

Results Obtained from Mechanical Thinning of Sugar Beets in the Eastern Area of the United States in 1951

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The number of mechanical thinners used *in* the sugar beet crop in the eastern area of the United States increased from 96 machines in 1950 to 929 machines in 1951. Nine hundred seven of these thinners were grower-owned. The total acres on which a mechanical thinner was used at least once in 1951 were 21,837 for an average of 23.5 acres per machine. This compares with 4,878 acres in 1950, or an average of 50.8 acres per machine.

The use of the thinner, and the enthusiasm of growers as regards the results obtained from the use of the machine, varied throughout the territory. For example, one fieldman had more than 90 percent of his contracted acres machine-thinned while others had very few. One factory district had 57 percent of the total acreage machine-thinned while other factory districts had less than 10 percent so worked.

One of the primary reasons for variation in the use of the thinner between territories is the attitude of fieldmen and growers and hesitancy in the proper use of the machines. Inexperienced growers and fieldmen became skeptical and frightened after seeing the results of going over a field of very small beets with a mechanical thinner and weeder. A second reason was poor stands and adverse weather conditions at the time of thinning. Many growers are skeptical of a light stand and wish to tear it up and replant and are extremely hesitant about using any mechanical aids in thinning. In some territories there happened to be plenty of labor ready to work when the beets were ready to thin and consequently farmers did not use their thinners when it was desirable to do so.

Some measures which have been taken to correct the above are as follows:

1. Education of fieldmen and growers. It is extremely important that members of a field force be convinced of the value of the machine before it can be expected that they can do a good job of convincing growers that it is profitable to use. It is very difficult to encourage farmers to use the mechanical thinner properly when a skeptical fieldman is supervising his territory.

- 2- Demonstrations should be held in each territory to show the proper technique and use of the thinners. Holding meetings to discuss the use of thinners, using visual aids and pictures of results obtained in the field all aid in promoting the use of the thinner. However, the most effective means are actual field demonstrations in each territory. Many growers and fieldmen have a "show me" attitude as regards any relatively new practice. We have found that demonstrations showing proper adjustments and use of the machine and the fact that small sugar beets can be covered with dirt and still emerge have aided considerably in abolishing the fears of growers that they will ruin their stand through the use of a thinner. Our tests have demon-

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strated that small sugar beets, in the two- to four-leaf stage, may be covered with as much as one inch of loose dirt and still emerge.

3. Demonstration of the profitable use of the thinner in other crops. The use of the mechanical thinner in beans and corn in our area has been very successful. By demonstrating to a grower that proper use of the machine is valuable in the production of any type of row crop, and that it is not limited to use in sugar beets, we have greatly increased the sale and use of these machines.

4. Publicity of the results from tests conducted in each territory should be made through every medium possible. Growers are more apt to accept and use a practice which is being advocated if it has been successfully used by another grower with whom he is acquainted.

5. A study should be made, and publicity given to, any improvements made to the mechanical thinner or the use of any new type thinner which may be available. In view of our experience in the eastern area, it is felt that emphasis should be placed on thinning and weeding of sugar beets rather than blocking. For this reason, less emphasis was placed on blocking heads and more placed on spring tine weeder heads or units which use small teeth. There have been several machines, employing the use of small teeth for weeding and thinning purposes, used successfully in our area. These include the Silver or Great Western thinner, the Dixie thinner, the Palsgrove thinner and the Powell and Begaman thinning and weeding units.

Other variations in the structure of the thinner which were tested in 1951 are counter-rotating units in which two heads rotating in opposite directions operate on each row. The use of this type of mechanism has been found to be very effective and commercially made units will be demonstrated this year.

Another improvement tested in 1951 and which will be made available for area demonstrations in 1952 is the use of variable speed thinning units. This is a machine driven by a power takeoff in which the speed of the heads can be varied as the machine travels down the row. This can be accomplished by any number of various types of variable speed units placed between the power takeoff drive and the drive to the individual thinner heads.

Where labor is ordinarily paid on a piece rate basis, many growers ask "how do I save any money by using the thinner when the labor obtains the same amount for blocking and thinning?" There are many answers to this question including the fact that weeds are controlled early before causing excessive damage. By stirring up and aerating the soil, blackroot is brought, and kept, under control. Nitrification is stimulated and increased rate of growth is quite noticeable where beets have been worked with the weeder heads at the proper time. The use of the thinner enables labor to cover more acreage in a given period of time while making it possible for them to leave a better stand.

Several tests were run in the eastern area in 1951, all of which indicate there are no differences in yield due to late blocking and thinning if the machine is used at the proper time. Also, several tests were conducted to

show the effects of stand upon yield. It is a common belief among many of our growers and fieldmen that tonnage per acre is materially reduced if only a 75 percent to 80 percent stand is obtained as compared to a 100 percent stand.

Table 1 shows the results from two separate tests conducted in 1951. These and others indicate that no loss in tonnage is suffered, if mechanical thinners are used at the proper stage of growth, even though hand trimming is delayed ten days to two weeks. All tests indicate, however, that if a

Table 1.—Showing the Effect of Delayed Thinning with and without the Use of a Mechanical Thinner.

Michigan Sugar Company—Muck Soil—1951	
Treatment	Tons/Acre
1. Hand thin on time	11.1
2. Mech. thin on time, hand thin on time	11.7
3. Mech. thin on time, hand thin 10 days late	11.6
4. Hand thin 10 days late	9.8

Michigan Sugar Company—Clay-loam Soil—1951	
Treatment	Tons/Acre
1. Hand thin on time	17.4
2. Mech. thin on time, hand thin on time	17.3
3. Mech. thin on time, hand thin 2 weeks late	16.8
4. Hand thin 2 weeks late	15.7

mechanical thinner is not used such a delay in hand thinning results in a reduced yield. All figures represent an average of four randomized replications.

At the time of blocking and thinning, many growers do not have as thick a stand as is desirable and wish to tear up their fields and either replant to sugar beets or to some other crop. It has been our observation

Table 2.—Showing the Effect on Yield of Sugar Beets from Spacings in the Row Varying from 8 to 48 Inches.

Michigan Sugar Company—Muck Soil—1951		
Spacing in Row	Beets per 100 Ft.	Tons per Acre
8 in.	138	12.7
10 "	109	12.6
12 "	104	12.9
20 "	60	13.1
32 "	42	11.3
48 "	31	8.9
12 in. Reseed	91	7.8

Michigan Sugar Company—Clay-Loam Soil—1951		
Spacing in Row	Beets per 100 Ft.	Tons per Acre
8 in.	151	16.6
10 "	115	16.5
12 "	98	15.4
20 "	60	15.8
32 "	36	13.1
48 "	28	13.2
12 in. Reseed	85	10.9

that the greatest majority of fields which are torn up because of so-called poor stands could very profitably be left rather than tearing up and reseeded. We have found through many tests over the past five years that uniform stands ranging from 60 to 150 beets per 100 feet of row do not materially affect yield of sugar beets. Table 2 shows the results of two tests conducted in 1951, giving the effect on the yield of sugar beets from spacings in the row varying from eight (8) to 48 inches. Included in these tests is a treatment in which the plot was torn up at the time of blocking and thinning (four to six-leaf stage) and reseeded, in much the same manner as a grower would if he thought he had too thin a stand to leave. It is interesting to note that *in* all cases the reseeded beets, blocked and thinned to an approximate 100 percent stand, did not yield as much as the original beets blocked and thinned to 48 inches or a 25 percent stand.

It should be noted that the spacings in table 2 are uniform and may or may not be similar to stands left in which all of the thinning was done by machine with no hand trimming. Table 3 shows the effect on the yield of sugar beets from varying stands obtained from hand thinning, which resulted in uniform spacing, as against varying stands obtained by repeated use of a mechanical thinner with no hand trimming whatever. All subsequent weeding in the mechanically thinned plots was accomplished by pulling the weeds. There was no hoeing in the mechanically thinned plots in this table.

Table 3.—Showing the Effect in Yield of Sugar Beets from Varying Stands Obtained from Hand Thinning (Uniform Spacing) vs. All Mechanical Thinning with no Hand Trimming (Irregular Spacing).

Clay-Loam Soil—1951			
Hand Thinned		All Mechanical	
Beets per 100 Ft.	Tons per Acre	Beets per 100 Ft.	Tons per Acre
151	16.6	200	11.9
115	16.3	164	11.3
98	15.4	150	14.7
60	15.3	120	14.0
36	13.1	75	14.7
28	13.2	75	15.1

It would appear from this, and other tests conducted in the eastern area in 1951, that best results can be obtained by using a mechanical thinner to thin the beets to an approximate final stand and complete the job by hand-trimming. In many cases where nothing but the machine is used, although the proper number of beets per 100 feet of row may be left, they are not spaced uniformly and result in clusters of beets, sometimes three to five *in* one foot of row. Consequently, it appears that 100 beets per 100 feet of row obtained by hand thinning will not necessarily *give* the same yield as 100 beets per 100 feet of row obtained by purely mechanical thinning. This again emphasizes the fact that it is desirable to have uniform stands of sugar beets for proper and correct use of the thinner. Also, it is indicated that, where mechanical thinning is practiced, it may be advisable to leave more beets per 100 feet of row than would necessarily be desired if the entire thinning operation was accomplished by hand.

The general acceptance and use of the sugar beet thinner in the eastern area increased more *in* one year from 1950 to 1951 than did the use of mechanical harvesters over a three-year period from the time they were first introduced commercially in 1944. We are very encouraged with the results obtained and believe that with proper publicity and field demonstrations on sugar beets growing in the field in the various territories we are well on the way toward eliminating a very substantial percentage of the spring labor required in the eastern area. We think that this can be done with benefit to a grower without reducing, and in many cases actually increasing, his yields. We also believe that the use of the machine will save a great many acres which have been torn up in the past due to poor stands, attacks of blackroot or through the inability of labor to work the fields on time.