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Rugose Spiralling Whitefly: An Invasive Pest of Coconut in India

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INTRODUCTION

Indian economy is mainly based on agriculture sector contributing 15.2 per cent of India's gross domestic product (GDP) which provides employment to 42 per cent of the countries workforce. During 1990-92, economic reforms paved way for globalization which led to the introduction of certain plant, insect and pathogen species to new localities. Such non-native species are termed as Alien species. Coconut eriophyid mite, *Aceria guerreronis* Keifer, Asian grey weevil, *Myllocerus undatus* Marshall, inflorescence moth, *Batrachedra arenosella* and spiralling whitefly, *Aleurodicus dispersus* Russell are a few exotic pests that have challenged coconut industry during its initial phase of entry into the country. A recent invasion of rugose spiralling whitefly, *Aleurodicus rugioperculatus* Martin was reported in Pollachi (Tamil Nadu) and Palakkad (Kerala).

Taxonomical classification

Kingdom	:	Animalia
Phylum	:	Arthropoda
Class	:	Insecta
Order	:	Hemiptera
Family	:	Aleyrodidae
Genus	:	*Aleurodicus*
Species	:	*Aleurodicus rugioperculatus*

Identification

The rugose spiralling whitefly can be easily identified under field conditions by its larger size as compared to commonly found whitefly species in India. It colonizes underside of the leaves with white waxy matter dispersed in a spiraling pattern. In males, at the tip of the abdomen, a pair of sword – like structure can be seen. Adults have grayish eyes with white body which looks like a small moth.

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Elliptic and yellowish eggs are laid in a spiral manner with deposits of white flocculent waxy material surrounding each egg. Nymphs are oval in shape with white waxy material all over the body. White coloured pseudo-puparium represents the final nymphal stage.

Biology

Rugose spiralling whitefly is a small sap sucking insect belonging to Order Hemiptera. The adults look like a very small moth and have a body length of about 2.5 mm relatively larger than common whiteflies. Adults have a pair of irregular light brown bands across the wings with greyish eyes. The males are slightly smaller than females and have elongate claspers at the distal end of the abdomen. Females lay eggs on the underside of leaves in a concentric circular or spiral pattern. Eggs are elliptical and yellowish in colour having length of 0.3 mm with a short stalk and are associated with irregular spiralling deposits of white flocculent wax surrounding each egg in a semi-circular pattern. The spiralling of waxy material is the feature from which its common name, spiralling whitefly is derived. There are four distinct nymphal instars. The first instar nymphs called crawlers have functional walking legs and antennae. Adults emerged from the pupae through a 'T' shape exit hole on the dorsal surface of the pupae. Adults are about three times larger than the commonly found whiteflies and are lethargic in nature. The males are slightly smaller than females and have elongated claspers at the distal end of the abdomen.

Host Range

This is a polyphagous pest feeding on a wide range of host plants including palms, woody ornamentals, and fruits. ICAR-Central Plantation Crops Research Institute, Kassargod has reported *Psidium guajava; Musa sp., Myristica fragrans; Colacasia sp., Garcinia sp., Annona muricata; Murraya koenigii; Mangifera indica* and *Artocarpus heterophyllus* as alternate hosts of *A. rugioperculatus*. All life stages of this pest were noticed on coconut, banana, citrus, and custard apple, nutmeg, guava, topioca and cocoa. Hosts subjected to oviposition only comprise arecanut, neem, jatropha, mango, okra, black pepper, sapota, brinjal, cotton, maize, bajra and hibiscus.

Nature of damage

The immature and adult whiteflies siphon out coconut sap from the abaxial surface of the coconut leaflets which stress on the palms due to removal of water and nutrients. Excretion of honey dews from this body of this pest gets deposited on leaves. The severity of infestation ranged between 40-60 per cent in coconut and 25-40 per cent of leaf in banana. Complete drying of banana leaves due to this pest was also observed in several places in Tamil Nadu and Kerala. In case of severe attack, egg spirals could be located on leaf petiole as well as on tender coconuts. Honey dew excrement, being sweet and watery, attracts ants and encourages growth of the fungus, *Capnodium* sp. which causes disfigurement of leaves affecting the photosynthetic efficiency of the plant. Waxy flocculent material produced by the adult whiteflies can be another nuisance to human beings, as they get dispensed with a fluff of white dust.

Management

Rugose spiralling whitefly should be managed properly due to its polyphagous nature and wide host range. Central Plantation Crop Research Institute (CPCRI), Kassargod, has recommended the following measures for its management.

a) Strict quarantine should be enforced.
b) Avoid coconut leaves in packaging during transit from pest-infested locations.
c) Complete screening of planting materials, soil and organic matter etc. during transportation from pest-prone zones.
d) Monitor domestic quarantine and issue of strict phyto-sanitary certificate.
e) Organizing nation-wide seminars, workshops and sensitization campaigns and intensive bio-control programmes in endemic regions.
f) Application of 1 per cent starch solution on leaflets to flake out the sooty moulds.

g) Installation of yellow sticky traps on the palm trunk to trap adult whiteflies.

h) Encourage the build-up of parasitoids like *Encrasia guadeloupe* and introduce parasitized pupae to emerging zones of whitefly outbreak.

i) In severe case, spray neem oil 0.5% or complete destruction of adult and immature stages on coconut seedlings by spraying imidacloprid 0.005% to avoid spread of the pest to new areas.

j) Habitat conservation of sooty mould feeding scavenging beetle (*Leiochrinus nilgirianus*) in the palm ecosystem.

k) *Encarsia guadeloupae* Viggiani, *Encarsia noyesi* Hayat, *Aleuroctonus spp*., *Cryptolaemus montrouzieri* Muls. and lace wing, *Ceraeochrysa sp*. have been reported as major natural enemies for biological management of rugose spiralling whitefly can be encouraged.