

# Evaluation of Suitable Management Strategy Against Melon Fruit Fly in the Terai Region of West Bengal

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*Bactrocera cucurbitae* (Coquillett) (Diptera: Tephritidae), the melon fruit fly, is found worldwide in temperate, tropical, and subtropical climates. It is a serious pest of cucurbitaceous vegetables, especially the bitter melon (*Momordica charantia*), muskmelon (*Cucumis melo*), snap melon (*C. melo* var. *momordica*), and snake gourd (*Trichosanthes anguina*). It has been recorded to injure 81 host plants. (Dhillon *et al*, 2005). Depending on the season and the type of cucurbit, losses might range from 30% to 100%. On-farm testing was laid out at multilocal farmer's fields of different villages of Cooch Behar district of state West Bengal by Cooch Behar Krishi Vigyan Kendra to find out the suitable management strategy against melon fruit fly infesting bottle gourd (*Lagenaria siceraria*, family cucurbitaceae) during 2020-21 and 2021-22.

## Materials and methods

For selection of farmers a group meeting was organized from where a few farmers (8 numbers) were selected considering the production system and farming situation. The 21 days old seedlings of hybrid variety of bottle gourd NS Kaveri by Namdhari Seeds were used during the study. The seeds were planted in raised heap method. 250 gms of Single super phosphate, 100 gms of urea and 80 gms of potash were applied during planting as basal dose. Another 100 gms of urea and 70 gm of potash were applied per plant as top dressing after 45 days after planting (DAP). Three technologies were tested viz. Technology option1 (To-I): Bait spraying (Spinosad 45 SC @ 0.3 ml L<sup>-1</sup> + jaggery 10 gm L<sup>-1</sup> + water) at the trunk

region of the plants soon after flowering @ 20 spots Ha<sup>-1</sup>, Technology option 2 (To-II): Placement of pheromone trap @ 25 Ha<sup>-1</sup> soon after flowering + collection of all fallen/affected fruit in an air tight polythene pack followed by exposure to direct sunlight, Technology option 3 (To-III): Bagging of fruit with shed net (70%) just after fruit setting. The method of data observation was through calculation of post set damage, harvested damage percentage and total marketable yield as per method suggested by Sapkota *et al*. 2010.

**Post-set damage (PSD):** Just after set to immature fruits (<100 g) damaged by cucurbit fruit fly.

**Harvested damage (HD):** Unmarketable fruits (>100 g) damaged by cucurbit fruit fly recorded at harvest.

**PSD** = Number of PSD fruit fly damaged fruits/ Total number fruits set x 100

**HD%** = Number of harvested fruit fly damaged fruits/ Total number fruits set x 100

## Results and Discussion

The results of the study conducted on assessment of suitable management strategy against melon fruit fly infesting bottle gourd indicated that (Table 1) (Graph-1) all the technologies provided significantly higher yield as compared to the farmer's practice. Among the technologies evaluated TO1 recorded highest yield of 23.68 quintal Ha<sup>-1</sup> and lowest percentage of harvested damage 11.13%. The lowest post set damage (23.83 %) was recorded in TO2. The next best treatment was technology option 2 which recorded 21.54 quintal Ha<sup>-1</sup> whereas in farmers practice the yield was 17.25 quintal Ha<sup>-1</sup>. 32.17% post set damage obtained in TO2 was may be due to larger pore size space in 70% shade net from where female flies were able to puncture which resulted in fruit damage. Highest yield and control obtained in TO1 was may be due to use of Spinosad + jaggery solution that glued to the plant surface and flies were died after coming in contact with Spinosad when they were roaming around the plants before and after fruit set.

Sapkota *et al.* 2010 reported similar findings from Nepal where they observed that out of total set fruits, 26% post set damage and harvested damage of 14.04% by the cucurbit fruit fly in squash orchard. Chakraborty *et al.* 2019 reported that Pheromone traps @ 25 Ha<sup>-1</sup> + gur based poison bait trap (50 ml Malathion 50 EC + 200g gur + 2 litre water) resulted mean percent fruit infestation by melon fruit fly to the tune of 13.92% in 2017 and 16.90% in 2018 in gherkins. The highest net return of Rs. 50110 Ha<sup>-1</sup> was recorded in TO1 which resulted in lowest benefit cost ratio of 2.03 whereas in farmers practice only net return of Rs. 28780 Ha<sup>-1</sup> was recorded (Table 2). It was clear from the study that frequent use of contact insecticides to

manage melon fruit fly is of limited use. Similar findings were reported by Sapkota *et al.* 2010.

### Conclusion

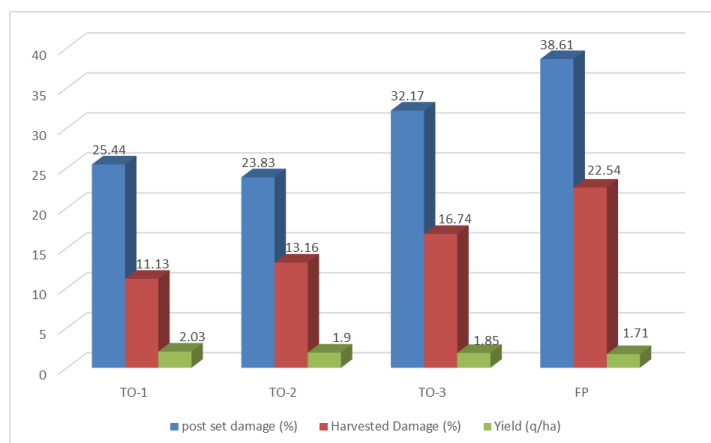
From the study it was concluded that all the management options evaluated are equally applicable to manage melon fruit fly. All the options may be considered to apply together like placement of pheromone trap @ 25 Ha<sup>-1</sup>+ collection of all fallen/affected fruit in an air tight polythene back and exposure to direct sunlight + bagging of fruits + bait spraying (Spinosad 45 SC @ 0.3 ml L<sup>-1</sup> + jaggery 10 gm L<sup>-1</sup>) The efficacy of poly propylene bags are to be evaluated in place of shed net bags as percentage of post set damage was higher through shed net bags.

**Table 1: Different yield components under different management options against melon fruit fly (mean of two years study 2020-21 and 2021-22)**

Treatments	Post set damage (%)	Harvested damage (%)	Yield (quintal/ha)
<b>Technology option1 (To-I):</b> Bait spraying (Spinosad 45 SC @ 0.3 ml L <sup>-1</sup> + jiggery 10 gm L <sup>-1</sup> + water) at the trunk region of the plants soon after flowering @ 20 spots Ha <sup>-1</sup>	25.44	11.13	2.03
<b>Technology option 2 (To-II):</b> Placement of pheromone trap @ 25 Ha <sup>-1</sup> soon after flowering + collection of all fallen/affected fruit in an air tight polythene pack followed by exposure to direct sunlight	23.83	13.16	1.90
<b>Technology option 3 (To-III):</b> Bagging of fruit with shed net (70%) just after fruit setting	32.17	16.74	1.85
<b>Farmers Practice:</b> Frequent use of lamda cyhalothrin 5% EC @ 1 ml L <sup>-1</sup>	38.61	22.54	1.71
CD at 5%			1.98

**Table 2: Economics of different management options against melon fruit fly (mean of two years study 2020-21 and 2021-22)**

Treatments	Gross Cost (Rs Ha <sup>-1</sup> )	Gross return (Rs Ha <sup>-1</sup> )	Net return (Rs Ha <sup>-1</sup> )	Benefit cost ratio (B:C)
<b>Technology option 1 (To-I):</b> Bait spraying (Spinosad 45 SC @ 0.3 ml L <sup>-1</sup> + jiggery 10 gm L <sup>-1</sup> + water) at the trunk region of the plants soon after flowering @ 20 spots Ha <sup>-1</sup>	48610	98720	50110	1: 2.03
<b>Technology option 2 (To-II):</b> Placement of pheromone trap @ 25 Ha <sup>-1</sup> soon after flowering + collection of all fallen/affected fruit in an air tight polythene pack followed by exposure to direct sunlight	45350	86140	40790	1: 1.90
<b>Technology option 3 (To-III):</b> Bagging of fruit with shed net (70%) just after fruit setting	42630	78920	36290	1: 1.85
<b>Farmers Practice (FP):</b> Frequent use of lamda cyhalothrin 5% EC @ 1 ml L <sup>-1</sup>	40580	69360	28780	1: 1.71



**Fig 1: Graphical representation of Different yield components under different management options against melon fruit fly (mean of two years study 2020-21 and 2021-22).**

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