Behavioural and electroantennographic responses of female fall armyworm moth, *Spodoptera frugiperda* to maize plant volatiles

C. Gargi[1,*], J. S. Kennedy[1], P. D. Kamalajayanthi[2], T. D. Jayabal[1] and M. Muthukumar[3]

[1]Department of Agricultural Entomology, Centre for Plant Protection Studies, Tamil Nadu Agricultural University, Coimbatore 641 003, India
[2]Division of Crop Protection, Indian Institute of Horticultural Research, Bengaluru 560 089, India
[3]College of Agricultural Sciences, SRM Institute of Science and Technology, Kattankulathur 603 203, India

The fall armyworm, *Spodoptera frugiperda* (J.E. Smith) (Lepidoptera: Noctuidae) is a devastating invasive pest recently introduced in India in 2018. The fall armyworm infestation has significantly impacted maize cultivation in the country. Identifying the host plant volatiles (kairomones) that are attractive to *S. frugiperda* from its highly preferred host plant, i.e. maize will help developing eco-friendly management strategies against this nefarious pest. Gas chromatography electroantennogram detector (GC-EAD) analysis revealed that a total of 18 compounds in maize headspace volatiles and 17 in maize leaf extract elicited an antennal response in female moths of *S. frugiperda*. Olfactometer bioassays of GC-EAD active plant volatile compounds revealed that heptanoic acid, 2,5-ditert butyl-1,4-benzoquinone and *n*-hexadecane were the most preferred plant volatile compounds and 50 : 50 ratio blend of heptanoic acid and 2,5-ditert butyl-1,4-benzoquinone was found to be the most attractive kairomone blend for *S. frugiperda*.

Keywords: Antennal response, fall armyworm, host plant volatiles, insect–plant interaction, maize cultivation.

it was reported that (*Z*)-3-hexenyl-acetate, a maize volatile, played a crucial role in female attraction and oviposition stimulation[8]. In light of these data, maize plant volatile compounds eliciting an antennal response in female *S. frugiperda* were identified, as their determination is essential to develop cutting-edge pest control techniques.

Materials and methods

Insects

S. frugiperda larvae were reared in a Lablab-based artificial diet developed by Tamil Nadu Agricultural University, Coimbatore. Pupae separated for adult emergence were provided with *Nerium oleander* twigs for oviposition and sugar solution for nutrition. Female *S. frugiperda* moths, 3–7-days-old, that were not previously exposed to plant volatiles were used for the study[9].

Air entrainment method of headspace volatile collection from maize plant