Phylogenetic Reconstruction of Species around Strack Pond, Forest Park using DNA barcoding

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URBAN BARCODE RESEARCH PROGRAM
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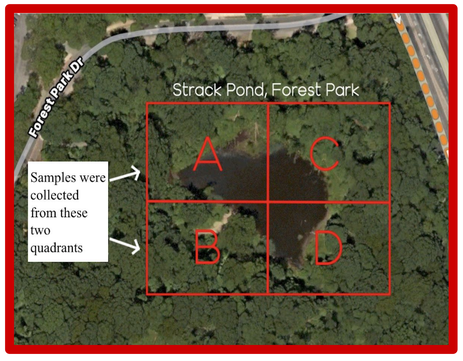
CSH Cold Spring Harbor Laboratory DNA Learning Center

Abstract

Researchers at Forest Hills High School found that there may be a correlation in the DNA of insect species collected around the same area in Strack Pond, Forest Park.This phylogenetic tree determines how the species are related. The objectives were to collect, barcode, and create a phylogenetic tree using the insects DNA. Insects were collected from Strack Pond where insect DNA can be isolated, amplified and then broken down to the level where they can be sequenced. The specimens would be sent to Genewiz for sequencing and put into DNA Subway to be analyzed.Using DNA Subway, an accurate phylogenetic tree should be accomplished. Results were not obtained due to the Coronavirus pandemic, however once kits from DNA barcoding were received, ants were collected and barcoded at home. Results from all barcoding groups at Forest Hills High School that participated were combined and a phylogenetic tree was constructed. This secondary experiment, although it yielded few useful results, was a good way to still have a DNA barcoding experience and experiment despite the circumstances.



Some of the Original Samples

KJJ- 004

KJJ- 025

KJJ- 005

KJJ- 010

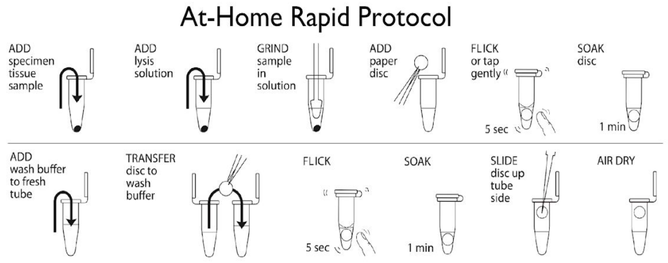
KJJ- 021

Methods

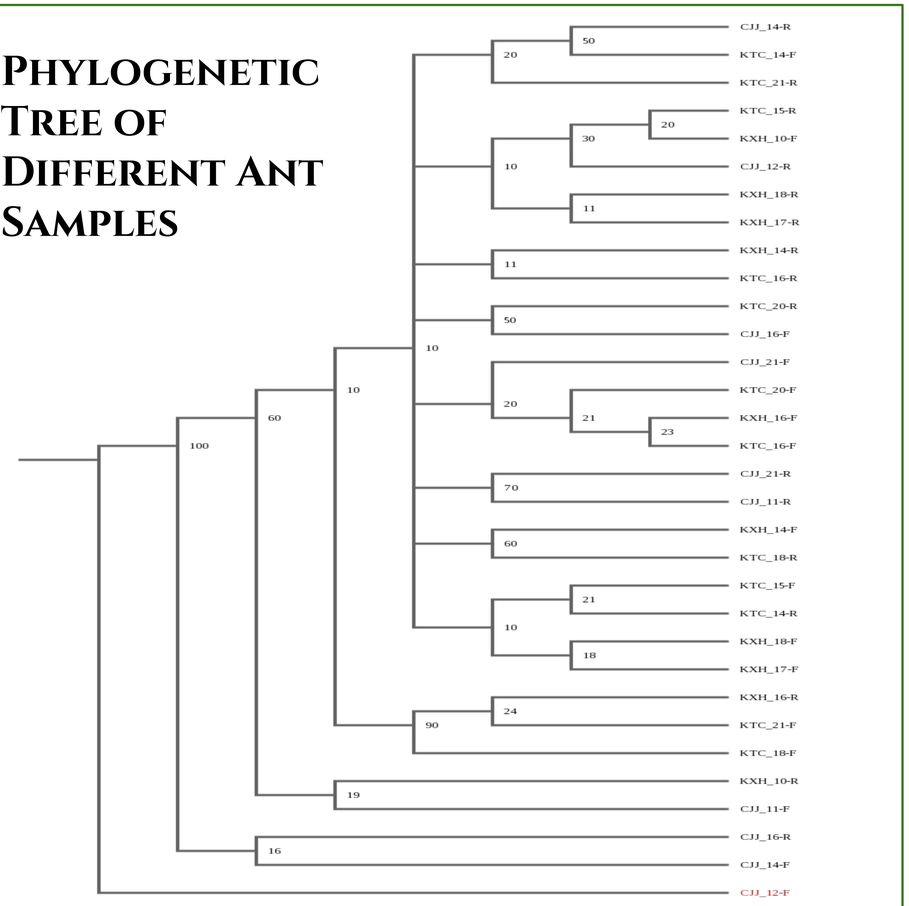
Methods for original experiment

- A permit was obtained for gathering insects
- Insects were collected at random from 2 quadrants of Strack Pond, Quadrants A and B
- DNA of samples was isolated and amplified
- COVID-19 prevented further progress but the rest of the experiment was supposed to proceed as follows:
- Using gel electrophoresis was supposed to be used to separate the DNA strands of each sample
- The DNA would then be photographed and the samples sent to Genewiz
- Once results were obtained from Genewiz they were to be put into DNA Subway where the phylogenetic tree would be constructed

Methods for at home ant barcoding experiment



Phylogenetic Tree of Different Ant Samples



Results/Discussion

Due to the COVID-19 pandemic, the experiment was not able to be completed as originally planned. However, a similar experiment was conducted at home using different ants species. Ants were collected and DNA their was isolated. Samples were sent to the Urban Barcode Project where the rest of the DNA Barcoding procedure took place.

Once the results were received from the Urban Barcode Project the data from each participating barcoding group in Forest Hills High School was combined and put into DNA Subway. Then a phylogenetic tree was constructed and it was determined how each sample relates to the other in terms of commonalities. As shown, it can be determined that all of the ant specimens evolved from one distant common ancestor. Some are more closely related which is shown between samples KXH_10-R and CJJ_11-F.

Acknowledgments

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