

Planting for Machine Thinning

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Since the seedbed is the environment for the seed and subsequently the seedling, the importance of the proper preparation of this seedbed can not be overemphasized. If climatic and soil conditions permit, fall plowing should be done to obtain the mellowing effect of winter weather which does much toward producing a desirable seedbed for early planting.

In irrigated areas use of a two-way plow will leave the ground in a more level condition because back furrows and dead furrows are eliminated. Clods resulting from fall plowing can be eliminated by use of a land packer or roller. Air pockets in the soil can be removed by using a harrow. Soils which tend to pulverize should not be worked until shortly before planting time. An Eversman land leveler will pack the topsoil enough to maintain good contact with subsoil moisture, and at the same time leave the finished seedbed in such a condition that only slight depressions left by the press wheels of the drills will be visible.

Since obtaining a uniform emergence of seedlings is so essential to the successful use of the mechanical thinner, the importance of the planter and its proper use can not be stressed too often. It is desirable to use the John Deere 66, the Milton or the International—all so-called precision planters—so that a mechanical thinner can later be used. They are "so-called" because there are many factors beyond the control of the planter which determine a uniform stand.

To depend upon the planter's mechanisms alone to produce an even distribution of seeds and for even distribution as to unvarying depths and unvarying intervals, is expecting far too much from any mechanical device completely severed from human influences. Human influences, of necessity, must enter into the successful performance of a beet drill. For the speed at which a drill is operated, and the care that the mechanisms of the planter receive during its operation are the controlling factors in obtaining maximum performance from any beet drill.

If a planter is operated at a maximum speed of 2½ miles per hour, the seed will be more evenly distributed. This was proven conclusively by a recent study made by the Beet Sugar Development Foundation. This study on percent of cell fill in relation to speed showed that, when a planter was driven 2½ miles per hour the cell fill was 112 percent, but as the speed of the planter was increased the percent of cell fill decreased. When the planter was being operated at 5 miles per hour, the percent of cell fill decreased to 82 percent.

A study was also made as to the importance of the use of a new seed plate in comparison to an old one relative to cell fill. In each case the percent of cell fill where the new plates were used was much greater—in some cases as much as 18 percent.

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The size of seed plates in relation to the size of seed used will also determine the percent of cell fill. If a 7 to $9\frac{1}{2}/64$ inch seed is to be planted, a plate with a cell diameter of $11/64$ inch should be used. By using a $1\frac{1}{2}/64$ inch larger cell than your largest seed, you eliminate the danger of damaging your seed germ, and also increase your cell fill.

Seeding rates should be determined by seeds per foot rather than by pounds per acre. In the National Sugar Company territory in southern Colorado, twelve seeds per foot is the recommended seeding rate. This would be equivalent to $6\frac{1}{2}$ pounds to $7\frac{1}{2}$ pounds per acre when 7 to $9\frac{1}{2}/64$ inch seed is used. If this seeding rate is used, loss from frost, insects and seedling diseases will be minimized. Also, better germination will provide a uniform emergence so necessary for the successful use of a mechanical thinner.

Most of the beet planters on the market today will distribute the seeds in a uniform pattern if they are driven at a rate of not more than $2\frac{1}{2}$ miles per hour, if the proper cell plates are used and if the seed bed is in a level, well mulched condition. Bunching of seed and subsequent failure to drop seeds are results of increased speed. This has been proved again and again by tests we have made. In fact, our tests have shown that the total number of seeds in 100 inches of row will decrease as much as 30 percent when the speed is increased from 2 to 4 miles per hour.

Speed is not the only determining factor for uniform emergence as depth of planting is equally important. Many beet growers have a habit of using only one planting depth regardless of time. The average percentage of seedling emergence can be improved if the importance of the planting depth in relation to planting time is stressed (1)².

This past year on the Sugar Company farm at Sugar City the beets were planted with a 6-row Milton hang-on planter. However, some difficulty was experienced in obtaining uniform compaction immediately above the seed; so on one of the units the press wheel brace was extended up 4 inches and the spring tension arm was made 2 inches longer. This lowered the packer wheel $1\frac{1}{2}$ inches; thus the bottom of the packer wheel was only 1 inch above the bottom of the disc opener. One of the dual packer wheels was removed and $1\frac{1}{2}$ inch spacers installed. A drag chain was attached to roughen up the depressions left by the remaining wheel, which ran immediately above the seed row. Following emergence, stand counts were taken. In the one row where increased pressure and the single wheel were used the average stand count was 38 beet-containing inches and in the other five the average stand count was 30. This experimental unit was used on 75 acres of beets and seeds planted with it germinated so much faster than the seeds in the other five rows that this row was used as a guide row for the first cultivation. Our Milton drill set at a depth of $1\frac{1}{2}$ inches was attached to the back cultivator bar and a culro set at the same depth was attached to the front bar. This additional mulching of the ground immediately ahead of the planter was for the purpose of improving the capillary action of the subsoil moisture.

² Numbers in parentheses refer to literature cited.

At the present stage of planter development any of the planters used in our particular locale are adequate if they are properly operated and the seedbed is properly prepared. However, a planter can do no more than place seeds at a fairly uniform depth and at fairly uniform intervals in a seedbed so prepared that it offers an ideal environment for the germinating of every seed unit. The end result is a uniform stand so necessary for successful thinning.

Literature Cited

- (1) MCBIRNEY, S. W.
1948. Improvement of sugar beet seedling emergence by planter development. Proc. Amer. Soc. Sugar Beet Tech. pp. 230-231.