Results of Mechanical Thinning Trials of Sugar Beets at Fort Collins in 1945[1]

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Seventy-eight percent of thinning and hoeing labor may be saved by "mechanically thinning" sugar beets. Some loss in yield may be sustained by mechanical thinning, but if the grower is anxious to maintain a high yield he may accomplish this and still use only 48 percent as much thinning and hoeing labor as is customary with the usual hand methods.

Plots cross blocked, then thinned with a long handled hoe and subsequently cross cultivated required only 81 percent as much thinning labor as the check plots of hand blocking and thinning but suffered a 9-percent decrease in yield.

The object of the first trial was to compare four methods of thinning beets under varying conditions of beet stands. Beets were planted at *2,* 4, and 6 pounds of segmented seed per acre, which means approximately 4, 8, and 12 seeds per foot of row. An excellent seedbed caused an unusually high germination; in one case 94 percent of the viable germs in the seeds actually made plants.

The trial was planned with replicated plots to have the heavier seeding rates thinned in four ways: (1) Hand blocked and thinned; (2) machine blocked followed by long handled hoe thinning; (3) long handled hoe thinning; and (4) machine thinned.

The low seeding rate—four seed balls per foot of row—had only two treatments: (1) No thinning; and (2) long handled hoe thinning.

The labor time involved was checked for both thinning and subsequent hoeing.

Two other trials were incorporated, one to compare 20-inch, 30-inch, and 40-inch rows. In each of these replicates an attempt was made to maintain a reasonable approach to the same population per acre—this meant the 30-inch rows were supposed to have 150 beets per 100 feet of row as compared to 100 beets per 100 feet of 20-inch row.

The third trial compared cross blocked, long handled hoe thinned and subsequently cross cultivated beets with the customary hand blocked and thinned beets. Here the labor for thinning and hoeing

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Table 1.—Results of mechanical thinning- trials at Fort Collins, Colo., 1945.

Seeding rate, seeds per foot	4	8	12
Percent potential	94	85	92
Beets per 100 inches of row	31	57	92
Percent germination stand	22	38	53
Singles per 100 inches	14	22	24
Average maximum gap, inches	12	7.5	5

Thinning method*	A	B	B	C	D	E	B	C	D	E	30 inches E	40 inches E
Hills per 100 feet	204	145	136	130	116	134	126	135	125	119		
Percent singles after thinning		62	50	63	61	90	24	58	62	81		
Time thinning, man-hours per acre	0	6.0	0.0	0.5	6.0	23.0	11.7	.5	6.0	20.1		
Time hoeing, man-hours per acre	0	7.5	6.8	7.6	6.3	5.0	3.3	6.4	5.6	5.5		
Total time, man-hours per acre	0	13.5	15.8	8.1	12.3	28.0	20.0	6.9	11.6	31.6		
Harvest												
No. marketable beets for 100 feet	174	139	130		108	104	140	123	127	103	140	108
No. unmarketable beets for 100 feet	102	28	34	30	20	5.	47	46	24	5.	15	12
Tons marketable beets per acre	11.1	12.7	11.7	11.5	11.9	12.6	11.2	11.1	11.5	12.2	11.1	9.8
Tons unmarketable beets per acre	1.4	.49	.46	.48	.34	.11	.72	.71	.36	.07	.12	.12
Total tons per acre	12.5	13.1	12.3	12.2	12.7	11.9	12.3	11.2	9.9			

*Thinning methods

A. Nothing
B. Long handled hoe only
C. Machine only
D. Machine followed by hoe
E. Hand block and thin

Table 2.—Mechanically cross blocked beets followed by long handled hoe thinning and subsequent machine cross cultivation.

Thinning labor 31 percent of hand thinned plot Hoeing labor 80.5 percent of hand thinned plot		
After-thinning population for 100 feet, machine		122
After-thinning population for 100 feet, hand		107
Percent singles	machine	60
Percent singles	hand	83
Yield tons per acre	machine	14.98
Yield tons per acre	hand	16.50
The difference in yield is statistically significant.		

was compared for the two methods, and at liarvest the yields of each plot were measured.

The results of the mechanical thinning plots were:

(1) The highest yield was obtained with the lowest seeding rate where the total thinning and hoeing labor was only 48 percent of the check hand-thinned plot.

(2) In the higher seeding rates there was no significant difference in yield between the three "mechanical thinning" methods but all three yielded about 9 percent under the check hand-thinned method.

(3) Long handled hoe thinning resulted in a lower percentage of singles than machine thinning; this was very significant in the heaviest seeding rate where the mechanical thinner cut out 5% inches of row and left a inch block—a much smaller block than the hand laborer could leave.

(4) The loss in yield of the cross blocked and subsequently cross cultivated plot as compared with the hand blocked and thinned field was 9.02 percent but was largely compensated for by a saving of 69 percent of the thinning labor and 19.5 percent of the hoeing labor.

(5) The loss in yield in the "down the row" mechanically thinned plots was also 9 percent but in one method saved 78 percent of the thinning and hoeing labor.