

Mosquito & Flying Insect Biodiversity

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Introduction

What is the diversity of mosquitoes present on Long Beach Island?

There has been some evidence that there are disease carrying mosquitoes as well as new, invasive species living on Long Beach Island. Some mosquitoes carry infectious diseases such as West Nile Virus, O'nyong-Nyong, and the Zika virus. Temperatures in the city frequently reached up to 32°C degrees in the summer and there are numerous rain showers during that season. These conditions are optimal for mosquito breeding. Once the weather drops to around 16°C, mosquitoes become lethargic, and after 10°C they become dormant and can hardly function at all.

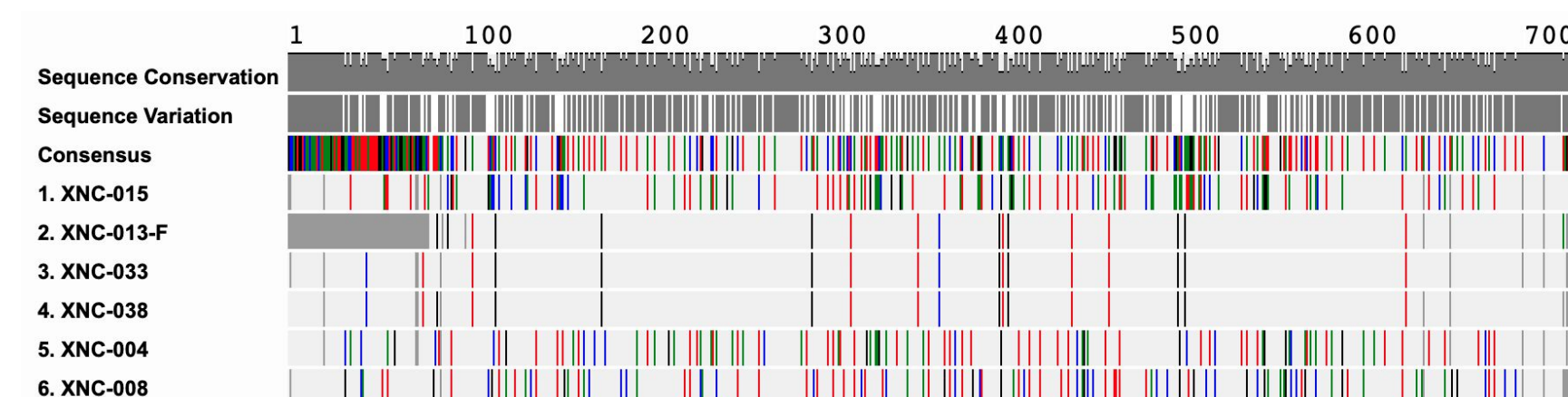
Materials & Methods

Trap

To catch the mosquitoes, a CDC trap (Bioquip Catalog #: 2836BQX) was used.. We set up the trap by suspending it from a tree, allowing the trap to hang. We utilized a lure with lactic acid, ammonia, and fatty acids, which are all substances that are found on human skin that attract mosquitoes.

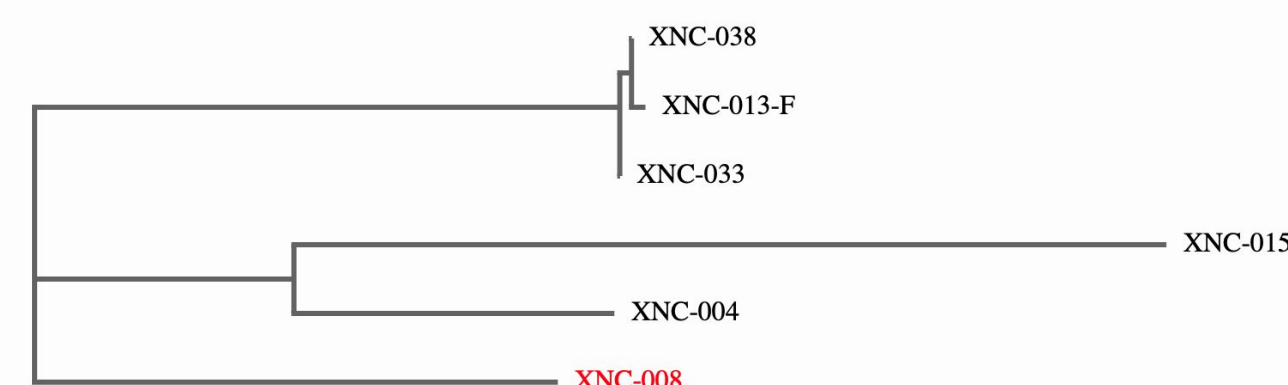
Discussion

Originally, our research question was an extension of a project from last year in which a mosquito known to carry Zika virus (*Aedes vexans*) was found. The original research question inquired about the biodiversity of mosquitoes across Long Beach Island, but we were not able to dive deeply into that topic due to the inability to deploy our traps in numerous locations across the island. To better suit the collection we were able to do, we shifted our focus onto weather. But, our sample size was still quite small and all of the insects that were successfully barcoded did not turn out to be mosquitoes.



Examination of polymorphisms

Phylogenetic tree



	C	1	2	3	4	5	6
C	-	82.89	96.87	97.62	97.35	86.07	85.47
1	82.89	-	78.84	80.36	80.08	82.54	79.04
2	96.87	78.84	-	99.22	99.37	82.13	81.45
3	97.62	80.36	99.22	-	99.72	83.75	83.01
4	97.35	80.08	99.37	99.72	-	83.50	82.87
5	86.07	82.54	82.13	83.75	83.50	-	84.97
6	85.47	79.04	81.45	83.01	82.87	84.97	-

Similarities as shown through percentages

Weather

The dates of collection were September 13th to September 25th, 2019. The weather during this time span ranged from warm to hot, with temperatures going as low as 20°C during the day (9°C at night) and as high as 27°C (21°C at night). It was cloudy half the time and clear the other half, but it never rained. This lack of rain could be the reason why mosquitoes were so scarce in the traps. Mosquitoes function best in hot and moist environments, and with the weather being consistently under 27°C (for the most part) with no rain at all, the mosquitoes most likely struggled. But, it seems like midges prefer dryer and cooler weather since they made up half of our successful barcodes.

Results

The trap captured approximately 48 organisms, most of which were not mosquitoes. It is believed that they were attracted to the lure because it is composed of chemicals found on human skin. The insects collected included craneflies, midges, and others. Midges are human-biting insects and would naturally be attracted to the lure due to its human-like properties. Out of the 15 organisms barcoded, only six were successful. Out of those six, none were actually mosquitoes: one was a cranefly, another was a sweet potato leaf miner, and three were midges. One sample came back inconclusive. That sample appears to be a novel sequence and the sample is being sent to an entomologist for further study. An initial goal of the study was to correlate species with weather data but due to inconsistencies in the weather and success of traps an inadequate amount of collection occurred before temperatures dropped to make conclusions.



Possibly a novel sequence (2)



Bedellia somnulentella (4)



Rhipidia domestics (1)



Smittia aterrima (5)



Smittia aterrima (3)



Smittia aterrima (6)