An Investigation of the Biodiversity of Beneficial and Detrimental mushroom Species and how they Affect the Environment in Glen Cove, Long Island, New York using DNA Barcoding

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Abstract

Mushrooms impact the ecosystem by breaking down any decaying organic matter in a similar process to digestion which will allow it to absorb those nutrients. This is important and helpful to the environment because it helps break down and recycle the nutrients (Wildlife leadership Academy, 2018). We think that the biodiversity of mushrooms commonly found around Glen Cove are more likely to be species that are beneficial for the environment. We also think that Garvies point will have more diversity of beneficial mushrooms compared to the biodiversity of mushrooms we would find around Glen Cove high school campus. Mushrooms will be collected from both sites and we will use DNA barcoding to isolate the ITS gene, used for identification of fungi species.

Introduction

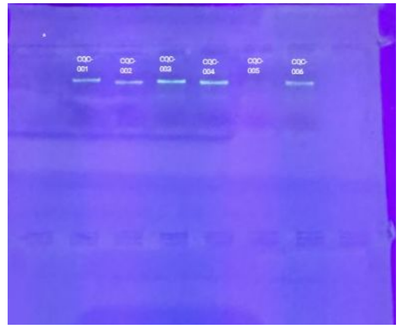
Mushrooms can be placed into one of three categories; parasitic, saprophytism and mycorrhiza. Parasitic fungi can invade a living host, obtain nourishment and typically cause damage to the function and structure of the host.

Saprophytes grow on dead organic matter such as fallen leaves, and are the primary recyclers of nutrients plant roots and dead wood. They extract carbon dioxide and minerals from it. (Engelbrecht, 2006) This category includes mushrooms that can be used for food or medicine. such as for example white button, crimini, shiitake and oyster mushrooms. These fungi are beneficial to the environment. We expect to find different samples of Saprophytes since they are commonly found on Long Island. They will be found around our school campus and in Garvies Point Preserve. We expect to find a greater diversity of saprophytes at Garvies point than at our school.Mycorrhiza is a fungi which grows with the roots of a plant in a symbiotic or mildly pathogenic relationship. According to a research group, these mushrooms are beneficial because they can absorb extra carbon dioxide from the atmosphere. Carbon dioxide is a big factor in global warming and climate change so mycorrhiza absorbing some extra CO_2 is a beneficial trait. These fungi are beneficial to our enviroment. Mycorrhizae are typically found in forests, so we think we will get a more diverse sample of mycorrhizae at Garvies Point compared to Glen Cove.

The purpose of this project is to survey the different species of fungi found in Glen Cove and then research the type of species so we can determine if they have a beneficial impact on our ecosystem. We know the categories of mushrooms but are unsure of specific species that are local to us. This project is important because it is good to know the wildlife in your area, the kind of fungi that commonly grows and the benefits it`1 can bring. By doing this project we will figure out what fungi are around us and then we can determine if they are beneficial or detrimental to our environment.

Materials & Methods

We will collect samples from 2 sites, from the Glen Cove High School campus and Garvies Point. Garvies Point is a nature preserve in Glen Cove. The purpose is to compare biodiversity in Garvies Point compared to Glen Cove High School campus. We are looking to find how the difference in the environment can affect the different species of fungi that can thrive there. We expect more biodiversity at Garvies Point than at the Glen Cove High School campus, there is more wildlife, less human activity and there is more land of forest and nature to cover. From each location we are planning to get 10 samples from both Glen Cove High School campus and Garvies Point. Gloves will be worn for protection and then one sample will be collected for each species of fungi, we will base this mostly on phenotype, and try to collect samples that look visibly different.



Gel showing successful DNA amplification except sample 5

Results/Discussion

CQC- 001 - Trichaptum biforme common name: 0 mismatches Violet-toothed polypore
CQC-002 - Stereum fasciatum common name:False turkey-tail 2 mismatches
CQC- 003 - Cerrena unicolor name:Cerrena unicolor 0 mismatches
CQC- 004 - Trametes versicolor name:Turkey tail 0 mismatches
CQC- 006 - Coniochaeta Name : Coniochaeta 94 mismatches

We extracted the DNA well and we saw matches for 5 of our DNA samples except 1. We found DNA and found matches for the majority of our DNA samples. They are important because they show that we successfully extracted 5 out of the 6 DNA samples. We were also able to find their scientific names. Originally we were seeking to compare the diversity between Garvies Point and Glen Cove campus mushrooms. However, we were unable to find mushrooms on Glen Cove campus. If we were to repeat this study we would attempt to collect at warmer times of the year to maybe have more diversity of samples. The Violet-toothed polypore and False turkey-tail are similar because both are beneficial to the ecosystem by decomposing old wood, which is why they are found on old trees.

Acknowledgements

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Works Cited

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