ROTHAMSTED RESEARCH

Rothamsted Report for 1932

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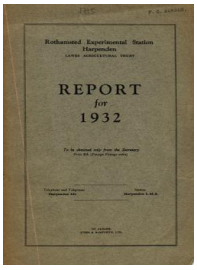

Valuation of Farmyard Manure

Rothamsted Research

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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.

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The low recovery of the nitrogen of farmyard manure in the crop is associated with a loss of nitrogen and also an accumulation of nitrogen in the soil, only part of which subsequently becomes available to the plant. Thus the fate of 100 parts of nitrogen applied to the soil in the farmyard manure is somewhat as follows :

	Woburn Continuous Barley.	*Rothamsted Continuous Barley.*	*Rothamsted Continuous Wheat.*
In Crop	30	20	20
In Soil	40	25	25
Lost	30	55	55

Each pound of nitrogen taken up from farmyard manure by the barley crop at Woburn is associated with the production of about 90 lb. of total produce and 60 lb. of grain. For nitrate of soda the figures for total produce are approximately the same, but the quantity of grain appears to be somewhat less.

LEYS AND FALLOW BEFORE WHEAT

In the 1932 experiment in Long Hoos (pp. 142-6), there was little difference in yield whether the wheat followed clover alone or clover mixed with rye grass, but the nitrogen content of the straw, as well as the slight superiority in yield, showed that clover left rather more nitrogen in the soil than clover and rye grass. It made no difference to the yield of wheat whether the clover or the mixture was left growing till autumn to furnish two cuts of hay, or whether it was cut in June and the ground immediately ploughed and given a bastard fallow. The young wheat at first appeared greatly to benefit by the bastard fallow, but it soon lost this early advantage.

So far as the farm is concerned, the clover and rye grass has the advantage that where the clover has failed the rye grass may succeed so that a crop can still be obtained. The rye grass has, however, the disadvantage that it shelters some of the insect pests of wheat, notably the Frit fly *Oscinella* (*Oscinis*) *frit* Linn., which may lead to a reduction in the wheat crop. It was indeed, for this reason that many Hertfordshire farmers gave up adding rye grass in spite of its other advantages.

The yields of hay in 1931 and of wheat in 1932 were :

	1 *cut ley and bastard fallow.*		2 *cuts ley, no bastard fallow.*		Standard Error.
	Clover.	Clover and Rye Grass.	Clover.	Clover and Rye Grass.	
1931 Seeds, Hay— Hay, cwt. per acre	39.8	37.3	52.3	53.4	—
1932 Wheat, cwt. per acre—					
Grain	26.6	26.0	27.6	27.2	0.96
Straw	52.2	50.2	53.1	49.5	1.20
Nitrogen, as per cent of dry matter—					
Grain	2.02	2.00	2.00	1.94	—
Straw	0.61	0.56	0.60	0.57	—

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