Olfaction of leaf volatiles determines the most attractive host plant for *Aleurodicus rugioperculatus* Martin (Hemiptera: Aleyrodidae): potential pest management opportunities

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The rugose spiralling whitefly (RSW), an invasive polyphagous insect introduced into India in 2016, has threatened coconut and other crops. Natural infestation intensity data indicated, in order, the following most likely RSW hosts: *Cocos nucifera* L. (75.83%) > *Dypsis lutescens* H. Wendel (55.83%) > *Annona squamosa* L. (54.17%) > *Musa paradisiaca* L. (43.33%). A preference analysis of these four host plants showed that coconut was the most favoured (8.17 spirals per 30 cm^2 and 33.04 eggs per spiral). Olfactometry of the headspace leaf volatiles revealed that *C. nucifera* (3.05 ± 0.27 min) and *D. lutescens* (1.67 ± 1.67 min) had longer residence durations and attracted more RSW females than the other hosts. According to principal component analysis, those potential hosts shared six volatile compounds, the most peculiar of which was 2-ethyl-1-hexanol. Gas chromatography coupled electroantennographic detection analysis revealed that 2-ethyl-1,3-dioxolane, 1,3-dioxolane, 2-propyl, butanoic acid, 2-hydroxy-2-methyl-methyl ester, *m*-ethyltoluene, *p*-dichlorobenzene and 2-ethyl-1-hexanol evoked consistent olfactory responses in RSW. More studies on these chemicals might help develop parakairomones for managing RSW.

Keywords: Coconut, olfaction, pest management, principal component analysis, rugose spiralling whitefly, volatile organic compounds.

L. (family Arecaceae) in India in 2016 in the southern peninsular region[6]. It has since spread to major coconut-growing regions across the country, infesting other monocots and dicots as well[7,8]. The pest feeds on around 30 host plants in India and over 120 plant species worldwide including numerous commercially significant horticultural and ornamental crops[9,10]. Its high reproduction rate, short life cycle, and broad host range enabled the quick spread of the pest over several regions, causing severe loss of up to 30.38% on the coconut variety East Coast Tall[11]. Adult RSWs colonize the abaxial surface of the leaves, depositing eggs in spirals, while the developing nymphs and adults feed on phloem sap. The honeydew expelled by RSW attracts secondary growth of the fungi *Capnodium* spp. and *Leptoxyphium* sp. generating sooty mould on the adaxial surfaces of the lower crown canopy and interfering with photosynthesis[12,13]. Coconut palms with severe RSW infestations appear sick and turn blackish.

RSW management in coconut plantations is exceptionally challenging due to the inaccessibility to plant canopy and the impenetrability of pesticide applications. Although a diverse assemblage of RSW-associated natural enemies has been reported to effectively reduce RSW populations, their performance often exhibits seasonal fluctuations, limiting sole reliance on such pest suppression agents[9,14–16]. Furthermore, the rapid dissemination and persistent presence of RSWs in infested environments necessitate developing alter-