

COCONUT

The coconut crop is attacked by several pests. The Central Plantation Crops Research Institute (CPCRI), Kasaragod has developed an integrated pest management (IPM) technology.

RHINOCEROS BEETLE (*Oryctes rhinoceros*)

This is one of the major insect pests of coconut palm. The adult beetle damages the palm by boring through the unopened spindle, inflorescences and petiole. The damage of spindle on unfolding presents the typical 'V' shaped geometric cut pattern. The IPM package includes:

- By using a beetle hook, extract adult beetles, during the peak period of pest abundance (June-Sept.) from crown of all the palms. Holes should be filled with Dithane M-45, 3 g mixed in 1 kg fine sand.
- Treat all possible breeding sites of the insect (Farm Yard Manure dump, fallen coconut logs, etc.) with 0.01% Carbaryl (50% WP) on w/w basis.
- Dispose of all breeding grounds of beetle.



Adults of Rhinoceros beetle



Characteristics 'V' shaped cut caused by Rhinoceros beetle

- As a biological suppression of the pest, release 10–15 beetles inoculated with *Oryctes* virus in one ha of garden. During monsoon period, apply 5×10^{11} spores of *Metarhizium anisopliae* fungus/cubic meter area of the breeding site of the pest.
- Carry out leaf axil fillings with 12 g naphthalene balls/palm covered with sand at 45 days interval.
- Set up breeding traps using decaying organic debris treated with 0.1% Carbaryl 3–4 times a year.

RED PALM WEEVIL (*Rhynchophorus ferrugineus*)

Red palm weevil is a serious tissue borer pest of the coconut, capable of causing damage to the crown and bole regions of the palm. Infestation, if undetected, kills the palm outright by toppling the crown. All the stages of the insect are completely hidden inside the palm. The apodous grubs are the damage inflicting stage. *IPM* package includes:

- Clean palm crown periodically to avoid decaying of organic debris by cutting and splitting. Burn red palm weevil infested palms.
- Treat the wounds on the palm with Coal tar + 1% Carbaryl or 0.1% Endosulfan.
- Treat bud rot and leaf rot diseases with recommended fungicides and insecticides. While cutting the leaves, leave 120 cm long petiole.

Prophylactic leaf axil filling with 20 g Phorate (10 g in 200 g of fine sand) or with 250 g marotti oil cake + 200 g of fine sand in leaf axils around spindle during May, September and December.

- Adopt curative treatment of infested palms with 0.1% Endosulfan/ Dichlorvos or 1% Carbaryl. Introduce the chemical into the palm by a funnel inserted into a hole drilled slantingly downward on the stem at about 15 cm above the infested portion. After the chemical application a 45 days waiting period must be given for harvest.
- Trap floating population of the weevil by using coconut logs treated with fermented toddy (@ 10 traps/ha) or with mud pots containing sugarcane molasses 2.5 kg or toddy 2.5 lit + acetic acid 5 ml + yeast 5 g + longitudinally split tender coconut stem/logs of green petiole at the rate of 75 numbers/ha. The traps should be kept in the evening. Trapped weevils must be killed next day morning.
- Set up pheromone traps. Use Five litre plastic bucket and make four windows (2.5 × 5.0 cm) equidistantly just below the upper rim of the bucket. Stick jute cloth (gunny) on the outside of the bucket to provide better grip for the attracted weevils to get into the bucket.

Hang the pheromone lure on the inner side of the lid using a metal wire. Provide a food bait of pineapple 100 g or 100 ml of toddy, yeast 2 g or jaggery and carbaryl 5 g mixed in 1 liter of water in the bucket. Hung the traps at about 1.0 to 1.5 m above the ground. Undertake once in a week, servicing of the traps and replacing it with fresh food bait. One trap per hectare is recommended, and the trap should be shifted from place to place. Placement of the traps on young palms (less than 10 year old) should be avoided.

LEAF EATING CATERPILLAR (*Opisina arenosella*)

In certain areas, leaf eating caterpillar is a major endemic pest. The larvae of this insect feed on the undersurface of the leaflets within silken galleries resulting in considerable reduction of photosynthetic area. This leaf-eating caterpillar can be managed by biological control methods. In an epidemic outbreak, IPM method as recommended below should be followed.

- Cut and burn badly infested outer leaves/leaflets.
- Spray less toxic insecticide like 0.02% Dichlorvos, when the pest is in active larval stage.

- Release larval parasitoids *Goniozus nephantidis* @ 20.5%, pre-pupal parasitoids like *Elasmus nephantidis* @ 49.4% and *Brachymeria nosatoi* @ 31.9% respectively at fortnightly intervals depending on the larvae, pre-pupal and pupal population of *Opisina*.

ERIOPHYID MITE (*Aceria guerreronis*)

The mites are very small (about 250 microns in size) and harbour on the tender meristematic regions of the nuts underneath the perianth. The mites suck the sap from the tender nuts resulting in appearance of elongated triangular white patch below the perianth, which first becomes pale yellow and with the advancement of the mite infestation to brown. Severe infestation leads to poor development of the nuts with reduced kernel weight and poor quality fiber. The following measures should be adopted:

Chemical Pesticide

Spray micronised Wettable Sulphur at 0.4% concentration or 0.2% Triazophos or 0.1% of Endosulfan or Dicofol or 0.05% Carbosulfan.

Botanical pesticides

Spray 2% Neem oil, Garlic and soap mixture or 0.004% Azadirachtin. Prepare Neem oil, Garlic and soap mixture (Neem oil–20 ml, cleaned garlic pearls–20 g, washing soap–5 g, water–1 liter). Dissolve the soap in 500 ml of water, add neem oil to this solution and mix it well until emulsification occurs. In another 500 ml water, mix the well ground garlic and add this to the soap-neem oil by sieving through a cloth. Stir the whole contents well. Spray it on the same day.

The mite colonies are harboured on the inner soft tissues of the developing nuts covered by the perianth. Therefore, pesticide spray should be focused on the perianth regions from the top to provide the maximum possible accessibility to the perianth lobes through capillary action. The droplet of spray should be fine and about 250–500 ml/palm of spray solution is sufficient. Nuts of 2–7 months alone need to be sprayed during April–May, Oct.–Nov. and Dec.–Jan., in such a way that all mite infested palms in an area are covered at the shortest possible interval. Mature bunches should be harvested before the pesticide application. Unpollinated bunches should not be sprayed.

For more details contact:

Director
Central Plantation Crops
Research Institute (ICAR)
Kasaragod 167 124
Kerala