

Invasive Pest Rugose Spiralling Whitefly (RSW) *Aleurodicus rugioperculatus* (MARTIN): Challenges and Strategies for Management

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Introduction

Rugose Spiralling Whitefly (RSW) *Aleurodicus rugioperculatus* (Martin) (Hemiptera: Aleyrodidae) is an invasive, polyphagous pest, has a high reproductive potential, short life cycle and causes positively impacted global food production and attacks a wide range of host plants including coconut, oil palm, banana, mango, citrus, guava, areca palm, sugarcane, ornamental plants, and other broad-leaved plants, etc. However, a severe infestation of the pest was observed in coconut and oil palm (Elango *et al.*, 2022). Martin (2004) first described the pest on coconut (*Cocos nucifera* L) in Belize (Sundararaj and Selvaraj, 2017). Shanas *et al.*, (2016) first reported the pest in Kerala, and RSW was also reported in Tamil Nadu, Karnataka, and Andhra Pradesh in July-August 2016 (Elango *et al.*, 2016).

Biology and identification of pest

Egg:

RSW females lay their eggs singly on the underside of leaves in a spiralling pattern that is covered with white waxy matter. Eggs are elliptical in shape, approximately 0.3mm long, translucent creamy white to dark yellow in colour, and have a very short stalk.

Immature Stages:

The crawler stage (only mobile immature stage) is the first young one to hatch from the eggs and searches for a suitable location to begin feeding by sucking plant sap through their needle-like mouthparts. After that, the Crawlers moult into immature stages that are immobile, oval, and flat at first but become more convex as their life cycle progresses.

Nymphal stage:

The size of nymphs varies according to their instar. They are translucent to golden yellow in colour and produce densely cottony wax as well as long, thin waxy filaments that become denser over time.

Pseudo-puparium:

The last immature stage, measuring about 1 mm in length, is the pseudo-puparium. This RSW stage is used for taxonomic identification.

Adults

RSW adults are roughly three times larger (approximately 2.5 mm) than common whiteflies. RSW adults are easily identified by their large size and a pair of irregular light brown bands, one medial and one apical that run across the wings. Males have long pincer-like structures on their abdomen (Kumar *et al.*, 2013).



Eggs

Crawler

Nymphs



Adult of RSW

Nature and symptoms of Damage

RSW is a sucking pest that begins by penetrating the plant phloem with their stylet and sucking the plant cell sap. The pest does not kill the host by feeding on it, but it consumes massive amounts of plant cell sap and interrupts the host's normal growth. The pest excretes honeydew on the leaves, which promotes the growth of black sooty moulds on the upper surface of the leaves and reduces the plant's photosynthesis. The honeydew-like substances also attract ants, which protect the whiteflies from predators.



Infestation of RSW and development of black sooty mould on Coconut leaves

Challenges for the Management of RSW

- The female RSW laid eggs on the undersides of the leaves.
- The presence of denser cottony white wax material with immature stages.
- Excretes sticky honeydew-like substances on infested leaves, attracting ants who protect the whiteflies from natural enemies.
- Growth of black sooty mould on sticky substances, requiring high-pressure washing and/or professional cleaning.

Integrative strategies for management RSW (ICAR-CPCRI Technical Bulletin)

- Use healthy, pest-free, and disease-free coconut seedlings. Transplanting with the affected coconut seedlings should be avoided.
- Follow the recommended spacing for coconut plantation.
- Fertilizer applications in accordance with the soil health card (soil-testing).
- Surveys and monitoring should be conducted on a regular basis (at least once a week) to allow for early detection and decision-making.
- Forced water spray on the lower surface of the leaflets can be helps to dislodge developing stages and adults of RSW.
- In whitefly-infested orchards, release parasitoids such as *Encarsia* sp., e.g., *Encarsia guadelupae* Viggani and *Encarsianoyessi* Hayat (Hymenoptera: Aphelinidae) at 100 per acre and predators such as Chrysoperla, Coccinellids at 400 per acre.
- Sooty mould feeding scavenging beetles *Leiochrinus nilgiranus* (Kaszab, 1946) (Tenebrionidae: Coleoptera) habitat conservation in the palm ecosystem.

- Important: Sooty mould (*Capnodium* sp.) growth on the leaf surface can be flaked out by spraying 2.5% maida paste solution mixed with detergent/ Khadi soap @ 5g/l. or 1% starch solution mixed with detergent/ Khadi soap @ 5g/l.
- Installing yellow sticky traps @ 10 per acre to monitor the adults of RSW those are active in the morning between 6 a.m. and 10 a.m. and in the evening dusk between 6 p.m. and 10 p.m.
- To manage the RSW infestation, spray the entomopathogenic fungus *Isaria fumosorosea* @ 5ml/l of water mixed with detergent/ Khadi soap @ 5g/l at fortnightly intervals.
- In severe cases, use only neem oil 0.5% or NSKE 5% and avoid using insecticides.
- Apply a 1% starch slurry spray to the infested plants leaves to dislodge the heavy sooty mould deposition.
- Spraying imidacloprid 0.005% or buprofezin 0.001% on coconut seedlings completely destroys RSW and immature stages.

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