

Management strategies to knock down red palm weevil infesting coconut

● Josephraj Kumar A*, Chandrika Mohan, Anjali A.S, Sunny Thomas, Shanavas M

ICAR-CPCRI, Regional Station, Kayamkulam, Krishnapuram -690 533, Kerala

Coconut is a versatile and small holder crop securing the livelihood of about 12 million farm families in the country. Being synonymous to every household in Kerala, coconut forms an integral component in their cuisine. In the recent past, incidence of red palm weevil has been quite predominant, inflicting loss as high as 3-5% in certain pockets of Kerala particularly in regions prevalent with root (wilt) disease.

Reasons for red palm weevil upsurge

The reasons attributed to the recent flare up of the pest problem are

1) Unscientific upkeep of coconut palm following close spacing (less than 7.5 x 7.5 m) with palms receiving improper and inadequate light.

2) Rampant injuries caused by rhinoceros beetle feeding damage, diseases such as leaf rot and bud rot emanating volatiles orienting the adult red palm weevils for egg laying on the damaged tissues.

3) Frequent injuries by human intervention such as cutting steps for climbing and damaging palm trunk by piercing with billhook etc.

4) Cutting petiole close to the trunk and improper crown management.

5) Shallow planting and water stagnation in palm basin during monsoon season inducing root rotting.

6) Deteriorating palm health due to root (wilt) disease.

7) Inadequate knowhow about the pest by the farming community.

8) Retention of crown toppled palms in the garden encouraging weevil dissemination.

9) Unscientific way of tapping coconut inflorescence.

10) Unhygienic farm and palm management inciting weevils for egg laying.

Why farmer's panic?

When a high yielding palm in front of the house is toppled all of a sudden, the farmer feels upset. This is because many times farmers fail to identify the latent feeding damage by the pest which needs a skillful and trained eye for early detection and a close association with the palms by a farmer is found essential. Even death of one palm in every 100 palms is rated as a threshold limit in this case. Being an indigenous pest, prevalence of red palm weevil is most likely in this part of Kerala as long as the coconut palms prevail thereby ensuring biotic balance. As mosquitoes are closely associated with mankind especially in the filthy environment, so is the incidence of red palm weevil closely linked with coconut as the entire life cycle (egg, grubs, pupae and adult weevils) sustains within the palm. As mosquitoes orient towards unhygienic situation, adult red palm weevils are mostly oriented towards injuries encountered on the palm. A trained eye for early detection and simple



Injury on palm trunk



Retention of crown toppled palms



Weevils surviving on collapsed crown



Crown entry



Leaf axil entry



Bole entry

avoidance of palm injuries insulates pest avoidance in the garden.

Modes of entry

Three modes of entry of red palm weevil are documented hereunder

No.	Entry mode	Linking factors / Pre-disposing factors
1	Crown entry	Damage by rhinoceros beetle, lightning and diseases such as leaf rot and bud rot. Palms with root (wilt) disease and deteriorating health.
2	Leaf axil entry	Dislocation of bunches due to heavy bearing particularly in dwarf genotypes and hybrids. Cutting petiole close to trunk and damage/injuries to leaves during harvesting operations
3	Bole entry	Shallow planting, planting in ill-drained soils, injury by tractor drawn farm implements

In a recent survey undertaken by ICAR-CPCRI scientists at Pollachi, Coimbatore District, Tamil Nadu, it was observed that palms with root (wilt) disease encountered higher incidence of red palm weevil (>5%) damage in comparison to healthy coconut palms (<0.25%). This is a clear indication of health deterioration in diseased palms well diagnosed by the weevil to hasten up the decomposition process during the course of feeding.

How to sensitize?

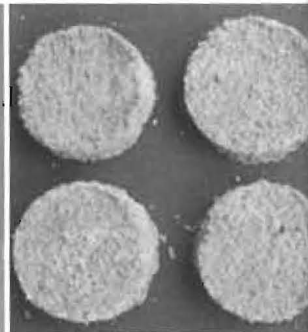
Farmers need not be panic as long as he understands the early diagnostic symptoms of red palm weevil infestation. This skill cannot be acquired all of a sudden but a routine and systematic inspection of crown, leaf axils and bole region of palm systematically could expose a farmer to understand the symptoms in advance. This routine inspection has failed in the coconut production system leading to the flare up of the pest and farmers are hereby advised to diagnose the following symptoms in advance

- Splitting of petiole at the base of trunk due to pest entry and subsequent feeding
- Abnormal un-gripping of leaf petiole from the trunk surrounding the base of the bunch
- Abrupt yellowing of leaves around mid-whorl region
- Choking and drying of spear leaf region
- Presence of bore holes and oozing fluid from the trunk
- Gnawing sound of grubs when heard through the trunk
- Injury/ damage in juvenile palms as the weevils prefer dwarf and juvenile palms aged 5-15 years for egg laying.

Though the crown collapse appears all of a sudden the feeding grubs would have fed for a period not less than 60 days in more than 50 numbers to kill the palm possessing a single apical meristem. There has been enhanced preference among farmers for planting dwarf genotypes for early bearing as well as disease resistance. When dwarf palms are planted on a large scale, they are relatively more susceptible to red palm weevil attack than the tall genotypes. It doesn't mean dwarfs are not preferred, but dwarfs need more systematic care for field establishment and early bearing.



Sachets containing chlorantraniliprole



Botanical cake developed by ICAR-CPCRI



Petiole splitting



Presence of bore holes



Oozing of brownish fluid

Approaches for red palm weevil management

Cultural

a) Close scrutiny and regular inspection of palms at all vulnerable points of entry (Crown, leaf axil and bole region) for early diagnosis. Early morning time can be best utilized for scouting.

b) Haphazard planting of coconut anywhere within the garden is not advisable. Planting coconut with correct spacing (Tall 8 x 8 m; Dwarfs 7x7 m) and proper light is very critical for adequate growth and pest repulsion. Never plant seedlings beneath big trees. Closer spacing infuses more volatile cues favouring the pest orientation.

c) Avoid physical injuries on palms and always cut petiole 1.2 m away from trunk. Palm and farm hygiene are very important practices for pest avoidance.

d) Constant vigil and prophylactic treatment for rhinoceros beetle damage, leaf rot and bud rot diseases are preferable.

Ecological

A pest suppressive coconut-based agro-ecosystem could be designed through ecological infrastructure within the cropping system such as defenders, volatile cue repulsion, refuge site, predatory birds etc. Such crop-habitat diversification approach could avoid pest entry into the system through stimulo-deterrent diversionary strategy. Growing intercrops such as nut meg, rambuttan, curry leaf, papaya, banana etc. distracts weevils from egg laying in coconut due to volatile confusion in host location.

Crop-habitat diversification technique

Botanical/Chemical

Prophylactic leaf axil filling with 250 g neem cake/ maroti cake / pongamia cake along with equal volume of sand and placement of two naphthalene balls on top-most two leaf axils repelled rhinoceros beetle. In addition, placement of two perforated sachets containing chlorantraniliprole (3 g) or fipronil (3 g) or botanical cake developed by ICAR-CPCRI was found effective during monsoon phase.

Spot application of imidacloprid 0.02% (1ml per litre) or indoxacarb 0.04% (2.5 ml per litre) was found effective in pest suppression on infested palms and the growing point recovered swiftly. Residue of imidacloprid was not detectable in nut water and nut meat up to 30 days.

Biological

Prophylactic delivery of filter paper sachets containing 10 *Heterorhabditis indica*-infected *Galleria mellonella* cadavers in combination with botanical cake on the leaf axils could reduce 35-85 % rhinoceros beetle attack and shielded palms from red palm weevil invasion during monsoon period.

Semiochemicals

Pheromone traps @ 1 trap / ha could catch more weevils when installed in community mode under strict precautionary measure and should not be attempted by individual farmer. Care should be taken for timely servicing of food baits and traps are to be placed at the corners of the field preferably on separate poles. In Kerala conditions, where palms of different age groups are available within a homestead, it can be avoided. However, in plantations of uniform age, it can be recommended as a component of IPM but never advised as a sole mode of management. Palms adjacent to the pheromone traps need to be meticulously monitored for pest attack.

Knowing the symptoms keenly, adoption of cultural techniques systematically and intervention using prophylactic as well as timely curative measures would reduce the incidence of red palm weevil. ■

*Author for correspondence : joecpcr@gmail.com; 09447978662