

Sugarbeet Variety Tests at the Mesa Farm

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Sugarbeet production in Arizona has been hampered by a number of problems. One of the most serious of these problems in terms of yield reductions has been the virus yellows diseases. The most promising means of control of the virus yellows diseases has been through varietal resistance, although the incidences of these diseases may be reduced by proper clean-up of "keeper beets" and "weed beets" and the use of a beet-free period. For the past several seasons all commercial acreage has been planted with US H9B a hybrid (developed by the U. S. Department of Agriculture) containing moderate yellows resistance.

Another problem more peculiar to Arizona's fall-planted beets is bolting or the production of seed stalks. In Arizona, bolting can be a major problem when prolonged periods of cold and cloudy weather occur in the winter or spring. A high percentage of bolters can result in reduced yields and sucrose percentages. Bolting is also objectionable for a number of other reasons such as: seed from bolters can produce "weed beets", pollen may be carried by wind to seed fields and the roots of bolters are sometimes more woody than normal making slicing more difficult. The present commercial variety, US H9B, does not contain adequate bolting resistance for central Arizona.

Considerable effort (by breeders) is also being directed toward developing varieties that have greater curly top and rot resistance as well as improved yield and quality characteristics.

A variety testing program was initiated at the Mesa Farm in 1968 to evaluate, under central Arizona conditions, new lines and hybrids developed by the sugar companies, the U. S. Department of Agriculture and state agricultural experiment stations. The results of tests conducted the past two seasons are reported here.

In the 1974-75 and 1975-76 seasons, variety tests were planted on two dates, late-September and mid-October, and were harvested on the same date. Twelve lines and hybrids were evaluated in each test. The source of each entry in the tests is given in Table 1.

Results

Sugar yields, root yields, sucrose percentages and bolting percentages for entries in the tests are shown in Tables 2-5. In all tests, US H9B1, the current commercial hybrid, was near the top in sugar yield. However, when conditions are favorable for bolting, as in the 1974-75 September test, US H9B1 produces more bolters than is desirable. The newly introduced Spreckels hybrid, S-445H, contains excellent bolting resistance but gave somewhat lower yields in the 1975-76 tests when conditions were unfavorable for bolting. In general, hybrids provided by Great Western Sugar Co., American Crystal

Co. and Betaseed Inc. do not have adequate bolting resistance for central Arizona. There is the possibility that a hybrid with less bolting resistance than is required for early planting might be adapted to late planting.

Table 1. Source of Entries in Variety Tests.

Entry	Source	Entry	Source
Sp. US H9B1	Amstar Spreckels	H74249	Amstar Spreckels
US H9B1	"	H74252	"
US H10B1	"	Mono-H _y D ₂	Great Western
S-301H8	"	G.W. H66-73R	"
S-445H	"	S70-110	American Crystal
H72194	"	S72-301	"
H73209	"	S72-320	"
H73211	"	S72-381	"
H74162	"	Betaseed 93	Betaseed Inc.
H74205	"	Betaseed 1224	"
H74236	"		

Table 2. Variety Test Planted September 1974.

Variety	Acre Yield		Sucrose %	Bolters %
	Sugar Tons	Roots Tons		
Sp. US H9B1	5.45 a*	34.8 a	15.8 a	22
US H9B1	5.38 a	34.0 ab	16.0 a	29
S-445H	5.27 ab	33.0 abc	16.2 a	5
US H10B1	5.12 abc	33.0 abc	15.6 a	23
H73209	5.10 abc	33.4 abc	15.4 a	16
H73211	4.91 abcd	30.4 bcd	16.3 a	15
H72194	4.74 bcd	29.8 cd	16.0 a	17
S-301H8	4.59 cd	27.9 de	16.5 a	5
G.W. H66-73R	4.41 de	28.1 de	15.7 a	39
Mono-H _v D ₂	3.98 ef	25.7 e	15.6 a	95
Betaseed 93	3.48 fg	21.8 f	16.1 a	92
Betaseed 1224	3.27 g	19.3 f	17.0 a	51

*Values followed by the same letter are not significantly different at the 5% level according to Duncan's Multiple Range Test.

CROP HISTORY: Previous Crop: Fallow. Planting Date: Sept. 20, 1974.
Row and Plant Spacing: 30 inch, single-row beds, plants thinned to 9 inches apart. Fertilizer: 150 lbs/A of 14-45-0 preplant and 70 lbs/A of N on 1/24/75. Harvest Date: 6/18/75. Plot Size: Single row plots 20 feet long, replicated 6 times.

Table 3. Variety Test Planted October 1974.

Variety	Acre Yield		Sucrose %	Bolters %
	Sugar Tons	Roots Tons		
US H9B1	4.77 a*	37.6 ab	12.7 a	1
Sp. US H9B1	4.69 a	38.1 a	12.4 a	5
US H10B1	4.46 ab	33.8 bcde	13.2 a	2
H72194	4.46 ab	34.9 abc	12.8 a	5
S-445H	4.43 abc	32.1 cde	13.9 a	0
H73209	4.27 abcd	34.2 abcd	12.5 a	2
H73211	4.07 bcd	30.9 cde	13.2 a	2
S-301H8	3.89 cde	30.3 def	12.9 a	2
G.W. H66-73R	3.83 de	30.0 ef	12.8 a	11
Mono-H ₂ D ₂	3.44 ef	26.7 fg	12.9 a	52
Betaseed 1224	2.98 fg	23.0 h	13.1 a	19
Betaseed 93	2.93 g	23.3 gh	12.6 a	56

*Values followed by the same letter are not significantly different at the 5% level according to Duncan's Multiple Range Test.

CROP HISTORY: Previous Crop: Fallow. Planting Date: Oct. 11, 1974.
Row and Plant Spacing: 30 inch, single-row beds, plants spaced 9 inches apart. Fertilizer: 150 lbs/A of 14-45-0 preplant and 70 lbs/A of N on 1/24/75. Harvest Date: 6/18/75. Plot Size: Single row plots, each row 20 feet long, replicated 6 times.

Table 4. Variety Test Planted September 1975.

Variety	Acre Yield		Sucrose %	Bolters %
	Sugar Tons	Roots Tons		
H74205	4.68 a*	27.5 a	17.0 d	0
H74252	4.51 a	25.1 ab	17.9 ab	2
H74249	4.40 a	25.1 ab	17.5 abcd	1
US H9B1	4.40 a	24.6 ab	17.9 ab	1
H74162	4.24 ab	23.7 b	18.0 ab	0
S-301H8	4.18 abc	24.0 cd	17.4 bcd	1
S70-110	4.13 abc	24.4 ab	16.9 d	4
S-445H	4.07 abc	23.3 bc	17.5 abcd	0
S72-381	4.07 abc	22.9 bc	17.7 abc	14
S72-301	3.63 bcd	20.0 cd	18.2 a	11
S72-320	3.58 cd	20.0 cd	17.9 abc	35
H74236	3.25 d	18.9 d	17.2 cd	1

*Values followed by the same letter are not significantly different at the 5% level according to Duncan's Multiple Range Test.

CROP HISTORY: Previous Crop: Fallow. Planting Date: Sept. 25, 1975.
Row and Plant Spacing: 30 inch, single-row beds, plants spaced 9 inches apart. Fertilizer: 200 lbs/A of 11-48-0. Harvest Date: 6/18/76. Plot Size: Single row plots, each row 20 feet long, replicated 6 times.

Table 5. Variety Test Planted October 1975.

Variety	Acre Yield		Sucrose %	Bolters %
	Sugar Tons	Roots Tons		
S70-110	4.07 a*	25.5 a	15.8 a	0
US H9B1	3.85 ab	24.3 ab	15.9 a	0
S72-381	3.74 ab	23.1 abc	16.4 a	1
74249	3.69 abc	23.0 abc	16.0 a	0
74162	3.69 abc	22.1 bcd	16.6 a	0
S-301H8	3.63 abc	22.5 abcd	16.1 a	0
74205	3.52 abcd	22.3 bcd	15.9 a	0
S72-301	3.52 abcde	19.7 de	17.0 a	1
S-445H	3.41 bcde	20.5 cde	16.6 a	0
74252	3.19 cde	19.8 de	16.3 a	0
S72-320	3.08 de	18.2 e	16.8 a	0
74236	3.03 e	19.8 de	15.4 a	0

*Values followed by the same letter are not significantly different at the 5% level according to Duncan's Multiple Range Test.

CROP HISTORY: Previous Crop: Fallow. Planting Date: Oct. 15, 1975.
Row and Plant Spacing: 30 inch, single-row beds, plants spaced 9 inches apart. Fertilizer: 200 lbs/A of 11-48-0. Harvest Date: 6/18/76. Plot Size: Single row plots, each row 20 feet long, replicated 6 times.