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Population Dynamics and Efficacy of Insecticides against Spider Mite *Schizotetranychus baltazari* (Tetranychidae) in Curry Leaf *Murraya koenigii*

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ABSTRACT: The field experiment was conducted to study the population dynamics and efficacy of insecticides against curry leaf mite *Schizotetranychus baltazari*. The experiment was conducted in the orchard (latitude: 11.009945° N and longitude: 76.93108°E), Department of Spices and Plantation Crops, Horticultural College and Research Institute, Coimbatore. The result showed that more mites were recorded in the 16th standard week (37.10/2cm^2). The maximum temperature and minimum temperature showed a positive and significant relationship in the development of the mite population, whereas morning relative humidity, evening relative humidity and rainfall showed a negative and non-significant relationship in the development of the mite population. The efficacy of insecticides *viz*., *Metarhizium anisopliae* @ 3ml/l, *Beauveria bassiana*@ 3ml/l, *Lecanicillium lecanii*@ 3ml/l, *Hirsutella thompsoni*@ 3ml/l, Spiromesifen 240 SC @ 0.8ml/l, Thiamethoxam 25 WG @ 2g/10l, Fenpyroximate 5 SC @ 2g/10l against curry leaf mite. Among these insecticides Spiromesifen 240 SC @0.8ml/l has highest cumulative per cent reduction of mites over control (86.48%), followed by Fenpyroximate 5 SC @1ml/l (84.31%), Thiamethoxam 25 WG @ 2g/10l (82.49%), *M. anisopliae* @ 3ml/l (76.60%), *B. bassiana*@ 3ml/l(70.95%), *L. lecanii*@ 3ml/l(61.73%) and *H. thompsoni* @ 3ml/l (46.17%). Curry leaf mites' small size and hidden habitat on leaf undersides make accurate population assessment and effective insecticide application difficult. Fluctuating environmental factors, including temperature and plant health, influence mite populations and interact with insecticide efficacy, requiring precise analysis for effective control strategies.

Keywords: Population dynamics, Insecticides, Spiromesifen, Thiamethoxam, *M. anisopliae*, *B. bassiana*, Curry leaf, Mite.

INTRODUCTION

Curry leaf (*Murraya koenigii*) belongs to the Rutaceae family, which comprises 150 genera and 1600 species (Sangam *et al*., 2015). Curry leaf is native to South Asia, primarily India, Sri Lanka, and Bangladesh. In Tamil Nadu and Karnataka, *Murraya koenigii* is used as a flavouring agent and is known as "Kari" (Jain *et al*., 2017). The air-dried curry leaf will retain its flavour and other qualities, making it an essential spice and condiment in tropical countries (Verma, 2018). Leaf flavour can be characterised as bitter, somewhat acidic, and pungent. 100 g of freshly harvested green curry leaves contain a nutritional value of 6 g of protein, 1 g of fat, 18.7 g of carbohydrate, 830 mg of calcium, 0.93 mg of iron, and 7560 µg of carotene. 100 g of dried curry leaves had 12 g of protein, 5.4 g of fat, 64.31 g of carbohydrates, 2040 mg of calcium, 12 mg of iron, and 5292 µg of carotene. The fragrant leaves are widely used to flavour dishes to improve appetite and digestion (Kataria *et al*., 2013).

The leaves of the plant can be utilised for the treatment of burns, external wounds, rheumatism, and toxicity from poisonous animal bites (Tan *et al*., 2014). Curry leaves have been traditionally utilised as a hair tonic to retain natural hair colour and enhance the growth of hair by boiling them in coconut oil till their contents are reduced to a clear residue (Saini *et al*., 2015).

The important insect pests in this crop are citrus butterflies, psyllids, scales, mealy bugs and non-insect pest two-spotted spider mites (Kumari and Gond 2020) which causes losses to the curry leaf crop's quality and quantity. Spider mites have been known for damaging all types of economically significant crops, including field crops, ornamentals, fruit and vegetable crops, and medicinal plants. Sharma and Agarwal (2010) observed the threat caused by the red spider mite *Tetranychus urticae* Koch on medicinal plants in India. Another species of spider mite, *Schizotetranychus baltazari* Rimando was also infesting *M. koenigii*, causing severe damage to the leaves. The first report on *Schizotetranychus baltazari* was made by Rimando in 1962. *S. baltazarae* cause damage to medicinal plants like *M. koenigii* and *Holarrhena tubescens* (Apocynaceae), according to Gupta and Karmakar (2011). *S.baltazari* was found on *Curcuma zedoaria* and *M. koenigii*, according to Roy *et al*. (2011). At 20°C and 32°C, females of *Schizotetranychus baltazari* Rimando showed a shorter developmental period of

20.95 and 10.07 days compared to males, which showed 24.11 and 10.17 days, respectively (Safeena and Srinivasa 2021). The study was conducted to know the population dynamics of mite *Schizotetranychus baltazari* and also to evaluate the efficacy of insecticides and acro-pathogenic fungi against mites in curry leaves *Murraya koenigii*.

MATERIALS AND METHODS

A. Population dynamics

The experiment was conducted in the Orchard (latitude: 11.009945 and longitude: 76.93108), Department of Spices and Plantation, Horticultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore. The observation of mites was recorded in 10 plants on three leaves (top, middle, bottom) in each plant in a 2cm^2 leaf area using a window hole technique using a 10X hand lens on weekly intervals from the month of February 2023 to May 2023. Data recorded on the incidence of mites during specific seasons have been provided as mean data on a standard meteorological week basis. The data of mites was correlated with climate factors, *viz.*, maximum and minimum temperatures, morning and evening relative humidity, and rainfall. The meteorological data was obtained from the Agro Climatic Research Centre, Agricultural College and Research Institute, TNAU, Coimbatore. Correlation and multiple linear regression analysis were performed between weather parameters and insect count using IBM SPSS Statistics version 22.

B. Efficacy of insecticides

The experiment was conducted in the Orchard (latitude: 11.009945 and longitude: 76.93108) of Tamil Nadu Agricultural University, Coimbatore. The experiment was designed with T1- *B. bassiana*@ 3ml/l, T2- *M. anisopliae* @ 3ml/l, T3- *L. lecanii*@ 3ml/l,T4- *H. thompsoni*@ 3ml/l,T5- Thiamethoxam 25 WG @ 2g/10l, T6- Spiromesifen 240 SC @ 0.8ml/l, T7- Fenpyroximate 5 SC @1ml/l, T8- Control in randomised block design (RBD) with three replications and plot size of 5 m × 4 m. The insecticides and fungal pathogens were sprayed in the curry leaf field in the Orchard of TNAU, Coimbatore. The insecticides at the required quantity were mixed with a small amount of water and then the spray solution was made by adding water to it. The spraying was done using the battery-operated high-volume knapsack sprayer during morning hours after the pest has reached the Economic Threshold level (ETL) 1/leaf. Three rounds of spraying were given at fortnightly intervals. The observation was recorded in three leaves (top, middle and bottom leaves) from 5 randomly selected plants in each replication during morning hours using the window hole technique (2cm^2). The pest count was recorded on the day before spraying and 3, 7, 10, and 14 days after spraying (DAS). The data recorded from each treatment were subjected to statistical analysis after doing square root transformation using the formula $\sqrt{x}+0.5$. The DMRT (Duncan's multiple range test) was performed using SPSS version 22 to determine the amount of effectiveness of the treatments.

RESULT AND DISCUSSION

A. Population dynamics

The population dynamics observation on the *Schizotetranychus baltazari* showed that the low population was recorded in the first three weeks in the month of February from 14.60 to 18.70 mites /2cm^2 and also in the first week (18 SMW) and second week (19 SMW) of May month. The population then gradually increased from the first week of March and reached the highest population of 37.10mites/2cm^2 in the last week of April (16 SMW) (Table 1). The observation showed that the lowest population during the first two weeks of May is due to the rainfall. The correlation study between the curry leaf mite *Schizotetranychus baltazari* and weather factors showed a significant positive correlation with the maximum temperature (r=0.829) and minimum temperature (r=0.516). Whereas morning relative humidity (r=-0.461), evening relative humidity (r=-0.100) and rainfall (r=-0.421) showed a significant negative correlation (Table 2). The obtained regression equation shows that for each unit of increase in maximum temperature, there was an increase of 1.74 mites, whereas for every unit increase in the morning relative humidity, evening relative humidity and rainfall there was a decrease of0.686, 0.017 and 0.245 number of mites respectively. The result of multiple linear regression showed that the weather factors contributed 85.2% (Table 3) (Fig. 1).

Thus, the present study revealed that the maximum temperature and minimum temperature have a positive and significant correlation with the development of the population. Whereas morning relative humidity, evening relative humidity and rainfall have non-significant and negative temperature effects on the mite population.

Efficacy of insecticides. The result of first spray showed that the mean mite population was less in the Spiromesifen 240 SC @ 0.8ml/l treated plots (4.06 mites/2cm^2 leaf) with 73.05 per cent reduction over control followed by Fenpyroximate 5 SC @1ml/l 5 SC (4.43 mites/2cm^2), Thiamethoxam 25 WG @ 2g/10l (4.65 mites/2cm^2), *M. anisopliae*@ 3ml/l with the mean population of 6.02 mites/2cm^2, *B. bassiana*@ 3ml/l (6.78 mites/2cm^2). The lowest per cent reduction of 40.19% was recorded in *H. thompsoni*@ 3ml/l (9.01 mites/2cm^2), as against untreated control (15.07 mites/2cm^2) (Table 4).

The second spraying resulted in more reduction of the mean mite population in the plots treated with Spiromesifen 240 SC @ 0.8ml/l (1.52 mites/2cm^2) with 90.74 per cent reduction over control followed by Fenpyroximate 5 SC @1ml/l with 1.97mites/2cm^2, Thiamethoxam 25 WG @ 2g/10l with 2.19 mites/2cm^2, *M. anisopilae*@ 3ml/l with the mean population 3.73 mites/2cm^2, *B. bassiana*@ 3ml/l with the mean population of 4.42 mites/2cm^2. The lowest per cent reduction of 51.44 per cent was recorded in *H. thompsoni*@ 3ml/l with a mean population of 7.95 mites/2cm^2, as against untreated control (16.37 mites/2cm^2) (Table 5).

The result of the third spray showed that the mean mite population was lowest in the plots treated with

Spiromesifen 240 SC @ 0.8ml/l (0.83 mites/2cm^2) with the per cent reduction of 95.12%, followed by Fenpyroximate 5 SC @1ml/l with 1.04 mites/2cm^2, Thiamethoxam 25 WG @ 2g/10l with 1.46 mites /2cm^2, *M. anisopilae*@ 3ml/l with 2.04 mites/2cm^2, *B. bassiana* @ 3ml/l with the population of 3.03 mites/2cm^2. The lowest per cent reduction of 52.69 % was recorded in the plots treated with *H. thompsoni*@ 3ml/l with a mean population of 8.05mites/2cm^2, as against untreated control (17.02 mites/2cm^2) (Table 6).

Among insecticides, Spiromesifen 240 SC @ 0.8ml/l has the highest cumulative per cent reduction with 86.78 %, followed by Fenpyroximate 5 SC @1ml/l (84.66 %), Thiamethoxam 25 WG @ 2g/10l (82.88 %). Among entomopathogenic fungi, *M. anisopliae*@ 3ml/l recorded the highest cumulative per cent reduction with 75.67 % followed by *B. bassiana*@ 3ml/l (70.64 %), *L. lecanii*@ 3ml/l(64.99 %), *H.thompsoni*@ 3ml/l (48.38 %) respectively (Table 6) (Fig. 2).

The present findings were on par with the findings of Kottalagi *et al.* (2016) were positively and significantly correlated with temperature, and negatively correlated with the population. Sangavi *et al*. (2020) concluded that the mite population was positively and significantly correlated with minimum temperature and positive non-significant correlation with maximum temperature. The present study revealed that both the maximum and minimum temperature has a positive and significant correlation with the development of the mite population. The present findings were in accordance with the previous findings of Kumar *et al.* (2018) showed that the mite population has a significant positive correlation with temperature and a non-significant and negative correlation with rainfall. Our findings are also in accordance with the findings of Veerendra *et al.* (2015) who concluded that maximum and minimum temperature was positively correlated whereas relative humidity and rainfall was negatively correlated. Rao *et al*. (2018) concluded maximum and minimum temperature has a positive relationship with the development of mites and has a negative correlation with morning relative humidity, evening relative humidity and rainfall. Our findings are also on par with the findings of Meena *et al.* (2013) ; Kumar *et al*. (2015).

The present findings are in accordance with the findings of Sood *et al*. (2015) who reported that spiromesifen 240SC @ 144 g ai/ha has a significant reduction in the mite population in cucumber. The findings are also on par with the findings of Reddy *et al*. (2014) showed acaricides such as abamectin, fenazaquin, spiromesifen, fenpyroximate and hexythiazox have significant control of mite population compared to control in cucumber. Our findings are also in agreement with the findings of Martin *et al* (2015) reported that spiromesifen was more effective than abamectin in controlling the mite population in cotton. Alam *et al*. (2014) revealed that the spiromesifen significantly reduces tomato's red spider mite population. Balikai (2020) reported that spiromesifen 240 SC @150,120,90 g ai/ha showed the highest reduction of mites and whitefly which was on par with our findings. Kavya *et al*. (2015) reported that all the acaricides tested had a significant reduction of mites to control among which propargite @ 570g ai/ha and spiromesifen @ 100g ai/ha had a more significant reduction compared to other acaricides. According to Sanjaya *et al*. (2013) *M. anisopilae* Ma6 showed the highest reduction *T. kanzawai*. Their findings are on par with our result in which *Metarrhizium anisopilae* is effective comparing the remaining fungal pathogen used in our study. The present study is on par with the findings of Hussein *et al*. (2020) who concluded that *M. acridum* has shown the highest reduction of 92 per cent reduction of adult females of dust mites which is on par with our findings in which *Metarrhizium anisopiliae* showed more reduction comparing the other fungal pathogen. Erler *et al*. (2013) concluded that *M. anisopilae* was effective against the motile stage of mites with 80.6% and 82.1% reduction during 2010 and 2011 and *B. bassiana* was effective against the egg stage of mites with 81.7% and 78.1% reduction in 2010 and 2011 respectively. According to Muraleedharan (2001), *Hirsutella thompsoni* showed the least reduction compared to *Verticillium lecanii* and *Paecilomyces fumosoroseus* which is in accordance with our findings.

Table 1: Population dynamics of mites in curry leaf.

SMW	Maximum temperature	Minimum temperature	Morning relative humidity	Evening relative humidity	Rainfall	Mite/2cm^2
5	29.93	20.50	82.00	43.29	0.21	14.60
6	32.29	18.21	80.57	22.71	0.00	16.30
7	32.71	17.93	79.29	23.57	0.00	18.70
8	32.74	19.93	81.00	27.86	0.00	22.30
9	32.20	19.42	79.17	25.67	0.00	21.35
10	33.00	21.10	77.43	27.43	0.00	24.31
11	33.99	22.97	80.86	38.00	0.00	27.30
12	34.96	22.41	80.00	35.57	0.00	29.20
13	35.13	23.51	83.43	39.57	2.14	22.70
14	35.00	24.16	81.86	39.43	0.07	32.80
15	36.00	23.71	74.14	27.57	0.00	35.40
16	37.01	23.79	77.71	32.00	0.00	37.10
17	35.24	24.60	84.86	49.14	2.83	21.20
18	32.59	23.67	91.71	57.14	15.29	15.80
19	33.53	23.89	90.43	57.86	8.57	17.70
20	35.47	24.86	85.43	55.00	0.87	33.70
21	34.64	24.29	84.71	58.00	1.57	24.90

*****Mean of ten replications, SMW-Standard Meteorological Week

Table 2: Correlation of abiotic factors with the population of curry leaf mite *Schizotetranychus baltazari*

Pest	Maximum temperature	Minimum temperature	Morning RH	Evening RH	Rainfall
Mite	0.829**	0.516*	-0.461	-0.100	-0.421

***Significant at P = 0.05 level; **Significant at P= 0.01 level

Table 3: Multiple linear regression models for the influence of weather parameters on the population of curry leaf mite *Schizotetranychus baltazari.*

Population	No. of observations	Constant	Temperature (°C)		Relative humidity (%)		Rainfall (mm)
			Maximum (X_1)	Minimum (X_2)	Morning	Evening	
Schizotetranychus baltazari	17	-8.651	1.748	1.401	-0.686	-0.017	-0.245

Table 4: **Efficacy of insecticides and entomopathogenic fungi after the first spray against mites.**

Treatment	Number of mites /3 leaves						
	PTC	3DAS	7DAS	10DAS	14DAS	MEAN	PROC
T1- *B. bassiana*@ 3ml/l	12.03 (3.54)	11.03 (3.39) b	6.17 (2.58) b	4.63 (2.26) a	5.29 (2.40) a	6.78 (2.70) ab	55.00
T2- *M. anisopliae* @ 3ml/l	11.99 (3.53)	10.37 (3.29) b	5.91 (2.53) b	3.43 (1.97) a	4.38 (2.20) a	6.02 (2.55) ab	60.03
T3- *L. lecanii* @ 3ml/l	11.72 (3.49)	12.03 (3.54) b	7.09 (2.75) bc	4.12 (2.14) a	4.46 (2.22) a	6.93 (2.72) ab	54.04
T4- *H. thompsoni*@ 3ml/l	12.46 (3.60)	12.27 (3.57) b	8.23 (2.95) c	7.31 (2.79) b	8.24 (2.95) b	9.01 (3.08) b	40.19
T5- Thiamethoxam 25 WG @ 2g/10l	11.64 (3.48)	6.24 (2.59) a	3.51 (1.99) a	4.24 (2.17) a	4.59 (2.25) a	4.65 (2.27) a	69.17
T6-Spiromesifen 240 SC @ 0.8ml/l	11.23 (3.42)	5.07 (2.35) a	3.12 (1.89) a	3.85 (2.07) a	4.2 (2.16) a	4.06 (2.14) a	73.05
T7-Fenpyroximate 5 SC @1ml/l	12.08 (3.54)	6.02 (2.55) a	3.29 (1.93) a	4.02 (2.11) a	4.37 (2.20) a	4.43 (2.22) a	70.63
T8- Control	13.97 (3.80)	14.53 (3.87) c	15.73 (4.03) d	13.69 (3.76) c	16.32 (4.10) c	15.07 (3.95) c	0.00
CD (p=0.05)	0.272	0.337	0.382	0.417	0.073	0.382	
SE.d	0.127	0.157	0.178	0.194	0.034	0.183	

* Each value is the mean of three replication; ***P**TC- Pre-treatment count; *DAS-days after spraying; *PROC-Per cent reduction over control; *Values in parenthesis are square root transformation values √ (x + 0.5); *Mean followed by the same alphabets in a column are not significantly different

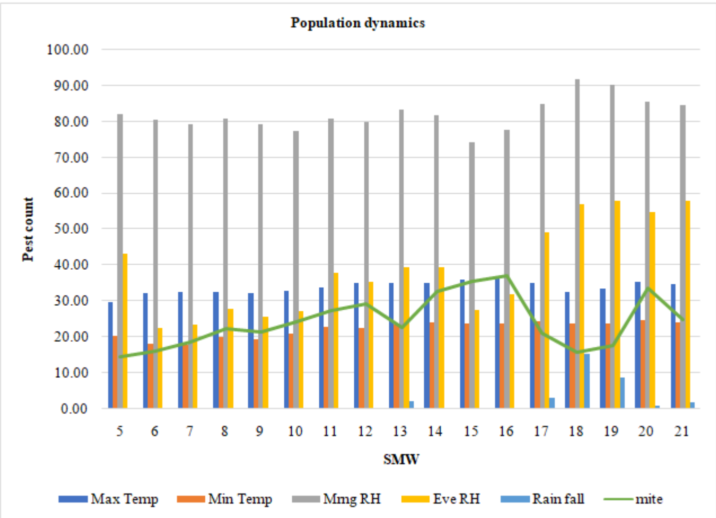

Fig. 1. Population dynamics of curry leaf mite *Schizotetranychus baltazari*.

Table 5: Efficacy of insecticides and entomopathogenic fungi after the second spray against mites.

Treatment	Number of mites /3 leaves					
	3DAS	7DAS	10DAS	14DAS	MEAN	PROC
T1- *B. bassiana*@ 3ml/l	6.22 (2.58)^{c}	4.88 (2.32)^{c}	2.67 (1.76)^{ab}	3.91 (2.09)^{ab}	4.42 (2.22) ^{b}	73.00
T2- *M. anisopliae* @ 3ml/l	5.31 (2.40)^{bc}	3.97 (2.11)^{b}	2.56 (1.73)^{ab}	3.07 (1.87)^{a}	3.73 (2.06) ^{b}	77.23
T3- *L. lecanii* @ 3ml/l	5.39 (2.42)^{bc}	4.67 (2.27)^{c}	3.97 (2.10)^{b}	5.84 (2.51)^{b}	4.97 (2.34) ^{b}	69.65
T4- *H. thompsoni*@ 3ml/l	9.17 (3.10)^{d}	7.83 (2.89)^{d}	6.46 (2.63)^{c}	8.33 (2.97)^{c}	7.95 (2.91) ^{c}	51.44
T5- Thiamethoxam 25WG @ 2g/10l	3.18 (1.90)^{ab}	1.21 (1.30)^{a}	2.02 (1.56)^{a}	2.35 (1.66)^{a}	2.19 (1.64) ^{a}	86.62
T6- Spiromesifen @ 0.8ml/l	2.19 (1.60)^{a}	0.82 (1.14)^{c}	1.36 (1.33)^{a}	1.69 (1.44)^{a}	1.52 (1.42) ^{a}	90.74
T7- Fenpyroximate5SC@1ml/l	2.96 (1.84)^{ab}	0.99 (1.21)^{a}	1.80 (1.49)^{a}	2.13 (1.59)^{a}	1.97 (1.57) ^{a}	87.96
T8- Control	16.41 (4.11)^{e}	15.69 (4.02)^{e}	16.5 (4.12)^{d}	16.87 (4.17)^{d}	16.37 (4.11) ^{d}	0.00
CD (p=0.05)	0.146	0.203	0.152	0.410	0.118	
SE.d	0.068	0.095	0.071	0.191	0.246	

* Each value is the mean of three replication; *DAS- Days after spraying; *PROC- Per cent reduction over control; *Values in parenthesis are square root transformed values √ (x + 0.5)
*Mean followed by the same alphabets in a column are not significantly different

Table 6: **Efficacy of insecticides and entomopathogenic fungi after the third spray against mites.**

Treatment	Number of mites /3 leaves						Cumulative mean	Cumulative per cent reduction
	3DAS	7DAS	10DAS	14DAS	MEAN	PROC		
T1- *B. bassiana*@ 3ml/l	4.32 (2.19)^{b}	3.28 (1.94)^{e}	1.75 (1.50)^{b}	2.76 (1.79)^{a}	3.03 (1.88) ^{b}	82.21	4.74 (2.29)^{ab}	70.64
T2- *M. anisopliae* @ 3ml/l	3.27 (1.93)^{b}	2.35 (1.69)^{d}	0.86 (1.16)^{a}	1.68 (1.44)^{a}	2.04 (1.59) ab	88.01	3.93 (2.10)^{ab}	75.67
T3- *L. lecanii* @ 3ml/l	6.09 (2.56)^{c}	5.23 (2.39)^{f}	3.91 (2.10)^{c}	5.06 (2.35)^{b}	5.07 (2.36) ^{c}	70.20	5.66 (2.48)^{b}	64.99
T4- *H. thompsoni*@ 3ml/l	9.36 (3.14)^{d}	8.07 (2.93)^{g}	6.84 (2.71)^{d}	7.94 (2.90)^{c}	8.05 (2.92) ^{d}	52.69	8.34 (2.97)^{c}	48.38
T5- Thiamethoxam 25WG @ 2g/10l	1.24 (1.29)^{a}	0.91 (1.19)^{c}	1.65 (1.46)^{b}	2.04 (1.57)^{a}	1.46 (1.40) ^{a}	91.42	2.77 (1.81)^{a}	82.88
T6- Spiromesifen 240SC @ 0.8ml/l	1.06 (1.21)^{a}	0.13 (0.79)^{a}	0.87 (1.16)^{a}	1.26 (1.27)^{a}	0.83 (1.15) ^{a}	95.12	2.14 (1.62)^{a}	86.78
T7- Fenpyroximate 5SC @1ml/l	0.93 (1.15)^{a}	0.43 (0.96)^{b}	1.17 (1.29)^{ab}	1.62 (1.42)^{a}	1.04 (1.24) ^{a}	93.90	2.48 (1.73)^{a}	84.66
T8- Control	17.23 (4.21)^{e}	16.57 (4.13)^{h}	16.82 (4.16)^{e}	17.46 (4.24)^{d}	17.02 (4.19) ^{e}	0.00	16.15 (4.08)^{d}	0.00
CD (p=0.05)	0.192	0.073	0.199	0.202	0.282		0.416	
SE.d	0.089	0.034	0.093	0.094	0.136		0.194	

* Each value is the mean of three replication ; *DAS- Days after spraying; *PROC- Per cent reduction over control; *Values in parenthesis are square root transformed values √ (x + 0.5); *Mean followed by the same alphabets in a column are not significantly different

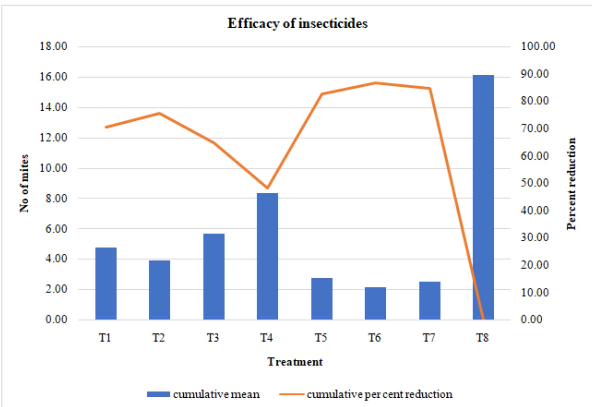

Fig. 2. Efficacy of insecticides against curry leaf mite.

CONCLUSIONS

This study revealed that the maximum temperature and minimum temperature have a positive and significant correlation with the development of the population. Whereas morning relative humidity, evening relative humidity and rainfall have non-significant and negative temperature effects on the mite population. Among insecticides, Spiromesifen 240 SC @ 0.8ml/l was found to be effective in controlling the mites with 86.78 per cent reduction followed by Fenpyroximate 5 SC @1ml/l (84.66 %), Thiamethoxam 25 WG @ 2g/10l (82.88 %). Among entomopathogenic fungi, *M. anisopliae*@ 3ml/l (75.67) % followed by *B. bassiana*@ 3ml/l (70.64 %) showed the highest reduction. The *Hirsutella thompsoni* @ 3ml/l has shown the least reduction in controlling the mites in curry leaf with a 48.38 per cent reduction. The *Hirsutella thompsoni* @ 3ml/l has shown the least reduction in controlling the mites in curry leaf with a 47.17 per cent reduction.

FUTURE SCOPE

The entomopathogenic fungi *Metarhizium anisopliae,* and *Beauveria bassiana* can be used as alternatives to insecticides Spiromesifen, Fenpyroximate and Thiamethoxam to control mites to prevent insecticide resistance development and risk to the environment.

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