

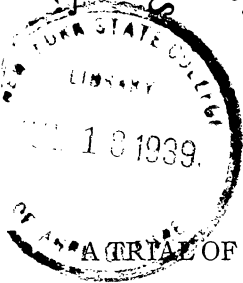
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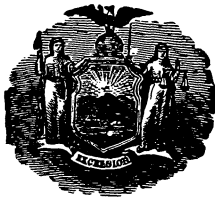
New York State Agricultural Experiment Station

Geneva, N. Y.



TRIAL OF NEW VARIETIES OF HOPS FOR NEW YORK

J. D. HARLAN



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ABSTRACT

THIS report deals with the performance of certain hop varieties as grown in the vicinity of Waterville, N. Y., during the year 1938. The report covers certain of the older varieties and also some newly named seedling varieties.

Something of the origin of the varieties is included and also their performance in the experimental hop yard, together with data on the percentages of soft resins present in samples of these hops.

The new varieties Brewer's Gold and Bullion are promising and the former yielded much higher than any other variety. Both varieties contained greater percentages of soft resins than any of the standard American sorts.

Other than the great difference in yields there seems to be no material difference between the hops produced on roots obtained from the West Coast states and those produced on the native New York hops that have been selected for good healthy growth. The New York roots have not produced as well as the roots coming from the West.

A TRIAL OF NEW VARIETIES OF HOPS FOR NEW YORK

J. D. HARLAN

Associate in Research

INTRODUCTION

WITH the repeal of prohibition funds were made available to this Station for the re-establishment of the hop industry in the State. One of the first projects established was a trial of varieties suitable for the growing conditions of the State, and also the determination of varieties which would be desired by the user of hops. As a result, a planting was made at Waterville, in the center of the older hops growing region of the State, of such varieties as were available for trial. Standard varieties were obtained from England and from the West Coast. These were the first plantings and were made in the spring of 1935. Since then numerous varieties in small quantities have been obtained from different sources in Europe and larger quantities of some new seedling varieties have been obtained from Professor E. S. Salmon in England. Professor Salmon has spent many years in the development of these hop varieties and has recently named some of the more promising ones.

The first crop of hops was produced in 1936. Only the roots from the West Coast produced a crop at that time. In 1937 a full crop was produced on these Oregon roots and some of the new seedling varieties also produced small crops. In the spring of 1937, 40 hills of the Saaz hop were obtained from Budapest and planted in the experimental yard, after a year at Geneva. Most of the above varieties produced yields during the season of 1938 and it is upon these yields that this report is based. To date the performance of the small quantities of Central European roots has been very unsatisfactory and no report will be made on them at this time.

ORIGIN OF VARIETIES

Fuggle.—This is a standard English variety which is grown very extensively in the hop-growing sections of Kent in England. It is a chance seedling discovered many years ago in England. It was

recognized as a superior hop for English conditions, and because of its resistance to downey mildew, its culture has become quite extensive during recent years. It is successfully grown on the West Coast, but in this country its production per acre is rather low.

Brewer's Favorite.—This hop was raised from a seedling, which in turn had for its parents a plant of the Oregon Cluster variety crossed with an English male hop plant. The resulting seedling was then crossed with an English male to produce the single seed from which this variety was produced. The grandmother of this variety, therefore, is Oregon Cluster.

Brewer's Gold.—This hop was raised in 1919 from a seed which was collected from a cutting of a wild hop growing at Morden, Manitoba, Canada. The male parent was an English hop. This seedling first attracted attention in 1925 by the extraordinary richness of its cones.

Bullion.—This hop has exactly the same parentage as Brewer's Gold and is therefore a sister plant but differs from the former in certain of its characters.

Cats' Tails.—This variety is a natural crossing of a wild hop from Colorado with an English male hop. Under English conditions it is a heavy yielder.

All of the four preceding varieties were originated by Professor E. S. Salmon of South-Eastern Agricultural College, Wye, Kent, England, who kindly furnished the supply of roots for the present trials. He has also presented several other named varieties which are now growing under New York conditions but which have not yet reached a production age. Attention is also called to the fact that all four of these hop varieties have American parentage.

Millstate.—This name has been given to a selection of New York State stock which had been carried along during the prohibition period in this country. The roots were selected in the fall of 1936 from a yard which was subsequently plowed up because of the poor growth and low production of a large portion of the hills in the planting. They are said to have come from the so-called "Onyon" stock which was brought to this country from England many years ago.

Late Cluster.—The roots of this variety of hops came from the West Coast in the spring of 1935 and are the same hop as grown in the western states under the name "Late Cluster".

MANAGEMENT OF HOP YARD

While this is not the proper place for an exhaustive study of the cultural practices to be followed in the successful production of hops, it is believed that it may be worthwhile to outline briefly the practices followed in this hop yard. First the hills are given a rather severe pruning in the spring of the year. Commercial fertilizers are applied as soon as growth starts in the spring at the rate of 1,500 pounds

per acre. This is supplemented with 200 to 300 pounds of some form of nitrogen carrier applied in two applications, one of which is made in May and the other about a month later. The results obtained indicate very clearly that, when the proper variety is grown and when the proper cultural practices are followed, a good crop of hops can be produced.

By following the recommended spray practices there was no difficulty encountered in obtaining good control of insects and the mildews to which the hop crop is subject. The grower of hops therefore need not hesitate to put into the growing of his crop the necessary expense of growing a full crop. He should look at the spraying practices advised as a form of insurance of a successful crop.

The weather records given in Table 1 were provided by Dr. R. O. Magie in charge of the disease investigations.

TABLE 1.—MONTHLY TEMPERATURE AND RAINFALL RECORDS FOR THE GROWING SEASON AT WATERVILLE, N. Y., 1938.

MONTH	TEMPERATURES			RAINFALL, INCHES
	Mean maximum °F	Mean minimum °F	Mean monthly °F	
May.....	61.6	43.1	52.4	2.57
June.....	75.1	52.4	63.8	2.20
July.....	79.1	59.6	69.3	3.55
August.....	79.8	58.9	69.4	5.51

YIELDS

At the time of harvest the hops were weighed green and after drying were weighed again to obtain the relative production in terms of dry weight. The number of pounds of dry weight thus obtained was then converted into weight per acre as an assumed yield for each variety under consideration. This yield is based on a planting of 778 hills per acre, which is the number of hills to an acre of hops planted 7 feet apart and in rows spaced 8 feet. Table 2 gives the date of harvest, the green weight, and the number of hills for each variety.

Attention is called to the low yield of Bullion, but this is accounted for by the fact that this was the first year for this variety. The above figures are for the actual yields obtained.

In Table 3 these figures are converted into the calculated or assumed yields per acre of dry hops. The last column gives the percentage of green weight as dry weight of cured hops.

TABLE 2.—GREEN WEIGHT OF HOPS AS HARVESTED, 1938.

VARIETY	DATE HARVESTED	NUMBER OF HILLS	GREEN WEIGHT, LBS.
Fuggle.....	Aug. 14	720	945
Brewer's Favorite.....	Sept. 1	53	240
Cats' Tails.....	Sept. 1	24	143
Brewer's Gold.....	Sept. 8	41	396
Bullion.....	Sept. 1	45	90
Millstate.....	Sept. 8	40	196
Late Cluster.....	Sept. 8-15	640	5,130

Upon examination of Table 3 it is evident that there is a very wide range in the yield of these hop varieties. The lowest yield is that of the Fuggle variety. If it can not be made to produce larger crops than it has in the past, then it will not be of any use to the New York hop grower. There are several reasons, however, why this yield is so low.

TABLE 3.—KILN DRY WEIGHT OF HOPS PER PLAT AND PER ACRE.

VARIETY	DRY WEIGHT OF CROP, LBS.	DRY WEIGHT PER ACRE, LBS.	PERCENTAGE OF GREEN WEIGHT AS DRY WEIGHT
Fuggle.....	248	267	26.2
Brewer's Favorite.....	65	932	27.1
Cats' Tails.....	38	1,240	26.6
Brewer's Gold.....	112	2,100	28.3
Bullion.....	28	482	31.1
Millstate.....	49	951	25.0
Late Cluster.....	1,385	1,681	27.0

Fuggle is an early hop as is apparent from the date of harvest, and as is usually the case with any early-maturing crop, the yield is low. Another reason for the low yield is the fact that it has been grown as a seedless hop for the reason that there have been no early males to fertilize the flowers. Recently, an early male has been imported from England and it is hoped that with the presence of this male better yields will be obtained. It is true that in some parts of Europe hops are successfully grown without seeds, but it is claimed that it is not possible to grow seedless hops successfully in England, and this may be true here. This is attributed to the fact that the varieties in Central Europe are different from those grown in England. Then, too, it may be possible that we do not know how to grow this hop successfully because of its nutritional requirements.

Of the four new varieties, Brewer's Gold is outstanding in its ability to produce a crop of hops. In the experimental hop yard it

produces good long arms which hang low on the vine and these lower arms bear an abundance of hops. This feature appeals to growers, all of whom are well pleased with the performance of this variety. Its sister, Bullion, also gives promise of being a suitable hop for the New York grower.

The Cats' Tails hop is a very vigorous growing variety which bears large rather soft cones. If it were better liked by the brewers it might be a satisfactory hop for New York conditions. The yields of Brewer's Favorite have been low, partly because we do not fully know its fertilizer requirements. Under the conditions of growth in the experimental yard the size of the cone is so small as not to appeal to the grower.

Of the other two varieties under consideration the Late Cluster yield has greatly exceeded the yield of the Millstate. While it may not be wise to discard this latter variety at the present time, the wise grower will look around for some variety that may take the place of these State hops, unless it can be shown that this variety possesses some other redeeming character which is not apparent at the present time.

While it is not now unconditionally recommended that the New York hop grower attempt to grow a seedless hop he should endeavor to keep the amount of seeds to a minimum. These seeds are of no use to the brewer and are in fact undesired by him. Seeds contain appreciable quantities of a fatty oil which has a very unpalatable and persistent bitter taste. A portion of this material may be incorporated in malt beverages when the hops contain large quantities of seeds. That good yields can be obtained without large quantities of seeds being present is evident by the fact that a good yield of Late Cluster hops was obtained with a seed content of 2.2 per cent. There are only two male vines to the acre in this planting.

THE RESIN CONTENTS

The purchaser of hops considers flavor as one of the determining factors in evaluating the crop that he may be about to purchase. He also examines the sample for the amount of resins present. The larger the quantity of this material present, all other factors being equal, the more value there is to the hop. The resin content is determined by chemical analysis and such analyses were made for the varieties discussed in this publication. The results are given in Table 4 and are based on moisture-free hops.

TABLE 4.—THE RESIN CONTENTS OF HOPS GROWN IN VARIETY TEST, 1938.

VARIETY	ALPHA RESINS %	BETA RESINS %	SOFT RESINS, TOTAL %
Brewer's Favorite.....	6.27	8.42	14.69
Cats' Tails.....	5.62	9.94	15.56
Brewer's Gold.....	11.01	11.57	22.58
Bullion.....	10.70	15.02	26.72
Millstate.....	7.35	10.19	17.54
Late Cluster.....	6.51	10.22	16.73

Attention is called to the fact that the total soft resins for the two sister hops Brewer's Gold and Bullion are very much higher than these same resins are for any of the other varieties. Brewer's Gold has been exhibited at brewmasters conventions for the past three years and is well liked by the brewmasters. While the variety Bullion is a very rich hop, it is not yet certain that the purchaser of hops will be impressed with its flavor. The Late Cluster and the Millstate do not materially differ from each other, either in content of resins or in the natural hop flavor which they possess. The other two varieties, i.e., Brewer's Favorite and Cats' Tails, have to date shown no outstanding features which would recommend their planting at this time.

CONCLUSIONS

The performance of seven varieties of hops are reported. Of these seven, Brewer's Gold, Late Cluster, and Millstate have been the most satisfactory. Bullion is included because of its promise as a good hop from the grower's point of view.

With proper care and a good spraying program there were no serious difficulties with insects or diseases.

The resin content of the two new varieties Brewer's Gold and Bullion far exceeds the content of resins in any of the other varieties tested. Of these the former is well liked by the manufacturers of malt beverages. Just how well the latter will approve of the variety Bullion is not yet determined.

The varieties Late Cluster and Millstate are very similar in their resin content and so far as can be determined are liked equally well by the users of hops. The Late Cluster, however, has outyielded the Millstate.