

# Increasing Sugar-Beet Yields Through Early Planting

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It is common knowledge that early planting; of sugar beets generally increases the sugar per acre yields. Such plantings, as a rule, are subject to frost injury, which may necessitate replanting. Where these early planted beets come through with a fair pre-thinning stand, the advantages are greatly in favor of this practice not only from the standpoint of increased tonnage of beets, but also from more timely performance of hand-labor operations. As a partial offset to this, the percentage of sucrose may be somewhat less, due to increased susceptibility to leafspot, and in some varieties the bolting tendency may be greatly aggravated.

Aside from development of adapted varieties, principally curly-top-resistant origin, probably the greatest single contributing factor toward increased tonnage yields in California, has been that of earlier planting. It is common occurrence for some plantings to be made in late December. This has extended greatly the growing season for sugar beets, and as a result increased the tonnage yield per acre. Now that we have a number of domestic varieties available which have a low-bolting tendency, a more general utilization of this early planting practice will no doubt result.

The problem of increasing the length of the growing season in areas normally visited with freezing temperatures through the use of extremely early dates of planting appears more hopeful of solution now than ever before. With the advent of new varieties which are quite resistant to leafspot, others resistant to curly top, and some which definitely have a lessened tendency for bolting, it appears that it should be possible to extend the length of the growing season by several weeks. The main body of this paper is concerned with work done along this line at Rocky Ford, Colorado, this past season.

A field was selected on the Rocky Ford West Farm for the conduct of this early date planting project. The field was in barley in 1940, heavily manured and fall plowed in October, and partly fitted as to seedbed. February 12, 1941, the seedbed was levelled and planted. Treated seed of 12 varieties all of domestic origin was used in the test. The seed was planted 1 inch deep, rate 30 pounds per acre, in 4-row plots extending the full length of the field. The seed treatment used was 11/2 percent New Improved Ceresan.

To prevent the seed from blowing;, the field was lightly irrigated 1 week after planting. No growth occurred until March 25,

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when all of the varieties came to full stand within a period of 3 days. The seedling plants were vigorous, uniform as to stand, and gave no evidence of damping-off organisms.

The comparison planting was made April 25, using 11 of the 12 varieties included in the early date planting. This later date was selected as representing the average date of planting the larger portion of the sugar-beet acreage in the Arkansas Valley. The early planting was thinned to a distance of 8 inches in the row in mid-May, and the average-date planting was thinned 3 weeks later, on June 6. Bolter counts were taken at monthly intervals, all of which data appear in the table of results. A heavy hailstorm occurring August 26, defoliated the plants, and to that extent depressed seriously the sucrose percentage in the beets.

Table 1 ----Very early versus average date of planting sugar beets.

Variety	Very Early—Feb. 12, 1941.				Average Date—April 25, 1941.						
	Tons beets per A.		Percent- age sucrose		Lb. sugar per A.		Percentage holding in very early planting				
	Early	Ave- rage	Early	Ave- rage	Early	Ave- rage	6/6	7/17	8/18	9/18	Total
0-419	21.22	14.06	14.30	14.25	6060	4007	.12	.28	.10	0	.50
0-410	10.32	15.01	13.31	13.30	5158	4232	1.00	5.00	2.25	0	8.25
0-423	18.22	13.32	13.75	13.93	5011	4330	1.13	7.13	2.25	.50	11.00
0-401	17.04	14.82	14.10	14.25	4805	4259	.59	3.40	1.10	.50	5.56
0-424	17.20	12.82	13.35	14.05	4592	3756	2.25	0.60	3.00	0	15.45
U. S. No. 33	17.18	13.42	13.20	13.30	4536	3570	.25	.78	.75	.50	1.88
0-411	17.92	11.42	12.25	13.30	4390	3038	.88	0.00	2.50	1.50	10.88
8-401	16.72	14.38	12.93	13.15	4330	3782	.75	8.25	2.00	.50	11.50
0-409	15.90		13.00		4326		0	1.65	0	.50	2.15
U. S. No. 15	17.32	12.20	12.15	11.10	4313	2708	0	0	0	0	0
8-101	16.73	15.25	12.20	12.00	4682	3843	1.56	4.10	1.50	1.00	8.16
U. S. No. 23	17.77	13.05	11.10	11.30	3943	2902	.50	0	.25	0	.75
Mean	17.71	13.90	13.07	13.24	4631	3681	.75	3.82	1.36	.42	6.85

**Discussion.**—Before discussing the results shown in the above table, a resume of temperature and moisture conditions existing during the pre-germination period is in order. During February following the planting of the field, there were 13 days when the temperature was below freezing, dropping to a low of 17°F. In March there were 16 days of below-freezing weather with a low of 10°F. For the greater part of this period the soil was bare of snow cover, and in consequence thereof the soil was frozen to a depth of several inches up to March 15. Despite this, a good stand of beet plants was obtained on all plots. Evidently, this experience parallels that of volunteer growths of shattered seed of other crops, which can and do withstand extremes of temperature during the winter months, and in due season in the spring germinate and grow vigorously; whereas

seed of the same crop when seeded at normal planting: dates often grows slowly and indifferent stands frequently result.

In the 12 varieties, 3 were curly-top resistant, (8-101. U. S. No. 23, and U. S. No. 33). 2 were crosses of curly-top and leafspot resistant varieties (0-423 and 0-424), one was mildew resistant (U. S. No 15).and the rest were more or less resistant to leafspot. While there are large individual differences between varieties in yields of tons of beets per acre, it is significant to note that on an average, the early planting outyielded the later planting by 9.10 pounds of sugar per acre.

The bolting picture yields some interesting information. It will be noted that the U. S. No. 15 variety was free from bolters. Variety 0-419, an A. C. S. Co. development, was next, and from the results of this test appears the best of the lot. The curly-top-resistant varieties were also good in this respect. The two curly-top leafspot crosses were the most serious offenders in this respect, although they ranked fairly well in sugar-per-acre yield. Nevertheless, it is a known fact that beets which bolt at a, relatively early date are depressed both in yield and in percentage sucrose. Extremely late bolting, such as recorded in the September 18 reading, does comparatively slight damage to the yield, other than affecting the cosmetic appearance of the field.

While considerably more time could be devoted to the discussion of individual results, it is believed that they speak for themselves. It would be extremely interesting to arrange for a number of these very early dates of planting in a comparatively large number of areas where beets are grown. A paper presenting the outcome of such work should be of value to all concerned, since it might well point the way to increased sugar-per-acre production on a national scale.