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ROTHAMSTED RESEARCH

Rothamsted Report for 1966

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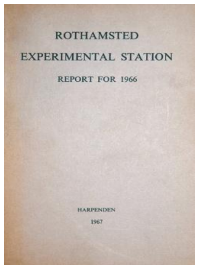

The Farms : Woburn

J. R. Moffatt

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Equipment

A new 4 tons/hour oil-fired vertical-flow grain drier was installed to deal with the more grain from the extra land at Scout Farm. This worked satisfactorily, and on no occasion was cutting delayed by lack of drying facilities. Four new Crittall storage bins, each holding 30 tons, were built and equipped for pneumatic emptying.

Buildings

Four new cottages for farm workers were completed.

The sunken cattle yard at the steading was filled in, and the space is used to store, sample and weigh produce from grain and potato plots.

WOBURN

The wet and cold autumn of 1965 delayed wheat drilling, sugar-beet lifting and ploughing, and at the end of the year all three jobs were unfinished. Cereals and most of the potatoes were planted in a fine spell during early spring. The summer was dull, cool and wet; however, some good hay was made, but the corn lodged badly. Sugar beet and grass grew well, but potatoes, after a good start, were disappointing. Harvest was rather late, but grain yields and quality were good. In the dry September most of the potatoes were lifted, but much rain in the last 3 months delayed the lifting of sugar beet and ploughing. However, at the end of the year only a little ploughing remained to be done.

The effect of weather on crops

The harvesting of sugar beet was not finished until almost the end of January 1966. Most of the wheat was sown early in November, but some was not sown until early January when there was a slight frost.

Very little land work was possible in January, but some ploughing was done. February was mild and wet, and the 3 in. of rain made the ground very wet. Temperatures were above average, and there was no frost of any severity. Ploughing was finished, and by the end of the month field work was up to date.

March and early April were dry, and field work was uninterrupted. Spring cultivations started early, and all spring cereals and beans were sown before the end of the month.

Potato planting started at the end of March, and most were planted before a wet spell started early in April. April was wet and cold, and there were 3·13 in. of rain in 23 rainy days. The ground became very wet, and no field work was done between 5 and 26 April. Sugar beet was drilled early in the month in good conditions.

The weather in May was changeable, which delayed the spraying of cereals and other field work, but by the end of the month it was up to schedule. May ended with a blaze of sunshine and the early part of June was hot, but on 10 June there was a heavy thunderstorm, during which 1·5 in. of rain fell. The weather then changed and there were 4·3 in. of rain

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in June. Hay harvest started at the end of May, and much was made and carted in excellent condition.

The dull, cold and wet weather in July and early August delayed the ripening of cereals until the third week of August, when they ripened quickly in a warm, sunny spell.

There were only 8 rainy days in September; harvest finished on 12 September, and most of the potatoes were lifted before heavy rain fell at the end of the month.

In October there were 4·38 in. of rain in 18 rainy days, which delayed the finish of the potato lifting until nearly the end of the month; ploughing was also delayed. The small acreage of winter wheat was drilled in a few dry days at the end of the month.

November and December were mild and wet, with rain falling on 25 days in each month. However, the sugar beet were all lifted by mid-November, and at the end of the year ploughing was finished except for the ground after sugar beet.

Field experiments

There were 1,640 full-scale field plots and 731 microplots. The full programme was completed. Many of the cereal plots lodged, but were harvested satisfactorily. The largest plot yield of both winter and spring wheat was almost 63 cwt/acre. Some small plots were cut by an Austrian Pam/150 S combine; this was designed for experimental plots and has a cutter bar 1,500 mm wide. All potato and sugar-beet plots were lifted under good conditions.

Grazing on the Ley–Arable experiment started in mid-April, but stopped after 2 days to avoid poaching the land; it restarted near the end of the month. The first-year leys were first grazed on 22 June and were grazed 10 times, as were the second- and third-year leys. The haulm of the eelworm-resistant Maris Piper potatoes, which replaced Majestic, died back early, and the crop was lifted on 5 September. The carrots germinated very slowly and unevenly; they were sprayed with linuron immediately after planting, and three times with menazon to protect against the aphid vector of carrot motley dwarf virus. The plants improved later and gave a mean yield of about 20 tons/acre, but the roots were so misshapen as to be unsaleable. The second- and third-year sainfoin were sprayed with paraquat against chickweed (*Stellaria media*) in February; no damage was done to the established plant of the second year, but the third-year plant (redrilled the previous autumn) was damaged and was redrilled in May. The second-year plant was resprayed with paraquat after the first cut and gave three cuts in the season. The barley averaged 43 cwt/acre.

Potatoes and leys were grown in the first year of the Intensive Cereal rotation experiment, on the site of the old permanent wheat and barley experiments. The potatoes on the barley ground looked better throughout the season and gave nearly double the yield of those on the wheat ground, though all treatments were similar. Grass also yielded more on the site of the old barley experiment.

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The first wheat crop of the new organic manuring experiment, after fallow in 1965, was badly damaged by wheat-bulb fly (*Leptohylemyia coarctata*). It was sprayed with paraquat and redrilled with spring barley. The undersown trefoil grew vigorously and smothered the barley given the smallest dressing of N.

The red beet of the Market Garden experiment germinated and grew well. Harvesting was done on two dates 3 weeks apart, and in this time the crop more than doubled in weight.

The carrots on the motley dwarf virus experiment germinated very slowly and unevenly. Soil conditions at drilling were not good, and rain during the operation caused some capping of the seed-bed. The area was given a pre-emergent spray of linuron which may have contributed to the poor growth. The plants grew rapidly later in the season and, though they remained uneven and gappy, yielded more than 11 tons/acre of marketable roots.

Potatoes were reintroduced into the Cultivation/Weedkiller experiment after a 2-year break with sugar beet because of potato-root eelworm; Maris Piper replaced the Majestic grown previously, and yielded almost 18 tons/acre. The haulm on the rotary-cultivated plots was greener than on the ploughed or tine-cultivated plots, but this difference was not reflected in the yield. The N to the barley gave the expected increase in yield.

In a potato variety trial, using Rothamsted-grown seed, Pentland Dell (7·7 tons/acre) was outyielded by King Edward (10·7) and Maris Piper (13·0). The Majestic Stock Seed produced a gappy stand, but gave 9·6 tons/acre. All varieties were affected by *Verticillium* sp. and died early.

The potatoes in the Irrigation experiment showed evident signs of magnesium deficiency: Pentland Dell did so more than Maris Piper, and most on the irrigated, unfumigated plots.

The last wheat and barley experiments in the series comparing broadcast and drilled seed again showed little effect of the method of sowing on yield of either crop; yields were larger from the smaller than from the larger seed rate.

Cropping

Of the 172 acres farmed, 45 carried wheat, 39 barley, 14 potatoes, 7 beans and 5 sugar beet. There were small areas of rye, oats, sainfoin, carrots and red beet. There were 28 acres of temporary grasses and clovers, and 15 acres of permanent grass.

A six-course rotation is being introduced on both the light and heavy land to give both a 1-year and 2-year "break" from cereals. This will provide land with different intensities of soil-borne diseases of cereals and prevent potato and sugar-beet pathogens reaching dangerous populations. On the light land the "breaks" are potatoes, fallow or a ley; on heavy land beans also will be grown. In preparation for the new rotation, beans were grown again in 1966 and some barley was undersown; the rotation will be in full operation in 1967.

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Crops

Wheat. Cappelle was the only winter variety grown. Some was not sown until January, and this yielded poorly. Other areas grew well, except on land fallowed in 1965, where crops were badly attacked by wheat-bulb fly (*Leptohylemyia coarctata*); they were sprayed with paraquat and redrilled with Maris Badger barley. N top-dressings were given in April; there was more loose smut (*Ustilago tritici*) than usual. There was some lodging, but, excluding the late-sown area, the yield was about 40 cwt/acre. Although much of the Kloka spring wheat lodged badly, the yield averaged nearly 40 cwt/acre. The crop shed badly just before harvesting.

Barley. Maris Badger, the only variety grown, germinated well but became yellow and uneven in May. It improved later and grew well; much of the crop was lodged and yields averaged about 32 cwt/acre. The quality was far superior to the 1965 crop.

Sugar beet. Drilling was done early in April. Germination was good and singling and side-hoeing presented no difficulties. One spray was given against virus yellows. In July it became yellow in patches and this was variously ascribed to magnesium deficiency, virus yellows and "Docking disorder". The crop was lifted under reasonable conditions in October and early November. The sugar content ranged between 13·8% and 16·3%.

Beans. The spring tic beans were drilled in mid-March and the ground sprayed with simazine the next day. They grew well throughout the summer and weeds were few; they were sprayed against aphids with a systemic insecticide, but there was no attack. The crop ripened quickly and was cut in mid-September. The yield of 30 cwt/acre was less than expected from the appearance of the crop.

Potatoes. King Edward was the main variety grown with Majestic and Pentland Dell in a few experiments, and Maris Piper, an eelworm-resistant variety, on areas known to be infested. Seed of all varieties except Majestic was grown and chitted at Rothamsted, and was sown early. Most areas were sprayed with a linuron/paraquat herbicide, and were earthed up with a rotoridger.

The crop grew well at first but, as the wet summer favoured the spread of blight, it was sprayed three times with fungicide, starting at the end of June. All varieties began to lose vigour towards the end of July, and in early August they turned yellow and began to die back quickly. By the end of the month there was little green haulm left, so few areas were burnt off; on all areas a flail was used to break up the dead haulm. *Verticillium* sp. was thought to be the main cause of the plants dying prematurely. Lifting started in mid-September and finished towards the end of October. There was less scab (*Streptomyces scabies*) than usual, and very few tubers with blight. The King Edward yielded a light crop of rather small tubers, probably because the plants died early. One experiment gave an average total yield of 16 tons/acre King Edward and one on Maris Piper gave almost 18 tons.

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Grass. This was all given a high-nitrogen compound fertiliser in March. The hay aftermath was given more of the same compound, and the grazed fields "Nitro-Chalk" in mid season; some fields were also given a late application of "Nitro-Chalk".

To avoid poaching the ground, the cattle remained in the yards until the end of April. Grass grew well during the summer and a lot of good hay was made. More cattle than usual were bought to eat the ample grass.

Livestock

Cattle. Of the 33 Hereford cattle bought in autumn 1965, 15 were yarded and 18 outwintered. They were fed on hay, sugar-beet tops or brock potatoes, and a small ration of home-grown concentrates. Some were sold fat off the grass, but 25 were transferred to Rothamsted for finishing. Sixty more bullocks were bought in late spring and summer, and all were still outside at the end of the year.

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