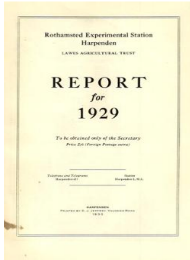
ROTHAMSTED RESEARCH

Report for 1929


Rothamsted Experimental Station
Harpenden

REPORT
for
1929

Winter Wheat

Rothamsted Research

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Soon after the grain begins to form, the carbohydrates and the nitrogen compounds move into it together, and the proportions in which they go remain almost constant throughout the whole process of grain formation. Not quite constant, however, for drought seems to check the flow of carbohydrate more than that of nitrogen, and therefore to raise the percentage of nitrogen in the grain.

For the maltster one of the most important properties of barley is the amount of extract obtainable from the malt. Hitherto, this has been determined by a laborious malting test. Dr. Bishop has shown that it is simply related to the moisture content, the percentage of nitrogen and the 1,000 corn weight of the barley grain: he has constructed a slide rule by means of which the chemist, knowing these three easily ascertained quantities, can read off at once the number of pounds of extract obtainable from a hundredweight of barley.

A study of the nitrogen compounds during malting has shown that hordein and glutelin both break down rapidly from the third to the sixth day on the floor to give salt-soluble compounds, chiefly non-protein nitrogen. After this there is an approximate balance due to a resynthesis in the embryo equal in amount to the breakdown in the endosperm. No marked changes take place as a result of the subsequent kilning process, nor are the proportions much altered by variations (within limits) in the amount of moisture supplied to the germinating grain, or in the time of flooring.

Calcium Cyanamide. Reference to the detailed tables shows that calcium cyanamide has given as good results as sulphate of ammonia for barley, and distinctly good results for sugar beet at the western centre. Both these crops require lime. On the other hand, in our earlier experiments it did not give as good results for potatoes, a crop which does not in general benefit by lime. We are following up this distinction and it may help in deciding the conditions in which the expert could advise the use of cyanamide. On the Continent farmers are sometimes advised to apply cyanamide a few days after the sowing of the seed wherever it is impossible to adopt the better plan of applying it several days before the sowing. We found no advantage in this course: no harm was done when 1 or 2 cwt. was sown with the seed, though 4 cwt. proved distinctly injurious.

WINTER WHEAT.

The experiments with wheat were somewhat weakened by the circumstance that some of the plants died during winter and the survivors were too irregularly distributed to form good experimental material. This winter mortality probably explains the higher standard errors per plot as compared with those obtained in experiments on spring sown cereals (pages 46-7).

The results agreed with those of 1927 in that the early dressing of sulphate of ammonia was better than the late: they thus differed from the results of 1926 and 1928. Muriate of ammonia, however, gave better results late than early, again in accordance with 1927 and in opposition to 1926 and 1928.

In each year Square-Head's Master has the highest nitrogen content, Yeoman II. follows closely: then come Million III. and

Swedish Iron. In neither year did the nitrogenous dressing appreciably affect the percentage of nitrogen in the grain: though the muriate appeared to give a lower percentage than the sulphate in Square-Head's Master, as it usually does in barley. Nor did time of application have any effect. The results are shown in Table II.

Table II. Percentage of Nitrogen in dry matter of wheat grain. Rothamsted 1928 *crop.*

	Square-Head's Master.			Yeoman II.		
	Early Dressing	Late Dressing	Early and Late Dressing	Early Dressing	Late Dressing	Early and Late Dressing
Sulphate of Ammonia ..	2.00	2.01	1.99	1.99	2.01	2.00
Muriate of Ammonia ..	1.96	1.97	2.01	2.00	2.05	1.99
No Nitrogen ..		2.02			1.98	
	Million III.			Swedish Iron.		
Sulphate of Ammonia ..	1.84	1.85	1.81	1.77	1.76	1.89
Muriate of Ammonia ..	1.78	1.84	1.95	1.77	1.85	1.84
No Nitrogen ..		1.83			1.80	

Note that the figures given on page 32 of the 1928 Report are for grain containing 15% moisture and not for dry grain, as there stated.

1929 *Crop.*

	Square-Head's Master.			Yeoman II.		
	Early Dressing.	Late Dressing.	Early and Late Dressing.	Early Dressing.	Late Dressing.	Early and Late Dressing.
Sulphate of Ammonia ..	1.80	1.79	1.76	1.75	1.76	1.71
Muriate of Ammonia ..	1.75	1.76	1.72	1.74	1.67	1.67
No Nitrogen ..	—	1.76	—	—	1.73	—
	Million III.			Swedish Iron.		
Sulphate of Ammonia ..	1.66	1.60	1.64	1.44	1.58	1.51
Muriate of Ammonia ..	1.65	1.55	1.62	1.49	1.51	1.55
No Nitrogen ..	—	1.55	—	—	1.60	—

WINTER OATS.

There was a serious loss of plant during the winter and, in consequence, many weeds appeared in spring. As not infrequently happens in these circumstances, the effect of nitrogenous manure was to increase the growth of the weeds as well as of the crop: in the end there was an increase in the straw (including the weeds) but not in the grain, indeed there was evidence that sulphate of ammonia lowered the yield of grain.

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