A New, Large-Flowered Variety of *Eremocarya micrantha* (Boraginaceae)
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Summary By:
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Significance Statement: The complexity of different plant species is quite interesting in the way plants have evolved to live in a constantly changing environment. Different plants can look very similar from the outside visible morphological differences; however, there are many physical and genetic features that can classify plants as different. Research amongst different plants can account for geographical and climatic differences and these can be further supported through DNA sequencing techniques and molecular studies. The information gained through these research projects are valuable in the study of character evolution and determining taxa.



First Picture: Eremocarya lepida (Simpson 3847, SDSU 21205); *Second Picture: Eremocarya micrantha* var. *pseudolepida* (Simpson 2816, SDSU17572); Third Picture: *Eremocarya micrantha* (Simpson 3126, SDSU19604)

At first glance, these three flowers look like they are on the same plant, implying they are the same species. However, each of these flowers belongs to a separate species of plants. Recently, the flower in the second picture, *Eremocarya micrantha* var. *pseudolepida*, has been classified as a new taxonomic variety, different from *Eremocarya micrantha* (third picture) and *Eremocarya lepida* (first picture). Researchers documented the physical features of the three species of flowers to determine if the various differences were statistically significant enough to classify *Eremocarya micrantha* var. *pseudolepida* as different.

Researchers gathered data of the different plants from a significantly large area. They collected data from different locations in California, Baja California, Arizona,

Nevada, New Mexico, and Mexico (Simpson et al., 2016). There were various features recorded for each plant: vegetative morphology, inflorescence structure, fruit nutlet size and shape, corolla limb width, corolla limb diameter, fornix bodies at the corolla mouth, latitude, longitude and elevation of the location, etc. (Simpson et al., 2016). Additionally, photographs were also documented for these plants. Some dry plants were boiled for about 2 minutes to use as samples; boiled plants most closely resemble plants that were alive (Simpson et al., 2016). Fruits were detached from the plant and examined after dissection for nutlet morphologies. After collecting all the individual data from each plant, researchers needed to determine how different each of the species were.

Statistical analysis was done to determine how significantly different the three species were from each other in order to classify a new species. Box plots of the characteristics recorded were used to visualize character distributions of three taxa (Simpson et al., 2016). Different variables were assess for statistically difference at probabilities of less than 0.01 and 0.05 (Simpson et al., 2016). Some of the characteristic data was used to do a principal component analysis in order to connect different variances together (Simpson et al., 2016). After these statistical tests were done, topographic maps were constructed to annotate species distributions to determine if location was a factor that influenced the differences of morphologies in the plants (Simpson et al., 2016).

The statistically significant differences of the various characters of each species lead to the deduction of a new variety of species. The presences of a yellow coloration of the corolla, small nutlets, absence of fornix bodies and the presences of corolla fornices all point to the classification of *Eremocarya micrantha* var. *pseudolepida* as a separate taxa variety (Simpson et al., 2016). Distinctions were also made after the principal component analysis showed differences in all three plants and accounted for variances that could have changed the results (Simpson et al., 2016). Through this research study, the investigators found that the quantitative analyses done on the different species accounted for the qualitative data that was collected on the species in question. Researchers claimed that the geographic locations helped in the classification of the new species since some morphological factors of the plant were altered based on location (Simpson et al., 2016). In the future, these data can be supported further with genetic and molecular analysis of these species. Such research can answer questions about ancestry of these plants and pose more questions about how changing geography can alter biogeography.