



A Study of Genetic Diversity and Structure of San Diego Thornmint

San Diego thornmint (*Acanthomintha ilicifolia* (Gray) Gray (Lamiaceae)) is a winter herb restricted to San Diego county in the United States and Baja California Norte in Mexico. Historic records document 80 occurrences of this species, with 55 known extant occurrences in San Diego County currently. The status of approximately 13 occurrences in Baja California Norte is unknown. The narrow range of this endemic, the decline in numbers of the populations, and the susceptibility of the species to habitat conversion and degradation have all been cited in its listing as a threatened species under federal regulations, as an endangered species by the state of California, and as a species of concern by several local municipalities.

A major concern regarding the recovery of San Diego thornmint (SDTM) is the unstable or small size of many of its populations. As such, some habitat managers consider supplemental seeding or planting to be a key element of restoration or enhancement. For small occurrences, seed may be collected off-site, but there are no guidelines for selecting appropriate, locally adapted seed sources. Attempts to translocate salvaged occurrences have largely failed. This could be the result of various factors, but a strong candidate for a main or contributing issue is mismatched seed source.

This study—the first genetic study of San Diego thornmint—was designed to investigate the amount, nature, and distribution of genetic diversity in the species. Although a comprehensive study was both beyond the scope of the budget and better approached through informed sequential stages, the results of this study will provide sufficient information to develop preliminary guidance for genetically appropriate management and restoration. The guidelines will help prevent genetic contamination of extant thornmint populations and potentially improve success of restoration and salvage projects because of the ability to improve the matching of (genetic source of) plant materials with site.

The genetic investigation was approached through two companion studies: (1) a rangewide laboratory study of population (occurrence) differentiation and (2) a common-garden study to assess adaptive variation in a subset of populations. The first study was based on a broad range (15) of sites throughout the extant (US) range and used an appropriate and low-risk methodology (isozyme analysis) to measure (selectively neutral) genetic diversity. Spatial patterns in genetic diversity were assessed by comparing diversity within and among populations (i.e., element occurrences). This study also provided a measure of ploidy within the sampled populations—an important consideration for any restoration or reintroduction activities. Many species in this family (*Lamiaceae*)—with examples from *Thymus*, *Glechoma*, *Pycnanthemum*, *Salvia*, and *Mentha*—are polyploid, providing reasonable possibility that San Diego thornmint, also, may be a polyploid.

The second study provided some insight into local adaptation by growing out seeds from a subset of the study populations and measuring a range of morphological and phenological characteristics in two controlled environments (differing in moisture supplied). Significant differences among populations grown within the same conditions would provide evidence of genetic differences and, depending on the trait, could reflect adaptive differences.

Research Collaboration

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