

Mr. Nuckols and John Gaskill, each, used 40-inch distances between the hills in all directions while Mr. Stewart used 30-inch intervals. The harvested results were sufficiently different, from the results obtained by normal procedure of growing breeding plots, to warrant the presentation of these data upon the growing of sugar beets free from competition.

CONCLUSIONS

1. The planting of sugar beets in hills 40 inches apart is valuable in the growing of sugar beet selections for mother beets, as it enables one to produce a greater number of mother beets from a small amount of seed.
2. The beets grown in wide spacing are larger and produce more seed than competitive beets. In some instances more than 2 pounds of seed has been grown from 1 beet.
3. These large beets can be divided into four or more parts which makes possible various open pollanization crosses (the seed beets saved in 1937 average over 12 pounds in weight).
4. The beets are free from competition one with another and beets adjacent to missing spaces are not increased in size, therefore, any beets grown can be accurately judged as to weight.
5. The hill planted beets will vary more in weight than similar beets planted in the 12 x 20 inch spacing.
6. The sucrose content of hill planted beets is slightly lower than that of commercial plantings, however, the variation between strains is no greater than that for the same strains planted in 12 x 20 inches and in majority of instances, the higher sucrose percentage strains or the lower sucrose percentage strains are identical in both types of planting.
7. The hill planted beets do not produce as great a proportion of leaves in proportion to root as do the same strains in 12 x 20 inch planting.
8. As few as 30 hills of beets have been found to give a reasonably accurate estimation of the value of a strain of beets.
9. Sugar beet breeding work will be expedited by the use of this additional method of production of mother beets; however, the competitive method will continue as a necessary part of the procedure.

WIDE SPACING AS AN AID IN SELECTION

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Thirty two strains of sugar beets, largely of leaf-spot resistant type, were grown in 1937 under conditions of normal (10" x 20") and wide (40" x 40") spacing, in adjoining areas, with 8 replications in each spacing. All data taken from the normally-spaced plots were based on fully competitive beets, but since competition was effectively eliminated by 40" x 40" arrangement, it was not necessary to consider skips in the latter set of plots.

The results for all 32 strains indicated that performance in wide spacing was closely correlated with that in normal spacing, both for weight and percent sucrose. The correlation coefficients were 0.624 and 0.779, respectively, and were highly significant.

In order to study the variability of individual beets under wide and normal spacings, individual weights and analyses were recorded for 80 roots from each of 6 representative strains, in each of the two spacings, amounting to a total of 960 roots. Coefficients of variability for percent sucrose were 10.62 and 9.59 for wide and normal spacing, respectively, indicating slightly greater variability for wide spacing. The difference, though statistically significant, was too small to be of much importance. Coefficients of variability for weight were 26.49 and 41.30 for wide and normal spacing, respectively, and the difference was found to be highly significant. On the basis of these data, approximately 24 beets would be required to make up a sample, from normal spacing, equivalent in statistical accuracy to a 10-beet sample from wide spacing.

MOTHER BEET STORAGE METHODS

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In the fall of 1936 approximately 650 sugar-beet roots of a commercial variety were trimmed in the usual manner for mother beets and placed in crates in a root storage cellar at Fort Collins, Colorado, where they were allowed to remain for a short time. On November 23 these roots were divided by a random method into 5 identical lots, numbered from 1 to 5. Lot #1 was analyzed immediately, and lot #5 was stored in a trench silo in accordance with customary procedure. All other lots were stored in crates in the root cellar. Individual weights and analyses were made on all roots, as indicated below:

Treat- ment No.	Method of Storage	Date of Analysis	Aver. Wt. per Rt. (lb)	Aver. Sucro. %
1	---	Nov. 24, 1936	1.452	15.74
2	Cellar(crates)	Jan. 4, 1937	1.416	15.53
3	Cellar(crates)	Feb. 16, 1937	1.491	15.09
4	Cellar(crates)	Mar. 29, 1937	1.460	14.77
5	Silo	Mar. 29, 1937	1.477	14.68

The roots in each lot were weighed only once—i.e. on the date of analysis—but since none of the weight-differences between lots were significant, it was assumed that neither type of storage appreciably affected the weight. Then, considering percent sucrose alone, the gradual loss during storage, in the cellar, apparently was accompanied by an approximately equal loss in the silo, as indicated by the fact that the differences in percent sucrose, between treatments #4 and 5, was only 0.09—an amount which was far from significant.

Rot was not a factor in either silo or cellar; consequently, it was concluded that, under the conditions of the experiment, the cellar besides