SMART Corn 2013: 5, 50 and Fungicide

Purpose:

This project was initiated to evaluate the yield and economic response to more intensive corn management practices through increasing plant populations, nitrogen rates and including a fungicide application.

Methods:

Trials were established at five locations in Southern Ontario in 2013. Two treatments were conducted at each location; a control treatment consisting of the grower's standard practice, and a SMART treatment consisting of standard grower practices plus an additional 5,000 seed/acre, an additional 50 lbs/ac of nitrogen, and a fungicide application. All trials were replicated at least twice at each location.

Results:

Table 1. Corn Yield Response To SMART Management Practices Across Five Locations In Southern Ontario, 2013.

Location	Control	SMART	Response
	---------- *bu/ac* ----------		
1	211	226	+15
2	177	187	+10
3	181	190	+9
4	199	216	+17
5	190	196	+6
Average	*192*	*203*	*+11*

A positive yield response was observed for SMART treatments at all locations in 2013, with an average response of 11 bu/ac (Table 1). Based on an estimated cost of $66/ac to implement SMART practices (Table 2), and an average spring 2013 new crop corn price of $4.50/bu, a grower would have required a yield response of 15 bu/ac to breakeven. The average yield response across all trials was below breakeven, though two locations had a yield response which at least broke even in 2013. In 2011 trials, the yield response to SMART practices averaged 6 bu/ac, for which economic returns were positive at 3 of the 8 trial locations. Degree of yield response may have depended on the aggressiveness of existing grower practices before SMART treatments were implemented.

Table 2. Cost Estimates For SMART Management Practices In Ontario For The 2013 Growing Season.

Practice	Adjustment	Cost
Population	+ 5,000 seeds/ac @ $270/80,000	$17/ac
Nitrogen	+ 50 lb-N/ac @ $600/tonne Urea	$29/ac
Fungicide	1 Application @ $20/ac (incl. app)	$20/ac
	Total Cost:	***$66/ac***

One location conducted a full inclusion and omission experiment in 2013 where the yield contribution of each SMART factor, and interactions between SMART factors could be determined (Table 3). At this location, yield responses for each SMART factor applied individually were limited. The large yield gains associated with the SMART treatment appeared to be due to the interaction between a higher nitrogen rate and a fungicide application.

Table 3. Corn Yield Response To Inclusion And Omission Of SMART Factors At One Location In Ontario, 2013.

Treatment	Population	Nitrogen	Fungicide	Yield	Response
				-------- bu/ac --------	
Control	Control	Control	None	199	-
Control + 5K seeds	+ 5K	Control	None	198	-1
Control + 50 lb-N	Control	+ 50 lb	None	202	+3
Control + Fung	Control	Control	Fungicide	198	-1
SMART - 5K seeds	Control	+ 50 lb	Fungicide	217	+18
SMART - 50 lb-N	+ 5K	Control	Fungicide	201	+2
SMART - Fung	+ 5K	+ 50 lb	None	202	+3
SMART	+ 5K	+ 50 lb	Fungicide	216	+17

Summary:

While a positive corn yield response to SMART practices was observed across all trials, the average yield response of 11 bu/ac was below the economic breakeven yield response of 15 bu/ac. Two locations in 2013 had yield responses that were equal to or above the breakeven yield response, however. These results are similar to SMART trials which have been conducted in previous years.

Acknowledgements:

Thank you to the Thames Valley Soil and Crop Improvement Association, OSCIA and all of the farm co-operators. Thank you to Shane McClure and Ben Rosser for technical assistance.

Project Contact:

Peter Johnson, OMAFRA, peter.johnson@ontario.ca