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## Efficacy of insecticide for the management of cashew apple and nut borer (*Nephopteryx* Sp)

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**Abstract**

Cashew is influenced by many of the pest out of which cashew apple and nut borer is one of the most important pest which causes economic losses considering the importance of this pest a field experiment was conducted at Regional Fruit Research Station, Vengurle during the year 2012-13 to 2015-16 to find out the efficacy of insecticide for the management of apple and nut borer in cashew. At the end of the subsequent year the treatment Dichlorvos caused larval mortality (79.99%) of cashew apple and nut borer followed by the treatment Lambda cyhalothrin (75.99%) and treatment of Quinalphos (60.44%).

**Keywords:** Cashew, pest, apple and nut borer, management

**1. Introduction**

Cashew (*Anacardium occidentale*) one of the most important foreign exchange, dollar earning crop in India. It was introduced in India by Portuguese during sixteenth century. Initially it was considered as a crop of soil erosion, now it is widely grown in tropical climates and very well adapted to the Indian conditions presently. India is the largest producer, processor, consumer and exporter of cashew in the world. Maharashtra ranks first in area production and productivity of cashew in the country<sup>[1]</sup>

Among the different constraints incidence of pest is one of the major constraint in cashew production. Cashew is infested by more than fifty eight species of insect pests<sup>[2]</sup>. However, when extent of damage and intensity of pests infestation taken in to consideration, cashew tea mosquito bug, cashew stem and root borer, flower thrips are the major pest of cashew<sup>[2]</sup>.

The cashew apple and nut borer was considered being a pest of minor significance in the past and hence the earlier research workers have paid not much attention. But now days it causes more damage to cashew. The four species of apple and nut borer are reported infesting cashew viz., *Thylocoptila panrosema* meyrick, *Hyalospila leuconeurella* Ragonot, *Anarsia epotias* Meyrick and *Nephopteryx* sp<sup>[3]</sup>.

The larvae of *T. panrosema* bore in to tender apple and nuts<sup>[4]</sup> similarly the adult of *H. leuconeurella* laid eggs in the grooves near the junction of apple and nut, after emerging caterpillar infest cashew<sup>[5]</sup>. The scientist reported that cashew apple and nut borer, *Nephopteryx* sp infestation from the cashew plantation in Bapatala and Chirala talukas of Andhra Pradesh<sup>[6]</sup>. The apple and nut borer *Thylocoptia panrosema* sp. causes 10% yield losses during the sevier infestation therefore it is very necessary to manage the pest<sup>[3]</sup>. At present, very little information available on pest management aspects. The collection and destruction of infested apple and nuts from the plantation would minimize the pest population<sup>[7]</sup>. For management of apple and nut borer the spray of insecticide carbaryl (0.15) and Malathion (0.15%) were the most effective against *Nephopteryx* sp<sup>[8]</sup>. The spray schedule, which included 0.05 per cent phosphamidon as third spray at fruiting stage would take care of apple and nut borer<sup>[3]</sup>. Considering the importance of apple and nut borer, the present experiment was conducted on management of apple and nut borer in cashew.

**2. Materials and Methods**

A field experiment was carried out for management of apple and nut borer at Regional Fruit Research Station Vengurle Dist Sindhudurg during the year 2012-13 to 2015-16. The experiment was laid out in Randomized Block Design with nine treatments and replicated thrice. Insecticides were applied as per the treatment, when the infested nut observed in the field. The treatment details are given in Table 1.

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**Table 1:** Details of the treatments used in the present study.

Tr. No.	Insecticidal Details.
T <sub>1</sub>	Lambda cyhalothrin 5 EC (0.003%)
T <sub>2</sub>	Profenophos 50 EC (0.05%)
T <sub>3</sub>	Cypermethrin 4% + Profenophos 40% (0.04%)
T <sub>4</sub>	Triazophos 40 EC (0.04%)
T <sub>5</sub>	<i>Beauveria bassiana</i> @ 2 ml /lit
T <sub>6</sub>	<i>Metarhizium anisopliae</i> @ 2 ml /lit
T <sub>7</sub>	Quinalphos 25 EC (0.05%)
T <sub>8</sub>	Diclorvos 76 EC (0.05%)
T <sub>9</sub>	Control

## 2.1 Methods of Recording Observations

To evaluate the efficacy of different insecticide, twenty five infested nuts were randomly selected and labeled individually. The observation on per cent mortality of larvae on the selected nuts were recorded at seven days after spraying of different insecticides by slightly opening of frass material and it was further converted to percent mortality and statically analyzed.

## 2.2 Stastical Analysis

After the transformation of percent incidence of apple and nut borer data were statistically analysed by stander analysis of variance method<sup>[10]</sup>

## 3. Results and Discussion

In the year 2012-13, the data on percent larval mortality were recorded and presented in Table.2. The result revealed that the insecticidal treatment; T<sub>1</sub> Lambda cyhalothrin 0.003% caused more larval mortality (60.00%) however it was at par with treatment T<sub>8</sub> Dichlorvos and T<sub>7</sub> Quinalphos. The insecticidal treatment T<sub>8</sub> Dichlorvos showed (54.67%) larval mortality and it was at par with treatment T<sub>7</sub> Quinalphos, T<sub>2</sub> Profenophos and T<sub>3</sub> Cypermethrin + Profenophos.

The data presented in Table 2 showed that in the year 2014-15; the insecticidal treatment T<sub>8</sub> Diclorvos 0.05% caused more larval mortality (93.33%) after the sevendays of application of insecticide however it was at par with the treatment T<sub>1</sub>

Lambda cyhalothrin 0.003% and T<sub>4</sub> Trizophos 0.01%. The insecticidal treatment T<sub>1</sub> Lambda cyhalothrin 0.003% found second best insecticide with larval mortality (86.66%) where as it was at par with the treatment T<sub>4</sub> Trizophos and T<sub>6</sub> *Metarhizium anisopliae*.

In the year 2015-16 (Table 2) showed that the treatment T<sub>8</sub> Diclorvos 0.05% notices more larval mortality (93.33%). From the mean of three replications the insecticidal treatment T<sub>1</sub> Lambda cyhalothrin 0.003% (81.33) but it was at par with the treatment T<sub>7</sub> Quinalphos.

To find out the efficacy of insecticides for the management of apple and nut borer in cashew; the pooled mean analysis for three year was carried out and presented in Table 2. From the mean of the three years it is revealed that the insecticidal treatment T<sub>8</sub> Diclorvos 0.05% causes more percent larval mortality (80.44%) but it was at par with treatment T<sub>1</sub> Lambda cyhalothrin 0.003%. The insecticidal treatment T<sub>1</sub> Lambda cyhalothrin 0.003% found second best insecticide in which more percent larval mortality was observed i.e. 75.99% and it was at par with treatment T<sub>7</sub> Quinalphos and T<sub>4</sub> Trizophos. The insecticidal treatment T<sub>7</sub> Quinalphos 0.05% found third best insecticide in which larval per cent mortality was up to (60.44%) but it was at par with the treatment T<sub>4</sub> Trizophos, T<sub>2</sub> Profenophos, T<sub>3</sub> Cypermethrin + Profenophos, and T<sub>5</sub> *Beauveria bassiana*.

The per cent investigation was in conformity with the study of Dharmaraju *et al* <sup>[6]</sup>. They reported that spraying with Diclorvos was found the effective for the control of pest. Shrivastava <sup>[11]</sup> reported that effectiveness of Diclorvos due to fumigation action. Butani <sup>[12]</sup> also repoted the efficacy of DDVP for management of apple and nut borer in cashew. Gupta <sup>[13]</sup> reported the efficacy of Diclorvos against apple tree borer. The insecticide Diclorvos found effective against grape stem borer Jagginavar<sup>[14]</sup>. The cashew apple and nut borer was consider to be a pest of minor significance in the past and hence the earlier research worker have paid not much attention, however recent this pest creating problem in cashew.

**Table 2:** Efficacy of insecticide for the management of Apple and Nut Borer in cashew for the year 2012-13, 2014-15, and 2015-16.

Treatment details	2012-13	2014-15	2015-16	pooled Mean for three year
T <sub>1</sub> Lamda cyhalothrin 5 EC (0.003%)	60.00 (50.80)	86.66 ( 72.28)	81.33 ( 65.01)	75.99 ( 62.70)
T <sub>2</sub> Profenophos 50 EC (0.05%)	46.67 (43.09)	40.00 ( 39.23)	50.66 ( 45.37)	45.77 ( 42.56)
T <sub>3</sub> Cypermethrin 4% + Profenophos 40% (0.04%)	45.33 (42.31)	26.66 ( 30.78)	45.33 ( 41.80)	38.99 ( 38.29)
T <sub>4</sub> Triazophos 40 EC (0.04%)	40.00 (39.22)	73.33 ( 63.84)	44.00 ( 41.48)	52.44 ( 48.28)
T <sub>5</sub> <i>Beauveria bassiana</i> @ 2 ml /lit	30.67 (33.41)	53.33 ( 46.91)	30.66 ( 33.41)	38.22 ( 37.91)
T <sub>6</sub> <i>Metarhizium anisopliae</i> @ 2 ml /lit	34.67 (36.04)	40.00 ( 38.85)	40.66 ( 43.10)	38.44 ( 39.33)
T <sub>7</sub> Quinalphos 25 EC (0.05%)	53.33 (46.68)	66.66 ( 59.20)	61.33 ( 51.55)	60.44 ( 51.15)
T <sub>8</sub> Diclorvos 76 EC (0.05%)	54.67 (47.68)	93.33 ( 81.14)	93.33 (81.14)	80.44 ( 69.98)
T <sub>9</sub> Control	1.33 (5.05)	13.33 ( 18.31)	6.66 (10.06)	7.10 ( 11.14)
S.Em ±	2.02	7.35	5.63	4.84
CD at 5%	6.07	22.04	16.28	14.51

## 4. Conclusion

From the above study, it is concluded that the insecticide Dichlorvos and Lambda cyhalothrin found effective against apple and nut borer in cashew.

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