Progress Report to the California Native Plant Society—Bristlecone Chapter
Systematic study of Polygonaceae Subfamily Eriogonoideae

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With the assistance of the Bristlecone Chapter of the CNPS, through the Mary Dedecker Botanic Grant program, development of my dissertation project has been made possible. Support has been used toward travel and the purchase field supplies for field collection of plants from several locations throughout southern California. From these collections it has been possible to preliminarily assess the current classification of the subfamily by employing phylogenetic methodology.

Several trips were made to southern California desert regions to several collect several taxa. Approximately 65 collections were made in southern California including [*Genus* (number of taxa collected)]: *Eriogonum* (49), *Chorizanthe* (6), *Centrostegia* (1), *Goodmania* (1), *Sidotheca* (2), *Dodecahema* (1), *Lastarriaea* (1), *Dedeckera* (1), *Nemacaulis* (1), *Acanthoscyphus* (1), *Oxytheca* (1), and *Pterostegia* (1). Due to sparse rains early in the season I was unable to collect many taxa, therefore fewer taxa overall were collected than planned. Many annual taxa did not germinate and grow at collection sites due to the scarceness of rain. Collection of these taxa is now planned for early spring 2007.

Laboratory work completed to date includes DNA extractions, PCR amplifications, PEG purifications, sequencing of DNA regions within the chloroplast (trnT-L-F) and nuclear (internal transcribed spacer, ITS) genomes, and preliminary phylogenetic. Anatomical and morphological methods will also be used to examine the relationships within Eriogonoideae; these studies are currently underway. Preliminary results from phylogenetic analyses show that the genetic relationships of Eriogonoideae are not reflected in current classifications. Further studies and collection of additional taxa are necessary in order to represent all morphological groups in subfamily Eriogonoideae in this study.

Maximum parsimony strict-consensus trees for regions trnL-F and ITS are attached. These phylogenetic trees show that several of the subgenera of *Eriogonum* are not monophyletic, and they show that *Chorizanthe* might be nested within *Eriogonum*. There is not much conflict between the nuclear and chloroplast datasets; both of the trees appear to show similar phylogenetic patterns and several clades are present and represented by most of the trees. However, the position of several the smaller genera (incl. *Dedeckera, Nemacaulis, Acanthoscyphus* and others) are dubious when comparing trees. In addition, the resolution of ITS does not appear to adequately represent the phylogenetic relationships of early diverging lineages. This preliminary data will direct me in the selection of additional molecular markers (DNA regions) that are suitable for the evaluation of the genetic relationships within Eriogonoideae.

I will complete this project upon graduation (expected June 2010). Laboratory work and planning for future field collections is currently in progress. Currently I am in the process of obtaining application collection permits for 2007. Field collecting will resume in February 2007.

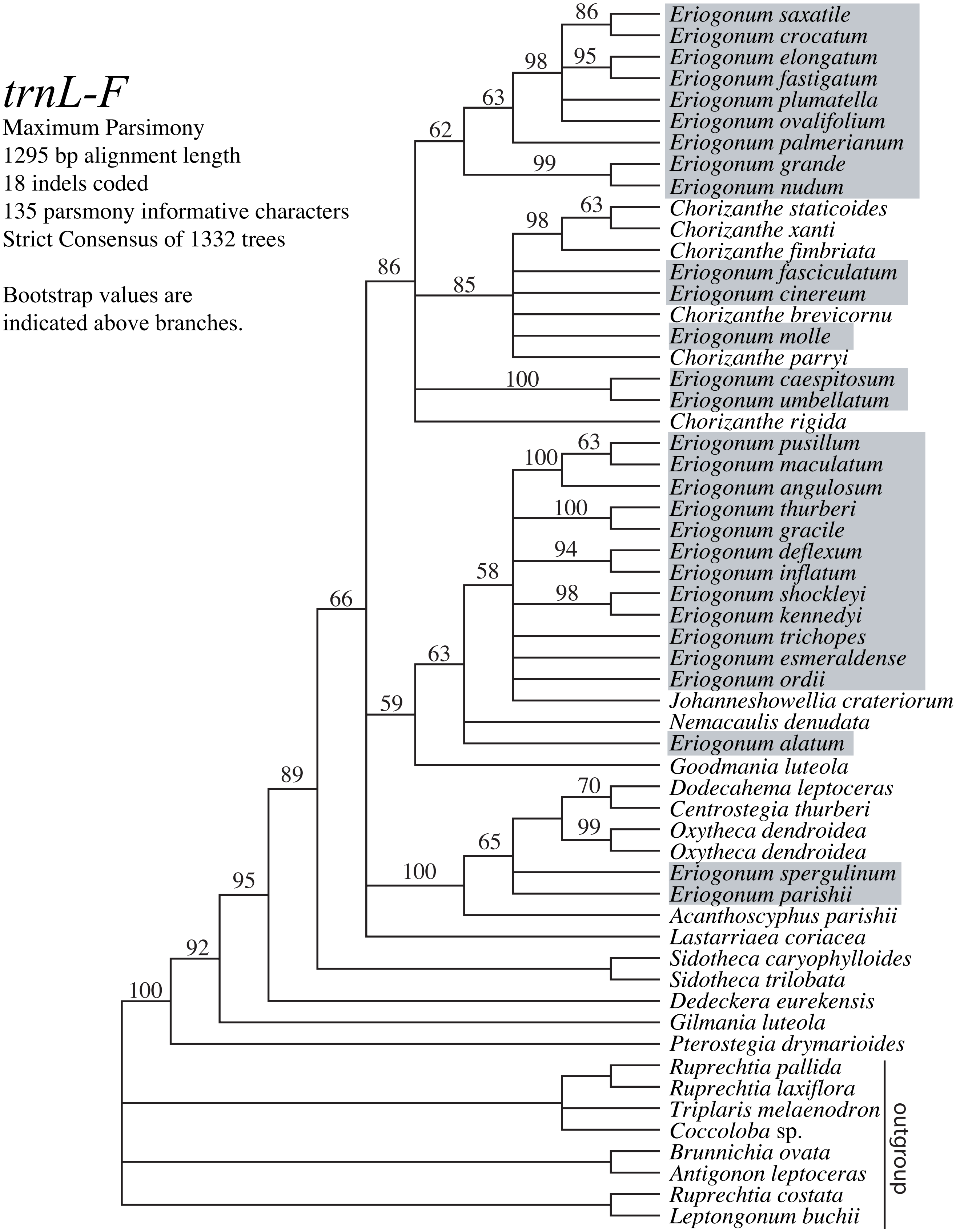

Figure 2. Preliminary parsimony analysis of *trnL-F* (cpDNA) sequences, representing 14 genera and 49 species within Eriogonoideae. Strict-consensus of 1332 most parsimonious trees. Bootstrap percentages are shown above branches. Also note that several species in the genus *Eriogonum* (highlighted) appear to be more closely related to species in other genera.

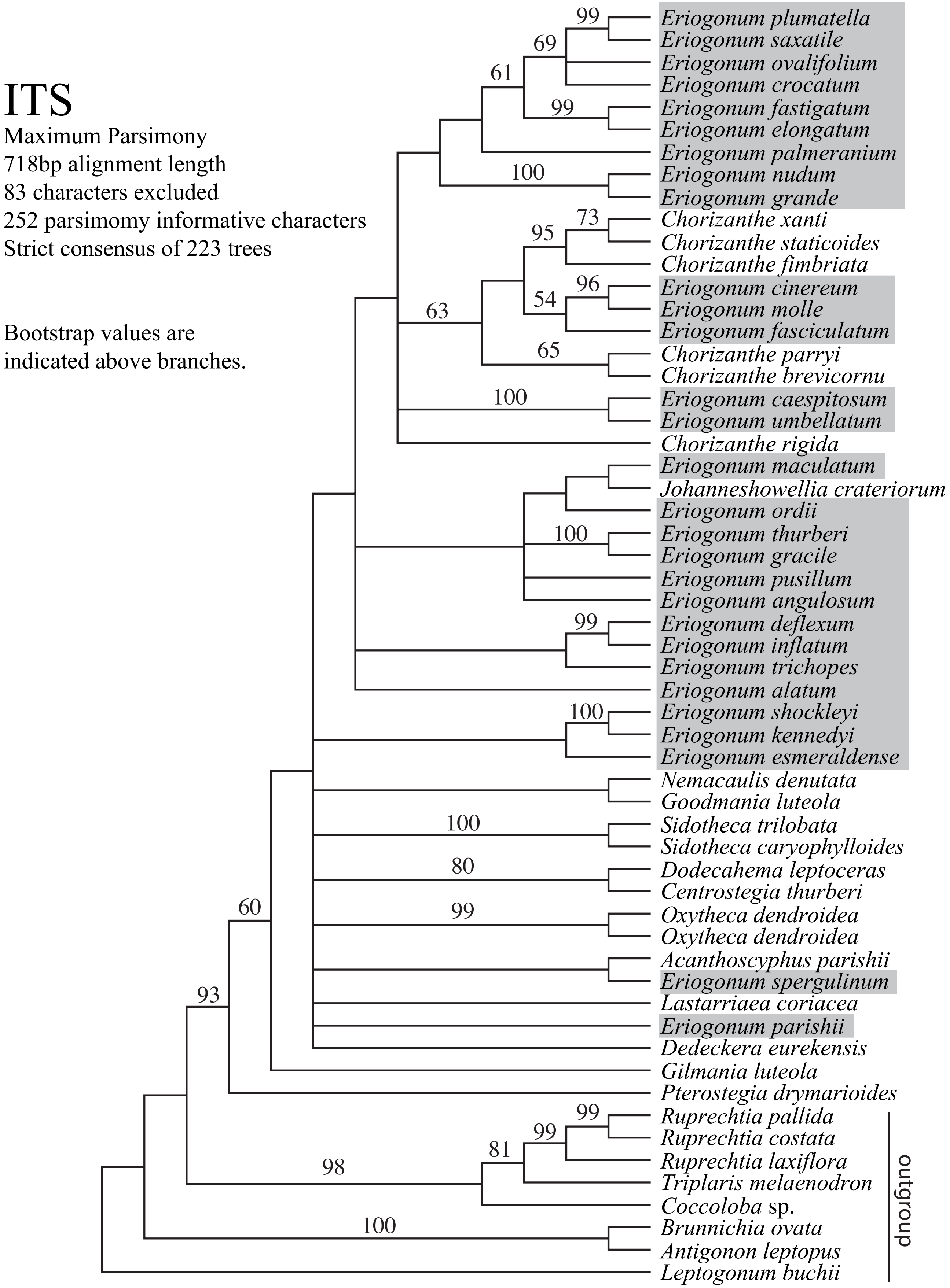

Figure 1. Preliminary parsimony analysis of ITS (nDNA) sequences, representing 14 genera and 49 species within Eriogonoideae. Strict-consensus of 223 most parsimonious trees. Bootstrap percentages are shown above branches. Also note that several species in the genus *Eriogonum* (highlighted) appear to be more closely related to species in other genera.