INSECT MANAGEMENT IN THE TEXAS ERADICATION ZONES: A PROGRESS REPORT

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Abstract

This paper discusses the climatic conditions and insect pest management in active boll weevil eradication zones in Texas during 1998. Drought conditions existed in each of the three boll weevil eradication zones which affected insect management. Results of a survey of private consultants in the South Texas-Winter Garden zone which reflect the impact of the eradication efforts on management of insect pests in that zone are presented.

Weather conditions, especially rainfall and temperatures, set the stage for both crop conditions and insect management. Multiple applications of most insecticides inside or outside eradication zones reduce natural enemies and increase the risks of secondary pests. It is generally agreed by pest managers that ULV malathion used area wide in eradication programs reduces natural enemies more than alternative insecticides used by growers on a field by field basis. This tends to result in more secondary pest problems and alters management for other pests. However, eliminating the boll weevil as a key pest generally allows other pests to be managed much more easily and effectively using good IPM strategies.

Introduction

The year 1998 will be long remembered by agricultural producers in Texas for both droughts and floods. The drought of 1998 is expected to cost Texas agriculture more than $2.1 billion in direct economic losses. That translates into projected economic losses for the Texas economy of about $5.8 billion. The 1998 cotton crop is one of the smallest the past 20 years with direct producer losses estimated at $659 million (Texas Department of Agriculture).

The three areas in active boll weevil eradication zones were among the areas hardest hit by drought conditions. Each of these areas are primarily rainfed with a relatively low percentage of acres irrigated. Estimated planted and harvested acres of cotton in the three zones are shown on Table 1. While the South Texas-Winter Garden Zone (ST-WG) harvested almost all of the acres planted to cotton, yields were considerably lower than normal. The Southern Rolling Plains Zone (SRP) harvested approximately 70% of the acres planted while the Rolling Plains Central Zone (RPC) harvested approximately 22% of the acres planted to cotton (Osama El-Lissy, Texas Boll Weevil Eradication Foundation, personal communication). Much of the acreage that was not harvested was destroyed due to drought conditions. Temperatures and rainfall compared to normal during the five main cotton producing months in the active zones are shown on Table 2. The months used for these calculations were April through August in the ST-WG zone and May through September in the SRP and RPC zones. Most fields in the ST-WG zone had a full profile of water at planting time but received little measurable rainfall until August. Both the SRP and RPC were very dry during the fall and winter and many areas had inadequate moisture for planting in May or June.

Temperature, rainfall and cotton acreage data are shown to depict the type of cotton growing conditions in the active eradication zones during 1998. Temperatures were considerably above normal and rainfall 33-60% of normal. Weather and crop conditions set the stage for insect management and are the parameters in which insect management takes place. These must be understood and appreciated in order to understand the impacts of the boll weevil eradication program on management of pests other than boll weevils.

Rolling Plains Central Zone (RPC)

The RPC zone had a very difficult year as evidenced by an estimated 22% of planted acres being harvested. Many growers were never able to get an acceptable stand established and were not willing to input any costs for insect management. The remaining information from this zone will be primarily from a few areas that obtained sufficient rainfall to produce a crop plus irrigated acres which comprise less than 10% of planted acres in this zone. This zone was in the first full season of boll weevil eradication after having a fall diapause program only in 1996 and 1997. The information presented on management of insects other than boll weevils is based upon personal observations, discussions with producers and other Extension and research entomologists and information from industry representatives and private scouts. There are few private consultants in this zone.

Most growers and pest managers believe that the Boll Weevil Eradication Foundation (BWEF) did an effective job of controlling boll weevils. The number of applications needed to control boll weevils in season were low due to the effectiveness of those applied plus weather which resulted in high natural mortality of boll weevil grubs in infested squares. Pest managers agreed that where ULV malathion (Fyfanon®) was used for control of overwintered boll weevils, especially where more than one application was used, natural enemies were reduced dramatically. Essentially all fields treated for overwintered boll weevils in this zone were treated by theTBWEF with ULV malathion. Although alternative insecticides applied at the

Reprinted from the *Proceedings of the Beltwide Cotton Conference*
Volume 2:824-828 (1999)
National Cotton Council, Memphis TN

growers expense were allowed, few chose to use this alternative.

Most pest managers thought that bollworm populations were about the same as they would have been had conventional treatments for overwintered boll weevils been used by growers although one area did experience higher than normal bollworm and tobacco budworm populations. Samples taken in approximately 140 fields by personnel with the TBWEF indicated that bollworm populations were similar in fields treated with ULV malathion and untreated fields (Danny Kizer, TBWEF, personal communication). Several pest managers reported higher aphid populations in areas where several applications of ULV malathion were used. Beet armyworm populations were higher than normal in this area as well as in the remainder of the South Plains outside the eradication program. Little difference was noted in fields treated with ULV malathion versus untreated fields. Fields heavily treated with any broad spectrum insecticide tend to have higher beet armyworm and aphid populations. The only unusual pest reported by pest managers was the whitefly, probably the greenhouse whitefly, and only at levels high enough to be noticed.

South Texas Winter Garden Zone (ST-WG)

This zone was also in its first full season eradication program in 1998 after fall diapause programs only in 1996 and 1997. Drought conditions unquestionably impacted not only cotton production but also insect pest and natural enemy dynamics. The information presented for this zone is based primarily upon results of a survey of 15 private consultants who manage cotton in the zone. I conferred with several Extension entomologists in the zone who agreed, in general, with the observations of the private consultants surveyed.

Many growers in the ST-WG zone chose to reduce cotton acreage during the first full season of boll weevil eradication. Sixty seven percent of the clients of 15 private consultants in this area reduced cotton acreage presumably to reduce risks associated with the first year of eradication (Figure 1). All but one of the consultants reported that boll weevil control by the TBWEF was effective, with one indicating that due to mistimed applications for control of overwintered boll weevils and resultant season long populations in several fields, it was too early to judge the effectiveness of controls (Figure 2).

Although figures from the TBWEF indicate that only 3% of the accumulative acreage treated for boll weevils in this zone season long were treated with insecticides other than ULV malathion, 93% of the consultants reported that one or more of their clients used alternative insecticides for overwintered boll weevil control (Figure 3). Vydate® (oxamyl) was the alternative insecticide used most frequently with lesser amounts of Guthion® (azinphosmethyl) and Thiodan® or Phaser® (endosulfan) used (Figure 4).

Eighty percent of consultants reported that ULV malathion applications affected the way that they managed pests (Figure 5) primarily as a result of these treatments having a more detrimental impact on natural enemies of pests than material normally used (Figure 6).

Only 43% of consultants thought that ULV malathion applied for overwintered boll weevils provided effective fleahopper control (Figure 7). Two thirds of those who indicated that fleahopper control was not effective cited timing of applications to be the primary reason for lack of effective control (Figure 8).

All of the consultants (100%) indicated that treatments applied by the TBWEF for boll weevil control caused increased secondary pest problems with aphids, spider mites and whiteflies most often mentioned (Figure 9). Sixty percent of consultants reported that ULV malathion treatments resulted in higher bollworm and tobacco budworm populations with the remaining 40% reporting that problems were similar to those when alternative treatments were used (Figure 10).

When asked to compare the number of insecticide applications used in 1998 to the average of the past 5 years, consultants reported that treatments for fleahoppers were slightly fewer but more treatments were used for aphids and beet armyworms (Figure 11). The average number of treatments for beet armyworms were, however, relatively low. Drought conditions undoubtably did impact the number of applications used for insect management. Applications for bollworms and tobacco budworms are not reported due to interactions with the unusual weather conditions.

Southern Rolling Plains Zone (SRP)

The Southern Rolling Plains began its eradication program in the fall of 1994 followed by four years of season long eradication efforts. Populations of boll weevils are very low and relatively few applications of insecticides (averaged less than two) were applied for boll weevil control during 1998. While drought conditions undoubtably influenced insect pest populations, even irrigated cotton had few insect problems. The average cost for insecticides on cotton in the Southern Rolling Plains was estimated at less than $3.00 per acre. An estimated 30-40% of the cotton harvested in this zone was Bt cotton with an estimated 75-80% of irrigated cotton being planted in Bollgard® varieties. Very few bollworm and essentially no tobacco budworm problems were noted. Aphids were a significant problem primarily in the few fields treated with pyrethroids for bollworm control during July. None of the fields sustained economic damage from boll weevils.

The Texas Pest Management Association has conducted an IPM program in Runnels and Tom Green counties for many years. These two counties represent the majority of the cotton acreage grown in the SRP. Only two of approximately 150 fields in the IPM program, most of which were irrigated, were treated with insecticides other than seed treatments and treatments applied for boll weevils by the TBWEF. Each of these two fields received one application for aphids in September. No other insecticide treatments were applied to any program fields. TPMA scouts did not find any live boll weevils in any of the program fields during the 1998 season. One to two percent punctured squares were founds in a few fields in August.

Conclusions

Weather conditions, especially rainfall and temperatures, set the stage for both crop conditions and insect management. These conditions set the parameters in which insect management takes place. Multiple applications of most insecticides used inside or outside of boll weevil eradication zones reduce natural enemies and increase the risks of secondary pests. The higher the percentage of acreage treated in eradication programs, the greater the risks. It is generally agreed by pest managers that ULV malathion used for boll weevil control in eradication programs, especially if used multiple times and on an area wide basis, reduces natural enemies more than alternative insecticides used by growers on a field by field basis. This tends to result in more secondary pest problems and causes pest mangers to alter management for other pests. Growers should expect secondary pest problems during the first two full years of eradication. However, eliminating the boll weevil as an economic pest allows pest managers to manage most other pests much more easily allows IPM strategies to be much more effective.

Acknowledgment

The author gratefully acknowledges the help of private agricultural consultants in the South Texas-Winter Garden zone, Dr. Roy Parker, Dr. Noel Troxclair, Dr. Chris Sansone, Rick Minzenmayer, Stephen Biles, Dr. J. E. Slosser, Emory Boring III, Jennifer Schwertner, Mary Langford, Nick Johnson, Danny Kizer and Osama El-Lissy who provided information for this paper.

Table 1. Estimated planted and harvested cotton acres in three active eradication zones in Texas, 1998.

Zone	Acres Planted	Acres Harvested
Southern Rolling Plains	200,000	140,000
Rolling Plains Central	650,000	140,000
S. Texas/Winter Garden	300,900	300,000

Source: Texas Boll Weevil Eradication Foundation

Table 2. Weather data from three active boll weevil eradication zones in Texas, 1998.

Zone	Temperatures (F) departure from normal [a]	Rainfall (in.) % of normal[a]
Southern Rolling Plains	+3.5	60
Rolling Plains Central	+3.9	33
S. Texas/Winter Garden	+6.1	33

[a] Temperatures and rainfall represent average departure from normal during May through September in SRP and RPC and April through August in ST/WG zones. Source National Weather Service San Angelo (SRP), Abilene (RPC) and Corpus Christi, Tx. (ST/WG).

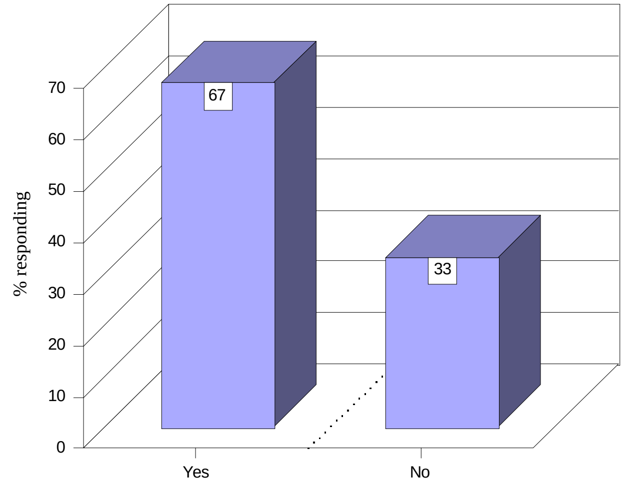

Figure 1. Did your clients reduce acreage due to BWEP?

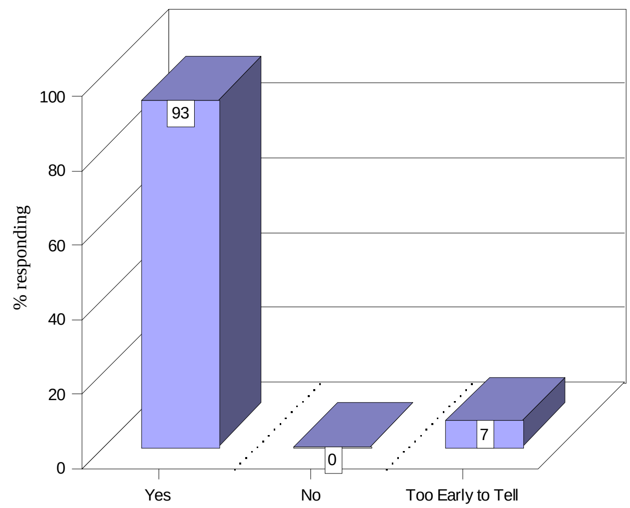

Figure 2. Did ULV malathion applied by TBWEF effectively control boll weevils?

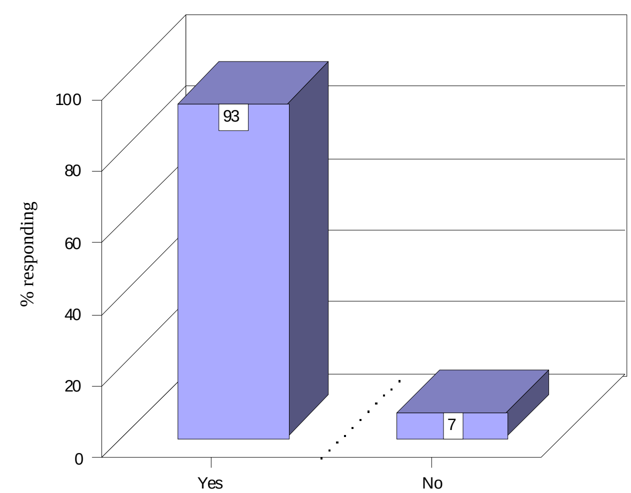

Figure 3. Did any of your clients use alternate treatments for overwintered boll weevil control?

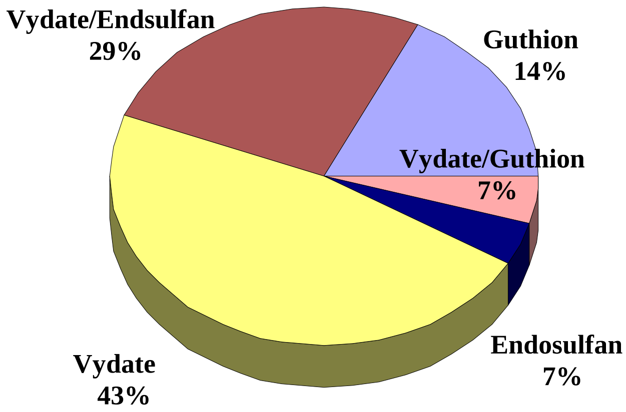

Figure 4. Which alternative insecticides were used?

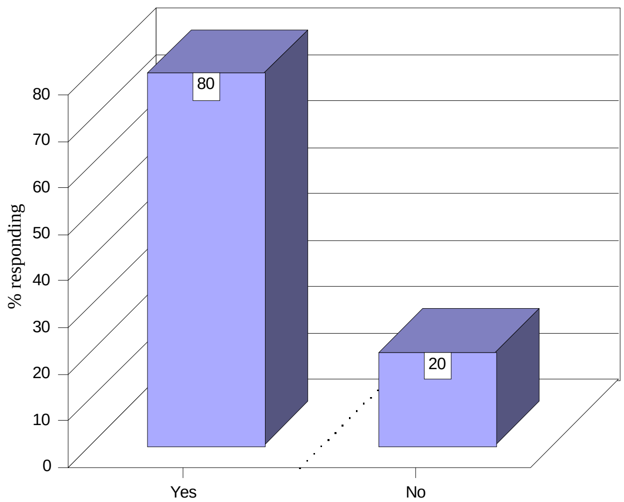

Figure 5. Did BWEF treatments effect the way you managed pests?

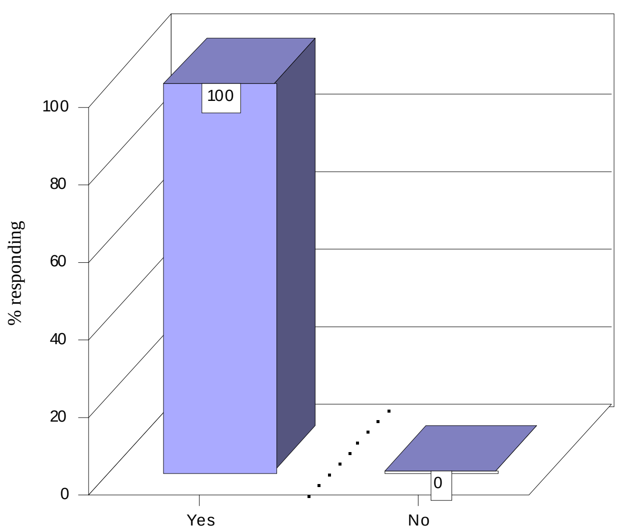

Figure 6. Did ULV malathion applied by the BWEF reduce natural enemies more than treaments you usually use?

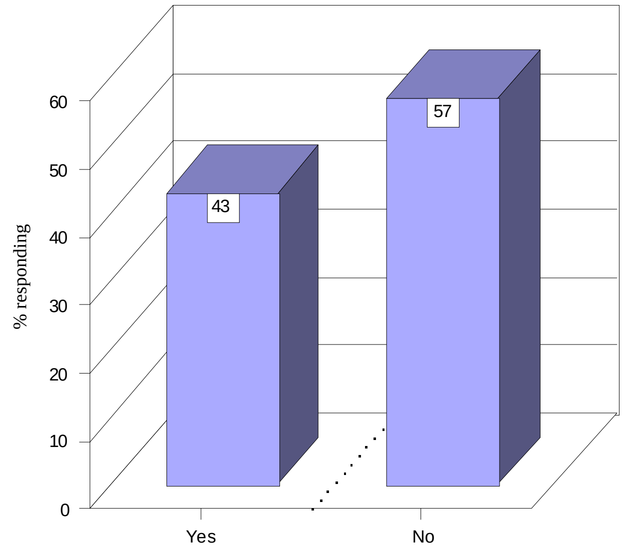

Figure 7. Did ULV malathion effectively control fleahoppers?

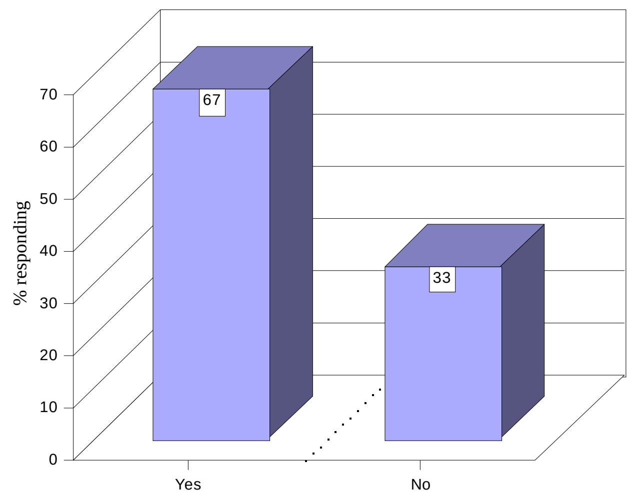

Figure 8. Was timing the primary reason for lack of fleahopper control?

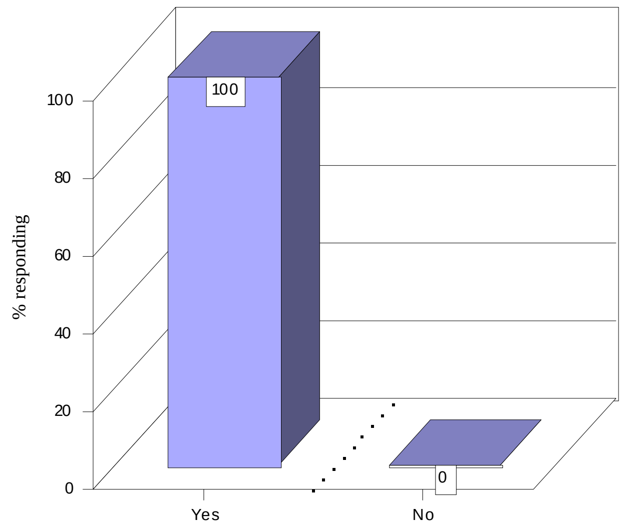

Figure 9. Did ULV malathion applied by the BWEF trigger secondary pests?

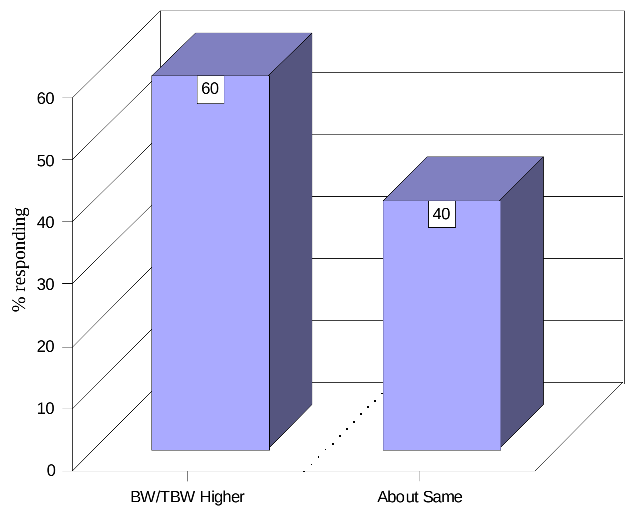

Figure 10. How did ULV malathion impact bollworms and tobacco budworm populations compared to conventional treatments?

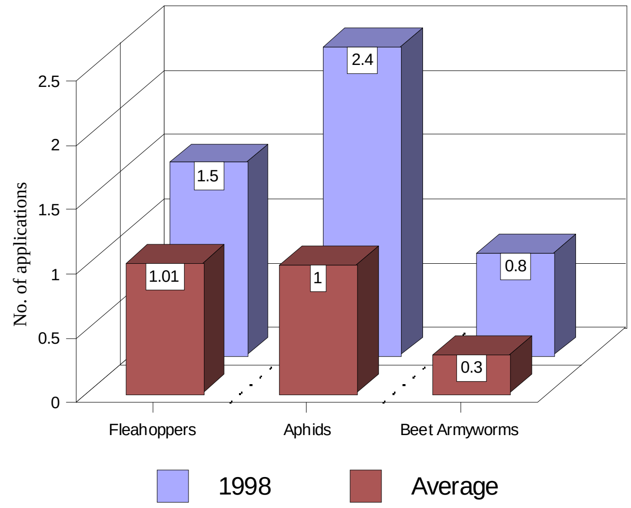

Figure 11. Number insecticide applications used for various pests in 1998 compared to 5 year average?