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ROTHAMSTED RESEARCH

Rothamsted Report for 1932

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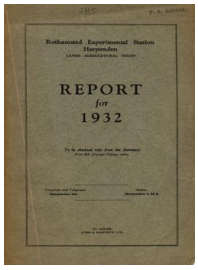

Cereals Under Mechanical Conditions

Rothamsted Research

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beet; it had no significant effect on barley or the fodder mixture. It increased the straw but the yield of grain was reduced, probably owing to bird damage. Muriate of potash benefited potatoes, barley straw and sugar percentage in beet; it was without effect on the barley grain, clover and fodder crop. Superphosphate benefited none of the crops.

At Woburn the yields were all lower than before, but the response to fertilisers differed from those obtained at Rothamsted. Sulphate of ammonia benefited barley (grain only), potatoes and fodder crops, had no significant effect on sugar beet, barley straw or wheat grain or straw, but injured clover hay. Muriate of potash benefited sugar beet (roots and tops) and barley (grain and straw), but had no significant effect on clover, wheat, potatoes, or fodder crops. Superphosphate had no effect.

The average yields of all the plots and significant responses during the three years 1930-1932 have been:

	Mean yields		Fertilisers to which the crop responded significantly					
			Rothamsted			*Woburn.*		
	Roth-amsted	*Wo-burn*	1930	1931	1932	1930	1931	1932
Barley—								
Grain, cwt. per acre	27.3	20.2	N	N	—	N	N	N, K
Straw, cwt. per acre	31.8	41.7	—	N	K	N	—	K
Clover Hay—								
Dry Matter, cwt. per acre ..	24.7	15.9*	N	—	N	**	—	N–
Wheat—								
Grain, cwt. per acre	24.6	8.2*	—	N	N–	**	N	—
Straw, cwt. per acre	55.9	27.4*	—	N	N	**	N, K–	—
Potatoes—								
Tons per acre ..	7.18	9.40	P–, K	K	N, K	N	—	N
Forage—								
Dry Matter, cwt. per acre ..	36.5	34.2*	N	N	—	**	N	N
Sugar Beet—								
Roots, tons per acre	6.80	5.58	—	N	—	N, P–	N, K	K
Tops, tons per acre	11.27	6.84	N	—	—	N, P–	K	K
Sugar percentage	17.15	17.09	—	—	N, K	N–, P	K	—

— No response.
– Negative response.
* Two experiments only (1931 and 1932).
** No experiment.

Wheat and potatoes thus appear at opposite ends of the test, for while Woburn is much the better for potatoes, Rothamsted excels for wheat; for clover hay, barley, sugar beet, and fodder crops there is not much to choose between the centres and manuring has smoothed out the differences due to soil type.

THE CEREALS

Corn Growing Under Mechanised Conditions

Further experiments have been made to discover how best to maintain fertility on a corn farm cultivated as far as possible by machinery and making little or no farmyard manure. The problems under investigation include the return of straw to the land, and the preparation of the land for the crop.

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Return of Straw to the Land. In 1928 a four-course rotation experiment was set up in Hoosfield to find out whether straw could be effectively returned to the land in any form other than farmyard manure. Equal quantities of straw are :

(1) Converted into artificial farmyard manure and applied to one set of plots.
(2) Ploughed in along with the same amount of artificial fertilisers as are used in making the artificial farmyard manure.

A third set of plots receives farmyard manure, containing the same quantity of organic matter as is supplied by the artificial farmyard manure. The amounts of nitrogen, phosphate and potash thus introduced are equalised on all three sets of plots by addition of artificial fertilisers so that the only variant is the amount of organic matter.

The experiment is designed to show the effect of each manure not only in the year of application, but in the first, second, third and fourth years after application. It is not yet possible to say how far the results already obtained are significant, as the experiment is still in its preliminary stages.

THE VALUATION OF FARMYARD MANURE

Of all problems in scientific agriculture one of the most difficult is to put a value on farmyard manure. For artificial fertilisers the problem is simple : the cost of the plant food is known exactly ; the effect is measured in the increased crop yield immediately obtained ; no other effects are normally produced so that an account can easily be made up. Farmyard manure, however, presents much greater difficulties : its cost cannot be exactly stated and its effects are not measured simply by the increase immediately obtained ; it alters the soil and it persists for a longer period than one year.

In many of the experiments at Rothamsted and at Woburn farmyard manure is compared with artificial manures. When the comparison goes on for a number of years the cumulative effects come into the account so that the results are higher than those obtained after one year only ; even so they are not complete, as they do not include the whole of the residual effects.

Some of the figures obtained at Rothamsted and at Woburn are given in Table IV.

TABLE IV.—Comparative Value of Nitrogen in Farmyard Manure when that in Sulphate of Ammonia = 100.

	Rothamsted.	*Woburn.*	*Oakerthorpe.*
One year only, 1932—			
Potatoes	12	—	—
Kale	—	22*	—
Mangolds, Roots	—	—	57
Leaves ..	—	—	52
Repeated annual dressings (approximate values)—			
Mangolds, Roots	56	—	—
Leaves ..	48		
Wheat grain	43	30	
Barley grain	28	35	

* See Fig. 2, page 29.