

The efficacy of lufenorun (EC 5%) and comparison it's some insecticides on cotton bollworm, *Helicoverpa armigera* (Hub.) in the cotton fields Golestan province of Iran

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ABSTRACT: Cotton bollworm, *Helicoverpa armigera* (Lep. Noctuidae) is one of the key pests in cotton fields in Golestan province. In some areas the feeding of buds, floweres, bolls of cotton and cotton products will be reduced slightly. In this survey a new insecticide product Lufenorun were tested on cotton bollworm and important natural enemies, chrysopids in the field of cotton in Golestan province during 2015-2016. Eight treatments with four replications were tested at a complete randomized block design in Gorgan. Sampling was done before and 3, 7, 14 and 21 days after spraying. According to the results of the test toxin, lufenorun 1.5 liter treatment after 7 to 14 days 81.75 and 86.75 percent more with the greatest impact on cotton bollworm common pesticides used to good effect had. The impact on important natural enemies such as green lacewing (*Chrysopa formosa*) to control showed no effect. This is necessary because conventional pesticides bollworm stretch in the province for many years taken in order to avoid the possible resistance of the pest in the future can be accommodated.

Keywords: Insecticides, lufenorun, *Helicoverpa armigera*, Cotton and Golestan province.

INTRODUCTION

In a review on common pesticides against cotton pests in Golestan provice, carbaril and avant in comparison with larval and endosulfan had the greatest effect on the control of cotton bollworm (Mojeni, 2005). New tested toxins in cotton fields in Golestan province, toxin Karvin, with a dose of 1.5 liters per hectare, had more than 90% exposure to bollworm (Mojeni, 2015). In a mortality study in the first instar larvae of *Phethorima operculella*, on the potato treated with Lufenorun were very high in comparison with the control (more than 90%) most of the larval mortality was observed during the first age of ecdysis (Edmvanden, *etal.*, 2000). In order to investigate the susceptibility of bollworm to some common toxins in the Moghan area and to determine the contact toxicity of these toxins, a study was conducted and chlorpyrifos, atrymphus, prohenofos and endosulfan were superior (Alhayary, 1998). In Khorasan province toxine avant, 300cc per hectare had a modest effect on control of sugar beet leaf worm in comparison with other toxins (Hosseini, 2003). In a toxin test, Moghan, Endosulfan and Thiodicarb had the most effect on cotton bollworm (Taghizadeh, 2000).

Studies have shown that the observed symptoms are the common effects of insecticides of benzoyl phenylureas derivatives. Also, the cause of mortality in larvae of the first age of potato *Phethorima operculella* may be due to the prevention of Lufenorun insecticide by producing hormone ecdysis or blocking the synthesis of kethin in larvae (Mulder and Gijswijt, 2006).

There was no significant difference in the treatment of potato *Phethorima operculella* eggs with Lufenorun insecticide at hatching rate between the control and check treatment was higher than 90%(Edmvanden, *etal.*, 2000). Some researchers reported the low contact and low embryo activity Lufenorun activity and stated that the characteristics of the egg wall affect the penetration of insecticides of benzoylphenyl urea derivatives.(Grousscurt

and Jongsma, 1987). Laboratory studies were conducted on the effects of various growth regulators on the third instar larvae of *Helicoverpa armigera*. Six different concentrations were prepared and mortality percent were recorded after 48, 72, 96 and 120 hours. The results showed that 50% of the deaths of larvae of age third *H. armigera* after 120 hours were induced by various Lufenorun, fluofenoxuron, chloroflurosarone and dipflobenzuron concentrations. The results also showed that all insect growth regulators are effective in controlling *H. armigera* pests. However, Lufenorun and fluofenoxuron had the greatest impact (Khatri, *etal.*, 2014).

Material and Methods:

This experiment was carried on a cotton field Hashem Abad station in Golestan province with uniform infection with bollworm with 8 treatments in 4 replications in a randomized complete block design. Dimensions of each plot were 5 × 10m² and separated by one meter and repetitions at a distance of two meters from each other. The characteristics of the treatments are:1- Lufenorun (EC 5%) with 2lit/he.2- Indoxacarb SC 150% with 0.5 lit/he. 3- Lufenorun (EC 5%) with 1.5lit/he .4- Tiodicarb DF 80% with 1.5 kg/he.5- Karvin SC 53% with 1.5 lit/he.6- Biological insecticide Bt. with 2kg/he.7- Teboffenosid 1.5 lit/he.8- Check without spraying. The spray motor was used to spray a motorized rear sprayer after calibrating it. Sampling from the larval stage, from each plot, 10 plants were randomly selected, all buds, flowers and bolls of each plant were examined and the number of larvae was counted and recorded (Razaq,*etal.*, 2005). The percentage of toxin effect on bollworm larvae is calculated based on Henderson Tilton's formula (Henderson and Tilton, 1955) (Hatami, 1991). Statistical analysis and Duncan's multi-domain test were performed. Using SAS software, statistical analysis was performed and Duncan's multi-scope test was used to estimate the mean of treatments.

Results and Conclusion:

Based on the results of the 2016 experiment, the analysis of variance showed that there was a significant difference among the treatments tested. The results are as follows: On the 3rd day after spraying, Lufenorun was 1.5 liters with 59.75% and avent 0.5 Lit with 58% had the greatest effect on bollworm and placed at 5% level in group a.

On the 7th day after spraying, the karvina toxin treatment was 1.5 liters with 86.75% and Lufenorun 1.5 liters with 81.75% and Lufenorun 2 liters with 77.25% had the highest effect on the pest and at 5% Were in group a.

At the time of 14 days after spraying, Lufenorun treatment was 1.5 liters (86.75%) and karvina semen (1.5 lit), 86.85% and Lufenorun (2.9 l) with 85.75% had the greatest effect on cotton bollworm at 5% level in group a.

On the 21st day after spraying, Lufenorun 2 liters with 63.25 percent and Bt microbial insecticide. 59.5% and karvina 1.5 liters with 59% and Lufenorun 1.5% with 55.50% had the most effect on cotton bollworm and placed in group a, at 5% level (Table1,2).

In a study conducted in Golestan in 2012, karvin toxin with a dose of 1.5 lit/he had a good effect on the cotton bollworm on recommended pesticides and has not reduced the impact on important natural enemies such as green lacewing (*Chrysopa formosa*) compared to basal(Mojeni, 2014). In this study, the results obtained from karvin, Lufenorun, with the appropriate effect on cotton bollworm and not having adverse effects on natural enemies, are recommended as low-toxic poison, which is consistent with the studies of Lufenorun poison (Bozsik, 1996) The results showed that 50% of the deaths of larvae of age third *H. armigera* after 120 hours were induced by various Lufenorun, fluofenoxuron, chloroflurosarone and dipflobenzuron concentrations (Khatri, *etal.*, 2014). This is necessary because conventional pesticides bollworm stretch in the province for many years taken in order to avoid the possible resistance of the pest in the future can be accommodated

Table 1. Analysis of variance of different insecticides against on cotton bollworm in Golestan province.

C.V	F	S.S	df	Sources of changes	The days after spraying
24.3	3.806ns	339.667	3	Rep.	3
	4.955**	441.821	6	Treat.	
	-	89.250	18	Erro.	
21.72	2.42ns	469.428	3	Rep.	7
	3.35**	741.726	6	Treat.	
	-	220.901	18	Erro.	
12.49	6.420**	610.226	3	Rep.	14
	3.56**	331.488	6	Treat.	
	-	94.282	18	Erro.	
22.63	2.58ns	575.643	3	Rep.	21
	7.38**	1643.143	6	Treat.	
	-	222.532	18	Erro.	

Table 2. Comparison of the average of toxins control groups after 14 days of spraying in the treatments based on Duncan test

5%	Average impact percentage	Treatment
a	86.75	Lufenorun 1.5lit/he
a	86.50	Karvin
a	85.75	Lufenorun 2lit/he
ab	73.75	Indoxacarb (Avant)
ab	73.50	Teboffenosid
b	67.25	Tiodicarb
b	67.25	Biological insecticide(Bt.)

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