



ORIGINAL ARTICLE

Effect of *Bacillus thuringiensis* on reproduction in *Diacrisia obliqua* Walker

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ABSTRACT

Diacrisia obliqua Walker belongs to order Lepidoptera of class insecta. It is a serious pest of various crops of economic importance. It causes a lot of damage to crops resulting in economic loss to farmers. In order to control this pest, commercial preparation of *Bacillus thuringiensis* (B.t.) (a bacterium) was administered and tested against this pest. It was found that *Bacillus thuringiensis* (B.t.) reduces reproduction in the insect and causes sterility from lowest concentration (0.05%) to highest concentration (1.0%) of the bacterial preparation.

Key words: *Diacrisia*, *Bacillus thuringiensis* (B.t.), Pest

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INTRODUCTION

Diacrisia obliqua is a serious polyphagous pest causing remarkable damage to several crops. Farmers have been using chemical pesticides to control this pest. But Chemical pesticides are injurious to human & pet animals. They also cause development of resistance. They cause environmental pollution. So microorganisms like bacteria, virus & fungi are being used as biopesticides & have been tested against various pests (Gupta, 2016).

Bacillus thuringiensis (B.t.) is a gram positive bacteria. It has been reported to be pathogenic to more than 500 insect species. It secretes a number of toxins during sporulation. δ endotoxin is one of the most important toxins. It is proteinaceous in nature (Bulla *et. al.*, 1977). It works on the cells of midgut epithelium of insects upon ingestion.

MATERIAL & METHOD

Male & female moths were captured to perform the experiment. They were kept carefully. These insects ensured the regular supply of insects by reproduction. Adults were kept in glass chimneys but the larvae were kept in large petridishes. When the larvae were full grown, they were transferred to pneumatic trough. 10-15 cm thick soil was kept in troughs on their bottom, for larvae to pupate. Dipel is a commercial preparation of B.t. It is a wetttable powder. It contains 25×10^9 viable spores of B.t. per gram of final product. To increase the stickyness of dipel, 2% skimmed milk powder was added to it and we used LDM method to test the effectiveness of dipel on insects.

LEAF DIP METHOD (LDM): In this method, leaves that were to be given to larvae to feed on were treated with different concentration of dipel.

Various statistical analysis have been applied to study the nature and relationship between variables, to know the reliability and precision in the results obtained, to test the

significant difference between observed and expected values. These statistical methods include- Standard Error, Test of Significance (Chi square Test) and Regression Equation.

OBSERVATION

The results obtained in different experiments are presented in following table-

Table 1: Effect of Dipel on reproduction in *D. obliqua* (Values are mean \pm S.E.)

Mating between	No. of eggs laid (mean \pm S.E.)	No. of eggs hatched (mean \pm S.E.)	Hatching (%)	% Net sterility
UNT F X TR M	92.5 \pm 4.34	42.4 \pm 2.14	45.65	54.5
TR F X UNT M	81.7 \pm 2.35	31.4 \pm 2.63	38.52	61.3
TR F X TR M	70.4 \pm 4.36	11.2 \pm 1.35	15.71	72.7
CONTROL	346.2 \pm 4.24	310.3 \pm 2.14	89.60	-

RESULT & DISCUSSION

The cross between untreated female and treated male caused fall in fecundity (92.5 eggs/female) as compared to control experiment i. e. between untreated female and untreated male (346.2 eggs/female). 45.65 % hatching was recorded in the eggs obtained from this pair. The mating between treated female and untreated male reduced the fecundity (81.7 eggs/female). The fertility was also reduced 38.52 % significantly.

The mating between treated male and treated female caused fall in fecundity (70.4 eggs/female) and fertility 15.71%. The per cent net sterility was also increased 72.7%.

The results show that *Bacillus thuringiensis* (*B.t.*) has potential to affect the reproduction and cause sterility in *Diacrisia obliqua*.

Chaturvedi (2002) and Bajpai (2003) also worked on microbial preparations against sex oriented sterilizing influence on different insects. The present findings are in correlation with the results of earlier workers. The present investigation also reveals that bacterial preparation is differently effective in male and female. Bacterial preparation induces more sterility in case where both sexes are treated in comparison to the case where only one sex is treated.

Similar findings have also been reported earlier by Sharma (1993) by using insect growth regulators to observe the effect of these on development and sterility of *U. pulchella*.

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