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Entitled

THE RED PALM WEEVIL IN THE UAE: MORPHOLOGICAL DIVERSITY AND RNAI-MEDIATED GENE SILENCING OF TWO CUTICLE-RELATED GENES

by

Safa Hashem Mohammed Musaed

Faculty Advisor

Dr. Mohammad Ali Al-Deeb, Department of Biology

College of Science

Date & Venue

02:00 pm

Thursday, 28 October 2021

Online Session Link

https://eu.bbcollab.com/guest/d86f90cecf8046ec8a55dd2ccdc83ba3

Abstract

Red palm weevil (RPW), *Rhynchophorus ferrugineus* (Coleoptera: Curculionidae), threatens palm trees worldwide. A better understanding of this insect can help with designing an adequate management strategy. This study aimed to a better understanding of the morphological diversity of RPW and examined RNAi-mediated gene silencing of two cuticle-related genes, vestigial (vg) gene, and laccase (Lac2) gene by injecting the last larva stage with dsRNA. For morphological diversity study, adults of RPW were collected and classified by their prothoracic spots. Additional morphological characters were measured such as pronotum length (PL), pronotum width (PW), elytra length (EL), elytra width (EW), and total length without snout (TL), as well as observing the density of the hair-like structure in the male snout. The data were analyzed using descriptive statistics, scatterplots to present data distribution within the typologies, box-and-whisker plots to show the distribution of the body length, Student t-test conducted to compare the body length (TL) between typologies, and percentage to reflect hair-like structure density. For RNAi experiments, total RNA was extracted and double-stranded RNA (dsRNA) was prepared using to inject the RPW larva. For vg gene, two doses were used (1,800 ng and 5,600 ng), and 5,600 ng for Lac2 gene. To measure the expression level, quantitative real-time polymerase chain reaction (RT-qPCR) was performed. The morphological study showed the presence of seven prothoracic spot typologies and addressed the morphological differences and the three levels of setae on the male's snout. Besides that, dsRNA had successfully silenced the vg and lac2 genes in R. *ferrugineus*, resulting in adults emerging with developmental abnormalities that can affect the insect's survival and reproduction.

Keywords: *Rhynchophorus ferrugineus*, morphological diversity, typology, gene silencing, double-stranded RNA (dsRNA), Quantitative real time -polymerase chain reaction (RT-PCR).