

COMPARISON OF TEMPERATURE CHANGES IN DEFOLIATED AND NON-DEFOLIATED SUGARBEETS

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ABSTRACT

It has long been known that warm sugarbeets that go into storage piles will have a higher respiration rate and reduced storability than cool beets. The objective of this study was to determine crown temperature differences between defoliated and non-defoliated beets during the course of a sunny day. Understanding how fast sugarbeets warm after defoliation will help growers understand the need to harvest as quickly as possible after defoliation.

This trial was conducted at the Michigan State University Research farm located in Richville, Michigan. The trial was conducted during early season delivery of beets on October 4, 2011. The day was sunny with no clouds and an initial air temperature at 10:45 a.m. of 57 degrees (F) and peaked at 1:45 p.m. at 72 degrees. Two defoliation timings were compared (10:45 a.m. and 1:30 p.m.) to non-defoliated beets. Digital temperature probes were inserted two inches into the beet crown and two inches into the soil around defoliated and non-defoliated beets. Crown and soil temperature readings were taken every 15 minutes until 3:30 p.m.

Results from the study clearly showed that beets with foliage intact (full canopy) gained temperature slower than sugarbeets that were defoliated. Defoliated beets actually increased temperature faster than the air temperature, indicating that radiant energy (sun) was also heating the crowns. Crown temperatures taken at 2:30 p.m. were higher than ambient air temperature at 74 degrees. Sugarbeets defoliated at 10:45 had increased in temperature 25 degrees by 3:30 p.m. Sugarbeet crowns with foliage intact, increased temperature at about half the rate and were about 13.5 degrees cooler in the same time period. Sugarbeets topped at 10:45 a.m. and 1:30 p.m. both had increased crown temperature at a rate of about 4.9 and 5.5 degrees per hour, respectively, compared to the non-defoliated beets increasing at a rate of 2.5 degrees per hour. Soil temperatures taken at the 2 inch depth were 50 degrees at 10:45 a.m. Soil temperature around the sugarbeets that were defoliated were 65 degrees by 3:30 p.m. Soil temperature around sugarbeets that were not defoliated only increased to 59 degrees.

Results indicate that intact canopies will slow down temperature increases for both sugarbeet crowns and soil. Sugarbeet crowns with tops intact increased in temperature by 2.5 degrees Fahrenheit per hour. When tops are removed from defoliation, crowns increased in temperature about 5 to 5.5 degrees per hour. Radiant heating from the sun can increase beet crown temperatures above ambient air temperatures on full sun days.