

1995 SURVEY OF INSECT LOSSES

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Abstract

Yield reductions from insect pests were 11.08% contributing to the lowest yield of cotton in the 1990's. Losses plus costs exceeded \$1.68 billion. The increased abundance of some insect pests, insect resistance to pesticides, weather, and an increase in cotton acreage across the belt all combined to bring about one of the most 'insect active' years on record. 1995 saw heavy losses from the tobacco budworm in the midsouth and southeast, from the beet armyworm in the south and southwest, and from *Lygus* in the west. There were reports of large acreage devastated and abandoned because of insect pests and an inability to manage them.

Introduction

1995 can truly be called the year of the cotton insect. Yield reductions from insect pests exceeded 10% (11.08), one of the highest ever. When coupled with weather and other factors which hindered production, a below average crop was produced for the cotton belt. The December estimates from the USDA for 1995 report a 551 pound per acre average for the belt (Williams, 1996). This is the lowest yield in the nineties, (Table 1) (Head, 1991,92,93 and Williams, 1994, 95, 96) .

Table 1. Average yield of cotton 1990-95

USDA CROP PRODUCTION ALL COTTON December estimates		
Year	Yield	
1990	641	
1991	656	
1992	696	
1993	597	
1994	695	
1995	551	

Discussion

Accompanying the low yield figures are the costs of insect management: these also set records. Losses plus costs of management and control exceeded \$1.68 billion. Insect damage alone cost cotton farmers over \$665 million dollars in lost production. Spray insecticide costs averaged \$57.93 per acre across the cotton belt. Four states spent more than \$30.00 per acre above this average. Arizona, Alabama and Louisiana averaged spending more than \$90.00 per acre for insect management. Mississippi,

Arkansas, California, Florida, Oklahoma, Tennessee, and Missouri spent more than \$50.00 per acre (Table 2). The new upsurge of interest in cotton and the resulting increase in acreage on the eastern side of the cotton belt with lower costs of control has masked some of the upsurge in the cost of control.

High acreage states where only a portion of the crop had problems also works to mask the high expenditures for insect management. For example, one area of Texas spent more than \$200 per acre on insect control while incurring greater than 60% losses. The total loss of 250,000 acres of cotton to one insect pest is not reflected well when those acres are averaged over the entire state's 5 million plus acres. Other papers in this series will bring attention to bear more closely on the individual problems and specific pests, but it is very important to understand that there was a tremendous increase in the abundance of insect pests in 1995 and that they were not confined to a small area of the belt.

Table 2. Control - All Insects, Dollars Spent Beltwide

Alabama	\$94.29	Missouri	\$52.32
Arizona	\$215.06	New Mexico	\$24.29
Arkansas	\$80.56	North Carolina	\$23.16
California	\$76.03	Oklahoma	\$56.71
Florida	\$75.01	South Carolina	\$41.99
Georgia	\$36.16	Tennessee	\$52.66
Louisiana	\$94.93	Texas	\$31.72
Mississippi	\$89.78	Virginia	\$21.45

The three primary pests of cotton for 1995 were the *Heliothis* complex (bollworm/budworm), boll weevil and beet armyworm. This is not very different from many of the years in the past, and in fact it may be surprising that even with eradication the boll weevil is rated as the number 3 pest in U.S. cotton in 1995. The elevation of beet armyworm to number two reflects the tremendous devastation which this species wreaked on cotton crops in the south and southwest (Table 3). Bollworm/budworm, however, are almost always rated high and this year reached new highs in devastation. Resistance to insecticides by tobacco budworm is a primary factor in these species maintaining this ranking.

Table 3. Top three insect pests over the Cotton Belt from 1991-95

	1	2	3
1995	Bollworm/ budworm (3.97)	Beet army- worm (1.68)	Boll weevil (1.66)
1994	Bollworm/ budworm (1.80)	Boll weevil (1.75)	Lygus (1.16)
1993	Boll weevil (1.88)	Bollworm/ budworm (1.56)	Lygus/ Thrips (0.88)
1992	Bollworm/ Budworm (2.21)	Boll weevil (2.12)	Lygus (0.89)
1991	Aphids (2.01)	Bollworm/ Budworm (1.68)	Boll weevil (0.69)

From Beltwide Cotton Insect Losses, 1992-96

Bollworm/budworm

The two species - bollworm/budworm are almost always talked about interchangeably and often appear in cotton fields in synchrony with one another. Entomologists recognize that one species generally appears early and the other follows. The areas of the belt which were hit hardest by this pest complex this year reported that the damage was done by almost pure populations of tobacco budworm. Alabama, Mississippi and Tennessee took tremendous losses from the tobacco budworm. Infestations of tobacco budworm were confined to the hill area of Mississippi and to that area of Tennessee generally north of the Mississippi state line. South Carolina, North Carolina, Florida, Arkansas, and Louisiana also posted significant losses to this pest complex. While budworms were the major problem, these latter states reported losses from the bollworm, as well (Table 4).

Table 4. Percent yield loss to budworm/bollworm, 1995

Alabama	17.42	Missouri	1.41
Arizona	0.01	New Mexico	1.57
Arkansas	3.57	North Carolina	3.70
California	0.00	Oklahoma	2.46
Florida	3.88	South Carolina	4.70
Georgia	2.80	Tennessee	10.80
Louisiana	3.18	Texas	0.98
Mississippi	8.03	Virginia	0.99

A number of states spent more on tobacco budworm sprays than they usually spend on all other insects combined. Inundative numbers of tobacco budworms overwhelmed all attempts at control on many farms and caused thousands of acres to be abandoned when control began to break down (Table 5).

Table 5. Average dollars spent for control of budworm/bollworm, 1995

Alabama	\$66.06	Missouri	\$13.65
Arizona	\$ 0.00	New Mexico	\$ 3.06
Arkansas	\$48.07	North Carolina	\$23.92
California	\$ 0.00	Oklahoma	\$21.15
Florida	\$58.14	South Carolina	\$32.90
Georgia	\$28.32	Tennessee	\$34.80
Louisiana	\$48.27	Texas	\$ 4.68
Mississippi	\$59.34	Virginia	\$15.00

Frisbie *et al* (1989) wrote:

The arthropods generally considered to be 'key pests' vary among cotton growing areas of the U.S. In California, *Lygus hesperus* and spider mites often dominate management programs. In the desert southwest, the pink bollworm, *Heliothis* complex, and *Lygus* spp. dominate. From the Rolling Plains of Texas to the east coast, the boll weevil frequently dominates control strategies. In Texas and parts of Oklahoma and Louisiana, the cotton fleahopper is considered to be an important pest. The *Heliothis* complex may appear in damaging numbers almost anywhere in the cotton belt...

Boll Weevil

Therefore, though new pests arise occasionally in areas where they have not been a problem, we can continue to

expect to get damage from those 'key pests' in areas where they occur. A positive exception to this 'rule' is the elimination of the boll weevil as a pest from Alabama east.

Where boll weevil is a pest, it remains a tremendous factor in determining management options for cotton production. The 1.66% yield reduction representing 451,000 bales of cotton is only a small part of the cost with which this pest is associated. Farmers involved in the various Boll Weevil Eradication projects across the U. S. expended over \$53 million dollars in 1995 in monies to support eradication of this pest of cotton. Losses to this serious pest are now somewhat confined to the states along the Mississippi River and in Texas and Oklahoma (Table 6).

Table 6. Percent yield loss to boll weevil, 1995

Alabama	0.00	Missouri	2.56
Arizona	0.00	New Mexico	0.46
Arkansas	3.23	North Carolina	0.00
California	0.00	Oklahoma	7.28
Florida	0.00	South Carolina	0.00
Georgia	0.00	Tennessee	3.33
Louisiana	4.64	Texas	2.14
Mississippi	2.09	Virginia	0.00

Armyworms

In the last few years a number of 'new' pests have begun to express themselves. In 1995 damage from stink bugs, salt marsh caterpillars, loopers, grasshoppers, European corn borers, leaf miners, thrips and cutworms was reported from a number of areas across the belt. In localized areas some of these pests give problems every year, but the armyworm group is one which seems to have adapted to cotton over the last few years and has begun to cause significant amounts of damage in some area of the belt every year.

Table 7. Percent yield loss to beet armyworms, 1995

Alabama	4.61	Missouri	0.00
Arizona	0.09	New Mexico	2.22
Arkansas	0.00	North Carolina	0.00
California	0.05	Oklahoma	0.09
Florida	3.80	South Carolina	0.90
Georgia	0.20	Tennessee	0.01
Louisiana	0.38	Texas	1.72
Mississippi	0.58	Virginia	0.00

Portions of Texas, Florida and South Alabama were the areas selected by this pest for attack this year. The lower Rio Grande Valley region lost over 250,000 acres of cotton to beet armyworm and much of the remainder of the crop in that area yielded less than 100 pounds of lint per acre. The need for economical management tools has never been greater as costs of applications and lack of sustained suppression caused many farmers to have to abandon control attempts (Table 7).

Aphids

Another pest which many farmers encountered in 1995 and which many have problems with knowing what to do about it when it occurs is the cotton aphid. These pests have the potential to build into high populations quickly, they often exhibit high levels of resistance to pesticides, and then

because of natural factors, crash. As a result of these factors, most entomologists and farmers wait as long as possible before initiating pesticide control measures, but losses to this pest are consistently reported each year (Table 8). In fact as recently as 1991, it was ranked the number one insect pest in the cotton belt.

Table 8. Percent yield loss to aphids, 1995

Alabama	1.28	Missouri	0.02
Arizona	0.00	New Mexico	1.26
Arkansas	0.50	North Carolina	0.00
California	2.48	Oklahoma	1.35
Florida	0.17	South Carolina	0.00
Georgia	0.27	Tennessee	0.05
Louisiana	0.39	Texas	0.67
Mississippi	1.47	Virginia	0.00

Plant bugs

Pests seem to run in cycles and decisions are quite often made as a result of the most recent problem which was encountered. Many agriculturists, especially in the midsouth, started 1995 determined not to take any damage from plant bugs. These insects just never materialized as a factor for production in those areas, but plant bugs did cause tremendous problems to the western cotton crop. Both Arizona and California report high losses as a result of damage from *Lygus* (Table 9).

Table 9. Percent yield loss to *Lygus* (includes fleahopper*), 1995

Alabama	0.37	Missouri	0.33
Arizona	6.08	New Mexico	0.60*
Arkansas	0.15	North Carolina	0.00
California	4.47	Oklahoma	0.31*
Florida	0.46	South Carolina	0.01
Georgia	0.40	Tennessee	0.38
Louisiana	0.41*	Texas	0.17*
Mississippi	0.63	Virginia	0.00

* indicates fleahopper and plant bug

Mites and other pests

The West also has problems more often with spider mites and this was the case in 1995. California reported significant damage attributed to spider mites (4.21%) (Table 10).

Table 10. Percent yield loss to spider mites, 1995

Alabama	0.00	Missouri	0.00
Arizona	0.00	New Mexico	0.07
Arkansas	0.00	North Carolina	0.00
California	4.21	Oklahoma	0.01
Florida	0.00	South Carolina	0.01
Georgia	0.00	Tennessee	0.00
Louisiana	0.01	Texas	0.01
Mississippi	0.09	Virginia	0.00

Whiteflies are also pests with which the Western states have had to deal in the last few years. Arizona reported 1.31% yield loss from whiteflies (Table 11).

Table 11. Percent yield loss to whiteflies*, 1995

Alabama	0.00	Missouri	0.00
Arizona	1.31	New Mexico	0.00
Arkansas	0.00	North Carolina	0.00
California	0.05	Oklahoma	0.00
Florida	0.00	South Carolina	0.00
Georgia	0.01	Tennessee	0.00
Louisiana	0.00	Texas	0.01
Mississippi	0.00	Virginia	0.00

* this includes both groups of whiteflies

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