



Looking at Biodiversity in Massapequa Park Preserve Through the Collection and Identification of Organisms

By: Emma Kok, Sage Milow, and, Georgia Wu Mentors: August Eberling and Jeff Petracca



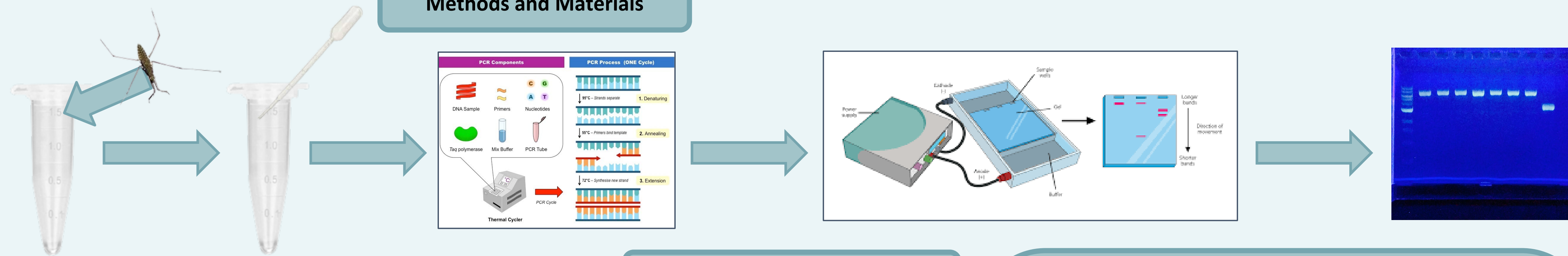
Abstract

The Massapequa preserve should be a place of high biodiversity. It's essential for an ecosystem to have high biodiversity, since it permits an ecosystem to recover when it has to deal with a disturbance. The objective was to determine what species are found in the preserve to assess the level of biodiversity, given the preserve has a high level of human activity. Macroinvertebrates were collected out of the water using nets and waders and placed in sample tubes full of 95% alcohol, so they can be processed for DNA barcodes. DNA sequencing via Sanger sequencing was used to determine the order of nucleotides in PCR amplicons of COI DNA to fully understand the genetic blueprint. After the species was discovered, a conclusion was made about the biodiversity of the preserve.

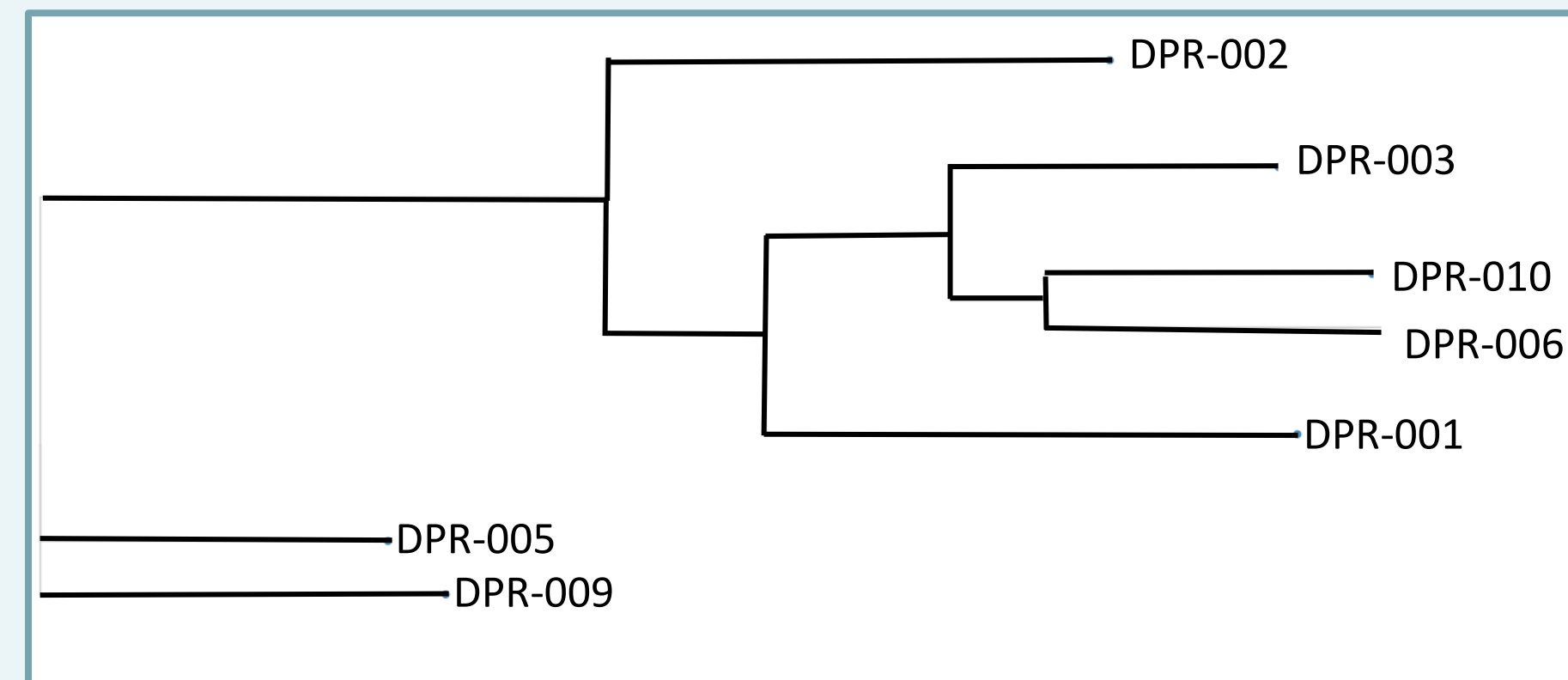
Introduction

Biodiversity is essential for the survival and health of an ecosystem. Biodiversity is the variety of all different living things, such as fungi, plants, and macroinvertebrates. Biodiversity is being affected by urbanization (Yao, 2023). Urbanization is the process of humans transforming areas into city-like spaces. Urbanization is expanding throughout Massapequa, New York, causing areas to become more urban, which means that biodiversity is decreasing in the Massapequa Preserve. This is a negative impact because if biodiversity is interrupted, animals like macroinvertebrates would have a moderate chance of surviving because they need specific water temperatures and conditions to survive (Yao,2023). Urbanization can additionally pollute the air, soil, and water of an ecosystem (Yao,2023). This can lead to poorer conditions in an ecosystem, leading to a decrease in biodiversity, which could potentially lead to the destabilization of the ecosystem.

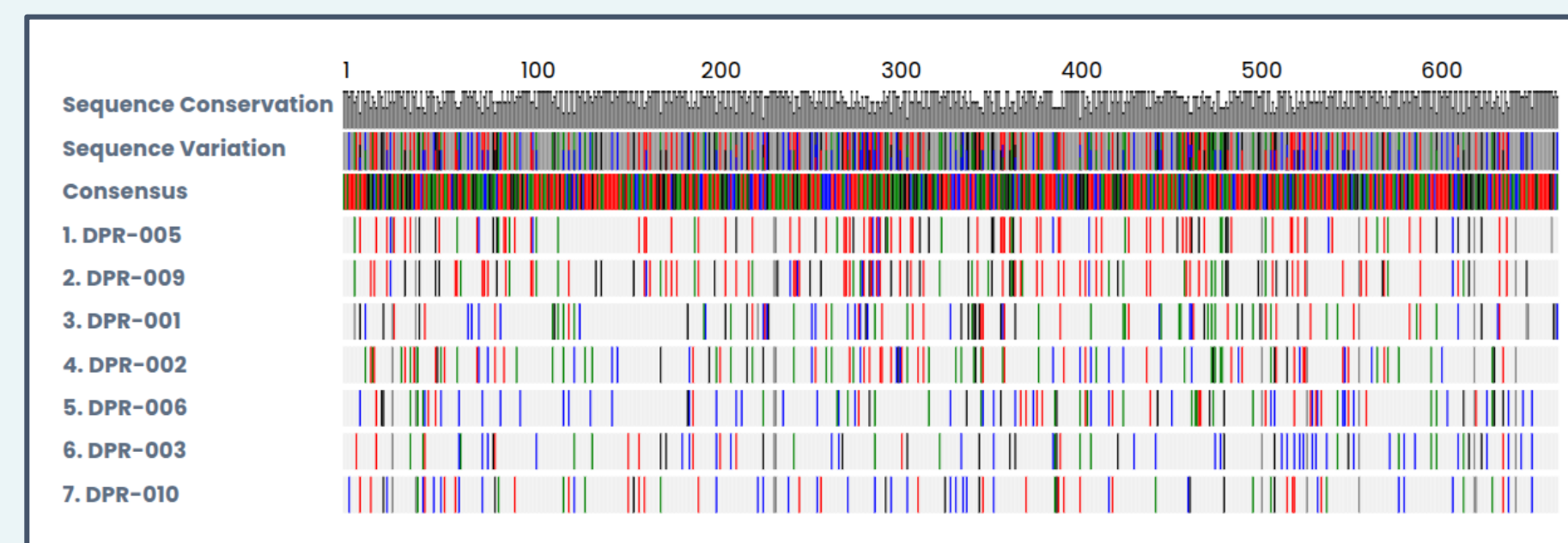
Methods and Materials



Phylogenetic Tree



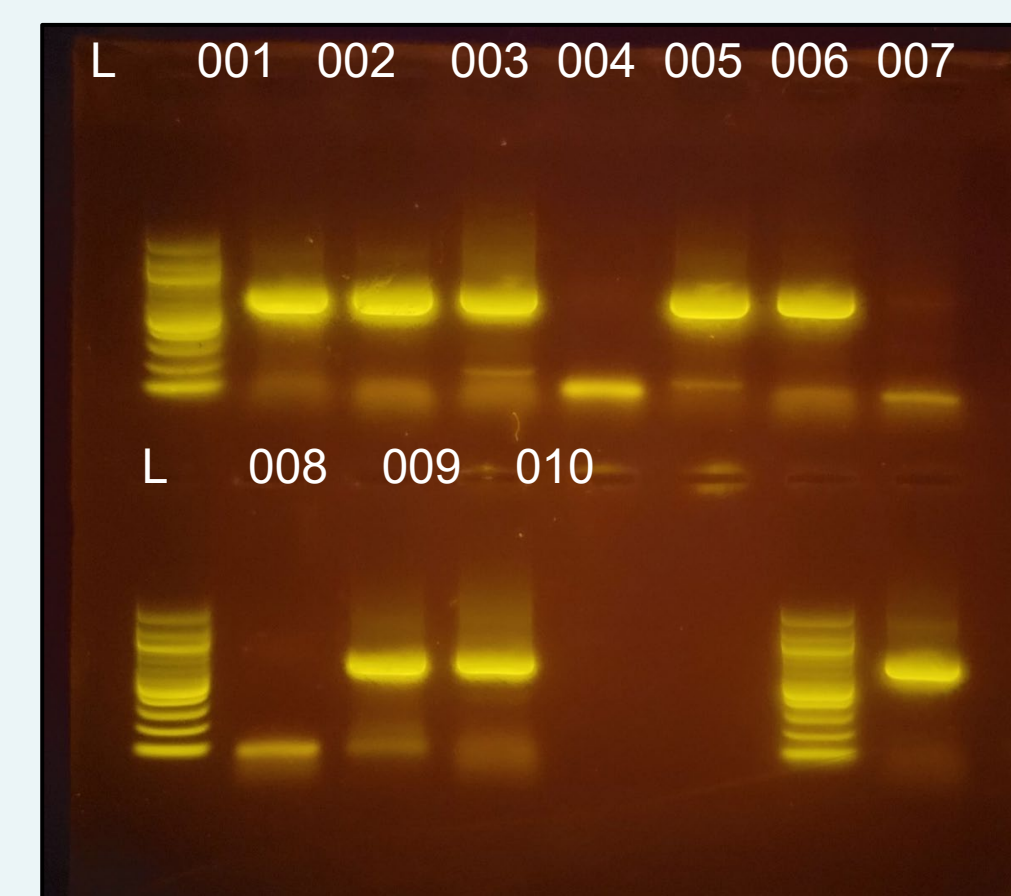
MUSCLE Alignment



Results Table

DPR 001	<i>Ischnura sp.</i>
DPR 002	<i>Aquarius remigis</i>
DPR 003	<i>Neoporus clypealis</i>
DPR 005	<i>Coras lamellosus</i>
DPR 006	<i>Tropistemus natator</i>
DPR 009	<i>Trochosa ruricola</i>
DPR 010	<i>Calathus opaculus</i>

Gel Electrophoresis Results using KOD Polymerase



Field Photo



DPR 003



DPR 001



DPR 005



DPR 009



DPR 002



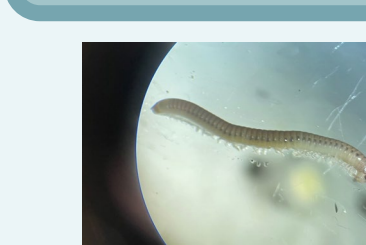
DPR 006



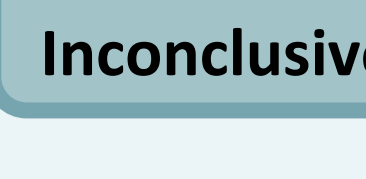
DPR 010



DPR 004 Inconclusive



DPR 007 Inconclusive



Conclusion

Levels of biodiversity were expressed in Massapequa through the many different organisms that were found during the research. Through this experiment, data was collected at different sites within the Massapequa Preserve to get a sense of the level of biodiversity. In doing this it was shown that there was high levels of biodiversity in the Massapequa Preserve because even though all the organisms collected were from the same location (Massapequa Preserve) none of the organisms identified were identical. The organisms were found to be closely related, but not the same. This was predicted to happen because the Massapequa Preserve is a natural area within the suburban ecosystem.

References

- Yao, H., Li, Z., Geisen, S., Qiao, Z., Breed, M. F., & Sun, X. (2023). Degree of urbanization and vegetation type shape soil biodiversity in city parks.
- Yao, Haifeng, et al. The Science of the total environment, 899, 166437. "Degree of Urbanization and Vegetation Type Shape Soil Biodiversity in City Parks." *Science of the Total Environment*, vol. 899, Nov. 2023, p. 166437

Acknowledgments

A special thanks to August Eberling from Massapequa Ames High School and Jeffery Petracca from Cold Spring Harbor Laboratory DNA Learning Center for their assistance to this project/experiment in contributing to the project layout, design, sample collection, and data analysis. The DNA barcoding and gel electrophoresis procedure were done at the Cold Spring Harbor DNA Learning Center with the help of professionals.