

## **Impact of harvest date on sugar beet quality, yield and economic return in Ontario.**

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In 1996 sugar beets returned to Ontario on a trial basis after an absence of almost 30 years. The first true production year was 1997. Many of the current growers have a family history of growing sugar beets. While understanding the limitations of piling yard management, several growers questioned the delivery deadlines claiming that they were forfeiting higher sugar content and economic return. With the advent of the early delivery premium program in Ontario, other growers expressed concern about potential loss of income from early delivery.

The objective of this three-year study was to examine the impact of harvest date on crop quality, both sugar content and juice purity, yields and profitability. Cooperating growers provided the site and planted and managed the crop for fertility, weeds and disease pressure. Replicated field scale strips were harvested from a minimum of two grower fields each of the three years. The harvest schedule was divided to produce an early, a main season and a late harvest sequence. The early harvest corresponds to the third to fourth week of September and would be comparable to the early delivery premium period. The main or commercial harvest aligns with the first week of commercial harvest, usually the second week of October. The late harvest or post commercial harvest was completed either in the last week of October or the first week of November. Over the three years of the study, eight of nine sites were successfully followed through to harvest. The one site was abandoned due to extreme weed pressure and poor emergence.

A significant increase in sugar content was observed on the second and third harvest dates in comparison with the earliest harvest date for all three years of the study. This effect was actually intensified in year three with significant differences in sugar from first to second and second to third harvest date. This effect can attributed to the cool wet weather conditions experienced through much of the growing season. The growing conditions during October were much more conducive to photosynthesis and sugar accumulation.

Clear juice purity was not as consistent in its significance across all plots and all years as sugar content. Results from 1998 and 1999 do show an increase in CJP with time when comparing the first harvest date with the second harvest date, however there is generally no difference with the second compared with the third harvest date. In 2000 the CJP shows a similar trend but it is not significant at the 5% level.

Yield results display more variability. The plot locations that had a greater incidence of *Cercospora* and lost leaf tissue in the early fall, have their highest yields at the first harvest. Yields at these locations drop significantly with time as the disease progressed. Healthy fields however, exhibited rising yields with progressive harvest periods. Five of eight locations have significantly higher yields when comparing second and third harvest dates with the earliest harvest date.

The Michigan Sugar 2000 contract was used to calculate the economic return for this study. A base payment of \$30 was used to calculate dollar return per acre for all years data while the year

appropriate company sugar average and quality adjustment was used. For the early delivery premium the middle of the early delivery premium sliding scale or a payment of \$4 per ton was chosen.

Similar to the yield response observed, the disease affected fields showed a significant drop in profitability with time. These plot locations realized a dollar return per acre of 120 % on average more from the first harvest than the second harvest date. The remainder of the plot locations displayed an increase in return to the grower with time. Based on these grower sites, dollar return pre acre from early delivery premiums and sugar beet yield was 75 to 100 % of the dollar return realized at the middle harvest date.

The study results suggest that the early harvest premiums may not compensate for the reduction in yield and sugar content. The variability in the plot location responses suggest that growers need to know the condition of their crop in order to make informed decisions about early delivery.

However, the results of the study also indicate that early delivery has an important role for growers that have concerns about disease progression, weed levels, rotation options, field access and improvement of factory efficiency by lengthening the campaign. The study also indicates no significant advantage to delaying harvest past the end of October.