

Materials & Methods

(Materials are **bolded**)

- Collect **test tube** samples of bird sanctuary pond water, (40.7320° N, 73.6711° W)
- Examine water with **microscope** and search for possible insects/larvae
- Use the **Silica DNA isolation** to get the DNA samples of the larva and remove excess particles
- Save and store viable samples for PCR testing
- Conduct PCR testing and amplify larvae DNA samples using **PCR** with invertebrate-specific primer: **Insect primer, LCO1490**
- Analyze PCR results through **gel electrophoresis**
- Then, all purified samples with visible bands were sent to be sequenced and barcoded

References & Acknowledgements

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Special thanks go to our mentor Dr. Steven Gordon and the Garden City Bird Sanctuary for giving permission to collect samples from its ponds.

Abstract

Our project for Barcode Long Island consists of going to the Garden City Bird Sanctuary intending to take samples of pond water, looking for different types of insect larvae. We will be doing this in both the fall and the spring, examining the differences. From Oxford Languages, larva(e) is defined as the active immature form of an insect, especially one that differs greatly from the adult and forms the stage between an egg and a pupa: which is an insect in its inactive immature form between larva and adult.On Long Island, it is not out of the ordinary to find insect larvae living in ponds, in fact, it is quite common. Since these types of insect larvae are frequently found in Long Island ponds, we expect to find some samples of these during our research trip to the Garden City Bird Sanctuary. At the bird sanctuary there is a small pond fit for our experiment. The purpose of this project is to take the larvae, examine it using methods like the Silica Method, and PCR testing.

Introduction

- From Oxford Languages, larva(e) is defined as the active immature form of an insect, especially one that differs greatly from the adult and forms the stage between an egg and a pupa
- There are three main types of insect larvae: oligopods, polypods, and apodous, which each have their own subtypes
- In the past, many different types of these insect larvae have been found on Long Island such as Carcinas Mainis, the southern pine beetle, phantom midges, mayflies, gypsy moth caterpillars, carpet beetles
- The goal is to determine the different species of insect larvae that thrive in the pond water during the fall and spring and compare them. Through this, it is hoped to find similarities to common insect larvae that are expected to be present and to find irregularities/outlying species.

Biodiversity of Insect Larvae During the Fall and Spring at the Garden City Bird Sanctuary

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Results

Even after numerous trips to the bird sanctuary, the study only successfully found one larva. On the other hand, in the murkier, non-filtered water, numerous plants were found. Samples from the Garden City Bird Sanctuary were collected on 11/16/23 and 4/2/24 (a fall trip and a spring trip) and a water sample from the fall visit was found to contain an insect.

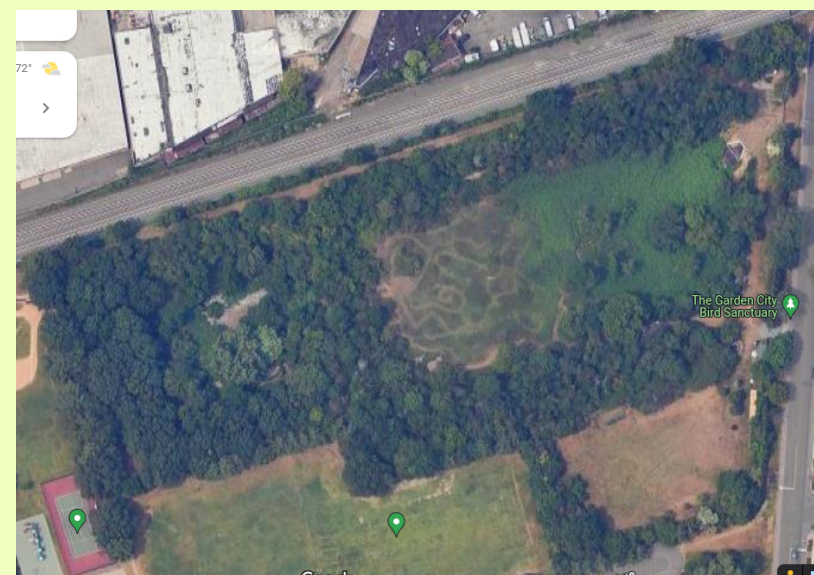


Figure 1: Bird Sanctuary

Figure 2: Gel Electrophoresis results of unknown insect



Discussion

Although the discovery of larvae seemed promising in pond water, only the fall pond water collection yielded an insect, while the spring sample did not. The possible reasons for this unsuccessful result are: there was no insect DNA present in the samples, there was a small quantity of insect DNA, and that the DNA within the sample was degraded. However, to combat these issues, a new solution is possible, metabarcoding. Metabarcoding provides a future solution where multiple insect larvae samples can be barcoded at once, even with a small DNA sample. Therefore, by using metabarcoding, the study will be much more successful with more insects being identified, despite the small DNA sample. With more identified insects, these species can now be compared between the two seasons and analyzed for any commonalities or irregularities in insects that may disrupt or aid the biodiversity and ecosystem of the Garden City Bird Sanctuary Ponds.