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Efficacy of certain insecticides and botanical against shoot and fruit borer, (*Earias vittella)* on okra (*Abelmoschus esculentus* L.) under field condition

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Abstract
The field trial consisting of Eight treatments which were evaluated against okra shoot and fruit borer *viz*, Cypermethrin 25% EC (500 ml/ha), Spinosad 45% SC (200 ml/ha), Imidacloprid 17.8% SL (100 ml/ha), Chlorantraniliprole 8.8% SG + Thiamethoxam 17.5% SC (250 ml/ha), Neem oil 0.03% (2 ml/ha), Emamectin benzoate 5% SG (200 ml/ha), Chlorantraniliprole 18.5% SC (200 ml/ha) and untreated control. The lowest infestation was recorded in Chlorantraniliprole 8.8% SC + Thiamethoxam 17.5% SC (3.64% and 3.14%) followed by Chlorantraniliprole 18.5% (4.16% and 3.26%), Imidacloprid 17.8% SL (5.23% and 4.0%), Cypermethrin 25% EC (5.52% and 4.70%), Emamectin benzoate 5% SC (6.16% and 5.22%), Neem oil 0.03%(6.44% and 6.27%) and untreated Control (6.64% and 7.26%) respectively. The highest yield and was recorded in Chlorantraniliprole 8.8% + Thiamethoxam 17.5% SC (195.5 q/ha) followed by Chlorantraniliprole 18.5% (182.8 q/ha).

Keywords: Insecticides, *Abelmoschus esculentus*, cost benefit ratio, *Earias vittella*, yield

Introduction
Okra (*Abelmoschus esculentus* Linnaeus) belongs to the family Malvacae. originated from tropical America and now grown as a vegetable throughout the tropical and subtropical area of the world. Okra crop suffers damage by a number of insect pest among them Okra Shoot and Fruit borer (*Earias vitella*) is one of the most destructive pest. Larvae bore into the terminal shoot in the vegetative stage and flower buds, flowers and young fruits in the fruit forming stages. They feed on internal tissues, inflicting 45-57.1% damage to fruits. Although insecticidal application is the common mean to control the fruit borer but all this insectices are not only the best mean of control of this pest.

Materials and Methods
The trial was conducted for the management of okra shoot and fruit borer "Efficacy of certain insecticides and botanical against shoot and fruit borer, (*Earias vittella*) on okra (*Abelmoschus esculentus* L.)" under field condition was carried out by using variety arka anamika at central research farm of SHUATS, U.P, India during kharif, 2023. The evaluation was done in a randomized block design with eight treatments replicated three times in a plot size of 2 m x1 m. The observation on infestation of Shoot and fruit borer were recorded from 5 randomly selected and tagged plant in each plot. The infestation of shoot and fruit borer was recorded in field on the selected plants from each plot at one day prior to the spray and 3rd, 7th and 14th day after spray of insecticides. Two spray was done during the trial period. When the pest reached to their ETL level then the first spray on 14th October and second on 29th October was done. The yield was collected separately from each plot and weighed. The insecticidal cost which used in the experiment was recorded.

Infestation recorded by following method

$$\text{No. of Shoots effected Percent} = \frac{\text{No Shoot damage}}{\text{Total no. of shoots}}$$

$$\text{Percent fruit infestation} = \frac{\text{No of fruit infected}}{\text{Total no of fruits}} \times 100$$

Results and Discussion

The shoot borer infestation on okra after first spray signified that all the chemical treatments was superior over control. Among all the treatments found, lowest mean percent of the shoot infestation in Chlorantraniliprole 8.8% SG + Thiamethoxam 17.5% SC (3.64) followed by Chlorantraniliprole 18.5% (4.16), Spinosad 45% SC (4.69), Imidacloprid 17.8% SL (5.23), Cypermethrin 25% EC (5.52) Emamectin benzoate 5% SG (6.16) and Neem oil 0.03% (6.44) was found least effective.

Table 1: Shoot Infestation percentages of *Earias vittella* after first spray.

Treatment		One day before spray	Percent shoot infestation on okra of *Earias vittella* after first spray			
			3rd DAS	7th DAS	14th DAS	Mean
T_1	Cypermethrin 25% EC	6.92	5.89	4.19	5.89	5.72
T_2	Spinosad 45% SC	6.59	4.35	3.35	4.47	4.69
T_3	Imidacloprid 17.8% SL	5.98	5.35	3.84	5.78	5.23
T_4	Chlorantraniliprole 8.8% +Thiamethoxam 17.5% SC	6.24	3.05	1.94	3.35	3.64
T_5	Neem oil 0.03%	6.23	6.53	6.35	6.66	6.44
T_6	Emamectin benzoate 5% SG	6.42	6.20	5.66	6.38	6.16
T_7	Chlorantraniliprole 18.5% SC	6.30	3.43	3.05	3.86	4.16
T_8	control	6.62	6.69	6.81	6.97	6.77
	F-test	NS	s	s	s	s
	C.D. at 0.05%	-	1.10	0.96	1.68	1.14
	S. Ed. (±)	0.38	0.52	0.45	0.50	0.55

The shoot borer infestation on okra after second spray signified that all the chemical was superior over control. Among all the treatments found lowest mean percent of fruit infestation in Chlorantraniliprole 8.8% +Thiamethoxam 17.5% SC (3.14) followed by Chlorantraniliprole 18.5% (3.26), Spinosad 45% SC(3.68), Imidacloprid 17.8% SL (4.01), Cypermethrin 25% EC (4.70), Emamectin benzoate 5% SG (5.22) and Neem oil 0.03% (6.27) was found least effective.

Table 2: Fruit infestation percentages of *Earias vittella* After second spray.

Treatment		Percent Fruit infestation on okra of *Earias vittella* after second spray			
		3rd DAS	7th DAS	14thDAS	Mean
T_1	Cypermethrin 25% EC	4.80	4.10	5.21	4.70
T_2	Spinosad 45% SC	3.95	3.01	4.10	3.68
T_3	Imidacloprid 17.8% SL	4.15	3.04	4.85	4.01
T_4	Chlorantraniliprole 8.8% SC + Thiamethoxam 17.5% SC	3.30	2.93	3.21	3.14
T_5	Neem oil 0.03%	6.80	5.04	6.97	6.27
T_6	Emamectin benzoate 5% SG	5.11	4.75	5.82	5.22
T_7	Chlorantraniliprole 18.5% SC	3.32	2.96	3.50	3.26
T_8	Control	7.30	7.31	7.19	7.26
	F-test	s	s	s	s
	C.D. at 0.5%	2.03	0.90	1.82	0.68
	S. Ed. (±)	0.95	0.42	0.84	0.57

Table 3: Economics of cultivation

Treatment		Yield (q/ha)	Selling price (Rs/q)	Gross return (Rs)	Total cultivation cost (Rs)	Net return (Rs)	C:B Ratio
T_1	Cypermethrin 25% EC	156.2	2500	390000	44248	345752	1:8.8
T_2	Spinosad 45% SC	178.2	2500	445500	46448	399052	1:9.5
T_3	Imidacloprid 17.8% SL	165.2	2500	413000	44848	369552	1:9.2
T_4	Chlorantraniliprole 8.8% +Thiamethoxam 17.5% SC	195.5	2500	488750	49148	439602	1:9.9
T_5	Neem oil 0.03%	100.3	2500	250750	44348	206402	1:5.6
T_6	Emamectin benzoate 5% SG	140.3	2500	350750	43148	307602	1:8.1
T_7	Chlorantraniliprole 18.5% SC	182.8	2500	457000	46748	410252	1:9.7
T_8	Control	72.2	2500	180500	42748	137752	1:4.2

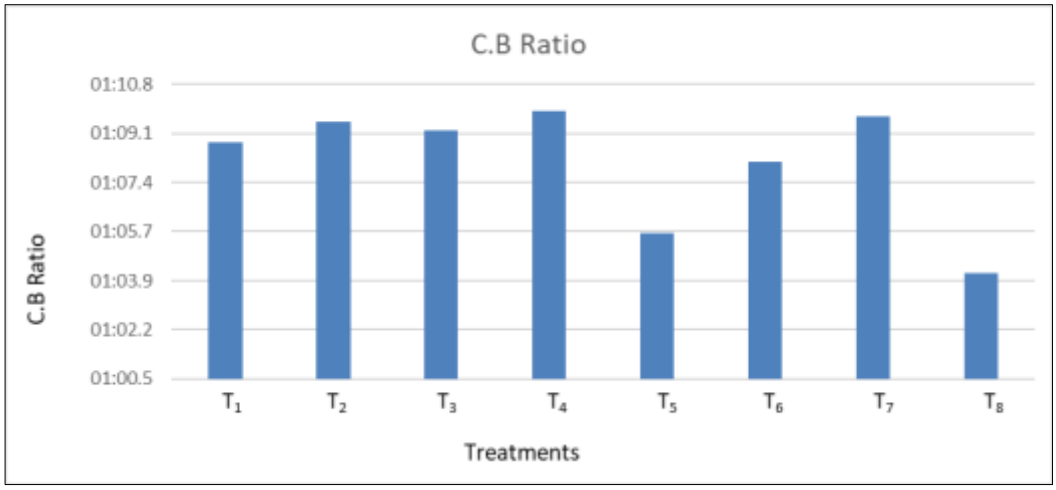

Fig. 1: Graphical representation of economics of different treatments

Discussion

All the treatments was found superior over the control on the first and second spray which revealed that Chlorantraniliprole 8.8% SC + Thiamethoxam 17.5% SC was found effective in reducing the shoot and fruit bore population. The values obtained in the first and second spray are (3.64% and 3.14%) respectively similar finding were made by Chandra *et al.,* (2020) [1] who reported that Chlorantraniliprole 8.8% SC + Thiamethoxam 17.5% SC found most effective treatment. The next most effective treatment was Chlorantraniliprole 18.5% SC in which the values obtained in first and second spray are (4.16% and 3.26%) respectively. Similar finding made by Kulkarni and Kumar (2022) [7], Shrivastava *et al.,* (2007) [13] followed by Spinosad in first and second spray are (4.69% and 3.68%) respectively. Similar Finding made by Kaveri and kumar (2020) [6]. Imidacloprid was found to be next effective treatment and the values obtained in the first and second spary are (5.23% and 4.0%) respectively. Similar finding made by Gautam *et al.,* (2015) [4] and Pankaj *et al.,* (2016) [11]. This was followed by the next best treatment which is Cypermethrin 25% EC in which the efficacy values obtained (5.52% and 4.70%) respectively which was supported by Singh *et al* (2015) [14] This was followed by next effective treatment Emamectin benzoate 5% SG and Neem oil 0.03%. Similar finding made by Lipsa *et al.,* (2020) [15].

The highest yield and cost benefit ratio (195.5 q/ha) and (1:9.9) was obtained in Chlorantraniliprole 8.8% SC + Thiamethoxam 17.5% S which was encouraged by Chandra *et al.* [1], followed by Chlorantraniliprole 18.5% SC (182.2 q/ha) and (1:9.7) and the results were encouraged by Kulkarni and Kumar (2022) [7], Spinosad (178.2 q/ha) and (1:8.1) and this was encouraged by Kumar *et al.,* (2017) [9] and Pachole *et al.,* (2017) [10], Cypermethrin 25% EC (156.2q/ha) and (1:7.8) and was supported by Manikant and Kumar (2022) [16], Emamectin benzoate 5% SG (140.3 q/ha) and (1:5.5) and Neem oil 0.03% (100.3q/ha) and (1:5.2) which were encouraged by Kumar and Thakur (2017) [8].

Conclusion

From the present study, the result showed that the spraying of insecticides significantly reduced the shoot and fruit borer percent infestation of okra. The findings concluded that the new generation insecticides like Cypermethrin 25% EC (1 ml/lit), Spinosad 45% SC (0.3-0.4 ml/ lt), Imidacloprid 17.8% SL (0.4ml/lit), Chlorantraniliprole SG + Thiamethoxam 17.5% SC (1 ml/lit), Neem oil 0.03% (2 ml/lt), Emamectin benzoate 5% SG (0.4 g/lt) Chlorantraniliprole 18.5% SC (0.05 ml/lt) were found effective against the okra shoot and fruit borer. further among all the best effective was found in the combination of the treatments Chlorantraniliprole 8.8% SC + Thiamethoxam 17.5% SC. It was observed that the cost benefit ratio was also high with Chlorantraniliprole 8.8% SC + Thiamethoxam 17.5% SC and Chlorantraniliprole 18.5% SC. Botanical are the part of integrated pest management in order to avoid indiscriminate use of pesticide causing population in the environment and not much harmful to beneficial insects.

References

1. Chandran R, Ramesha B, Sreekumar KM. Efficacy of new insecticides against okra shoot and fruit borer, *Earias vittella* (Fab.) (Lepidoptera: Noctuidae). ENTOMON. 2020;45(4):295-300.
2. Choudhury MAR, Mondal MF, Khan AU, Hossain MS, Azad MOK, Prodhan MDH, *et al*. Evaluation of biological approaches for controlling shoot and fruit borer (*Earias vitella* F.) of okra grown in peri-urban area in Bangladesh. Horticulturae. 2021;7(1):7.
3. Dash L, Ramalakshmi V, Padhy D. Bio-efficacy of emamectin benzoate 5% SG against shoot and fruit borer *Earias vitella* (Fabricius) on okra. The Pharma Innovation Journal. 2020;9(12):144-146.
4. Gautam HK, Singh NN, Rai AB. Effect of some plant extract and an insecticide on the incidence of *Earias vittella* in okra. Indian Journal of Agriculture Research. 2015;49(2):175-179.
5. Padwal KG, Kumar A. Efficacy of plant products and combinations with cypermethrin in management of *Earias vittella* of Okra. Journal of Plant Protection & Environment. 2014;22(1):73-75.
6. Kaveri G, Kumar A. Field efficacy of certain biopesticides against okra shoot and fruit borer, *Earias vittella* (Fabricius) on okra, *Abelmoschus esculentus* (Linn.) Moench. Journal of Entomology and Zoology Studies. 2020;8(6):1279-1281.
7. Kulkarni S, Kumar A. Efficacy and economics of some selected insecticides against shoot and fruit borer (*Earias vittella*) of okra [*Abelmoschus esculentus* (L.) Moench]. The Pharma Innovation Journal. 2022;SP-11(5):982-985.

8. Kumar A, Thakur S. Comparative efficacy of essential oils, neem products and Beauveria bassiana against brinjal shoot and fruit borer (*Leucinode sorbonalis*) of Brinjal (*Solanum Melongena* L.) (*Earias vitella* Fabr.) in okra crop. Horticulture Flora Research Spectrum. 2017;2(3):251-254.
9. Kumar S, Singh VK, Kumar A, Chandra N. Bioefficacy of Coragen against Shoot and Fruit Borer, *Earias vittella* (Fab.) in Okra. International Journal of Current Microbiology and Applied Sciences. 2017;6(10):1021-1027.
10. Pachole SH, Thakur S, Simon S. Comparative bio-efficacy of selected chemical insecticides and bio-rationals against shoot and fruit borer (*Earias vittella* (Fabricius)) on okra [*Abelmoschus esculentus* (L.) Moench]. Journal of Pharmacognosy and Phytochemistry. 2017;6(5):1493-1495.
11. Pankaj K, Singh DV, Dabas JPS, Sachan K, Kumar M. Assessment the efficacy and economic of insecticides and bio-pesticides against major insect pests of okra (*Abelmoschus esculentus*). International Journal of Agriculture Sciences. 2016;8:2050-2052.
12. Rajput GS, Tayde AR. Population dynamics and comparative efficacy of certain novel insecticides, botanicals and bio-agents against shoot and fruit borer (*Earias vitella* Fabricius) of okra crop [*Abelmoschus esculentus* (L.) Moench]. Journal of Entomology and Zoology Studies. 2017;5(4):1667-1670.
13. Shrivastava PK, Kumar A, Dhingra MR. Evaluation of insecticides for the management of shoot and fruit borer *Earis vitttella* (Fab.) infesting okra. Journal of Entomology and Zoology Studies. 2017;5(5):1052-1056.
14. Singh HP, Vijaya VB, Chamroy T. Seasonal incidence and field efficacy of insecticides against shoot and fruit borer, *Earias vitella* (Fab.) on okra (*Abelmoschus esculentus* L.). Plant Archives. 2015;15(1):389-392.
15. Lipșa FD, Ursu EL, Ursu C, Ulea E, Cazacu A. Evaluation of the antifungal activity of gold–chitosan and carbon nanoparticles on Fusarium oxysporum. Agronomy. 2020 Aug 6;10(8):1143.
16. Almounajjed A, Sahoo AK, Kumar MK, Assaf T. Fault diagnosis and investigation techniques for induction motor. International Journal of Ambient Energy. 2022 Dec 31;43(1):6341-6361.