

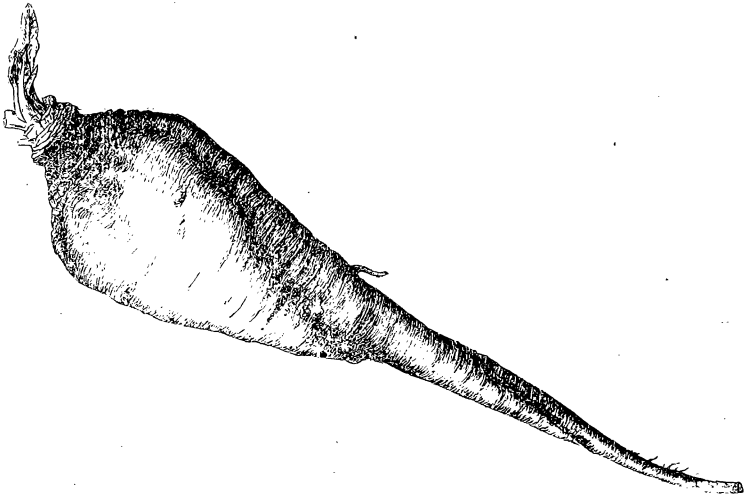
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SUGAR BEET SUCCESS FOR THE SEASON.

F. H. HALL, AND L. L. VAN SLYKE.

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The Bulletins published by the Station will be sent free to any farmer applying for them.

*Connected with Fertilizer Control.

†Connected with Second Judicial Department Branch Station.

POPULAR EDITION*

OF

BULLETIN No. 155.

SUGAR BEET SUCCESS FOR THE SEASON.

F. H. HALL.

**A
sugar
beet
state.**

Sugar beets can be grown successfully in New York State. The experiments of this Station, continued through two years upon its own farm and extended during the past season to many other farms in different counties of the State, prove that, so far as quantity and quality of the crop are concerned, the soil and climate of New York are as well adapted to sugar beet culture as those of any state. These facts may be considered proven and the Station does not consider it necessary to make added effort to confirm them. The kind and quantity of fertilizer to use, cultural methods and economy of management, however, may well be studied further; for most varied results in yield, quality of product and financial return have met the investigators, not only on different farms under circumstances known to vary, but even upon the same farm under supposedly similar conditions.

*This is a brief review of Bulletin No. 155 of this Station on Sugar Beet Investigations in 1898, by L. L. Van Slyke. Any one specially interested in the detailed account of the investigations will be furnished, on application, with a copy of the complete bulletin; and the names of those who so request will be placed on the Station mailing list to receive future bulletins, popular or complete as desired.

**Tests
of
1898.**

Two lines of investigation were carried on by the Station during the past season: General—To study yields, quality, cost and profitableness of small plats of beets grown on different farms scattered through the central portion of the State; and Special—To test the comparative effect of different quantities of commercial fertilizer and to compare commercial fertilizers with stable manure, these last tests being made in duplicate on the Station farm and that of Mr. F. E. Dawley at Fayetteville. In addition the Station analyzed a large number of beets grown in many other counties of the State under various conditions, and conducted a test of varieties from seed sent out by the U. S. Department of Agriculture.

**Cooper-
ative
work.**

Representative farmers in different sections were invited to assist the Station in its tests by growing small plats of beets (from one-tenth to one-fifth acre), using seed and fertilizer furnished by the Station and doing the work under the general supervision of a member of the staff. Careful records were to be kept by each cooperator on blanks furnished for the purpose; and while some of the farmers failed to appreciate the importance of accuracy in the work, complete returns were received from 17 series of 3 plats each, in ten counties.

The soil on the different farms varied from gravelly loam through sandy loam and clay loam to alluvial clay and muck; and the yields, quality of beets, labor required and financial returns differed even more widely than the character of the soil. The yields, considered separately or taking the average, can not be regarded as an indication of what any particular soil will be likely to do, as so much depends upon cultivation and care, weather conditions and unforeseen influences. They are interesting, though, as showing what may reasonably be expected of the general crop of the State in a not specially favorable year. The low tonnage of the smallest crop reported, less than $4\frac{1}{2}$ tons per acre, and of many of those only slightly higher, was due to unevenness of the stand caused by deep sowing of the seed; but other plats were injured by washing out or drowning by rain; burning by hot, dry weather; and by disease. The heaviest crop

was grown on muck land, with 750 lbs. of commercial fertilizer per acre, the yield being 29½ tons per acre of topped and washed beets. This soil was too rich in nitrogen, however, so that the sugar content and purity coefficient of the beets were low. The average yield was over 13 tons per acre, a very encouraging figure.

The quality of the beets grown was also good and the low sugar content and purity coefficient of most of the poor samples could be readily explained by well known principles, as excessive nitrogen supply in the case just mentioned and, in another instance, the starting into second growth of beets which had been checked by disease. The lowest, highest and average figures relating to quality were 10.1 per ct., 18.5 per ct. and 15.5 per ct. for sugar in beets and 72.5, 87.3 and 82.3 for coefficient of purity.

It is impossible to give from the data of these experiments any figures which will represent fairly the average cost and profit of sugar beets in ordinary culture, for several reasons: The plats were small and all expenses of cultivation would be reduced in field culture; the reported kind and cost of labor differed greatly with the different farmers, the hand labor varying from 250 to 852 hours per acre at a cost of from 3 cents to 12½ cents an hour, and the team labor varying from minimums of 5 hours and 15 cents an hour to maximums of 44 hours and 30 cents an hour; the work was carried on with whatever tools happened to be available and in few cases was special machinery used to save hand labor; and, as the work was new in most cases, costly errors of judgment were made, such as putting off weeding too long which needlessly added \$20 an acre to the cost of the crop in one instance. Bearing all these points in mind, there is encouragement in the average cost per acre of the beets, \$59.87, and the average profit, \$4.04 per acre. The lowest cost per acre was \$33⅓ and the highest \$109; while the financial returns varied from a loss of \$53.30 to a gain of \$37.11.

Upon each of the farms cooperating three plats were used, one unfertilized and the others receiving either 500 lbs. or 750 lbs. per acre of a complete fertilizer. This was compounded from 1000 lbs. acid rock, 350 lbs. sulphate of potash, 450 lbs. dried blood and 200 lbs. nitrate of soda. It cost \$24 a ton; or \$6 for the

small application, \$9 for the larger one. The 500 lbs. application proved more profitable than the greater amount, as it produced an average increase in the crop of 3874 lbs. per acre, insuring a net profit of \$1.26 per acre from its use; while 750 lbs. gave an average increase of 5264 lbs. per acre, but the added yield would only bring, at current prices, a profit of 87 cents. The fertilizer did not exert a marked influence upon the quality of the beets; for while there was a difference in the amount of sugar and in the coefficient of purity in some cases, the differences were in opposite directions in different instances; so that the averages on fertilized and unfertilized plats differed but slightly. The largest average variation was a decrease in amount of sugar in beets of one-half of one per ct. from the use of 750 lbs. of fertilizer.

**Special
fertilizer
tests.**

In the special fertilizer trials made on the Station farm and that of Mr. Dawley at Fayetteville, a slightly different combination was used. This included 400 lbs. nitrate of soda, 400 lbs. dried blood, 900 lbs. acid rock and 300 lbs. sulphate of potash; and it was applied on duplicate plats at each place at the rates of 500, 1000, 1500 and 2000 lbs. per acre (omitting the ton rate at Fayetteville). The results at the Station were marked by discrepancies between duplicate plats; as with 500 lbs. a yield of 21,375 lbs. per acre was given on one plat, while its duplicate produced over 27,000 lbs. With the two 1500 lbs. plats there was a difference of more than 2 tons per acre between the duplicate plats, and with the ton application a difference of nearly 3 tons. The plats at Fayetteville agreed much more closely, 700 lbs. per acre being the greatest difference between duplicates. For these reasons the results must be considered only tentative and further study must be given the questions involved. So far as the averages go, they indicate that the use of 1500 lbs. or more of a complete fertilizer is at a financial loss, but that the use of 500 lbs. is profitable, in these tests giving a direct gain of nearly \$5 per acre. Excessive quantities of fertilizer (2000 lbs.) seemed to lessen the amount of the crop, possibly because of injury to the seed. The quality of the beets was somewhat lowered by the use of fertilizers, independent of the quantity used; for the amount of sugar in the beets was decreased 1 per ct. whether 500 lbs., 1000

lbs. or 1500 lbs. was used. The coefficient of purity was also slightly decreased.

Chemicals
vs.
stable
manure.

In the use of stable manure the experience of the past season at the Station and at Fayetteville has given results directly contradictory of the accepted belief. The manure was applied at the rate of 20 tons per acre on 15 plats, the application being made in the spring, when thought most liable to exert an injurious effect on the quality of the beets. Instead of increasing the size of the beets at the expense of quality, the very opposite effects were produced; for the manure-grown beets averaged slightly less in weight than those grown without manure; the amount of sugar in the beets was increased 15 per ct. where manure was used and the coefficient of purity was increased from 82.6 on the unfertilized plats to 84.2 on the manured plats.

The yields were increased from $2\frac{1}{2}$ to 10 tons per acre on the various manured plats, the average increase being 8723 lbs. per acre. As the 20 tons of manure applied cost \$40 per acre, the application, counted for a single year, was far from profitable; but if the effect of the manure be continued for two or three years, as is considered probable, a financial gain will result.

Distance
test.

On three of the stable manure plats at the Station the beets were thinned to 6 inches apart in the row, on three others to 8 inches and on three others to 10 inches. The yield, size of the beets and the coefficient of purity increased with the distance between the beets, with little change in the percentage of sugar.

Miscel-
laneous
work.

Many samples of beets were sent to the Station by farmers scattered throughout the State, and the analyses of these beets grown under all sorts of conditions, known and unknown, have been united in a table with the analyses of the beets grown experimentally. Samples are included from 33 counties of the State, from St. Lawrence in the north to Suffolk in the southeast and Chautauqua in the southwest; and in but one instance where more than one sample from a county was sent was the average for any county less than $12\frac{1}{2}$ per ct. for sugar in the

beet or 77 for coefficient of purity. The average results are shown in the table below:

COMPOSITION OF SUGAR BEETS GROWN IN 1898.

No. of samples.		Sugar in beet.	Sugar in juice.	Purity coefficient.	Weight of one beet.
343	Lowest	<i>Per ct.</i> 7.4	<i>Per ct.</i> 7.8	64.1	<i>Ozs.</i> 4
	Highest	20.2	21.2	90.0	54
	Average	14.2	15.0	85.2	17

Of the 4 varieties grown from 9 sets of seed sent to the Station by the U. S. Department of Agriculture, Pitzschke's Elite gave the heaviest yield, nearly 22 tons per acre, with a sugar content of 14.2 per ct. and a coefficient of purity of 84.1; Kleinwanzlebener from seed grown by Vilmorin of France gave a yield of $21\frac{1}{4}$ tons but was much less rich in sugar (11.6 per ct.) and had a lower coefficient (81.5); and Kleinwanzlebener from American grown seed (J. B. Rice, Cambridge, N. Y.) was next in order of yield (13 3-5 tons) and was somewhat better in quality than the crop from French seed.