

**COMPARATIVE EFFICACY OF REGENT
800 WDG (FIPRONIL) A NOVEL COTTON
BOLL WEEVIL INSECTICIDE IN
NORTHWESTERN MEXICO.**

**Jose L. Martinez-Carrillo and J.J. Pacheco-
Covarrubias
INIFAP-CIRNO
Cd. Obregon, Sonora. Mexico.**

Abstract

Fipronil was evaluated for boll weevil control in cotton at the Yaqui valley of Sonora, Mexico. 25, 50 and 100 g ai/ha of fipronil were compared to the commercial standard azinphos methyl 500 g ai/ha. Results indicated no significant differences in mortality 48 hours after application on 3 to 5 day old adults of the boll weevil. Residuality test showed that reinfestation 2 days after spraying and mortality recorded 2 days later did not present significant difference between fipronil 50 g ai/ha and azinphos methyl 500 g ai/ha. However, reinfestation 7 days after application and mortality readings 2 days later, indicated that fipronil was significantly different from azinphos methyl with 16.1 % and 5.0 % mortality respectively. Even though there was a significant difference from the statistical analysis, from the biological point of view this mortality is not considered important. Fipronil represents a new alternative for insect management strategies established in the Yaqui valley.

Introduction

Insecticide resistance is one of the major concerns when a new product is developed for any insect pest. Resistance has become a very important issue in entomological literature due to the fact that key insect pests of different crops have become more difficult to control with the insecticides actually available (Georghiou and Lagunes 1991). The boll weevil is one example. This insect is a very important pest of cotton in Mexico and has a history as a severe insect pest in the United States of America (Lincoln and Graves 1978). In order to keep its populations below the economic injury level, several applications of different insecticides have to be sprayed on cotton. In the Yaqui valley of Sonora, Mexico, the boll weevil has been traditionally a key pest. If this insect is not controlled cotton production can be drastically reduced. Not many insecticides are available that give good control of this pest, thus it is important to search for new alternatives to the actually recommended pesticides to control the boll weevil in cotton at the Yaqui valley. Fipronil is an insecticide that belongs to a new class of insecticides known as phenyl pyrazoles, developed by Rhone Poulenc. The mode of action of this insecticide sets it apart from most commercial insecticides presently in the

market. It interferes with the passage of chloride ions through the gamma-aminobutyric acid (GABA) regulated chloride channel, thereby disrupting the central nervous system activity and, at sufficient doses causes death. In resistance management one of the premises to delay resistance is to rotate products with different mode of action, in this way fipronil was evaluated as a new alternative for boll weevil control.

Materials and Methods

During the summer of 1995, an experiment was established to test the effect of fipronil at 25, 50, and 100 grams of active ingredient per hectare, as compared to azinphos methyl the standard insecticide used for boll weevil control in the Yaqui valley. A check without insecticide was also utilized to test for natural mortality. Experimental units were 180 meter² in size and Delta Pine 5415 was the cotton variety planted.

Adult boll weevils 3 to 5 days old were used for the test. They were obtained from field collections of infested bolls and squares, then were taken to the laboratory at the experimental field station in the Yaqui valley and placed in emergency cages.

Insecticide treatments were sprayed early in the morning of the julian day 191, a back pack motorized sprayer calibrated to apply 760 liters of water, was used. Once sprayed, four organandy cylindrical cages, 35 cm long by 25 cm diameter were placed on the terminal of the cotton plants and 50 boll weevils introduced into the cages.

Mortality data were obtained 4, 24, 28 and 48 hours after spraying. Fipronil 50 g ai/ha was compared to azinphos methyl 500 g ai/ha, with respect to residual effect, for this, another 50 adult boll weevils were introduced to the cages 2 and 7 days after the initial spray. Mortality data were recorded as before and in both cases corrected using Abbott's Formula.

Analysis of variance was used to evaluate if there were significant differences between treatments and LSD to separate means of the treatments.

Results and Discussion

Corrected mortality data are presented in Table 1. The analysis of the data did not detect significant differences between treatments in any of the samples taken after spraying, indicating that all treatments had the same effect on boll weevil adults. Four hours after spraying, 25 g of fipronil showed the lowest mortality and azinphos methyl the highest. However 24 hours after spraying this difference is not as noticeable as before.

Residuality test indicated that when reinfestation with boll weevils were done 48 hours after spraying and mortality

evaluated four hours later, significant differences were obtained between fipronil 50 g ai/ha and azinphos methyl 500 g ai/ha. The last one presented higher mortality, but data taken 24, 28 and 48 hours later did not show any difference. When reinfestations were done 7 days after spraying, significant differences were detected in data taken 48 hours after reinfestation, fipronil 50 g ai/ha showed three times higher mortality than azinphos methyl 500 g ai/ha. In both cases even though there were significant differences at different times, these are not considered important from the biological point of view and thus concluded that both products have the same effect on adult boll weevil populations.

Conclusions

Fipronil gave similar control of the boll weevil as the recommended commercial standard azinphos methyl. Fipronil represents a new alternative to control boll weevil in the Yaqui valley of Sonora Mexico. This product has a different mode of action and can be integrated into the resistance management strategy that is been implemented in this area (Martinez-Carrillo, 1990).

References

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Table 1. Mortality of adult boll weevils sprayed with different treatments in the Yaqui valley of Sonora. Mexico. 1995.

TREATMENT	MORTALITY (HOURS AFTER SPRAYING)			
	4	24	28	48
FIPRONIL 25 g ai/ha	14.8	78.3	81.5	88.5
FIPRONIL 50 g ai/ha	32.8	89.0	90.5	94.5
FIPRONIL 100 g ai/ha	29.0	81.0	84.0	89.8
AZINPHOS METHYL 500 g ai/ha	45.8	88.3	92.0	95.3

Table 2. Residual effects of Fipronil and Azinphos Methyl on 3-5 days old adult boll weevils from the Yaqui valley of Sonora. Mexico. 1995.

TREATMENT	REINFESTATION	MORTALITY (HOURS AFTER SPRAYING)			
		4	24	28	48
FIPRONIL 50 g ai/ha	48 HRS	2.0 b	40.8	54.0	84.3
AZINPHOS METHYL 500 g ai/ha	48 HRS	10.5 a	41.8	72.8	79.3
FIPRONIL 50 g ai/ha	7 DAYS	1.3	3.0	7.8	16.1 a
AZINPHOS METHYL 500 g ai/ha	7 DAYS	1.8	5.0	5.0	5.0 b