The Effects of Adult Nutritional Stress on Remating Behavior in Female *Aedes aegypti* Mosquitoes

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Introduction

- *Aedes aegypti* is a vector for dengue, Zika, chikungunya, and yellow fever, with dengue causing more than 700,000 deaths per year [1]
- Adult nutrition aids in energy needed for flying and mating activity [2]
- Mating allows for seminal fluid transfer that can affect female physiology and behavior, which induces a refractory response to future matings contributing to the usual monogamous nature in females [3][4]
- Recent findings show post-mating gene expression changes are nutrition dependent in female *Ae. aegypti* [5]
- Greater gene expression changes observed in nutritionally-stressed females maintained on 3% sucrose [5]
- Mosquitoes may experience nutritional stress in their environment [6]

Aims

- This study aims to investigate the effect of nutritional stress on likelihood of remating and remating behavior in female *Ae. aegypti* by examining behavior and insemination.

Methods

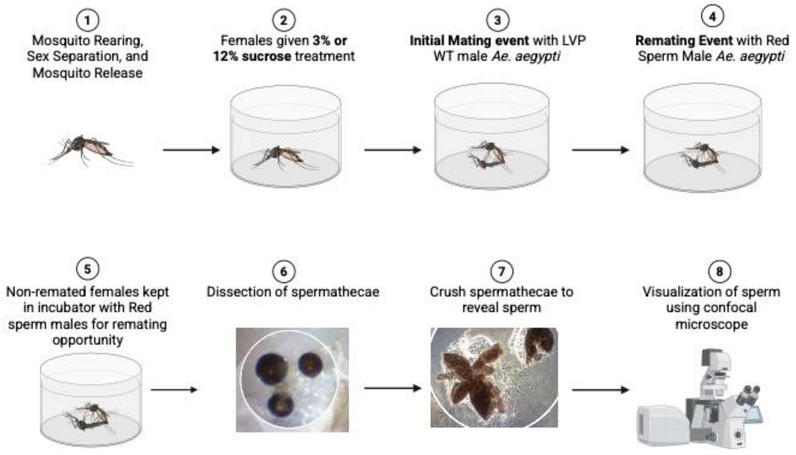

Figure 1. Procedure Timeline [8]

Methods (cont.)

Scoring of Matings

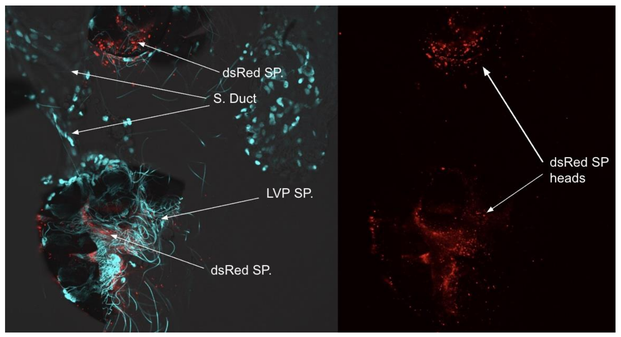

Figure 2. Visualization of sperm in spermathecae of female *Ae. aegypti*. Red fluorescence due to DsRed tagged sperm (SP) in spermathecae or spermathecal ducts (S. Duct) indicates scoring of a successful remating.

Results

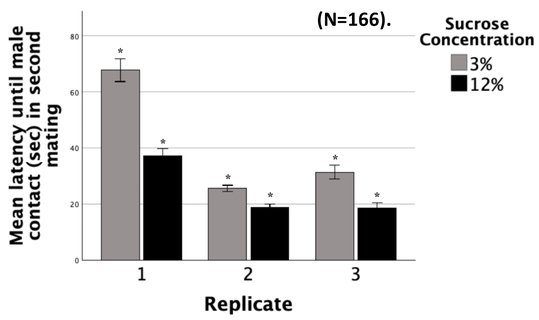

Figure 3. Mean latency to male contact (sec) of female *Ae. aegypti* in remating event. A significant difference in latency between 3% and 12% sucrose females. The * indicates significant differences. Error bars depicted standard error.

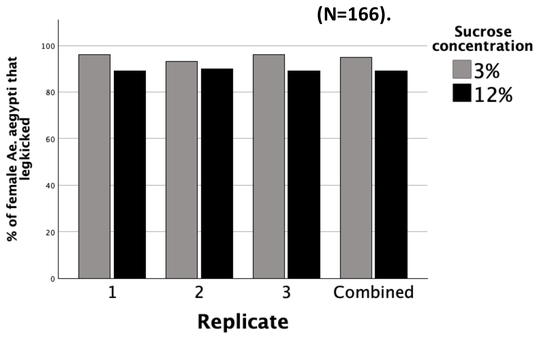

Figure 4. The percentage of female *Ae. aegypti* that leg kicked in remating event. There was no significant difference in leg kicking in 3% and 12% sucrose females.

Results (cont.)

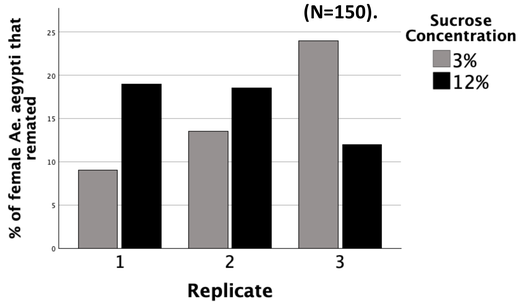

Figure 5. The percentage of female *Ae. aegypti* that remated. No significant difference in remating in 3% and 12% sucrose females. Remating refers to a female *Ae. aegypti* that mated with a DsRed male after the initial mating event.

Discussion and Future Directions

- Nutrition significantly affected latency to male contact but not leg kicking and remating likelihood
- Understanding remating behavior is key for evaluating mosquito control strategies like the Sterile Insect Technique [7]
- Further studies can test varied sucrose levels that reflect field conditions to assess remating behavior
- To improve the design, the female *Ae. aegypti* refractory period will be accounted for by reducing the interval between initial and remating events.

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References

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