Reducing Soybean Seed Costs Through Lower Seeding Rates (2006 Interim Report)

Purpose:

This study was designed to determine the most profitable soybean seeding rate in solid seeded (7.5") and intermediate (15") row widths for various CHU regions, soil types, and planting dates.

Current Ontario Ministry of Agriculture Food and Rural Affairs (OMAFRA) seeding rate recommendations are based on research conducted with conventional varieties, untreated seed, and with less precise planting equipment than is now available. Current OMAFRA seeding recommendations are:

225 000 seeds/acre in 7.5 inch rows,
200 000 seeds/acre in 15 inch rows,
170 000 seeds/acre in 22 inch rows,
160 000 seeds/acre in 30 inch rows.

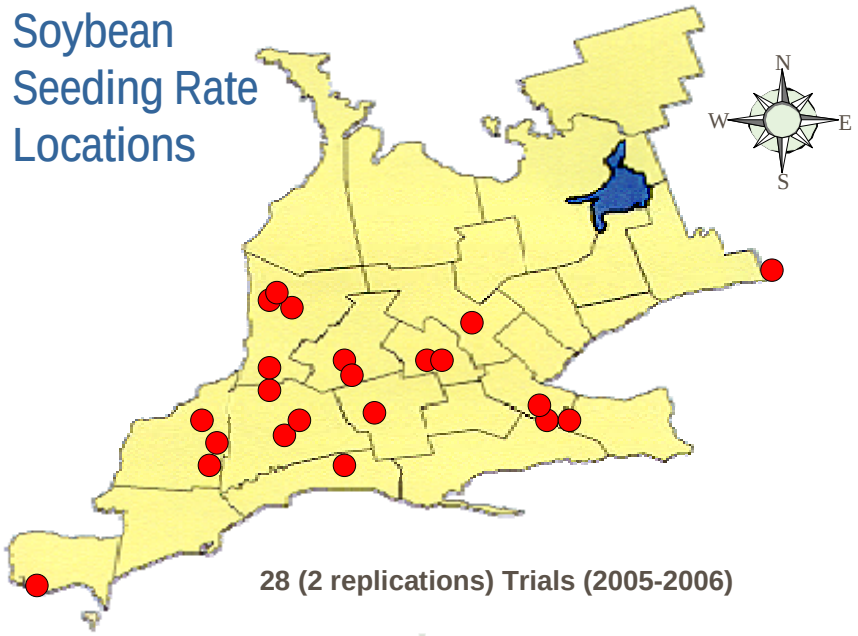
If recommended seeding rates could be reduced (for example from 225 000 to 200 000 seeds/acre in 7.5 inch rows) while still achieving maximum yields, a significant savings could be realized. This reduced seeding rate would represent a savings of approximately $5.92 per acre, assuming a $32.00 per unit cost for glyphosate tolerant seed with 2700 seeds/pound. If a producer could switch from 7.5 inch rows to 15-inch rows, that producer could potentially save $11.84 per acre in seed costs (reducing seeding rates from 225 000 to 175 000 seeds per acre). At present, little Ontario field scale data is available on which to base seeding rate recommendations when taking into account new technology such as glyphosate tolerant varieties, seed treatments, and better planting equipment. These innovations have significantly changed the potential of soybean seed, making the study of lower seeding rates necessary.

Methods:

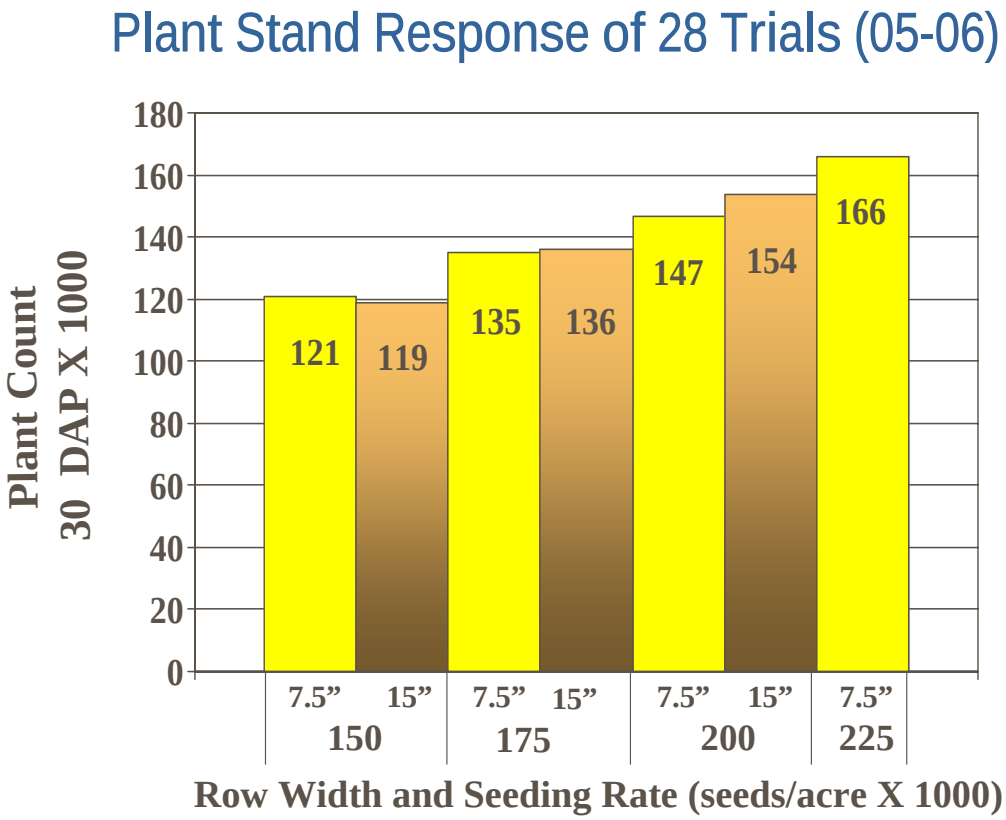
This project compared plant stands and final yields of 7.5 inch rows compared to 15 inch rows at various seeding rates, soil types, and planting dates. Trials did not include wider row widths because most Ontario producers use row widths of less than 20 inches. Each treatment was 20 feet wide with a minimum length of 1200 feet. Most sites were field length strips (>1500 feet). In total, 12 sites were harvested in 2005 and 16 in 2006, with a minimum of two replications per site. Most of the sites were no-till soybeans following corn, although some sites were soybeans following soybeans. At three of the sites each year, two different planting dates were seeded. The two planting dates included the ideal planting date (May 5-25) and a late planting date.

Treatments included:

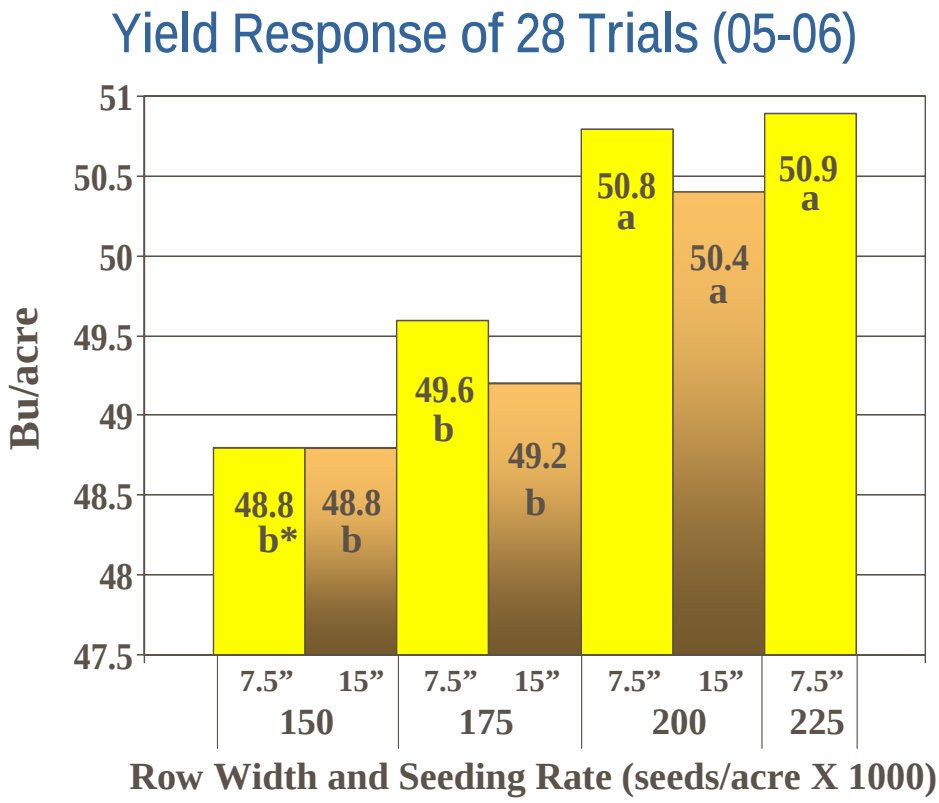
Row Width	Seeding Rate (x 1000)			
7.5 inch	150	175	200	225
15 inch	150	175	200	



Results and Summary:



Plant stand counts taken at 30 days after seeding showed that between 73 – 80% of the seed emerged and survived to 30 days after planting. The highest seeding rate (225 000 seeds/acre) produced the lowest percentage of surviving plants. 74% of seeds planted survived to 30 days after planting (166 000 plants of the 225 000 seeds that were planted). The lowest seeding rate (150 000 seeds/acre) produced the highest percentage of surviving plants 30 days after planting. 80% of what was planted survived to 30 days after planting. The difference in emergence percentages may be a result of early season competition reducing the seedling survival at higher seeding rates.



*Values followed by the same letter are not significantly different at the 5% level.

In the two years of this experiment, the highest yields resulted from the following three seeding rates:

225 000 seeds/acre in 7.5" rows,
200 000 seeds/acre in 7.5" rows,
200 000 seeds/acre in 15" rows.

These three seeding rate/row width treatments had statistically equal yields.

The following treatments all resulted in statistically lower yields compared to the treatments listed above:

175 000 seeds/acre in 7.5" rows,
150 000 seeds/acre in 7.5" rows,
175 000 seeds/acre in 15" rows,
150 000 seeds/acre in 15" rows.

These four treatments all produced statistically equal yields.

Results were similar for soil type, planting date, tillage practice, and CHU area. There was also no difference in the results based on whether the seed was treated with a fungicide. Glyphosate tolerant and conventional varieties behaved the same in this study. These results indicate that seeding rates could be reduced to 200 000 seeds/acre when planting in either 7.5" rows or 15" rows. A saving in seed cost of approximately $5.92 per acre could be realized by reducing seeding rates from 225 000 to 200 000 in 7.5" rows. However, a reduction of 1.2 bu/ac occurred when reducing seeding rates to 175 000 seeds/acre and another 0.8 bu/ac reduction occurred when rates were reduced to 150 000 seeds/acre.

7.5” rows sometimes yielded higher than 15” rows. This study found that under poor growth conditions such as late planting, heavy soils, and low fertility, solid seeding provided slightly higher yields than 15” rows (1-3 bu/ac).

This study has found that a plant stand taken at 30 days after seeding of 150 000 plants per acre produced the highest actual and economic yield. In this study 200 000 seeds/acre were required to achieve a plant stand of 150 000 plants/acre. When emergence conditions are excellent (warm soils, no crusting, etc) it is often possible to achieve 150 000 plants/acre with a lower seeding rate than 200 000 seeds/acre. Some producers may be able to seed 175 000 seeds/acre while others will need to seed 200 000 seeds/acre depending on the equipment used, the conditions following planting, residue levels etc.

Although the yield losses associated with reduced seeding rates are relatively small they are real. A seeding rate of 200 000 seeds/acre provided the highest economic return as well as the highest yields. When using a seed drill to plant soybeans in Ontario significantly cutting seeding rates lowers profits. Further studies will be conducted to investigate if seeding rates can be reduced successfully when using planter units.

Next Steps:

This study will be conducted for one more year and will be completed by the fall of 2007. More sites will focus on conventional tillage to determine if plant response is similar.

Acknowledgements:

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Project Contacts:

Stay tuned for future results and contact Horst Bohner, horst.bohner@ontario.ca if you wish to be involved in 2007.