

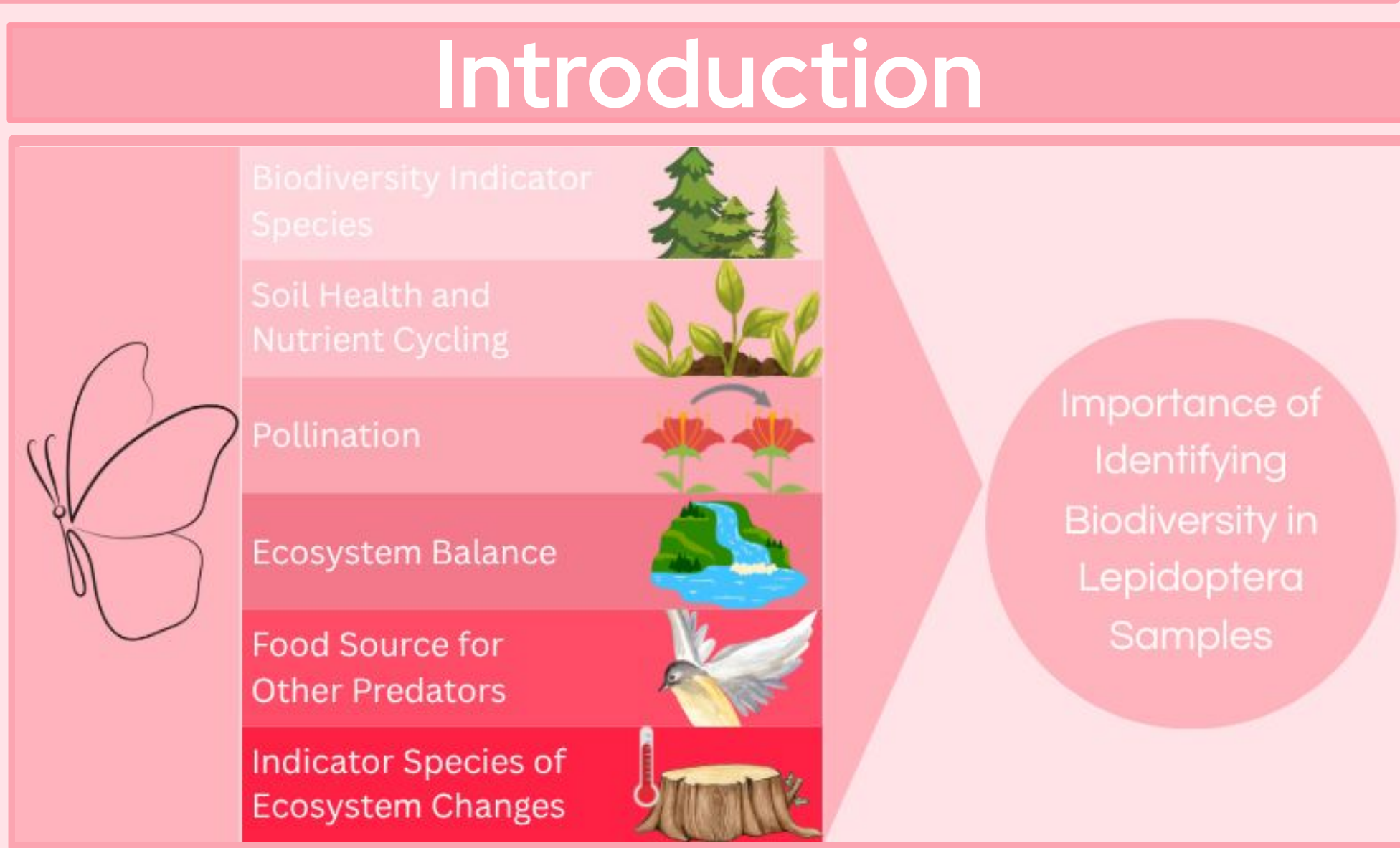
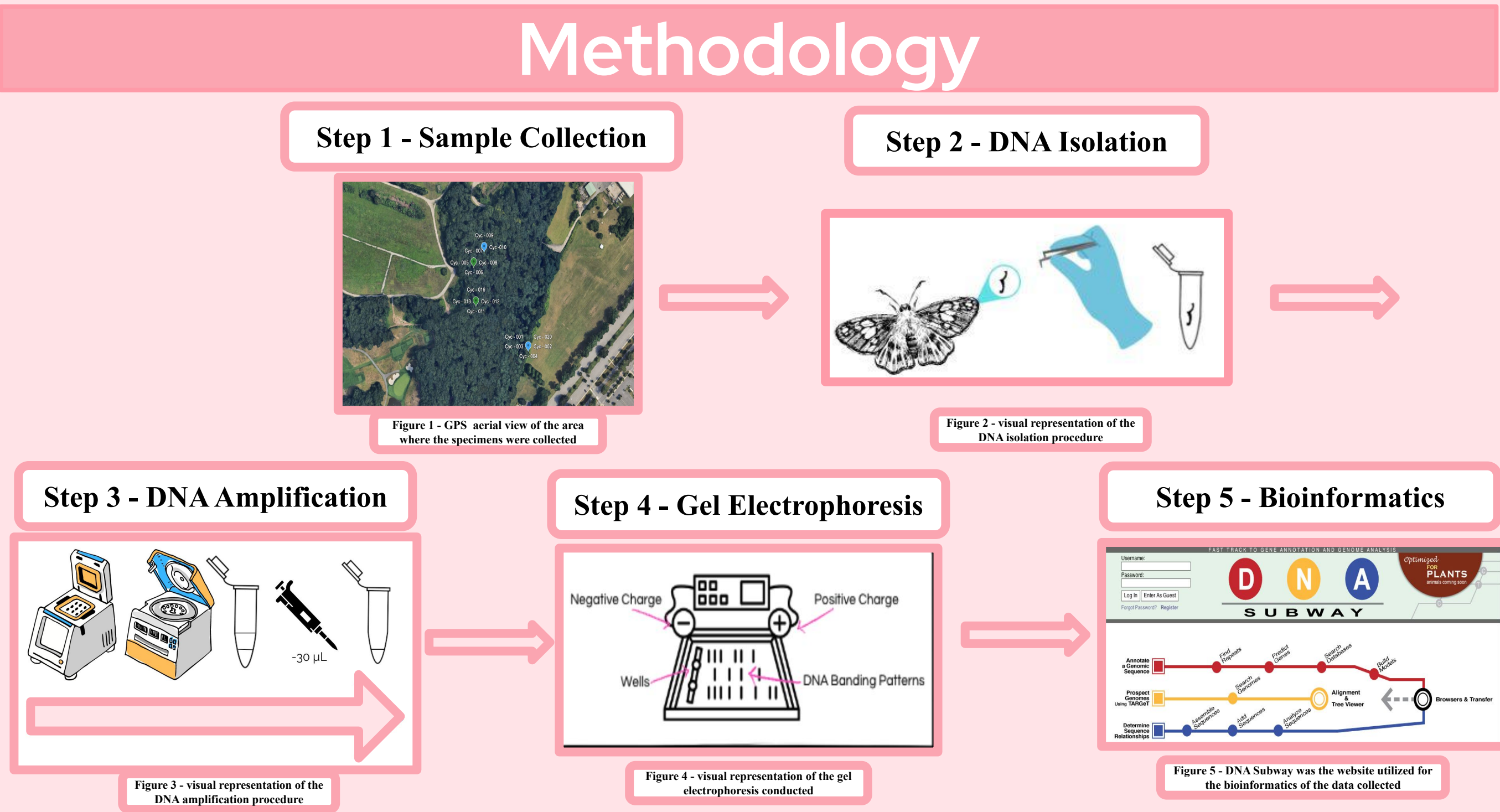
Utilizing the CO1 Gene to Navigate Lepidoptera Biodiversity in Farmingdale State University Forest

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Abstract

Biodiversity is crucial for ecosystem stability and can be effectively studied using DNA barcoding. DNA barcoding identifies species using shortened DNA sequences. These DNA sequences are compared to other genus and species of Lepidoptera. When all compared sequences have over 15 mismatches, it can be named as a novel species. The purpose of this study is to investigate Lepidoptera biodiversity on Long Island by using DNA barcoding techniques. DNA Isolation was practiced to lyse the cells. To conduct this research, insects were photographed and documented after collection from a Malaise trap located in Farmingdale State University Teaching Gardens. DNA was extracted using the Chelex method. The cytochrome oxidase I (CO1) gene was amplified through polymerase chain reaction (PCR). Confirmation of successful amplification was achieved using gel electrophoresis. The resulting sequences were then analyzed in DNA Subway to identify and compare species. DNA Subway was also used to trim the DNA sequence of mis-reads. A Simpson's index was used to calculate biodiversity. The results indicated a high level of biodiversity, reading at a number of 0.99. Future research could explore comparing forest Lepidoptera and field Lepidoptera to obtain differences when in opposite habitats.



Research Goal

Determine how the CO1 gene can be used to measure and compare biodiversity of Lepidoptera in 100% forest habitats.

Hypothesis

Ho - The CO1 gene cannot be used to proficiently measure and compare Lepidoptera biodiversity within forest habitats.

Ha - The CO1 gene can be used to effectively measure and compare Lepidoptera biodiversity within forest habitats.

Key References

ARTICLE #1: Malaise trap and insect sampling: Mini Review
Sheikh, A. H., Thomas, M., Bhandari, R., & Meshram, H. (2016). Malaise trap and insect sampling: Mini Review. Bio Bulletin, 2(2), 35-40.

Goals - The goal of this study was to relate contrasting and comparing aspects of different malaise traps into a single window system

Findings - Malaise traps are able to collect diverse insect groups efficiently, but certain factors such as collectors, tap location, killing agents, and trap dimensions have impacted certain aspects of collection

ARTICLE #2: DNA Barcoding for Identification of Agriculturally Important Insects
Jalali, S. K., Ojha, R., & Venkatesan, T. (2015). DNA barcoding for identification of agriculturally important insects. New horizons in insect science: Towards sustainable pest management, 13-23.

Goals - The goal of this study was to examine the ability of DNA barcoding in identifying and assigning unknown specimens to species besides facilitating the discovery of new species.

Findings - DNA barcoding is favorable as it is a decisive tool in quick and reliable identification of insects.

