



Efficacy of *HaNPV*, Botanicals and Synthetic Insecticides Against *Helicoverpa Armigera*, (Hubner) on Chickpea

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Abstract

The experiment on “Efficacy of *HaNPV*, botanicals and synthetic insecticides against *Helicoverpa armigera* (Hubner) on chickpea” was carried out during *Rabi* season 2016-17. The crop was sprayed two times at 15th days interval with six types of treatments and water spray. The treatment of Emamectin Benzoate 5 SG was found most promising which recorded lowest larval population of *Helicoverpa armigera*. That insecticide recorded 0.65 and 0.56 larval population over control after 7th and 14th days of first spray, and 0.14 and 0.15 larval population after 7th and 14th days of second spray, respectively. The per cent pod damage was observed in the range of 14.54 to 51.51 per cent. The lowest pod damage 14.54 per cent was recorded in the treatment of Emamectin Benzoate 5 SG @ 0.0022%. The highest 15.23 q/ha and lowest 7.45 q/ha, yield was recorded in treated plot with Emamectin Benzoate 5 SG @ 0.0022% over control, respectively.

Key Words:-*Helicoverpa armigera*, *HaNPV*, botanicals (Azadirachtin, Neem oil) and synthetic insecticides (Emamectin benzoate, Flubendiamide, Quinalphos)

Introduction

Among the biotic factors, pod borer, *Helicoverpa armigera* (Hubner) (Lepidoptera:Noctuidae) is the most important pest on chickpea. Chemical control is most effective tool of pest management but on the other hand evaluating the efficacy of biopesticide and botanicals. Present investigation was undertaken to study the efficacy of *HaNPV*, botanicals and synthetic insecticides against *Helicoverpa armigera* (Hubner) on chickpea. The details of treatments with respective dose and method of application has been given in Table 1.

Treat. No.	Treatments	Dose
T ₁	<i>HaNPV</i> 1×10 ⁹ POB/ml @ 500 LE/ha	1 ml/L
T ₂	Azadirachtin (1500 ppm)	2.5 ml/L
T ₃	Neem Oil (2%)	20ml/L
T ₄	Flubendiamide 20 WG (0.007%)	0.17g/L
T ₅	Emamectin benzoate 5 SG (0.0022%)	0.44g/L
T ₆	Quinalphos 25 EC (0.05%)	2ml/L
T ₇	Control (Water spray)	---

Materials and Methods

The experiment was conducted at research farm (Insectary) of, college of agriculture Nagpur, (Maharashtra) in the year 2016-17 in Randomized Block Design (RBD) with seven treatments, each consisting of three replicates. The chickpea seeds of variety 'JAKI-9218' were sown in plots (2.70 x 1.80 m²) with row spacing 30 cm and plant to plant distance 10 cm. All the treatments under investigation were applied as foliar spray using Knapsack sprayer. To determine the “Efficacy of *HaNPV*, botanicals and synthetic insecticides” two sprays were applied on chickpea, after attaining 50% flowering at an interval of 15th days. The population of *Helicoverpa armigera* larvae was recorded per meter row length from each treated plot to counted the larval population. The infested pods were counted from randomly selected five plants from each treated plot. The formula used to calculate percent infestation of pods was: Pod Infestation (%) = (No. of infested pods/Total no. of pods) X 100.

Table 2: Effect of treatments on larval population of *Helicoverpa armigera* (Hubner), pod damage and grain yield in chickpea.

Treat no.	Treatments	Pre count	Mean larval population				%pod Damage	Grain yield q/ha
			7DAS	14DAS	7DAS	14DAS		
T ₁	<i>Ha</i> NPV 1×10 ⁹ POB/ml @ 500 LE/ha	2.29 (1.67)	1.27 (1.33)	1.15 (1.28)	0.59 (1.04)	0.52 (1.00)	22.30 (28.18)	11.37
T ₂	Azadirachtin (1500 ppm)	2.14 (1.62)	1.38 (1.37)	1.28 (1.33)	0.83 (1.15)	0.62 (1.05)	26.68 (31.05)	10.84
T ₃	Neem Oil (2%)	2.19 (1.64)	1.52 (1.42)	1.42 (1.38)	0.94 (1.20)	0.73 (1.10)	30.05 (33.21)	10.46
T ₄	Flubendiamide 20 WG (0.007%)	2.52 (1.73)	0.75 (1.11)	0.69 (1.09)	0.20 (0.83)	0.18 (0.82)	17.52 (24.73)	14.22
T ₅	Emamectin benzoate 5 SG (0.0022%)	2.32 (1.67)	0.65 (1.07)	0.56 (1.02)	0.15 (0.80)	0.14 (0.80)	14.54 (22.38)	15.23
T ₆	Quinalphos 25 EC (0.05%)	2.25 (1.65)	0.89 (1.17)	0.79 (1.13)	0.27 (0.87)	0.25 (0.86)	20.23 (26.71)	12.68
T ₇	Control (Water spray)	2.46 (1.72)	2.23 (1.67)	2.27 (1.68)	1.97 (1.57)	1.96 (1.56)	51.51 (45.86)	7.45
F test		NS	Sig	Sig	Sig	Sig	Sig	Sig
SE ±		0.15	0.08	0.07	0.05	0.05	1.07	0.06
CD 5%		0.44	0.24	0.23	0.16	0.16	3.15	0.19

Results and Discussion

The data presented in Table 2 revealed that all treatments had significantly effective in minimizing larval population after 7th and 14th days of 1st spraying. Among all the treatments, the Emamectin benzoate 5 SG was found most effective with lowest larval population 0.65 and 0.56 larvae /mrl which was at par with Flubendiamide 20 WG and Quinalphos 25 EC recorded 0.75 to 0.69 and 0.89 to 0.79 larval population at 7th and 14th DAS of 1st spraying respectively. Similarly Quinalphos 25 EC at par with *Ha*NPV 500 LE and Azadirachtin 1500 ppm recorded 1.27 to 1.15 and 1.38 to 1.28 larvae /mrl except Neem oil 2 % 1.52 to 1.42 larvae /mrl respectively, However treatments *Ha*NPV 500 LE, Azadirachtin 1500 ppm and Neem oil 2 % at par with each other as compared to control 2.23 to 2.27 larvae /mrl.

The data presented in Table 2 indicated that at 7th and 14th days after 2nd spraying, the treatment Emamectin benzoate 5 SG was found highly effective among all the treatments, which at par with Flubendiamide 20 WG and Quinalphos 25 EC recorded 0.15 to 0.14, 0.20 to 0.18 and 0.27 to 0.25 larval population of *Helicoverpa armigera* respectively. Similarly the treatments *Ha*NPV 500 LE, Azadirachtin 1500 ppm and Neem oil 2 % which recorded 0.59 to 0.52, 0.83 to 0.63 and 0.94 to 0.73 larvae /mrl found at par with Quinalphos 25 EC except Neem oil 2%, However the treatments *Ha*NPV 500 LE, Azadirachtin 1500 ppm and Neem oil 2 % at par with each other over a control 1.97 to 1.96 larvae /mrl.

The per cent pod damage was observed to be within the range of 14.54 to 51.51 per cent. The

lowest per cent pod damage was recorded in the treatment of Emamectin Benzoate 5 SG due to lowest larval population, followed by treatments Flubendiamide 20 WG and Quinalphos 25 EC which recorded 17.52 and 20.23 per cent pod damage respectively. The remaining treatments in ascending order are *Ha*NPV 500 LE, Azadirachtin 1500 ppm, and Neem Oil 2 % recorded 22.30, 26.68 and 30.05 per cent pod damage respectively as compared to control 51.51 per cent.

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