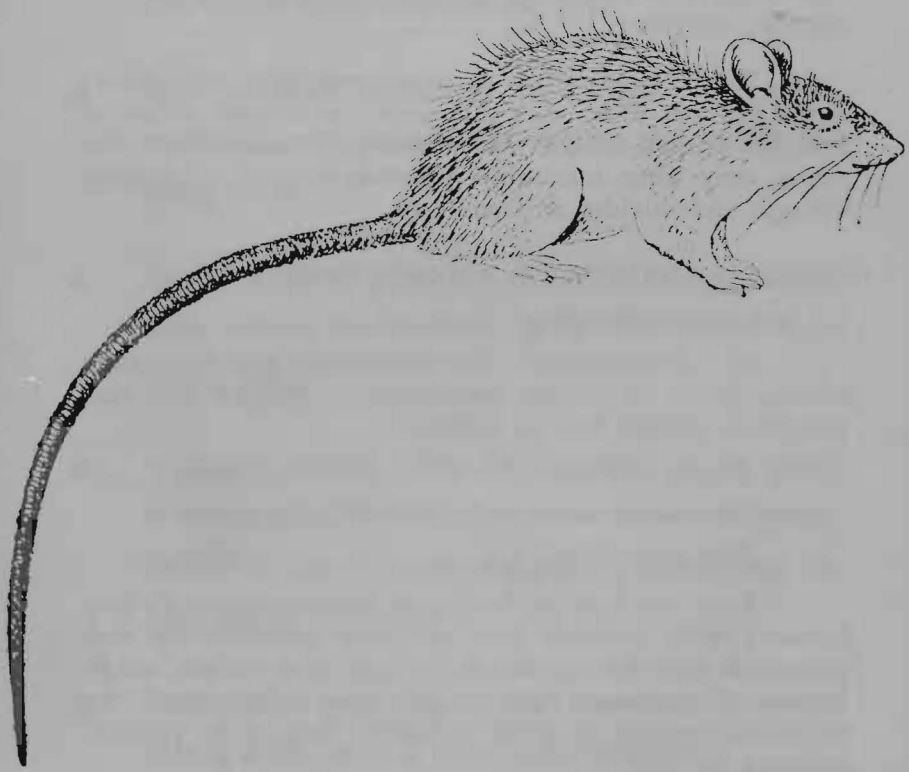
Extension Folder No. 1

Rodent Pest Management in Coconut and Cocoa



CENTRAL PLANTATION CROPS RESEARCH INSTITUTE
Kasaragod 670 124, Kerala, India

RODENT PEST MANAGEMENT IN COCONUT AND COCOA CROPS

It is estimated that on an average about 70 per cent of cocoa and 20 per cent of coconut are lost due to rodent attack in this country. In islands like Minicoy (Lakshadweep) and Car Nicobar, the damage by rodents to coconut crop reaches even upto 55 per cent.

Ten rodent species infest coconut and cocoa and out of them the Black rat, Rattus rattus wroughtoni *and the Western Ghat squirrel,* Funambulus tristriatus *constitute about 60 and 22 per cent respectively of total rodent population. Besides these two, House rat,* Rattus rattus rufescens *also damages coconuts and cocoa pods, if plantations are in and around residential complexes. The lesser bandicoot rat* (Bandicota bengalensis), *larger bandicoot rat* (B. indica) *and Indian gerbil* (Tatera indica cuvieri) *are three rodents which damage cocoa pods and coconut at nursery stage. The long tailed tree mouse* (Vandeleuria oleracea) *and field mouse* (Mus booduga) *confine their attack to cocoa and coconuts respectively. Besides rodents, the bats like flying fox* (Pteropus *sp.*), *short nosed fruit bat* (Cynopterus sphinx) *and Indian false vampire bat* (Megaderma lyra) *and shrew* (Suncus murinus) *also cause loss to ripened cocoa pods or tender coconuts.*

BASICS OF RODENT PEST CONTROL

- Do the control operations with pesticides or trapping in a large area of plantations or residential complexes. Control operations carried out in a smaller area will result in re-infestation of rodents from adjoining fields.

- Apply rodenticides intermittently (after a gap of three to six months) to avoid problems like resistance and bait shyness among rodents.

- For squirrels set up poison baits or traps in the early morning hours, whereas for bandicoots, gerbils and rats, do it in evening hours.

- In coconut monocrop, keep the traps/baits on the crowns of infested palms, because, rodents seldom come to the ground. However, in case of coconut-cocoa cropping systems, keep the baits/traps on cocoa trees.

- Remove rodent nests from coconut crowns and do general cleaning of the crowns to reduce rodent infestation.

MECHANICAL METHODS OF RODENT CONTROL

Wooden life traps can effectively reduce rodent numbers particularly squirrels. Trapping of about 5000 rodents from about 100 farmers' fields near Kasaragod and Mangalore has resulted in increase in production of cocoa by about 5 to 10 times and coconut by about 20 per cent.

Iron snap traps, death fall traps (for porcupines), bow traps and Thanjavur rat traps are also effective in trapping rodents.

Trunk banding of coconut trees with aluminium bands (30 cm wide × 0.15 mm thick) at a level of 2.5 m from the ground reduces rat infestation considerably. But do it only after maximum possible control of rodents through rodenticides or traps.

CHEMICAL METHODS OF RODENT CONTROL

1. With acute rodenticides

(i) *Zinc phosphide:* This rodenticide kills burrowing rodents (such as gerbils, bandicoots). Prepare the zinc phosphide poison bait as follows:

Broken rice/wheat	95 parts
Coconut oil/any other edible oil	3 parts
Zinc phosphide	2 parts

Give two days pre-baiting of rodent burrows (5 gm/burrow) with ordinary bait and then introduce the zinc phosphide baits for one day at the rate of 6–10 gm/'active' burrow of rodents. As it is highly toxic, insert them deep inside the burrows to avoid accidental feeding by poultry, livestock or wild life.

(ii) *Aluminium phosphide* (Celphos tablets): Place 1.5 gram tablet in the burrows in case of smaller rodent species like gerbils, mice and rats, whereas to control bandicoot rats apply 3 gm tablet/'active' burrow. Seal open burrows with wet soil after inserting this fumigant.

2. Anticoagulants

Warfarin (trade name–Rodafarin) in the wax cake form can be effectively used to control rodents inhabiting coconut crowns or damaging cocoa crops. Prepare warfarin wax blocks as follows:

Warfarin powder	5 parts
Crushed rice/wheat	90 parts
Coconut oil/any other edible oil	3 parts
Jaggery	2 parts

After mixing all these ingredients in a 5 cm deep tray (1 m × 0.75 m), add enough molten wax and mix with a wooden spoon and spread the mixture in a tray. The entire cake is cut into 5 cm cube pieces. Apply 4–5 such pieces directly in the rodent infested crowns of coconut trees. In case of cocoa crop, bait stations made up of bamboos, wood or metal sheets can be used to keep similar quantity of poison baits. Thirty such bait points per hectare should be established for the effective control of rodents.

Besides warfarin which is a multiple dose anticoagulant rodenticide (showing its effectiveness only after 5–6 days' period), two other new generation single dose anticoagulants like bromadialone and broadifacoum also are effective, but are yet to be marketed in India.

PRECAUTIONS

* Mix poison baits in correct proportion and maintain correct effective concentration to obtain better results.
* Insert zinc phosphide baits deep inside the rodent burrows to avoid poisoning to non–target animal species.
* Poisoned dead rodents should be buried deep in soil to avoid secondary poisoning to carnivorous animal species.
* Un–consumed poison baits should be collected and incinerated or buried deep in the soil.
* The fleas, if any, are seen on the dead or live trapped rodents, should be killed with an insecticide.
* Use handgloves and mask while mixing rodenticides and fumigating burrows.
* Keep rodenticides out of reach of children, livestock, poultry and birds.
* Keep aluminium phosphide away from fire since it is inflammable.

FIRST AID AND ANTIDOTES

In case of accidental ingestion of zinc phosphide poison or bait, immediately induce vomiting by giving mustard emetic. Then give a dilute warm solution of potassium permanganate. A few minutes later give a dilute solution of copper sulphate. Purgatives like epsom salt (5 gm) also helps the patient in recovery. As soon as possible take the patient to a physician.

For warfarin poisoning, a doctor should be called immediately. Vitamin K injection is the antidote for this poison.

BIO CONTROL OF RODENTS

Some of the animal species like varanids, harmless snakes, owls, cats, eagles, falcons and vultures regulate the rodent population to a certain level. Therefore, indiscriminate killing of these animals should be avoided.

CALENDAR OF RODENT CONTROL OPERATIONS

Pre Control :

1. Survey and assess the damage by counting damaged nuts and cocoa pods.
2. Estimate manpower, bait material and rodenticide requirements.
3. Form operational squads with detailed instructions.

Control :

With acute poisons (for burrowing field rodents only)		*With anticoagulant poisons* (for houses as well as plantations)	
1st day	– Start pre-baiting with ordinary bait	1st day	– Place 4-5 pieces of warfarin (5%) wax cakes/infested trees (30 trees/ha) or establish bait stations in houses (3-4 / house; 300 gm each) or on cocoa trees.
3rd day	– Mix 2% zinc phosphide to prepare poison bait; 6 gm/ burrow application	2nd to 7th day	– Replenish the consumed poison bait with freshly made bait. Disposal of dead rodents.
4th day	– Close all rodent burrows	8th day	– Harbourage removal, crown cleaning, improvement in sanitation.
5th day	– Fumigation of open rodent burrows with 1.5 to 3.0 gm celphostablets/burrow		
6th & 7th days	– Collection and disposal of dead rodents.		

Post control :

1. Harbourage removal, improvement in sanitation and crown cleaning.
2. Estimation of rodent damage to coconuts and cocoa pods and evalution of effectiveness of entire operation and cost benefit ratio.

Published by

K. V. AHAMED BAVAPPA
Director
Central Plantation Crops Research Institute
Kasaragod 670 124, Kerala, India

Text prepared by

RANJAN ADVANI

Mathrubhumi M M Press, Calicut.