

EFFECT OF SOME IPM COMPONENTS IN MANAGEMENT OF CASHEW STEM AND ROOT BORER

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ABSTRACT

A field experiment was conducted district during 2002 and 2003 for the management of cashew stem and root borer (CSRB). The experiments consisted of mainly phytosanitary measures in cashew orchards alone and in combination with curative measures i.e., painting the tree with neem oil (5%), kalichakra (*Metarrhizium anisopliae* @ 5 gm/lit of water) and spraying with chlorpyrifos and monocrotophos (both 0.2%). All the treatments were applied on need basis and compared with farmers' practice. The results revealed that there was 80-100% recovery of early infested plants from CSRB attack irrespective of treatments. Although the phytosanitation measure alone was the cheapest method (Rs.51/tree/2 years) but it was not trust-worthy as its frequency of application was more. The phytosanitation measure followed by chloropyrifos / monocrotophos spray was most effective and cost worthy (Rs.55.50 and Rs.65.60/tree/2 years, respectively). Other treatment i.e., phytosanitation followed by neem oil application proved to be effective but costly (Rs.94.50/tree/2 years). The phytosanitation with *M. anisopliae* application was neither effective nor economical (Rs.132/tree/2 years).

Key words : Phytosanitation, *Metarrhizium anisopliae*, cashew stem and root borer.

Cashew (*Anacardium occidentale* L., Anacardiaceae) has gained significant economic and social importance in India as a major foreign exchange earner. The low productivity of the crop is mainly due to existing old plantation, use of seedling trees and poor management practices, particularly lack of timely application of crop protection measures. Among the different insect pests, the cashew stem and root borer is considered to be most serious pest in cashew (Sundararaju, 1993). The pest is capable to kill 1-10% productive trees (Ramadevi and Krishna Murty, 1983; Jena *et al.*, 1985a, b; Samiyyan *et al.*, 1991; Mohapatra *et al.*, 2004; Mohapatra and Mohapatra, 2004). As the borer remains in a concealed condition in the interface of bark and hard wood, it escapes from the attack of the natural enemies. Secondly, application of pesticides is not very effective as the grubs remain inside a thick protective layer. Very little information is available on the sustainable management technology of the pest. Therefore, the present study was undertaken to device a suitable management practice for control of the pest.

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MATERIALS AND METHODS

To study the effect of some IPM components in infested cashew orchards, multi-locational trials were carried out in cashew plantations of Ranasinghpur, Lahanga, Kalibati, Bhuinpur and Sardhapur of Khurda district during 2002 and 2003. The experiment retained mainly phytosanitary measures in cashew orchards alone and in combination with curative measures like painting the trunk with neem oil (5%), Kalichakra (*M. anisopliae* @ 5 g/lit) and spraying with chlorpyrifos and monocrotophos (both 0.2%). The above treatments were compared with the "farmers practice" (usually Orissa cashew growers do not adopt/sparsely adopt any preventive/curative measures in the cashew plantation). In each of the five locations 100 infested trees were selected for each treatment. Each tagged tree was inspected once weekly to examine the presence of the grubs which were removed and destroyed to ascertain the extent of fresh infestation. Infested trees were again treated with the respective treatments according to the schedule. The experiment prolonged for 104 consecutive weeks. At the end of two years, the percentage recovery of trees from the attack of borer was determined. The cost of treatment of each tree was calculated based upon the frequency of application of treatments.

RESULTS AND DISCUSSION

The results as revealed from Table 1 indicated that out of six treatments, T_4 (i.e., phytosanitation followed by chlorpyrifos (0.2%) application on the trunk upto one meter above the collar region) resulted in 100% recovery of the early-infested trees, 37.5% of the middle-level infested trees and only 5% of the advanced-stage infested trees. Likewise, tree recovery in T_5 (phytosanitation followed by monocrotophos spray around collar region) was 91.0% in case of early-infested trees, 26.7% in case of middle stage infested trees and 2.9% in advanced-stage infested trees. The respective figure in T_2 (T_1 + neem oil spray) were 90%, 20% and 0%, respectively. There was no visible differences between T_4 (phytosanitation) and T_3 (T_1 + *M. anisopliae* formulation application). In farmers' practice mortality of the infested trees was 100%.

To make the plants borer free, the frequency of application needed was 17 times in case of T_1 (phytosanitation) whereas, the corresponding frequencies were 7.5, 8.0, 9.0 and 11.0, respectively in T_4 (T_1 + chlorpyrifos spray), T_5 (T_1 + monocrotophos spray), T_2 (T_1 + neem oil paint) and T_3 (T_1 + fungus application). It was seen from the data that during the course of two years, the treatment cost per tree was Rs.3/- in case of T_1 whereas, in case of T_3 , T_4 , T_5 and T_2 it was Rs.12, 8.2, 7.4 and 10.5, respectively (Table 1). Analysis of data in Table 1 further revealed that although phytosanitation was the cheapest method, but frequency of its application was more. So total cost of application was highest in *M. anisopliae* formulation (Rs.132/-) followed by neem oil (Rs.94.50), monocrotophos, (Rs.65.60), chlorpyrifos (Rs.55.50) and phytosanitation alone (Rs.51.00). (Fig.1).

Therefore, it was concluded that the cashew plants could be protected by mechanical extraction of grubs in early stage of infestation followed by immediate application of chlorpyrifos (0.2%) or monocrotophos (0.2%). The other treatment i.e. phytosanitation followed by neem oil application although was effective, the cost involved was high. Phytosanitation with *M. anisopliae* was neither effective nor economical. The present finding reiterated with the earlier findings (Anonymous, 2002 and Mohapatra *et al.*, 2004).

Table 1. Need based studies on the effect of promising IPM components in infested cashew orchards

Sl. No.	Treatments	Pre-treatment count/ No. of infested trees in different stages of infestation (n = 100)			No. of trees showing infestation 104 week after the initiation of the experiment			No. of trees recovered (saved i.e. trees without any grub)			% trees recovered			Frequency of application of treatments (need-based)			Cost of treatment per tree in (Rs.) 2 year cycle (104 weeks)	No. of trees saved after 2 years	Frequency of application of P.P. measures	Cost (Rs) involved
		Early	Middle	Adv.	Early	Middle	Adv.	Early	Middle	Adv.	Early	Middle	Adv.	Early	Middle	Adv.				
T ₁	Phytosanitation	30	40	30	5	38	30	25	2	0	83.0	5.0	0.0	10	4	3	3.00	27	17.0	51.00
T ₂	T ₁ + neem oil (5%) paint on tree trunk upto 1m from collar	40	30	30	4	24	30	36	6	0	90.0	20.0	0.0	3	3	3	10.50	42	9.0	94.50
T ₃	T ₁ + <i>M. anisopliae</i> (5 g/lit) paint on trunk upto 1m from collar	50	30	20	10	26	20	40	4	0	80.0	13.3	0.0	5	3	3	12.00	44	11.0	132.00
T ₄	T ₁ + chlorpyrifos (0.2% a.i.) sprayed on trunk upto 1m from collar	40	40	20	0	25	20	40	15	0	100.0	37.5	5.0	1.5	3	3	7.40	55	7.5	55.50
T ₅	T ₁ + monocrotophos (0.2% a.i.) sprayed on trunk upto 1m from collar	35	30	35	3	22	34	32	8	1	91.0	26.7	2.9	2	3	3	8.20	41	8.0	65.60
T ₆	Farmers' practice	40	30	30	40	30	30	00	00	00	0.0	0.0	0.0	0	0	0	0.00	0	0.0	0.00

P.P.: Plant Protect. Adv. Advanced

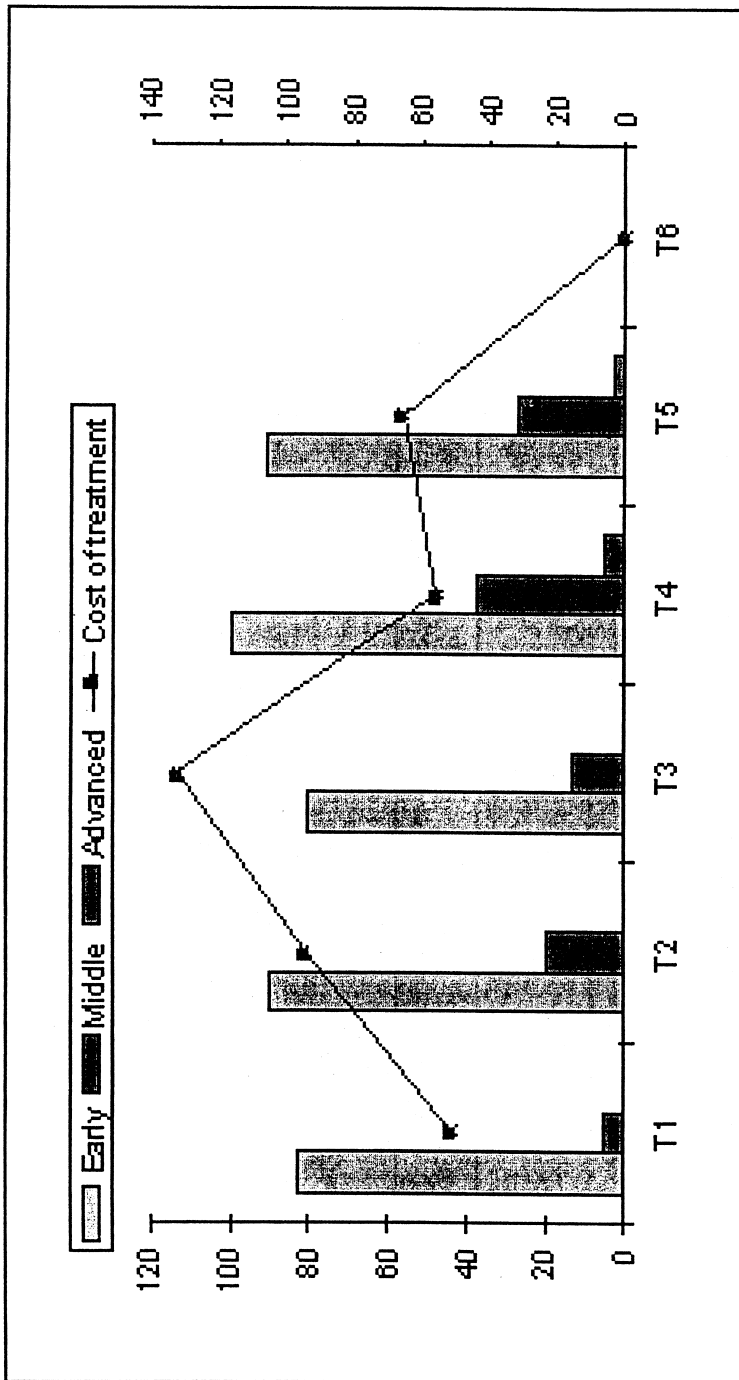


Fig. 1. Percentage recovery of trees and economics of treatment/tree/(two-year cycle)

Treatments

Percentage recovery of trees(Two year after pre treatment count)

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