

A Floristic Survey of the Phoenix Zoo (Arizona Center for Nature Conservation)

by

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## ABSTRACT

The Phoenix Zoo, also known as the Arizona Center for Nature Conservation (PZ), is an Association of Zoos and Aquariums (AZA) accredited zoological institution and among largest-nonprofit, privately-owned zoos in the United States (Smith, 2020). Located within Papago Park in Phoenix (Maricopa County), Arizona, adjacent to the Desert Botanical Garden (DES), the two combine to bring environmental awareness to the Phoenix Metropolitan Region. While the DES specializes in botanical presentation, the ACNC focuses on zoological education. Whereas the flora of DES is well known, that of ACNC has yet to be completely documented. Given its role as a center for public engagement and education, documenting and mapping the floristic diversity of the Phoenix Zoo provides updated botanical information and occurrence records, an important component of understanding biodiversity for the Phoenix area. Between the fall of 2017 and the Spring of 2021, the grounds of the ACNC were walked within the 2-mile perimeter and surrounding exterior within Papago Park. Plant specimens and photographs were collected and archived for later identification using various botanical keys. Species names were verified through updated botanical databases such as Tropicos.org and worldfloraonline.org and compiled into a checklist. A total of 706 species have been identified, and of those 548 specimens have been collected as specimen vouchers. Of these, 120 are of taxa known to be native to the Phoenix Salt River Valley. While approximately 79 of those previously listed taxa native to Papago Park were either not found during this study or were extirpated from the grounds of the ACNC during urbanization of the region. There are 586 exotic taxa, some are common cultivars, while

others are new to the region. Data for this survey is publicly available on SEINet, a regional network of North America herbaria (<https://swbiodiversity.org/seinet/>), as georeferenced voucher specimens, human observations, and photographs. Data is also partially duplicated through the iNaturalist platform ([iNaturalist.com](https://www.inaturalist.org/)).

## DEDICATION

To my mom, for investing in my pursuit of the natural sciences and for reminding to find my passion.

In memory of Tara Oakes, whose passion for wildlife education was an inspiration and encouraged the early progress of this flora.

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## PREFACE

When the Phoenix Zoo was first established in 1962, the landscape had already changed from a Sonoran Desert-scrub environment to one of more riparian stature. During the decades following, many more taxa were introduced, including those from Africa, Australia, Mexico and the Tropics of World. During my time as a ZooTeen volunteer in the early 2000's there had been a prototype master roster of known flora compiled by zoo horticultural staff, but nothing yet made accessible that volunteers or guests could utilize for botanically related questions. Later, during my time as a Camp Zoo Instructor, some of the most prominent questions that I found myself unable to answer were those from middle school children asking, "what plant is this?" Naturally, I would turn to horticultural staff, although, given the sheer diversity of flora maintained on grounds and the limited time of each personnel, the answers were not always met with accuracy. I realized the need for a comprehensive botanical checklist.

## CHAPTER 1

### INTRODUCTION

The Phoenix Zoo (Arizona Center for Nature Conservation) is the largest privately owned, nonprofit zoological institution in the United States (CNN, 2020). This facility is also recognized as an accredited zoo by both the Association of Zoos and Aquariums (AZA) and the World Association of Zoos and Aquariums (WAZA). Located in the USDA Plant Hardiness Zone 9b (usda.gov), the original zoo grounds probably had as many as 251 species of Sonoran Desert Upland species such as creosote [*Larrea tridentata* (Sesse & Moc ex DC) Coville], paloverde [*Parkinsonia florida* (Benth. Ex A. Gray) S. Watson and *P. microphylla* Torr.] as well as saguaro [*Carnegeia gigantea* (Engelm.) Britton and Rose) (Walters, 2002).

Before the zoo was created, the Arizona Game and Fish Department established the Hunt Bass Hatchery in the 1930s (Brown, 2012). Associated with this project they created a series of lakes, most of which reside on land owned by the Phoenix Zoo. With the appearance of the lakes, the flora began to change to incorporate new riparian flora, such as the fan palm [*Washingtonia filifera* (L. Linden) H. Wendl.], cottonwood ([*Populus fremontii* (Benth. Ex A. Gray) S. Watson], saltcedar (*Tamarix chinensis* Lour.), cattail (*Typha domingensis* Pers.) and various sedges. While much of the floral abundance now consists of introduced and/or cultivated taxa, such as the date palm (*Phoenix dactylifera* L.), numerous figs (*Ficus*), Indian rosewood (*Dalbergia sissoo*

Roxb. Ex DC.) and the African sumac (*Rhus lancea* L.f.), there are remnants of native Sonoran Desert flora throughout zoo grounds. While the horticultural staff that maintains the collection are quite knowledgeable about the plants, and make efforts to increase public outreach, their time and personnel are limited. In addition, the current plant guide, available to only volunteers and staff is limited to only the most concerning poisonous plants and just over 100 plants used for browse certified by veterinary staff and animal nutrition services. A spreadsheet was also compiled in the 1990's by zoo staff members, and identified 468 taxa, but lacked any annual species that occur there, or adventives, and was not publicly available. This goal of this study is to provide a comprehensive checklist of the Phoenix Zoo flora that will (1) support and amplify the institution's capacity for botanical instruction, (2) enhance visitor experience, and (3) promote sustainability.

In this study vouchered specimens were collected and prepared according to standard botanical protocols for identification; and these were entered into the Southwestern Ecological Information Network (SEINet), helping create updated species profiles, including photographs that elucidate those key characteristics. Most of the flora included in the checklist consists of nonnative cultivated taxa from different regions of the world including Africa, Australia, Eurasia, East Asia, the Canary Islands and North and South America. Extremities of the grounds were also surveyed to identify the native Papago Park flora. Identified specimens were verified by comparing to existing specimens housed within ASU Vascular Plant Herbarium. The resulting private checklist consists of 706 species of 391 genera and 103 plant families.

The Papago Park complex, including the Desert Botanical Garden and the Phoenix Zoo is located centrally in an area of high urban density and exposed to the likelihood of species introduction from nearby homes and other developments. Many such introductions, such as pineapple weed [*Oncosiphon piluliferum* (L. f.) Kallersjo], buffelgrass [*Pennisetum setaceum*] (L.) Link], African sumac (*Rhus lancea* L. f.), common oleander (*Nerium oleander* L.), Ravenna grass [*Saccharum ravennae* (L.) L.], may have likely originated from zoos and/or botanical gardens. Introductions have the capacity to create new niches and can change pollinator scope and differences in food quality, thus forming what is known as a novel ecosystem (Hobbs et al., 2013). As cities expand, this increases the possibility of any new introductions from escaped cultivars and human dispersal and requires an appropriate level of local conservation efforts to monitor changes to the surrounding region. The ecosystems of zoos and botanical gardens inform a deeper understanding of the local flora by observing the successes and failures of introduced taxa in their novel situations and are therefore important florae to document and study. With the construction of both the Desert Botanical Garden and the Phoenix Zoo, along with the increasing urbanization of the Salt River Valley, introduced species with desert tolerance are reproducing and dispersing. Although mitigation efforts are implemented by multiple organizations in Maricopa County, certain nonnative species are extending their range through introduction by human populations. Subsequently, the flora of Papago Park is likely to change. Furthermore, introduction of alternate genotypes and closely related species presents opportunities for cross-pollination to and from native ecotypes.

Engagement in responsible stewardship is one of the most valuable actions that a human can pursue. Conservation and preservation of species are among the imperatives of zoological parks and botanical gardens, alongside their ability to stand as a link to the natural world (Love, 2014). Furthermore, the ability to establish naturalistic habitat improves the physical and psychological health of the fauna present within the zoo living collection and is pivotal in providing an appropriate level of animal welfare (Boyle, 2017). The complexity that underlies different natural ecosystems is often difficult to replicate in an effective manner, that simultaneously provides the well-maintained and aesthetically pleasing function of a zoological institution.

This difficulty, among other ecological constraints limits the potential for transmission of information and behavioral health in novel ecosystems through introducing plants, such as in arboreta or cultivated landscapes. Other limiting factors are the availability of horticultural manpower and assets, essential resources such as water, and legacy information regarding the local flora.

Environmental complexity reduces stereotypical behavior of animals kept in captivity, such as swaying and fidgeting (Greco, et al., 2016) and is more likely to improve quality of life among intelligent species (Edwards, 2019). Furthermore, many of the animals maintained within the zoo's collection, by nature would travel long distances in the wild in search of food for grazing. Implementing botanical diversity within behavioral enrichment further encourages locomotion and other more natural activities, benefitting animal welfare (Holdgate et al, 2016). Often, zoological institutions do implement environmental complexity through the introduction of foliage to provide a

naturalist landscape, improving security by breaking up the dimensions between exhibits, and by the utilization in behavioral enrichment diets as “browse” plants.

This improvement of complexity, however, can be challenging due to restrictions of certain species based on invasiveness or its potential to become adventive into the region. Restrictions to species introductions, as regulated by the International Union for the Conservation of Nature (IUCN) and the United States Department of Agriculture (USDA), as well the difficulty in keeping exotic species in foreign environments, restricts the overall existence of plants in each region. In addition, potential fire hazards, such as foliage type and plant density, as well as available moisture, and pest concerns, or risks of toxin exposure further dictate the abundance and types of flora, as recommended by the Association of Zoological Horticulture (AZH) and Association of Zoos and Aquariums (AZA).

Plant toxicities are also a potential hazard and may be present in the states of direct consumption of weedy species and through bioaccumulation of small mammals or other animals unintentionally consumed by members of the living collection (i.e. carnivorous birds and mammals). Thus, an inclusive checklist may help in designating flora that pose a risk to the fauna and mitigating their spread. Medicinal plants approved by the local veterinarians at the Animal Care Center (ACC) may also be a part of the managed flora, and knowing which plants on grounds may be available is a valuable tool in the health and well-being of the zoo inhabitants.

## Study Site

The Arizona Center for Nature Conservation (ACNC) is among the largest, nonprofit, privately-owned zoos in the United States. This AZA accredited, zoological institution is built on the remains of the former Hunt Bass Hatchery, consisting of multiple man-made lakes developed in the early 1930's by the Arizona Game and Fish Department (Brown, 2012). In 1962, these grounds were purchased by Robert Maytag, grandson of the man who founded the Maytag appliance company, and the grounds were dedicated as a zoological institution, beginning the introduction of this modified naturalistic landscape to the area. This study site consists of 126 hectares or 311 acres within a 2-mile perimeter with a relatively low elevation change of 359 – 433m (1177.82 - 1420.6ft) with the highest point being the top of an enclosed butte system, one of which being used to house their collection of bighorn sheep.

The soil structure of these buttes and the surrounding area below 50-200 feet of surface layer substrate consists of red conglomerate sandstone and granite formed after Precambrian lava flow. The overall surface substrate exists as alluvium deposits of sand, silt and clay settled after the Arizona sea reduced into the salt river basin, leaving behind a caliche like layer, rendering the soil relatively rough to dig through (Reynolds, 2002).





Figure 1: Boundaries of the Phoenix Zoo with colored areas indicating designated trails. **Arizona Trail**, **Africa Trail**, **Tropics Trail**, **Children's Trail**, **Harmony Farm**, **Conservation Center**, **Desert Lives Trail**, **Butte Habitat** (undeveloped), **Lakes**

## Background

### Native State

Because the grounds of the ACNC have been highly modified over the duration of its existence as a fish hatchery and as a zoological institution, the original native composition was not expected to be wholly represented along the grounds in its absolute entirety (Sobczynski, 2009, Page #83). For this reason, previous floras were compiled to identify taxa known to exist in the region. Among the best representatives is the Flora of the Papago Military Preservation (Walters, 2002), located at the northwest end of the

park, which identified 251 species representing 53 families and 176 genera. Of these, 18 are mentioned to be exotic and naturalized in 2002. A more recent and broadly conducted survey exists on SEINet which is also used in comparison of species not collected, but still likely to exist within the grounds of the ACNC. This Papago Park checklist revealed only 168 species (<https://swbiodiversity.org/seinet/checklists>). To broaden this scope a comparison is also made between the overall Phoenix Flora which reveals 1016 species known as native or naturalized to the overall Phoenix metropolitan area.

(<https://swbiodiversity.org/seinet/checklists/checklist.php?clid=22&pid=1>)

Located in the heart of Papago Park, this region of the Arizona Upland Sonoran Desertscrub is characterized by the long-lived populations of paloverde (*Parkinsonia microphylla*), desert ironwood (*Olneya tesota* A. Gray), creosote (*Larrea tridentata*), saguaro (*Carnegiea gigantea*), California fire barrel cactus [*Ferocactus cylindraceus* (Engelm.) Orcutt.] and desertbroom (*Baccharis sarothroides* A. Gray] (Dimmitt et al, 2015). Many annual species exist in seasonal alternation predominately in the plant families Asteraceae, Boraginaceae, Euphorbiaceae and Poaceae. The common species emerging with warm weather rains generally consists of Coulter's horseweed [*Laennecia coulteri* (A. Gray) G.L. Nelson], skeleton weed (*Eriogonum deflexum* Torr.), sandmats [*Chamaesyce micromera* (Boiss. Ex Engelm.) Woot & Standl.] and *Chamaesyce polycarpa* (Benth.) Millsp. Ex Parish. Cooler season rains offer a more abundant diversity although seem to heavily favor the dominant cover of Guadalupe cats-eye [*Cryptantha maritima* (Greene) Greene], sparsely mixed with bearded cats-eye

[*Cryptantha barbiger* (A. Gray) Greene] as well as two combseed species *Pectocarya recurvata* I.M. Johnston and *Pectocarya heterocarpa* (I.M. Johnston) I.M. Johnston (Walters, 2002).

### Cultivated Taxa

A significant portion of the botanical living collection of the Phoenix Zoo consists of exotic and near-native cultivars, commonly found elsewhere in gardens or arboreta across Maricopa County, Arizona. To verify these species identities and prior occurrences, “A Vegetative Key to the Salt River Valley” (Pinkava et al., 1991) was used in conjunction with and an existing Phoenix Cultivated Flora checklist on SEINet, which reveals a total of 1039 species of 126 plant families that are cultivated in the Phoenix area (<https://swbiodiversity.org/seinet/checklists/checklist.php?clid=104&pid=1>).

An informal document maintained by staff horticulturalists and volunteers, called “The Big Bad Book of Browse” was initially produced by Sue Zislis, WJ Wheaton and Hassena Kassim. The document was provisioned for horticultural volunteers and contained 103 species useful for identification of approved browse plants and known toxic species. The limitations for this one is that “The Big Bad Book of Browse”, is a printed document and is not fully inclusive, although still sufficient for standard volunteer duties. This document is not digitally or publicly available for scientific or local analysis. Additionally, horticultural staff, compiled an original master roster on a spreadsheet, consisting of 468 specimens including varieties and subspecies. Limitations for this version is that it is not fully inclusive, nor readily available online, and lacks up to date nomenclature that has been

modified over the years Therefore, the compilation of an online checklist will provide a dynamic medium in which to maintain the zoo checklist, complete with species descriptions, field photographs, and herbarium vouchers.

## CHAPTER 2

### METHODOLOGY

#### Collection

The ACNC was visited for a total of 30 trips during the spring, summer and fall during 2017-2021. Permission to collect specimens was granted and assisted by the zoo's horticulture team. The scope of this flora was originally aimed to identify which plants are likely to be interacted with or observed by visitors and staff and to achieve a basic checklist for use as an extension to signage, as well as providing documented species accounts for future reference. Portions of individual plants found throughout the grounds, both on and off trail were collected, and pressed for drying. Specimens were taken to the Arizona State University Vascular Plant Herbarium (ASU) for identification. Photo vouchers were also taken in situations where collection was not feasible such as with smaller, immature specimens, or larger succulents such as cacti, aloes and agaves, and other larger specimens as banana (*Musa acuminata* Colla), and palms. Specimens, such as duckweed (*Lemna* sp. L.) whose characters preserve less upon drying are also not included as preserved specimen vouchers. Identifications were made using various botanical keys, such as *Agaves of Continental North America* (Gentry, 1982), *Aloes: The Definitive Guide* (Newton et al., 2011), *Arizona Flora* (Kearney & Peebles, 1960), *The Jepson Manual: Higher Plants of California* (Hickman, 1993), *A vegetative key to the cultivated woody plants of the Salt River Valley, Arizona* (Pinkava et al., 1970), *Convolvulaceae of Sonora, Mexico* (Felger, et al, 2012). Additional documents were consulted for taxonomic issues of specific taxonomic groups including *Asclepidaceae* (Becket and Stitt, 1935), *Boraginaceae* (Retief & Wyk, 2011), *Convolvulaceae* (Keeler,

1977; McPherson, 1981), Fabaceae (Kylangalilwa et al, 2013), Oleaceae (Kobuski, 1959), and Solanaceae (Chiang and Landrum, 2009).

### Data Management

Photographs of the plant habit, anatomy and traits of each observation were recorded during the duration of the study. Because observations have been made in the area through both SEINet and iNaturalist, these occurrences will also be factored into the study to account for species previously not listed as to offer the most inclusive list of taxa. Vouchers were deposited at the Arizona State University, Vascular Plant Herbarium (ASU). Where possible, duplicates collected will be sent to the Desert Botanical Garden Herbarium (DES) and University of Arizona Herbarium (ARIZ). Notes and vouchers, as well as a dynamic map of collection points are made publicly available through SEINet as well as iNaturalist to be provided for scientific data and casual observation.

## CHAPTER 3

### RESULTS

The following tables summarize the major attributes of the flora.

Table 1: Nativity Status - Species contained within the botanical collection represent known native taxa or cultivated specimens

<b>Nativity Status</b>	
<b>Native</b>	<b>120</b>
<b>Cultivated</b>	<b>586</b>
<b>Total</b>	<b>706</b>

Table 2: Growth Types - Trees (with a woody trunk), Shrubs (woody with mainstems near the base), Subshrub (woody only at base), Herbaceous (nonwoody annuals/perennials), Grasses/Graminoids (including rushes and sedges), Succulents (Fleshy), Cacti (Cactaceae)

<b>Table 2 Vegetation Types</b>	
Trees	212
Shrubs	133
Subshrubs	19
Herbaceous	124
Grasses	27
Graminoids	13
Vines	20
Succulents	89
Cacti	71

Table 3. Composition of Phoenix Zoo Flora- Major Represented Families

<b>Family</b>	<b>Dominant Genera</b>	<b>Genera/Species</b>
<b>Arecaceae</b>	<i>Phoenix,</i> <i>Washingtonia</i>	20/15
<b>Asparagaceae</b>	<i>Agave</i>	43/12 20
<b>Asteraceae</b>		33/28
<b>Boraginaceae</b>	<i>Cordia,</i> <i>Ehretia</i>	11/8
<b>Cactaceae</b>	<i>Cylindropuntia,</i> <i>Echinocerus,</i> <i>Opuntia</i>	63/21
<b>Euphorbiaceae</b>	<i>Euphorbia</i>	32/10 15
<b>Fabaceae</b>	<i>Acacia,</i> <i>Caesalpinia,</i> <i>Parkinsonia,</i> <i>Propolis, Senna,</i> <i>Vachellia</i>	76/36
<b>Malvaceae</b>	<i>Albutilon, Hibiscus</i>	20/12
<b>Moraceae</b>	<i>Ficus</i>	20/3 15
<b>Myrtaceae</b>	<i>Eucalyptus</i>	19/6 11
<b>Poaceae</b>	<i>Phyllostachys</i>	27/12 2



## Floral Composition

Much of the representative taxa of the ACNC consists of those nonnatives to the region of Papago Park and are thus introductions due to human movement into the region. Of the taxa collected 120 are native to area and the remaining 685 are newly introduced within the past 100 years.

## Common Landscape Cultivars

Much of the vegetative cover of the ACNC comprises commonly planted cultivated taxa that are also found throughout Maricopa County, which are likely to be found on all trails and near guest service areas. Thus, due to their frequency across the grounds or immediate accessibility upon entering the zoo, these are listed here as common landscape cultivars.

Dwarf century-plant (*Agave desmettiana* Jacobi), Sisal-hemp (*Agave sisalana* Perrine ex Engelm.), Baja fairy duster [*Calliandra californica* (Benth.) D. Gibs.], (*Calliandra eriophyllum* Benth.), red powderpuff tree (*Calliandra haematocephala* Hassk.), canna lily (*Canna x generalis* L.H. Bailey (pro sp.) [glauca x indica]), Mexican olive (*Cordia boissieri* A. DC.), littleleaf cordia (*C. parvifolia* Ortega), emubush (*Eremophila glabra* Ostenf) and (*Eremophila maculata* F. Muell), (*Bougainvillea glabra* Choisy), coralvine (*Antigonon leptopus* Hook. & Arn.), Indian rosewood (*Dalbergia sissoo* Roxb. Ex DC.), river red gum (*Eucalyptus camaldulensis* Dehnhardt), Lindheimer's evening primrose (*Gaura lindheimeri* Engelm. & A. Gray) silver dollar gum (*Eucalyptus polyanthemos* Schauer), yellow trumpets [*Tecoma stans* (L.) Juss. Ex

Kunth], Chinese elm (*Ulmus parviflora* Jacq.), fan palm [*Washingtonia filifera* (L. Linden) H. Wendl.] and (*Washingtonia robusta* H. Wendl.), date palm (*Phoenix dactylifera* L.), Canary Island date palm (*Phoenix canariensis* hort. Ex Chabaud), golden bamboo (*Phyllostachys aurea* Riviere & C. Riviere), rosemary (*Rosmarinus officinalis* L.), and silver wild sensitive plant [*Senna artemesioides* (Gaud. Ex DC.) Randell].

### Riparian Taxa

The foundation of the zoo exists on a prior fish hatchery (Brown, 2012), and because of this, much of the structure is ideal habitat for wetland taxa not originally present in Papago Park such as the wind dispersed Fremont cottonwood (*Populus fremontii* S. Watson), southern cattail (*Typha domingensis* Pers.), tall-flat sedge (*Cyperus eragrostis* Lam.) as well as the rabbits foot grass [*Polypogon monspeliensis* (L.) Desf.]. There are many creeks through the grounds that connect the underlying lake structures, and the one situated at the southern end of the zoo, designated for the Conservation Center is currently used to house a population of the critically endangered Huachuca water umbel [*Lilaeopsis schaffnieri* (Schlecht.) Coult. & Rose], marsh fleabane (*Pluchea odorata* (L.) Cass], lizard's tail [*Anemopsis californica* (Nutt.) Hook. & Arn.], (*Veronica anagallis-aquatica* L.), common buttonbush (*Cephalanthus odoratus* L.), umbrella plant (*Cyperus involucratus* Rottb.), and several introduced wetland species, such as the desert fan palm [*Washingtonia filifera* (L. Linden) H. Wendl.] and (*Washingtonia robusta* H. Wendl.), and saltcedar (*Tamarix chinensis* Lour.).

## Invasive Taxa

The Walters (2002) flora identified 18 invasive taxa existing in the Papago Buttes area: African sumac (*Rhus lancea*), Maltese star-thistle (*Centaurea melitensis*), Scaly Hawkbit (*Hedynopsis cretica*), Golden Dyssodia (*Thymophylla pentachaeta*), London rocket (*Sisymbrium irio*), *Chenopodium murale*, *Enchylaena tomentosa*, *Salsola kali*, *Tribulus terrestris*, *Lantana camara*, Storksbill [*Erodium cicutarium* (L.) L'Her. Ex Aiton], *Phacelia nashianana*, *Hordeum murinum* var. *glaucum*, *Washingtonia filifera*, Bermudagrass [*Cynodon dactylon* (L.) Pers.], buffelgrass [*Pennisetum ciliare* (L.) Link], *Arabian grass* (*Schismus arabicus* Nees), and five-stamen Tamarisk (*Tamarix chinensis* Lour.) (Walters, 2002). The flora of ACNC increases this number to 54 potentially invasive taxa and known weedy species, such as the salt cedar (*Tamarix chinensis* and *Tamarix ramossissima*), the giant milkweed [*Calotropis procera* (Aiton) W.T. Aiton] (Punia, 2013), stinknet [*Oncosiphon piluliferum* (L.f) Kallersjo] and Ravenna grass [*Saccharum ravennae* (L.) L.]. These taxa are found cultivated or volunteering on grounds at the PZ, as well as in other regions across the Salt River Valley.

## Trails

The walking paths of the zoo are broken up by the institution itself, into themed trails, each with their own characteristic flora. These trails are denoted as the Arizona Trail, Africa Trail, Children's Zoo, Desert Lives Trail, Harmony Farm, Inner Tropics and Outer Tropics Trails. Certain event areas are split off from these trails and are accessible only during special events or private showings, such as Ruby's House, Stonehouse

Pavilion and the Conservation Center. Specimen collections are presented in these following paragraphs and organized based on these denoted trails.

## Arizona

The Phoenix Zoo offers an excellent display of the flora of Arizona, featuring various specimens native from various regions within the state of Arizona. Much of the vegetation of this trail consists of the originally native specimens of the Sonoran desertscrub of creosote (*Larrea tridentata*), saguaro (*Carnegiea gigantea*), palo verde (*Parkinsonia microphylla* and *P. florida*) and hackberry (*Celtis pallida*). Beginning in the Arizona aviary, the flora present represents both riparian floral elements and those found in washland habitats towards the uplands desert both within Maricopa County and around the exteriors in the National Parks. These include the fragrant elephant tree (*Bursera microphylla* A. Gray), Cat-claw Acacia (*Senegalia greggii*), Little-Leaf False Tamarind (*Lysiloma watsonii*) and wild forage foods, the black elderberry (*Sambucus caerulea* L.) desert hackberry (*Celtis pallida* Torr.), Fremont wolfberry (*Lycium fremontii* A. Gray) and the toxic limberbush [*Jatrophylla cardiophylla* (Torr.) Muell.-Arg.]. Other, more showy specimens include the pollinator-friendly Apache plume [*Fallugia paradoxa* (D. Don) Endl. Ex Torr.], Emory's Globemallow (*Sphaeralcea emoryi* Torr. Ex A. Gray) and chuparosa [*Justicia californica* (Benth.) D. Gibson]. Proceeding out of the Arizona aviary, guests are immediately greeted with the Jojoba (*Simmondsia chinensis*) and Honey mesquite (*Prosopis glandulosa*) along a winding trail where they will also meet

Parry's Agave (*Agave parryi*), Dark-spined prickly pear (*Opuntia phaeacantha*) and the Soap-tree yucca (*Yucca elata*) before venturing under an archway style exhibit featuring their first sighting of Red Barberry (*Berberis haematocarpa*). Upon exiting the archway, to the right is the Mexican Jumping bean (*Sebastiania bilocularis*), which is often well known for its fruits' habit of "jumping" in the presence of an herbivorous moth larva. Just opposite this large shrub is the Senita cactus (*Pachycereus schottii*), which, instead of being preyed on by the moths, are in fact, dependent on them for reproduction and survival, in a process known as obligate mutualism. Continuing on this trail, visitors will pass the shrub known as the Canyon senna (*Senna wislizeni*), desert lavender [*Condea emoryi* (Torr.) Harley & J.F.B. Pastore] and whitebrush [*Aloysia gratissima* (Gillies & Hook.) Troncoso]. This route also begins to expose guests to a wide variety of cacti and succulent species, namely the Majestic Agave (*Agave franzosinii* P. Sewell), Toumey's Agave (*Agave toumeyii* Trel.), Christmas cholla [*Cylindropuntia leptocaulis* (DC.) Knuth], Engelman's hedgehog cactus [*Echinocereus engelmannii* (Parry ex Engelm.) Lem.], pinkflower hedgehog cactus [*Echinocereus rectispinus* (Peebles) L. Benson], and the Claret-cup hedgehog cactus (*Echinocereus triglochidiatus* Engelm.), fire barrel cactus [*Ferocactus cylindraceus* (Engelm.) Orcutt], the straight spined barrel cactus (*Ferocactus rectispinus* Britton & Rose), the ocotillo (*Fouquieria splendens* Engelm.) and the Banana yucca (*Yucca baccata* Torr.). Heading towards the graywolf exhibit, exposes guests to a more upland-oakscrub vegetation where they will find the Arizona juniper, *Pinus halepensis*, Parish's Desert-thorn (*Lycium parishii* A. Gray), western redbud (*Cercis occidentalis* Torre. Ex A. Gray), Alder-leaf Mountain-Mahogany (*Cercocarpus montanus*

Raf.), red barberry (*Berberis haematocarpa*), Netleaf hackberry (*Celtis reticulata* Torr.), and fringed twinevine (*Sarcostemma cynanchoides* Decne.).

Four species of vines sparsely inhabit this terrain and are dispersed throughout the zoo by birds and mammals as well as through anemochory (wind), as in the case as the climbing milkweed (*Sarcostemma cynanchoides* Decne.) which is often frequented by a variety of butterflies, hymenopterans (bees and wasps) as well as predatory assassin flies and herbivorous milkweed bugs. Also present is the resin bee-friendly orchid vine [*Callaeum macropterum* (Moc. & Sesse ex DC.) D.M. Johnson]. The Arizona passionflower [*Passiflora arizonica* (Killip) D.H. Goldman] and sorrelvine [*Cissus trifoliata* (L.) L.] are those more prized by larger organisms for their fruits and are the only largely edible vines present on this trail.

## Africa

This trail houses animal species native to the regions of Africa through to Saudi Arabia and thus incorporates taxa native to similar regions. The *Aloe* and *Aloidendron* (tree *Aloe*) species are spread throughout this trail starting at the Savannah exhibit and are generally presented with other succulent species, especially towards the Cheetah exhibit. This succulent group of the family Asphodelaceae is native to Africa and Madagascar and species present in this collection are: (*Aloe divaricata* A. Berger), *Aloe ferox* Mill., *Aloe vera* (L. Burm. f.), *Aloe saponaria* Haw., soap Aloe (*Aloe maculata* Thunb.), quiver tree (*Aloidendron dichotomum* L.f.) and other hybrid specimens. Another stand-out succulent species is the African ocotillo (*Alluaudia procera* Drake). Found towards the Lion exhibit is the Anacacho orchid tree (*Bauhinia lunarioides* A. Gray ex S. Wats.).

While the orchid tree is not native to Africa (Texas to Mexico), it is selected as a cultivar here for its showy flowers and drought tolerant capability. North of the Lion exhibit is the Sausage tree [*Kigelia africana* (Lam.) Benth.], which during the time of this study was too immature to be flowering. Among the dominant and tallest floral element of this trail is the fever tree [*Vachellia xanthophloea* (Benth.) P.J.H. Hurter] easily recognized by its long thorns and yellow bark. Also found along this trail is the Namibian puzzle bush (*Ehretia alba* Retief & A.E. van Wyk) (Retief, et al 2001), prized by mammals for its edible fruits. Another common tree of this trail is the African sumac (*Rhus lancea* L.f.). The sumac is also often sighted naturalizing both around the zoo and off grounds as it is readily dispersed by birds. Another succulent heavy collection is found on the Africa trail in the form of multiple Euphorbs. The mottled spurge (*Euphorbia lactea* Haw.), Moroccan mound (*Euphorbia resinifera* Berg), Royle's spurge (*Euphorbia royleana* Boiss.), *Euphorbia neriifolia* L., *Euphorbia lividiflora* L.C. Leach, *Euphorbia tirucalli* L., Baja spurge (*Euphorbia xanti* Engelm. ex Boiss.) and *Euphorbia splendens* Boj. ex Hook.). Other succulents, which appear more grass-like are the Spear-Orchid (*Sanseveria cylindrica* Bojer) and (*Sanseveria masoniana* Chahinian). In front of the Zebra exhibit, a wall of trees presents includes Brazil wood (*Haematoxylum brasiletto* Karst.) which rather than being native to Africa are endemic from Mexico to Guatemala. Other nonnatives trees are present on this trail for their water-hardiness and ready use as browse for much of the hoofstock collection (giraffes, zebra, etc) such as the white thorn acacia (*Vachellia constricta* Benth.) and Chilean mesquite [*Prosopis chilensis* (Molina) Stuntz]. This trail also contains a small planting of the known invasive crimson fountain grass [*Pennisetum setaceum* (Forssk.) Chiov.].

## Desert Lives

Remaining largely native, the Desert Lives Trail walks visitors through a trail of native trees and naturalized cultivars such as the fever tree [*Vachellia xanthophloea* (Benth.) P.J.H. Hurter], cascalote (*Caesalpinia cacalaco* Humb. & Bonpl), the rock fig (*Ficus petiolaris* Kunth.), whitebark acacia [*Mariosousa willardiana* (Rose) Seigler & Ebinger], weeping Pittosporum (*Pittosporum angustifolium* Lodd.) monk's pepper (*Vitex agnus-castus* L.) and orchid-vine [*Callaeum macropterum* (Moc. & Sesse ex DC.) D.M. Johnson]. Also found along this trail are several cacti, such as the saguaro [*Carnegiea gigantea* (Engelm.) Britton & Rose], Christmas cholla [*Cylindropuntia leptocaulis* (DC.) Knuth], walkingstick cactus [*Cylindropuntia spinosior* (Engelm.) Knuth], Jumping cholla [*Cylindropuntia fulgida* (Engelm.) Knuth], teddy-bear cholla [*Cylindropuntia bigelovii* (Engelm.) Knuth], as well as the herbaceous, succulent the rush milkweed (*Asclepias subulata* Decne.) and the annual desert silverbush [*Ditaxis claryana* (Jepson) G.L. Webster] brushing up towards fragments of the Phoenix Butte system that currently houses the Arabian Oryx and bighorn sheep herd. These small buttes are as close to their native predisposition as when the Hohokam likely inhabited the region, due to its relative isolation as fenced in from Papago Park by the Phoenix Zoo. Flora of these butte habitats consist of cacti known as the strawberry hedgehog cactus [*Echinocereus engelmannii* (Parry ex Engelm.) Lem.] and Graham's Pincushion Cactus (*Mammillaria grahamii* Engelm.) as well as the arid adapted shrubs like the wolfberry (*Lycium exertum* A. Gray), apricot globemallow (*Sphaeralcea ambigua* A. Gray), narrowleaf silverbush [*Argythamnia lanceolata* (Benth.) Mull. Arg] and Coulter's brickelbush (*Brickellia coulteri* A. Gray).



## Tropics

### Inner Tropics (East Asiatic)

Aside from floral cultivars common to traditional, drought hardy, landscapes planted throughout the Phoenix area, this region is dominated by plants that can be found from the regions of India through East Asia into the Indo-Pacific archipelago down towards Australia. Although many of the animals and plants are native to the Old World Tropics, some flora found on this trail are native to the New World.

Species found here are the Burmese fishtail palm (*Caryota mitis* Lour.), Madagascar dragon tree (*Dracaena reflexa var angustifolia* Baker), Narrow-leaf fig (*Ficus binnendijkii* Miq.), horseradish tree (*Moringa oleifera* Lam.), *Epipremnum aureum* (Linden ex Andre) Bunting, Chinese tallowtree (*Triadica siberica* Small), *Thaumatococcus danianus* (Schott ex Endl.) Sakur., Calazans & Mayo, common fig (*Ficus carica* L.), Indian rubber tree (*Ficus elastica* Roxb.), scarlet rose-mallow (*Hibiscus coccineus* Walter), Japanese cheesewood [*Pittosporum tobium* (Thunb.) W. T. Aiton], Arabian jasmine [*Jasminum sambac* (L.) Aiton], and guava (*Psidium guajava* L.).

### Outer Tropics (New World)

The flora of Mexico through Mesoamerica through to South America is represented in the Outer Tropics region and the Forest of Uco. These extend from the junction of Inner Tropic and the Africa Trail and reconnects to the Harmony Farm and

Children's Trail before winding back near the entrance and Inner Tropic. Essentially, this trail consists of a large portion of the perimeter of walkable trails. This trail is most notable for its collection of palm trees, including the blue hesper palm (*Brahea armata* S. Wats.) and the Guadalupe palm (*Brahea edulis* H. Wendl.) and variety of *Ficus* species and other key specimens from the Sinaloa region of Mexico, which exists as the southern extent of the Sonoran Desert, graduating from thorn forests into the tropics.

Representatives of these sub-tropical thorn forests of Sinaloa Mexico are combined in a 500-foot-long, densely planted canopy from the howler monkey exhibit up to the Chilean flamingos. This feature serves additionally as a privacy barrier for the horse stalls to the south, and as a wind break for the southern extremity of the park. Specimens contained within this planting are woman's tongue [*Albizia lebbek* (L.) Benth.] fragrant bursera [*Bursera fagaroides* (Kunth.) Engl.], *Bursera laxiflora* S. Watson, the tree morning glory (*Ipomoea arborescens* Sweet) (McPherson, 1981), [*Coulteria platyloba* (S. Watson) N. Zamora], hierba del cuervo (*Galphimia speciosa* CE Anderson), (*Guaiacum coulteri* A. Gray), (*Pachycereus pecten-aboriginum* Britton and Rose), [*Stenocereus alamosensis* J.M.Coult.) A.C.Gibson & K.E.Horak], Mexican palo verde (*Parkinsonia aculeata* L.), [*Pseudobombax ellipticum* (Kunth) Dugand[excluded]], Mexican tree ocotillo (*Fouquieria macdougalii* Nash), The species of ficus which reside here occur almost as northern range extensions of their home territory, making them ideally suited as a subtropical and largely drought and frost tolerant canopy cover. These specimens include rock fig (*Ficus petiolaris* Kunth), (*Ficus palmeri* S. Watson), (*Ficus cotinifolia* Kunth), Sonoran fig (*Ficus pertusa* L.f.), as well as the Banyan tree (*Ficus*

*benghalensis* L.) which also bears a more worldwide distribution. Three vine species are planted along this trail which include the common passionflower and two Bignoniaceae species, the trumpet vine [*Campsis radicans* (L.) Seem. ex Bureau] and the cat-claw vine [*Dolichandra unguis-cati* (L.) L.G. Lohmann].

### Children's Zoo

This exhibition houses a diverse array of Australian species, such as River red gum (*Eucalyptus camaldulensis* Dehnhardt), Lemon Scented gum (*Eucalyptus citriodora* Hook.), Red cap gum (*Eucalyptus erythrocorys* F. Muell.), book-leaved mallee (*Eucalyptus kruseana* F. Muell.), yellow gum (*Eucalyptus leucoxydon* F. Muell.), (*Eucalyptus microtheca* F. Muell.), ghost gum (*Eucalyptus papuana* F. Muell.), red-box (*Eucalyptus polyanthemos* Schauer), silver-leaved mountain gum (*Eucalyptus pulverulenta* Sims), swamp mallee (*Eucalyptus spathulata* Hook), coral gum (*Eucalyptus torquata* Luehm.), Outback Cassia (*Cassia oligophylla* F. Muell) and emu bush (*Eremophila maculate* F. Muell.) multiple *Melaleuca* and *Callistemon* cultivars, and several more tropical cultivars such as bamboo (*Phyllostachys*) and heavenly bamboo (*Nandina domestica* Thunb.). This location also consists of one of the two populations of pines on grounds. A species of acacia known as the camelthorn [*Vachellia erioloba* (E. Mey.) P.J.H. Hunter] also resides along this trail, along with the giant milkweed [*Calotropis procera* (Aiton) W.T. Aiton] and Perez's sea lavender (*Limonium perezii* Hubbard ex L.H. Bailey).

## Harmony Farm

Harmony farm represents a collection of seasonal crop cultivars and edible fruit trees. Because of this, the active flora during any season is more subject to fluctuation here than anywhere else on grounds, except for the consistently visible perennial species. Most predominant species include those long-lived taxa and most prized specimens, such as the date palm (*Phoenix dactylifera* L.), pomegranate (*Punica granatum* L.), common fig (*Ficus carica* L.), guava (*Psidium guajava* L.), drumstick tree (*Moringa oliefera* Lam.), dwarf century-plant (*Agave desmettiana* Jacobi), sugarcane (*Saccharum officinarum* L.), rosemary (*Rosmarinus officinalis* L.), (*Morus rubra* L.) the cochineal nopal cactus (*Opuntia cochinillifera* DC) and the Baja Spurge (*Euphorbia xanti* Engelm. ex Boiss).

## Special Events

### Ruby's House/ Stonehouse Pavilion

This region is specifically used for special events and educational tours not part of the standard guest experience. From the right of the entrance there is a winding, canopy covered walkway up to the Stonehouse Pavilion and Ruby's House. On this pathway, lies species that are unlikely to be encountered elsewhere in the zoo.

Chilean palo verde [*Geoffroea decorticans* (Gill. ex Hook. & Arn.), sweet acacia [*Vachellia farnesiana* (L.) Willd], (*Vachellia aroma* Hook. & Arn.), papache (*Randia echinocarpa* Sesse & Moc. Ex DC.), red elephant tree (*Bursera hindsiana* Engl.), (*Selenicereus undatus* D.R. Hunt), sorrelvine [*Cissus trifoliata* (L.) L.], sickle bush [*Dichrostachys cinerea* (L.) Wight & Arn.], Bidwill's coralbean (*Erythrina x bidwillii* Lindl.), Arizona nettle-spurge [*Jatropha cinerea* (Ortega) Muell.-Arg.], physic nut (*Jatropha curcas* Wall.), (*Cordia parvifolia* Ortega), screwbean mesquite (*Prosopis pubescens* (Sw.) DC.), three-leaf chastetree (*Vitex trifolia* L.), Brazilian peppertree (*Schinus terebenthifolius* Raddi), calabash tree (*Crescentia alata* Kunth), little-leaf elephant tree (*Bursera microphylla* A. Gray), downy thorn-apple (*Datura metel* Regel), and evening rainlily (*Cooperia drummondii* Herbert).

### Conservation Center

The Conservation Center is situated on a near permanent creek, provided by flow from the Salt River Project that cuts underneath two separate private roadways into the back lake behind the horse stalls near the Tropics Trail. This location is prime for its purpose as a microhabitat for resident riparian flora such as the critically endangered Huachuca Water Umbel [*Lilaieopsis schaffnieri* subsp *recurvata* (A.W.Hill) Affolter]. Much of the Conservation Center is limited to conservation research for various endangered animals. In front of the Conservation Center are showy flora that represent some characteristic specimens from across the state and Mexico, including

(*Penstemon eatoni* A. Gray), [*Penstemon parryi* (A. Gray) A. Gray], pine needleleaf milkweed (*Asclepias linaria* Cav.), and a cactus from southern Sonora Mexico [*Ferocactus pottsii* (Salm-Dyck) Backeb.] and chuparosa [*Justicia californica* (Benth.) D. Gibson]. The riparian rabbits foot grass [*Polypogon monspeliensis* (L.) Desf.] can also be found growing from the creek in this area as well as others across grounds.

## CHAPTER 4

### DISCUSSION

Between the fall of 2017 and summer of 2021, a total of 706 plant species were identified on grounds at the Phoenix Zoo (ACNC), representing 391 genera of 103 plant families. Of these, 120 are native to the Salt River Valley, while the remainder are exotic. This translates to a near 450% increase in flora to this region of Papago Park, since the creation of manmade lakes by Arizona Game and Fish Department. The increase in flora, of primarily exotic taxa renders this landscape a novel environment where human influence has brought new ecotypes, pollination mechanisms, gene lines and food sources to the area. The shift was fully intended for the pursuit of a useful resource to aid the health and well-being of both the animals within the private collection and the comfortability of the guests who visit.

Before the drastic shift in biodiversity, this land constituted a typical Sonoran Desert upland ecotype with predominately dryland vegetation, as explored and identified in the Walters flora (2002). Thanks to the lakes produced, the land now favors subtropical and tropical flora who previously would not be able to reside in this area without considerable irrigation. Many of these specimens have already been employed for use in the diet of the living collection or archived onto a spreadsheet for horticultural curation. The Big Bad Book of Browse allowed for staff and volunteers to maintain a cohesive understanding of which plants were useful for being provided as browse plants for animals. The original spreadsheet was an overall collection of taxa that have been

accumulated over the years. Prior to the checklist produced by this botanical survey, the known taxa count accumulated to 468. There have thus been an additional 238 species added to the original master roster that were previously unknown or unaccounted for.

Given that a floristic survey is a snapshot in time and there are bound to be species not found during this study. This serves to suggest that this list can always be improved upon, especially during noticeably wet years, such as during future El Nino events and after new exhibits are established and further species are introduced. This checklist does not provide estimated dates as to when these species were introduced, although, vouchered specimens highlight when the specimen was observed. Several species such as some *Aloe* & *Opuntia* cultivars are still yet to be identified do to the nature of hybridization of complexity of characteristic features. Some specimens, such as *Kigelia africana* and *Lilaeiopsis shaffneriana* were not viewed flowering during the course this study, either due to age (*Kigelia*) or other environmental factors (*Lilaeiopsis*). Any future studies might then be able to include these, bounding off the dynamic checklist to ease future identifications.

The checklist for this botanical inventory can be viewed online at <https://swbiodiversity.org>, selecting “Flora Projects” and “Arizona” and looking through the alphabetical list of previously completed research checklists. Species by default are listed by scientific name and alphabetized by family and can further be displayed by common name, images and with taxon authors visible. In addition, there is also a dynamic map which shows the geographical coordinates of each compiled botanical specimen voucher that allows for the searching for a specific taxon or genus.



## CHAPTER 5

### CONCLUSION

The goal of this research was to compile an up-to-date checklist of species found within the grounds of the Phoenix Zoo, to aid in conservation momentum, botanical education, visitor experience and to improve the overall welfare of the animals maintained here. Currently the flora of this section of Papago Park, dedicated for the Phoenix Zoo constitutes a novel ecosystem system and now includes upwards of 700 plant species from across the world. Within 311 acres of modified desert landscape, 700+ species provides a rich botanical diversity, as well as a unique identity for the zoo with its numerous tropical and subtropical species in addition to desert trees from around the world. With much of the botanical diversity provided for guest experience, the walking trails would have a marked reduction in canopy cover, reducing the appeal for the frequent visitor attendance the zoo does receive (Perkins & Debbage, 2016). Each trail on grounds is also home to its own unique set of flora and thus, each exhibit can be described by remarking of the plant species nearby. Many of these specimens are included in daily diets of animals in the Phoenix Zoo's (ACNC) living collection from small reptiles and small mammals to birds and large mammals. Moreover, the floristic composition provides shade as well as privacy, combining to provide an overall naturalistic habitat for the animals in collection.

The dedicated horticultural staff is frequently busied with maintaining this prestigious association's floristic presentation and providing these botanical diets of ~100

species of plant to this living collection. Thus, an accurate representation of all the potential flora available might allow this number of utilized taxa to increase as well. The ability for staff members of this institution to recognize and account for changes in this botanical structure should be streamlined by this provision of a formal botanical checklist, accessible online.

The Phoenix Zoo also maintains a strong outreach and education presence to its several visiting school groups, zoo camps and guests. Extending this ability to include information on the floral collection as well will provide a broader curriculum where capable. This botanical inventory also aims to help the Phoenix Zoo in its mission to improve the stewardship and conservation of both animals and their habitats while inspiring others to care for the natural world; as well as providing assistance to the horticultural staff in the education, management and supporting the sustainable use of the flora which reside here.

## REFERENCES

- Beckett, R. E., & Stitt, R. S. (1935). *The desert milkweed (Asclepias subulata) as a possible source of rubber* United States Department of Agriculture, Technical Bulletin No. 472, 1-20, Washington, D.C.
- Boyle, K. (2017). *Enclosing nature: naturalism, animal welfare, and the evolution of zoo design* . MS Thesis, Arizona State University, Tempe.
- Brown, D. E. (2012). Bringing back the game: Arizona wildlife management, 1912-1962. Phoenix, Ariz.: Arizona Game and Fish Department.
- Chiang, F., & Landrum, L. R. (2009). Solanaceae, part three: Lycium L. wolf berry, desert thorn. *CANOTIA*, 5, 17-26.
- Dimmitt, M., Comus, P., Brewer, L., & Phillips, S. (2015). *A natural history of the Sonoran Desert* (Second edition.). Arizona-Sonora Desert Museum Press, Tuscon.
- Edwards, K., Miller, M., Carlstead, K., & Brown, J. (2019). Relationships between housing and management factors and clinical health events in elephants in North American zoos. *PloS One*, 14(6), e0217774–e0217774.  
<https://doi.org/10.1371/journal.pone.0217774>
- Felger, R., Austin, D., Van Devender, T., Sánchez-Escalante, J., & Costea, M. (2012). Convolvulaceae of Sonora, Mexico. I. Convolvulus, Cress, Dichondra, Evolvulus, Ipomoea, Jacquemontiana, Merremia, and Operculina. *Journal of the Botanical Research Institute of Texas*, 6(2), 459-527. Retrieved May 20, 2020, from [www.jstor.org/stable/41972435](http://www.jstor.org/stable/41972435)
- Gentry, H. (1982). *Agaves of continental North America* . University of Arizona Press.
- Greco, B., Meehan, C., Hogan, J., Leighty, K., Mellen, J., Mason, G., & Mench, J. (2016). The days and nights of zoo elephants: Using epidemiology to better understand stereotypic behavior of African elephants (*Loxodonta africana*) and Asian elephants (*Elephas maximus*) in North American zoos. *PloS One*, 11(7), e0144276–e0144276. <https://doi.org/10.1371/journal.pone.0144276>
- Hickman, J. C. (1993). *The Jepson Manual: Higher Plants of California* (1st THUS ed.). University of California Press.
- Holdgate, M., Meehan, C., Hogan, J., Miller, L., Soltis, J., Andrews, J., & Shepherdson, D. (2016). Walking behavior of zoo elephants: Associations between GPSmeasured daily walking distances and environmental factors, social factors, and welfare indicators. *PloS One*, 11(7), e0150331–e0150331.

<https://doi.org/10.1371/journal.pone.0150331>

Hobbs, R.J., E.S. Higgs, and C.M. Hall. 2013. Defining novel ecosystems. Pages 58–60  
In: Hobbs, R.J., E.S. Higgs, and C.M. Hall (eds). *Novel ecosystems: intervening  
in the new ecological world order*. Wiley-Blackwell, Oxford, United Kingdom.

iNaturalist (iNaturalist.com) accessed 2021-04-22

Kearney, T. H. & Peebles, R. H. 1960. *Arizona Flora*. University of California Press,  
Berkeley and Los Angeles, California

Keeler, K. (1977). The Extrafloral Nectaries of *Ipomoea carnea*  
(Convolvulaceae). *American Journal of Botany*, 64(10), 1182-1188. Retrieved  
May 20, 2020, from [www.jstor.org/stable/2442480](http://www.jstor.org/stable/2442480)

Kobuski, C. (1959). A revised key to the Chinese species of *Jasminum*. *Journal of the  
Arnold Arboretum*, 40(4), 385–390.

Kyalangalilwa, B., Boatwright, J., Daru, B., Maurin, O., Bank, M., (2013) “Phylogenetic  
Position and Revised Classification of *Acacia* S.l. (Fabaceae: Mimosoideae) in  
Africa, Including New Combinations in *Vachellia* and *Senegalia*.” *Botanical  
journal of the Linnean Society* 172.4 (2013): 500–523. Web.

Love, K. (2014). *Institutional Identity and Conservation Momentum: A Study of the  
Phoenix Zoo* (MS Thesis, Arizona State University, Tempe).

McPherson, G. (1981). Studies in *Ipomoea* (Convolvulaceae) I. The Arborescens  
Group. *Annals of the Missouri Botanical Garden*, 68(4), 527-545.  
doi:10.2307/2398887

Newton, L. E., Carter, S., Lavranos, J. J., & Walker, C.C. (2011). *Aloes: The Definitive  
Guide* (Illustrated ed.). Royal Botanic Gardens, Kew.

Perkins, D., & Debbage, K. (2016). Weather and Tourism: Thermal Comfort and  
Zoological Park Visitor Attendance. *Atmosphere*, 7(3), 44–.  
<https://doi.org/10.3390/atmos7030044>

Pinkava, D., Lehto, E., & Rubio, R. (1970). *A vegetative key to the cultivated woody  
plants of the Salt River Valley, Arizona* (Rev. and updated / by Roisan Rubio.).  
University Herbarium, Dept. of Botany and Microbiology, Arizona State  
University.

- Punia, G. (2013). A Review on Varieties of Arka-*Calotropis procera* (Aiton) Dryland. And *Calotropis gigantea* (L.) Dryland. *Journal of Research on Medicinal Plants & Indigenous Medicine*, 2(5), 392.
- Retief F. and Van Wyk A.E. 2001. The genus *Ehretia* (Boraginaceae: Ehretioideae) in a southern Africa. *African Biodiversity & Conservation*. Vol. 31 (1), pp.9-23
- Reynolds, S. (2002). *Subsurface geology of the easternmost Phoenix basin, Arizona : implications for groundwater flow* . Arizona Geological Survey.
- Sobczynski, K. A. (2009). Papago Park: master plan redevelopment.
- Solves, J.P. (2020). *A Preliminary Flora for Las Cienegas National Conservation Area and Studies on the Life History of the Endangered Huachuca Water Umbel* . MS Thesis Arizona State University, Tempe.
- Smith, J. (2020, April 08). The wild world of America's private zoos. Retrieved April 01, 2021, from <https://www.cnn.com/travel/article/america-private-zooslegislation/index.html>
- United States Department of Agriculture. (n.d.). Retrieved April 17, 2021, from <https://planthardiness.ars.usda.gov/PHZMWeb/>
- Verma, S. (2016). *Calotropis procera* (Asclepiadaceae): A Review. *International Journal of Scientific Research in Science and Technology*, 2(6), 487-490.
- Walters, G. M. (2002). Flora of the Papago Park Military Reservation: a desert remnant in Phoenix, Arizona. *Journal of the Arizona-Nevada Academy of Science*, Vol. 34, 16-23.

APPENDIX A  
FLORISTIC CHECKLIST

**Phoenix Zoo**

**Authors:** Z. Berry

**Locality:** Papago Park, Tempe, AZ (33.449820, -111.949200)

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**Families:** 103

**Genera:** 391

**Species:** 706

**Total Taxa:** 710

The following taxon nomenclature is updated following most recent naming through Tropicos.org. Those species with preserved voucher specimens are listed with an associated collector number. Those with date formats contain a record of human observation and thus no voucher specimen was collected.

## ACANTHACEAE

*Dicliptera resupinata* (Vahl) Juss. - **Arizona Foldwing**

Z. Berry 338 [ASU], Z. Berry 384 [ASU]

*Justicia californica* (Benth.) D. Gibson - **Hummingbird-Bushm**

Z. Berry 460 [ASU], Z. Berry 387 [ASU]

*Justicia spicigera* Schlect. – **Mohintli**

Z. Berry 308 [ASU]

*Ruellia californica* I.M.Johnst. – **tronadora**

Z. Berry 501 [ASU]

*Ruellia peninsularis* (Rose) I. M. Johnston - **rama parda**

Z. Berry 340 [ASU]

*Ruellia simplex* C. Wright - **Linear-Leaf Wild Petunia**

## ADOXACEAE

*Sambucus nigra* L. - **Black Elder**

Z. Berry 623 [ASU]

## AIZOACEAE

*Aptenia cordifolia* Schwantes - **Hearts-and-Flowers**

Z. Berry [ASU], Z. Berry [ASU]

*Mesembryanthemum crystallinum* L. - **Crystalline Iceplant**

*Sesuvium verrucosum* Raf. - **Verrucose Sea-Purslane**

Z. Berry 364 [ASU]

## AMARANTHACEAE

*Amaranthus fimbriatus* (Torr.) Benth. ex S. Wats. - **Fringed Amaranth**

Z. Berry 381 [ASU], Z. Berry 485 [ASU], Z. Berry 364 [ASU] *Atriplex*

*canescens* (Pursh) Nutt. - **Four-Wing Saltbush**

Z. Berry 604 [ASU]

*Bassia hyssopifolia* (Pallas) Kuntz - **Five-Horn Smotherweed**

*Beta vulgaris* L. - **Sea Beet**

*Chenopodium album* L. - **Lamb's-Quarters**

Z. Berry 421 [ASU], Z. Berry 515 [ASU], Z. Berry 379 [ASU]

*Chenopodium murale* L. - **Nettle-Leaf Mock Goosefoot**

Z. Berry 517 [ASU], Z. Berry [ASU]

*Chenopodium pratericola* Rydb. - **Desert Goosefoot**

Z. Berry 758 [ASU]

*Enchylaena tomentosa* R.Br. - **Ruby-Saltbush**

*Gomphrena globosa* L. - **Common Globe-Amaranth** Z. Berry [ASU]



*Krascheninnikovia lanata* (Pursh) A.D.J. Meeuse & Smit – **winterfat**

Z. Berry 2020-12-10 [ASU]

*Salsola kali* L. - **Russian thistle**

Z. Berry 319 [ASU]

*Salsola tragus* L. - **Prickly Russian-Thistle**

Z. Berry 423 [ASU]

#### AMARYLLIDACEAE

*Allium cepa* L. - **Garden Onion**

*Allium sativum* L. - **Cultivated Garlic**

*Cooperia drummondii* Herbert - **evening rainlily**

Z. Berry [ASU]

*Crinum asiaticum* Roxb. – **Poisonbulb**

Z. Berry [ASU]

*Hymenocallis littoralis* Salisb. - **Tropical Spider-Lily**

*Zephyranthes candida* Herb. - **Autumn Zephyr-Lily**

Z. Berry 263 [ASU], Z. Berry 329 [ASU]

*Zephyranthes chlorosolen* (Herb.) D. Dietr. - **Evening Rain-Lily**

#### ANACARDIACEAE

*Mangifera indica* Wall. – **Mango**

Z. Berry 755 [ASU]

*Pistacia atlantica* Desf. - **Mt. Atlas Mastictree**

Z. Berry 386 [ASU]

*Rhus aromatica* Aiton - **Fragrant Sumac**

Z. Berry 2017-08-08 [ASU]

*Rhus kearneyi* Barkl. - **Kearney's Sumac**

Z. Berry 2020-01-21 [ASU]

*Rhus lancea* L.f. - **African sumac**

Z. Berry 345 [ASU], Z. Berry 468 [ASU]

*Rhus ovata* S. Watson - **Sugar Sumac**

Z. Berry 701 [ASU]

*Rhus virens* Lindh. ex A. Gray - **Evergreen Sumac**

*Schinus terebinthifolius* Raddi

Z. Berry 342 [ASU]

*Searsia ciliata* (Licht. ex Schult.) A.J.Mill.

#### APIACEAE

*Cyclospermum leptophyllum* (Pers.) Sprague ex Britton & P. Wilson - **Marsh-Parsley**

*Lilaeopsis schaffneriana* (Schlecht.) Coult. & Rose - **Schaffner's Grasswort**

*Lilaeopsis schaffneriana* subsp. *recurva* (A.W.Hill) Affolter

Z. Berry 704 [ASU], Z. Berry 262 [SEINet]

*Petroselinum crispum* (Mill.) Fuss - **Parsley**

#### APOCYNACEAE

*Adenium obesum* Roem. & Schult. - **desert rose**

Z. Berry [ASU]

*Asclepias curassavica* L. – **Bloodflower**

Z. Berry 425 [ASU]

*Asclepias linaria* Cav. - **Pine-Needle Milkweed**

Z. Berry 603 [ASU]

*Asclepias subulata* Decne. - **Rush Milkweed**

Z. Berry 560 [ASU], Z. Berry 462 [ASU]

*Calotropis procera* (Aiton) W.T. Aiton – **Roostertree**

Z. Berry 2017-06-01 [SEINet]

*Carissa macrocarpa* (Ecklon) A. DC. – **Amatungula**

Z. Berry [ASU]

*Catharanthus roseus* G.Don - **Madagascar-Periwinkle**

Z. Berry 437 [ASU], Z. Berry 564 [ASU], Z. Berry 566 [ASU]

*Fockea edulis* K.Schum

*Pachypodium geayi* Constantin & Bois

*Pachypodium lamerei* Drake

*Plumeria rubra* L. – **Templetree**

Z. Berry [ASU]

*Sarcostemma cynanchoides* Decne. - **Fringed Twinevine**

Z. Berry 369 [ASU], Z. Berry 625 [ASU]

*Thevetia peruviana* (Pers.) K. Schum. – **Luckynut**

Z. Berry [ASU], Z. Berry 2021-02-11 [SEINet]

*Trachelospermum jasminoides* (Lindl.) Lem. - **Confederate-Jasmine**

*Vallesia baileyana* Woodson - **jazmín del Nacapule**

Z. Berry 756 [ASU]

#### ARACEAE

*Anthurium schlechtendalii* Kunth - **Birdnest Laceleaf**

*Colocasia esculenta* (L.) Schott - **Coco-Yam**

Z. Berry 297 [ASU]

*Epipremnum aureum* (Linden ex Andre) Bunting

Z. Berry [ASU]

*Lemna gibba* L. - **Inflated Duckweed**

*Lemna minor* L. - **Common Duckweed**

*Thaumatococcus bipinnatifidum* (Schott ex Endl.) Sakur., Calazans & Mayo

Z. Berry 678 [ASU]

*Zamioculcas zamiifolia* Engl.

#### ARALIACEAE

*Hedera helix* L. - **English Ivy**

Z. Berry 2021-02-11 [ASU]

*Schefflera arboricola* Hayata - **Dwarf Umbrella-Tree**

#### ARAUCARIACEAE

*Araucaria heterophylla* (Salisb.) Franco - **Norfolk Island-Pine**

#### ARECACEAE

*Arenga engleri* Becc.

*Bismarckia nobilis* Hildebr. & H.Wendl. - **Bismarck Palm**

*Brahea armata* S. Wats. - **palma azul**

Z. Berry [ASU], Z. Berry 529 [ASU]

*Brahea edulis* H. Wendl. - **Guadalupe Palm**

*Butia capitata* Becc. - **Pindo Palm**

*Caryota mitis* Lour. - **Burmese Fishtail Palm**

Z. Berry 675 [ASU]

*Chamaedorea* sp.

*Chamaerops humilis* L. - **Mediterranean Fan Palm**

Z. Berry 328 [ASU]

*Copernicia alba* Morong ex Morong & Britton

*Livistona chinensis* R.Br. - **Chinese Fountain Palm**

*Phoenix canariensis* hort. ex Chabaud - **Canary Island Date Palm**

*Phoenix dactylifera* L. - **Date Palm**

*Phoenix reclinata* Jacq. - **Senegal Date Palm**

*Phoenix roebelenii* O'Brien - **Pygmy Date Palm**

Z. Berry 685 [ASU]

*Rhapis excelsa* Henry ex Rehder - **Lady Finger Palm**

Z. Berry 674 [ASU]

*Sabal mexicana* Sauvalle - **Rio Grande Palmetto**

Z. Berry [ASU]

*Sabal uresana* Trel. - **palma real**

*Syagrus romanzoffiana* (Cham.) Glassman - **Queen Palm**

*Trachycarpus fortunei* (Hook.) H. Wendl. - **Windmill Palm**

*Washingtonia filifera* (L. Linden) H. Wendl. - **California Fan Palm**

Z. Berry 2020-11-13 [ASU]

*Washingtonia robusta* H. Wendl. - **Washington Fan Palm**

## ASPARAGACEAE

*Agave sp.* L. – **agave**

Z. Berry 524 [ASU], Z. Berry 523 [ASU]

*Agave americana* L. - **American Century-Plant**

*Agave angustifolia* Haw. - **Narrow-Leaf Agave**

Z. Berry 524 [ASU]

*Agave attenuata* Salm-Dyck - **Drachenbaum Century-Plant**

*Agave bovicornuta* Gentry - **lechuguilla**

*Agave colorata* Gentry - **mezcal ceniza**

*Agave desmettiana* Jacobi - **Dwarf Century-Plant**

Z. Berry 2017-07-04 [ASU]

*Agave filifera* Salm-Dyck – **Thread Agave**

*Agave fourcroydes* Lem. - **henequén**

*Agave franzosini* P.Sewell – **Majestic Agave**

Z. Berry [ASU]

*Agave geminiflora* Lindl. - **Twin Flowered Agave**

*Agave lophantha* Schiede - **Thorn-Crest Century-Plant**

*Agave macroacantha* Zucc. - **Black Spine Agave**

*Agave murpheyi* F. Gibson - **Hohokam Century-Plant**

*Agave parryi* Engelm. - **Parry's Century-Plant**

*Agave parryi var. truncata* H.S.Gentry  
*Agave schidigera* Lem.

*Agave schottii* Engelm. - **Schott's Century-Plant**

Z. Berry 2020-09-30 [ASU]

*Agave sisalana* Perrine ex Engelm. - **Sisal-Hemp**

*Agave toumeyana* Trel. - **Toumey's Century-Plant**

*Agave victoriae-reginae* T.Moore - **mezcal**

*Agave vilmoriniana* A. Berger – **amole**

Z. Berry 2020-09-30 [ASU]

*Agave weberi* Cels ex Poisson - **Weber's Century-Plant**

*Asparagus aethiopicus* - **South African Asparagus-Fern**

Z. Berry 287 [ASU], Z. Berry 548 [ASU]

*Asparagus densiflorus* (Kunth) Jessop

*Asparagus retrofractus* Schousb.

Z. Berry 549 [ASU]

*Beaucarnea recurvata* Lem.  
 Z. Berry 681 [ASU]  
*Chlorophytum comosum* Baker - **Spider Ivy**  
 Z. Berry [ASU]  
*Dasyllirion longissimum* Lem. - **junquillo**  
*Dasyllirion wheeleri* S. Watson - **Common Sotol**  
*Dracaena marginata* Lam.  
 Z. Berry 2020-02-05 [ASU] *Dracaena*  
*reflexa* Lam.  
*Dracaena reflexa* var. *angustifolia* Baker  
*Hesperaloe funifera* (K. Koch) Trel. - **New Mexico False Yucca**  
 Z. Berry 581 [ASU]  
*Hesperaloe nocturna* Gentry - **night-flowering hesperaloe**  
 Z. Berry 581 [ASU]  
*Hesperaloe parviflora* (Torr.) Coult. - **Red-Flower False Yucca**  
 Z. Berry 580 [ASU]  
*Hesperaloe tenuifolia* G.D.Starr  
 Z. Berry 2021-02-23 [ASU]  
*Liriope muscari* L.H.Bailey. - **Big Blue Lilyturf**  
 Z. Berry 2017-10-17 [ASU]  
*Manfreda maculosa* Rose - **Spice-Lily**  
 Z. Berry 2019-10-30 [ASU]  
*Nolina matapensis* Wiggins - **palmita**  
*Nolina microcarpa* S. Watson - **Sacahuista Bear-Grass**  
*Sansevieria cylindrica* Bojer - **Spear-Orchid**  
*Sansevieria masoniana* Chahinian  
 Z. Berry 752 [ASU]  
*Sansevieria trifasciata* Prain - **Mother-in-Law's-Tongue**  
*Yucca aloifolia* L. - **Aloe Yucca**  
*Yucca baccata* Torr. - **Banana Yucca**  
*Yucca elata* (Engelm.) Engelm. - **Soaptree Yucca**  
*Yucca elephantipes* Regel ex W.Trelease  
*Yucca faxoniana* (Trel.) Sarg. - **Eve's-Needle**  
 Z. Berry 2020-09-30 [ASU]  
*Yucca gloriosa* L. - **Moundlily Yucca**  
 Z. Berry 659 [ASU]  
*Yucca gloriosa* var. *gloriosa*  
*Yucca gloriosa* var. *tristis* Carriere  
*Yucca madrensis* Gentry - **Mountain Yucca**

*Yucca pallida* McKelvey - **Twist-Leaf Yucca** *Yucca recurvifolia* Salisb. - **Adam's-Needle**

#### ASPHODELACEAE

*Aloe sp.* L. - **aloe**

*Aloe arborescens* Mill.

Z. Berry 374 [ASU]

*Aloe barbadensis* P. Mill. - **Barbados Aloe**

*Aloe barberae* Dyer – **tree aloe**

*Aloe dichotoma* L.f. – **quiver tree**

*Aloe divaricata* A. Berger

Z. Berry 2020-02-21 [ASU]

*Aloe ferox* Mill. – **bitter aloe**

*Aloe humilis* Mill. – **spider aloe**

*Aloe maculata* Thunb. - **Soap Aloe**

*Aloe mitriformis* Mill.

Z. Berry [ASU]

*Aloe petricola* Pole Evans

*Aloe ramosissima* Pillans

Z. Berry [ASU]

*Aloe saponaria* Haw.

*Aloe striata* Haw.

*Aloe vaombe* Decorse & Poisson

Z. Berry [ASU]

*Aloe vera* (L.) Burm. f. - **Barbados Aloe**

*Aloe wickensii* Pole-Evans

Z. Berry 709 [ASU]

#### ASTERACEAE

*Ambrosia ambrosioides* (Cav.) W.W. Payne - **Ambrosia-Leaf Burr-Ragweed**

Z. Berry 609 [ASU]

*Ambrosia artemisioides* Meyen & Walp.

*Ambrosia deltoidea* (Torr.) W.W. Payne - **Triangle Burr-Ragweed**

Z. Berry 459 [ASU]

*Ambrosia dumosa* (A. Gray) W.W. Payne - **White Burrobush**

*Artemisia sp.* L. - **sagebrush**

Z. Berry [ASU]

*Baccharis salicifolia* (Ruiz & Pav.) Pers. - **Douglas' False Willow**

Z. Berry 323 [ASU], Z. Berry 498 [ASU]

*Baccharis sarothroides* A. Gray - **Rosinbush**  
 Z. Berry 368 [ASU], Z. Berry 476 [ASU]

*Bahiopsis parishii* (Greene) E.E. Schilling & Panero - **Parish's Scrub-Aster**  
 Z. Berry 700 [ASU], Z. Berry 280 [ASU]

*Baileya multiradiata* Harv. & A. Gray - **desert marigold**  
 Z. Berry 562 [ASU]

*Bebbia juncea* (Benth.) Greene - **Sweetbush**

*Berlandiera lyrata* Benth. - **Lyre-Leaf Greeneyes**  
 Z. Berry 2017-08-08 [SEINet]

*Brickellia coulteri* A. Gray - **Coulter's Brickellbush**  
 Z. Berry 610 [ASU]

*Centaurea melitensis* L. - **Maltese Star-Thistle**  
 Z. Berry 657 [ASU]

*Conyza bonariensis* (L.) Cronquist - **Asthmaweed**  
 Z. Berry 2017-07-27 [ASU]

*Cynara cardunculus* L. - **Cardoon**

*Dimorphotheca sinuata* Dc. - **Cape-Marigold**  
 Z. Berry 637 [ASU]

*Eclipta prostrata* (L.) L. - **False Daisy**  
 Z. Berry 360 [ASU]

*Encelia farinosa* A. Gray ex Torr. - **Goldenhills**  
 Z. Berry 528 [ASU], Z. Berry 479 [ASU]

*Ericameria laricifolia* (A. Gray) Shinnars - **Turpentine-Bush**  
 Z. Berry [ASU]

*Gaillardia pulchella* Foug. - **Firewheel**

*Gutierrezia sarothrae* (Pursh) Britton & Rusby - **Kindlingweed**

*Helianthus annuus* L. - **Common Sunflower**

*Isocoma acradenia* (Greene) Greene - **Alkali Jimmyweed**  
 Z. Berry 481 [ASU], Z. Berry 316 [ASU]

*Laennecia coulteri* (A. Gray) G.L. Nesom - **Coulter's Horseweed**  
 Z. Berry 535 [ASU], Z. Berry 231 [ASU], Z. Berry 642 [ASU], Z. Berry 616 [ASU]

*Oncosiphon piluliferum* (L. f.) Kallersjo - **Stinknet**  
 Z. Berry 644 [ASU], Z. Berry 636 [ASU]

*Pluchea odorata* (L.) Cass. - **Sweetscent**  
 Z. Berry 590 [ASU]

*Pluchea sericea* (Nutt.) Coville - **Arrow-Weed**  
 Z. Berry 621 [ASU]

*Pseudognaphalium luteoalbum* (L.) Hilliard & B. L. Burt - **Jersey Rabbit-Tobacco**

Z. Berry [ASU]

*Senecio vulgaris* L. - **Old-Man-in-the-Spring**

Z. Berry 234 [ASU]

*Sonchus asper* (L.) Hill - **Spiny-Leaf Sow-Thistle**

Z. Berry 429 [ASU], Z. Berry 270 [ASU], Z. Berry 645 [ASU]

*Sonchus oleraceus* L. - **Common Sow-Thistle**

Z. Berry 430 [ASU]

*Sphagneticola trilobata* (L.) Pruski - **Bay Biscayne Creeping-Oxeye**

Z. Berry 291 [ASU]

*Stephanomeria exigua* Nutt. - **White-Plume Wire-Lettuce**

Z. Berry 278 [ASU]

*Symphotrichum subulatum* (Michx.) G. L. Nesom - **Seaside American-Aster**

*Tetraneuris acaulis* (Pursh) Greene - **Stemless Four-Nerve Daisy**

Z. Berry 2020-12-10 [ASU]

*Thymophylla tenuiloba* (DC.) Small - **Bristle-Leaf Pricklyleaf**

Z. Berry 2020-12-10 [ASU]

*Tithonia rotundifolia* S.F. Blake - **Clavel-de-Muerto**

Z. Berry 411 [ASU]

*Trixis californica* Kellogg - **American Threefold**

Z. Berry 233 [ASU]

## **BERBERIDACEAE**

*Berberis haematocarpa* Wooton - **Red Oregon-Grape**

Z. Berry 389 [ASU], Z. Berry 622 [ASU], Z. Berry [ASU]

*Nandina domestica* Thunb. - **Sacred-Bamboo**

Z. Berry [ASU]

## **BIGNONIACEAE**

*Campsis radicans* (L.) Seem. ex Bureau - **Trumpet-Creeper**

*Catalpa bignonioides* Walter - **Southern Catalpa**

*Chilopsis linearis* (Cav.) Sweet - **Desert-Willow**

*Crescentia alata* Kunth - **ayal** Z. Berry 337 [ASU]

*Dolichandra unguis-cati* (L.) L.G.Lohmann - **Catclawvine**

*Handroanthus impetiginosus* (Mart. ex DC.) Mattos - **amapa**

Z. Berry 683 [ASU]

*Jacaranda mimosifolia* D. Don - **Black Poui**

*Kigelia africana* (Lam.) Benth. – **sausage tree**

Z. Berry 536 [ASU]



*Spathodea campanulata* P.Beauv. - **African-Tuliptree**

Z. Berry 2019-10-30 [ASU]

*Tabebuia chrysantha* Nichols. - **amapa amarilla**

*Tecoma capensis* (Thunb.) Lindl. - **Cape-Honeysuckle**

Z. Berry 563 [ASU], Z. Berry 465 [ASU]

*Tecoma stans* (L.) Juss. ex Kunth - **Yellow Trumpetbush**

Z. Berry 305 [ASU], Z. Berry 312 [ASU], Z. Berry 596 [ASU]

## **BORAGINACEAE**

*Amsinckia menziesii* (Lehm.) A. Nels. & J.F. Macbr. - **Small-Flower Fiddleneck**

Z. Berry 509 [ASU]

*Cordia boissieri* A. DC. - **Anacahuita**

Z. Berry 514 [ASU], Z. Berry 299 [ASU]

*Cordia parviflora* Ortega - **vara prieta**

Z. Berry 339 [ASU], Z. Berry 568 [ASU]

*Cryptantha barbiger* (A. Gray) Greene - **Bearded Cat's-Eye**

Z. Berry 496 [ASU], Z. Berry 482 [ASU], Z. Berry 503 [ASU], Z. Berry [SEINet]

*Cryptantha maritima* (Greene) Greene - **Guadalupe Cat's-Eye**

Z. Berry 477 [ASU], Z. Berry 504 [ASU], Z. Berry 396 [ASU], Z. Berry 508 [ASU], Z. Berry 502 [ASU]

*Ehretia alba* Retief & A.E. van Wyk

Z. Berry 268 [ASU]

*Ehretia rigida* (Thunb.) Druce

Z. Berry 599 [ASU], Z. Berry 314 [ASU]

*Heliotropium curassavicum* L. - **Seaside Heliotrope**

Z. Berry 393 [ASU], Z. Berry 506 [ASU], Z. Berry 439 [ASU], Z. Berry 318 [ASU]

*Johnstonella angustifolia* (Torr.) Hasenstab & M.G. Simpson - **Panamint**

**NarrowWing Cat's-Eye**

*Nama hispida* A.Gray - **Sandbells**

Z. Berry 2019-04-19 [ASU]

*Pectocarya heterocarpa* (I.M. Johnston) I.M. Johnston - **Chuckwalla Combseed**

*Pectocarya recurvata* I.M. Johnston - **Curve-Nut Combseed**

Z. Berry 619 [ASU]

## **BRASSICACEAE**

*Brassica oleracea* L. - **Cabbage**

*Lepidium oblongum* Small - **Veiny Pepperwort**

Z. Berry 759 [ASU]

*Lobularia maritima* (L.) Desv. - **Sweet-Alison**

Z. Berry 284 [ASU]

*Sisymbrium irio* L. - **London Rocket**

#### **BROMELIACEAE**

*Hechtia montana* Brandegee - **mezcalito**

Z. Berry 734 [ASU]

*Puya berteroniana* Mez

#### **BURSERACEAE**

*Bursera fagaroides* (Kunth) Engl. - **Fragrant Bursera**

Z. Berry 351 [ASU]

*Bursera filicifolia* Brandegee - **torote**

*Bursera hindsiana* Engl. - **torote prieto**

Z. Berry 687 [ASU], Z. Berry 689 [ASU]

*Bursera laxiflora* S.Watson - **torote prieto**

*Bursera microphylla* A. Gray - **Elephant-Tree**

Z. Berry 344 [ASU]

#### **CACTACEAE**

*Austrocylindropuntia subulata* (Muehlenpf.) Backeb.

*Carnegiea gigantea* (Engelm.) Britton & Rose - **Saguaro**

Z. Berry 631 [ASU]

*Cephalocereus leucocephalus* (Poselg.) Britton & Rose

*Cereus peruvianus* Mill. - **Peruvian cereus**

*Cereus repandus* Mill.

*Cleistocactus samaipatanus* (Cardenas) D.R.Hunt

Z. Berry [SEINet]

*Cylindropuntia acanthocarpa* (Engelm. & Bigelow) F.M. Knuth - **Buck-Horn Cholla**

*Cylindropuntia arbuscula* (Engelm.) Knuth - **Arizona Pencil Cholla**

*Cylindropuntia bigelovii* (Engelm.) Knuth - **Teddy-Bear Cholla**

Z. Berry [ASU]

*Cylindropuntia echinocarpa* (Engelm. & Bigelow) F.M. Knuth - **Golden Cholla**

*Cylindropuntia fulgida* (Engelm.) Knuth - **Jumping Cholla**

*Cylindropuntia imbricata* (Haw.) F.M. Knuth - **Tree Cholla**

*Cylindropuntia leptocaulis* (DC.) Knuth - **Christmas Cholla**

Z. Berry [ASU]

*Cylindropuntia munzii* (C.B.Wolf) Backeb. - **Munz's Cholla**

*Cylindropuntia ramosissima* (Engelm.) Knuth - **Darning-Needle Cholla**

Z. Berry 2020-01-21 [SEINet]

*Cylindropuntia spinosior* (Engelm.) Knuth - **Walkingstick Cactus**  
*Echinocactus grusonii* Hildm. - **golden barrel**  
*Echinocereus brandegeei* - **casa de rata**  
*Echinocereus engelmannii* (Parry ex Engelm.) Lem. - **Saints Cactus**  
*Echinocereus rectispinus* Peebles - **pinkflower hedgehog cactus**  
*Echinocereus santaritensis* W. Blum & Rutow  
 Z. Berry 2020-12-10 [ASU]  
*Echinocereus stoloniferus* W.T.Marshall  
*Echinocereus triglochidiatus* Engelm. - **kingcup cactus**  
*Echinocereus triglochidiatus var. arizonicus* (Rose ex Orcutt) L. Benson - **Arizona Claretcup**  
*Echinopsis candicans* (Salm-Dyck) F.A.C.Weber  
*Echinopsis oxygona* (Link) Zucc. ex Pfeiff.  
 Z. Berry 264 [ASU]  
*Ferocactus sp.* Britt. & Rose - **barrel cactus**  
 Z. Berry 2020-12-10 [ASU], Z. Berry 2020-12-10 [ASU]  
*Ferocactus acanthodes* (Lem.) Britt. & Rose - **biznaga**  
*Ferocactus acanthodes var. lecontei* (Engelm.) Lindsay - **biznaga**  
 Z. Berry 2020-12-10 [ASU]  
*Ferocactus cylindraceus* (Engelm.) Orcutt - **biznaga**  
*Ferocactus diguetii* Britton & Rose - **biznaga**  
*Ferocactus emoryi* (Engelm.) Orcutt - **Emory's Barrel Cactus**  
*Ferocactus pottsii* (Salm-Dyck) Backeb. - **biznaga**  
 Z. Berry [ASU], Z. Berry 2017-07-28 [ASU]  
*Ferocactus rectispinus* Britton & Rose - **biznaga**  
 Z. Berry 2020-12-10 [ASU]  
*Ferocactus wislizeni* (Engelm.) Britton & Rose - **Candy Barrel Cactus**  
*Grusonia invicta* (Brandege) E.F.Anderson - **devil's club cholla**  
*Mammillaria candida* Scheidw.  
*Mammillaria grahamii* Engelm. - **Graham's Nipple Cactus**  
 Z. Berry 667 [ASU]  
*Mammillaria standleyi* Orcutt. - **pitahayita**  
*Myrtillocactus cochal* Britton & Rose - **cochal**  
*Myrtillocactus geometrizans* Console - **bazto**  
*Neobuxbaumia polylopha* (DC.) Backeb. - **Cone Cactus**  
*Opuntia sp.* P. Mill. - **pricklypear**  
 Z. Berry 706 [ASU]  
*Opuntia basilaris* Engelm. & Bigelow - **Beaver-Tail Cactus**  
 Z. Berry [ASU]

*Opuntia cochinelifera* Mill.  
Z. Berry 698 [ASU]

*Opuntia engelmannii* Salm-Dyck - **Cactus-Apple**  
Z. Berry [ASU]

*Opuntia ficus-indica* (L.) P. Mill. - **Indian-Fig**

*Opuntia glomerata* Haw.

*Opuntia linguiformis* Griffiths  
Z. Berry 651 [ASU]

*Opuntia macrocentra* Engelm. - **Long-Spine Purple Prickly-Pear**  
Z. Berry 385 [ASU]

*Opuntia microdasys* (Lehm.) Pfeiff. - **Bunny-Ear's Prickly-Pear**  
Z. Berry 697 [ASU]

*Opuntia monacantha* Haw. - **Cochineal Prickly-Pear**  
Z. Berry 679 [ASU]

*Opuntia phaeacantha* Engelm. - **Tulip Prickly-Pear**  
Z. Berry 385 [ASU]

*Opuntia quimilo* K. Schum.

*Opuntia rufida* Engelm.  
Z. Berry 2021-04-03 [ASU]

*Opuntia santa-rita* (Griffiths & Hare) Rose - **Santa Rita Prickly-Pear**  
Z. Berry 665 [ASU], Z. Berry 521 [ASU]

*Pachycereus marginatus* Britton & Rose - **Mexican Fence Post**  
Z. Berry 2019-04-13 [ASU]

*Pachycereus pecten-aboriginum* Britton & Rose - **etcho**

*Pachycereus pringlei* Britton & Rose - **sahueso**

*Pachycereus schottii* (Engelm.) D.R. Hunt - **sinita**

*Peniocereus greggii* (Engelm.) Britt. & Rose - **Night-Blooming-Cereus**

*Pereskia grandifolia* Haw. - **Rose Cactus**  
Z. Berry 543 [ASU]

*Selenicereus undatus* D.R. Hunt

*Stenocereus alamosensis* (J.M.Coult.) A.C.Gibson & K.E.Horak - **sina**  
Z. Berry 680 [ASU], Z. Berry [ASU]

*Stenocereus beneckeii* (Ehrenb.) A.Berger & Buxb.  
Z. Berry 2020-09-30 [SEINet]

*Stenocereus gummosus* (Engelm.) A.C.Gibson & K.E.Horak - **pitahaya agria**

*Stenocereus marginatus* (DC.) Buxbaum - **órgano**

*Stenocereus stellatus* Riccob.

*Stenocereus thurberi* (Engelm.) Buxbaum - **pitahaya**  
Z. Berry [ASU]

*Tephrocactus alexanderi* (Britton & Rose) Backeb.

Z. Berry 710 [ASU]

*Tephrocactus articulatus* (Otto) Backeb.

Z. Berry 520 [ASU]

*Trichocereus camarguensis* Cárdenas

*Trichocereus candicans* Britton & Rose - **trailing torch cactus**

*Trichocereus formosus* (Pfeiff.) F. Ritter

*Trichocereus terscheckii* Britton & Rose - **cardón**

#### CAMPANULACEAE

*Lobelia erinus* L. - **Edging Lobelia**

*Lobelia laxiflora* Kunth - **Sierra Madre Lobelia**

Z. Berry 426 [ASU]

#### CANNABACEAE

*Celtis pallida* Torr. - **Spiny Hackberry**

Z. Berry [ASU], Z. Berry [ASU]

*Celtis reticulata* Torr. - **Net-Leaf Hackberry**

Z. Berry [ASU], Z. Berry [ASU]

#### CANNACEAE

*Canna x generalis* L.H. Bailey (pro sp.) [glauca × indica]

Z. Berry 428 [ASU], Z. Berry 356 [ASU]

#### CAPRIFOLIACEAE

*Lonicera japonica* Thunb. - **Japanese Honeysuckle**

Z. Berry 2020-12-10 [ASU]

*Lonicera x heckrottii* Rehder [×americana × sempervirens]

Z. Berry 555 [ASU]

#### CARICACEAE

*Carica papaya* L. - **Papaya**

#### CASUARINACEAE

*Casuarina equisetifolia* L. - **Beach She-Oak**

Z. Berry 2020-11-13 [ASU], Z. Berry 2020-02-21 [ASU]

#### CELASTRACEAE

*Maytenus* sp.

*Maytenus phyllanthoides* Benth. - **Florida Mayten**

## COMMELINACEAE

*Commelina erecta* L. - **White-Mouth Dayflower**

Z. Berry 298 [ASU], Z. Berry 556 [ASU]

*Tradescantia andrieuxii* C.B.Clarke

*Tradescantia pallida* (Rose) D.R.Hunt – **purple queen**

*Tradescantia semisomna* Standl. - **spiderwort**

## CONVOLVULACEAE

*Ipomoea arborescens* Sweet - **Tree Morning Glory**

Z. Berry [ASU], Z. Berry 293 [ASU]

*Ipomoea batatas* (L.) Lam. - **Sweet-Potato**

Z. Berry [ASU]

*Ipomoea carnea* Jacq. - **Gloria-de-la-Manana**

Z. Berry 302 [ASU], Z. Berry 2017-07-25 [ASU]

*Merremia aurea* (Kellogg) O'Donell - **yuca**

## CRASSULACEAE

*Bryophyllum daigremontianum* (Raym.-Hamet & H. Perrier) A. Berger -

**Devil'sBackbone** Z. Berry 497 [ASU]

*Kalanchoe pinnata* (Lam.) Pers. - **Cathedral-Bells**

## CUCURBITACEAE

*Trichosanthes cucumerina* L. - **Annual-Gourd**

Z. Berry 2019-05-28 [SEINet]

## CUPRESSACEAE

*Cupressus arizonica* Greene - **sabino**

Z. Berry 2017-08-08 [ASU]

*Cupressus sempervirens* L. - **Italian Cypress**

*Juniperus scopulorum* Sarg. - **Rocky Mountain Juniper**

*Taxodium mucronatum* Ten. - **Montezuma Bald-Cypress**

## CYCADACEAE

*Cycas revoluta* Thunb. - **Sago-Palm**

## CYPERACEAE

*Bolboschoenus maritimus* (L.) Palla - **Alkali Bulrush**

*Cyperus alternifolius* L.

Z. Berry 317 [ASU]

*Cyperus eragrostis* Lam. - **Tall Flat Sedge**

Z. Berry 661 [ASU]

*Cyperus esculentus* L. – **yellow nutsedge**

*Cyperus involucratus* Rottb. - **Alternate-Leaf Flat Sedge**

Z. Berry 591 [ASU], Z. Berry 447 [ASU]

*Cyperus odoratus* L. - **Rusty Flat Sedge**

Z. Berry 361 [ASU]

*Eleocharis geniculata* (L.) Roem. & Schult. - **Capitate Spike-Rush**

Z. Berry 272 [ASU]

*Eleocharis macrostachya* Britton - **Pale Spike-Rush**

*Eleocharis palustris* (L.) Roem. & Schult. - **common spikerush**

*Schoenoplectus americanus* (Pers.) Volk. ex Schinz & R. Keller - **Chairmaker's Wood Club-Rush**

Z. Berry 624 [ASU]

*Schoenoplectus lacustris* (L.) Palla - **Common Wood Club-Rush**

*Schoenoplectus pungens* (Vahl) Palla - **Three-Square**

Z. Berry 575 [ASU]

*Schoenoplectus tabernaemontani* (C. C. Gmel.) Palla - **Soft-Stem Wood Club-Rush**

Z. Berry 271 [ASU]

#### **DIDIEREACEAE**

*Alluaudia procera* Drake

Z. Berry [ASU], Z. Berry [ASU]

*Portulacaria afra* (L.) Jacq. - **Dwarf-Jade**

Z. Berry 464 [ASU]

#### **DORYANTHACEAE**

*Doryanthes palmeri* W.Hill ex Benth.

Z. Berry 2020-12-10 [ASU]

#### **DRYOPTERIDACEAE**

*Cyrtomium falcatum* (L. f.) C. Presl - **Japanese Net-Vein Holly Fern**

Z. Berry 676 [ASU]

#### **EPHEDRACEAE**

*Ephedra viridis* Coville - **Mormon-Tea**

Z. Berry 696 [ASU]

#### **EUPHORBIACEAE**

*Argythamnia lanceolata* (Benth.) Müll. Arg - **narrowleaf silverbush**

Z. Berry 612 [ASU]

*Chamaesyce abramsiana* (L.C. Wheeler) Koutnik - **Abrams' Sandmat**  
*Chamaesyce albomarginata* (Torr. & A. Gray) Small - **White-Margin Sandmat**  
*Chamaesyce hyssopifolia* (L.) Small - **Hyssop-Leaf Sandmat**  
 Z. Berry 2017-07-25 [ASU], Z. Berry 2017-07-28 [ASU]  
*Chamaesyce maculata* (L.) Small - **Spotted Sandmat**  
*Chamaesyce micromera* (Boiss. ex Engelm.) Woot. & Standl. - **Sonoran Sandmat**  
 Z. Berry 478 [ASU], Z. Berry 398 [ASU]  
*Chamaesyce polycarpa* (Benth.) Millsp. ex Parish - **Small-Seed Sandmat**  
*Codiaeum variegatum* (L.) A. Juss. - **Garden-Croton**  
 Z. Berry [ASU]  
*Croton insularis* Baill.  
 Z. Berry 750 [ASU], Z. Berry 2021-02-12 [SEINet]  
*Ditaxis claryana* (Jepson) G.L. Webster - **desert silverbush**  
 Z. Berry 375 [ASU], Z. Berry 511 [ASU]  
*Ditaxis neomexicana* (Müll.Arg.) A. Heller - **New Mexico silverbush**  
 Z. Berry 614 [ASU]  
*Euphorbia antisiphylitica* Zucc.  
 Z. Berry 747 [ASU]  
*Euphorbia canariensis* Tremaut  
*Euphorbia horrida* Boiss.  
*Euphorbia ingens* E.Mey. ex Boiss. - **Candelabra-tree**  
*Euphorbia lactea* Haw. - **Mottled Spurge**  
 Z. Berry 713 [ASU]  
*Euphorbia lathyris* L. - **Moleplant**  
*Euphorbia lividiflora* L.C. Leach  
 Z. Berry 546 [ASU]  
*Euphorbia maculata* L. - **Spotted Sandmat**  
 Z. Berry 605 [ASU]  
*Euphorbia milii* Desmoul. ex Boiss. - **Christplant**  
 Z. Berry 740 [ASU], Z. Berry 445 [ASU]  
*Euphorbia neriifolia* L.  
*Euphorbia resinifera* Berg - **Moroccan mound spurge**  
 Z. Berry 739 [ASU], Z. Berry [ASU]  
*Euphorbia royleana* Boiss.  
 Z. Berry 2019-04-13 [ASU]  
*Euphorbia splendens* Boj. ex Hook.  
*Euphorbia tirucalli* L. - **False Caper**  
 Z. Berry 739 [ASU]  
*Euphorbia tortilis* Rottler ex Ainslie



Z. Berry 2021-02-17 [ASU]  
*Euphorbia trigona* Mill. - **African-Milktree**  
*Euphorbia xanti* Engelm. ex Boiss.  
 Z. Berry 512 [ASU]  
*Jatropha cardiophylla* (Torr.) Muell.-Arg. - **Sangre-de-Cristo**  
 Z. Berry 668 [ASU]  
*Jatropha cinerea* (Ortega) Muell.-Arg. - **Arizona Nettle-Spurge**  
 Z. Berry 673 [ASU]  
*Jatropha cordata* Müll.Arg. - **papelío**  
*Jatropha cuneata* Wiggins & Rollins - **Physicnut**  
*Jatropha curcas* Wall. - **Barbados-Nut**  
 Z. Berry 620 [ASU]  
*Jatropha integerrima* Jacq. - **Peregrina**  
 Z. Berry 2021-01-01 [SEINet]  
*Jatropha malacophylla* Standl. - **sangrengado**  
*Manihot esculenta* Crantz - **Tapioca**  
*Pedilanthus macrocarpus* Benth. - **candelilla**  
 Z. Berry [ASU]  
*Sebastiania bilocularis* S. Watson - **Arrow-Poison**  
 Z. Berry [ASU]  
*Triadica sebifera* Small - **Chinese Tallowtree**  
 Z. Berry 655 [ASU]

#### FABACEAE

*Acacia aneura* F. Muell. ex Benth. – **Mulga**  
 Z. Berry [ASU]  
*Acacia aroma* Hook. & Arn.  
 Z. Berry 688 [ASU]  
*Acacia constricta* Benth. - **Mescat False Acacia**  
*Acacia farnesiana* (L.) Willd. - **Mealy False Acacia**  
 Z. Berry 491 [ASU], Z. Berry 466 [ASU]  
*Acacia gerrardii* Benth.  
 Z. Berry 702 [ASU]  
*Acacia glaucoptera* Benth.  
 Z. Berry 402 [ASU]  
*Acacia greggii* A. Gray - **Long-Flower Catclaw**  
*Acacia karroo* Hayne - **Karoo**  
*Acacia pennatula* Benth. - **algarrobo**  
*Acacia redolens* Maslin - **Desert-Carpet**  
*Acacia salicina* Lindl. - **Willow Acacia**

Z. Berry 436 [ASU], Z. Berry 494 [ASU]  
*Acacia sieberiana* DC.  
*Acacia stenophylla* A. Cunn. ex Benth. - **Shoestring Acacia**  
*Acaciella angustissima* (Mill.) Britton & Rose - **Arizona Desert-Carpet**  
 Z. Berry [ASU]  
*Albizia lebbbeck* (L.) Benth. - **capiro**  
 Z. Berry [ASU], Z. Berry 322 [ASU], Z. Berry 296 [ASU]  
*Bauhinia acuminata* Vell. Z. Berry 542 [ASU]  
*Bauhinia blakeana* Dunn  
*Bauhinia lunarioides* A. Gray ex S. Wats. - **Texasplume**  
 Z. Berry 551 [ASU], Z. Berry 542 [ASU]  
*Bauhinia variegata* L. - **Mountain-Ebony**  
 Z. Berry 420 [ASU]  
*Bolusanthus speciosus* Harms - **Tree Wisteria**  
*Caesalpinia cacalaco* Humb. & Bonpl. - **Cascalote**  
 Z. Berry 334 [ASU], Z. Berry 377 [ASU]  
*Caesalpinia mexicana* A. Gray - **Potro**  
 Z. Berry 487 [ASU]  
*Caesalpinia paraguariensis* (D.Parodi) Burkart - **Tranquility Tree**  
 Z. Berry 669 [ASU]  
*Caesalpinia pulcherrima* (L.) Sw. - **Pride-of-Barbados**  
 Z. Berry 653 [ASU]  
*Calliandra californica* (Benth.) D. Gibs. - **tabardillo**  
 Z. Berry 302 [ASU], Z. Berry 490 [ASU], Z. Berry 274 [ASU]  
*Calliandra eriophylla* Benth. - **fairyduster**  
 Z. Berry 313 [ASU]  
*Calliandra haematocephala* Hassk. - **Red Powderpuff Tree**  
 Z. Berry 446 [ASU], Z. Berry 418 [ASU]  
*Cassia oligophylla* F. Muell.  
 Z. Berry 440 [ASU]  
*Ceratonia siliqua* L. - **St. John's-Bread**  
 Z. Berry 343 [ASU]  
*Cercis occidentalis* Torr. ex A.Gray - **Southwestern Redbud**  
 Z. Berry [ASU]  
*Cochliasanthus caracalla* Trew - **Bertoni-Bean**  
 Z. Berry 452 [ASU], Z. Berry 282 [ASU]  
*Coulteria platyloba* (S. Watson) N. Zamora  
 Z. Berry [ASU], Z. Berry 353 [ASU], Z. Berry 600 [ASU]  
*Coulteria pumila* (Britton & Rose) Sotuyo & G.P. Lewis - **palo piojo**

Z. Berry 656 [ASU]  
***Coursetia glandulosa* A. Gray - Rosary Baby-Bonnets**  
 Z. Berry 753 [ASU]  
***Dalbergia sissoo* Roxb. ex DC. - Indian-Rosewood**  
 Z. Berry 276 [ASU], Z. Berry 573 [ASU], Z. Berry 310 [ASU]  
***Dalea bicolor* Humb. & Bonpl. ex Willd. - Silver Prairie-Clover**  
***Dermatophyllum secundiflorum* (Ortega) Gandhi & Reveal - Texas Western Mountain-Laurel**  
 Z. Berry 281 [ASU]  
***Dichrostachys cinerea* (L.) Wight & Arn. - Aroma**  
 Z. Berry 326 [ASU]  
***Ebenopsis ebano* (Berl.) Barneby & Grimes - Texas-Ebony**  
 Z. Berry 531 [ASU], Z. Berry 2017-06-27 [SEINet]  
***Erythrina flabelliformis* Kearney - Coral-Bean**  
***Erythrina herbacea* L. - Red-Cardinal**  
 Z. Berry 349 [ASU]  
***Erythrina x bidwillii* Lindl. - Bidwill's coral bean**  
 Z. Berry 349 [ASU]  
***Geoffroea decorticans* (Gill. ex Hook. & Arn.) Burkart - Chilean Palo Verde**  
 Z. Berry [ASU]  
***Gleditsia triacanthos* L. - Honey-Locust**  
***Haematoxylum brasiletto* Karst. - palo brasil**  
 Z. Berry 295 [ASU], Z. Berry 534 [ASU]  
***Havardia mexicana* Britton & Rose - palo chino**  
***Leucaena leucocephala* (Lam.) de Wit - White Leadtree**  
 Z. Berry [ASU], Z. Berry [ASU]  
***Lonchocarpus hermannii* M.Sousa S. - nesco**  
 Z. Berry 336 [ASU], Z. Berry 347 [ASU]  
***Lotus salsuginosus* Greene - coastal bird's-foot trefoil**  
***Lotus salsuginosus subsp. brevivexillus* (Ottley) Munz - coastal bird's-foot trefoil**  
 Z. Berry 695 [ASU]  
***Lysiloma watsonii* Rose - Little-Leaf False Tamarind**  
 Z. Berry [ASU]  
***Mariosousa willardiana* (Rose) Seigler & Ebinger - palo blanco**  
 Z. Berry 2021-02-11 [SEINet]  
***Medicago lupulina* L. - Black Medick**  
 Z. Berry 539 [ASU]  
***Melilotus indica* (L.) All. - trébol**  
 Z. Berry 646 [ASU], Z. Berry 539 [ASU]

*Mimosa dysocarpa* Benth. - **Velvet-Pod Mimosa**

*Olneya tesota* A. Gray - **Desert-Ironwood**

*Parkinsonia aculeata* L. - **Mexican Palo-Verde**  
Z. Berry [ASU]

*Parkinsonia florida* (Benth. ex A. Gray) S. Watson - **Blue Palo-Verde**  
Z. Berry 613 [ASU]

*Parkinsonia microphylla* Torr. - **Yellow Palo-Verde**

*Parkinsonia praecox* (Ruiz & Pav.) J.A.Hawkins - **brea**  
Z. Berry 550 [ASU]

*Phaseolus vulgaris* L. - **Kidney Bean**  
Z. Berry 574 [ASU]

*Pithecellobium dulce* (Roxb.) Benth. - **Monkeypod**

*Pithecellobium mexicanum* Rose - **palo chino**

*Prosopis chilensis* (Molina) Stuntz - **mezquite chileno**

*Prosopis glandulosa* Torr. - **Honey Mesquite**

*Prosopis juliflora* (Sw.) DC. - **Mesquite**

*Prosopis pubescens* Benth. - **American Screw-Bean**  
Z. Berry 325 [ASU]

*Prosopis velutina* Wooton - **Velvet Mesquite**

*Senna artemisioides* (Gaud. ex DC.) Randell - **Silver Wild Sensitive-Plant**  
Z. Berry 300 [ASU], Z. Berry 488 [ASU]

*Senna atomaria* (L.) H.S.Irwin & Barneby - **Flor-de-San Jose**

*Senna covesii* (A. Gray) Irwin & Barneby - **Hairy Wild Sensitive-Plant**  
Z. Berry 652 [ASU], Z. Berry 392 [ASU]

*Senna didymobotrya* (Fresenius) H.S.Irwin & Barneby - **African Wild Sensitive-Plant**  
Z. Berry 301 [ASU], Z. Berry 526 [ASU], Z. Berry 2018-01-19 [SEINet]

*Senna wislizeni* (A. Gray) Irwin & Barneby - **Wislizenus' Wild Sensitive-Plant**  
Z. Berry 2020-09-30 [ASU], Z. Berry 664 [ASU]

*Tipuana tipu* (Benth.) O. Kuntze Z.  
Berry 2017-07-13 [ASU]

*Vachellia erioloba* (E. Mey.) P.J.H. Hurter  
Z. Berry [ASU]

*Vachellia tortilis* (Forssk.) Galasso & Banfi

*Vachellia xanthophloea* (Benth.) P.J.H. Hurter  
Z. Berry 544 [ASU], Z. Berry [ASU]

## FAGACEAE

*Quercus chihuahuensis* Trel. - **Chihuahuan Oak**

*Quercus emoryi* Torr. - **Emory's Oak**

Z. Berry 663 [ASU]

*Quercus gambelii* Nutt. - **Gambel's Oak**

Z. Berry 532 [ASU]

*Quercus perpallida* Trel. - **encino cacachila**

*Quercus suber* L. - **Cork Oak**

Z. Berry [ASU]

*Quercus tuberculata* Liebm. - **Baja-Sonoran Live oak**

*Quercus turbinella* Greene - **Arizona shrub oak**

## FOUQUIERIACEAE

*Fouquieria diguetii* (Tiegh.) I.M. Johnst. - **palo adán**

*Fouquieria macdougalii* Nash - **ocotillo macho**

Z. Berry 290 [ASU], Z. Berry 383 [ASU]

*Fouquieria splendens* Engelm. - **ocotillo**

## GENTIANACEAE

*Eustoma exaltatum* (L.) Salisb. ex G. Don - **Catchfly Prairie-Gentian**

Z. Berry [ASU]

## GERANIACEAE

*Erodium cicutarium* (L.) L'Hér. ex Aiton - **Red-Stem Stork's-Bill**

Z. Berry 486 [ASU]

## GESNERIACEAE

*Episcia cupreata* (Hook.) Hanst. - **Flame-Violet**

Z. Berry 694 [ASU]

## HALORAGACEAE

*Myriophyllum spicatum* L. - **Eurasian Water-Milfoil**

## HYDROCHARITACEAE

*Najas guadalupensis* (Spreng.) Magnus - **Guadalupe Waternymph**

## IRIDACEAE

*Chasmanthe floribunda* (Salisb.) N.E. Br. - **African-Cornflag**

Z. Berry 2020-02-05 [ASU], Z. Berry 748 [ASU]

*Dietes bicolor* Sweet ex G.Don

Z. Berry 450 [ASU]

## JUGLANDACEAE

*Juglans major* (Torr.) Heller - **Arizona Walnut**

## KOEBERLINIACEAE

*Koeberlinia spinosa* Zucc. - **Crown-of-Thorns**

## LAMIACEAE

*Hyptis emoryi* Torr. - **salvia**

Z. Berry 608 [ASU], Z. Berry 571 [ASU]

*Hyptis suaveolens* Poit. - **chani**

*Lavandula stoechas* L. - **French Lavender**

Z. Berry 538 [ASU]

*Mentha occidentalis*

*Nepeta cataria* L. - **Catnip**

*Ocimum basilicum* L. - **Sweet Basil**

*Rosmarinus officinalis* L. - **Rosemary**

Z. Berry 451 [ASU], Z. Berry 565 [ASU]

*Rothea myricoides* (Hochst.) Steane & Mabb. - **Blue Glorybower**

Z. Berry 265 [ASU]

*Salvia coccinea* P.J. Buchoz ex Etlinger - **Blood Sage**

Z. Berry 330 [ASU], Z. Berry 350 [ASU]

*Salvia dorrii* (Kellogg) Abrams - **Gray Ball Sage**

Z. Berry 705 [ASU]

*Salvia mexicana* Walter

Z. Berry 660 [ASU]

*Vitex agnus-castus* L. - **Lilac Chastetree**

Z. Berry 585 [ASU], Z. Berry 376 [ASU]

*Vitex mollis* H.B. & K. - **uvalama**

*Vitex trifolia* L. - **Three-Leaf Chastetree**

Z. Berry 346 [ASU]

## LINACEAE

*Linum grandiflorum* Desf. - **Flowering Flax**

Z. Berry 754 [ASU]

## LYTHRACEAE

*Cuphea hyssopifolia* Kunth - **False Heather**

Z. Berry [ASU]

*Lagerstroemia indica* L. - **Crape-Myrtle**

Z. Berry [ASU]

*Lythrum californicum* Torr. & A. Gray - **California Loosestrife**

*Punica granatum* L. - **Pomegranate**

Z. Berry 579 [ASU], Z. Berry 579 [ASU]

## MALPIGHIACEAE

*Callaeum macropterum* (Moc. & Sesse ex DC.) D.M. Johnson - **gallinita**

Z. Berry 453 [ASU]

*Galphimia speciosa* C.E.Anderson

Z. Berry 382 [ASU]

## MALVACEAE

*Abutilon palmeri* A. Gray - **Santa Catalina Indian-Mallow**

Z. Berry 463 [ASU], Z. Berry 304 [ASU]

*Adansonia digitata* L. - **baobab**

Z. Berry 2020-12-10 [ASU]

*Alyogyne huegelii* (Endl.) Fryxell

Z. Berry 633 [ASU]

*Brachychiton populneus* (Schott & Endl.) R. Br. - **White-Flower Bottletree**

*Brachychiton rupestris* Terr. - **Bottle Tree**

*Ceiba acuminata* Rose - **pochote**

Z. Berry 2020-12-10 [ASU]

*Ceiba speciosa* (A. St.-Hil.) Ravenna - **floss silk tree**

*Gossypium harknessii* Brandegees - **algodón silvestre**

Z. Berry 352 [ASU], Z. Berry 626 [ASU]

*Gossypium hirsutum* L. - **Upland Cotton**

Z. Berry 449 [ASU]

*Grewia occidentalis* L.

Z. Berry 541 [ASU]

*Heliocharis palmeri* S.Watson - **chini**

*Hibiscus coccineus* Walter - **Scarlet Rose-Mallow**

Z. Berry 587 [ASU]

*Hibiscus moscheutos* L. - **Crimson-Eye Rose-Mallow**

Z. Berry 279 [ASU]

***Hibiscus rosa-sinensis* L. - Shoe-Back-Plant**

Z. Berry 593 [ASU], Z. Berry 427 [ASU]

***Hibiscus sabdariffa* L. - Jamaican-Sorrel**

Z. Berry 691 [ASU]

***Malvaviscus arboreus* Cav. - Wax-Mallow**

Z. Berry 424 [ASU], Z. Berry 289 [ASU]

***Pseudobombax ellipticum* (Kunth) Dugand [excluded]**

Z. Berry 684 [ASU]

***Pseudobombax palmeri* (S.Watson) Dugand - cuajilote**

***Sphaeralcea ambigua* A. Gray - Apricot Globe-Mallow**

***Sphaeralcea emoryi* Torr. ex A. Gray - Emory's Globe-Mallow**

Z. Berry [ASU]

***Sphaeralcea laxa* Woot. & Standl. - Caliche Globe-Mallow**

## MELIACEAE

***Melia azadirachta* L. - Neemtree**

## MENISPERMACEAE

***Cocculus laurifolius* (Roxb.) DC. - Hindu Laurel**

Z. Berry [ASU], Z. Berry [ASU]

## MORACEAE

***Ficus benghalensis* L. - Indian Banyan**

Z. Berry 499 [ASU], Z. Berry [ASU]

***Ficus benjamina* L. - Weeping Fig**

Z. Berry [ASU], Z. Berry 533 [ASU]

***Ficus binnendijkii* Miq. Z. Berry [ASU]**

***Ficus carica* L. - Common Fig**

Z. Berry [ASU], Z. Berry [ASU], Z. Berry [ASU]

***Ficus cotinifolia* Kunth - nacapul**

Z. Berry [ASU]

***Ficus elastica* Roxb. - Indian Rubbertree**

Z. Berry 335 [ASU]

***Ficus lutea* Vahl - Lagos Rubbertree**

***Ficus lyrata* Warb.**

Z. Berry [ASU]

***Ficus microcarpa* L. f. - Chinese Banyan**

***Ficus nitida* Thunb. - Weeping Fig**

***Ficus palmeri* S.Watson - tescalama**

***Ficus pertusa* L.f. - nacapule**



Z. Berry [ASU], Z. Berry [ASU], Z. Berry [ASU], Z. Berry 516 [ASU]

***Ficus petiolaris* Kunth - tescalama**

Z. Berry 647 [ASU], Z. Berry 324 [ASU], Z. Berry 323 [ASU], Z. Berry 263 [SEINet]

***Ficus pumila* L. - Climbing Fig**

Z. Berry 322 [ASU]

***Ficus religiosa* L. - Botree**

Z. Berry 602 [ASU] *Ficus*

***subpisocarpa* Gagnep.**

Z. Berry 2020-11-13 [ASU]

***Ficus superba* Miq.**

***Maclura tinctoria* D.Don ex Steud. - Fustictree**

***Morus microphylla* Buckley - Texas Mulberry**

***Morus nigra* L. - Black Mulberry**

***Morus rubra* L. - Red Mulberry**

Z. Berry 321 [ASU]

**MORINGACEAE**

***Moringa oleifera* Lam. - Horseradish-Tree**

Z. Berry 357 [ASU], Z. Berry 527 [ASU]

**MUSACEAE**

***Musa acuminata* Colla - Edible Banana**

Z. Berry [ASU]

**MYRTACEAE**

***Callistemon* sp. R. Br.**

Z. Berry 435 [ASU]

***Callistemon citrinus* (Curtis) Stapf - Lemon Bottlebrush**

***Callistemon rugulosus* (D.F.K. Schldtl. ex Link) DC.**

Z. Berry 438 [ASU]

***Callistemon viminalis* (Sol. ex Gaertn.) G. Don - weeping bottlebrush**

Z. Berry 569 [ASU]

***Eucalyptus camaldulensis* Dehnhardt - River Red Gum**

Z. Berry 594 [ASU]

***Eucalyptus cinerea* F. Muell. ex Benth. - Argyle-Apple**

Z. Berry [ASU]

***Eucalyptus citriodora* Hook. - Lemon Scented Gum**

Z. Berry [ASU]

***Eucalyptus erythrocorys* F.Muell. - Red Cap Gum**

*Eucalyptus kruseana* F.Muell.

Z. Berry [ASU], Z. Berry [ASU]

*Eucalyptus leucoxylon* F. Muell. - **eucalyptus**

*Eucalyptus microtheca* F. Muell. - **Coolibah**

*Eucalyptus papuana* F. J. Muell. - **Ghost Gum**

*Eucalyptus polyanthemus* Schauer - **Red-Box**

*Eucalyptus pulverulenta* Sims - **Silver-Leaf Mountain Gum**

Z. Berry 455 [ASU]

*Eucalyptus spathulata* Hook. - **Swamp Mallee**

Z. Berry [ASU]

*Eucalyptus torquata* Luehm. - **Coral Gum**

Z. Berry 606 [ASU]

*Melaleuca elliptica* Labill.

Z. Berry 570 [ASU]

*Melaleuca viminalis* Byrnes - **Weeping Crimson-Bottlebrush**

Z. Berry 457 [ASU]

*Melaleuca williamsii* Craven

*Myrtus communis* L. - **Myrtle**

Z. Berry [ASU]

*Psidium guajava* L. - **Brazilian Guava**

Z. Berry [ASU], Z. Berry [ASU]

*Syzygium cumini* (L.) Skeels - **Jambolan-Plum**

Z. Berry [ASU], Z. Berry [ASU]

#### NYCTAGINACEAE

*Abronia villosa* S. Watson - **Desert Sand-Verbena**

*Boerhavia coccinea* P. Mill. - **Scarlet Spiderling**

Z. Berry 380 [ASU]

*Boerhavia intermedia* M.E. Jones - **mochis**

Z. Berry 275 [ASU]

*Bougainvillea glabra* Choisy

*Bougainvillea spectabilis* Willd. - **Great Bougainvillea**

Z. Berry 595 [ASU]

#### NYMPHAEACEAE

*Nymphaea odorata* Aiton - **American White Water-Lily**

Z. Berry 2017-08-08 [ASU]

## OLEACEAE

*Fraxinus velutina* Torr. - **Velvet Ash**

Z. Berry 703 [ASU]

*Jasminum laurifolium* Roxb. - **Windmill Jasmine**

Z. Berry 699 [ASU]

*Jasminum sambac* (L.) Aiton - **Arabian Jasmine**

Z. Berry [ASU], Z. Berry [ASU]

*Olea europaea* L. - **Olive**

Z. Berry 519 [ASU]

## ONAGRACEAE

*Gaura lindheimeri* Engelm. & A. Gray - **Lindheimer's Evening-Primrose**

Z. Berry 627 [ASU], Z. Berry 414 [ASU]

*Ludwigia peploides* (Kunth) P. H. Raven - **Floating Primrose-Willow**

*Oenothera speciosa* Nutt. - **Pinkladies**

Z. Berry 634 [ASU]

## PAPAVERACEAE

*Eschscholzia californica* Cham. - **California-Poppy**

Z. Berry 757 [ASU]

## PASSIFLORACEAE

*Passiflora arizonica* (Killip) D.H. Goldman - **Arizona Passion-Flower**

Z. Berry [ASU]

*Passiflora incarnata* L. - **Purple Passion-Flower**

Z. Berry [ASU], Z. Berry 267 [ASU]

## PINACEAE

*Pinus brutia* Ten. - **Calabrian Pine**

Z. Berry 507 [ASU]

*Pinus canariensis* C. Smith - **Canary Island Pine**

Z. Berry [ASU]

*Pinus eldarica* Medw. - **Mondel Pine**

*Pinus halepensis* P. Mill. - **Aleppo Pine**

*Pinus roxburghii* Sarg. - **Indian Longleaf Pine**

Z. Berry [ASU]

## PITTOSPORACEAE

*Pittosporum angustifolium* Lodd.

Z. Berry 2021-02-12 [SEINet], Z. Berry 2021-02-12 [SEINet]

*Pittosporum tobira* (Thunb.) W. T. Aiton - **Japanese Cheesewood**  
Z. Berry 751 [ASU], Z. Berry 2017-07-25 [ASU]

#### PLANTAGINACEAE

*Angelonia angustifolia* Benth.  
Z. Berry 307 [ASU], Z. Berry 412 [ASU], Z. Berry 306 [ASU]  
*Bacopa monnieri* (L.) Pennell - **Herb-of-Grace**  
Z. Berry 500 [ASU]  
*Linaria maroccana* Hook. f. - **Moroccan Toadflax**  
Z. Berry 2021-04-03 [ASU]  
*Penstemon eatonii* A. Gray - **Eaton's Firecracker**  
Z. Berry 635 [ASU]  
*Penstemon parryi* (A. Gray) A. Gray - **Parry's Beardtongue**  
Z. Berry 495 [ASU]  
*Russelia equisetiformis* Schlttdl. & Cham. - **Fountainbush**  
Z. Berry 407 [ASU], Z. Berry 309 [ASU], Z. Berry [ASU]  
*Veronica anagallis-aquatica* L. - **Blue Water Speedwell**  
Z. Berry 638 [ASU]

#### PLATANACEAE

*Platanus wrightii* S. Watson - **Arizona Sycamore**  
Z. Berry [ASU]

#### PLUMBAGINACEAE

*Limonium perezii* Hubbard ex L.H.Bailey - **Perez's Sea-Lavender**  
Z. Berry 658 [ASU]  
*Plumbago auriculata* Lam. - **Cape Leadwort**  
Z. Berry 2021-04-03 [ASU]  
*Plumbago zeylanica* L. - **Wild Leadwort**  
Z. Berry 266 [ASU]

#### POACEAE

*Aristida purpurea* Nutt. - **Purple Three-Awn**  
Z. Berry 2020-11-13 [ASU], Z. Berry 410 [ASU]  
*Arundo donax* L. - **Giant-Reed Z.**  
Berry 601 [ASU]  
*Bambusa oldhamii* W. Munro [excluded] – **Oldham's Bamboo**  
*Bouteloua curtipendula* (Michx.) Torr. - **Side-Oats Grama**  
*Bouteloua gracilis* (Kunth) Lag. ex Griffiths - **Blue Grama**  
*Chrysopogon zizanioides* (L.) Roberty - **Khus-Khus**

*Cortaderia selloana* (Schult. & Schult. f.) Asch. & Graebn. - **Selloa Pampus Grass**  
*Cymbopogon citratus* Stapf - **Lemon Grass**  
*Cynodon dactylon* (L.) Pers. - **Bermuda Grass**  
     Z. Berry 378 [ASU]  
*Echinochloa colona* (L.) Link - **Jungle-Rice**  
*Muhlenbergia capillaris* (Lam.) Trin. - **Hair-Awn Muhly**  
*Muhlenbergia dumosa* Scribn. ex Vasey - **Bamboo Muhly**  
     Z. Berry 617 [ASU]  
*Muhlenbergia rigens* (Benth.) A.S. Hitchc. - **Deer Grass**  
*Oryzopsis micrantha* (Trin. & Rupr.) Thurb. - **Little-Seed Mountain-Rice Grass**  
     Z. Berry 285 [ASU]  
*Otatea acuminata* (Munro) C.E. Calderón & Soderstr.  
     Z. Berry 283 [ASU]  
*Paspalum vaginatum* Sw. - **Seashore Crown Grass**  
*Pennisetum ciliare* (L.) Link - **Buffel Fountain Grass**  
     Z. Berry 367 [ASU]  
*Pennisetum setaceum* (Forssk.) Chiov. - **Crimson Fountain Grass**  
     Z. Berry 286 [ASU]  
*Phragmites australis* (Cav.) Trin. ex Steud. - **Common Reed**  
     Z. Berry 690 [ASU]  
*Phyllostachys aurea* Rivière & C. Rivière - **Golden Bamboo**  
     Z. Berry 598 [ASU]  
*Phyllostachys vivax* McClure  
     Z. Berry 692 [ASU]  
*Polypogon monspeliensis* (L.) Desf. - **Annual Rabbit's-Foot Grass**  
     Z. Berry 277 [ASU], Z. Berry 632 [ASU]  
*Saccharum officinarum* L. - **Sugar-Cane**  
     Z. Berry 677 [ASU]  
*Saccharum ravennae* (L.) L. - **Ranenna Grass**  
     Z. Berry 671 [ASU]  
*Schismus arabicus* Nees - **Arabian Mediterranean Grass**  
     Z. Berry 510 [ASU]  
*Schismus barbatus* (Loefl. ex L.) Thellung - **Common Mediterranean Grass**  
     Z. Berry 484 [ASU]  
*Vetiveria zizanioides* Stapf - **Khus-Khus**  
     Z. Berry 589 [ASU]

## **POLYGONACEAE**

*Antigonon leptopus* Hook. & Arn. - **Queen's-Jewels**

Z. Berry 354 [ASU], Z. Berry [ASU], Z. Berry [ASU], Z. Berry [ASU]

*Coccoloba goldmanii* Standl. - **uval de mar**

Z. Berry 618 [ASU]

*Eriogonum deflexum* Torr. - **Flat-Crown Wild Buckwheat**

Z. Berry 483 [ASU]

*Persicaria hydropiperoides* (Michx.) Small - **Swamp Smartweed**

Z. Berry [ASU]

*Rumex crispus* L. - **Curly Dock**

Z. Berry 432 [ASU]

## **PORTULACACEAE**

*Portulaca oleracea* L. - **Little-Hogweed**

## **PRIMULACEAE**

*Anagallis arvensis* L. - **Scarlet Yellow-Loosestrife**

Z. Berry 2021-04-03 [ASU]

*Primula malacoides* Franch.

## **PROTEACEAE**

*Grevillea robusta* A. Cunn. ex R. Br. - **Silk-Oak**

Z. Berry 2021-01-27 [SEINet]

## **RANUNCULACEAE**

*Clematis drummondii* Torr. & A. Gray - **Texas Virgin's-Bower**

Z. Berry 670 [ASU]

## **RESEDACEAE**

*Oligomeris linifolia* (Vahl) J.F. Macbr. - **Line-Leaf Whitepuff**

Z. Berry 235 [ASU]

## **RHAMNACEAE**

*Condalia globosa* I.M. Johnston - **Bitter Snakewood**

*Ziziphus jujuba* Mill. - **Common Jujube**

*Ziziphus obtusifolia* (Hook. ex Torr. & A. Gray) A. Gray - **barchata**

Z. Berry 577 [ASU], Z. Berry 545 [ASU]

## ROSACEAE

*Cercocarpus montanus* Raf. - **Alder-Leaf Mountain-Mahogany**

*Fallugia paradoxa* (D. Don) Endl. ex Torr. - **Apache-Plume**

Z. Berry 628 [ASU]

*Prunus domestica* Thunb. - **European Plum**

*Pyracantha coccinea* M. Roem. - **Scarlet Firethorn**

Z. Berry 355 [ASU], Z. Berry 537 [ASU], Z. Berry 355 [ASU]

*Pyrus kawakamii* Hayata. - **Evergreen Pear**

Z. Berry [ASU]

*Rosa* sp. L. - **rosales**

Z. Berry 443 [ASU], Z. Berry 442 [ASU]

*Rosa banksiae* R. Br.

*Rubus idaeus* L. - **Common Red Raspberry**

*Vauquelinia californica* (Torr.) Sarg. - **Arizona-Rosewood**

Z. Berry 492 [ASU]

## RUBIACEAE

*Cephalanthus occidentalis* L. - **Common Buttonbush**

Z. Berry [ASU]

*Hamelia patens* Jacq. - **Scarletbush**

Z. Berry 303 [ASU]

*Ixora chinensis* Lam.

Z. Berry [ASU]

*Ixora coccinea* L. - **Scarlet Jungleflame**

*Randia echinocarpa* Sessé & Moc. ex DC. - **papache**

Z. Berry 2017-10-17 [SEINet]

*Randia thurberi* S.Watson - **papache borracho**

## RUTACEAE

*Casimiroa edulis* S.Watson - **zapote blanco**

*Citrus aurantium* L. - **naranja agrio**

*Citrus japonica* Thunb. - **Kumquat**

*Citrus paradisi* Macfad. - **toronja**

*Citrus x tangelo* J.W. Ingram & H.E. Moore - **Tangelo**

Z. Berry 416 [ASU]

## SALICACEAE

*Populus fremontii* S. Watson - **Fremont cottonwood**

Z. Berry 480 [ASU]

*Salix alba* L. - **White Willow**

*Salix gooddingii* C.R. Ball - **Goodding's Black Willow**

Z. Berry 572 [ASU], Z. Berry 572 [ASU], Z. Berry 640 [ASU]

#### SAPINDACEAE

*Dodonaea viscosa* (L.) Jacq. - **Florida Hopbush** Z.

Berry 493 [ASU], Z. Berry 629 [ASU]

#### SAURURACEAE

*Anemopsis californica* (Nutt.) Hook. & Arn. - **Yerba-Mansa**

Z. Berry 370 [ASU], Z. Berry 588 [ASU]

#### SCROPHULARIACEAE

*Buddleja marrubiiifolia* Benth. - **Woolly Butterfly-Bush**

Z. Berry 458 [ASU]

*Eremophila* sp. "Summertime Blue"

Z. Berry 358 [ASU]

*Eremophila glabra* Ostenf.

Z. Berry 2020-01-21 [ASU]

*Eremophila maculata* F.Muell.

Z. Berry 553 [ASU], Z. Berry 489 [ASU], Z. Berry 433 [ASU]

*Leucophyllum frutescens* (Berl.) I.M. Johnston - **Texas Barometer-Bush**

Z. Berry [ASU], Z. Berry 552 [ASU]

*Leucophyllum pruinatum* I.M.Johnst. - **Sierra Bouquet sage**

Z. Berry [ASU]

*Leucophyllum zygophyllum* I.M.Johnst. - **Blueranger**

#### SELAGINELLACEAE

*Selaginella arizonica* Maxon - **Arizona Spike-Moss**

#### SIMMONDSIACEAE

*Simmondsia chinensis* (Link) Schneid. - **jojoba**

Z. Berry [ASU]

#### SOLANACEAE

*Calibrachoa parviflora* (Juss.) D'Arcy - **Seaside-Petunia**

Z. Berry 232 [ASU]

*Datura discolor* Bernh. - **Desert Thorn-Apple**

Z. Berry 373 [ASU]

*Datura wrightii* Regel - **Sacred Thorn-Apple**

Z. Berry [ASU]

*Lycium* sp. L. - **desert-thorn**



*Lycium andersonii* A. Gray - **Red-Berry Desert-Thorn**

Z. Berry 682 [ASU], Z. Berry 406 [ASU], Z. Berry 327 [ASU],

*Lycium exsertum* A. Gray - **Arizona Desert-Thorn**

Z. Berry 611 [ASU], Z. Berry 395 [ASU], Z. Berry 607 [ASU]

*Lycium fremontii* A. Gray - **Fremont's Desert-Thorn**

Z. Berry 639 [ASU], Z. Berry 273 [ASU], Z. Berry 419 [ASU]

*Lycium parishii* A. Gray - **Parish's Desert-Thorn**

Z. Berry 557 [ASU], Z. Berry 399 [ASU]

*Nicotiana glauca* Graham - **Tree Tobacco**

Z. Berry [ASU]

*Nicotiana obtusifolia* M. Martens & Galeotti - **Desert Tobacco**

Z. Berry 513 [ASU], Z. Berry 397 [ASU], Z. Berry 320 [ASU]

*Solanum americanum* P. Mill. - **American Black Nightshade**

Z. Berry 578 [ASU]

*Solanum elaeagnifolium* Cav. - **Silver-Leaf Nightshade**

*Solanum lycopersicum* L. - **Garden Tomato**

Z. Berry 431 [ASU]

*Solanum melongena* Wall. - **Eggplant**

Z. Berry 269 [ASU]

*Solanum nigrum* L. - **European Black Nightshade**

#### STEGNOSPERMATACEAE

*Stegnosperma halimifolium* Bentham - **chapacolor**

#### STRELITZIACEAE

*Strelitzia reginae* Aiton - **ave del paraíso**

#### TAMARICACEAE

*Tamarix aphylla* (L.) Karst. - **Athel Tamarisk**

Z. Berry [ASU]

*Tamarix chinensis* Lour. - **Five-Stamen Tamarisk**

Z. Berry 648 [ASU], Z. Berry 662 [ASU]

*Tamarix ramosissima* Ledeb. - **Five-Stamen Tamarisk**

#### THEACEAE

*Camellia japonica* L. - **Snow Camellia**

#### TYPHACEAE

*Typha domingensis* Pers. - **Southern Cat-Tail**

Z. Berry 518 [ASU], Z. Berry [ASU]

## ULMACEAE

*Ulmus parvifolia* Jacq. - **Chinese Elm**

*Ulmus pumila* L. - **Siberian Elm**

## VERBENACEAE

*Aloysia gratissima* (Gillies & Hook.) Troncoso - **Whitebrush**

Z. Berry 348 [ASU], Z. Berry 390 [ASU], Z. Berry 672 [ASU]

*Duranta erecta* L. - **Golden Dewdrops** Z. Berry 554 [ASU]

*Lantana camara* L. - **Hierba-de-Cristo**

Z. Berry 332 [ASU], Z. Berry 567 [ASU]

*Lantana montevidensis* Briq. - **Trailing Shrub-Verbena**

Z. Berry 333 [ASU]

*Verbena rigida* Spreng. - **Tuberous Vervain**

Z. Berry 559 [ASU], Z. Berry [SEINet]

## VITACEAE

*Cissus trifoliata* (L.) L. - **Sorrelvine**

Z. Berry [ASU], Z. Berry [ASU], Z. Berry [ASU], Z. Berry [ASU]

*Vitis vinifera* L. - **European Grape**

Z. Berry [ASU]

## ZAMIACEAE

*Bowenia* sp.

*Dioon edule* Lindl. - **palma de la virgin**

Z. Berry 693 [ASU]

*Zamia furfuracea* Aiton - **Cardboard-Palm**

Z. Berry 592 [ASU], Z. Berry 586 [ASU]

## ZINGIBERACEAE

*Alpinia zerumbet* (Pers.) B.L. Burtt & R.M. Sm. - **Shellplant**

Z. Berry 687 [ASU]

## ZYGOPHYLLACEAE

*Guaiacum coulteri* A.Gray - **Guayacán**

Z. Berry [ASU], Z. Berry [ASU]

*Guaiacum sanctum* L. - **Hollywood Lignumvitae**

*Larrea tridentata* (Sessé & Moc. ex DC.) Coville - **Creosote-Bush**

Z. Berry [ASU], Z. Berry 394 [ASU], Z. Berry 461 [ASU]