



Identification of Different Mosquito Species Across Long Island, New York using DNA Barcoding

Adnan Adzemovic¹, Barbara Benitez¹, Michelle Pinilla¹, Rose Tursi¹,

Teacher: Kerry Bunyan

Glen Cove High School¹, Cold Spring Harbor DNA Learning Center.



Abstract

Mosquitoes can transmit many infectious pathogens, therefore they are considered disease vectors and can be harmful to the environment. For our project we are looking to collect samples of different mosquito species and identify them using DNA barcoding, specifically amplifying the COI gene. We will be using microscopes to document each sample and record the phenotype, noting any colors, or stripes that may be distinguishing features for specific species. After DNA barcoding, we will use DNA subway to ensure we identify each mosquito species correctly. Each mosquito species obtained will be researched to see if that particular species can be a vector for disease, and if so, specifically which disease. This investigation will help us determine what mosquitoes are found in our area and what potential diseases they can carry.

Introduction

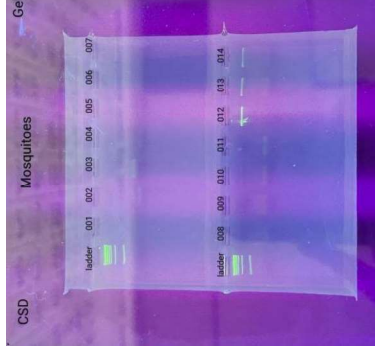
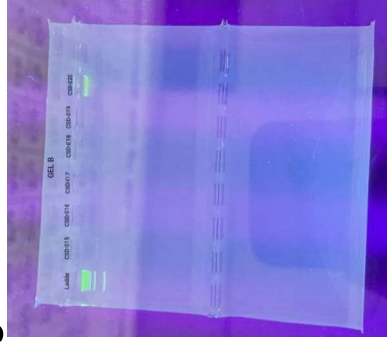
Mosquitoes are plant pollinators and they are considered biological control agents, meaning they keep insect populations under control. However they also carry many diseases not only afflicting humans but also other organisms. There are more than 50 species of mosquitoes found on Long Island. For our project we will be observing the types of diseases that mosquitoes could carry (especially in the northeast region) such as West Nile Virus, Chikungunya Virus, and others. The mosquitoes samples will be provided to us from Cold Spring Harbor's DNA learning center, who have obtained samples from Suffolk county vector control.

Materials & Methods

We will be analyzing mosquitoes that were collected at various points in Long Island, using malaise traps. The malaise trap is tent-like structures used for the collection of flying insects. Mosquitoes will be stored in ethanol until we are able to perform DNA barcoding, amplifying the COI gene to identify each species. We will photograph each mosquito sample using handheld microscopes that connect to our chromebooks.

Results

- CSD-012 → *Ochlerotatus taeniorhynchus* - Black Saltmarsh Mosquito - 4 mismatches
- CSD-013 → *Uranotaenia sapphirina* - 0 mismatches
- CSD-014 → *Anopheles* sp. - 1 mismatch
- CSD-020 → inconclusive results



Here are our gels showing that samples 12, 13, 14 and 20 were successful

Discussion

Only three of our samples were successful, the DNA of the other samples might have been degraded and didn't show accurate results. The rest of the samples showed that the black salt marsh, uranotaenia sapphirina and Anopheles sp mosquito species are present in Long Island. Which are vectors for diseases such as dog heartworm, Eastern Equine Encephalitis (EEE) and Malaria. Which proves that they are both harmful to humans and animal species, or the environment in general. However the species that's most commonly found on Long Island are the Culex Pipiens and Aedes Albopictus which is interesting as those species were not found in our project. Those species commonly have West Nile and Zika Viruses. This means that more research must be done on what species are commonly found on Long Island.

References

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CSD - 012



CSD - 013