Determination Of the Invasive Invertebrate Species In Central Park

Allegra Masterson, Jay Huennekens Mentor: Michael Paul

Dwight School New York

Funded by the Thompson Family Foundation

Abstract

New York City is a prime destination for invasive species via trade and tourist travel. The objective of this investigation was to determine the frequency of invasive beetles in NYC, later changed to determining the frequency of invasive invertebrates due to a lack of beetle specimens. Polymerase chain reactions and gel electrophoresis were used to amplify DNA samples obtained from specimens, and Sanger sequencing was then used to trim and analyze the sequences, providing a list of species that were similar to the amplicon. Of the three specimens that amplified successfully, one was a Japanese cockroach, Periplaneta japonica, while the other two, were of North American origin.

Introduction

- We aimed to gain an understanding of the amount of non-indigenous species in the Central Park area.
- New York's environment is frequently influenced by international trade as well as domestic trade.
- Focused on two areas in Central Park, the North Woods and the Ramble.
- Aimed to use a taxonomic database to determine the origin of the insect species we collected.
- Cytochrome oxidase one primer cocktail (LCO1490/HC2198) is typically used to differentiate invertebrate species.

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Acknowledgements

We thank Mr. Paul for putting up with us.

Materials & Methods

- We obtained 9 samples of invertebrates from two areas of central park
- We extracted DNA from the specimens and performed a polymerase chain reaction to amplify the mitochondrial CO1 gene of the samples
- We confirmed the PCR amplification by using a gel electrophoresis
- Successful amplicons were sent off for Sanger sequencing
- Afterwards, we used DNA Subway to analyze the sequences and identify the genus and species of each properly amplified specimen using the BLASTN program
- After obtaining the likely species of each specimen, we then identified each as being a native species or an invasive species

Results

- Out of the nine specimens, three amplified correctly, leaving us with three sequences to analyze.
- Our first specimen had a Bit score of 1167 for *Periplaneta japonica*, or a roach of Japanese origin.
- Our seventh specimen had a Bit score of 1176 for *Reticulitermes flavipes,* a termite commonly found in North America.
- Our ninth specimen had a Bit score of 1157 for *Discus rotundatus*, a snail found in North America and Europe.

Discussion

- These findings tell us that there are in fact invasive species in New York City.
- As one of our species found was from Japan, their predator might not have a large population or any population in NYC, thus making it easier for this species to swarm, like we found it.