

How whiteflies came, saw and conquered India's crops

The first reported invasive spiralling whitefly is now distributed throughout India except Jammu & Kashmir

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It was early summer in 2016 when Selvaraj Krishnan and his team from ICAR-National Bureau of Agricultural Insect Resources set out to investigate a coconut field in Tamil Nadu. They were surveying the area for the whitefly, which was reducing the yield and wreaking havoc: the whitefly reported from Kerala in 1995 has now spread across the country, and a study has now detailed the damage caused by the pest.

Patterns of occurrence
Extensive studies were carried out from 2015 to 2020 across the country to understand the patterns of occurrence, the intensity of the infestation and their natural enemies. The team visited at least 5 to 10 locations in each district and 5 to 12 districts in each state including the islands of Lakshadweep. They

extracted genomic DNA from individual adult whiteflies and explained in detail about eight invasive species found in India.

"Most of these species are native to the Caribbean islands or Central America [or both]. It is difficult to pinpoint how they entered our country. Most probably a nymph or baby insect may have come along with imported plants. Also nowadays with globalisation, it is also possible that tourists may have brought the insect along with plants. Out of curiosity, people randomly pluck and bring tiny plants which lead to the accidental introduction of invasive species. We need to create awareness among the travellers," explains R. Sundararaj from the Forest Protection Division at ICFRE-Institute of Wood Science and Technology. He is the first author of the paper published in *Phytoparasitica*.



Dusty pest: Approximately 1.35 lakh hectares of coconut and oil palm in India are affected by rugose spiralling whitefly. •

The team note that the first reported invasive spiralling whitefly *Aleurodicus dispersus* is now distributed throughout India except Jammu & Kashmir.

Similarly, the rugose spiralling whitefly which was reported in Pollachi, Tamil Nadu in 2016 has now spread throughout the country including the islands of Andaman

Nicobar and Lakshadweep. Recent reports have indicated that approximately 1.35 lakh hectares of coconut and oil palm in India are affected by the rugose spiralling whitefly.

The team found that the host range of all of the invasive whiteflies was increasing due to their polyphagous nature (ability to feed on va-

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rious kinds of food) and prolific breeding.

Aleurodicus dispersus and *Aleurodicus rugipericulatus* have been reported on over 320 and 40 plant species, respectively.

Invasive whiteflies

Other invasive whiteflies were also found to expand their host range on valuable plants species, especially coconut, banana, mango, sapota, guava, cashew, oil palm, and ornamental plants such as bottle palm, false bird of paradise, butterfly palm and important medicinal plants.

The team also carried out explorative surveys to find novel biological control of these invasive pests. "The

whiteflies are difficult to control by using synthetic insecticides, and hence currently naturally occurring insect predators, parasitoids and entomopathogenic fungi (fungi that can kill insects) are being used. They are not just environmentally friendly but also economically feasible," explains Selvaraj Krishnan, corresponding author of the paper.

"Entomopathogenic fungi specific to whiteflies are isolated, purified, grown in the lab or mass-produced and applied into the whitefly infested field in combination with the release of lab-reared potential predators and parasitoids," he says.

He adds that continuous monitoring of the occurrence of invasive species, their host plants and geographical expansion is needed, and if required, import of potential natural enemies for bio-control programmes can also be carried out.