PROGRESS REPORT - TEXAS BOLL WEEVIL ERADICATION PROGRAM

Charles T. Allen
Lindy W. Patton
Larry E. Smith
Richard O. Newman
Texas Boll Weevil Eradication Foundation
Abilene, TX

Abstract

The Texas Boll Weevil Eradication Foundation (TBWEF) completed a successful year in 2007. Program activities were carried out in Texas and eastern New Mexico cotton fields, 5,661,273 mapped cotton acres. The program was active in 16 Texas and 4 New Mexico zones. Reductions in boll weevil captures compared with 2006 were seen in all but two zones. The weevil captures in the South Texas/Winter Garden (ST/WG) zone were considerably higher than in 2006 and a late season migration of boll weevils into the Southern Rolling Plains (SRP) zone left that zone with an sizable increase in weevils at the end of the year compared with 2006.

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. The National Cotton Council estimates that since the boll weevil crossed the Rio Grande river about 1892 (Hunter and Hinds 1905) it has cost US cotton producers more than $13 billion (NCC 1994). Following successful experiences with cooperative boll weevil eradication experiments in Mississippi, Louisiana and Alabama in 1971 and a successful three-year boll weevil eradication trial in North Carolina and Virginia 1977-80, growers requested program expansion in other regions of the US beginning in 1983 (El-Lissy 1998). Active programs were established in the Southeastern and Southwestern US from 1983 through the mid-1990's. Producers put together programs that succeeded in eradicating the boll weevil from those regions. After 1994, boll weevil eradication programs moved into the center of the U.S. cotton belt. Programs were initiated in the mid-south, Oklahoma, New Mexico and Texas (Brashear and Brumley 2001).

The history of the boll weevil and the destruction it caused, farmers struggle each year for most of the 20th century to find a way to keep weevils from destroying their cotton crop and the eradication effort are well documented (Dickerson et al. 2001 and Allen 2008). It is a story of stunning losses, disappointment, tenacity, sacrifice and innovation. The eradication program in Texas and across the Cotton Belt is well on the way to successful elimination of the boll weevil, thereby bringing a happy ending to the story for the nation's cotton growers.

Records of the entry of Texas and Eastern New Mexico zones into boll weevil eradication programs and program retention referenda have been provided in previous Beltwide Cotton Conference Proceedings (Allen et al. 2006 and Allen et al. 2007). In 2007 several referenda and were held in Texas in 2007. The Northwest Plains (NWP) zone voted in February. Over 81 percent of those voting voted to continue the program. The Permian Basin (PB) zone voted in April. The vote in the PB zone was 87.2 percent in favor of continuing the program. A third referendum was held in the Northern Rolling Plains (NRP) zone. Eligible voters in the NRP voted to continue the program with 89.9 percent in favor of the measure. The passage of referenda in these three zones meant the program would continue on the 1,421,649 cotton acres in those zones, 25 percent of the cotton acreage in the state.

In recent years, boll weevil eradication has freed Texas cotton producers from economic damage by the boll weevil for the first time since the weevils got established in the state (1892 – 1905). Concurrently, the Texas cotton crops of 2004 and 2005 were the two largest crops on record. The 2006 crop was severely limited by drought, yet was still the fourth largest crop on record. The 2007 cotton crop received abundant rainfall and is on track to set another yield record. During the last four years Texas cotton production has changed the record books. These four crops have taken four of the top five places since cotton production records began being kept.

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

Rainfall was plentiful in Texas cotton producing regions in 2007. In southern and eastern areas rain was excessive during the summer months. During extended periods when fields were wet it was not possible to run all traps. Treatments were repeatedly washed from plants by the rains and the residual life of treatments was shortened by the continuing rains. In some areas boll weevils successfully colonized fields and successfully reproduced. Because of this large late season weevil captures occurred in some fields.

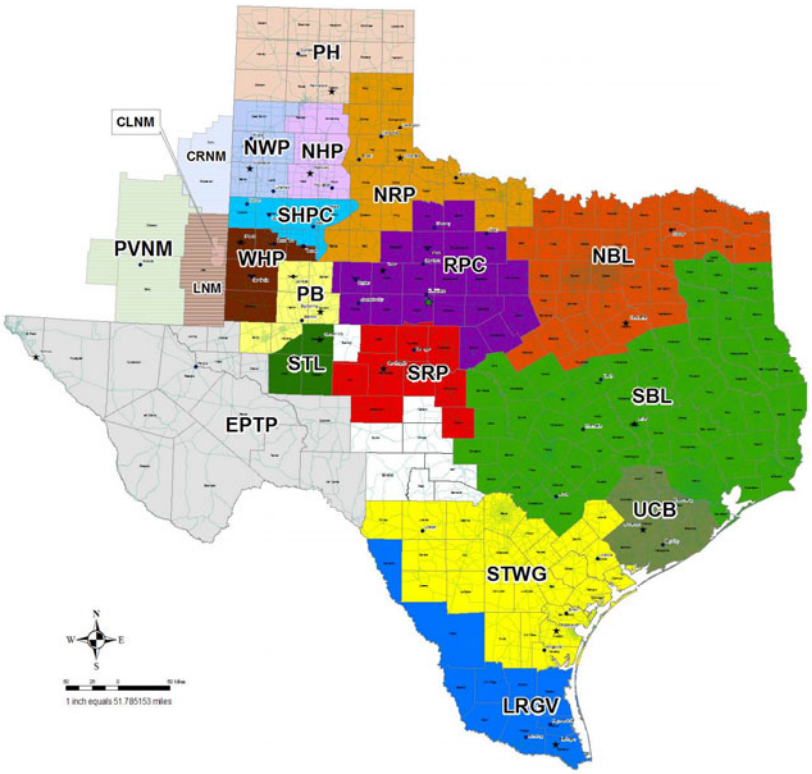

Figure 1. Boll weevil eradication zones operated by TBWEF.

West Texas Zones

The boll weevil eradication program in most of West Texas was very successful in 2007. The exception was the Southern Rolling Plains (SRP) zone which experienced a large late season migration into the zone from the south. No weevils had been caught in the SRP zone prior to the passage of tropical storm Erin at the end of August. However, after Erin passed a total of 6,062 weevils were caught in the zone between early September and mid-December. The other ten West Texas zones caught a total of only 292 weevils, down from 4,494 weevils caught in these zones in 2006. No weevils were caught in the El Paso/Trans Pecos (EP/TP), Northern High Plains (NHP), NRP, NWP, Panhandle (PH) or Western High Plains (WHP) zones, a total of over 2 million cotton acres. And, no weevils were

caught in the 31,000 cotton acres in the four eastern New Mexico zones. Only one weevil was caught in the 1,198,282 cotton acres in the Southern High Plains/Caprock (SHP/C) zone in 2007. For the eleven zones in the region, however, 6,354 weevils were caught in 2007 compared with 4,524 weevils caught in the region in 2006.

In 2007, the 4.9 million cotton acres in the West Texas region had 449,748 cumulative acres treated for boll weevil eradication. A total of only 261,685 acres were treated in the region in 2006. In order to control migrating weevils, 390,093 cumulative acre treatments were made in the SRP zone alone in 2007.

South and East Texas Zones

Excessive rainfall fell in Texas' Southern and Eastern zones in 2007. The rain kept fields muddy and washed off insecticide treatments for six to eight consecutive weeks in June, July and August. The continual rains negatively affected boll weevil eradication program efforts in the five of the zones in this region. In spite of the rain, overall, weevil captures were reduced by 41 percent from 2006 in these zones. A total of 2,637,777 weevils were caught in the South and East Texas zones in 2007 compared with 4,499,920 the previous year. Compared with 2006, the number of weevils captured was reduced by 93 percent in the Northern Blacklands (NBL) zone, by 72 percent in the Upper Coastal Bend (UCB) zone, by 62 percent in the Lower Rio Grande Valley (LRGV) and by 6 percent in the Southern Blacklands (SBL) zone. In the South Texas/Winter Garden (ST/WG) zone, however, the number of weevils captured in 2007 increased over 12 fold compared with the captures in 2006. Captures increased in the Sinton, Robstown, Kingsville and Uvalde districts in the ST/WG zone with the highest captures in a few fields near Hondo. In spite of the increased captures in the ST/WG zone, 65 percent of the fields in the zone caught no weevils during 2007. And boll weevil captures at the end of the year were 92 percent lower than when the program began in the zone.

The zones with higher percentages of fields that caught no weevils generally experienced greater boll weevil population increases. Since triggering fields in wet weather requires reliance on historical trap capture data, those zones with wide-spread early season weevil catches had a greater percentage of the acreage treated each week as fields were triggered on past weevil captures during the rainy weather. Weevils were not as likely to become established in these fields and zones with a higher percentage of fields being treated each week tended to make better progress.

Twenty-five percent fewer cumulative acre treatments were made in 2007 compared with 2006. This is largely explained by the 590,065 acre reduction in cotton acreage in the South and East Texas zones in 2007. Forty-four percent fewer acres were planted in 2007 compared with 2006. NBL had 60 percent fewer acres treated followed by UCB, SBL and LRGV with 41, 38 and 11 percent fewer acres treated, respectively. Treated acres increased in ST/WG by 73 percent.

State-wide Totals

State-wide, weevil captures were reduced 41 percent. Weevil captures declined from 4,504,444 in 2006 to 2,646,138 in 2007. Treatments were down 21 percent from 6,546,004 cumulative acres treated in 2006 to 5,151,894 in 2007.

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

Zone	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
TX													
SRP	7.87	2.03	1.52	0.04	0.0023	0.00009	0	0.00005	0.00064	0.0013	0.0074	0.00008	0.022
RPC		16.99	11.52	0.69	0.14	0.028	0.00053	0.0089	0.0044	0.012	0.0031	0.00005	0.00014
ST/WG		12.82	16.09	2.13	1.53	1.12	0.16	0.144	0.16	0.67	0.21	0.045	1.08
EP/TP					0.21	0.0093	0.00032	0.00052	0.012	0.00009	0.00029	0	0
NRP					18.54	2.34	0.056	0.0019	0.00005	0.00025	0.00015	0.000002	0
NWP					7.23	1.30	0.015	0.0009	0.00001	0	0.000003	0	0
PB					9.99	0.42	0.0097	0.028	0.014	0.026	0.017	0.00044	0.00016
WHP					18.20	0.68	0.021	0.0026	0.00017	0.00034	0.0004	0.00001	0
NHP							0.89	0.0045	0.00002	0.00002	0.000028	0.000003	0
SBL							13.68	1.36	0.356	0.52	0.19	0.099	0.24
SHP/C							1.16	0.0047	0.00004	0.00013	0.00029	0.00003	0.0000016
UCB								18.22	3.34	1.59	0.29	0.23	0.11
PH										0	0	0	0
STL										3.23	0.26	0.00625	0.00038
NBL											11.47	0.41	0.086
LRGV											16.12	2.97	2.66
NM													
C/RNM							1.1	0.0037	0.00004	0	0.00006	0	0
CLCNM						1.83*	0.11*	0.029	0.00009	0	0.00035	0	0
LCNM						1.83*	0.11*	0.046	0.00019	0.0001	0.00021	0	0
PVNM							2.49	0.96	0.05	0.0026	0.00005	0	0

* Data not separated between zones

Table 2. Annual average number of ULV malathion applications per acre[1].

Zone	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
TX													
SRP	8.90	4.55	7.60	1.42	0.64	0.01	0	0.087	0.23	0.79	0.91	0.033	1.84
PC		5.42	6.89	1.62	3.12	1.52	0.15	0.91	0.89	1.37	0.44	0.025	0.024
ST/WG		4.93	4.62	5.57	6.24	8.05	4.80	2.92	4.15	5.39	4.02	1.14	3.31
EP/TP					3.42	0.96	0.14	0.11	0.097	0.02	0.06	0	0
NRP					9.21	9.11	2.22	0.53	0.103	0.23	0.09	0.0008	0
NWP					5.85	7.36	1.57	0.30	0.013	0	0.002	0	0
PB					7.08	3.63	0.52	1.34	3.09	2.37	1.66	0.17	0.017
WHP					9.23	6.19	1.41	0.38	0.176	0.35	0.50	0.00035	0
NHP							9.59	0.71	0.033	0.06	0.03	0.001	0
SBL							7.86	18.58	11.6	11.05	8.39	6.32	6.43
SHP/C							6.83	1.08	0.087	0.24	0.33	0.0099	0.00017
UCB								9.71	16.3	16.79	11.09	13.24	12.01
PH										0	0	0	0
STL										7.02	4.52	0.60	0.22
NBL											9.40	9.97	7.89
LRGV											4.37	4.12	9.47
NM													
C/RNM							3.00	1.01	0.015	0	0	0	0
LCNM						9.3*	6.03*	2.63	0.014	0	0.59	0	0
LCNM						9.3*	6.03*	5.16	0.22	0.016	0.24	0	0
PVNM							8.64	8.17	7.83	1.46	0.31	0	0

[1] Mapped cotton acres.
* Data not separated between zones.

Summary

Texas cotton producers have set all time production records in three of the last four years. And during the last four seasons the crops produced have been among the top five crops ever produced in the state. Boll weevils have been reduced to below economic damage levels in all areas of the state. This has undoubtedly been one of the key factors that has enabled growers to produce these record crops. The four New Mexico and eleven West Texas zones are approaching program completion. More work will be needed to complete the job in the Southern and Eastern zones.

Acknowledgements

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 eradication 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 Keith Watson, Larry Turnbough, Keith Bram, Eddy Herm, Craig Shook, John Norman, Kenneth Gully, Carey Niehues, Hilton Nolen, Neil Walters, Joe Alspaugh, John Saylor, Ron Craft, Steven Beakley, Mike Wright, Mark Morris and Sam Simmons.

We wish to thank the many producers who serve on our grower steering committees and the thousands of growers who support the program by maintaining good communications with program personnel and payment of their assessments. We are indebted to the grower organizations that provide communications with growers, 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 Todd Staples and the many dedicated TDA employees, for essential program oversight, administration of the stalk destruction program, conducting necessary referenda, conducting the Texas boll weevil quarantine and for other program support. We thank the New Mexico Department of Agriculture for their assistance and support with the program in New Mexico zones operated by TBWEF.

Also, we are indebted to Aaron Miller, Philip Garcia, Gary Carpenter, Bill Grefenstette, Osama El-Lissy, and other USDA APHIS personnel for their knowledge, guidance and assistance.

Additionally, we thank Dr. James Coppedge, Dr. John Westbrook, Dr. Dale Spurgeon, Dr. Don Rummel, Dr. Jeff Slosser and many others with USDA-ARS and Texas A&M for the research base that has provided the technical foundation for the program. Special thanks go to Dr. Tom Fuchs, Chairman of the TBWEF Technical Advisory Committee and committee members Osama El-Lissy, Dr. Ray Frisbie, Dr. Chris Sansone, Dr. Roy Parker, Dr. Don Rummel, Dr. Robert Lemon, Dr. Frank Carter, Dr. James Boston and David Kostroun for their 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 them for their commitment to the program and for working the long hours each day until the job was done. We thank Edward Herrera, Lyn Vandiver, Johnny Aten, Michael Hester, Patrick Burson, DeAnn Yates, Barbara Jones, Wes Jones, Filemon Guzman, Larry Broyles, Kiro Guerra, Cleve Cleveland, Wil Baucom, Randal Schwartz and Darrell Dusek, the Zone Managers for 2007 operations; and JoAnn Long, Rusty Bennett, Josh Osborn, Mike Gray and Joe Girndt, Assistant Zone Managers in 2007. We thank the full time and seasonal staff that work in the sixteen Texas and four New Mexico zones operated by TBWEF for their hard work and dedication to the program. In addition, we thank the Abilene based Headquarters staff for their commitment to the field staff and to Texas cotton growers.

References

Allen, C.T. 2008. Boll Weevil Eradication – An Areawide Pest Management Effort. *In* Areawide Pest Management. G. Cuperus, N. Elliot and O. Koul *(eds.).* CABI, Wallingford, UK (in press).

Allen, C.T., L.E. Smith, L.W. Patton and R.O. Newman. 2007. Boll weevil eradication: the Texas program. *In* Proc. Beltwide Cotton Conf. D.A. Richter and M. Huffman *(eds.).* National Cotton Council. Memphis, TN.

Allen, C.T., L.E. Smith, L.W. Patton and R.O. Newman. 2006. Texas Boll Weevil Eradication Update. *In* Proc. Beltwide Cotton Conf. D.A. Richter and M. Huffman *(eds.).* National Cotton Council. Memphis, TN.

Dickerson, W.A., A.L. Brashear, J.T. Brumley, F.L. Carter, W.J. Grefenstette and F.A. Harris *(eds.).* 2001. Boll Weevil Eradication in the United States Through 1999. Number Six, The Cotton Foundation Reference Book Series. The Cotton Foundation. Memphis, TN 627 pp.

Brashear, A.L. and J. Brumley. 2001. The Evolution of Program Management, USDA/Grower Responsibilities and Funding in the Southeastern Boll Weevil Eradication Program. *In* Boll Weevil Eradication in the United States. W.A. Dickerson, A.L. Brashear, J.T. Brumley, F.L. Carter, W.J. Grefenstette and F.A. Harris *(eds.).* Number Six, The Cotton Foundation Reference Book Series. The Cotton Foundation. Memphis, TN: 77-100.

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. P. Dugger

and D.A. Richter *(eds.)*. 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.

Stavinoha, K.D. and L.A. Woodward. 2001. Texas Boll Weevil History. *In* Boll Weevil Eradication in the United States. W.A. Dickerson, A.L. Brashear, J.T. Brumley, F.L. Carter, W.J. Grefenstette and F.A. Harris *(eds.)*. Number Six, The Cotton Foundation Reference Book Series. The Cotton Foundation. Memphis, TN: 451-502.

Texas Agricultural Statistics Service. http://www.nass.usda.gov/Statistics_by_State/Texas/index.asp