A COST-EFFECTIVE AREA-WIDE SUPPRESSION PROGRAM FOR BOLL WEEVIL IN LOWER RIO GRANDE VALLEY OF TAMAULIPAS AND TEXAS

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A draft of "A Plan for Boll Weevil Eradication in Texas" was developed by R. E. Frisbie and J. R. Brazzel in 1992.. They stated that "For the purpose of this plan, eradication is defined as the elimination of the boll weevil as an economic pest from cotton". Scott and Lukefahr (1997) outlined multiple actions for a suppression plan for the Lower Rio Grande Valley (LRGV) of Texas (USA) and Tamaulipas (Mexico). With one exception I think that their plan focuses on actions which would suppress populations of the boll weevil and be economically and environmentally acceptable in this subtropical area. This exception is the need for automatic (or pre-emptive) applications of insecticides in the spring to first pinhead squares. My critique of this action is summarized in Wolfenbarger (1998). Here, I wish to outline a suppression program against the boll weevil for the LRGV. Actions support most of those of Scott and Lukefahr (1997). We want this program to involve a series of actions year-round and not just the use of an insecticide during the growing season. This concept is not new, but the actions have not been defined. No attempt is made here to outline a program for other areas in the United States or Mexico.

The boll weevil is the most important pest of cotton, year after year, in the LRGV. Lepidopteran pest populations often rise and fall from one year to the next. The LRGV of Tamaulipas and Texas is 90 miles north to south by 80 miles east to west (7,200 miles2), separated by the Rio Grande River. All irrigated and non-irrigated cotton fields in this area have to be included in the program. In any given year 8,000 to 20,000 fields of cotton of various sizes and conditions are planted. There are 500 to 1,500 producers of cotton in both countries. Two weevils could be present in each field on any given day and economic suppression would still be exhibited; this means that 16,000 to 40,000 weevils could be present and the economics of production would not be affected. If eradication is the objective of the program then no boll weevil can be present in the LRGV at any time during the year. This scenario is unlikely if cotton is planted each year. There is too much pressure from wild weevils which survive in cultivated and non-cultivated areas north and south of the LRGV. How they survive in this subtropical area is presented by Scott and Lukefahr (1997) and supported by Wolfenbarger (1998).

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Frisbie and Brazzel (1992) state that all or most cotton fields will be infested by boll weevil in the spring. This is true, but spring lasts until June 21 which is midseason for cotton in the LRGV. Most cotton (80 to 90%) is planted from February 15 to March 15 and harvested from July 25 to August 25, depending on edaphic and weather conditions. The philosophy of cotton production in the LRGV each year should be to plant and harvest as early as possible. It should include the planting of short-season cotton cultivars.

The planting and plow-up dates for pink bollworm suppression are the key action against the boll weevil; it has to include 100% of the acreage. The plow-up on August 31 is the start of a 5 month cotton-free period before the first planting date of February 1.

The question of "diapause" applications is moot for the LRGV because, with the exception of July, >1 weevils are in that category each month of the year (Wolfenbarger et al 1967). Guerra et al (1983) used the term quiescence for weevils in LRGV. Their activity is restricted at temperatures less than 50°F. Weevils are active year around when temperatures are greater than 50°F. They are also found in pheromone traps year-round in the LRGV.

Sprays of malathion (Fyfanon) to all cotton fields in the LRGV which exhibit a prescribed trigger are the keys to maximum suppression of the boll weevil during the growing season. Area-wide suppression with insecticides kill more weevils than producers kill with their field by field control practices with insecticides. The trigger should be the presence of >1 adult in 20 white blooms/field/sample date. The entire field should be sprayed within 24 h after the trigger is determined so that weevils do not disperse to other fields. This is of utmost importance. The sampling process should be initiated at first bloom and be maintained twice or thrice weekly until 70% - 90% open bolls. Sampling should identify the start of each generation and the size of the population in each field. Six applications of malathion may need to be applied to each field beginning June 7 - 17 depending on infestations in each field (table 1). Sprays will be applied only if weevils are found in the field. Applications should continue for 30 - 48 days to July 27 - August 15. Defoliation should include a chemical to remove all squares.

Weevils in traps around the field do not always indicate that weevil populations are present in that field or an adjacent field. Weevils are dispersing in the spring across the LRGV prior to 1/3-grown squares in each field. Following development of 1/3-grown squares dispersal activity is greatly reduced.

The residual life of malathion which will kill >63% was 6 days with no rainfall (Jones et al 1996). Newly emerging adults will contact the residue on flowers, leaves, stems and bracts surrounding squares and bolls. If rainfall occurs

within 24 h after application the application should be repeated. If rainfall occurs from two to six days following an application the sampling should indicate the need for the next application.

Some action needs to be conducted across the LRGV after the plow-up date and before the planting date. On November 1st traps or attract-and-kill devices which contain 30 mg of pheromone should be placed selectively in high, open sites and over-wintering sites near each cotton field planted that year and maintained until March 1 the following year.

This activity, the mandatory planting and plow-up dates with properly timed mid to late-season malathion sprays, should reduce populations to a sub-economic level and keep them at these levels with this multi-action approach. Malathion should not be viewed as a single action for a suppression program of this insect in the LRGV. Suppression has to involve year-round actions because it is the sum of the control by each action which will lead to suppression of the boll weevil. There is no silver bullet for suppression of the boll weevil. The program needs to be maintained each and every year for three years because wild weevils will be present. No more than 10% of the fields will need to be treated against this insect during the fourth and subsequent years.

Cost of application + malathion ($3.42/acre in 1997) should not exceed $21/acre/growing season the first three years. Cost of trappers and field samplers is $3.00/acre/ 25 week year in 1997. Cost should not exceed $10/acre/growing season after three years. The cost of trap or attract-and kill device should not exceed $15/acre/November 1 to March 1. Costs will continue each year because there will always be a boll weevil present somewhere in the LRGV of Texas or Tamaulipas. Producers and scouts should be part of the decision making process. With cooperation and diligence cotton in the LRGV should be a strong, viable and economically competitive crop.

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Table 1. Planting, Fruiting, and proposed spray dates for suppression of boll weevils the first year. Lower Rio Grande valley of Tamaulipas and Texas.

- Cotton planted - February 1 - March 20.
- First square - April 15 - 25.
- First flower - May 1 - 10.
- First application - June 7 - 15.
- First open boll - June 15 - 25.
- Second application - June 17 - 25.
- Third application - June 27 - July 5.
- Fourth application - July 7 - 15.
- Fifth application - July 17 - 25.
- Defoliation and square shed treatment - July 27 - August 20.
- Sixth application - July 27 - August 3
- \Cotton harvested and plowed up - July 28 - August 31.