Biodiversity of Mushrooms in the Long Island Pine Barrens Region

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Abstract

DNA was extracted from mushrooms collected from the campus of the Shoreham-Wading River High School, identified by physical characteristics and then analyzed to confirm genetic identity. Species identified include *Laccaria trullisata, Tricholoma sp. and Neofavolus alveolaris.*

Introduction

Fungi are a common species found in suburban areas, especially fruiting bodies such as mushrooms. While typically considered a nuisance, often removed and discarded, some of these fungi are essential to maintaining a healthy environment. Certain fungi can also help with human health in some ways, as well as being an indicator of a healthy forest environment. This study focuses on the Shoreham Wading-River community pond, where there are an abundance of mushrooms. Originally designed as a runoff station, the pond has the potential to have heightened amounts of trace metals such as: Fe, Mn, Zn, Cu, Pb, and Cr, due to the close proximity to a heavily trafficked road. Car exhaust is normally made up of primarily chromium, zinc, and iron and these chemicals, emitted as particulates, can settle out into the water and soil surrounding the pond (Pereira 2007). The presence of mushrooms such as the *Russula Emetica* or other genetically similar species would potentially reduce the chance of mutated organisms in and around the pond. To help facilitate the creation of a healthy pond ecosystem, identification of the species of mushrooms surrounding the pond will be genetically identified, allowing for the selection of species that are more efficient in their removal of metals from the soil components.

Collecting mushroom samples

Identification of sample mushrooms through taxonomic methods

Sample #	Common Name	Scientific name
1	Torn fibrecap	Inocybe lacera
2	Waxcap	Hygrocybe sp.
3	Yellow milkcap	Lactarius chrysorrheus
4	Sarahusokas	Entoloma serrulatum
5	America abrupt bulbed Lepidella	Amanita polypyramis
7	Sarahusokas	Entoloma serrulatum
10	Panther cap	Amanita pantherina
11		Gymnopus dichrous

Materials and Methods

In this study, samples were collected in the Pine Barren region of Long Island, using a knife to remove mushrooms from their original location. Samples were photographed where they were found and growth habit was noted. Once removed from the site, samples were stored at 4°C. Sample species were taxonomically identified using Field Guide to Common Macrofungi in Eastern Forests and Their Ecological Functions.
As per the Barcode Long Island DNA extraction protocol, lysis solution was used in order to break down cell walls, then silica resin was added to bind DNA. After washing with wash buffer to remove impurities, DNA was released from the silica beads by eluting in distilled water. 50ul of this DNA solution was transferred to a new tube and stored at -20C until ready for PCR. In the PCR reaction we used the ITSIF primer, and PCR products were checked for amplified DNA using gel electrophoresis, and the resulting gel is shown below. Samples 1-5, 7, 10 and 11 were sent for sequencing.
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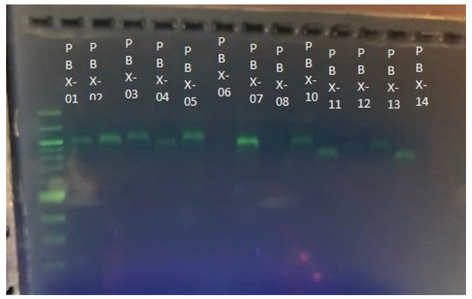
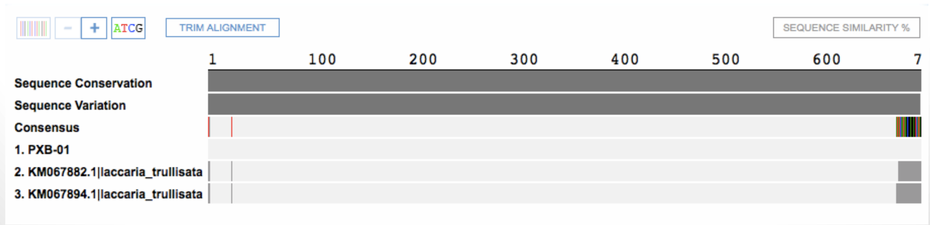
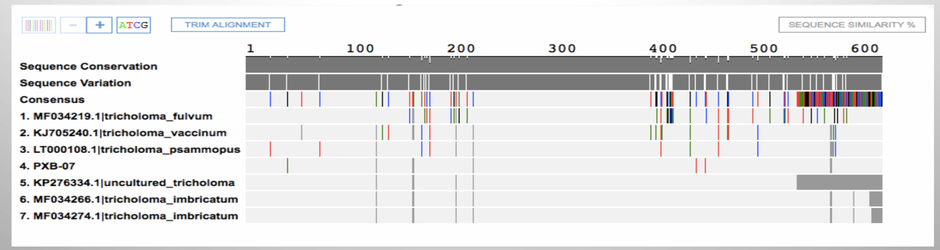


Gel electrophoresis to confirm presence of DNA after PCR

Results





Discussion

None of the samples we identified taxonomically matched with the names provided by the BLAST search, but of the species that were sequenced, several did match our samples in appearance and therefore are believable specimen identification.
Mushrooms proved difficult to work with for extraction purposes, as their tissue is very dense and rubbery, but as evidenced from our electrophoresis gel post PCR, the majority of our samples amplified well despite this.
The diversity of mushrooms in the collection site in the Pine Barren region was fairly significant, as we were able to collect fourteen samples with very different looking appearances. Our next steps will be to analyze the soil around these collection locations as well as the tissues of the mushrooms to determine the effects of the mushrooms on the removal of metals from the soil environmnet.

Sample 1 *Laccaria trullisata*

Sample 11 *Neofavolus vaccinum*

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