



Field evaluation of two pheromone lures against red weevil, (*Rhynchophorus Ferrugineus* Oliv.) in coconut gardens in Andhra Pradesh

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Abstract

The Red palm weevil *Rhynchophorus ferrugineus* (Oliv.) is a destructive pest of palms. Management using pheromone trap as one of the components in IPM of red palm weevil is a suitable approach to manage the pest effectively. Between the two types of pheromone lures [Chem tica and Central Plantation Crops Research Institute (CPCRI)] evaluated, Chem tica lure is significantly superior in majority of months (4 months out of 8 months data *i.e.*, February to May) in trapping the adult weevils except for catches in the month of August 2005 when compared to that of CPCRI lure. It is also observed that total number of weevils were trapped more in Chem Tica lure (1865 nos. with an average catch of 155.4/ trap) in a period of 230 days while, CPCRI lure during the same period trapped 1398 nos. of red palm weevil adults with an average trap catch of 116.5 /trap. However, CPCRI lure exhausted in twenty months and Chem Tica lure in eight months. Infestation levels of red palm weevil were also decreased in the experimental garden after use of pheromone trap. Mass trapping of red palm weevil adults using pheromone lures is useful in monitoring the pest damage and reducing the adult population as well as damage by the pest.

Key words: Red palm weevil, pheromone traps, coconut

Introduction

The Red palm weevil *Rhynchophorus ferrugineus* is a destructive pest of palms. The pest being concealed tissue borer many times goes unnoticed and if not controlled in time, lead to death of palm. Hence, controlling of the pest with single method (root feeding with monocrotophos 10 ml + 10 ml water) has a chance of pest escape and persistent damage. This serious condition necessitates the multidirectional approach to control the pest *i.e.*, Integrated pest management (IPM) with possible ecofriendly measures. Abraham and Kurian 1975; Abraham *et al.*, 1998 reported that red palm weevil (RPW) could be managed by employing IPM which comprises several techniques. Use of pheromones as one of the methods in IPM has become a suitable ecofriendly control method, which helps in continuous monitoring

of the pest in the field. Keeping in view of the importance of pheromone trap as one of the steps of IPM: present study was conducted to evaluate the efficacy of two types of pheromone lures (Chem Tica and CPCRI) in coconut plantations of East Godavari district, Andhra Pradesh in the years 2005 & 2006.

Materials and Methods

Field studies were conducted from January 2005 to August 2006 with two treatments *i.e.*, (1) Chem Tica lure (800 mg) which costs Rs.345.00/lure and (2) CPCRI lure (85 - 100 micro litres) costs Rs.40.00/ampule keeping 12 traps each at 50 metres distance between two traps as per AICRP on Palms recommendations. Two treatments were imposed in pest infested coconut gardens in two distant villages *viz.*, Mosalapalli and Erusumanda. Bucket traps were used, with 5 litre plastic

bucket wrapped with gunny cloth having four circular holes of 5 cm diameter made at equidistant around the rim of the bucket. The pheromone sachet was arranged in the center of the lid inside the bucket using an iron wire and keeping the food bait in the bucket. The bucket was hung at 1.5 metre height from the ground to the trunk with the help of coir rope.

Food bait was prepared with ripend banana fruit pulp (250 gm), in one litre water containing 10% yeast, fermented for one day in advance and 3 gm of carbaryl 50% W.P. was added as poison. The traps were set up in the month of January 2005 and weevil catches were recorded and traps were also serviced by replacing with fresh food bait at weekly intervals till the lures exhausted. The data collected on number of weevils trapped in each treatment was subjected to completely randomized design analysis and the results obtained are presented and discussed.

Results and Discussion

The perusal of data revealed that, monthly mean number of adults (females and males) trapped were higher in Chem Tica lure, than that of CPCRI lure and this catch increased gradually from February to April and reached maximum in April and decreased from May to August (Table 1). The maximum number of trapped weevils in Chem Tica pheromone lure were 35.75 adults /trap, while in CPCRI pheromone lure it was 28.17 adults/trap in the month of April. Similar high catches of red palm weevil in the month of April were reported by Ajlan and Abdulsalam (2000) and Abdulaziz and Abdulsalam (2005) in Saudi Arabia in date plantations. During the present study in both the pheromone lures female dominant catches have been obtained more particularly in Chem Tica pheromone lure with a sex ratio of 1:1.31 and 1:1.07 in CPCRI lure. Similar female dominant captures using RPW pheromones in coconut and date plantations have been reported by Faleiro and Rangnekar (2000); Faleiro and Satarkar (2003) and Abraham *et al.* (1999). When monthly data was analysed, Chem Tica lure is significantly superior in majority of months (4 months out of 8 months data *i.e.*, February to May months) in trapping the adult weevils except for catches in the month of July and August 2005 when compared to that of CPCRI lure. From the observations recorded, it is also observed that more total number of weevils were trapped in Chem Tica lure (1865 nos. with an average catch of 155.4/trap) in a period of 230 days and it was exhausted in 230 days while, CPCRI lure during the same period trapped 1398

Table 1. Number of Red palm weevil adults trapped/12 replications

Month	T1 Trapped weevils (Chem Tica lure)			T2 Trapped weevils (CPCRI lure)			CD
	Male	Female	Total	Male	Female	Total	
JAN '05	58	66	124	56	63	119	Non-Sig.
FEB '05	131	157	288	104	88	192	Sig (4.32)
MAR '05	132	172	304	83	68	151	Sig (4.11)
APR '05	193	236	429	177	161	338	Sig (5.56)
MAY '05	134	212	346	90	71	161	Sig (6.55)
JUN '05	72	111	183	60	68	128	Non-Sig.
JUL '05	66	87	153	60	105	165	Non-Sig.
AUG '05	18	20	38	59	85	144	Sig (4.14)
SEP '05				53	51	104	
OCT '05				20	34	54	
NOV '05				40	31	71	
DEC '05				49	58	107	
JAN '06				36	39	75	
FEB '06				33	42	75	
MAR '06				107	92	199	
APR '06				112	120	232	
MAY '06				98	121	219	
JUN '06				85	112	197	
JUL '06				56	77	133	
AUG '06				46	38	84	
Total	804	1061	1865	1424	1524	2948	
Male : Female ratio = T1 = 1.0 : 1.3			T2 = 1.0 : 1.07				

nos. of red palm weevil adults with an average trap catch of 116.5/trap. However, CPCRI lure was found to be still working in the field and lasted up to August 2006 (20 months). In West Coast CPCRI lure was found to be working for 4 months but in present study it was found to work for 20 months. Further investigations on its efficiency needs to be worked out. However, weather conditions during experimental period of East coast are furnished in an annexure for further clarification.

When the pre and post infestation levels of red palm weevil were observed in the experimental garden and the village in which experiment was conducted, it was observed that the infestation level has come down from 2.4 to 0.2 and 1.5 to 0.1 per cent in both the treatments *i.e.*, T1 and T2, respectively (Table 2) in the experimental field and in that respective villages also the per cent dead palms has come down from 2.7 to 0.5 and 1.6 to 0.1 per cent in Mosalapalli and Erusumanda villages respectively.

From the present study, it can be inferred that mass trapping of red palm weevil adults using pheromone lures is useful in reducing the adult population as well as damage by the pest. It was also noticed that though the Chem Tica lure is superior, CPCRI lure would be more economical because of its less cost, long working period.

Table 2. Pre and post treatment (lures) infestation levels of red palm weevil in the experimental gardens

Treatments		Total no. of palms	Percent damage	
			Pre treatment dead palms	Post treatment (dead palms 20 months after)
			Jan'05	August'06
T1- Chem Tica	a) Experimental garden	840	2.4	0.2
	b) Mosalapalli village	—	2.7	0.5
T2- CPCRI lure	a) Experimental garden	840	1.5	0.1
	b) Erusumanda village	—	1.6	0.1

The studies of Faleiro and Satarkar (2003) revealed that, the synthetic red palm weevil 400 mg lure (Ferrolure+) was significantly superior in attracting red palm weevil adults as compared to the Kairomone releasing food bait (coconut petiole). However, weevil captures were significantly higher (with female dominant weevil captures) when the synthetic pheromone and food bait were used together in the trap, signifying synergism between the two. Abraham *et al.* (1998) and Falerio *et al.* 1999 further confirmed the efficacy of pheromone lures in IPM.

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