

ATTRACTANTS—AN AID IN RED PALM WEEVIL MANAGEMENT

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ABSTRACT

The red palm weevil (*Rhynchophorus ferrugineus* F.), is an enemy of young coconut palms. It bores into the tissues and ultimately kills the palm. Being a hidden enemy, timely detection is necessary for effecting control. Traps and attractants, by which adults can be trapped and killed have proved to be effective components of integrated pest management. Log traps consisting of tender coconut stems, 50 cm long and split longitudinally were found to be superior to metal traps. The cut surfaces were treated with candidate attractants. Macerated fruits, molasses (jaggery from sugarcane) and toddy, singly or in combination, were the test materials. Along with these, yeast and/or acetic acid was mixed to ascertain whether the same will enhance the attractiveness. Out of sixteen combinations tested in the field, logs treated with coconut toddy + yeast + acetic acid were the best, followed by coconut toddy + acetic acid, pineapple + molasses + yeast, pineapple + molasses, and molasses + yeast. The use of coconut log traps treated with the above combination is recommended as one of the effective components of integrated pest management.

INTRODUCTION

Rhynchophorus ferrugineus F., the red palm weevil, damages young coconut palms by boring into the tissues. If they are not detected early and controlled, they can kill the palm. Being a hidden enemy, difficulties in detection reduces the chances for effecting curative and timely control. Hence an integrated approach for the management of the pest is most essential (Abraham and Kurian, 1975). Trapping the weevils, using a suitable attractant, and killing them form one of the components of pest management. Hagley (1965) reported that a mixture of malt, skatele and iso-amylacetate was significantly better than coconut stem tissue as an attractant for both sexes of *R. palmarum*. Field tests conducted at the Central Plantation Crops Research Institute, Regional Station

Kayangulam, using these in comparison with toddy-treated log-trap, revealed that adults of *R. ferrugineus* were rarely attracted to the former, whereas the latter trap proved effective (Kurian, 1972). Metal traps filled with coconut petioles were reported to be effective in Sri Lanka and Trinidad (Maharaj, 1973). However, in India coconut logs proved more effective than metal trap (Kurian *et al.*, 1979). In the present study, an attempt was made to enhance the attractiveness of toddy and also to evaluate the attractiveness of various fruits to the weevils with a view to including this as a component of red palm-weevil management. The results of the experiment are presented here.

MATERIAL AND METHODS

Logs of tender coconut palm were cut to 50 cm length and split longitudinally into two equal halves. Coconut toddy, mace-rated grapes, cashew apple, pineapple, crushed sugarcane and molasses (jaggery from sugarcane) were the candidate materials. These were used either singly or in combination with yeast or acetic acid or both. The doses tried are presented in Table 1. The trap was prepared by smearing any one or a combination of the above materials on the cut surface of the split log. The split halves were put one over the other. Such log traps were kept 200m apart in cultivators' field having medium level of red palm weevil infestation. Traps were set towards dusk and weevils were collected in the early morning. The treatments and observations were continued for three days.

Table 1. Dosage of different test materials used

Toddy	One litre—200 ml/log
Toddy + Yeast	5 g yeast in one litre toddy @200 ml/log
Fruits or Sugarcane + Yeast	5 g yeast for 500 g of pineapple, oil palm fruit, grapes, cashew apple or sugarcane @100 g/log
Toddy + Acetic acid	5 ml acetic acid for one litre toddy @200ml/log
Fruits + Acetic acid	5ml acetic acid for 500g of fruits @ 100g/log
Fruits + Molasses (jaggery)	50 g molasses (jaggery) for 500 g of fruits @100 g/log
Coconut water + Molasses	50 g of molasses in one litre coconut water @ 200 ml/log

RESULTS AND DISCUSSION

The mean weevil catch per trap under various treatments is furnished in Table 2, where it is seen that, logs treated with a combination of coconut toddy, yeast and acetic acid was the best with a mean catch of 2.1 weevils per day against nil in control. Logs treated with toddy and acetic acid, pineapple+molasses+yeast, pineapple+molasses and molasses+yeast, followed the same trend. All other treatments attracted weevils, but to lesser degrees.

Table 2. Order of efficacy and mean catch per trap

Treatment	Mean catch of weevil
Log alone—Control	0.00
Log+Toddy+Yeast+Acetic acid	2.10
Log+Toddy+Acetic acid	1.90
Log+Pineapple+Molasses (Jaggery)+Yeast	1.70
Log+Pineapple+Molasses	1.60
Log+Molasses+yeast	1.50
Log+Toddy+Yeast	1.10
Log+Cashew apple	1.00
Log+Sugarcane+Yeast	1.00
Log+Pineapple+Yeast	0.86
Log+Grapes+Yeast	0.83
Log+Toddy	0.81
Log+Grapes	0.75
Log+Pineapple+Molasses+Acetic acid	0.62
Log+Molasses+Acetic acid	0.5
Log+Molasses+Coconut water	0.4

Toddy alone could catch only 0.81 weevil per day and the addition of acetic acid to toddy increased the catch to 1.9 and a further addition of yeast resulted in the maximum catch. Hence it is evident that addition of yeast or acetic acid to toddy is necessary for a better catch.

Molasses+yeast and molasses+acetic acid bagged 1.5 and 0.5 weevil respectively, indicating that along with molasses, yeast

is superior to acetic acid. Adding molasses or molasses+yeast along with pineapple resulted in catches of 1.7 and 1.6 weevils but pineapple+yeast alone could catch only 0.86 weevils. This shows that along with pineapple, molasses must be added for enhancing its efficacy. Molasses with coconut water was least effective.

This study has resulted in bringing out the utility of locally available materials for attracting weevils which can be recommended for easy adoption by farmers. One or the other of these will be available throughout the year. They are cheap and leave no hazardous residues in the environment. Pineapple and grapes need not be of edible quality. Even overripe or partially rotten fruits which do not have any market value could be used. Vinegar and yeast are readily available. Availability of coconut logs can sometimes be a limitation, but palms cut for various reasons could be made use of. Thus, trap collection and killing should form an important component of the integrated pest management programme, along with other control measures like field sanitation and prophylactic and curative insecticidal applications.

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DISCUSSIONS

- M. J. CHACKO, (CCRI): How are the weevils attracted to the trap, killed?
- C. KURIAN: Mechanically.

- M. J. C.:** What is the range and duration of effectiveness of the trap?
- C. K.:** Two weeks very effectively, but if not completely dried, can be used for a longer period.
- M. J. C.:** Does any natural enemy get caught in the trap?
- C. K.:** Earwig predators are common which evidently predate on the eggs laid by females which preponderate over the males in trap in the ratio of 2:1.
- N. MURALEEDHARAN, (UPASI):** Is there any definite flight period for this weevil?
- C. K.:** All through the year and mostly nocturnal.
- P. P. ZACHARIA, (J.D.A. Pondicherry):** The important aspect of this pest is that it escapes detection. Has any attempt been made to develop an electronic device for the detection of this pest?
- C. K.:** The pest infestation could be detected by the external visual symptoms manifested by the attacked palm, viz. holes on the stem, exudation of a brown viscous fluid and extrusion of fibres from the holes, splitting of bases of leaf petioles and wilting of inner leaves. The feeding sound produced by the grubs of the pest is audible from close proximity. Prof. T. A. Davis had fabricated an electronic device which gave nearly 85 per cent efficacy in detecting pest infestation. Attempts are being made by Shri C. P. Ramachandran of CPCRI to fabricate a more sure detector.
- P. S. SREENIVASAN (Palghat):** Red palm weevil being nocturnal, has moonlight any effect on the magnitude of collection of weevils with the said trap?
- C. K.:** No marked difference in collection was observed, and so moonlight may not have definite effect on the nocturnal movement of the weevil.