



Soy7-2011 - SMART II Initiative for Increasing Soybean Performance in Ontario

CROP ADVANCES **Field Crop Reports**

Volume 8 — February 2, 2012

Field Crops Team, Agriculture Development Branch
Ministry of Agriculture, Food and Rural Affairs
In partnership with
Ontario Soil and Crop Improvement Association
And other Agricultural Organizations and Businesses

<http://www.ontariosoilcrop.org/cropadvances.htm>



SMART II Initiative for Increasing Soybean Performance in Ontario

Purpose:

Farm yields of soybeans have been stagnant over the past two decades in Ontario. With higher commodity prices soybean growers are seeking solutions to overcome the limitations on soybean yields. Current agronomic recommendations in Ontario are based on research with relatively narrow objectives that focus on simple effects of a few factors at a time. Management needs to consider additive and synergistic effects on yield and profitability. This project will study possible additive effects of inputs on different varieties as well as the effects of later maturing bean varieties. A “kitchen sink” approach was applied at the field scale level to assess the impacts of multiple inputs on soybean yields. This treatment package was also broken down into its individual components and applied on 8 different varieties on small plots at the University of Guelph.

Methods:

Field scale treatments included:

1. Variety A (Adapted) – Untreated
2. Variety B (+200 CHU) – Untreated
3. Variety B (+200 CHU) – *Kitchen Sink

***Kitchen Sink** treatment consisted of Cruiser Maxx seed treatment, Hi Coat inoculant, Quilt foliar fungicide, a higher seeding rate (250,000 seeds/acre), 50 lbs/acre of nitrogen in the form of ESN and ammonium sulphate, 3 gallons/acre of 2-20-18 liquid applied in furrow, 6L of SRN (slow release nitrogen) and 2L of 3-16-16 foliar fertilizer. +200 CHU refers to a variety that is 200 Crop Heat Units (CHU's) longer than recommended for the given area.

Results:

The spring of 2011 was cold and wet, which delayed planting by about 2 weeks. These trials were planted in late May or early June. In many years this would have been enough to significantly decrease yields. However, the August-October period of the growing season was outstanding, and resulted in above average yields.

Choosing a longer maturing soybean variety provided 2.7 bu/ac more yield. The “kitchen sink” approach added another 4.1 bu/ac. The cost of the kitchen sink approach in this study was about \$140 per acre. The good news is that parallel small plot trials with the U of G have shown a response of up to 10 bu/ac with some varieties. Further study will be needed to understand the variety interactions. However, extending the heat unit range by growing a variety that was up to +200 CHU longer than recommended was an effective way of increasing yields without added input costs.

Table1 shows the yield averages for each treatment while Table 2 reports the results of the seed analysis.



Figure 1. This picture shows plant growth differences between with the Kitchen Sink treatment (left) versus untreated beans (right) near Delhi, Ontario.



Figure 2. Planting of the SMART Project was completed using a Kearney custom 15" planter, capable of applying both liquid and dry fertilizers, as well as a precision control on depth and seeding rate.

Table 1. Field Scale Trial Results (2011)

Treatment	Average Yield Across All Sites (bu/ac)
Adapted Untreated	48.0
Long Season Untreated	50.7
Long Season + Kitchen sink	54.8

Table 2. Summary of Seed Analysis Results from 2011 SMART II Project

Measurement	SMART II Treatment		
	Adapted (Untreated)	+200 CHU (Untreated)	+200 CHU (Kitchen Sink)
Moisture	10.8	11.1	11.0
Oil	20.9	20.0	19.9
Protein	39.7	41.4	41.3
100 Sd Wgt (g)	14.2	15.0	15.6
Visual	1.0	1.0	1.0

The adapted beans had better oil content and the +200 CHU beans had higher protein levels. The seed size was slightly higher for the longer day bean varieties and the kitchen sink treatment. This could explain some of the increased yield.

Summary:

- 1) An average yield gain of 4.1 bu/ac was realized when seed treatments, nitrogen fertilizer, a higher seeding rate, foliar fungicides and foliar fertilizer were applied together in 2011. This approach was not economically profitable.
- 2) An average yield gain of 2.7 bu/ac was realized when a variety that was 200 CHU's longer than recommended was planted. This translated to a 7-8 day delay in harvest date in the fall. This strategy is a viable way to increase soybean yields for fields not intended for winter wheat production.
- 3) Seed size, oil content, and protein were impacted by these management strategies.

Next Steps: The 2011 findings will be used as part of an ongoing study to help Ontario grower's maximize their yields when growing soybeans. This is the first year of a three year study, and more data must be collected over the next few years.

Acknowledgements: We would like to thank the cooperators who lent their time and land to the project. We would also like to thank the Grain Farmers of Ontario as well as Syngenta who have been major sponsors of this project. The access to tractors for these field projects from John Deere is greatly appreciated.

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