

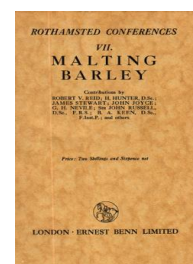
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Malting Barley

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Influence of Season on Quality and Yield of Barley

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of name ; nor, so far as I am aware, have any effective steps been taken to organize an efficient seed-supply on a sufficiently large scale to influence the character of the crop by areas. I therefore submit this side of barley growing for the special consideration of maltsters and brewers. The regulation of a proper seed-supply has been the corollary of variety investigations in other countries, and it is no less necessary here than elsewhere.

INFLUENCE OF SEASON ON QUALITY AND YIELD OF BARLEY

BY JAMES STEWART

IN approaching this subject, I intend to take as my basis the conditions appertaining to the principal malting barley-growing counties as a whole. Therefore my findings can be taken to apply to the average results obtained in any one season.

Yield.—So many factors influence the yield that one cannot altogether go on the published statistics. It is quite evident that, given droughty conditions, the yield must suffer, and if the reverse be the case the yield is greater. In the latter case the yield suffers materially if the weather conditions are abnormally wet and cold ; for example, in the English barley crop of 1927, when weather conditions were without parallel since 1879, the average yield was 16·4 cwt., or 2 cwt. per acre *more* than the average of the last ten years.

Scotland, however, experienced normal conditions up to the beginning of August, but in August and September the rainfall was 14·93 inches against 5 inches normal, and this materially affected the yield, as the following figures show :

The average bushel weight of malting barley in Scotland in 1927 was only 51 $\frac{3}{4}$ lb. In 1925, which was a good summer, the average weight was 55 lb.

From a study of the yields in England and Scotland since 1920 the facts emerge :

- (1) The yield is greater in a wet season.
- (2) It is practically an average in a normal season.
- (3) It is much less in a dry season, and also in an abnormally wet season.

The yields in Scotland are invariably greater than they are in England, and it will be generally acknowledged that there is more rain, less sun, and lower temperature in Scotland than in England ; but of course it must also be remembered that Scotch barleys invariably contain a much larger percentage of moisture.

MALTING BARLEY

17

My experience has been that, given a certain amount of moisture, sunshine is not essential until the ripening period commences, and I take as an illustration the year 1926, which, according to the statisticians' reports, was a "Sunless Year."

SUMMARY SHOWING WEATHER CONDITIONS DURING AUGUST AND SEPTEMBER 1926 IN THE PRINCIPAL BARLEY-GROWING COUNTRIES

	Rainfall		Sunshine		Temperature degrees F. Max.—Min.
	Inches	Normal	Hours	Normal	
Norfolk—					
August . . .	2.54	2.37	205	156	79-44
September . .	1.14	2.14	144	156	86-38
Suffolk—					
August . . .	1.03	1.70	219	220	80-46
September . .	0.75	1.81	157	184	81-41
Essex—					
August . . .	0.76	1.69	226	207	82-45
September . .	0.35	1.59	154	157	85-37
Lincolnshire—					
August . . .	2.04	2.26	217	193	75-47
September . .	0.60	1.55	133	156	84-38
Cambridgeshire—					
August . . .	1.10	2.35	194	187	79-42
September . .	2.44	1.61	148	151	86-35
Kent—					
August . . .	1.07	2.33	204	200	78-44
September . .	0.51	2.25	140	152	84-35
Somerset—					
August . . .	3.02	3.25	184	194	76-48
September . .	1.73	2.20	102	152	79-36
Scotland—					
August . . .	1.85	2.94	178	148	73-46
September . .	3.80	1.76	133	121	79-36

During the growing period the crops were very prolific, but it is the weather conditions prevailing during harvest that I particularly wish to draw your attention to. It will be noticed that in nearly all the counties August has rainfall under the normal, with sunshine over the normal, whereas in September the outstanding feature is the low

MALTING BARLEY

rainfall, sunshine under the normal, and a higher maximum temperature than that which prevailed during August. There is a record of seven severe thunderstorms.

The barley produced in August could be described as a vintage crop, but the warm, thundery and sunless conditions prevailing during the month of September severely damaged what remained in the fields, and was responsible for producing a barley quite different in character from that harvested in August.

Take, again, 1927, which was quite a sunless year. The accompanying Table (of 1927) will demonstrate that from the beginning of the ripening period until harvest there was abnormal rainfall, with sunshine much below the average, and is perhaps the best illustration that can be given of the conditions prevailing during that critical period. Notwithstanding this, the yield was 16.4 cwt. compared with 16 cwt. of the previous year, but a small correction should be made for the extra moisture which the barley contained.

SUMMARY SHOWING WEATHER CONDITIONS DURING JUNE, JULY, AUGUST, SEPTEMBER OF 1927 IN THE PRINCIPAL BARLEY-GROWING COUNTIES

County	Rainfall		Sunshine		Temperature	
	Actual Inches	Normal Inches	Actual Hours	Normal Hours	Mean	Normal Mean
Norfolk . . .	12.56	8.22	590	758	58.8	58.8
Suffolk . . .	12.79	7.89	699	871	59.3	59.7
Essex . . .	14.57	7.00	669	825	59.3	59.3
Lincolnshire . . .	11.16	8.25	631	771	58.3	59.0
Cambridgeshire . . .	10.22	8.23	602	741	58.6	59.6
Kent . . .	13.96	7.63	730	749	59.7	60.3
Somerset . . .	17.58	9.63	578	757	59.0	59.3
Yorkshire . . .	15.27	8.74	550	620	57.4	58.4
Average . . .	13.51	8.19	631	761.5	58.8	59.3
Scotland . . .	20.78	9.58	620	620	56.3	55.2

Many factors go to upset the yield—a poor seed-bed ; late frosts ; drought ; abnormal rain or sunshine ; or a wrong distribution of each.

But, apart from seasonal influences, the variety of barley sown in

MALTING BARLEY

19

recent years has an important bearing on the yield ; the yield per acre has increased appreciably, owing to the use of the comparatively new varieties of barley—Plumage-Archer, etc.

The influence of season on quality is quite another matter, and has a more far-reaching effect ; take the year 1921, when, with the universal drought, the crops showed a decrease of $1\frac{1}{2}$ bushels to the acre. The barley was prematurely ripened, and it had not completed its natural development. It had a nitrogen-content ranging from 1.7 per cent. and moisture 13 per cent., instead of the usual 16 per cent.

An examination of the ear showed that, in many cases, the basal bristle was not attached to the barley corn, but remained in the ear, with the result that the skins were not sealed together, as in a ripe corn. The base of the corn being thus open, the germ, from want of its natural protection, loses a great deal of its vitality, and on the malting floors rapidly develops mould. A further very bad feature is that, if used for malting purposes, it is quite impossible to get a proper modification, and the resultant malt is not only deficient in extract, and high in diastase, but creates many difficulties during the fermentation process in the brewery.

If, on the other hand, we consider a barley which has been through a very wet season, we cannot take a better illustration than the year 1927—the wettest season we have had for about fifty years ; and when one considers that there is a range of prices from 38s. to 80s. per quarter, it will give some idea as to the very great variation which exists. All barleys are more or less weathered, and a large proportion fit only for feeding cattle. Owing to exposure they contain a large percentage of slack or loose-skinned corns. They also produced barleys which were unripe and those which were overripe (rather “washed,” as I prefer to call them). The nitrogen-content ranged from 1 to 2 per cent. Barleys which were harvested in Lincolnshire and Norfolk—which counties largely escaped the rain in *August*—have showed excellent quality, and the later threshings are such that it is difficult to imagine they were grown in 1927. These barleys have a nitrogen-content of about 1.4 for the “Chevallier” varieties, and 1.6 for the “Goldthorpe” varieties.

Some of the “washed” barleys which have suffered most have a nitrogen-content of only 1 per cent. Their vitality is very weak, and they are all more or less sour. One has only to smell an English barley growing on the malting floors and compare this with a sample of a two-rowed, sun-dried “Chevallier” foreign barley at the same stage of growth to realize the effect of weather.

It might be interesting at this point to give you the following details in connexion with the barley which won the World's Champion Prize in 1926 :

The soil is stony brash gravel ; manure, “Fison's Fertiliser” ; seed, “Beaven's Plumage-Archer.”

MALTING BARLEY

	1926	1927
<i>Seed-Bed :</i>	Good.	Good.
<i>Ripening Period :</i>	Drought at beginning of ripening period.	The plant suffered very much during the drought in April and May; recovered with the rain in June, and later suffered from lack of sunshine.
<i>Harvesting Period :</i>	A combination of gentle rain and sunshine improved the quality, and the barley harvested exceedingly well.	Harvested during a favourable period.
<i>Yield :</i>	38 bushels per acre.	8 sacks per acre (32 bushels per acre?)

This gives a striking example of the influence of season on the yield and quality of barley grown in a particularly favoured district.

The best of the barleys this year have produced analytically quite as good malts as last year. In some of them the soluble nitrogen is somewhat low, indicating deficient yeast-feeding properties, and thus causing fermentation troubles, and there are many brewers who are not prepared to take the risk, with the result that a very much larger quantity of sun-dried Czecho-Slovakian two-rowed barley has been imported into this country, which has meant thousands of pounds going abroad.

It is quite apparent that the growing of barley generally cannot altogether be regarded as a paying proposition, otherwise there would not be the continued decrease in acreage which has taken place since the War. The total decreased acreage since 1920 is, approximately, 760,000 acres, representing 2,850,000 quarters of barley.

Sugar-beet, on the other hand, has increased from 3000 acres, sown in 1920, to 221,700, sown in 1927.

Whatever grievance may exist among the agricultural community there can be no doubt that their greatest enemy is the British climate, and if we were favoured with the right type of weather the influence of the season, both on yield and quality, would be such that the result would be rapidly reflected in the farmers' pockets.