

# Problems Connected with High Beet Populations

L. J. HOLMES AND CURZON KAY<sup>1</sup>

**Are we leaving too many beets per foot of row?** This is the main topic of discussion at Clarksburg this season. Briefly, let us go into some of the reasons for, and the results of, high population in the beet fields.

The reasons for high populations are varied. We all know that a definite relation exists between soil fertility, adequate moisture, growing season, etc., and the population which can be maintained. A few years past when both the thinning and harvesting were done by hand we used to shoot for a 100 percent stand which to us meant 100 beets per 100 feet of 20 inch row. In the past few years, however, conditions have changed and now our harvest is almost 100 percent mechanical and spring work is rapidly moving in that direction. With these changes have come a change in our population trend.

Here at Clarksburg, on ground which is highly fertile, we found that with mechanical harvesters if our beets became too large and grew out of the ground we lost a considerable amount of our tonnage due to breakage of these large beets. In order to overcome this our growers for the past four or five years have been increasing their field population to the point where an average population has been ranging from 120 to 140 beets per 100 feet of row. This seemed to work very nicely. Our beets were more uniform in size and our tonnage continued high. However, with increased drives for mechanical thinning which have been carried out the last few years a great deal of information has been published and distributed to farmers stating that doubles do not lower yields and that fields with increased population have produced as much or more than fields with lighter population.

It is not the objective of this paper to question or argue with the many authors on this subject, but we would like to call attention to the following points which we think have been overlooked by many, and may have misled some of our growers.

**First**, it must be remembered that articles written by fieldmen and farmers which brag on increased tonnages on fields with heavy population are usually based on one year's experience and many of the fields have no check for comparison. Furthermore climatic and other conditions play a large part in production from year to year, and many of these production reports are based on only one year's results.

**Second**, it has been noted in some of the published research work on which population studies have been made that all beets were weighed which had a diameter of 1 inch or over. We feel that many of the beets which have been used in the final results are unmarketable beets. A large portion of these, if picked up by the harvester, will fall out through the potato chains on the harvesters and a great many more will be removed by the Rienks screen at the dump.

<sup>1</sup> Manager and Agricultural Superintendent, respectively, American Crystal Sugar Company, Clarksburg, California.

Third, we have several growers who have told us that it is the industry's fault that they have so many triples and clumps of beets in their field. They reason this way—"We had lots of doubles when we insisted on thinning to singles, but now that we don't worry much about doubles we get a whole field full of triples and clumps."

We will go along with the statement that doubles do not hurt, but when our growers begin to get lax on their field supervision, and do not insist on thinning to singles, labor immediately begins to leave triples or clumps.

Because of the tremendous population increase which we have experienced in the past year in our fields, we feel that it is high time to call attention to some of the detrimental effects of overpopulation. We want to stress emphatically at this point that we are not arguing for or against mechanical thinning and our sampling this year showed that many of the hand-thinned fields had as heavy a population as those fields handled by mechanical means.

Let us consider now some of the detrimental effects of over-population in our beet fields.

First, the effect on tonnage: Due to the increased number of beets per foot of row we changed our field sampling method for 1953. In taking a preharvest sample, each fieldman, using a measuring stick of 5 feet, sampled all the marketable beets in five feet of row. The fieldman's judgment was relied upon in determining marketable beets but for a general rule of thumb any beet under 1½ inches in diameter was discarded. Seventy-eight samples were taken on our early fields between the dates of June 16 to June 29. All of the beets were counted and the unmarketable beets noted. The average of these samples indicated a population of "158 marketable beets per 100 feet of row. In addition, there were more than two unmarketable beets per sample which would make more than 40 unmarketable beets per 100 feet. This would make the total visible population at harvest time in excess of 198 beets per 100 feet of row. We saw visible population because it was shown this year at Clarksburg in a plot where a total population of 471 beets were left at thinning time, that 25 of these had disappeared by harvest time. The total stand counts at thinning time and the marketable beets which were harvested are shown in Table 1.

It seems obvious to us regardless of the final tonnage of clean beets produced that the 40 or more unmarketable beets per 100 feet of row which survived to harvest competed with the marketable beets and had a tendency

**Table 1.—Population Studies—100 Feet of Row 1953. A. E. Greene, Clarksburg.**

|       | No. Beets      |                      | Marketable Beets |           | Unmarketable Beets |           | Sclerotium Beets (Not Weighted) |         | Tons Per Acre |                |                     |
|-------|----------------|----------------------|------------------|-----------|--------------------|-----------|---------------------------------|---------|---------------|----------------|---------------------|
|       | After Thinning | No. Beets at Harvest | No.              | Wt.(Lbs.) | No.                | Wt.(Lbs.) | Weighted                        | % Sugar | Market-able   | Un-market-able | Lib. Sugar Per Acre |
| Dixie | 471            | 466                  | 197              | 155.58    | 196                | 26.31     | 53                              | 15.7    | 20.2          | 3.4            | 6,588               |
| Hand  | 182            | 176                  | 137              | 185.77    | 37                 | 6.00      | 2                               | 15.5    | 24.2          | 0.8            | 7,450               |

to lower the tonnage. Any other plant competing against the beets for soil nutrient would be called a weed. The unmarketable beets have the same effect.

Second, let us consider harvest problems caused by overpopulation. The average tare for the first 30 days of harvest in 1952 was 4.0 percent. The average tare for the first 30 days of 1953 was 6.6 percent. This is a comparison of the beets received over the same factory dump, from the growers in the same factory area, and in both cases the beets were approximately 98 percent mechanically harvested. This means that due to the increased number of small beets which are poorly topped plus the number of unmarketable beets which are screened through the Molnau screen, the grower is hauling 2.6 percent more material for which he is not receiving profit and the company is handling 2.6 percent more trash which has a tendency to slow down factory operations. Table 2 is a comparison of the amount of unmarketable beets which went through the Molnau screen at Clarksburg showing the variation between growers with high population as compared to those with a lower population.

**Table 2.—Comparison of the Amounts of Unmarketable Beets in the Screenings from Average 6 Ton Loads at Clarksburg—September 30, 1953.**

|               | Population<br>Per 100' of Row<br>at Harvest Time | Total<br>Wt. of<br>Screening | Wt. of<br>Small Beets<br>in Screenings | Number of<br>Small Beets<br>in Screenings |
|---------------|--|------------------------------|--|---|
|               |  | Lbs.                         | Lbs.                                   |   |
| Hand Thinning | 110  | 260                          | 3.51                                   | 55  |
| Hand Thinning | 158  | 560                          | 93.13                                  | 940                                       |
| Cross-Blocked | 165  | 570                          | 100.57                                 | 977                                       |
| Dixie Thinner | 173  | 1,200                        | 145.76                                 | 1,293                                     |

Third, there is the problem caused by increased susceptibility to certain diseases in heavy populations. This year at Clarksburg we have experienced one of the worst sclerotium root rot outbreaks since 1945. It is our opinion that the tonnages at Clarksburg will, for the factory district, be lowered at least a ton per acre due to *Sclerotium rolfsii*. We all know that there are many factors influencing the degree and severity of this disease from year to year. However, Dr. L. D. Leach, plant pathologist at the University of California at Davis, has this to say in one of his articles on this subject. "It is well known that when one sugar beet becomes infected by the southern root rot fungus, the disease quickly spreads to other plants left in the same block. More important, however, is the fact that doubles or multiples are about three times as apt to become infected as single beets in the same field. This conclusion is based on observations of 56,000 beets in several commercial fields in Yolo, Sutter, and Solano counties." (1)<sup>2</sup>

Dr. Leach concludes his article with the following statement: "It is, therefore, suggested that in fields known to be infected with *Sclerotium rolfsii* care should be exercised in thinning to obtain a high percentage of single beets."

<sup>2</sup> Numbers in parentheses refer to literature cited.

In conclusion, it is our opinion that overpopulation has the following detrimental effects. Tonnage is reduced due to unmarketable beets competing with marketable beets. The quality of harvest is lowered due to small and poorly topped beets. Susceptibility to disease is increased.

We believe uniform spacing is more important in the final analysis than total population. We feel that such glib remarks as "doubles do not hurt yields," and others, which are often made to growers without the necessary elaboration on all aspects of the problem, can do considerable harm.

#### Literature Cited

- (1) L. D. LEACH  
1942. Multiple beets more susceptible to rot than singles. Spreckel;  
Sugar Beet Bulletin.