

MISSISSIPPI PEOPLE: CONTRIBUTORS TO

BOLL WEEVIL ERADICATION



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Mississippi People –
Contributors to Boll Weevil Eradication

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PREFACE

From 2001 to 2003, the Mississippi Entomological Association planned and prepared a special program for the November 2003 Annual Meeting. That special program was to celebrate the 50th anniversary of the association, including a half-day session on the Mississippi Boll Weevil Eradication Program. The eradication program began in Mississippi in 1994 before it encountered problems and ended briefly. It started again in earnest in 1997 and was under way statewide at the time the jubilee celebration was being planned.

The information presented in this bulletin was first presented in a more abridged style at the 50th anniversary celebration in a series of posters entitled *Boll Weevil Eradication Hall of Fame*. In this way, the association honored the people who had made significant contributions to boll weevil control and eradication, as well as those Mississippi entomologists who had worked diligently on boll weevil problems during the early part of the 20th century when control methods were inadequate and difficult.

A total of 83 individuals are featured in the bulletin. Nineteen were/are employees of Mississippi

State University, 49 were/are employees of the United States Department of Agriculture, five were/are employed by Mississippi State University during part of their professional service and with the United States Department of Agriculture during another part of their service, four were employees of the Mississippi Department of Agriculture and Commerce Bureau of Plant Industry, five were/are Mississippi farmers and agribusinessmen, and one was a distinguished U.S. congressman. All were distinguished citizens of Mississippi during part or all of their professional careers.

The following individuals, in addition to the first author, served on the Boll Weevil Eradication – MEA Program Subcommittee, which planned the Celebration of Boll Weevil Eradication part of the program for the November 2003 MEA Annual Meeting and also made substantial contributions of information and pictures: Farrell Boyd, Jimmy Etheridge, Dick Hardee, Gerald McKibben, Joe Mulrooney, Jim Smith, Eric Villavaso, Jeff Willers, and David Young.

Mississippi People – **Contributors to Boll Weevil Eradication**

INTRODUCTION

Mississippi people in various professions have made major contributions to a national Boll Weevil Eradication Program that is nearing completion across the entire Cotton Belt of the United States. The contributions of these people need to be concisely recorded and archived because of their importance in the agricultural history of Mississippi, and that is the purpose of this bulletin. The Boll Weevil Eradication Program has been an important part of improved cotton insect management that is safe and successful. From both a national and state perspective, boll weevil eradication has been the most comprehensive insect management program ever undertaken. Mississippians who have worked on boll weevil control and eradication, both native born and others who made Mississippi their home during their professional careers, are important contributors to the agricultural, scientific, and educational history of the state.

Numerous manuscripts that provide information about the boll weevil and insight into its impact on the agriculture, economy, culture, and quality of life in the South have been written and published (e.g., Cross 1973, Helms 1977, Smith and Harris 1994, Brazzel et al. 1996, and Smith 1998). Hardee and Harris (2003) wrote a perceptive and concise presentation of boll weevil history, its impact on American agriculture, and the importance of boll weevil eradication. Currently, the most comprehensive compilation about the boll weevil and boll weevil eradication is a Cotton Foundation reference book, *Boll Weevil Eradication in the United States through 1999* (Dickerson et al. 2001). One chapter in the reference book tells the Mississippi boll weevil eradication story (Harris and Smith 2001).

A very brief synopsis of the boll weevil story, which is detailed in the above references and other literature, is a needed introduction to the primary

purpose of this presentation. The boll weevil, *Anthonomus grandis grandis* Boheman, is a small-snout beetle (weevil) that came into the United States from Mexico near Brownsville, Texas, about 1892. The boll weevil was adapted to live and reproduce primarily on a single host plant, cotton. Consequently, its spread into the United States was inevitable once the southwestern margin of the enormous cotton growing areas of the southern United States approached or encroached on the weevil's native territory.

Once the connection was made between the boll weevil and U.S. cotton, the weevil infestation moved north through Texas and east across the cotton-producing states at a rate of about 50 miles per year until it had infested most of the cotton in Texas and all of the cotton-production areas east of Texas by 1922. The weevil crossed the Mississippi River from Louisiana and infested the southwest corner (Adams County near Natchez) of Mississippi in 1907.

As the weevil progressed in its invasive migration across the South, it destroyed the region's economy, which was largely dependent on cotton as its main source of cash income. Much of the system of agricultural research by the United States Department of Agriculture (USDA) and the state experiment stations was founded on the need to solve the boll weevil problem. The highly successful Cooperative Extension Service that now exists in every state of the union was founded to teach farmers how to grow cotton in spite of the boll weevil.

Insecticides that were highly effective in controlling boll weevils were eventually developed and seemed to be a panacea for the cotton farmer. Euphoria over the success of this chemical technology was short-lived. Insecticide resistance in the boll weevil

made many of the insecticides ineffective.

Farmers became fearful about the future of such an ephemeral boll weevil control method and in the late 1950s began to look for a better way to deal with the boll weevil problem. In 1960, after much lobbying by cotton industry leadership, the U.S. Congress appropriated funds to construct the USDA Agricultural Research Service (ARS) Boll Weevil Research Laboratory on the campus of Mississippi State University. This unique laboratory facility was formally dedicated in March 1961. A highly focused, multidisciplinary, and large-scale (more than 70 scientists and science support staff) research program was dedicated to developing the knowledge base and control methods necessary for eradicating the boll weevil.

By 1969, the cotton industry wanted to know if eradication technology was far enough along in development to achieve boll weevil eradication. A national Special Study Committee determined that effective techniques were available and recommended that a large experiment should be conducted to test a multifaceted program (eight control techniques integrated into a coordinated program) that would determine if boll weevil eradication were feasible.

Consequently, the Pilot Boll Weevil Eradication Experiment was initiated in 1971 and concluded in 1973. This large-area experiment covered most of Mississippi south of Jackson and parts of Alabama and Louisiana. A Technical Guidance Committee evaluated the results of the experiment and concluded that it was “technically and operationally feasible to eliminate the boll weevil...” There were some unanswered questions and concerns about implementation of a national boll weevil eradication program based on that experiment.

After a delay of five years, a second large-area boll weevil eradication experiment called the Boll Weevil Eradication Trial (BWET) was initiated in North Carolina and Virginia in 1978. A companion project called the Optimum Pest Management Trial (OPMT) was conducted in north Mississippi at the same time as the BWET. The purpose of the two trials (BWET and OPMT) conducted simultaneously was to determine whether the objective should be to eradicate or to manage the boll weevil. Both

philosophies had substantial followings in the community of professional entomologists.

The success of the North Carolina/Virginia trial resulted in the choice of eradication as the national goal. Consequently, the BWET was expanded to become the Boll Weevil Eradication Program, which progressed incrementally south and west and reached Mississippi in 1994. Concurrent western programs were conducted in California and Arizona. There were some start-up problems in Mississippi after the initial start in 1994. These problems delayed full implementation of the program until 1997. However, since 1997 the Mississippi Boll Weevil Eradication Program has progressed across the state and is now near completion over the entire state.

Successful boll weevil eradication coupled with introduction of transgenic Bt cotton (genetically engineered caterpillar-insect-resistant cotton) has completely changed cotton insect management in Mississippi from an insecticide intensive program to minimum chemical insecticide use in a true integrated-pest-management system.

The remainder of this bulletin is devoted to its primary purpose — an account of key Mississippi people and their contributions toward the management and eradication of the boll weevil.

People working in Mississippi over many years of efforts in boll weevil control, preparation for boll weevil eradication, and implementing the boll weevil eradication program have made great scientific and visionary contributions and have had profound impacts on the successful outcome of the national program, and consequently on the Mississippi portion of the national Boll Weevil Eradication Program.

Categorization and chronological order of contributions is elusive for some individuals with long and diverse careers, so some overlap and omission is inevitable. Chronological order of presentations is not rigorous. Individuals are loosely grouped as much as possible according to related categorization of their work. Some individuals listed are deceased, and the current location and status of some are unknown to the authors. The order of presentation indicates no judgment about the relative importance of any individual accomplishment.

IN THE BEGINNING

Many of the early researchers and other workers were primarily involved in helping growers deal with the devastating invasion of the boll weevil. In the early days of boll weevil infestation in Mississippi, this activity was focused on cultural control methods that promoted early fruit production to escape the heaviest mid- and late-season boll weevil infestation. Some practices that promoted earliness were planting early, using of fertilizers to hasten maturity, changing to early-maturing varieties, and harvesting early followed by destruction of stalks (Helms 1977). Attention soon evolved to searching for chemical insecticides that worked and dealing with insecticide resistance when it occurred.

Robey W. Harned was an early entomologist in Mississippi, who served as head of the Mississippi State University Department of Entomology. He made observations of the first boll weevil infestations in Mississippi in 1907 and wrote an early experiment station bulletin (1910) on his observations and on boll weevil biology and control. The Boll Weevil Research Laboratory, originally dedicated on March 21, 1962, was renamed the Robey Wentworth Harned Laboratory and rededicated on November 10, 1982, in his honor.



Harned

E.W. Dunnam was a USDA entomologist at Delta Branch Experiment Station in Stoneville, Mississippi, from 1936 until 1955. He conducted research on the early arsenical dust insecticides and continued boll weevil control research with organochlorine and organophosphate insecticides. His research also spanned the important transition from dust application to water-diluted spray application. He was the leader of entomology science at Stoneville during his tenure there.



Dunnam

Marvin Merkl, Randle Furr, Sr., Edwin Lloyd, Ted Pfrimmer, and Tomie Cleveland were USDA entomologists at Delta Branch Experiment Station. Their tenures at the Delta Branch began during the mid-1950s and lasted for various durations into the 1960s, 1970s, and 1980s. They worked on boll weevil control and on various aspects of boll weevil biology, behavior, and crop damage. Much of their work was done before the concept of boll weevil eradication was developed. Cleveland did early work on ultra-low-volume (ULV) application of malathion. ULV application was application of non-water diluted spray at rates usually of 1 quart per acre or less. ULV malathion became very important in the Boll Weevil Eradication Program. Two of



Merkl



Furr



Lloyd



Pfrimmer



Cleveland

these scientists (Merkl and Lloyd) moved on to Mississippi State and worked in specific areas of boll weevil eradication research at the USDA-ARS Boll Weevil Research Laboratory. Their contributions will be cited again in that regard.

A.L. Hamner was a Mississippi Experiment Station entomologist at Mississippi State University who conducted research on insecticidal control of boll weevil. He conducted a major study on the effect of different levels of boll weevil infestation on the cotton plant and yield. His work provided fundamental information on when cotton farmers should start spraying insecticides to avoid yield loss to developing boll weevil infestations.



Hamner

C.E. (Skipper) King and Marion Laster were Mississippi State University research entomologists who conducted boll weevil control research at the Delta Branch Experiment Station. King worked there in the 1950s. Laster's tenure spanned a period from 1968 to 1988. The later part of Laster's career was devoted to work on a sterile hybrid cross (*Heliothis virescens* x *Heliothis subflexa*). *Heliothis virescens* was the notorious tobacco budworm, a cotton pest that was difficult to control and at various times caused great destruction to the crop. Caterpillar pests, such as the tobacco budworm, are often secondary pests in an agro-ecosystem. Natural enemies of such secondary pests are killed by insecticides applied to control a key pest



King



Laster

like the boll weevil. This sets up a condition that may aggravate a serious outbreak of the secondary pest. Laster retired from Mississippi State University in 1988 and continued his sterile-hybrid research as research entomologist for the USDA-ARS at Stoneville from 1988 until 1995.

Charlie Parencia had a long career in boll weevil research, starting in Texas with early insecticide experiments. He was a pioneer in the discovery and promotion of benefits of early-season (pinhead-square applications) control of boll weevil. He served many years at USDA headquarters in Beltsville, Maryland, as assistant to the chief of the Cotton Insects Branch of the USDA-ARS Entomology Research Division. This service was during the years of intensive research and pilot testing of boll weevil eradication. Parencia finished his career as a scientist on the USDA-ARS staff at the Southern Insect Management Research Unit located in the Jamie Whitten Research Center in Stoneville.



Parencia

William Scott conducted research on ULV application of malathion in the early stages of development of this technology. He started his career at Tallulah, Louisiana, and later moved to Mississippi, first to the Boll Weevil Research Laboratory at Mississippi State and then to the USDA-ARS Southern Insect Management Research Unit at Stoneville. His research included work on reproduction-diapause and boll weevil trapping research, both very important components of boll weevil eradication. He also served a key research role in the Optimum Pest Management (OPM) Trial in north Mississippi.



Scott

PREPARATION FOR THE PROGRAM

Important political, research, educational, and promotional activities began after the great scare caused by boll weevil resistance to organochlorine insecticides. Commitment to boll weevil eradication was secured. The USDA-ARS Boll Weevil Research Laboratory was opened, research programs were established, and the large-scale experiment and area-wide demonstration trial were planned, financed, and conducted. Mississippi people were key players in much of this long-term, broad-based journey toward a Beltwide Boll Weevil Eradication Program. Much of the work was done in Mississippi by Mississippi residents and members of the Mississippi Entomological Association. Of course, there were many contributions from people in other states, but this bulletin focuses on those who worked in Mississippi.

Jamie Whitten, member of the U.S. House of Representatives from Mississippi, was a key congressional leader in obtaining congressional authorization and funding for boll weevil eradication. He was influential in boll weevil eradication policy development. Whitten exerted an important influence on the USDA budgets, to which funds were appropriated for research facilities, personnel, support, large-scale experiments, and area-wide trials. He played a significant role in location of the national boll weevil research facility on the campus of Mississippi State University.



Whitten

Theodore B. (Ted) Davich was a luminary in boll weevil research and a visionary advocate of the scientific potential and possibility of boll weevil eradication. He was the first director of the USDA-ARS Boll Weevil Research Laboratory at Mississippi State and began his career there in 1961. He provided a type of leadership that allowed and promoted creativity in indi-



Davich

vidual scientists. Under his direction, major scientific discoveries and developments in boll weevil eradication technology were achieved. Especially notable were advances in insect rearing, and pheromone and trapping technology.

Norman Mitlin was an insect physiologist at the USDA-ARS Boll Weevil Research Laboratory who worked on the effect of radiation sterilization and chemosterilization on the physiology, behavior, and longevity of boll weevil.



Mitlin

Jack Haynes was an entomologist who spent his professional career, including graduate school, at the USDA-ARS Boll Weevil Research Laboratory at Mississippi State. His work was focused on sterilization of the boll weevil. He tested radiation, chemosterilants, additives, and synergists in attempts to attain a sterile and competitive boll weevil.



Haynes

Robert T. (Bob) Gast was a scientist of great intellect and exceptional creative ability. He designed, built, and tested many of the automated processes used in mass rearing of boll weevil, processes that have been adapted to mass rearing of other insects. It was his ability to rear very large numbers of boll weevils that made some of the early pheromone (grandlure) research possible. His achievements were done at a time when instruments were far less sensitive than they are today. Bob was killed in a tragic accident in his laboratory in 1966. The Robert T. Gast Rearing Facility at MSU is named in honor of him.



Gast

J.G. (Jack) Griffin followed Bob Gast as a leader in boll weevil rearing research at Mississippi State. He continued the progress in development of mass rearing techniques with emphasis on control of microbial contaminants and pathogens.



Griffin

Stan Malone contributed significantly to the development of boll weevil rearing techniques. In his work as a technician, he developed, modified, and maintained highly sophisticated automation equipment for mass rearing.



Malone

Dorwayne Glover was a USDA Animal and Plant Health Inspection Service (APHIS) Methods Development Division employee who was assigned to the USDA-ARS Boll Weevil Research Laboratory in 1968 to work on rearing procedures for mass production of boll weevil. He briefly (1970-1972) worked with a team of researchers to construct and maintain a boll weevil rearing facility for APHIS Methods Development in Gulfport, Mississippi. In 1972, he returned to the Gast Rearing Laboratory at Mississippi State University, where weevils were reared, sexed, and sterilized (males) for release in the Pilot Boll Weevil Eradication Experiment in south Mississippi.



Glover

Oliver H. Lindig worked as a research leader in boll weevil rearing at the Gast Rearing Facility. During his tenure at the facility, he organized and improved mass rearing procedures.



Lindig

Jon Roberson worked in boll weevil and other insect rearing research and production techniques at the Gast Rearing Facility at Mississippi State. He provided leadership in improvement of production capacity and weevil quality, and he was a participant in sterile weevil research. He initiated work on rearing of boll weevil parasites. His work was cut short by death midway in his career.



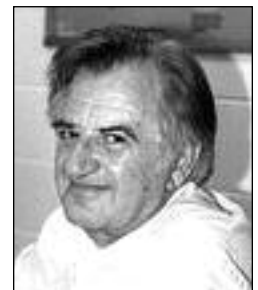
Roberson

Alan C. Bartlett was an insect geneticist in the Boll Weevil Research Laboratory at Mississippi State. His work affected other areas of boll weevil research including rearing, behavior, chemosterilization, and irradiation sterilization. His discovery and propagation of the ebony trait in boll weevil made it possible to identify boll weevils that were reared and released.



Bartlett

Peter P. Sikorowski was an insect pathologist in the Entomology Department of Mississippi State University. He led research and development of sanitary methods of rearing boll weevils free of debilitating disease and microbial diet contaminants.



Sikorowski

William H. (Bill) Cross was a consummate naturalist and insect behaviorist in the Boll Weevil Research Laboratory at Mississippi State. Keen observation and careful records characterized his research. From his work, one could see high-speed photography of a boll weevil taking off in flight, of the positions and motion of elytra and membranous hind wings during flight, and of a



Cross

landing. One could find time and motion studies of a boll weevil on a cotton plant, as well as the flight pattern of a boll weevil responding to pheromone. He knew the alternative wild host plants of boll weevil in the subtropics and tropics of the Americas. He headed the Biological Evaluation Teams of both the Optimum Pest Management Trial in Mississippi and the Boll Weevil Eradication Trial in North Carolina and Virginia. Cross conceived the need, promoted the concept, and shepherded the early organization of the Insect Museum at Mississippi State University. He possessed rare and extraordinary talent that was unfortunately far too short-lived. He died at the hands of criminal highwaymen while on one of his many ecological research excursions into Mexico.

Joe Leggett worked with Bill Cross and is credited with pioneer work in pheromone trap design. The Leggett Trap was the first trap that captured weevils in a cage instead of using the messy Stickem® (glue coating) method of capture.



Leggett

W.L. (Bill) Johnson worked with Bill Cross, Dick Hardee, and others on boll weevil behavior, trapping, and biological control. He conducted some of the early research on the boll weevil parasite, *Catolaccus grandis*.



Johnson

William L. (Bill) McGovern had a long career in boll weevil research at the Boll Weevil Research Laboratory with Bill Cross, Jack Haynes, Gerald McKibben, Eric Villavaso, and Jim Smith. He worked on behavior, biological control, sterilization, pheromone trapping, attract-and-kill technology, and malathion dose efficiency. Bill was a keen observer who helped perfect the boll weevil trap and the attract-and-kill device.



McGovern

James H. (Jim) Tumlinson gave a stellar performance as a capable scientist while he was a graduate student working toward a Ph.D. degree in organic chemistry at Mississippi State University. His work on the boll weevil pheromone was a major contribution to the Boll Weevil Eradication Program. The boll weevil pheromone, grandlure, used as a lure in a trap made it possible to detect very low population densities of the boll weevil. Without such a technique, it would be cost-prohibitive, if not practically impossible, to determine areas that harbor low weevil infestations and to direct eradication efforts to such areas. It also allows the confident determination of eradication in an area or region. Tumlinson was the key person in a team of scientists who isolated, identified, and synthesized the four-chemical blend that makes up the boll weevil pheromone used in these boll weevil traps.



Tumlinson

Paul Hedin was the chemistry investigations leader at the Boll Weevil Research Laboratory. He recruited, employed, organized, and led the team of researchers that developed grandlure. He served one of the longest tenures at the Boll Weevil Research Laboratory.



Hedin

Richard C. (Dick) Gueldner was a synthetic organic chemist at the Boll Weevil Research Laboratory. He provided guidance to the synthesis team and did much of the synthesis work on the four components of grandlure. He synthesized the first grandlure that was field-tested.



Gueldner

James P. (Jim) Minyard was a USDA-ARS research chemist who served on the boll weevil pheromone research team with Jim Tumlinson and others during the years of Tumlinson's graduate school studies and research on isolation, identification, and synthesis of grandlure. After Minyard's work at the Boll Weevil Research Laboratory and attainment of a Ph.D. degree from Mississippi State University, he was employed for many years with the Mississippi Department of Agriculture and Commerce, Mississippi State Chemical Laboratory at Mississippi State.



Minyard

A.C. Thompson was a USDA-ARS research chemist at the Boll Weevil Research Laboratory who worked with Tumlinson, Hedin, Gueldner, and Minyard in the isolation, identification, and synthesis of grandlure.



Thompson

J.C. (Jack) Keller was involved in several aspects of boll weevil research in the early years of concentrated effort at the Boll Weevil Research Laboratory. His work included participation in experiments on the sterile male technique. He was the first scientist to observe, test, and report that male boll weevils produced a sex attractant.



Keller

D.D. (Dick) Hardee was a leader in research on boll weevil response to pheromone and bioassay methods for testing grandlure components and formulations. He had a productive career at the Boll Weevil Research Laboratory and was



Hardee

deeply involved in the original development of traps and lures for boll weevil monitoring, management, and eradication. Following his tenure at the Boll Weevil Research Laboratory, Hardee spent several years in private business, and then returned to research with USDA-ARS. He served as research leader of the Southern Insect Management Research Unit at Stoneville from the late 1980s until he retired in 2004.

E. Bruce Mitchell is a native Mississippian who grew up near Louisville, Mississippi. He was employed at the Boll Weevil Research Laboratory and earned a Ph.D. degree at Mississippi State University. He is credited with having a major role in developing the complex bioassay procedure that was critical to the pheromone isolation process, and he developed the first practical trap. He obtained the first patent that was issued on a boll weevil pheromone trap.



Mitchell

Nevie Wilson was a biological technician at the Boll Weevil Research Laboratory. Jim Tumlinson credited her with having the magic touch in the bioassay procedure for chemical fractions (gas-chromatography separations of potential active pheromone chemicals) to determine active components. She successfully assayed thousands of fractions in search for the magic four active ones. Her work over many years also contributed to sterile weevil research and to development of the attract-and-kill tactic.



Wilson

Paul Huddleston worked on the sterile boll weevil technique with Ted Davich, on boll weevil behavior with Bill Cross, and was a key contributor to boll weevil trapping research with Dick Hardee.



Huddleston

Gerald H. McKibben was a leader in research and development of formulations for stable and controlled release of grandlure. He had a long career in boll weevil research at the Boll Weevil Research Laboratory and completed his tenure as the research leader of the Boll Weevil Research Unit. He researched many aspects of the boll weevil, including flight, movement, trapping, sterility, response to grandlure, attract-and-kill device, and control with malathion. He has obtained several patents on boll weevil control devices.



McKibben

Eric J. Villavaso has had a long and productive career in boll weevil research at the Boll Weevil Research Laboratory at Mississippi State after a short tenure with USDA-ARS at Louisiana State University. He contributed significantly to research on sterility, grandlure, trapping, diapause, attract-and-kill devices, and malathion insecticide. He led in the research that showed that the malathion rate could be reduced below the standard rate of 16 ounces per acre, a major basis for reduced cost of eradication in Mississippi.



Villavaso

Terence L. (Terry) Wagner conducted basic research on and modeled boll weevil dispersal and development of diapause. He worked with Eric Villavaso and others to develop models of boll weevil diapause development and spray scheduling. His next-spray-needed prediction model improved the efficiency of diapause control sprays in the first two years of intensive treatments in the Mississippi Boll Weevil Eradication Program.



Wagner

Edwin P. Lloyd began a long boll weevil research career in Mississippi beginning with USDA-ARS at Stoneville in the late 1950s and continuing at the Boll Weevil Research Laboratory. He made a major contribution to boll weevil eradication through his research on diapause and reproduction-diapause control. He was involved in many aspects of boll weevil research including trapping and insecticidal control. He provided leadership in both the Pilot Boll Weevil Eradication Experiment in south Mississippi and in the Boll Weevil Eradication Trial in North Carolina and Virginia. He served as director of the USDA-ARS Boll Weevil Research Laboratory at Mississippi State until retirement in 1986.



Lloyd

Marvin E. Merkl worked as a boll weevil researcher at the Boll Weevil Research Laboratory at Mississippi State after transferring in the early 1960s from Stoneville. He contributed to the sterile boll weevil research program, to diapause and diapause control research, and to insecticidal control of boll weevil.



Merkl

John McCoy worked in Ed Lloyd's laboratory and contributed to research on diapause control, trapping, and insecticide research. He developed the McCoy Bug Catcher and later contributed to early development of geographic information systems (GIS) for boll weevil eradication.



McCoy

E.C. (Eddie) Burt was an agricultural engineer who worked in insecticide application research in the Boll Weevil Research Laboratory at Mississippi State. He was a participant in early work on ULV application of malathion and azinphosmethyl (Guthion®). His work with ground application enabled small plot testing of the concept.



Burt

Frank Aubrey Harris had a long career in cotton insect research that included work on boll weevil fall biology, diapause, control with ULV malathion, and safety of malathion to commercial catfish production. He started in Ed Lloyd's laboratory (in the Boll Weevil Research Laboratory) as a graduate student at Mississippi State University. He was a professor and researcher in the Mississippi State University Department of Entomology from 1968 to 1976, after which he was in private business for several years before returning to Mississippi State University to work as a research professor at the Delta Research and Extension Center. He became chairman of the Mississippi Boll Weevil Technical Advisory Committee in 1995.



Harris

Johnie N. Jenkins came to the Boll Weevil Research Laboratory soon after it opened in 1961 as a geneticist and plant breeder and has had a highly accomplished career in boll weevil and cotton genetics research. Jenkins was the lead scientist for all boll weevil genetics work in the early days of that research program. He accumulated an archive of cotton germplasm in search of boll weevil resistant traits, one of which was the Frego bract characteristic.



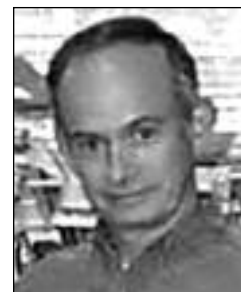
Jenkins

Fowden G. Maxwell became a leading host-plant-resistance entomologist who worked as a team member with Johnie Jenkins in the host-plant-resistance research program at the Boll Weevil Research Laboratory. He became department head in the Department of Entomology at Mississippi State University in 1968 and served through the period of the Pilot Boll Weevil Eradication Experiment in south Mississippi. In that capacity, he provided leadership and a stabilizing influence during controversy about that experiment. Maxwell later served as head of the Department of Entomology and Nematology at the University of Florida and completed a nationally acclaimed career as head of the Department of Entomology at Texas A&M University.



Maxwell

Jack C. McCarty worked as plant breeder at the Boll Weevil Research Laboratory. He is a native Mississippian who has had an effective career in cotton genetics and breeding. He did much of the early work on crossing modern cotton with primitive stocks of cotton in search of resistance and good agronomic qualities.



McCarty

William L. (Bill) Parrott was an entomologist who began his work in 1963 on host-plant-resistance at the Boll Weevil Research Laboratory with Johnie Jenkins and Fowden Maxwell. He evaluated cottons possessing potential resistance to boll weevil, including the influence of the Frego bract trait on boll weevil behavior and insecticide efficacy.



Parrott

Jeffrey L. Willers has provided expertise in insect sampling and modeling important to boll weevil eradication. He worked on boll weevil diapause, movement, and malathion control. His work showed the pattern of boll weevil invasion and dispersion in cotton fields.



Willers

W.T. (Billy) Buford worked as a technician and graduate student in the host-plant-resistance laboratory in the USDA-ARS Boll Weevil Research Laboratory with Johnie Jenkins. Part of his work involved testing a trait in cotton that suppressed oviposition of the boll weevil.

James W. (Jim) Smith moved from the USDA-ARS Southern Field Crop Insect Management Laboratory at Stoneville in 1987 to become research leader of the Boll Weevil Research Unit at Mississippi State. He led and conducted research on developing new technologies for use in boll weevil eradication programs. That work included development of GIS technology applicable to the Mississippi Boll Weevil Eradication Program, as well as application of pheromone technology in an attract-and-kill device for boll weevil control. He served as chairman of the Mississippi Boll Weevil Technical Advisory Committee from 1994 to 1995.



Smith

R.J. Daum was an insect toxicologist at the Boll Weevil Research Laboratory with a special interest in developing and testing boll weevil bait in which pathogens could be incorporated.

Glenn Wiygul worked in boll weevil physiology research and made significant contributions to knowledge about pheromone production in the boll weevil. Wiygul also worked with Jim Smith in the USDA-ARS Boll Weevil Research Unit on development of a GIS for application in boll weevil eradication, and he worked as a computer analyst in the Geographic Information System Project of the Mississippi Boll Weevil Management Corporation.



Wiygul

Joseph E. (Joe) Mulrooney was an entomologist in application technology research in the USDA-ARS Application and Production Research Unit at Stoneville. He did extensive research on ULV malathion, air-assist spray technology, and adjuvant/additive technology. His work provided essential support of reduced rate for ULV malathion in the Mississippi Boll Weevil Eradication Program and essential information on drift potential for ULV malathion.



Mulrooney

R.E. McLaughlin was an insect pathologist at the USDA-ARS Boll Weevil Research Laboratory at Mississippi State. He discovered, isolated, cultured, and tested numerous boll weevil pathogens.

Randy Bell was an insect pathologist in McLaughlin's laboratory at the Boll Weevil Research Laboratory. After completing a Ph.D. degree at Mississippi State University, he continued his work in insect pathology at USDA-ARS laboratories at Tempe, Arizona and Stoneville, Mississippi.

EDUCATION AND PROMOTION

The politics, program organization, and logistics of boll weevil eradication are analogous to getting ready for war. The methods (weapons) were believed to be available, operational, and effective. The important and necessary task then was to convince the U.S. Congress and state legislatures, research and regulatory agencies, the general public, and cotton farmers that it could and should be done, and that it would be safe and cost-effective. The job of putting it all together into an organized, structured, cohesive, and functioning system required numerous people with super organizational and negotiating skill. Mississippi provided a large number of these skilled people.

David F. Young was the Extension entomologist for Mississippi and, for many years, head of the Extension Entomology Department at Mississippi State University. He began his entomology career in Tylertown in 1949 with the State Plant Board (now the Bureau of Plant Industry), and then moved to Stoneville in 1951 before moving to Mississippi State University in 1955 to work for the Cooperative Extension Service. He was keenly interested in utilizing boll weevil diapause control as the foundation of a cotton insect-pest-management system. He became a strong proponent and spokesman for boll weevil eradication in Mississippi and served in various policy-influencing capacities.



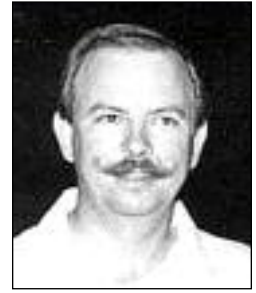
Young

Gordon L. Andrews was the area pest management specialist with Mississippi Cooperative Extension Service at Batesville in Panola County during the Optimum Pest Management Trial in north Mississippi from 1978 to 1981. He provided technical expertise and on-site management of this trial in Mississippi.



Andrews

Ron Seward was optimum pest management operations chief located at Batesville in Panola County. He worked closely with Gordon Andrews in management and operation of the Optimum Pest Management Trial. Seward later worked as a private cotton entomology consultant, an entomology specialist with the University of Tennessee Extension Service in West Tennessee, and the Tennessee program manager for the Southeastern Boll Weevil Eradication Foundation.



Seward

Jim Hamer was the state IPM coordinator in the Extension Service at Mississippi State University. He provided part of the leadership for the Optimum Pest Management Trial.



Hamer

Clyde F. Sartor, Jr., was Extension entomologist in the Extension Service at Mississippi State University between 1971 and 1976. Sartor later worked for private industry before becoming a private consultant. He has participated in boll weevil eradication in several capacities and represented the Mississippi Agricultural Consultants Association on the first State Technical Advisory Committee.



Sartor

H.C. Mitchell was Extension entomologist in the Extension Service at Mississippi State University from 1976 to 1979. He had a key role in promotion, education, and leadership of the Optimum Pest Management Trial. Prior to his Extension Service work, Mitchell did some outstanding research with isotope tracers for marking boll weevils and tracking them in the field.



Mitchell

Robert B. (Bob) Head succeeded H.C. Mitchell as Extension cotton entomologist and served in that capacity from 1979 until 1993. He had been an area pest management specialist before that appointment. His tenure was during much of the critical stage when boll weevil eradication was initiated in Mississippi. He served as chairman of the State Technical Advisory Committee, which was the first technical advisory committee for boll weevil eradication. The directors of the MSU Extension Service and Mississippi Agricultural and Forestry Experiment Station appointed this committee.



Head

M. Blake Layton succeeded Bob Head as Extension cotton entomologist for Mississippi and provided outstanding service to Mississippi in that capacity from 1993 until 2003. He possessed a wealth of information and ability to effectively present it. He played an important role in informational and promotional activities in support of boll weevil eradication in Mississippi.



Layton

Michael R. (Mike) Williams served as an Extension entomologist at Mississippi State University. He has contributed significantly to the Mississippi Boll Weevil Eradication Program by operating a boll weevil trap line program that identified the extent and intensity of boll weevil infestation in different regions of the state.



Williams

Dave C. Ranney was a plant pathologist who worked in cotton pathology research then administration in the USDA-ARS before becoming head of the Delta Research and Extension Center. He was called upon by the Mississippi Boll Weevil Management Corporation to serve as chair of the Mississippi Boll Weevil Technical Advisory Committee during the early stages of promotion and initiation of the Mississippi Boll Weevil Eradication Program.



Ranney

Clarence H. Collison became head of the Department of Entomology (currently Department of Entomology and Plant Pathology) at Mississippi State University in 1989, a few years before intensive activity to initiate boll weevil eradication in Mississippi. He provided leadership and support of the many entomological activities involved before initiation and during implementation of the Mississippi Boll Weevil Eradication Program.



Collison

Fred T. Cooke, Jr., has worked for many years as an agricultural economist at the Delta Research and Extension Center (retired from USDA Economics Research Service). Cooke has been involved in the economic evaluation of boll weevil eradication since the early days of the pilot experiment in south Mississippi and the eradication trial in North Carolina and Virginia. He served on the evaluation teams for these trials.



Cooke

O.T. Guice, Jack Coley, Robert McCarty, and Edwin Dyess were state entomologists and directors of the Mississippi Department of Agriculture and

Commerce, Bureau of Plant Industry (formerly the State Plant Board). They collectively served for many years from the 1960s through 2002. They were shepherds of the regulatory aspects of boll weevil eradication, of which there were many, including state registrations of boll weevil insecticides, environmental issues, and issues of enforcement and collection of assessments.

David W. Parvin, Jr., professor of agricultural economics at Mississippi State University, was involved for many years in economic analyses of various aspects of boll weevil control and eradication.



Parvin



Guice



Coley



McCarty



Dyess

IMPLEMENTATION OF THE PROGRAM

Boll weevil eradication was not an easy sell in all of Mississippi. It was very important to cotton growers in some areas of the Hills Region of the state and a simple decision for them. However, the decision was not so straightforward for much of the Delta, which had large cotton acreages in most counties. Strong leadership was needed to bring the diverse factions together in an acceptable and workable plan. That leadership came forward and engaged in the task of education, promotion, and persuasion. Statutory authority was secured. An effective organization was created. Competent personnel were employed. Referenda were scheduled and passed. The program was implemented.

James R. (Jim) Brazzel was one of the luminaries of boll weevil research and of scientific, technical, and promotional leadership. He could fit into any one or all categories for people cited in this publication. He became the head of a newly organized Department of Entomology at Mississippi State University in 1963. He did seminal research on diapause in the boll weevil while at Louisiana State University and shortly thereafter did the conceptual and validation work at Texas A&M University on diapause control of boll weevil. He brought this interest and expertise to Mississippi State University, where he restored the Entomology Department to a position of national leadership. He later moved to USDA-APHIS Methods Development, where he provided operational and technical guidance to the Boll Weevil Eradication Program for many years.



Brazzel

Kenneth Hood, a farmer/ginner/agribusinessman in Bolivar County, stood head and shoulders above the fray during the early days of organizing a Mississippi Boll Weevil Eradication Program. He was undeterred by chal-



Hood

lenges of substantial opposition, a recall referendum in east Mississippi that failed and stopped the program for a year, or daunting financial shortfalls. He provided energetic and committed leadership essential for the political, financial, and operational success of the program. He has served as president and chairman of the Board of Directors of the Mississippi Boll Weevil Management Corporation. Hood was recipient of a special award from the Mississippi Entomological Association in 2003 for his contributions to boll weevil eradication.

Bernard King, a farmer/ginner/agribusinessman in Rankin County, provided committed and tireless leadership throughout the organization, initiation, roadblocks, and ultimate statewide implementation of the Mississippi Boll Weevil Eradication Program. He has served as treasurer of the Mississippi Boll Weevil Management Corporation since its charter was issued. He has been a key person in dealing with the Mississippi Legislature to obtain enabling legislation for the program and has been tireless in the pursuit of financing and financial assistance for the program. King received a special award from the Mississippi Entomological Association in 2003 for his contributions to boll weevil eradication.



King

Bobby Miller, a farmer/agribusinessman in Leflore County, was one of the early leaders in the Mississippi Boll Weevil Management Corporation. He served as the first chairman of the Board of Directors of the corporation and spent much time and energy in the planning and organization phases of boll weevil eradication in Mississippi.



Miller

Don Waller, a farmer and businessman in Lafayette County, was president of the Mississippi Farm Bureau Federation during the promotional, organizational, and initiation phases of the Mississippi Boll Weevil Eradication Program. He provided valuable leadership for boll weevil eradication in Mississippi.



Waller

David Bennett, a farmer and former state legislator from Benton County, was one of the strongest advocates in the state for boll weevil eradication. His political connections and friendships provided important opportunities to help secure authorization and funding for the eradication program.



Bennett

George Mullendore, a retired Extension cotton specialist, was employed as the project coordinator for the Mississippi Boll Weevil Management Corporation with offices on the campus of Mississippi State University. In that capacity, he managed the Geographic Information System Project that had the primary objective of developing a computerized system of handling boll weevil trapping data for the eradication program.



Mullendore

J.L. Slay, commodity director of the Mississippi Farm Bureau Federation, provided guidance and support to the eradication program from inception through implementation. He was a competent advocate and excellent communicator who served as liaison between Farm Bureau and various stakeholders. Slay served a key role in development and passage of enabling legislation.



Slay

Jeannine Kirkpatrick Smith, office administrator on the Mississippi Boll Weevil Management Corporation staff at Mississippi State University, succeeded George Mullendore upon his retirement with the title of executive director of the corporation. She continued responsibilities for boll weevil trapping data management.



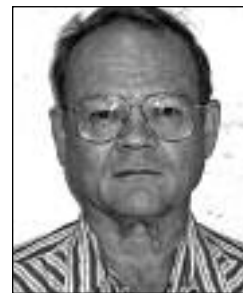
Smith

Farrell J. Boyd, Mississippi program manager for the Southeastern Boll Weevil Eradication Foundation, Inc., had responsibility for administration and management of the program in Mississippi. He worked for USDA-APHIS for many years and had operational responsibility for the Pilot Boll Weevil Eradication Experiment in south Mississippi (1971-73). His capable direction and management of the program has been a key to its success in Mississippi.



Boyd

Robert G. (Bob) Jones, an entomologist with USDA-APHIS PPQ Methods Development, worked for many years with Jim Brazzel on field testing and improvements of eradication methods in the southeastern program. He was transferred to Mississippi with an office at Mississippi State where he continued methods development work with ULV malathion, application methods, and attract-and-kill devices. Jones coauthored a pictorial key for weevil identification.



Jones

TECHNICAL ADVISORY COMMITTEES

A program as geographically large in scope and as technically and operationally complex as the Boll Weevil Eradication Program needed a formalized source of technical advice and guidance during its preparatory, implementation, and operational stages. This was accomplished in Mississippi with two technical advisory committees. The first was established because of the foresight of a group of university administrators when it was obvious to them that the program was about to move across the Cotton Belt. The second was required by state law, the Mississippi Boll Weevil Management Act, which authorized creation of the Mississippi Boll Weevil Management Corporation that would function to implement and manage a boll weevil eradication program in the state. Many of the people who served on one or both of these committees are featured in the previous sections of this bulletin, but some are not. Following are brief discussions of the functions of these committees and lists of committee members.

State Technical Advisory Committee. The Southern Agricultural Experiment Station Directors recommended in their May 1989 meeting that each state producing cotton in the southern region should appoint a Statewide Technical Advisory Committee (STAC). At Mississippi State University, Verner G. Hurt, director of the Mississippi Agricultural and Forestry Experiment Station (MAFES), and Hiram D. Palmertree, director of the Mississippi Cooperative Extension Service (MCES), appointed the following Mississippi STAC on August 15, 1989, (as revised with two additional names on January 15, 1990).

STAC Appointed by Hurt and Palmertree

Bob Head, MCES, Extension Cotton Entomologist, Chair

Roy Reid, MCES, Delta Cotton Extension Entomologist

Thomas Love, MCES, County Agent

Barney Tanner, MCES, County Agent

Aubrey Harris, MAFES, Entomologist (Delta Cotton)

Randy Luttrell, MAFES, Entomologist (Hill Cotton)

John Wilson, MCES, Program Leader

Fred Cooke, MAFES, Agricultural Economist

Ex-Officio STAC Members

C.H. Collison, Head, MSU Department of Entomology

J.W. Smith, USDA-ARS, Research Leader, Mississippi State

D.D. Hardee, USDA-ARS, Research Leader, Stoneville

STAC Members from State Regulatory Agencies and Other Organizations

Jack Coley, MDAC, Bureau of Plant Industry

Bruce Bracken, Mississippi Department of Health

Kenneth Hood, Cotton Producer, Delta Council

Robroy Fisher, Cotton Producer, Delta Council

David Bennett, Cotton Producer, Mississippi Farm Bureau Federation

Bernard King, Cotton Producer, Mississippi Farm Bureau Federation

Vince Muzzi, Mississippi Aerial Applicators Association

Sam A. Newsom, Mississippi Agricultural Chemicals Council

Clyde Sartor, Mississippi Agricultural Consultants Association

Robert Seyfarth, Mississippi Department of Environmental Quality

STAC became active in late 1989 with its first meeting on November 30, 1989. A Grower Advisory Committee was appointed with cotton producers representing all cotton growing areas of the state: Tom Garrett, Jakey Hurdle, L.H. Johnson, Wendell Johnson, Margaret McKee, Bobby Miller, Frank Mitchener, Tom Robertson, Bo Robinson, Bill Thomas and Robert Mashburn. STAC reported to the Grower Advisory Committee, and the growers acted as liaison between STAC and other cotton producers in their home areas.

STAC became active in various aspects of preparing for boll weevil eradication. During late 1989 and early 1990, the committee developed and proposed a plan to initiate a statewide boll weevil management program that could be implemented in the 1990 growing season to take advantage of a harsh 1989-90 winter. There was interest in a sustained boll weevil management program that would maintain boll weevil infestations at relatively low levels and consequently make boll weevil eradication a less daunting task when eradication came to Mississippi. Five technical members of the committee (Hardee, Harris, Head, Sartor, and Smith) proposed a management program. The Cooperative

Extension Service and the farm media conducted a concerted educational program that encouraged Mississippi cotton producers to implement a boll weevil management strategy. This effort probably provided some general suppression of boll weevil infestations in the state, but an organized and sustained management program did not materialize.

STAC made proposals for general provisions of new legislation that would be needed for boll weevil eradication and could also serve for establishing pest management districts for suppression of boll weevil or other pests where eradication was not necessarily the objective. STAC provided an important function of conceptualizing an area-wide or statewide insect management or eradication program, and it addressed various options for organization, regulation, and operation of such programs. However, as the reality of implementing a boll weevil eradication program in Mississippi became imminent, cotton producers and other industry leaders in the state began to organize independently of STAC. Technical people who worked for Mississippi State University, USDA, or other state agencies were called upon during a brief transitional period on an *ad hoc* basis for technical advice and information. The resulting organization — including a technical advisory committee — was created and managed by cotton farmers under provisions of a state law.

Mississippi Boll Weevil Technical Advisory Committee. The Board of Directors of the Mississippi Boll Weevil Management Corporation appointed a “technical advisory committee” as required by the Mississippi Boll Weevil Management Act. The Mississippi Boll Weevil Technical Advisory Committee (MBWTAC) was appointed early in 1993, before the statute took effect on July 1, 1993. The statute defined the technical advisory committee as “a group of professional scientists in the fields of entomology, agronomy, agricultural economics and other appropriate disciplines...to provide guidance in developing and conducting effective boll weevil management programs.” Following is a list of the first committee members:

C.D. Ranney, Head, Delta Research and Extension Center, Chairman

Clarence Collison, Head, MSU Department of Entomology

D.D. Hardee, Director, Southern Insect Management Lab, USDA-ARS, Stoneville

Aubrey Harris, Entomologist, Delta Research and Extension Center

Blake Layton, Extension Entomologist, MSU

R.G. Luttrell, Entomologist, MSU Department of Entomology

Gerald McKibben, Entomologist, Boll Weevil Research Unit, USDA-ARS, MSU

Roy Reid, Area Entomology Specialist, Delta Research and Extension Center

James W. Smith, Research Leader, Boll Weevil Research Unit, USDA-ARS, MSU

Bill McGovern, Entomologist, Boll Weevil Research Unit, USDA-ARS, MSU

Clyde Sartor, Consultant, Vicksburg

Fred T. Cooke, Jr., Agricultural Economist, Delta Research and Extension Center

David W. Parvin, Jr., Agricultural Economist, MSU Department of Agricultural Economics

DeWitt Caillavet, Extension Agricultural Economist, Delta Research and Extension Center

Robert McCarty, Director, MDAC Bureau of Plant Industry, MSU

Will McCarty, Extension Cotton Specialist, MSU

Hubert Tubbs, Commercial Beekeeper, Webb, Mississippi

Joe Love, County Agent, Lowndes County

Barney Tanner, Area Extension Agent, Hinds and Rankin Counties

James McPhail, Area Director, Extension Service, Delta Research and Extension Center

Responsibilities assigned by law and by the Mississippi Boll Weevil Management Corporation to the MBWTAC were to (1) provide technical guidance for developing and conducting boll weevil management or eradication programs, (2) determine costs upon which program budgets and grower assessments would be based, and (3) define specific “regions” within the state for the purpose of holding referenda and conducting boll weevil management programs.

C.D. Ranney retired as head of Delta Research and Extension Center (DREC) in 1994 and concurrently resigned as chairman of the MBWTAC. James W. Smith was named head of DREC to replace Ranney and was named chairman of the MBWTAC. Smith elected to resign from the chairmanship of the MBWTAC in 1995, and Aubrey Harris was appointed as chairman at that time. Membership in the committee has been adjusted since 1993 because of resignations due to retirement and job changes, and new members have been appointed as needed.

Resignations have included R.G. Luttrell, Roy Reid, Clyde Sartor, DeWitt Caillavet, Joe Love, Barney Tanner, and James McPhail.

Replacements and additions to membership have included Joe Mulrooney, USDA-ARS research entomologist, Stoneville; Mike Williams, MSU Extension entomologist; Gordon Andrews, Extension entomologist, DREC; Eric Villavaso, USDA-ARS research entomologist, MSU; Terry Wagner, USDA-ARS research entomologist, MSU; Bob Jones, USDA-APHIS Methods Development entomologist, MSU; Jim Robbins, assistant entomologist, DREC; Jack Reed, entomologist, MSU Department of Entomology and Plant Pathology; Scott Stewart, assistant entomologist, MSU Department of Entomology and Plant Pathology; John Robinson, Extension agricultural economist, MSU Department of Agricultural Economics; Michael Quart, MSU Extension program leader; John Coccaro, Extension agent, Sharkey County, Rolling Fork, Mississippi; John M. Kimbrough III, consultant, Lexington, Mississippi; Phillip L. McKibben, consultant, Mathiston, Missis-

issippi; George Mullendore, state coordinator, Mississippi Boll Weevil Management Corporation, MSU; and Farrell Boyd, Mississippi program manager, Southeastern Boll Weevil Eradication Foundation, Inc., Clinton, Mississippi.

MBWTAC meetings have served both in a technical advisory capacity for the Mississippi Boll Weevil Management Corporation and in an information exchange capacity for various groups interested in the eradication program in Mississippi. MBWTAC has been required to deal with numerous important technical issues, including determining boundaries of the four boll weevil eradication regions of the state, studying and recommending budgets for each region, recommending the ULV malathion rate for use in Mississippi, recommending pheromone trap capture treatment thresholds for ULV malathion sprays, defining buffer (transition) zones and special treatment regimens for these areas, and recommending variations in trapping patterns in special situations.

CONCLUSION

The Boll Weevil Eradication Program that has progressed across the cotton-growing areas of the Southeast, Midsouth, Southwest, and West will have a long-term beneficial impact on the safe and effective management of cotton insect pests. The process of developing and implementing the program will serve as a model for other large-scale pest-management programs that may evolve in the United States and internationally. It has greatly reduced the dependence of cotton producers on chemical pesticides for control of insect pests. Boll weevil eradication, coupled with the cotton insect resistance now available through transgenic technology, provides the foundation for a sustainable system of integrated pest management for cotton. These two technologies, which reached Mississippi at about the same time, have made possible and mark the beginning of a new era in cotton insect management.

A risk in making this list of Mississippi contributors to boll weevil eradication is that some important contributions and contributors may be omitted. The list cannot be sufficiently comprehensive to include every worker who ever made a research, leadership, organizational, or operational contribution in Mississippi to boll weevil eradication. That is regrettable because many other Mississippi farmers, businessmen, political leaders, promotional and advocacy organizations, and employees in the eradication program made contributions that, collectively, have been monumental.

For those whose names were listed and whose accomplishments were briefly described, it is appropriate that their record is chronicled, honored, and archived as important in the history of Mississippi.

REFERENCES

- Brazzel, J.R., J.W. Smith, and E.F. Knipling.** 1996. Boll Weevil Eradication, pp. 625-662. *In* E.G. King, J.R. Phillips, and R.J. Coleman [Eds.]. Cotton insects and mites: characterization and management. Cotton Foundation Reference Book Series, No. 3. The Cotton Foundation, Memphis, Tennessee.
- Cross, W.H.** 1973. Biology, control, and eradication of the boll weevil. *Annu. Rev. Entomol.* 18: 17-46.
- Dickerson, W.A., A.L. Brashear, J.T. Brumley, F.L. Carter, W.J. Grefenstette, and F.A. Harris.** 2001. Boll weevil eradication in the United States through 1999. Reference Book Series No. 6, The Cotton Foundation, Memphis, Tennessee.
- Hardee, D.D., and F.A. Harris.** 2003. Eradicating the boll weevil. *Am. Entomol.* 49: 82-97.
- Harned, R.W.** 1910. Boll weevil in Mississippi, 1909. *Miss. Agric. Exp. Stn. Bull.* 139.
- Harris, F.A., and J.W. Smith.** 2001. Boll weevil eradication in Mississippi, pp. 305-344. *In* Dickerson, W.A., A.L. Brashear, J.T. Brumley, F.L. Carter, W.J. Grefenstette, and F.A. Harris. [Eds.], Boll weevil eradication in the United States through 1999. Reference Book Series No. 6, The Cotton Foundation, Memphis, Tennessee.
- Helms, D.** 1977. Just lookin' for a home: the cotton boll weevil and the south. Ph.D. dissertation, Florida State University, Tallahassee.
- Smith, J.W.** 1998. Boll weevil eradication: area-wide pest management. *Ann. Entomol. Soc. Am.* 91: 239-247.