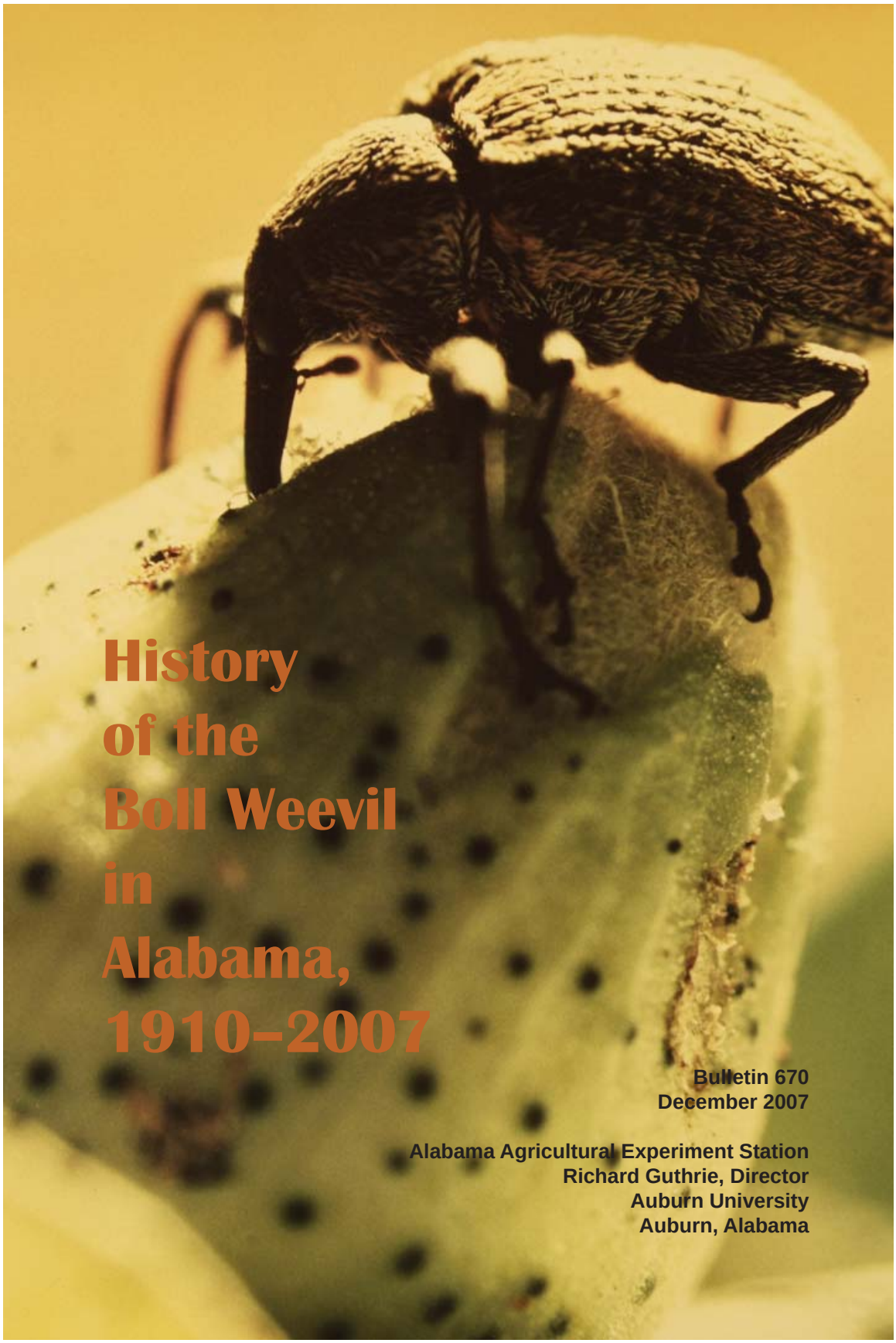

History of the Boll Weevil in Alabama, 1910–2007

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History of the Boll Weevil in Alabama

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No other agricultural pest in history has had the impact of the boll weevil. This impact extended far beyond agriculture and economics. Some historians have stated that cotton played a major role in religion, politics, laws, economics, and art of the south. If this is true, then the boll weevil could safely be referred to as second only to the Civil War as the most important influence on Southern society, history, and culture *(11)*.

IMPACT AND SPREAD OF THE BOLL WEEVIL

The boll weevil entered the United States from Mexico in 1892. During the following thirty years the weevil spread throughout the cotton-growing areas of the United States. In the weevil's wake was destruction, devastation, poverty, ruined lives, and numerous changes in southern culture and agriculture *(17)*. Alabama had an agricultural and rural economy and had not fully recovered from the devastation of the Civil War when the weevil struck in 1910. The weevil has had no equal relative to agricultural pest status or impact on a rural economy.

The weevil was first observed in Alabama in Mobile County. The farmer's first reaction to weevil devastation was disbelief and despair. Officials attempted to warn farmers ahead of the weevil as to its impact, but most would not believe anything could be so devastating until they saw it with their own eyes *(8)*. In 1917, the first year that the weevil was found statewide in Alabama, cotton planting declined more than a million acres from previous years. Alabama had produced more than 1.7 million bales of cotton in 1914. This still stands as the largest cotton crop ever produced statewide. By 1917, the state produced just 515,000 bales, a 70 percent decline.

In spite of the boll weevil, farmers were hesitant to give up on a crop that had served them well for generations. Farmers continued to plant cotton as their primary cash crop. In fact, cotton acreage in Alabama remained more than 3 million acres until the beginning of the Great Depression. It was estimated in 1955 that the boll weevil had caused an average annual loss to cotton of $200 million per year nationwide. Economic losses to the weevil in Alabama were $20 to $40 million each year for more than 80 years *(7)*.

During the late 1890s and early 1900s, the weevil continued its march from Texas north and east to Oklahoma, Louisiana, Mississippi, and Arkansas. Many thought that the Mississippi River would be a natural barrier, but that proved to be untrue as the

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weevil reached the Alabama border in the fall of 1909. On September 3, 1910, Warren E. Hines, Alabama's recently hired entomologist, and one of the nation's leading authorities on the weevil, found infested cotton fruit (squares) in Mobile County *(5).* The following year, 1911, the weevil advanced into twelve southwest Alabama counties. In 1917, the weevil was found throughout the state, and by 1922 in all cotton-growing areas of the south.

FIGHTING THE BOLL WEEVIL

Farmers resorted to many means in their fight against boll weevils. Pinching off adult weevils or the infested squares, drowning weevils in kerosene, and spraying them with carbolic acid or ashes were some of the methods employed to fight the boll weevil.

In their desperation, farmers tried all sorts of home remedies. In July of 1925, for example, a Lawrence County cotton farmer with four acres, Lewis E. Smith, paid his nine-year-old eldest son, Reuben, a nickel for each one-gallon syrup bucket filled with cotton fruit damaged by the boll weevil. (The prebloom cotton fruiting bud, called a "square," is where a weevil deposits an egg. Once the egg is deposited, the square drops from the plant onto the soil as the immature stages of the weevil develop.) The young Smith's job was to walk or "run the middles" of each row in the field picking up weevil-damaged squares. Once his bucket was filled, it was taken to the home where the squares containing the developing weevils were dumped into the fire of the wood-burning cook stove. Home remedies, such as just described, did suppress weevil numbers and damage, but not enough to prevent economic losses.

Numerous mechanical contraptions had been developed in Texas to combat the weevil, but none were highly effective. The burning of woods surrounding cotton fields during the winter months to kill weevils as they hibernated under deciduous leaf litter did offer some relief. Government quarantine programs were ineffective.

Certain cultural measures were about the only thing growers could do that really helped in minimizing weevil damage. These practices were the use of earlier maturing cotton varieties and early planting, improved fertilization, constant cultivation, and the destruction of green cotton at least three to four weeks prior to the usual time of the first killing frost *(1,2,14).*

County Agents and the Ag Experiment Station

After his initial sighting of weevils in 1910, Dr. Hines turned to county demonstration agents to help him. This concept had already been used successfully in Texas, where the first Extension Service farm demonstration had been conducted on a farm near Terrell, Texas, in 1903. The first farmer demonstration agents in Alabama were hired in 1906 *(16).* The men were C.R. Hudson, James C. Phelps, B.S. Waldrop, I.S. Ingram, and Tom Campbell. Campbell was from Tuskegee and thus became the nation's first black county agent. Campbell was hired to work with Negro farmers in the Macon county area. The others were assigned multiple county areas primarily in south and central Alabama, but extending as far north as Talladega and Etowah counties.

The job of these agents was to improve farming methods, encourage diversification and teach farmers cultural control of the boll weevil. This work was the forerunner of the Cooperative Extension Service.

In 1911, the Alabama legislature passed three Acts to aid the efforts of the federal government (U.S. Department of Agriculture). These Acts resulted in support for the Alabama Agricultural Experiment Station of Alabama Polytechnic Institute, now Auburn University, and provided funding for travel for USDA county demonstration work (16). Thus, even before the passage off the Smith-Lever Act of 1914, which created the Cooperative Extension Service, Alabama farmers had the support and interaction of trained agriculturalists, thanks to the boll weevil. However, many farmers ignored these agents and their new ideas, preferring to continue farming their old way.

In 1913, the entire cotton crop of southwest Alabama was devoured by boll weevils. Cotton yields in Coffee County (south-central Alabama) fell by 60 percent in 1915. In the forefront in this fight against the weevil were farmer leaders, bankers, businessmen, and the API Agricultural Experiment Station. As early as 1904, the Alabama Station was producing publications concerning the boll weevil and methods of combating the pest.

Early research on the boll weevil in Alabama was conducted by Dr. W.E. Hines, and later by Dr. F.S. Arant, between 1910 and the 1950s. Weevil research from 1957 to 1976 was conducted by Drs. James Rawson, Theo Watson, and Floyd Gilliland. The first entomologist hired by the Extension Service to assist growers in combating the boll weevil was Jerry Ruffin who served as Extension Entomologist from 1924 to 1961. He was succeeded by Dr. Walter Grimes for a short period. Dr. Grimes later went on to a long and successful career with Chemagro (Bayer) Chemical Corporation. From 1962 until the mid 1970s, Dr. Roy J. Ledbetter served as Extension cotton entomologist. His contributions will be referenced later.

Another prominent entomologist during the weevil era was a gentleman of Scottish heritage, Mr. H. Frank McQueen. Between the 1950s and 1970s he was employed by a pesticide formulator—Agricultural Chemical Service Company in Montgomery, Alabama—and later by the Alabama Extension Service to train “scouts,” conduct surveys, and educate growers on how to best control boll weevils. McQueen had a knack for getting on the grower’s level and often sketched weevil life cycles in the sand at the edge of cotton fields.

Diversification of Crops

One of the ways cotton farmers in Alabama survived the onslaught of the weevil was through diversification to other crops. No better example of this approach can be found than that in Coffee County. Their story began with a trip by their county agent, John Pittman, to Texas in 1913 to see boll weevil destruction first hand. Pittman decided that farmers would have to diversify their crops. The farmers listened but did not take Pittman’s advice seriously until the weevil actually arrived in Coffee County during the 1915 cotton season. Instead of producing their usual 30,000 bales, barely 10,000 bales were picked in 1915. The weevil now had the farmer’s attention and pocketbook.

Following the 1915 disaster, Pittman and H.M. Sessions, a banker and cotton merchant, took action by making a trip to Virginia and North Carolina to look at agriculture in those states *(15).* It was on this trip that they decided that peanuts was the crop of the future for Coffee County. A local farmer indebted to banker Sessions, C.W. Baston, agreed to plant his entire 125-acre farm to peanuts in 1916. This venture proved to be a huge success, and due to another devastating weevil year in 1916, growers all over the county wanted peanut seed.

In 1917, Coffee County produced more than one million bushels of peanuts that sold for more than $5 million. By 1919, Coffee County was the largest peanut-producing county in the United States.

This was the situation that caused a prominent Enterprise merchant, Roscoe "Bon" Fleming, to have the idea of a monument to the boll weevil in honor of what the weevil had done for diversification and the economy of Coffee County. Fleming personally paid $1,795 (in 1919 dollars—a huge amount in these days), more than one-half the cost of the monument, and it was ordered from Italy. On December 11, 1919, with bands playing and flags flying, more than 3,000 people attended the unveiling of the boll weevil monument in Enterprise *(15).* Dr. George Washington Carver, the renowned scientist from Tuskegee Institute, had been selected to give the dedicatory remarks because of his great work on peanuts. However, recent heavy rains had washed out a section of the railroad track between Tuskegee and Enterprise and his train could not make it to the ceremony. A substitute speaker from the South Carolina delegation volunteered to be the principle speaker. The monument still stands today, possibly the only monument in the world dedicated to a pest.

COTTON ACREAGE MOVES NORTH AND WEST

The boll weevil caused the shifting of cotton acreage from the southern counties of Alabama to the more northern areas, particularly the Tennessee Valley and Sand Mountain. These areas experienced colder winters, which in some years had a great impact on the survival of adult weevils hibernating in diapause (inactive and living on body fat stored by feeding on green bolls just before frost in the fall). Researchers later discovered that few weevils could survive single digit temperatures on successive days or nights. A good example of this fact was the summer of 1963, where no weevils were observed in Limestone County fields until August, when the crop was almost mature. The previous winter was one of the coldest on record. Single digit temperatures were recorded in Russellville, Alabama, on 16 nights during December and January *(3).*

Later movement of cotton planting was from the South to the western states of California, Arizona, New Mexico, and the high plains of Texas where the weevil did not occur. In the east, attempts were made to grow cotton as far north as southern Illinois, but the seasons were too short for profitable production with varieties available at the time.

EARLY USE OF INSECTICIDES

The weevil continued its devastation to the cotton industry between 1915 and the late 1950s, when the first highly effective controls were developed. From the 1950s, until eradicated as an economic pest in 1995, the weevil continued as the "key

pest" of cotton. A key pest is one that requires the first use of insecticides each season. Once insecticides are applied to a field, the natural balance of insects is upset, resulting in outbreaks of secondary insects. This biological and insecticide treadmill continued in each cotton field annually from the 1950s until the weevil was eradicated during the 1987 to 1995 period *(4)*. In 1985, just prior to the initiation of eradication in Alabama, weevils were causing yield reductions of 9 to 15 percent of a $200 million crop annually, in spite of heavy pesticide use. In addition to the yield reductions there was the high cost of pesticides and the impact of the pesticides on the environment to consider.

Calcium arsenate dust in 1918 was the first insecticide available for farmers to use against the boll weevil. This era lasted from 1918 until after WWII. Numerous methods were used to spread this "dust" or powder over the fields. Hand cranked or mule-drawn dust blowers were common in Alabama. Flower sacks filled with dust, placed on each end of a stick, and supported across the shoulders of a mule was another method. The movement of the mule walking down the rows would dislodge some of the dust on each plant.

In the mid-south (Mississippi delta states) where large fields of cotton were grown, another method of spreading the dust was devised. In 1922, Army Air Service planes were tested for applying this dust near Tallulah, Louisiana. Aerial applications of arsenic dust (thus the term, "crop duster") were successful, popular, and continued until the 1950s, when new formulations of insecticides were developed in liquid form to be applied in water as a spray. Another historical note from the 1920s crop-duster era was the evolution of the aerial application business that began as a company known as Delta Air Services. This company is now one of the world's largest airlines, Delta Airlines.

COTTON SCOUTING EVOLVES

Another development that originated during the calcium arsenate era of weevil control was the use of "cotton scouts" to monitor the level of weevil damage weekly in each field. Early entomologists in Arkansas discovered that scouting and treating only as needed provided the most economical method of using this new chemical. Scouting in later years became the key component for cotton insect management throughout the Cotton Belt.

Successful control of the boll weevil with calcium arsenate never reached its full potential because the Cooperative Extension Service did not have the manpower to carry out the needed educational programs and to train and supervise enough scouts. It was not until the development of the first synthetic insecticides, the chlorinated hydrocarbons, and several successive heavy weevil years, about 1950, that the general use of scouting was adopted. The worst weevil year on record was 1950 with losses throughout the U.S. estimated at $750 million. The adoption of scouting and the threshold concept eventually matured into grower acceptance of an integrated pest management (IPM) approach to cotton insect control in the 1970s.

LATER USE OF INSECTICIDES

Shortly after WWII, in the mid 1940s, a new class of insecticides was developed. This class was known as the chlorinated hydrocarbons and contained chemicals

known to growers as DDT, toxaphene, and BHC. These were initially only available as dusts, but some later were formulated to be applied as liquid sprays. Early on, these chemicals were highly effective against weevils, especially if applied at an interval of four to seven days. Their long residual in the environment and food chain of animals and fish lasted for years, but they only controlled the weevil for a few days. After about a decade, the weevil became resistant to this class of chemistry.

It was during this period, the late 1950s and early 1960s, that researchers developed a new class of highly effective insecticides, known as the organophosphates. Prominent insecticides in this group were methyl parathion, azinphosmethyl (Guthion), and malathion. All insecticides in this group were available as sprays, utilizing water as a carrier. These chemicals were usually applied by ground equipment, a high clearance machine known as a "high cycle" or "high boy." These machines contained a large tank where the concentrated chemical was diluted with water. The spray mixture was then applied through a pressurized system of hoses and a long boom that contained nozzles producing fine droplets of spray. These high cycles supported a boom wide enough to cover about 14 to 16 rows with each pass through the field.

The organophosphate class of chemistry did not have long residual in the environment, but most were acutely and highly toxic to humans, warm-blooded animals, and birds. After all, these phosphates were derived from chemicals that were developed for use during WWII as nerve gases. Because of their short residual, sprays for the weevil had to be reapplied about every three to five days. The typical spray schedule for growers fighting the weevil during this era, was to begin sprays about July 4th each season and spray every four to five days until the crop was mature in early September. This spray interval often resulted in 12 to 16 applications to cotton fields each season. Large farmers would own and operate several high cycles that were kept busy five to six days each week by a full-time designated driver.

Weevil control was good during this era, but insecticide use was heavy. A typical mixture used during the 1960s was a combination of chlorinated hydrocarbons and phosphates. This mixture would contain Toxaphene, DDT, and methyl parathion, formulated to contain four, two, and one pound of each per gallon. This formulation was referred to by growers as 4:2:1 and was used at the rate of one gallon per two acres. Therefore, a field of cotton that received 15 applications for weevils in a season had a total of 52.5 pounds (3.5 pounds x 15 applications) of insecticide applied.

During the 1950 to 1970 era, as these more highly effective chemicals became available, growers tended to rely more heavily on insecticides and to a lesser extent on cultural and other management tools in their battle against the boll weevil. It was this scenario that caused the concern of officials in the USDA. They saw a need to better educate growers on pesticide safety and how to utilize some of the older proven management practices against the weevil in addition to chemical controls. This intensified educational program is discussed in more detail later in this publication.

In 1979, the introduction of pyrethriod insecticides, which did not pose the environmental problems associated with earlier insecticide classes, helped alleviate some of the USDA's concerns. These insecticides, effective at tenths of pounds of active ingredient per acre instead of pounds, reduced the insecticide load used by cotton

farmers. While pyrethriod insecticides were targeted for caterpillar pests, they were also effective against the boll weevil.

ERADICATION OF THE BOLL WEEVIL BECOMES GOAL

At this same time (1950-1970), entomology researchers feared that weevils might become resistant to the organophosphate class of chemistry just as they had to the chlorinated hydrocarbons. Officials feared that this could set cotton production back again to the days before synthetic chemicals, with tremendous losses to weevils. Key entomologists at this time began developing the idea and concept of boll weevil eradication. It was about this same time in history that a program developed by Dr. E.F. Knipling was used to eradicate the screwworm from the American cattle industry. The primary tool in the screw worm battle was the sterilization of the male screw worm fly. This same method was thought of for use against the boll weevil, but was later proven to be ineffective.

The elimination of the boll weevil from the U.S. became the goal of entomologists and the cotton industry very soon after the pest was first observed in Texas in 1892. Early attempts at eradication failed because the necessary technology was unavailable. The concept of boll weevil eradication lay dormant for about 50 years. In 1959 influential agricultural officials and entomologists lobbied Congress for support of additional research into ways that might be used to eradicate the boll weevil. This resulted in the establishment in 1962 of the USDA Agricultural Research Service Boll Weevil Research Laboratory on the campus of Mississippi State University. During the next decade, sufficient new information was developed that gave researchers some confidence that the boll weevil could be eradicated from the United States *(6)*.

DEVELOPMENT OF ERADICATION METHODS

The eradication program that eventually evolved used only a few tactics. Some of the most critical were techniques developed at the Boll Weevil Laboratory *(11)*. The boll weevil eradication effort was based on the following points: the weevil had only one host on which it could reproduce, that being cotton; there was a long period from first frost until cotton produced the first fruit the following season; and, the chemical communication system that weevils use to find cotton fields and the opposite sex to mate was known.

Malathion evolved as the preferred insecticide in boll weevil eradication programs because of its effectiveness on the weevil, safety, and cost efficacy. It also had the attribute of being more effective against weevils when applied at ultra low volumes. Malathion was formulated so that it could be applied at 10 to 16 ounces of concentrated material per acre with no water for dilution. This proved very cost effective since aircraft, the primary application method used in eradication programs, could carry enough spray for several hundred acres without refilling.

Another phase of the eradication effort was cultural control. Farmers were required by regulatory agencies such as the Alabama Department of Agriculture, to disk or plow down stalks soon after harvest in order to eliminate old stalks as an overwintering source.

In addition to targeting weevils during the cotton fruiting season, researchers also discovered that weevils needed to feed on unopened bolls during the fall season, to build fat reserves that enabled them to overwinter in an inactive state termed "diapause." Eradication efforts targeted controls during this fall period to reduce the number of weevils overwintering for the next season. Alabama was one of the first states in the U.S. to organize a grower boll weevil diapause group. This effort was conducted in the Coosa River Valley region (Talladega, Shelby, and St. Clair counties) in the fall of 1969. Technical support for the program was provided by Drs. Floyd Gilliland and Roy Ledbetter, Auburn University, and Dr. Ed Lloyd of the USDA Boll Weevil Research Lab *(7).*

The last major component of the eradication effort was the use of a sex attractant that male boll weevils produce to attract females. This sex attractant, called a pheromone, was identified and mass produced synthetically by researchers at the Boll Weevil Laboratory. At the same time, inexpensive and highly effective traps were designed to hold this pheromone and attract and capture both male and female weevils. In addition to capturing many weevils, these pheromone traps also told eradication personnel which fields still had weevils and where malathion sprays were needed. The first attempt to put this technology together in the field and prove that eradication of the boll weevil was feasible, was a multi-county pilot program conducted in South Mississippi from 1971 to 1973 *(11).*

In 1973, the National Cotton Council, Memphis, TN., established a committee to pursue an eradication effort. After much debate and disagreement within the scientific and entomological community, a trial eradication was initiated in 1978 in northeastern North Carolina and Virginia. Fortunately, resistance to the phosphate class of chemistry never developed, which allowed these insecticides to be an integral part of an eradication effort. A number of control techniques, including sterile weevils, were used in this trial program. However, since the female weevil mated several times, unlike the screwworm fly, which only mated once, the male sterile technique did not work for weevils.

The cotton industry is indebted to numerous entomologists and researchers for their contributions toward the eradication of the boll weevil. Those who stand out are Drs. E.F. Knipling, J.R. "Jim" Brazzel, and T.B. "Ted" Davich. Several other scientists who made major contributions to boll weevil eradication were Drs. William H. "Bill" Cross, D.D. "Dick" Hardee, Gerald H. McKibben, E. Bruce Mitchell, and James H. "Jim" Tumlinson. Three other non-scientists who played major roles in the movement to eradicate the weevil were Robert Coker, cotton breeder; Richie Smith, National Cotton Council; and, Eugene Butler, editor *Progressive Farmer* magazine.

ERADICATION OF THE BOLL WEEVIL IN ALABAMA

The beginning of the end of the boll weevil in Alabama began with the implementation of an organized eradication program in September of 1987. The initial zone was 21 counties in southern Alabama. During the next seven years the program expanded throughout the remainder of the state (central Alabama 1992, northeast Alabama 1993, and Tennessee Valley 1994). By the summer of 1995, no weevil damage could be found anywhere in the state. For the next several years, a watchful eye was kept for migrant weevils reentering the state from noneradicated areas to the west and north.

Numerous problems occurred with the conduct and implementation of this program, which was a logistical nightmare to implement. The program was funded by growers, with assistance from both the state and federal governments. Cost overruns; sloppy aerial applications of Guthion in the initial year and malathion thereafter; mistimed startups; under estimation of the historical weevil problem; disruption of the beneficial complex, resulting in horrendous outbreaks of secondary pests such as beet armyworm and insecticide resistant tobacco budworms; the lack of a preprogram environmental impact study and statement; personnel and logistical problems that came with expanding a program of a few hundred thousand acres in the Carolinas, to more than a million acres in Georgia and Alabama; and lastly the lack of support from a small percentage of the farmers *(7,10)*. All of these factors hindered or plagued the program throughout its implementation in Alabama. During the eradication program, growing cotton was a challenge, with greater than ever input cost on the grower's part. However, the long term success of the program in removing the insect that had been the key pest of cotton for most of the 20th century, was well worth the cost and effort to Alabama cotton growers.

Some of the key players in the eradication program during its implementation in Alabama were Robert Springer, Raleigh Wilkerson, and Buddy Adamson, Alabama Farmers Federation; Albert McDonald, grower and Commissioner of Agriculture; W.L. "Sonny" Corcoran, Claude Buchanan, Sam Spruell, and Jimmy Sanford, growers; Lanny Brashear and Fred Planer, USDA-APHIS (Animal Plant Health and Inspection Service); Dr. Ron Smith, Auburn Extension entomologist; Guy Karr, Alabama Department of Agriculture and Industries; Johnny Paul DeLoach and James Brumley, Southeastern Boll Weevil Eradication Foundation. Numerous others played key roles in the success of this program.

INTENSIFICATION OF EDUCATION PROGRAM

At the same time that eradication plans were being devised and implemented in the 1970s, additional efforts were made by the federal government to intensify the educational aspects of the management of boll weevils and other cotton pests. In 1972, additional federal funds were appropriated to the state Cooperative Extension Services of each Land Grant University in all cotton-producing states. These funds were used to employ additional entomologists to conduct a more intensified educational program for the integrated management of the boll weevil and other cotton insects. Dr. Roy J. Ledbetter, an Alabama Extension entomologist for cotton, spent part of the 1971 year on assignment in Washington D.C. developing the formula for the distribution of these funds to the cotton-producing states. Dr. Ronald H. Smith, grandson of the Lawrence County farmer, Lewis Smith, was employed in April of 1972 by the Alabama Cooperative Extension Service to coordinate this expanded educational effort. In 1976, two area Extension cotton entomology positions were added. Entomologists who have served in those positions are Dr. Richard Davis, Barry Freeman, Dr. Tim Reed, and Glenn Worley.

More than $150,000, in earmarked federal dollars, was received by the Cooperative Extension Services each year from 1976 through 2007 to support this program.

The program included the promotion and training of college students, or farmer's sons and daughters, to serve as "cotton scouts" to inspect fields weekly to assess the level of weevil damage. Several hundred scouts were employed by farmers each season during the 1970s and 80s to provide this service *(12)*. This educational program greatly expanded a scouting program that was begun on a limited scale a decade earlier.

The first cotton scout in Alabama was employed in Pickens County in 1959 and was arranged by the local county agent, Mr. Cecil Davis. This scout was Max H. Bass, who later became a professor of entomology at Auburn University, and still later, a professor and Department Head at the University of Georgia.

During the 1970s and 1980s, this field monitoring service for boll weevils expanded into the private consulting sector. In this program, professional entomologists contracted with cotton farmers to provide scouting in addition to advice on all insects, other pests (such as weeds), and fertility.

EFFECT OF BOLL WEEVIL ERADICATION

The elimination of the boll weevil caused tremendous changes in cotton insect management and control in Alabama *(13)*. These changes have resulted in lower insecticide use and significant changes in the cotton insect spectrum *(9)*. For the first year since 1910, no yield losses to the boll weevil were reported in 1995 *(18)*. The number of insecticide applications to cotton each season was reduced from the historical average of 10 to 14 to one to four, depending on the year and location within the state.

Also, a factor in this reduction was the introduction in 1996 of genetically altered cotton varieties that contained a "Bacillus" bacterial strain. These varieties were highly effective against caterpillar insects. Therefore, for the first time in almost 100 years, cotton could be produced in Alabama with minimal losses to insects or input for insect control. However, it should be noted that this greatly reduced insecticide usage created a situation where low levels of other insect species, such as plant bugs and stink bugs, could move into fields, increase in numbers over a period of several weeks, and eventually reach damaging levels.

It is interesting that the chapter on boll weevil history in Alabama began with the arrival of weevils in Mobile County in 1910 and ended with the last one being a single find in Mobile County in 2003.

The weevil had profound effects on agriculture and society in Alabama for much of the 20th century. However, in retrospect it must be admitted that, in addition to its negative impact, the weevil had an impact on several positive, long-lasting events. Some of these are the diversification of agriculture; the development of the Cooperative Extension Service (county agent system); the importance of the Agricultural Experiment Stations; the rise of the science of entomology in the south; advancements in insect control technology and equipment, including aerial application; the development of the agricultural insecticide industry; renewed interest in the philosophy of integrated pest management, where pest monitoring and damage thresholds are utilized; and the agricultural scouting and private consulting industry.

The boll weevil eradication program in 2007 is in the final stages of eradicating the weevil in Mississippi, Arkansas, Missouri, west Tennessee, and Texas. Plans are in place to continue this program into the cotton-growing areas of Mexico from

whence the weevil came. Cotton planting has returned to south Alabama, even Coffee County—where it has become an excellent rotational crop with peanuts, minimizing disease losses in that crop.

Edited by Dr. Max H. Bass, Resident Director, UGA, Coastal Plain Experiment Station, Retired.

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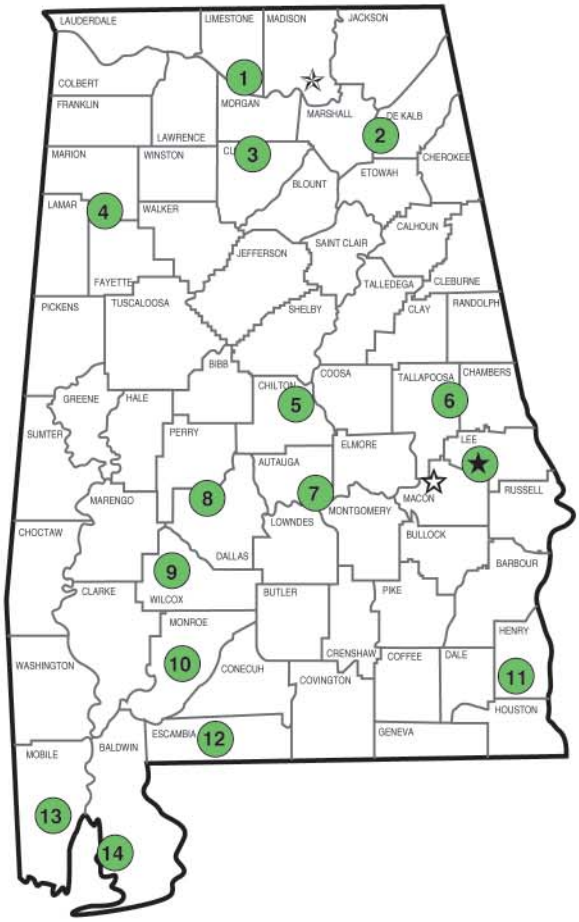
Alabama's Agricultural Experiment Station
AUBURN UNIVERSITY

With an agricultural research unit in every major soil area, Auburn University serves the needs of field crop, livestock, forestry, and horticultural producers in each region in Alabama. Every citizen of the state has a stake in this research program, since any advantage from new and more economical ways of producing and handling farm products directly benefits the consuming public.



Research Unit Identification

★ Main Agricultural Experiment Station, Auburn.
⛤ Alabama A&M University.
☆ E. V. Smith Research Center, Shorter.

1. Tennessee Valley Research and Extension Center, Belle Mina.
2. Sand Mountain Research and Extension Center, Crossville.
3. North Alabama Horticulture Research Center, Cullman.
4. Upper Coastal Plain Agricultural Research Center, Winfield.
5. Chilton Research and Extension Center, Clanton.
6. Piedmont Substation, Camp Hill.
7. Prattville Agricultural Research Unit, Prattville.
8. Black Belt Research and Extension Center, Marion Junction.
9. Lower Coastal Plain Substation, Camden.
10. Monroeville Agricultural Research Unit, Monroeville.
11. Wiregrass Research and Extension Center, Headland.
12. Brewton Agricultural Research Unit, Brewton.
13. Ornamental Horticulture Research Center, Spring Hill.
14. Gulf Coast Research and Extension Center, Fairhope.