ripened quickly in the warm dry September and were harvested by the end of the month.

Harvesting of potatoes was uninterrupted, but because of the dry soil there was more mechanical damage than usual and more were left in the ground than was desirable.

As many winter cereals were sown as was compatible with leaving sufficient fields to provide sites for spring experiments. Germination of some crops was patchy, particularly on the heavier soil where seedbeds were difficult to obtain. Where a good tilth was obtained generally germination was good, particularly of direct sown crops, as in this case undisturbed soil had not lost as much moisture as cultivated soil. At Rothamsted some fields were irrigated and a small area was ploughed and redrilled.

A final cut was taken from grass experiments in November and PK was applied to experimental grassland.

There was a very cold spell in late November which continued until December. The weather then became warmer until a cold spell in the last few days of the year. Rainfall in December was above average.

Field work at both farms was well up to date at the year's end with ploughing almost completed.

Field experiments

There were 5736 plots managed by the farm and yields were taken from 4794.

Numbers fell slightly at Woburn from 1680 in 1977 to 1577 and increased at Rothamsted from 3604 to 4159. A feature of the Rothamsted figures was the increase in the numbers of plots planned for autumn sowing, and fortunately the fine autumn of 1977 enabled this to be done. There was a similarly large programme in the 1978 autumn, fortunately also dry.

Broadbalk was sown in good conditions in 1977 and yielded well. The best plot gave 8·05 t ha^{-1} of Cappelle wheat following beans. In the autumn of 1978 the variety was changed to Flanders and 'Dicurane' (chlortoluron) was used as an autumn herbicide instead of 'Prebane' (terbutryne). Conditions at drilling were very dry and on parts of the field the seedbed was not ideal. Germination suffered but the stand improved considerably with the late autumn rain and looked satisfactory by the year's end.

Beans were grown on the rotation section for the last time as the soil is now badly infested with stem eelworm.

Pending a decision on future cropping, Barnfield continued in grass except for Sections 1 and 2 which were fallowed.

On the Cultivation-Weedkiller experiment at Rothamsted the 4-course rotation was replaced by continuous cereals and the rotavated treatment was replaced by the NIAE designed rotary digger.

On Hoosfield a decision was made to end the rotation plots and these will revert to continuous barley.

Experiments were initiated as part of a programme designed to investigate the factors limiting yield of the wheat crop.

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Crops

There were 340 ha farmed (264 at Rothamsted and 76 at Woburn). Cereal crops occupied 177·8 ha, potatoes 16·6 ha and beans 16·8 ha. There were 97·9 ha of grass and small areas of rape, maize, sugar beet and fallow.

Wheat. There were 56·3 ha at Rothamsted and 8·3 ha at Woburn, mostly winter sown.

The main varieties were Flanders, Maris Huntsman and Atou, but a little Cappelle was grown on Broadbalk and on a few long-term experiments where a variety change was undesirable.

Although sown in reasonable time, the wet winter did not suit the crop. Without a protective snow cover it suffered further in the frosty spell in February. However, top dressing in April followed by better weather brought about a rapid improvement.

At Woburn, 5 ha unfortunately including the variety experiment, and at Rothamsted about 3 ha were redrilled to barley or spring wheat.

Weed control was difficult as the spraying season was one of the worst experienced for some years. Poor results were obtained from post-emergent weedkillers and mayweed species (*Matricaria*) were not well controlled. Fortunately much wheat had been sprayed in the autumn and this eased the work load. The crop remained disease free and aphids were few. No spraying was done against aphids.

Some good plot yields were obtained. In a sowing date experiment Flanders sown in early November gave 7·79 t ha^{-1}, outyielding October sowing by 0·5 t and late November sowing by 1·25 t.

The best yields were obtained in an experiment comparing split nitrogen dressings, seed rate and methods of sowing. Maris Huntsman gave a mean yield of 9·05 t ha^{-1} and on some plots just over 10·0 t was achieved. In this experiment early nitrogen and chlormequat chloride were beneficial. Fungicides included as a test showed little benefit as there was little disease. Precision sowing on 100 mm rows gave similar yields to conventional sowing at the same row width.

The variety experiment suffered from the wet winter. The Woburn experiment was lost and two of the three blocks of the Rothamsted experiment following irrigated potatoes suffered from erosion and were lost.

The site following wheat at Rothamsted, although not sown until 10 November, survived better and gave a mean yield of 6·47 t ha^{-1}. The heaviest rate of nitrogen (189 kg ha^{-1}) gave the best mean yield (6·94 t ha^{-1}). Applying part of this as a foliar spray did not improve the yield when compared with a single application of all nitrogen given in April. Maris Huntsman gave the best mean yield outyielding the recently introduced Mardler. The quality wheat Armada did extremely well.

Barley. There were 65·2 ha at Rothamsted mostly spring sown and 20·7 ha at Woburn all spring sown. Julia, which had been the standard variety was largely discontinued, and was grown only on Hoosfield and a few long term experiments. Mostly Porthos was grown, with some Wing where a mildew susceptible variety was required for experimental purposes. At Woburn a little Athos was also grown.

Some winter barley, Sonja and Athene, was grown and weeds were controlled with either 'Tribunil' (methabenzthiazuron) or 'Fortrol' (cyanazine).

Spring sowing was protracted and frequently interrupted by rain. Starting in March it was not finished until 19 April.

Initially good seedbeds were easy to obtain, but became more difficult later in the spring as the frost tilth was lost on the heavier soils.

Germination was slow in the wet, cold weather and early sown crops, particularly Porthos, became discoloured, but recovered when the weather improved.

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Mildew was controlled by a seed dressing of 'Milstem' (ethirimol) or a spray of 'Calixin' (tridemorph). On experiments both were used.

Spraying with herbicides was difficult as the season was wet, windy and cold and weed control was not good. Yields on most experiments exceeded 5 t ha^{-1} and over 6 t were obtained on some sites.

The barley variety experiment at Rothamsted gave a mean yield of 6·16 t ha^{-1} when mildew was controlled by a 'Calixin' (tridemorph) spray. Yields of all varieties were similar. Athos gave the best mean yield of 6·49 t ha^{-1} closely followed by Georgie (6·46 t ha^{-1}), Aramir (6·39 t ha^{-1}) and Porthos (6·35 t ha^{-1}).

There was no response to N above 75 kg ha^{-1}. Julia, now outclassed, yielded 5·73 t ha^{-1}.

The Woburn site yielded less. The mean yield was 4·48 t ha^{-1}. The yield patterns were similar; Minak yielded best (4·72 t ha^{-1}), closely followed by Porthos (4·68 t ha^{-1}), Aramir (4·64 t ha^{-1}), Athos (4·60 t ha^{-1}) and Jupiter (4·59 t ha^{-1}). On a very sandy soil the best yield was obtained from 113 kg ha^{-1} of N. This amount of N gave a mean yield of 5·33 t ha^{-1} compared with 4·69 t ha^{-1} at 75 kg ha^{-1}.

Work was started in conjunction with the National College of Agricultural Engineering and Wye College on the effect of subsoiling and the incorporation of PK into the subsoil.

At Rothamsted a conventional subsoiler slightly increased yields but a winged subsoiler depressed yields slightly.

The use of the Wye double digger increased yields from 4·76 t ha^{-1} to 5·23 t ha^{-1}. The addition of 1930 kg P_2O_5 ha^{-1} and 460 kg K_2O ha^{-1} to the subsoil further increased yields to 5·99 t ha^{-1}.

At Woburn on a sandy soil a similar pattern emerged.

The effect of sowing date was shown by an experiment on mildew control which gave a mean yield of 5·82 t ha^{-1} when sown on 8 March, compared with 4·91 t ha^{-1} when sown on 24 April. Ethirimol seed dressing increased yield from 5·5 t ha^{-1} to 6·14 t ha^{-1} on the early sowing but lessened yield slightly on the later sowing.

Oats. Nineteen hectares of winter oats were grown at Rothamsted and 8·3 ha at Woburn. All were winter sown Peniarth except for 1·5 ha of spring sown Manod grown as a preparation for a wheat experiment in 1979. Both varieties are resistant to stem eelworm. Most crops were laid and ripened unevenly, making cutting difficult and much drying was needed. However, they yielded well and in a sowing date and virus experiment a mean yield of 6·33 t ha^{-1} was obtained. Later sowings lessened yield.

One field was sprayed with chlormequat chloride and stood well.

Beans. Only 1·2 ha were grown at Woburn as the light soil does not suit them.

At Rothamsted there were 15·6 ha. There was a large experimental programme with an increasing emphasis on winter beans. Five hectares of Throws MS winter beans were grown and cropped well, averaging over 5 t ha^{-1}. They were badly attacked by chocolate spot (*Botrytis fabae*), but a 'Benlate' (benomyl) spray in May, together with drier weather brought a rapid improvement. In an experiment on chocolate spot control, four sprays of benomyl increased yield from 5·82 t ha^{-1} to 6·74 t ha^{-1}.

Irrigation included as a treatment depressed yields. Unsprayed irrigated plots gave a mean yield of 4·65 t ha^{-1} compared with 5·82 t ha^{-1} unirrigated.

The value of timely sowing in view of the subsequent cold and wet winter was illustrated by this experiment. Sown on 14 October the mean yield of unirrigated plots was 6·33 t ha^{-1}, but a neighbouring experiment which for technical reasons was not sown until 16 November, yielded only 4·77 t ha^{-1}.

Drilling of spring beans was protracted and because some experiments required complex treatments before sowing, seedbeds were spoilt by rain before they could be sown. Conse-

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quently it was difficult to sow them deeply enough to avoid damage from herbicide (simazine). Aphids were numerous and were controlled by spraying with 'Aphox' (pirimicarb).

Crops at Rothamsted have averaged nearly 5 t ha^{-1}. In an experiment comparing the effects on yield of various treatments a mean yield of 5·89 t ha^{-1} was obtained.

Potatoes. As the experimental programme was smaller than usual less were grown; 16·6 ha compared with 18·1 ha in 1977.

At Rothamsted there were 9·6 ha, mostly Pentland Crown. Some Maris Peer second earlies and a few King Edward were also grown.

At Woburn there were 7·0 ha, mainly Pentland Crown except for a few Maris Piper grown on eelworm-infested sites. Planting was extremely difficult at both farms because of wet weather. To avoid bringing raw soil to the surface a rotary harrow was used at Woburn to prepare seedbeds, but on the heavy Rothamsted soil it was impossible to obtain sufficient depth and the spike rotavator had to be used as in past years. Poor seedbeds had an effect in producing misshapen tubers.

Generally the crop grew well. Some later plantings at Woburn, although planted in excellent conditions emerged poorly because of soft rots (*Erwinia*) which were encouraged by wet weather soon after planting.

Blight (*Phytophthora infestans*) was well controlled by routine spraying with 'Dithane' (mancozeb) followed by burning off with B.O.V. Aphids were few. The Rothamsted seed crop had little virus and produced a sound crop of seed for use in 1979.

Lifting was done under exceptionally dry conditions and there was minimal interruption from rain. However, there was more mechanical damage than usual because of dry conditions.

Yields were good. In an experiment comparing various forms of N at Rothamsted a mean yield of 50·9 t ha^{-1} was obtained. The best treatment yielded 55·6 t ha^{-1}.

Oilseed rape. There were 2·4 ha grown at Rothamsted. Sown in good time it grew well but was difficult to protect from the birds in view of the small area grown.

Weeds were controlled with a mixture of 'Dowpon' (dalapon) and 'Kerb' (propyzamide) and it was successfully combined direct after desiccation with 'Reglone' (diquat).

Grass. The season has been favourable for grass growth. At Rothamsted there has been an increasing number of grass experiments and this, together with a more favourable spring, greatly increased the amount of silage produced. Because of inclement weather the second cut, normally made into hay, was also cut for silage. A third silage cut was also taken. At Woburn, with a much smaller grass area the first cut was made into hay and the second and third cut green and fed to stock.

Haymaking at Woburn was easy, but at Rothamsted it was drawn out and difficult because silage making and cutting grass plots took priority. Nevertheless, most was baled in good order although some was weathered. Only Park Grass, where hay is made after cutting the sample areas, was lost but as the produce is variable it was of little consequence.

Cattle

One hundred and eighty six steers were sold fat from the two farms. One hundred and fifty five yearlings were bought.

Staff

J. M. Smith was promoted to Assistant Manager. R. N. Bradfer-Lawrence joined the staff in October as an Assistant Manager.

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Heather Dunning left the Recorder staff and H. L. Jones transferred to Field Experiments Section. Dianne Grant and P. Tuck replaced them.

J. Bygrave, R. Goldsmith and T. D. McKnight left. T. Chalkley, F. Ledbury, V. Goldring and G. Bassett were appointed.

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