OVICIDAL TOXICITY OF NEWER INSECTICIDES AGAINST *H. armigera* IN THE LABORATORY

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ABSTRACT

The experiment to study the ovicidal toxicity of newer insecticides against H. armigera in the laboratory was carried out at Center of Excellence for Research on Pulses, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar during 2012. Among the various insecticides, profenophos 50 EC @ 250 g a.i./ha was best treatment, which recorded highest egg mortality. However, it was at par with indoxacarb 14.5 % SC @ 75 g a.i./ha and chlorantraniliprole 18.5 % SC @ 30 g a.i./ha.

KEY WORDS: Cajanus cajan, ovicidal toxicity, pigeonpea

INTRODUCTION

Pigeonpea [*Cajanus cajan* (L.) Millspaugh], also known as red gram, *tur* or *arhar*, is the second most important grain legume of India after chickpea with the production of 2.65 million tonnes from 4.04 million hectares area with an average productivity of 656 kg/ha (Anonymous, 2012). In Gujarat, pigeonpea covers the area about 0.24 million hectares and production about 0.26 million tonnes with an average productivity of 1057 kg/ha (Anonymous, 2012). Nearly, 30 species of lepidopteran of six families feeds on the reproductive stage of pigeonpea (Shanower *et al*., 1999). Pigeonpea suffers damage from large number of insect pest complex including several species of lepidopteran larvae, which feed upon the flowers and pods, and *H. armigera* is the most important of these (Bhatnagar *et al*., 1982). *Helicoverpa armigera* is considered major devastating pest of pigeonpea crop. It has been reported to feed on more than 181 plant species belonging to 45 families, 40 dicot and 5 monocots (Manjunath *et al*., 1989). This pest gained major status because of its polyphagy, mobility, high reproductive rate, host range and ability to undergo diapause. This has made *H. armigera* more powerful and difficult to control with synthetic insecticides. Siddappaji *et al*. (1985) have reported on an average 36.9 per cent yield loss in pigeonpea due to *H. armigera* in Karnataka.

MATERIALS AND METHODS

To find out the ovicidal toxicity of newer insecticides against *H. armigera* a laboratory, an experiment was conducted in completely randomized block design with nine treatments and three repetitions at Center of Excellence for Research on Pulses, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar, during 2012. Initially the larvae of *H. armigera* were collected from the pigeonpea field. Each larva was kept separately in clean glass petridish (15 cm diameter, 1.5 cm height) in the laboratory. Freshly pods of pigeonpea were provided as food. The full grown larvae were transferred to the plastic jar (11 cm length × 9 cm width × 15 cm height) having one third part of the jar filled with moist soil to facilitate the pupation. After pupation the glass jar were kept as such and observed regularly to record the emergence of the adults. Newly emerged adults were paired and confined in a wooden rearing cage. Fresh pigeonpea twigs were provided inside the cage for egg laying purpose. A conical flask (250 ml. capacity) with water was fixed with a cotton plug to keep the twigs fresh for a longer period. A piece of 5 × 5 cm sized sponge submerged in 5 per cent honey solution was also provided for the food to the adults. The pieces of sponge were replaced every morning. The eggs laid on pigeonpea twigs were utilized for ovicidal study.

Single day laid eggs were used for ovicidal study. Ten eggs were taken in each glass slide with the help of camel hair brush. Application of respective insecticides was given with respective dose by using baby sprayer. These glass slides were kept individually in petridish. Each petridish was labeled with definite number of treatment and replication. Eggs without any insecticidal application were kept as untreated control. All the eggs were observed daily under binocular microscope up to the hatching. The egg mortality per cent was calculated by using Abbott's formula (Abbott, 1925). Per cent egg mortality was subjected to arc sin transformation for statistical analysis.

RESULTS AND DISCUSSION

Various insecticides were evaluated for their ovicidal toxicity against *H. armigera*. Among the insecticides treated, profenophos 50 EC @ 250 g a.i./ha recorded highest (Table 1 and Fig. 1) egg mortality (80.48 %). However, it was at par with indoxacarb 14.5 % SC @ 75 g a.i./ha and chlorantraniliprole 18.5 % SC @ 30 g a.i./ha, which recorded 75.61 and 69.84 per cent egg mortality, respectively and proved that second effective group of treatments against *H. armigera* eggs. The remaining insecticides *viz*., chlorantraniliprole 9.3 % + lambda cyhalothrin 4.6 % ZC @ 37.5 g a.i./ha (65.17 %), chlorantraniliprole 9.3 % + lambda cyhalothrin 4.6 % ZC @ 30 g a.i./ha (59.69 %), lambda cyhalothrin 4.9 % CS @ 25 g a.i./ha (49.10 %), neem oil @ 0.5 % (34.78 %) and NSKE @ 5 % (34.78 %) were showed less effective against eggs of *H. armigera* in the laboratory condition.

From the above results, it can be seen that profenophos @ 250 g a.i./ha was that best effective treatment followed by indoxacarb @ 75 g a.i./ha and chlorantraniliprole @ 30 g a.i./ha against eggs of *H. armigera*. Profenofos recorded the maximum (99 %) ovicidal toxicity, while thiodicarb + thiacloprid gave 98 per cent egg hatch inhibition of *H. armigera* as recorded by Preetha *et al*., (2007). Spinosad 0.009 per cent, indoxacarb 0.014 per cent and profenophos + cypermethrin (Polytrin C) 0.066 per cent were the most effective chemicals in killing eggs of *H. armigera* as per the report of Thakor and Patel (2008). The present finding is in close agreement with the above reports.

CONCLUSION

Profenophos @ 250 g a.i./ha was that best effective treatment followed by indoxacarb @ 75 g a.i./ha and chlorantraniliprole @ 30 g a.i./ha against eggs of *H. armigera*.

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Table 1: Ovicidal toxicity of newer insecticides against *H. armigera* under laboratory condition

Sr. No.	Treatments	Dose (g a.i./ha)	Egg Mortality (%)
1.	Chlorantraniliprole 9.3 % + Lambda cyhalothrin 4.6 % ZC	30	50.88(59.69*)
2.	Chlorantraniliprole 9.3 % + Lambda cyhalothrin 4.6 % ZC	37.5	54.13(65.17)
3.	Chlorantraniliprole 18.5 % SC	30	57.00(69.84)
4.	Lambda cyhalothrin 4.9 % CS	25	44.77(49.10)
5.	Profenophos 50 EC	250	64.14(80.48)
6.	Indoxacarb 14.5 % SC	75	60.74(75.61)
7.	Neem oil 0.5 %	-	36.44(34.78)
8.	NSKE 5 %	-	36.44(34.78)
S. Em. $\pm$			2.84
C. D. at 5 %			8.44
C.V. %			10.84

**** Figures in the parentheses are retransformed values; those outside are arc sin transformed values.***

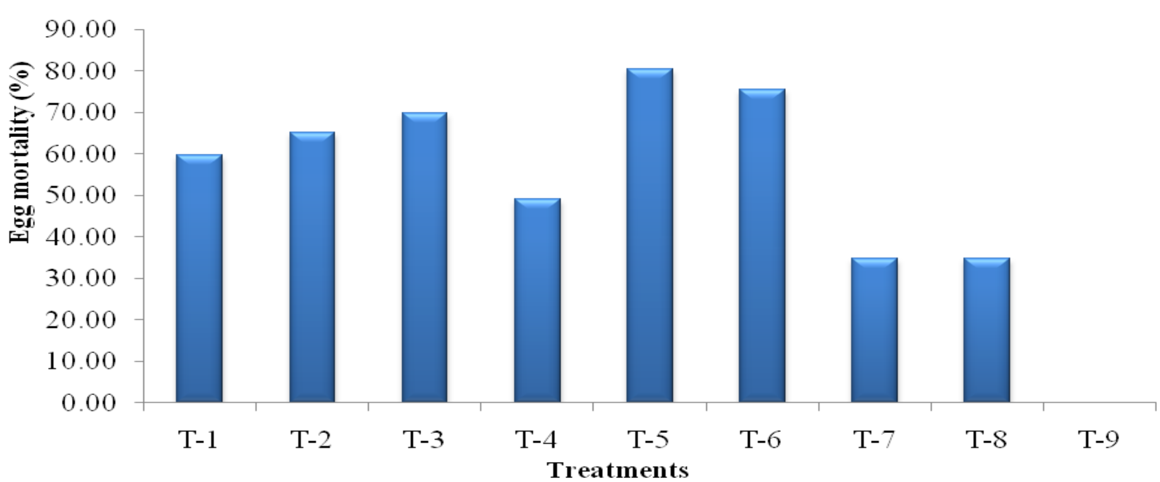

Fig. 1 : Ovicidal toxicity of newer insecticides against *H. armigera* in the laboratory

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