

UPDATE ON BOLL WEEVIL ERADICATION IN TEXAS
C.T. Allen, L.E. Smith, L.W. Patton, and R.O. Newman
Texas Boll Weevil Eradication Foundation
Abilene, TX

Abstract

The Texas Boll Weevil Eradication Foundation (TBWEF) completed a successful year in 2003 with more than 5.7 million acres in 12 active zones in Texas and just over 31,000 acres in four zones in New Mexico. Support from growers, grower organizations, Texas and federal legislators, USDA research and implementation agencies and Texas agricultural research and education agencies, and the Texas Department of Agriculture has grown stronger with continued program success. Retention referenda conducted in four zones 2003 have reaffirmed growers desire to continue the program.

Introduction

During the twentieth century, boll weevil has been responsible for more dollars in control costs and crop losses than any other cotton pest in Texas. In the US. The National Cotton Council estimates the boll weevil has cost cotton producers more than \$13 billion (NCC 1994) since it entered the US about 1892 (Hunter and Hinds 1905). Following successful experiences with a cooperative boll weevil eradication experiment in Mississippi, Louisiana and Alabama in 1971 and a successful three-year boll weevil eradication trial in North Carolina and Virginia from 1977-80, growers requested program expansion in other regions of the US beginning in 1983 (El-Lissy 1998).

Texas cotton growers began participating in boll weevil eradication in 1994 on approximately 220,000 acres in the Southern Rolling Plains (SRP) zone. In 1996 eradication activities began on approximately 500,000 acres of cotton in the South Texas/Winter Garden (ST/WG) zone and about 500,000 acres in the Rolling Plains Central (RPC) zone. In 1997 the program was challenged and halted by the Texas Supreme Court, and a new law was passed that allowed the program to be restarted (El-Lissy, 1998).

Eradication programs were conducted on 1,130,263 acres in three zones, SRP, RPC and ST/WG, in 1998.

In 1999 boll weevil eradication was initiated in five new zones, adding an additional 2.3 million acres to the program. Added were 745,692 acres in the Western High Plains (WHP) zone by a positive vote by 79 percent of qualified voters in Dec. 1998, 445,289 acres in the Northwest Plains (NWP) zone through a positive vote by 75 percent of the voters there, 73,467 acres in the El Paso/Trans Pecos (EP/TP) zone with a positive vote by 80 percent of the growers and land owners, 716,548 acres in the Permian Basin (PB) zone with a positive vote by 73 percent of qualified voters, and 295,682 acres in the Northern Rolling Plains (NRP) zone with a positive vote by 71 percent of the growers and landowners in that zone (El-Lissy 2000, Stavinoha and Woodward 2001). By the fall of 1999, eight zones were involved in active eradication. Full season programs were continuing on 1,299,343 acres in the SRP, ST/WG and RPC zones. Diapause control programs had begun in the WHP, NWP, EP/TP, PB and NRP zones, representing 2,276,678 acres. Boll weevil was being eradicated on 3,576,021 acres of Texas cotton.

The SRP zone was declared functionally eradicated by Texas Department of Agriculture (TDA) Commissioner Susan Combs on Sept. 20, 2000. Full-season programs were conducted on 4,288,399 cotton acres in 8 active zones in 2000. Referenda held during 2000 added 3 new zones. Growers in the Southern Blacklands (SBL) zone, the Northern High Plains (NHP) zone, and the Southern High Plains/Caprock (SHPC) zone held referenda to assess grower support for the program. Referenda were passed in the NHP by a 75.5 percent positive votes among qualified voters in October 2000 and in the SHPC by 80.4 percent of the voters in November 2000. A referendum supporting starting a program had been previously passed in the SBL in 1999 through a positive vote of 52 percent of the acreage in the zone, but the assessment proposal had failed (Stavinoha and Woodward, 2001). An assessment referendum held in April 2000 passed by 70.8 percent.

In the late summer and fall of 2001, the diapause control phase of the program began in the three new zones. The program was conducted in the NHP on 558,993 acres, in the SBL on 91,770 acres and in the SHPC on 1,230,590 acres, for a total of 1,881,353 acres in the diapause phase of the program. A total of 4,249,402 acres were in full-season programs in the eight older zones. All together, eleven zones with a total of 6,130,755 cotton acres were involved in eradication programs in the fall of 2001.

After two years of participation with Texas producers through contracting acres into Texas zones, cotton producers from the Lea County Boll Weevil Control District (LCNM), the Central Lea County Boll Weevil Control District (CLCNM) and the

Curry/Roosevelt Counties Boll Weevil Control District (C/RNM) formally associated with the Texas Boll Weevil Eradication Foundation for operations in August, 2001. After three years of program work in the Pecos Valley, the Pecos Valley Boll Weevil Control District (PVNM) began collaborating with the Texas Foundation to conduct program operations in 2003.

On February 19, 2002, Commissioner Susan Combs declared the RPC zone functionally eradicated. A referendum in the Upper Coastal Bend (UCB) zone was held in January 2002. It passed with greater than 55.2 percent of the acreage voting in favor of the program. The program began diapause treatments on the UCB zone's 187,813 acres in early July 2002. The eleven older zones, comprising 5,546,253 cotton acres, were conducting full season eradication programs. In total, boll weevil eradication was conducted on 5,734,066 acres in 2002.

A referendum to conduct boll weevil eradication in the Northern Blacklands (NBL) zone failed in December 2002 and failed again in December 2003.

Retention referenda were passed in the ST/WG by 87.8% of the voters in October 2001, in the SRP by 88.2% in February 2002, in the RPC by 89.7% in March 2002, and in the WHP by 86.0% in December 2002. More retention referenda were passed during 2003 as follows: in the NWP zone by 83.3% in March 2003, in the RPC zone by 89% in March 2003, in the PB zone by 85.7% in April 2003, and in the NRP by 90.6% in April 2003.

A referendum to attach a portion of northern Glasscock County to the PB zone failed by a narrow margin in August 2003.

Texas Boll Weevil Eradication Foundation operations were conducted on 5,735,257 Texas cotton acres in 12 active zones in 2003. In addition, program operations were conducted on 31,006 acres in four active zones in New Mexico.

At the end of the 2003 season, seven west Texas zones encompassing more than 4.2 million acres were poised to join the SRP and RPC zones with weevil populations low enough to be considered for suppressed or functionally eradicated status. Taken together, nine Texas zones and three New Mexico zones totaling over 5 million cotton acres had achieved low enough boll weevil populations to be considered for quarantine protection by December 2003.

Methods

El-Lissy et al. (1997) provided a detailed description of the boll weevil eradication methods used in the Texas program. Only minor modifications have been made in data management systems and in the management of secondary pests since that time.

Discussion

Texas High Plains Zones

A preliminary trapping program was conducted in the 13 counties in the northern part of the Texas Panhandle in 2003. No weevils were caught. Cotton growers in the area have petitioned the Texas Department of Agriculture to begin the referendum process necessary to initiate an eradication program. The referendum will be held in the spring of 2004. Cotton acreage in the panhandle is expected to increase from the 24,979 acres certified in 2003 to over 100,000 acres in 2004.

The eradication program begun in the NWP zone (Hereford, Muleshoe, Littlefield, Dimmitt area) in 1999 produced excellent results in 2003. The zone had 503,124 planted cotton acres in 2003. Stormy weather during the year destroyed about 68% of the planted acres, leaving about 160,000 acres that were taken to harvest. A total of 10 boll weevils were caught in 1,002,457 trap inspections in the zone for a year-long average of 0.00001 weevils caught per trap inspection. This was a reduction of 98.9% from the weevils per trap inspection in 2002. No boll weevils were caught until the week of June 30. Four weevils were caught between June 30 and July 28. Then no weevils were caught until custom harvest equipment began moving back into the zone from boll weevil infested areas to the south. Six weevils were caught near major roads the first two weeks of September. For the twelve week period from mid-September through the first week of December no boll weevils were caught. It is significant that no weevils were caught during the defoliation and harvest period in the NWP zone. During this period nearly 300,000 trap inspections occurred. The absence of weevils in pheromone traps during defoliation and harvest supports the belief that the goal of boll weevil eradication is being reached in the zone. After its fifth year in eradication, it is unlikely that reproducing populations of boll weevils still exist in the NWP zone. Only 6,457 acres were treated in the NWP zone in 2003 or 1.3% of the acres planted to cotton in the zone.

The NHP zone (Tulia, Plainview, Floydada area) began eradication in 2001 and had a successful year in 2003. Originally, 549,703 cotton acres were planted in the zone. Only about 266,000 acres remained after the early summer storms, a 51% loss.

Weevils per trap inspection in the NHP was 0.000021 for the year in 2003. This was a reduction of 99.5% from the previous year. A total of 37 boll weevils were trapped during the year in the NHP zone. Of these, 19 were caught by the first week of July and 28 were caught by the first week of September. Only nine weevils (24% of the total) were caught after the first week of September when defoliation and harvest activities were underway. This indicates the absence or near absence of reproducing boll weevil populations in the NHP zone after only three years of boll weevil eradication operations. A total of 18,394 acres were treated in 2003, 3.3% of the planted acres in the zone.

The SHP/C zone (Morton, Levelland, Lubbock, Tahoka, Crosbyton area) which began eradication activities in 2001, made excellent progress in 2003. A total of 1,158,431 acres were planted and about 870,000 acres remained after the summer storms. The storm loss in the SHP/C zone was 24.8%. At the end of 2003, the third year of eradication activities in the SHP/C zone, 145 weevils were trapped from 3,994,167 trap inspections or 0.000036 weevils per trap inspection. This was a reduction of 99.2% from the previous year. The temporal pattern of capture was different in the SHP/C zone than in the neighboring zones to the north, however. Ninety-six of the weevils trapped (66%) were caught after the first week of September. The weevils caught during September and early October were caught near Levelland (a reproducing population), along the caprock, near major roads and a few were caught near where organic cotton fields had been planted in previous years. Later in the fall most of the weevils were caught in fields along the caprock. The pattern of these catches and those of neighboring zones suggests many of these weevils moved into the SHP/C zone from the St. Lawrence area. A total of 101,518 acres were treated in 2003 in the SHP/C zone. This was 8.7% of the acreage planted to cotton in the zone.

The WHP zone (Brownfield, Plains, Seagraves, Seminole area) began eradication in 1999. Summer storms did little damage to the 825,371 cotton acres in the WHP zone in 2003. Only 4% of the planted acres were lost. Progress in boll weevil eradication was made in the WHP zone, but late season boll weevil movement into the WHP from the St. Lawrence area fed hundreds of weevils into the zone in the fall. From planting through the end of August only four boll weevils were trapped in over 927,000 trap inspections. This indicated reproducing boll weevil populations were very low through the spring and summer months. Boll weevil trap captures increased sharply through the fall on the south and southeast edges of the zone, on the fields nearest the St. Lawrence area. By the end of the season 347 boll weevils had been captured in 2,021,823 trap inspections, 0.00017 weevils per trap inspection. In spite of the influx of weevils from the St. Lawrence area, the WHP was able to reduce boll weevil populations 93.5% from 2002. A total of 145,466 acres were treated during the year or 17.6% of the acres planted to cotton in the zone.

The PB zone (Lamesa, Big Springs, Stanton, Midland area) began eradication in 1999. In 2003 storms caused the loss of just over 1% of the cotton acres in the 770,329 zone. Both reproducing and migratory boll weevil populations were present in the PB zone in 2003. Spring survival was noted from the 2002 fall migration from the St. Lawrence zone and subsequent PB zone reproduction. Twenty eight weevils were captured in the zone through May, 916 through June and 1,352 through July of 2003. Through August 2003 2,729 weevils had been captured in 1,037,395 trap inspections. Strong boll weevil movement into the PB zone from its border with the St. Lawrence zone occurred from September through November. At years end, 32,553 boll weevils had been captured in 2,286,832 trap inspections, 0.0142 weevils per trap inspection. Despite large scale migration into the zone from the St. Lawrence area, weevil populations were reduced 49.3% from 2002. Treated acres totaled 2,385,889 or 3.09 acre treatments per planted cotton acre in the zone.

All active zones in the Texas High Plains region had boll weevil populations low enough to be considered for suppressed or functionally eradicated status by the end of the year 2003.

Growers from the St. Lawrence zone renewed discussions with TBWEF personnel to consider entering an eradication program in the fall and winter of 2003-2004. The cotton in the zone (151,581 certified cotton acres in 2003) produced large numbers of boll weevils in 2002 and 2003. As these weevils moved into nearby eradication zones they increased eradication costs and slowed the progress toward eradication in six High Plains and Rolling Plains zones over the last two years. Clearly, boll weevil eradication in Texas will not be successful unless all cotton producing acres are participating in a program.

New Mexico and Far West Texas Zones

Program activities in Curry and Roosevelt Co.s of New Mexico began through some growers contracting with the NWP zone in 1999. Formal entry into a program conducted by TBWEF occurred in 2001. Hail, wind, cold temperatures and seedling disease took its toll on cotton fields in the C/RNM zone (Clovis, Portales area) in 2003. Planted acres were 16,500 but over 40% of the planted acres were lost to severe weather. Weevil populations in the C/RNM zone were reduced 99% from 2002 to 2003. Trapping data indicate low probability of reproducing boll weevil populations in the zone. Two weevils were caught in 53,038 trap inspections for the year or 0.000038 weevils per trap inspection. One of the weevils was trapped the week of July 12, the other was trapped the week of October 18 in the far north end of the zone. Field inspections and subsequent trapping did not indicate any further evidence of infestation. A total of 251 acres were treated in the zone, 1.5% of the cotton acreage planted in the zone.

Program activities in Lea Co. New Mexico began through some growers contracting with the WHP zone in 1999. Formal entry into a program conducted by TBWEF occurred in 2001. Data for the two LCNM and CLCNM zones (Hobbs, Lovington area) will be combined for this report. Of the 13,993 acres planted to cotton in the Lea County zones, virtually no acres were lost to storms in 2003. Weevil populations were reduced over 99.5% in the Lea County zones from 2002 to 2003. Ten weevils were caught during the year in these zones in 54,062 trap inspections, 0.00018 weevils per trap inspection. Nine of the ten were caught between October 11 and November 8. One was caught in early August. The temporal pattern of weevil capture suggests a low level reproductive population probably is present. This may have been the result of incomplete trapping in the CLCNM zone due to lack of access to all fields during 2003. New Mexico Department of Agriculture is working to rectify this problem.

Boll weevil eradication began in the PVNM zone (Carlsbad, Artesia, Roswell area) in 2000 and TBWEF began operations in the zone in 2003. Some 8,146 acres of cotton were planted in 2003. No acres were lost to weather. A total of 4,089 weevils were captured in 79,159 trap inspections or 0.0517 weevils per trap inspection. Population reduction from 2002 was 94.6%. Boll weevil captures averaged 23 per week in May, 54 per week in June, 31 per week in July, 112 per week in August, 191 per week in September 389 per week in October and 104 per week in November. Sixty four thousand one hundred forty-two acres were treated or 7.9 applications per planted cotton acre.

Eradication activities began in the EP/TP zone (El Paso, Pecos, Presidio area) in 1999. Weevil populations increased in the zone from 58 weevils captured from 111,619 trap inspections or 0.00052 weevils per trap inspection in 2002, to 1,321 weevils captured from 108,741 trap inspections or 0.0121 weevils per trap inspection in 2003. Thirteen hundred of the weevils caught were caught on approximately 200 acres planted at Presidio, TX on the Rio Grande River, 93 miles from the nearest cotton in the zone. This was the first cotton planted on the Texas side of the river at Presidio in 40 years. Some cotton has been continually planted on the Mexican side of the Rio Grande, however. A Mexican boll weevil and pink bollworm eradication program is operating to reduce boll weevil populations on the adjacent Mexican cotton, but is in its second year and has not yet reduced weevil populations to the extent that migration across the Rio Grande does not impact cotton on the Texas side of the river. Weevils were caught on the cotton planted at Presidio from the first week of July through the third week of November with the peak capture in early November, about three weeks after the cotton stalks on the Texas side had been plowed down. The remaining 21 weevils were caught near Acala in Culberson County. This infestation became apparent the week of September 15. Captures continued through the week of November 24 with the peak capture the week of November 3. In spite of the higher weevil captures in the EP/TP zone in 2003, the acreage treated was lower than in previous years. Treated acres in 2003 were 3,693 acres or 9.7% of the acres of cotton planted in the zone. In 2002 4,480 acres were treated or 11% of the acres planted to cotton in the zone. The isolation of the two areas where weevils were caught restricted weekly treatments to a relatively small number of acres each week. Though weevil catches were higher than expected, the small acreage involved, the isolation of these acres from others in the zone and the fact that the weevil population did not spread to other cotton in the zone kept treatment costs relatively low.

With the exception of the PVNM zone, all New Mexico zones operated by TBWEF and the EP/TP zone in Texas had weevil populations low enough to be considered for suppressed or functionally eradicated status at the end of 2003.

Texas Rolling Plains Zones

Strong progress in boll weevil eradication was made in the 387,811 acre NRP zone (Clarendon, Childress, Paducah, Vernon area), which began eradication in 1999. Very little weather related loss of cotton plantings occurred in 2003 in the NRP zone. From the early season through the mid-season the Wellington and Turkey areas had weevil higher weevil catches. Through the first week of September, 18 weevils had been caught in the Wellington district and 9 had been caught in the Turkey district. Later in the fall, 31 weevils were trapped in the Jayton district and 4 were caught in the Vernon district. The late season catches in the Jayton District seemed to fit the pattern of movement from the St. Lawrence area, and those at Vernon appeared to be associated with movement of modules of cotton from Oklahoma and movement of harvest equipment into the zone from other areas. By the end of the season, 80 weevils had been caught in 1,578,776 trap inspections or 0.000051 weevils per trap inspection in the zone. This was a 97.2% reduction in the numbers of boll weevils trapped from 2002 to 2003. A total of 39,900 acres were treated in 2003. Treated acres were 10.3% of the acreage planted to cotton in the zone.

The 571,246 acre RPC zone (Snyder, Colorado City, Abilene, Stamford, Munday area) began eradication in 1996. It was affected by weevils migrating into the zone from the St. Lawrence zone and to a much lesser extent by weevils being moved into the zone on equipment in 2003. A total of 7,404 weevils were captured from 1,700,189 trap inspections or 0.0044 weevils per trap inspection. In spite of the weevils moving into the zone, weevil populations were reduced by 48.8% from 2002 to 2003. Captures by district in 2003 were as follows: Colorado City 5,726, Snyder 1,583, Rotan 55, Haskell 34, and Stamford 6. The majority of the captures were made after the first week of September. By that date only 402 weevils had been caught in the zone, 5.4% of the total captured for the year. Treatments were applied to 510,190 acres or 89% of the acreage planted to cotton in the zone.

The SRP zone (San Angelo, Ballinger area) has been in active eradication since 1994. In 2003 the zone was affected strongly by movement of boll weevils into the zone from the west and to a much lesser extent by weevils being moved into the zone on harvest equipment. No boll weevils were caught in the 210,682 acre SRP zone in 2003 until the first week of September. During September 3 boll weevils were caught. In October numerous weevil captures began to occur on the west side of the zone in fields nearest the St. Lawrence zone. A total of 63 weevils were caught in October. In November traps on the western side of the zone continued to catch boll weevils. November catches totaled 118 weevils and limited trapping in December produced two more weevils. For the season 186 weevils were caught in 290,136 trap inspections or 0.00064 weevils per trap inspection. A total of 48,891 acres were treated, 23% of the acres planted to cotton in the zone.

Both the SRP and the RPC zones have been declared functionally eradicated. The NRP zone has low enough weevil populations to be considered for suppressed or functionally eradicated status after the 2003 season.

Texas Blacklands Zones

The approximately 70,000 acre NBL zone (Waco, Waxahachie, Ennis, Paris area), has not entered active eradication because referenda held in December 2002 and 2003 have not passed. Boll weevil eradication program staff in Oklahoma reported that in both 2002 and 2003 boll weevils entered their state from NBL cotton. SBL trapping data support the belief that weevils are moving from NBL into the SBL zone increasing costs and slowing progress there.

The 96,075 acre SBL zone (Taylor, Bryan, Temple area) has been in active eradication since 2001. The zone has made good progress in reducing boll weevil populations. In 2003, 236,156 weevils were caught from 633,250 trap inspections or 0.356 weevils per trap inspection. Weevil populations were reduced 73.8% from 2002 and 97.4% from 2001, the diapause year. At the end of 2003 weevil populations were somewhat higher in the Bryan district, 0.51 weevils per trap inspection, and lower in the Marlin and Thorndale districts, 0.30 and 0.28 weevils per trap inspection, respectively. An average of 11.6 treatments per acre of cotton in the zone were made in 2003, down 37.6% from the previous year.

South Texas Zones

Eradication began in the UCB zone (Rosenburg, Wharton, Bay City, El Campo area) in 2002. In 2003 182,988 acres were planted to cotton in the zone. Though weevil populations remained high in the zone in 2003 at 3.34 weevils per trap inspection, they had been reduced by year end by 81.7% from the 18.22 weevils per trap inspection present in the zone during the 2002 diapause phase of the program. The Bay City district had the highest weevil populations in the zone at 4.90 weevils per trap inspection. Populations were lower in the El Campo and Rosenburg districts at 3.24 and 1.74 weevils per trap inspection, respectively. A 2003 hurricane and wet field conditions in both 2002 and 2003 contributed to the higher than desirable weevil populations. Treatments in the UCB averaged 16.3 applications per acre in the zone.

The ST/WG zone (Kingsville, Corpus Cristi, Victoria, Uvalde area) began eradication activities in 1996. For 2003 at year's end, 295,454 weevils were caught from 1,865,120 trap inspections or 0.158 weevils per trap inspection. This was not improved from trap captures in 2002. A hurricane and wet field conditions affected program activities in the Victoria district. Migration of weevils from the UCB and the Lower Rio Grande Valley continued to limit success in the Victoria, Kingsville and to some extent in the Robstown districts. The Uvalde district had good overwintering weevil survival from 2002 and wet conditions during critical periods in 2003. Weevils per trap inspection by district were as follows: Uvalde 0.457, Kingsville 0.432, Victoria 0.029, Robstown 0.053 and Sinton 0.0023. Treatments averaged 4.15 applications per acre in the zone in 2003, up from the previous year.

Summary

Overall, excellent progress has been made in recent years in the boll weevil eradication program in Texas. As in past years, program success was strong. Migration of boll weevils from areas with active weevil populations affected progress in several zones. Emphasis from all involved has focused on the need to have all areas of Texas and New Mexico in eradication programs. This is essential for completion of the program. Work has begun by the TBWEF Technical Advisory Committee on maintenance trapping plans. Cooperative work with USDA-FSA, USDA-ARS and Texas A&M is ongoing to improve early (pre-squaring) detection of cotton fields using remote sensing. Program personnel continue to work to strengthen the quality assurance program to improve program performance. And TBWEF continues to work with the Texas Department of Agriculture and the New Mexico Department of Agriculture to protect the progress that has been made in eradication.

The Texas Boll Weevil Eradication Program had a successful year in 2003. Weevil populations continued to be pushed lower in all but a few localized areas in which migrating weevils were present. In addition to the two zones previously declared functionally eradicated, seven zones have now reached boll weevil levels low enough to be considered suppressed or functionally eradicated. Through the leadership of our Board of Directors and Zone Steering/Advisory Committees, solid technical guidance

from the Technical Advisory Committee, and oversight from the Texas Department of Agriculture, we continue to make progress and move toward the day when the boll weevil is no longer present in Texas and New Mexico cotton fields.

Acknowledgments

The authors wish to thank the Board of Directors of the Texas Boll Weevil Eradication Foundation for the support and personal sacrifices they have made toward the goal of elimination of the boll weevil from Texas cotton. We deeply appreciate the selfless service of Chairman Woody Anderson, Vice Chairman Don Parrish, Secretary Weldon Melton, Treasurer John Inman, and members Larry Turnbough, Eddy Herm, Craig Shook, John Hunter, Kenneth Gully, Carey Niehues, Hilton Nolen, Donald Stolte, Vicki Davis Patchke, John Saylor, Ron Craft, Steve Patman, Mike Wright and Mark Morris.

We wish to thank the many producers who serve on our grower steering committees across the state; the many growers who support the program through maintaining good communications with program personnel and payment of their assessments and the grower organizations that provide leadership, support, program inputs and political support.

We thank state and federal legislators who have supported the program with legislative and financial assistance.

We thank Texas Department of Agriculture, Commissioner Susan Combs and the many dedicated TDA employees for essential program oversight and program support.

We are indebted to Bill Grefenstette, Osama El-Lissy, Gary Carpenter, Aaron Miller, Ken Pierce, Carolyn Sandoval, James R. Reynolds and others with USDA APHIS for their knowledge, guidance and assistance.

We thank Dr. James Coppedge, Dr. John Westbrook, Dr. Dale Spurgeon, Dr. Don Rummel, Dr. Jeff Slosser and many others with USDA-ARS and the state universities for their research that has provided the technical foundation for the program. Special thanks go to Dr. Jim Leser, Chairman of the TBWEF Technical Advisory Committee and committee members Mr. Osama El-Lissy, Dr. Ray Frisbie, Dr. Tom Fuchs, Dr. Jeff Slosser, Dr. Jim Leser, Dr. Roy Parker, Dr. Don Rummel, Dr. Robert Lemon, Dr. Frank Carter, Dr. James Boston and Mr. David Kostron for their diligent work in the area of technical program direction and oversight. Also we thank our many cooperating partners in Texas Cooperative Extension for their work in communicating program needs and goals to producers and others in the community.

Finally, we wish to thank the many people who have worked as employees of the Texas Boll Weevil Eradication Foundation. We thank you for your commitment to the program and for working the long hours every day until the job was done. We thank Edward Herrera, Johnny Justiss, Stanton Mote, Patrick Burson, DeAnn Yates, Barbara Jones, Wes Jones, Joey Hogan, Cleve Cleveland, Wil Baucom, Randal Schwartz and Darrell Dusek, the Zone Managers for 2003 operations, and the people they supervise in each of the sixteen zones now active in Texas and New Mexico. In addition, special thanks go to the Abilene based Headquarters staff for their hard work and commitment to the field staff and to Texas cotton growers.

References

Allen, C.T., L.W. Patton, L.E. Smith and R.O. Newman. 2001. Texas Boll Weevil Eradication Update. *In Proc. Beltwide Cotton Conf. National Cotton Council. Memphis, TN. 934-37.*

El-Lissy, O., Lindy Patton, Ray Frisbie, Tom Fuchs, Don Rummel, Roy Parker, Don Dippel, J.R. Coppedge, Gary Cunningham, Frank Carter, James Boston and Jack Hayes. 1998. Boll Weevil Eradication Update - Texas, 1997. *In Proc. Beltwide Cotton Conf. National Cotton Council. Memphis, TN. 1001-06.*

El-Lissy, O., Danny Kiser, Lindy Patton, Ray Frisbie, Tom Fuchs, Don Rummel, Roy Parker, Jeff Slosser, Don Dippel, J.R. Coppedge, Frank Carter, James Boston and Jack Hayes. 2000. Boll Weevil Eradication Update - Texas, 1999. *In Proc. Beltwide Cotton Conf. National Cotton Council. Memphis, TN. 1076-82.*

El-Lissy, O., F. Meyers, R. Frisbie, T. Fuchs, D. Rummel, R. Parker, D. Dippel, E. King, G. Cunningham, F. Carter, J. Boston and J. Hayes. 1997. Boll weevil eradication update - Texas, 1996. *In Proc. Beltwide Cotton Conf. National Cotton Council, Memphis, TN. 973-9.*

Hunter, W.D. and W.E. Hinds. 1905. The Mexican cotton boll weevil. U.S. Dept. of Agric. Bull. No. 51. pp. 181.

National Cotton Council of America. 1994. Boll Weevil Eradication: A National Strategy for Success. 6 pp.

Smith, L.E. C.T Allen, L.W. Patton, and R.O. Newman. 2002. Status of Boll Weevil Eradication in Texas. *In Proc. Beltwide Cotton Conf.* National Cotton Council. Memphis, TN.

Stavinoha, K.D. and L.A. Woodward. 2001. Texas Boll Weevil History. *In Boll Weevil Eradication in the United States Eds.* W.A. Dickerson, A.L. Brashear, J.T. Brumley, F.L. Carter, W.J. Grefenstette and F.A. Harris. Number Six, The Cotton Foundation Reference Book Series. The Cotton Foundation. Memphis, TN.

Table 1. Annual average weevils caught per trap inspection in active Texas boll weevil eradication zones.

Zone	1995	1996	1997	1998	1999	2000	2001	2002	2003
Texas									
SRP	7.87	2.03	1.52	0.04	0.0023	0.000091	0	0.000049	0.00064
RPC		16.99	11.52	0.69	0.14	0.028	0.000534	0.0086	0.0044
ST/WG		12.82	16.09	2.13	1.53	1.12	0.156	0.144	0.158
EP/TP					0.21	0.0093	0.000326	0.00052	0.0121
NRP					18.54	2.34	0.056	0.0019	0.000051
NWP					7.23	1.30	0.015	0.00091	0.00001
PB					9.99	0.42	0.0097	0.028	0.0142
WHP					18.20	0.68	0.021	0.0026	0.00017
NHP							0.89	0.0045	0.000021
SBL							13.68	1.36	0.356
SHP/C							1.16	0.0047	0.000036
UCB								18.22	3.34
New Mexico									
C/RNM							1.1	0.0037	0.000038
LC/CLC-							0.114	0.042	0.00018
PVNM							2.49	0.96	0.0517

Table 2. Annual average number of ULV malathion applications per acre.

Zone	1995	1996	1997	1998	1999	2000	2001	2002	2003
Texas									
SRP	8.90	4.55	7.60	1.42	0.64	0.01	0	0.087	0.23
RPC		5.42	6.89	1.62	3.12	1.52	0.15	0.91	0.89
ST/WG		4.93	4.62	5.57	6.24	8.05	4.80	2.92	4.15
EP/TP					3.42	0.96	0.14	0.11	0.097
NRP					9.21	9.11	2.22	0.53	0.103
NWP					5.85	7.36	1.57	0.30	0.013
PB					7.08	3.63	0.52	1.34	3.09
WHP					9.23	6.19	1.41	0.38	0.176
NHP							9.59	0.71	0.033
SBL							7.86	18.58	11.6
SHPC							6.83	1.08	0.087
UCB								9.71	16.3
New Mexico									
C/R							3.00	1.01	0.015
LC/CLC-							6.44	3.68	0.173
NM									
PVNM							8.6	8.7	7.9

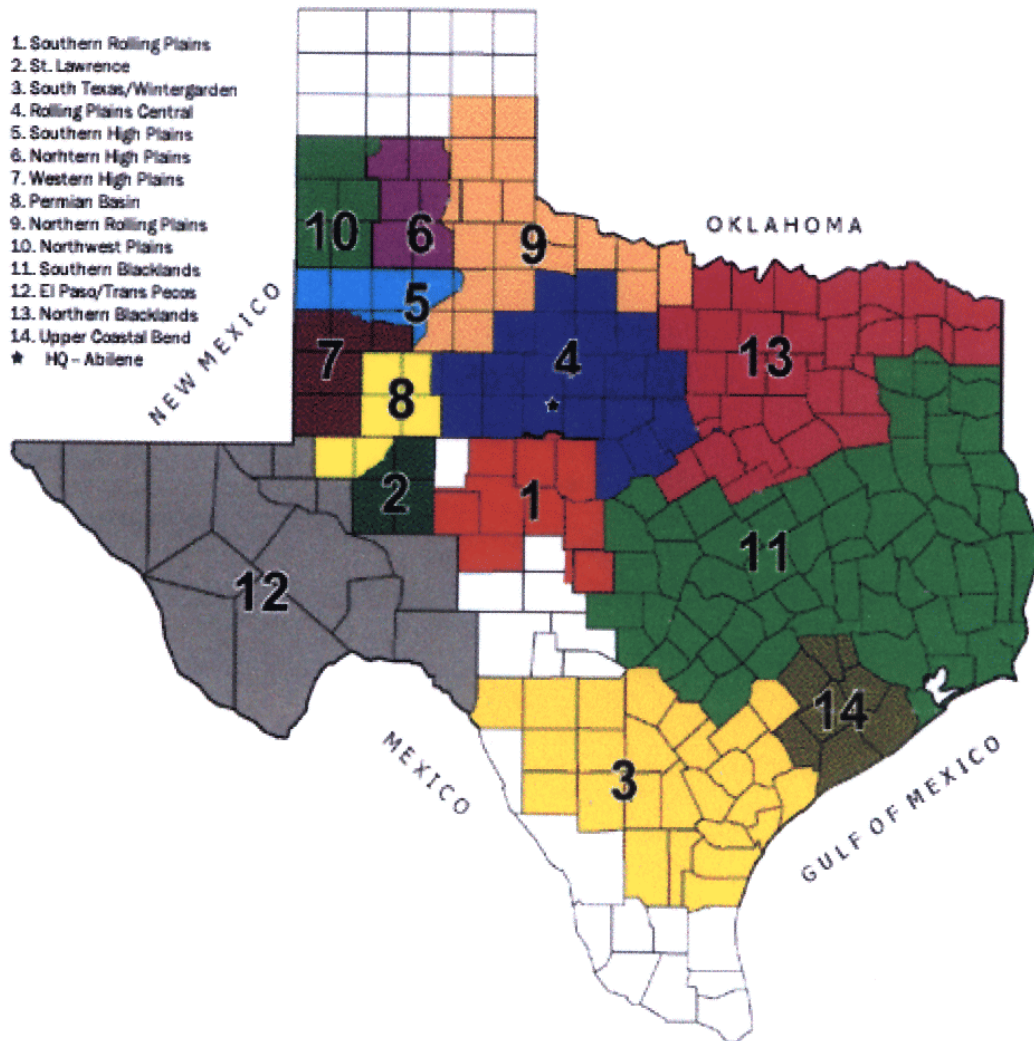


Figure 1. Boll weevil eradication zones in Texas.