The Theory of Island Biogeography Under Log Islands

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Introduction

- In this study, the theory of island biogeography was studied on the smallest scale, examining log diversity based on the size of the logs. Logs can be considered "islands" because of the micro-habitats that lie beneath them (Glassman, Lubetkin, Chung, Bruns, 2017).
- The theory of Island Biogeography is "based on information, which can help predict the number of species that will occur on a given island." (Thompson, 1999). These islands are not actual islands
  - This theory "predicts that species richness is a function of island size and distance from the mainland." (Glassman, Lubetkin, Chung, Bruns, 2017).
- As there was no accurate way of measuring the distance of the logs from a "mainland", the theory was only looked at relative to log size and temperature.
- We are also interested in how the Log Islands found here could yield intriguing results on the differences in log sizes and temperature.

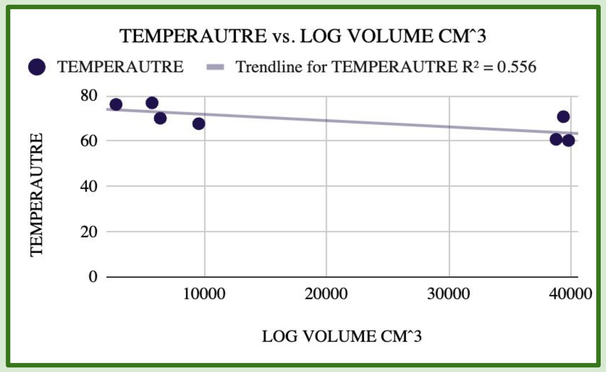
Materials and Methods

- At Randall's Island we collected specimens from underneath logs and placed them in 70% ethanol.
- We measured the logs' volume and temperature.
- At the lab we used The silica method to extract DNA, with the COI primer.
- We used the PCR method to amply the DNA
- We used Gel electrophoresis to check for DNA bands.
- Once the samples were sequenced, we used DNA subway to identify the species.

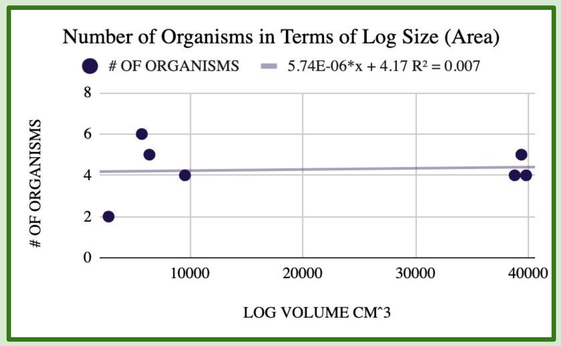
Results

Log #	Specimen #	Suspected type	Volume (cm^3)	Temperature C°
3	KMM-001	False Milkweed Bug	39377	70.8
1	KMM-008	Japanese Burrowing Cricket	5740	76.9
3	KMM-009	Common Pillbug	39377	70.8
3	KMM-020	False Milkweed Bug	39377	70.8
5	KMM-021	Ground Yellowjacket	38781	60.8
6	KMM-022	Bald-Faced Hornet	39796	60.3
6	KMM-025	Furry Snake Millipede	39796	60.3

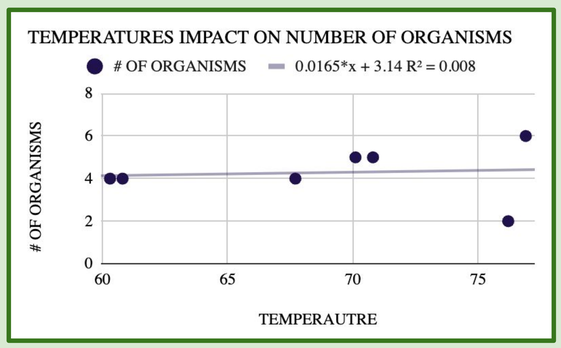
Species Successfully Sequenced



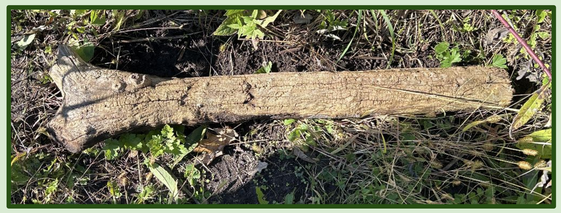
This graph shows the relation between the temperature and the log volume



This graph shows the relation between the number of species found and the log volume



This graph shows the relation between the temperature and the number of organisms found



This photo shows log 1

Discussion

- No conclusions can be drawn when looking at the theory of island biogeography in connection to species richness on a small scale likely because of the small sample size and lack of species identified
- When comparing the log size to temperature it can see seen that the larger the log, the lower the temperature under it.
  - The R^2 value when comparing temperature and size is 55.56%
- We hypothesize that we would see a positive correlation between species richness and temperature with a bigger sample size: the warmer temperature under logs the more species.
- The probable connection is that the smaller the log, the higher the temperature and therefore the more species under it will be.

LIKELY ERRORS

- Because the sample size was so small it was difficult to end up with significant results.
- No chilopods were identified during the DNA extraction, though we attempted to extract their DNA. This error could potentially stem from the invertebrate primer or protocol used during the PCR stage.
- Also, only 20% of species were identified likely due to a mix of human and experimental error in lab techniques.

References

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