

Red palm weevil—a dreaded enemy of coconut palm*

THE coconut palm is one of the major plantation crops. It plays a vital role in the economy of our country. It is intensively grown in the states of Kerala, Mysore, Tamil Nadu, Andhra Pradesh, Orissa, Gujarat, Assam and West Bengal.

Coconut cultivation too, however, is not without hazards. It is subject to attack by



Symptoms of infestation by red palm weevil

a variety of insect pests. The 'red palm weevil' (*Rhynchophorus ferrugineus*) is one of the four major pest enemies of the coconut palm. This is a pest not only of coconut but also of date palms in Punjab.

Red palm weevil is an internal tissue feeder capable of outrightly killing the palm. This happens, when the pest has gained access to the growing point or cabbage-portion of the palm and damaged it. If timely curative control measures are not adopted, the death of the palm is almost sure.

Important symptoms

The pest is generally seen in the internal tissues of the trunk, leaf stalk or crown. The external symptoms of infestation are not easily detectable at early stages. Quite often the infestation is detected only when the crown of the palm is toppled down. However, certain external symptoms can be observed singly or in combination on infested palms. Yellowing and wilting of leaves of the inner and middle whorls, toppling of the crown, presence of small circular holes on the stem, oozing out of a brownish black viscous fluid from the holes, easy coming out of leaves when handled, longitudinal splitting of leaf bases, ex-

*V. A. Abraham and G. B. Pillai, Central Plantation Crops Res. Inst., Kasaragod and Chandy Kurian, Central Plantation Crop Res. Stn., Kayangulam. Adapted partly from: "Note on an effective method of preventing entry by red weevil, *Rhynchophorus ferrugineus* F. (Curculionidae: Coleoptera) into the stem of coconut palm through cut petioles" by V. A. Abraham (1972), *Indian J. Agric. Sci.* 41 (12): 1130-1131, (ii) "The enemy that strikes to kill" by C. Kurian and J. Antony (1957), *Bull.* 11 (5): 184-190, and (iii) "Investigations on the pests of coconut palm part IV; *Rhynchophorus Ferrugineus* F. by K. K. Nirula (1956), *Indian Coconut J.* 9(4): 229-247 and 10 (1): 28-44.

trusion of fibres chewed up and left behind by the grubs in the tunnels, emission of a characteristic odour from the damaged portion of the crown, presence of cocoons or adult weevils or chewed up fibres in leaf axils or at the base of the palms on the ground are the chief symptoms of attack of this pest. The gnawing sound produced by the feeding grubs inside also is generally audible when the ear is closely applied to the infested palm.

Biology of the weevil

Female weevil lays eggs in the leaf axils or in wounds in the stem or leaf stalk. The plant sap oozing out from the wounds attracts the weevil for oviposition. They prefer to deposit eggs in the broken and exposed plant tissues. The eggs are creamy white in colour, elongate oval in shape and measure 2.62 mm. in length and 1.12 mm. in breadth. The eggs hatch out in two to three days and the young grubs start feeding by tunneling into the soft tissues of the palm. They progress by making tunnel in the tissues and plugging the hole with chewed up fibres. Grubs attain full growth in 36 to 78 days, with an average of 55 days and thereafter undergo pupation. When about to pupate, the grubs construct fibrous oval cocoons within which the pupal stage is completed. The cocoon can be seen inside the tunnels or in leaf axils. Pupal period ranges from 12 to 20 days, with an average of about a fortnight. Adult longevity has been found to be 76 days for females and 113 days for males. Male weevils can be distinguished from females by the presence of a tuft of fine brownish hairs on the dorsal side of the forwardly directed snout. A female weevil lays as many as 204 eggs during its life span.

Nature of damage

Red palm weevil infestation is generally severe on coconut palms of the age group of

5 to 20 years. The attack of this pest falls under three categories, viz., crown attack, stem attack and hole attack. The crown is subject to injuries by the attack of rhinoceros beetle (*Oryctes rhinoceros*), or due to incidence of bud rot or leaf rot diseases. This type of weevil infestation will be more serious, since the young grubs hatching out from the eggs can easily tunnel and get access to the growing point or cabbage portion within a short period. In the latter two categories of infestation, eggs are laid on stem or bole, especially in portions injured by the cultural operations or other mechanical means. Bole attack will be more severe in the case of young palms.

CONTROL MEASURES

The pests can be controlled by adoption of prophylactic and curative control measures. Periodic examination of all palms below the age group of 5 to 20 years is the first and the foremost step. Examine the leaf axils to detect the presence of adult weevils or fresh incidence. Maintenance of plant and field sanitation is essential. Dead and badly infested palms which are beyond recovery should be cut and burnt to check further spread of the pest.

Cut ends of petioles and other wounds, such as, those caused by rhinoceros beetle attack or lightning strike, bud rot and leaf rot diseases, steps cut on the palm trunk for easy climbing by climbers and cultural operations, etc., are the favourite sites of oviposition by the weevil. Application of BHC or coal tar plus BHC at the wounds has been found to check laying of eggs by the weevils at such sites.

The common practice of cutting green leaves of coconut palms, which are in great demand for various domestic uses, such as, thatching, fencing etc., exposes the plants to

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(i) Use of improvised brood-lac containers for inoculation. Use of 60-mesh brass wire-gauze containers and woven grass or bamboo baskets to contain the brood-lac for entrapping the lac enemies and allowing the crawlers to swarm out. To reduce the cost, however, brass wire-gauze containers have recently been replaced by those made from synthetic netting.

(ii) Hand picking of predatory caterpillars and pupae, especially from bushes, once only at the time of their peak incidence in the month of September has been recommended.

2. CHEMICAL : Insecticides, namely, endosulfan and dieldrin have been found to be selective in their action. These have proved harmless to the lac insects even in their early

stages but lethal to the predatory caterpillars both under laboratory and field conditions. Endosulfan has been recommended as a spray.

3. BIOLOGICAL : This includes following important steps :

(i) Thuricide R, a commercial preparation based on *Bacillus thuringiensis* has been found selectively effective in the control of predatory caterpillars without adversely affecting the lac insects or the parasites of lac predators.

(ii) Parasites of the predators, namely, *Bracon greeni*, *Elasmus claripennis* and *Apanteles tachardiae*, have been found useful for their inundative releases in the fields.

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the the danger of oviposition by red weevil and subsequent entry of hatching grubs into the stem through the tunnels made in the petiole. Red weevil grubs hatching out from eggs laid at cut ends of leaf stalks will not be able to make their way into the trunk before the staying petiole dries up, if leaves are cut at or beyond a length of 120 cm. from the stem.

Filling of all the leaf axils of young palms with a mixture of 250 gm. of BHC (5%) dust and an equal volume of sand, thrice a year in April, August and December has been found to protect the palms against this pest.

An infested palm can be saved by adoption of the curative chemical measures. As stated earlier, timely detection of infestation is an essential pre-requisite for this method of control. Coconut palms being a single budded plant, the bud once damaged by the pest will not grow again. Hence early detection of infestation and immediate insecticidal treatment are necessary to save the palm. The use of Pyrethrins-piperonyl butoxide (Pyrocon-E

2/20) 10 ml. in 1,000 ml. water has been found to give a effective control. Carbaryl (Sevin 50% W. P.), 20 gm. in 1000 ml. water has been found to be an equally effective and economical substitute to Pyrocon-E. A specially devised funnel and an auger (15 mm. in diameter) are required for the purpose. Plug all the holes on the stem, using cement mortar or clay and make a fresh hole using the auger on the stem just above the infested region. If this part is in the leaf-axil, remove two or three leaves with the leaf bases. Insert the tail of the funnel into the newly made hole and fix it in position. Pour the insecticide suspension into the funnel. The fluid will gradually percolate into the tunnels and come in contact with the immature stages of the pest. It may take nearly one to two-and-a half hours for the percolation of the entire insecticide suspension. Remove the funnel and plug the hole with cement mortar or clay. Carefully examine the treated palm after a week. If there is any further oozing out of the brown viscous fluid from holes or any other symptom of presence of the pest, then a second injection may be necessary.