# **Yield and Quality of Certain Sugar Beet Varieties** Harvested at Weekly Intervals

#### Introduction

Some of the results from the variety testing program of the Great West-ern Sugar Company indicated that the new varieties might have the ability to continue growth under the cool autumn conditions at a different rate than the older varieties, even where a disease factor might not be the con-tributing factor.

In order to get some pertinent data relative to this possible difference in varietal interaction a date of harvest study was initiated in 1951 covering the period from the last half of August and continuing through November.

## Materials and Methods

The test, as designed in 1951, was set up in a randomized complete block arrangement with 10 replicates per week of plots 1 row by 25 feet to be harvested at weekly intervals, covering the period August 20 to No-vember 26. There were 6 varieties included, representing a considerable range in potential yielding ability and sugar content. Weight and sugar content were determined each week. In 1952, the test, was continued using the same 6 varieties but with a slightly different scheme for randomization, with 15 replicates per week of plots 1 row by 18 feet for harvest from August 25 through December 1. In order to institute more local control on the sample, the 1953 test included only 4 varieties, and was arranged as a multiple Latin square design with 12 replicates of plots 1 row by 18 feet, to be harvested each week starting August 17 and continuing through November 30. Thin juice apparent purity was also determined in 1953, using a method devised recently by Brown and Serro of the Great Western Laboratory in Denver (1)<sup>2</sup>

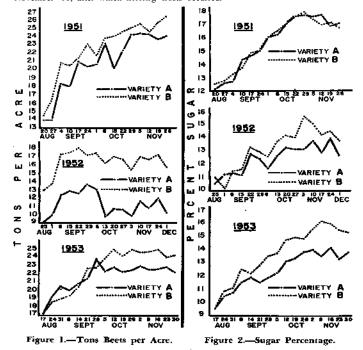
#### Discussion of Results

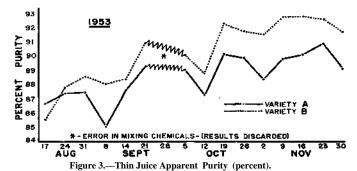
This report will include only the data for the two varieties which were carried for all three years of test. These varieties have the following char-acteristics: Variety A is a potentially good yielder with a low sugar content and susceptible to leaf spot. Variety B is leaf spot-resistant with a high yield-ing ability and rather high sugar content. The 1951 field was not planted until April 26, while plantings were made approximately one month earlier in 1952 and 1953, and this may offer a partial explanation for the results obtained in sugar content in 1951. Soil variability was rather great in 1951 but there were no diseases evident. In 1952 field was badly affected with nematode the variations were not very well controlled through the experimental design. nematode, the variations were not very well controlled through the experimental design used, and Variety A appeared to be more adversely affected by the nematode than did Variety B, as judged from top appearance in the field. This may account, in part at least, for the great difference in yielding ability between the varieties for this year. The 1953 data no doubt were affected to some extent by the development of a moderate leaf spot infection on Variety A late in September.

<sup>1</sup> Statistician-Agronomist, Agricultural Experiment Station, The Great Western Sugar Company, Numbers in parentheses refer to literature cited.

The weekly results for each year are presented in graphic form in Figures 1, 2 and 3. The differential yearly effect may be readily observed.

In 1951 and 1952 the varieties developed similarly in yield of roots throughout the period covered, although the curves were somewhat dis-similar for the two years. The highest mean tonnage resulted from the November 5 sampling in 1951, although the high point in sugar content occurred on October 29. The temperature dropped to minus 15° F. on November 2, 1951, which no doubt was the limiting factor for further de-velopment that year. In 1952, probably due to lack of moisture and nema-tode infestation, there was little tonnage increase after September 15, although the sugar content increased fairly rapidly until November 3, with a slight drop indicated after November 10, considering the mean results for the two varieties. In 1953, the maximum mean tonnage for the two varieties was indicated on October 12, while the sugar content continued to increase until November 16, after which killing frosts occurred.





Since the variety-week interaction is oi prime importance, the accompanying data in Table 1 will serve as a guide in interpreting the results. Table 1.

Var. x Week Interaction	1951			1952			1953		
	E	5% pi.	l°° pt	F	5% pt.	1%, pt.	F	5% pt.	1% pt.
Vield of roots	N'S	1.34	1.50	.\\$	1.30	1.45	2.14	1.40	1.61
Sugar content	NS	1.54	1.50	2.50	1.50	1.45	3.92	1.40	1.61
App. purity							1.41	1.40	1.61

The results for 1953 indicate a highly significant interaction between varieties and weeks for yield of roots, although no interaction occurred in either of the previous years for this character. In both 1952 and 1953 there was a definite interaction between weeks for this character. In both 1952 and 1953 there was a definite interaction between weeks and varieties for development of sugar where Variety B, the high sugar variety, continued to increase in sugar content at a more rapid rate than did Variety A. The contrasting results for 1951, as compared with 1952 and 1953, probably can only be explained as an environmental effect, with the possibility of the rather late planting date, previously mentioned, offering some tangible explanation. The interaction for thin juice apparent purity was just significant at the 5 percent level of significance.

## Summary and Conclusions

The significant variety weekly interaction for tonnage in 1953, and for sugar content in both 1952 and 1953, gives evidence that different types of varieties may react differently as the season progresses. This effect may not always occur, however, as shown by the fact that no interaction was found in the other data studied. The importance of considering the date of harvest when evaluating varieties is emphasized by the results of this study.

### Literature Cited

(1) SERRO, ROBERT F., and BROWN, ROBERT J.

1954. A method of determination of thin juice purity from individual mother beets. Proc. Amer. Soc. Sugar Beet Tech. 8(2): 274-278.