# American Crystal Sugar Company AggNotes

### 445 – Harvest Goals

September 23, 2003

Maximize Yield, Minimize Field Losses and Tare, Optimize Beet Storage

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The harvest of the Red River Valley sugarbeet crop has often been characterized as the single most intense harvest of any crop, in the least time, anywhere in the world. Many areas of the American Crystal growing area have been extremely dry for 6 to 8 weeks or longer. Very excessive delivery of tare has contributed to deterioration of beets during prepile. Tares of 10, 20, 30 and over 40% have been received during prepile. Harvest of the crop to maximize sugar per acre, minimize field loss and put beets in piles (so they will properly store and process well) must be achieved through cooperation of shareholders, the American Crystal Sugar Company Ag Department and harvest crews.

The photograph below (Figure 1) is an actual sample taken off a piler on September 12 with 34.4% tare. Loads with excessive weeds, tare, or frost damage will be rejected during the full stockpile harvest.



Figure 1. 34.4% actual tare sample from 9/12/03 in the Moorhead district. Harvester settings for very dry soil conditions when loading excessive tare. Consider the following situations and suggested harvestor changes to correct beet lifting problems in hard, dry soil conditions:

#### Speed:

• Slow lifter speed down (2 to 4 mph)

#### Depth:

• Dig shallower (1.5" to 3") making small adjustments while monitoring tare.

#### Lifter Wheel:

- Remove close ups/filler wheels
- Adjust pinch point tighter (starting at 1.75")

#### Grabrolls:

- Slow down Grabrolls start with a 50 rpm reduction
- Lower the front of the Grabroll bed
- Raise smooth Grabrolls
- Open Grabrolls (Wider on the pinching side) (Starting point 1.5" tube to tube)

#### Scrub Chain:

• Increase scrub % (Don't exceed a 15% scrub maximum)

Recommended Pinch Point Settings Regardless of Soil Conditions:

Crop Size (150 to 170 Stand)	Avg. Beet wt. (lbs)	Pinch Point Setting
18 to 22 ton	0.9 to 1.2	1 1/2 to 1 3/4 inches
22 to 26 ton	1.1 to 1.5	1 3/4 to 1 7/8 inches
26 to 30 ton	1.3 to 1.7	1 7/8 to 2 inches

Proper Defoliation Pays Large Dividends:

Proper setup and operation of defoliators has not received adequate attention by some shareholders. Payments to shareholders can be dramatically effected due to improper defoliator operation. Defoliator speed of operation has great impact on revenue per ton and per acre.

## Table 1: Effects of Defoliator Ground Speed on Sucrose Content and Beet Payment.Larry Smith, U of MN, 1990.

Defoliator Speed (mph)	Sucrose (%)	SLM (%)	Rec. Sucrose (lb/T)	Revenue (\$/T)*
2	19.66	1.62	360.7	43.48
3	19.40	1.70	353.9	42.16
4	19.12	1.81	346.0	40.65
5	18.90	1.85	340.9	39.64

\* Based on American Crystal payments for 1999 crop.

Crop quality and revenue decreased for several reasons as defoliator ground speed increased. These reasons included:

- Insufficient time for flails to remove petioles as they passed down the row.
- Poor defoliation of small beets close to large ones.
- Bouncing of the defoliator due to field roughness at increased speeds.

Tips For Successful Defoliator Operation:

- Slow down excessive speed is costly, operate at 2-3 mph whenever possible.
- Poorly adjusted and dull scalping knives cause increased yield loss.
- Adjust defoliator settings for each field or variety.
- Don't use all rubber flails after a frost.
- Take time to train defoliator operators thoroughly.
- Change flails as needed they won't last the life of the machine.
- Studded flails may damage beets and increase storage losses.

When Flail Shredder Use is Required:

Use of a flail shredder ahead of the defoliator is recommended whenever the defoliator does an inadequate job of removing all petiole material. This includes:

- Fields with very heavy canopy growth.
- Fields with bad weed infestations.
- When operating defoliators at 4 mph or faster.

• When defoliating after a hard frost.

Benefits of Flail Shredder Use:

- Ability to operate the defoliator to maintain best beet quality.
- Less fuel use with the defoliator tractor.
- Beets store better.
- Factory sugar recovery increased.
- Factory operating costs reduced.
- Much less defoliator repair and maintenance

**Know Your Harvest Loss Level:** Harvesting conditions during the 2003 prepile under extremely dry conditions has presented many challenges in parts of the Red River Valley.

Beet loss is like an iceberg - much of it is under the soil surface so you can't always look behind the lifter and know that you are doing a good job. It's also important to remember that conditions can change from one field to the next and even within a field so the need to adjust your harvest equipment to the conditions at hand is necessary.

Harvest Loss Appraisals Tell The Story:

The harvest loss appraisal technique was developed as a tool for both the grower and agriculturist to use as a method of evaluating what tonnage is actually being left in the field. This quick analysis can and has saved growers hundreds and thousands of dollars by measuring tonnage not going into the truck and allowing for corrective action. One lost two-lb. beet per 10' of row equates to a 2.4 ton/acre loss! It doesn't take much beet loss to add up to big \$'s.

To Conduct a Harvest Loss Assessment:

- Mark Out Sample Area: (22" rows only)
- 4 Row Lifter 4 rows wide x 15' length = 110 sq. ft.
- 6 Row Lifter 6 rows wide x 10' length = 110 sq. ft.
- 8 Row Lifter 8 rows wide x 7 ½' length = 110 sq. ft.
- Clean the area picking up any small pieces of sugarbeet which have been broken off due to the harvester or defoliator. Make a mental note as to beets which have been rolled out by the defoliator. Dig down the rows looking for broken tails remaining in the ground.

- Next, weigh the whole beets and pieces.
- Take the beet weight and divide by 5 to get Tons/Acre Loss. EXAMPLE: a beet weight of 3.25 lbs. / (divided by) 5 = .65 tons/acre loss.

What is an Acceptable Loss?

- 1 ton/acre is HIGH Adjustments recommended.
- 1/2 to 3/4 ton/acre is ACCEPTABLE.
- 0 to  $\frac{1}{2}$  ton/acre is LOW.

In assessing the loss you must take into consideration stand count, variety, weed pressure and disease. Adjustments recommended:

- Defoliator speed, flail height and condition.
- Harvester speed, depth, pinch point, chain speed and ratio, row finders and spacing.

Harvest BMP's Information:

Contact your agriculturist for "The Sugarbeet Harvest" brochure for maximizing On-Farm Profit with proper harvest practices. Frost management strategies listed below are just a small part of the information in this brochure.

Frost Management Strategies for Successful Storage:

One of the greatest threats to successful storage is frost damage to roots before they are stored. During periods of potential frost, rotobeating ahead should be minimized, thus reducing the severity and quantity of frost damaged beets. Foliage has proven to provide a natural barrier to frost conditions, thus providing protection to the crown area just prior to and during periods of the frost. Exposed roots during a frost shutdown, experience a higher degree of frost damage, resulting in a longer shutdown period and potential storage problems. These rotobeating guidelines must be followed to provide an excellent product for storage. Years of experience have shown that roots partially damaged by frost (Fig.9), store better if they are allowed to "heal" before being harvested and placed in storage piles. Frost damaged tissue becomes yellow to light tan and water-soaked. These symptoms are due to rupturing cells. In the event of a frost, beets will be cut at random whenever the air temperature reaches 32° F. If a significant amount of frost is present, i.e., greater than ¼", and/or the air temperature reaches 26° before 5:00 a.m., stockpiling could be terminated. Stockpiling will resume when there is no longer evidence of frost damage in the beet roots delivered.

Each factory district's Agricultural staff has a "shutdown/startup" delivery schedule. These schedules will depend upon logistics and facilities of each factory district and their respective receiving stations.

Cost Savings Opportunity:

American Crystal Sugar Company's Purchasing Department has reached an Agreement with the Grainger Company on a major account contract. Grainger is a major distributor of parts and supplies and has distribution facilities in Fargo and Grand Forks.

Under this Agreement, American Crystal Sugar Company group will receive "credit" for purchases made by employees, shareholders and company personnel increasing the discount level (estimated at 10-15 per cent) for everyone.

Employees and growers can order over 285,000 items or parts on their web site <u>www.grainger.com</u> or by phone 701-282-8908.

The special account for shareholders and employees is set up for Cash or Personal Credit Card terms only. The account 835361528 must be referenced when calling in an order or via the Internet.