Journal of Entomology and Zoology Studies

Available online at www.entomoljournal.com

E-ISSN: 2320-7078
P-ISSN: 2349-6800
JEZS 2019; 7(6): 1211-1213

Received: 10-09-2019
Accepted: 14-10-2019

Govardhan Naidu
Department of Entomology, SHUATS, Naini, Prayagraj, Uttar Pradesh, India

Ashwani Kumar
Department of Entomology, SHUATS, Naini, Prayagraj, Uttar Pradesh, India

Corresponding Author:
Govardhan Naidu
Department of Entomology, SHUATS, Naini, Prayagraj, Uttar Pradesh, India

Field efficacy of certain insecticides against shoot and fruit borer (*Earias vittella* Fab.) on rainy season okra in Prayagraj (U.P.)

Govardhan Naidu and Ashwani Kumar

Abstract
The present investigation was conducted during July to November 2018 at Central Research Farm, SHUATS, Naini, Prayagraj. The occurrence of shoot and fruit borer commenced from August third week with an average population of 2.69% infestation. The shoot and fruit borer, *Earias vittella* population increased and gradually reached its peak level of infestation 48.61% in October second week there after declined trend was observed as temperature decreased. It was found that shoots and fruit borer population increased with increasing maximum temperature and positively correlated with maximum temperature. Two applications of seven insecticides *viz*; Flubendiamide 39.35 SC (0.01%), Chlorantraniliprole 20 SC (0.006%), Cypermethrin 25 EC (0.006%), Spinosad 45 SC (0.005%), Indoxacarb 14.5 SC (0.01%), Fipronil 5 SC (0.005%) and Imidacloprid 17.8 SL (0.004%) were evaluated against shoot and fruit borer, *Earias vittella.* Minimum percent of shoot infestation, percent fruit infestation and B:C ratio were observed in Chlorantraniliprole with (2.77%, 4.97% and 1:3.13) respectively which was followed by Flubendiamide (3.94%, 6.44% and1:2.64) < Spinosad (6.79%, 7.68% and 1:3.08) < Indoxacarb (7.02%, 12.12%, and 1:2.26) < Cypermethrin (9.81%, 15.21%, and 1:2.50) Fipronil (10.76%, 17.98% and 1:2.52) < Imidacloprid (11.31%, 19.46% and1:2.72) < untreated control(water spray) (16.68%, 43.29% and 1:1.65) respectively.

Keywords: Benefit cost ratio, *Earias vittella*, incidence, insecticides, Okra shoot and fruit borer

Introduction

Abelmoschus esculentus (L.) *Moench* (Okra) is a warm season vegetable, also known as Bhendi or lady's finger. It is an excellent source of minerals, vitamins and fibre. Okra seed oil is reported to contain Linoleic acid which is one of the essential fatty acid (Chin and Nushirwan, 1990) [1].

Okra is an important vegetable crop grown all over India and tropical and sub-tropical parts of the world. Globally India ranks first in okra production (72% of the total world production) having area of 533 hectares with an annual production of 6346 million tons and productivity of 11.9 million tons/ha. Okra is susceptible to a large number of insect pests and fruit borer (*Earias vittella*) is reported to cause direct damage to the fruits (52.33 to 70.75%) (Pareek and Bhargava, 2009) [2]. In recent years, various types of insecticides belonging to different chemical groups have been used to manage the pests and excessive reliance on these chemicals has led to the problem of resistance, resurgence, environmental pollution and health threat to the consumers thus it has become essential to use the insecticides in optimal dosage so as to reduce and control the damage to environment and human health as well as to reduce the pest incidence. Hence an investigation was undertaken to evaluate the performance of certain chemical insecticide at their recommended dosages against okra fruit and shoot borer.

Materials and Methods

The experiment was conducted during the *kharif* season 2018. The site selected was uniform, cultivable with typical sandy loam soil having good drainage. Sowing was done at 8 kg/ha by dibbling method with spacing of 25 cm between row to row and 25 cm between plant to plant by placing 2-3 seeds per hill at depth of 4 cm. Chemical fertilizers were applied at the following dosages NPK 50:25:25 kg/ha and 20 tonnes FYM per hectare. Full doses of P, K, 33.3% N and FYM was applied as basal in the drills before sowing the seeds and rest of the nitrogen was applied as top dressing in two equal splits at 21 and 41 days after germination. Weeding was done at 20 days, 40 days and 60 DAS and the fruit yield per plot was recorded (q.ha^{-1}). The insecticidal spray solution was freshly prepared every time at the site of experiment just before the start of spraying operations. Observations were record on the number of infested shoots in each plot a day before spray 7th, 14th days after spraying on selected plants in a plot. Observations were also recorded on the number of infested fruits and number of marketable fruits on selected plants in a plot picking wise. The per cent fruit damage will be worked out by using the formula. The benefit cost ratio was also calculated.

Results and Discussion

All the treatments were found to be significantly superior to control in reducing percent shoot and fruit infestation. The minimum shoot and fruit infestation were recorded in Chlorantraniliprole 20 EC from 2.77% to 4.97%. These results are similar to the findings reported by Chowdary *et al.* (2010) [3] whereas Imidacloprid was found least effective in reducing shoot and fruit damage. Sinha *et al.* (2009) [4] reported that Malathion was least effective against shoot and fruit borer of okra. Singh (2014) [5] recorded the highest cost benefit ratio was obtained in the treatment of Chlorantraniliprole 0.006% which is in alignment with the findings of the present study. Chiranjeevi *et al.* (2005) [6] obtained lower yield with the treatment of Imidacloprid which corroborates the present findings. The minimum benefit cost ratio was obtained in Imidacloprid (2.52) due to its less effectiveness compared to other synthetic insecticides and high cost evolved with low efficacy against the pest.

Table 1: Efficacy of certain insecticides to control shoot and fruit borer (*Earias vitella*) in okra. (First Spray): percent fruit infestation.

Treatments		% Fruit infestation				
		Before Spraying	3 DAS	7 DAS	14 DAS	Mean
T_1	Fipronil	22.17 (28.09)	11.82 (20.10)	10.56 (18.95)	12.58 (20.77)	11.65 (19.94)
T_2	Indoxacarb	21.16 (27.35)	13.14 (21.24)	11.41 (19.73)	14.49 (22.36)	13.01 (21.12)
T_3	Cypermethrin	23.01 (28.65)	11.93 (20.19)	11.36(19.67)	13.26 (21.35)	12.18 (20.14)
T_4	Flubendiamide	23.76 (29.17)	10.72 (19.10)	9.06 (17.51)	11.18 (19.56)	10.30 (18.70)
T_5	Chlorantraniliprole	22.83 (28.52)	9.80 (18.23)	8.12 (16.53)	10.59 (18.98)	9.17 (17.61)
T_6	Imidacloprid	24.01 (29.33)	10.91 (19.28)	9.28 (17.73)	11.41 (19.74)	10.53 (18.92)
T_7	Spinosad	21.46 (27.57)	10.22 (18.63)	8.43 (16.87)	10.72 (19.10)	9.79 (18.21)
T_8	Control (water spray)	24.93 (29.93)	23.66 (29.10)	20.43 (26.86)	26.24 (30.81)	23.44 (28.93)
F- test		NS	S	S	S	S
S. Ed. (±)		1.755	0.319	0.722	0.246	0.590
C. D. (P = 0.05)		NS	0.685	1.549	0.527	1.266

Figures in parenthesis are arc sin transformed value

Table 2: Efficacy of certain insecticides to control shoot and fruit borer (*Earias vitella*) in okra. (Second Spray): percent fruit infestation.

Treatments		% Fruit infestation			
		3 DAS	7 DAS	14 DAS	Mean
T_1	Fipronil	12.19 (20.43)	9.88 (18.32)	14.40 (22.29)	12.15 (20.35)
T_2	Indoxacarb	13.24 (21.33)	10.48 (18.87)	15.41 (23.09)	12.84 (20.92)
T_3	Cypermethrin	12.58 (20.76)	9.88 (18.31)	15.20 (22.94)	12.75 (20.87)
T_4	Flubendiamide	10.98 (19.32)	7.98 (16.40)	13.24 (21.33)	10.73 (19.03)
T_5	Chlorantraniliprole	10.00 (18.42)	5.28 (13.23)	10.61 (19.01)	8.63 (16.91)
T_6	Imidacloprid	11.61 (19.91)	9.11 (17.56)	13.98 (21.93)	11.56 (19.81)
T_7	Spinosad	10.89 (19.26)	7.48 (15.86)	12.58 (20.77)	10.31 (18.63)
T_8	Control (water spray)	25.29 (30.18)	25.03 (30.02)	25.29 (30.18)	25.20 (30.13)
F- test		S	S	S	S
S. Ed. (±)		0.719	0.562	0.634	0.783
C. D. (P = 0.05)		1.542	1.206	1.359	1.679

Figures in parenthesis are arc sin transformed value

Table 3: Economics of Cultivation

S. No	Treatments	Yield q/ha	Cost of yield / Rs/q	Total cost of yield (Rs.)	Common cost (Rs.)	Treatment cost (Rs.)	Total cost (Rs.)	C:B ratio
1	Flubendiamide 39.35 SC	94.40	1350	127,440	42728	5400	48128	1:2.64
2	Chlorantraniliprole 20 SC	108.5	1350	146,475	42728	4049	46777	1:3.13
3	Cypermethrin 25EC	81.32	1350	109,782	42728	1030	43758	1:2.50
4	Spinosad 45 SC	102.8	1350	138,780	42728	2220	44948	1:3.08
5	Indoxacarb 14.5 SC	74.13	1350	100,075	42728	1524	44252	1:2.26
6	Fipronil 5SC	85.02	1350	114,777	42728	2700	45428	1:2.52
7	Imidacloprid 17.80 SL	88.72	1350	119,772	42728	1262	43990	1:2.72
8	Control	52.44	1350	70,798	42728	------	42728	1:1.65

Conclusion

From the critical analysis of the present findings it can be concluded that shoot and fruit borer population increased with maximum temperature and decreased with decline in minimum temperature. Insecticides like Chlorantraniliprole 20SC followed by Spinosad 45 SC and Flubendiamide 39.35SC and are showing good result against *Earias vittella* and can be a part of integrated pest management as an effective tool under chemical control.

Acknowledgements

The authors are grateful to Hon'ble Vice chancellor, Prof. Dr.

Rajendra B. Lal, Directorate of Research, Director, Prof. Dr. Shilesh Marker, Dean, Naini Agricultural institute, Prof. Dr. Gautam Ghosh and Head of the department, department of Entomology, Prof. (Dr.) Mrs. L. Sobita Devi, SHUATS for their keen interest and encouragement to carry out the research work.

References

1. Chin AHG, Nushirwan Z. Properties of vegetable oils from some un employed sources in Malaysia. Malaysian Agricultural Research and Development Institute Research Journal. 1990; 18(2):261-265.
2. Pareek BL, Bhargava MC. Estimation of avoidable losses in vegetable crops caused by borers under semi-arid conditions of Rajasthan. Insect Environment. 2009; 9:59-60.
3. Chowdary LR, Bheemanna M, Kumar LR. Field efficacy of Rynaxypyr (Coragen) 20 SC against fruit and shoot borer, *Earias vitella* (Fab.) in okra. International Journal of Plant Protection. 2010; 3(2):316-318.
4. Sinha SR, Vishwa N, Singh R. Management of *Earias vittella* through new insecticide schedules. Annals of Plant Protection Sciences. 2009; 17(1):242-243
5. Singh AK. Evaluation of new molecule of insecticides against pod fly (*Melanagromyza obtusa*) of pigeon pea. South Asian Association for Regional Cooperation. Journal of Agriculture. 2014; 12(1)89-95.
6. Chiranjeevi CH, Narayanamma M, Neeraja G. Evaluation of IPM module for the management of brinjal shoot and fruit borer. Vegetable Science. 2005; 32(1):105-106