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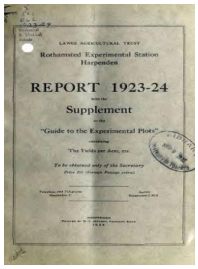
Report for 1923-1924 With the Supplement to the Guide to the Experimental Plots Containing the Yields per Acre Etc.



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Results of Malting Barley

Rothamsted Research

Rothamsted Research (1925) *Results of Malting Barley ;* Report For 1923-1924 With The Supplement To The Guide To The Experimental Plots Containing The Yields Per Acre Etc., pp 17 - 19 **- DOI: https://doi.org/10.23637/ERADOC-1-116**

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CHLORIDES AND SULPHATES AS FERTILISERS.

Farmers now have the choice of muriate or sulphate of potash : and they can also have the choice of muriate or sulphate of ammonia. The experiments with potassic fertilisers are described under " Potatoes." Our experience with the muriate of ammonia is that it is less effective than the sulphate for potatoes but more effective for barley. The difference depends on the rainfall during the months of March, April and May and becomes less as the rainfall increases. The average of all the results at Rothamsted has been as follows :—

	1921	1922	1923	1924
Effectiveness of muriate when that of Sulphate = 100 ... ... Corn ...	106	103	109	104
Potatoes	(112)*	95	92	100
Rainfall—March, April and May (inches)	4·08	7·38	5·64	8·95

*Crop almost failed ; 2 tons per acre only.

The chloride of ammonia has had a remarkable effect on the grain of barley as is described below.

BARLEY.

During the past three years an extended investigation into the effect of manures on the yield and quality of barley has been carried out at Rothamsted and on certain good barley farms in various parts of the country, the work being done in connection with the Research Scheme of the Institute of Brewing. The variety grown is Plumage Archer, and seed from one and the same field was used at all the centres.

The results show a considerable degree of concordance among themselves, but they differ in several important respects from the current teachings of agricultural science. It is usually recommended that the manuring for barley should be mainly phosphatic, nitrogen being given only after a corn crop and potash but rarely. Out of 30 different tests this recommendation would have involved loss of money in no less than 26. The actual yields are given on p. 114; the average reduction in yield in bushels per acre, consequent on the omission of each fertiliser during the three years 1922, 1923 and 1924, has been :—

Decrease due to omission of :—	After a straw crop.	After roots fed off.	After potatoes or beets (well manured).	Mean of all experiments.
1 cwt. sulphate of ammonia ...	5·8	3·9	6·7	5·4
3 cwt. super-phosphate	0·9	[0·5]	1·2	0·5
1½ cwt. sulphate of potash	[1·1]	1·3	1·1	0·3

(The figures in brackets are increases and not decreases.)

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The reasons for this unexpected result are probably two :—

1. The modern varieties of high quality barley, such as Plumage Archer, are stiffer in the straw than the older ones, and therefore can carry larger crops of grain without risk of being lodged. Apparently, therefore, they can safely receive more nitrogenous manuring.

2. Good farmers now realise the importance of giving ample dressings of superphosphate to their root crops and sufficient of this fertiliser generally remains in the soil to satisfy the needs of the barley. Potash and phosphates intended for the seeds mixture can, of course, be applied to the barley in which they are sown. The barley may derive benefit, but the profit from these manures must come from the seeds.

One of the distinguishing features of the scheme is that all the experimental barleys are examined by expert maltsters appointed by the Institute of Brewing Research Committee, and are afterwards malted separately and the malts fully analysed.

It is shown that the use of a nitrogenous manure even after roots folded off has not adversely affected the valuation of the barley or the value of the malt, but that the omission of potash from the manure lowered some of the desirable qualities of the malt in 1922, though not apparently in 1923. At each centre the heaviest crops obtainable by manuring have been valued as high, or nearly as high, per quarter, as any other samples of the same set, and it is clear that manurial schemes can be devised which will enhance the present yield without detriment to valuation. So far as the investigation has gone it suggests that farmers using a good modern variety of barley can aim at the biggest crop that will stand, and they can use the appropriate fertiliser to secure this without fear of loss of valuation.

Thus, for the season 1923, the figures for valuation were :—

Valuation per quarter of 448lb., 1923 barleys : made January, 1924.

	Rotham-sted.	East Lothian.	Eyton.	Chisel-borough.	Walcott.	War-minster.	Lincs. Wolds.
1 cwt. sulphate of ammonia	57/–	49/6	49/–	47/–	41/6	52/–	42/–
No Nitrogen	56/–	49/–	50/–	46/–	41/–	52/–	41/6

A remarkable effect is produced when the chloride (or muriate) of ammonia is substituted for the sulphate. In every instance the valuation of the grain has been raised and its nitrogen content lowered. This is shown by the following table :—

Season.	Valuation of Barley. per qr. of 448 lb.		N. content of grain per cent. of dry matter.	
	Sulphate of Ammonia.	Ammonium Chloride.	Sulphate of Ammonia.	Ammonium Chloride.
1922 ...	31/–	36/–	1·647	1·602
1923 ...	57/–	58/–	1·544	1·485
1924 ...	63/6	64/–	1·517	1·495

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The result is all the more interesting in that this is the only manurial method hitherto tested which has consistently improved the quality of the grain. Other treatments have acted sometimes one way and sometimes the other, the change being usually small and unpredictable.

When yield is combined with the valuation and allowance is made for tail corn there is found to be a considerable difference in money value per acre in favour of the chloride :—

Yield (measured bushels per acre) and Money Value of Barley per Acre.

	Sulphate of Ammonium.		Ammonium Chloride.		Difference in favour of Chloride as against Sulphate.
	Yield.	Money Value per Acre.	Yield.	Money Value per Acre.	
1922 ...	36.0	136/–	35.7	156/–	20/–
1923 ...	32.5	239/–	35.6	265/–	26/–
1924 ...	29.8	238/–	29.7	249/–	11/–

In the course of the work it has become clear that the method of valuation commonly adopted does not always work out quite fairly either to the buyer or the farmer. On the loams the estimate has usually been tolerably correct; the value of the malt obtained has paid the cost of the barley, the transport, expenses and profits of malting and other charges. But on the lighter soils, the barley has not generally been as good as it looked, so that the value of the resulting malt did not pay all the charges. On the chalk and limestone soils the barley turned out better than it looked; the farmer received less than he deserved and the malt gave an additional profit to the maltster.

These results are quite intelligible. The buyer judges from certain external appearances of the barley which are on the whole correlated with the value of the resulting malt. But the correlations between the external characteristics and chemical composition are liable to be affected by changes in environment, and it need occasion no surprise that a correlation holding good on loams may be modified in one direction on a sandy soil, and in another on a chalk soil.

The malting and brewing part of the investigation lies outside the scope of Rothamsted, and is carried out entirely by the Institute of Brewing, but the Station, at the cordial invitation of the Institute, is keeping in close touch with the work.

BASIC SLAG AND GRASS LAND.

It is well known that basic slag produces excellent results on many grass fields, especially on the Boulder clays where there is much bent grass and only little wild white clover, but on a number of fields it fails to act.

Two causes of failure are already known, and methods of dealing with them have been worked out :—

(1) The land may be too sour, requiring a dressing of lime before the slag can act.