

Final Delaware Soybean Board Report – 2007

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

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Objectives:

- (1) To determine if seed applied treatments containing an 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.
- (3) To compare the effectiveness of a seed applied treatment and a foliar insecticide spray for Dectes stem borer management.

Study # 1 - Seed Treatment Trials to Evaluate Yield Enhancement: The variety 'Southern States RT 3851N' was planted on 15-inch centers in replicated strip plots in four locations throughout the state: Georgetown - April 20; Smyrna - April 23; replanted June 13; Middletown - May 1; and Selbyville - May 4. The following treatments were evaluated and compared to an untreated control: Apron Maxx RTA, Cruiser 5FS, and Cruiser Maxx (combination of Apron Maxx and Cruiser 5FS). All treatments were commercially applied by Southern States in Seaford, DE. Overall plot size at each location was 320 to 480 foot wide by 400 to 500 ft long depending on land available at each location. Each plot was replicated 4 times in a randomized, complete block design. 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 in the Selbyville and Middletown plots. Insect data collected included bean leaf beetle damaged plants per ft of row; number of leafhoppers and bean leaf beetles per sweep; and number of soybean aphids and thrips per leaf. Due to severe drought stress and mite damage in the Georgetown plot (it was sprayed twice but mites still were not kept under control by the miticide), insect sampling was terminated in early July and no yields were taken. At the Smyrna location, extremely wet weather after planting and slug damage resulted in the need to replant the plot. However, only 2 treatments were established at re-planting on June 13. Stand and insect counts were taken on a weekly basis through early pod set. Yield data was taken at the plots in Selbyville, Smyrna and Middletown at or shortly after physiological maturity.

Results:

(A) Middletown Location

Table 1. Stand Counts and Yield

Treatment	Rate/100 lb seed	Yield BU/A	Stand Count per 3 ft of row			
			May 18	May 24	June 1	June 6
Untreated	---	40.64a	9.04a	8.84a	7.70a	8.01a
Apron Maxx RTA	5 oz	40.99a	8.84a	9.78a	7.88a	8.11a
Cruiser 5FS	1.28 oz	41.54a	8.98a	10.08a	7.91a	7.91a
Cruiser Maxx	3 oz	40.54a	9.21a	10.03a	8.51a	8.38a

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

Table 2. Bean Leaf Beetle and Thrips Counts

Treatment	Rate/100 lb seed	% BLB Damaged Plants			Thrips per 10 leaves	
		May 24	June 1	June 6	June 28	July 3
Untreated	---	34.10a	82.82a	94.29a	1.33ab	1.65a
Apron Maxx RTA	5 oz	29.37a	80.82a	89.31a	1.88a	1.23ab
Cruiser 5FS	1.28 oz	4.87b	39.27b	52.09b	0.83b	0.65ab
Cruiser Maxx	3 oz	5.77b	29.51b	52.71b	0.53b	0.53b

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

(B) Selbyville Location

Table 1. Stand Counts and Yield

Treatment	Rate/100 lb seed	Yield BU/A	Stand Count per 3 ft of row ¹			
			May 21	May 30	June 7	June 13
Untreated	---	54.17a	7.55ab	7.55b	6.64a	7.83a
Apron Maxx RTA	5 oz	55.79a	6.86b	7.89ab	6.75a	7.73a
Cruiser 5FS	1.28 oz	56.36a	7.89ab	8.07ab	6.41a	7.83a
Cruiser Maxx	3 oz	54.65a	8.95a	8.97a	8.00a	8.67a

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

Table 2. Bean Leaf Beetle and Thrips Counts

Treatment	Rate/100 lb seed	% BLB Damaged Plants ¹			Thrips per 10 leaves ¹	
		May 21	May 30	June 7	June 18	June 25
Untreated	---	1.94ab	55.81a	90.36a	16.75a	27.58a
Apron Maxx RTA	5 oz	3.77a	54.86a	88.28a	17.05a	22.20ab
Cruiser 5FS	1.28 oz	0.70b	28.89b	69.71a	11.83a	9.78b
Cruiser Maxx	3 oz	0.00b	17.73b	48.24b	11.05a	7.60b

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

(C) Georgetown Location

Table 1. Stand Counts

Treatment	Rate/100 lb seed	Stand Count per 3 ft of row			
		May 3	May 8	May 15	May 29
Untreated	---	6.78a	8.64a	9.29a	8.73a
Apron Maxx RTA	5 oz	6.61a	7.75a	7.97b	7.99a
Cruiser 5FS	1.28 oz	7.21a	8.64a	9.09ab	8.83a
Cruiser Maxx	3 oz	6.69a	8.29a	8.98a	8.58a

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

Table 2. Bean Leaf Beetle and Thrips Counts

Treatment	Rate/100 lb seed	% BLB Damaged Plants			Thrips per 10 leaves	
		May 15	May 29	June 4	June 13	June 27
Untreated	---	33.77a	74.46a	97.56a	8.43a	0.35a
Apron Maxx RTA	5 oz	31.39a	78.85a	96.88a	2.63a	0.23a
Cruiser 5FS	1.28 oz	2.34b	26.47b	53.10b	1.15a	0.10a
Cruiser Maxx	3 oz	2.36b	36.84b	51.66b	1.28a	0.13a

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

(D) Smyrna Location

Table 1. First Planting

Treatment	Rate/100 Lb seed	Stand Count per 3 foot of row			% BLB Damaged Plants		
		May 14	May 23	June 1	May 14	May 23	June 1
Untreated	---	3.18a	5.34a	4.06a	55.67a	69.62a	88.13a
Apron Maxx RTA	5 oz	2.22a	4.82a	3.91a	47.13a	60.32a	89.18a
Cruiser 5FS	1.28 oz	2.67a	4.61a	4.22a	3.49b	21.83b	55.73b
Cruiser Maxx	3 oz	3.22a	5.74a	4.84a	7.16b	21.95b	44.56b

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

Table 2. Second Planting

Treatment	Rate/100 lb seed	Stand Count per 3 ft of row				% BLB Damaged			Yield BU/A
		6/25	7/3	7/9	7/16	7/3	7/9	7/16	
Untreated	---	8.90	9.20	8.80	8.97	0.33	6.80	0.00	32.46
Cruiser Maxx	3 oz	8.40	9.27	9.03	8.23	0.00	2.20	1.22	28.88

Conclusions: Overall, no significant differences were detected between the untreated control and the seed applied treatments for stand count and yield. Overall, the Cruiser treatments did provide significantly better bean leaf beetle control compared to the untreated check and fungicide alone treatment. Since bean pod mottle virus was identified for the first time in DE in 2007, early season bean leaf beetle management may be important in the future. Data from the Mid-West indicates that the use of seed treatments may be one part of the management program.

Study #2 - Comparison of a Seed Treatment and Foliar Insecticide for *Dectes* Stem Borer Management : Replicated research plots were established in two locations: University of Delaware’s Middletown Demonstration site located near Middletown, DE on May 25 and the Carvel Research and Education located near Georgetown, DE on May 21. Two varieties were planted at each location: SS RT3851 N (Group III) and Asgrow 2802 (Group II). Plot size was 18 foot wide x 18 ft long. Treatments were established in a randomized, complete block design and replicated four times. Treatments included an untreated check, fipronil seed treatment, and one foliar treatment of Warrior. Plots were sampled on a weekly basis from plant emergence through mid-August to determine the abundance of *Dectes* adults. The foliar treatment plots were sprayed on July 17 in Middletown and July 18 in Georgetown with Warrior at a rate of 3.2 oz per acre (0.025 lb ai/A) . 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 was 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.

(A) Middletown

Table 1. First Harvest

#	Treatment	Rate	% Infested Stems Sept 19	# Larvae per Stem 20 stems Sept 19	% Lodged Stems Oct 2	# Lodged Stems/Plot Oct 2	Yield BU/A Oct 2
1	AG2802 Untreated	---	25.00a	5.00a	4.00a	3.50a	28.13b
2	AG2802 + Fipronil ST	3 oz. /100 lb seed	0.00b	0.00b	0.00a	0.00b	28.27b
3	AG2802 + Warrior	3.2 oz/A	15.00ab	3.00ab	3.00a	0.00b	28.63b
4	SS RT3851 Untreated	---	11.25ab	2.25ab	5.00a	0.00b	34.40ab
5	SSRT3851 + Fipronil ST	3 oz/100 lb seed	2.50b	0.50b	0.00a	0.00b	40.54a
6	SS RT3851 + Warrior	3.2 oz/A	18.75ab	4.00ab	5.00a	0.00b	35.50ab

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

Table 2. Second Harvest

#	Treatment	Rate	Losses from First Harvest – 8 DAH		# Lodged Stems/Plot Oct 16	% Lodged Stems Oct 16	Yield BU/A Oct 22
			# Lodged Stems/plot Oct 10	Yield Loss Bu/A			
1	AG2802 Untreated	---	14.25a	1.38a	27.25a	8.50a	19.83c
2	AG2802 + Fipronil ST	3 oz/ 100 lb seed	0.00b	0.00b	0.00c	0.00b	28.19bc
3	AG2802 + Warrior	3.2 oz/A	5.50b	0.56ab	18.50ab	4.00ab	24.03bc
4	SS RT3851 Untreated	---	6.25b	0.75ab	11.25bc	6.00ab	33.65ab
5	SSRT3851 + Fipronil ST	3 oz/ 100 lb seed	0.00b	0.00b	0.00c	0.00b	41.65a
6	SS RT3851 + Warrior	3.2 oz/A	2.50b	0.26b	11.25bc	5.00ab	38.05ab

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

(B)Georgetown

Table 1. First Harvest

Treatment	Rate	% Infested Stems Sept 20	# Larvae per Stem 20 stems Sept 20	% Lodged Stems Oct 10	# Lodged Stems/Plot Oct 10	Yield BU/A Oct 18
AG2802 Untreated	---	10.00ab	2.00ab	1.50ab	16.50a	38.86a
AG2802 + Fipronil ST	3 oz/100 lb seed	0.00b	0.00b	0.00b	0.00b	46.07a
AG2802 + Warrior	3.2 oz/A	11.25ab	2.25ab	0.50b	0.00b	36.77a
SS RT3851 Untreated	---	21.25a	4.25a	5.00a	8.50ab	50.50a
SSRT3851 + Fipronil ST	3 oz/100 lb seed	0.00b	0.00b	0.00b	0.00b	51.86a
SS RT3851 + Warrior	3.2 oz/A	15.00ab	3.00ab	5.00a	8.00ab	53.12a

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

Table 2. Second Harvest

Treatment	Rate	% Lodged Stems Oct 30	# Lodged Stems/Plot Oct 30	Yield BU/A Nov 1
AG2802 Untreated	---	2.50a	7.75ab	41.54a
AG2802 + Fipronil ST	3 oz/100 lb seed	0.00a	0.00b	35.76a
AG2802 + Warrior	3.2 oz/A	1.00a	9.50a	31.75a
SS RT3851 Untreated	---	0.00a	26.25a	32.73a
SSRT3851 + Fipronil ST	3 oz/100 lb seed	0.00a	0.00b	37.75a
SS RT3851 + Warrior	3.2 oz/A	3.00a	22.00a	46.51a

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