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BIO-EFFICACY OF AMPLIGO 150 ZC (CHLORANTRANILIPROLE 9.3% + LAMBDACYHALOTHRIN 4.6%) AGAINST LEAF MINER (*LIRIOMYZA TRIFOLII*) IN TOMATO (*LYCOPERSICUM ESCULENTUM* MILL.)

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Abstract

The efficacy of insecticides viz., chlorantraniliprole 9.3% w/w + lambdacyhalothrin 4.6% w/w 150 ZC (Ampligo 150 ZC) lambdacyhalothin (Metador) chlorantraniliprole (Coragen) novaluron 5.25% + indoxacarb 4.5% SC (Plethora) against leaf miner (*Liriomyza trifolii*). On the basis of reduction in insect population over control on 7th day after spray, the order of efficacy against *L. trifolii* was chlorantraniliprole 9.3% w/w + lambdacyhalothrin 4.6% w/w 150 ZC > novaluron 5.25% + indoxacarb 4.5% SC > chlorantraniliprole 18.5% SC > lambdacyhalothrin 4.9% CS against *L. trifolii*. chlorantraniliprole 9.3% w/w + lambdacyhalothrin 4.6% w/w 150 ZC treatments resulted in significantly higher yield as compared to untreated check.

Key words: Bioefficacy, *Liriomyza trifolii*, chlorantraniliprole 9.3% w/w + lambdacyhalothrin 4.6% w/w 150 ZC.

Introduction

Tomato (*Lycopersicum esculentum* Mill) is an important vegetable crop grown throughout India and important – protective foods because of the special nutritive value. It is worlds third largest vegetable crop after potato and sweet potato. Tomato is consumed in many countries, as it provides several plant nutrients and considered as a important nutritional value for human diet (Willeox, 2003). In Tamilnadu tomato is grown in an area of about 26.10 thousand hectares with a production of 519.10 thousand tones Madhya Pradesh, Karnataka, Orissa, Maharashtra and Bihar are the major tomato growing states in India. India ranks second in area as well as in production of tomato followed by China, U.S.A and Turkey (Anonymous, 2011). Tomato crop is affected by several biotic, physiochemical and mesobiotic factors. Amoung the biotic factors insect pests are predominant and occur regularly at different stages of crop growth. A number of insect pests (nearly 100 to 200 species) are reported in the tomato fields (Lange and Bronson, 1997). Among them loss incurred to the tomato crop by leaf miner (*Liriomyza trifolii* Patra Sandip.) they are polyphagous in nature and have the ability to adapt different cropping system and wide geaographical range (Tewari and Krishna Moorthy, 1984). *Liriomyza trifolii* infestation starts from nursery and continues till fruiting stage and leads to severe yield loss. The estimated losses due to infestation of *Liriomyza trifolli* was 46 to 70 per cent during seedling stage (Pohronenzy *et al*., 1986), 90 per cent to tomato foliage (Johnson, 1983) and 70 per cent of tomato fruit yield (Zoebisch *et al*., 1984). Considering the economic importance of tomato and the losses caused by the pest, the present investigation is planned to evaluate the bio-efficacy of newer insecticide formulation chlorantraniliprole 9.3% w/w + lambdacyhalothrin 4.6% w/w 150 ZC in tomato

Materials and Methods

The present investigation have been designed to evaluate the bioefficacy of chlorantraniliprole 9.3%w/w + lambdacyhalothrin 4.6%w/w 150 ZC against major pests of tomato *Liriomyza trifolii* under tolerance in field conditions during 2016-2018. The numbers of live mines on five randomly selected leaves per plant were counted and recorded (Hossain and Sheikh, 2009).

Test Chemicals

Chlorantraniliprole 9.3% w/w + lambdacyhalothrin 4.6% w/w 150 ZC (Syngenta India Pvt Ltd) chlorantraniliprole 18.5 SC (Syngenta India Pvt Ltd) lambda-cyhalothrin 4.9 CS (Du Pont India Pvt Ltd) novaluron 5.25 % + indoxacarb 4.5% SC (Adama India Pvt Ltd)

Field Trials

The experiment were laid out at the Experimental farm, sivapuri in Chidambaram during the years 2017-2018 in a randomized block design with 8 treatments including an untreated control and replicated thrice. The plot size was 50 m^2 with the spacing of 45cm × 60cm in both the seasons. Each treatment was replicated three times.

Observation

Three doses of chlorantraniliprole 9.3% w/w + lambdacyhalothrin 4.6% w/w 150 ZC @ 28, 35, and 41.7 g a.i/ha were evaluated and compared with the standard chlorantraniliprole 18.5 SC @ 15 g a.i/ha lambda-cyhalothrin 4.9 CS @ 83.4 novaluron 5.25 % + indoxacarb 4.5% SC @ 30 g a.i/ha and control. The insecticides treatments were done using manually operated Knapsack sprayer with cone nozzle @ 500 L/ha employing water for dilution. Single insecticidal application was given at the onset of flowering (after 90 days of planting). Observation on population of *S litura* from 5 randomly selected tomato plants before and at 3, 7 and 10 days after treatment (DAT) were recorded. The number of larvae per plant was recorded to calculate and yield on whole plot basis from three pickings from 100 days of planting. The number of natural enemies was recorded from each plot before and at 3, 7 and 10 DAT

Statistical treatment

Randomized block design was followed and analysis was done following Panse and Sukhatme (1957).

The corrected per cent reduction in field population was worked out by using the formula of Henderson and Tilton (1955) as follows

$$\text{Corrected percent reduction} = 1 - \frac{T_a \times C_b}{T_b \times C_a} \times 100$$

Results and Discussion

During 2017-18, the population of *Liriomyza trifolii* before first spray ranged from 1.93 to 0.33 nos. plant in various treatments. The mean larval population was the lowest in chlorantraniliprole 9.3% + lambdacyhalothrin 4.6% ZC @ 41.7 g a.i/ha (0.75 nos./plant) which was on par with chlorantraniliprole 9.3% + lambdacyhalothrin 4.6% ZC @ 35 g a.i/ha (0.82 nos./plant) chlorantraniliprole 9.3% + lambdacyhalothrin 4.6% ZC @ 28 g a.i/ha (1.00 nos./plant) followed by novaluron 5.25% + indoxacarb 4.5% SC @ 85.32 g a.i/ha (1.00 nos./plant) chlorantraniliprole 18.5% SC @ 30 g a.i/ha (1.07 nos./plant) and lambdacyhalothrin 4.9% CS @ 15 g a.i/ha (1.32 nos./plant). Untreated check plots a recorded a mean larval population of 2.40 nos./plant Table-I. The population of *Liriomyza trifolii* during season-II ranged from 2.03 to 0.93 nos./plant in various treatments. The mean larval population was lowest in chlorantraniliprole 9.3% + lambdacyhalothrin 4.6% ZC @35 g a.i/ha (1.00 nos./plant) chlorantraniliprole 9.3% + lambdacyhalothrin 4.6% ZC@ 28 g a.i/ha (1.21 nos./plant) followed by novaluran 5.26% + indoxacarb 4.5% SC @ 85.32 g a.i/ha (1.31 nos./plant), chlorantraniliprole 18.5% SC @ 30 g a.i/ha (1.59 nos./plant) and lambdacyhalothrin 4.9% CS @ 15 g a.i/ha (1.66 nos./plant). Untreated check plots a recorded a mean larval population of 3.51 nos./plant (Table-2)

Effect on natural enemies

A non significant difference was recorded on natural enemies' viz., spider coccinellid as compared to untreated check during both the seasons.

Table 1 and 2 : Effect of chlorantraniliprole 9.3% + lambdacyhalothrin 4.6% ZC against tomato leaf miner (season : I & II)

Treatments	Dose (g a.i/ha)	No of mines per plant *								
		PTC	FIRST SPRAY			SECOUND SPRAY			MEAN	%ROC
			3 DAT	7DAT	10DAT	3DAT	7DAT	10DAT		
Chlorantraniliprole 9.3% w/w+ Lambdacyhalothrin 4.6 w/w ZC	28 (18.60 + 9.20)	2.20 (1.48)	1.93 (1.39)	1.00 (1.00)	0.47 (1.21)	0.87 (0.93)	0.60 (0.77)	0.13 (1.00)	1.00 (1.00)	58.3
Chlorantraniliprole 9.3% w/w+ Lambdacyhalothrin 4.6 w/w ZC	35 (23.25 + 11.50)	2.13 (1.46)	1.73 (1.32)	0.67 (0.82)	1.47 (1.21)	0.60 (0.77)	0.33 (0.58)	0.13 (0.29)	0.82 (0.90)	65.8
Chlorantraniliprole 9.3% w/w+ Lambdacyhalothrin 4.6 w/w ZC	41.7 (27.90 + 13.80)	2.33 (1.52)	1.80 (1.34)	0.67 (0.82)	1.23 (1.11)	0.67 (0.82)	0.13 (0.37)	0.00 (0.00)	0.75 (0.86)	68.7
Lambdacyhalothrin 4.9% CS	15	2.40 (1.55)	1.67 (1.29)	1.33 (1.15)	2.00 (1.41)	1.27 (1.13)	0.87 (0.93)	0.80 (0.87)	1.32 (1.15)	45.0
Chlorantraniliprole 18.5% SC	30	2.20 (1.48)	1.80 (1.34)	1.33 (1.15)	1.60 (1.26)	0.93 (0.93)	0.53 (0.73)	0.27 (0.50)	1.07 (1.03)	55.4
Novaluron 5.25%+ Indoxacarb 4.5% sc	85.32 (45.94 + 39.38)	2.20 (1.48)	1.80 (1.34)	1.00 (1.00)	1.67 (1.29)	0.73 (0.86)	0.47 (0.68)	0.33 (0.46)	1.00 (1.00)	58.3
Untreated check	-	2.13 (1.46)	2.67 (1.63)	2.00 (1.41)	3.10 (1.76)	2.33 (1.53)	2.00 (1.41)	2.33 (1.53)	2.40 (1.55)	-
CD (0.05%)		NS	0.09	0.11	0.23	0.28	0.31	0.32	0.21	-

Treatments	Dose (g a.i/ha)	No of mines per plant *								
		PTC	FIRST SPRAY			SECOUND SPRAY			MEAN	%ROC
			5DAT	10DAT	15DAT	5DAT	10DAT	15DAT		
Chlorantraniliprole 9.3% w/w+ Lambdacyhalothrin 4.6 w/w ZC	28 (18.60 + 9.20)	3.00	2.03 (1.42)	1.37 (1.15)	1.70 (1.70)	1.03 (1.01)	0.73 (0.85)	0.40 (0.62)	1.21 (1.06)	65.53
Chlorantraniliprole 9.3% w/w+ Lambdacyhalothrin 4.6 w/w ZC	35 (23.25 + 11.50)	2.73	1.73 (1.30)	1.07 (1.03)	1.40 (1.40)	0.77 (0.87)	0.57 (0.75)	0.43 (0.65)	1.00 (0.97)	71.65
Chlorantraniliprole 9.3% w/w+ Lambdacyhalothrin 4.6 w/w ZC	41.7 (27.90 + 13.80)	3.07	1.70 (1.28)	0.83 (0.91)	1.43 (1.43)	0.70 (0.83)	0.40 (0.62)	0.37 (0.60)	0.91 (0.91)	74.22
Lambdacyhalothrin 4.9% CS	15	2.70	2.40 (1.54)	1.73 (1.30)	2.03 (2.03)	1.73 (1.29)	1.07 (1.03)	0.97 (0.98)	1.66 (1.27)	52.85
Chlorantraniliprole 18.5% SC	30	3.40	2.70 (1.63)	1.77 (1.32)	1.73 (1.73)	1.43 (1.18)	1.07 (1.03)	0.83 (0.91)	1.59 (1.23)	54.75
Novaluron 5.25%+ Indoxacarb 4.5% sc	85.32 (45.94 + 39.38)	3.03	2.07 (1.43)	1.33 (1.15)	1.37 (1.36)	1.37 (1.15)	0.80 (0.89)	0.93 (0.96)	1.31 (1.13)	62.63
Untreated check	-	3.10	3.77 (1.93)	3.40 (1.83)	3.73 (3.73)	3.43 (1.85)	3.23 (1.77)	3.50 (1.84)	3.51 (1.81)	-
CD (0.05%)		NS	0.30	0.21	0.95	0.31	0.26	0.25	0.11	-

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