

# Comparison of Methods Employed in the Germination of Beet Seed

R. S. LAMBDIN<sup>1</sup>

During past years a considerable amount of beet seed had been reported as having a rather low germination. In many cases field plantings of this seed produced excellent stands, considerably better than was expected on the basis of the germinations reported. Therefore it seemed advisable to attempt to find methods of testing seed which would more nearly duplicate maximum field emergence in the greenhouse and to compare these tests with those of commercial laboratories.

## Materials and Methods

A medium sandy loam soil was employed in the greenhouse emergence studies. The pasteurizing was sufficient to control all soil-borne disease-causing organisms and to make non-viable any weed seed present. The flats were made of galvanized sheet metal and were 6 inches wide, 8 inches long, and 2 inches deep. An inner removable partition, also of galvanized metal, divided the flat into 100 small rectangular compartments. The partition was only 1 1/2 inches high. Hence, when it was in the flat a 1/2-inch space was left on top to facilitate watering, etc. After the partition was inserted the flat was filled with soil by sifting the damp soil into the compartments through a 1/8-inch mesh hand screen. Enough soil was sifted into the flat to reach the top level of the partition. In order to insure a definite planting depth the soil was packed somewhat by means of a wooden tamper.

The seed tested was taken from commercial lots and the data reported in this article were taken from the tests run on the seed used to plant the 1945 sugar beet crop grown for the Spreckels Sugar Company. A representative 1-pound sample was taken from each lot to be tested. Half of this sample was sent to a commercial seed laboratory for the standard germination tests. Thus the design of the experiment was that of a randomized complete block in which the variability due to differences between samples was controlled. Four hundred seed units were used in the soil tests, one unit being planted in each rectangle of the 4 flats having 100 rectangles each. The seed units were placed on the soil surface and sufficient water was added to bring the soil moisture content up to its water-holding capacity. Then the seed units were covered with screened soil to a depth of 1/2 inch. The flats were covered with burlap and further watering was

<sup>1</sup>Assistant Agricultural Superintendent, Spreckels Sugar Company, Spreckels, Calif.

not necessary until the fifth day. Water was added daily, including the fifth day, until the tenth day when final counts were made. Injured seedlings were not included in the emergence counts.

Both sheared and whole seed were used in the studies.

The analysis of variance was used in reducing the data and any differences discussed in this article will have been found to be statistically significant unless a statement to the contrary is added. Differences giving odds as great as, or greater than, 19 to 1 against the deviations noted being due to chance were considered as statistically significant. The standard errors are given for the averages of table 1.

### Results

The reduced data showing the results of the study are given in table 1. These results are indicative of the necessity of germinating seed under conditions which will bring out more closely the seeds' ability to emerge in commercial field plantings.

Table 1.—Comparisons of germination means at Spreckels and commercial laboratories.

Sheared seed Variety and lot number	Number of tests	Germination percent			Range of germination	
		Spreckels	Commercial laboratory	Difference	Spreckels	Commercial laboratory
U. S. 15-2272A	3	87	76	11	4.50	8.25
U. S. 15-3251	3	83	79	4	1.75	4.00
U. S. 15-3254	4	86	75	11	7.25	5.75
U. S. 15-3280E	4	89	79	10	1.00	5.00
U. S. 15-3280D	20	88	81	7	4.25	8.00
U. S. 15-1008	16	81	66	15	7.00	21.75
<b>Average</b>		<b>85.48±0.528</b>	<b>76.56±0.528</b>	<b>9.92±0.746</b>		
<b>Whole seed</b>	<b>27</b>	<b>80.33±0.562</b>	<b>77.67±0.562</b>	<b>2.66±0.786</b>		

Note: All Spreckels tests were conducted in soil for a 10-day period. Commercial laboratory tests are 14-day tests.

The increased percentage germination in the soil test over commercial tests of 9.92 in sheared seed and only 2.66 for whole seed is to be expected because of the difference of the number of sprouts per seed unit. The sheared seed used in these tests averaged 1.38 seedlings per unit, whereas whole seed will average approximately 2 seedlings per unit.