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ROTHAMSTED RESEARCH

Rothamsted Report for 1963

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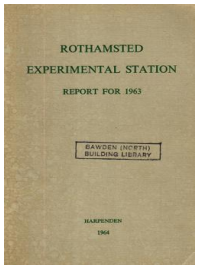

The Farms : Woburn

J. R. Moffatt

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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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pregnancy toxaemia, and 2 with prolapse of the uterus had to be slaughtered. The final lambing percentage was 141. All but 8 of the lambs were sold fat by the end of the year.

Culling brought the flock down to 107; 40 Scotch Half-bred gimmers were bought and 20 Suffolk × Half-bred gimmers of our own breeding were added to the flock. The ewes were flushed on fresh grass before being put to Suffolk rams. Hay feeding had not started by the end of the year.

The ewes were injected in the autumn and in the spring with a combined vaccine. The lambs were injected at weaning. Ewes and lambs were also drenched with a nematicide.

Equipment

A new tanker combine-harvester was adapted by the suppliers for quick conversion to a bagger for harvesting field plots. The conversion was very satisfactory, and much time and labour were saved when the machine was used as a tanker on the plot-discard areas and non-experimental corn crops.

The four 10-ton radial-flow drying silos were fitted with a larger fan and heater unit capable of giving an airflow of 10,000 cu ft/min, double that of the one replaced. Even with this extra capacity the plant was barely able to handle the large volume of very wet grain that was harvested.

Arc welding equipment was provided in the workshop.

Buildings

The building designed as a bagged grain store in 1940, and subsequently used as a fertiliser store, is now used as a potato chitting house. No structural alterations were made but thermostatically controlled fan heaters and vertical fluorescent lights have been fitted, and trays have been bought for 40 tons of "seed".

WOBURN

The year 1963 was a difficult and disappointing one, as the very hard winter resulted in a late start to spring work, and haymaking, harvesting and sugar-beet lifting were made difficult by frequent rain. However, the summer was drier than usual and the yearly total of 22·1 in. rain was 2·2 in. below the average, and sunshine was 100 hours below average.

Despite the early onset of wintry weather in December 1962, all root crops were lifted before the end of the year and dung had been carted to arable land. This, and the ground after the last-lifted sugar beet, were the only areas still to be ploughed when the hard weather started on 23 December. Six inches of snow fell on 30 December 1962 and frosts were very severe; on three successive nights the temperature fell below 0° F.

There were frosts every day throughout January and February, and though a daytime thaw started towards the end of February, the general thaw did not start until 3 March. Land work started on 6 March; the dung carted out in early December was spread and ploughed in, several

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experimental areas were given a last ploughing and the land after sugar beet was ploughed. The 2·89 in. of rain in 18 days in March made the ground too wet for much seedbed work, and only 4 acres of spring wheat were drilled, but the grassland was chain harrowed and fertilised.

April was dull and showery, and rain on 17 days gave a total of 2·15 in. Field work was severely curtailed, and corn drilling did not start again until 8 April, when all corn drilling in 1962 was finished and most of the potatoes were planted. Good progress was made when conditions were suitable, and by the end of April field work was almost up to schedule; cereals and sugar beet were drilled, many of the potatoes were planted and grass and clover seeds were sown.

May was dull and cool, and though there were 17 rainy days, there was only 1·31 in. of rain. The spring-sown crops grew well and looked as well as in 1962, when, though sown early, growth was retarded by cold winds and drought.

The storms in June missed Woburn, and only 1·31 in. of rain fell in the month. Towards the end of June some winter and spring wheat were showing the need for water. Rain fell on 14 days and the weather was too unsettled for cutting hay crops.

July seemed rather wet, but there were only 1·53 in. of rain in 12 days. Some hay was made in the rather unsettled weather early in the month, and all was made by the end of the month. The 3 months May, June and July each had less rain than usual, and the total of 4·15 in. was 2·11 in. below average. This affected all crops on light land; the early potatoes bulked slowly and the growth of maincrops was retarded; sugar beet grew slowly, and both winter and spring wheat were severely attacked by mildew (*Erysiphe graminis*). The small area of spring beans grew slowly and did not pod well. The corn on the heavy land looked well and there was slight lodging.

August was a dull, wet month with 2·86 in. of rain in 16 days, and sunshine 57 hours below average. Harvesting was impossible and several areas of barley were lodged. Sugar beet and maincrop potatoes grew fast, and despite several sprayings, potato blight spread rapidly, especially in the King Edwards.

Harvest started on 9 September, but because the combine broke down, some of the few fine days were lost, and it did not finish until 28 September. The badly lodged barley would not have been harvested but for the fine spell at the end of the month.

The first week of October was wet, but in fine weather which lasted until the end of the month potato lifting was finished, ploughing got well forward and some wheat was drilled. The 1·40 in. of rain was about half the average.

November was very wet and blustery; rain fell on 22 days and totalled 4·14 in. This interfered with sugar-beet lifting, but wheat drilling was finished and some ploughing was done.

The weather improved early in December, and it remained fine for most of the month. Only 0·40 in. of rain fell, but there were several sharp frosts. These delayed sugar-beet lifting, which was not quite finished at the end of the year, but ploughing was well forward.

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Field Experiments

There were 1,139 full-scale field plots, 75 more than in 1962, and there were also 495 micro-plots. Despite the hard winter, the full programme was completed. A winter wheat and a potato experiment were affected by water shortage and disease, and were partial failures. Though some barley plots were lodged, all cereal plots were combine-harvested without difficulty, and potato plots were harvested quickly and easily. Sugar-beet lifting was a slow and tedious job.

Cropping

Of the 172 acres farmed, 18 carried wheat, 45 barley, 18 potatoes and 11 sugar beet. There were small areas of rye, beans, lucerne and carrots, and other market-garden crops. Temporary grass and clovers occupied 22 acres and permanent grass 35 acres.

Potato-root eelworm (*Heterodera rostochiensis*) is now widespread and, as the eggs seem to remain viable at Woburn for several years, maincrop potatoes will usually be grown not more than once in 6 years. As beans are unsuitable on the light land as a break from cereals, the acreage under sugar beet was increased to the maximum that could be harvested by hand. Some of the uneven parts of the fields of the Dairy Farm will be levelled to provide extra land, when greater use will be made of temporary leys.

Crops

Wheat. Cappelle wheat was drilled on 4 acres after grass, and after potatoes or carrots. The crop was protected by snow against the hard frosts, and though damage was done on one area where the snow was blown away by wind, it recovered later. Growth in May was rapid and the crops came into ear towards the end of June. The crops on heavy land continued to grow well and yielded 32 cwt/acre. The plants in the light land in Butt Close stopped growing early and were affected by drought, scorch, mildew (*Erysiphe graminis*) and Fusarium sp.; the worst affected areas were also seriously damaged by birds. The only piece of Jufy I spring wheat on light land in Stackyard Field also suffered from drought and mildew, and there were no green leaves at the end of July; the yield was small.

Barley. The Proctor barley grew well, but was slow to ripen. Much of it lodged badly in August, and though it was all combined without much loss, the grain quality is poor. The average yield was 34 cwt/acre.

Beans. The only beans grown were the spring tics on the long-term liming experiment. They were sprayed against bean aphids (*Aphis fabae*) in June, but grew slowly in the dry summer; the leaves on the acid plots started to turn yellow before the end of July and there was a late attack

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of bean aphids; in August the plants died prematurely in patches. The yield ranged from 12·4 cwt/acre at a pH of 5·8, to 17·5 cwt/acre at a pH of 7.

Potatoes. The small area of unchitted Arran Pilot planted in mid-April made good top growth in June and July, but tubers grew very slowly and lifting was delayed. Selling prices were small, so most of the crop was left to mature, and it gave 9 tons/acre of good-quality tubers almost free from common scab.

The maincrop Majestic and King Edward were planted late, and though the haulm grew fast, tubers grew slowly. Because of severe aphid infestation, some of the King Edwards were sprayed with menazon. Despite several sprayings against blight, the disease spread rapidly in August, especially in the King Edward. One area of this variety looked well in mid-July, but at the end of the month the haulm died very quickly, probably from a combination of drought, aphid damage, blight and, possibly, *Verticillium* wilt. The Majestic maintained their vigour until mid-September, and the haulm was then killed with "Reglone". There was far less common scab than usual, but many of the tubers were badly split, probably because of a sudden increase in the rate of tuber growth. The King Edward tubers were not split, but many were blighted and there was a large proportion of small tubers.

Lifting was done in October in a spell of excellent weather, and the crop was handled by the pallet system. The Majestic yielded 10–13 tons/acre total tubers, and the King Edward 8–10 tons/acre.

In an experiment chemical sprays controlled weeds well and yields were as good as where weeds were controlled by mechanical operations. This confirms the results obtained at Rothamsted.

Sugar beet. The crop was drilled late in April with a precision drill which gave an even stand with a high proportion of individual plants. This facilitated singling, which was also helped and made less urgent by the use, for the first time, of a down-the-row thinner. There was a 20% saving in singling time after one passage of the thinner and a further 20% saving after the second passage. The threat of a bad attack of leaf miner (*Pegomyia betae*) was averted by spraying with "Metasystox", which also killed the aphids. The crop was kept clean without difficulty, but growth in summer was slow. Experiments were lifted in October and early November, and yields ranged from 12 to 18 tons/acre of washed beet. The lifting of the non-experimental crop was delayed by wet weather in November and frosts in December, and was not finished by the end of December. The yield was 13 tons/acre of washed beet, with an average sugar content of 16·5%; the dirt tare on some loads was inexplicably large.

Carrots. Early carrots were grown on one experiment and maincrops on two experiments. Germination was quick and even, probably reflecting the even depth of planting resulting from the use of individual seeder units mounted on a market-garden track-laying tractor. Both early and maincrops were affected by the dry weather during the summer, but the Early Market was lifted on two occasions 2 weeks apart in July, and in this

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time the yield of roots increased by nearly 50%; the maincrop was lifted in mid-September and yielded 21 tons/acre. Two experiments were sprayed with "Metasystox" to kill the vectors of motley dwarf virus, and the other experiment tested methods of controlling the aphids, but they were very few.

Market-garden crops. The leeks planted out in 1962 had a favourable autumn, but grew slowly in December. Frost prevented lifting until March, but the plants were not damaged; the yield was below average. Weeds were plentiful in the crop planted out in 1963 and took root again after hoeing. Despite replacing missing plants several times, there are far more gaps than usual.

The red beet germinated evenly and a good stand was obtained. After thinning there were more plants than usual, the increase being greatest where the seed was dusted with "Mergamma B". The areas for yield were all harvested at one time this year, but the pulling of discard rows was spread over several weeks.

Lucerne and clover. On the Ley–Arable experiment the lucerne was thin and backward and grew slowly, and was obviously affected by pest, disease or malnutrition, but yields were about average. In the Irrigation experiment a lot of plants were killed, probably by the hard winter, and on one low-lying area the crop was very patchy. The Crimson clover (*Trifolium incarnatum*) responded well to irrigation, but the irrigated plots made a poor recovery.

Grass. Despite an early application of fertilisers, early growth was slow and there was no spring "flush". Twenty-four acres of grass were saved for hay, and it grew rapidly in May. Because of the unsettled weather, cutting did not begin until the end of June, by when the grass was at a forward stage of growth. Drying was delayed by frequent light rain, and the crop was baled in rather unsatisfactory condition.

A mid-season application of nitrogen ensured ample grass for the cattle all the summer and autumn, which was supplemented with sugar-beet tops.

A piece of poor grass on Great Hill was sprayed with paraquat and rotavated to give a seedbed for resowing. However, there was so much couch (*Agropyron repens*) that it was sprayed with TCA and will be resown next spring.

In the Ley–Arable experiment grazing started on 30 April and ended on 13 October; the first and second-year leys were grazed 6 times and the third-year leys 5 times. The 1-year seeds hay gave a good first cut and the aftermath started to grow well. However, the grass dried up in the dry weather, and the second cut gave a small yield.

Livestock

Cattle. Seventeen dehorned Hereford bullocks were wintered in covered yards. Eleven of the best beasts were transferred to Rothamsted and the

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others were turned out in April and fattened on the grass. Twenty-nine young cattle were bought in April and 27 more in autumn 1963 to help eat the sugar-beet tops. When nearly fat they were transferred to Rothamsted for finishing and selling. At the end of the year there were 27 left outside.

Sheep. Sixty ewe tegs for grazing experiments at Rothamsted and Woburn were over-wintered at Woburn in 1962/63. Sugar-beet tops were fed until they were covered with thick snow, and then hay was fed in the covered yard at the Dairy Farm. In 1963, 30 ewe lambs after weaning were sent for over-wintering and were fed on sugar-beet tops supplemented, from the middle of December, by hay.

Pigs. The Large White pig herd was maintained at about 25 by keeping home-bred gilts from sows on the National Register. Farrowing crates were used and the average litter size at weaning increased from 8·2 in 1962 to 8·8 in 1963. Three hundred and forty pigs were sold for pork, and 90% were in grade "A" or the "Quality" grade. The sows were running out with the boar, but, as some of them did not breed regularly, there is now stricter control of service. Weaning weights were rather variable, and sows are now culled more strictly for milking ability. Feeding costs are very satisfactory when compared with other herds in the Pig Industry Development Association's feed-recording scheme.

Implements

A prototype 7-ft tractor-mounted angled rotary cultivator was bought, as it had proved its value on the heavy land at Woburn. A prototype down-the-row thinner was used on sugar beet in spring, and this was bought later.

A grain-drying and storage plant was installed. It consists of a pre-cleaner, three standard radial-flow drying and storing cylinders of 10 tons capacity and a special quick-drying self-emptying cylindrical silo. This has a grain thickness of only 14 in. between the central drying cylinder and the silo wall, and will be used to dry small lots of wet grain which come from field plots. There are also three galvanised storage bins which make the total storage capacity 130 tons. All grain moving is done by auger conveyors. The fan and heater are those replaced by bigger ones at Rothamsted.

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