Corn Seed Treatment to Control Seed and Seedling Insect Pests 2005

Purpose:

This study was undertaken to assess the use of Poncho 250 pre-treated corn seed for the control of seed and seedling insect pest in first year corn.

Lindane, which has been de registered, was traditionally used as an effective and inexpensive tool (~$1.50/acre) to protect corn seeds and seedlings from the damage of soil born seed and seedling insects such as wire worms and seed corn maggots. Poncho 250 (clothianidin 0.25 mg ai/seed) is now available as a commercially pre-applied seed treatment to control a number of seed and seedling insect pests at a cost of $6 - $8/acre. The objective of the project was to evaluate the feasibility of using corn seed pre-treated with Poncho 250 under various environments such as: different crop rotation systems, soil types, planting dates, planting conditions and planting systems for the control of seed and seedling insect pest in first year corn.

Methods:

Site Selection: Where possible, the plots were located perpendicular to known sources of potential variables such as tile lines, primary tillage, dead furrows or low spots that cut across the plot area. The goal was to reduce inherent or applied variation in the whole plot to ensure that observed treatment differences were real and not due to unrelated underlying variations.

Treatments: Poncho 250 was compared to an untreated control (check) using side-by-side comparison with the same hybrid of corn. This was accomplished by using the split-planter method. One half of the planter seed hoppers were filled with treated seed, the other half with the untreated check. This method gave multiple replications as the planter traveled back and forth across the field.

Data Collection: Production information such as soil type, previous crop, tillage system, planting date, hybrid, fertility and herbicide program, plant population at harvest, weed control, growing conditions and harvest date was recorded during the growing season. Yield data was collected from 19 on-farm strip trials sites with a total of 55 replications.

Summary:

Corn in strips treated with Poncho 250 and in untreated strips (seed only treated with a fungicide) had similar seedling emergence and vigor, similar tasselling/silking/pollination date and similar grain moisture and bushel weight at harvest.

Yield differences between treated and untreated strips ranged from a loss of 4.1 bu/acre (257 kg/ha) to a gain of 10.6 bu/ac (665 kg/ha). Overall, plots treated with Poncho 250 yielded an additional 3.3 bu/acre (207 kg/ha) over the untreated plots. At a price of $2.60 per bushel for corn (allowing for costs associated with harvesting, drying, marketing etc.) and $7.00 per acre for Poncho 250, the treatment provided a return of

Results: **Table 1. Soil and Crop Corn Seed Treatment Trials (Poncho 250) for 2005**

Cooperator	Number of Replications	Soil Type	Previous Crop	Hybrid	Planting Date	Seed drop X1000	Population Difference X1000	% Moisture difference	Average Yield Untreated bu/A	Variability (bu/A)	Yield Treated bu/A	Variability (bu/A)	Yield Difference
St Isidore	2	Clay loam	Soys	NK 27M3	10-May	34.2	**-1.0**	**-0.1**	**194.9**	12.2	**190.8**	4.0	**-4.1**
West	1		Wheat	Pion 38H67	16-Apr			**0.2**	**168.7**		**166.3**		**-2.4**
Wainfleet	7	Clay loam	Wheat	NK 43C4	7-May	31.0		**-0.2**	**173.0**	10.3	**171.6**	9.0	**-1.4**
Moose Creek	3	Clay loam	Soys	Myco 2P172	17-May	30.0	**0.0**	**0.0**	**183.4**	4.1	**183.1**	0.2	**-0.3**
Morewood	3	Clay loam	Soys	DK 3946	10-May	29.6	**-2.2**	**-0.3**	**196.4**	4.1	**196.7**	9.4	**0.3**
Melbourne	2	Sand	Wheat	DKC 50-18	6-May			**0.0**	**193.3**	0.9	**193.9**	9.1	**0.6**
Strathmere	1		Soys	Eli 90M28LL	6-May			**0.0**	**129.6**		**130.6**		**1.0**
St George 1	4	Silt loam	Wheat	NK 3030BT	5-May	32.0		**0.0**	**187.6**	2.6	**189.4**	6.7	**1.8**
Chesterville N	1	Clay	Soys	Pride A6383	7-May		**3.3**	**-0.4**	**175.3**		**177.6**		**2.3**
Vernon	1	Clay loam	Soys	Pion 39D82	17-May	33.5	**-2.3**		**157.1**		**159.7**		**2.6**
Chesterville	3	Clay loam	Soys	Pion 38P04	8-May	32.0	**0.5**	**-0.1**	**155.9**	4.1	**159.2**	7.6	**3.4**
Milton	8	Loam	Soys	NK 25J7	10-May	30.0		**0.0**	**99.8**	56.7	**103.3**	50.6	**3.5**
Moffat	3	Loam	Soys	Pion 38A25	12-May	29.8		**-0.1**	**126.7**	10.3	**130.8**	15.8	**4.1**
Toys Hill	2	Clay loam	Soys	Pri A6686BT	9-May	30.2		**-0.4**	**188.8**	0.2	**193.9**	2.7	**5.0**
Bouget	1	Clay loam	Soys	Pion 39D82	10-May	32.8	**0.0**	**0.5**	**175.0**		**182.8**		**7.8**
Williamsburg N	3	Clay loam	Soys	DK 39-45	9-May	30.0	**0.3**	**0.4**	**165.7**	3.2	**174.7**	0.4	**8.9**
Williamsburg S	4	Clay loam	Wheat	DK 3946	12-May	30.0	**2.3**	**-0.9**	**179.0**	7.4	**188.2**	6.7	**9.3**
St George 2	4	Silt loam	Wheat	Pion 38A24	6-May	32.0		**0.1**	**181.6**	5.9	**191.7**	5.5	**10.1**
Guelph	2	Loam	Wheat	Pioneer D82	5-May	31.6	**4.3**	**0.2**	**144.1**	1.7	**154.7**	0.7	**10.6**
No. Reps	**55**				**Average (bu/ac)**		**0.5**	**-0.1**	**167.1**		**170.5**		**3.3**
					(t/ha)				**1.05**		**1.07**		**0.02**

$1.23 per acre on average. Of the nineteen trials in the study, nine showed an economic return to the seed treatment, while 10 trials showed no economic benefits to seed treatment.

Yield response to seed treatment was generally consistent within individual plots. However, yield response to seed treatment between plots of similar agronomic background was extremely variable and unpredictable. Yield response was not correlated to planting date. Seedling insect damage could only be correlated to yield response in 2 of the 19 trials. Overall, there was a low correlation between visually observed insect damage and yield response. There was also little correlation between plant population and yield. In the majority of plots where Poncho 250 significantly increased yields over the untreated check, there was little difference between the plant population of the treated and untreated strips (often less than 1000 plants per acre difference). This indicates that there is little justification for lowering the seeding rate when planting Poncho 250 treated seed. Yield response to Poncho 250 treated seed was slightly higher for corn following wheat than corn following soybeans ((4.1 bu/acre (257 kg/ha) when following wheat vs 2.9 bu/acre (182 kg/ha) when following soybeans)).

Next Steps:

Given the consistency of yield response within individual trials and the highly variable yield response between trials, Poncho 250 trials should be repeated in 2006 in an effort to further identify factors affecting yield response. In particular, 2004 trial sites planted to corn in 2006 should be reevaluated to determine if the response to Poncho 250 seed treatment can be site specific in some instances. An effort needs to be undertaken to identify the situations when the use of Poncho seed treatments is most likely to result in a significant economic benefit. Work to date has not separated out trials where infestation levels warranted treatment vs those that did not. This results in a conclusion that the response is not as great as one would expect. Given significant infestations of seedling insects, the use of Poncho likely provides great economic benefit to the producer, but as a general broadspectrum management tool, its use is barley economical.

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Location of Project Final Report:

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