

Mechanical Thinning of Sugar Beets in the Area Served by the Utah-Idaho Sugar Company

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Introduction

Mechanical thinning or machine thinning of sugar beets infers the complete replacement of hand labor in the thinning process. As generally used, however, it includes machine work which reduces hand labor requirements. Closely related to machine thinning is type of seed used, type of drill used, seeding rate and cultural and environmental factors which affect germination stands.

The area served by the Utah-Idaho Sugar Company includes the following: Gunnison Valley in south central Utah; Salt Lake, Utah, and Boxelder Counties in north central Utah; the Upper Snake River Valley in southeastern Idaho; Yakima Valley, Walla Walla and Columbia Basin areas in Washington, and the Belle Fourche factory district in southwestern South Dakota and northwestern Nebraska.

Seeding Rates, Stands and Drills

All acreage within the area covered by this report was planted in 1953 with 8-10 decorticated seed. This seed was sized so that not more than 4 percent was under 8/64 and not more than 4 percent was over 10/64. About 55 to 57 percent ranged in size from 9/64 to 10/64 and 37 to 40 percent ranged in size from 8/64 to 9/64. The average number of seed units per pound was from 37,000 to 38,000. Average seeding rates ranged from 8 to 10 seeds per foot with the majority running closer to the 10 seeds per foot rate.

The 8-10 processed seed had an average germination of 90 percent and germination tests showed an average of 57 percent singles. Field counts following some of our better drills showed an average of about 347 beet-containing inches in 100 feet of row. Sixty-four percent of these inches contained single beets.

Some field trials were also made using monogerm seed which had been decorticated and sized 8-10. When planted in the same drills as those referred to above, the inches containing single beets increased to an average of 89.6 percent. This indicates that the better of our modern drills do a very acceptable job of distributing seed uniformly in the row and that mechanical thinning should receive a definite impetus when monogerm seed is available for commercial planting. Details of the above work are given in Table 1.

Machines Reduce Hand Labor Requirements

Mechanical thinning of sugar beets is no longer an experimental problem in the area served by the Utah-Idaho Sugar Company. Hundreds of farmers made it a reality during the 1953 season and hundreds more gained

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Table 1.—Comparison of Decorticated and Monogerm Seed in 1953 Plantings¹

Type of Seed	Inches in 100 feet Containing Beets	Inches With Single Beets	Inches With Double Beets	Inches With 3 or More Beets	Average Maximum Gap	% Inches With Singles
Decorticated 8-10	347	222	100	25	12	64.0
Monogerm 8-10	211	189	21	1	20	89.6

¹ Average counts from 14 field trials. Germination percentage of decorticated 8-10 seed was 93 percent. Germination percentage of monogerm seed was 60 percent.

sufficient experience so that they will have confidence to go ahead in 1954. Mechanical thinning has not only increased rapidly in amount during the past two years but it has improved greatly in quality. Both farmers and fieldmen are thinking in terms of the end result and not merely in terms of running over the ground with machines. The practical results are beginning to be evident. More farm families are doing their own weeding following complete machine thinning. Long-hoe thinning with no finger work is on the increase. Sugar beet laborers are showing increased output per man. This is resulting in a decrease in imported labor demands. In districts where outside labor, including Texas Spanish-Americans, Mexican Nationals and Navajo Indians, is brought in for spring work, labor needs were calculated on the basis of one worker for each 10 acres of beets planted for 1952. In 1953 needs were calculated on the basis of one worker for each 12 acres and in 1954 needs will be calculated on the basis of one worker for each 15 acres of beets. This indicates that machines are decreasing hand labor requirements.

Machines in Use

Thinning machines in the area covered by this report consist largely of Silver thinners. There are some Dixie thinners in use and some B&P blockers and weeders. Complete thinning jobs have been done with all these machines. It is only fair to state, however, that farmers have generally done a more complete job of thinning with the Silver thinners.

Method Most Generally Used

We have stressed the Windsor or twice-over method of machine thinning. This consists of using an 8-spoke cutting head with a 1³/₄-inch knife or hoe for the first time over. This operation, if done properly, cuts 50 percent of the within row area and consequently reduces the germination stand by 50 percent. The machines have available a 16-spoke cutting head with an assortment of knife or hoe sizes so that the percent removal for the second operation can be suited to the need.

Density of Stands Left

The objective which we have established is to reduce the stand to an average of 100 to 125 beet-containing blocks. If stands have been reduced to this point by machine, then we definitely discourage any beet removal by hand labor. We do not even want any long-hoe trim on this type of stand. We want weeding only.

During the 1953 season we had machine-thinned fields left with an average of 165 to 170 beets per 100 feet of row. We worried for fear that some of these heavier stands might be too thick. Harvest results in every

case were entirely satisfactory. In the future we will discourage the removal of beets by hand labor if total beets do not run in excess of 150 beets per 100 feet of row.

Yield Results from Machine Thinning

Direct yield comparisons between hand- and machine-thinned beets made on the experimental and demonstration farm at Shelley, Idaho, showed a yield advantage for machine thinning. Hand-thinned strips with 90 to 100 beets per 100 feet of row yielded 16.70 tons per acre. Machine-thinned beets in the same field averaging 165 beets per 100 feet of row yielded in excess of 18 tons per acre. Sugar content averaged .70 percent higher. These strip comparisons were machine-harvested and yields are based on actual beets delivered. Many other less direct comparisons were made in farmers' fields and between farmers' fields, and in every case where adequate stands, *i.e.*, at least 100 blocks of beets, were left, the comparison demonstrated the advantages of machine thinning.

Amount of Machine Thinning Done

During the 1953 thinning season 22,758 acres were worked with machines. This compared to 11,233 acres in 1952 and 3,385 acres in 1951. Out of this total 9,322 acres were machine worked at least twice. This compares with 1,756 acres in 1952 and 327 acres in 1951. Most of this 9,322 acres was long hoe worked with a minimum of finger work. In 1953 a total of 2,910 acres was completely machine thinned. Hand labor did weeding only. This compared with zero percentage in 1952 and in 1951. A detailed report of machine thinning by districts is shown in table 2.

Table 2.—Summary of Spring Mechanization for the Year 1953 for Various Factory Districts in the Utah-Idaho Sugar Company Area.

District	Total Acres Thinned	Total Acres Machine Worked		Once Over With Machine		Twice Over ¹ With Machine		No Hoe Trim ² Weeding Only	
		Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent
South Dakota and Nebraska	8,133	4,259	52.36	2,957	36.35	1,302	16.00	1,089	13.38
Gunnison	5,460	2,826	51.75	1,746	31.97	1,079	19.76	107	1.95
West Jordan	7,525	3,437	45.67	2,036	27.05	1,400	18.60	151	2.00
Garland	6,809	2,230	32.75	1,191	17.49	1,039	15.25	8	.11
Idaho Falls	11,517	2,866	24.88	1,361	11.81	1,505	13.07	862	7.49
Washington	31,762	7,140	22.48	4,143	13.05	2,997	9.44	693	2.18
Grand Total for									
1953	71,206	22,758	31.96	13,434	18.86	9,322	13.09	2,910	4.08
1952	54,650	11,233	20.55	9,477	17.34	1,756	3.21	0	0
1951	65,352	3,385	5.18	3,058	4.68	327	.50	0	0

¹ Long-hoe thinning—very little finger thinning.

² No long-hoe trimming or finger thinning. Hand labor consisted of weeding only.

The advancement made in machine thinning in this area in 1953 as compared to 1952 was almost directly proportional to emphasis placed on the program by the various district managers and their staffs. This will no doubt continue to be an important factor. However, it is now evident that in every district there will be many farmers who will help to proclaim the possibilities and advantages of machine thinning.