

Pest alert

Invasive Nesting Whitefly, *Paraleyrodes pseudonaranjæ* Martin (Hemiptera: Aleyrodidae) - a New Record to India



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Invasive Nesting Whitefly, *Paraleyrodes pseudonaranjae* Martin (Hemiptera: Aleyrodidae) - New Record to India

In February, 2025, a team of scientists from ICAR-NBAIR collected whiteflies from Golden Dewdrops, *Duranta erecta* in Bengaluru that was covered moderately in white wax and black sooty mold. Identity of species was confirmed both through their morphological and molecular characteristics at ICAR-NBAIR. The whitefly pupa after processing was identified as *Paraleyrodes pseudonaranjae* Martin (Hemiptera: Aleyrodidae) using keys (Martin, 2001; Martin, 2004). The identity was also confirmed by the taxonomist Dr. R. Sundararaj, Former Scientist-G and Head, Institute for Wood Science and Technology. Published literatures revealed that the species was known from USA (Florida), Hawaii and China (Hong Kong; Hainan Island) as a pest affecting many economically important agriculture crops. The occurrence of the species represents the first report from the Indian Subcontinent. This whitefly is native to Neotropics (Brazil) and highly polyphagous species known to infest on coconut, areca nut, guava, mango, custard apple, citrus, litchi, ficus and many ornamental crop plants. In last decade, India has witnessed the invasion two other species in this genus i.e., *Paraleyrodes bondari* Peracchi and *Paraleyrodes minei* Iaccarino which invaded during 2018. Species in this genus have been given the common name “nesting whiteflies” after the characteristic pattern of wax that forms on the leaf surface around the pupa.

Identity of species was also confirmed through molecular characteristics GenBank Accession No. PV450590.1 and PV474288.1 and the nucleotide sequences shared 100% similarity with *P. pseudonaranjae* Acc. No. viz., KP032221.1, KF595126.1 and HM150635.1 submitted from Florida and China, respectively. *Paraleyrodes pseudonaranjae* is one of the 17 species in the genus *Paraleyrodes* that occur throughout the Neotropics. Voucher specimen's permanent slides of puparia and adult male genitalia are deposited with ICAR-NBAIR repository as NIM/NBAIR/HEM/ALEU/1525. This pest alert represents the first record of the distribution of this invasive species in India.

Damage Symptoms and Coexistence: Adults and nymphs of *P. pseudonaranjae* infest and colonise abaxial leaf surface and directly harms the host plant by sucking the sap, secrete a large amount of

wax secretion and honey, which induces sooty mould affecting the photosynthesis (Fig. 1). In our observations on *D. erecta*, the pest colonies were found at moderate levels. Besides, colonies of *P. pseudonaranjae* most commonly coexist with invasive whiteflies viz., Bondar's nesting whitefly, *P. bondari* and solanum whitefly, *A. trachoides*, in *Duranta erecta* (Fig. 1). This indicates the probable simultaneous introduction of all *Paraleyrodes* spp. from the New World.



Fig.1 Symptoms and coexistence of *Paraleyrodes pseudonaranjae* on golden dewdrops: a. infested *Duranta erecta*; b and c. Co-existence *P. bondari*, *P. pseudonaranjae* and *Ferrisia virgata*; c. *P. pseudonaranjae* and *A. trachoides* adults

Life stages of *Paraleyrodes pseudonaranjae*: Adult population prefers to colonize the abaxial leaf surface and lay eggs randomly. Eggs are stalked, initially creamy white and turn to dark brown before hatching (Fig. 2a). The nymphal stages are pale yellow with wax filaments (Fig. 2b,c) and patches of broken white filaments were observed in nesting structure (Fig. 3d). Colonies of *P. pseudonaranjae* looks similar to *P. bondari* and *P. minei* in field condition. Whole life cycle is completed in about 25-32 days.

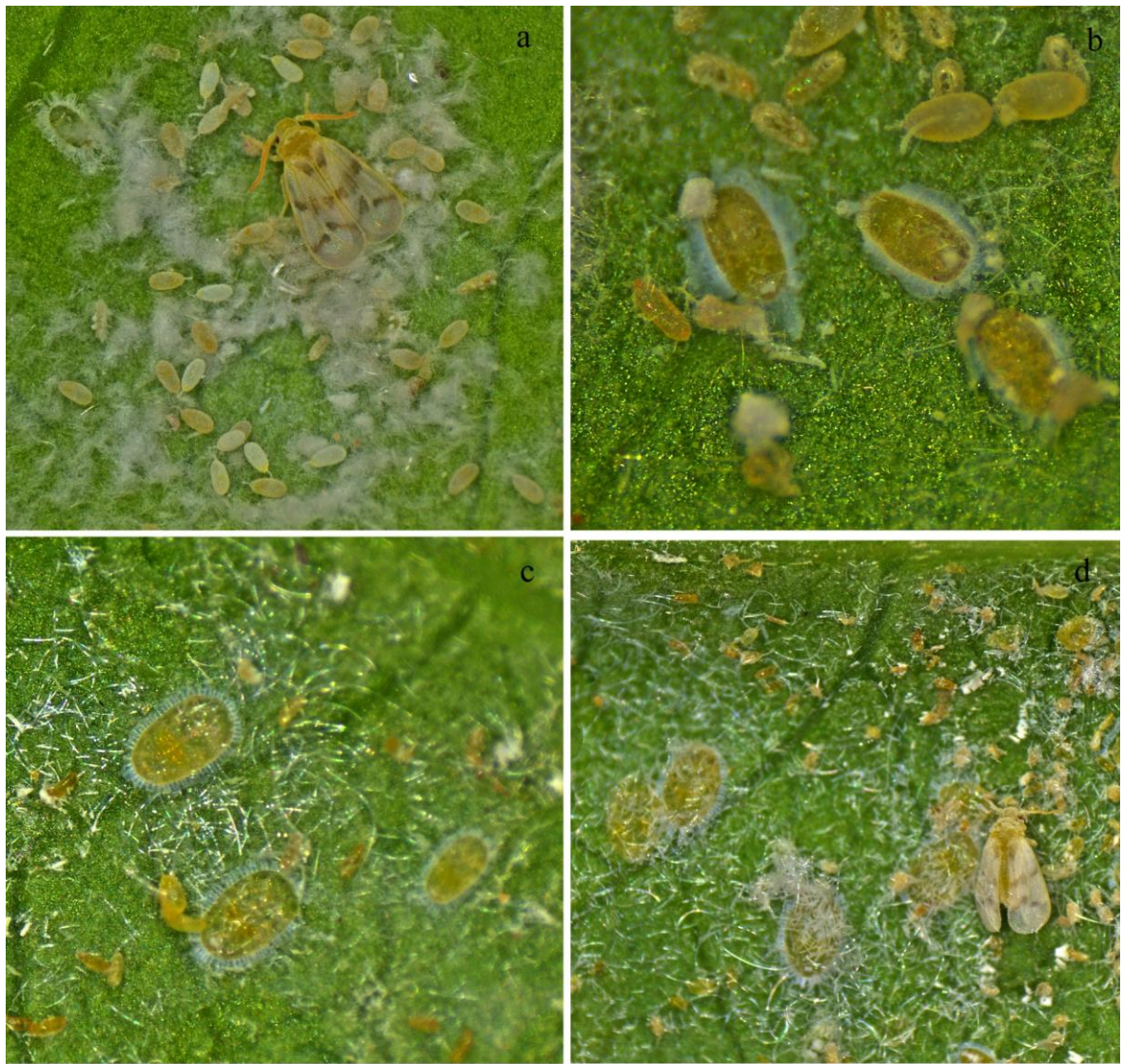


Fig. 2. Life stages of *P. pseudonaranjiae* a. egg; b&c. Different instar nymphs; d. Nesting structure with female

Diagnosis characteristics: Puparial margin smooth to slight irregular with six pairs of abdominal compound pore and a single cephalothoracic pair are present (Fig. 3a). Compound pores are subequal in size and structure; central lumen with inner annulus (ring) composed of 6 to 10 spinneret cells bearing 6-10 splines arranged radially; outer annulus faintly marked (Fig. 3b). Vasiform orifice cordate with tongue shaped quadrisetose excluded lingula (Fig. 3c). Fore and hind wings each with a single main vein, characteristic for the *Paraleyrodes* genus. Forewing has a pattern of blackish obvious near-tan spots and the base with a prominent black patch (Fig. 3d). The male genitalia distinctive with a double hooked protrusion of aedeagus in lateral view (Fig. 3e). *P. pseudonaranjiae* can be easily distinguished from all other known species of *Paraleyrodes* species from India by the

external genitalia of the male aedeagus as puparia and adult specimen's looks similar in field condition.



Fig. 3. *Paraleyrodes pseudonaranaje* a. Mounted puparium; b. Compound pore; c. Operculum; d. Adult male; e. Male genitalia

Global distribution and probable pathways of introduction to India: *P. pseudonaranjæ* is well established in Puerto Rico, Hong Kong, Hawaii and the USA (Florida). *P. pseudonaranjæ* reported to infests 37 species of host plants belonging to 20 families and 29 genera were identified; preferred hosts included *Cocos nucifera*, *Areca catechu*, *Annona squamosa*, *Citrus* sp. and *Psidium guajava*. In India, so far its occurrence was noticed in Bengaluru Urban district of Karnataka from Feb-May, 2025 on *D. erecta*. Present study indicates the probable simultaneous introduction of all *Paraleyrodes* spp. from the New World through exchange of infested plant material.

Occurrence of Natural Enemies in India: No record of parasitoid so far. However, a generalist predator *Acletoxenus indicus* was found predating on invasive *P. pseudonaranjæ*.

Economic Importance to Indian Agriculture: Apart from *D. erecta*, *P. pseudonaranjæ* can infest several important fruit crops (coconut, guava, custard) and ornamental plants if left unchecked, it could be a potential threat to many economically important crop plants in India. Keeping in view of its quarantine importance, stringent vigilance and enforcement required to contain its spread to other custard apple and host plant growing states in India.

Advisory for the Containment and Management

- Sensitize the quarantine officials across the entry ports and check multiple introductions in imports.
- Sensitize state functionaries and other stakeholders about the invasion of this exotic whitefly and its economic importance.
- Nationwide intensive survey need to be initiated to monitor and determine its distribution in India.
- Explore the potential natural enemies to develop viable biocontrol approach to tackle this pest in India.

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