DNA Sequencing and Phylogenetics for the Conservation of the Florida Ridge Biodiversity

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The Florida Ridges, ecosystems that have been undisturbed for the past millions of years, are home to many unique and rare flora. There is an expressed need to preserve these special ecosystems with significant biodiversity that is evidence to the evolutionary history of the Earth itself. DNA Barcoding is the modern way of species identification and discovery using a short section of DNA from a standardized region of the genome. Ribulose-1,5-Bisphosphate carboxylase oxygenase large subunit (rbcL) in the chloroplast, Maturase K (matK) in the chloroplast, and Intergenic Transcribed Spacer Region 2 (ITS2) in the nuclear DNA are used as barcode regions for land plants. This project established rbcL, matK, and ITS2 samples for many rare plants conserved in Bok Tower Gardens living museum, Lake Wales, Florida. DNA was extracted from each sample. The gene region was amplified using PCR, and then confirmed with Gel Electrophoresis. Samples were then sent to GENEWIZ for sequencing. Bioinformatic analysis was performed at DNA Subway and Internal Transcibed Spacer 2 Ribosomal RNA Database. The rbcL barcodes were established for every sample analyzed; the matK barcodes were established for 5 samples; the ITS2 barcodes were established for 14 samples. 41 barcodes were analyzed and submitted to GenBank. Of these, 19 were the first report of their barcode. ITS2 Secondary structure provided an extra parameter for species identification. DNA Barcoding is much quicker than traditional identification and also does not require highly trained taxonomists. Therefore, DNA Barcoding is an invaluable tool for conservation efforts.

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