

Original Research Article

<https://doi.org/10.20546/ijcmas.2019.809.142>

## Efficacy of Different IPM Modules against Melon Fruit Fly and American Serpentine Leaf Miner of Cucumber

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### ABSTRACT

#### Keywords

Cucumber, Fruit fly, Serpentine leaf minor

#### Article Info

Accepted:  
12 August 2019  
Available Online:  
10 September 2019

Field experiment was conducted during *Rabi* season of 2017-18 with nine modules, replicated thrice, in the 'Randomized Block Design' with gross plot size 4.00 m x 3.00 m. As regards with melon fruit fly infestation, the module M7 (15.82 per cent) was found most effective at 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> pickings. The next best module M4 (19.43 per cent) and M5 (22.12 per cent). The module M7 (23.82 per cent) was found most superior in reducing American serpentine leaf miner population at 25, 45 and 65 days after sowing. Followed by module M4 (25.80 per cent) and M5 (28.74 per cent).

### Introduction

Cucumber, (*Cucumis sativus* L.), which is one of the monoecious annual crops of the cool climate belongs to the cucurbitaceae family comprising 118 genera and 825 species.

Fruit fly, *B. cucurbitae* is one of the most destructive pests often rendering cultivation of cucumber unprofitable.

The fruit are damaged by the maggots of this fly as the female fly lays its eggs in the tissues of fruits. The maggots feed on flesh and look like rotten fruits. Hence, present investigation was undertaken to study the efficacy of

different IPM modules against melon fruit fly and American serpentine leafminer of cucumber under natural infestation in the field conditions.

### Materials and Methods

The field experiments were conducted during *Rabi* season of 2017-18 with local Kheera variety of cucumber with nine treatments replicated thrice in the 'Randomized Block Design' with gross plot size 4.00 m x 3.00 m carried out during *Rabi* 2017-18 at Post Graduate Research Farm, Department of Horticulture, R.C.S.M. College of Agriculture, Kolhapur.

## Method of recording observations

The observations of fruit fly damage were recorded at weekly interval throughout the crop season.

The damaged and healthy fruits were recorded at each picking for recording fruit infestation by fruit flies. . (Dubale *et al.*, 2018)

Percent fruit infestation

$$\frac{\text{Total number of damaged fruits}}{\text{Total number of observed fruits}} \times 100$$

Observations on per cent damaged leaves by American leaf miner were recorded on randomly selected three plants in each plot for these purpose five plants per plot were tagged.

The observations were recorded by counting total number of leaves per plant and number of leaf miner infested leaves. The per cent damage of leaves was expressed as below.

Percent damage of leaves

$$\frac{\text{No. of leaf miner infested leaves}}{\text{Total number of leaves}} \times 100$$

## Statistical analysis

In order to compare the treatment effect based on generated data of field experiments, the natural counts were subjected to transformation as per statistical methods suggested by Panse and Sukhatme, (1967).

The data on pest infestation based on calculated percentage were transformed to arc sine values in respect of melon fruit fly, e and serpentine leaf miner infestation.

## Results and Discussion

### Efficacy of different modules against fruit infestation by melon fruit fly (*B. cucurbitae* Coq.) of cucumber

Data pertaining to the survival population of melon fruit fly of cucumber on number basis at each picking are presented in Table 2. All the modules were found to be significantly superior in reducing population of melon fruit fly when observations were recorded at 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, picking.

From the overall performance of all the modules it was found that all the modules were significantly superior over control in reducing melon fruit fly infestation. The module M7 (15.82 per cent) was found as the best treatment with 56.26 per cent reduction over control. The next promising modules in decreasing order were M4 (19.43 per cent), M2 (22.12 per cent), M6 (24.76 per cent), M5 (27.15 per cent) and M1 (29.66 per cent) which are found equally effective in next order of efficacy. The module M3 (31.51 per cent) and M8 (33.49 per cent) were least effective.

These results are confirmative with result of Golvankar *et al.*, (2018) the results on efficacy of insecticides against fruit flies infesting cucumber indicated that spinosad 45 SC @ 0.014 per cent was the best treatment which recorded minimum (15.38%) mean fruit infestation and was at par with emamectin benzoate 5 SG @ 0.002 per cent (20.49%).

### Efficacy of different modules against American serpentine leaf miner (*L. trifolii* Burgess) of cucumber

Data pertaining to the survival population of leaf miner of cucumber on number basis at each picking are presented in Table 3.

**Table.1** Module details for pest complex of cucumber

Sr.No.	Module Details
<b>M1.</b>	Soil application of Carbofuran 10%G @ 15 Kg/ha + erection of yellow sticky traps(1-2 traps @50-100 m <sup>2</sup> ) + foliar spray of NSE 5% + spaying of Indoxacarb 14.55%SC @ 0.5ml/L.
<b>M2.</b>	Soil application of <i>Trichoderma viridae</i> @ 3-5 Kg/ha + poison bait(Malathion 20ml + 20L water + 50g molasses) + <i>Metarhizium anisopliae</i> @ 5 g/L + foliar spray of Deltametrin 1.8%EC @ 1.25ml/L.
<b>M3.</b>	Spaying of <i>Pseudomonas fluorescens</i> @ 4-6 g/L + erection of Cue lure trap + spraying of <i>Lecanicilicium laccani</i> @ 5g/L + foliar spray of Propergite 57%EC @ 2ml/L.
<b>M4.</b>	Spraying of Spirotetramate 15%OD @ 1 ml/L + foliar spray of NSE 5% + spraying of <i>Beauveria bassiana</i> @ 5g/L + spraying of Flubendamide 39.35%SC @ 0.1ml/L.
<b>M5.</b>	Trap crop Marigold (Two rows) + spraying of Flonicamide 50%WG @ 0.3gm/L + spraying of <i>Metarhizium anisopliae</i> @ 5 g/L + foliar spray of Chloranatrinirole18.5%SC @ 0.25ml/L.
<b>M6.</b>	Trap crop French bean (Two rows) + spraying of Dinotefuron 20%SG @ 0.25g/L + foliar spray of NSE 5% + spraying of Abamectin 1.9% EC 0.5ml/L.
<b>M7.</b>	Trap crop Maize (Two rows) + spraying of Indoxacarb 14.55%SC @0.5ml/L + spraying of <i>Metarhizium anisopliae</i> @ 5 g/L + spraying of NSE 5%.
<b>M8.</b>	Trap crop Mustard (Two rows) + soil application of Phorate 10%G @ 15 Kg/ha + spraying of <i>Metarhizium anisopliae</i> @ 5 g/L + spraying of Acephate 75%SP @ 0.5 g/L.
<b>M9.</b>	Untreated control.

**Table.2** Efficacy of different modules against melon fruit fly on cucumber

Module	Percent fruit infestation at different pickings						Per cent Reduction over control
	1 <sup>st</sup> Picking	2 <sup>nd</sup> Picking	3 <sup>rd</sup> Picking	4 <sup>th</sup> Picking	5 <sup>th</sup> Picking	Mean	
<b>M1</b>	28.11 (32.09)*	30.33 (33.42)	31.96 (34.43)	28.88 (32.51)	29.02 (32.60)	29.66 (33.00)	18.00
<b>M2</b>	20.88 (27.19)	23.14 (28.75)	23.97 (29.31)	21.72 (27.78)	20.89 (27.20)	22.12 (28.06)	38.84
<b>M3</b>	29.96 (33.19)	32.62 (34.83)	33.21 (35.19)	31.11 (33.90)	30.64 (33.61)	31.51 (34.15)	12.88
<b>M4</b>	18.21 (25.26)	19.86 (26.46)	20.7 (27.06)	19.97 (26.54)	18.42 (25.42)	19.43 (26.16)	46.28
<b>M5</b>	25.96 (30.63)	28.73 (32.41)	29.11 (32.65)	26.76 (31.15)	25.17 (30.11)	27.15 (31.40)	24.94
<b>M6</b>	23.38 (28.92)	26.08 (30.71)	26.86 (31.22)	24.37 (29.58)	23.11 (28.73)	24.76 (29.84)	31.55
<b>M7</b>	14.08 (22.039)	16.46 (23.94)	17.86 (25.00)	16.11 (23.66)	14.57 (22.44)	15.82 (23.43)	56.26
<b>M8</b>	31.88 (34.38)	34.58 (36.02)	35.06 (36.31)	33.46 (35.34)	32.46 (34.73)	33.49 (35.36)	7.41
<b>M9. Untreated control</b>	33.51 (35.37)	37.11 (37.53)	38.08 (38.10)	37.03 (37.48)	35.11 (36.34)	36.17 (36.97)	
<b>S.E.±</b>	1.15	0.94	0.89	1.01	0.86		
<b>C.D.(5%)</b>	3.46	2.83	1.26	3.05	2.60		
<b>CV</b>	7.92	5.89	5.41	6.60	5.88		

DAS = Days after sowing

\*Figures in parentheses are arcsine transformed value

**Table.3** Efficacy of different modules against serpentine leaf miner on cucumber

Module	Percent leaf mines infestation/plant					Per cent Reduction over control
	Pre count	25 DAS	45 DAS	65 DAS	Mean	
<b>M1</b>	41.19 (39.93)*	32.5 (34.76)	26.3 (30.85)	29.31 (32.78)	32.33 (34.65)	9.16
<b>M2</b>	42.63 (40.76)	31.38 (34.07)	19.32 (26.07)	21.64 (27.72)	28.74 (32.42)	19.25
<b>M3</b>	42.98 (40.96)	26.67 (31.09)	30.65 (33.62)	33.47 (35.35)	33.44 (35.33)	6.04
<b>M4</b>	40.32 (39.42)	27.81 (31.83)	16.1 (23.66)	18.98 (25.83)	25.80 (30.53)	27.51
<b>M5</b>	42.6 (40.74)	32.53 (34.77)	24.76 (29.84)	27.27 (31.48)	31.79 (34.32)	10.68
<b>M6</b>	42.94 (40.94)	32.26 (34.61)	21.43 (27.58)	24.24 (29.49)	30.22 (33.35)	15.09
<b>M7</b>	40.35 (39.44)	26.34 (30.88)	12.91 (21.06)	15.67 (23.32)	23.82 (29.21)	33.07
<b>M8</b>	41.17 (39.91)	33.63 (35.44)	29.71 (33.03)	33.44 (35.33)	34.49 (35.96)	3.09
<b>Untreated control</b>	41.24 (39.95)	34.94 (36.23)	31.76 (34.30)	34.4 (35.91)	35.59 (36.62)	
<b>S.E.±</b>	NS	0.82	1.10	0.87	-	
<b>C.D.(5%)</b>	NS	2.48	3.30	2.60		
<b>CV</b>		5.40	7.45	6.18		

DAS= Days after sowing

\*Figures in the parentheses are arcsine transformed value

All the modules were found to be significantly superior in reducing population of leaf miner when observations were recorded at 25,45,65 DAS.

From the overall performance of all the modules it was found that all the modules were significantly superior over control in reducing per cent leaf miner infestation.

The module M7 (23.82 per cent) was found as the best treatment with 33.07 per cent reduction over control. The next promising modules in decreasing order were M4 (25.80

per cent), M2 (28.74per cent) and M6 (30.22 per cent) which are found equally effective in next order of efficacy.

The module M5 (31.79 per cent) was found least effective. These results are confirmative with the results Desai (2018) revealed that on efficacy of different insecticides against *L. trifolii* through foliar sprays. The abamectin 1.9EC at 0.00057% was most effective treatment for suppression *Liriomyza trifolii* and it was followed by cartap hydrochloride 50 SP at 0.05%.

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### How to cite this article:

Sarade, S. A., A. S. Bagde, P. B. Mohite and Karade, V. M. 2019. Efficacy Of Different IPM Modules against Melon Fruit Fly and American Serpentine Leaf Miner of Cucumber. *Int.J.Curr.Microbiol.App.Sci*. 8(09): 1240-1245. doi: <https://doi.org/10.20546/ijcmas.2019.809.142>