

A New Non-Bolting, Curly-Top-Resistant, Sugar Beet Variety, U. S. 75

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Introduction

A variety of sugar beets is needed in California which combines non-bolting with high curly-top resistance. Each of the three principal commercial varieties now in use possesses one or the other of these characteristics, but none is adapted to fall plantings in areas where curly top is severe. The non-bolting U. S. 56/2 variety most nearly meets this requirement, and is widely used for October plantings in the Imperial Valley and for winter plantings in the coastal valleys. Recent date-of-planting experiments demonstrate that sugar beets could be planted still earlier in the Imperial Valley if a variety were available with the bolting resistance of U. S. 56/2 and the curly-top resistance of U. S. 22/3. Such a variety is also needed for fall plantings in the central valley and for late fall and early winter planting in those sections of the coastal valleys subject to curly top.

This paper describes the new U. S. 75 variety which offers promise of fulfilling these needs.

Origin of U. S. 75

The U. S. 75 variety is the product of cooperative breeding research involving the U. S. Department of Agriculture, the Curly Top Resistance Breeding Committee and the Spreckels Sugar Company. In 1946, Dr. Leroy Powers, plant breeder for the Spreckels Sugar Company, made a non-bolting selection from U. S. 22/3 at Salinas, California. Seed was produced from the selected mother beets in 1947, and a portion of it was assigned the government designation, SL 731. Tests completed in the spring of 1948 showed that an improvement had been made in both bolting and downy-mildew resistance. A second mass selection was made in August, 1948, from a September, 1947, planting of SL 731 at Salinas, California. A total of 44 mother beets was selected on the basis of bolting resistance and high refractometer readings, and planted as a group in an isolation plot. Of these, 33 survived and produced seed which was assigned the number, C975. Increases of this seed were made at Medford, Oregon, and gave rise to the variety, U. S. 75.

Results with U. S. 75

Bolting

Replicated plantings of U. S. 75 and other non-bolting varieties were made in September, 1949, and 1950 at Salinas, California. The results are shown in Table 1 and Figure 1. U. S. 75 proved to be similar in bolting resistance to U. S. 56/2. It was significantly more non-bolting than U. S. 15.

Curly Top

Comparisons of the curly-top resistance of U. S. 75 with those of U. S. 22/3 and other commercial varieties were made at Jerome, Idaho, in 1950

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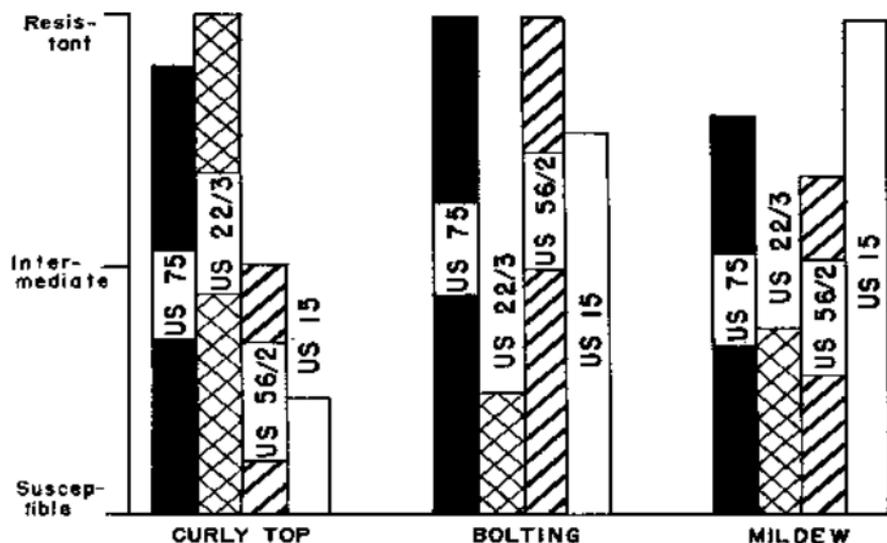


Figure 1. The relative resistance of four sugar beet varieties to curly-top, bolting and downy mildew. In making this graphic comparison, the most resistant variety has been represented as resistant, even though a higher degree of resistance may be obtained through breeding.

and 1951 by Albert M. Murphy, agronomist with the Division of Sugar Plant Investigations. The results in Table 1 and Figure 1 showed that the resistance of U. S. 75 approached that of U. S. 22/3 which is the most highly-resistant of our commercial varieties. U. S. 75 was more resistant than either U. S. 56/2 or U. S. 22/2.

Downy Mildew

Tests were made in field plots under conditions favorable for mildew during the springs of 1950 and 1951. In 1950, the environmental condi-

Table 1.—A Comparison of the Bolting, Mildew, and Curly-top Resistance of U. S. 75 with the Resistance of Commercial Varieties.

Variety	Bolting		Mildew		Curly Top ¹	
	1950	1951	1950	1951	1950	1951
	(%)	(%)	(%)	(%)	(Grade) ²	(Grade)
U. S. 75	39	50	31	34	1.9	1.8
U. S. 15	66	78	21	36	— ³	—
U. S. 56/2	39	59	41	49	2.8	2.5
U. S. 22/2	—	—	—	—	2.5	2.2
U. S. 22/3	—	95 ⁴	50	42	—	1.0
Sig. Diff. (Odds 19:1)	10	7	5	6		

¹ Curly-top data courtesy Albert Murphy, Twin Falls, Idaho.

² Curly-top grades range from 0 = No curly top to 5 = Severe curly top.

³ U. S. 15 had a grade of 4.0 in 1949.

⁴ Not replicated.

tions were especially favorable for infection at thinning time, and for about a month following thinning. In 1951, the heaviest infection occurred between emergence and thinning. Counts were made when the plants were about six weeks old, and the results are shown in Table 1 and Figure 1. U. S. 75 was significantly more resistant than either U. S. 22/3 or U. S. 56/2 in both 1950 and 1951. Inasmuch as the incidence of mildew is influenced both by the environment and by the age of plants at the time of the infection, additional tests will be required to definitely establish the relative resistance of U. S. 75.

Table 2.—Comparison of the Acre Yield and Sucrose Percentage of U. S. 75 with Those of Commercial Varieties at Salinas and Shafter, California.

Variety	Salinas December 1949 Planting		Shafter March 1950 Planting		Shafter November 1950 Planting	
	Yield (Tons)	Sucrose (%)	Yield (Tons)	Sucrose (%)	Yield (Tons)	Sucrose (%)
U. S. 75	25.5	14.07	38.2	11.96	45.2	10.95
U. S. 15	23.5	14.82	..	.....	13.6 ¹	11.91
U. S. 56/2	24.7	14.38	..	.....	45.5	11.50
U. S. 22/3	....	.....	37.2	11.99	.....	.....
Sig. Diff. (Odds 19:1)	3.1	.94	2.9	.51	4.0	.50

¹ Severely damaged by curly top.

Yield and Sugar Content

The yielding ability of U. S. 75 was determined in a 1950 test at Salinas, California, and in 1950 and 1951 tests at Shafter, California. The results in Table 2 showed that U. S. 75 may be expected to produce a yield of gross sugar similar to that of our present commercial varieties. A tendency existed for U. S. 75 to have a slightly lower sucrose percentage than either U. S. 15 or U. S. 56/2.

Conclusions and Summary

A new, non-bolting, curly-top-resistant, sugar beet variety designated U. S. 75 is being released for stock seed production. The variety has been developed by selection from the U. S. 22/3 variety.

Tests conducted during 1950 and 1951 demonstrate that U. S. 75 is similar to U. S. 56/2 in bolting resistance, approaches U. S. 22/3 in curly-top resistance, and is superior to U. S. 22/3 in mildew resistance. Yield trials have been promising, but have not been extensive enough to warrant recommending the variety for widespread commercial planting.

U. S. 75 is recommended for extensive trials in those districts where fall plantings are made under conditions favorable for curly top.