



Invasion of the palm infesting whitefly, *Aleurotrachelus atratus* Hempel (Hemiptera: Aleyrodidae) in the India

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Abstract

The highly invasive whitefly *Aleurotrachelus atratus* Hempel (Hemiptera: Aleyrodidae) has been found to infest both India and the Oriental area for the first time. In the Karnataka districts of Mandya and Mysore in February 2019, the pest was discovered colonising coconut palms, *Cocos nucifera* (Arecaceae), and ornamental areca palms, *Dypsea lutescens* (Arecaceae). Whitefly specimens were gathered from afflicted palm plants, and physical traits helped identify the species. However, four predator species were detected feeding on this invasive plant, including *Dichochrysa astur* (Neuroptera: Chrysopidae), *Cybocephalus spp.* (Coleoptera: Nitidulidae), *Chilocorus nigrita*, and *Jauravia pallidula* (Coleoptera: Coccinellidae). Infestation intensity and its effects on coconut and other agricultural plants in India are discussed. Citrus whitefly is another name for this pest, which is thought to have originated in the Neotropics but is now widespread across the warmer regions of the world wherever citrus is planted.

Keywords: Invasive, Coconut, *Aleurotrachelus atratus*. Predator, Oriental region

Introduction

Invasive species, particularly those intimately associated with plants, such scale insects and whiteflies, have proliferated and spread due to the significant rise in the volume, diversity, and speed of movement of plant products throughout the world. Four recently introduced species, such as the solanum whitefly *Aleurothrixus trachoides* (Back), which feeds on 24 host plants, are known to feed on



agricultural, horticultural, and forestry crop plants in India. Other recently introduced species include the rugose spiralling whitefly *Aleurodicus rugioperculatus* Martin, which feeds on coconut and several horticultural and ornamental plants. *Aleurotrachelus atratus* Hempel (Hemiptera: Aleyrodidae), another palm-infesting, highly invasive whitefly species, was discovered in February 2019 colonising on members of the Areaceae, including coconuts (*Cocos nucifera*) and ornamental areca palms (*Dysoxylum alutescens*) in the Karnataka districts of Mysore and Mandya.

Aleurotrachelus is one of the largest genera of whiteflies, with 74 species known to exist at this time across all continents except for the Afrotropics. *A. corbetti* Takahashi, *A. longispinus* Corbett, *A. multipapillus* Singh, and *A. tuberculatus* Singh are the only four species that have been identified in India thus far. The Neotropical whitefly *A. atratus* was first identified by Hempel in 1922.

Host range

It is said to consume more than 20 different plant families, with citrus species being its clear favourite. The species was viewed as a serious economic nuisance because of its invasiveness and wide host range. *A. atratus* caused a 55% economic loss to local coconut farmers in the Comoro Islands in 2002.

Within a span of four years, four exotic whiteflies invaded in guava ecosystem. *A. floccosus* co-existence with *P. bondari*, *P. minei*, *A. dispersus* and *A. rugioperculatus*. *A. floccosus* is found to be dominant species which may replace the existing invasives and native species in the guava ecosystem by inter-specific competition.

Life cycle

A. atratus eggs and larvae are found on the underside of palm fronds, and when present in large numbers, the copious flocculent white wax covering the black pupae makes them very noticeable. The stalked eggs are at first creamy white and then change dark brown before hatching.

Puparia are elliptical, black, 1.0-1.1 mm long, with a long, white wax fringe around the border, and dorsal filaments that frequently cover the insect entirely.

Adults are different from the whiteflies that have lately invaded and are now infesting palms; they are smaller than *Aleurodicus rugioperculatus* but larger than *P. bondari* and *P. minei*, and their wings are unmarked with wavy lines. The elongate oval puparium, the marginal teeth having crenulations on their sides, the pattern of the tile-like sculpturing on the submargin, and the rounded lingula tip that is not bilobed distinguish *A. atratus* from its closely related and other recently invaded species, *Aleurothrixes trachoides*.



Total duration for the pre- imaginal development of *A. atratus* is around 48 days at 25-27 °C.

Symptoms of damage

Found primarily on the underside of leaflets where they form groups of 97 to 186 nymphs with 3 to 48 groups per leaflet. In extreme circumstances, more than 60% of a leaflet's surface area covered by nymphs causes chlorosis or necrosis, as well as a loss of vigour and drying of the leaflets. The ejected honeydew, which acts as a medium for the growth of sooty moulds, also causes indirect harm.

Natural enemies

Four species of predators such *Dichochrysa astur* (Banks) (*Mallada astur* (Banks)) (Neuroptera: Chrysopidae, *Jauravia pallidula* (Motschulsky), *Chilocorus nigrita* (Fabricius) (Coleoptera: Coccinellidae), *Cybocephalus spp.* (Coleoptera: Nitidulidae) were found feeding in the field condition. Kityo et al. (2017) reported four parasitoid species viz., *Encarsia basicincta*, *Eretmocerus cocois*, *Encarsia sp.* and *Signiphora sp.* are suppressing the whitefly population. However, in India, no parasitisation was observed on this species.

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