

Chemical Control

Susceptibility of the boll weevil in Arizona to various insecticides was determined in both laboratory and field studies.

Laboratory studies: Response of the boll weevil to 15 different organophosphate and pyrethroid insecticides was determined using the topical application method. Results with the organophosphates -- such as Guthion^R and methyl parathion -- indicated a similar response by the weevil as others have reported with the boll weevil in the South. Some of the pyrethroids provided a quick "knockdown" of the weevil but with delayed mortality.

Field studies: A large-scale field study was conducted at Texas Hills Farms to determine the effect of "pin-head" square treatments on subsequent population build-up. Results were inconclusive due to the low populations initially, and to the erratic occurrence of localized populations across the test site. Two important conclusions emerged: 1) low, early-season populations are extremely difficult to detect; and, 2) three early-season applications appeared to have little, if any, detrimental effect on beneficial insects. Treatments in this experiment were Temik^R (side-dressed), Guthion, Imidan^R, Dimilin^R, and untreated checks.

A mid-to late-season experiment on boll weevil control was conducted at Roll, AZ. Good control was achieved with Guthion, methyl parathion -- EPN, Pennncap^R - M, and Ammo^R. Applications were made at 3-4 day intervals using a high-clearance ground sprayer.

1983 PRE-SEASON TRAP CATCH OF BOLL WEEVIL (Coleoptera: Curculionidae) IN WESTERN ARIZONA INCLUDING A COMPARISON WITH THE 1982 CATCH

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Summary

An adult boll weevil (Anthonomus grandis complex) trapping network was organized in the major cotton producing areas of western Arizona for the first four months of 1982 and 1983. The results for each year are summarized as the mean number of adult boll weevils caught per grandlure baited trap and adjusted for the number of days each trap was in operation. Where possible,

the 6 major cropping areas were subdivided into trapping sectors which permitted more detailed analysis. The results indicate the boll weevil expanded its range in western Arizona between 1982 and 1983. In 1982, they were trapped in 43% of the sectors and in 1983, 96% of the sectors. The results also show an increase in population size between 1982 and 1983. The mean number of boll weevils BW caught per trap per day was 1 to 291 times greater in 1983 depending on trapping sector.

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In August 1981, cotton producers in the Texas Hill area of Yuma County reported BW infestations in planted cotton for the first time since 1966. A pre-season trapping network was organized in 1982 to monitor movement and size of the BW population in Yuma and La Paz counties (Borth 1983a). The report shows that in Yuma County, BW were trapped in the western portion of the Wellton-Mohawk Irrigation District and on the south Yuma Mesa. In La Paz County they were trapped in the northern two-thirds of the Parker Valley. During the 1982 growing season, BW had to be controlled with insecticides in some fields throughout these areas. By December 1982, late planted cotton as far west as Avenue 21E in Yuma County and in the Bard/Winterhaven area of California were found to be infested with BW. A much more extensive pre-season trapping network was organized in 1983 to monitor this growing western Arizona BW population and help predict possible problem locales prior to the 1983 growing season. The present report summarizes the results of the 1983 network and compares them with that of the 1982 network.

Materials and Methods

Between January 1 and April 30, 1983, 459 grandlure baited pheromone traps were placed in the six major cotton producing areas of western Arizona. The trap density was approximately one per square mile. Four hundred twenty-seven (93%) of the traps were of the design known as the "Hercon" trap and the remaining 32 traps were of the design known as the "Albany International" trap. Approximately 50% of the traps were checked and maintained on a weekly basis by private volunteers. The other 50% were the responsibility of the Arizona Commission of Agriculture and Horticulture. All BW caught in the private traps were counted, destroyed and discarded. The grandlure bait was replaced at approximately four-week intervals, according to the manufacturer's instructions.

During the pre-season trapping period trap records were collected, summarized, tabulated and disseminated to the public on a monthly basis (Borth 1983b). At the end of the trapping period, the final results were tabulated as well as incorporated and used on area maps to show those regions where pinhead-square insecticide treatments for early season BW control were likely to be warranted (Borth 1983c).

Results and Discussion

The results reported here add to the historical data base that was begun in 1982. It is now possible to compare the pre-season populations of BW on an area-wide basis for two consecutive years in western Arizona.

The 1982 and 1983 pre-season trapping results are compared in Table 1. Borth (1983a) provides the explanation for the geographical subdivision into trapping sectors. Despite the greater effort that was devoted to the 1983 network (3.8 times as many traps in a much more uniform distribution, approximately one per sq. mile) the coefficients of variability remained extremely high. This indicates that the trap counts in any one trapping sector were highly variable. Perhaps this was due to non-uniform BW populations within the sector, different trap designs in the same sector, and/or different grandlure replacement schedules.

Each sector contained a different number of traps reflecting the actual trapping area within the sector. The width of the sectors varies naturally with the width of the river valleys. A valid comparison can be made between sectors and between years, however, because the trap counts are presented as the mean number of BW caught per trap for all traps within the sector. They are also adjusted for the number of days each trap was in operation.

These trapping results indicate that between 1982 and 1983, the BW population in western Arizona increased its range by 53%. In 1982, BW were trapped in nine of 21 sectors and in 1983, they were trapped in 24 of 25 sectors.

In 1983, in general, the largest populations of BW were found in the eastern one-third of the Wellton-Mohawk district, the southern portion of the Yuma Mesa, the northern half of the Parker Valley, and in the Wenden-Salome area. Where it is possible to compare, the greatest increase in population size, from 1982 to 1983, was found in these four sectors: Gila Valley, Avenue 15E-10E (291 x), Parker Valley, Parker Town - Indian School Rd (241 x), Wellton-Mohawk, Avenue 35E-30E (238 x) and Wellton-Mohawk, Avenue 55E-50E, (143 x).

By December 1983, in Yuma county, BW had infested fields as far west as Avenue 7E and on the south Yuma Mesa. In La Paz County, fields were infested between Tsosie Road and Parker Town. In Mohave County, the first BW was caught in a trap operated by the Arizona Commission of Agriculture and Horticulture.

Table 1. Mean number of boll weevil adults caught per grandlure baited trap in western Arizona during the pre-season trapping periods of 1982 and 1983. The means are adjusted for the number of days each trap was in operation. Trapping sectors are in approximately 8.0 km (5 mi.) increments (except where noted) though the actual trapping area differs in each sector.

TRAPPING SECTOR	TRAPPING PERIOD					
	JAN. - APR. 1982			JAN. - APR. 1983		
	Avg. ¹	(CVZ) ²	n ³	Avg. ¹	(CVZ) ²	n ³
Wellton-Mohawk, Dome,						
Gila Valley						
Avenue 55E - 50E	1.6	(65)	3	229.2	(317)	30
50E - 45E	9.6	(182)	4	105.3	(97)	19
45E - 40E	13.2	(117)	7	82.9	(95)	22
40E - 35E	4.6	(149)	6	71.4	(97)	23
35E - 30E	0	(0)	1	23.8	(125)	26
30E - 25E	-	-	0	16.0	(145)	20
25E - 20E	0	(0)	2	8.0	(64)	15
20E - 15E	0	(0)	5	8.4	(127)	18
15E - 10E	0	(0)	3	29.1	(193)	8
10E - 5E	0	(0)	9	1.8	(168)	35
5E - Arizona Avenue	0	(0)	4	2.7	(71)	12
Yuma Valley						
North Valley Levee -						
Co. 10th St.	0	(0)	4	0.4	(180)	11
Co. 10th St. - Co. 15th St.	0	(0)	2	0.1	(190)	34
Co. 15th St. - Co. 20th St.	0	(0)	7	0.2	(200)	33
Co. 20th St. - Mexican Border*	0	(0)	8	0.3	(176)	14
Yuma Mesa						
Co. 15th St. - Co. 20th St.	1.3	(443)	3	7.0	(106)	5
Co. 20th St. - Mexican Border*	-	-	0	266.4	(100)	4
Parker Valley						
Parker Town - Indian School Rd.						
Indian School Rd. - Scott Rd.	0.3	(177)	10	72.4	(211)	17
Scott Rd. - Peterson Rd.	0.5	(134)	8	49.1	(128)	18
Peterson Rd. - Tsosie Rd.	0.5	(200)	9	25.4	(311)	30
Tsosie Rd. - 1 mi N. Welsh Rd.	0.3	(143)	14	1.7	(68)	13
1 mi N. Welsh Rd. - S. End Valley	0	(0)	3	4.9	(87)	16
	0	(0)	3	1.9	(133)	17
Wenden - Salome**	-	-	0	161.2	(125)	4
Mohave Valley**	-	-	0	0	(0)	15

¹Mean number of weevils caught per trap per day ($\times 10^{-3}$).

²Coefficient of variability.

³Number of traps per sector.

*Approximately 4.8 km (3 mi.) increment.

**No subdivision made.