



**CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY**

Name(s) Jasmine A. Mack	Project Number 36605
Project Title Variations of Zeaxanthin epoxidase and Phosphoglucomutase in Landoltia punctata	
Abstract Objectives/Goals While Landoltia punctata, commonly known as duckweed, has many potential uses, very little of its genome has been sequenced and cataloged. The purpose of this research was to sequence and analyze samples of Landoltia punctata DNA and determine how the genes compare with those expressed in other species. Methods/Materials The DNA was initially analyzed by running gel electrophoresis on Polymerase Chain Reaction (PCR) samples and Restriction Digest samples. After verifying that the DNA existed in the sample, the DNA was sequenced and a BLAST analysis was conducted. Results While analyzing the samples with the BLAST database, the researcher found two new protein variations for the Zeaxanthin epoxidase and Phosphoglucomutase proteins. Zeaxanthin epoxidase functions in the conversion of zeaxanthin to violaxanthin, a process that produces the plant hormone abscisic acid (ABA). Abscisic acid regulates the resistance of stresses, seed development and plant dormancy. Phosphoglucomutase bidirectionally catalyzes glucose-1-phosphate and glucose-6-phosphate (breaks and forms glucose). Lack of Phosphoglucomutase in humans leads to PGM deficiency, a condition similar to muscular dystrophy. This means further research on Phosphoglucomutase could aid the medical community. Conclusions/Discussion After the end of experimentation, the researcher confirmed the alternate hypothesis and concluded that genes sequenced from Landoltia punctata are similar to genes expressed in other species. Future research could involve confirming the role of the proteins in Landoltia punctata. The researcher's discovery of two new protein variations were confirmed to be new and were published. This may lead to further experimentation to determine how Phosphoglucomutase from Landoltia punctata can be used to create pharmaceuticals for patients suffering from PGM deficiency and/or muscular dystrophy.	
Summary Statement The purpose of this research was to sequence and analyze samples of Landoltia punctata DNA and determine how the genes compare with genes expressed in other species.	
Help Received Ms. Katherine Huang, Dr. Andrew Vershon, Rutgers University Waksman Student Scholars Program, National Institute of Health National Center for Biotechnology Information	