

The grant from the Conservation Committee of the San Diego County Orchid Society was used to assist in field and molecular work for the study of Section *Piperia* within *Platanthera* L. C. Richard *s.l.* This work has led to a publication in preparation produced from my Ph.D. dissertation “The Molecular Phylogenetics and Evolution of *Piperia* (Orchidaceae): Employing Nuclear Ribosomal ITS and Plastid Intergenic Spacer Regions” (Systematic Botany, In prep). This publication will be submitted in the fall of 2013 for review.

The field work has also assisted in the documentation of several populations of section *Piperia* populations within California, and to assess the viability of these populations. Presentations and a letter to the California Native Plant Society have been submitted requesting the change of status of *Platanthera (Piperia) cooperi* from a conservation status of 4 (plants of limited distribution), to a conservation status of 1b (plants rare, threatened, or endangered in California and elsewhere). This will provide greater protection of the species due to recent human developmental impacts.

The following is an excerpt from the abstract for this study:

Piperia Rydberg includes nine species and two subspecies, and is a section of *Platanthera s.l.* *Piperia* has been studied to a limited extent and is considered by orchidologists as a model system for terrestrial orchid studies. Scientific interest for *Piperia* has intensified because of its taxonomic placement within other terrestrial orchid genera, including its controversial placement within the genus *Platanthera*.

The main goals of this study are to: (1) assess monophyly of *Piperia*, determining the phylogenetic relationships among *Piperia* and their close relatives; (2) phylogenetically evaluate labellum color to determine whether green-flowered species are conspecific, and whether homoplasy and cryptic species are the source of some identification problems within the group. This study reports sequences from five molecular regions (ITS, *trnS*^{GCU}-*trnG2S*, partial *ndhF*, *rpl14-rpl36*, and *petA-psbJ*) and comparative morphology, analyzed employing parsimony, Bayesian inference, and maximum likelihood methods.

The results of ITS, combined plastid, and morphology data analyses strongly support the monophyly of *Piperia*. Investigation of perianth-lobe color evolution rejects the hypothesis that green-flowered *Piperia* are more closely related to one another, than to white flowered taxa; that homoplasy is common in the perianth-lobe color character; and that small green flowered taxa such as *P. leptopetala* are polyphyletic species assemblages.