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Research Note

Effect of some microbial insections against *Plutella xylostella*

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Most of the cruciferous vegetables are vulnerable to many insect pests of which the diamond back moth (DBM), *Plutella xylostella* (L.) is one of the major productive constraints particularly for early and late winter cabbage and cauliflower grown in West Bengal. DBM attacks the crop from the nursery stage onwards and can cause 52 per cent loss in marketable yield in cabbage (Krishna Kumar *et al*., 1986). Thus, it may reduce the yield to a considerable extent. As a result of intensive insecticide use, the insect has developed resistance to nearly all classes of insecticides used against it (Shelton *et al.*, 1993). Thus use of microbial pesticides may be one of the alternative ways to combat the problem of resistance in the pest. Moreover, there is an increased realization the world over now to develop bio-intensive pest management in which one of the important elements is microbial insecticides. In this direction, *Metarhizium anisopliae* has been reported to cause the disease in lepidopterans including *Plutella xylostella* (Robert and Marchal, 1980). The efficacy of *Beauveria bassiana* against *Plutella xylostella* in cabbage has been evaluated and resulted reduced infestation with increased control measures (Razek *et al*., 2006). Since the early 1900's *Bacillus* group has received great attention for its use as bio-pesticide against a variety of insect pests belonging to the order of Lepidoptera, Coleoptera and Diptera (Eswarapriya *et al.*, 2010). By taking all the above mentioned facts into consideration, the present study was conducted to evaluate the different available entomopathogens against third instars larvae of DBM under laboratory situation.

This experiment was conducted in IPM Laboratory of Directorate of Research, Bidhan Chandra Krishi Viswavidyalaya, Kalyani, W.B. at 18-25^{0}C room temperature and 65 -75 per cent R.H. Larvae were collected from untreated heavily infested field of cabbage during the crop season. Among microbials, the commercial *Bacillus thuringiensis* var *kurstaki* (*B.t.k*) 5 per cent WP (Halt), *B.t.k.* 8L (Dipel), *Beauveria bassiana* 1 per cent WP (Daman) and *Metarhizium anisopliae* 1 per cent WP (Kalichakra) were taken for study. After collection only third instars larvae were used for laboratory evaluation of above mentioned microbials. The required concentration was made for each treatment and small pieces of fresh thoroughly washed cabbage leaves were dipped in respective pesticide solution and then dried under shade. Eight hours starved larvae were allowed to feed on the treated leaves for 24 hours then they were transferred to fresh cabbage leaves. An untreated control lot was maintained as check where only water was used. Each treatment was replicated four times and 10 larvae were released for each replication. The observations on mortality were taken at 48, 72 and 96 hours after exposure of treatment. The data on per cent mortality were corrected by using Abbott's (1925) formula and analyzed statistically through duncan multiple range test (DMRT).

The results of the laboratory experiment to evaluate the efficacy of different microbial pesticides against *Plutella xylostella* Linn. are presented in the Table 1. All the treatments were significantly superior over untreated control. However, the maximum larval mortality of about 96.60 per cent was observed only in *B.t.k* 8L 5 per cent WP (Dipel) @ 0.2 per cent followed by 92.96 per cent in another formulation of *B.t.k* 5 per cent WP (Halt) @ 0.2 per cent at 96 hours after treatment and

Table 1: Efficacy of different microbial pesticides under laboratory condition against *Plutella xylostella* Linn

Treatments	Concentration (%)	Mortality % at different hours after treatment		
		48	72	96
B.t.k. 8L (Dipel)	0.2	46.92[a] (53.33)	68.34[a] (85.93)	82.97[a] (96.60)
B.t.k. 5% WP (Halt)	0.2	45.00[a] (50.00)	65.62[a] (82.59)	77.10[a] (92.96)
Beauveria bassiana 1% WP (Daman)	0.5	23.86[b] (16.67)	35.53[b] (34.07)	40.69[b] (42.59)
Metarhizium anisopliae 1% WP (Kalichakra)	0.5	21.14[b] (13.33)	33.89[b] (31.11)	36.76[b] (35.93)
Untreated control	-	0.99[c] (0.00)	6.80[c] (3.33)	12.62[c] (6.67)
S.E. (±)	-	2.03	4.44	5.22
C.D. (P=0.05)		6.60	13.17	17.03

Figures within parenthesis are angular transformed values
In a column, means followed by same alphabet are not significantly different (P=0.05) by DMRT

they were statistically at par with each other throughout the investigation period. Among the fungal bio-agents, *Beauveria bassiana* 1 per cent WP (2 x 10^9 spores/g) @ 0.5 per cent provided 42.59 per cent larval mortality at 4 days after treatment which was significantly at par with that of lower mortality (35.93 %) provided by *Metarhizium anisopliae* 1 per cent WP (2 x 10^9 spores/g) @ 0.5 per cent. The present investigation showed that in all the treatments, mortality percent increased with the increase in period of observation from 48 hours to 96 hours after treatment. The larval mortality percent of *Plutella xylostella* in two formulations of *Btk* (Dipel and Halt) were significantly higher than that of fungal based entomopathogens such as *Beauveria bassiana* (Daman) and *Metarhizium anisopliae* (Kalichakra). So, the findings of the present study are in accordance with the findings of Chatterjee and Senapati (2000) who reported 83.01 per cent mortality of *Btk* against Diamond Back Moth (*Plutella xylostella*). Kato *et al.* (1989) reported the pathogenicity of *Beauveria bassiana*, *Paecilomyces fumosoroseus* and *Metarhizium anisopliae* collected from soil to *Plutella xylostella.* From the present study, it may be concluded that both formulations of *Btk* could be successfully used in the management of *Plutella xylostella* in bio-intensive pest management of cruciferous crops.

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