UC RIVERSIDE

DEPARTMENT OF ENTOMOLOGY

ENTM250 Series Webinar

Speaker:

Caleb Hubbard
PhD Candidate
Department of Entomology
University of California, Riverside

Date: Monday, Nov. 09, 2020
Time: 4:00 pm - 4:50 pm
Zoom: 952-3324-4564
Passcode: 835322

Title:

“Genetic evaluation and characterization of behavioral resistance to imidacloprid in the house fly "

Abstract:

Insecticide resistance in pest populations is an increasing problem in both urban and rural settings because of over-application of insecticides and lack of rotation among chemical classes. The house fly (Musca domestica L.) is a cosmopolitan pest fly species implicated in the transmission of numerous pathogens. The evolution of insecticide resistance has long been documented in house flies, with resistance reported to all major insecticide classes. House fly resistance to imidacloprid, the most widely used neonicotinoid insecticide available for fly control, has evolved in field populations through both physiological and behavioral resistance mechanisms. Previous studies have characterized and mapped the genetic changes that confer physiological resistance to imidacloprid, but to date no studies have examined the genetics involved in behavioral resistance to imidacloprid. In the current study, several approaches were utilized to characterize the genetics and inheritance of behavioral resistance to imidacloprid in the house fly. These include behavioral observation analyses, preference assays, and the use of genetic techniques for the identification of house fly chromosome(s) carrying factors. Behavioral resistance was mapped to autosomes 1 and 4. Inheritance of resistance was shown to be neither fully dominant nor recessive. Factors on autosomes 1 and 4 independently conferred contact-dependent avoidance of imidacloprid and a feeding preference for sugar alone or for sugar with dinotefuran, another neonicotinoid insecticide, over imidacloprid. This study serves as the first linkage analysis of a behavioral trait in the house fly and opens up new avenues for research to understand aspects of inherited behavior in the house fly and other animals.