

Final Delaware Soybean Board Report – 2008

Title: Effectiveness of Seed Treatments for Yield Enhancement and Dectes Stem Borer Management

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Cooperators: Delaware State University (D.Meyer), HB Farms (Harrington) and Gilpin Farms (Townsend), Baker Farms (Middletown)

Objectives: (1) To determine if seed applied treatments containing a insecticide/fungicide combination will provide a yield advantage for early planted soybeans.
(2) To determine if a seed applied treatment will provide effective control of Dectes stem borer.

Methods:

(A) Seed Treatment Trials to Evaluate Yield Enhancement: The variety Southern States RT 3851N was on planted on 15-inch center in replicated strip plots in three locations throughout the state: Townsend on May 4, Smyrna at the Delaware State Research farm on April 25 and Harrington on May 1. Treatments included: Untreated seed and Cruiser Max treated seed (combination of Apron Max plus Cruiser 5FS). Overall plot size at each location was: 320 X 400 at Smyrna; 180 x 500 at Harrington and 150 ft x 1700 ft long at the Townsend site. Stand counts were taken on a weekly basis for four weeks starting at plant emergence in all 4 locations. Insect counts were taken on a weekly basis from plant emergence through early pod set. Insect data collected included bean leaf beetle damaged plants per ft of row; number of leafhoppers, grasshoppers and bean leaf beetles per sweep; and number of soybean aphids and thrips per leaf. Yield data was taken in all plots at physiological maturity.

(B) Evaluation of a New, Non-Labeled Seed Treatment for Dectes Stem Borer Management: Replicated research plots were established in two locations: Baker Farms located near Middletown, DE on May 29 and the Carvel Research and Education located near Georgetown, DE on May 8. Two varieties were planted at each location: SS RT3851 N (Group III – SCN resistant) and SS RT3860 (Group II- SCN susceptible). As SCN susceptible variety was used due to past information that SCN resistance provides some level of suppression of Dectes stem borer. Plot size was 18 foot wide x 18 ft long. Treatments were established in a randomized complete block design and replicated six times. Treatments included 2 untreated checks and 2 rates of the fipronil seed treatment. Plots were sampled on a weekly basis from mid-June through early August to determine the abundance of Dectes adults. Prior to harvest, plots were evaluated for the percentage of lodged plants (counts per plot as well as number of stems that would lodge when pushed) and percentage of stems infested with Dectes. A section of the plots were harvested at physiological maturity to simulate a “timely harvest”. A second section of plot was harvested 2 -3 weeks after the “timely harvest” to determine the yield affects of late harvest.

Results:

(A) Seed Treatment Trials to Evaluate Yield Enhancement

Townsend Location

Table 1. Stand Counts and Yield

Treatment	Rate/100 lb seed	Yield BU/A Sept 22	Stand Count per 3 ft/row	
			June 3	June 13
Untreated	---	26.39	7.43	7.27
Cruiser Maxx	3 oz	26.71	7.60	8.33

Table 2. Bean Leaf Beetle and Thrips Counts

Treatment	Rate/100 lb seed	BLB Damaged Plants per 3 ft/row		Thrips per 5 Leaves				
		June 13	June 17	June 13	June 17	June 24	July 1	July 8
Untreated	---	6.3	5.7	2.8	6.5	3.4	3.6	4.3
Cruiser Maxx	3 oz	3.33	2.85	0.7	0.5	1.2	1.4	2.7

Table 3. Average Number of Bean Leaf Beetles per 10 Sweeps

Treatment	Rate/100 lb seed	Number of BLB per 10 Sweeps						
		June 13	June 17	June 24	July 1	July 8	July 15	August 11
Untreated	---	6.3	5.7	2.8	6.5	3.4	3.6	4.3
Cruiser Maxx	3 oz	3.33	2.85	0.7	0.5	1.2	1.4	2.7

Table 4. Average Number of Grasshoppers per 10 sweeps

Treatment	Rate/100 lb seed	Number of Grasshoppers per 10 Sweeps				
		June 13	June 17	June 24	July 1	July 8
Untreated	---	0.2	0.15	0.17	0.13	0.27
Cruiser Maxx	3 oz	0	0.1	0.03	0.3	0.03

Smyrna Location

Table 1. Stand Counts and Yield

Treatment	Rate/100 lb seed	Yield BU/A	Stand Count per 3 ft/row		% BLB Damaged Plants	
			June 13	June 19	June 13	June 19
Untreated	---	5.86	12.0	8.0	86.2	93.8
Cruiser Maxx	3 oz	3.94	8.9	9.3	51.5	65.5

Table 2. Thrips Counts

Treatment	Thrips per 5 leaves						
	June 13	June 19	June 19	June 24	July 1	July 15	July 29
Untreated	8.7	8.8	5.6	2.1	6.1	6.2	34.6
Cruiser Maxx	0.4	1.3	1.3	1.1	1.6	1.3	2.9

Table 3. Average Number of Bean Leaf Beetles per 10 Sweeps

Treatment	Bean Leaf Beetles per 10 Sweeps						
	June 13	June 19	June 19	June 24	July 1	July 15	July 29
Untreated	0.13	0.1	0.1	.27	0.1	0	0
Cruiser Maxx	0.2	0.2	0	0.3	0	0	0

Table 4. Average Number of Grasshoppers per 10 sweeps

Treatment	Rate/100 lb seed	Number of Grasshoppers per 10 Sweeps					
		June 13	June 19	June 24	July 1	July 8	July 15
Untreated	---	0.33	0.27	0.13	0.6	0.47	0
Cruiser Maxx	3 oz	0.57	0.47	0.77	0.67	0	0

Harrington Location

Table 1. Stand Counts and Yield

Treatment	Rate/100 lb seed	Yield BU/A Sept 24	Stand Count per 3 ft/row			% BLB Damaged Plants
			June 3	June 10	June 19	June 19
Untreated	---	8.3	7.7	7.6	6.5	94.49
Cruiser Maxx	3 oz	6.6	8.3	9.53	7.3	65.22

Table 2. Bean Leaf Beetle and Thrips Counts

Treatment	Rate/100 lb seed	BLB Damaged Plants per 3 ft/row		Thrips per 5 Leaves				
		June 3	June 10	June 10	June 19	June 24	July 1	July 8
Untreated	---	7.4	0.57	7.1	12.9	3.5	2.3	0.9
Cruiser Maxx	3 oz	1.0	2.7	3.5	2.0	2.6	0.9	0.1

Table 3. Average Number of Bean Leaf Beetles per 10 Sweeps

Treatment	Rate/100 lb seed	Number of BLB per 10 Sweeps		
		June 19	July 15	August 11
Untreated	---	0.07	0.2	1.5
Cruiser Maxx	3 oz	0.07	0	0.2

Table 4. Average Number of Grasshoppers per 10 sweeps

Treatment	Rate/100 lb seed	Number of Grasshoppers per 10 Sweeps					
		June 10	June 19	June 24	July 1	July 8	July 15
Untreated	---	1.43	1.2	2.13	1.3	1.0	1.03
Cruiser Maxx	3 oz	0.67	0.43	1.6	0.87	1.93	0.83

(B) Evaluation of a Seed Treatment for Dectes Stem Borer Management

Georgetown - First Harvest Data

Treatment	Rate/ 100 kg seed	% Infested Stems Sept 23	# Larvae per Stem 15 stems Sept 23	% Lodged Stems* Sept 30	Yield BU/A Oct 3	Lodging Yield Loss BU/A
SS3851 Fipronil ST	50 g ai	0.00c	0.00b	0.00a	50.22ab	0.00b
SS3851 Fipronil ST	100 g ai	1.11c	0.00b	0.00a	62.18a	0.03b
SS3851	Untreated	15.56bc	2.33ab	2.67a	55.00ab	1.33ab
SS3851	Untreated	14.44bc	2.33ab	4.33a	49.68ab	1.18ab
SS3860 Fipronil ST	50 g ai	1.11c	0.17b	0.00a	39.59b	0.07b
SS3860 Fipronil ST	100 g ai	0.00c	0.00b	0.00a	46.02ab	0.00b
SS 3860	Untreated	32.22a	4.83a	5.33a	40.68b	1.88ab
SS 3860	Untreated	25.56ab	3.17a	6.33a	38.34b	2.39a

Means followed by the same letter are not significantly different (Tukeys; P=0.05).

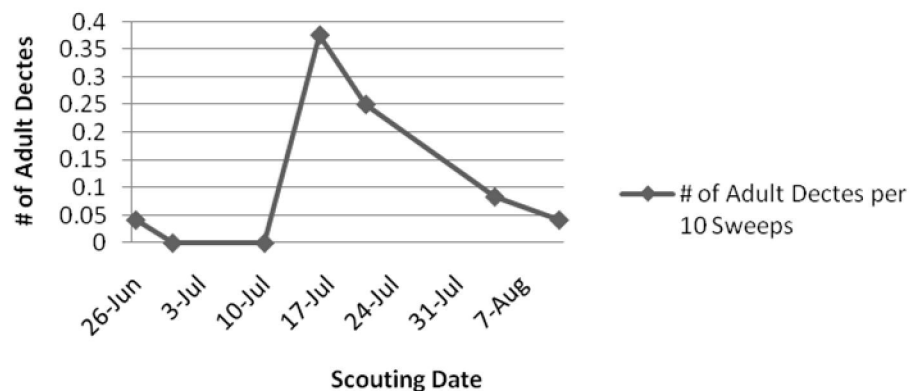
* 50 stem sample – pushed for lodging

Georgetown– Second Harvest Data

Treatment	Rate/ 100 kg seed	% Lodging loss per acre (based on 170,000 plants/A)	Yield BU/A Oct 31	Lodging Yield Loss BU/A
SS3851 Fipronil ST	50 g ai	0.24d	61.96ab	0.51b
SS3851 Fipronil ST	100 g ai	0.35d	69.40a	0.54b
SS3851	Untreated	9.47c	53.88bcd	11.77a
SS3851	Untreated	10.73bc	47.28cde	12.36a
SS3860 Fipronil ST	50 g ai	0.25d	50.75bcde	0.39b
SS3860 Fipronil ST	100 g ai	0.00d	57.63abc	0.00b
SS 3860	Untreated	12.76ab	41.61de	13.13a
SS 3860	Untreated	13.86a	39.12e	14.06a

Means followed by the same letter are not significantly different (Tukeys; P=0.05).

Georgetown Location - # of Adult Dectes per 10 Sweeps



Middletown – First Harvest

Treatment	Rate	% Infested Stems Sept 22	# Larvae per Stem 15 stems Sept 22	% Lodged Stems Oct 3	Yield BU/A Oct 6	Lodging Yield Loss Bu/A
SS3851 Fipronil ST	50 g ai	8.89c	1.33c	1.33d	14.36a	0.03c
SS3851 Fipronil ST	100 g ai	20.00bc	2.83bc	6.33cd	13.09a	0.17c
SS3851	Untreated	48.89ab	7.00ab	15.33bc	13.59a	0.57abc
SS3851	Untreated	67.78a	9.83a	13.33bcd	12.83a	0.38abc
SS3860 Fipronil ST	50 g ai	11.11c	1.50c	4.00cd	16.90a	0.30c
SS3860 Fipronil ST	100 g ai	6.67c	1.00c	4.33cd	14.23a	0.23c
SS 3860	Untreated	68.89a	10.00a	26.00ab	12.96a	0.91ab
SS 3860	Untreated	72.22a	10.50a	35.00a	11.44a	1.04a

Means followed by the same letter are not significantly different (Tukeys; P=0.05).

Middletown – Second Harvest

Treatment	Rate	Yield BU/A Nov 11	Lodging Yield Loss BU/A
SS3851 Fipronil ST	50 g ai	13.06a	0.72b
SS3851 Fipronil ST	100 g ai	12.96a	1.64b
SS3851	Untreated	10.03a	4.18ab
SS3851	Untreated	9.09a	4.05ab
SS3860 Fipronil ST	50 g ai	18.09a	2.29b
SS3860 Fipronil ST	100 g ai	15.73a	1.10b
SS 3860	Untreated	10.44a	7.59a
SS 3860	Untreated	8.99a	4.70ab

Means followed by the same letter are not significantly different (Tukeys; P=0.05).



Conclusion:

(A) Seed Treatment Trials to Evaluate Yield Enhancement : Overall, no significant differences were detected between the untreated control and the seed applied treatments for stand count and yield. Once again, the Cruiser treatments did provide significantly better bean leaf beetle control compared to the untreated check. Since bean pod mottle virus is now known to occur in Delaware, early season bean leaf beetle management using seed treatments could be part of a management program for bean leaf beetle. However, the seed treatments do not provide season long bean leaf beetle control so additional treatments will be needed later in the season.

(B) Evaluation of a Seed Treatment for Dectes Stem Borer Management : Overall, the fipronil seed treatment provided significantly better Dectes stem borer control in both varieties and locations. In general, yield losses from lodging were significantly higher in the untreated plots compared to both rates of the seed treatment. ***However, at this time fipronil is not labeled as a seed treatment for soybeans.***