

Short communication

Comparative efficacy of certain botanicals and bioagents against pod borer, *Helicoverpa armigera* on fieldbean [*Lablab purpureus* (L.)]

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ABSTRACT

The occurrence of field bean pod borer *Helicoverpa armigera* (Hubner) in 2013-2014 *Kharif* season commences from 6th standard week (February second week) with an average of 0.25 larvae/plant. There after declined trend was observed. It was observed that the temperature between 25-35° C favored the multiplication of gram pod borer whereas more than 35° C temperature might be attributed as to decline of the larval population. The results obtained on an average pod damage percentage of *Helicoverpa armigera* (Hubner) on pods damage percentage evaluating each treatment for pod borer management have been described thoroughly all the treatments were found to be significantly over the control. NSKE gave the highest percentage of pod damage of pod damage reduction and emamectin benzoate 5SG was found to be next effective treatment (13.23%). The yield and cost benefit ratio (C:B ratio) was also found maximum in NSKE treated plots. However emamectin benzoate recorded second highest C:B ratio of 1:2:25. Among bio-agent HaNPV@250 LE showed maximum efficacy against pod borer with C:B ratio 1:2:10. The plant products also achieve certain range of mortality but are less effective when compare to new insecticide molecules because they are highly specific and effective.

Key words: Bioagents, Botanicals, Field bean, *Helicoverpa armigera*, Management

Fieldbean [*Lablab purpureus* L.] known as Sem, Dolichos bean, Hyacinth bean or the kannada name is avarekai. Field bean is one of the most ancient crops among cultivated plants. In India, it is being cultivated in Karnataka, Tamil Nadu, Andhra Pradesh, Kerala and Assam. In Karnataka, Dolichos bean is cultivated in 0.77 lakh hectares with an annual production of 0.17 lakh tonnes with productivity rate of 183 kg/ha (Byrappa *et al.* 2012). In field bean recorded as many as 55 species of insects and one species of mite feeding on the crop from seedling stage till harvest of the crop. Among them, the pod borers are considered to be the most devastating pests causing pod loss to the tune of nearly 54% (20 q/ha) The damage due to pod borers alone was estimated to be 80 percent they damage even up to 90-95 per cent. The pod borers of field bean include *Helicoverpa armigera* (Hubner), *Adisura Atkinsoni* (Moore), *Marucate stulalis*, *Etiellaz inckenella*

(Treitschke), *Sphenar chescaffer* (Zeller), *Exelastis atomosa* (Walshingham), *Callosobruchus chinensis* (Linnaeus) and *Lampides boeticus* (Linnaeus)

MATERIALS AND METHODS

Studies on the comparative efficacy of botanicals and bio-agents against pod borer, *Helicoverpa armigera* (Hubner) on field bean *Lablab purpureus* (L.) during *kharif* season of 2013-2014 was carried out at the Research Farm of Sam Higginbottom Institute of Agriculture Technology & Science, (Deemed-to-be-University), Allahabad. The experiment was laid out in Randomized Block Design (RBD) with eight treatments replicated thrice in 4m² plot size. This investigation was carried out on 'Long green' a field bean variety. All the recommended agronomic practices were followed to raise the crop. Four botanicals, two bio-agents and one chemical insecticide were evaluated against the field bean pod borer, *Helicoverpa armigera*. The treatments were imposed by using hand sprayer @ 400-500 litres of spray solution/hectare depending on stage of the crop. The crop received two sprays, the first being given when the damage crossed economic threshold while, the second spray was imposed 20 days after first spray. The observation of pods damaged and total pods was recorded on 5 randomly selected plants in each plot. The first and second spray whereas, the post-treatment observations were made on 3rd, 7th and 14th day after each spray and analyzed statistically for variance to compare the treatment means.

RESULTS AND DISCUSSION

Efficacy of certain botanicals and bio-agents: All the treatments were found to be significantly superior over control. NSKE was performed more effective in percentage of pod damage 15.4% Pachundkar *et al.* (2013) reported that NSKE gave the highest percentage of pod damage reduction and emamectin benzoate 5 SG was found to be next effective treatment (13.23%). Reported that emamectin benzoate proved to be the best after NSKE in reducing number of larvae on the basis of 3DAS, 7DAS, 14 DAS data.

Economics of various treatments: Among all treatments higher cost benefit ratio was obtained from NSKE treated plots is 1:2.42 yield and these results are in accordance

Table 1. Efficacy of botanicals and bio-agents against field bean pod borer *H. armigera* during Kharif season 2013-2014.

Tr. No.	Treatment	Dosage	Percentage infestation reduction in pod damage			
			3DAS	7DAS	14DAS	Mean
T ₁	NSKE(Neem seed kernel extract)	5%	18.78(25.681)	9.91(18.349)	16.75(24.159)	15.41
T ₂	Emamectin benzoate5SG	5gm/lit	17.21(24.510)	6.42(14.677)	16.08(23.641)	13.23
T ₃	HaNPV	250LE/ha	16.85(24.235)	9.03(17.488)	14.71(22.553)	13.53
T ₄	Neem oil	3ml/lit	14.57(22.569)	7.44(16.525)	14.35(22.423)	12.12
T ₅	Pongamia Seed extract	5ml/lit	14.73(22.439)	8.09(15.829)	14.55(22.260)	12.46
T ₆	CGKE(ChilliGarlic kerosene extract)		13.40(22.521)	7.63(17.287)	13.48(23.366)	11.50
T ₇	<i>Bacillus thuringiensis</i> @ 1kg/ha	1kg/ha	14.67(21.473)	8.83(16.035)	15.73(21.540)	13.08
T ₀	Control	13.40(21.473)	7.63(16.035)	13.48(21.540)	11.50
	Overall Mean		19.17	12.49	18.61	
	F- test		S	S	S	
	S. Ed. (±)		6.012	4.010	3.671	
	C. D. (P = 0.05)		12.746	8.501	7.783	

Figures in parenthesis are arc sin transformed values

Table 3. Economics of field bean pod borer management using botanicals and bio-agents against field bean pod borer *H. armigera* during kharif season, 2013-2014.

Tr. No:	Treatments	Cost of yield (Rs/q)	Total cost of yield (Rs/ha)	Common cost (Rs/ha)	Treatment cost (Rs/ha)	Total cost (Rs/ha)	Net returns (Rs/ha)	C:B ratio
T ₁	NSKE (Neem seed kernel extract)	4643	6,03,590	1,74,464.42	2000	1,76,464.42	427125.58	1:2.42
T ₂	Emamectin benzoate5SG	4643	5,75,732	1,74,464.42	2440	176904.42	39887.50	1:2.25
T ₃	HaNPV	4643	5,47,874	1,74,464.42	2050	176514.42	371359.58	1:2.10
T ₄	Neem oil	4643	5,47,874	1,74,464.42	1550	176014.42	223383.58	1:1.27
T ₅	Pongamia seed extract	4643	4,27,156	1,74,464.42	1100	175564.42	251591.58	1:1.43
T ₆	CGKE (Chilli Garlic kerosene extract)	4643	3,34,296	1,74,464.42	2405	176869.42	157426.58	1:0.89
T ₇	<i>Bacillus thuringiensis</i> @ 1kg/ha	4643	4,92,158	1,74,464.42	1800	174264.42	315893.58	1:1.79
T ₀	Control	4643	2,92,509	1,74,464.42	-----	174464.42	118044.58	1:0.67

with those obtained by Bhushan *et al.* (2011) and cost benefit ratio (C:B ratio) was also found maximum in the NSKE treated plots suggesting that these integrated pest management components can be incorporated in the management Karabhantanal SS and Awaknavar JS (2012) reported that NSKE C:B ratio and yield was high. Emamectin benzoate recorded second highest C:B ratio of 1:2.25 followed by HaNPV(1:2.10), Neem Oil (1:1.27), *Bacillus thuringiensis* (1:1.79) and GCKE(1:0.89) Pongamiaseed extract (1:1.43) and Control (1:0.67).

CONCLUSION

From the critical studies on the comparative efficacy of various botanicals and bio-agents against pod borer on field bean during *kharif* season of 2013-2014 at research farm of SHIATS, Allahabad. It is concluded that among all the treatments, NSKE 5% was found superior over all treatments. It is also gave the highest C:B ratio of 1:2:42 along with high yield. Among bio-agents, HaNPV 250LE.

Therefore is suitably incorporated management scheduled against *Helicoverpa armigera* on field bean, *Lablab purpres* (L).

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