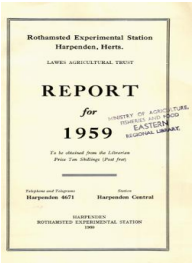
ROTHAMSTED RESEARCH

Report for 1959

Full Table of Content



Field Experiments Section

G. V. Dyke

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FIELD EXPERIMENTS SECTION

G. V. DYKE

The field experiments at Rothamsted and Woburn are controlled by the Field Plots Committee: F. Yates (Chairman), G. V. Dyke (Secretary), F. C. Bawden, G. W. Cooke, H. V. Garner, P. H. Gregory, J. R. Moffatt, C. A. Thorold, R. G. Warren and D. J. Watson.

On 1 April 1959 H. V. Garner retired from the headship of the Field Experiments Section and was succeeded by G. V. Dyke. H. V. Garner continues to be employed part-time; he spent September in China as one of a small British delegation invited by the Chinese People's Association for Cultural Relations with Foreign Countries.

Table 1 shows the total number of large plots harvested by the staff of the two farms and how they were distributed between different crops and experiments of different types. Two hundred and fifty-three large plots were managed but not harvested by farm staff. In addition, the departments laid down 224 large plots and 392 microplots; the total was 3,170.

TABLE 1

	Grain	Roots	Hay	Grazing	Total
Classical experiments:					
Rothamsted	230	73	48	—	351
Woburn	52	—	—	—	52
Long-period rotation experiments:					
Rothamsted	263	174	147	96	680
Woburn	157	265	53	12	487
Short-period experiments:					
Rothamsted	404	107	—	—	511
Woburn	147	73	—	—	220
Total	1,253	692	248	108	2,301

Broadbalk

The sowing of Broadbalk was delayed until December by the wet autumn; the condition of the seedbed was the worst for at least 10 years. Sowing was interrupted by bad weather and plot 2 (farmyard manure) was sown 4 weeks after the remainder. Conditions improved and plot 2 made up lost ground, so that by the late winter it looked as well as the rest. Section V (first crop after fallow) became exceptionally weedy as the season advanced, probably because the bare fallow was ineffective in the wet season of 1958. The TCB/MCPA weed-killer applied to section Ia (last fallowed in 1951) checked weeds, and yields generally were close to those of other sections: on the dung plot, however, section Ia yielded much less than the other sections. During the spring and summer plot 16 (minerals and 5 cwt. nitrate of soda) showed exceptionally good colour and growth, and its yield was about 4 cwt./acre higher than plot 7, which receives minerals and an equivalent dressing of sulphate of ammonia.

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Broadbalk was harvested early and in excellent condition; there was no lodging. Estimates were made as in 1958 of the amount of chaff, etc., not picked up by the baler. The mean loss, adjusted to 85% dry matter, was 5·7 cwt./acre—rather less than in 1958. Three different sampling methods to determine the proportion of weed seeds and rubbish in the grain delivered by the combine harvester were tested.

Hoosfield Permanent Barley

In April plots receiving nitrate of soda without potash were pale yellow, especially 2AA, which receives also superphosphate, but the colour soon became normal, and no exceptional loss of yield occurred. Yields were above average in spite of the drought. There was an unusually large increase of 2 cwt. grain where silicate of soda was applied.

Spraying was begun as recommended by Dr. E. K. Woodford of the Agricultural Research Council Unit of Experimental Agronomy to control coltsfoot (*Tussilago farfara*). This involves using 2 : 4-D ester on the stubble and MCPA (potassium salt) applied to the crop. First results seemed promising. A few areas were sprayed after harvest with dalapon to control couch grass (*Agropyron repens*).

As in 1958, the plots were harvested by combine-harvester, and on certain plots five separate parallel cuts were made. In some plots in each year the yield from different cuts varied considerably. Although the results for the two seasons are not entirely consistent, the cuts near the edges usually gave higher yields than the inner cuts. This point will be studied on all plots in 1960.

Park Grass

Growth was slow at the beginning of the season on all plots, and the second cut (in mid-September) on some yielded more than the first. In early June the unlimed ends of some plots, especially 10, 11–1 and 11–2, showed scattered patches of bright yellow grass. Yorkshire fog (*Holcus lanatus*), virtually the only species present, was growing nearby quite normally. The yellowing coincided with areas where the peaty mat of partly-decayed grass had come adrift from the true soil below. Normal colour returned after a few weeks.

Just before the first cutting a forage harvester with a flail cutting action was tested on some plots and the samples were compared with those obtained with a normal cutter bar. The flail machine worked well under a wide range of conditions and was used for the whole area at the second cutting. Yields of the second crop were calculated from the fresh weights of sample cuts.

Garden Clover

In July one or two well-grown established plants showed a deformity not previously observed. Each half of each leaflet was rolled downward and inward, the mid-rib remaining almost straight. There was no discoloration. Neighbouring plants seemed quite normal.

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Barnfield

In spite of a very dry spell at the time of drilling, a good plant was established on all plots, rather slowly on plots without farmyard manure. The crop later suffered from drought, and wilting was greatest on the well-manured plots where the leaf area was relatively high. Virus yellows was severe; spraying against the aphid vectors was not possible because of the risk that drifting insecticide would affect an adjacent experiment on an insect pest.

Ley–arable experiments

As in recent years, the plots of 3rd-year lucerne were poor, especially on Highfield. Of the two lucerne plots which reached their 3rd year in 1958 one was ploughed up early in that season because of the heavy attack of wilt (*Verticillium*). The wheat grown in 1959 on these two plots differed greatly in the degree of lodging; after 2 years lucerne and a 1-year fallow lodging was severe, but after 3 years lucerne only about 10% of the area was lodged. The yield of grain was higher after the 1 year's fallow.

Combine-Drilling Nitrogen for Spring Cereals

by H. V. Garner

The advantages of combine-drilling phosphorus and potassium fertilisers with the seed of cereals was clearly shown in field experiments during and after the War. The practice was so convenient and successful that it has since become almost standard on the better-equipped corn-growing farms. If nitrogen was put through a combine-drill at all it was in the form of a mixed fertiliser with a strict limit on the maximum content of sulphate of ammonia, usually not more than 0·2 cwt. N/acre. This was quite suitable for winter cereals because most of the nitrogen would not be applied till the spring, but spring cereals presented a problem because the new varieties needed far more than 1 cwt. of sulphate of ammonia/acre, and it would be convenient to apply the whole of the nitrogen through the combine-drill with the phosphate and potash, rather than to go over the ground first with the phosphate and potash and later with the nitrogen. Experiments on spring wheat and barley were therefore made at Rothamsted and Woburn similar to those initiated by G. W. Cooke and F. V. Widdowson in 1954.

The design and rates of dressing were the same for all experiments. A basal dressing of 0·54 cwt. P_2O_5 and 0·54 cwt. K_2O was applied as granular fertiliser by combine-drill. Sulphate of ammonia was applied at four levels (0·00, 0·22, 0·54, and 0·72 cwt. N/acre) either through the combine-drill as part of a granular NPK fertiliser (whose PK provided the basal dressing) or broadcast immediately after sowing the seed. In spite of careful calibration, the scheduled amounts of nutrients could not always be exactly applied, but the discrepancy was seldom large. The broadcast nitrogen was always made equal to the nitrogen drilled. The

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