COTTON INSECT LOSS ESTIMATES - 2009

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Abstract

Cotton losses to arthropod pests reduced yields by 2.58% in 2009. Once again inclement weather was the biggest deterrent to yields. Thrips took top ranking at 0.713% loss. *Lygus* were second at 0.614% and bollworm/budworm complex was third, reducing yields by 0.486%. Stink bugs were number four at 0.371%, fall armyworms were fifth at 0.113%, spider mites were sixth at 0.099% and cotton fleahoppers were seventh at 0.093%. Clouded plant bugs were eighth at 0.038% and aphids were ninth at 0.030%. Total cost and loss for arthropods in 2009 was $502 million. Direct management costs for arthropods were $43.33 per acre.

Introduction

Cotton acreage was significantly reduced again in 2009 and weather events were the major factors impacting cotton production. Both of these worked to change the dynamic of the pests of the crop. A shift away from the bollworm/budworm pest complex toward the bugs has been developing since the advent of the *Bt* technology in 1995. But, Bollworms and budworms continue to inflict damage to the crop. Overall losses were at 2.58% for 2009. Florida was the top loser at 7.95% and Oklahoma was second at 7.76% loss to arthropod pests in 2009 (Table 1). Thrips were found in 94.5% of the US crop and was the number one pest at 0.713% (Table 2). Management of *Lygus* has developed into the major problem with insect pests. They captured the number two pest status for 2009 at 0.614% reduction in yield. *Lygus* infested 53% of the cotton acreage in the US. Heliothines infested about 56% of the US cotton crop in 2009. Boll weevils infested only 1.5% of the crop (Table 2), and are reported as pests only in Louisiana, and Texas (Table 8). Total arthropod losses across the US (Table 1) (2.58%) translates to 512472 bales of cotton. Florida's 7.95% loss represented 15,421 bales, Oklahoma's 8.09% loss represented 29,910 bales and Alabama at 6.15% lost 32,851 bales. Missouri (4th) reported losses of 6.11%, Mississippi (5th) had 5.94%, South Carolina (6th) 4.45%, Tennessee (7th) 4.39%, Louisiana (8th) 4.22%, Arkansas (9th) 3.67%, North Carolina (10th) 3.33%, Arizona (11th) 3.31%, Kansas (12th) 3.2%, and Georgia (13th) 3.03%.

All other states reported 2% or less in losses. In descending order they were Virginia (2.0%), California (1.93%), Texas (1.14%) and New Mexico (0.19%). Texas reported 107,243 bales lost, Georgia lost 62576 and Mississippi lost 47,702 bales to arthropod pests.

Pest status continues to change and pests which were once considered minor now are major players in causing losses. Current technologies are helping to maintain losses below 5%. Bugs continue to increase in importance and overall rank among pests of cotton. The reduction of acres has helped to intensify management to allow producers to keep pests low.

Discussion

Early season Thrips reduce US crop by 0.713%

Early season Thrips infested almost 95% of the US acreage in 2009 and cost US farmers $7.73 per acre in management (Williams, 2010). There were 138,207 bales of US cotton lost to this complex of pests in 2009. Oklahoma (5.0%) reported the highest losses from Thrips. Kansas (2.0%) and Missouri (1.28%) reported more than 1% loss. All other states reported l% or less in losses: Texas (0.89%) Tennessee (0.7%), Arkansas (0.54%), Louisiana (0.5%), North Carolina(0.5%), California (0.48%), Virginia (0.33%), South Carolina (0.25%), Mississippi (0.24%), Alabama (0.12%), Florida (0.10%), Arizona (0.07%) and Georgia 0.01%). New Mexico reported no losses from early-season Thrips (Table 6).

Lygus: 2nd most damaging pest in US cotton

This report combines the western species, *Lygus hesperus*, and the eastern species, *Lygus lineolaris.* Six states reported greater than 1% loss to *Lygus:* Missouri (3.7%), Arkansas (2.79%), Mississippi 2.49%, Louisiana (2.14%), Arizona (1.95%), and Tennessee (1.2%). California (0.95%) and Alabama (0.60%) also lost more than 3,000 bales each to these pests. Other state losses to these pests were low. Lygus infested 4.2 million acres of the crop and

cause the loss of 126,871 bales for a 0.614% reduction (Table 5). Virginia, Oklahoma and Florida reported no losses to *Lygus.*

Heliothines: third most damaging US pest

Bollworms and budworms still infest 4.3 million acres but have dropped to less that 0.5% loss. Bollworms (*H. zea*) were the dominant species at 79%. There was 0.486% loss to heliothines which infest about 56% of the US crop. Heliothines damages resulted in the loss of 91,119 bales of cotton (Table 3). Florida (2.5%) reported the highest loss to Heliothines, Alabama at 1.88% and Georgia (1.8%) was second and third. Louisiana (1.06%) and South Carolina (1.0%) rounded out the top 5 states which reported losses to Heliothines. Georgia (1.8%) lost 37,125 bales, and Alabama (1.88%) lost 10,039 bales. California, Oklahoma, and Virginia reported no losses to heliothines.

Bt cotton acreage was 5.8 million acres in 2009 (Table 4). This is almost a 400,000 acre drop. This is more reflective of an overall decrease in cotton acreage as the percentage of *Bt* cotton acres was 79%. Heliothines were sprayed on 1.368 million Bt cotton acres in 2009. The cost of *Bt* is estimated at $15.31 per acre of the US crop. This represents about 35% of the cost of arthropod management and is the top cost for 2009. (Williams 2009).

Stink bugs: fourth most damaging pest at 0.371%

Stink bugs reduced the US crop by 0.371% in 2009. Florida (4%), Alabama (2.78%) South Carolina (1.95%), North Carolina (1.8%) Virginia (1.67%) and Mississippi (1.01%) reported problems with this pest. The stink bug complex infested 3.266 million acres of cotton in 2009 and destroyed 79,327 bales of cotton (Table 5). New Mexico, California, Kansas, and Oklahoma reported no losses to stink bugs.

Fall armyworm: 5th at 0.113%

Fall armyworm (0.113%) infested about 1,835,299 acres of cotton and reduced yields by 20,238 bales of cotton. Nine states reported losses to this pest: Florida (1.35%), South Carolina (0.90%), Alabama (0.73%), Georgia (0.3%), North Carolina (0.083%), Texas (0.044%), Tennessee (0.03%), Louisiana (0.02%), and Arkansas (0.019%). Three other states reported infestations but no losses to these pests, five states reported no acres infested (Table 9).

Spider mites rank sixth at 0.099%

Mites infested 2.022 million acres of cotton in 2009. Mississippi (0,825%) reported highest losses to spider mites. Only six states reported no losses to spider mites. 21,673 bales of US cotton were lost to spider mites in 2009 (Table 7).

Cotton fleahoppers ranks 7th in damage at 0.093%

Cotton fleahoppers (0.093%) infested 1.491 million acres of cotton in 2009 (Table 6). Oklahoma (2.75%), Kansas (0.90%), Texas (0.045%) and Arizona (0.040%) reported losses to cotton fleahoppers. All other states reported no loss, nine states reported no infestation. Fleahoppers destroyed 15,598 bales of cotton.

Clouded plant bugs rank 8th

Eight states reported infestations of clouded plant bug which reduced cotton yields by 0.04%. 452,752 acres were infested in Texas, Tennessee, Arkansas, Mississippi, Florida, Alabama, South Carolina and Louisiana. 8,300 bales were lost to this pest, (Table 8).

Aphids: 9th most damaging pest of US cotton

Aphids infested 48.9% of US cotton, and yield losses were 0.03%. Louisiana (0.315%) and Mississippi (0.142%) reported heaviest losses to aphids All states but Kansas and Virginia reported infestations and indicated light losses to this pest. Six states: Arkansas, Florida, Kansas, Missouri, New Mexico, and Virginia reported no losses to aphids (Table 7). Aphids reduced yields by 6456 bales of US cotton.

Silverleaf Whitefly (*Bemesia sp)* .008% loss

Seven states reported infestations of silverleaf whiteflies (*Bemisia* sp) in 2009. The 0.008% reduction in yield places it as the 10th most damaging pest in US cotton. Arizona (0.395%) lost 2,122 bales, California (0.02%) lost 111 bales, and Texas (0.0001%) lost 13 bales. *Bemisia* sp were reported in 289,731 acres (Table 11).

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 and dropped to 116,247 acres in 2009. Boll weevils were the number ten ranked pest in the US in 2007. Texas and Louisiana reported infested acres in 2009 and only Texas lost 400 bales. Eradication costs for boll weevil were $4.39 per US acre (Table 8).

Losses from all remaining pests of cotton were almost negligible. Other insects, which included the mealybug and *Creontiades* (green mirid) (Table 13) combined to reduce cotton yields by 0.003% in 2009. Averaged across the cotton belt, all other pests of cotton reduced yields by less than 0.01% in 2009. European cornborers were reported as a pest on 655 acres in 2009. Beet armyworms (Table 9), cutworms and loopers (Table 10), bandedwinged whiteflies (Table 11), cotton leaf perforator (Table 12), grasshoppers (Table 13), saltmarsh caterpillars and southern armyworms (Table 14) contributed to the losses from arthropod pests in 2009.

Pink bollworm infested 81,211 acres of US cotton. Texas, California, and Arizona 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 2009were 2.58%, 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 long have plagued cotton growers. The boll weevil and tobacco budworm remain a threat, but are no longer the major factors in production they once were. The emergence of new pest complexes has been much slower than many anticipated. The bugs continue to be a concern in much of the cotton belt and as the older insecticide chemistries drop from usage, spider mites, aphids and Thrips will continue to make comebacks. The costs of insect management were $43.33 per acre in 2009; costs plus loss were $63.72 per acre (Williams 2010).

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References

National Agricultural Statistics Service, (NASS), Agricultural Statistics Board, U.S. Department of Agriculture. Crop Production Report December 2009 and January, 2010

Williams, M. R. 2010, Cotton insect losses – 2009. Proceedings Belt wide Cotton Conferences

Williams, M. R. 2009, Cotton insect losses – 2008. Proceedings Belt wide Cotton Conferences

Williams, M. R. 2008, Cotton insect losses – 2007. Proceedings Belt wide Cotton Conferences

Williams, M. R. 2007, Cotton insect losses – 2006. Proceedings Belt wide Cotton Conferences

Table 1. Number of acres, percent reduction in yield by arthropods, cost plus loss and bales lost by state in 2009

	Acres	% reduction	Cost + Loss	Bales Lost
US	7,871,264	2.58%	$501,573,842	512,472
Florida	87,900	7.95%	$12,805,503	15,421
Oklahoma	190,000	7.76%	$20,954,321	29,910
Alabama	251,049	6.15%	$27,986,500	32,851
Missouri	275,000	6.11%	$31,520,086	40,045
Mississippi	296,344	5.94%	$51,463,681	47,702
South Carolina	115,000	4.45%	$13,678,204	11,415
Tennessee	300,000	4.39%	$27,924,020	36,528
Louisiana	228,000	4.22%	$30,628,822	26,252
Arkansas	520,000	3.67%	$65,554,364	47,151
North Carolina	361,000	3.33%	$28,611,938	21,005
Arizona	147,057	3.31%	$5,625,809	17,591
Kansas	35,000	3.20%	$1,410,233	1,854
Georgia	990,000	3.03%	$77,174,496	62,576
Virginia	65,000	2.00%	$4,430,400	4,063
California	190,065	1.93%	$11,305,625	10,656
Texas	3,785,972	1.14%	$117,854,676	107,243
New Mexico	33,877	0.19%	$1,417,032	208

Table 2. Percent lost, acres infested, rank, and percent of US cotton infested by insect pests in 2009

Pest	% Reduction	Acres Infested	Rank	% Infested	Cost/acre	Bales Lost
Thrips	0.713%	7,437,609	1	94.49%	$1.44	138,207
Lygus	0.614%	4,209,086	2	53.47%	$2.98	126,871
Bollworm/Budworm	0.486%	4,376,640	3	55.60%	$1.69	91,119
Stink Bugs	0.371%	3,265,604	4	41.49%	$2.57	79,327
Fall Armyworm	0.113%	1,835,299	5	23.32%	$0.72	20,238
Spider Mites	0.099%	2,022,705	6	25.70%	$0.67	21,673
Cotton Fleahopper	0.093%	1,490,760	7	18.94%	$0.47	15,598
Clouded Plant bugs	0.038%	452,752	8	5.75%	$0.15	8,300
Aphids	0.030%	3,851,114	9	48.93%	$0.24	6,456
Silverleaf Whitefly (Bemesia)	0.008%	289,731	10	3.68%	$0.34	2,245
Beet Armyworm	0.004%	703,067	11	8.93%	$0.00	643
Other Insects	0.003%	62,193	12	0.79%	$0.09	668
Boll Weevil	0.002%	116,247	13	1.48%	$0.00	400
Grasshoppers	0.001%	1,128,763	14	14.34%	$0.01	266
Banded Winged Whitefly	0.001%	524,519	15	6.66%	$0.00	249
Cutworms	0.001%	386,007	16	4.90%	$0.25	200
Loopers	0.000%	808,131	17	10.27%	$0.01	12
Saltmarsh Caterpillars	0.000%	487,934	18	6.20%	$0.00	0
Cotton Leaf Perforator	0.000%	2,585	19	0.03%	$0.00	1
Pink Bollworm	0.000%	81,211	20	1.03%	$0.00	0
European Cornborer	0.000%	655	21	0.01%	$0.00	0
Southern Armyworms	0.000%	68,798	22	0.87%	$0.01	0

Table 3. Bollworm and budworm: percent of population, yield reduction, acres infested, bales lost and % *Bt* acres by state in 2009

	Bollworm/ Budworm					
States	**% Yield Reduction**	**% Crop Infested**	**% Bollworm**	**Acres Infested**	**Bales Lost**	**% *Bt* Acres**
US	0.486%	56	79.2%	4,376,640	91,119	79
Alabama	1.879%	100	0.0%	251,049	10,039	89
Arizona	0.000%	14	0.0%	20,350	2	98
Arkansas	0.268%	100	0.0%	520,000	3,436	95
California	0.000%	1	0.0%	1,901	0	3
Florida	2.500%	100	94.9%	87,900	4,849	95
Georgia	1.800%	90	47.4%	891,000	37,125	97
Kansas	0.150%	15	0.0%	5,250	87	40
Louisiana	1.055%	100	98.1%	228,000	6,558	93
Mississippi	0.995%	65	0.0%	193,132	7,998	97
Missouri	0.520%	52	90.2%	143,000	3,411	90
New Mexico	0.025%	8	100.0%	2,812	27	89
North Carolina	0.700%	100	98.2%	361,000	4,411	98
Oklahoma	0.000%	100	96.3%	190,000	0	100
South Carolina	1.000%	100	92.4%	115,000	2,565	99
Tennessee	0.400%	80	98.0%	240,000	3,328	98
Texas	0.078%	29	0.0%	1,084,123	7,282	56
Virginia	0.000%	30	100.0%	19,500	0	98

Table 4. *Bt* cotton acreage, acres sprayed for caterpillars, average number of applications and percent of population which was bollworm from 1995 to 2009

Year	***Bt* cotton acreage**	**Acres *Bt* sprayed**	**Avg. # applications**	**% Population bollworm**
1995	<15,000	nr	nr	30*
1996	1,851,094	nr	nr	40*
1997	2,271,824	nr	nr	50*
1998	2,731,827	nr	nr	60*
1999	4,234,785	1,055,331	0.290	76
2000	5,220,392	1,455,084	0.330	79
2001	5,717,747	2,727,821	0.400	74
2002	4,893,810	3,091,586	0.520	83
2003	6,040,529	3,151,114	0.551	86
2004	6,591,338	2,909,459	0.466	94
2005	7,395,393	3,050,093	0.541	95
2006	8,495,822	3,961,194	0.590	92
2007	7,106,473	2,211,222	0.503	92
2008	6,278,444	1,921,668	0.751	75
2009	5,841,945	1,368,256	0.747	79

nr – not reported * polled entomologists for estimates

Table 5. *Lygus* and stink bugs: percent yield reduction, acres infested and bales lost by state in 2009

	Lygus			**stink bugs**		
	% Reduction	**Acres infested**	**Bales lost**	**% Reduction**	**Acres infested**	**Bales lost**
US	0.614%	4,209,086	126,871	0.371%	3,265,604	79,327
Alabama	0.604%	79,708	3,228	2.775%	251,049	14,825
Arizona	1.950%	129,224	10,396	0.490%	58,371	2,583
Arkansas	2.786%	520,000	35,791	0.038%	468,000	491
California	0.950%	180,562	5,259	0.000%	0	0
Florida	0.000%	61,530	0	4.000%	87,900	7,759
Georgia	0.015%	148,500	309	0.800%	792,000	16,500
Kansas	0.150%	5,250	87	0.000%	0	0
Louisiana	2.138%	216,600	13,286	0.060%	136,800	373
Mississippi	2.488%	283,161	19,996	1.013%	141,018	8,137
Missouri	3.710%	204,050	24,334	0.120%	22,000	787
New Mexico	0.041%	1,152	44	0.000%	0	0
North Carolina	0.100%	361,000	630	1.800%	361,000	11,343
Oklahoma	0.000%	0	0	0.000%	0	0
South Carolina	0.050%	115,000	128	1.950%	115,000	5,002
Tennessee	1.200%	300,000	9,984	0.700%	300,000	5,824
Texas	0.036%	1,499,216	3,400	0.025%	467,466	2,310
Virginia	0.000%	1,300	0	1.670%	65,000	3,392

Table 6. Thrips and cotton fleahoppers: % yield reduction, acres infested and bales lost by state in 2009

	Thrips			cotton fleahoppers		
	% Reduction	Acres infested	Bales lost	% Reduction	Acres infested	Bales lost
US	0.713%	7,437,609	138,207	0.093%	1,490,760	15,598
Alabama	0.121%	251,049	646	0.000%	3,034	0
Arizona	0.070%	147,057	354	0.040%	68,418	218
Arkansas	0.539%	520,000	6,924	0.000%	172,900	0
California	0.475%	180,562	2,629	0.000%	0	0
Florida	0.100%	87,900	194	0.000%	0	0
Georgia	0.009%	891,000	186	0.000%	0	0
Kansas	2.000%	17,500	1,159	0.900%	15,750	521
Louisiana	0.490%	223,440	3,046	0.000%	2	0
Mississippi	0.237%	281,077	1,905	0.000%	10,423	0
Missouri	1.278%	140,525	8,379	0.000%	0	0
New Mexico	0.000%	0	0	0.000%	0	0
North Carolina	0.500%	361,000	3,151	0.000%	0	0
Oklahoma	5.000%	0	19,272	2.750%	104,500	10,599
South Carolina	0.250%	115,000	641	0.000%	115,000	0
Tennessee	0.700%	300,000	5,824	0.000%	0	0
Texas	0.888%	3,769,331	83,227	0.045%	1,103,565	4,259
Virginia	0.330%	65,000	670	0.000%	0	0

Table 7. Spider mites and aphids: percent yield reduction, acres infested and bales lost by state in 2009

	spider mites			aphids		
	% Reduction	Acres infested	Bales lost	% Reduction	Acres infested	Bales lost
US	0.099%	2,022,705	21,673	0.030%	3,851,114	6,456
Alabama	0.012%	34,143	65	0.024%	117,784	129
Arizona	0.350%	95,095	1,854	0.013%	19,407	60
Arkansas	0.013%	128,700	171	0.000%	520,000	0
California	0.475%	180,562	2,629	0.005%	95,033	28
Florida	0.000%	1	0	0.000%	87,900	0
Georgia	0.000%	198,000	0	0.080%	792,000	1,650
Kansas	0.000%	0	0	0.000%	0	0
Louisiana	0.100%	91,200	622	0.315%	159,600	1,958
Mississippi	0.825%	108,623	6,627	0.142%	210,709	1,143
Missouri	0.478%	131,450	3,135	0.000%	11,000	0
New Mexico	0.000%	0	0	0.000%	1,762	0
North Carolina	0.050%	361,000	315	0.100%	361,000	630
Oklahoma	0.000%	0	0	0.010%	1,900	39
South Carolina	0.100%	115,000	257	0.100%	115,000	257
Tennessee	0.560%	210,000	4,659	0.038%	225,000	312
Texas	0.014%	368,929	1,340	0.003%	1,133,020	251
Virginia	0.000%	0	0	0.000%	0	0

Table 8. Boll weevil and European cornborer: percent yield reduction, acres infested and bales lost by state in 2009

	boll weevil			Eradication	European cornborer		
	% Reduction	Acres infested	Bales lost	costs/acre	% Reduction	Acres infested	Bales Lost
US	0.002%	116,247	400	$4.39	0.000%	653	0
Alabama	0.000%	0	0	$0.60	0.000%	0	0
Arizona	0.000%	0	0	$2.09	0.000%	0	0
Arkansas	0.000%	0	0	$12.65	0.000%	0	0
California	0.000%	0	0	$0.00	0.000%	0	0
Florida	0.000%	0	0	$1.50	0.000%	0	0
Georgia	0.000%	0	0	$2.00	0.000%	0	0
Kansas	0.000%	0	0	$0.00	0.000%	0	0
Louisiana	0.000%	22800	0	$5.10	0.000%	0	0
Mississippi	0.000%	0	0	$3.00	0.000%	0	0
Missouri	0.000%	0	0	$5.00	0.000%	0	0
New Mexico	0.000%	0	0	$5.95	0.000%	0	0
North Carolina	0.000%	0	0	$1.25	0.000%	0	0
Oklahoma	0.000%	0	0	$0.00	0.000%	0	0
South Carolina	0.000%	0	0	$1.25	0.000%	0	0
Tennessee	0.000%	0	0	$5.00	0.000%	0	0
Texas	0.004%	93,447	400	$4.82	0.000%	653	0
Virginia	0.000%	0	0	$2.50	0.000%	0	0

Table 9. Beet and fall armyworms: percent yield reduction, acres infested and bales lost by state in 2009

	beet armyworms			fall armyworms		
	% Reduction	Acres infested	Bales lost	% Reduction	Acres infested	Bales lost
US	0.004%	703,067	643	0.113%	1,835,299	20,238
Alabama	0.000%	4,414	0	0.730%	158,370	3,902
Arizona	0.001%	23,195	0	0.000%	5,391	0
Arkansas	0.000%	85,800	0	0.019%	200,200	247
California	0.000%	57,020	0	0.000%	0	0
Florida	0.000%	4,395	0	1.350%	79,110	2,619
Georgia	0.030%	29,700	619	0.300%	594,000	6,188
Kansas	0.000%	0	0	0.000%	0	0
Louisiana	0.000%	11,400	0	0.020%	45,600	124
Mississippi	0.003%	5,927	24	0.000%	10,975	0
Missouri	0.000%	0	0	0.000%	70,125	0
New Mexico	0.000%	34	0	0.000%	0	0
North Carolina	0.000%	0	0	0.083%	30,000	524
Oklahoma	0.000%	0	0	0.000%	0	0
South Carolina	0.000%	43,700	0	0.900%	103,500	2,309
Tennessee	0.000%	9,000	0	0.028%	21,000	233
Texas	0.000%	325,649	0	0.044%	517,028	4,093
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 2009

	cutworms			loopers		
	% Reduction	Acres infested	Bales lost	% Reduction	Acres infested	Bales lost
US	0.001%	386,007	200	0.000%	808,131	12
Alabama	0.004%	9,101	0	0.000%	19,038	0
Arizona	0.000%	2,881	0	0.000%	12,723	0
Arkansas	0.001%	94,900	7	0.000%	287,300	0
California	0.000%	0	0	0.000%	1,901	0
Florida	0.000%	0	0	0.000%	70,320	0
Georgia	0.000%	9,900	0	0.000%	9,900	0
Kansas	0.000%	0	0	0.000%	0	0
Louisiana	0.003%	68,400	19	0.002%	45,600	12
Mississippi	0.003%	10,096	27	0.000%	20,846	0
Missouri	0.000%	3,850	0	0.000%	3,850	0
New Mexico	0.000%	2,778	0	0.000%	0	0
North Carolina	0.000%	15,000	0	0.000%	0	0
Oklahoma	0.000%	0	0	0.000%	0	0
South Carolina	0.050%	115,000	128	0.000%	46,000	0
Tennessee	0.000%	45,000	0	0.000%	15,000	0
Texas	0.000%	9,101	0	0.000%	275,652	0
Virginia	0.000%	0	0	0.000%	0	0

Table 11. Whiteflies: percent yield reduction, acres infested and bales lost by state in 2009

	bandedwinged whiteflies			*Bemisia* spp		
	% Reduction	Acres infested	Bales lost	% Reduction	Acres infested	Bales lost
US	0.001%	524,519	249	0.008%	289,731	2,245
Alabama	0.000%	33,561	0	0.395%	116,231	2,122
Arizona	0.000%	0	0	0.020%	76,026	111
Arkansas	0.000%	213,197	0	0.000%	15,830	13
California	0.000%	1,904	0	0.000%	2,510	0
Florida	0.000%	102,700	0	0.000%	0	0
Georgia	0.000%	0	0	0.000%	1	0
Kansas	0.000%	19,800	0	0.000%	49,500	0
Louisiana	0.000%	0	0	0.000%	0	0
Mississippi	0.040%	45,600	249	0.000%	0	0
Missouri	0.000%	4,006	0	0.000%	879	0
New Mexico	0.000%	0	0	0.000%	0	0
North Carolina	0.000%	0	0	0.000%	0	0
Oklahoma	0.000%	0	0	0.000%	0	0
South Carolina	0.000%	0	0	0.000%	0	0
Tennessee	0.000%	97,750	0	0.000%	28,750	0
Texas	0.000%	6,000	0	0.000%	0	0
Virginia	0.000%	0	0	0.000%	0	0

Table 12. Cotton leaf perforator and pink bollworm: % yield reduction, acres infested and bales lost by state in 2009

	cotton leaf perforator			PBW eradication	pink bollworms		
	% Reduction	Acres infested	Bales lost	costs per acre	% Reduction	Acres infested	Bales lost
US	0.000%	2,585	1	$0.26	0.000%	81,211	0
Alabama	0.000%	0	0	$0.00	0.000%	0	0
Arizona	0.000%	1,029	1	$8.58	0.0000%	241	0
Arkansas	0.000%	0	0	$0.00	0.000%	0	0
California	0.000%	0	0	$2.00	0.0000%	5,702	0
Florida	0.000%	0	0	$0.00	0.000%	0	0
Georgia	0.000%	0	0	$0.00	0.000%	0	0
Kansas	0.000%	0	0	$0.00	0.000%	0	0
Louisiana	0.000%	2	0	$0.00	0.000%	0	0
Mississippi	0.000%	0	0	$0.00	0.000%	0	0
Missouri	0.000%	0	0	$0.00	0.000%	0	0
New Mexico	0.000%	0	0	$2.00	0.000%	0	0
North Carolina	0.000%	0	0	$0.00	0.000%	0	0
Oklahoma	0.000%	0	0	$0.00	0.000%	0	0
South Carolina	0.000%	0	0	$0.00	0.000%	0	0
Tennessee	0.000%	0	0	$0.00	0.000%	0	0
Texas	0.000%	1,550	0	$0.09	0.0000%	70,126	0
Virginia	0.000%	0	0	$0.00	0.000%	0	0

Table 13. Grasshoppers and others: percent yield reduction, acres infested and bales lost by state in 2009

	grasshoppers			others*		
	% Reduction	Acres infested	Bales lost	% Reduction	Acres infested	Bales lost
US	0.001%	1,128,763	266	0.003%	62,193	668
Alabama	0.000%	20,251	0	0.004%	0	0
Arizona	0.000%	12,903	0	0.000%	720	1
Arkansas	0.000%	449,800	0	0.001%	0	0
California	0.000%	19	0	0.000%	0	0
Florida	0.000%	0	0	0.000%	0	0
Georgia	0.000%	9,900	0	0.000%	0	0
Kansas	0.000%	4	0	0.000%	0	0
Louisiana	0.000%	342	0	0.003%	0	0
Mississippi	0.000%	25,240	0	0.003%	0	0
Missouri	0.000%	0	0	0.000%	0	0
New Mexico	0.128%	5,420	138	0.000%	0	0
North Carolina	0.000%	361,000	0	0.000%	0	0
Oklahoma	0.000%	19	0	0.000%	0	0
South Carolina	0.050%	115,000	128	0.050%	0	0
Tennessee	0.000%	6,000	0	0.000%	0	0
Texas	0.000%	105,288	0	0.000%	61,473	667
Virginia	0.000%	0	0	0.000%	0	0

*Other Insects include Mealybug (Arizona) and *Crenotiades* (green mirid) (Texas)

Table 14. Saltmarsh caterpillars and southern armyworms: percent yield reduction, acres infested and bales lost by state in 2009

	saltmarsh caterpillar			southern armyworms		
	% Reduction	Acres infested	Bales lost	% Reduction	Acres infested	Bales lost
US	0.000%	487,934	0	0.000%	68,798	0
Alabama	0.000%	0	0	0.000%	38,076	0
Arizona	0.000%	9,453	0	0.000%	0	0
Arkansas	0.000%	293,800	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%	228	0	0.000%	0	0
Mississippi	0.000%	7,133	0	0.000%	4,721	0
Missouri	0.000%	0	0	0.000%	0	0
New Mexico	0.000%	0	0	0.000%	0	0
North Carolina	0.000%	0	0	0.000%	0	0
Oklahoma	0.000%	0	0	0.000%	0	0
South Carolina	0.000%	43,700	0	0.000%	23,000	0
Tennessee	0.000%	6,000	0	0.000%	3,000	0
Texas	0.000%	127,609	0	0.000%	0	0
Virginia	0.000%	0	0	0.000%	0	0

Table 15. Clouded plant bug: percent yield reduction, acres infested, and bales lost by state in 2009

	clouded plant bug		
	% Reduction	Acres infested	Bales lost
US	0.04%	452,752	8,300
Alabama	0.00%	9,519	0
Arizona	0.00%	0	0
Arkansas	0.01%	71,240	84
California	0.00%	0	0
Florida	0.00%	35,160	0
Georgia	0.00%	0	0
Kansas	0.00%	0	0
Louisiana	0.00%	22,800	6
Mississippi	0.23%	34,029	1,845
Missouri	0.00%	0	0
New Mexico	0.00%	0	0
North Carolina	0.00%	0	0
Oklahoma	0.00%	0	0
South Carolina	0.00%	23,000	0
Tennessee	0.77%	255,000	6,365
Texas	0.00%	2,003	0
Virginia	0.00%	0	0