Phylogenetic Tree Construction and Evolutionary Analysis Using DNA Barcoding

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Introduction

Objective: The objective of this project is to develop a computational tool that constructs phylogenetic tree and analyze conservation status from DNA barcode

- Depicts evolutionary analysis
- Facilitate species identification
- Support conservation efforts

What is DNA Barcoding?

DNA barcoding is a method of species identification using a short section of DNA from a standardized region of the genome

- Sampling
- DNA Extraction
- PCR Amplification
- Sequencing
- Sequence Matching

Genes

The mat K gene and rbcL gene are both used as markers in plant molecular biology and phylogenetics.

mat K gene:

- Codes for Maturase k enzyme
- It is widely used as a marker for plant DNA barcoding due to its rapid rate of evolution and ability to provide resolution among plant families.

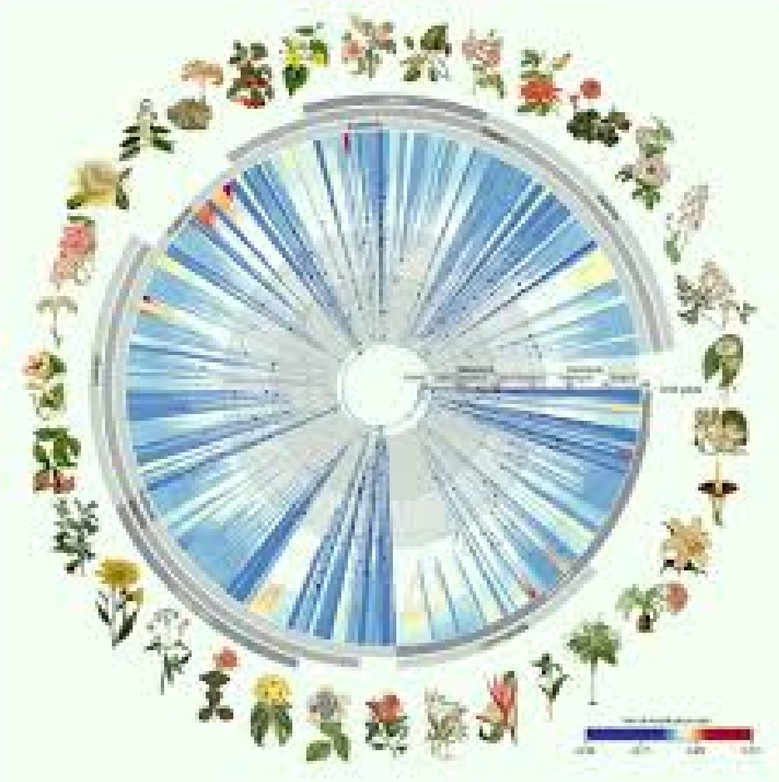
rbcL gene:

- Codes for one of the large subunit of ribulose-1,5-bisphosphate carboxylase/oxygenase
- Used in phylogenetic studies due to its relatively slow rate of evolution

Phylogeny

Phylogeny is the evolutionary history of a species or group.

- Tracing lineage
- Conservating Biology
- Comparative Genomics



METHOD FOR DETECTING THE PRESENCE OF MAMMALIAN ORGANISMS USING SPECIFIC CYTOCHROME COXIDASE I

Method for detecting the presence of mammalian organisms Using specific cytochrome C-Oxidase 1 and Cytochrome B sub sequences By PCR assays

- Application No.: 11/592,117
- Pranvera Ikonomi, Jason Cooper, Greg Sykes, Yvonne Reid

Ethical concerns in DNA Barcoding

“DNA barcoding: access to biodiversity and benefit-sharing policy issues in the Indian context” -Haribabu Ejnavarzal :

- The freedom of a scientist being questioned!
- Access to species in countries which has not signed the CBD treaty is not possible
- Without regulating the exploitation for trails in DNA barcoding and having a proper record of it, conservation status of a species cannot be determined.

Expected Outcomes

Focused Tree Visualization:

- The ability to zoom in on specific species and their hierarchical relationships, including parental and daughter nodes, for enhanced interpretability.

Enhanced Conservation Insights:

- Insights into the genetic diversity and evolutionary significance of species, aiding conservation efforts for endangered medicinal plants.
- Reusable Computational Tool:

A computational tool integrating phylogenetic tree construction and visualization, accessible for researchers and educators in bioinformatics and molecular biology.

Thank you