LARVICIDAL EFFICACY OF CYANTRANILIPROLE AGAINST S*podoptera litura* (FABRICIUS) IN COTTON

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ABSTRACT

A larvicidal experiment conducted at Department of Entomology, Anand Agricultural University, Anand, Gujarat during *kharif* 2011 to study the efficacy of cyantraniliprole 10 OD against *S. litura*. Cyantraniliprole are members of a new chemical class called diamide that modulate ryanodine receptors in muscles cells causing uncontrolled release and depletion of calcium. Among the different insecticides cyantraniliprole @ 105 and 90 g a.i./ ha recorded higher per cent larval mortality than the rest of treatments. The cyantraniliprole @ 75 g a.i. /ha, indoxacarb 14.5 SC (75 g a.i./ ha) and endosulfan 35 EC (0.07%) were equally effective against *S. litura*. Cyantraniliprole @ 45 g a.i. /ha was least effective and it was at par with cyantraniliprole @ 60 g a.i./ ha.

KEY WORDS: Cotton, *Spodoptera litura*, Cyantraniliprole, Anthranilic diamide

INTRODUCTION

Cotton is one of the important commercial crop belonging to the family Malvaceae. World total cotton production was recorded 345 lakh bales from the 121.91 lakh hectares of total cultivated area and 481 kg/ ha productivity in 2011-12 (Anon. 2011). In India, 67 per cent produced is consumed directly as a food or feed with remaining 33 per cent as fiber in the textile sector. In India, over 160 species of insect pests have been reported damaging to cotton crop (Agrawal, 1978). Recently, M/s E. I. DuPont India Pvt. Ltd. developed a new molecule cyantraniliprole 10% OD for the control of bollworms in cotton. Cyantraniliprole is the first anthranilic diamide group of insecticide which possess cross spectrum activity against sucking and chewing insect pests. Cyantraniliprole is the second generation ryanodine receptor (RyR) activator from anthranilamide insecticide class. Ryanodine receptors are a distinct class of ligand-gated calcium channels controlling the release of calcium from intracellular stores (Wiles *et al.*, 2011). Cyantraniliprole found effective against most of the lepidopteran insect pests. To check this newer molecule against *Spodoptera litura* as larvicide, an experiment was conducted at Anand.

MATERIALS AND METHODS

An experiment was conducted in completely randomized design with three repetitions as field-cum-laboratory trial during October, 2011 at Anand Agricultural University, Anand on Cotton Hybrid 12. The insecticides (Table 1) were sprayed treatment wise in respective plots. After 6 hours, three cotton leaves were plucked from the respective plots and brought to the laboratory. Under each repetition, 10 numbers of second instars larvae of *S. litura* obtained from laboratory culture were allowed to feed on the treated leaves. The treated leaves were provided to the larvae till 7 days. The observations on larval mortality were recorded at 1, 3, 5 and 7 days after treatments. The data on per cent mortality were corrected using Abbott's formula and subjected to ANOVA.

RESULTS AND DISCUSSION

The data on larval mortality pooled over periods are presented in Table 1. There was significant difference in the larval mortality in different insecticidal treatments after 1, 3, 5 and 7 days.

Among the treatments, the larval mortality was observed in the range of 4.26 to 19.18, 6.46 to 22.37, 6.46 to 32.56 and 4.26 to 19.18 after 1, 3, 5 and 7 days of continuous feeding by larvae, respectively (Table 1). The higher larval mortality noted in cyantraniliprole @ 105 g a. i./ ha and it was at par with cyantraniliprole @ 90 g a.i./ ha. The insecticide cyantraniliprole @ 75 g a.i./ ha was at par with indoxacarb, cyantraniliprole @ 60 g a.i./ ha, endosulfan and cyantraniliprole @ 45 g a.i./ ha after 1 day and the same chronological order of various insecticides was also observed except in case of endosulfan, more effective than cyantraniliprole @ 60 g a.i./ ha after 3 days. Cyantraniliprole @ 105 g a.i./ ha recorded significantly higher larval mortality and it was at par with cyantraniliprole @ 90 g a.i./ ha against *S. litura.* Cyantraniliprole @ 75 g a.i./ ha observed next best treatments and it was at par with cyantraniliprole @ 60 g a.i./ ha, endosulfan, indoxacarb and cyantraniliprole @ 45 g a.i./ha after 5 days of continuous feeding.

After 7 days of treatments, the higher larval mortality of *S. litura* noticed in treatment of cyantraniliprole @ 105 g a.i./ ha and it was at par with cyantraniliprole @ 90 g a.i./ ha. These both treatments found significantly superior than rest of the insecticides. The insecticides indoxacarb, endosulfan and cyantraniliprole @ 75 g a.i./ ha found equally effective against *S. litura* (Table 1).

The data on cumulative corrected per cent larval mortality are presented in Table 1. There was significant difference in different insecticidal treatments. Cyantraniliprole at higher doses (105 and 90 g a.i./ ha) found significantly more effective than rest of the insecticidal treatments. The cyantraniliprole @ 75 g a.i./ ha, indoxacarb and endosulfan were equally effective against *S. litura*. Among the evaluated insecticides, cyantraniliprole @ 45 g a.i./ ha was least effective against *S. litura* and it was at par with cyantraniliprole @ 60 g a.i./ ha. Mandal (2012) also reported the higher effectiveness of cyantraniliprole @ 105 and 90 g a.i./ ha against the leaf eating caterpillar, *S. litura* in tomato under field condition.

CONCLUSION

Overall, the higher dose of cyantraniliprole (105 and 90 g a.i./ ha) recorded higher per cent larval mortality of *S. litura* under field cum-laboratory condition in comparison with indoxacarb and endosulfan.

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Table 1: Toxicity of various insecticidal treatments to *S. litura* under field cum-laboratory Condition

Treatments (g a. i./ ha or Concentration %)	Corrected larval mortality (%) days after spray				
	1	3	5	7	Cumulative
Cyantraniliprole 10 OD @ 45	11.91c (4.26)	14.72b (6.46)	14.72c (6.46)	11.91d (4.26)	27.77e (21.71)
Cyantraniliprole 10 OD @ 60	14.72c (6.46)	14.72b (6.46)	20.35bc (12.09)	14.72cd (6.46)	33.48de (30.43)
Cyantraniliprole 10 OD @ 75	17.54bc (9.08)	20.35b (12.09)	23.16b (15.47)	17.54bc (9.08)	43.79c (47.89)
Cyantraniliprole 10 OD @ 90	23.16b (15.47)	28.23a (22.37)	32.75a (29.27)	25.97a (19.18)	71.14b (89.55)
Cyantraniliprole 10 OD @ 105	25.97a (19.18)	28.23a (22.37)	34.79a (32.56)	25.97a (19.18)	83.69a (94.79)
Indoxacarb 14.5 SC @ 75	17.54bc (9.08)	20.35b (12.09)	17.54bc (9.08)	20.35b (12.09)	41.78cd (44.39)
Endosulfan 35 EC @ 0.07	14.72c (6.46)	17.54b (9.08)	20.35bc (12.09)	17.54b (9.08)	38.25cd (38.33)
Mean	17.94 (9.49)	20.59 (12.37)	23.38 (15.75)	19.14 (10.75)	48.56 (56.20)

ANOVA

S. Em. ±	2.13	2.45	2.26	1.84	2.74
C. D. at 5 %	6.45	7.42	6.86	5.59	8.32
C. V. %	20.54	20.57	16.74	16.67	9.78

Notes: *1. Figures in parentheses are retransformed values; those outside are arc sine transformed values.*

2. Treatment mean with letter(s) in common are not significant at 5 % level of significance within a column.

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