CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
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Project Number
S1999

Project Title
A Comparative Study of Nuclear Differences Between Similar Brodiaeas

Abstract

Objectives/Goals
My interest is to determine the paternity of the Brodiaea santarosae in comparison to other related species. In analyzing already published chloroplast sequences I saw that they are very similar. Based off of this information, I deduced that there is not enough knowledge to determine the procession of paternity between the questioned species. In order to attain more knowledge, I decided to take an alternate route in sequencing. I am interested in amplifying a nuclear gene segment, cloning it, sequencing this fragment and comparing the sequences of the other Brodiaea species in order to come to a conclusion concerning the paternity of said species.

Methods/Materials
-Extraction of DNA for the collected plant specimen using a Qiagen kit.
-Setting up PCR using the taq polymerase enzyme from TAKARA as a test to see if extracted DNA will amplify a product from B. filifolia.
-Gel Electrophoresis (ran after every PCR)
-Test PCRs using the TAKARA enzyme on Brodiaea and Citrus Samples. Test for the appropriate annealing temperature required for the amplification of products of the expected size.
-Run final PCR
-Cloning of PCR amplified products in E. coli cells
-Plasmid Miniprep using a Qiagen kit
-Sequencing and Analysis

Results
The results returned were close to what was anticipated but there were a few discontinuities with what was expected. It was predicted that the returned nuclear sequence would be of MDH, but it clearly was not, so further testing will be required to properly identify the type of nuclear gene that was sequenced. The results returned from B. filofolia diverged from the other tested species considerably, so it was eliminated from the sequencing chart and chromatograph in order to try to view the results without such a protruding outlier. While excluding B. filofolia it is apparent based off of the chromatograph that the specimen are a part of a closely related family.

Conclusions/Discussion
The chromatograph shows specific peaks nearly every time, but the broadness off the rest of the data is shown in the additional noise which show a discontinuity with the sequences. While this was expected, the returned results were not sufficient to form a cluster that would adequately and conclusively inform of

Summary Statement
The purpose of this project is to inform of the paternity of the Brodiaea santarosae in comparison to other similar Brodiaea species in order to determine santarosae's ability to evade extinction.

Help Received
Used lab equipment at the USDA center at UCR under the supervision of Dr. Ramadugu and Dr. Keramane