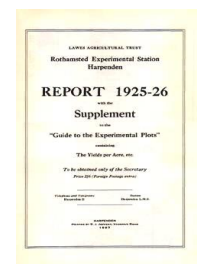


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ROTHAMSTED  
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# Report 1925-26 With the Supplement to the Guide to the Experimental Plots



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## Results on Malting Barley

### Rothamsted Research

Rothamsted Research (1926) *Results on Malting Barley* ; Report 1925-26 With The Supplement To The Guide To The Experimental Plots, pp 20 - 22 - DOI: <https://doi.org/10.23637/ERADOC-1-84>

sulphate of ammonia, did not cause the straw to grow so long. Further, it caused more tillering, *i.e.*, it increased the number of heads per plant, though it produced no more grain than sulphate of ammonia. It is improbable that the cyanamide itself brings about these effects as it quickly decomposes in the soil; some other substance associated with it is more likely to be the agent.

These results seem to promise a way of obtaining valuable increases in grain crops. For if both the number of heads per plant and the number of grains per head can be increased, the way seems open to considerable increases in yield at only small expense.

#### BARLEY.

The amount of barley used for malting is steadily increasing, the fall in the quantity taken by distillers being more than counterbalanced by the increased amount taken by brewers. The figures for the past three years for Great Britain and Northern Ireland have been\* :—

Year ended 30th September.	Malt used in Brewing.	Malt used in Distilling.	Total Malt.	Estimated equivalent in Barley of Total Malt.
	cwt.	cwt.	cwt.	cwt.
1923 ... ..	10,742,000	3,242,502	13,985,302	18,647,000
1924 ... ..	11,275,235	3,105,525	14,380,760	19,174,000
1925 ... ..	11,453,591	3,056,601	14,510,192	19,347,000

\* Earlier figures are not comparable since they include the whole of Ireland.

Of these quantities it is estimated that 75 per cent. are home grown. It is perhaps too much to hope that all the malting barley could be produced in these islands, but the proportion could be raised with advantage to the British farmer; the maltsters will pay 50/- to 70/- per quarter for barley, which, if kept on the farm and fed to animals, would be no better than grain purchased for 35/- per quarter.

The field experiments have, therefore, been made with malting barley, and their purpose has been to discover the effects of soil, climate and manure on the yield and quality of the grain. They have been carried out under the Research Scheme of the Institute of Brewing, of the Barley Committee of which the Director is Chairman; the arrangement has the great advantage that the produce from each plot is examined in full detail by expert maltsters and brewers.

The first series of experiments, carried out not only at Rothamsted, but on some 15 good barley growing farms in different parts of the country, led to the following conclusions :—

1. Soil and season are the main factors determining yield and quality in barley. Conditions increasing the quantity per acre of non-nitrogenous material (presumably starch) in the grain without correspondingly increasing the amount of nitrogen appear also to be conditions making for malting quality.

2. Sulphate of ammonia in small quantities (1 cwt. per acre) increased the number of tillers and the number bearing

grain; it also increased the yield of grain by about 5 bushels per acre in all the seasons 1922—26, the effect being but little influenced by season. On the average it slightly raised the nitrogen content of the grain, but insufficiently to affect the buyers' valuation.

The Institute of Brewing is going further into the question whether the slight change is of any significance in malting, and for this purpose 30 quarter samples of each experimental lot are being obtained this year.

3. Larger quantities of nitrogenous manure may raise the percentage of nitrogen in the grain so much as to be perceptible by the buyer; in consequence the valuation falls.

4. Superphosphate also increased the number of tillers, but at most centres it had little effect on yield, except in 1925, when it commonly gave increases, and no recognisable effect on quality or on percentage of nitrogen in the grain. On loams in the Eastern Counties, however, it increased the yield and decreased the percentage of nitrogen. In certain circumstances it appeared to decrease the crop.

5. Sulphate of potash caused little or no increase in yield; indeed, at one centre there was a depression. It slightly lowered the percentage of nitrogen in the grain, but had no effect on the weight of 1,000 corns or on valuation.

6. Muriate of ammonia, however, had the remarkable effect of increasing the number of grains of head corn per plant, apparently by increasing the number per head rather than the number of heads. Its action seemed to be to move the material more completely from the rest of the plant to the seed, for it gave no increase in total plant growth per acre (*i.e.*, grain, straw, cavings, and all the rest of the plant). It lowered the nitrogen content of the grain and improved the valuation. A tabulated summary of the Rothamsted results follows:—

*Nitrogenous Fertiliser.*

	1,000 Corn Weight.		Nitrogen in Dry Matter.	
	No Nitrogen.	Complete.	No Nitrogen.	Complete.
1922 ... ..	41.8	41.4	1.702	1.767
1923 ... ..	40.0	40.0	1.617	1.629
1924 ... ..	39.5	39.1	1.434	1.414
1925 ... ..	40.0	40.0	1.567	1.649
General Mean ...	40.3	40.1	1.578	1.611

*Phosphatic Fertiliser.*

	1,000 Corn Weight.		Nitrogen in Dry Matter.	
	No Phosphate.	Complete.	No Phosphate.	Complete.
1922 ... ..	42.0	41.4	1.760	1.767
1923 ... ..	39.8	40.0	1.684	1.629
1924 ... ..	38.9	39.1	1.425	1.414
1925 ... ..	39.7	40.0	1.636	1.649
General Mean ...	40.0	40.1	1.619	1.611

*Potassic Fertiliser*

			1,000 Corn Weight.		Nitrogen in Dry Matter.	
			No Potash.	Complete.	No Potash.	Complete.
1922	...	...	41.4	41.4	1.774	1.767
1923	...	...	39.7	40.0	1.663	1.629
1924	...	...	39.2	39.1	1.451	1.414
1925	...	...	39.8	40.0	1.681	1.649
General Mean	...		40.0	40.1	1.641	1.611

POTATOES.

The potato crop is one of the most important in the country; it occupies about half a million acres and forms a large item in the annual value of British agricultural produce. Potatoes are among the few foods of which we produce practically all that we consume.

Potato growing tends to become highly specialised, and, as in all specialised farming, the growers have a thorough knowledge of the peculiarities of the crop. Ordinary field experiments are rarely accurate enough to give them useful information; we have therefore used the new methods, which are not only in themselves more accurate, but permit of the calculation of the degree of trustworthiness of the results.

The purpose of the experiments is to discover

1. the effect of manures on the yield and quality of potatoes;
2. the relation between the amount of fertiliser and the crop yield.

The fertilisers most studied are the nitrogen and potassium compounds, and these necessitate a large number of plots; there have been very few experiments with superphosphate, although it forms the basis of most potato manures.

The nitrogen fertilisers are usually the most consistent in their action, giving every year, with rare exceptions, an increase of about 20 cwts. of potatoes per cwt. of sulphate of ammonia, whatever the season and whether farmyard manure has been given or not. The increases have been, in cwts. of potatoes per cwt. of sulphate of ammonia applied:—

1922.	1923.	1924.	1925.	1926.
20	22—25	20	20	25

The data suggest that potassic fertilisers are a good insurance against loss by spring droughts. On our farm—we have not the necessary data for others—there is curiously little variation from season to season in the maximum yield of potatoes obtainable by appropriate manuring. Our maximum is 11 to 13 tons per acre and the yields of these plots have been between these limits in each of the four years 1923 to 1926 inclusive. Usually 4 cwts. sulphate of ammonia and 4 cwts. sulphate of potash per acre are necessary to secure the maximum crop. Economy of either ammonia or potash reduces the yield, but the effect depends