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Report

2013 Soybean Insect Losses in the Southern US

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Abstract Survey-based soybean insect losses were collected following the 2013 growing season to provide a record of insect pressure and soybean management practices for the year. This survey has been conducted annually in all participating states for at least the last 3 years and has been conducted in Mississippi for 10 years. The 2013 survey represents more than 10 million soybean acres across the southern United States. Overall, the 2013 survey showed corn earworm to be the most costly insect pest in the region for the third consecutive year. The stink bug complex and soybean looper were the second and third most costly insect pests, respectively. The proportion of soybean fields scouted remained at 61% while the proportion of soybeans planted with insecticide seed treatments increased to 66%. Estimated yield losses from insects during 2013 were 3.86%, or \$22.98/acre. An additional \$25.72/acre was spent on insect monitoring and protection, giving total insect losses plus costs of \$48.70/acre during 2013, lower than the impact of insects during each of the previous 3 years.

Key Words: soybean, yield loss, pest management

Introduction

Soybean losses have been compiled annually since 2004 in Mississippi (MS) (Musser and Catchot 2008), 2008 in Tennessee (TN) (Musser et al. 2009), 2009 in Arkansas (AR) (Musser et al. 2010), and 2011 in Alabama (AL), Louisiana (LA), North Carolina (NC) and Virginia (VA) (Musser et al. 2012). These survey-based losses provide an annual record of insect pressure and management decisions. 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 provide an estimate of the economic impact of the various soybean pests. Over time, the changes in estimated losses and insecticide applications provide a reliable record of shifts in pest spectrums and grower management.

Materials and Methods

An informal telephone or written survey was conducted with numerous crop consultants and extension personnel in the fall of the year. Surveyed people were those who actively scouted soybean fields and those who assisted growers in making soybean pest management decisions. These surveys were compiled and then combined with the author's own experience to estimate the various fields in the table. Acreage, yield and price data were drawn from Agricultural Statistics Service publications (USDA NASS) before final estimates were published, so values in the tables may differ from final NASS values. Estimates were placed in an Excel spreadsheet (Microsoft Office 2010, Microsoft Corp.) to make calculations. Actual formulas used in the spreadsheet were published by Musser and Catchot (2008). Additional columns were added this year for acres above economic threshold (ET) and % acres above ET. Economic threshold, sometimes referred to as an action threshold, is a density of insects or injury where intervention is needed to prevent the insect from causing economic damage (Stern 1973). These thresholds are published by university extension specialists to guide growers and consultants. These columns therefore represent insect pressure in grower fields, independent of whether or not fields were treated for pests. These thresholds sometimes differ among states, with each state using its own thresholds.

Results and Discussion

Yields in surveyed states were higher in 2013 than in 2012, but prices were lower. After several years of increased scouting in soybeans, percent of acres being scouted remained at 61% in 2013. Use of seed treatments in soybeans continued to increase, reaching 66% during 2013. Highest insect yield losses were found in AR and lowest losses were in VA. The most pesticide applications were made in LA while the fewest were made in VA (Table 1).

Corn earworm, *Helicoverpa zea* (Lepidoptera: Noctuidae), was the most expensive insect pest overall in terms of lost yield and control costs. However, only in NC and AR was it the most expensive pest. Overall, corn earworm damage in soybean continued to decline since its peak in 2011, costing growers \$12.03/acre in 2013 compared to greater than \$20/acre in 2011 and 2012. Stink bug costs declined slightly during 2013, but because overall damage decreased, proportion of total insect losses attributed to stink bugs increased. Stink bug was the most damaging insect in AL, LA, MS, TN and VA. Green stink bug was the dominant species overall, but the pest complex varied among states. Green stink bug, *Acrosternum hilare*, was the dominant species in AR, TN and VA; brown stink bug, *Euschistus servus*, was dominant in NC; redbanded stink bug, *Piezodorus guildinii*, was dominant in LA, and brown, green, and southern green stink bugs occurred in nearly equal proportions in AL and MS. Soybean looper, *Chysodeixis includens*, was the third most damaging insect during 2013. Stink bugs, corn earworm and soybean looper combined accounted for greater than 70% of all insect-related costs and losses during 2013.

The first recorded soybean losses for *Megacopta cribraria* (Hemiptera: Plataspidae), commonly known as the kudzu bug were recorded in the 2011 survey. During 2012, soybean acres infested with kudzu bug increased by 24 fold to 366,600 acres, and during 2013 this figure nearly doubled to 576,829 acres. Acres treated for kudzu bug increased more evenly, with a 6.4 fold increase from 2011 to 2012, and a 6.0 fold increase from 2012 to 2013. During 2013 soybeans were treated for kudzu bug in all surveyed states except the most western states of AR and LA.

Table 1. Soybean management and losses in AL, AR, LA, MS, NC, TN and VA, 2004-2012.

Year	% soybeans scouted	% soybeans with insect. seed treatment	No. foliar insecticide applications	% yield loss to insects	\$ loss + cost/acre ¹
Combined States					
2011-12	58	53	1.64	6.57	58.36
2013	61	66	1.46	3.86	48.70
Alabama					
2011-12	37	18	0.62	4.05	38.43
2013	50	25	0.16	2.29	17.88
Arkansas					
2009	65	40	1.37	4.34	35.03
2010-12	67	60	1.61	11.27	80.13
2013	75	80	0.74	5.52	56.71
Louisiana					
2011-12	73	85	4.16	3.29	65.20
2013	80	90	3.46	2.54	65.77
Mississippi					
2004-06	12	0	0.88	6.70	20.73
2007-09	52	39	2.21	5.49	46.80
2010-12	80	77	1.79	4.65	53.98
2013	85	90	2.04	3.54	57.63
North Carolina					
2011-12	14	3	1.12	5.86	35.82
2013	15	29	2.26	4.89	54.11
Tennessee					
2008-09	25	45	0.66	3.26	22.66
2010-12	38	48	1.00	5.87	38.44
2013	49	53	0.68	1.79	25.45
Virginia					
2011-12	54	8	0.40	5.55	36.18
2013	30	25	0.10	1.36	11.49

¹ 1 acre = 0.405 ha

State Highlights

Alabama. Following a year with substantial infestations of soybean looper in 2012, 2013 had minimal damage from soybean looper or any other insect. Stink bugs and three-cornered alfalfa hoppers accounted for 2/3 of all insect losses in a light insect year.

Arkansas. Costs and losses from corn earworm, soybean looper and stink bugs were all reduced from 2012, contributing to overall costs + losses being reduced by \$28/acre.

Louisiana. Stink bugs and soybean looper remained the two most damaging pests, but the number of insecticide applications was lower for each pest than during 2012, resulting in reduced insect control costs in 2013 compared to 2012.

Mississippi. Costs for controlling bean leaf beetle were sharply higher, but costs + losses for corn earworm were reduced, resulting in little change in overall costs + losses for insects.

North Carolina. The pest complex changed little from 2012, but pressure was more intense in 2013 with more insecticide applications and more yield losses from insects.

Tennessee. Overall insect pressure was lower in 2013 than in 2012, largely from a reduction in spider mite, soybean looper and green clover worm costs. Stink bugs remained the primary pest.

Virginia. Corn earworm, the dominant pest during 2012, was totally absent in 2013. Stink bug damage remained about the same as in 2012, but in 2013 was the only insect to cause much damage. Therefore overall insecticide applications and yield loss to insects were much lower in 2013 than in 2012.

Complete data for each state and all states combined are in appendices following this report.

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References

- Musser, F. R., and A. Catchot. 2008.** Mississippi soybean insect losses. *Midsouth Entomol.* 1: 29-36.
- Musser, F. R., S. D. Stewart, and A. L. Catchot, Jr. 2009.** 2008 soybean insect losses for Mississippi and Tennessee. *Midsouth Entomol.* 2: 42-46.
- Musser, F. R., G. M. Lorenz, S. D. Stewart, and A. L. Catchot, Jr. 2010.** 2009 soybean insect losses for Mississippi, Tennessee, and Arkansas. *Midsouth Entomol.* 3: 48-54.
- Musser, F. R., A. L. Catchot, Jr., J. A. Davis, D. A. Herbert, Jr., B. R. Leonard, G. M. Lorenz, T. Reed, D. D. Reising, and S. D. Stewart. 2012.** 2011 soybean insect losses in the southern US. *Midsouth Entomol.* 5: 11-22.
- Stern, V. M. 1973.** Economic thresholds. *Annu. Rev. Entomol.* 18: 259-280.
- USDA NASS.** NASS Data and Statistics,
http://www.nass.usda.gov/Data_and_Statistics/Quick_Stats/index.asp.



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Appendix 1. Overall soybean insect losses from seven surveyed southern states, 2013.

Combined in the year 2013

Pest	Acres Infested	% Acres Infested	Acres above ET	% Acres above ET	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 Cost/acre	% Total Loss + Cost		
Armyw orm complex	1,673,934	16.4%	310,189	3.0%	251,885	2.5%	1.00	\$8.81	1.419	0.025	\$0.22	0.23%	1,081,523	\$16,343,372	\$1.60	4.3%		
Banded Cucumber Beetle	1,800,000	17.7%	0	0.0%	0	0.0%	0.00	\$0.00	0.002	0.000	\$0.00	0.00%	1,821	\$23,785	\$0.00	0.0%		
Bean Leaf Beetle	6,708,128	65.8%	1,372,395	13.5%	1,604,714	15.7%	1.30	\$9.68	0.343	0.204	\$1.98	0.23%	1,046,370	\$33,801,435	\$3.32	8.9%		
Blister Beetle	1,340,278	13.2%	186,173	1.8%	191,057	1.9%	1.00	\$3.90	0.039	0.019	\$0.07	0.01%	23,589	\$1,053,440	\$0.10	0.3%		
Corn Earw orm	4,066,755	39.9%	1,886,851	18.5%	2,137,255	21.0%	1.09	\$12.70	3.844	0.229	\$2.90	1.53%	7,118,021	\$122,531,424	\$12.03	32.1%		
Cutw orms	204,952	2.0%	100	0.0%	100	0.0%	1.00	\$6.20	0.000	0.000	\$0.00	0.00%	0	\$620	\$0.00	0.0%		
Dectes Stem Borer	5,612,974	55.1%	0	0.0%	12,000	0.1%	1.00	\$7.75	0.064	0.001	\$0.01	0.04%	164,132	\$2,236,439	\$0.22	0.6%		
Garden Webw orms	773,000	7.6%	0	0.0%	0	0.0%	0.00	\$0.00	0.024	0.000	\$0.00	0.00%	8,537	\$4,286,107	\$0.01	0.0%		
Grape Colaspis	3,813,761	37.4%	0	0.0%	13,600	0.1%	1.00	\$8.00	0.002	0.001	\$0.01	0.00%	3,870	\$159,343	\$0.02	0.0%		
Grasshopper	5,705,040	56.0%	130,547	1.3%	310,241	3.0%	1.00	\$7.86	0.092	0.030	\$0.24	0.05%	238,343	\$5,552,218	\$0.54	1.5%		
Green Cloverw orm	7,941,916	77.9%	341,888	3.4%	566,829	5.6%	1.00	\$8.24	0.219	0.056	\$0.46	0.17%	790,239	\$14,989,078	\$1.47	3.9%		
Kudzu Bug	576,829	5.7%	227,546	2.2%	364,829	3.6%	1.19	\$7.78	0.266	0.043	\$0.33	0.02%	69,744	\$4,286,107	\$0.42	1.1%		
Lesser Cornstalk Borer	527,710	5.2%	32,000	0.3%	0	0.0%	0.00	\$0.00	1.004	0.000	\$0.00	0.05%	241,323	\$3,151,507	\$0.31	0.8%		
Mexican Bean Beetle	50,135	0.5%	0	0.0%	0	0.0%	0.00	\$0.00	0.000	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Potato Leafhopper	4,311,181	42.3%	0	0.0%	0	0.0%	0.00	\$0.00	0.000	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Saltmarsh Caterpillar	1,354,093	13.3%	70,714	0.7%	70,714	0.7%	1.00	\$11.68	0.120	0.007	\$0.08	0.02%	73,991	\$1,791,976	\$0.18	0.5%		
Soybean Aphid	281,500	2.8%	1,700	0.0%	1,000	0.0%	1.00	\$7.70	0.006	0.000	\$0.00	0.00%	729	\$17,214	\$0.00	0.0%		
Soybean Looper	4,966,252	48.7%	1,697,772	16.7%	1,924,286	18.9%	1.02	\$12.98	1.197	0.193	\$2.50	0.58%	2,706,464	\$60,834,984	\$5.97	16.0%		
Spider Mites	72,034	0.7%	8,000	0.1%	8,000	0.1%	1.00	\$8.00	0.292	0.001	\$0.01	0.00%	9,562	\$188,871	\$0.02	0.0%		
Spotted Cucumber Beetle	5,155,997	50.6%	42,500	0.4%	42,500	0.4%	1.00	\$8.09	0.026	0.004	\$0.03	0.01%	61,469	\$1,146,492	\$0.11	0.3%		
Stink Bugs (see box below)	7,741,419	76.0%	3,014,012	29.6%	3,235,097	31.8%	1.46	\$8.86	0.961	0.464	\$4.11	0.73%	3,387,727	\$86,161,357	\$8.46	22.6%		
Threecornered Alfalfa Hopper	7,273,878	71.4%	1,475,000	14.5%	1,270,000	12.5%	1.00	\$8.54	0.161	0.125	\$1.06	0.11%	533,274	\$17,811,671	\$1.75	4.7%		
Thrips	7,974,949	78.3%	2,286	0.0%	82,286	0.8%	1.00	\$7.03	0.017	0.008	\$0.06	0.01%	61,924	\$1,386,977	\$0.14	0.4%		
Trochanter Mealybug	400	0.0%	0	0.0%	0	0.0%	0.00	\$0.00	2.000	0.000	\$0.00	0.00%	364	\$4,757	\$0.00	0.0%		
Velvetbean Caterpillar	1,535,406	15.1%	495,357	4.9%	490,357	4.8%	1.00	\$7.23	0.440	0.048	\$0.35	0.07%	307,438	\$7,557,775	\$0.74	2.0%		
Other	0	0.0%	0	0.0%	0	0.0%	0.00	\$0.00	0.000	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
												1.457	\$14.43	3.86%	17,930,453	\$381,142,335	\$37.41	100.0%

SUMMARY DATA

State	Combined
Year	2013
Total Acres	10,189,000
Yield/acre	43.77
Price/Bushel	\$13.06
% Acres Scouted	61
Scouting Fee/scouted acre	\$6.49
% Acres Insect Seed Trt.	66
Seed Trt Cost/treated ac	\$11.06

Total Bushels Harvested	446,002,000
Total Bushels Lost to Insects	17,930,453
Percent Yield Loss	3.86%
Yield w/o Insects	45.53
Ave. # Spray Applications	1.457
Seed Treated Acres	6,747,550
Scouted Acres	6,231,400

	Total	Per Acre
Foliar Insecticides Costs	\$146,983,535	\$14.43
Seed Treatment Costs	\$74,647,545	\$7.33
Scouting costs	\$40,424,900	\$3.97
Total Costs	\$262,055,980	\$25.72
Yield Lost to insects	\$234,158,800	\$22.98
Total Losses + Costs	\$496,214,780	\$48.70

Species	% of SB
Brow n	23.1
Brow n Marmorated	1.0
Green	48.4
Redbanded	11.7
Redshouldered	4.3
Southern Green	11.5
Total	100

Appendix 2. Alabama soybean insect losses, 2013.

Pest	Acres Infested	% Acres Infested	Acres above ET	% Acres above ET	Acres Treated	% Acres Treated	# of apps/acres treated	Cost of 1 Insecticide	% loss per acre infested	# of apps per total soy acres	Overall % reduction	bushel lost per pest	Loss + Cost	Loss + Cost Cost/acre	% Total Loss + Cost			
Armyworm complex	125,000	30.6%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Banded Cucumber Beetle	0	0.0%	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	150,000	36.7%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Blister Beetle	250,000	61.1%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Corn Earworm	100,000	24.4%	1,000	0.2%	500	0.1%	1	\$6.00	0.05	0.001	\$0.01	0.01%	1,944	\$28,278	\$0.07	0.6%		
Cutworms	30,000	7.3%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Dectes Stem Borer	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Garden Webworms	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Grape Colaspis	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Grasshopper	409,000	100.0%	5,000	1.2%	10,000	2.4%	1	\$6.00	0.25	0.024	\$0.15	0.25%	39,765	\$576,939	\$1.41	11.4%		
Green Cloverworm	409,000	100.0%	0	0.0%	0	0.0%	1	\$6.00	0.25	0.000	\$0.00	0.25%	39,765	\$516,939	\$1.26	10.2%		
Kudzu Bug	100,000	24.4%	20,000	4.9%	10,000	2.4%	1	\$0.00	1.00	0.024	\$0.00	0.24%	38,890	\$505,564	\$1.24	10.0%		
Lesser Cornstalk Borer	25,000	6.1%	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	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Potato Leafhopper	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Saltmarsh Caterpillar	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Soybean Aphid	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Soybean Looper	50,000	12.2%	10,000	2.4%	10,000	2.4%	0	\$0.00	0.25	0.000	\$0.00	0.03%	4,861	\$63,195	\$0.15	1.2%		
Spider Mites	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Spotted Cucumber Beetle	0	0.0%	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 (see box below)	409,000	100.0%	100,000	24.4%	20,000	4.9%	1	\$6.00	1.00	0.049	\$0.29	1.00%	159,058	\$2,187,755	\$5.35	43.2%		
Threecornered Alfalfa Hopper	409,000	100.0%	100,000	24.4%	25,000	6.1%	1	\$6.00	0.50	0.061	\$0.37	0.50%	79,529	\$1,183,878	\$2.89	23.4%		
Thrips	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Trochanter Mealybug	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Velvetbean Caterpillar	100,000	24.4%	5,000	1.2%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Other	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
												0.160	\$0.81	2.29%	363,811	\$5,062,548	\$12.38	100.0%

SUMMARY DATA

Data Input	
State	AL
Year	2013
Total Acres	409,000
Yield/acre	38
Price/Bushel	\$13.00
% Acres Scouted	50
Scouting Fee/scouted acre	\$6.00
% Acres Insect Seed Trt.	25
Seed Trt Cost/treated ac	\$10.00

Yield & Management Results	
Total Bushels Harvested	15,542,000
Total Bushels Lost to Insects	363,811
Percent Yield Loss	2.29%
Yield w/o Insects	38.89
Ave. # Spray Applications	0.160
Seed Treated Acres	102,250
Scouted Acres	204,500

Economic Results		
	Total	Per Acre
Foliar Insecticides Costs	\$333,000	\$0.81
Seed Treatment Costs	\$1,022,500	\$2.50
Scouting costs	\$1,227,000	\$3.00
Total Costs	\$2,582,500	\$6.31
Yield Lost to insects	\$4,729,548	\$11.56
Total Losses + Costs	\$7,312,048	\$17.88

Stink Bug Composition	
Species	% of SB
Brown	25
Brown Marmorated	0
Green	30
Redbanded	5
Redshouldered	0
Southern Green	40
Total	100

Appendix 3. Arkansas soybean insect losses, 2013.

Pest	Acres Infested	% Acres Infested	Acres above ET	% Acres above ET	Acres Treated	% Acres Treated	# of apps/acres treated	Cost of 1 Insecticide	% loss per acre infested	# of apps per total soy acre	cost/acre	Overall % reduction	bushel lost per pest	Loss + Cost	Loss + Cost/acre	% Total Loss + Cost
Armyw orm complex	1,120,000	35.0%	160,000	5.0%	10,000	0.3%	1	\$9.00	2.00	0.003	\$0.03	0.70%	1,066,836	\$13,958,868	\$4.36	10.5%
Banded Cucumber Beetle	320,000	10.0%	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	3,200,000	100.0%	300,000	9.4%	425,000	13.3%	1	\$7.75	0.50	0.133	\$1.03	0.50%	762,026	\$13,200,084	\$4.13	9.9%
Blister Beetle	480,000	15.0%	96,000	3.0%	96,000	3.0%	1	\$7.75	0.10	0.030	\$0.23	0.02%	22,861	\$1,041,190	\$0.33	0.8%
Corn Earw orm	2,080,000	65.0%	480,000	15.0%	625,000	19.5%	1.25	\$12.00	4.00	0.244	\$2.93	2.60%	3,962,534	\$60,887,939	\$19.03	45.9%
Cutw orms	160,000	5.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Dectes Stem Borer	2,560,000	80.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Garden Webw orms	640,000	20.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Grape Colaspis	2,240,000	70.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Grasshopper	3,200,000	100.0%	64,000	2.0%	68,000	2.1%	1	\$7.75	0.10	0.021	\$0.16	0.10%	152,405	\$2,508,267	\$0.78	1.9%
Green Cloverw orm	3,200,000	100.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Kudzu Bug	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Lesser Cornstalk Borer	480,000	15.0%	32,000	1.0%	0	0.0%	0	\$0.00	1.00	0.000	\$0.00	0.15%	228,608	\$2,971,900	\$0.93	2.2%
Mexican Bean Beetle	0	0.0%	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	2,560,000	80.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Saltmarsh Caterpillar	600,000	18.8%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Soybean Aphid	160,000	5.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Soybean Looper	1,600,000	50.0%	320,000	10.0%	400,000	12.5%	1	\$12.00	1.00	0.125	\$1.50	0.50%	762,026	\$14,706,334	\$4.60	11.1%
Spider Mites	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Spotted Cucumber Beetle	2,240,000	70.0%	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 (see box below)	2,720,000	85.0%	480,000	15.0%	400,000	12.5%	1	\$7.75	1.00	0.125	\$0.97	0.85%	1,295,444	\$19,940,768	\$6.23	15.0%
Threecornered Alfalfa Hopper	3,200,000	100.0%	420,000	13.1%	200,000	6.3%	1	\$7.75	0.10	0.063	\$0.48	0.10%	152,405	\$3,531,267	\$1.10	2.7%
Thrips	3,200,000	100.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Trochanter Mealybug	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Velvetbean Caterpillar	160,000	5.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Other	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
							0.744	\$7.34	5.52%	8,405,144	\$132,746,618	\$41.48	100.0%			

SUMMARY DATA

Data Input	
State	AR
Year	2013
Total Acres	3,200,000
Yield/acre	45
Price/Bushel	\$13.00
% Acres Scouted	75
Scouting Fee/scouted acre	\$7.50
% Acres Insect Seed Trt.	80
Seed Trt Cost/treated ac	\$12.00

Yield & Management Results	
Total Bushels Harvested	144,000,000
Total Bushels Lost to Insects	8,405,144
Percent Yield Loss	5.52%
Yield w/o Insects	47.63
Ave. # Spray Applications	0.744
Seed Treated Acres	2,560,000
Scouted Acres	2,400,000

Economic Results		
	Total	Per Acre
Foliar Insecticides Costs	\$23,479,750	\$7.34
Seed Treatment Costs	\$30,720,000	\$9.60
Scouting costs	\$18,000,000	\$5.63
Total Costs	\$72,199,750	\$22.56
Yield Lost to insects	\$109,266,868	\$34.15
Total Losses + Costs	\$181,466,618	\$56.71

Stink Bug Composition	
Species	% of SB
Brow n	20
Brow n Marmorated	0
Green	66
Redbanded	1
Redshouldered	10
Southern Green	3
Total	100

Appendix 4. Louisiana soybean insect losses, 2013.

Pest	Acres Infested	% Acres Infested	Acres above ET	% Acres above ET	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 Cost/acre	% Total Loss + Cost		
Armyworm complex	100,000	9.3%	50,000	4.6%	50,000	4.6%	1	\$8.00	0.00	0.046	\$0.37	0.00%	0	\$400,000	\$0.37	0.7%		
Banded Cucumber Beetle	1,080,000	100.0%	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	10,000	0.9%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Blister Beetle	10,000	0.9%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Corn Earworm	112,000	10.4%	110,000	10.2%	110,000	10.2%	1	\$13.00	0.50	0.102	\$1.32	0.05%	27,006	\$1,772,977	\$1.64	3.3%		
Cutworms	9,000	0.8%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Dectes Stem Borer	1,080,000	100.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Garden Webworms	8,000	0.7%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Grape Colaspis	1,080,000	100.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Grasshopper	1,080,000	100.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Green Cloverworm	800,000	74.1%	25,000	2.3%	25,000	2.3%	1	\$12.50	0.50	0.023	\$0.29	0.37%	192,900	\$2,762,333	\$2.56	5.1%		
Kudzu Bug	100	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Lesser Cornstalk Borer	10,000	0.9%	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	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Potato Leafhopper	1,080,000	100.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Saltmarsh Caterpillar	200,000	18.5%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Soybean Aphid	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Soybean Looper	900,000	83.3%	500,000	46.3%	500,000	46.3%	1	\$14.00	1.00	0.463	\$6.48	0.83%	434,025	\$12,512,123	\$11.59	23.0%		
Spider Mites	10,000	0.9%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Spotted Cucumber Beetle	1,080,000	100.0%	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 (see box below)	1,080,000	100.0%	900,000	83.3%	900,000	83.3%	2	\$10.00	1.00	1.667	\$16.67	1.00%	520,831	\$24,614,548	\$22.79	45.3%		
Threecornered Alfalfa Hopper	1,080,000	100.0%	800,000	74.1%	800,000	74.1%	1	\$9.00	0.25	0.741	\$6.67	0.25%	130,208	\$8,853,637	\$8.20	16.3%		
Thrips	1,080,000	100.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Trochanter Mealybug	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Velvetbean Caterpillar	750,000	69.4%	450,000	41.7%	450,000	41.7%	1	\$7.00	0.05	0.417	\$2.92	0.03%	18,084	\$3,379,672	\$3.13	6.2%		
Other	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
												3.458	\$34.72	2.54%	1,323,054	\$54,295,289	\$50.27	100.0%

SUMMARY DATA

State	LA
Year	2013
Total Acres	1,080,000
Yield/acre	47
Price/Bushel	\$12.70
% Acres Scouted	80
Scouting Fee/scouted acre	\$7.00
% Acres Insect Seed Trt.	90
Seed Trt Cost/treated ac	\$11.00

Total Bushels Harvested	50,760,000
Total Bushels Lost to Insects	1,323,054
Percent Yield Loss	2.54%
Yield w/o Insects	48.23
Ave. # Spray Applications	3.458
Seed Treated Acres	972,000
Scouted Acres	864,000

	Total	Per Acre
Foliar Insecticides Costs	\$37,492,500	\$34.72
Seed Treatment Costs	\$10,692,000	\$9.90
Scouting costs	\$6,048,000	\$5.60
Total Costs	\$54,232,500	\$50.22
Yield Lost to insects	\$16,802,789	\$15.56
Total Losses + Costs	\$71,035,289	\$65.77

Species	% of SB
Brown	10
Brown Marmorated	0
Green	5
Redbanded	65
Redshouldered	1
Southern Green	19
Total	100

Appendix 5. Mississippi soybean insect losses, 2013.

Pest	Acres Infested	% Acres Infested	Acres above ET	% Acres above ET	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 Cost/acre	% Total Loss + Cost
Armyw orm complex	100,000	5.0%	7,500	0.4%	7,500	0.4%	1	\$9.50	0.40	0.004	\$0.04	0.02%	17,830	\$303,046	\$0.15	0.4%
Banded Cucumber Beetle	400,000	20.1%	0	0.0%	0	0.0%	0	\$0.00	0.01	0.000	\$0.00	0.00%	1,783	\$23,180	\$0.01	0.0%
Bean Leaf Beetle	1,500,000	75.4%	950,000	47.7%	950,000	47.7%	1.5	\$11.00	0.20	0.716	\$7.88	0.15%	133,729	\$17,413,473	\$8.75	20.1%
Blister Beetle	7,500	0.4%	0	0.0%	0	0.0%	0	\$9.50	0.00	0.000	\$0.00	0.00%	3	\$43	\$0.00	0.0%
Corn Earw orm	550,000	27.6%	350,000	17.6%	350,000	17.6%	1.1	\$16.00	3.50	0.193	\$3.10	0.97%	858,093	\$17,315,205	\$8.70	20.0%
Cutw orms	3,500	0.2%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Dectes Stem Borer	725,000	36.4%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Garden Webw orms	125,000	6.3%	0	0.0%	0	0.0%	0	\$0.00	0.15	0.000	\$0.00	0.01%	8,358	\$108,655	\$0.05	0.1%
Grape Colaspis	85,000	4.3%	0	0.0%	0	0.0%	0	\$0.00	0.10	0.000	\$0.00	0.00%	3,789	\$49,257	\$0.02	0.1%
Grasshopper	535,000	26.9%	3,500	0.2%	3,500	0.2%	1	\$6.50	0.10	0.002	\$0.01	0.03%	23,848	\$332,778	\$0.17	0.4%
Green Cloverw orm	1,300,000	65.3%	95,000	4.8%	95,000	4.8%	1	\$8.50	0.70	0.048	\$0.41	0.46%	405,644	\$6,080,869	\$3.06	7.0%
Kudzu Bug	20,000	1.0%	2,500	0.1%	2,500	0.1%	1	\$8.50	0.10	0.001	\$0.01	0.00%	892	\$32,840	\$0.02	0.0%
Lesser Cornstalk Borer	10,000	0.5%	0	0.0%	0	0.0%	0	\$0.00	5.00	0.000	\$0.00	0.03%	22,288	\$289,746	\$0.15	0.3%
Mexican Bean Beetle	0	0.0%	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	650,000	32.7%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Saltmarsh Caterpillar	325,000	16.3%	65,000	3.3%	65,000	3.3%	1	\$12.00	0.50	0.033	\$0.39	0.08%	72,436	\$1,721,673	\$0.87	2.0%
Soybean Aphid	1,000	0.1%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Soybean Looper	1,200,000	60.3%	500,000	25.1%	500,000	25.1%	1.1	\$14.00	1.50	0.276	\$3.87	0.90%	802,372	\$18,130,841	\$9.11	21.0%
Spider Mites	15,000	0.8%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Spotted Cucumber Beetle	1,350,000	67.8%	2,500	0.1%	2,500	0.1%	1	\$9.50	0.10	0.001	\$0.01	0.07%	60,178	\$806,063	\$0.41	0.9%
Stink Bugs (see box below)	1,400,000	70.4%	850,000	42.7%	850,000	42.7%	1.7	\$9.50	0.75	0.726	\$6.90	0.53%	468,051	\$19,812,157	\$9.96	22.9%
Threecornered Alfalfa Hopper	1,500,000	75.4%	65,000	3.3%	65,000	3.3%	1	\$8.50	0.01	0.033	\$0.28	0.01%	6,686	\$639,424	\$0.32	0.7%
Thrips	1,850,000	93.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Trochanter Mealybug	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Velvetbean Caterpillar	375,000	18.8%	17,500	0.9%	17,500	0.9%	1	\$12.00	1.50	0.009	\$0.11	0.28%	250,741	\$3,469,638	\$1.74	4.0%
Other	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
							2.042	\$22.99	3.54%	3,136,722	\$86,528,887	\$43.48	100.0%			

SUMMARY DATA

Data Input	
State	MS
Year	2013
Total Acres	1,990,000
Yield/acre	43
Price/Bushel	\$13.00
% Acres Scouted	85
Scouting Fee/scouted acre	\$5.00
% Acres Insect Seed Trt.	90
Seed Trt Cost/treated ac	\$11.00

Yield & Management Results	
Total Bushels Harvested	85,570,000
Total Bushels Lost to Insects	3,136,722
Percent Yield Loss	3.54%
Yield w/o Insects	44.58
Ave. # Spray Applications	2.042
Seed Treated Acres	1,791,000
Scouted Acres	1,691,500

Economic Results		
	Total	Per Acre
Foliar Insecticides Costs	\$45,751,500	\$22.99
Seed Treatment Costs	\$19,701,000	\$9.90
Scouting costs	\$8,457,500	\$4.25
Total Costs	\$73,910,000	\$37.14
Yield Lost to insects	\$40,777,387	\$20.49
Total Losses + Costs	\$114,687,387	\$57.63

Stink Bug Composition	
Species	% of SB
Brow n	30
Brow n Marmorated	0
Green	30
Redbanded	11
Redshouldered	2
Southern Green	27
Total	100

Appendix 6. North Carolina soybean insect losses, 2013.

Pest	Acres Infested	% Acres Infested	Acres above ET	% Acres above ET	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 Cost/acre	% Total Loss + Cost
Armyw orm complex	188,934	11.8%	91,689	5.7%	183,385	11.5%	1	\$9.00	0.50	0.115	\$1.03	0.06%	40,723	\$2,203,486	\$1.38	2.7%
Banded Cucumber Beetle	0	0.0%	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	628,128	39.3%	109,395	6.8%	189,714	11.9%	1	\$8.00	0.50	0.119	\$0.95	0.20%	135,388	\$3,356,281	\$2.10	4.2%
Blister Beetle	394,778	24.7%	89,973	5.6%	94,857	5.9%	1	\$0.00	0.00	0.059	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Corn Earw orm	1,043,755	65.2%	935,851	58.5%	1,043,755	65.2%	1	\$12.00	5.00	0.652	\$7.83	3.26%	2,249,731	\$43,076,412	\$26.92	53.6%
Cutw orms	452	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Dectes Stem Borer	46,974	2.9%	0	0.0%	0	0.0%	0	\$0.00	0.01	0.000	\$0.00	0.00%	202	\$2,750	\$0.00	0.0%
Garden Webw orms	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Grape Colaspis	408,761	25.5%	0	0.0%	13,600	0.9%	1	\$8.00	0.00	0.009	\$0.07	0.00%	0	\$108,800	\$0.07	0.1%
Grasshopper	442,040	27.6%	57,877	3.6%	228,571	14.3%	1	\$8.00	0.10	0.143	\$1.14	0.03%	19,056	\$2,087,344	\$1.30	2.6%
Green Cloverw orm	732,916	45.8%	131,888	8.2%	345,829	21.6%	1	\$8.00	0.10	0.216	\$1.73	0.05%	31,595	\$3,195,690	\$2.00	4.0%
Kudzu Bug	406,729	25.4%	197,046	12.3%	345,829	21.6%	1.2	\$8.00	0.10	0.259	\$2.07	0.03%	17,533	\$3,558,063	\$2.22	4.4%
Lesser Cornstalk Borer	2,710	0.2%	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	50,135	3.1%	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	20,181	1.3%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Saltmarsh Caterpillar	228,093	14.3%	5,714	0.4%	5,714	0.4%	1	\$8.00	0.00	0.004	\$0.03	0.00%	0	\$45,712	\$0.03	0.1%
Soybean Aphid	80,000	5.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Soybean Looper	715,752	44.7%	347,772	21.7%	494,286	30.9%	1	\$12.00	2.00	0.309	\$3.71	0.89%	617,099	\$14,311,633	\$8.94	17.8%
Spider Mites	16,034	1.0%	8,000	0.5%	8,000	0.5%	1	\$8.00	0.00	0.005	\$0.04	0.00%	0	\$64,000	\$0.04	0.1%
Spotted Cucumber Beetle	485,997	30.4%	40,000	2.5%	40,000	2.5%	1	\$8.00	0.00	0.025	\$0.20	0.00%	0	\$320,000	\$0.20	0.4%
Stink Bugs (see box below)	882,419	55.2%	329,012	20.6%	535,097	33.4%	1	\$8.00	0.50	0.334	\$2.68	0.28%	190,198	\$6,863,671	\$4.29	8.5%
Threecornered Alfalfa Hopper	183,378	11.5%	0	0.0%	0	0.0%	0	\$0.00	0.50	0.000	\$0.00	0.06%	39,526	\$536,759	\$0.34	0.7%
Thrips	484,949	30.3%	2,286	0.1%	2,286	0.1%	1	\$8.00	0.00	0.001	\$0.01	0.00%	0	\$18,288	\$0.01	0.0%
Trochanter Mealybug	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
Velvetbean Caterpillar	150,406	9.4%	22,857	1.4%	22,857	1.4%	1	\$8.00	0.50	0.014	\$0.11	0.05%	32,419	\$623,104	\$0.39	0.8%
Other	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%
							2.264	\$21.60	4.89%	3,373,471	\$80,371,993	\$50.23	100.0%			

SUMMARY DATA

Data Input	
State	NC
Year	2013
Total Acres	1,600,000
Yield/acre	41
Price/Bushel	\$13.58
% Acres Scouted	15
Scouting Fee/scouted acre	\$6.50
% Acres Insect Seed Trt.	29
Seed Trt Cost/treated ac	\$10.00

Yield & Management Results	
Total Bushels Harvested	65,600,000
Total Bushels Lost to Insects	3,373,471
Percent Yield Loss	4.89%
Yield w/o Insects	43.11
Ave. # Spray Applications	2.264
Seed Treated Acres	464,000
Scouted Acres	240,000

Economic Results		
	Total	Per Acre
Foliar Insecticides Costs	\$34,560,259	\$21.60
Seed Treatment Costs	\$4,640,000	\$2.90
Scouting costs	\$1,560,000	\$0.98
Total Costs	\$40,760,259	\$25.48
Yield Lost to insects	\$45,811,733	\$28.63
Total Losses + Costs	\$86,571,993	\$54.11

Stink Bug Composition	
Species	% of SB
Brown	52
Brown Marmorated	4
Green	37
Redbanded	0
Redshouldered	1
Southern Green	6
Total	100

Appendix 7. Tennessee soybean insect losses, 2013.

Pest	Acres Infested	% Acres Infested	Acres above ET	% Acres above ET	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 Cost/acre	% Total Loss + Cost		
Armyworm complex	40,000	2.9%	1,000	0.1%	1,000	0.1%	1	\$7.75	0.02	0.001	\$0.01	0.00%	391	\$12,833	\$0.01	0.1%		
Banded Cucumber Beetle	0	0.0%	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	88.2%	13,000	1.0%	40,000	2.9%	1	\$6.90	0.07	0.029	\$0.20	0.06%	41,057	\$809,736	\$0.60	3.6%		
Blister Beetle	190,000	14.0%	200	0.0%	200	0.0%	1	\$6.90	0.02	0.000	\$0.00	0.00%	1,857	\$25,525	\$0.02	0.1%		
Corn Earworm	180,000	13.2%	10,000	0.7%	8,000	0.6%	1	\$11.00	0.60	0.006	\$0.06	0.08%	52,787	\$774,232	\$0.57	3.4%		
Cutworms	2,000	0.1%	100	0.0%	100	0.0%	1	\$6.20	0.00	0.000	\$0.00	0.00%	0	\$620	\$0.00	0.0%		
Dectes Stem Borer	1,200,000	88.2%	0	0.0%	12,000	0.9%	1	\$7.75	0.30	0.009	\$0.07	0.26%	175,957	\$2,380,439	\$1.75	10.5%		
Garden Webworms	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Grape Colaspis	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Grasshopper	35,000	2.6%	170	0.0%	170	0.0%	1	\$7.75	0.10	0.000	\$0.00	0.00%	1,711	\$23,556	\$0.02	0.1%		
Green Cloverworm	1,250,000	91.9%	90,000	6.6%	100,000	7.4%	1	\$7.75	0.20	0.074	\$0.57	0.18%	122,192	\$2,363,500	\$1.74	10.4%		
Kudzu Bug	35,000	2.6%	3,000	0.2%	3,000	0.2%	1	\$7.75	0.30	0.002	\$0.02	0.01%	5,132	\$89,967	\$0.07	0.4%		
Lesser Cornstalk Borer	0	0.0%	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	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Potato Leafhopper	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Saltmarsh Caterpillar	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Soybean Aphid	40,000	2.9%	1,500	0.1%	800	0.1%	1	\$7.75	0.04	0.001	\$0.00	0.00%	782	\$16,366	\$0.01	0.1%		
Soybean Looper	500,000	36.8%	20,000	1.5%	20,000	1.5%	1	\$12.00	0.40	0.015	\$0.18	0.15%	97,754	\$1,510,800	\$1.11	6.7%		
Spider Mites	30,000	2.2%	0	0.0%	0	0.0%	0	\$0.00	0.70	0.000	\$0.00	0.02%	10,264	\$133,434	\$0.10	0.6%		
Spotted Cucumber Beetle	0	0.0%	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 (see box below)	1,100,000	80.9%	330,000	24.3%	480,000	35.3%	1	\$7.75	0.90	0.353	\$2.74	0.73%	483,881	\$10,010,458	\$7.36	44.1%		
Threecornered Alfalfa Hopper	900,000	66.2%	90,000	6.6%	180,000	13.2%	1	\$7.75	0.30	0.132	\$1.03	0.20%	131,968	\$3,110,580	\$2.29	13.7%		
Thrips	1,360,000	100.0%	0	0.0%	80,000	5.9%	1	\$7.00	0.10	0.059	\$0.41	0.10%	66,473	\$1,424,144	\$1.05	6.3%		
Trochanter Mealybug	400	0.0%	0	0.0%	0	0.0%	0	\$0.00	2.00	0.000	\$0.00	0.00%	391	\$5,083	\$0.00	0.0%		
Velvetbean Caterpillar	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Other	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
												0.680	\$5.28	1.79%	1,192,597	\$22,691,273	\$16.68	100.0%

SUMMARY DATA

Data Input		Yield & Management Results		Economic Results		Stink Bug Composition	
State	TN	Total Bushels Harvested	65,280,000	Total		Species	% of SB
Year	2013	Total Bushels Lost to Insects	1,192,597	Foliar Insecticides Costs	\$7,187,518	Brown	12
Total Acres	1,360,000	Percent Yield Loss	1.79%	Seed Treatment Costs	\$7,928,800	Brown Marmorated	2
Yield/acre	48	Yield w/o Insects	48.88	Scouting costs	\$3,998,400	Green	84
Price/Bushel	\$13.00	Ave. # Spray Applications	0.680	Total Costs	\$19,114,718	Redbanded	0
% Acres Scouted	49	Seed Treated Acres	720,800	Yield Lost to insects	\$15,503,756	Redshouldered	1
Scouting Fee/scouted acre	\$6.00	Scouted Acres	666,400	Total Losses + Costs	\$34,618,473	Southern Green	1
% Acres Insect Seed Trt.	53					Total	100
Seed Trt Cost/treated ac	\$11.00						

Appendix 8. Virginia soybean insect losses, 2013.

Pest	Acres Infested	% Acres Infested	Acres above ET	% Acres above ET	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	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Banded Cucumber Beetle	0	0.0%	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	20,000	3.6%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Blister Beetle	8,000	1.5%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Corn Earworm	1,000	0.2%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Cutworms	0	0.0%	0	0.0%	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	0.2%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Garden Webworms	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Grape Colaspis	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Grasshopper	4,000	0.7%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Green Cloverworm	250,000	45.5%	0	0.0%	1,000	0.2%	1	\$7.50	0.00	0.002	\$0.01	0.00%	0	\$7,500	\$0.01	0.2%		
Kudzu Bug	15,000	2.7%	5,000	0.9%	3,500	0.6%	1	\$7.50	0.00	0.006	\$0.05	0.00%	0	\$26,250	\$0.05	0.7%		
Lesser Cornstalk Borer	0	0.0%	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	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Potato Leafhopper	1,000	0.2%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Saltmarsh Caterpillar	1,000	0.2%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Soybean Aphid	500	0.1%	200	0.0%	200	0.0%	1	\$7.50	0.00	0.000	\$0.00	0.00%	0	\$1,500	\$0.00	0.0%		
Soybean Looper	500	0.1%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Spider Mites	1,000	0.2%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Spotted Cucumber Beetle	0	0.0%	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 (see box below)	150,000	27.3%	25,000	4.5%	50,000	9.1%	1	\$7.50	5.00	0.091	\$0.68	1.36%	266,129	\$3,834,677	\$6.97	99.1%		
Threecornered Alfalfa Hopper	1,500	0.3%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Thrips	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Trochanter Mealybug	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Velvetbean Caterpillar	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
Other	0	0.0%	0	0.0%	0	0.0%	0	\$0.00	0.00	0.000	\$0.00	0.00%	0	\$0	\$0.00	0.0%		
												0.09%	\$0.75	1.36%	266,129	\$3,869,927	\$7.04	100.0%

SUMMARY DATA

Data Input		Yield & Management Results		Economic Results		Stink Bug Composition	
State	VA	Total Bushels Harvested	19,250,000	Foliar Insecticides Costs	Total \$410,250 Per Acre \$0.75	Species	% of SB
Year	2013	Total Bushels Lost to Insects	266,129	Seed Treatment Costs	\$1,375,000 \$2.50	Brown	15
Total Acres	550,000	Percent Yield Loss	1.36%	Scouting costs	\$1,072,500 \$1.95	Brown Marmorated	15
Yield/acre	35	Yield w/o Insects	35.48	Total Costs	\$2,857,750 \$5.20	Green	70
Price/Bushel	\$13.00	Ave. # Spray Applications	0.099	Yield Lost to insects	\$3,459,677 \$6.29	Redbanded	0
% Acres Scouted	30	Seed Treated Acres	137,500	Total Losses + Costs	\$6,317,427 \$11.49	Redshouldered	0
Scouting Fee/scouted acre	\$6.50	Scouted Acres	165,000			Southern Green	0
% Acres Insect Seed Trt.	25					Total	100
Seed Trt Cost/treated ac	\$10.00						