



Original Research Article

Bioefficacy of Different Insecticides against Leaf Minor (*Liriomyza trifolii*) on Cucumber and Their Effect on Natural Enemies

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A B S T R A C T

The Field experiment was carried out at entomological section, PGI block, MPKV, during 2014 to study the efficacy of different insecticides against American serpentine leaf minor (*Liriomyza trifolii*) on cucumber and their effect on natural enemies. Eight insecticides included Abamectin 1.9 EC(0.00057%), Cartap hydrochloride 50 SP (0.05 %), Spinosad 45 SC (0.018 %), Fipronil 5 SC (0.0075%), Imidacloprid 17.80 SL (0.0071%), Carbosulfan 25 EC(0.025%), Trizophos 40 EC(0.08 %), NSKE 5 % and one treatment was kept as untreated control. The results of the efficacy revealed that Abamectin 1.9 EC at 0.00057 % was most effective treatment for suppression of *liriomyza* followed by Cartap hydrochloride 50 SP at 0.05 %. Abamectin 1.9 EC at 0.00057 % recorded significantly higher percent decline in damaged leaves followed by Cartap hydrochloride 50 SP at 0.05%. Effect of insecticides on natural enemies of *L. trifolii* revealed that NSKE 5 %, Abamectin 1.9 EC at 0.00057 %, Fipronil 5 SC at 0.0075 %, Imidacloprid 17.80 SL at 0.0071%, Trizophos 40 EC at 0.08 % and Spinosad 45 SC at 0.018 % had lower parasitism by *Chrysotomomyia* spp. than the untreated control. Considering the performance of different insecticides the plots treated with Abamectin 1.9 EC at 0.00057 % recorded maximum crop growth and yield.

Keywords

Efficacy,
Liriomyza
trifolii, Natural
Enemies,
Cucumber

Introduction

Cucumber (*Cucumis sativas* L.) is one of the most widely grown vegetable crops during Kharif and summer season in all parts of the country. In Maharashtra, cucumber is grown in all districts. American serpentine leaf minor (*Liriomyza trifolii*) has attained a pest of economic importance in recent past. Control of leaf minor with insecticides is usually difficult because of its biology, short lifecycle, smaller in size and high mobility of adults, relatively long pupal stage in soil, high reproductive capability i.e. fecundity and concealed larval stages. In addition, mines created by larvae remain on the leaf as long as the leaf survives.

Different conventional insecticides were tried for the control of serpentine leaf minor infesting cucumber (Pawar and Patil 2013). Crop Protection with chemicals is desirable and unavoidable part of integrated pest management. (Ganapathy *et al.*, 2010).

Thus to overcome the losses and to increase yield, pesticides application is almost important. So there is need to compare the efficacy of insecticides against pests for effective pest management and to reduce the indiscriminate use of insecticides. Thus the present study was conducted to evaluate different products available in the market for

their efficacy against American serpentine leaf minor on cucumber.

Materials and Methods

The field experiment was laid out in a randomized block design with three replications and nine treatments at Entomological section, PGI Block, MPKV, Rahuri during 2014. All the recommended agronomical practices were followed in raising the crop and uniform plant population was maintained. The observations on live mines were recorded on randomly selected there plants in each plot. Pre-treatment counts of *L. trifolii* were recorded one day before the insecticide applications and subsequent observations for the post treatments counts were recorded on 7th day after insecticide application of each spray. Three sprays were applied at a 14 days of interval. The difference on live mines between the pre count and post count observations was worked out. The data on percent mortality of maggot of *L. trifolii*., percent decline of damaged leaves of cucumber and yield were statistically analyzed

Results and Discussion

Eight insecticides were tested for their efficacy against American Serpentine leaf miner *L. trifolii* on cucumber. The data regarding the efficacy of different insecticides and effect on natural enemies is given table 1. Data revealed that Abamectin 1.9 EC at 0.00057 % was found most effective and reduced maggot population of leaf miner by 70.95 % followed by Cartap hydrochloride 50 SP @ 0.05 % that showed % mortality of maggot by 68.25 % on 7th day after application of spray. Next better treatment for % mortality of maggot was Fipronil 5 SC @ 0.0075 % and NSKE 5 % by recording 65.34 and 64.01 % mortality of

maggot. In case of % damage on leaves Abamectin 1.9 EC at 0.00057 % was found significantly superior and recorded lowest % damage on leaves i.e. 18.91. Next better treatment for % damage on leaves was Cartap hydrochloride 50 SP @ 0.05 % which recorded 21.70 % damage on leaves. Highest % decline of damaged leaves (55.34 %) was recorded in treatment Abamectin 1.9 EC at 0.00057 % followed by Cartap hydrochloride 50 SP @ 0.05 % which recorded 48.71 % decline of damaged leaves. Maximum % parasitism on *L. trifolii* was recorded in untreated control i,e 61.60 %. Among all insecticide treatment NSKE recorded highest % parasitism on *L. trifolii* i.e 20.79 %. Carbosulfan 25 EC @ 0.025 % recorded lowest % parasitism on *L. trifolii* i.e. 4.64 % among all the treatments.

Effect of different insecticide on growth and yield of cucumber in given in Table 2. Highest mean length of plant (1.56 m) is recorded in Abamectin 1.9 EC at 0.00057 % followed by Cartap hydrochloride 50 SP @ 0.05 % which recorded 1.48 mean length of plant. Lowest length of plant recorded in untreated control. (1.12 m). The yield data revealed that all treatments gave significantly higher yield over untreated control. Amongst the insecticide Abamectin 1.9 EC at 0.00057 % recorded significantly higher yield (122.66 q/ha) than the untreated control (52.00 q/ha). The next subsequent treatment for better yield was Cartap hydrochloride 50 SP @ 0.05 %, and Fipronil 5 SC at 0.0057 % which recorded 114.66 and 105.33 q/ha yield respectively. Highest Increase yield and % increase yield over control was recorded in Abamectin 1.9 EC at 0.00057 % i.e. 70.66 % and 135.88 % respectively. While lowest increase in yield and % increase yield over control was recorded in treatment with Carbosulfan 25 EC @ 0.025 % i.e. 30.66 and 58.96 % respectively.

Table.1 Efficacy of different insecticides against *L.trifolii* on cucumber through foliar sprays

Sr. No.	Treatment	% Mortality of maggot	% damage on leaves	% Decline of damaged leaves	% Parasitism on <i>L. trifolii</i>
1	Abamectin 1.9 EC (0.00057%)	70.95 (57.44)*	18.91 (25.16)	55.34 (38.03)	13.67 (21.53)
2	Cartap hydrochloride 50 SP (0.05%)	68.25 (55.77)	21.70 (27.40)	48.71 (32.42)	0.947 (17.88)
3	Spinosad 45 SC (0.018%)	63.00 (52.57)	29.17 (32.59)	34.59 (22.90)	10.06 (18.46)
4	Fipronil 5 SC (0.0075 %)	65.34 (53.99)	24.97 (29.73)	44.04 (30.51)	11.11 (19.44)
5	Imidacloprid 17.80 SL (0.0071%)	58.38 (49.83)	33.67 (35.44)	21.99 (9.30)	10.87 (19.25)
6	Carbosulfan 25 EC (0.025%)	56.36 (48.66)	34.83 (36.15)	19.43 (7.54)	0.4.64 (12.22)
7	Trizophos 40 EC (0.08%)	61.52 (51.68)	30.54 (33.48)	29.29 (22.25)	10.41 (18.77)
8	NSKE 5%	64.01 (53.16)	27.07 (31.18)	39.76 (26.75)	20.79 (26.14)
9	Untreated	0.00	00.00	0.00	61.60 (51.86)
	SE +	0.83	0.32		0.84
	CD at 5%	2.57	1.00		2.57

*Figures in the parenthesis are arcsine transformed values

Table.2 Effect of different insecticides on growth and yield of cucumber

Sr. No.	Treatments	Mean length of plant (m)	Total yield of cucumber (q/ha)	Increase yield over control (q/ha)	% increase yield over control
1	Abamectin 1.9 EC (0.00057%)	1.56	122.66	70.66	135.88
2	Cartap hydrochloride 50 SP (0.05%)	1.48	114.66	62.66	120.50
3	Spinosad 45 SC (0.018%)	1.32	93.33	41.33	79.47
4	Fipronil 5 SC (0.0075 %)	1.43	105.33	53.33	102.56
5	Imidacloprid 17.80 SL (0.0071%)	1.22	86.66	34.66	66.65
6	Carbosulfan 25 EC (0.025%)	1.20	82.66	30.66	58.96
7	Trizophos 40 EC (0.08%)	1.30	89.66	37.66	72.42
8	NSKE 5%	1.24	97.33	45.33	87.18
9	Untreated	1.12	52.00		
	SE +	0.21	1.48		
	CD at 5%	0.65	4.58		

The present findings are in conformity with several workers who reported that these insecticides reduce the infestation of *L. Trifolii* on various crops. Muhammad Naeem *et al.*, (2016) and Rai *et al.*, (2017) reported efficacy of Abamectin on pea and tomato while Hernandez *et al.*, (2011) reported efficacy of Abamectin and Novaluron on peppe. The present findings showed that Abamectin 1.9 EC @ 0.00057 % was more effective than other insecticide for the control of cucumber leaf minor. Leaf minor is a severe pest of cucumber which causes significant yield losses of cucumber which also affect their quality as well. While keeping in view the problem of leaf minor on cucumber present investigation will be a milestone in this regard.

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