CRITIQUE OF NEED FOR AUTOMATIC EARLY SPRING INSECTICIDE APPLICATIONS FOR SUPPRESSION PROGRAM AGAINST BOLL WEEVIL IN LOWER RIO GRANDE VALLEY

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Abstract

There is no need for two automatic applications of insecticides in the spring against boll weevil populations when pinhead squares first develop in each field in the Lower Rio Grande Valley (LRGV) of Texas, USA and Tamaulipas, Mexico. These applications are not needed in a LRGV wide suppression program because there are none or <1/field weevils present on any given day in the 8,000 to 20,000 fields (20 to 40 acres/field) of cotton when pinhead squares first develop. This assumes that the philosophy of cotton production is to plant each field as early as possible and harvest as early as possible. I do not know of any data indicating that there are >1 weevil/field present during the non-fruiting or pinhead square development of the few dominate plants which are present. There may be >1 weevil present on any given day after planting, but these populations are moving about the LRGV. Most of the weevils alive in September and October will die before planting in February-March the next year because they are old and/or they will be exposed to inclement weather. Death is not due to lack of food or water in this subtropical area. The two automatic sprays should be replaced with an "action" involving the use of grandlure from October of one year to February of the next year to reduce the over-wintering population of this insect. Since spring ends June 21 one or two applications are needed in mid June in the LRGV wide suppression program.

Resume

The outline for the spring LRGV wide suppression wide program for reduction of the boll weevil to non-economic levels is described by Frisbie and Brazzel (1992). This program needs to be examined as does the component "pre-emptive sprays in the spring" of Scott and Lukefahr (1997) since they are intertwined. Spring starts before cotton is planted in the LRGV of Texas and Tamaulipas and spring ends in mid-season. Cotton fields are proximate and are planted on the same dates in both countries. Frisbie and Brazzel (1992) indicate that an average of four applications of insecticides should be applied in the spring in the LRGV wide suppression program, but the timetable for these applications is not indicated. Their rationale assumes that "all or most acres in the LRGV of Texas and Mexico will be infested by boll weevil in the spring. This infestation pattern normally results in season-long reproduction of the weevil thereby requiring intensive applications of eradication techniques". Frisbie and Brazzel (1992) state that the intensive category is "where cotton is infested in the spring by over-wintering weevils". Weevils are indeed present in traps Wolfenbarger et al (1976) and Guerra and Garcia (1982) in the spring, but their numbers in fields to first pinhead squares on the dominate plants and one week later is not known for any large portion of the fields. Presence of weevils in traps does not mean they are present in non-fruiting cotton or cotton with pinhead squares.

In 1993 (Wolfenbarger et al 1994) and 1994 a tractor-mounted air blower "bug catcher" was used to sample cotton fields for adult weevils at first pinhead square. This was the first attempt to determine the size of populations of boll weevils in individual cotton fields at pinhead squares on dominate plants. If sprays are going to be applied to cotton at first pinhead squares this information is essential.

No more than 40 weevils/ha (16 weevils/acre) were found on one sample date in the interior of 12 fields sampled in 1993 and 1994 in LRGV (Table 1). In 1994 the second row from the edge of each field was also sampled. No weevils were found in 58% of the fields. More weevils were found in 1993 than 1994. In 1994 weevils were found at either the edge of the cotton field and in the interior of three cotton fields.

No weevils were found on calendar days 117 and 126 in 1993 and days 118, 125, and 132 in 1994. Boll weevils were found in cotton on days 140 and 153 in 1993 and 139, 147 and 154 in 1994. On days 117 and 118 during both years only pinhead squares were found and their size is defined by Norman and Sparks (1997). Squares >5.1mm were found in one or more fields both years on all subsequent days. The smallest square size used by the boll weevils for oviposition is 1/3 grown or ¼ inch (6.4mm). Results show that weevils were not found until 1/3 squares were present in the cotton. The two smaller sizes of squares (Norman and Sparks 1997); pinhead (1/16 inch) or match head (3/16 inch) are rarely used for oviposition by the boll weevil unless populations are exceedingly high (10,000 weevils/field).

Scott and Lukefahr (1997) state that "weevils that have survived the non-growing season are low in number". Populations in traps in January and February are indeed lower than in September and October according to Wolfenbarger et al (1976) and Guerra and Garcia (1982). The trap is the best way to find both sexes of weevils over the LRGV, but it is not 100% efficient. There are a number of wild cotton plants which maintain immature weevil populations in the LRGV from November through February. This topic was well developed by Scott and Lukefahr (1997).

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An unknown number of boll weevils survive the winter on the wide array of flowering plants which develop in this subtropical LRGV of Texas and Tamaulipas. Scott and Lukefahr (1997) state that this over-wintering weevil is in a weakened physiological state. It is not known if this is true or not because the weevil ingests pollens of many species of flowering plants (Benedict et al 1991); nectar or water and plant foliage and all these components are available in the LRGV year around. Cotton is not needed for living and survival. It is only needed as an oviposition site to maintain the species from one generation to the next. Weevils are >60 days old by February 1, but stalk destruction and planting dates make a 150 day cotton-free period. Dispersal capability of the boll weevils for the LRGV in both countries is well presented by Scott and Lukefahr (1997). The boll weevil is a survivor and I suggest that >1 weevil will be present in the LRGV each day of the year. There is too much pressure from weevils migrating from the north and south to prevent their presence. If traps with pheromone are used over the LRGV of both countries from October through February they will capture some of these insects.

Scott and Lukefahr (1997) state that pre-emptive (automatic) sprays should be applied to fields with "history" in the LRGV. "History" requires definition and fields with proven "history" need to be identified each year. Gage et al (1984) stated that there was no significant difference in days to 15% square damage between treated and untreated fields of cotton with "history" in the spring in the LRGV. They did show great variation in days to 15% square damage in these fields, but this does not mean that boll weevils were controlled by the automatic sprays. Perhaps weevils did not enter all fields at the same time.

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Table 1. Boll weevils collected with "bug-catcher" in cotton fields. Brownsville, TX 1993-1194.

Field Size [Hectares]	Area Sampled [m2]	Weevils Collected/Ha
	1993 [Day 117-153][1]	
16.3	7818	4
12.2	3441	0
12.2	6409	10
10.1	2360	0
8.1	1236	0
7.3	2070	15
6.1	1968	15
5.3	2079	15
4.0	1236	0
3.2	5009	0
3.2	4584	0
2.5	2981	40
	1994 [Day 118 to 154]	
17.8	975	0
17.8	455[2]	0
16.1	1341	0
16.1	994[2]	10
13.0	975	0
13.0	284[2]	0
12.9	975	0
12.9	212[2]	0
9.3	782	14
9.3	238[2]	0
9.3	975	0
9.3	242[2]	0
7.3	975	0
7.3	280[2]	0
5.7	975	0
5.7	371[2]	26
5.7	975	0
5.7	93[2]	0
4.0	975	0
4.0	325[2]	0
3.2	975	0
3.2	315[2]	0

[1]Taken from Wolfenbarger et al. [1994]
[2]Taken at edges of field