Sugarbeet Variety Test at the Mesa Farm

John Nelson
University of Arizona

Summary

Amstar Spreckels' experimental line H79290 has produced outstanding root yields and sucrose percentages in tests conducted the past two seasons.

Introduction

Sugarbeet variety improvement in the United States is a cooperative undertaking of the sugarbeet industry, the U. S. Department of Agriculture and the State Agricultural Experiment Stations. In Arizona, the Agricultural Experiment Station does not conduct breeding work on sugarbeets. However, the University of Arizona has cooperated with Spreckels Sugar Division of Amstar Corporation and other sugar companies since 1968 in testing lines and hybrids that may have potential for central Arizona.

Much progress has been made by breeders in developing varieties that are better adapted to central Arizona conditions. In the late 1960's sugarbeet production in Arizona was seriously hampered by diseases commonly known as virus yellows. Yields were greatly improved by the release of US H9B, a hybrid with moderate virus yellows resistance. Tests at the Mesa Farm showed that this hybrid would outyield varieties without yellows resistance by 2 to 6 tons per acre. More recently, hybrids have been developed that have Erwinia rot resistance and bolting resistance. Bolting resistance is of particular importance to growers in central Arizona, since varieties for use in this production area must have a higher level of bolting resistance than those of most other growing areas because of the winter season. Several hybrids have been developed that have excellent bolting resistance and appear superior to S-445H in yield characteristics. Currently, Amstar Spreckels is testing several experimental lines that appear to be superior in root and sugar yield to varieties now being used commercially.

The entries in this year's test are limited to Amstar Spreckels' lines and hybrids. The test was planted 12 September 1980 and harvested 24 June 1981. The characteristics of each entry are given in Table 1.

Results

Sugar yields, root yields, sucrose percentages and bolting percentages are shown in Table 2. The experimental line, H79290, produced a significantly higher root yield than the commercial variety S-445H but not SS-E1 or Sp USH9B. There were no significant differences among entries in sucrose percentages or sugar yields. No bolters were observed in this test.

H79290 has produced excellent root yields the past two growing seasons (Table 3). In addition, the sucrose concentration in roots of H79290 has been as high or higher than that of the standard commercial varieties. More information is needed on the bolting characteristics of this experimental line, but it is expected to have adequate bolting resistance for central Arizona. The past several winters have been unusually mild making it difficult to screen varieties for bolting resistance.

Table 1. Characteristics of Entries in Variety Test

Entry	Characteristics
SS-E1	Commercial variety, ERR*
Sp USH9B	Commercial variety, ERS
S-445H	Commercial variety, VNB
SS-X912T	Semi-commercial variety, NB, winter growth type
SS-X411NB	Experimental, VNB, fair CTR
SS-X815E	Experimental, VNB, CTR, ERR, some PMR
H79290	Experimental, high yield and % S
H80160	Experimental, CTR
H80157	Experimental, NB
H80174	Experimental
H80181	Experimental
H79331	Experimental

*ERR = Erwinia rot resistant, ERS = Erwinia rot susceptible, VNB = very non-bolting, NB = non-bolting, CTR = curly top resistance, PMR = powdery mildew resistant

Table 2. Sugarbeet Variety Test, 1980-81, U of A Mesa Farm

Variety	Acre Yield			
	Sugar (Tons)	Roots (Tons)	Sucrose %	Bolters %
H79290	7.36 a*	40.2 a	18.38 a	0
SS-X815E	6.79 a	37.2 ab	18.28 a	0
Sp. H9B3	6.76 a	38.2 ab	17.74 a	0
H80160	6.72 a	36.2 ab	18.54 a	0
SS-X912T	6.69 a	38.1 ab	17.62 a	0
H79331	6.62 a	36.4 ab	18.20 a	0
H80174	6.55 a	35.3 ab	18.56 a	0
H80157	6.50 a	35.3 ab	18.44 a	0
SS-X411NB	6.44 a	35.1 ab	18.36 a	0
SS-E1	6.36 a	35.0 ab	18.22 a	0
S-445H	6.20 a	33.6 b	18.48 a	0
H80181	6.07 a	33.9 b	17.96 a	0

*Means followed by the same letter are not significantly different at the 5% level according to Student Newman-Keuls' test.

CROP HISTORY: Previous Crop: Small grains. Planting Date: Sept. 12, 1980. Row and Plant Spacing: 30 inch, single row beds, plants thinned to 10 inches apart. Fertilizer: 200 lbs/A of 16-46-0 preplant and 70 lbs/A of N on Dec. 18, 1980. Plot Size: Single row plots 20 feet long, replicated 5 times. Harvest Date: June 24, 1981.

Table 3. Two Year Averages of Root Yields, Sugar Yields and Sucrose Percentages for a High Yielding Experimental Line and Three Commercial Hybrids*.

Variety or Line	Root Yield (T/A)	Sugar Yield (T/A)	Sucrose (%)
H79290	40.5	7.10	17.6
SS-E1	37.5	6.11	16.5
Sp. US H9B	36.5	5.97	16.3
S-445H	33.2	5.66	17.2

*Values are averages of data from tests in 1979-80 and 1980-81 seasons.

Effect of Planting Date, Variety and Preharvest Dryup on Late Season Sugarbeet Production

John Nelson
University of Arizona

Summary

Several cultural factors were studied to determine their effect on late season sugarbeet production in central Arizona. As in previous tests, September planted beets gave higher yields than those planted in October or November, when harvest was in July or August. During the period 9 July to 11 August sucrose percentages decreased an average of 1.2 percentage points, resulting in lower sugar yields. Age of the planting did not appear to have an effect on late season stand losses. The variety SS-E1 produced higher yields and had lower stand losses than S-445H. The length of the preharvest dryup period had no measureable influence on late season production. A 60 percent reduction in leaf area occurred between 14 May and 14 July.