Yields From Sugar Beets With Doubles 20 Inches Apart Versus Singles 10 Inches Apart[1]

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Few experienced sugar beet growers would question the advisability of having all beets thinned to singles and evenly distributed in the row, but with mechanized thinning methods or with long-handle hoe work the ideal distribution is difficult to obtain. Frequent questions are asked about the harm sustained by leaving doubles, provided extra space is allowed when the doubles occur.

To obtain information along this line, F. G. Larmer[3] set up experiments at Davis, Calif., in 1937 and in 1938 with double beets spaced 20 inches apart compared with single beets spaced 10 inches apart. No significant differences in yield were obtained from the the two different methods of spacing. Larmer's work, published as an abstract *(1)*[4], is the only experimental work on the subject known to the writers. It was deemed advisable to repeat the experiment under Utah conditions. It also seemed advisable to compare results with different varieties.

Materials and Methods

In connection with variety tests near Salt Lake City. Utah, in 1945, a buffer strip of 16 rows was made available for the spacing experiment. Plans for the experiment were made in consultation with Bion Tolman, formerly Associate Agronomist of this Division.

The soil used for the experiment has been classified as Taylorsville loam and was in a high state of fertility because of good soil management and relatively frequent applications of chicken litter. Ample irrigation water was applied during the growing season.

The beet rows were planted 20 inches apart and a uniform, relatively thick pre-thinning stand was obtained. Eight of the 16 rows were planted to variety SL 34 and the other eight rows were planted to variety SL 214. The variety SL 34 was known to be a high-sugar type and variety SL 214 was more of a yield type. In each variety eight comparisons were made between two methods of spacing. The

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[4]Italic numbers in parentheses refer to literature cited.

[5]Information on soil type was furnished by Dr. W. G. Harper from an unpublished soil survey made by the Division of Soil Survey, Bureau of Plant Industry and Agricultural Engineering, Agricultural Research Administration, U. S. Department of Agriculture.

first method consisted in thinning all the beets in a plot to singles spaced 10 inches apart. The second method consisted in thinning to doubles 20 inches apart. Plots with these two types of spacing were alternated up the field. The alternate positions of the plots made possible the use of ''Student's" pairing method (2) for statistical analysis. The beets were planted April 6 and harvested October 12, 1945. Harvest counts showed averages of 111 beets per 100 feet of row for plants with single beets spaced 10 inches apart and 117 beets per 100 feet of row for doubles spaced 20 inches apart.

Experimental Results

The yield data are shown in table 1. For both varieties a small difference in both yield and sugar percentage was obtained in favor of the plots with beets spaced to singles 10 inches apart, but the only difference which was large enough to be statistically significant was the 1.39 tons per acre in favor of single beets spaced 10 inches apart with the variety SL 34.

Table 1.— Yield data comparing single beets spaced 10 inches apart versus doubles spaced 20 inches apart in standard 20-inch rows, with eight replicated plots on each spacing method for each of two varieties.

	Tons beets per acre		Percent sucrose	
	Variety SL 34	Variety SL 214	Variety SL 34	Variety SL214
Single beets spaced 10 inches apart	31.50	31.90	17.90	16.85
Double beets spaced 20 inches apart	30.11	30.88	17.58	16.79
Mean difference	1.39	1.02	0.32	0.11
Standard error of mean difference	0.27	0.77	0.21	0.15
Diff. ÷ S. E.	5.08**	1.33	1.55	0.76

*A figure of 2.36 represents the 5 percent point of significance.
**A figure of 3.50 represents the 1 percent point of significance.

In the plots with doubles thinned 20 inches apart there was more variation in size of individual beets, but practically all were large enough to be marketable.

Discussion and Conclusions

The data indicate a small and possibly significant increase in yield with single beets spaced 10 inches apart as compared with double beets spaced 20 inches apart. However, it should be pointed

out that the conditions of this test are extreme. Obviously, if the differences are small with practically 100 percent doubles, they would be smaller if the doubles were less than 100 percent, as they ordinarily would be in field practice. In many cases, also, a tolerance of doubles would mean less disturbance and injury to the seedlings in the thinning operations.

Literature Cited

1. Larmer, F. G. The Effect of Spacing and Density of Stand on Hill Production of Sugar Beets. Proc. Amer. Soe. Sug. Beet Tech. 16: 1938.
2. Love, H. H., and Brunson, A. M. Student's Method of Interpreting Pairing Experiments. Jour. Amer. Soc. Agron. 16: 60-68. 3924.

A Wide- and Narrow-Row Test with Sugar Beets in Southern Idaho

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A test of wide and narrow rows for sugar beets was conducted in the season of 1945 near Jerome, Idaho. The test was in connection with an incidental to curly top resistance breeding work carried on in the same field. The highly resistant variety SL 411 was used.

Methods

Planting was made April 18. Two row widths were used. One of these was the 22-inch width generally used with beets in this area. The other was 44 inches. This extreme width is only 4 inches greater than that which has been extensively tried in other areas. This width was used here because merely doubling the standard row width simplified the experimental procedure and facilitated use of regular field equipment. There were eight rows per plot in the 22-inch width and four rows per plot of the 44-inch width. The plots were 60 feet long but were reduced 1o 55 feet in length at harvest. The intention was to have twice as many plants per 100 feet of row in the 44-inch plots as in the 22-inch rows and thereby have the population per acre the same in both treatments. The after-thinning stand obtained was thicker in the 44-inch rows, but, as shown in table 1, it fell short of being double the number in the 22-inch rows. There were 10 replications of each treatment. Harvest yield data were based on four rows of the plots with 22-inch rows and the two center rows of the plots with 44-inch rows. Four 10-beet samples were taken from each plot at harvest for sugar and purity determinations.

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