

## Agronomic Research on Sugarbeet Culture at Marana

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### Summary

Sugarbeet research conducted at Marana from 1965-69 to provide information on planting dates, harvest dates, varieties and nitrogen fertility is discussed.

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Research was initiated at the University of Arizona Marana Farm in 1965 to study the culture of sugarbeets in the Marana area. Marana, at an elevation of 1900 feet, appeared to have potential as a commercial growing area if a crop could be produced for an August or fall harvest. An August harvest at Marana could have been used to extend the central Arizona campaign two weeks to a month, depending on the acreage available. A fall harvest could have provided beets for processing before the crop in southeastern Arizona was ready for harvest. Research at Marana included tests comparing planting dates, harvest dates, varieties and nitrogen (N) fertility levels.

### Date of Planting Tests

February and March planting dates were compared in 1965. Sugarbeets were planted on 40-inch, double-row beds and portions of the planting were sampled for root yield in July, August and September. Root yields in the February planting increased from 26 tons per acre in July to 42 tons per acre in September (Table 1). The March planting produced about 10 tons per acre less roots than the February planting on each harvest date. The physical condition of the roots was good on all harvest dates. The sucrose content of beets in both plantings was less than 12 percent throughout the harvest season.

In the 1965-66 season, an October planting was compared with a spring planting. An October planting date was tested because it would provide a longer growing season than winter and spring plantings. The plantings were not fertilized with N in an attempt to improve sucrose content. Beets planted in March grew very slowly during the spring and summer and yielded less than 10 tons of roots per acre in August (Table 1). Virus yellows symptoms were observed in the March planting early in the growing season. The October planting produced over 25 tons of roots per acre in July. However, yields did not increase during the summer and were slightly lower in September. There was a high incidence of rot in both plantings resulting in loss of stands. Sucrose content was low even though no N fertilizer was supplied.

In 1969, several sugarbeet varieties were planted in February and harvested in September and October to determine the feasibility of a fall harvest campaign in the Marana area. Acceptable root yields were obtained on both harvest dates (Table 2). However, root yields and sucrose content decreased slightly between harvest dates. Root rots were observed as early as July and stand losses were greatest in August and early September.

In these tests, sugarbeets planted in the fall or winter at Marana performed better than those planted in the spring. It appears that it will be difficult to consistently produce good sugar yields when harvest is in August or September. Heavy rainfall and high temperatures that commonly occur during the summer months provide favorable conditions for rot. In addition, quality of the crop tends to decline during the summer.

### Nitrogen Fertility Tests

Sucrose content of sugarbeets grown in test plots at Marana was generally very low. Studies were conducted in 1967 and 1968 to determine if sucrose content could be increased through better management of N fertilizer.

In 1967, beets were planted in February and harvested in July, August and September. Plots were sidedressed with 0, 100 or 200 lbs of N per acre when plants were at the two to three true leaf stage. Irrigation frequency was reduced in the summer months in an effort to reduce the incidence of rots. Over 20 tons of roots per acre were produced by July (Table 3). However, there was only a small increase in root yield from July to August. The physical condition and quality of the crop declined during the summer. This was largely the result of damage from crown and root rots. Regrowth of diseased plants in late August increased yield but reduced sucrose content. Supplemental N at the rate of 100 lbs per acre gave the highest root and sugar yield in July. Beets receiving no N fertilizer had the highest sucrose content. Petiole analysis indicated that even when no N fertilizer was supplied, the beets were not deficient in N at harvest.

In 1968, three N fertility levels were compared at a location on the Marana Farm expected to have a low level of residual soil N. Beets were planted in February and sidedressed in April with 0, 100 or 200 pounds of N per acre. Root yields were low for both July and September harvest dates, but did increase during the summer (Table 3). Crown and root rots that reduced stands in previous summers were

not a problem in this test. There were no differences among N fertility levels in root yield; however, beets receiving no N fertilizer had the highest sucrose content. Sucrose percentages were higher than in previous tests and showed an increase from July to September.

The low sucrose content of beets in tests at Marana can be partly attributed to high residual soil N in the test plot area. Most land available for sugarbeet research had been previously planted to cotton and was high in residual N. Also, winter planted beets were generally growing rapidly when harvested, a condition not favorable for sucrose accumulation. Summer rains tended to increase the problem by leaching N from the upper portion of the beds into the root zone.

Table 1. Planting and harvest date tests at Marana in 1965 and 1965-66 seasons.

1965		Harvest date					
Planting date	July 21		August 17		September 14		
	Root yield (T/A)	Sucrose content (%)	Root yield (T/A)	Sucrose content (%)	Root yield (T/A)	Sucrose content (%)	
February 3	26.1	11.8	35.2	11.0	42.0	11.6	
March 23	--	--	25.4	10.6	30.3	11.4	

  

1965-66		Harvest date					
Planting date	July 27		August 17		September 18		
	Root yield (T/A)	Sucrose content (%)	Root yield (T/A)	Sucrose content (%)	Root yield (T/A)	Sucrose content (%)	
October 19	25.4	11.1	26.8	11.6	21.9	12.2	
March 17	--	--	9.3	--	--	--	

Table 2. Variety and harvest date test at Marana in 1969.

Variety	Harvest date			
	September 3		October 7	
	Root yield (T/A)	Sucrose content (%)	Root yield (T/A)	Sucrose content (%)
US H9B	30.3	13.6	29.3	13.6
US H9A	27.9	14.0	24.9	13.6
S-301H8	<u>27.2</u>	<u>13.7</u>	<u>24.0</u>	<u>12.4</u>
Ave.	28.5	13.8	26.1	13.2

Table 3. Nitrogen fertility tests at Marana in 1967 and 1968.

1967		Harvest date								
		July 25			August 17			September 14		
Nitrogen level (Lbs/A)	Root yield (T/A)	Sugar content (%)	Sugar yield (Lbs/A)	Root yield (T/A)	Sugar content (%)	Sugar yield (Lbs/A)	Root yield (T/A)	Sugar content (%)	Sugar yield (Lbs/A)	
0	22.0	13.1	5760	23.9	12.7	6070	29.1	11.5	6690	
100	28.0	12.5	7000	27.3	11.9	6500	30.7	11.6	7120	
200	22.6	11.5	5200	24.7	11.0	5430	29.3	10.4	6090	
LSD.05	3.5	0.7	1080	NS	0.6	NS	NS	NS	NS	

  

1968		Harvest date					
		July 31			September 6		
Nitrogen level (Lbs/A)	Root yield (T/A)	Sugar content (%)	Sugar yield (Lbs/A)	Root yield (T/A)	Sugar content (%)	Sugar yield (Lbs/A)	
0	15.7	11.6	3660	19.1	13.6	5200	
100	17.5	11.4	3980	23.7	12.8	6040	
200	17.1	10.8	3680	20.8	12.1	5020	
LSD.05	NS	0.6	NS	NS	1.0	800	

Effect of Planting Date and Nitrogen Fertility on  
Late Season Sugarbeet Production

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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 November, when harvest was in July or August. Increasing the nitrogen fertilizer application rate resulted in increased root yields but did not appear to have an effect on late season stand losses or losses in leaf area. A 62 percent reduction in leaf area per plant occurred between April 16 and July 12. Stand losses in July and early August were low and were not greatly affected by planting date. It appears that there are many things that can happen to sugarbeets held in the field in July and August and most of them are bad!!

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