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Rugose Spiralling Whitefly *Aleurodicus rugioperculatus* (Hemiptera: Aleyrodidae)

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Abstract

Rugose Spiralling Whitefly (RSW) (*Aleurodicus rugioperculatus* Martin) is an invasive polyphagous pest infecting crops like coconut, mango, guava and sapota. Feeding by this pest not only causes stress to its host plant, but the excessive production of wax and honeydew creates an enormous nuisance in infested areas. The presence of honeydew results in the growth of fungi called sooty mold, which then turns everything in the vicinity covered with honeydew black with mold.

Introduction

There are more than 442 species of whiteflies belonging to 63 genera is known from India. Rugose spiralling whitefly *Aleurodicus rugioperculatus* (Hemiptera: Aleyrodidae) was believed to have originated from Central America and its incidence is limited to Belize, Mexico, Guatemala and Florida in Central and North America. rugose spiraling whitefly has been identified on at least 118 plant species, which include a combination of edibles, ornamentals, palms, weeds, as well as native and invasive plant species (Stocks, 2012). In India it is seen in Tamil Nadu, Karnataka, Kerala, Andhra Pradesh, Goa and Assam.

Host Plants

Coconut, banana, mango, sapota, guava, cashew, maize, ramphal, oil palm, Indian almond, water apple, jack fruit and many other ornamental plants like bottle palm, Indian shot, false bird of paradise, butterfly palm (Selvaraj et al., 2017).

Bionomics

Rugose spiraling whitefly adults are about three times larger (approx. 2.5 mm) than the commonly found whiteflies and are lethargic by nature. Although taxonomic identification is required for species confirmation, Rugose spiraling whitefly adults can be distinguished by their large size and the presence of a pair of irregular light brown bands across the wings (Stocks and Hodges, 2012). Males have long pincer-like structures at the end of their abdomen.

Eggs

Females lay eggs on the underside of leaves in a concentric circular or spiral pattern and cover it with white waxy matter. Eggs are elliptical and creamy white to dark yellow in color. Adult females sometimes lay their eggs on non-plant surfaces such as cars, windows and walls.

Immature Stages

Rugose spiraling whitefly has 5 developmental stages. The first instar, known as the crawler stage (because it is the only mobile immature stage) hatches out of the egg, and

looks for a place to begin feeding with its needle-like mouth parts used to suck plant sap. Crawlers molt into immature stages that are immobile, oval and flat initially but become more convex with the progression of its life cycle (Mannion, 2010). Nymphs are about 1.1-1.5 mm long but may vary in size depending on instars. The nymphs are light to golden yellow in color, and will produce a dense, cottony wax as well as long, thin waxy filaments (Stocks and Hodges, 2012) which get denser over time. The puparium of this species is used for taxonomic identification.



Figure 1: Eggs of rugose spiraling whitefly, *Aleurodicus rugioperculatus* Martin on guava

Nature of Damage

Infestation of this pest usually does not kill the host plant, but it may interfere with the normal growth of its host. Rugose spiraling whitefly can cause stress to the plant by removing nutrients and water, and by promoting the growth of black sooty molds. The layers of sooty mold on leaves may disrupt the photosynthesis process in the host leading to physiological disorders (Stocks and Hodges, 2012). Nymphs and adults suck the sap from the leaves by direct feeding especially on underside of the leaflets. Adults produce the large quantities of honey dew excretion which in turn completely darken by sooty mold development on the upper surface of leaves and also understory crops. The typical concentric waxy spiraling symptoms were noticed on various parts of host plants including on leaf petiole and tender nuts. Waxy flocculent material produced by adults, cause nuisance to human being where heavily infested areas.

Symptoms of Damage

- Egg spirals of rugose spiraling whitefly on the underside of leaves.
- Presence of heavy white, waxy material.



Figure 2: SWF in underside of the leaves

- Presence of sticky honeydew around the whitefly infested area.
- Black sooty mold formation.
- Leaf damage and early leaf drop (not evident on all types of plants (Mayer et al., 2010).



Figure 3: Sooty mould

Mechanical Control

- Coconut leaflets can be dislodged by forced water spray, targeting the lower surface of the leaflets.
- Installation of yellow sticky traps on the palm trunk @ 15 acre⁻¹ is recommended to manage the RSW.
- Installation of yellow light traps.

Biological Control

- Encourage build-up of parasitoid (*Encarsia* sp.) in the orchards and re-introduce parasitized pupae in the whitefly-infested orchards.
- Conserve and augment predators of RSW such as *Chrysoperla* and Coccinellids, which are available in the field.
- Release 1st instar larvae of green lacewing (*Chrysoperla* sp./*Mallada* sp.) @ 4,000 acre⁻¹.
- Spray of entomopathogenic fungus *Isaria fumosorosea* @ 5 ml l⁻¹ of water mixed with detergent/ Khadi soap @ 5 g l⁻¹ can be done at fortnightly intervals to manage the RSW infestation.

Conclusion

Rugose spiraling whitefly can be controlled by the application of systemic pesticides; but it can kill the biological control agents and should be used only as a last resort. Regular survey and monitoring should be conducted at regular intervals for early detection of the pest and encouraging natural parasitoid *Encarsia guadeloupa*; setting up of yellow sticky traps helps in managing the rugose spiralling whitefly. In addition to that entomopathogenic fungus, *Isaria fumosorosea* is highly effective against the pest.

Considering the environment and human security ensured in this non-chemical approach resulting in the successful bio-control.

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