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Invasive Rugose Spiraling Whitefly: A Devil in The Coconut Arena

Satyabrata Sarangi
PhD Scholar, Department of Entomology,
Odisha University of Agriculture and Technology, Bhubaneswar, ODISHA

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Introduction:

Among more than 900 species of pests that are associated with coconut palms, (Kumara *et al*., 2015), the Rugose Spiraling Whitefly (RSW), *Aleurodicus rugioperculatus* Martin is an invasive insect pest was first identified in the Pollachi district of Tamil Nadu on coconut trees by ICAR-NBAIR in August 2016, as described by Selvaraj *et al*. (2016) and later, it was also found in Karnataka (Mangalore) by Selvaraj *et al*. (2017).

Epidemiology:

The abiotic variables have a close relationship with the pest's increased proliferation (Boopathi *et al.*, 2014). The predisposal elements intended to flare and disseminate the pest in coconut are a prolonged dry spell (Srinivasan *et al*., 2016), rainfall deficiency, maximum temperature, and lower humidity (Joseph *et al*., 2018).

Biology and life cycle:

The four stages of the rugose spiraling whitefly (RSW) are egg, nymph, pupae, and adult. According to Byrne and Bellows (1991) and Martin (2004), it has four nymphal instars, with the crawler being the first and sole mobile juvenile stage. Both a long, thin waxy filament and a dense cottony wax are produced by light to golden yellow nymphs (Stocks and Hodges, 2012).

Rugose spiraling whiteflies are sessile by nature, with two asymmetrical light brown bands running the length of their wings. Adults are around three times larger (approximately 2.5 mm) than common whiteflies (Stocks and Hodges, 2012). The oval, creamy white to dark yellow eggs are laid by females in a concentric circular or spiral pattern on the underside of leaves, which is then covered with a white waxy substance. Found in coconuts, which have a fecundity of 49.50± 4.09 eggs, they are the favored host for growth and development (Pradhan *et al*., 2020).

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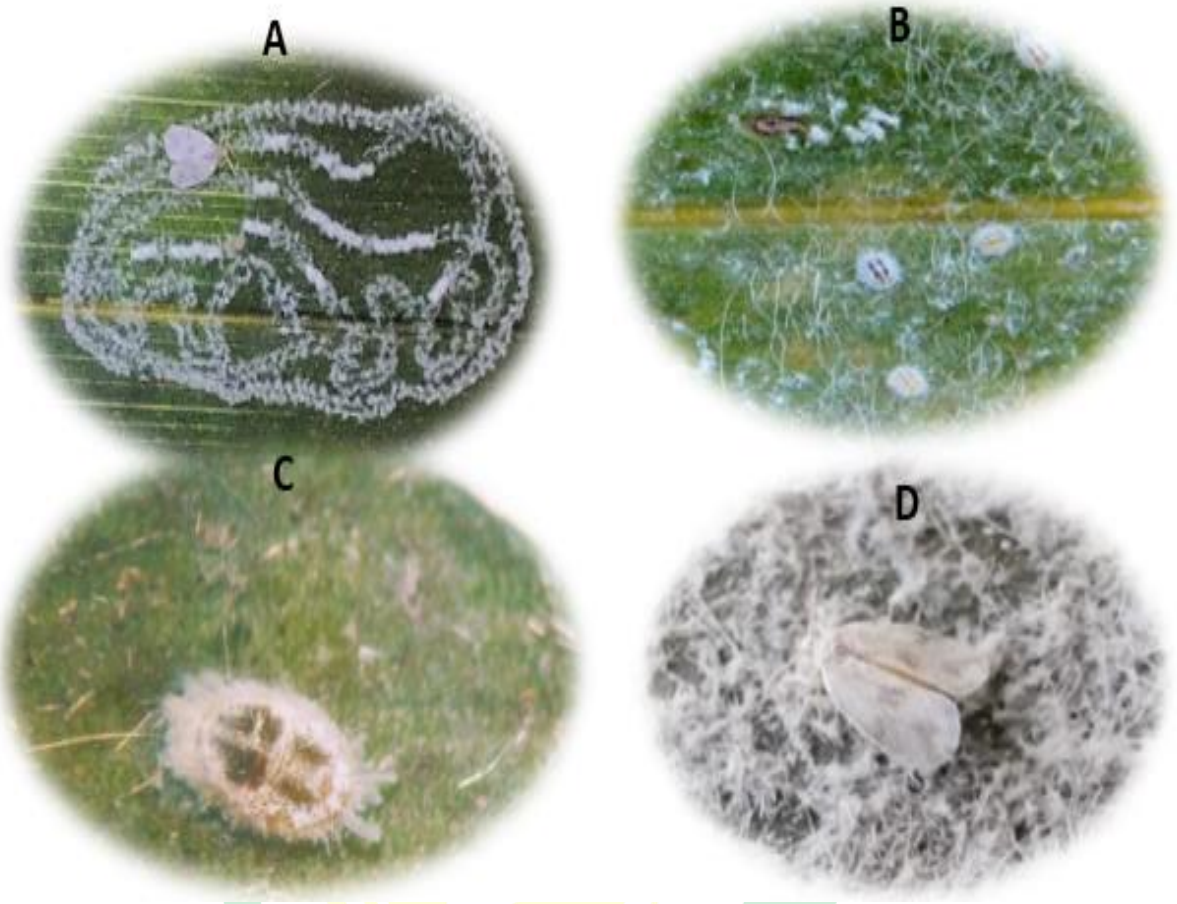

Fig. 1. Different growth stages of RSW; A – Egg, B – Nymph, C – Pupae, and D -

Host range

More than 118 hosts from 43 plant groups, including numerous commercially significant crops in the US, were home to RSW (Francis *et al*., 2016). 35 host plants from 11 plant families have been reported to be colonized by RSW in India (Selvaraj *et al*., 2016).

Leaf damage and Crop loss:

According to Selvaraj *et al*. (2016), the infestation ranged from 20–45% in coconuts, 18–56% in bananas, and 21–52% in Indian almonds. After the nymph sucked sap from the lower leaf surface, it secreted a honeydew that covered the upper surface of the underlying fronds (Joseph *et al*., 2016). According to Chandrika Mohan *et al*. (2016), the fungus *Capnodium* sp. takes hold of this honeydew and gives it a black charcoal-like appearance, causing a significant reduction in photosynthesis on the plantation (Shanas *et al*., 2016).

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Fig. 2. Coconut leaves covered with Waxy filament secreted by nymphs of RSW

Management of RSW

Application of imidacloprid, acetamiprid, clothianidin, and dinotefuran through the basal trunk, foliar spray along with trunk injection is reported to reduce the RSW population up to 25-30 percent (Mannion, 2010). From the report on biological control, among all the parasitoids, *Encarsia guadeloupae* Viggiani is found to the promising, causing 70-80% and *Encarsia dispersa* (Poorani and Thanigairaj, 2017) with 5-6% parasitism against the RSW, is given by ICAR-CPCRI (*Anon*., 2017). The population decline of RSW was reported up to 42.1-52.4% due to the application of *Isaria fumosorosea* Wize (Kumar *et al*., 2018). By the use of 1% starch solution on leaflets, spraying of neem oil @ 0.5% + 1 ml of sandovit, and installation of yellow sticky traps near the palm plantation, the RSW can be controlled up to a significant level (ICAR-NBAIR) (*Anon*., 2018).

Conclusion

The RSW is an extreme threat to the Indian plantation industry in terms of crop loss and leaf damage. Although chemical control is widely accepted by the coconut growing farmers, sometimes it is very different in applying to the tall trees. Instead of going through chemical management, biological and rational control methods should be adopted by the farmers for controlling the pest and maintaining the environment sustainability to a greater extent.

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