

New report of Neotropical invasive Bondar's nesting whitefly, *Paraleyrodes bondari* Peracchi (Hemiptera: Aleyrodidae) from West Bengal, India

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Globalization has enhanced international agricultural trade. The movement of goods and planting materials across the countries risks the introduction of invasive pests. Despite strict quarantine measures, various insect pests have hitherto entered. The invasion causes significant losses to biodiversity and a greater impact on agriculture crop production and the economy of the country. India has witnessed the incursion of different species of exotic whiteflies (Selvaraj *et al.*, 2020) and raised biosecurity concerns.

Recently, the occurrence of invasive Bondar's Nesting Whitefly (BNW), *Paraleyrodes bondari* Peracchi (Hemiptera: Aleyrodidae) has been documented in West Bengal (22°59'31"N Latitude and 88°26'54"E Longitude). *Paraleyrodes bondari* was first described on Citrus species from Brazil in 1971 (Peracchi, 1971) and later in 2011, it was detected in Florida USA (Stocks, 2012) where it is considered an emerging pest. Previously, nesting whiteflies, *P. bondari* and *P. minei* were

confined and restricted only in the Southern parts of India which were first reported on coconut palms in Kerala (Josephraj Kumar *et al.*, 2019). *Paraleyrodes minei* closely resembles *P. bondari*, but lacks distinct markings on wings and constructs loose wax nests (Iaccarino *et al.*, 2011).

Although BNW made its first entry in continental India during 2019, its occurrence has not yet been reported from Eastern parts of India. Soon after understanding its invasion, a roving survey was undertaken to explore their incidence pattern. During our survey, *P. bondari* was found to be colonizing on different host species *viz.*, coconut, arecanut, banana, guava and jack fruit (Table. 1) at Nadia districts of West Bengal during late October 2021. The specimens were collected from the infested plants and the identity of the pest species was confirmed through morphological characteristics (Martin, 2004; Josephraj Kumar *et al.*, 2020).

Table 1. Host plants of *P. bondari* recorded in West Bengal

Host Species	Family	Economic Importance
Coconut, <i>Cocos nucifera</i> L.	Arecaceae	Plantation crop
Arecanut, <i>Areca catechu</i> L.	Arecaceae	Plantation crop
Banana, <i>Musa</i> sp.	Musaceae	Fruit crop
Guava, <i>Psidium guajava</i> L.	Myrtaceae	Fruit crop
Jack, <i>Artocarpus heterophyllus</i> Lam	Moraceae	Fruit crop

The intensity and severity of this pest were found to be more on coconut palms (> 30 adults/leaflet), moderate in arecanut (11-20 adults/leaflet) and low in other recorded hosts (<10 adults/leaf). The infestations produce circular white nests that create a dot pattern (Fig.1). In coconut palms, the co-occurrence of previously reported rugose spiralling whitefly (RSW), *Aleurodicus rugioperculatus* Martin with *P. bondari* was observed (Fig. 2). A similar observation on the concomitant

occurrence of RSW and nesting whiteflies was reported by previous researchers on coconut from Southern parts of India (Chandrika *et al.*, 2019; Vidya *et al.*, 2019). The feeding damage of BNW has lesser than RSW with minimum honeydew and sooty mold deposits. During the field investigation, we could not observe any parasitized nymph or puparium. Nevertheless, natural enemies like chrysopid and spider activity were noticed in the infested leaflets.



Fig. 1. Symptoms of damage on coconut palm

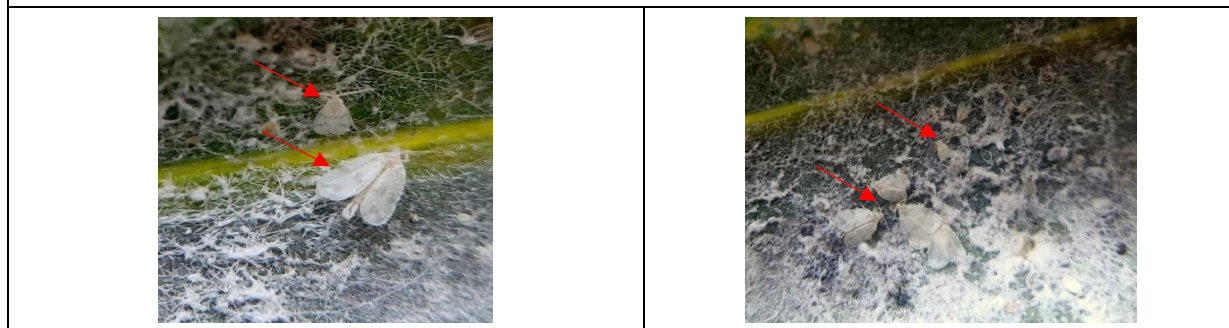








Fig. 2. Co-existence of RSW, *A. rugioperculatus* with BNW, *P. bondari* and heavily infested coconut palm

P. bondari constructs unique woolly wax nests on the abaxial surface of leaves. It lays stalked (Fig.3), clustered eggs (Fig.4) and hatches into first instar crawler (Fig.5), which find a feeding site and settle. The nymphs (Fig.6) are creamy yellow and transparent with

the presence of marginal hairs, the pupa is flat (Fig. 7) with a characteristic pattern of wax around. The adult is a small fly measuring about 1.0 mm with a dull yellow body and possesses 'X'-shaped oblique grayish markings on forewings (Fig. 8).

	
<p>Fig. 3 Stalked egg of BNW, <i>P. bondari</i></p>	<p>Fig. 4 Egg clusters of BNW, <i>P. bondari</i> in woolly wax nest</p>
	
<p>Fig. 5 Mobile crawler of BNW, <i>P. bondari</i></p>	<p>Fig. 6 Nymphal stages of BNW, <i>P. bondari</i></p>
	
<p>Fig.7 Pupa of BNW, <i>P. bondari</i></p>	<p>Fig. 8 Adult BNW, <i>P. bondari</i> inside the waxy nest</p>

The aedeagus of *P. bondari* is unique and easily distinguished from other *Paraleyrodes* species (Fig. 9) and male genitalia resembles rod-like with anterior and posterior horns (Martin, 2004; Vidya *et al.*, 2019). Apart from trade and transport, a drastic shift in weather patterns may influence the invasion and upsurge of this pest in newer areas. The polyphagous feeding nature and absence of

specific natural enemies of this exotic BNW may pose a great concern to the horticulture sector if left unchecked. There is an urgent need to formulate suitable management strategies by exploring potential natural enemies to tackle this invasive pest and warrants stringent quarantine protocols to prevent its further spread to newer areas.



**Fig. 9 Abdominal terminalia of BNW,
*P. bondari***

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