

**COTTON INSECT LOSS ESTIMATES - 2013****Michael R. Williams****Entomology and Plant Pathology Department****Mississippi State University Extension Service****Mississippi State, MS****Abstract**

Cotton losses to arthropod pests reduced yields by 2.72% in 2013. *Lygus* took top ranking at 0.778% loss. Stink bugs were second at 0.681% and Thrips were third, reducing yields by 0.557%. Cotton fleahoppers were number four at 0.218%, Bollworm/budworm were fifth at 0.182%, spider mites were sixth at 0.125%, brown stink bugs (Arizona) at 0.063% and aphids were eighth at 0.037%. Silverleaf whiteflies were eighth at 0.036%; clouded plant bugs were ninth at 0.031% and grasshoppers were tenth at .003%. Total cost and loss for arthropods in 2013 was \$716.5 million. Direct management costs for arthropods were \$62.59 per acre.

**Introduction**

Weather was again the major factor influencing cotton production. 2.55 million acres of the crop was lost due to weather induced factors. More than 2.4 million acres of cotton were lost in Texas alone. Overall losses to arthropod pests are still very low at 2.72% that translates to 582,591 bales of cotton. While some of the states reported substantial losses, no single pest exceeded 1% nationally. *Lygus* were the top pests at 0.778% loss (Table 2) and Mississippi reported the highest percent loss at 8.10% (76,497 bales) in 2013 (Table 1). *Lygus* infested 37.85% of the crop in 2013 and were responsible for 29% of the losses. Stink bugs (0.681%) and cotton fleahoppers (0.218%) were ranked 2nd, and 4<sup>th</sup> respectively. Thrips (ranked 3rd) were found on 85% of the US cotton crop and cost of management, (which includes in-furrow, seed treatments, as well as sprays) amounts to \$15.18 per US acre. *Bt* technology now dominates with 6.5 million acres (Table 4). This represents 82% of the total crop. The bollworm/budworm complex infested 36.2% of the crop in 2013 with bollworms making up 82% of the population. Spider mites were ranked 6<sup>th</sup> at 0.125% and infested 24.4% of the US crop.

There were 8,500 acres reported to be infested by boll weevils in the US crop in 2013 (Table 2). Total cost for boll weevils (eradication) was \$3.04 per US acre. Only Kansas and California do not assess a boll weevil eradication fee. Fees for eradication range from \$0.50 per acre in Virginia to a high of \$8.00 per acre in Arkansas (Table 8). Mississippi lost 8.10% (76,497 bales), Tennessee lost 8.03% (50,022 bales), Arkansas lost 7.34% (72,626 bales), New Mexico lost 6.92% (8,906), Florida lost 6.43% (19,739 bales), and Arizona at 6.09% (41,535 bales) loss rounded out the top six states with losses. Louisiana (7<sup>th</sup>) lost 5.34% and Missouri was 8<sup>th</sup> at 5.0%. All the other states reported losses less than 5%. Alabama (4.08%) lost 42,587 bales; North Carolina at 3.59% was 10<sup>th</sup> (28,047 bales). South Carolina (26,455 bales) was 11<sup>th</sup> at 3.52% and Georgia (108,975 bales) was 12<sup>th</sup> at 3.10%. Virginia at 1.25% loss was 13<sup>th</sup>. Oklahoma lost 0.87% and 2,824 bales; Texas (0.74%) lost 34,416 bales; Kansas (0.43%) lost 176 bales; and California reported 0.27% loss (2,521 bales).

**Discussion*****Lygus*: most damaging pest in US cotton at 0.778%**

This report combines the western species, *Lygus hesperus*, and the eastern species, *Lygus lineolaris*. Eight states reported greater than 1% loss to *Lygus*: Arkansas (5.0%), Mississippi (4.80%), Missouri (4.0%), Tennessee (3.4%), Louisiana (3.00%), Arizona (1.8%), Florida (1.5%) and New Mexico (1.365%). *Lygus* infested 2.99 million acres of the crop and caused the loss of 187,088 bales for a 0.778% reduction (Table 5). Virginia and Oklahoma reported no losses to *Lygus* and Oklahoma reported no infestations of this pest.

**Stink bugs: 2<sup>nd</sup> most damaging pest at 0.681%**

Stink bugs reduced the US crop by 0.681% in 2013. Arizona (3.33%) reported highest losses (22,691 bales) to stink bug. North Carolina (3.0%), Florida (3.0%), Alabama (2.55%), Georgia (1.8%), South Carolina (1.5%) reported losses of 1% or greater with this pest. The stink bug complex infested 4.24 million acres of cotton in 2013 and destroyed 142,037 bales of cotton (Table 5). Arkansas, Missouri, Kansas, and Texas reported no losses to stink bugs. Arizona reported 3.19% loss to brown stink bugs resulting 21,760 bales lost (Table 8). Leaf-footed bugs and

Bagrada stink bugs are also reported as pests in 2013. The Leaf-footed bug was a pest in New Mexico and Texas. Bagrada bugs were pests in Arizona.

#### **Thrips: ranked 3<sup>rd</sup> at 0.557%**

Early season Thrips infested 84.9% of the US acreage in 2013 and cost US farmers \$15.18 per acre in management (Williams, 2013). There were 117,438 bales of US cotton lost to this complex of pests in 2013. Tennessee (3.4%), Alabama (1.46%), Arkansas (1.43%), and South Carolina (1%) had 1% or greater loss. Georgia (0.95%), Florida (0.95%), Virginia (0.5%), Missouri (0.92%), New Mexico (0.858%), North Carolina (0.36%), Mississippi (0.297%), Oklahoma (0.225%) had greater than 0.2% loss. Arizona (0.098%), Texas (0.095%), and Kansas (0.025%) had small losses, while Louisiana (0.0%), and California (0.0%) had no losses to Thrips. (Table 6). *Kurtomathrips* have been reported in Texas during the last three seasons. These pests infested 18,280 acres in 2013 (Williams, 2013).

#### **Bollworm/budworm complex (5<sup>th</sup>) reduces US crop by 0.182%**

Bollworms and budworms infested 2.86 million acres in 2013 and are ranked 5th at 0.182%. Bollworms (*H. zea*) were the dominant species at 82%. Heliothines damages resulted in the loss of 38,361 bales of cotton (Table 3). New Mexico (4.0%), South Carolina (0.75%), Mississippi (0.701%), and Tennessee (0.700%) reported the highest loss to Heliothines. Arkansas (0.476%), Florida (0.25%), North Carolina (0.17%) rounded out the top 7 states that reported losses to Heliothines. Texas (0.066%) lost 4349 bales, Georgia (0.15%) lost 5270 bales, and Arizona (0.023%) lost 168 bales. Alabama, California, Louisiana, Kansas, Missouri, Oklahoma and Virginia reported no losses to Heliothines.

*Bt* cottons were planted on 6.5 million acres in 2013 (Table 4), this represents 82% of US cotton acres. Heliothines were sprayed on 919,582 *Bt* cotton acres in 2013. The cost of *Bt* is estimated at \$19.03 per acre of the US crop. This represents about 29.5% of the cost of arthropod management (Williams, 2013).

#### **Cotton fleahoppers ranks 4<sup>th</sup> at 0.218%**

Cotton fleahoppers (0.218%) infested 1.763 million acres of cotton in 2013 (Table 6). Oklahoma (0.600%), New Mexico (0.36%) Kansas (.300%), Texas (0.481%), Mississippi (0.017%) and Arizona (0.006%) reported losses to cotton fleahoppers. All other states reported no loss; nine states reported no infestation. Fleahoppers destroyed 21,591 bales of cotton (Table 6).

#### **Spider mites rank 6<sup>th</sup> at 0.125%**

Mites infested 1.929 million acres of cotton in 2013. Mite damage was once again highest in the Midsouth states: Louisiana (2.0%), (reported highest losses to spider mites), Mississippi (1.229%), Arkansas (0.434%), and Tennessee (0.160%). South Carolina (0.10%), California (0.047%), Missouri (0.077%), Arizona (0.030%), Texas (0.028%), Georgia (0.002%) reported losses. Alabama, Florida, Kansas, and North Carolina reported infestations but no losses. Three states reported no infestations of mites. 31,541 bales of US cotton were lost to spider mites in 2013 (Table 7).

#### **Aphids: 8<sup>th</sup> most damaging pest of US cotton**

Aphids infested 44.2% of US cotton, and yield losses were 0.037%. Florida (0.6%), Mississippi (0.057%), Arizona (0.01%), Tennessee (0.008%), Georgia (0.005%), and North Carolina (0.001%) reported losses to aphids. All states but Oklahoma, Kansas and Virginia reported infestations and indicated light losses to this pest (Table 7). Aphids reduced yields by 4,324 bales of US cotton.

#### **Silverleaf Whitefly (*Bemisia* sp) .036% loss**

Five states reported infestations of silverleaf whiteflies (*Bemisia* sp) in 2013. The 0.036% reduction in yield places it as the 9th most damaging pest in US cotton. Arizona (0.794%) lost 5,411 bales Georgia (0.12%) lost 4,216 bales and Texas (.0002%) lost 17 bales. *Bemisia* sp were reported in 705,446 acres (Table 11).

#### **Clouded Plant Bugs .031% loss**

Three states reported losses to clouded plant bugs in 2013: Mississippi (0.66%), Florida (0.13%), and Tennessee (0.10%) lost bales of cotton to this pest. 492,502 acres of cotton were infested by clouded plant bugs. Eight states reported infestations and lost 7,193 bales (Table 13).

### **Other pests of cotton**

Boll weevils infested 2.221 million acres of cotton in 2002 and slightly less at 2.097 million acres in 2003; dropped to 1.572 million acres in 2004; saw resurgence to 1.828 million acres in 2005; infested 1.199 million acres in 2006; infested 612,393 acres in 2007; were pests in 224,428 acres in 2008; dropped to 116,247 acres in 2009 and were pests in 115,470 acres in 2010. In 2011 only Texas reported infestations of weevils on 185,353 acres but no bales of cotton were lost to boll weevils. 23,894 acres were infested by weevils in the US in 2012 and only 8,500 acres in 2013. Eradication costs for boll weevil were \$3.04 per US acre (Table 8).

In recent years, new pests have appeared in various regions of the cotton belt. These 'Other' insects include the Pale-sided Flea Beetles, Bagardia bugs, darkling beetles, mealy bugs and citrus Thrips in Arizona and verde plant bugs, leaf-footed bugs, and *Kurtomathrips morrelli* in Texas. New Mexico also reported leaf-footed bugs as pests. False chinch bug was a pest of cotton in Tennessee in 2013. 'Other' pests infested 205,943 acres and took 188 bales of US cotton in 2013 (Williams 2013).

Fall armyworms infested 872,757 acres and reduced yield by 0.002% (526 bales). Beet Armyworms infested 695,542 acres and reduced yield by 97 bales (Table 9). Losses from all remaining pests of cotton were almost negligible. Averaged across the cotton belt, all other pests of cotton reduced yields by less than 0.001% in 2013. Cutworms were reported on 375,392 acres and took 10 bales (Table 10); grasshoppers infested 2.087 million acres and reduced yields by 269 bales (Table 13). Loopers (Table 10), bandedwinged whiteflies (Table 11), cotton leaf perforator (Table 12), saltmarsh caterpillars and southern armyworms (Table 14) contributed to the losses from arthropod pests in 2013.

Pink bollworm infested 16,680 acres of US cotton. Only California had infested acres, but no losses. Pink bollworm eradication cost US producers about \$0.26 per acre in eradication costs (Table 12).

### **Conclusion**

Total losses from insect pests in US cotton in 2013 were 2.72%, another year with low percent losses (Table 1). Losses below 5% continue to reflect the outstanding contribution technology has made to managing pest complexes which have plagued cotton growers. Budworm is still a serious threat and continues to drive decisions, but we have adapted to dealing with Lepidoptera pests in a different manner than 10 years ago. New GM varieties are being developed and introduced. These continue to protect the crop and add to the diversity of species held in check. The bug complexes continue to increase in importance and in difficulty to manage. Resistance and the incursion of pests into new areas present new challenges each year. Regional differences in pest complexes also present additional problems to be solved. The loss of 'old standby' insecticide chemistries will also complicate and stimulate new approaches to successful management. The costs of insect management were \$62.59 per acre in 2013; costs plus loss were \$90.75 per acre (Williams 2013).

### **Acknowledgments**

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Table 1. Number of acres, percent reduction in yield by arthropods, cost plus loss and bales lost by state in 2013

	<b>Acres</b>	<b>% reduction</b>	<b>cost + loss</b>	<b>bales lost</b>
<b>US</b>	7,895,580	2.72%	\$716,561,035	582,591
Mississippi	320,000	8.10%	\$79,655,215	76,497
Tennessee	235,000	8.03%	\$36,815,177	50,022
Arkansas	318,000	7.34%	\$69,314,359	72,626
New Mexico	42,258	6.92%	\$4,772,332	8,906
Florida	125,000	6.43%	\$16,026,442	19,739
Arizona	156,500	6.09%	\$35,073,652	41,535
Louisiana	128,000	5.34%	\$37,440,369	28,426
Missouri	260,000	5.00%	\$43,018,714	36,369
Alabama	359,222	4.08%	\$38,776,236	42,587
North Carolina	502,000	3.59%	\$44,849,297	28,047
South Carolina	255,000	3.52%	\$23,395,894	26,455
Georgia	1,335,000	3.10%	\$123,399,805	108,975
Virginia	83,500	1.25%	\$877,699	2,471
Oklahoma	172,100	0.87%	\$5,330,500	2,824
Texas	3,300,000	0.74%	\$117,768,687	34,416
Kansas	26,000	0.43%	\$477,518	176
California	278,000	0.27%	\$26,445,979	2,521

Table 2. Percent lost, acres infested, rank, and percent of US cotton infested by insect pests in 2013

<b>pest</b>	<b>% Reduction</b>	<b>acres infested</b>	<b>rank</b>	<b>% infested</b>	<b>Cost/acre</b>	<b>Bales lost</b>
<i>Lygus</i>	0.778%	2,988,742	1	37.85%	\$9.99	187,088
Stink Bugs	0.681%	4,236,095	2	53.65%	\$5.27	142,037
Thrips	0.557%	6,726,437	3	85.19%	\$3.20	117,438
Cotton Fleahopper	0.218%	1,762,563	4	22.32%	\$0.60	21,591
Bollworm/Budworm	0.182%	2,858,315	5	36.20%	\$0.70	38,361
Spider Mites	0.125%	1,929,726	6	24.44%	\$1.80	31,541
Brown Stink Bugs	0.063%	124,750	7	1.58%	\$0.55	21,760
Aphids	0.037%	3,486,533	8	44.16%	\$0.52	4,325
Silverleaf Whitefly ( <i>Bemesia</i> )	0.036%	705,446	9	8.93%	\$1.08	9,643
Clouded Plant bugs	0.031%	492,502	10	6.24%	\$0.04	7,193
Grasshoppers	0.003%	2,087,308	11	26.44%	\$0.08	269
Banded Winged Whitefly	0.003%	371,979	12	4.71%	\$0.01	512
Fall Armyworm	0.002%	872,757	13	11.05%	\$0.01	526
Other Insects	0.001%	205,943	17	2.61%	\$0.02	189
Beet Armyworm	0.001%	695,542	14	8.81%	\$0.00	97
Cutworms	0.000%	375,392	15	4.75%	\$0.20	10
Saltmarsh Caterpillars	0.000%	292,505	16	3.70%	\$0.00	12
Loopers	0.000%	150,830	18	1.91%	\$0.00	0
Southern Armyworms	0.000%	81,260	19	1.03%	\$0.00	0
Pink Bollworm	0.000%	16,680	20	0.21%	\$0.00	0
Boll Weevil	0.000%	8,500	21	0.11%	\$0.00	0
Cotton Leaf Perforator	0.000%	1,580	22	0.02%	\$0.00	0

Table 3. Bollworm and budworm: percent of population, yield reduction, acres infested, bales lost and % Bt acres by state in 2013

<b>States</b>	<b>% Reduction</b>	<b>% infested</b>	<b>% bollworm</b>	<b>acres infested</b>	<b>bales lost</b>	<b>% bt acres</b>
<b>US</b>	0.182%	36.2	64.6%	2,858,315	38,361	82
<b>Alabama</b>	0.000%	15.1	27.0%	39,300	0	99
<b>Arizona</b>	0.023%	5.4	99.0%	8,500	168	99
<b>Arkansas</b>	0.476%	82.8	99.4%	263,200	4,710	99
<b>California</b>	0.000%	0.0	0.0%	0	0	0
<b>Florida</b>	0.250%	50.0	50.0%	62,500	768	100
<b>Georgia</b>	0.150%	157.1	89.4%	400,500	5,270	99
<b>Kansas</b>	0.000%	0.1	100.0%	520	0	80
<b>Louisiana</b>	0.000%	40.0	99.9%	128,000	0	99
<b>Mississippi</b>	0.701%	95.4	99.6%	224,250	6,622	98
<b>Missouri</b>	0.000%	0.0	100.0%	0	0	100
<b>New Mexico</b>	4.000%	15.2	100.0%	42,258	5,148	2549
<b>North Carolina</b>	0.170%	139.7	99.8%	502,000	1,328	100
<b>Oklahoma</b>	0.000%	0.0	0.0%	0	0	98
<b>South Carolina</b>	0.750%	50.8	100.0%	255,000	5,637	100
<b>Tennessee</b>	0.700%	389.3	99.7%	164,500	4,363	100
<b>Texas</b>	0.066%	21.1	36.3%	696,812	4,349	67
<b>Virginia</b>	0.000%	85.0	100.0%	70,975	0	100

Table 4. *Bt* cotton acreage, acres sprayed for caterpillars, average number of applications and percent of population that was bollworm from 1995 to 2013

Year	acreage	sprayed	applications	bollworm	acres by air	acres by grnd
1995	<15,000	nr	nr	30*		
1996	1,851,094	nr	nr	40*		
1997	2,271,824	nr	nr	50*	1.62	1.54
1998	2,731,827	nr	nr	60*	2.30	2.56
1999	4,234,785	1,055,331	0.290	76	2.41	2.43
2000	5,220,392	1,455,084	0.330	79	1.85	1.35
2001	5,717,747	2,727,821	0.400	74	1.73	1.73
2002	4,893,810	3,091,586	0.520	83	1.88	1.87
2003	6,040,529	3,151,114	0.551	86	0.97	0.95
2004	6,591,338	2,909,459	0.466	94	1.02	1.13
2005	7,395,393	3,050,093	0.541	95	0.90	1.41
2006	8,495,822	3,961,194	0.590	92	0.79	1.36
2007	7,106,473	2,211,222	0.503	92%	0.94	1.46
2008	6,237,969	1,713,418	0.626	78%	1.99	1.55
2009	5,841,945	1,368,256	0.747	79%	2.30	1.84
2010	8,336,277	1,773,474	1.063	88%	1.98	1.72
2011	8,930,070	2,213,337	0.823	88%	2.18	2.16
2012	11,163,956	1,362,208	0.949	88%	1.97	1.82
2013	6,499,813	919,582	0.339	65%	2.95	2.04

nr – not reported \* polled entomologists for estimates

Table 5. *Lygus* and stink bugs: percent yield reduction, acres infested and bales lost by state in 2013

	<i>Lygus</i>			stink bugs		
	% Reduction	Acres infested	Bales lost	% Reduction	Acres infested	Bales lost
US	0.778%	2,988,742	187,088	0.681%	4,236,095	142,037
Alabama	0.073%	110,322	3,008	2.553%	359,222	24,118
Arizona	1.800%	140,400	12,267	3.330%	140,550	22,691
Arkansas	5.000%	318,000	49,467	0.000%	222,600	0
California	0.047%	258,540	429	0.180%	16,680	1,662
Florida	1.500%	125,000	4,608	3.000%	125,000	9,216
Georgia	0.075%	200,250	2,635	1.800%	1,201,500	63,235
Kansas	0.100%	2,600	41	0.000%	1,300	0
Louisiana	3.000%	128,000	15,985	0.335%	85,760	1,785
Mississippi	4.802%	307,350	45,378	0.325%	117,000	3,067
Missouri	4.000%	260,000	29,095	0.000%	75,000	0
New Mexico	1.365%	38,455	1,757	0	4,648	212
North Carolina	0.060%	502,000	469	3.000%	502,000	23,431
Oklahoma	0.000%	0	0	0.001%	8,605	2
South Carolina	0.100%	255,000	752	1.500%	255,000	11,273
Tennessee	3.400%	235,000	21,189	0.260%	152,750	1,620
Texas	0.0001%	106,990	8	0.000%	1,051,480	0
Virginia	0.000%	835	0	0.750%	41,750	1,483

Table 6. Thrips and cotton fleahoppers: % yield reduction, acres infested and bales lost by state in 2013

	Thrips			cotton fleahoppers		
	% Reduction	Acres infested	Bales lost	% Reduction	Acres infested	Bales lost
US	0.557%	6,726,437	117,438	0.218%	1,762,563	21,591
Alabama	1.459%	359,222	15,462	0.000%	0	0
Arizona	0.098%	154,950	668	0.006%	93,450	40
Arkansas	1.431%	318,000	14,156	0.000%	222,600	0
California	0.000%	250,200	0	0.000%	0	0
Florida	0.950%	118,750	2,919	0.000%	0	0
Georgia	0.950%	1,268,250	33,374	0.000%	0	0
Kansas	0.025%	1,300	10	0.300%	7,800	124
Louisiana	0.000%	128,000	0	0.000%	6,400	0
Mississippi	0.297%	316,800	2,806	0.017%	55,850	165
Missouri	0.923%	240,000	6,714	0.000%	0	0
New Mexico	0.858%	27,890	1,104	0.374%	14,368	481
North Carolina	0.360%	502,000	2,812	0.000%	0	0
Oklahoma	0.225%	77,445	732	0.600%	68,840	1,952
South Carolina	1.000%	255,000	7,516	0.000%	229,500	0
Tennessee	3.400%	235,000	21,189	0.000%	0	0
Texas	0.095%	2,390,130	6,988	0.481%	1,063,755	18,828
Virginia	0.500%	83,500	988	0.000%	0	0



Table 7. Spider mites and aphids: percent yield reduction, acres infested and bales lost by state in 2013

	spider mites			aphids		
	% Reduction	Acres infested	Bales lost	% Reduction	Acres infested	Bales lost
<b>US</b>	0.125%	1,929,726	31,541	0.037%	3,486,533	4,325
<b>Alabama</b>	0.000%	136,522	0	0.000%	202,022	0
<b>Arizona</b>	0.030%	46,650	206	0.010%	15,575	67
<b>Arkansas</b>	0.434%	138,001	4,293	0.000%	318,000	0
<b>California</b>	0.047%	258,540	429	0.000%	222,400	0
<b>Florida</b>	0.000%	25,000	0	0.600%	100,000	1,843
<b>Georgia</b>	0.002%	267,000	70	0.005%	667,500	176
<b>Kansas</b>	0.000%	520	0	0.000%	0	0
<b>Louisiana</b>	2.000%	128,000	10,656	0.000%	64,000	0
<b>Mississippi</b>	1.229%	224,750	11,614	0.057%	181,750	537
<b>Missouri</b>	0.077%	20,000	560	0.000%	5,000	0
<b>New Mexico</b>	0.000%	1,268	0	0.000%	6,761	0
<b>North Carolina</b>	0.000%	100,000	0	0.001%	502,000	8
<b>Oklahoma</b>	0.000%	0	0	0.000%	0	0
<b>South Carolina</b>	0.100%	255,000	752	0.000%	255,000	0
<b>Tennessee</b>	0.160%	47,000	997	0.008%	94,000	50
<b>Texas</b>	0.028%	281,476	1,963	0.057%	852,525	1,643
<b>Virginia</b>	0.000%	0	0	0.000%	0	0

Table 8. Boll weevil and brown stink bug: percent yield reduction, acres infested and bales lost by state in 2013

	Boll weevil			Eradication	Brown stink bugs		
	% Reduction	Acres infested	Bales lost		% Reduction	Acres infested	Bales Lost
<b>US</b>	0.000%	8,500	0	\$3.04	0.063%	124750	21760
<b>Alabama</b>	0.000%	0	0	\$3.23	0.000%	0	0
<b>Arizona</b>	0.000%	0	0	\$1.22	3.193%	124750	21760
<b>Arkansas</b>	0.000%	0	0	\$8.00	0.000%	0	0
<b>California</b>	0.000%	0	0	\$0.00	0.000%	0	0
<b>Florida</b>	0.000%	0	0	\$1.00	0.000%	0	0
<b>Georgia</b>	0.000%	0	0	\$0.85	0.000%	0	0
<b>Kansas</b>	0.000%	0	0	\$0.00	0.000%	0	0
<b>Louisiana</b>	0.000%	0	0	\$6.00	0.000%	0	0
<b>Mississippi</b>	0.000%	0	0	\$4.66	0.000%	0	0
<b>Missouri</b>	0.000%	0	0	\$5.00	0.000%	0	0
<b>New Mexico</b>	0.000%	0	0	\$5.95	0.000%	0	0
<b>North Carolina</b>	0.000%	0	0	\$0.90	0.000%	0	0
<b>Oklahoma</b>	0.000%	0	0	\$2.00	0.000%	0	0
<b>South Carolina</b>	0.000%	0	0	\$1.00	0.000%	0	0
<b>Tennessee</b>	0.000%	0	0	\$1.00	0.000%	0	0
<b>Texas</b>	0.000%	8,500	0	\$4.15	0.000%	0	0
<b>Virginia</b>	0.000%	0	0	\$1.02	0.000%	0	0

Table 9. Beet and fall armyworms: percent yield reduction, acres infested and bales lost by state in 2013

	beet armyworms			fall armyworms		
	% Reduction	Acres infested	Bales lost	% Reduction	Acres infested	Bales lost
US	0.00001	695,542	97	0.002%	872,757	526
Alabama	0.000	0	0	0.000%	0	0
Arizona	0.000	15,800	7	0.000%	1,580	0
Arkansas	0.000	880	0	0.000%	50,400	0
California	0.000	0	0	0.000%	0	0
Florida	0.000	0	0	0.000%	0	0
Georgia	0.000	0	0	0.000%	0	0
Kansas	0.000	0	0	0.000%	0	0
Louisiana	0.000	0	0	0.000%	10,240	0
Mississippi	0.000	5,350	0	0.000%	6,400	0
Missouri	0.000	15,000	0	0.000%	15,000	0
New Mexico	0.000	13,523	0	0.000%	4,648	0
North Carolina	0.000	75,300	0	0.000%	125,500	0
Oklahoma	0.000	0	0	0.000%	0	0
South Carolina	0.000	0	0	0.070%	178,500	526
Tennessee	0.000	0	0	0.000%	0	0
Texas	0.000	569,690	91	0.000%	480,489	0
Virginia	0.000	0	0	0.000%	0	0

Table 10. Cutworms and loopers: percent yield reduction, acres infested and bales lost by state in 2013

	cutworms			loopers		
	% Reduction	Acres infested	Bales lost	% Reduction	Acres infested	Bales lost
US	0.000%	375,392	10	0.000%	150,830	0
Alabama	0.000%	12,342	0	0.000%	0	0
Arizona	0.000%	0	0	0.000%	1,580	0
Arkansas	0.000%	72,400	0	0.000%	0	0
California	0.000%	0	0	0.000%	0	0
Florida	0.000%	0	0	0.000%	0	0
Georgia	0.000%	0	0	0.000%	0	0
Kansas	0.000%	0	0	0.000%	0	0
Louisiana	0.000%	0	0	0.000%	0	0
Mississippi	0.001%	26,750	8	0.000%	45,100	0
Missouri	0.000%	0	0	0.000%	0	0
New Mexico	0.000%	0	0	0.000%	0	0
North Carolina	0.000%	25,000	0	0.000%	0	0
Oklahoma	0.000%	0	0	0.000%	0	0
South Carolina	0.000%	229,500	0	0.000%	12,750	0
Tennessee	0.0004%	9,400	2	0.000%	0	0
Texas	0.000%	0	0	0.000%	91,400	0
Virginia	0.000%	0	0	0.000%	0	0

Table 11. Whiteflies: percent yield reduction, acres infested and bales lost by state in 2013

	bandedwinged whiteflies			<i>Bemisia</i> spp		
	% Reduction	Acres infested	Bales lost	% Reduction	Acres infested	Bales lost
<b>US</b>	0.003%	371,979	512	0.036%	705,446	9,643
<b>Alabama</b>	0.000%	7,860	0	0.000%	2,620	0
<b>Arizona</b>	0.000%	31,075	0	0.794%	124,600	5,411
<b>Arkansas</b>	0.000%	0	0	0.000%	0	0
<b>California</b>	0.000%	0	0	0.000%	222,400	0
<b>Florida</b>	0.000%	0	0	0.000%	0	0
<b>Georgia</b>	0.000%	0	0	0.120%	160,200	4,216
<b>Kansas</b>	0.000%	0	0	0.000%	0	0
<b>Louisiana</b>	0.000%	0	0	0.000%	0	0
<b>Mississippi</b>	0.010%	33,300	98	0.000%	0	0
<b>Missouri</b>	0.000%	0	0	0.000%	0	0
<b>New Mexico</b>	0.000%	0	0	0.000%	0	0
<b>North Carolina</b>	0.000%	0	0	0.000%	0	0
<b>Oklahoma</b>	0.000%	0	0	0.000%	0	0
<b>South Carolina</b>	0.000%	178,500	0	0.000%	25,500	0
<b>Tennessee</b>	0.001%	11,750	3	0.000%	0	0
<b>Texas</b>	0.006%	109,494	410	0.0002%	170,126	17
<b>Virginia</b>	0.000%	0	0	0.000%	0	0

Table 12. Cotton leaf perforator and Pink bollworm: percent yield reduction, acres infested and bales lost and eradication cost by state in 2013

	cotton leaf perforator			PBW erad	pink bollworms		
	% Reduction	Acres infested	Bales lost	costs per acre	% Reduction	Acres infested	Bales lost
<b>US</b>	0.000%	1,580	0	\$0.26	0.000%	16,680	0
<b>Alabama</b>	0.000%	0	0	\$0.00	0.000%	0	0
<b>Arizona</b>	0.000%	1,580	0	\$1.22	0.0000%	0	0
<b>Arkansas</b>	0.000%	0	0	\$0.00	0.000%	0	0
<b>California</b>	0.000%	0	0	\$6.59	0.0000%	16,680	0
<b>Florida</b>	0.000%	0	0	\$0.00	0.000%	0	0
<b>Georgia</b>	0.000%	0	0	\$0.00	0.000%	0	0
<b>Kansas</b>	0.000%	0	0	\$0.00	0.000%	0	0
<b>Louisiana</b>	0.000%	0	0	\$0.00	0.000%	0	0
<b>Mississippi</b>	0.000%	0	0	\$0.00	0.000%	0	0
<b>Missouri</b>	0.000%	0	0	\$0.00	0.000%	0	0
<b>New Mexico</b>	0.000%	0	0	\$1.12	0.000%	0	0
<b>North Carolina</b>	0.000%	0	0	\$0.00	0.000%	0	0
<b>Oklahoma</b>	0.000%	0	0	\$0.00	0.000%	0	0
<b>South Carolina</b>	0.000%	0	0	\$0.00	0.000%	0	0
<b>Tennessee</b>	0.000%	0	0	\$0.00	0.000%	0	0
<b>Texas</b>	0.000%	0	0	\$0.00	0.0000%	0	0
<b>Virginia</b>	0.000%	0	0	\$0.00	0.000%	0	0

Table 13. Grasshoppers and Clouded plant bugs: percent yield reduction, acres infested and bales lost by state in 2013

	grasshoppers			clouded plant bugs		
	% Reduction	Acres infested	Bales lost	% Reduction	Acres infested	Bales lost
<b>US</b>	0.003%	2,087,308	269	0.031%	492,502	7,193
<b>Alabama</b>	0.000%	138,417	0	0.00%	62,122	0
<b>Arizona</b>	0.000%	15,575	0	0.00%	0	0
<b>Arkansas</b>	0.000%	159,000	0	0.00%	111,300	0
<b>California</b>	0.000%	0	0	0.00%	0	0
<b>Florida</b>	0.000%	0	0	0.13%	31,250	384
<b>Georgia</b>	0.000%	0	0	0.00%	26,700	0
<b>Kansas</b>	0.000%	0	0	0.00%	0	0
<b>Louisiana</b>	0.000%	0	0	0.00%	0	0
<b>Mississippi</b>	0.000%	16,000	0	0.66%	85,000	6,201
<b>Missouri</b>	0.000%	0	0	0.00%	0	0
<b>New Mexico</b>	0.009%	1,268	12	0.00%	0	0
<b>North Carolina</b>	0.000%	50	0	0.00%	0	0
<b>Oklahoma</b>	0.043%	146,285	138	0.00%	0	0
<b>South Carolina</b>	0.000%	229,500	0	0.00%	5,100	0
<b>Tennessee</b>	0.000%	0	0	0.10%	152,750	608
<b>Texas</b>	0.005%	1,381,214	119	0.00%	18,280	0
<b>Virginia</b>	0.000%	0	0	0.00%	0	0

Table 14. Saltmarsh caterpillars and southern armyworms: percent yield reduction, acres infested and bales lost by state in 2013

	saltmarsh caterpillar			southern armyworms		
	% Reduction	Acres infested	Bales lost	% Reduction	Acres infested	Bales lost
<b>US</b>	0.000%	292,505	12	0.000%	81,260	0
<b>Alabama</b>	0.000%	0	0	0.000%	13,100	0
<b>Arizona</b>	0.001%	7,900	7	0.000%	0	0
<b>Arkansas</b>	0.000%	6,360	0	0.000%	0	0
<b>California</b>	0.000%	0	0	0.000%	0	0
<b>Florida</b>	0.000%	0	0	0.000%	0	0
<b>Georgia</b>	0.000%	0	0	0.000%	0	0
<b>Kansas</b>	0.000%	0	0	0.000%	0	0
<b>Louisiana</b>	0.000%	0	0	0.000%	0	0
<b>Mississippi</b>	0.000%	3,200	0	0.000%	26,500	0
<b>Missouri</b>	0.000%	0	0	0.000%	0	0
<b>New Mexico</b>	0.004%	845	5	0.000%	0	0
<b>North Carolina</b>	0.000%	0	0	0.000%	0	0
<b>Oklahoma</b>	0.000%	0	0	0.000%	0	0
<b>South Carolina</b>	0.000%	0	0	0.000%	5,100	0
<b>Tennessee</b>	0.000%	0	0	0.000%	0	0
<b>Texas</b>	0.000%	274,200	0	0.000%	36,560	0
<b>Virginia</b>	0.000%	0	0	0.000%	0	0