

RUGOSE SPIRALLING WHITEFLY, A NEW INVASIVE PEST, INFESTS BANANA

The rugose spiralling whitefly, *Aleurodicus rugioperculatus* Martin (Hemiptera: Sternorrhyncha: Aleyrodidae), has been recently reported from India (Selvaraj et al., 2016) from Tamil Nadu, Karnataka, Kerala and Andhra Pradesh. It is an invasive pest that attacks a wide range of host plants including palms, woody ornamentals, and fruits. Coconut and banana are among the most preferred host plants. During recent surveys done with the team from Central Integrated Pest Management Centre, Trichy, in Pollachi and nearby places in Tamil Nadu, severe infestation of this pest was observed on banana besides coconut. All the stages of the whitefly were observed on the leaves and fruits of banana. Natural enemies of this pest collected by researchers from CIPMC, Trichy, CPCRI, Kerala, and Coconut Research Station (TNAU), Aliyar Nagar, were also brought to our attention.

Origin

Aleurodicus rugioperculatus Martin was originally described from Belize (Martin 2004) and belongs to the *niveus* species-group of *Aleurodicus* (Martin, 2008). It is naturally distributed in Belize, Guatemala, Mexico (Martin, 2008) and subsequently, it has spread to 22 other countries in Central and South America, including Florida, USA. India is the only country in the Oriental region where the whitefly has been introduced.

Diagnosis

The pest is somewhat superficially similar in its habits and general appearance to spiralling whitefly (*Aleurodicus dispersus* Russell), which itself is an invasive pest that came to India in the mid-1990s. The eggs are laid in a spiralling pattern and have a very short stalk. The emerging nymph is yellowish and develops white waxy filaments later. The adult whitefly, though, is quite different from the spiralling whitefly by its much larger size and in having two pale brown wavy markings on the forewings, one medial and one apical. Martin (2008) has given a puparium-based illustrated key to separate the genera and species of Aleurodicinae including *Aleurodicus rugioperculatus*. Correct identification can be done by making permanent slide mounts of the puparium.



Various stages of rugose spiralling whitefly on banana

Host plants

It mainly infests coconut palms and other broad-leaved hosts in its native range (Martin, 2008). In our surveys, coconut, and banana were found to be common and preferred hosts and smaller infestations were observed on guava, citrus, mango, sapota, bhendi, custard apple, jatropha, and hibiscus. Severe infestation by the whitefly on coconut was observed in Kerala and Tamil Nadu. Heavy sooty mould deposition and near total drying of leaves were observed on banana in some places.



Sooty mould deposition on rugose whitefly infested banana

Natural enemies - Predators

Several indigenous predators have been observed feeding on this whitefly. Among these, *Pseudomallada* sp. (Neuroptera: Chrysopidae), *Cybocephalus* sp. (Coleoptera: Nitidulidae), *Diadiplosis* sp. (Diptera: Cecidomyiidae), *Jauravia pallidula* Motschulsky, *Scymnus nubilus* Mulsant, *Menochilus sexmaculatus* (F.) and *Scymnus coccivora* Ayyar (Coleoptera: Coccinellidae) were common and actual feeding was observed by these predators. The chrysopid and *Cybocephalus* sp. were the most predominant predators. Coccinellids including *Chilocorus nigrita* (F.), *Cryptolaemus montrouzieri* Mulsant, *Scymnus saciformis* Motschulsky, and *Sasajiscymnus dwipakalpa* (Ghorpade), were also observed on whitefly infested banana, but these were not confirmed to feed on the whitefly.



L to R: *Cybocephalus* sp., the most effective predator of the whitefly; indet. psocid



Coccinellids predatory on the whitefly (L to R: *Jauravia pallidula*, *Menochilus sexmaculatus* and *Scymnus nubilus*)



Larva and pupae of *Pseudomallada* sp. on whitefly infested banana



Larva and adult of *Diadiplosis* sp. (Diptera: Cecidomyiidae)

Natural enemies - Parasitoids

Encarsia guadeloupae Viggiani (Hymenoptera: Aphelinidae), an exotic parasitoid of the spiralling whitefly introduced in India in 1999, was found to cause 60–70% parasitism of this whitefly. Interestingly, *Encarsia dispersa* Polaszek, a species that was accidentally introduced along with the spiralling whitefly, was also found to parasitize this whitefly, albeit in much fewer numbers compared to *E. guadeloupae* and the extent of parasitism was about 5%. This species was variously referred to as *Encarsia* sp. nr. *haitiensis* and *Encarsia* sp. nr. *meritoria* by different authors. It was thought to have been competitively displaced by *E. guadeloupae* over most of South India, from where it was reported earlier.

Already *E. guadeloupae* is well established in most parts of South India where the spiralling whitefly also occurs and it appears to be keeping the new whitefly pest well under check.



Adult of *Encarsia guadeloupae* on banana



Adult of *Encarsia dispersa* Polaszek



Rugose spiralling whitefly parasitized by *Encarsia* spp.

Management

As the pest happens to be exotic, classical biological control using natural enemies from the native range of the pest seems to be the best option. The extent of parasitism by *E. guadeloupae* is high to very high in most localities where the whitefly is present and it is likely that the pest may be brought under control soon. Hence, Indiscriminate use of insecticides may be avoided so that these parasitoids and other indigenous natural enemies are not adversely affected.

The Kerala Department of Agriculture has recommended spraying a mixture of neem oil, soap, and garlic. CPCRI, Kasargod, has recommended the following measures:

- Spraying starch solution (1%) to dislodge the heavy sooty mould deposition on the leaves of infested plants.
- Use of yellow sticky traps to trap the adult whiteflies
- In case of severe infestation, spray neem oil 0.5%

References

- Martin, J.H. 2004. The whiteflies of Belize (Hemiptera: Aleyrodidae) Part 1 - introduction and account of the subfamily Aleurodicinae Quaintance & Baker. *Zootaxa*, 681, 1–119.
- Martin, J.H. 2008. A revision of *Aleurodicus* Douglas (Sternorrhyncha, Aleyrodidae), with two new genera proposed for palaeotropical natives and an identification guide to world genera of Aleurodicinae. *Zootaxa*, 1835: 1–100.
- Polaszek, A., Manzari, S., & Quicke, D.L.J. 2004. Morphological and molecular taxonomic analysis of the *Encarsia meritoria* species-complex (Hymenoptera, Aphelinidae), parasitoids of whiteflies (Hemiptera, Aleyrodidae) of economic importance. *Zoologica Scripta*33(5): 403-421.
- Ramani, S., Poorani, J. & Bhumannavar, B.S. 2002. Spiralling whitefly, *Aleurodicus dispersus* Russell (Homoptera: Aleyrodidae) in India. *Biocontrol News and Information* 23(2): 55N-62N.
- Viggiani, G. 1987. New species of *Encarsia* Foerster (Hymenoptera: Aphelinidae), parasitoids of whiteflies. *Bollettino del Laboratorio di Entomologia Agraria 'Filippo Silvestri', Portici* 44: 33-44.