CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)

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Project Number

S1510

Project Title

A Unique Approach in DNA Based Identification of Airborne Fungal Population in the Sacramento Area

Abstract

Objectives/Goals

My objective is to identify and document the airborne fungi present in the Sacramento area. I believe this can be achieved by a combination of a new method of collection, culturing, and identification.

Methods/Materials

Airborne spores were collected in the Fall and Winter months using an Ionic Spore Trap. Collected spores were cultured in growth medium. Well separated individual colonies with sizable mycelium were collected, frozen in liquid nitrogen and stored at -70°C. Fungal DNA were extracted from the mycelium and thereafter the nucleotide sequence of the fungal 18S rRNA were determined by Polymerase Chain Reaction (PCR) and nucleotide sequencing. The identity of each fungus was determined by matching the nucleotide sequence with the GenBank database.

Results

This project demonstrated an effective method of collecting and culturing ascospores which has not been previously achievable. In this study, approximately 15% of the collected spores were viable. Notably 60% of the viable spores were ascospores. Specifically, Lecythophora, Phaeosphaeria rousseliana, Phaeosphaeria CC52, Phaeosphaeria caricicola, Coprinellus xanthothrix, and Trametes versicolor were shown to be present in the Sacramento area.

Conclusions/Discussion

This work has successfully demonstrated that viable airborne ascospores can be collected for microbiological culture and identified by DNA sequence analysis. A detailed database of airborne ascospores can be established using this method. In addition, a parallel study conducted in the laboratory has demonstrated that PD170 (Phaeosphaeria) reacts with sera samples from patients with fungal allergies. Future studies identifying these fungal allergens at the molecular level will improve medical therapies.

Summary Statement

This project identifies and documents the airborne fungi species present in the Sacramento area by a combination of a new method of collection, culturing, and DNA identification.

Help Received

Used lab equipment at the University of California, Davis under the supervision of Professor Patrick Leung