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Boll Weevil Management in the Texas High Plains

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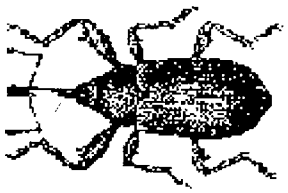


Cotton Boll Weevil

Anthonomus grandis Boheman

Entomology Fact Sheet

Texas High Plains Boll Weevil Task Force

INTRODUCTION

During the past four years boll weevils have spread dramatically in the Texas High Plains cotton growing area. The appearance of established boll weevil infestations in previously uninfested cotton acreage in numerous counties presents a threat to High Plains cotton production. The current boll weevil incursion is believed to be the result of two major factors: 1) the introduction of a large acreage of boll weevil winter habitat in the form of Conservation Reserve Program (CRP) grasslands; and 2) five consecutive mild winters which allowed boll weevils which migrated into the area to survive the winter in large numbers and infest cotton the following spring and summer.

The cooperative High Plains Boll Weevil Control Program was greatly expanded in 1995 but was discontinued in 1997. Now it is even more important that individual cotton producers adopt management practices to help prevent economic damage on their farms and reduce the spread of boll weevil infestations. The following cultural and chemical management techniques for the boll weevil are discussed in this report:

Cultural Controls:

Management of Overwintering Boll Weevil Habitat. The destruction or modification of boll weevil overwintering habitat can greatly reduce the numbers of diapausing boll weevils which survive the winter.

Managing Cotton for Earliness. Management of the crop to shorten the days from planting to harvest is an important boll weevil suppression tool. Short season production practices reduce the time that cotton is vulnerable to insect attack. Early crop termination removes late season food sources necessary for the development of diapausing boll weevils. Modern harvest-aid chemicals allow early crop termination and their use is an important part of the short season management practice.

Insecticides can be added to defoliants or desiccants to destroy diapausing boll weevils present in the field at the time of crop termination.

Chemical Controls:

Use of "Pheromone Trap Index System" and Control of Overwintered Boll Weevils. Pheromone traps are very effective in detecting overwintered boll weevils before the onset of squaring in cotton. Use pheromone traps and the "trap index system" to determine the need for applying insecticide for the control of overwintered boll weevils. When insecticide applications are properly timed to prevent significant egg laying by overwintered boll weevils, the need for control later in the season may be greatly reduced.

Mid- to Late Season Boll Weevil Control. Prior to peak bloom, control adult boll weevils with insecticide when punctured square counts average 20% or more. After peak bloom, the treatment threshold is 25-30% punctured squares. When plants approach cut out, small boll damage should be used as the criteria for further insecticide applications.

OVERWINTERING HABITAT MANAGEMENT

The boll weevil is known to overwinter in a variety of habitats outside cotton fields. The best sites are those area where large amounts of deciduous leaf litter accumulate such as under elm trees, western soapberry, pecan, hackberry, sand shinnery oak and in windbreaks (shelterbelts). Broadleaf trees and other vegetation in parks and in towns also appear to be well suited for successful overwintering boll weevil survival. However, there are many other types of less favorable habitat, and these can be of significant importance to survival, especially during mild winters. These less favorable habitats include mesquite/grass pastures, willow thickets in lake bottoms, salt cedar, fence rows overgrown with woody vegetation, Conservation Reserve Program grasses, and abandoned homesteads which have become overgrown with vegetation. Environmentally sensitive areas also can harbor overwintered boll weevils, and these areas include leaf litter in creek and river bottoms and wildlife refuges. Many of these overwintering areas can be managed to eliminate or reduce leaf litter where boll weevils survive.

Management of Windbreaks. Windbreaks range in width from single or double rows to ten or more rows of trees. These tree rows occur around farmsteads or adjacent to cultivated fields. Because these trees provide needed wind protection for adjacent buildings and fields, management is aimed at reduction of accumulated leaf litter. For existing windbreaks, interior tree limbs should be pruned high enough to allow passage of a tractor so that accumulated leaf litter can be destroyed by disking between the tree rows. Lower limbs that touch the ground in the exterior rows should be pruned just high enough to prevent them from trapping leaf litter. Wind will then blow leaf litter from underneath the trees. In multiple row windbreaks, selected trees may need to be removed so that disking between remaining rows can be accomplished. When planting new windbreaks, tree row spacing should be wide enough to accommodate a tractor and disk, and interior limbs should be pruned as soon as leaf litter begins to accumulate under the trees.

Fire should not be used to destroy litter in a windbreak. Fire often kills deciduous hardwood trees, and fire stimulates undesirable sprouting from lateral roots. When sprouting occurs, litter accumulates rapidly, and disking can no longer be accomplished easily.

Management of Sand Shinnery Oak. Sand shinnery oak infested rangeland occurs along the eastern, southern and western boundaries of the High Plains. This oak brush also occurs in fencerows and pastures, often in combination with mesquite, in several southern High Plains counties. Sand shinnery oak provides one of the best overwintering habitats for the boll weevil in the Rolling Plains. However, leaf litter accumulations in the High Plains often are not very good as high winds can more easily blow away leaf litter than in some of the other types of habitats. The best option for managing sand shinnery oak is to use fire in combination with tebuthiuron herbicide (Spike 20p). Fire eliminates the leaf litter while tebuthiuron prevents regrowth and future litter accumulations. Fire should not be used alone because the shinnery resprouts and litter begins to accumulate. Within a few years following fire the litter habitat is actually better than it was originally and boll weevil survival and effective emergence are higher than in unburned shinnery. Tebuthiuron can be used

without fire, but it takes about three years after application for the leaf litter to decompose or blow away sufficiently to lower boll weevil winter survival. Even when fire and tebuthiuron are used together, the shinnery will continue to resprout for 1-2 years before it is completely killed. Within three years following herbicide application, the shinnery and associated litter will no longer provide a suitable overwintering habitat for boll weevils.

Shredding should not be used alone. As with fire, shinnery immediately resprouts following shredding and leaf litter accumulates rapidly.

Management of Conservation Reserve Program Grasses. The scarcity of favorable overwintering habitat has long been considered a major obstacle to the establishment of the boll weevil in the Texas High Plains area. However, research conducted from 1987 to 1990 showed that boll weevils could overwinter in the then newly established CRP grasses. While survival in the CRP grasses was significantly less than in broadleaf type habitat it was concluded that CRP grasses could present a significant boll weevil overwintering hazard especially during mild winters. The present boll weevil problem in Texas High Plains counties is believed to result from two major factors: an unprecedented succession of mild winters during the last eight years and the maturation of extensive boll weevil winter habitat with the establishment of CRP grass acreage. Pheromone trap studies conducted by Extension entomologists in 1994 showed that six times as many weevils were captured in traps surrounding cotton fields with associated CRP grass acreage than in traps around cotton fields adjacent to cultivated land. Recent studies by Extension entomologists have also documented that boll weevils are using CRP grasses as overwintering sites. Cultural practices which reduce the quality of CRP grasses as winter habitat for boll weevils could have a major positive impact on boll weevil infestations in the area.

Burning CRP Acreage. Currently there are only limited data showing the effects of CRP grass burning on overwintered boll weevil populations. However, during 1995 some data were collected in Terry and Yoakum counties. The number of overwintered boll weevils captured in traps around fields with associated burned CRP grasses was reduced 93% compared to weevil numbers captured around fields with associated unburned CRP. In this study, none of the fields with associated burned CRP required treatment for overwintered boll weevils. However, treatment for overwintered boll weevils was required in fields near unburned CRP grasses.

Burning of CRP grasses during the winter should impact overwintering boll weevil populations in three ways: 1) direct mortality should result from the heat generated by the fire; 2) reduction of the grass thatch or litter would reduce the insulating property of the grass resulting in greater boll weevil winter mortality; and 3) the blackened surface of the burned grass would heat up faster as a result of direct solar radiation promoting earlier boll weevil emergence before squaring cotton is available.

Prescribed burning of CRP fields should be done only after careful planning and preparation of a fire plan. Precautions must be taken to ensure the fire is contained within the designated field and to protect any structures within the field. Blacklines should be installed if the field adjoins rangeland or other areas with adequate fuel to

carry a fire. Prior to burning, the Texas Natural Resource Conservation Commission must be notified. Weather conditions before and during the fire must be monitored to ensure a safe burn. ***Do not burn*** if the relative humidity is below 25%, air temperature is above 75°F, winds are above 15mph, or a cold front is forecast to pass within 12 hours. Winds are generally high prior to a cold front passing and wind direction may change up to 180° as the front passes. Both conditions are extremely hazardous. A drip torch should be used for ignition and after the fire front has swept the field, any unburned areas should be ignited.

The burning of crop land and agricultural waste land in the state of Texas is regulated by the Texas Natural Resource Conservation Commission (TNRCC). Detailed Guidelines for CRP burning are available from Plains Cotton Growers, Inc. (Lubbock, TX) and the Texas Agricultural Extension Service.

Haying and Grazing CRP Acreage. Reduction of grass density and thatch through haying or grazing should reduce the survival of overwintering boll weevils in CRP grasses. Reducing the thatch and bunch density of CRP grasses reduces the insulating properties of the grass resulting in lower temperatures within the habitat and increased winter mortality of boll weevils. However, CRP contracts limit the ability of landowners to hay or graze. Therefore, this practice cannot be used unless special permission is obtained.

Management of Other Habitat Types. Any area near cotton which is overgrown and allows for the accumulation of large amounts of plant debris is a potential overwintering site for boll weevils. For example, abandoned farmsteads that have become overgrown with woody vegetation provide excellent habitat for overwintered boll weevils. When located near cotton these areas often serve as a major source of overwintered boll weevils which infest cotton in the spring. Elm trees are particularly common to the High Plains and tend to be "messy" trees, shedding a lot of branches which trap and hold leaf litter that would otherwise be carried off

for the most part by winds. Any practical method of cleaning up these areas such as burning, plowing or disking may greatly reduce the overwintering boll weevil hazard.

Use of Insecticides. ***Insecticides should not be applied to boll weevil overwintering habitat.*** There are no insecticides labeled for this purpose, and it is extremely unlikely that such applications would be effective in killing sedentary, diapausing boll weevils within the leaf litter.

Managing Cotton for

Earliness

Planting Dates. Overwintered boll weevils which emerge from winter habitat prior to the onset of squaring in cotton have a relatively short life span. Studies conducted in west Texas have shown that the average life span of newly emerged overwintered boll weevils is usually less than two weeks if squares are not available for food. Even though boll weevils feed on the leaves of seedling cotton, this insect is primarily a

pollen feeder and is dependent upon pollen for extended longevity, reproduction and maximum pheromone production. The adult boll weevil uses its snout to drill into the square and feeds upon the pollen of the anthers which fill the inside of this fruiting structure. Female boll weevils do not lay eggs until cotton squares approximately 1/3 grown in size are present. Therefore, the majority of overwintered boll weevils which emerge two or more weeks in advance of squaring are suicidal.

Delayed uniform cotton planting to take advantage of suicidal emergence has proven to be an effective cultural control practice in the Texas Rolling Plains where late May plantings produce acceptable yields. ***In the High Plains however, late May planting is not recommended due to the shortness of the growing season.***

Cotton producers are encouraged to select planting dates and varieties which offer good yield and early harvest potential. However, producers should realize that cotton planted in late April or early May is more susceptible to infestation by overwintered boll weevils than are uniform plantings after mid-May. Uniformity in planting within boll weevil infested areas is an important aspect of the weevil management system. If planting extends over a long period, late planted cotton which has young fruit in the late season will serve as a trap crop when boll weevils begin to migrate from early planted fields.

In the west Texas area, overwintered boll weevil emergence peaks during late May or early June during most years. During years of very high overwintered boll weevil survival, significant emergence may continue into July. We have experienced this type of extended boll weevil emergence during the past five seasons. Therefore, producers should make overwintered boll weevil treatments when indicated by pheromone traps or by field inspections.

Plant Growth Management. Short-season management, shortening the days from planting to harvest,is the most important boll weevil cultural management tool we can use in the High Plains area. Early crop termination removes late season food necessary for the development of diapausing boll weevil populations. The key components of short-season management on the High Plains include: 1) preplant irrigation to provide 3 to 6 inches of stored moisture; 2) delay planting until soil temperatures and weather are favorable for stand establishment; 3) plant to a moderate stand of 30,000 to 50,000 plants per acre; 4) avoid full-season picker cottons such as Acala 90 and Acala 1517 in irrigated fields. If planting is delayed until late May or early June, or in areas where heavy boll weevil infestation pressure is expected, early maturing varieties such as All-Tex Excess, All-Tex Xpress, All-Tex Quickie, Paymaster Apache, Paymaster 145, Paymaster 183, Paymaster 280, Paymaster 2200RR Deltapine 2156, Stoneville H-1919, or Stoneville H-186 should be used. For early to mid-May planting, traditional, well adapted stripper varieties offer sufficient earliness except for in the heaviest boll weevil infested areas; 5) use high quality seed treated with a fungicide to ensure healthy seedling plants; 6) scout cotton for early season insects and treat if necessary to prevent excessive early square loss; 7) monitor the crop during early squaring and bloom to determine its development progress; 8) avoid nutrient deficiencies prior to cutout; 9) reduce irrigation rates after cutout to gradually dry the soil during boll maturation to hasten maturity and boll opening; 10) use harvest-aid chemicals to prepare the crop for an

early harvest; and 11) destroy stalks soon after harvest to prevent regrowth.

Harvest Management. During the fall season, diapausing boll weevils require squares and small bolls for food in order to develop fat reserves necessary for winter survival. Therefore, removing the weevil's food supply through timely crop termination and harvest serves as a cultural diapause control program. Proper harvest-aid timing requires several assessments of crop maturity and a consideration of harvest capacity in relation to the acreage.

The percent of open bolls and nodes above cracked boll (NACB) technique provides a forecast of the time till maturity. Fields are mature and safe to defoliate at 50 to 70 % open boll (depending on fruiting pattern) or at an average of NACB of 3 to 4. When a field approaches maturity, inspection of green bolls by slicing should provide final assurance that the field has reached readiness for harvest-aid chemical application. Bolls are safe for defoliants when seed coats have started to turn light brown and the cotyledons are dry and fully formed. Bolls must reach a higher level of maturity prior to application of desiccants. Delay application of desiccants until 80% of the bolls are open and the remaining unopened bolls can be cracked when squeezed by hand. Once a field has been treated with a harvest-aid, prompt stripping is necessary to avoid field weathering loss and regrowth problems. Inspect fields daily to assess the need for a second application and readiness to strip. If adult boll weevils are present in the field at the time of crop termination, add 16 ounces of methyl parathion (4E) or 1 pint of Guthion 2L per acre to the defoliant or desiccant. This practice will reduce the population of late season, potential overwintering boll weevils.

CHEMICAL CONTROL

Overwintered Boll Weevil Control. Overwintered boll weevil emergence begins during early spring and continues into the summer. During most years, peak emergence occurs during late May to early June with a rapid decline following the peak. However, following winters of high survival, significant overwintered boll weevil emergence may continue into July. Temperature and rainfall influence the emergence pattern of overwintered boll weevils. Emergence is accelerated by higher temperatures and depressed by low temperature and sharp increases in overwintered boll weevil emergence often follow rainfall during the spring and early summer. Boll weevils which seek winter shelter in leaf litter in cool shaded areas such as heavy tree groves tend to remain in hibernation longer than weevils overwintering in more open habitats. Overwintered boll weevils tend to emerge earlier from grasses, mesquite pastures and low growing brush where direct sunlight reaches the ground. Overwintered boll weevils usually move relatively short distances from hibernation sites to the nearest cotton. Overwintered boll weevil colonization in cotton is closely related to the fruiting of the plant, with the greatest numbers of weevils entering the field after squares are present. Egg laying begins as soon as squares approximately 1/3 grown (pencil eraser size) appear.

Overwintered boll weevil control is designed to destroy adult boll weevils before eggs are deposited in squares. Effective suppression of the overwintered boll weevil generation will keep the F1 (first field generation) below the treatment level, thereby avoiding treatments at a time when bollworm outbreaks are likely to occur. The simplest and most time efficient method for determining the need to treat for overwintered boll weevils is the ***"Trap Index Method"*** (Table 1). Boll weevil pheromone traps should be placed along field margins approximately three weeks before squaring begins. For fields up to 100 acres in size at least four to five traps should be used. Field margins near potential overwintering habitat such as CRP grasses, elm trees and abandoned homesteads should be given special consideration when placing traps. Pheromone traps must be inspected regularly and kept operational to furnish reliable information.

Inspect traps weekly and determine the average number of weevils captured per trap for each field. The life span of newly emerged weevils is relatively short (less than 2 weeks) when squaring cotton is not available for food. Therefore, weevils captured shortly before and during early squaring provide the best measure of potential infestation. ***Determine the average number of weevils captured per trap for the week that the first small squares (pinhead to matchhead size) appear. This will be the Trap Index.*** The number of weevils captured prior to and during early squaring provides a measure of the size of the overwintered population and indicates the need for one or more insecticide applications. When the number of boll weevils captured during the early squaring period averages 4 or more per trap per week, a second insecticide application should be scheduled automatically 4-5 days after the first.

The efficiency of pheromone traps decreases greatly when overwintered boll weevils begin to feed in fruiting cotton and produce pheromone. Therefore, pheromone trap data may not reliably predict the need for control after 1/3 grown squares are present

in the subject field or in neighboring cotton fields.Producers are encouraged to base decisions from this point on through field scouting information (see Mid- to Late Season Control). If field and/or trap inspections indicate that boll weevils are still entering the field following an insecticide application, additional treatments may be necessary.

The selection of an insecticide and rate for use in overwintered boll weevil control can be important in minimizing the reduction of developing populations of beneficial insects and spiders and the development of secondary pest problems such as cotton aphids and beet armyworms. The higher labeled rates of even the "softer" insecticides may not be selective in preserving natural enemies. Insecticides that have been less harmful to natural enemies and have created fewer secondary pest problems have been Vydate and Phaser/Thiodan (Table 2).

The benefits of overwintered boll weevil control in dryland production fields is less certain than for irrigated fields. While traps may indicate the potential need for overwintered boll weevil control applications, later hot, dry conditions may prevent these colonizing weevils from becoming an early threat. Generally, only one or two overwintering boll weevil control applications can be justified in most years for moist dryland fields. Boll weevil control can rarely be justified in fields where yield averages 1/4 bale or less.

The cost of early applications can be reduced significantly through the use of banded ground applications. However, good coverage is still critical for effective control.

Mid- to Late Season Control. Boll weevil management during the time from the appearance of first 1/3-grown squares (pencil eraser size) through the early boll maturation period relies on field scouting, treatment thresholds and insecticides. If overwintered weevil numbers were low or if overwintered boll weevil applications were made where the trap index so indicated, the appearance of economically damaging infestations can often be delayed. The advantage of delaying in-season economically damaging boll weevil infestations with overwintered boll weevil applications cannot be over emphasized.

Adult boll weevils puncture squares or smaller bolls both for feeding and egg laying. Egg laying punctures can be distinguished from feeding punctures by the presence of a wart-like plug which the female places over the feeding site after she has deposited an egg in the cavity. Feeding punctures can be found anywhere on the square while egg punctures are concentrated in the lower 1/3rd of the square. Bright yellow pollen deposits are associated with weevil punctures. The female deposits an average of 100 eggs during her life span of 30 days.

Eggs hatch into larvae, or grubs, within 3 to 5 days under summer conditions. Grubs feed entirely within a square or boll, pupating after 7 to 11 days. Adults emerge 3 to 5 days later. Recently emerged adult weevils tend to be reddish in color for the first few days before changing to their more characteristic grayish brown color. These 1/4-inch adult boll weevils feed on squares and bolls for 4 to 8 days before mating and laying eggs. The time required for development from egg to adult under summer field conditions averages 17 days, with a complete generation occurring in 21 to 25 days.

Egg punctured squares flare open and usually fall to the ground within a week. Small bolls that are punctured may also fall to the ground, but larger bolls remain on the plant. When direct sunlight and hot, dry conditions cause fallen infested squares to dry out rapidly, large numbers of weevil larvae do not survive.

Boll weevil damage reaches its highest level late in the growing season. As cotton plants mature and the number of squares decline, the percentage of boll weevil-damaged squares becomes an unrealistic indicator of damage because boll weevils are competing for limited squares. As square counts decline, boll weevils may cause more damage to small bolls.

When square numbers are greater than the combined number of blooms and bolls, inspect fields at least weekly, by examining 100 squares that are at least 1/3-grown. Take squares from a minimum of four representative locations in the field and from various portions of the plant. ***Do not select squares that are flared, yellow in color or showing other obvious weevil damage symptoms.*** Make sure that samples are taken across the entire field. Boll weevil infestations can remain clumped, at least during the early fruiting period, and are often missed if an adequate sampling scheme is not followed. More dispersed infestations often occur after mid-August, when adult weevils begin moving between adjacent fields and even longer distances. Prior to this time, boll weevil infestations tend to remain in fields that were originally colonized by overwintered weevils.

If 20 percent of the squares examined are weevil-damaged from the time of squaring to peak bloom, the economic threshold level has been reached and an insecticide application is needed (see Table 2; listing of insecticides). It may be necessary to repeat applications at 5-day intervals if weevil infestation buildup is extremely heavy. Regardless of the insecticide used, residual activity is very limited. Ultra Low Volume (ULV) vegetable oil applications of either Guthion or methyl parathion appear to have greater residual activity than the same insecticides delivered in a water carrier. The timing of an insecticide application can be further refined by separating feeding punctured-square counts from those that have egg punctures. If the majority of squares do not have egg punctures, this could indicate recent emergence of new adults that are feeding prior to commencing egg laying activities. Thus, a short delay in insecticide application would be warranted.

While several pyrethroid insecticides are labeled and are effective for boll weevil control, they are not more effective nor do they have longer residual than organophosphates, carbamates or cyclodienes. They are more effective for bollworm/budworm control and should be reserved for those situations when both boll weevils and bollworms/budworms are to be controlled by a single insecticide application. Therefore, pyrethroid insecticides should not be used for boll weevil control alone, especially in areas where insecticide resistance is an issue for budworm management or where cotton aphid infestations could be increased through their use.

After peak bloom, or when bloom and boll numbers exceed square counts, treatments should be initiated when 25-30 percent of the squares examined are weevil damaged. Once plants approach cutout and square densities decrease

significantly, small boll damage should be used as the criteria for further insecticide applications. Bolls are most vulnerable to weevil damage until they are 15 days old. Once boll lint begins to dry down, weevil grub survival decreases dramatically. **If there is sufficient time to mature these smaller bolls, boll protection is warranted when 15 percent of these small bolls are weevil damaged and there are at least 2-3 vulnerable, undamaged, potentially harvestable bolls found per 10 row feet of cotton plants examined (based on $0.75 per pound cotton lint).** Long distance movements of boll weevil adults generally begin after mid-August and really increase beginning the first week of September. At this time it is extremely difficult to keep cotton fields weevil free. If an appropriate insecticide program is being followed, adult weevils found in treated fields should be mostly grayish brown in color. The presence of numerous red weevils indicates poor control or too long a spray interval. Shortening the interval to less than 4-5 days may not be an economically sound management decision.

Knowing when to terminate treatments for boll weevils is very important. The expert system, COTMAN , was developed in Arkansas and has been validated in several areas of Texas. According to the insecticide termination rules of COTMAN, once bolls accumulate 350 Heat Units after flower, they are relatively safe from boll weevil and bollworm damage. Also, flowers after NAWF=5 are not given a high probability of adding to harvest. Under conditions where the crop is planted and managed in a timely manner, there should be no further need for boll weevil treatments after the first week in September.

Control of Diapausing Boll Weevils. Boll weevils overwinter as adults in a state of diapause which is characterized by increased body fat, lower water content and reduced respiration. Diapausing boll weevils began to appear in the population during late summer with the percentage of diapausing individuals increasing as the season progresses. After emergence from squares or bolls, approximately two weeks of feeding is required for diapausing boll weevils to build up adequate fat reserves.

Research and long experience has shown that well timed insecticide treatments applied at 10 to 14 day intervals starting in late September and continuing until a plant killing freeze greatly reduce the numbers of diapausing boll weevils which enter winter habitat. The combined effect of these diapause control applications and natural boll weevil mortality caused by cold winter temperatures greatly reduces the numbers of boll weevils which can infest cotton the following year. Plains Cotton Growers, Inc. in cooperation with state and federal agencies initiated a diapause boll weevil control program in the High Plains area in 1964. For many years this program was highly successful in preventing boll weevil populations from establishing on the Texas High Plains. However, during the first 26 years of the suppression program there were never more than two mild winters in a row.

Beginning with the winter of 1990/91 the High Plains area experienced a highly unusual pattern of successive very mild winters. By 1994 boll weevil infestations in southern and western counties outside the traditional control zone were escalating. Plans to enhance control efforts and enlarge the control zone required a four to five fold increase in funding. This was achieved following the passage of a cotton producer referendum across a thirty county area of the High Plains. This referendum

established a High Plains Boll Weevil Eradication Zone and set in place an assessment mechanism to support the plans. Plans called for enhancement and enlargement of the diapause program for a 3 year period followed by a 2 to 3 year eradication program to start in the spring of 1998. The goals during the first 3 years were to stop the further spread of the weevil, reduce the size of the infested area, and prepare for final elimination of the pest with a concerted eradication effort.

During the first year of the enhanced program (1995), infested fields were treated in 19 counties with a total of 5,100,000 acres treated from late September through the end of October. Program operations in 1996 included pheromone trapping in the spring and early summer to determine overwintered boll weevil survival, distribution of emerging populations and the development and spread of infestations during the growing season. A severely limited diapause program was conducted in the fall of 1996 due to the lack of collected assessments from producers.

As a result of a lawsuit filed against the Texas Boll Weevil Eradication Foundation and new legislation in 1997 the program was discontinued.

Table 1. Trap Index System for Determining the Need for Overwintered Boll Weevil Control.

Trap Index Decision

Average of one or fewer weevils per trap per week. Do not treat.

Average of more than one, but fewer than two Treatment may or may not be justified. Do not weevils per trap per week. treat unless field inspection at early 1/3 grown square stage indicates presence of weevils or weevil damaged squares, or unless the number of weevils captured per trap for the week previous to pinhead square exceeds 10.

Average of two or more weevils per trap per week. Treatment probably justified.

Table 2.

Selected Insecticides for Boll Weevil Control.*

Formulated

Treatment rate/acre

Guthion 2L 1 pt

Methyl parathion 4E 8-16 oz

Phaser 3E/Thiodan 3E 1-2 pts

Vydate 3.77C-LV 8.5 oz

Malathion 91% ULV 8-16 oz

Penncap M 2F 1-3 pts

**Both Vydate and Phaser/Thiodan are purportedly less*

harmful to beneficial arthropods and appear less likely

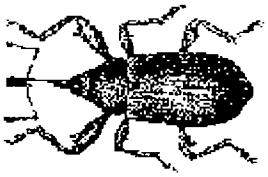
to increase secondary pest problems Phaser and Thiodan

require a shorter spray interval to maintain effective

boll weevil control.

SUMMARY

Cultural and chemical control methods outlined in this report can greatly reduce boll weevil damage if practiced on a uniform basis by producers in weevil infested areas. These management techniques should result in smaller numbers of boll weevils during the late summer and increase the effectiveness of fall diapause control programs. Cultural control practices should form the basis of boll weevil management programs. Insecticide applications based upon the use of pheromone traps in the spring and careful field scouting during mid-late season are used to supplement cultural management practices. Producers should not depend solely upon insecticides for boll weevil control. Shortening the growing season through proper management is probably the most powerful boll weevil cultural control tool we can use in the Texas High Plains. Short-season cotton production also provides escape from late season bollworm infestations.



Boll Weevil Task

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