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Effect of biobit on reproduction of *Antigastra catalaunalis*

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ABSTRACT

Sesame*(Sesamum indicum*) is commonaly known as til. It is an oldest oil crop and a rich source of protein (24%) and carbohydrates (15%). Due to its nutritional,medicinal and cooking qualities, it is also known as the queen of oils. The crop is grown in a wide range of environments. Now a days sesame crop is cultivated in India, China, Japan, Africa, Cyprus, Syria, France, Africa, Srilanka and Malta.

To increase the productivity of sesame, a large number of insecticides have been used for the control of the capsule borer, *A. catalaunalis*. Biobit in combination with chemical insecticides showed increased toxicity of each insecticide. Worker investigated chemical Biobit for controlling apest *Antigastra catalaunalis,* which spreads diseases on Til, *Sesamum indicum*.

Figure : 00 References : 07 Tables : 02
KEY WORDS : *Antigastra catalaunalis*, Biobit, Leaf dip method, Residue film method, *Sesamum indicum*.

Introduction

Sesame (*Sesamum indicum*) is an industrial crop for oil production with high nutritive and economical values. It is commonly known as Til in Hindi. Sesame,an oldest crop known to man,is cultivated throughout the tropical and warm temperate regions of the world for its excellent quality of oil and meal. Sesame is known as the queen of oils.Hence this oil is used by human beings.

To get the maximum profit from the productivity of sesame,a large number of insecticides and other control measures have been used for the control of the leaf webber and capsule borer, *A. catalaunalis*[3].

In these reports several insecticides namely carbaryl50WP,DICHLORVOS85ec, monocrotophos 36 WSC,chloropyriphos20EC, endosulfan 35 ec, quinalphos 25EC Asfoliar sprays and malathion5 % quinalphos1.5% and phenathoate2% as dust applications have been found, biobit has been found promising against this notorious pest.

Material and Method

One of the most important method of control to this pest is Biocontrol. To control the pest biobit wet table powder containg 25 x 109 viable spores per gram of final product of *B. thuringiensis* was used in this study.

Biobit was obtained in pure form and stock solution used in this investigation, was prepared in distilled water. One gram of biobit was mixed separately in 100ml. of distilled water which gave the concentration of one percent. The concentrations were used against *A. catalunalis*in. This study included 0.10,0.25,0.50,0.75 and 1.0 percent. The *A.catalunalis* was treated with different concentrations of biobit by following two methods:

Leaf Dip Method (LDM)

In this method of treatment,the uniform size of tender leaves were treated with each concentration of biobit and these treated leaves were used as food of *A.catalunalis.*

Residue Film Method (RFM)

In this method of treatment ,1-2 hr old were exposed to a thin film of residue of concentration of biobit for obtaining the thin film of biobit as residue about 10 ml of a concentration of biobit was poured in petridish (10 cm. dia) and the petridish was treated in different angles to spread the biobit on the whole floor area of the petridish and raised periphery.

Studies related to bio control of *A.catalunalis* were conducted experimentally under laboratory conditions of temperature and relative humidity. These studies were carried on the effect of biobit on growth, development, reproduction, sex-specific sterility and the compatibility of biobit with some chemical insecticides

Effect of Biobit on reproduction

The reproduction in *A. catalunalis* under influence was studied under two headings-

1. Effect of biobit on reproductive periods and fecundity
2. Effect of biobit on fertility and incubation period

Effect of Biobit on reproductive periods and fecundity

The pre-oviposition and oviposition periods and the number of eggs laid by a female were studied separately

by applying biobit to larvae and adults.

Effect of Biobit on reproductive periods and fecundity under leaf dip method of treatment

Ten males and ten females were obtained indiscriminately from the earlier treated stock. The females were maintained individually with a male in glass chimney on daily supply of 20% sugar solution for oviposition when these females laid eggs for the first time,pre oviposition period was recorded. The females were maintained till they laid last egg and after that their oviposition period was recorded and their total number of eggs were counted. The study was made separateley for each strength of biobit and records were obtained for them. A control experiment was also set to compare the findings

Effect of Biobit on Reproductive periods and fecundity under residue film method of treatment

Ten males and ten females were selected at random from the laboratory stock. Both males and females were compelled to contact a thin film of strength of biobit for 24 hrs. Thereafter each female was maintained in a glass chimney with a male on 20% sugar solution. They were as such for egg laying and when the first egg laid, the pre-oviposition period was recorded. The females were maintained till the deposition of their last egg , after which the oviposition period was recorded and the study was conducted separately for all concentrations of biobit used in the investigation and the records were obtained.Beside, a control experiment was also designed for comparative study purpose.

Effect on Biobit on fertility and incubation period of *Antigastra catalunalis*

The effect of biobit on fertility and incubation period in *A. catalunalis* was studied with refrence to leaf dip method and topical method as follows:

Effect of biobit on fertility and incubation period of *Antigastra catalunalis* under leaf dip method of treatment

Ten males and ten females, each one hour old were selected indiscriminately from the earlier treated laboratory stock . These moths were maintained as pairs in glass chimneys with 20% sugar solution. Each pair constituted a replicate. The egg from each replicate collected daily and kept datewise on moist filter paper. On hatching of the eggs, the number of eggs hatched and their incubation period were recorded. The study was undertaken with reference to different strength of biobit and related records were obtained. A control experiment was also set for comparative study purpose.

Effect of biobit on fertility and incubation period of *Antigastra catalunalis* under residue film method of treatment

For the study,ten males and ten females were drawn indiscriminately from the laboratory stock. These moths were complete to contact thin residue film of strength of biobit for 24 hrs and thereafter these were maintained as pairs in glass chimneys with 20% suagr solution . Each chimney had one pair of moth. Each moth pair made a replicate. Eggs from each replicate collected daily and kept datewise on moist filter paper. On hatching of the eggs, their viability and incubation period were recorded. This experiment was also accompanied by a control experiment.

The records pertained to the reduction in the fecundity, net sterility and control over reproduction were also obtained as described below:

The reduction in the fecundity was calculated following the formula

$$\% \text{ Reduction in fecundity} = \frac{\text{Eggs laid in normal - Eggs laid in test}}{\text{Eggs laid in normal}} \times 100$$

The sterility was calculated by the formula 1 as below

$$\% \text{ Net sterility} = \frac{\text{\% sterility in test-\% sterility in normal}}{\text{100- \% sterility in normal}} \times 100$$

The control over the reproduction was calculated by following the formula as below:

$$\% \text{ Control over reproduction} = \frac{\text{Eggs hatched in normal – Eggs hatched in test}}{\text{Eggs hatched in normal}} \times 100$$

TABLE-1 : Effect of "Biobit" on reproductive periods in *A. catalaunalis* at different concentrations under different modes of treatment (values are mean +SE.)

Mode of treatment	Concentration (%)	pre-oviposition period (days)	oviposition period (days)
L.D.M.	0.10	2.93 ± 0.22	4.22 ± 0.32
	0.25	2.86 ± 0.24	3.60 ± 0.30
	0.50	2.68 ± 0.44	3.32 ±0.43
	0.75	2.85 ± 0.13	3.06 ±0.28
	1.00	2.86 ± 0.12	2.12 ± 0.24
R.F.M.	0.10	2.92 ± 0.42	4.62 ± 0.14
	0.25	2.82 ± 0.32	3.90 ± 0.26
	0.50	2.65 ± 0.40	3.41± 0.28
	0.75	2.82 ± 0.12	3.34± 0.40
	1.00	2.82 ±0.13	2.24± 0.23
	CONTROL	1.68 ± 0.22	4.82 ± 0.73

Among the various factors responsible for low yield, damage due to insect pests is one of the major one. *A. Catalaunalis* is considered as key pest of regular occurrence.

For the control of *A. catalaunali*s, the administration of different concentrations of biobit were made by leaf dip method and residue film method. To evaluate the effect of biobit on growth and development, several experiments were done in laboratory. Sterilizing effect on male and females *A. catalaunalis* was also studied experimentally. Effect of chemical insecticides and efficacy of biobit in combination with chemical insecticides against five days old larvae of *A. catalaunalis* was also studied.

Result and Discussion

Result of the present investigation have been presented (Tables-1&2). The relative toxicity and toxicity of all the five insecticides (Endosulfan, Malathion, Monocrotophos, Cypermathrin, and Feneleate) showed that Cypermathrin was the most toxic insecticide. It was also found that there is a negative co-relation between the LC_{50} values and toxicity of cypermathrin (11.60), Fenvelerate (10.30), Monocrotophos (2.21), Endosulfan (1.20) and Malathion (1.00) times respectively was calculated on the basis of bio-efficacy test.

Biobit in combination with chemical insecticides showed increased toxicity of each insecticide. It contributed (3.375 times) toxicity of each insecticide. It contributed (3.375 times) toxicity when mixed with monocrotophos whereas it was minimum (2.2086 times) in combination with cypermathrin. Results showed that the insecticides which belong to santheticpyethroid group were more toxic than any other group of insecticides. The most toxic compound recorded was cypermathrin and it was closely followed by Fenvelerate Endosulfan, Malathion and Monocrotophos .

The frequent inspections and surveys of sesame crops during three continuous years at insectory . D.V College, Orai Jalaun (UP) revealed that 28 insect pests infested late sown kharif and semi-rabi sesame crops.

The size of the pest complex was not constant. It kept on changing in the crop due to addition , deletion and reappearance of pests.

The infestation of the most of the above mentioned

TABLE-2 : Effect of biobit on fecundity and fertility in *A. .catalaunalis* at different concentrations under different modes of treatment. (Values are mean +.- SE)

Mode of treatment	concentration	No. of eggs laid by a female	No. of eggs hatced	Hatched (%)	Incubation period (days)
L.D.M.	0.10	130.6 ±3.32	70.8 +3.62	53.60	3.24+ 0.54
	0.25	120+3.38	60.0+4.24	50.00	3.56+0.32
	0.50	110.3+2.52	44.3+2.76	40.20	3.92+0.14
	0.75	81.2+3.46	23.2+4.34	28.60	3.94+0.24
	1.00	40.4+2.20	4.3+1.42	8.30	4.42+0.12
R.F.M.	0.10	130.4+2.32	74.5+2.22	54.60	3.26+0.32
	0.25	122.5+3.32	65.4+2.33	53.40	3.44+0.32
	0.50	111.2+2.42	48.3+2.35	43.50	3.87+0.23
	0.75	89.4+3.26	19.1+3.44	21.40	3.97+0.12
	1.00	50.3+2.45	7.7+1.73	14.60	4.02+0.14
	Control	220.8+3.20	198.2+2.37	90.20	2.28+0.24

insect species in the sesame crop from different parts of India has already been reported by a good number of workers[1-7].

It was recorded for 3 continuous years and the related observations showed that *Antigastra catalaunalis* was the most regular pest in the sesame crop. It prevailed in the crop from July, 01 to December, 01. Its incidence was comparatively high.

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