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Applied Research Report

Evaluation of Economic Thresholds of Stinkbugs in Soybeans

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Summary

A trial was initiated in Calhoun County with the purpose of evaluating the economic threshold of stink bugs in soybeans. Treatments included untreated, treatment above 36 stink bugs (> ¼ inch) per 100 sweeps and treatment above 12 stink bugs (> ¼ inch) per 100 sweeps. All treatments were evaluated in soybeans from two planting dates, 14 March and 5 April. No differences were found in the early planted soybeans, indicating that late applications of insecticides need to be further investigated. The lower threshold of 12 per 100 sweeps had a greater net profit than the untreated but the 36 per 100 sweeps threshold was not different from either of the other treatments. The lowest population of stink bugs treated was 20 stink bugs per 100 sweeps. The later planted soybeans showed the need to insecticide applications for control of stink bugs at or below current recommended levels.

Objectives

The objective of this trial was to evaluate the accuracy of economic thresholds of stink bugs in soybeans. Current recommended economic threshold for stink bugs in soybeans is when the population of stink bugs larger than ¼ inch exceeds 36 per 100 sweeps.

Materials and Methods

A trial was initiated in Calhoun County with the purpose of evaluating the economic threshold of stink bugs in soybeans that is found in the Texas Cooperative Extension publication B-1501, “Managing Soybean Insects”. Treatments included the following:

1) Untreated
2) Treatment above 36 stink bugs (> ¼ inch) per 100 sweeps (36/100)
3) Treatment above 12 stink bugs (> ¼ inch) per 100 sweeps (12/100)

The soybean variety 5123 was planted on 14 March and 5 April. Plot size was 6 rows with a row width of 38 inches, 50 feet long. The second and fifth rows of the plots were sampled using a heavy duty 15 inch sweep net. Treatments were applied using a backpack sprayer with hollow cone TX-4 nozzles calibrated at 7 gallons per acre using a pressure of 28 psi and a speed of 3 miles per hour. Orthene 90 was used for all applications at a rate of 1 lb/A.

The early planted soybeans required one application for the 36/100 sweeps threshold on 29 June, and two applications for the 12/100 sweeps threshold on 17 and 29 June (Table 1). Harvest occurred on 13 July. Thus the 36/100 threshold was applied 14 days prior to harvest.

The late planted soybeans required one application for the 36/100 sweeps threshold on 8 July, and three applications for the 12/100 sweeps threshold on 29 June, 8 and 26 July (Table 2). Harvest occurred on 13 August. Thus the last application was required 20 days prior to harvest.

The third and fourth rows were harvested for yield and quality. Harvest dates were 13 July and 14 August for the early and late planted beans, respectively.

Results

Early Planting Date

Yield and yield quality parameters were analyzed for statistical differences for the early planting. There were no differences except for percent damaged kernels. This, however, did not have an adverse impact on the value of the soybeans. Yields were good with the return on investment of the insecticide application resulting in no net profits over the untreated soybeans (Tables 1, 2 & 3).

Late Planting Date

Statistical differences between treatments were found for most of the harvest parameters measured. The untreated had a bushel weight 3.6 and 5 lbs/bu less than the 36/100 and 12/100 treatments. The untreated also had 25.2% damaged kernels compared to 3.9 and 2.3 for the 36/100 and 12/100 treatments. One of the three untreated plots had sour beans and all three graded “Sample” indicating that they could be refused at the elevator due to poor quality.

The quality parameters resulted in a loss of value to the untreated soybeans. Using a base of $6.20 per bushel (bu) of soybeans, the untreated soybeans had a value of $4.89/bu (Table 6). This loss of value and a yield of only 34.5 bu/a resulted in a net return of $139.65 less than the 12/100 treatment. While a large numerical difference in yield and net return existed between the untreated and the 36/100 treatment, this difference could be due to random effects not accounted for in this trial.

Discussion

The lack of differences in the early planted soybeans indicates that application of

insecticides for stink bug control within 14-20 days of harvest may not result in preventing yield losses with a value greater than the cost of the control. However, the late planted soybeans show the need for in season treatments at or below current recommended Extension Economic Thresholds. The lowest population treated in the late planted soybeans was 20 stink bugs per 100 sweeps. Populations below this level were not treated in this trial and thus it cannot be determined from this trial if the economic threshold should be lower.

Keep in mind that this is only one trial in one year. In order to more fully understand this problem, additional studies must be conducted and repeated for several years.

Table 1. Number of stink bugs per 100 sweeps during the sampling period for the early planted soybeans.

	10 June	17 June	29 June	5 July
Untreated	8	24	48	63.8
36 per 100 Sweeps	8	24	*49	5.8
12 per 100 Sweeps	8	*24	*23	5.3

* indicates treatment timings.

Table 2. Soybean quality parameters for the early planted soybeans.

	Corrected Bushel Weight Lbs/bu - 10%		Foreign Matter %		Damaged Kernels %		Splits %		Grade	
Untreated	56.8	a	1	a	2.2	a	2.0	a	1.7	a
36 bugs/100 Swps (>0.25")	57.5	a	0.7	a	1.2	b	2.0	a	1.0	b
12 bugs/100 Swps (>0.25")	57.7	a	0.6	a	1.1	b	2.5	a	1.0	b
LSD (P=.10)	1.36		0.35		0.74		0.90		0.42	
Treatment Prob(F)	0.417		0.1509		0.0525		0.4871		0.0388	

Table 3. Yield, value and gross and net return for the early planted soybeans.

	Yield bu/ac		Value $/bu		Gross Return $/acre		Application Cost $/acre	Net Return $/acre	
Untreated	48.82	a	6.18	a	302.09	a	0.00	302.09	a
36 bugs/100 Swps (>0.25")	48.92	a	6.20	a	303.32	a	10.00	293.32	a
12 bugs/100 Swps (>0.25")	51.26	a	6.20	a	317.81	a	20.00	297.81	a
LSD (P=.10)	7.24		0.01		44.81			44.81	
Treatment Prob(F)	0.7568		0.1413		0.747			0.9264	

Table 4. Number of stink bugs per 100 sweeps during the sampling period for the late planted soybeans.

	29 June	3 July	8 July	18 July	26 July	1 August
Untreated	20	24	111.7	105	55	25
36 per 100 Sweeps	20	30.3	*61.7	11.7	20	15
12 per 100 Sweeps	*20	6.7	*28.3	16.7	*25	1.7

* indicates treatment timings.

Table 5. Soybean quality parameters for the late planted soybeans.

	Corrected Bushel Weight Lbs/bu - 10%		Foreign Matter %		Damaged Kernels %		Splits %		Grade	
Untreated	51.8	b	1.2	a	25.2	a	3.0	a	Sample	c
36 bugs/100 Swps (>0.25")	55.4	a	1.2	a	3.9	b	2.3	a	3	b
12 bugs/100 Swps (>0.25")	56.8	a	0.6	b	2.4	b	2.3	a	2	a
LSD (P=.10)	1.58		0.48		13.91		0.58		0	
Treatment Prob(F)	0.0058		0.0707		0.0426		0.1111		1.0000	

Table 6. Yield, value and gross and net return for the late planted soybeans.

	Yield bu/ac		Value $/bu		Gross Return $/acre		Application Cost $/acre	Net Return $/acre	
Untreated	34.5	b	4.89	b	172.68	b	0.00	172.68	b
36 bugs/100 Swps (>0.25")	43.6	ab	6.14	a	267.67	a	10.00	257.67	ab
12 bugs/100 Swps (>0.25")	55.4	a	6.18	a	342.33	a	30.00	312.33	a
LSD (P=.10)	13.35		0.89		94.92			94.92	
Treatment Prob(F)	0.0693		0.0601		0.0463			0.0817	

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