

## Evaluation Of Some Chemicals And Bio-Control Agents Against Capsicum Fruit Borer *Helicoverpa Armigera* (Hubner)

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### ABSTRACT

The efficacy of two insecticides viz., endosulfan and monochrotophos and three bio-control agents like nuclear polyhedrosis virus, *Bacillus thuringiensis* and *Beauveria bassiana* applied alone and in combination thrice, at 50 per cent flowering, fruit initiation stage and 15 days after second application were evaluated during *Rabi* 2002-03 and 2003-04 against *Helicoverpa armigera* (Hubner) on capsicum. All the treatments were found significantly effective in reducing the fruit borer incidence and increasing the yields compared with control. Application of nuclear polyhedrosis virus (250 LE ha<sup>-1</sup>) in combination with monochrotophos (0.025%) was the most effective treatment in controlling the pod borer infestation resulting lowest fruit damage (8.60 and 7.40%), highest fruit yield (22.80 and 24.10 t ha<sup>-1</sup>) and maximum net return (Rs. 49160 ha<sup>-1</sup>). Moreover, the maximum cost benefit ratio (17.5) was obtained in the treatment with spray of endosulfan (0.07%) or monochrotophos (0.05%).

**Key words:** Capsicum, *Helicoverpa armigera*, Insecticides, bio-control agents

### INTRODUCTION

Capsicum (*Capsicum annum* L.) is an important vegetable cash crop gaining popularity because of its remunerative price in the market. The production technology of capsicum is high cost oriented as it demands more input compared with other crops (Kalloo, 1996). The most important factor limiting the successful cultivation of this crop is the attack of insect pests, of which capsicum fruit borer, *Helicoverpa armigera* (Hubner) is the most serious. A number of chemical insecticides have been reported to be effective against this pest (Singh and Chahal, 1978 and Abrol and Bhat, 1996). However, the excessive use of the insecticides is not desirable because of its residual effects on quality of the harvesting fruits and also there is a possibility of their accumulation in food chains. Keeping these facts in view, emphasis is being given particularly on the use of bio control agents, which fit well in pest management programme. Therefore, the present investigation was carried out to evaluate the efficacy of some promising insecticides and bio control agents alone and their combinations under field conditions against *H. armigera*.

### MATERIALS AND METHODS

The Field experiment was carried out during *Rabi* 2002-03 and 2003-04 at Bareilly district of Uttar Pradesh

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in a randomized block design with three replications. Nursery of variety *Indira* was sown in the first week of August in poly house and five weeks old seedlings were transplanted at 70x50 cm. on ridges in the plot of 10x5 m. The recommended cultural practices were followed to raise the crop. There were nine treatments including control (Table-1). Three sprays of each treatment at 50 per cent flowering, fruit initiation stage and 15 days after second application were given with knapsack sprayer using 500 l/ha. of spray fluid. Observations were recorded on ten randomly selected plants from three central rows leaving one meter border area. Data on fruit damage and fruit yield were recorded at each picking. Cumulative yield of each picking was taken as yield per hectare. Statistical analysis was done as suggested by Panse and Sukhatme (1985).

### RESULTS AND DISCUSSION

All the treatments applied either alone or in combinations were effective in reducing the fruit borer infestation and thus increasing the yield significantly as compared to the control during both the years (Table 1). In treated plots, the fruit borer damage ranged from 8.60 to 16.40 per cent and 7.40 to 15.26 per cent as against 33.50 and 27.40 per cent in control plot during 2002-03 and 2003-04, respectively. The minimum fruit damage (8.60 and 7.40%) was recorded in plots (T<sub>9</sub>) sprayed thrice with nuclear polyhedrosis virus @ 250 LE ha<sup>-1</sup> in combination