Progress Made In Sugar Beet Machinery Investigations

Written Especially for “The National Beet Grower”
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About a year ago the United States Beet Sugar Association consisting of the manufacturers west of the Mississippi River, added their support to the investigations being conducted cooperatively by the University of California and Colorado Agricultural College and the United States Department of Agriculture. This support is planned to extend over a three years period and now that one year of that period has elapsed it is opportune to take stock of the progress thus far made and of the possibilities of the future.

For many years much money and effort has been expended on the possible development of a mechanical beet harvester. This effort has cost many hundreds of thousands of dollars. Not much thought had been given to the possible elimination of the peak labor load of thinning beets in the spring time. In fact it has been assumed that the thinning of beets was of necessity a hand operation. It is evident that the mechanization of the harvesting operation would be of little value if it were not possible to also mechanize the operations at the other end of the beet growing season.

Mechanical Blocking

During the past half dozen years considerable experimental work has been done on the possibility of “mechanical thinning” of beets. This idea was a development from the work that had been done in mechanical blocking. When mechanical blocking was first proposed the old standard of having one hundred beets per one hundred feet of row led to the proposal of having knives that would cut out eight inches of row leaving four inch block with the expectation of having a beet in each foot of row. Naturally the gaps in the row resulted in less than 100 beets per 100 feet of row. The actual result was, in ordinary stands, approximately 85 beets per 100 feet of row.

It was easy to rectify this mistake by cutting to smaller dimensions thus getting the desired number of beets. It is customary to block beets in ordinary stands by using a seven inch knife and to leave a block of only about three inches. It is quite possible to make a count of the stand of beets previous to blocking and exactly predetermine just what sized knives to use in order to get any desired number of beets.

Mechanical Thinning Developed

Mechanical blocking is now an established practice. One result has been that a very appreciable number of single beets result from this operation. The evidence of these singles induced studies which led to the proposed mechanical thinning. It was thought that if there were as many as twenty percent singles with mechanical blocking, that possibly, with smaller blocks we might obtain enough singles to practically eliminate hand thinning. If we were to find twenty percent singles by leaving three inch blocks it looked reasonable to expect three times as many singles if the blocks were to be cut down to blocks one-third as large. Actually these results are approached.

In blocking to these very small sizes there are left in the rows perhaps sixty single beets per hundred feet of row. In order to insure the desired 100 beets per 100 feet of row the small blocks are spaced very much closer together than has been the custom with mechanical blocking, sometimes as close as three inches center to center which would mean four such blocks per foot of row. Another expectation with this small blocking is that about half of the blocks will be blanks. A normal expectation will then be that we would have four blocks of beets in every two feet of row, one of which would be a single and the other three would be doubles or multiples. The next operation then is to use a long handled hoe and cut (Continued on Page 8)
Not “If” but “When”!

With the combined efforts of the groups mentioned in the accompanying article by Mr. Mervine directed towards complete mechanization of all sugar beet operations, beet growers can be assured that this long sought goal will soon be reached.

For the past decade or more, inventors have been seeking the perfect sugar beet harvester. Many of them thought they had found it only to have actual field tests meet their hopes. Our memory recalls that this was also true of cotton pickers for many years, and it was said that work could never be handled as the implement manufacturers will be able to make single seed ball planters with very little change in their present machines.

Germination Important

In the seed laboratory where germinating conditions were kept ideal, large sized seed balls showed a maximum average of from 2.0 to 2.75 sprouts per seed ball and an average of around 2. or slightly over for larger sized sack-run seed. Large sized seed balls spaced at regular intervals in the row under favorable germination conditions produced an average of approximately 1.75 to 2.25 sprouts per seed ball. Evidently the bunching of seedlings obtained with commercial planters is largely due to the bunching of the seed balls.

Considerable preliminary experimental work was done on planters which would plant single seed balls. The first planter, and the type which most accurately does this work, was one which has a series of cups attached to a chain. This chain pulls the cups up through the seed hopper. Each cup picks up one seed ball, any extras fall off as the cups pass under the supply of the seed supply. The path of the seed cups is confined so that the individual seed balls are carried as individuals right down into the furrow where they are deposited.

Definite Progress Made

The results with the single row, chain feed, pick-up cup, single seed planter were so encouraging a six-row, tractor-drawn planter using the same type of planting mechanism was built for the next year’s planting season (1938). This machine was used for several experimental plot and field strip plantings during the past two seasons. A simpler pick-up cup type of single seed planting mechanism was used in another experimental planter which was also built for the 1938 planting season. It consisted of a pick-up cup type of single seed which was attached to the inner side of one of the disk opener cups. These cups pick up seed from a supply carried in a small secondary hopper formed in the disk opener casting. Several experimental planters and field plantings have also been put in with this planter during the past two seasons.

Probably the most encouraging result of this experimental work is that it was not necessary to elaborate as elaborately as the experimental machines used in this development work. It now appears that the implement manufacturers will be able to make single seed ball planters with very little change in their present machines.

The best growers should soon be able to get machines that will plant single seed balls that should make it possible to eliminate a large part of the present hand labor.

Harvesting Solution More Difficult

Thus it would seem that the thinning end of the problem might be mechanized, The harvesting end of the problem is another view. Progress has been made. Mechanical harrow planters that have been developing during the last several years have shown improvements and under favorable conditions could be expected to fill emergency needs.

Probably one of the most encouraging developments has been made in the tapping of beets in the ground. This development is entirely new. So far as we know nothing like it has been developed anywhere in Europe or in this country. The tapping itself is involved is based on the expectation that the doubles on the 1938 seed balls per acre when the seed were planted with the conventional planter that when a conventional planter was used as shown in the next column of the table. This difference is highly significant. The hand planting is still better but not significantly better than the single seed planter. The last column shows the number of single seedlings, that is, inch lengths of row which contained a single seedling, per hundred inches. The single seed planter had again as many singles as did the conventional planter, a difference which is highly significant. Again, the difference between the single seed planter and hand planting is not quite significant though nearly so in this latter case.

Different plantings at different seeding rates all showed better germination stands for the single seed planter than for the conventional planter, and the differences for each planting rate were significant. The percentage stands with the single seed planter increased from 30 percent for the 5-pound seeding rate to 73 percent for the 30-pound seeding rate, whereas with the conventional planter the corresponding percentages increased from 26 percent to 59 percent.

AFTER-ThINNINg STAND COUNTS showed that reasonably satisfactory hand thinned stands were obtained with seeding rates as low as five pounds per acre with the single seed planter while the after-thinning stands obtained with the conventional planter at that seeding rate were not satisfactory.

Sugar Beet Machinery Research

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