MECHANICAL THINNING TEST

Cooperators.

This test was made with the cooperation of Mr. E. M. Mervine of the Bureau of Agricultural Engineering who supervised the thinning of the test and the local staff of the Great Western Sugar Company who determined weights, tares and percent sucrose of the beets from this experiment as they were delivered to the local factory.

Plan of Test.

The following thinning treatments were replicated two times:

1. Normal hand thinning; blocked by long handled hoe and thinned by hand.
2. Blocked with Dixie Cotton Chopper and the number of plants in the thickest blocks further reduced by chopping with a long handled hoe.
3. Blocked with Dixie Cotton Chopper and no further treatment given.

The plots were 12 rows wide and 720 feet in length, approximating .331 acre in size (The factor used in calculating yields was .33058).

The germination stand was somewhat nonuniform, but for the most part was heavier than appears to be desireable for mechanical thinning to give the best results. Many blocks could be found in treatment 3 with 5 or more plants at harvest, some or all of which were very small due to the crowding in the hill.

The test was harvested October 19, 21, and 22. Each plot was pulled and topped as a single "land" and hauled in two loads to the sugar factory, each load was sampled for tare and percent sucrose determination in the laboratory of the Fort Collins factory of the Great Western Sugar Company.

A summary of the test follows:

Mechanical vs. Hand Thinning
Plot Summaries.

	Treatment	Plot No.	T. Roots per A.	% Sucrose	Gross lb. Sug. per A.	% Tare	*lb. Non-mkt'le.	Hr. to Harv.
1.	Hand blocked and thinned.	1.	20.889	13.30	5557	14.5	10.0	1.75
		4.	18.890	14.70	5554	18.0	16.0	
		7.	21.763	13.50	6464	---	--	
	Average		20.514	13.83	5858	15.3		
2.	Cotton Chopper; fol. with hoe.	2.	19.244	13.90	5350	13.0	9.8	1.75+
		5.	18.079	14.25	5152	17.5	21.6	
		8.	19.849	15.10	5994	16.5	--	
	Average		19.057	14.42	5499	15.7		
3.	Cotton Chopper only.	3.	17.049	13.50	4603	21.0	34.3	2.25
		6.	16.852	14.35	4837	17.5	47.7	
		9.	18.457	13.90	5131	11.0	--	
	Average		17.453	13.92	4857	16.5		

*Non marketable beets are the beets which were loaded, but which were returned to the truck with the dirt. For some reason the amount of these beets from plots 7, 8 and 9 was negligible.

Mechanical vs. Hand Thinning 1940
Summary

Treatment	Yield: Tons Roots per A.	Yield: Gross lb. Sugar per A.	Sucrose %
Hand Thinned	20.514	5858	14.28
Mech. Blocked only	19.057	5499	14.42
" " + Hoe	17.453	4857	13.92
Mean	19.008	5405	14.21
F	28.99**	23.32**	1.15
2 times S.E. of a Diff.	.804T.	297lb.	---
S.E. of Mean in % of the Mean.	1.50%	1.94%	

** Value for F exceeds 1% point.

Discussion.

Discussion of the mechanics of the test, time consumed in the thinning operations and the economics of time used will be left to Mr. Mervine.

The approximate time required in the harvest of the treatments was as follows for windrowing, topping and piling of one plot: No. 1 one and three fourths hours. No. 2 slightly longer, but the difference was so small that it was not exactly determined. No. 3 two and one fourths hours or approximately 28 percent longer than for treatment No. 1 (The time as given is for the full crew and while comparable is not man hours per plot.)

It was evident at harvest that there were some beets in treatment, No. 2 which were too small to be considered as of marketable size and many more such beets in treatment No. 3. The soil at harvest was very wet and the beets came out muddy: probably due to this condition no very accurate determination of unmarketable sized beets could be made from the screenings returned to the truck at the beet dump. (see plot summary).

The yields of roots and sugar per acre from treatment No. 1 exceeds the yields of treatment No. 2 by 1.45 tons and 359 pounds gross sugar respectively. These differences slightly exceed twice the standard error of a difference. The yields of treatment No. 1 exceed the yields of treatment No. 3 by 3.06 tons and 1001 pounds gross sugar. This loss in yield is probably highly significant and considering that it requires 28 percent more time to harvest treatment No. 3, it is probable that this treatment resulted in a monetary loss in comparison with treatment No. 1 in spite of the saving in thinning cost. It has been observed that when two or more beets have grown in one hill, the tops tend to intermingle, a condition which interferes with the rhythm of hand topping. It is possible that the full effectiveness of mechanical thinning awaits the mechanization of harvest operations.