

INFLUENCE OF EARLY HARVEST IN MICHIGAN ON SUGARBEET YIELD, QUALITY AND GROWER INCOME

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Introduction:

Sugarbeet yields in Michigan increased by approximately ten tons per acre during the past decade. Michigan Sugar Company has improved factory efficiency and capacity but at a slower rate than sugarbeet yield increases. In order to process the increased sugarbeet yields our Cooperative needs to reduce acreage, increase processing capacity, start slice earlier or finish processing later in the spring. Running the factories into late March or early April is very risky as warming temperatures can cause sugarbeet piles to spoil.

Michigan Sugar Company has increased the capacity of the factories, reduced acreage when necessary and we are processing later in the spring than in past years. However, to maximize income sugar processing needs to begin around September 1st or even earlier if the sugarbeet yield is above normal. Michigan Sugar has developed an early harvest incentive payment program to compensate growers for early harvest and to ensure an uninterrupted supply of sugarbeets after processing begins.

Small plot replicated trials have been conducted in recent years to gain a better understanding of sugarbeet yield and quality levels in our growing region during mid to late August and September.

Procedure:

Five small plot replicated trials were conducted during 2011 and 2012 to evaluate the influence of early harvest on sugarbeet yield, quality and grower income. The trials were located near Bay City and Reese in 2011 and near Bay City, Freeland and Richville in 2012. The harvest dates for the trials were: August 15, September 1, September 15, October 1, October 15 and November 1. A randomized complete block design with 6 replications was utilized at each location. Individual plots were six rows wide and 38 feet long and sugarbeets were grown in 22 inch rows.

The trials were planted with a Monosem six row planter that has been modified for research. Sugarbeet seeds were planted from 0.75 to 1.0 inch deep and were spaced 4.1 inches apart in the row. Trials were planted during the normal planting time but on average our planting dates were about 7 to 10 days later than most grower fields. Sugarbeet varieties with tolerance to Cercospora leaf spot and Rhizoctonia root rot were utilized.

Soil nutrient levels were adequate at each location. Nitrogen and phosphorus were applied 2X2 (2 inches to the side and 2 inches below the seed level) at planting at rates of 40 and 25 lbs active, for nitrogen and phosphorus, respectively. The remainder of the nitrogen was applied at the 4 leaf stage using a fluted coulter applicator. The applicator has coulters that roll between the rows and open a slit about 0.5 to 0.75 inches wide and stream nozzles spray liquid fertilizer into the opening. The nitrogen rate was 70 lbs active following soybeans and 110 lbs active following corn or wheat.

The plots were hand thinned lightly to remove doubles and to ensure that each treatment had similar sugarbeet populations. To control *Rhizoctonia* root rot, Quadris fungicide was applied at a rate of 8 fl oz/A at planting in a 3.5 inch T-Band (after the seed drop and before the seed furrow closed). An additional Quadris application was made at the 8 leaf stage at a rate of 14.25 fl oz/A applied in a 7 inch band over the row. To control *Cercospora* leafspot, 4 fungicide applications were applied following BEETcast spray recommendations. Sugarbeet diseases were not a problem at any of the sites. Weeds were well controlled with four Roundup applications and there were no problems with insects or nematodes.

Sugarbeets were hand harvested, hand topped, cleaned, counted, weighed and processed for quality analysis at each harvest date. The center 2 rows from each 6 row plot were harvested, leaving 4 rows between plots to provide competition for later harvest treatments.

The early harvest incentive program considers the field RST compared to the company average RST and for each harvest date prior to the permanent pile date an adjustment is made to increase the payment. Two additional adjustments that are not part of the early harvest program were figured into the final payment. These were the cost for trucking beets (\$4/Ton) and the value of saved *Cercospora* applications (Aug 15 = \$50, Sep 1 = \$37.50, Sep 15 = \$25 and Oct 1 = \$12.50).

Results and Discussion

The quality of the trials is considered to be good. There were some trials that had problems but they are not included in this summary. Sugarbeets emerged well and an average of 195 sugarbeets per 100 row feet was present at harvest. Weather conditions were near normal during the trial period and sugarbeet yields and quality improved steadily throughout the 78 day harvest period (Table 1).

Harvest Date	\$/Acre	\$/Ton	RSA	RST	Tons/A	% Suc	% CJP
Oct 15	2261.8	73.97	9370.4	289.42	32.46	19.34	95.27
Nov 1	2258.7	67.18	10384.8	290.30	35.83	19.32	95.53
Sep 15	2217.6	86.81	6483.9	244.57	26.58	16.65	95.00
Oct 1	2183.9	82.19	7565.4	272.32	27.88	18.49	94.70
Sep 1	1923.3	85.31	4934.3	212.69	22.99	15.07	93.50
Aug 15	1793.4	83.25	4003.7	181.99	21.60	13.12	93.26
Mean	2106.5	79.79	7123.75	248.55	27.80	17.00	94.54
LSD (P=.05)	72.8	1.79	232.78	5.62	0.83	0.30	0.26
CV	7.7	3.4	7.9	3.5	6.8	2.7	0.6
Trt Prob (F)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Sugarbeet root yields increased from 21.6 ton per acre on August 15 to 35.8 tons per acre on November 1st. Sugar levels improved from 13.1% to 19.3% during the same time period. The influence of early harvest on grower's compensation is also shown in Table 1.

The early harvest payment schedule evened out grower payments to a large degree, despite significant differences in yield and quality. Only sugarbeets harvested on August 15 and September 1 had significantly lower returns to growers. This early harvest incentive plan has been used for the past two seasons and has provided incentive for growers to keep the factories supplied with beets during early harvest. Growers typically like to harvest fields early when disease infestations are building up or when they suspect that a field will not yield well, even if left until late in the season. Diseased sugarbeet fields are good candidates for early harvest because those beets will not store as well in permanent piles.

Information from replicated strip trials conducted by Sugarbeet Advancement has provided information that closely matches the Michigan Sugar Company small plot trial results (data not shown).

The 2011 and 2012 trials were conducted under conditions of normal rainfall and temperatures. Additional harvest date trials will be conducted in the future to develop more accurate information about yield and quality trends during early harvest, including years when weather conditions deviate from normal.