

Effect of seed and foliar insecticide treatments on infestation incidence and yield reduction by *Dectes* stem borer (*Dectes texanus texanus* LeConte (Coleoptera: Cerambycidae)) in Kentucky grown soybean in 2007

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WARNING: Data from non-registered pesticides are included in this report. In no way should anyone interpret the inclusion of these products as a recommendation for their use on soybeans. The reader is reminded that the label is a legal document. As always, a pesticide should only be used in strict compliance with the label.

Methods & Procedures

Plots of Asgrow, “AG3906” soybeans were established on the University of Kentucky Research and Education Center (UK-REC) Princeton, Caldwell Co. KY on 18 May 2007 using a John Deere no-till planter modified to plant sequential plots. Plots consisted of four 20'-long sections of rows with 30" spacing in a no-tillage seed bed which was seeded at a rate of ten seeds per row-ft. Four non-treatment rows were planted around the complete circumference of the study. Standard agricultural practices for fertility and weed control were used.

The study was planted as a randomized complete block design (Steel and Tory 1960) with four replications. Treatments were assigned randomly using SAS “Proc Plan”. Data were analyzed using “Proc GLM”. If significance was detected, mean separation was done using the “Ryan-Einot-Gabriel-Welsch” multiple-range test (SAS 2000).

Insecticide treatments are listed in Table 1.

Table 1. Insecticide treatments applied to plots of soybean for control of <i>Dectes</i> stem borer on the UK-REC in 2007.	
Insecticide	Application Type/Date
No insecticide	No application
Regent TS @ 25g ai / 100KG seed	Seed applied
Regent TS @ 49g ai / 100KG seed	Seed applied
Regent TS @ 100g ai / 100KG seed	Seed applied
Cruiser @ 50g ai/ 100KG seed	Seed applied
Warrior (1 foliar app) @ 3.8 fl oz / A	30 July 2007
Warrior (2foliar app) @ 3.8 fl oz /A	30 July & 13 Aug 2007
Regent 4SC (1 foliar app) @ 4.2 floz /A	30 July 2007
Regent 4SC (2 foliar app) @ 4.2 floz /A	30 July & 13 Aug 2007
Regent (fipronil) is a product of BASF. Cruiser (thiamethoxam) and Warrior (lambda-cyhalothrin) are products of Syngenta.	

Seed treatments were made by a commercial treater. Foliar sprays were applied using a CO₂ powered, back-pack sprayer calibrated to deliver twenty gallons per acre at 45 PSI pressure and four miles per hour. The spray boom was fitted with four 8003 nozzles on 18” centers. The single foliar application was made on 30 July, plots receiving two applications were treated on 30 July 07 and again on 13 Aug 07, based on activity of the *Dectes* adult population (Fig. 1.).

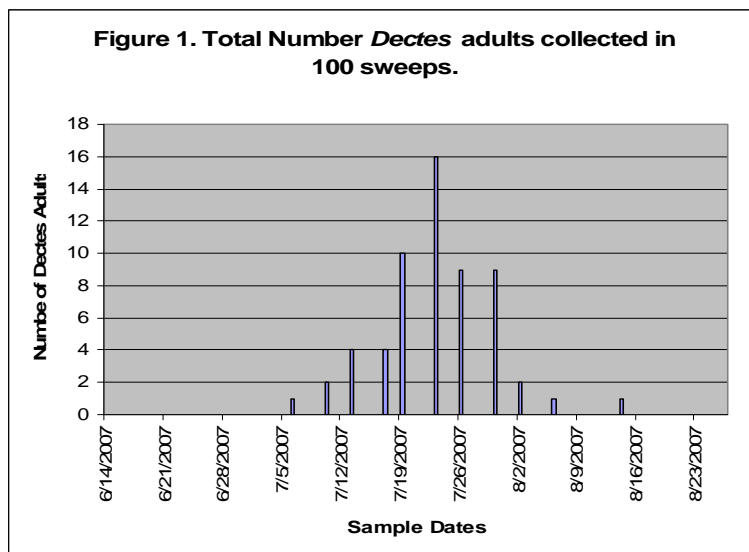
The *Dectes* population was sampled twice weekly with a 15- inch sweep net beginning 14 June 07; sampling ended on 26 Aug 07, after three successive samples produced no adults. Each sample date consisted of 100 complete figure-eight sweeps. Samples were taken from the non-treatment areas surrounding the study. These samples were used to time the foliar insecticide applications targeting the early instars of the larvae in the plants.

On 17 Sep 07, *Dectes* larval infestation data were collected. Five stems were randomly selected from each of the two outer, non-harvest rows of each plot. Each stem was split and examined for larvae or larval damage. The number of damaged and undamaged stems was recorded.

Before harvest the plots were trimmed to fifteen feet in length. On 24 Sep 07 the two center rows of each plot were harvested using a Winterstiger “delta” plot combine which supplies grain weight (lbs.) percent moisture and test weight for each plot. Plot seed weights were standardized to bushels per acre for a 60 lb bushel at 13 % moisture.

Results

Figure 1. illustrates the number of the *Dectes* beetles captured on each sampling date. The first beetle was caught on 06 July and the final capture on 14 Aug. A single peak capture occurred on 23 July.



There are significant differences among treatments with regard to the level of infestation by *Dectes* larvae (Table 2.). All Regent treatments produced a significant reduction from the “No Insecticide” plots. The Regent seed applied treatments appear to be superior to the foliar

applications. This is quite interesting in that the product is a systemic and appears to be active in a year of low rainfall. The Cruiser seed applied treatment and the Warrior foliar treatments were not significantly different from the “No insecticide” check nor from each other.

There were no significant differences in yield among treatments (Table 2.). This is somewhat unexpected given the differences in infestation level among treatments. Though there were some girdled stalks, there was no lodging at harvest. I expect that the major reason for lack of differences and the overall poor yield was lack of adequate rain fall. The 2007 production season progressed from “mild” to “extreme” drought (Agricultural Weather Center. 2007.) from planting to harvest time. At the time of harvest rainfall at these plots was 11.5” below normal for the time interval.

Table 2. Mean yield and infestation incidence in soybean plots on the UK-REC treated with various insecticides for control of <i>Dectes</i> stem borer in 2007.			
Treatment	n	Yield Bu/Ac ± SE	Mean number (± SE) uninfested stems per 10
Regent TS @ 49g ai / 100KG seed	4	29.5 ± 1.4	9.8 ± 0.3 a
Regent TS @ 25g ai / 100KG seed	4	29.8 ± 3.1	9.5 ± 0.3 ab
Regent TS @ 100g ai / 100KG seed	4	30.5 ± 1.9	9.5 ± 0.3 ab
Regent 4SC (1 foliar app) @ 4.2 floz /A	4	25.7 ± 1.9	6.5 ± 0.5 bc
Regent 4SC (2 foliar app) @ 4.2 floz /A	4	25.7 ± 4.9	6.3 ± 0.6 c
Warrior foliar (2app) @ 3.8 fl oz /A	4	31.6 ± 2.0	3.5 ± 1.3 d
No insecticide	4	29.3 ± 1.7	3.0 ± 0.7 d
Cruiser @ 50g ai/ 100KG seed	4	27.7 ± 3.3	2.8 ± 0.8 d
Warrior (1 foliar app) @ 3.8 fl oz / A	4	24.0 ± 3.3	2.2 ± 0.5 d
ANOVA		F(8,27) = 0.86; Pr>F=0.5631	F(8,27)=22.18; Pr>F=<.0001
Means followed by the same letter are not significantly different at p=0.05 level using Ryan-Einot-Gabriel-Welsch multiple-range test.			
Regent TS and Regent 4SC are NOT labeled for use on soybean.			

Summary

The Regent insecticidal treatments appear to have good suppression of *Dectes* larvae. Conversely, the reduction in *Dectes* larval infestation by Regent did not translate into increased yield. This may have been due to the over-riding reduction in expected yield by drought conditions.

References

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<http://pest.ca.uky.edu/EXT/Res/ResPubs.shtm>