

Report

2010 Soybean Insect Losses for Mississippi, Tennessee, and Arkansas

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Abstract Survey-based soybean insect losses provide a glimpse of current soybean management practices and allow the detection of evolving trends. This survey was initiated in Mississippi in 2004, Tennessee in 2008, and Arkansas in 2009. The 2010 survey shows stink bugs and corn earworm caused similar amounts of damage in the region. Combined, these two insects caused more than half of all insect losses in 2010. Insect scouting and the adoption of seed treatments were at similar levels compared to 2009.

Key Words: soybean, yield loss, pest management

Introduction

Soybean losses have been compiled annually since 2004 in Mississippi (Musser and Catchot 2008), since 2008 in Tennessee (Musser et al. 2009), and since 2009 in Arkansas (Musser et al. 2010), providing an annual record of insect pressure and management decisions. These estimates are based on surveys of consultants and extension personnel, similar to those used to estimate insect losses in cotton (Williams 2006). While the costs and losses estimated for a pest in any given year are somewhat subjective, these losses provide an historical record of pest pressure and management practices, and also provide an estimate of the economic impact of the various soybean pests.

Materials and Methods

A telephone or written survey was conducted with numerous crop consultants and extension personnel in the fall of the year. The survey was limited to people who actively scouted soybean fields and those who assisted growers in making soybean pest management decisions. These surveys were compiled and then combined with our own experience to estimate the various fields in the table. Acreage, yield, and

price data were drawn from Agricultural Statistics Service publications (USDA NASS). The estimates were placed in an Excel spreadsheet (Microsoft Office 2003, Microsoft Corp.) to make the various calculations. The actual formulas used in the spreadsheet were published by Musser and Catchot (2008).

Results and Discussion

After several years of substantial increases in soybean acreage and use of seed treatments and crop consultants, there were few changes from 2009 to 2010 in Mississippi, Tennessee, or Arkansas (Table 1). Mississippi growers more intensively managed their crop than did growers in Arkansas and Tennessee, as Mississippi had a higher level of seed treatment adoption, a higher percentage of acres scouted, and applied more foliar insecticides. These higher levels of management in Mississippi resulted in lower estimated yield losses attributed to insects (4.5%) compared to Arkansas (13.8%) and Tennessee (7.9%). Percent yield loss from insects continued to decline in 2010 in Mississippi. However, there were sharp increases in both Tennessee and Arkansas, largely attributed to damage from corn earworm. In spite of reduced insect losses in MS, total loss plus cost due to insects was higher than any previous year of the survey in all states, at least partially a result of higher prices for soybeans during 2010.

Table 1. Average soybean management and performance, 2004–2010. Values reported often differ slightly from earlier published losses due to changes in NASS yield and price estimates.

Year	Acres (million) ¹	Yield (bu/ac) ²	Price (\$/bu)	% acres scouted	% acres with insect seed trt.	No. foliar insecticide applications	% yield loss to insects	\$ loss + cost/ac
Mississippi								
2004	1.67	37.5	6.20	10	0	0.89	8.09	25.46
2005	1.61	36.5	5.92	11	0	0.71	5.89	17.61
2006	1.67	26.0	6.23	15	0.01	1.04	6.12	19.12
2007	1.46	40.5	8.36	25	2	2.10	6.83	42.73
2008	2.00	40.0	9.29	55	50	2.41	5.11	50.99
2009	2.16	38.0	9.15	75	65	2.11	4.52	46.68
2010	2.00	39.0	10.00 ³	75	70	2.47	4.45	52.91
Tennessee								
2008	1.49	34.0	9.45	20	40	1.00	4.33	26.82
2009	1.57	45.0	9.65	30	50	0.32	2.19	18.50
2010	1.45	32.0	10.00 ³	33	47	0.93	7.75	39.42
Arkansas								
2009	3.42	37.5	9.60	65	40	1.37	4.34	35.03
2010	3.19	35.0	10.00 ³	60	51	1.35	13.51	73.12

¹ 1 acre = 0.405 ha

² 1 bu/ac = 67.2 kg/ha

³ Estimate

Stink bugs (Hemiptera: Pentatomidae) were always the primary pests in all states surveyed until this year. While still the primary foliar insecticide target in the region, several pests were more frequently sprayed than stink bugs in Mississippi. Stink bug pressure was lower in Mississippi during 2010 than in previous years while pressure in Arkansas and Tennessee was similar to previous years as reflected in the number of foliar applications directed at these pests (Table 2). The redbanded stink bug (*Piezodorus guildinii*), which was a substantial part of the stink bug complex in Mississippi and Arkansas during 2009, was largely absent from both states in 2010. Applications targeting corn earworm (*Helicoverpa zea*), soybean looper (*Chrysodeixis includens*), and bean leaf beetle (*Cerotoma trifurcata*) increased in all states compared to previous years. Saltmarsh caterpillar (*Estigmene acrea*) was one of the five most targeted insects overall during 2010 for the first time due to infestations in Mississippi and Arkansas. Applications targeting the threecornered alfalfa hopper (*Spissistilus festinus*) were lower in 2010 compared to past years in all states. The gray looper moth (*Rachiplusia ou*) was added to the list for 2010 due to some

early season spraying targeting this insect in Mississippi and Arkansas. This is the first year since this survey began that the gray looper moth was the target of any insecticide applications in soybeans.

Table 2. Foliar insecticide use (No. applications per soybean acre) on major soybean pests during in Mississippi, Tennessee and Arkansas.

Pest	MS		TN		AR		Overall	
	2004– 2009	2010	2008– 2009	2010	2009	2010	2009	2010
Stink bug	0.729	0.385	0.422	0.641	0.322	0.379	0.478	0.438
Corn earworm	0.088	0.630	0.008	0.116	0.274	0.329	0.228	0.373
Soybean looper	0.184	0.420	0.007	0.099	0.088	0.207	0.133	0.247
Bean leaf beetle	0.262	0.540	0.006	0.003	0.050	0.043	0.075	0.184
Saltmarsh caterpillar	0.005	0.110	0.000	0.000	0.000	0.094	0.000	0.078
Armyworms	0.008	0.065	0.006	0.021	0.199	0.094	0.110	0.069
Threecornered alfalfa hopper	0.231	0.135	0.088	0.001	0.146	0.008	0.166	0.045
All insects	1.547	2.466	0.662	0.925	1.371	1.346	1.364	1.591

The ranks in 2010 overall losses plus costs (Table 3) mirror the number of insecticide applications (Table 2), with stink bugs causing the most losses closely followed by corn earworm and soybean looper. Total insect costs in losses and control measures were nearly double the costs of 2009. Insecticide costs increased only \$3.53/ac, with the balance of the change due to higher estimated insect losses and higher value of the soybeans lost to insects.

Table 3. Estimated losses plus management costs (\$/ac) due to insect pests in Mississippi, Tennessee, and Arkansas. Management costs do not include seed treatments and scouting fees.

Pest	MS		TN		AR		Overall	
	2004– 2009	2010	2008– 2009	2010	2009	2010	2009	2010
Stink bug	14.65	6.32	10.35	17.11	8.51	17.02	9.69	13.90
Corn earworm	1.93	12.41	1.51	6.16	7.09	18.50	6.26	13.77
Soybean looper	4.56	8.51	0.19	5.80	1.08	13.96	2.40	10.46
Bean leaf beetle	3.76	6.93	0.28	0.17	1.24	2.35	1.43	3.18
Saltmarsh caterpillar	0.07	2.54	0.00	0.00	0.00	3.80	0.02	2.53
Armyworms	0.19	0.93	0.29	2.69	2.91	3.32	1.71	2.50
Threecornered alfalfa hopper	4.03	1.92	2.28	0.36	2.19	0.66	2.40	0.97
All insects	30.66	43.21	17.76	34.38	27.00	65.73	26.85	51.76

References

- Musser, F. R., and A. Catchot. 2008.** Mississippi soybean insect losses. *Midsouth Entomol.* 1: 29-36.
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- USDA NASS.** NASS Data and Statistics, http://www.nass.usda.gov/Data_and_Statistics/Quick_Stats/index.asp.
- Williams, M. R. 2006.** Cotton insect losses, <http://www.msstate.edu/Entomology/Cotton.html>.

Appendix 1. Overall soybean insect losses from Mississippi, Tennessee, and Arkansas, 2010.

Pest	Acres Infested	% Acres Infested	Acres Treated	% Acres Treated	# of apps/acres treated	Cost of 1 Insecticide	% loss per acre infested	# of apps per total soy acres	cost/acre	Overall % reduction	bushel lost per pest	Loss + Cost	Loss + Cost/acre	% Total Loss + Cost
Armyworm complex	1,530,000	23.0%	461,000	6.9%	1.00	7.80	2.16	0.069	\$0.54	0.50%	1,298,161	\$16,576,863	\$2.50	4.8%
Banded Cucumber Beetle	500,000	7.5%	2,100	0.0%	1.00	8.50	0.01	0.000	\$0.00	0.00%	1,769	\$35,539	\$0.01	0.0%
Bean Leaf Beetle	5,890,000	88.7%	730,000	11.0%	1.67	9.56	0.41	0.184	\$1.76	0.36%	945,368	\$21,136,510	\$3.18	6.2%
Blister Beetle	855,000	12.9%	95,600	1.4%	1.00	7.45	0.46	0.014	\$0.11	0.06%	153,303	\$2,245,529	\$0.34	0.7%
Corn Earworm	3,800,000	57.2%	1,470,000	22.1%	1.69	8.59	4.70	0.373	\$3.21	2.69%	7,016,557	\$91,456,139	\$13.77	26.6%
Cutworms	144,000	2.2%	10,000	0.2%	1.00	4.00	0.01	0.002	\$0.01	0.00%	373	\$43,734	\$0.01	0.0%
Dectes Stem Borer	3,600,000	54.2%	26,000	0.4%	1.00	7.51	0.00	0.004	\$0.03	0.00%	0	\$195,250	\$0.03	0.1%
Garden Webworms	940,000	14.2%	395,400	6.0%	1.00	7.53	1.06	0.060	\$0.45	0.15%	392,298	\$6,901,082	\$1.04	2.0%
Grape Colaspis	2,625,000	39.5%	0	0.0%	0.00	0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Grasshopper	4,695,000	70.7%	36,200	0.5%	1.00	7.42	0.08	0.005	\$0.04	0.06%	152,124	\$1,789,687	\$0.27	0.5%
Green Cloverworm	5,790,000	87.2%	250,000	3.8%	1.00	9.13	0.15	0.038	\$0.34	0.13%	340,018	\$5,682,680	\$0.86	1.7%
Lesser Cornstalk Borer	315,000	4.7%	0	0.0%	0.00	0.00	5.12	0.000	\$0.00	0.24%	633,849	\$6,338,486	\$0.95	1.8%
Mexican Bean Beetle	0	0.0%	0	0.0%	0.00	0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Potato Leafhopper	2,610,000	39.3%	0	0.0%	0.00	0.00	0.00	0.000	\$0.00	0.00%	1,179	\$11,793	\$0.00	0.0%
Saltmarsh Caterpillar	3,090,000	46.5%	500,300	7.5%	1.04	9.60	0.97	0.078	\$0.75	0.45%	1,179,253	\$16,787,225	\$2.53	4.9%
Soybean Aphid	221,500	3.3%	550	0.0%	1.00	0.00	0.03	0.000	\$0.00	0.00%	2,752	\$27,516	\$0.00	0.0%
Soybean Looper	5,100,000	76.8%	1,430,000	21.5%	1.15	10.89	2.57	0.247	\$2.69	1.97%	5,153,337	\$69,421,385	\$10.46	20.2%
Spider Mites	1,975,000	29.7%	27,000	0.4%	1.00	7.61	0.20	0.004	\$0.03	0.06%	158,216	\$1,787,665	\$0.27	0.5%
Spotted Cucumber Beetle	3,890,000	58.6%	900	0.0%	1.00	9.50	0.08	0.000	\$0.00	0.05%	128,146	\$1,290,005	\$0.19	0.4%
Stink Bugs	5,740,000	86.4%	2,425,000	36.5%	1.20	8.15	3.04	0.438	\$3.57	2.63%	6,859,323	\$92,300,730	\$13.90	26.9%
Threecornered Alfalfa Hopper	5,890,000	88.7%	296,000	4.5%	1.00	9.33	0.16	0.045	\$0.42	0.14%	367,927	\$6,439,770	\$0.97	1.9%
Thrips	6,440,000	97.0%	53,100	0.8%	1.00	6.45	0.03	0.008	\$0.05	0.03%	83,688	\$1,179,127	\$0.18	0.3%
Velvetbean Caterpillar	218,000	3.3%	4,600	0.1%	1.00	7.89	0.73	0.001	\$0.01	0.02%	62,894	\$665,210	\$0.10	0.2%
Other: Gray Looper Moth	520,000	7.8%	135,000	2.0%	1.00	7.99	0.13	0.020	\$0.16	0.01%	27,516	\$1,354,159	\$0.20	0.4%
								1.591	\$14.17	9.56%	24,958,050	\$343,666,084	\$51.76	100.0%

SUMMARY DATA

Data Input	
State	Combined
Year	2010
Total Acres	6,640,000
Yield/acre	35.55
Price/Bushel	10.00
% Acres Scouted	58.62
Scouting Fee/scouted acre	6.11
% Acres Insect Seed Trt.	55.85
Seed Trt Cost/treated ac	7.47

Yield & Management Results	
Total Bushels Harvested	236,050,000
Total Bushels Lost to Insects	24,958,050
Percent Yield Loss	9.56%
Yield w/o Insects	39.31
Ave. # Spray Applications	1.591
Seed Treated Acres	3,708,400
Scouted Acres	3,892,500

Economic Results		
	Total	Per Acre
Foliar Insecticides Costs	\$94,085,588	\$14.17
Seed Treatment Costs	\$27,718,050	\$4.17
Scouting costs	\$23,769,000	\$3.58
Total Costs	\$145,572,638	\$21.92
Yield Lost to insects	\$249,580,496	\$37.59
Total Losses + Costs	\$395,153,134	\$59.51

Appendix 2. Mississippi soybean insect losses, 2010.

Pest	Acres Infested	% Acres Infested	Acres Treated	% Acres Treated	# of apps/acres treated	Cost of 1 Insecticide	% loss per acre infested	# of apps per total soy acres	cost/acre	Overall % reduction	bushel lost per pest	Loss + Cost	Loss + Cost/acre	% Total Loss + Cost	
Armyworm complex	460,000	23.0%	130,000	6.5%	1	\$8.50	0.40	0.065	\$0.55	0.09%	75,106	\$1,856,059	\$0.93	2.1%	
Banded Cucumber Beetle	450,000	22.5%	2,100	0.1%	1	\$8.50	0.01	0.001	\$0.01	0.00%	1,837	\$36,218	\$0.02	0.0%	
Bean Leaf Beetle	1,500,000	75.0%	600,000	30.0%	1.8	\$10.00	0.50	0.540	\$5.40	0.38%	306,138	\$13,861,381	\$6.93	16.0%	
Blister Beetle	50,000	2.5%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%	
Corn Earworm	900,000	45.0%	600,000	30.0%	2.1	\$9.50	3.50	0.630	\$5.99	1.58%	1,285,780	\$24,827,799	\$12.41	28.7%	
Cutworms	14,000	0.7%	0	0.0%	0	\$4.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%	
Dectes Stem Borer	600,000	30.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%	
Garden Webworms	300,000	15.0%	25,000	1.3%	1	\$8.00	0.10	0.013	\$0.10	0.02%	12,246	\$322,455	\$0.16	0.4%	
Grape Colaspis	45,000	2.3%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%	
Grasshopper	55,000	2.8%	3,200	0.2%	1	\$6.00	0.05	0.002	\$0.01	0.00%	1,123	\$30,425	\$0.02	0.0%	
Green Cloverworm	1,150,000	57.5%	200,000	10.0%	1	\$9.50	0.50	0.100	\$0.95	0.29%	234,706	\$4,247,059	\$2.12	4.9%	
Lesser Cornstalk Borer	15,000	0.8%	0	0.0%	0	\$0.00	7.50	0.000	\$0.00	0.06%	45,921	\$459,207	\$0.23	0.5%	
Mexican Bean Beetle	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%	
Potato Leafhopper	300,000	15.0%	0	0.0%	0	\$7.50	0.01	0.000	\$0.00	0.00%	1,225	\$12,246	\$0.01	0.0%	
Saltmarsh Caterpillar	600,000	30.0%	200,000	10.0%	1.1	\$12.00	1.00	0.110	\$1.32	0.30%	244,910	\$5,089,105	\$2.54	5.9%	
Soybean Aphid	1,500	0.1%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%	
Soybean Looper	1,700,000	85.0%	700,000	35.0%	1.2	\$12.00	1.00	0.420	\$5.04	0.85%	693,913	\$17,019,130	\$8.51	19.7%	
Spider Mites	25,000	1.3%	0	0.0%	0	\$9.00	0.50	0.000	\$0.00	0.01%	5,102	\$51,023	\$0.03	0.1%	
Spotted Cucumber Beetle	700,000	35.0%	900	0.0%	1	\$9.50	0.01	0.000	\$0.00	0.00%	2,857	\$37,123	\$0.02	0.0%	
Stink Bugs	1,100,000	55.0%	550,000	27.5%	1.4	\$10.00	1.10	0.385	\$3.85	0.61%	493,903	\$12,639,028	\$6.32	14.6%	
Threecornered Alfalfa Hopper	1,250,000	62.5%	270,000	13.5%	1	\$9.50	0.25	0.135	\$1.28	0.16%	127,558	\$3,840,575	\$1.92	4.4%	
Thrips	1,800,000	90.0%	3,100	0.2%	1	\$7.50	0.02	0.002	\$0.01	0.02%	14,695	\$170,196	\$0.09	0.2%	
Velvetbean Caterpillar	160,000	8.0%	3,500	0.2%	1	\$8.00	1.00	0.002	\$0.01	0.08%	65,309	\$681,095	\$0.34	0.8%	
Other: Gray Looper Moth	300,000	15.0%	125,000	6.3%	1	\$8.00	0.20	0.063	\$0.50	0.03%	24,491	\$1,244,910	\$0.62	1.4%	
									2.466	\$25.03	4.45%	3,636,818	\$86,425,032	\$43.21	100.0%

SUMMARY DATA

Data Input	
State	MS
Year	2010
Total Acres	2,000,000
Yield/acre	39
Price/Bushel	\$10.00
% Acres Scouted	75
Scouting Fee/scouted acre	\$5.00
% Acres Insect Seed Trt.	70
Seed Trt Cost/treated ac	\$8.50

Yield & Management Results	
Total Bushels Harvested	78,000,000
Total Bushels Lost to Insects	3,636,818
Percent Yield Loss	4.45%
Yield w/o Insects	40.82
Ave. # Spray Applications	2.466
Seed Treated Acres	1,400,000
Scouted Acres	1,500,000

Economic Results		
	Total	Per Acre
Foliar Insecticides Costs	\$50,056,850	\$25.03
Seed Treatment Costs	\$11,900,000	\$5.95
Scouting costs	\$7,500,000	\$3.75
Total Costs	\$69,456,850	\$34.73
Yield Lost to insects	\$36,368,182	\$18.18
Total Losses + Costs	\$105,825,032	\$52.91

Appendix 3. Tennessee soybean insect losses, 2010.

Pest	Acres Infested	% Acres Infested	Acres Treated	% Acres Treated	# of apps/acres treated	Cost of 1 Insecticide	% loss per acre infested	# of apps per total soy acres	cost/acre	Overall % reduction	bushel lost per pest	Loss + Cost	Loss + Cost/acre	% Total Loss + Cost			
Armyworm complex	320,000	22.1%	31,000	2.1%	1	\$7.75	3.30	0.021	\$0.17	0.73%	366,319	\$3,903,435	\$2.69	7.8%			
Banded Cucumber Beetle	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%			
Bean Leaf Beetle	1,200,000	82.8%	5,000	0.3%	1	\$7.75	0.05	0.003	\$0.03	0.04%	20,814	\$246,886	\$0.17	0.5%			
Blister Beetle	25,000	1.7%	600	0.0%	1	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%			
Corn Earworm	400,000	27.6%	120,000	8.3%	1.4	\$7.75	5.50	0.116	\$0.90	1.52%	763,164	\$8,933,636	\$6.16	17.9%			
Cutworms	35,000	2.4%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%			
Dectes Stem Borer	1,000,000	69.0%	1,000	0.1%	1	\$7.75	0.00	0.001	\$0.01	0.00%	0	\$7,750	\$0.01	0.0%			
Garden Webworms	40,000	2.8%	400	0.0%	1	\$7.75	1.70	0.000	\$0.00	0.05%	23,589	\$238,987	\$0.16	0.5%			
Grape Colaspis	330,000	22.8%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%			
Grasshopper	1,450,000	100.0%	7,000	0.5%	1	\$7.75	0.10	0.005	\$0.04	0.10%	50,299	\$557,244	\$0.38	1.1%			
Green Cloverworm	1,450,000	100.0%	30,000	2.1%	1	\$7.75	0.20	0.021	\$0.16	0.20%	100,599	\$1,238,488	\$0.85	2.5%			
Lesser Cornstalk Borer	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%			
Mexican Bean Beetle	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%			
Potato Leafhopper	10,000	0.7%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%			
Saltmarsh Caterpillar	90,000	6.2%	300	0.0%	1	\$9.00	0.00	0.000	\$0.00	0.00%	0	\$2,700	\$0.00	0.0%			
Soybean Aphid	70,000	4.8%	550	0.0%	1	\$0.00	0.10	0.000	\$0.00	0.00%	2,428	\$24,282	\$0.02	0.0%			
Soybean Looper	700,000	48.3%	130,000	9.0%	1.1	\$11.30	2.80	0.099	\$1.11	1.35%	679,909	\$8,414,994	\$5.80	16.9%			
Spider Mites	450,000	31.0%	2,000	0.1%	1	\$9.00	0.20	0.001	\$0.01	0.06%	31,220	\$330,203	\$0.23	0.7%			
Spotted Cucumber Beetle	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%			
Stink Bugs	1,450,000	100.0%	775,000	53.4%	1.2	\$7.75	3.50	0.641	\$4.97	3.50%	1,760,480	\$24,812,297	\$17.11	49.8%			
Threecornered Alfalfa Hopper	1,450,000	100.0%	2,000	0.1%	1	\$7.75	0.10	0.001	\$0.01	0.10%	50,299	\$518,494	\$0.36	1.0%			
Thrips	1,450,000	100.0%	20,000	1.4%	1	\$6.20	0.10	0.014	\$0.09	0.10%	50,299	\$626,994	\$0.43	1.3%			
Velvetbean Caterpillar	8,000	0.6%	100	0.0%	1	\$7.75	0.00	0.000	\$0.00	0.00%	0	\$775	\$0.00	0.0%			
Other: Gray Looper Moth	20,000	1.4%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%			
											0.925	\$7.49	7.75%	3,899,419	\$49,857,166	\$34.38	100.0%

SUMMARY DATA

Data Input	
State	TN
Year	2010
Total Acres	1,450,000
Yield/acre	32
Price/Bushel	\$10.00
% Acres Scouted	33
Scouting Fee/scouted acre	\$6.00
% Acres Insect Seed Trt.	47
Seed Trt Cost/treated ac	\$6.50

Yield & Management Results	
Total Bushels Harvested	46,400,000
Total Bushels Lost to Insects	3,899,419
Percent Yield Loss	7.75%
Yield w/o Insects	34.69
Ave. # Spray Applications	0.925
Seed Treated Acres	681,500
Scouted Acres	478,500

Economic Results		
	Total	Per Acre
Foliar Insecticides Costs	\$10,862,975	\$7.49
Seed Treatment Costs	\$4,429,750	\$3.06
Scouting costs	\$2,871,000	\$1.98
Total Costs	\$18,163,725	\$12.53
Yield Lost to insects	\$38,994,191	\$26.89
Total Losses + Costs	\$57,157,916	\$39.42

Appendix 4. Arkansas soybean insect losses, 2010.

Pest	Acres Infested	% Acres Infested	Acres Treated	% Acres Treated	# of apps/acres treated	Cost of 1 Insecticide	% loss per acre infested	# of apps per total soy acres	cost/acre	Overall % reduction	bushel lost per pest	Loss + Cost	Loss + Cost/acre	% Total Loss + Cost
Armyworm complex	750,000	23.5%	300,000	9.4%	1	\$7.50	2.75	0.094	\$0.71	0.65%	835,376	\$10,603,765	\$3.32	5.1%
Banded Cucumber Beetle	50,000	1.6%	0	0.0%	1	\$8.50	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Bean Leaf Beetle	3,190,000	100.0%	125,000	3.9%	1.1	\$7.50	0.50	0.043	\$0.32	0.50%	646,024	\$7,491,495	\$2.35	3.6%
Blister Beetle	780,000	24.5%	95,000	3.0%	1	\$7.50	0.50	0.030	\$0.22	0.12%	157,962	\$2,292,121	\$0.72	1.1%
Corn Earworm	2,500,000	78.4%	750,000	23.5%	1.4	\$8.00	5.00	0.329	\$2.63	3.92%	5,062,888	\$59,028,877	\$18.50	28.2%
Cutworms	95,000	3.0%	10,000	0.3%	1	\$4.00	0.01	0.003	\$0.01	0.00%	385	\$43,848	\$0.01	0.0%
Dectes Stem Borer	2,000,000	62.7%	25,000	0.8%	1	\$7.50	0.00	0.008	\$0.06	0.00%	0	\$187,500	\$0.06	0.1%
Garden Webworms	600,000	18.8%	370,000	11.6%	1	\$7.50	1.50	0.116	\$0.87	0.28%	364,528	\$6,420,279	\$2.01	3.1%
Grape Colaspis	2,250,000	70.5%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Grasshopper	3,190,000	100.0%	26,000	0.8%	1	\$7.50	0.08	0.008	\$0.06	0.08%	96,904	\$1,164,037	\$0.36	0.6%
Green Cloverworm	3,190,000	100.0%	20,000	0.6%	1	\$7.50	0.00	0.006	\$0.05	0.00%	0	\$150,000	\$0.05	0.1%
Lesser Cornstalk Borer	300,000	9.4%	0	0.0%	0	\$0.00	5.00	0.000	\$0.00	0.47%	607,547	\$6,075,465	\$1.90	2.9%
Mexican Bean Beetle	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Potato Leafhopper	2,300,000	72.1%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Saltmarsh Caterpillar	2,400,000	75.2%	300,000	9.4%	1	\$8.00	1.00	0.094	\$0.75	0.75%	972,074	\$12,120,744	\$3.80	5.8%
Soybean Aphid	150,000	4.7%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Soybean Looper	2,700,000	84.6%	600,000	18.8%	1.1	\$9.50	3.50	0.207	\$1.97	2.96%	3,827,543	\$44,545,431	\$13.96	21.2%
Spider Mites	1,500,000	47.0%	25,000	0.8%	1	\$7.50	0.20	0.008	\$0.06	0.09%	121,509	\$1,402,593	\$0.44	0.7%
Spotted Cucumber Beetle	3,190,000	100.0%	0	0.0%	0	\$0.00	0.10	0.000	\$0.00	0.10%	129,205	\$1,292,049	\$0.41	0.6%
Stink Bugs	3,190,000	100.0%	1,100,000	34.5%	1.1	\$7.50	3.50	0.379	\$2.84	3.50%	4,522,171	\$54,296,713	\$17.02	25.9%
Threecornered Alfalfa Hopper	3,190,000	100.0%	24,000	0.8%	1	\$7.50	0.15	0.008	\$0.06	0.15%	193,807	\$2,118,073	\$0.66	1.0%
Thrips	3,190,000	100.0%	30,000	0.9%	1	\$6.50	0.01	0.009	\$0.06	0.01%	12,920	\$324,205	\$0.10	0.2%
Velvetbean Caterpillar	50,000	1.6%	1,000	0.0%	1	\$7.50	0.00	0.000	\$0.00	0.00%	0	\$7,500	\$0.00	0.0%
Other: Gray Looper Moth	200,000	6.3%	10,000	0.3%	1	\$7.90	0.05	0.003	\$0.02	0.00%	4,050	\$119,503	\$0.04	0.1%
								1.346	\$10.70	13.59%	17,554,895	\$209,684,199	\$65.73	100.0%

SUMMARY DATA

Data Input		Yield & Management Results		Economic Results	
State	AR	Total Bushels Harvested	111,650,000	Total	Per Acre
Year	2010	Total Bushels Lost to Insects	17,554,895	Foliar Insecticides Costs	\$34,135,250
Total Acres	3,190,000	Percent Yield Loss	13.59%	Seed Treatment Costs	\$11,388,300
Yield/acre	35	Yield w/o Insects	40.50	Scouting costs	\$13,398,000
Price/Bushel	\$10.00	Ave. # Spray Applications	1.346	Total Costs	\$58,921,550
% Acres Scouted	60	Seed Treated Acres	1,626,900	Yield Lost to insects	\$175,548,949
Scouting Fee/scouted acre	\$7.00	Scouted Acres	1,914,000	Total Losses + Costs	\$234,470,499
% Acres Insect Seed Trt.	51				
Seed Trt Cost/treated ac	\$7.00				