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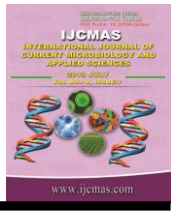

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Joint Action of Entomopathogenic Fungus *Beauveria bassiana* and Certain Indigenous Products against *Plutella Xylostella* (Linn) Infesting Cabbage

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A B S T R A C T

The present study was conducted to know the comparative efficacy of Entomopathogenic fungus *Beauveria bassiana* and certain indigenous products against the larvae of diamond back moth, *Plutella xylostella* (Linn) on Cabbage (*Brassica oleracea*) a lab trial was conducted during the 2017-2018 at SHUATS, Allahabad. All the treatments were found significantly superior over control. Among the treatments the highest larval mortality of 100 % with the treatment T_4 and the minimum larval mortality of 26.666% was recorded with the treatment T_2 (NL+BBM). Each treatment was replicated three times and mortality of different larval instar (1^{st}, 3^{rd}, 5^{th}) was recorded after. 24, 48 and 72 hours, mortality at 72 hours was highest over 48 and 24 hours and mortality in 1^{st} instar was found more in comparison to 3^{rd} and 5^{th} instar.

Introduction

Cabbage (Brassica Oleracea Var. Capitata) is one of the most important cruciferous vegetable grown all over the country with 0.27 million hector areas and 5.90 million tones production. Among the pest complex of cabbage, diamond back moth (DBM) *Plutella Xylosletta* (Linn) is the most destructive and dreaded Pest. It was reported that52 percent loss in marketable yield of cabbage due to attack of *Plutella xylostella* (Krishna Kumar, 1983). Indigenous products Viz. Neem products are not only effective against the crop pest but also ecologically safe and free from residual problems. Neem oil 1% water extract of neem leaves-40% and neem kernel extract-2% have been found effective against bridjly in linseed (Gupta *et al.*, 2000) and so, attention is now being focused on the use of biopesticides, *Beauveria bassiana* Constituting on the important component to

supplement or as on alternate to synthetic chemicals. Keeping these facts in view, present study were conducted to evaluate the efficacy of Indigenous products and Entomopathogenic fungus *Beauveria bassiana* against *Plutella Xylostella* under laboratory condition.

Materials and Methods

The trial was carried out for the management of Plutella Xylostella at the Department of Biological Sciences, SHUATS, Prayagraj for deterning the efficacy of different treatments against the Ist instar, 3rd instar and 5th instar larvae. The larvae of *Plutella Xylostella* (Linn.) were kept in Jar (6×8 inch) covered by muslin cloth. The insect were fed on fresh capable leaves at 28+2^{0}C and 70-80% R.H. Laboratory culture of *Plutella Xylostella*, was maintained on excised leaves of cabbage as per the method elaborated by standard methods (Sood *et al.*, 1996). There were 11 treatment including control.

Details of this treatment

T_1 -Neem leaf + Buffalo Urine 4%

T_2 -Neem leaf + Buffalo Butter Milk 4%

T_3 -NSKE + Buffalo Butter Milk 4%

T_4-D.D.V.P. 0.05%

T_5-D.D.V.P. 0.25%+ *Beauveriabassiana* 2%

T_6- D.D.V.P. 0.025%+ *Beauveriabassiana* 4%

T_7- D.D.V.P. 0.025%+ Neem leaf +Buffalow Butter Milk 2%

T_8- D.D.V.P. 0.025%+ Neem leaf + Buffalo Urine 2%

T_9-D.D.V.P. 0.025%+NSKE+ Buffalo Butter Milk 2%

T_{10}-D.D.V.P. 0.025% + N.S.K.E. + Buffalow Urine 2%

T_0-Control (D.W.)

Results and Discussion

The data on efficacy of Indigenous product applied in combination with insecticide in the control of larvae *Plutella Xylostella* are presented in the Table 1, 2 and 3.

In the present study, the mortality of *Spodopteralitura* was significantly more by T_4 (DDVP 0.05%) was found to be superiors in larval. Population reduction followed by T-$_6$>T_5> T_{10}> T_9> T_3> T_1> T_2. The mortality in 1st instar larval is significantly more over 3rd and 5th instar larvae and mortality at 72 hours was highest over 48 hrs and 24 hrs.

The results of the present study corraborate the finding of (Aggarwal, 1990; Ali- Niazee *et al.*, 1997; Bhalla *et al.*, 1991; Schmutterce, 1990; Verma *et al.*, 1994). They reported that younger instars were more susceptible to HNSKE than older one of *S.litura* Combined effect of BTK and SINPV with of *S. litura*on cauliflower (Masuda, 2001; Srinivasan, 2004; Sood *et al.*, 1996). Yoon *et al.*, (1999) also reported the efficacy of mixture of insecticides. The treatment of DDVP solution recorded highest mortality 100% on I, III, V instar larvae at 72 hrs, Application of treatments was done by leaf dip or larval feeding T_1> T_2> T_0 and the order of mortality recorded was as 1st> 3rd> 5th instar.

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Table.1 Effect of different Treatment on 1st, 3rd, 5th instar larvae of *Plutella xylostella* when treated for 24 hours through leaf dip method

Treatment	1st instar		3rd instar		5th instar	
	% mortality	% net mortality	% mortality	%net mortality	% mortality	**% net mortality**
T1	46.666	42.857	33.333	28.571	30.000	**25.000**
T2	40.00	35.714	30.000	25.00	26.666	**21.429**
T3	50.000	46.429	46.666	42.857	46.666	**42.857**
T4	100.000	100.000	96.666	96.429	96.666	**96.429**
T5	76.666	75.000	70.000	67.857	70.000	**67.857**
T6	80.000	78.571	76.666	75.000	76.666	**75.000**
T7	63.333	60.714	60.000	57.143	56.666	**53.571**
T8	63.333	60.714	63.333	60.724	60.000	**57.143**
T9	56.666	53.571	53.333	50.000	53.333	**50.00**
T10	70.000	67.857	66.666	64.296	63.333	**60.714**
T0	6.666	0.000	6.666	0.000	6.6666	**0**
Mean	**58.72**	**(56.49)**	**54.84**	**(51.62)**	**53.32**	**(49.88)**

Table.2 Effect of different Treatment on 1st, 3rd, 5th instar larvae of *Plutella xylostella* when treated for 48 hours through leaf dip method

Treatment	1st instar		3rd instar		5th instar	
	% mortality	% net mortality	% mortality	% net mortality	% mortality	**% net mortality**
T1	50.000	46.421	40.00	35.714	36.666	**32.143**
T2	43.333	39.289	40.00	35.714	33.333	**28.571**
T3	53.333	50.00	50.00	46.421	46.666	**42.857**
T4	100.00	100.00	100.00	100.00	100.00	**100.000**
T5	76.666	75.000	73.333	71.429	70.000	**67.857**
T6	83.333	82.142	80.000	78.571	76.666	**75.0000**
T7	63.333	60.000	60.000	57.143	56.666	**53.571**
T8	70.00	714	60.000	57.143	60.000	**57.143**
T9	60.00	67.857	56.666	53.571	53.333	**50.000**
T10	73.333	57.143	66.666	64.286	63.333	**60.714**
T0	6.666	0.00	6.666	0.00	6.666	**0.000**
Mean	**61.81**	**59.29**	**57.67**	**53.56**	**54.84**	**51.534**

Table.3 Effect of different Treatment on 1st, 3rd, 5th instar larvae of *Plutella xylostella* when treated for 72 hours through leaf dip method

Treatment	1st instar		3rd instar		5th instar	
	% mortality	%net mortality	% mortality	%net mortality	% mortality	**%net mortality**
T1	53.333	50.000	50.000	46.429	43.333	**39.286**
T2	46.666	42.857	46.666	42.857	43.333	**39.286**
T3	60.000	57.143	56.666	53.571	50.000	**46.429**
T4	100.000	100.000	100.00	100.00	100.00	**100.00**
T5	83.333	82.143	76.666	75.000	73.333	**71.429**
T6	86.6666	85.714	83.333	82.143	83.333	**82.143**
T7	66.666	63.296	63.333	60.714	63.333	**60.714**
T8	76.666	75.000	73.333	71.429	66.666	**64.286**
T9	63.3333	60.714	60.333	57.143	56.666	**53.571**
T10	80.000	78.571	73.333	71.429	70.000	**67.857**
T0	6.6666	0.000	6.666	0.000	6.666	**0.000**
Mean	**75.57**	**69.70**	**62.75**	**55.81**	**59.66**	**52.85**

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