SMART Initiative for Increasing Soybean Performance in Ontario

Purpose:

To identify, quantify, and reduce the yield limitations that are impacting current on-farm soybean performance by using the latest technological innovations. This project tried to assess the viability of more intensively managed soybean production than is generally practiced in Ontario.

Farm yields of soybeans have been relatively stagnant over the past two decades in Ontario. With higher commodity prices and larger yield gains found in corn and wheat soybean growers are seeking a solution to overcome the limitations on soybean yields. Current agronomic recommendations in Ontario are not comprehensive enough to overcome limitations to yield; most recommendations 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 is assessing the additive impact of multiple inputs on yield.

SMART in this project is an acronym that means Strategic Management Adding Revenue Today.

Methods:

Field scale trials included four main treatments:

1. Untreated Check - normal no-till practices (i.e., no pre-tillage, no seed treatments, no fertilizer or foliar fungicides or insecticides)
2. Cruiser Maxx seed treatment + HiStick NT inoculant
3. Cruiser Maxx + HiStick NT + fertilizer + pretillage
   (fertilizer = 40lbs P and 70 lbs K per acre and liquid alpine 6-24-6 at 11L/ac, pretillage = Salford RTS run at 3" depth 3 days before planting)
4. Cruiser Maxx + HiStick NT + fertilizer + pretillage + foliar Quadris + foliar Matador
   (fertilizer = 40lbs P and 70 lbs K per acre and liquid alpine 6-24-6 at 11L/ac, pretillage = Salford RTS run at 3" depth 3 days before planting)

Figure 1: Salford STS for Pre Tillage Treatment Implementation

Results:

Table 1: SMART soybean yield and quality responses on field-length strips at 10 on-farm locations across Southern Ontario in 2009.

County-System[1]		Seed Yield (bu/ac)			Protein (%)			Oil (%)		
		Quadris+Matador		Mean	Quadris+Matador		Mean System	Quadris+Matador		Mean
		No	Yes		No	Yes		No	Yes	
Kent	UTC	71.0	73.2	72.1	41.2	41.6	41.4	21.2	21.0	21.1
	ST	73.3	72.4	72.8	41.8	41.1	41.4	20.8	21.2	21.0
	ST+F	71.9	72.6	72.3	41.2	41.6	41.4	20.7	20.8	20.7
	Mean	72.1	72.7	72.4	41.4	41.4	41.4	20.9	21.0	20.9
Elgin	UTC	49.4	51.9	50.7	38.8	38.5	38.6	21.7	21.7	21.7
	ST	52.8	55.5	54.1	38.6	38.4	38.5	21.2	21.1	21.2
	PT+ST+F	53.3	55.8	54.5	38.8	38.5	38.7	21.3	11.8	16.6
	Mean	51.9	54.4	53.1	38.7	38.5	38.6	21.4	18.2	19.8
Perth	UTC	40.3	45.3	42.8	42.5	43.1	42.8	19.7	20.0	19.9
	ST	42.2	44.2	43.2	43.6	43.1	43.4	19.4	19.6	19.5
	ST+F	41.5	47.3	44.4	43.3	43.7	43.5	19.5	19.2	19.4
	Mean	41.3	45.6	43.5	43.1	43.3	43.2	19.5	19.6	19.6

Middlesex	UTC	45.2	46.4	45.8	39.8	40.0	39.9	20.3	20.4	20.3
	ST	46.4	48.5	47.4	40.3	40.0	40.1	20.1	20.2	20.2
	PT+ST+F	47.5	48.8	48.2	40.4	40.0	40.2	20.0	20.3	20.1
	Mean	46.4	47.9	47.1	40.2	40.0	40.1	20.1	20.3	20.2
Perth	UTC	39.7	42.0	40.9	38.2	37.9	38.1	21.2	20.8	21.0
	ST	.	42.8	42.8	38.5	38.0	38.3	21.1	20.6	20.9
	ST+F	41.5	45.3	43.4	37.8	38.8	38.3	20.9	20.0	20.5
	Mean	40.6	43.4	42.3	38.2	38.2	38.2	21.1	20.5	20.8
Elgin	UTC	51.3	55.0	53.1	40.4	40.7	40.5	20.9	20.4	20.6
	ST	53.8	55.8	54.8	40.3	40.2	40.2	20.4	20.5	20.4
	PT+ST+F	55.1	57.7	56.4	40.3	40.6	40.4	20.4	20.5	20.5
	Mean	53.4	56.2	54.8	40.3	40.5	40.4	20.6	20.4	20.5
Haldimand	UTC	42.7	44.9	43.8	39.8	39.3	39.5	20.7	20.9	20.8
	ST	47.9	48.2	48.1	39.0	39.1	39.1	20.7	21.1	20.9
	PT+ST+F	49.9	51.4	50.6	38.8	39.1	39.0	21.0	21.0	21.0
	Mean	46.6	48.1	47.4	39.2	39.2	39.2	20.8	21.0	20.9
Middlesex	UTC	46.1	49.6	47.9	39.6	39.2	39.4	20.5	20.7	20.6
	ST	46.2	51.6	48.9	40.2	38.9	39.5	20.6	20.7	20.6
	PT+ST+F	45.7	53.0	49.3	39.4	39.3	39.3	20.4	20.5	20.4
	Mean	46.0	51.4	48.7	39.7	39.1	39.4	20.5	20.6	20.5
Perth	UTC	50.8	55.4	53.1	41.4	41.2	41.3	19.1	19.4	19.2
	ST	51.6	54.8	53.2	42.0	41.3	41.6	18.9	19.0	19.0
	PT+ST+F	53.8	55.4	54.6	41.7	41.6	41.7	19.2	19.2	19.2
	Mean	52.1	55.2	53.6	41.7	41.4	41.5	19.0	19.2	19.1
Huron	UTC	36.5	40.1	38.3	39.0	38.9	39.0	21.8	21.9	21.9
	ST	44.6	45.1	44.8	39.9	38.9	39.4	21.3	21.7	21.5
	PT+ST+F	45.1	46.7	45.9	40.3	40.0	40.1	21.3	21.2	21.2
	Mean	42.0	44.0	43.0	39.7	39.3	39.5	21.5	21.6	21.5
Average	UTC	48.1	51.1	49.6	40.0	40.0	40.0	20.7	20.7	20.7
	ST	51.7	52.8	52.3	40.4	39.8	40.1	20.5	20.6	20.5
	PT+ST+F	51.5	54.2	52.9	40.1	40.2	40.2	20.5	19.4	19.9
	Mean	50.5	52.7	51.6	40.2	40.0	40.1	20.6	20.2	20.4

[1] UTC=no seed tmts, no pre-tillage, no fertilizer; ST=seed treatment CruiserMaxx + Hi-Stick; PT=pre-till, vertical tillage with 2 passes of RTS, F=fertilizer before planting, Quadris/Matador applied at R2

[2] Conventional tillage system

Summary:

1) An average yield gain of 6.7 bu/ac was realized when all inputs were applied together in 2009. (Treatment #4 above)
2) A yield increase of 3.2 bu/ac resulted from the use of CruiserMaxx seed treatment along with HiStick NT inoculant.
3) Fields responded economically to some inputs but not necessarily to all. For example under lower fertility situations extra fertilizer was economical, but foliar fungicides were not.

Next Steps:

This data will be used to formulate new recommendations once all data has been collected and analyzed.

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