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Bio efficacy of insecticides for the management of red banded thrips (*Selenothrips rubrocinctus* Giard.) of cashew under Bhubaneswar conditions of Odisha

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Abstract

Studies on foliage thrips of Cashew with special reference to Red Banded Thrips (*Selenothrips rubrocinctus* Giard.) was conducted at the Cashew Research Station (CRS), All India Coordinated Research Project (AICRP) on Cashew, Orissa University of Agriculture and Technology (OUAT), Bhubaneswar during 2016-17 and 2017-18. Efficacy of insecticides on thrips was evaluated by spraying on the formulations directly on the infested leaves. 3 synthetic, 1 microbial, 1 moulting inhibitor and 2 neem formulations were evaluated against the Red Banded Thrips and among these LCyhalothrin was found most effective with 1.53 thrips/leaf at 30 days after spraying followed by Thiamethoxam and Carbosulfan. Above all the regular monitoring and timely application of correct insecticides and correct dose at the initial stage at the initial stage could be the greatest tool for management of this emerging pests of cashew.

Keywords: red banded thrips, cashew, L cyhalothrin, thiomethoxam, carbosulfan

1. Introduction

Cashew (*Anacardium occidentale* L.) belongs to native of South America (Brazil) and is now found in many tropical areas. The English name cashew is derived from the Portuguese name "caju". The cashew tree was first described by Thivet (1558). In the 16th century cashew was introduced to India (Goa) by the Portuguese and it spread all along the laterite hill slopes in the Western area from Mumbai to Cape Comorian and to the sandy soil on the Eastern coast as well as over inland areas in the Southern states. The major cashew producing states in India are Kerala, Karnataka, Tamil nadu, Andhra Pradesh, Odisha, Maharashtra, Goa and West Bengal and interior tracts of Chhattisgarh, Andaman and Nicobar Islands, Gujarat, Jharkhand and North Eastern regions. The crop is also reported to be attacked by a number of insect pests as well as microbial pathogens causing diseases. About 400 species of arthropods are known to infest cashew till now, while 70 species of insect pests have been reported to infest cashew in different stages of crop growth in India (Pillai *et al.* 1979). Among these several insect pests cashew stem and root borer is the most..... important pest of this region followed by the incidence of Tea Mosquito Bug. Besides this Shoot Tip Caterpillar, Leaf Miner, Leaf and Blossom Webber, Apple and Nut Borer and Thrips also cause yield reduction in unmanaged plantations (Sundarraju *et al.* 1945). Since last two years (2015-16) foliage thrips (*Selenothrips rubrocinctus*) had been recorded from Bhubaneswar seriously affecting the growth and yield of the cashew plants. Some cashew varieties in the germplasm block were observed to be highly susceptible to the pest. The affected trees showed leaf sheddings and drying of the branches and panicles. Red Banded Thrips was first reported in Cacao. (Cocoa) plant in the country West Indies by Broadway (1898). The pest was found in the leaf with high population of 70-80 nymphs and adults per leaf and in high infestation, all the leaves are affected. Both nymphs and adults scrap and suck the cell content. Under severe conditions the leaves turn silvery white and shed off. 3 Red Banded Thrips was also found attacking grape, mango, avocado, guava along with cashew and cocoa (Moritz *et al.* 2004). However available literatures on seasonal incidence, biology and management of the pest in cashew are very scanty. Therefore it was decided to conduct a thorough investigation of this pest in cashew at Cashew Research Station, Bhubaneswar.

2. Materials and Methods

“Studies on foliage thrips of cashew (*Anacardium occidentale* L.) with special reference to Red Banded Thrips (*Selenothrips rubrocinctus*) under Bhubaneswar conditions” were conducted during the cropping season 2016-17 and 2017-18 under field conditions at Cashew Research Station (CRS), Orissa University of Agriculture and Technology (OUAT), Ranasinghpur, Bhubaneswar (BBSR). The insecticide solution of each treatment were made at desired concentration and sprayed on the leaves having thrips incidence by means of a 1 lit poly pneumatic sprayer. The initial population before

application were also recorded and subsequent observations were taken at 7, 15 and 30 days after spraying. 3 replications of each treatment were done by considering each branch as single replication. The data obtained from various experiments were subjected to statistical analysis after suitable transformation wherever necessary (Gomez and Gomez, 1984). The variations in the treatment were tested for significance by “f” test. The standard error of means [SEm (\pm)] and critical difference (CD) at five percent level of significance were calculated following the standard procedures and used for comparison of treatment means.

Table 1: Evaluation of insecticides against Red Banded Thrips (*Selenothrips rubrocinctus*) of cashew

Treatments	Common name	Trade name	(a.i)	Dose	Manufacturer
T1	Thiomethoxam	Meridion	25 WG	0.2gm/l	Syngenta
T2	Carbosulfan	Atank	25% EC	2ml/lit	Dhanuka
T3	Buprofezin	Kri - march	25%SC	2ml/lit	Syngenta
T4	Beauveria bassiana	Bio protector	2 x 10 ⁹ per gram	1g/lit	IIHR,Bangalore
T5	Beauveria bassiana	Bio protector	2 x 10 ⁹ Per gram	5gm/lit	IIHR,Bangalore
T6	L Cyhalothrin	Saber	5% EC	0.6ml/lit	Syngenta
T7	NSKE	Collected locally	5%	50gm/lit	-
T8	Neem formulation	Neem ban	3000ppm	3ml/lit	-
T9	Water spray		-	2ml/lit	-
T10	Untreatedcheck		-	1ml/lit	-

3. Results and Discussion

Efficacy of insecticides on thrips was evaluated by spraying on the formulations directly on the infested leaves. 3 synthetic, 1 microbial, 1 moulting inhibitor and 2 neem formulations were evaluated against the Red Banded Thrips. The efficacy of insecticides on Red Banded foliage Thrips population of Cashew during the year 2016-17 and 2017-18 was analysed and presented in Table 2, 3 respectively and the pooled analysis of both the years is presented in table 4.

It was revealed from the result that there was significant difference between the insecticide treatments including water spray and untreated check. No significant difference of pest population was noticed before application of insecticides. At 7 DAS L-Cyhalothrin scored the lowest (0.98) thrips population/leaf followed by Thiamethoxam and Carbosulfan. Both Buprofezin and B.Bassiana were found least effective to the pest. At 15 DAS and 30 DAS a similar trend of results was observed with respect to efficacy of insecticides on thrips. However the treatment L-Cyhalothrin continued to suppress the pest population even 30 days after spraying. This was followed by Thiamethoxam and Carbosulfan where the thrips population was recorded around 4 and 8.3 per leaf at 15 days and 30 days after spraying. Water spray has no significant effect on the thrips as evident from the results. The efficacy of insecticides during 2017-18 revealed that there was no significant difference of thrips population before application of insecticides. LCyhalothrin proved to be the best effective insecticides even after 30 days of spraying followed by same Thiamethoxam and Carbosulfan. Here also moulting inhibitor Buprofezin, microbial like B.bassiana, NSKE and Neembaan don't have any significant results. The overall performance of the insecticides over the 2 years revealed that LCyhalothrin at 0.003% proved to be the best insecticides with mean thrips population 1.53 per leaf followed by spraying with Thiamethoxam and Carbosulfan. The later two were at par. Microbial and botanical insecticides were found least effective against the pest. In cashew nut most of the

insect pests were noticed after the flushing i:e new growth of the shoot after rainy season and 2nd during flushing, flowering and shooting taken place during December3rd week and continue upto end of fruiting season i:e May(2nd week). Therefore in the insecticidal management trial it was suggested that recommended insecticides to be spread starting from initiation of flowering and to be repeated at 21 days. Efficacy of insecticides on thrips was evaluated by spraying on the formulations directly on the infested leaves. 3 synthetic, 1 microbial, 1 moulting inhibitor and 2 neem formulations were evaluated against the Red Banded Thrips. Among the different insecticides tested in AICRP trials (Anonymous 2012, 2014, 2016) [9, 10] spraying of L-Cyhalothrin (0.003%) was found most effective (1.53/ leaf) followed by Thiamethoxam (4.26/ leaf) and Carbosulfan (5.15/leaf). Microbial and neem formulations were least against this pest. The present findings are also in conformity with respect to findings of AICRP trials (Annual Report, AICRP2010-11 to 2014-15, Raviprasad, 2009). With the advancement of days a simultaneous increase in thrips population was noticed as was evident from the result. The unsprayed plant recorded 66.5, 76.2 and 85.18 number of thrips per leaf at 7,15 and 30 days after spraying during 2016-17 and 68.67, 79.25 and 88.76 number of thrips per leaf at 7.15 and 30 days after spraying during 2017-18. A similar trend of result was noticed at 15 days after spraying with significantly lower population contributed from L-Cyhalothrin, Thiamethoxam and Carbosulfan. 3 species of foliage thrips viz., *Selenothrips rubrocinctus*, *Rhipiphorthrips cruentatus* and *Retithrips syriacus* reported to cause serious damage to young plantations during the summer months in the east coast tracts. In severe cases of incidence a total shedding of leaves and stunting of trees have been reported by Pillai *et al.*, (1976). Considering the severity of damage during the period of investigation insecticides found in the present studies may be suggested for control of this notorious pest.

Table 2: The efficacy of insecticides on Red banded foliage thrips population of Cashew (2016-17)

Treatments	Concentration	Dose	1DBS(No./leaf)	7 DAS (No/leaf)	15 DAS(No/leaf)	30DAS(N0/leaf)
T1 Thiomethoxa m	25% WG	0.25gm/lit	55.85	1.89(7.32)	4.09 (11.56)	7.31(15.64)
T2 Carbosulfan	25%EC	2ml/lit	51.75	3.71(10.23)	4.11 (11.61)	8.27(16.68)
T3 Buprofezin	25%SC	2ml/li	56.75	30.24(33.34)	38.01 (38.04)	41.17(41.90)
T4 B.bassiana	2x10 ⁹ per gram	1g/lit	58.35	14.88(22.59)	52.74 (49.15)	60.85(51.24)
T5 B.bassiana	2x10 ⁹ per gram	5g/lit	62.28	12.68(20.75)	54.06 (47.36)	58.32(49.76)
T6 L.Cyhalothrin	5%EC	0.6ml/lit	60.20	0.98(5.53)	1.55 (6.83)	1.73(7.50)
T7 NSKE	5%	50gm/lit	54.23	10.05(18.45)	19.38 (26.06)	22.25(28.11)
T8 Neemban	3000ppm	3ml/lit	57.35	9.71(18.08)	20.561 (36.92)	23.20(28.79)
T9 Water spray	-	-	59.76	50.45(45.23)	55.56(48.56)	58.23(49.72)
T10 Untreated check	-	-	62.88	66.23(51.63)	76.23(61.33)	85.18(67.17)
SE(m)±		NS	1.45	2.02	0.626	0.626
CD(0.05)			4.43	6.12	1.878	1.878

Table 3: The efficacy of insecticides on Red banded foliage thrips population of Cashew (2017-18)

Treatments	Concentration	Dose	1DBS (No./leaf)	DAS (No/leaf)	15 DAS (No/leaf)	30DAS (N0/leaf)
T1 Thiomethoxam	25% WG	0.25gm/lit	53.45	1.41(10.28)	4.82 (12.60)	6.15 (14.30)
T2 Carbosulfan	25%EC	2ml/lit	49.81	4.60(12.33)	5.27 (13.22)	4.96 (12.83)
T3 Buprofezin	25%SC	2ml/li	54.15	18.48 (25.44)	39.15 (38.70)	39.61 (38.94)
T4 B.bassiana	2x10 ⁹ per gram	1g/lit	56.25	15.43 (22.89)	58.17 (49.68)	59.58(50.31)
T5 B.bassiana	2x10 ⁹ per gram	5g/lit	62.48	13.36 (21.41)	53.06 (46.75)	56.09(48.48)
T6 L.Cyhalothrin	5%EC	0.6ml/lit	58.87	0.72(4.66)	2.05(9.88)	2.12(8.26)
T7 NSKE	5%	50gm/lit	55.45	11.43 (19.72)	21.40(27.56)	35.25(36.40)
T8 Neemban	3000ppm	3ml/lit	57.54	12.52 (18.81)	22.27(30.13)	36.17(36.93)
T9 Water spray	-	-	60.56	38.78 (38.47)	41.68 (40.16)	52.28 (46.26)
T10 Untreated check	-	-	63.44	68.67 (55.92)	79.25(62.87)	88.76(70.36)
SE(m)±		NS	NS	1.153	0.521	0.462
CD(0.05)		NS		3.425	1.546	1.372

DBS =Day before spraying, DAS = Day after spraying Values in parentheses are sine transformed values

Table 4: Pooled analysis of both the years (2016-17 and 2017-18)

Treatments	Year1 (Mean)	Year 2 (Mean)	Pooled Mean
T1- Thiamethoxam	4.43	4.12	4.26
T2-Carbosulfan	5.36	4.94	5.15
T3-Buprofezin	36.47	37.03	36.75
T4-B.bassiana	40.99	44.39	42.69
T5-B.bassiana	41.68	40.83	41.26
T6- L.Cyhalothrin	1.42	4.12	1.53
T7-NSKE	17.22	22.69	19.96
T8-Neem baan	17.82	24.65	21.24
T9-Water spray	54.74	51.24	53.00
T10-Untreated check	75.98	78.89	77.44
SE(m)±			2.49
CD(0.05)			6.95

Conclusion

Studies on foliage thrips of cashew with special reference to Red Banded thrips (*Selenothrips rubrocinctus* Giard.) were conducted under Bhubaneswar conditions during 2016-17 and 2017-18.

Spraying of L-Cyhalothrin (0.003%) was found most effective (1.53/ leaf) followed by Thiamethoxam (4.26/ leaf) and Carbosulfan (5.15/leaf). Microbial and neem formulations were least against this pest. This species can be managed effectively with insecticides like L- Cyhalothrin, Carbosulfan, and Thiamethoxam etc. During the period of observation some of the cashew germplasms had completely shed up its leaves and the terminal branches along with inflorescence and leaves were dried out, keeping in view of the seriousness of the pest as an emergent pest the future strategy may be planned out to study the resistance.

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