RED RIVER VALLEY NON-THINNING TRIALS - 1946

O. A. Holkesvig[1]

In previous papers presented before this Society, the cross cultivation method was described and discussed as a standard method used in the Red River Valley of the North in Northwestern Minnesota and Northeastern North Dakota, for reduction and possible elimination of hand labor used in blocking, thinning and hoeing of sugar beets. For many years, the cross cultivation method enabled the growers of sugar beets in this area to produce their crop with less labor and reduced costs per acre and because the major portion of the acreage planted to beets is planted on land that had sweet clover, green manure plowed under in June of the previous year and kept black by subsequent field cultivations, which eliminate a large part of the weed problem, such a practice fits in perfectly with non-thinning work. In this paper, a report is made on some 451 acres of mechanically thinned beets, in comparison with 134 acres of hand thinned beets with data presented to show the economies of mechanical thinning.

The 1946 trials were not the first attempt made in the Red River Valley at non-thinning. Prior to the general use of segmented seed and precision planters for better distribution of the seed in the row, graded whole seed was used in 1940, in check row planters and the fields subsequently cross cultivated. The yields produced from mechanically thinned fields were not markedly below those obtained from hand thinning, but the amount of hoeing required was too great to warrant adopting mechanical thinning as a general practice. With the introduction of segmented seed and development of planters, which distribute seed more uniformly in the row, conditions are more conducive to elimination of hand work in thinning without a corresponding increase in the amount of work required for hand hoeing. Therefore, early in 1946, plans were outlined for extensive field experiments to test thoroughly the mechanical thinning method. It was felt that the experiments would have to be distributed over the entire area if the results were to be judged on a commercial basis and avoid the criticism of a tailor made experiment. If the results were favorable, it would then be possible to recommend this practice to all growers. Therefore, twenty-five growers were selected at random and on whose farms the tests reported herewith were conducted. In every case, all hand thinning was eliminated in the non-thinning comparison field, leaving only long handle hoe work around the blocks.

1946 TESTS

SEEDING RATES:

Germinating conditions were far from satisfactory, making the erratic stands the rule rather than the exception. Two rates of seeding were used, a three pound and a six pound per acre rate planting of segmented seed, sized 7/64" - 10/64" inclusive and of approximately 90 per cent viability. With an 18 inch width row planting, the heavier rate is more conducive to a higher

[1] Manager, American Crystal Sugar Company, East Grand Forks, Minnesota

field emergence and a greater number of beet containing inches of beet row. Therefore, until some field method is found which will consistently improve field emergence, reliance will be placed on increasing the seeding rate to 7 pounds segmented seed per acre, which will place the seed about one inch apart in the row and make possible the use of smaller beet blocks at the time cultivator tools are being set for cross blocking the field.

WIDTHS OF BLOCKS AND SPACING IN ROW:

Under average conditions, an 18 inch row width with an 18 inch spacing in the row has been found productive of outstanding results in this area. On a perfect stand, basis, an 18 inch x 18 inch pattern has 19,360 beet containing blocks per acre. To maintain a beet population of at least 16,000 beets at harvest, it is apparent that a change in the spacing pattern has to be made, since with 2 to 2-½ inch blocks and the rather low field emergence, too many blank blocks would result. On the other hand, cutting wider blocks would result in too many plants per block and long handle hoe thinning would be necessary.

Spacing patterns were altered in two fields. In one, the cultivator tools were set to space beets 14 inches apart between tractor wheels and 16 inches apart in the spaces where the tractor wheels traveled. Thus, a pattern was obtained, providing 23,232 potential beet containing blocks. In the other field, where the grower's tractor had all narrow tires, the spacing was made 14 inches apart in the row, or 24,891 beet containing blocks per acre. The width of block was reduced to 1-½ inch width, this being accomplished by staggering the discs on the front cultivator bar to avoid moving the block. Discs were given their maximum pitch so that a clean cut would result. The only other tool used was a five inch Planet-Junior duckfoot, set to cut 3 to 3-½ inches deep. This equipment was used at a lesser depth for the first cross cultivation after cross blocking and for the second and last cross cultivation, the discs were removed entirely. A comparison of yields obtained from fields where good field emergence was had and small blocks were employed, shows the following results:

TABLE I.

NON-THINNING VERSUS HAND THINNING COMPARED

Tons Per Acre		Acres Per Worker	
Mech. Thinned	Hand Thinned	Mech. Thinned	Hand Thinned
11.41	11.22	29	12.6

From the above results, it is concluded that unless field emergence is satisfactory, a spacing closer than 18 inches in the row between beets is necessary to maintain beet yields. Also, the maintenance of a small block to reduce the number of multiple beet plants and to effect a better control of weeds.

WEED CONTROL THROUGH FIELD AND HOEING OPERATIONS:

Effective control of weeds was accomplished in a number of fields through use of a weeder mulcher having three bars of teeth, spaced two inches apart and operated down the row and across the row. This mulcher destroyed almost all of the weed growth in the beet row without apparent harm to the beet plants. In another field, a soil ridge cover four inches deep was ridged over the planted row at time of planting and removed two days later. Not only was the germinating stand improved, but in harrowing down the ridge, many germinating weed seeds were destroyed.

Hoeing on non-thinned beets should commence early in their second true pair leaf stage. Early eradication of weeds conserves both moisture and plant food. The general experience gained from this non-thinning work in 1946, was the surprisingly good reaction of field labor in hoeing the non-thinned fields. On an average field and with present piece rates for hoeing, the laborer's earnings were increased over what he would have ordinarily earned in working beets in normal manner. In one field, four laborers hoed 220 acres of beets and with less effort than expended by other workers in the regular blocking and thinning and hoeing work on 40 acres.

EFFECT OF DOUBLES AND MULTIPLE BEETS ON YIELDS:

To determine the effect of double and multiple beets in a beet block, a controlled field test was conducted near East Grand Forks, Minnesota, to determine the weight of marketable beets per hill. Beets less than 1-½ inches in diameter were discarded as unmarketable. This test conducted on one thousand hill comparisons, chosen at random, showed that beet blocks containing three marketable beets produced .74 pounds more weight than single beet containing blocks. Beyond three beets per block, the competition was too severe and many unmarketable beets were produced. From these and other tests conducted in this area and elsewhere, it is concluded that when beet blocks contain not more than three beets per block, there need be no concern on the part of the grower, as to their possible effect in depressing yield. In fact, under good soil moisture conditions and not more than 40 or 50 percent of the hills containing double or multiple beet hills, an increase might easily result. Uniform distribution of seed in the row to result in a uniform stand and then cutting down the beet blocks to 1-½ to 2 inch size, will effectively reduce the percentage of multiple beet containing blocks.

Considering all of the yields from the 25 growers, the following data is obtained:

TABLE II.

MECHANICAL AND HAND THINNING COMPARED

	Total Acres	Beets Tons Per Acre	Man Hours Per Acre	Cost Per Acre
Mechanical	451	10.82	10.25	$ 7.61
Hand	134	11.70	16.11	16.00

The above data represents a drop of about 8% in yield from mechanically thinned beets, as compared to hand worked beets, due primarily to poor germinating stands and the retention of a better stand at harvest for the hand worked beets. It is felt that the information gathered this year and the "know how" experience obtained, will narrow this yield difference in the future and that the growers will produce beet yields with non-thinning that will be equal to or surpass those yields now produced under the practices now employed in this area. There is no question that the number of beet containing blocks can be maintained through use of proper spacing of beets in the row. With the improvement of field emergence brought about by drill and seed bed improvement and with the elimination of stunted plants, attributable to the shock of thinning, the future for non- thinning of beets looks bright.

The only objection encountered is the harvesting problem and this, we feel, is the limiting factor to extensive non-thinning operations until such time as mechanical harvesters are perfected to a point where they will do an acceptable job of topping doubles and multiple beets. As soon as these harvesters are available, growers in this area will be prepared to reduce the costs of production to a point where only hoeing labor will be required. When that is done and stoop labor is eliminated, hoeing of the crop should prove attractive to local labor.