

Characterization of the the Mosquito Microbiome Across Different Mosquito Species and Locations

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Background

Mosquito-borne diseases (MBD) are a major threat to global public health. 100's of millions of people are infected annually—primarily from malaria, but also from viruses such as dengue, yellow fever, West Nile, and Zika. *Aedes spp.* mosquitoes are responsible for the transmission of the medically important arboviruses listed above. Mosquito control for the past 70 years has primarily used synthetic insecticides that target both the larval and adult stages.

However, growing insecticide resistance and environmental damage are drawbacks to their use. The focus has shifted towards using biological control agents to control mosquito populations. Great attention is now being directed at the mosquito microbiome as a potential target for population control. This complex community of microorganisms has profound effects on mosquito physiology and presents a ripe target to effectively—and safely—control mosquito populations.

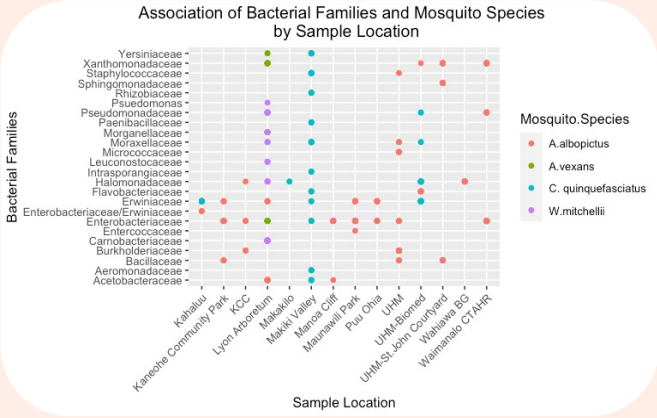
Data Collection

Mosquitoes were caught at different locations around Oahu.

Midguts were extracted and disrupted to free resident bacteria.

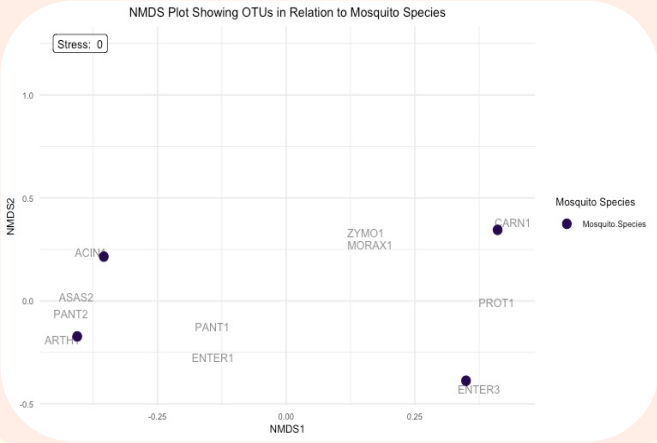
Bacteria were cultured and sequenced via PCR.

Data Analysis



Binomial Regression was attempted, but there wasn't enough variation in the data for significant results.

A principal component analysis was attempted, but the data was too noisy for any meaningful. interpretation



Conclusions

OTU representation has some dimensionality with mosquito species. Some OTUs are linked more closely with a particular species of mosquito whereas some OTUs are less clustered around a specific species of mosquito.

Future Work

Elucidate the mechanisms driving dissimilarity between lab-reared and field-caught *Aedes albopictus* mosquitoes.

Understand the role of microbiome structure in *A. albopictus* immunology.

Measure the effects of the microbiome-immune complex on *A. albopictus* vector competence.

References

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Images

Occi, J.L. (Photographer). (August, 2010). [Online image]. Retrieved from https://flic.kr/p/8uLqg2.

Image of Enterobacteriaceae [Online image]. Retrieved from https://americansecuritytoday.com/cdc-germs-unusual-antibiotic-resistance-widespread-us/carbapenem-resistant-enterobacteriaceae/.