

# New distributional record of Neotropical Coconut Whitefly *Aleurotrachelus atratus* (Hemiptera: Aleyrodidae) in Tamil Nadu

Selvaraj, K and Sumalatha, B.V

Division of Germplasm Conservation and Utilization, ICAR- National Bureau of Agricultural Insect Resources, Bengaluru-560024, Karnataka



## Abstract

Occurrence of Neotropical palm infesting whitefly, *Aleurotrachelus atratus* (Hemiptera: Aleyrodidae) on coconut (*Cocos nucifera*) was recorded for the first time in Dharmapuri and Krishnagiri districts of Tamil Nadu. *Aleurotrachelus atratus* is a highly invasive, oligophagous pest which prefer to feed on palm plants and mostly distributed in tropical and subtropical regions. The observed infestation level was low (less than 10 live colony or adults /leaflet) to moderate (11-20 live colony or adults /leaflet). This study also revealed the co-existence of *A. atratus* with earlier invaded whiteflies viz., rugose spiralling whitefly *Aleurodicus rugioperculatus*, Bondar's nesting whitefly, *Paraleyrodes bondari* and nesting whitefly *Paraleyrodes minei* on coconut. This quick dispersal was believed to occur through transportation of infested seedlings from pest affected areas. Strict domestic quarantine and sensitization of farmers and other stakeholders need to be advocated to avoid spread of this pest to other coconut and other palms growing areas in the country.

## Introduction

Invasive whiteflies viz., rugose spiralling whitefly *Aleurodicus rugioperculatus* during 2016, Bondar's nesting whitefly, *Paraleyrodes bondari*, nesting whitefly, *Paraleyrodes minei* during 2018 and palm infesting whitefly, *Aleurotrachelus atratus* during 2019 were invaded on coconut palms and raised biosecurity concerns in India (Selvaraj et al., 2020). They prefer to colonize on palm plants belonging to Arecaceae family. Origin of these invasive species was believed to be Neotropical regions and their interception was likely through importation of plant materials for the trade. Both nymphs and adult whitefly inflict direct feeding injury on the host plants while sucking sap which leads to excessive drains of the sap, necrosis and premature drying. Indirectly, they are producing a significant amount of honeydew which deposit on the upper even some times on lower surface of the infested plants leading to the growth of black sooty mould (Fig.1). This is the secondary infection arising out of the whiteflies infestation which is believed to interfere on plant normal photosynthesis and yield parameters.

\*Corresponding author: K.Selvaraj@icar.gov.in



Fig.1. Symptoms of damage of palm infesting whitefly on coconut



Among these whiteflies, Neotropical palm infesting whitefly, *Aleurotrachelus atratus* was recorded for the first time from India during 2019 in Mandya district of Karnataka on coconut and areca palm (*Dyopsis lutescens*) (Selvaraj et al., 2019). Subsequently it spread rapidly to adjoining districts viz., Ramanagara, Mysore, Bengaluru rural, Bengaluru Urban, Hassan, Chamrajnagar and Tumkur and extended its host ranges on areca nut (Areca catechu) and oil palm (*Elaeis guineensis*) (Selvaraj and Sumalatha, communicated). So far, this species is distributed in various coconut growing areas in Karnataka state only. Its rapid spread and establishment could affect high fecundity, high dispersal and survival ability, voracious feeder, ability to withstand many environmental conditions and benefits from mutual interaction with other insects.

This paper analyses the occurrence and spread of this species in Tamil Nadu for the first time, and its natural enemies and their interaction with other invasive whiteflies infesting coconut.

## Materials and Methods

**Survey:** Field survey was conducted in Dharmapuri, Krishnagiri, Tirupathur, Tiruvannamalai and Viluppuram districts of Tamil Nadu to assess the incidence and infestation of these invasive whiteflies on coconut and other host plants. Besides, an infested coconut leaf sample was received for identification from a farmer from Marandahalli village of Dharmapuri district. Whiteflies sample along with coconut leaves were collected in paper for further species confirmation. Whitefly species confirmation based on morphological characteristic was achieved by permanent mounts of the puparium and the best mounts were obtained from puparial cases from which adults emerged. During survey, the level of infestation was assessed by visual inspection using a qualitative scale as follows, 0-10= live egg spirals or adults/leaflet (Low); 11-20 live egg

spirals or adults/leaflet (moderate) and > 21% live egg spirals or adults/leaflet (severe). To assess this, randomly 10 leaves/palm were selected consisting of upper, medium and lower strata at each location.

Field collected infested plants were sorted out as the prevailing whitefly species-wise and placed in rearing jar (21×10 cm) separately and observed for the emergence of parasitoid adult/ predators. The emerged adult parasitoids were collected using aspirator and preserved in vials containing 70% ethanol for further identification. Assessment of parasitism (%) was determined based on the number of puparium parasitized as against un-parasitized pupae in the host leaves. Identification of natural enemies of other natural enemies such as predators was confirmed by morphological means.

## Results and Discussion

**New distributional record:** Present study revealed the presence of rugose spiralling whitefly *Aleurodicus rugioperculatus*, Bondar's nesting whitefly, *Paraleyrodes bondari*, nesting whitefly, *Paraleyrodes minei* and palm infesting whitefly, *Aleurotrachelus atratus* on coconut. Occurrence of *A. rugioperculatus* (Sundararaj and Selvaraj, 2017), *P. bondari* and *P. minei* (Josephraj Kumar et al., 2020) in the state was reported earlier. The present study revealed the presence of Neotropical palm infesting whitefly, *A. atratus* in Dharmapuri and Krishnagiri districts of Tamil Nadu. The infestation of *A. atratus* was low (0-10= live egg spirals or adults/leaflet) to



Fig 2: Co-occurring of palm infesting whitefly with rugose spiralling whitefly on coconut

moderate (11-20= live egg spirals or adults/leaflet) and it seems that pest was at initial stage of invasion. This pest population may increase during dry months (March to May) in the district based on interaction with other species. Spread might be from Karnataka through transportation of infested seedling from adjoining districts viz., Mandya and Ramanagara.

Study also revealed the co-occurring of *Aleurotrachelus atratus* with other invasive species such as rugose spiralling whitefly *Aleurodicus rugioperculatus* (Fig. 2), nesting whiteflies, *P. bondari* and *P. minei* (Fig.3). Among the species, *Aleurodicus rugioperculatus* and Bondar's nesting whitefly, *Paraleyrodes bondari* was found to be dominant with moderate (11-20= live egg spirals or adults/leaflet) to severe (30= live egg spirals or adults/leaflet) infestation and major portion of leaves infested in terms of number of colonies. These whiteflies colonizes on the under surface of the leaflets in groups, *A. rugioperculatus* and *A. atratus* has higher damage potential, produce of intense white wax which often cover entire immature stages as compared to nesting whiteflies which produce moderate wax. On the other hand, the feeding damage by the nesting whiteflies was not as intense as that of *A. rugioperculatus* and *A. atratus* with minimum honey dew and sooty mould deposits observed on coconut.

Occurrence of parasitoid *Encarsia guadeloupae* Viggiani (Hymenoptera: Aphelinidae) on *Aleurodicus rugioperculatus* was recorded with natural parasitism to the extent of 42-68% on coconut. *Encarsia guadeloupae* is the potential dominant parasitoid for *A. rugioperculatus* with 62-82% natural parasitism on coconut and many other host plants (Selvaraj et al., 2016). In case of Bondar's nesting whitefly, *P. bondari*, nesting whitefly, *P. minei* and palm infesting whitefly, *A. atratus*, no parasitism was observed so far under field conditions. Similar observation was also reported earlier in Karnataka (Selvaraj et al., 2019). These show that these invasives might have

entered into India without their natural enemy's complex and this might have favoured for severe outbreak situation in short span of time. Among predators, only a generalist predator, *Pseudomallada astur* (Neuroptera: Chrysopidae) was found to feed on *A. atratus*, *P. bondari* and *P. minei* during survey.

This quick dispersal believed to occur through transportation of infested seedlings from pest affected areas. Strict domestic quarantine and sensitization of farmers and other stakeholders need to be advocated to avoid spread of this pest to other coconut and other palms growing areas in the country.

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