Influence of antibiotics on the fitness parameters of rugose spiraling whitefly, *Aleurodicus rugioperculatus* Martin (Hemiptera: Aleyrodidae)

M. Saranya[1,*], J. S. Kennedy[1], S. Jeyarani[1], R. Anandham[2] and N. Bharathi[3]

[1]Department of Agricultural Entomology,
[2]Department of Agricultural Microbiology, and
[3]Department of Plant Molecular Biology and Bioinformatics, Tamil Nadu Agricultural University, Coimbatore 641 003, India

Rugose spiraling whitefly, *Aleurodicus rugioperculatus*, is an invasive phloem-feeder reported in India during July–August 2016. Bacterial communities associated with insects play a major role in their fitness parameters. To resolve this hypothesis, efforts were made to disrupt the facultative secondary symbionts harboured in *A. rugioperculatus* through disparate antibiotic treatment. The fitness parameters of the antibiotic treated whitefly reared on four different host plants, viz. coconut, banana, sapota and guava were studied. Treatment with antibiotics such as erythromycin E15, ciprofloxacin CIP5, carbenicillin CB100 and cefotaxime CTX30 was done to the whitefly adults by parafilm feeding chamber method, and the fitness parameters of *A. rugioperculatus* progeny were observed. Antibiotic treatment combinations disrupted the bacterial genera *Bacillus*, *Exiguobacterium*, *Acinetobacter*, *Lysinibacillus*, *Arthrobacter* and *Pseudomonas* associated with *A. rugioperculatus*. Combinations of carbenicillin 100 µg ml^{-1} + ciprofloxacin 5 µg ml^{-1} reduced egg hatchability (59.44 ± 0.59%), as well as nymphal survival (31.67 ± 0.40%), increased developmental time (32.69 ± 0.83 days) and reduced fecundity (82.00 ± 0.09 eggs). Antibiotic treatment reduced the fitness parameters, viz. egg hatchability, nymphal survival developmental time and fecundity of *A. rugioperculatus* reared on coconut followed by banana, sapota and guava. Antibiotic treatment prolonged developmental time of *A. rugioperculatus* and thus exposing them to parasitoid attack for longer periods. Antibiotic treatment could be used for the effective management of whiteflies.

Keywords: Antibiotics, fitness parameters, host plants, insect associated bacteria, rugose spiraling whitefly.

whitefly species has been reported in the country over the past six years[2]. They include the solanum whitefly, *Aleurothrixus trachoides* Back in 2015 (ref. 3), rugose spiraling whitefly, *Aleurodicus rugioperculatus* Martin in 2016 (ref. 4), legume feeding whitefly, *Tetraleurodes acaciae* Quaintance in 2017 (ref. 5), Bondar's nesting whitefly, *Paraleyrodes bondari* Peracchi in 2018 (ref. 6), nesting whitefly, *Paraleyrodes minei* Iaccarino in 2018 (ref. 7), palm infesting whitefly, *Aleurotrachelus atratus* Hempel in 2019 (ref. 8) and woolly whitefly, *Aleurothrixus floccosus* Maskell in 2019 (ref. 9).

Increasing insect pests in the coconut ecosystem severely affect palm productivity and negatively affect international trade by restricting the export of value-added coconut products from India. Severe incidences of rugose spiraling whitefly, *A. rugioperculatus* (Hemiptera: Aleyrodidae), have been recorded in the coconut plantations of India. Martin[10] originally described the incidence of *A. rugioperculatus* in coconut plantations of Belize and Mexico in 2004. Subsequently, *A. rugioperculatus* was recorded as a pest of gumbo limbo (*Bursera simaruba* L.) in Florida from Miami-Dade County, USA, in 2009 (ref. 11). In India, it was first reported in coconut farms of Pollachi, Tamil Nadu during July 2016 (ref. 12).

The life cycle of *A. rugioperculatus* consists of egg, nymphal, pseudo-pupal and adult stages. Eggs are elliptical and yellowish in colour, with irregular spiraling deposits of white flocculent wax surrounding each egg. Nymphal stages have a white waxy covering and a broad, fluff tail-like structure on the posterior side of *A. rugioperculatus*. Taxonomic identification of *A. rugioperculatus* was done by its puparial characters. The presence of