The Connecticut Agricultural Experiment Station

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RESEARCHERS DEVELOP BACTERIA FREE MOSQUITOES: A NEW TOOL FOR STUDYING MOSQUITO BORNE DISEASE CONTROL

New Haven, CT - Researchers at the Connecticut Agricultural Research Station's Center for Vector Biology & Zoonotic Diseases have developed a novel method in which mosquitoes can be reared in the complete absence of any bacteria, a state commonly referred to as "germ-free" or axenic.

"Virtually all organisms host a complex community of microorganisms which we refer to as their microbiome" said Dr. Blaire Steven an environmental microbiologist at the CAES. "In humans the status of the microbiome has been associated with Crohn's disease, Inflammatory Bowel Disease, and obesity. In this study, we were attempting to remove the microbiome from mosquitoes in order to better understand how the microbiome interacts with mosquito biology and the transmission of disease-causing agents".

The axenic mosquitoes were able to grow and develop normally, although development was delayed in comparison to their bacterially colonized cohorts. In addition, axenic mosquitoes had reduced egg clutches compared to conventionally reared mosquitoes, indicating that bacteria may play a role in mosquito reproduction.

"The complex interactions between the mosquito, its resident gut bacteria and infectious agents such as dengue, West Nile and Zika viruses are poorly defined" said co-author and CAES vector biologist Dr. Doug Brackney. "This new model system will allow us to explore these interactions in greater detail and could aid in the development of novel control strategies"

The results of this first of its kind study are available as a preprint on the bioRxiv server (https://doi.org/10.1101/264978).

A freshly blood-fed female *Aedes aegypti* mosquito from the CAES colony.

Photo credit: Mike Thomas, CAES.

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