



REGULAR ARTICLE

# EFFECTIVENESS OF VARIOUS INSECTICIDES AGAINST SPOTTED BOLLWORMS (*EARIAS* SPP.) AT SHAHJAHANPUR, U.P., INDIA

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## SUMMARY

In order to evaluate the performance of cypermethrin, fenpropathrin, bifenthrin and cyhalothrin, against spotted bollworm (SBW) (*Earias* spp.) at A Research Farm, Shahjahanpur, U.P. and at a farmer's field for the years 2007 and 2008, studies were carried out in Randomized Complete Block Design with three replications. The data of the spotted bollworms was taken from fruiting bodies of 25 plants selected at random. Bifenthrin and cyhalothrin registered lowest number of spotted bollworm larvae 48 hr after spray and high gain of seed cotton. The efficacy of insecticides is discussed under condition of the area of the study.

**Key words:** Insecticides, Bollworms, U.P

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## 1. Introduction

Spotted bollworms (*Earias vittella* and *E. insulana*) are serious pests of (*Gossypium*) and take a heavy toll on both from germination to maturity of the crops and in certain years has caused 19-20% yield losses in cotton (Kamaluddin, 1994). Besides adopting different control measures varietal resistance and chemical control has been mostly relied upon for the control this pest on cotton (Wahla et al., 1998). The 3 per cent incidence in freshly shed fruiting bodies was determined as the economic threshold level on the basis of better control of bollworms, higher cost/benefit ratio (1:4.61), and increased net income of Rs 1296/ha over recommended schedule with the same number (6) of sprays (Singh and Singh, 1998). Chauke et al. (1998) reported that cypermethrin was effective in controlling spotted bollworms [*Earias vittella* and *E. insulana*]. Seed yields for these treatments were 2.23, 2.26 and 2.14 t/ha, respectively. Applying the pyrethroids in combination with methyl demeton [demeton-methyl] did not increase seed yield. A number of the insecticides mentioned above are currently

available in the local market but the efficacy of these has been reported from the cotton

growing mostly in the irrigated areas of the U.P., India. Shahjahanpur is one such area where cotton has not been popular in many years. Many areas of Shahjahanpur have been brought under cotton cultivation during recent years. It is necessary to investigate the pest status and efficacy of insecticides under the conditions of Shahjahanpur. The present studies describe the effect of cypermethrin, fenpropathrin, bifenthrin and cyhalothrin on spotted bollworm (*Earias* spp.).

## 2. Materials and Methods

The studies of the efficacy of insecticides against spotted bollworms were conducted at Research Farm, Shahjahanpur and at Farmer's field at Shahjahanpur, during years 2007 and 2008. The crop was sown under randomized Complete Block Design, with five treatments including a control and in three replications. The insecticides were sprayed with a knapsack spray in the month of October when infestation reached economic threshold level (5%). The numbers of larvae were counted on 25 randomly

selected plants from squares, flowers and bolls 24 hr before and 48 hr after spray. The details of treatments (formulation and application rate) is as follow:

T1 = check; T2 = cypermethrin 10 EC @ 625ml; T3 = fenpropathrin 10 EC @ 750 ml; T4 = bifenthrin @ 625ml; T5 = cyhalothrin @ 825ml; per acre. The spray was done with the help of Matabi hand operated sprayer fitted with control flow valve (CFV). The sprayer was fitted with an imported hollow cone nozzle with a discharge rate of 0.80 L/min at 2.4 bar pressure. The crop was sprayed with an application rate of 200 L/hectare. This rate of application was selected keeping in view LAI of the crop. Spray was done during day time with temperature averaging 30-35°C at 5.7km/hr North West wind. The ambient conditions were selected to minimize the risk of spray drift and evaporation. Agricultural engineers from Agricultural Mechanization Institute were involved to ensure efficacy of spray machine for spraying of pesticides. Data were analyzed through 2-way ANOVA and LSD at 5% level of probability did comparison of means.

### 3. Results

The efficacy of cypermethrin, fenpropathrin, bifenthrin and cyhalothrin, on spotted bollworm (SBW) (*Earias* spp.) at Research Farm Shahjahanpur, for the years 2007 and 2008 is given in Table 1. The number of larvae (25 plants) before the spray had non-significant difference on all fruiting bodies (square, flower, boll) in all the plots allocated for different treatments in 2007 and 2008 ranging, respectively, p value at 5% (0.63 - 0.75 and 0.11 - 0.16). 48 hr after the spray of different insecticides, mean number of SBW larvae had statistical difference among the treatments. T4 (bifenthrin) and T5 (cyhalothrin) shared the lowest equal number of larvae (0.66) on squares and were statistically similar to T3 (fenpropathrin). Lowest (0.33) number of larvae in flowers was recorded in T4 (bifenthrin) and was statistical at par with T3 (fenpropathrin),

T5 (cyhalothrin). On bolls, the number of larvae in T4, being least, was statistically at par with T3 (fenpropathrin) and T5 (cyhalothrin) in the year 2007 (Table 1). Mean number of SBW larvae was lowest (0.00) on squares in T4 (bifenthrin) plots 48 hr after the spray in the year 2008. All other treatments had non-significant difference among themselves and had number of larvae in range of 1.00 - 1.33. T4 (bifenthrin) and T5 (cyhalothrin) had lowest number of larvae in flowers (0.66) and were statistically similar with T7 (deltamethrin). All the treatments were statistically non-significant among themselves in respect of number of larvae on bolls, having lowest (0.66) in T4, however, significantly from T1 (check), which had 2.66 larvae (Table 1). The efficacy of cypermethrin, fenpropathrin, bifenthrin, and cyhalothrin on spotted bollworm (SBW) (*Earias* spp.) at Farmer's field, Shahjahanpur for the years 2007 and 2008 is given in Table 2. The number of larvae (25 plants) before the spray had non-significant difference on all fruiting bodies (square, flower, boll) in all the plots allocated for different treatments in 2007 and 2008 ranging, respectively, p value at 5% (0.08 - 0.38) and (0.08 - 0.50) (Table 2). T4 had lowest number (0.33) of larvae after 48 hr of spray and was statistically similar to T3 (bifenthrin), on squares. All the treatments had statically similar number of larvae in flowers and on bolls in the year 2003 (Table 2). The significantly lower number of larvae (0.33) was recorded in T4 (cyhalothrin). Highest number of larvae (2.00) in T1 (check) was at par with (cyhalothrin) T5. All other treatments had non-significant difference among the number of larvae in flowers. The number of larvae in bolls had significant difference among the treatments being lowest in T4 (bifenthrin) and T5 (cyhalothrin) (1.00 in each case) (Table 2). Table 3 shows the yield from treated plots (extrapolated into acre). Highest yield was obtained from T5 treated plots at Research Farm and at Farmer's field in the 2007 and 2008 except in 2008 on farmer's field, the yield was not at par with highest (746.2) in T4.

Table 1: Mean number of larvae (from 25 plants) on fruiting bodies of cotton at Research Farm (RF) Shahjahanpur

Treatments	RF 2007						RF 2008					
	24 hr before spray			48 hr before spray			24 hr before spray			48 hr before spray		
	S	F	B	S	F	B	S	F	B	S	F	B
Check	1.66	2.00	2.66	2.00a	2.66a	3.00a	1.66	1.66	2.00	1.66a	3.00a	2.66a
Cypermthrin	1.23	2.00	2.00	1.66ab	1.66b	1.66bc	1.33	3.00	1.33	1.33ab	2.00bc	1.33b
Fenpropethrin	2.0	1.66	2.00	1.33abc	1.33bc	1.66bc	1.00	3.33	1.00	1.00b	2.66ab	1.00b
Bifenthrin	1.33	2.00	2.33	0.66c	0.33c	0.66c	1.33	2.33	1.33	0.00c	0.66d	0.66b
Cyhalothrin	1.00	2.67	2.33	0.66c	1.00bc	1.66bc	1.33	1.00	2.00	1.00b	0.66d	1.00b

in 2007 and 2008

Table 2: Mean number of larvae (from 25 plants) on fruiting bodies of cotton at Farmer's field at Shahjahanpur in 2007 and 2008

Treatments	FF 2007						FF 2008					
	24 hr before spray			48 hr before spray			24 hr before spray			48 hr before spray		
	S	F	B	S	F	B	S	F	B	S	F	B
Check	1.7	1.7	3.3	2.00a	3.33a	3.33a	1.7	1.7	3.3	2.00a	3.00a	3.00a
Cypermthrin	1.3	2.3	2.3	1.33ab	1.67b	2.00b	1.7	2.0	2.3	1.00b	1.33b	2.00b
Fenpropethrin	1.0	1.3	2.3	1.00bc	1.00b	2.00b	1.0	2.0	2.3	1.00b	1.33b	2.33ab
Bifenthrin	2.0	1.7	2.3	0.33c	0.66b	1.00b	2.0	1.7	2.3	0.33c	0.66b	1.00c
Cyhalothrin	1.7	2.3	1.3	1.67ab	1.00b	1.00b	1.7	2.3	1.3	1.66a	1.33b	1.00c

S; squares; F, flowers; B, bolls

#### 4. Discussion

Spotted bollworms are not only pest of cotton but cause a considerable damage to lady's finger too (Kamaluddin, 1994). Control of this pest is very important in both cases. Insecticides of pyrethroids groups are usually recommended for its control (Khan and Ahmad, 1979). The pest load and variety is different from the former areas. A threshold of 5% is recommended in the early August in the various areas but same level of threshold was reached in the month of October in two years in the present locations of the study.

In the present studies the lowest number of larvae and high gain of seed cotton was obtained in bifenthrin and cyhalothrin treated plots. Cypermethrin was not as effective as above mentioned two insecticides and results are not in conformity with those of Chauke *et al.* (1998) and Brar *et al.* (1998) who found it very effective after 72 hr of spray. Deltamethrin was not as effective as bifenthrin and cyhalothrin but yield obtained showed statistically similarity with latter treated plots. In most of the previous studies,

time point for effectiveness is commonly represented as 5-6 days after spray but we have tried to find whether immediate control of this pest is envisaged if the pest breaks out. In this case bifenthrin and cyhalothrin would be remedy against spotted bollworms.

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