2003 BELTWIDE COTTON CONFERENCES, NASHVILLE, TN – JANUARY 6-10

COTTON INSECT LOSSES - 2002

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Abstract

Cotton losses to arthropods were light in 2002. Pests reduced overall yields by 4.61%. The bollworm/budworm complex retained the top ranking as the number one cotton pest by reducing yields by 2.31%. *Lygus* was number two at 0.72%, Thrips were 3rd at 0.447% and stinkbugs were 4th at 0.446%. Total cost and loss for insects in 2002 was $1.140 billion. Direct management costs for arthropods were $59.51 per acre.

Introduction

The outlook for arthropod losses continues to change and any attempt at predicting losses or making unequivocal statements about pests and their status from one year to the next is futile and at times dangerous. Boll weevils continue to be a factor even though they infest only 17.4% of the crop (Table 2) – causing losses in only two states, Arkansas and Texas (Table 9). Total arthropod losses across the US (Table 1) were 4.61% translating to 1.223 million bales of cotton. Alabama reported 16.1% loss representing 191,357 bales and Oklahoma was second at 9.4% and 24,835 bales. South Carolina (3rd) reported losses of 8.52%, Arkansas (4th) had 8.48%, and Missouri (5th) had 7.81%. Mississippi (6.84%), Tennessee (6.70%), and Louisiana (5.09%) reported arthropod losses greater than 5%. Nine states reported less than 5% loss and three had less than 2%. Mississippi actually reported more bales lost (236,011) than all other states, and Texas (2.09%) was 3rd in bales lost at 184,375. Kansas (1.15%) lost fewest at 1432 bales.

Pest status continues to change, as well, resulting in losses from minor pests. Yellow-striped armyworms, western flower thrips, saltmarsh caterpillars, southern armyworms and clouded plant bugs all contributed to the new look in losses. Bugs continue to increase in importance and overall rank among pests of cotton. *Lygus* spp. and stinkbugs rank 2nd and 4th respectively among most injurious pests in 2002. No pest, other than bollworm/budworm, exceeded 1% in losses in 2002 and only four pests: Thrips (95.6%), bollworm/budworm (79.4%), aphids (70.3%), and *Lygus* (53.1%) infested more than half of the US crop (Table2).

Discussion

Heliothines: US Top Arthropod Pest Complex

Losses caused by heliothines at 2.31% were almost double the 2001 losses (1.23%). Of the US crop 79.4% was infested with bollworm/budworm complex resulting in loss of 613,102 bales. Bollworms made up 83% of the pest population in the US (Table 3). Alabama (9.85%), Arkansas (5.22%), South Carolina (4.69%), Missouri (4.25%), Tennessee (3.38%) and Mississippi (3.23%) reported largest percent losses to Heliothines. Mississippi lost 111,250 bales to this pest complex. Only California reported no losses to Heliothines.

Bt cotton acreage decreased by almost a million acres in 2002 (Table 4). 3.1 million *Bt* acres were sprayed in 2002.

Lygus: Second Most Damaging Pest in US Cotton

Lygus bugs infested about 53% of US cotton in 2002. This report combines the western species, *Lygus hesperus*, and the eastern species, *Lygus lineolaris*. As with 2001, the mid-south states: Alabama (2.07%), Arkansas (1.0%), Louisiana (2.32%), Mississippi (2.33%), Missouri (0.97%), Tennessee (0.65%), and Arizona (2.91%) in the West reported the highest losses from plant bugs. Kansas, Oklahoma, North Carolina and Virginia reported no losses to *Lygus*, only South Carolina (0.51%) exceeded a one half percent loss in the southeast. These pests combined to reduce yields by 0.72%, for a loss of 190,869 bales of US cotton (Table 5).

Early Season Thrips Reduce US Crop by 0.447%

Early season Thrips are almost omni-present in US cotton. This pest infested 95.6% of the US acreage in 2002 and cost US farmers $5.65 per acre in management (Williams, 2003). There were 118,484 bales of US cotton lost to this complex of pests in 2002. Virginia (2.51%), Tennessee (1.75%), Alabama (1.71%), Oklahoma (1.67%) and Missouri (1.56%) reported heaviest losses from Thrips. Five states: California, Georgia, New Mexico, North Carolina and South Carolina reported no losses from early-season Thrips (Table 6).

Stink Bug: 4th Most Damaging Pest

Stink bugs reduced yield by 0.446% across the US. South Carolina (2.39%), Alabama (2.33%), Florida (1.40%), Georgia (1.29%) and Tennessee (0.92%) were the biggest losers to stink bugs. The complex infested 5.604 million acres of cotton in 2002 and destroyed 118,346 bales of cotton (Table 5). California, Kansas, New Mexico and Virginia reported no losses to stink bugs.

Boll Weevils Rank 5th Most Damaging Pest in US Cotton

Boll weevils infested 2.221 million acres of cotton in 2002. This pest reduced US cotton yield by 0.175%. Five states, Arkansas, Louisiana, Missouri, New Mexico, and Texas reported acres infested by boll weevil. Only three states Arkansas (0.556%), Texas (0.415%) and New Mexico (0.001%) lost bales to boll weevil. Those losses amounted to 46,536 bales of cotton (Table 8). Boll weevil eradication costs for US cotton were $10.63 per acre (Williams, 2003).

Aphids: 6th Most Damaging Pest of US Cotton

Aphids infested 70.3% of US cotton, and yield losses were 0.12%. Alabama (0.814%), Missouri (0.22%), and Florida (1.5%) reported the heaviest losses to aphids. Seven states: Arizona, Arkansas, Kansas, New Mexico, North Carolina, South Carolina and Virginia reported no losses to aphids; only Kansas reported no acres infested (Table 7).

Other Pests of US Cotton

Cotton fleahopper (0.109%) infested more than 3.951 million acres of cotton, ranking as the 7th most damaging pest in 2002 (Table 6). All the other pests reduced yield by less than 0.1%. Of the minor pests only beet armyworm (Table 2) infested more than 20% of the crop. Spider mites (Table 7), European Cornborers (Table 8) beet and fall armyworms (Table 9), cutworms and loopers (Table 10), whiteflies (Table 11), cotton leaf perforator and pink bollworm (Table 12), grasshoppers and other insects (Table 13) and saltmarsh caterpillars and southern armyworms (Table 14) contributed to the losses from arthropod pests in 2002.

Conclusion

Total losses from insect pests in US cotton were 4.61% in 2002 (Table 2). This figure is up only slightly from 2001 and continues to reflect a year of low insect pressure over the Cotton Belt. It also reflects a year in which management technologies were more responsive to needs of production. As the boll weevil fades from the scene via eradication efforts, other pests are arising. Research, development, and management are `currently' rising to the challenge presented by the new pest species. The costs of insect management were $59.51 per acre in 2002; costs plus loss were $86.11 per acre.

Acknowledgments

The Cotton Losses Coordinators from each of the Cotton States are to be commended for their work in collecting and submitting the estimates. Thanks are also extended to Debbie Richter, Frank Carter, Gene Burris, and Dick Hardee for their assistance and patience. The National Cotton Foundation supports this project.

References

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Table 1. Number of acres, percent reduction in yield, cost plus loss and bales lost by state in 2002.

	Acres cotton	Percent Reduction	Cost plus loss	Bales lost
US	**13,239,289**	**4.609**	**$1,140,045,310**	**1,222,896**
Alabama	517,000	16.140	$80,530,035	191,357
Oklahoma	175,000	9.396	$17,912,587	24,835
South Carolina	200,000	8.523	$29,866,400	29,404
Arkansas	900,000	8.476	$168,258,875	150,986
Missouri	385,000	7.810	$51,285,229	64,210
Mississippi	1,180,000	6.841	$179,399,255	236,011
Tennessee	536,000	6.702	$62,387,975	61,371
Louisiana	492,000	5.092	$92,611,978	54,806
Arizona	235,000	4.838	$33,595,706	40,125
Florida	120,000	4.694	$8,625,330	12,909
Georgia	1,400,000	4.220	$114,773,800	123,069
Virginia	103,000	3.332	$6,659,120	3,946
New Mexico	51,524	2.508	$4,046,154	2,585
Texas	5,281,400	2.089	$174,752,935	184,375
North Carolina	950,000	1.554	$55,504,966	26,319
Kansas	60,000	1.146	$812,900	1,432
California	653,365	1.083	$69,263,199	23,586

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

pest	% reduction	acres infested	rank	% infested
Bollworm/Budworm	2.311	10,511,085	1	79.4
Lygus	0.719	7,024,825	2	53.1
Thrips	0.447	12,659,849	3	95.6
Stink Bugs	0.446	5,604,138	4	42.3
Boll Weevil	0.175	2,221,449	5	16.8
Aphids	0.119	9,307,757	6	70.3
Cotton Fleahopper	0.109	3,951,601	7	29.8
Silverleaf Whitefly (Bemesia)	0.0873	1,029,510	8	7.8
Fall Armyworm	0.0460	2,306,786	9	17.4
Beet Armyworm	0.0395	3,049,492	10	23.0
Pink Bollworm	0.0332	313,735	11	2.4
Spider Mites	0.0273	2,071,859	12	15.6
Grasshoppers	0.0253	2,606,268	13	19.7
Loopers	0.0102	2,198,629	14	16.6
Cutworms	0.0088	1,180,341	15	8.9
Saltmarsh Caterpillars	0.00207	1,201,700	16	9.1
Banded Winged Whitefly	0.00134	1,888,875	17	14.3
Other Insects*	0.00124	458,345	18	3.5
European Cornborer	0.00061	99,964	19	0.8
Southern Armyworms	0.00009	154,000	20	1.2
Cotton Leaf Perforator	0.00004	221,081	21	1.7

*Other Insects include Yellow-striped armyworms, western flower Thrips, and clouded plant bugs.

Table 3. Bollworm and budworm: percent of population, yield reduction, acres infested and bales lost by state in 2002.

States	% yield reduction	% crop infested	% bollworm	acres infested	bales lost
US	**2.311**	**79.5**	**83**	**10,511,085**	**613,102**
Alabama	9.847	95.4	63	517,000	116,749
Arizona	0.156	55.0	80	119,350	1,292
Arkansas	5.222	100.0	58	900,000	93,021
California	0.000	10.0	100	65,337	0
Florida	1.050	17.5	45	21,000	2,888
Georgia	2.857	85.7	66	1,200,000	83,333
Kansas	0.708	13.3	100	8,000	885
Louisiana	2.171	97.1	82	477,580	23,370
Mississippi	3.225	100.0	87	1,180,000	111,250
Missouri	4.250	88.7	50	341,631	34,944
New Mexico	1.091	27.4	100	617,000	1,680
North Carolina	1.324	100.0	95	950,000	22,421
Oklahoma	3.403	85.1	93	148,870	8,994
South Carolina	4.688	147.5	85	295,000	16,175
Tennessee	3.384	90.9	94	487,370	30,990
Texas	0.813	70.2	91	3,677,947	71,802
Virginia	0.821	98.1	85	101,000	972

Table 4. *Bt* cotton acreage, acres sprayed for caterpillars, average number of applications and percent of population which was bollworm from 1995 to 2002.

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	0.29	76
2000	5,220,392	1,455,084	0.33	79
2001	5,717,747	2,727,821	0.40	74
2002	4,893,810	3,091,586	0.52	83

* polled entomologists for estimates.

Table 5. *Lygus* and stink bugs: percent yield reduction, acres infested and bales lost by state in 2002.

	Lygus			stink bugs		
States	Percent reduction	Acres infested	Bales lost	Percent reduction	Acres infested	Bales lost
US	**0.719**	**7,024,825**	**190,869**	**0.446**	**5,604,138**	**118,346**
Alabama	2.068	392,000	24,524	2.333	447,000	27,660
Arizona	2.911	232,650	24,140	0.040	94,000	332
Arkansas	1.000	900,000	17,813	0.500	900,000	8,906
California	0.008	522,692	174	0.000	0	0
Florida	0.167	20,000	458	1.400	84,000	3,850
Georgia	0.029	400,000	833	1.286	1,200,000	37,500
Kansas	0.000	0	0	0.000	0	0
Louisiana	2.318	456,227	24,950	0.250	363,200	2,692
Mississippi	2.333	1,080,000	80,500	0.356	340,000	12,281
Missouri	0.968	300,627	7,960	0.117	205,018	963
New Mexico	0.295	19,000	304	0.000	0	0
North Carolina	0.000	950,000	0	0.230	950,000	3,898
Oklahoma	0.000	87,500	0	0.115	80,500	304
South Carolina	0.507	125,000	1,750	2.385	175,000	8,229
Tennessee	0.651	498,475	5,961	0.920	460,220	8,427
Texas	0.017	960,654	1,501	0.046	266,200	4,070
Virginia	0.000	80,000	0	0.000	39,000	0

Table 6. Thrips and cotton fleafhoppers: percent yield reduction, acres infested and bales lost by state in 2002.

	Thrips			cotton fleahopper		
States	Percent reduction	Acres infested	Bales lost	Percent reduction	Acres infested	Bales lost
US	**0.447**	**12,659,849**	**118,484**	**0.109**	**3,951,601**	**29,031**
Alabama	1.043	517,000	12,363	0.000	10,000	0
Arizona	0.043	108,100	358	0.000	211,500	0
Arkansas	0.900	900,000	16,031	0.011	350,000	198
California	0.000	646,831	0	0.000	0	0
Florida	0.547	82,000	1,503	0.000	900	0
Georgia	0.000	1,350,000	0	0.000	50,000	0
Kansas	0.208	14,000	260	0.229	15,000	286
Louisiana	0.142	467,052	1,533	0.004	17,330	38
Mississippi	0.428	1,180,000	14,780	0.001	8,000	19
Missouri	1.560	385,000	12,825	0.262	229,659	2,158
New Mexico	0.000	8,000	0	0.000	10,000	0
North Carolina	0.000	950,000	0	0.000	0	0
Oklahoma	1.665	157,500	4,401	3.600	175,000	9,516
South Carolina	0.000	300,000	0	0.000	60,000	0
Tennessee	1.698	519,920	15,543	0.000	17,010	0
Texas	0.407	4,971,446	35,912	0.191	2,797,202	16,817
Virginia	2.511	103,000	2,974	0.000	0	0

Table 7. Spider mites and aphids: percent yield reduction, acres infested and bales lost by state in 2002.

	spider mites			aphids		
States	Percent reduction	Acres infested	Bales lost	Percent reduction	Acres infested	Bales lost
US	**0.027**	**2,071,859**	**7,256**	**0.119**	**9,307,757**	**31,450**
Alabama	0.000	19,000	0	0.814	517,000	9,655
Arizona	0.030	61,100	249	0.000	35,250	0
Arkansas	0.039	150,000	693	0.000	750,000	0
California	0.045	588,029	980	0.180	588,029	3,920
Florida	0.000	400	0	1.500	120,000	4,125
Georgia	0.000	10,000	0	0.005	650,000	135
Kansas	0.000	0	0	0.000	0	0
Louisiana	0.049	162,337	533	0.041	405,610	444
Mississippi	0.078	215,000	2,688	0.134	500,000	4,625
Missouri	0.247	202,573	2,033	0.219	255,286	1,799
New Mexico	0.000	0	0	0.000	2,500	0
North Carolina	0.000	170,000	0	0.000	950,000	0
Oklahoma	0.000	26,250	0	0.169	45,500	447
South Carolina	0.000	43,500	0	0.000	270,000	0
Tennessee	0.007	196,170	67	0.024	428,420	220
Texas	0.000	215,500	15	0.069	3,710,162	6,081
Virginia	0.000	12,000	0	0.000	80,000	0

Table 8. Boll weevil and European cornborers: percent yield reduction, acres infested and bales lost by state in 2002.

	boll weevil			European cornborers		
	Percent reduction	Acres infested	Bales lost	Percent reduction	Acres infested	Bales lost
US	**0.175**	**2,221,449**	**46,536**	**0.001**	**99,964**	**162**
Alabama	0.000	0	0	0.000	0	0
Arizona	0.000	0	0	0.000	0	0
Arkansas	0.556	900,000	9,896	0.000	50,000	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	357,198	0	0.000	0	0
Mississippi	0.000	0	0	0.000	0	0
Missouri	0.000	81,415	0	0.019	29,964	160
New Mexico	0.001	51,524	1	0.000	0	0
North Carolina	0.000	0	0	0.000	15,000	0
Oklahoma	0.000	0	0	0.000	0	0
South Carolina	0.000	0	0	0.000	0	0
Tennessee	0.000	0	0	0.000	5,000	2
Texas	0.415	831,312	36,639	0.000	0	0
Virginia	0.000	0	0	0.000	0	0

Table 9. Beet and fall armyworms: percent yield reduction, acres infested and bales lost by state in 2002.

	beet armyworm			fall armyworm		
States	Percent reduction	Acres infested	Bales lost	Percent reduction	Acres infested	Bales lost
US	**0.039**	**3,049,492**	**10,469**	**0.046**	**2,306,786**	**12,200**
Alabama	0.000	22,000	0	0.034	200,000	406
Arizona	0.058	79,900	482	0.000	0	0
Arkansas	0.017	300,000	297	0.194	550,000	3,464
California	0.000	261,346	0	0.000	0	0
Florida	0.000	500	0	0.010	2,000	28
Georgia	0.021	300,000	625	0.014	200,000	417
Kansas	0.000	0	0	0.000	0	0
Louisiana	0.091	223,860	979	0.015	147,603	161
Mississippi	0.000	13,700	3	0.175	411,000	6,028
Missouri	0.000	20,896	0	0.082	57,168	671
New Mexico	0.000	0	0	0.000	0	0
North Carolina	0.000	647,000	0	0.000	95,000	0
Oklahoma	0.144	31,500	381	0.040	17,500	106
South Carolina	0.942	145,000	3,250	0.000	69,000	0
Tennessee	0.006	116,890	55	0.003	50,405	29
Texas	0.050	836,900	4,397	0.010	507,110	891
Virginia	0.000	50,000	0	0.000	0	0

Table 10. Cutworms and loopers: percent yield reduction, acres infested and bales lost by state in 2002.

	cutworm			loopers		
States	Percent reduction	Acres infested	Bales lost	Percent reduction	Acres infested	Bales lost
US	**0.009**	**1,180,341**	**2,336**	**0.010**	**2,198,629**	**2,695**
Alabama	0.000	28,000	0	0.000	50,000	0
Arizona	0.000	1,410	0	0.000	84,600	0
Arkansas	0.000	300,000	0	0.038	675,000	668
California	0.000	0	0	0.000	6,534	0
Florida	0.001	1,000	2	0.000	8,000	0
Georgia	0.000	10,000	2	0.000	40,000	8
Kansas	0.000	0	0	0.000	0	0
Louisiana	0.000	69,177	0	0.000	328,171	0
Mississippi	0.053	268,000	1,838	0.058	370,000	2,000
Missouri	0.059	78,262	485	0.000	110,394	0
New Mexico	0.000	0	0	0.000	0	0
North Carolina	0.000	236,000	0	0.000	16,000	0
Oklahoma	0.000	21,000	0	0.000	26,250	0
South Carolina	0.000	13,000	0	0.000	12,000	0
Tennessee	0.001	53,600	9	0.000	200,000	0
Texas	0.000	100,892	0	0.000	271,680	19
Virginia	0.000	0	0	0.000	0	0

Table 11. Whiteflies: percent yield reduction, acres infested and bales lost by state in 2002.

	bandedwing whitefly			silverleaf whitefly		
States	Percent reduction	Acres infested	Bales lost	Percent reduction	Acres infested	Bales lost
US	**0.001**	**1,888,875**	**356**	**0.087**	**1,029,510**	**23,169**
Alabama	0.000	30,000	0	0.000	5,000	0
Arizona	0.000	129,250	0	0.535	232,650	4,435
Arkansas	0.000	500,000	0	0.000	0	0
California	0.000	10,000	0	0.850	555,360	18,512
Florida	0.000	20,000	0	0.000	500	0
Georgia	0.000	40,000	0	0.007	50,000	208
Kansas	0.000	0	0	0.000	0	0
Louisiana	0.010	98,401	108	0.000	0	0
Mississippi	0.000	42,000	0	0.000	1,000	0
Missouri	0.026	197,724	211	0.000	0	0
New Mexico	0.000	0	0	0.000	0	0
North Carolina	0.000	50,000	0	0.000	0	0
Oklahoma	0.000	17,500	0	0.000	0	0
South Carolina	0.000	0	0	0.000	0	0
Tennessee	0.004	220,000	38	0.000	0	0
Texas	0.000	464,000	0	0.000	185,000	13
Virginia	0.000	70,000	0	0.000	0	0

Table 12. Cotton Leaf Perforator and Pink Bollworm: percent yield reduction, acres infested and bales lost by state in 2002.

	cotton leaf perforator			pink bollworm		
States	Percent reduction	Acres infested	Bales lost	Percent reduction	Acres infested	Bales lost
US	**0.000**	**221,081**	**9**	**0.033**	**313,735**	**8,800**
Alabama	0.000	0	0	0.000	0	0
Arizona	0.000	28,200	0	0.963	227,950	7,990
Arkansas	0.000	0	0	0.000	0	0
California	0.000	0	0	0.000	21,290	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	0.000	0	0	0.000	0	0
Missouri	0.000	0	0	0.000	0	0
New Mexico	0.000	0	0	0.582	14,995	600
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	0	0	0.000	0	0
Texas	0.000	192,881	9	0.002	49,500	210
Virginia	0.000	0	0	0.000	0	0

Table 13. Grasshoppers and others: percent yield reduction, acres infested and bales lost by state in 2002.

	grasshoppers			others		
States	Percent reduction	Acres infested	Bales lost	Percent reduction	Acres infested	Bales lost
US	**0.025**	**2,606,268**	**6,721**	**0.001**	**458,345**	**330**
Alabama	0.000	46,000	0	0.000	0	0
Arizona	0.000	126,900	0	0.036	42,300	299
Arkansas	0.000	130,000	0	0.000	0	0
California	0.000	0	0	0.000	0	0
Florida	0.020	6,000	55	0.000	0	0
Georgia	0.000	40,000	0	0.000	0	0
Kansas	0.000	1,500	0	0.000	0	0
Louisiana	0.000	163,838	0	0.000	0	0
Mississippi	0.000	190,000	0	0.000	0	0
Missouri	0.000	0	0	0.000	0	0
New Mexico	0.000	0	0	0.000	0	0
North Carolina	0.000	160,000	0	0.000	0	0
Oklahoma	0.260	45,500	687	0.000	0	0
South Carolina	0.000	70,000	0	0.000	0	0
Tennessee	0.000	91,030	0	0.003	176,800	30
Texas	0.068	1,535,500	5,979	0.000	239,245	0
Virginia	0.000	0	0	0.000	0	0

*Others include western flower Thrips, yellowstriped armyworms, and clouded plant bug.

Table 14. Saltmarsh caterpillars and southern armyworms: percent yield reduction, acres infested and bales lost by state in 2002.

	saltmarsh caterpillars			southern armyworms		
States	**Percent reduction**	**Acres infested**	**Bales lost**	**Percent reduction**	**Acres infested**	**Bales lost**
US	**0.002**	**1,201,700**	**549**	**0.000**	**154,000**	**25**
Alabama	0.000	0	0	0.000	50,000	0
Arizona	0.066	79,900	548	0.000	0	0
Arkansas	0.000	400,000	0	0.000	0	0
California	0.000	0	0	0.000	0	0
Florida	0.000	0	0	0.000	2,000	0
Georgia	0.000	0	0	0.000	30,000	6
Kansas	0.000	0	0	0.000	0	0
Louisiana	0.000	120,800	0	0.000	0	0
Mississippi	0.000	60,000	0	0.000	60,000	0
Missouri	0.000	19,250	0	0.000	0	0
New Mexico	0.000	0	0	0.000	0	0
North Carolina	0.000	470,000	0	0.000	0	0
Oklahoma	0.000	26,250	0	0.000	0	0
South Carolina	0.000	0	0	0.000	0	0
Tennessee	0.000	0	0	0.000	0	0
Texas	0.000	25,500	1	0.000	12,000	19
Virginia	0.000	0	0	0.000	0	0