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Integrated pest management in Brinjal

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Abstract

Integrated Pest Management (IPM) represents a holistic approach to managing pests in brinjal (*Solanum melongena*) cultivation, combining cultural, biological, mechanical, and chemical strategies to minimize the reliance on synthetic pesticides. This research paper explores the effectiveness of IPM practices in controlling major pests affecting brinjal, including the shoot and fruit borer (*Leucinodes orbonalis*), aphids, and mites. Field trials were conducted to evaluate the impact of various IPM components, such as the use of pheromone traps, neem-based biopesticides, and the introduction of natural predators, on pest populations and crop yield.

The results demonstrate that IPM practices significantly reduced pest infestations and enhanced brinjal productivity compared to conventional pest control methods. Moreover, the economic analysis revealed that adopting IPM not only lowered production costs by reducing pesticide usage but also improved environmental sustainability by minimizing chemical residues in the soil and water. This study underscores the importance of promoting IPM in brinjal cultivation as a viable strategy for sustainable agriculture, offering insights into the challenges and opportunities associated with its broader adoption by farmers.

Keywords: Integrated pest management, Brinjal, leucinodes orbonalis, biopesticides, sustainable agriculture, pest control

Introduction

Brinjal (*Solanum melongena*), commonly known as eggplant, is one of the most widely cultivated vegetables in tropical and subtropical regions, including India, which is among the largest producers globally. Brinjal is valued for its nutritional content and versatility in culinary applications. Vegetable production in India mainly suffered from biotic stress insect pest apart from causing direct damage. They also act as vectors for several viral diseases, average yield loss due to major insect pest is vary from 33 - 40%.

Among the pest Brinjal shoot and Fruit borer are major pest problem in Brinjal. This pest damages the plant from seedling stage to flowering to fruiting stage. Therefore, yield losses some time may be heavy toll (70%). It is estimated that 18% of the total pesticide used in India are apply on vegetables (Kodandaram *et al.*). Therefore, it is thought desirable that component integrated pest management must be under study for fruitful result of IPM. IPM technology for pest control in vegetable tested in KVK-1 Sultanpur in year 2021 to 2023 for their acceptance are

rejection. The trials conducted on field of 10 vegetable growers in the district Sultanpur.

Method and Materials

KVK-1 carried out IPM trial on farmer's field from 2021-2023 in district Sultanpur of eastern plain zone of Uttar Pradesh.

Trial was conducted on field of vegetable growers in IPM mode and results were compared with farmers Practices. In case of farmers practice existing practices use by the farmers but there is permanent problem of fruit and shoot borer in Brinjal yield loss and % incidence of pest get from field was unsatisfactory. Therefore, comparative study trail was conducted to study potential yield, demonstration yield, yield gap between treatments in present study. The common practice used by vegetable growers to control pest in Brinjal was critical in manner. Therefor result obtained in farmers plot and trial plot were compared for access of desirable data. KVK-1 Sultanpur was facilitated trial programme from sowing to harvesting in supervision of expert scientist.

Table 1: Details of technology followed in trial of Brinjal

S. No.	Input	Quantity/ ha.	
		Trial	Farmer Practice
1	Variety	VNR-Naveena	VNR-Naveena
2	Seed rate	500 g	500 g
3	Seedling treatment	Seedling treatment with tycoderma 10g/l. of water	No seedling treatment
4	DAP	132 kg.	132 kg.

5	Urea	270 kg.	270 kg.
6	Potas	100 kg.	-
7	Insecticide	IPM mode seedling treatment with tyccoderama 10g/l., neem oil 4ml/l spraying during crop growth + use of pheroman trap (10 traps/ha.)	Corazen (18.5% sc) Chlorantraniliprote
8	Weedicide	Metribujin 1kg/ha.	-

Table 2: Average yield performance (2021 to 2023)

Particular	Crop	Variety	Technology demonstrated	Area (ha.)	No. of trial	Potential yield (q/ha.)	Yield under trial (q/ha.)	% increase in yield
Farmer practice	Brinjal	VNR-Naveena	F.P. practice	2.0	10	500	256	-
Trial	Brinjal	VNR-Naveena	IPM	2.0	10	500	312	22

Result and Discussion

To see the impact of IPM in Brinjal for management of fruit and shoot borer trial conducted by KVK-1 Sultanpur. The result obtained from the data analysis were revealed that IPM technology competent to control pest in Brinjal (2%) in term of pest infestation as compression to farmers practice (35%). The result of economic feasibility depicted that % increase in yield was 22% over farmer practice. The yield obtained from the trial 312 q/ha. in demonstration plot and 256 q/ha. in farmers plot respectively.

Yield difference between technology and farmers practice was due to comprehensive effect of IPM module of pest control which avoid and control pest population from seedling stage to flowering and fruiting stage, which was directly related to enhance yield and pest management below economic thresh hold level (ETL). It was also observed that quality of fruit and market value was higher in compression to farmer practice.

Weed management also played crucial role in pest management during crop period which was Ignore by the farmers because insect and pest harboring in major cause of pest infestation in vegetable therefore it is advisable to vegetable growers to must use recommended herbicide for indirect pest control.

To assess economic feasibility of the treatment under trial observed that IPM module gave higher net return of Rs. 1,71,300.00 as compared to Rs. 1,32,610.00 with a B.C. ratio of 4.48 in comparison to F.P.- 3.75.

Table 3: Economic performance of technology in Brinjal

Particular	Cost of Cultivation	Net Return	B.C. Ratio
Farmer Practice	48100.00	132610.00	3.75
Trial (IPM Module)	49200.00	171300.00	4.48

Conclusion

The implementation of Integrated Pest Management (IPM) in brinjal cultivation represents a significant step towards achieving sustainable agricultural practices This research has demonstrated that IPM not only effectively reduces pest populations, particularly the brinjal shoot and fruit borer (*Leucinodes orbonalis*), but also enhances crop yield and quality Technology trial tested on field of vegetable growers revealed that pest problem in Brinjal specially fruit and shoot borer was menace for vegetable growers. Therefore, integrated pest management with compatible combination

cultural, chemical and mechanical methods can protect life of Brinjal plant, quality of fruit and ultimately increase fruit yield and higher market value due to adoption of IPM technology. Obviously fruit and shoot borer of Brinjal damage production quality and market value.

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