

## **Evaluating the Economic Benefits of Corn Hybrid Traits St Clair SCIA Regional Partner Grant (Interim Report)**

### **Purpose:**

Seed corn companies offer a number of different traits in their corn hybrids. The traits include: glyphosate tolerance, Liberty tolerance, resistance to corn borer, and resistance to corn rootworm. Many more traits are in development such as drought tolerance, nitrogen use efficiency, and new insect protection, these and more will be offered in the near future. Many seed companies now offer these traits stacked with two or three in the same hybrid. They plan to offer greater numbers of stacks in the near future. Each trait has its value in allowing the use of an herbicide that would otherwise kill or injure the corn plant or by protecting the crop from an insect pest. With each added trait there is an added cost as the seed companies attempt to recover the cost of research and development and make a profit. There are many choices and many different field situations. It can be difficult for a farmer to decide which hybrid and trait to choose and to evaluate if the extra cost was good insurance, it paid in extra yield or provided some other benefit. This project aims to evaluate a corn hybrid and the same hybrid with one or more traits for yield, economic return and other agronomic characteristics.

### **Methods:**

A corn hybrid will be selected which has no traits and the equivalent hybrid with one or more traits, i.e. Hybrid 640, 640 Bt, 640 glyphosate tolerant, 640 Bt + glyphosate tolerant will be compared. A second set of hybrids may be included in the plot. The set of corn hybrids will be replicated at least three times in the plot. To make it easier to get 3 or more replications some co-operators split the planter with the three or six hybrids. The project area is large enough that different hybrids may be chosen as the number of crop heat units declines from Amherstburg to Grand Bend. The hybrids may be tested in different conditions such as very good growing conditions, nitrogen rates, or on sandy soils. Soil samples for fertility analysis will be taken from each plot. The hybrids will be monitored throughout the season for early growth, plant stand, weed control, insect and disease pressure. At harvest stand evaluations and yields will be taken. The economics and other benefits of the hybrid and the associated traits will be evaluated.

### **Results:**

See table 1 for the yield results. The plots were harvested in a reasonable time given cool summer and later maturity of the corn crop. None of the Roundup Ready hybrids were sprayed with glyphosate as it was too difficult to do so with the non glyphosate tolerant hybrids in close proximity.

Crop Advances: Field Crop Reports 2009

Table 1. 2009 Corn Hybrid Trait Yields and Other Site Information

Hybrid	Traits	CHU	1		2		3		4		5		Average	
			Kingsville		Amherstburg		Thamesville		Ridgetown		Florence			Yield
			% M	bu/ac	% M	bu/ac	% M	bu/ac	% M	bu/ac	% M	bu/ac	% M	bu/ac
CF 870	None	3300	23.5	165.6	24.0	197.0			27.2	178.5			24.9	180.4
CF 870 YGCB	ECB	3350	24.0	155.5	23.6	178.2			27.8	170.8			25.1	168.2
CF 870VT3	RR, ECB, CRW	3350	24.7	156.0	23.7	191.1			27.0	177.3			25.1	174.8
DKC 52-62	RR	3100	19.3	189.5	22.0	176.2	26.2	172.2					22.5	179.3
DKC 52-63	RR, ECB	3100	19.9	174.9	21.7	172.4	27.8	179.8					23.1	175.7
DKC 52-59	RR, ECB, CRW	3100	20.4	177.5	21.8	173.9	27.2	182.9					23.1	178.1
CF 771	None	3100									23.2	145.4		
CF 772 YGCB	ECB	3175									24.3	139.7		
CF 772 RBt	RR, ECB	3175									23.6	136.2		
<b># of Reps</b>			3		6		7		3		2			
<b>Plot Yield Variance</b>			41.7		50.6		32.6		18.5		25.4			
<b>Planting Date</b>			May 15, 2009		May 13, 2009		May 22, 2009		May 20, 2009		25-May-09			
<b>Harvest date</b>			13-Nov-2009		18-Nov-2009		2-Nov-2009		23-Nov-2009		20-Nov-2009			
<b>Soil Type</b>			Clay		Loam		Clay loam to s. loam		Clay loam		Clay			
<b>Tillage</b>			Minimum		No-till		Minimum		Minimum		Conventional			
<b># of Rows &amp; Row Width</b>			4 x 20"		2 x 30"		2 x 30"		4 x 36"		8 x 36"			
<b>Row length (ft)</b>			433		957		758		624		401			
<b>Previous Crop</b>			Winter wheat		Corn		Winter wheat		Soybeans		Winter wheat			
<b>Burndown</b>			Touchdown IQ Primextra II Magnum, Callisto		Primextra II Magnum, Callisto		Roundup Frontier Max, Impact, Merge, Aatrex		None Primextra II Magnum		None Distinct + atrazine			

Note: CF = Country Farm, DKC = Dekalb

**Summary:**

The yield results for the plots when averaged did not show any yield advantage to the hybrids with traits no matter what the trait or combination of traits was. One of the traits was Roundup Ready (RR) which was difficult for the co-operators to take advantage of as the hybrid without any traits was in close proximity making it impossible to spray glyphosate. The second trait present in the triple stack hybrids was Bt for corn rootworm (CRW). There was only one of the sites with corn following corn. The roots of the non CRW hybrids were not examined for feeding damage but the yield of the hybrid with no traits was not less than the hybrid with the trait.

The third trait was the Bt for European corn borer (ECB). The sites all had low ECB pressure except for the Florence site which had moderate pressure. In four out of the five sites the hybrids with the ECB trait yielded the same or lower than the hybrid without the ECB trait so on average there was no yield advantage to the ECB trait.

The corn hybrids without any traits had the least expensive seed cost per bag at a retail price of \$130 and the triple stacks topped out at \$285. Table 2 illustrates the net dollars per acre based strictly on seed cost versus yield gain for the hybrid with trait(s). From the table it is apparent that all of the hybrids with traits did not payback any of the extra cost for the seed. If the Thamesville site alone is examined the yield gains there would have paid more than paid for the additional Bt trait costs. As mentioned earlier glyphosate was not used so it is difficult to evaluate the economics of that trait. The lower yield of some of the hybrids with traits or moisture differences were also not taken into account.

It should be kept in mind that this is only the first year of this project. One should also consider why a particular trait or set of traits might suit their cropping system based on risk of pest infestation or other management considerations.

**Table 2. Economics of the extra cost of the traits vs. yield gain.**

Company	Hybrid	Traits	Average Yield (bu/ac)	Seed	Yield	Net
				Cost/bag	Gain/ac	\$/ac*
Country Farm	CF 870	None	180.4	\$130	NA	NA
Country Farm	CF 870 YGCB	ECB	168.2	\$170	0	(16.00)
Country Farm	CF 870VT3	RR, ECB, CRW	174.8	\$230	0	(40.00)
Dekalb	DKC 52-62	RR	179.3	\$240	NA	NA
Dekalb	DKC 52-63	RR, ECB	175.7	\$275	0	\$(14.00)
Dekalb	DKC 52-59	RR, ECB, CRW	178.1	\$285	0	\$(18.00)
Country Farm	CF 771	None	145.4	\$130	NA	NA
Country Farm	CF 772 YGCB	ECB	139.7	\$170	0	\$(16.00)
Country Farm	CF 772 RBt	RR, ECB	136.2	\$200	0	\$(28.00)

\* Assumed seeding rate of 32,000 seeds/ac

**Next Steps:**

The project will continue for two more years. Some further economics may be looked at for this year and future year's data. Further consideration may be given to the selection of the hybrids. Some consideration may also be given to the use of glyphosate.

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**Location of Project Final Report:**

**Figure 1: Amherstburg site.**

