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Evaluation of Insecticide for Management of Cashew Tea Mosquito Bug in Coastal Konkan Region of Maharashtra

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Cashew tea mosquito bug (*Helopeltis antonii)* is one of the major pests of cashew. The experiment was carried out in a randomized block design with six different insecticidal treatments and four replications having two trees per replication during the period 2012-13 to 2014-15 with the objective to find out efficacy of insecticides against cashew tea mosquito bug under Konkan region of Maharashtra. Among the different insecticides tested against tea mosquito bug, Lambda cyhalothrin 0.003 per cent treatment recorded lowest percent incidence (1.68%) and was found best for the management of tea mosquito bug. Second best management was by the treatment of Monocrotophos 0.05 per cent at flushing, Profenophos 0.05 per cent at flowering and Lambda cyhalothrin 0.003 per cent at fruit and nut development stage, this management recorded 3.93% incidence.

(***Key words***: *Cashew, Chemical management, Incidence, Tea mosquito bug*)

Cashew is one of the major foreign exchange earning crop of India. In beginning it was mainly considered as a crop for aforestation and soil conservation to check soil erosion. Because of its high adaptive and acclimatizing ability in wide range of agro climatic condition it has become a crop of economy and attend the status of an export oriented commodity of the country. The productivity of cashew in India is influenced by many factors out of which insect pest is one of the major factor that causing a crop loss of 30 to 40 per cent (Sathapathy, 1993). Cashew tea mosquito bug *Helopiltis antonii* is the most important pest of cashew in most cashew growing area. It is also a major pest on Cocoa, Tea, Neem (Stonedahl, 1991).

Both nymph and adults suck the cell sap from young and succulent plant parts, inflorescences and fruits. Their feeding causes the drying of new vegetative flush resulting in scorched appearance to the trees, shriveling and dropping of immature nuts. Tea mosquito bug can cause yield loss by damaging tender shoot inflorescences and immature nuts at various development stages of (Devasahayam and Nair, 1986). The tea mosquito bug alone has a potential to cause 40 to 50 per cent yield losses in cashew (Anon., 1999). In severe out break the pest cause yield losses up to 100 per cent.

Many of the research worker reported different management techniques for tea mosquito bug. Kurien (2004) reported that, Quinalphos 0.05 per cent, Carbaryl 0.1 per cent and Phosphamidon 0.03 per cent are the recommended insecticide for the management of tea mosquito bug in Kerala. Godse *et al.* (2004) reported that, synthetic pyrethoids tested were found equally effective in controlling tea mosquito bug. On the basis of pooled results thee sprays schedule *viz*., first at vegetative flush, second at flowering stage and third at fruit set development is recommended for Maharashtra. Considering the importance of management of cashew tea mosquito bug an efforts were made to find out most effective insecticide for the management of cashew tea mosquito bug.

MATERIALS AND METHODS

A field experiment was conducted during the year 2012-13 to 2014-15 at Regional Fruit Research Station, Vengurle. Experiment was laid out in a Randomized Block Design in four replications having two trees per replication with six treatments v*iz*., T_1 - Neem oil soap (4%) followed by L- Cyhalothrin (0.6 mL L^{-1}) followed by Neem oil soap, T_2 - Imidacloprid (0.6 mL L^{-1}) all three spray, T_3- Acetamiprid 20SP (0.5 g L^{-1}) all three spray, T_4 - L- Cyhalothrin 0.003% all three spray, T_5 - Monocrotophos 0.05% at flushing, Profenophos 0.05% at flowering and Lambda cyhalothrin 0.003%, at fruit & nut development stage, T_6 - Untreated control. Two trees in each treatment should be separated from adjoining set of treatment tress at least by one row of guard tree all around. These guard trees should also be sprayed with same insecticide of respective treatment.

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For recording of incidence of tea mosquito bug, 52 leaders shoot were selected at any four sides of canopy and labeled individually. Pretreatment observation was recorded one day prior to each spray while the post treatment observations were recorded at 15 days after each spray. The extent of damage to the shoots and panicles was scored in 0-4 scale on the basis of the number and nature of necrotic lesions (Ambika *et al*., 1979) as given below.

0 No Damage

1 1 to 3 necrotic streak/lesion on the shoot /panicle including apple and nut

2 4 to 6 necrotic streak/lesion on the shoot /panicle including apple and nut

3 Above six coalescing or non coalescing lesion/streak on shoot /panicle including apple and nut

4 Lesion /streak confluent or wilting or drying of affected shoot /panicle including apple and nut

The data recorded converted in to per cent incidence of cashew tea mosquito bug using the formula given below.

$$\text{Percent incidence} = \frac{\text{Sum of numerical rating}}{\text{No. of shoots observed x maximum rating}} \times 100$$

Period of spray *(three sprays)*

First spray – At flushing stage

Second spray – At panicle initiation stage

Third spray – At pea nut stage

RESULTS AND DISCUSSIONS

Efficacy of different insecticides against TMB incidence

During the year 2012-13, all the insecticidal treatment reduces the incidence of tea mosquito bug as compared to control. Among the different insecticidal treatment studied, the treatment T_4 Lambda cyhalothrin 0.003 per cent recorded significantly lowest incidence of tea mosquito bug (**2.10%**) after all three sprays (Table 1). This was followed by the treatment T_5 *i.e.* Monocrotophos 0.05 per cent at flushing, Profenophos 0.05 per cent at flowering and Lambda cyhalothrin 0.003 per cent at fruit & nut development stage after all three spray found second best treatment for the management of tea mosquito bug in cashew (5.28%).

In the year 2013-14, the incidence of tea mosquito bug was comparatively low on vegetative flush and on flowering panicle (Table 2). During the study period the efficacy of insecticide Lambda cyhalothrin, treatment T_4 was found best for the management of tea mosquito bug in cashew after first second and third spray of insecticide (1.38%). This was followed by the treatment T_5 *i.e.* Monocrotophos 0.05 per cent at flushing, Profenophos 0.05 per cent at flowering and Lambda cyhalothrin 0.003 per cent at fruit & nut development stage (2.85%).

During the year 2014-15, the incidence of tea mosquito bug observed in the range of 1.2 to 6.60 per cent (Table.3). All the insecticidal treatment significantly reduces the incidence of tea mosquito bug in cashew. However, the treatment T_4 Lambda cyhalothrin 0.003 per cent recorded significantly lowest cumulative average of tea mosquito bug incidence (1.58%) after first second and third spray.

Helopiltis antonii is one of the major pest of cashew to find out the efficacy of best insecticide for the management of *Helopiltis antonii* the mean for the three

Table 1. *Efficacy of different insecticides against TMB incidence for the year 2012-13*

Treatment	Per cent incidence 15 days after			
	First spray	Second spray	Third spray	Cum. Avg.
T_1 Neem oil soap (4%) followed by L- Cyhalothrin (0.6 mL L^{-1}) followed by neem oil soap	6.19 (13.26)	5.87 (13.81)	6.66 (14.93)	6.24 (14.00)
T_2 Imidacloprid (0.6 mL L^{-1})	4.86 (11.92)	5.46 (13.39)	6.00 (14.01)	5.44(13.10)
T_3 Acetamiprid 20SP (0.5 g L^{-1})	5.88 (13.64)	4.62 (12.19)	6.60 (15.45)	5.70 (13.76)
T_4 L-Cyhalothrin 0.003%	2.40 (8.49)	2.46 (8.28)	1.44(6.47)	2.10 (7.74)
T_5 Monocrotophos 0.05% at flushing or Lambda cyhalothrin 0.003%, Profenophos 0.05% at flowering and Lambda cyhalothrin 0.003%, at fruit & nut development stage	4.68 (12.46)	5.82 (14.06)	5.34 (11.65)	5.28 (12.72)
T_6 Untreated control	12.34 (21.51)	11.11 (19.35)	10.81 (16.45)	11.42 (19.10)
SEm±	1.60	1.15	1.66	0.94
CD at 5%	5.05	3.48	5.02	2.98

Table 2. *Efficacy of different insecticides against TMB incidence for the year 2013-14*

Treatment	Per cent incidence 15 days after			
	First spray	Second spray	Third spray	Cum. Avg.
T_1 Neem oil soap (4%) followed by L- Cyhalothrin (0.6 mL L^{-1}) followed by neem oil soap	4.00 (11.46)	3.88 (11.34)	3.54 (10.71)	3.80 (11.17)
T_2 Imidacloprid (0.6 mL L^{-1})	5.01 (13.22)	4.95 (12.84)	4.32 (11.61)	4.76 (12.55)
T_3 Acetamiprid 20SP (0.5 g L^{-1})	4.65 (12.16)	2.87 (9.70)	3.78 (10.33)	3.76 (10.73)
T_4 L-Cyhalothrin 0.003%	0.92 (4.94)	1.07 (5.85)	2.16 (7.11)	1.38 (5.96)
T_5 Monocrotophos 0.05% at flushing or Lambda cyhalothrin 0.003%, Profenophos 0.05% at flowering and Lambda cyhalothrin 0.003%, at fruit & nut development stage	3.07 (11.01)	2.12 (8.36)	3.36 (9.74)	2.85 (9.70)
T_6 Untreated control	6.26 (14.43)	7.37 (15.77)	8.34 (16.28)	7.32 (15.49)
Sem ±	1.14	0.40	1.19	0.62
CD at 5%	3.43	1.27	3.59	1.97

Table 3. *Efficacy of different insecticides against TMB incidence for the year 2014-15*

Treatment	Per cent incidence of Tea Mosquito Bug 15 days after spray			
	First spray	Second spray	Third spray	Cum. Avg.
T_1 Neem oil soap (4%) followed by L- Cyhalothrin (0.6mL L^{-1}) followed by neem oil soap	2.28 (8.35)	2.1 (8.04)	6.06 (14.22)	3.48 (10.26)
T_2 Imidacloprid (0.6 mL L^{-1}) all three spray	2.64 (9.24)	2.34 (8.56)	6.60 (14.77)	3.86 (18.85)
T_3 Acetamiprid 20SP (0.5 g L^{-1}) all three spray	2.22 (8.38)	2.28 (8.32)	4.44 (11.46)	3.15 (9.38)
T_4 L-Cyhalothrin 0.003% all three spray	1.44 (6.53)	1.2 (6.32)	2.1 (8.16)	1.58 (7.00)
T_5 Monocrotophos 0.05% at flushing, Profenophos 0.05% at flowering and Lambda cyhalothrin 0.003%, at fruit &nut development stage	3.36 (10.44)	3.30 (10.36)	4.32 (11.83)	3.66 (10.87)
T_6 Untreated control	4.44 (12.98)	5.62 (13.71)	8.11 (16.19)	6.05 (13.93)
S.Em±	0.655	0.64	0.75	0.69
CD at 5%	1.974	1.95	2.26	2.07

Table 4. *Efficacy of different insecticides against TMB incidence for the year 2012-13 to 2014-15*

Treatment	Per cent incidence of Tea Mosquito Bug 15 days after spray			
	2012-13	2013-14	2014-15	mean for 3 years
T_1 Neem oil soap (4%) followed by L- Cyhalothrin (0.6 mL L^{-1}) followed by neem oil soap	6.24 (14.00)	3.80 (11.17)	3.48 (10.26)	4.50 (11.81)
T_2 Imidacloprid (0.6 mL L^{-1}) all three spray	5.44 (13.10)	4.76 (12.55)	3.86 (18.85)	4.68 (14.83)
T_3 Acetamiprid 20SP (0.5 g L^{-1}) all three spray	5.70 (13.76)	3.76 (10.73)	3.15 (9.38)	4.20 (11.29)
T_4 L-Cyhalothrin 0.003% all three spray	2.10 (7.74)	1.38 (5.96)	1.58 (7.00)	1.68 (6.9)
T_5 Monocrotophos 0.05% at flushing, Profenophos 0.05% at flowering and Lambda cyhalothrin 0.003%, at fruit & nut development stage	5.28 (12.72)	2.85 (9.70)	3.66 (10.87)	3.93 (11.09)
T_6 Untreated control	11.42 (19.10)	7.32 (15.49)	6.05 (13.93)	8.26 (16.17)
S.Em±	0.947	1.24	0.62	1.20
CD at 5%	2.98	3.74	1.97	3.77

year was carried out and presented in (Table 4), from the data it is revealed that all the insecticidal treatment significantly reduce the incidence of tea mosquito bug in cashew over control. The efficacy of insecticide Lambda cyhalothrin 0.003 per cent found best for the management of tea mosquito bug (1.68%), similar finding was also reported by Jalgaonkar (2007) and Smith (2014). The efficacy of Lambda cyhalothrin (0.003%) was also presented by Bhat and Raviprasad (2009). From the cumulative of three year it is observed that the treatment T_5 Monocrotophos 0.05 per cent at flushing, Profenophos 0.05 per cent at flowering and Lambda cyhalothrin 0.003 per cent at fruit & nut development stage after first spray on vegetative flush at fruit and nut development found second best treatment for the management of cashew tea mosquito bug.

Among the efficacy of different insecticide tested during study period, the Lambda cyhalothrin 0.003 per cent was found most effective for management of tea mosquito bug.

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