

ELECTROPHYSIOLOGICAL AND BEHAVIORAL
RESPONSES OF FEMALE *Helicoverpa armigera* TO
COMPOUNDS IDENTIFIED IN FLOWERS OF AFRICAN
MARIGOLD, *Tagetes erecta*

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Abstract—Seven electrophysiologically active compounds were detected in air-entrained headspace samples of live flowers of *Tagetes erecta* analyzed by gas chromatography (GC) linked to a female *Helicoverpa armigera* electroantennograph (EAG) using polar and nonpolar capillary columns. These compounds were subsequently identified using GC linked to mass spectrometry as benzaldehyde, (S)-(-)-limonene, (R,S)-(\pm)-linalool, (E)-myroxide, (Z)- β -ocimene, phenylacetaldehyde, and (R)-(-)-piperitone. Electrophysiological activity was confirmed by EAG with a 1- μ g dose of each compound on filter paper eliciting EAG responses that were significantly greater than the solvent control response from female moths. Wind-tunnel bioassays with *T. erecta* headspace samples, equivalent to 0.4 flower/hr emission from a live flower, elicited a significant increase in the number of upwind approaches from female *H. armigera* relative to a solvent control. Similarly, a seven-component synthetic blend of EAG-active compounds identified from *T. erecta* presented in the same ratio (1.0:1.6:0.7:1.4:0.4:5.0:2.7, respectively) and concentration (7.2 μ g) as found in the natural sample elicited a significant increase in the number of upwind approaches relative to a solvent control during a 12-min bioassay that was equivalent to that elicited by the natural *T. erecta* floral volatiles.

Key Words—*Helicoverpa armigera*, *Tagetes erecta*, floral attractant, kairomone.

INTRODUCTION

The cotton bollworm, *Helicoverpa armigera* Hübner (Lepidoptera: Noctuidae), is a serious insect pest throughout much of its distribution in tropical and subtropical

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