UC RIVERSIDE

DEPARTMENT OF ENTOMOLOGY

Entomology Seminar Series

Speaker:

Carissa Gilliland Ph.D.
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Date: Monday January 27, 2025
Time: 4:00 pm - 4:50 pm
Format: In-Person Seminar & Virtual Access
Location: Genomics Auditorium 1102A
Zoom: 952 1906 3064
Passcode: 505445

Title:

"***The role of the gut microbiome on key physiological processes in Rhodnius prolixus***"

Abstract:

Kissing bugs (Hemiptera: Reduviidae) are obligately and exclusively hematophagous insects. Vertebrate blood is thought to be deficient in B vitamins, essential nutrients that insects are unable to synthesize for themselves. It is hypothesized that kissing bugs rely on their gut symbionts to provision these nutrients. Kissing bugs harbor environmentally acquired bacteria in their gut lumen that are necessary for development. Rhodococcus rhodnii was initially identified as the sole symbiont of Rhodnius prolixus, but modern studies of the kissing bug microbiome suggest that R. rhodnii is not always present or abundant in wild-caught individuals. We first investigated if R. rhodnii or other bacteria alone could support development. We found that insects harboring R. rhodnii developed faster, had higher survival, and laid more eggs than those harboring other bacterial monocultures. We also found that all other bacterial species tested colonized the guts at significantly lower titer compared to R. rhodnii. Next, we were interested in investigating the role of the immune system on modulation of gut bacteria in R. prolixus. We first conducted a gut transcriptome experiment that revealed key immune genes that were upregulated after feeding nymphs R. rhodnii. These genes were revealed to be involved in maintaining this symbiotic relationship as the knockdown of these genes resulted in either no change in bacterial titer or modest but significant decrease in titer. We further demonstrate that R. rhodnii displays tolerance to kissing bug humoral immunity. We also investigated the role of the gut microbiome on immune system function. We provide evidence that the presence of gut microbes in R. prolixus influences immune function by influencing both humoral and cellular immune processes. This plays a significant role in infection outcome as bugs that do not harbor any bacteria in their gut succumb to infection while bugs that harbor their symbiont do not.

Refreshments will be served in the Entomology Building at 3:30 pm