

Original Research Article

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Efficacy of Different IPM Modules against Sucking Pests of Cucumber

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ABSTRACT

Keywords

Cucumber, Sucking pest, Yellow sticky trap

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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. The module M6 (7.92 aphids/plant) was found most superior in reducing aphids population at 25, 45 and 65 days after sowing. The next best module M4 (8.57 aphids/plant) and M5 (9.16 aphids/plant). The module M6 (5.39 jassids/plant) was found most superior in reducing jassids population at 25, 45 and 65 days after sowing. The next best module M4 (6.56 jassids/plant) and M5 (7.17 jassids/plant). The module M6 (5.83 whitefly/plant) was found most superior in reducing whitefly population at 25, 45 and 65 days after sowing. The next best module M4 (6.68 whitefly/plant) and M5 (7.03 whitefly/plant).

Introduction

Cucumber, (*Cucumis sativus* L.), crop is grown worldwide and it ranks fourth in the list of economic vegetables in Asia after tomato, cabbage and onion. The nutritional composition of cucumber fruit per 100 g edible portion is water (96.30%), carbohydrate (2.7%), protein (0.40%), Total fat (0.10%), fiber (0.40%), mineral matter (0.4%). the fruit is a veritable source of vitamins such as vitamin A, C, K, E, (Vimala *et al.*, 1999).

One of the major constraints not attaining higher yields of cucurbits, as they are infested

with sucking pests right from primordial stages of the crop to harvest of the products.

Apart from sucking large amount of fluid from the growing plants and debilitating the plants aphids transmit the dreaded cucumber mosaic virus disease as a vector in a non persistent manner. The infected plants exhibit mosaic, vein banding and blistering on malformed leaves and fruits thereby reducing marketability. Hence, present investigation was undertaken to study the efficacy of different ipm modules against sucking pest of cucumber under natural infestation in the field conditions.

Materials and Methods

The field experiments were carried out 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 during *Rabi* 2017-18 at Post Graduate Research Farm, Department of Horticulture, RCSM College of Agriculture, Kolhapur.

Method of recording observations

Observations on sucking pest count were recorded on five randomly selected plants in each module plot on each selected plant, three leaves from top, middle and bottom portion were observed from lower side for presence of aphids, jassids and whitefly. Pre count was taken one day prior to spraying.

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 counts of aphids, jassids and whitefly were converted to square root transformed value using square root transformation.

Results and Discussion

Efficacy of different modules against aphids (*A. gossypii* Glover) of cucumber

Data pertaining to the survival population of aphid on cucumber one day before and 25, 45 and 65 days after sowing are presented Table.2.

From the overall performance of all the modules it was found that all the modules were significantly superior over control in reducing aphids population.

The module M6 (7.92 aphids/leaf) was found as the best treatment with 40.05 per cent reduction over control.

The next promising module was M4 (8.57 aphids/leaf), M5 (9.16 aphids/leaf) and M7 (9.24 aphids/leaf) in next order of efficacy.

The module M1 (9.75 aphids/leaf), M2 (9.85 aphids/leaf) and M8 (10.30 aphids/leaf) were least effective.

These results are confirmative with the results of Adhikari *et al.*, (2013) reported that NSE 5% found most effective among NSE 2.5% and NSE%. Rashki, *et al.*, (2012) revealed that the high potential of the pathogenic fungus, *B. bassiana* strain DEBI008, to use in IPM programs as an efficient biocontrol agent against the important aphids pest, *A. gossypii*.

Efficacy of different modules against jassids (*Amrasca biguttula biguttula* Ishida) of cucumber

Data pertaining to the survival population of jassids on cucumber one day before and 25,45 and 65 days after sowing are presented Table 3.

From the overall performance of all the modules it was found that all the modules were significantly superior over control in reducing jassids population.

The module M6 (5.75 jassids/leaf) was found as the best treatment with 40.66 per cent reduction over control.

Table.1 Module details for pest complex of cucumber

Sr.No.	MODULE DETAILS
M1.	Soil application of Carbofuran 10%G @ 15 Kg/ha + erection of yellow sticky traps(1-2 traps @50-100 m ²) + foliar spray of NSE 5% + spaying of Indoxacarb 14.55%SC @ 0.5ml/L.
M2.	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.
M3.	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.
M4.	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.
M5.	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.
M6.	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.
M7.	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%.
M8.	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.
M9.	Untreated control.

Table.2 Efficacy of different modules against aphids on cucumber

Module	Mean survival population of Aphids/leaf					Per cent Reduction over control
	Pre count	25 DAS	45 DAS	65 DAS	Mean	
M1	11.04 (3.40)*	11.13 (3.41)	9.02 (3.09)	7.81 (2.88)	9.75 (3)	26.19
M2	9.64 (3.18)	11.07 (3.40)	10.46 (3.31)	8.24 (2.96)	9.85 (3.21)	25.44
M3	11.59 (3.48)	13.08 (3.69)	10.81 (3.36)	8.74 (3.04)	11.06 (3.40)	16.28
M4	9.48 (3.16)	10.97 (3.39)	8.13 (2.94)	5.71 (2.49)	8.57 (3.01)	35.12
M5	11.76 (3.50)	10.81 (3.36)	8.26 (2.96)	5.81 (2.51)	9.16 (3.10)	30.66
M6	8.88 (3.06)	10.62 (3.33)	7.08 (2.75)	5.11 (2.37)	7.92 (2.90)	40.05
M7	10.1 (3.26)	11.08 (3.40)	8.71 (3.03)	7.07 (2.75)	9.24 (3.12)	30.05
M8	11.14 (3.41)	12.02 (3.54)	9.81 (3.21)	8.21 (2.95)	10.30 (3.29)	22.02
Untreated control	11.3 (3.44)	16.21 (4.09)	13.81 (3.78)	11.51 (3.47)	13.21 (3.70)	-
S.E.±	NS	0.89	0.56	0.69		
C.D.(5%)	NS	2.68	1.70	2.08		
CV		12.97	10.21	15.73		

DAS = Days after sowing

*Figures in parentheses are transformed values $\sqrt{X + 0.5}$

Table.3 Efficacy of different modules against jassids on cucumber

Module	Mean survival population of jassids/leaf					Per cent Reduction over control
	Pre count	25 DAS	45 DAS	65 DAS	Mean	
M1	10.16 (3.26)*	9.08 (3.10)	6.75 (2.69)	5.07 (2.36)	7.77 (2.87)	19.81
M2	9.21 (3.12)	8.36 (2.98)	7.26 (2.79)	6.66 (2.68)	7.87 (2.90)	18.78
M3	9.84 (3.22)	10.31 (3.29)	8.91 (3.07)	5.11 (2.37)	8.54 (3.01)	11.87
M4	7.71 (2.87)	7.61 (2.85)	6.36 (2.62)	3.11 (1.90)	6.20 (2.59)	36.02
M5	8.08 (2.93)	7.81 (2.88)	6.97 (2.73)	5.81 (2.51)	7.17 (2.77)	26.01
M6	8.66 (3.03)	6.51 (2.65)	3.26 (1.94)	4.56 (2.25)	5.75 (2.50)	40.66
M7	8.79 (3.05)	8.01 (2.92)	7.02 (2.74)	6.26 (2.60)	7.52 (2.83)	22.39
M8	9.64 (3.18)	8.97 (3.08)	7.46 (2.82)	6.51 (2.65)	8.15 (2.94)	15.89
Untreated control	10.43 (3.31)	10.51 (3.31)	9.36 (3.14)	8.46 (2.99)	9.69 (3.19)	
S.E.±	NS	0.74	0.49	0.71		
C.D.(5%)	NS	2.22	1.48	2.15		
CV		14.87	12.14	21.60		

DAS = Days after sowing

*Figures in parentheses are transformed values $\sqrt{X + 0.5}$

Table.4 Efficacy of different modules against whitefly on cucumber

Module	Mean survival population of whitefly/leaf					Per cent Reduction over control
	Pre count	25 DAS	45 DAS	65 DAS	Mean	
M1	8.57 (3.01)*	8.41 (2.98)	8.01 (2.92)	6.11 (2.57)	7.78 (2.88)	19.96
M2	9.44 (3.15)	9.81 (3.21)	7.86 (2.89)	6.02 (2.55)	8.28 (2.96)	9.26
M3	9.84 (3.22)	10.11 (3.26)	9.08 (3.10))	7.98 (2.91)	9.25 (3.12)	4.83
M4	8.16 (2.94)	7.61 (2.85)	6.11 (2.57)	4.85 (2.31)	6.68 (2.68)	31.28
M5	8.86 (3.06)	7.26 (2.79)	6.18 (2.58)	5.81 (2.51)	7.03 (2.74)	27.67
M6	7.86 (2.89)	6.14 (2.58)	5.08 (2.36)	4.24 (2.18)	5.83 (2.52)	40.02
M7	8.11 (2.93)	7.97 (2.91)	6.86 (2.71)	6.41 (2.63)	7.34 (2.80)	24.49
M8	9.51 (3.16)	9.02 (3.09)	7.96 (2.91)	6.86 (2.71)	8.34 (2.97)	14.20
Untreated control	10.81 (3.36)	10.51 (3.32)	9.36 (3.14)	8.18 (2.95)	9.72 (3.20)	-
S.E.±	NS	0.43	0.86	0.51		
C.D.(5%)	NS	1.31	2.59	1.53		
CV		8.81	20.14	14.00		

DAS = Days after sowing

*Figures in parentheses are transformed values $\sqrt{X + 0.5}$

The next promising module was M4 (6.20 jassids/leaf), M5 (7.17 jassids/leaf) and M7 (7.52 jassids/leaf) in next order of efficacy.

The module M1 (7.77 jassids/leaf) and M2 (7.87 jassids/leaf) were least effective. Naved Sabir *et al.*, (2011) reported that combination

of azadirachtin and agrospray (0.5%) was the most effective component of IPM for controlling the sucking pests of cucumber under protected cultivation. Of the potential biological control agents tested in this study.

Efficacy of different modules against whitefly (*Bemisia tabaci* Gen.) of cucumber

Data pertaining to the survival population of whitefly on cucumber one day before and 25, 45 and 65 days after sowing are presented Table 4. From the overall performance of all the modules it was found that all the modules were significantly superior over control in reducing whiteflies population. The module M6 (5.83 whitefly/leaf) was found as the best treatment with 40.02 per cent reduction over control. The next promising module was M4 (6.68 whitefly/leaf), M5 (7.03 whitefly/leaf) and M7 (7.34 whitefly/leaf) in next order of efficacy. The module M1 (7.78 whitefly/leaf) was least effective.

These results are confirmative Naved Sabir *et al.*, (2011) reported that combination of azadirachtin and agrospray (0.5%) was the most effective component of IPM for controlling the sucking pests of cucumber under protected cultivation. Of the potential biological control agents tested in this study. Banshiwal *et al.*, (2018) reported that all among the treatments, acetamiprid 20 SP found most effective against whitefly as recorded 62.79 per cent population reduction.

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