Biodiversity in Central Park at Turtle Pond and the Reservoir

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Abstract

For this experiment, hula hoops were thrown near 2 ponds in Central Park, Turtle Pond and the Reservoir. Plants, sticks, and insects that were in the hula hoop areas were placed in plastic bags. The collected samples were then brought to the lab where the DNA from the samples was extracted using 2 methods: Chelex DNA Isolation and PCR.

Introduction

Central park is one of New York City's most important and beloved attractions, and unlike the empire state building or the Statue of Liberty, it is teeming with life and ecosystems that you would never have noticed. We are going to be researching the different types of organisms and plants found around two different ponds in Central Park, located in Manhattan, New York City. The two ponds we are going to be looking at are Turtle Pond and the Reservoir, and we are looking for the express purpose of seeing and comparing the amount of biodiversity in these given places. According to National Geographic, biodiversity refers to the different varieties of species that live on Earth. This includes plants, animals, fungi, and bacteria (Lanting, 2019). Because there are so many different species that have yet to be discovered on Earth, we refer to biodiversity to talk about this topic. Biodiversity is important because it talks about the survival of species and in the bigger picture talks about the functioning Earth as a whole and the things that live on it that help our planet. Michigan State University wrote an article discussing the importance of pond plants and a healthy aquatic ecosystem. These plants offer shelter, food, and overall environment for the organisms living in the pond near to it (Clawson, 2018). The time when these pond plants are an issue is when they impede the original use of the pond. Additionally, pond plants are crucial to maintaining a health ecosystem and can come in four different types. 1. Submerged 2. Floating 3. Emergent 4. Shoreline. We are going to collect near or in the vicinity of the pond.

Materials & Methods

Throwing the Hula Hoop

Materials:

- 1 hula hoop/quadrat
- A place to throw the hula hoop
- Various gardening tools
- 1 pair of hands
- 15 ziploc bags

Procedure:

1. Find a spot in a place rich with nature, or any living organisms.
2. Throw the hula hoop around this spot, and find it where it landed.
3. Use hands to dig up flora from the area within the hula hoop.
4. Use your tools that are used to capture insects to capture insects.
5. Collect your flora and fauna and bring it back to your lab to test on.

Sample Processing:

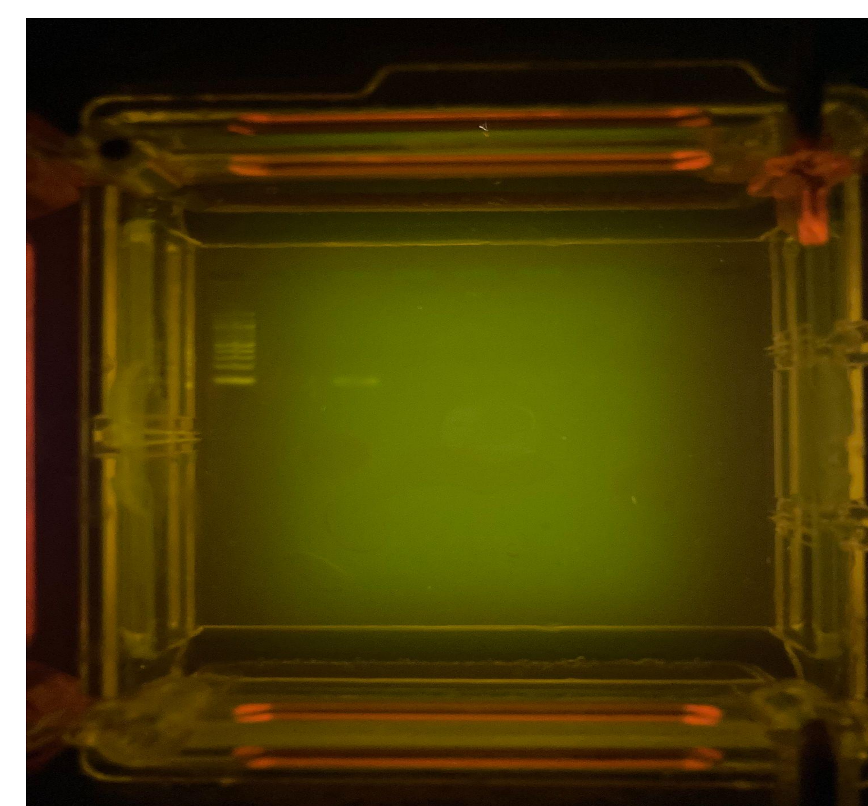
DNA Extraction - Chelex DNA Isolation

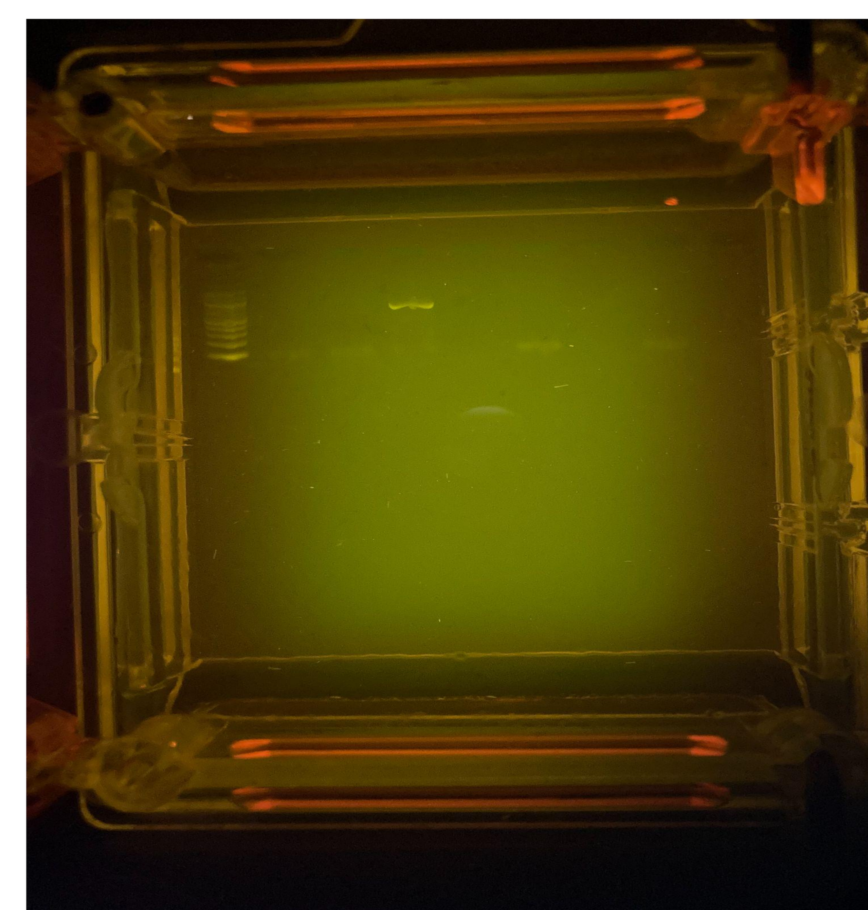
The first step is to open a tube of chelex solution. Then add a specimen tissue sample. Next, grind the sample in solution. After that, boil water and fill mug near to top. Now place tube through foil. Then rest on mug the chelex sample + sample submerged for 10 minutes. Remove sample from water and let chelex settle for 10 minutes. Now add paper disc (Whatman Disc). Soak for 1 hour (60 minutes). Next, slide disc up, tube side (be very careful). Finally, transfer disc to TE.

DNA Extraction - PCR

The PCR extraction technique allows us to make copies of one region of DNA and mimics DNA replication in an in vitro environment. The three primary steps of PCR amplification include: Denaturation (this occurs between 94 and 96 degrees celsius), Annealing (this occurs between 55 and 65 degrees celsius), and Elongation (this occurs at 72 degrees celsius). The procedure for this method includes: 1. Add primer mix 2. Transfer DNA to PCR tube and 3. Amplify in the thermal chamber.

Results





Discussion

We only had two samples containing DNA out of the 36 samples collected. When we were looking at the gel electrophoresis for the first time, we saw that there were only two bands that looked promising. Some of the possible errors that may have occurred were: poor quality of genomic DNA (for instance, the genomic DNA doesn't have high molecular weight or looks degraded), there was too much DNA sample in the liquid, DNA yield is low, and the DNA wouldn't have worked in a downstream application.

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