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Research Article

ASSESSING THE EFFICIENCY OF INTEGRATED PEST MANAGEMENT PRACTICES AGAINST FRUITFLY (*BACTROCERA CUCURBITAE*) IN SNAKE GOURD

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ABSTRACT

The Present study was conducted to assess the efficiency of Integrated Pest Management practices with farmers practices of chemical control against fruitfly in snake gourd. The demonstration was conducted at farmers field in Irur village of the Perambalur District (Tamil Nadu) during Kharif season, 2019-20. The findings revealed that in IPM plot fruit fly infested fruit of 6.9 % with highest weight of healthy fruit of 229.7 q/ha and lowest infested fruit of 15.96 q/ha with more mean number of 42.90 no. adult fruit fly trapped in pheromone trap where as in farmers practices it was 15.8 Percent of infested fruit, healthy fruit of 126.46 q/ha and infested fruit of 21.41 q/ha respectively. The result revealed that the IPM practices was significantly effective in management of fruitfly damage in snake gourd plants and increased the yield with low cost of cultivation Rs.22052.5/ha with a benefit cost ratio of 4.19 whereas it was Rs. 24412.5/ha and 2.22 respectively in farmers practices.

Keywords: *Bactocera cucurbitae*, Pheromone trap, Azadirachtin, Malathion, Snake gourd ecosystem.

INTRODUCTION

Snake gourd (*Trichosanthes cucumerina*) is an important cucurbitaceous vegetable grown almost all over the tropical and subtropical countries of the world. Among the insect pest threaten the production of this crop, the cucurbit fruitfly, *Bactocera cucurbitae* Coquillete is of major importance Kabir *et al*., (1991). In India, fruit flies have been recognized among the ten most serious pest of agricultural crops causing annual monetary losses to the tune of Rs. 7,000 crores Sardana *et al*.,(2005) melon fruitfly, is one of the divesting pest of Cucurbits causing more than 60 Percent crop losses Kapoor, (1993). The management of fruitfly is challenging because of concealed feeding nature so early monitoring and detection the pest infestation was must for effective management. Several research workers (Pawar *et al*, 1991; Zaman, 1995; Neupane, 1999, 2000; Akhtaruzzaman *et al*., 2000; Satpathy and Rai, 2002; Dhillon *et al*., 2005c; Palaniappan and Annadurai, 2006; Jacob *et al*., 2007). Though several options for management exist no single technology can effectively manage the pest hence, an attempt has been made to evaluate the IPM module in fruitfly management.

MATERIALS AND METHOD

Krishi Vigyan Kendra, Perambalur conducted Front line Demonstration (FLD) to find the efficiency of Integrated Pest Management module with famer practices (Chemical treatment) in 10 farmers field under real farming situation. Evaluation of IPM modules for control of fruitfly in snake gourd was studied for variety CORBH1 during *Kharif* seasons of 2019- 2020 at village Irur, Perambalur district, Tamil Nadu state. The crop was grown under irrigated conditions in sandy clay loam soil at spacing of 2.5 x 2 m. Treatment was conducted in 50 cent and farmer practices in another 50 cent of area following all recommended agronomic practices except plant protection measures were same in farmers practices and IPM module.

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In field, the data were recorded on number of healthy and damage fruits harvested at different stages of the fruiting e.g., early, mid and late fruiting stages. The number of healthy and damaged fruit was recorded in all the pickings. The number of fruit flies trapped in different trap at different fruiting stages of the crop was counted and recorded. The number of male and female flies trapped in different bait traps was counted. The number of fruit flies trapped in different trap was counted daily to determine the extent of residual effect of different traps. Number of the total fruit (TF) and infected fruit (IF) were recorded to get the infestation rate of fruit and percent fruit infestation was worked out. Based on yield, cost benefit ratios of different treatments were also calculated. All the data recorded were pooled to arrive the seasonal mean.

RESULTS AND DISCUSSION

A study was conducted to evaluate IPM module efficiency with farmer's practices (Chemical treatment) for effective management of fruitfly in snake gourd during *kharif* 2019-20. Observations on pheromone traps count on weekly interval were taken, and healthy and infested fruit was recorded at each harvest and the percent damaged fruit was calculated. The results showed that in IPM plots fruitfly catches in pheromone trap were significantly higher during mid fruiting stage 60.03 nos. /trap followed by 42.2 nos. /trap and 26.46 nos./trap in early and late fruiting stage. Fish meal trap attracted less number of fruitflies as compared to pheromone trap. Fish meal trap showed significantly higher catches (10.13 nos./trap) in mid fruiting stage followed by 7.93 nos./ trap and 3.76 nos/ trap in early and late fruiting stage (Table 2).

Table 1.Treatment details of pest management in Snake gourd.

Treatments	Technology adopted in pest management
Module 1	Farmers practice Only pesticide spray (Thiodicarb, Chlorpyriphos) without other management practices for pest
Module 2 (IPM)	Collect infested and fallen fruits and burry in deep pits. Installation of pheromone trap with cue lure @ 5 / acre Ribbed gourd as trap crop Poison bait against fruit fly- 500 gm jaggery with 20 ml malathion in plastic containers @ 20/acre for mass trapping of fruit fly. Use fish meal trap @10-15 nos/acre against fruit fly. Spraying with Azadirachtin 1 per cent and malathion @ 1 ml/lit

Table 2. Efficiency of different traps in monitoring of fruitfly in snake gourd.

Treatment	Pheromone trap catches (No./trap)			Average trap count (No./trap)	Fishmeal trap catches (No./trap)			Average trap count (No./trap)
	Early fruiting stage	Mid fruiting stage	Late fruiting stage		Early fruiting stage	Mid fruiting stage	Late fruiting stage	
Module 1	0	0	0	0	0	0	0	0
Module 2	42.2	60.03	26.46	42.90	7.93	10.13	3.76	7.27

Table 3. Efficiency of insecticide against fruitfly snake gourd.

SI. No	Treatment	Fruit infestation (%)					Mean	Variance	t Stat
			I st spray		II nd Spray				
		Pre count	3 DAT	7 DAT	3 DAT	7 DAT			
1	Module 1	22.1	19.4	18.6	13.4	15.8	17.2	2.8	
2	Module 2	7.6	6.2	5.3	7.1	6.9	6.1	1.6	2.57

Table 4. Efficiency of fruitfly management and fruit damage level using two different modules in snake gourd.

Treatment	Yield (q/ha)	Weight of healthy fruit/ ha (q/ha)	Weigh of infested fruit/ ha (q/ha)	Percent fruit infested (%)	Cost of plant protection measures/ ha (Rs.)
Module 1	135.5	126.46	21.41	15.8	19,500
Module 2	231.25	229.70	15.96	6.9	2,000

Azadiractin and malathion spray was found to be better treatment than comparing to farmers treatment of weekly spray of thiodicarb and chlorpyriphos in low per cent fruit infestation. The observations recorded on third and seventh day after first spray was 6.2 and 5.3 percent respectively. Second spray was conducted after 15 days after first spray and recorded 7.1 and 6.9 percent fruit infestation on 3 rd and 7 DAT in the IPM plot and it shows most effective treatment. Whereas in farmers practices it was 19.4 and 18.6 percent fruit infestation after first spray on 3 rd and 7 DAT. Then 13.4 and 15.8 percent fruit infestation was recorded after second spray in farmers practices (Table 3).

The observations recorded on the mean per cent fruit damage in different treatment modules against fruit fly infesting snake gourd during kharif, 2019. Results revealed that the minimum mean per cent fruit damage, more weight of healthy fruit and less weight of infested fruit was 6.9 %, 229.7 q/ha, 15.96 q/ha was recorded in treatment module comprising to farmers practices it was 15.8 %, 126.46 q/ha and 21.41 q/ha respectively (Table 4) and (Figure 1). The adoption of IPM technologies resulted in higher net income in economic terms also reduced less cost of plant protection which was exhibited by high incremental cost benefit ratio 4.19 whereas it was 2.22 in farmers practices respectively (Table 5).

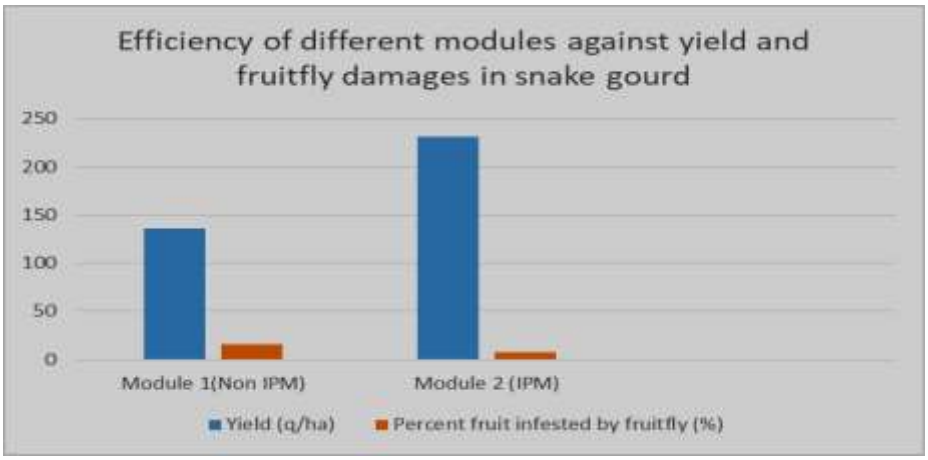

Figure 1. Efficiency of different modules against yield and Fruit fly damages in snake gourd.

Table 5. Economics of different pest management modules of snake gourd

Gross cost (Rs./ha)		Gross return (Rs./ha)		Net return (Rs./ha)		B:C	
Module 1	Module 2	Module 1	Module 2	Module 1	Module 2	Module 1	Module 2
22052.5	24412.5	92500	54200	70447.5	29787.5	4.19	2.22

Our present results are also in agreement with earlier studies by Sarkar *et al*., 2017 sex pheromone, bait trap with secufon + cucurbit chop, bait trap consisted of secufon + banana chop reduced fruit fly infestation to a significant level. Bhatnagarand Yadava (1992) observed malathion more effective than carbaryl on bottlegourd, sponge gourd and ridge gourd. Similar finding was also reported by Khursheed and Raj, (2012) who indicated that mean number of maggots per infested fruit was less in azadirachtin treatment than lambda-cyhalothrin. Similar finding was also reported by Dash *et al.,* (2005), Dash *et al.,* (2006), Karthikeyan *et al*.,(2010). The Present finding is complemented by Sunda *et al* (2024), who stated *Z. cucurbitae* is the major pest of cucurbits and 25 % cue lure (2.5:7.5:1) is more effective for monitoring and mass trapping of responsive fruitflies. Similar finding was reported by Birah *et al* (2015) observed management of fruitfly in cucurbit crops observed the IPM strategies could provide higher yields and returns besides judicious use of pesticides which is an important component of IPM.

CONCLUSION

The results of present study led to conclusion that fruitfly is the major pest of snake gourd in irrigated condition. The yield losses due to these pests can be managed effectively by the adoption of IPM modules. It was also concluded that the demonstrated IPM module is eco-friendly with high benefit cost ratio and safer to non-targeted organism in comparison to conventional insecticides.

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CONFLICT OF INTERESTS

The authors declare no conflict of interest

ETHICS APPROVAL

Not applicable

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