

THE ASU HERBARIUM VASCULAR PLANT IMAGE LIBRARY ON-LINE

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INTRODUCTION

The Arizona State University herbarium houses over 240,000 collections of dried plants. Herbaria are of enormous value to researchers, who utilize the specimens for studies in myriad fields, including systematics, ecology, anthropology, entomology, geology, geography, homeopathy, cancer research, journalism and scientific illustration. The ASU herbarium is a vital resource for the Central Arizona-Phoenix Long Term Ecological Research (CAP LTER) project by providing an historical record of plants growing in the Phoenix area and serving as a reference for new identifications. The Phoenix Flora area comprises the region within a forty-mile radius around the State Capitol building in Phoenix (Damrel, Pinkava & Landrum 1998). The main objective of this project is to increase access to the herbarium by providing on-line access to scanned images of herbarium sheets of plants growing within the Phoenix Flora area. A secondary objective is to include images of living plants for each taxon.



Button bush (above) at Canyon Lake, Arizona (photo by L. R. Landrum)

This specimen of *Cephalanthus occidentalis* (Button bush, left & right) was collected in 1907 by ASU's first science teacher, Frederick M. Irish. Button bush is now extinct locally due to the damming of the Salt River in the early 1900s.



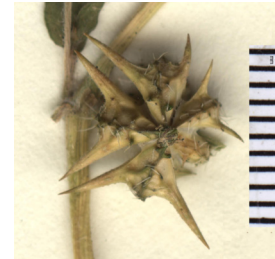
Linum lewisii (Blue flax, above) at Seven Springs, Arizona (photo by S. Doan)



Calochortus kennedyi (Mariposa-lily, above) at Seven Springs, Arizona (photo by S. Doan)



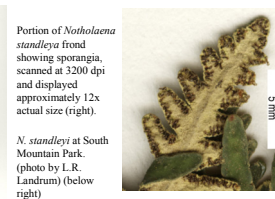
Cyathia of *Euphorbia eriantha* (Desert pointsettia, left) scanned at 2000 dpi and shown 16x actual; fruit of *Descurainia pinnata* (Tansy mustard, above) scanned at 2400 and shown 6x actual size; *Crassula connata* (Pygmyweed, right) at South Mountain Park (photo by S. Doan)



Fruit of *Tribulus terrestris* (Puncture vine, above left) and *Sphaeralcea ruscbyi* (Sphaeralcea, above right) scanned at 3200 dpi and displayed at approximately 11x actual size.

CONCLUSION

An herbarium's value grows with the number of people who utilize it. Increasing access to collections and data benefits scholars, scientists and the general public. Having good images of each taxon available on the web often allows one to make accurate identifications without consulting specimens, thus saving wear and tear on the specimens that normal use causes. It also allows one to compare numerous taxa in a short period of time and can be done anywhere web access is available. The Vascular Plant Image Library is growing, and our hopes are to eventually include all Arizona plants. As technology and the speed of the internet improve, it will be possible to include higher resolution images and the ability to magnify selected portions of the plant. Serious taxonomic work will still require use of actual specimens, so image collections such as ours will never replace herbaria; they will just make them more easily accessible and widen the base of users.



LITERATURE CITED

Damrel, D. Z., D. J. Pinkava and L. R. Landrum. 1998. The Phoenix Flora. A Checklist of the Vascular Plants Growing Wild and in Cultivation in the General Vicinity of Phoenix, Arizona (<http://lsvl.la.asu.edu/herbarium/herb13.htm>). Arizona State University, Tempe, Arizona 85287-1601.

ACKNOWLEDGEMENTS

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MATERIALS AND METHODS

For each taxon documented in the Phoenix Flora area, a specimen was selected that included complete data and as much fertile material as possible. A UMAX Powerlook 2100XL flatbed scanner was used to scan each herbarium sheet at a resolution of 300 dots per inch (dpi). Each image was edited in Adobe Photoshop 6.0 to enhance clarity and color. Locality information displayed in the image was erased for threatened and endangered species and for certain cacti. A copy of each image was made and the resolution reduced to 75 dpi for display on the world wide web. Higher resolution scans (from 1200 to 3200 dpi) were made of diagnostic characters for certain taxa (e.g. individual fruits, cyathia, flowers).



Inflorescence of *Cryptantha barbiger* (Cryptantha, left) scanned at 2400 dpi and shown approximately 8x actual size

A butterfly visiting *Lobelia cardinalis* (Cardinal flower) at Seven Springs, Arizona (photo by S. Doan)

Echinocereus engelmannii (Engelmann's hedgehog cactus) at Humboldt Mountain, Arizona (photo by S. Doan)

RESULTS

The Vascular Plant Image Library currently includes 1,070 images of herbarium sheets and 425 images of living plants. Each image is displayed on the web at its actual size (approximately 11.5 x 16.5 in or 42 x 29 cm), along with the plant's taxonomic and collection data. The Library's web site can be accessed independently, where one can browse all available images by family and genus, or through the Center for Environmental Studies' Southwestern Natural History Databases page. From the Southwestern Natural History Databases page, the herbarium's collections database can be searched by taxon, locality and/or collector. Available images are displayed with the search results.

Vascular Plant Image Library : http://cochise.asu.edu/collections/vasc_image_library/ImageIndex.jsp
Southwestern Natural History Databases: <http://cochise.asu.edu/collections/index.html>
ASU Vascular Plant Herbarium: <http://lsvl.la.asu.edu/herbarium/index.html>