Inheritance of Bolting Resistance

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A STUDY WAS inaugurated in 1945 by the Spreckels Sugar Company for the purpose of investigating the inheritance of bolting resistance in the progenies of various hybrid crosses. For the purpose of illustration, this report will be confined to a portion of that study in which crosses were made between bolting resistant selections of Improved U.S. 15 and cytoplasmic male-sterile selections of S.L. 5107, a United States Department of Agriculture variety which bolts readily under suitable conditions.

A number of non-bolting selections were made by Dr. LeRoy Powers from a seed field of Improved U.S. 15 growing in Medford, Oregon in 1945. These roots were refrigerated at a temperature of 4 degrees centigrade for approximately 60 days and transplanted into an isolated plot to furnish the male parent for the subsequent crosses of this test. Seed of S.L. 5107 was planted in the isolated plot alongside the non-bolting selections. During anthesis the cytoplasmic male-sterile plants were used as the female parent and the male-fertile plants of S.L. 5107 were rogued out. Controlled pollination crosses were made between these two varieties by means of both paper bags and doubled-cloth sugar bags. In addition, crosses were made within the non-bolting selections and all open-pollinated seed of this strain was saved.

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Table 1.—The percentage of bolters obtained from hybrid crosses.

Progeny	Bolting %
2012—1	23.3
2012—1A	28.5
2012—7	20.4
2012—10	20.4
2012—12	28.4
2012—14	16.4
2012—15	17.4
2012—17	22.7
2012—18	25.3
2012—22	26.7
2012—32	9.5
2012—45	4.9
2012—45A	2.7
2012—51	28.5
2012—52	21.3
2012—66	28.5
2012—67	6.6
2012—69	14.4
Average of progeny	19.2
Average of female parent S.L. 5107 (5 repl.)	58.7
Average of male parent 462001 (35 repl.)	1.6
Average of Improved U.S. 15 (32 repl.)	14.4

A progeny test of the resultant strains from this isolated plot was made in October of 1946 under conditions which were thought to be favorable for bolting. These bolting counts were made the following Spring.

In comparing the bolting percentages of the progeny from the hybrid crosses with the bolting percentages of the parents, it can be readily seen that the progeny all contained the factor for medium resistance to bolting. As a result of this test it would appear that the bolting resistance of the male parent is a dominant characteristic.