

Sugar Beet Planting Date Studies in Imperial Valley, California

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Imperial Valley, because of its fertile soil and relative mild winter climate, was considered a potential beet-growing area some time before beets were planted there on a commercial scale in 1937. Numerous small experiments were conducted in an effort to determine cultural practices best suited for growing the crop, but the sugar beet varieties in early experimental tests proved unsuitable for sugar production because they bolted too much. Curly-top resistant and other varieties were being planted in the Salt River Valley of Arizona for seed production by the field overwintering method only about six to eight weeks earlier than the planting dates for sugar production in the Imperial Valley. Since the winters in the Arizona seed districts are not much colder than are those of Imperial Valley, it is easy to understand why the varieties used went to seed. It became evident from the early tests that non-bolting varieties were necessary if sugar beets were to be grown for sugar in Imperial Valley.

In 1939 the senior author in cooperation with Holly Sugar Corporation and Harold Hunt conducted a planting date test near Holtville, California, on Mr. Hunt's ranch. In this test five varieties of sugar beets were planted at approximately monthly intervals in replicated plots beginning May 1 until October. The results of this test showed that sugar beets could be grown successfully in the Imperial Valley under a wide range of planting conditions. It was evident, however, that a variety with low bolting tendency and resistance to curly top was required if sugar beets were to compete with other agricultural crops growing in Imperial Valley. U. S. 15 had low bolting tendency and was moderately resistant to curly top, which made it the dominant choice for fall seeding in Imperial Valley. However, U. S. 56/2, a variety more recently developed, has now replaced U. S. 15 because of its superior yield under Imperial Valley conditions.

When non-bolting varieties became available, sugar beet production in Imperial Valley became stabilized, the successful practice being fall planting with harvest in May or June of the next year. Fall planting seemed preferable for sugar beets, and acreages increased. A beet sugar factory was built in 1947. It then became apparent that, for most efficient factory operations, large acreages with harvest spread over a considerable period were desirable. For growers to obtain satisfactory returns, the growing season needs to be long, and this puts limits on the period of harvest. Thus it was found that October-planted beets are not ready for harvest before the following May, and consequently the earlier harvest would be possible only if the beets were planted earlier than was the practice.

There is also a limit on extending the harvest into the summer. Records of Holly Sugar Corporation show that if the harvest period extends beyond

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mid-July, there is a decline in acre yields of sugar. This decline seems to be due principally to reduction in the sucrose percentage of the beets. It seemed, therefore, advisable to explore the possibility of planting beets earlier than was the practice so that the beet harvest could be completed before decline in sugar per acre yield occurs. A preliminary test by the senior author was conducted in 1950 to study these possibilities, but because of excessive damage from insect pests and high alkali concentration of the soil, the results of this test were not considered reliable.

Another test was conducted in 1951 under more favorable conditions, the results of which are reported here. The 1951 test was conducted at the Southwestern Irrigation Field Station, Brawley, California, on Holtville silty clay loam soil. The test consisted of five varieties planted in plots replicated four times at six different dates as follows: July 16; August 1, 15, and 31; September 14, and October 1, 1951. The beets were planted in six-row plots 62 feet long on beds 30 inches apart with one row per bed. Whole seeds were planted approximately one inch deep and at the rate of approximately 15 pounds per acre. The fertilizer program consisted of an application of 103 pounds of 13-39-0 per acre at seeding time, 80 units of nitrogen at thinning time, and a later application of 85 units of nitrogen.

The beets in each planting date were thinned at about the 8-leaf stage. Irrigation water was applied to the beets when need was evident. Pest control was found to be very important in the summer-planted beets, principally because there were not many crops growing during the summer and the insects seemed to concentrate on the small plot of beets. The experience in 1953 indicates that more difficulty from insects will probably be encountered with summer-planted sugar beets than with those planted in October.

Because of the excessive bolting that occurred in four of the five varieties used in this test (Figure 1) and the consequent deleterious effect on yield and sucrose percentages, only the yields and sucrose percentages of U. S. 56/2, a non-bolting variety, are reported here.

Excessive bolting in a variety eliminates it as a candidate for fall planting in Imperial Valley, but in spite of this showing with beets that were harvested in May, easy-bolting varieties of sugar beets may be used under some conditions for summer planting. The important consideration is that the harvest of these easy-bolting varieties may be completed early in the spring before normal bolting in sugar beets occurs. Tests are currently under way in the Imperial Valley designed to study the possibility of using easy bolting varieties suitable for summer planting, by avoiding loss from bolting by means of a March or early April harvest.

The sugar beets from plots planted July 16, August 1 and August 15, 1951, were sampled March 10 and April 7, 1952. There were no yields taken at these two sampling dates, because there were not sufficient beets in the plots for obtaining yield data at these two periods and at the final harvest.

Sucrose percentages were determined, however, and they were about equal to the sucrose percentages of the beets harvested May 7, 1952. The roots taken March 10 and April 7 for sucrose analysis were somewhat smaller



Figure 1.—A view of a portion of the experimental field -at harvest time, May 5, 1952. Plot in middle foreground which is free from bolting was planted July 16, 1951, with U. S. 56/2. Note excessive bolting in other varieties in the test.

than those harvested May 7, and consequently the yields at the early dates would have been lower. On May 7, 1952, sugar beets in all plots of all planting dates were harvested, and yield and sucrose percentages determined. Roots were taken only from measured areas in which the plants had competition on all sides. The middle four rows in each of the four replications of each planting date were harvested for yield and sucrose data. Yields as obtained from weights of beets from the measured areas were calculated to an acre basis. The sucrose determinations were based on two 10-beet samples taken at random from each plot. Results of this test are shown in Table 1.

The results of this test show that sugar beets planted in July and August and harvested in early May yielded significantly higher than beets planted September 14 or October 1, which correspond to the usual planting time for the Imperial Valley. It is further shown that on the May 7 harvest the differences in sucrose percentages of the beets for the various planting dates were small; the July 16 planting, however, was significantly high in three cases.

It would seem from the results of this experiment that sugar beets can be planted successfully in July and August in the Imperial Valley, and that these early-planted beets can be harvested earlier than is the current practice. Earlier plantings would permit prolonging the sugar beet harvest period, resulting in higher returns to both grower and processor. Advancing the planting date would make it possible to complete the harvest before late June or July, when reduction of the sucrose content in the beet may occur.

Table 1.—Effects of Date of Planting on the Acre Yield and Sucrose Percentage of Sugar Beet Variety U. S. 56/2 in the Imperial Valley, California, 1951-52.

4 Replicated Plots of Each Planting Date. Harvested: May 7, 1952

Planting Date	Acre Yield		Percent Sucrose
	Gross Sugar Tons	Tons Beets	
7-16-51	5.89	36.21	16.27
8- 1-51	5.93	37.87	15.67
8-15-51	5.54	36.79	15.05
8-31-51	5.63	37.10	15.17
9-14-51	4.85	30.96	15.62
10- 1-51	3.87	25.59	15.22
Sig. Diff. 5% point	.46	2.42	1.05