# Evaluating Early Planting and Long Season Varieties of Soybeans

## (Final Report)

### Purpose:

Most Ontario growers typically plant soybeans in mid-May. One management strategy that consistently leads to higher yields is early planting. Another strategy could be to plant longer maturing varieties for a given area. With the introduction of CruiserMaxx seed treatment, higher plant populations can often be achieved under more stressful conditions making it possible to plant earlier. This project was conducted to determine if an early planting strategy along with the use of longer maturing varieties can significantly increase yield potential.

The yield response to 3 soybean varieties (per region) was measured at an early planting date (April 15-May 5), a normal planting date (May 6-20) and a late date (May 21-June 5) over the three years of this study (2010-2012). Varieties were chosen over a range of maturities from an adapted variety for that site to varieties that were up to 200 CHU's longer maturing than adapted.

### Methods:

During the three years of this study eight small plot trials were conducted each year in various locations. The trials were conducted at three public research stations and six were conducted by Monsanto Canada Inc. These trials were located near Seaforth, Chatham, Ridgetown, Elora, Kemptville, Ayr, St. Hugues, and Coteau-du-lac. Plots were seeded using 3 varieties, including 1 variety that was planted with and without CruiserMaxx seed treatment. Each variety was planted on 3 planting dates: one early, one normal, and one late planting. These treatments were replicated at least 3 times.

### Results:

The three years of the study experienced very different growing conditions. The 2010 growing season was exceptional; the spring allowed for planting in April under good conditions and the remainder of the season received warm weather and timely rain. The 2011 growing season was unique; the spring was wet, resulting in later than normal planting. Dry weather followed in July, but the remainder of the season was very good with warm temperatures and consistent rainfall. In 2012 planting conditions were excellent for establishing three planting dates. Dry weather followed throughout June and July, but the second half of the growing season was excellent in most areas. Although the various weather circumstances caused some problems in establishing trials within the given planting windows from year to year, and site to site, consistent conclusions could be made from the results of the project.

In 2010 the results were very clear and consistent. There was a significant advantage to planting early. Averaged across all sites there was a 3 bu/ac advantage compared to a normal planting date, and almost 10 bu/ac compared to a late planting. Due to the exceptional growing season, in almost all cases the latest maturing varieties were the highest yielding soybeans at each location. In 2011 the results were affected by late planting conditions in the province. Yield response to planting date varied across varieties and site locations. Generally, the normal planting date and the early date

yielded about the same. In some cases adapted varieties that were seeded early suffered a yield loss compared to normal planting. In some cases late planting yielded the highest. The most likely reason for this is the very dry July and early August experienced in 2011, which meant that beans planted at the normal time were trying to set pods when moisture stress occurred. Later planted beans were still vegetative and so were not as adversely affected by this stress.

In 2012 the results may have been affected by prolonged dry soil conditions during early summer. Planting early generally provided no significant yield gains over the normal planting dates. It did, however, provide consistent and significant yield gains over late planting with all varieties. This demonstrates that there are fewer disadvantages to planting early, but major yield losses can be incurred when planting late.

**Figure 1. Average Planting Date Yield across all Varieties**

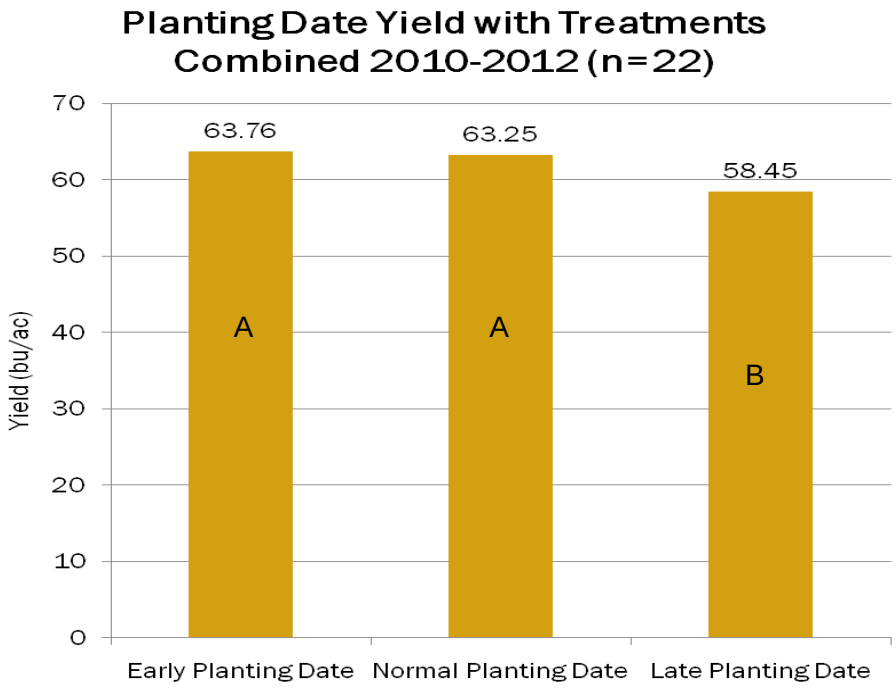



Figure 1, above, shows that there was no significant difference between early and normal planting dates across all varieties. It is also important to understand that this means it is not as “risky” to plant in the early planting window as might have been previously expected. There is a significant difference across all varieties with planting in the late window; planting late lead to significantly lower yields, with losses an average of over 5 bushels per acre.

The effect of seed treatments in this experiment was significant, especially at the late planting date. On average, across all planting dates, the average yield gain was 1.2 bushels per acre; while the yield advantage to seed treatments at late planting was 2.4 bushels per acre.

**Figure 2. A Yield Comparison of a Normal Planting Date with an Adapted Variety versus an Early Planting Date with a Long Season Variety at 22 Locations (2010-2012)**

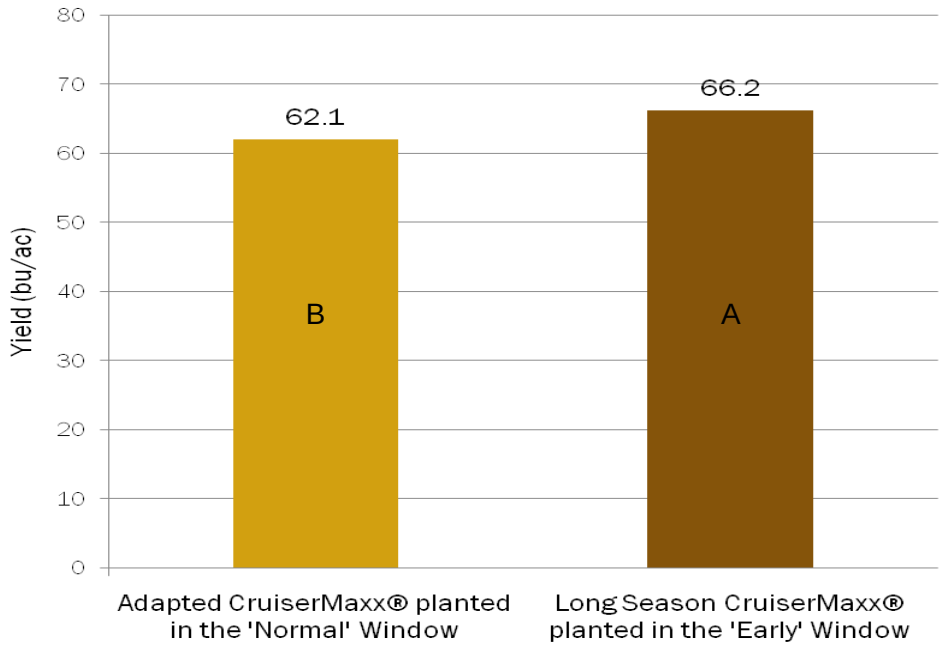
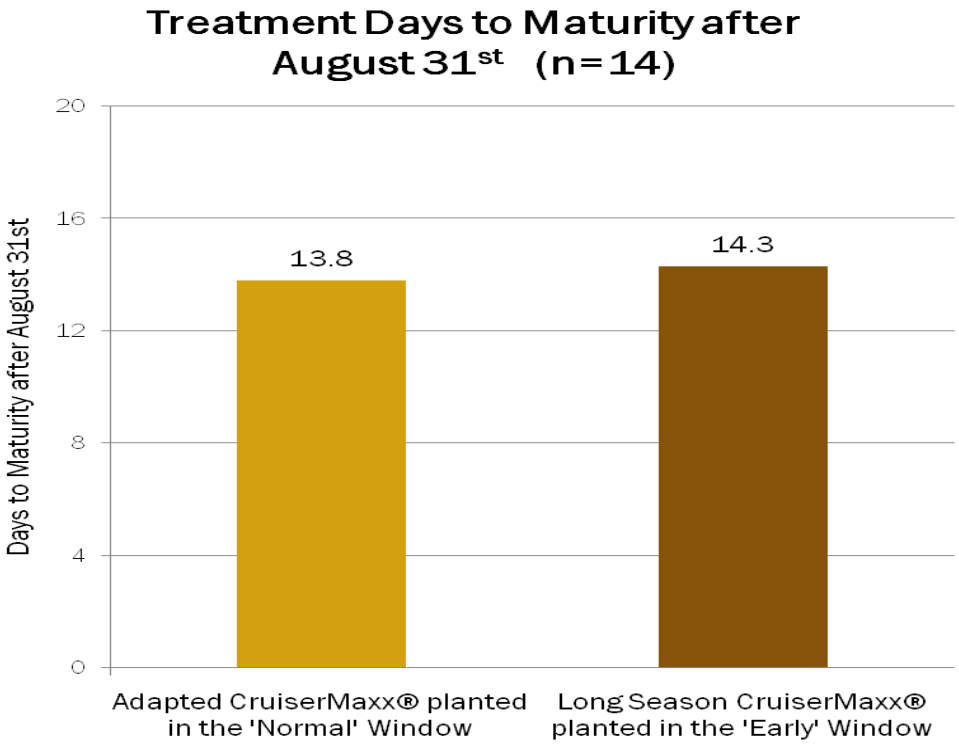



Figure 2, shows the “traditional” scenario versus the “experimental” scenario. The traditional scenario, which would be typical for most Ontario soybean production, is to grow a variety of soybean that is adapted to the relative maturity of their area and plant in the “normal” planting window between May 6 and May 20. The experimental scenario was to grow a soybean variety that was one full relative maturity longer (+200 CHU), and plant in the early planting window (April 15 and May 5). The results show that there was a significant yield increase when planting a later maturing soybean early versus an adapted soybean planted in the normal window. A yield gain of over 4 bushels per acre was realized. The difference grows even larger when comparing later maturing varieties planted early to adapted varieties planted in the late window, with an average yield improvement of over 10 bushels per acre. This demonstrates that this management scenario could be an effective way of improving soybean yields in Ontario.

There was a concern that planting later maturing soybean varieties would complicate wheat planting as a result of a later than normal soybean harvest. Figure 3 shows that in the scenario comparing the “traditional” scenario versus the “experimental” scenario, the difference in days to maturity was minimal at only 0.5 days. The ability to gain yield, while not delaying wheat planting, will be appealing to many grain producers in Ontario, and makes this management strategy more of a viable option.

**Figure 1. Planting date trial at Chatham location, June 2010.**

**Figure 3. Days to Maturity Comparison between Normal Planting Date Of Adapted Varieties and Early Planting Date Of Long Season Varieties (2010-2012)**



## Summary:

1. An early plating date had an advantage over a later planting date in most cases. Averaged across all three years of the study, delaying to plant for 30 days cost an average of 5.3 bu/ac. This is a significant difference in yield considering it costs nothing to plant early.
2. On average the longest day varieties yielded more than the adapted varieties.
3. Some varieties show greater yield gains than others with an early planting date. Planting a late maturing bean in June caused significant yield reductions, in most years, and is not recommended.
4. The effect of seed treatments in this experiment was significant, especially at the late planting date. On average, across all planting dates, the average yield gain was 1.2 bushels per acre; while the yield advantage at late planting was 2.4 bushels per acre.
5. A shift in management from planting adapted soybean varieties in a normal planting window to a longer maturity soybean variety planted in an early window resulted in yield gains of 4.1 bu/ac on average.
6. Planting a longer maturity soybean variety in an early window only delays maturity by half a day over an adapted variety planted in a normal window. This would have little impact on winter wheat planting timing.

## Next Steps:

This was the final year of this project (2010-2012). The findings of this project will help to generate recommendations for ideal soybean planting dates and crop heat unit (or relative maturity) variety selections for Ontario soybean producers.

## Acknowledgements:

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