

# Wide area management of red palm weevil and rhinoceros beetle in coconut using pheromone technology



## Mass trapping

- The pheromone traps should be placed under the shade of the palm/tree canopy at a height of one meter above the ground.
- For mass trapping programme 1-2 traps/ha is recommended.
- The traps should be serviced (discarding the attracted weevils and beetles, replacing the food baits and insecticide solution) every 10 days.
- Replace the pheromone lure only when most of the lure is exhausted.
- Community based approach is desired for mass trapping of red palm weevil and rhinoceros beetle in coconut plantations



Preparation of traps for placement



Training and distribution of pheromone traps to the farmers



Placement of trap

Attracted RPW

Attracted RB

## Popularisation of pheromone technology

ICAR-CCARI with assistance from NABARD conducted awareness training programme and field demonstration on use of pheromone traps for management of red palm weevil and Rhinoceros beetle in coconut in various parts of Goa.

In this project hands on training on trap placement, servicing, lure replacement and other integrated pest management approaches were given to the farmers. In addition traps were supplied to the farmers.

## Other integrated pest management practices for Red palm weevil and Rhinoceros beetle

Remove and burn all dead coconut trees in the garden to avoid breeding of the pests.

Collect and destroy the various bio-stages of the beetle and weevil from the manure pit and from the infested trees.

Place 3 naphthalene balls/palm at the base of inter space in leaf sheath in the 3 inner most leaves of the crown once in 45 days for managing rhinoceros beetle

Place 5 g phorate in perforated sachets in the two inner most leaf axils for 2 times at 6 months intervals for managing rhinoceros beetle.

Apply entomopathogenic fungus *Metarrhizium anisopliae* @  $5 \times 10^{11}$  Spores/m<sup>3</sup> in manure pits to check the multiplication of the rhinoceros beetle.

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## Introduction

Coconut, *Cocos nucifera* L. is a major plantation crop in India. In Goa coconut is cultivated in an area about 26,000 hectares. Red palm weevil (RPW) *Rhynchophorus ferrugineus* and Rhinoceros beetle (RB), *Oryctes rhinoceros* are the most devastating insect pest of coconut. Infestation due to Red palm weevil and Rhinoceros beetle are as high as 20 % leading to substantial economic losses.

### Red palm weevil *Rhynchophorus ferrugineus* (Curculionidae: Coleoptera)

Red palm weevil is a major and most destructive insect pest of coconut palm. The palms less than 20 years are highly susceptible to attack. The pest is well distributed throughout coconut growing states of India. It is an internal tissue borer and very difficult to detect at the early stage of infestation.

### Symptoms

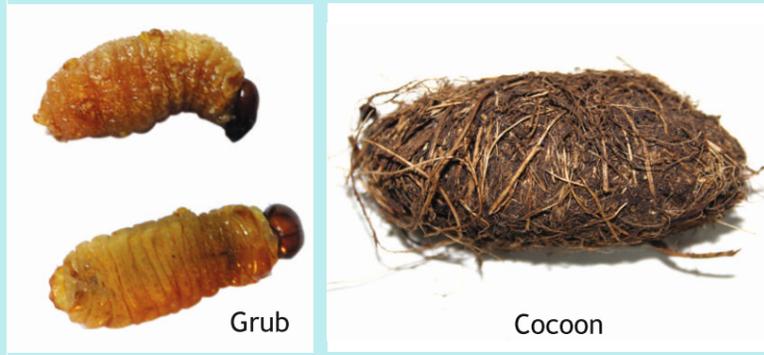
- Presence of small bore holes with protruding chewed fibrous material.
- Oozing of a brown liquid from such holes indicate the early infestation by the pest.
- Central shoot shows sign of yellowing and wilting.
- Presence of chewed fibrous material/empty pupal cases on the ground below the infested palm.
- Large number of grubs, pupae and adults of the insect could be seen inside the trunk at the affected portion.



Bore holes on the stem    Extrusion of frass material    Wilting of central shoot

### Life cycle

- The female weevil lays oval and white eggs on fresh wounds on the stem
- The full grown grub is stout, fleshy, apodous and pupates in a fibrous cocoon inside the trunk itself. The reddish brown weevil has six dark spots on the thorax.



Grub

Cocoon



Adults

### Rhinoceros beetle: *Oryctes rhinoceros* (Scarabaeidae: Coleoptera)

It is one of the most damaging insect pests of coconut palm and distributed throughout the coconut growing tracts of India. Adult beetle is the destructive one and causes 10 to 15 % yield loss. The peak incidence of the pest is noticed during the monsoon period (June to September).

### Symptoms

- The damaged leaves show characteristic 'V' or diamond shaped cuttings.
- A series of holes present on the fronds when leaf opens out.

- Death of the growing point in young plantations.
- The infestation can be easily made out by the chewed fibrous material present near bore holes.



Damage on leaves

Damaged young palm



V- shaped cut on leaves

### Life cycle

- The insect breeds in decaying organic matter such as farm yard manure pits, dead palm trunks, compost heaps and other decaying materials
- The adult beetle is stout, black or reddish black, about 5 cm in length. It has a long horn projecting dorsally from the head.
- Grub is stout, fleshy, dirty white, curved (C- shaped).



Grub



Adult beetles

### Pheromone trapping technology

The use of aggregation pheromone traps is one of the main component in integrated pest management programme of RPW and RB. Mass trapping of adult beetles and weevils using food baited pheromone traps in an infested coconut plantation significantly reduces the infestation levels. The red palm weevil lure (Ferrolure), rhinoceros beetle lure (Rhino lure) and traps are commercially available in private agro firms. The lures to be purchased and the traps can be prepared.

### Trap preparation

- The traps can be easily prepared by using a five litre plastic bucket with four windows (1.5 × 5 cm) cut below the upper rim of the bucket.
- Jute sack should be wrapped around the outer surface of the bucket to facilitate the entry of the beetle and weevil in to the trap.
- The pheromone lure is to be hung inner side of the bucket.
- Add food bait containing 200 - 300 g of fresh coconut petiole/ sugarcane pieces mixed in one litre of insecticidal solution (0.05% carbofuran 3G) in to the bucket.