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Efficacy and evaluation of insecticides for the management of stem and root borer in cashew

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Abstract
The studies were undertaken at Regional Fruit Research Station, Vengurle during 2015-16 to 2017-18 for management of cashew stem and root borer. The various insecticides were applied after removal of the CSRB grub from the infested portion of cashew tree. The results revealed that, swabbing of Fipronil (2ml/lit), recorded maximum number of cashew trees without re-infestation followed by Chlopyriphos (10 ml/lit). The infestation of cashew stem and root borer was more in already infested tree.

Keywords: Cashew, pest of cashew, chemical control, stem and root borer

1. Introduction
Cashew (*Anacardium occidentale* L.) belongs to family Anacardiaceae, introduced into India by Portuguese travelers in 16th century. Now a days India is the leading producer, processor and exporter of cashew kerrnel in world. The productivity of cashew is influenced by many factors out of which insect pests are one of them. In India, more than sixty insect pest species have been recorded causing damage to cashew [1]. Cashew is subjected to infeste by many of insect pests. Among them cashew tea mosquito bug, cashew stem and root borer, apple and nut borer, thrips are the most common pest and cause economic damage to cashew. However cashew stem and root borer (CSRB) *Plocaederus* spp. is the major pest of cashew in all cashew growing tracts of India [2] The incidence of CSRB mostly goes undetected by cashew growers in the initial stages, as it is not identified causes to loss of yielding trees resulting in reduced cashew productivity. Cashew stem and root borer is one of the major pest of cashew infest most of the orchard.It causes 8-10 percent damage to productive cashew tree and reduces the production. About three species of stem and root borer infest cashew *Viz*., *Plocaederus ferruginous*, *P. obsesus* and *Bactocera rufomaculata.* Out of these, *plocaederus ferruginous* is dominant species. *Plocaederus ferruginous* is capable to kill about 1-10 percent loss of productive trees every year [3].
The pest is prevalent throughout the year. Infestation of cashew tree by CSRB grub can be recognized by exudation of frass and gum from the infested region, usually in the collar zone in early stage and gum as well as coarse frass and yellowing canopy at the later stage of infestation. The symptoms of infestation include presence of small holes in the collar region, gummosis, extrusion of frass through holes, yellowing and shading of leaves, drying of twigs and final death of tree [4]. As a result of severe tunneling by grubs of different age groups in each tree, the sap flow of phloem tissue is completely stopped and the bark of the infested tree dries off. Considering the importance of cashew stem and root borer the experiment was conducted at Regional Fruit Research Station, Vengurle for its management for three years during the year 201516-2017-18.

2. Materials and methods
A field experiment was conducted in Completely Randomized Block Design with six treatments. Twenty cashew trees were used for each treatment and thus in all total of 120 trees were used for imposing all the treatments. Four insecticidal treatments *viz*., Fipronil swabbing (2ml/lit), Neem oil swabbing (5 percent), Imidacloprid swabbing and drenching (2ml/lit), Chlorpyrifos (10 ml/lit) percent were used as swabbing and drenching after removal of the grubs from the infested portion. Fifth treatment was treated check (only removal of the grubs from the infested portion of the cashew tree) and sixth treatment untreated check (without removal of grub).

The treatments were applied sequentially on tree as and when infestation was observed. The treatments were imposed sequentially i.e. T_1 on first infested tree, T_2 on second infested tree, T_3 on third infested tree, T_4 on fourth infested tree, T_5 on fifth infested tree and T_6 on sixth infested tree, again T_1 on seventh infested tree, T_2 on eighth infested tree and so on when infested trees were observed.

2.1 Stasticial Analysis

The experimental trees were under continuous observeation for incidence re-infestation. Percent re-infestation was calculated by observing re-infestation in treated experimental trees.

3. Results and Discussion

In the year 2015-16, all the insecticidal treatments reduced the re-infestation of cashew stem and root borer (Table.1). Among them the treatment, T_1 (Fipronil 2ml/lit) swabbing recorded maximum number of tree without re-infestation (95%) followed by the treatment T_4 (90%) (Chlorpyrifos 10 ml/lit) and Imidacloprid swabbing and dranching 2ml/lit (75%).Re-infestation was more in the treatment T_6 i.e. Untreated check (30.00%) and Treated check only removal of grub (45%).

In the year 2016-17, the treatment T_1 (Fipronil 2ml/lit) swabbing recorded maximum number of trees without re-infestation (90%) followed by the treatment T_4 (90%) (Chlorpyrifos 10 ml/lit) and Imidacloprid swabbing and dranching 2ml/lit (75%). The re-infestation was more in the treatment T_6 i.e. Untreated check (25.00%) and treated check only removal of grub (45%).

In the year 2017-18, T_1 (Fipronil 2ml/lit) swabbing recorded maximum number of trees without re-infestation (95%) followed by the treatment T_4 (90%) (Chlorpyrifos 10 ml/lit) and Imidacloprid swabbing and dranching 2ml/lit (80%). Re-infestation was more in the treatment T_6 i.e. Untreated check (25.00%) and Treated check only removal of grub (50%).

The mean efficacy of insecticides of three years indicated that the treatment T_1 (Fipronil 2ml/lit) swabbing recorded maximum number of tree without re-infestation (93.33%) followed by the treatment T_4 (86.66%) (Chlorpyrifos 10 ml/lit). Where-as the re-infestation more in treatment T_6 (26.66) (Untreated check)

The present finding are in line with the AICRP cashew centre in India. The use of Fipronil found effective and minimise re-infestation of CSRB. The 80.95, 77.30, 84.62 and 100 % trees found without re-infestation of CSRB in Bapatla, Bhubaneshwar, Hogalagere and Madakkathara respectively (Annon) [5]; Raviprasad [6] who reported that Chlorpyriphos (0.2%) found the best for the management of cashew stem and root borer. Mohapatra [4] reported 88.13 % of treated trees being free from re-infestation of CSRB with Chlorpyrifos (0.2%) treatment. Raviprasad [7] reported that adult of cashew stem and root borer had higher extent of egg laying already infested tree, which hints the possibility of volatile attractant.

Table 1: Efficacy of insecticides as post extraction prophylaxis (PEP) against stem and root borer (CSRB)

Tr. No.	Details	% trees without re-infestation / persistent attack (2015-16)	% trees without re-infestation / persistent attack (2016-17)	% trees without re-infestation / persistent attack (2017-18)	Mean for three year
T_1	Fipronil swabbing 2ml/lit	95	90	95	93.33
T_2	Neem oil swabbing 5%	55	65	75	65.00
T_3	Imidacloprid swabbing and dranching 2ml/lit	75	75	80	76.66
T_4	Chlorpyrifos 10ml/lit	90	80	90	86.66
T_5	Treated check (only removal of grub)	45	45	50	46.66
T_6	Untreated check	30	25	25	26.66

4. Conclusion

From the above study it is concluded that the mechanical removal of grubs and swabbing with insecticides (Fipronil 2ml/lit) after removal of grub recorded maximum number of tree without re-infestation. It is suggested to take continuous and repeated supervision and mechanical control by removing and destroying the grubs and adults of cashew stem and root borer particularly during October to May for successful management.

5. References

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