# The Plant Press

THE ARIZONA NATIVE PLANT SOCIETY

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# Vascular Plants of the Silver Bell Mountains

*by John Wiens*

The Silver Bell Mountains lie 30 miles (48 km) northwest of Tucson, in Pima county. They are the tallest of the mountains on the west side of Avra Valley, from Cerro Prieto, which lies 10 miles (16 km) to the northeast, to the Roskruge Mountains lying 32 miles (51 km) south. Living west of Marana, just to the east of the Silver Bells, has given me the opportunity to visit the area frequently and compile the catalogue of plants found on pages 7-10.

The Silver Bell Mountains have an interesting geologic and contemporary history. Much of the surface is volcanic and granitic, although many other rock types are found there, both above and below the ground. The geologic formation known as the Silver Bell Caldera has provided copper and other minerals, exploited since the Eighteenth Century. Sometime in the late 1800s, the town of Silver Bell was formed. Whether the town or the range was named first is not clear, nor is the origin of the name itself. Stories range from a local lady named Belle, who rode a silver horse, to my favorite, the plant *Streptanthus carinatus* (silverbells) found there in abundance.

The original town, which had a population of 1,200 at its largest, died after copper prices plummeted during the Great Depression. This site, now on private property, lies in ruins and is partially buried by mine tailings. In the 1940s, the mining corporation ASARCO acquired a major portion of the region, began large scale open-pit mining, and created a new company town of Silver Bell 4 miles (7 km) southeast of the original townsite. Again, falling copper prices doomed Silver Bell and the town was disassembled in 1984. Today, the southwest third of the range is pocked with shafts and huge open pits. Tons of tailings fill valleys, and acid-leaching runoff turns washes turquoise and amber with toxic precipitates. Fortunately, this has not been the fate of the rest of the mountain.

My personal bias against some of the mining industry for its abuse of the land under the jurisprudence of environmentally obsolete mining laws had me ignoring the Silver Bell Mountains for several years. In 1989 I finally gave in and was thrilled with the range, much of which is untouched. The eastern slopes rise from Avra Valley, beginning at 2,000 ft. (610 m) and gently climb to 4,261 ft. (1,299 m) at the pristine summit of Silver Bell Peak. The vegetation of Avra Valley generally

*Continued on page 6*

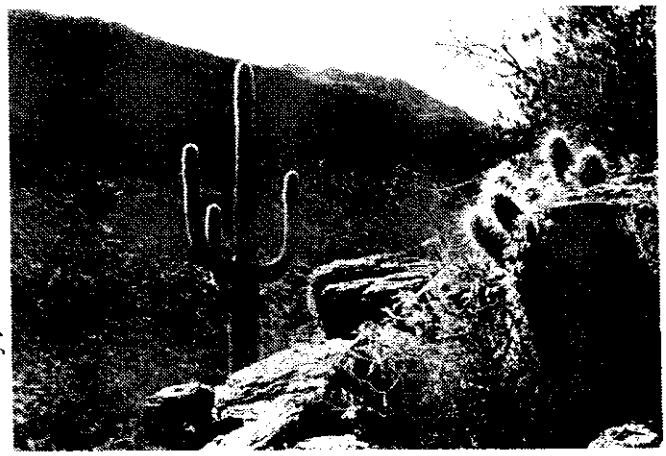


Photo by John Wiens

Silver Bell Mountains, looking out toward a north-facing slope rich in grasses and buckwheat.

# Notes from the President

Our editor has asked that I, as our Society's newly elected interim President, resume the time-honored custom of regularly communicating with you, the membership, through this column. It is only fitting and proper that the President should strive to provide elucidation and leadership to the membership. Past President Karen Reichhardt certainly did so, based upon years of service to the Society in many local and statewide forums. Karen's act will certainly be a hard one to follow. I now stand before you as the veteran of two state Board of Directors' meetings and a number of phone conversations dealing with Society business. From this august position of experience and wisdom I wish to state how I see my role.

As President, I see my role as one of facilitator to those active members who are the heart of our organization. Our Society has been very fortunate over the years in having a core of highly dedicated, talented and hardworking members who make the important things happen: local and state meetings and field trips, regular and special publications, environmental conservation education and advocacy, and instilling in people an appreciation of plants and of the living communities of which they are the warp and woof. They also watch over the fiscal and organizational health of the Society itself so that we can continue to grow and be ever more effective in addressing the needs of native plants, native plant communities, and plant-related conservation issues in this diverse and wonderful State of Arizona. If I, as interim President, am able to help you, the members, realize your visions of what our Society can be and achieve, then I will be content to have provided a worthwhile service for a great organization of which I have been a long-standing member and beneficiary.

*Bill Feldman*

# Editor's Desk

An appraisal of the Arizona Native Plant Society readily shows, as President Bill Feldman points out in his letter, a core of hard-working members who have dedicated their labor and leisure to the native flora of our State. John Wiens, who contributes his commendable flora of the Silver Bell Mountains to this issue (pages 7-10), is one such member. A short natural and historical background of the Silver Bells, also by John Wiens, is this issue's cover story. John's contribution exemplifies the significance of the independent plant study undertaken by some in our society. Do take a few minutes to examine this fine submission and let me know if you like the new format used on the plant list.

With this summer issue I am pleased to announce Susan Husband as the Editor of "Pressed Pages," our newsletter's book review feature. Susan is a librarian at the University of Arizona Science Library and an admirer of two of life's best gifts— books and plants. She wrote the review of Ann Zwinger's *The Mysterious Lands* which appeared in last spring's issue (Vol. 14; no. 1) of *The Plant Press*. (I note that that particular "good read," as Susan described it, has come out in paperback and can be purchased now for $12.95.) The review of *Wildflowers Across America,* appearing in the current issue on page 5, was also written by Susan. However, she anticipates receiving book reviews from other readers in the future. Submissions can be sent either to *The Plant Press* or directly to Susan at 2618 E. Malvern, Tucson, AZ 85716.

Also in this issue is Matt Johnson's horticultural impartation of Sonoran tree catclaw, *Acacia occidentalis* (see "The Native Landscaper," pages 11-12). I would guess that few among us have taken the opportunity to travel into the backcountry of Sonora, Mexico, to seek this magnificent tree growing to full stature in its native habitat. Matt's drawings, which accompany his article, suggest that such a trip might be worth taking if for no other reason than to see this tree.

And finally, don't miss Dr. Laura Jackson's first contribution to *The Plant Press* on page 3 of this issue in an article which discusses the changing ecology along I-10, from Phoenix halfway down to Tucson. This route crosses land so poorly respected by humankind that many who drive it simply ignore the scenery, or try to. Laura's article will find you taking a closer look next time you pass this way.

May the articles and features in this issue inspire your own plant-related activities this season. Enjoy them and enjoy your summer!

*Karen Enyedy Breunig*

**Corrections to Vol. 15; No. 1:**

The seedling on page 3 was incorrectly identified as desert lupine (*Lupinus sparsifolius*). Most probably this seedling was arroyo lupine (*Lupinus succulentus*).

Corrections to the Tent Rocks area plant list: Range rattany is now called *Krameria erecta* (Willd); formerly called *Krameria parvifolia* (not *parviflora*).

# The Lost Landscape — Sonoran Saltbush Desertscrub

*by Laura Jackson*

In a special issue of *Desert Plants*, Ray Turner and David Brown report that undisturbed desert saltbush (*Atriplex polycarpa*) communities, once second only to creosote bush communities in the total area they occupy within the Sonoran Desert, are now rare. The drive along I-10 from Phoenix to Picacho Peak tells the story of this lost landscape.

On the southern border of the Phoenix metropolitan area, saltbush stands were replaced first by agriculture, then by houses and malls, in a kind of eco-cultural succession. New, neat blocks of houses bearing names like "Pecan Grove Estates" replace the groves themselves. An auto dealership called an "Autoplex" squats between irrigation ditches where *Atriplex* once grew.

Further south, the Gila Indian Reservation preserves large tracts of saltbush desertscrub. Desert saltbush inhabits gentle slopes and floodplains with fine-textured, somewhat alkaline soils receiving 200-300 mm (7.8 to 11.7 in.) of rain each year. Barrel and hedgehog cacti, mesquite, creosote bush, wolfberry and ironwood are the other common perennials. Creosote bush and bursage may be intermixed on the edges of the desert saltbush community. The scant herbaceous plants present include six-weeks grama (*Bouteloua barbata*) and *Tidestromia lanuginosa* in the summer, fiddleneck (*Amsinckia intermedia*), Indian wheat (*Plantago insularis*) and owl clover (*Orthocarpus purpurascens*) in the winter. Where the soils are particularly fine-textured, large patches of bare, smooth clay devoid of vegetation reflect a blinding glare at midday. This vegetation type has never been particularly charismatic. It is not diverse, nor does it contain rare species. The structure of the vegetation is low and humble: just a bunch of shrubs, about the same height and shape, able to tolerate extreme heat and drought. For afficionados, however, saltbush scrub has an understated charm: a night-blooming cereus (*Peniocereus greggii*) tucked away beneath a saltbush, the tangy flavor of tomatillos (wolfberry; *Lycium andersonii*), the frost-pink stems and silvery-green leaves of *Tidestromia* and the fragile, lemony *Pectis papposa* contrast with the brutal summer heat; scattered mesquites, heavy with red and cream-variegated pods, provide scant but merciful shade.

Most of the Reservation is grazed, but its future may be in farming. Because of the Arizona Groundwater Management Act of 1980, Indian reservations will receive an assured supply of water from the Central Arizona Project, while private lands will not. On either side of the highway lie a series of terraces, each about a quarter square mile, recently leveled for cotton and lettuce production. A small, triangular field of guayule (*Parthenium argentatum*) can be seen nearby on the northeast side of the highway. Guayule is a desert shrub used as a rubber substitute that requires no irrigation to survive the Arizona climate. It has been heralded along with jojoba as an alternative

*Continued on page 4*


Drawing of desert saltbush, *Atriplex polycarpa* by Lucretia Breazeale Hamilton in Robert R. Humphrey, *Forage Production on Arizona Ranges*, U. of Ariz. Exp. Sta. Bull. 302, U. of Ariz Press. 1, vegetative branch with leaves; 2, branch with staminate flowers; 3, branch with many fruits; 4, pair of bracts enclosing the fruit, with dorsal projections.

crop for desert regions, but this field is abandoned: desert broom (*Baccharis sarathroides*) grows between the guayule rows.

South of the Reservation the highway follows a bajada sloping toward Casa Grande. Looking back, one can make out the distinct boundary between the rusty-green creosote bush-bursage community of the upper bajada, and the grey-green cast of the desert saltbush community in the lower bajada. The creosote bush was left to ranchers and developers, but once the saltbush begins, most of the land is cut into sharp, level squares of cotton, wheat and alfalfa. There is little trace, for a good ten miles, of the native plants that once grew here .

The highway passes southeast of Casa Grande and enters the Santa Cruz Flats, which run roughly parallel to and south of the road. This route bisects the largest contiguous farming area that still persists in the state, a rough triangle of about 500 square miles from Coolidge in the north to the tiny ghost town of Friendly Corners in the south, to Stanfield to the west. Billboards near the I-8 interchange advertise inexpensive lots carved out of undisturbed desert and old cotton farms. These developments, comprising over a dozen square miles, are sparsely occupied. The streets are laid out in concentric curves, and the names are inviting—Paradise Lane, Pepper Tree Road—but few live here, and many of the lots are either completely bare, or loosely covered with burrow weed (*Isocoma tenuisecta*) and mesquite.

Near the phantom development of Toltec, abandoned fields as bare as parking lots wait for a promised regional airport to spur commercial development. Because these farms were abandoned in the early 1950s, they no longer possess irrigation rights and thus can never be farmed again. Sheep are put out to graze here occasionally, after winter rains, but this serves more to ensure the property's cheap agricultural tax status than to fatten the sheep.

To really see the extent of agriculture in this region it is necessary to get off the highway. Sunshine Boulevard, from the struggling agricultural community of Eloy south to the ghostly Friendly Corners, is lined with stately date palms, active and retired cotton fields, and run-down old cotton gins. The only native plants occur along a small corridor where the Santa Cruz River forms a distinct channel. Most of the land north of the interstate from Eloy to Coolidge is also in active agriculture. Not for long, though. The city of Mesa has bought 11,600 acres for a "water farm." Beginning in 1998, parts of the land will be retired, and the groundwater pumped to supply the city.

As we are re-learning in the tropical rainforests, agriculture devastates resident plant and animal communities. While grazing is often harmful, farming is more so, because cultivation leaves virtually no plant shoots or seeds behind, and drastically changes soil properties. In humid climates the process of natural succession can return abandoned farmland to a nearly full complement of native plant species—although not its original splendor—in 30-50 years. Many, if not most of today's forests of New England were once farms. In arid lands, however, plants may only be able to get established one year in twenty—in that rare, wet year. Therefore, desert succession will be extremely slow, if it happens at all. As more and more farms are abandoned due to dropping water tables and economic pressure, can we expect Sonoran saltbush desertscrub to return to its former geographical extent?

My research at the Desert Botanical Garden has focused on finding out whether abandoned farmland in the desert will return to a native desert saltbush community, and how fast. I have been visiting native stands of desert saltbush and creosote bush, and comparing these to old fields abandoned at different times. Where the soils are coarse-textured to begin with, old fields seem to be achieving their former density and species composition in about 40 years. However, much of the land formerly occupied by desert saltbush has fine-textured, heavy clay soils. Leveling, tillage, and irrigation on these soils created a hard surface crust, reducing the ability of water to infiltrate. Burrow weed, mesquite, globe mallow (*Sphaeralcea*) and some native winter ephemerals readily return to old fields with clay soils, but it can take substantially longer than 40 years for creosote bush, saltbush, and wolfberry to gain a toehold. To make things worse, agricultural development has left miles between old fields and the nearest native seed source. Creosote bush and saltbush have heavy seeds without special adaptations for long-distance dispersal by birds or the wind.

In addition to studying natural processes of succession on abandoned farms, the Desert Botanical Garden has established a restoration experiment on a high-clay site near Toltec to test different methods of seeding desert perennials. So far, we have had good germination of saltbush, especially where straw mulch was applied (5.6 seedlings per square meter) compared to the bare

*Continued on page 11*

# Pressed Pages

*by Susan Husband*-Feature Editor

*Wildflowers Across America*, by Lady Bird Johnson and Carlton B. Lees, New York: Abbeville Press, 1988.

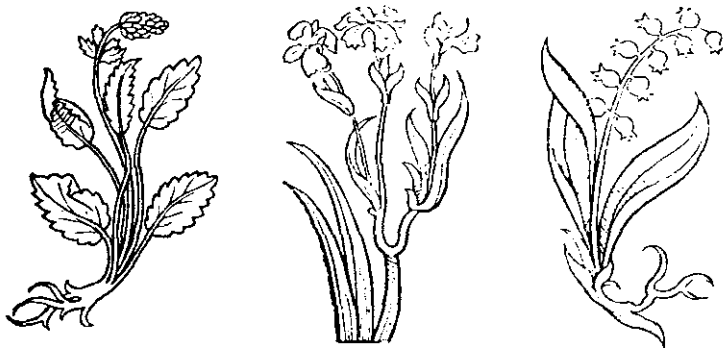
Any outdoor person who has lived in southern Arizona for even a few seasons knows that not only desert plants, but humans too, should take advantage of the gentle spring days and get out in them. But, when summer is upon us, and everything is brown and crispy, you can broaden your horizons and rejuvenate yourself with this beautiful book.

*Wildflowers Across America* is a feast for the eyes, beginning with a dust jacket featuring a landscape of lupine and paintbrush. It is lavishly illustrated with color photographs of both landscapes and close-ups of single flowers.

This work is the product of two authors, former First Lady, Lady Bird Johnson, who in recent years has pursued her lifelong passion for wildflowers, and Carlton B. Lees, a well-known horticulturist, and editor-in-chief of *Horticulture* magazine. It was published with support from the National Wildflower Research Center at Austin, Texas, founded in 1982 by Lady Bird Johnson.

*Wildflowers Across America* is arranged in four substantial sections—From the American Scene: Natives and Immigrants; Out of the Past: Observers and Enthusiasts; To Each a Season: North, East, South, West; and In New Landscapes: Wildflowers Tamed. These major topics are explored with chapters by each author. Lady Bird writes of the joy and beauty she has experienced in a lifetime of seeking out wildflowers, going on quests with friends and family, and of her commitment to save them. Her narrative is informal and personal:

> *I grew up in the country—rather alone—and one of my favorite pastimes was to walk in the woods, exploring, particularly in the springtime, searching for the first wild violets and starry white blossoms of dogwood, feeling the crush of pine needles underfoot, the wind whispering overhead. In summer, barefoot with sand between my toes, I hunted for the Cherokee rose and the black-eyed Susans that grew along the fence rows* [page 8].
>
> *The world in which many wildflowers grew and flourished, their native habitat, is disappearing, necessarily so because the population has doubled in the past fifty years. Meadows and fields and wild places I knew as a young woman have been filled with grids of housing developments, shopping malls, industrial parks, and ribbons of highways. A century ago, William Cullen Bryant looked with his poet's eyes at America's "unshorn fields, boundless and beautiful," and with his poet's voice said: "I think I hear the sound of that advancing multitude which shall soon fill these fields"* [page 284].



Drawing reproduced from *Wildflowers Across America* by Lady Bird Johnson and Carleton B. Lees. Reproduced with permission from Abbeville Press.

Carlton B. Lees has crafted his contributions in a more academic vein, using botanical names and providing citations to literature that is referred to or quoted. The chapter titled "Plant Explorers of the Past" is fascinating. Writes Lees:

> *There may be in this world no souls more generous than those of plant explorers, be they Scotsmen, Englishmen, Germans, Swedes, Frenchmen, or Spaniards: the fascination of the New World bred feverish enthusiasm that carried them through earthquakes, floods, Indian wars, famine, boat-swamping rapids, mosquitoes, infections and disease, searing heat, and penetrating cold in the search for new plants* [page 74].

Full color plates reproduced from the journals and publications of these plant pioneers are included, as well as excerpts of the journals they kept, and letters they wrote. The following excerpt is from the *Journal of David Douglas during his Travels in America, 1823-27*, written in 1823 when Douglas was near Amherstburg (near Detroit):

> *September 16th—. . .This is what I might term my first day in America. The trees in the woods were of astonishing magnitude. The soil, in general, over which we passed was a very rich black earth, and seemed to be formed of decomposed vegetables . . .* [page 103].

*Continued on page 11*

## Plants of the Silver Bells - *Continued from page 1*

shows the influence of the Lower Colorado River biotic community (creosote bush and white bursage), while the upper, north-facing slopes of the Silver Bells are vegetated with grassland species (Mormon tea, yucca, and grasses). Other exposures in the range are in the Arizona Upland Saguaro-Palo Verde biotic community.

The approximate boundaries for my study area are Avra Valley Road on the south, Silver Bell Road to the west, and Pump Station Road to the east (see map on Pg. 10). A wide saddle separates the Silver Bell Mountains from Ragged Top, to the north. These boundaries enclose approximately 28,000 acres (11,331 ha), but much of the mined areas are private property which I have had little opportunity to explore. With permission from ASARCO I was allowed to explore the modern townsite of Silver Bell. Here, I witnessed the desert reclaiming the land and saw how exotic ornamental species, though now neglected, cling to life and in several cases thrive and colonize. Townsite exotic plants which are reproducing by seed and therefore seem destined to become part of the permanent flora of the Silver Bells, are on my list in brackets. I did not find any rare, endangered, or unusual species although *Tumamoca macdougalii, Abutilon parishii, Mammillaria thornberi,* and a few other rare plants occur in the region. Of the 295 taxa listed, seven are ornamentals, thus far restricted to the Silver Bell townsite. Twenty of the remaining 288 are exotics. Seven of these 20 seem to be confined to other areas of human disturbance, leaving just 13 exotic species occurring in the undisturbed habitat. The discouraging part of this is that some of these nonnatives (the exotic filaree, Mediterranean grass, and red brome) are widespread and aggressive, displacing native species.

The dense saguaro "forests," and the rapid transition from desert to a rather well-developed grassland comprise the real jewel of this site. On north-facing slopes, triangle-leaf bursage and foothill palo verdes are replaced by a forest of yuccas and Mormon tea, with pancake prickly pear and wild buckwheat standing out against a carpet of spike moss and ferns. Sideoats grama, curly mesquite, and green sprangletop are just a few of the dozens of grass species found on these slopes. Passing over the crest to the south slopes instantly puts you back into the saguaro desert.

In the 1970s David Brown, of the Arizona Game and Fish Department, reported encountering a single large *Juniperus erythrocarpa* on the mountain. Later quests to look for this plant, made both by myself and by others, have failed to find evidence of it. The "white cholla" named in the plant list resembles *Opuntia acanthocarpa* and may be a variation of that species. However, its densely white-spined branches set it apart from the typical buckhorn chollas I see here and elsewhere.

The area can be reached by driving west from I-10 on Red Rock Road at Red Rock, Trico-Marana Road at Marana, or Avra Valley Road at Rillito. The best hiking access is from the north or east. Mesquiti Wells Road, Pipeline Road, and the road just west of Ragged Top bring you close without having to dodge "No Trespassing" signs. The latter three roads are best navigated by high-clearance vehicles. The Silver Bell Peak and Vaca Hills topographic maps are useful for hiking in this region. There are no trails, but cross-country hiking, from easy to difficult, will reward you with breathtaking scenery and wonderful views to the north and east. There is no permanent natural water, although "guzzlers" (water cachements) built for desert bighorn sheep could provide emergency water in wetter times of the year.

Though fairly comprehensive, this Silver Bell Mountains plant list is not definitive. I have not made an herbarium search for previous collections from the area. Although I have made several dozen hikes in the area, I am sure more species will be added; especially herbaceous perennials and spring annuals. Any information on additional plants found here by readers would be appreciated (see address page 7). I will publish updates as called for.

Plant nomenclature mostly follows Lehr's "A Catalogue of the Flora of Arizona" (1978) and its "Supplements I & II" (Lehr and Pinkava in the *Journal of the Arizona-Nevada Academy of Science;* vol. 15, 1980 and vol. 17, 1982). The sequence of the list is alphabetical by family, genus and species.

I thank my colleagues, the University of Arizona Herbarium staff, and Drs. John and Charlotte Reeder for their encouragement and help in identifying plants and Dr. Richard Felger for his review of the manuscript and plant list. □

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*John Wiens has a Bachelor's degree in Ornamental Horticulture and has worked in the Department of Botany at the Arizona-Sonora Desert Museum since 1985. He is a member of ANPS and enjoys spending his spare time hiking in the mountains near his home and compiling lists of the plant species he finds there. John's flora of the Silver Bell Mountains appears on pages 7-10 of this issue as a center pull-out/cut-out.*

# PROVISIONAL FLORA OF THE SILVER BELL MOUNTAINS

Compiled by John Wiens, 1989-1991

**KEY:** See Page 10.

**LOCATION:** Pima County, Arizona; 30 miles (48 km) northwest of Tucson. Drive west from I-10 on Red Rock Road at Red Rock, Trico-Marana Road at Marana, or Avra Valley Road at Rillito. Best hiking access is from the north or east. Topographic maps: Silver Bell Peak and Vaca Hills. Send additions, corrections or questions to: John Wiens, 16920 W. Placita Mañana, Marana, AZ 85653 or write to the Editor, *The Plant Press*, c/o The Arizona Native Plant Society, P.O.Box 41206, Tucson, AZ 85717.

| | | | |
|---|---|---|---|
| **ACANTHACEAE** | | | **ACANTHUS FAMILY** |
| 2 | *Anisacanthus thurberi* | WdSh | Desert Honeysuckle |
| 3 | *Carlowrightia arizonica* | SbSh | |
| 1 | *Ruellia nudiflora* | PHrb | Longneck Ruel |
| 3 | *Siphonoglossa longiflora* | SbSh | |
| **ADIANTACEAE** | | | **FERN FAMILY** |
| 2 | *Cheilanthes lindheimeri* | PHrb | Lindheimer Lipfern |
| 2 | *Cheilanthes wootoni* | PHrb | Beaded Lipfern |
| 2 | *Cheilanthes wrightii* | PHrb | Wright Lipfern |
| 3 | *Notholaena cochisensis* | PHrb | Helechillo |
| 3 | *Notholaena sinuata* | PHrb | Wavy Cloakfern |
| 4 | *Notholaena standleyi* | PHrb | Standley Cloakfern |
| 3 | *Pellaea truncata* | PHrb | Cliff Brake |
| **AGAVACEAE** | | | **AGAVE FAMILY** |
| 4 | *Yucca baccata* var. *brevifolia* | Succ | Banana Yucca |
| **AMARANTHACEAE** | | | **AMARANTH FAMILY** |
| 4 | *Amaranthus fimbriatus* | AHrb | Fringed Amaranth |
| 2 | *Amaranthus palmeri* | AHrb | Careless Weed |
| 2 | *Amaranthus sp.*[1] | AHrb | pigweed |
| 3 | *Tidestromia lanuginosa* | AHrb | Woolly Tidestromia |
| **ANACARDIACEAE** | | | **CASHEW FAMILY** |
| * | *[Rhus lancea]* | WdSh | African Sumac |
| **APOCYNACEAE** | | | **DOGBANE FAMILY** |
| 3 | *Haplophyton crooksii* | SbSh | Cockroach Plant |
| **ASCLEPIADACEAE** | | | **MILKWEED FAMILY** |
| 3 | *Cynanchum arizonicum* | PVin | Milkweed Vine |
| 2 | *Matelea parviflora* | PVin | Milkweed Vine |
| 2 | *Sarcostemma cynanchoides* | PVin | Climbing Milkweed |
| **BORAGINACEAE** | | | **BORAGE FAMILY** |
| 3 | *Amsinckia intermedia* | AHrb | Coast Fiddleneck |
| 3 | *Amsinckia tessellata* | AHrb | Checker Fiddleneck |
| 3 | *Cryptantha barbigera* | AHrb | Bearded Nievitas |
| 3 | *Cryptantha pterocarya* | AHrb | Wingnut Nievitas |
| 2 | *Harpagonella palmeri* | AHrb | |
| 3 | *Lappula redowskii* | AHrb | Stickseed |
| 3 | *Pectocarya recurvata* | AHrb | Archnut Combbur |
| 2 | *Tiquilia canescens* | SbSh | Shrubby Coldenia |
| **CACTACEAE** | | | **CACTUS FAMILY** |
| 5 | *Carnegiea gigantea* | Succ | Saguaro |
| 4 | *Echinocereus engelmannii* var. *acicularis* | Succ | Strawberry Hedgehog |
| 3 | *Echinocereus fasciculatus* | Succ | Robust Hedgehog |
| 3 | *Echinocereus nicholii* | Succ | Golden Hedgehog |
| 4 | *Ferocactus wislizeni* | Succ | Fishhook Barrel |
| 4 | *Mammillaria grahamii* | Succ | Fishhook Pincushion |
| 4 | *Opuntia acanthocarpa* | Succ | Buckhorn Cholla |
| 3 | *Opuntia acanthocarpa* ?X | Succ | White Cholla |
| 4 | *Opuntia bigelovii* | Succ | Teddybear Cholla |
| 2 | *Opuntia chlorotica* | Succ | Pancake Prickly Pear |
| 4 | *Opuntia fulgida* var. *fulgida* | Succ | Jumping Cholla |
| 1 | *Opuntia fulgida* var. *mammillata* | Succ | Jumping Cholla |
| 3 | *Opuntia leptocaulis* | Succ | Christmas Cholla |
| * | *[Opuntia lindheimeri* var. *linguiformis]* | Succ | Cow's Tongue Prickly Pear |
| 2 | *Opuntia macrocentra* | Succ | Long-spined Prickly Pear |
| 3 | *Opuntia phaeacantha* var. *major* | Succ | Sprawling Prickly Pear |
| 5 | *Opuntia phaeacantha* var. *discata*[2] | Succ | Engelman's Prickly Pear |
| 2 | *Opuntia spinosior* | Succ | Cane Cholla |
| 2 | *Opuntia spinosior* X *O. versicolor* | Succ | hybrid cholla |
| 2 | *Peniocereus greggii* | Succ | Night-blooming Cereus |
| **CAPRIFOLIACEAE** | | | **CAPER FAMILY** |
| 1 | *Sambucus mexicana* | WdSh | Mexican Elder |
| **CARYOPHYLLACEAE** | | | **PINK FAMILY** |
| 3 | *Silene antirrhina* | AHrb | Sleepy Catchfly |
| **CHENOPODIACEAE** | | | **GOOSEFOOT FAMILY** |
| 3 | *Atriplex canescens* | WdSh | Fourwing Saltbush |
| 3 | *Atriplex elegans* | AHrb | Wheelscale Saltbush |
| 3 | *Chenopodium neomexicanum* | AHrb | Fishy Goosefoot |
| *2 | *Salsola australis* | AHrb | Russian Thistle |
| **COMPOSITAE** | | | **SUNFLOWER FAMILY** |
| 3 | *Acourtia wrightii* | PHrb | Brownfoot |
| 4 | *Ambrosia ambrosioides* | WdSh | Canyon Ragweed |
| 3 | *Ambrosia confertiflora* | PHrb | Slimleaf Bursage |
| 5 | *Ambrosia deltoidea* | WdSh | Triangleleaf Bursage |
| 2 | *Ambrosia dumosa* | WdSh | White Bursage |
| 3 | *Artemisia ludoviciana* | SbSh | White Sage |
| 2 | *Baccharis sarothroides* | WdSh | Desert Broom |
| 2 | *Baileya multiradiata* | PHrb | Desert Marigold |
| 3 | *Bebbia juncea* | SbSh | Sweetbush |
| 2 | *Brickellia baccharidea* | WdSh | brickellbush |
| 4 | *Brickellia coulteri* | SbSh | brickellbush |
| 3 | *Calycoseris wrightii* | AHrb | Tackstem |
| *2 | *Centaurea melitensis* | AHrb | Malta Starthistle |
| 1 | *Conyza canadensis* | AHrb | Horseweed |
| 1 | *Dyssodia pentachaeta* | PHrb | Dogweed |
| 3 | *Dyssodia porophylloides* | PHrb | San Felipe Fetid Marigold |
| 4 | *Encelia farinosa* | WdSh | Brittle Bush |
| 3 | *Ericameria laricifolia* | WdSh | Turpentine Bush |
| 3 | *Erigeron divergens* | PHrb | Spreading Fleabane |
| 2 | *Erigeron cf. lobatus* | PHrb | Fleabane |
| 3 | *Eriophyllum lanosum* | AHrb | Woolly Daisy |
| 3 | *Eupatorium solidagnifolium* | SbSh | Boneset |
| 2 | *Filago sp.* | AHrb | Filago |
| 3 | *Gymnosperma glutinosum* | SbSh | Tatalencho |
| 2 | *Heterotheca psammophila* | AHrb | Camphor Weed |
| 2 | *Hymenoclea salsola* | WdSh | Cheesebush |
| 3 | *Isocoma tenuisecta* | SbSh | Burro Weed |
| *2 | *Lactuca serriola* | AHrb | Prickly Lettuce |

[1] First discovered in Tucson Mts. as a yet undescribed species

[2] *Opuntia engelmannii* (Salm-Dyck ex Engelm.)

| | | | |
|---|---|---|---|
| 3 | *Machaeranthera pinnatifida* | SbSh | Spiny Haplapappus |
| 2 | *Machaeranthera tagentina* | SbSh | Spinyleaf Aster |
| 3 | *Monoptilon bellioides* | AHrb | Desert Star |
| 2 | *Pectis cylindrica* | AHrb | |
| 3 | *Pectis papposa* | AHrb | Chinchweed |
| 3 | *Porophyllum gracile* | PHrb | Odora |
| 3 | *Psilostrophe cooperi* | SbSh | Paper Flower |
| 3 | *Rafinesquia neomexicana* | AHrb | Desert Chickory |
| 3 | *Senecio lemmoni* | PHrb | Groundsel |
| *2 | *Sonchus oleraceus* | AHrb | Sow Thistle |
| 3 | *Stephanomeria pauciflora* | SbSh | Desert Straw |
| 5 | *Trixis californica* | SbSh | Pichaga |
| 1 | *Xanthium strumarium* | AHrb | Common Cocklebur |
| 3 | *Zinnia acerosa* | SbSh | Desert Zinnia |
| **CONVOLVULACEAE** | | | **MORNING GLORY FAMILY** |
| 3 | *Evolvulus alsinoides* | PHrb | Arizona Blue Eyes |
| 2 | *Ipomoea cristulata* | AVin | Scarlet Morning Glory |
| 2 | *Ipomoea hederaceae* | AVin | Morning Glory |
| * | [*Merremia dissecta*] | PVin | Mile-a-minute Vine |
| **CRASSULACEAE** | | | **ORPINE FAMILY** |
| 2 | *Crassula connata* | AHrb | Pigmy Weed |
| **CROSSOSOMATACEAE** | | | **CROSSOSOMA FAMILY** |
| 3 | *Crossosoma bigelovii* | WdSh | Rhyolitebush |
| **CRUCIFERAE** | | | **MUSTARD FAMILY** |
| 2 | *Arabis perennans* | PHrb | Rock Cress |
| *1 | *Brassica sp.* | AHrb | mustard |
| 4 | *Caulanthus lasiophyllus* | AHrb | |
| 3 | *Descurainia pinnata* | AHrb | Tansy Mustard |
| 4 | *Draba cuneifolia* | AHrb | Whitlow Grass |
| 5 | *Lepidium lasiocarpum* | AHrb | Peppergrass |
| 3 | *Lesquerella gordonii* | AHrb | Yellow Bladderpod |
| *1 | *Matthiola bicornis* | AHrb | Evening Stock |
| *3 | *Sisybrium irio* | AHrb | London Rocket |
| 4 | *Streptanthus carinatus* | AHrb | Silverbells |
| 3 | *Thysanocarpus curvipes* | AHrb | Lacepod Mustard |
| **CUCURBITACEAE** | | | **GOURD FAMILY** |
| 2 | *Echinopepon wrightii* | AVin | Wright's Melon |
| **EPHEDRACEAE** | | | **JOINTFIR FAMILY** |
| 4 | *Ephedra nevedensis* | WdSh | Mormon Tea |
| 2 | *Ephedra trifurca* | WdSh | Longleaf Jointfir |
| **EUPHORBIACEAE** | | | **SPURGE FAMILY** |
| 1 | *Bernardia incana* | WdSh | |
| 2 | *Chamaesyce abramsiana* | AHrb | spurge |
| 4 | *Chamaesyce arizonica* | AHrb | spurge |
| 4 | *Chamaesyce capitellata* | PHrb | spurge |
| 5 | *Chamaesyce florida* | AHrb | spurge |
| 3 | *Chamaesyce gracillima* | AHrb | spurge |
| 3 | *Chamaesyce hyssopifolia* | AHrb | Hyssop Spurge |
| 3 | *Chamaesyce melanadenia* | PHrb | spurge |
| 3 | *Chamaesyce pediculifera* | PHrb | spurge |
| 3 | *Chamaesyce polycarpa* | PHrb | Smallseed Sand Mat |
| 5 | *Chamaesyce setiloba* | AHrb | Bristlelobe Sand Mat |
| 3 | *Croton sonorae* | WdSh | Croton |
| 3 | *Ditaxis lanceolata* | SbSh | Lanceleaf Ditaxis |
| 2 | *Ditaxis neomexicana* | PHrb | |
| 3 | *Euphorbia eriantha* | SbSh | Desert Poinsettia |
| 4 | *Jatropha cardiophylla* | SbSh | Limber Bush |
| **FOUQUIERIACEAE** | | | **OCOTILLO FAMILY** |
| 4 | *Fouquieria splendens* | WdSh | Ocotillo |
| **GERANIACEAE** | | | **GERANIUM FAMILY** |
| *5 | *Erodium cicutarium* | AHrb | Filaree |
| 3 | *Erodium texanum* | AHrb | Largeflower Stork's Bill |
| **GRAMINEAE** | | | **GRASS FAMILY** |
| 5 | *Aristida adscensionis* | AHrb | Sixweeks Threeawn |
| 3 | *Aristida hamulosa* | PHrb | threeawn |
| 3 | *Aristida parishii* | PHrb | threeawn |
| 4 | *Aristida purpurea* var. *nealleyi* | PHrb | Reverchon Threeawn |
| 4 | *Aristida ternipes* | PHrb | Spider Grass |
| 3 | *Bothriochloa barbinodis* | PHrb | Cane Beardgrass |
| 4 | *Bouteloua aristidoides* | AHrb | Sixweeks Needle Grama |
| 3 | *Bouteloua barbata* | AHrb | Sixweeks Grama |
| 4 | *Bouteloua curtipendula* | PHrb | Sideoats Grama |
| 4 | *Bouteloua repens* | PHrb | Slender Grama |
| 3 | *Bouteloua rothrockii* | PHrb | Rothrock Grama |
| 3 | *Bouteloua trifida* | PHrb | Red Grama |
| 3 | *Brachiaria arizonica* | AHrb | Arizona Panicgrass |
| *5 | *Bromus rubens* | AHrb | Foxtail Chess, Red Brome |
| 2 | *Cottea pappophoroides* | PHrb | Cotta Grass |
| *2 | *Cynadon dactylon* | PHrb | Bermuda Grass |
| 4 | *Digitaria californica* | PHrb | Arizona Cottontop |
| 1 | *Elymus elymoides* | PHrb | Squirrel Tail |
| 3 | *Enneapogon desvauxii* | PHrb | Spike Pappusgrass |
| *1 | *Eragrostis barrelieri* | AHrb | Mediterranean Lovegrass |
| *2 | *Eragrostis cilianensis* | AHrb | Stinkgrass |
| *2 | *Eragrostis lehmanniana* | PHrb | Lehman Lovegrass |
| 1 | *Eriochloa acuminata* | AHrb | Cupgrass |
| 4 | *Erioneuron pulchellum* | PHrb | Fluff Grass |
| 4 | *Heterpogon contortus* | PHrb | Tanglehead |
| 3 | *Hilaria belangeri* | PHrb | Curly Mesquite |
| 3 | *Leptochloa dubia* | PHrb | Green Sprangletop |
| 5 | *Leptochloa filiformis* | AHrb | Red Sprangletop |
| 3 | *Muhlenbergia microsperma* | AHrb | Littleseed Muhly |
| 4 | *Muhlenbergia porteri* | PHrb | Bush Muhly |
| 1 | *Muhlenbergia rigens* | PHrb | Deer Grass |
| 3 | *Panicum hirticaule* | AHrb | Witchgrass |
| 2 | *Pappophorum vaginatum* | PHrb | Pappus Grass |
| *2 | *Pennisetum ciliare* | PHrb | Buffel Grass |
| * | [*Pennisetum setaceum*] | PHrb | Fountain Grass |
| 2 | *Poa bigelovii* | AHrb | Bigelow's Bluegrass |
| *2 | *Polypogon monspeliensis* | AHrb | Rabbitfoot Grass |
| *5 | *Schismus barbatus* | AHrb | Mediterranean Grass |
| 3 | *Setaria grisebachii* | AHrb | Grisebach Bristlegrass |
| 3 | *Setaria leucopila* | PHrb | bristlegrass |
| 3 | *Seteria macrostachya* | PHrb | Plains Bristlegrass |
| *2 | *Sorghum halapense* | PHrb | Johnson Grass |
| 2 | *Sporobolus contractus* | PHrb | Spike Dropseed |
| 3 | *Sporobolus cryptandrus* | PHrb | Sand Dropseed |
| 2 | *Sporobolus wrightii* | PHrb | Sacaton |
| 4 | *Tridens muticus* | PHrb | Slim Tridens |
| 2 | *Vulpia octoflora* | AHrb | Sixweeks Fescue |
| **HYDROPHYLLACEAE** | | | **WATERLEAF FAMILY** |
| 3 | *Eucrypta chrysanthemifolia* | AHrb | Torrey Eucrypta |
| 4 | *Eucrypta micrantha* | AHrb | Smallflower Eucrypta |
| 4 | *Phacelia crenulata* | AHrb | Caterpillar Weed |
| 4 | *Phacelia distans* | AHrb | Wild Heliotrope |
| 3 | *Pholistoma auritum* | AHrb | |
| **KRAMERIACEAE** | | | **RATANY FAMILY** |
| 3 | *Krameria erecta* | WdSh | Range Ratany |
| 4 | *Krameria grayi* | WdSh | White Ratany |
| **LABIATAE** | | | **MINT FAMILY** |
| 2 | *Hedeoma nanum* | AHrb | Mock Pennyroyal |
| 3 | *Hyptis emoryi* | WdSh | Desert Lavender |
| 3 | *Salvia columbariae* | AHrb | Chia |

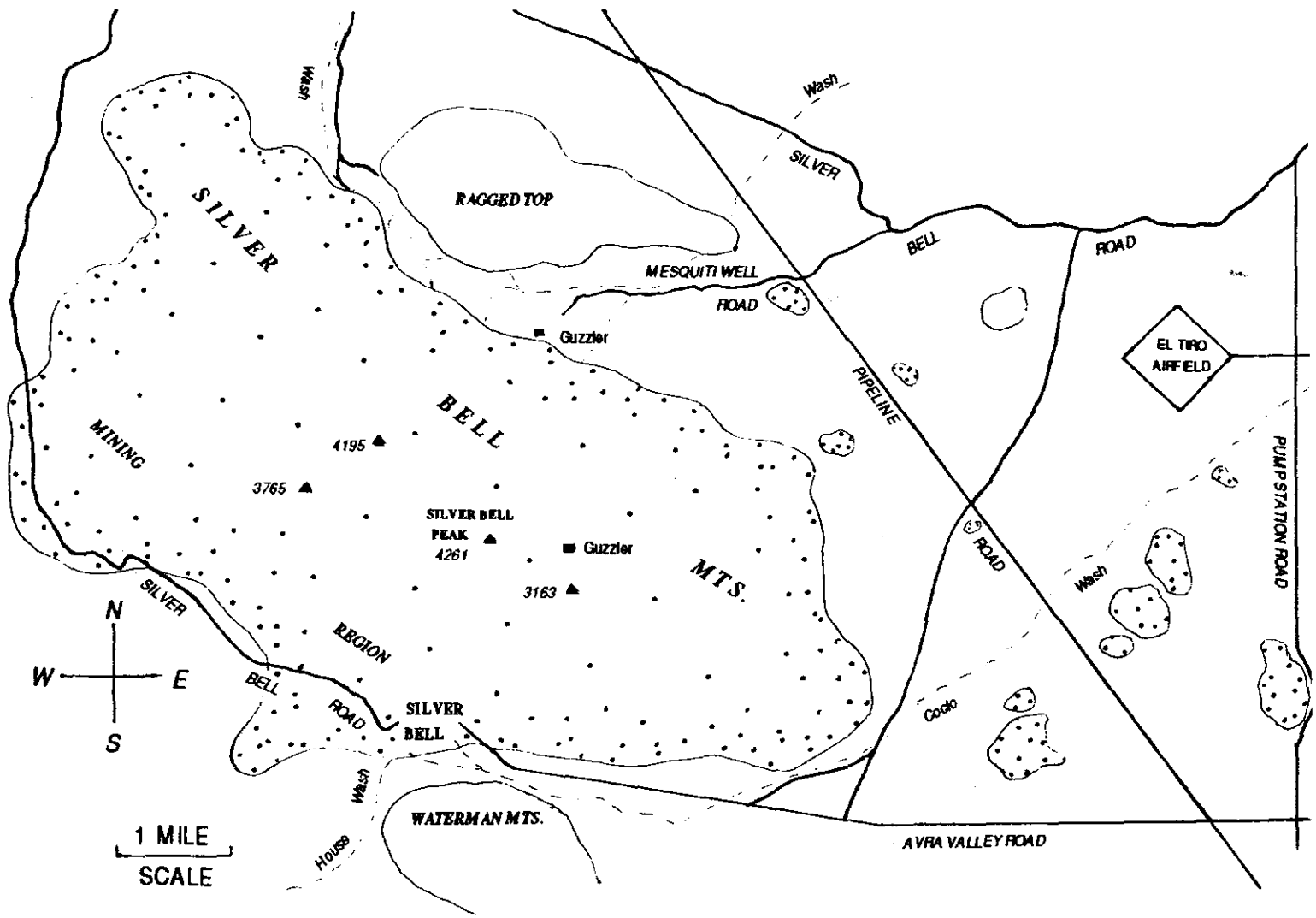
| | | | |
|---|---|---|---|
| **LEGUMINOSAE** | | | **PEA FAMILY** |
| 4 | *Acacia constricta* | WdSh | Whitethorn Acacia |
| 3 | *Acacia greggii* | WdSh | Catclaw Acacia |
| 2 | *Astragalus cf. arizonicus* | PHrb | locoweed |
| 2 | *Astragalus didimocarpus* | AHrb | locoweed |
| 4 | *Astragalus nuttallianus* | AHrb | Nuttall Locoweed |
| * | [*Caesalpinia gilliesii*] | WdSh | Yellow Bird-of-paridise |
| 4 | *Calliandra eriophylla* | SbSh | Fairy Duster |
| 2 | *Cercidium floridum* | Tree | Blue Palo Verde |
| 5 | *Cercidium microphyllum* | Tree | Foothill Palo Verde |
| 3 | *Lotus humistratus* | AHrb | Hill Locust |
| 3 | *Lotus salsuginosus* | AHrb | Deer Vetch |
| 3 | *Lotus strigosus* var. *tomentellus* | AHrb | Hairy Deer Vetch |
| 4 | *Lupinus sparsiflorus* | AHrb | Arizona Lupine |
| 3 | *Marina parryi* | PHrb | Parry Dalea |
| 3 | *Nissolia schottii* | PVin | |
| 3 | *Olneya tesota* | Tree | Ironwood |
| *2 | *Parkinsonia aculeata* | Tree | Mexican Palo Verde |
| * | [*Prosopis sp.*][3] | Tree | Chilean Mesquite |
| 3 | *Prosopis velutina* | Tree | Velvet Mesquite |
| 3 | *Senna covesii* | SbSh | Desert Senna |
| **LILIACEAE** | | | **LILY FAMILY** |
| 3 | *Allium macropetalum* | PHrb | Wild Onion |
| 3 | *Calochortus kennedyi* | PHrb | Desert Mariposa Lily |
| 4 | *Dichelostemma pulchellum* | PHrb | Bluedick |
| **LOASACEAE** | | | **STICKLEAF FAMILY** |
| 3 | *Mentzelia affinis* | AHrb | Yellow Comet |
| 3 | *Mentzelia pumila* | PHrb | Blazing Star |
| **MALPIGHIACEAE** | | | **MALPIGHIA FAMILY** |
| 4 | *Janusia gracilis* | PVin | Desert Vine |
| **MALVACEAE** | | | **MALLOW FAMILY** |
| 4 | *Abutilon incanum* | SbSh | Indian Mallow |
| 3 | *Abutilon malacum* | SbSh | Indian Mallow |
| 4 | *Herissantia crispa* | PHrb | Pelotazo |
| 3 | *Hibiscus coulteri* | SbSh | Desert Rose Mallow |
| 3 | *Hibiscus denudatus* | SbSh | Rock Hibiscus |
| 3 | *Horsfordia newberryi* | SbSh | Yellow Felt Plant |
| 1 | *Sida abutifolia* | PHrb | Spreading Sida |
| 4 | *Sphaeralcea ambigua* | SbSh | Desert Globe Mallow |
| 3 | *Sphaeralcea coulteri* | AHrb | Coulter Globe Mallow |
| 3 | *Sphaeralcea emoryi* | SbSh | Emory Globe Mallow |
| 3 | *Sphaeralcea laxa* | SbSh | Caliche Globe Mallow |
| **NYCTAGINACEAE** | | | **FOUR O'CLOCK FAMILY** |
| 4 | *Allionia incarnata* | PHrb | Trailing Four-o'clock |
| 3 | *Boerhaavia coccinea* | PHrb | Red Spiderling |
| 3 | *Boerhaavia erecta* var. *intermedia* | AHrb | Fivewing Ring Stem |
| 3 | *Commicarpus scandens* | SbSh | Bush Spiderling |
| 3 | *Mirabilis bigelovii* | PHrb | Wishbone Bush |
| **OLEACEAE** | | | **OLIVE FAMILY** |
| 2 | *Forestiera shrevei* | WdSh | Desert Olive |
| 4 | *Menodora scabra* | SbSh | Twinberry |
| **ONAGRACEAE** | | | **EVENING PRIMROSE FAMILY** |
| 3 | *Camissonia californica* | AHrb | Mustard Evening Primrose |
| 3 | *Camissonia chamaenerioides* | AHrb | Longcapsule Primrose |
| 3 | *Oenothera primaveris* | AHrb | Yellow Desert Primrose |
| **PAPAVERACEAE** | | | **POPPY FAMILY** |
| 2 | *Argemone gracilenta* | AHrb | Crested Prickly Poppy |
| 3 | *Eschscholzia mexicana* | AHrb | Mexican Gold Poppy |
| **PLANTAGINACEAE** | | | **PLAINTAIN FAMILY** |
| 5 | *Plantago insularis* | AHrb | Indian Wheat |
| 3 | *Plantago patagonica* | AHrb | Pursh Plantain |
| **POLEMONIACEAE** | | | **PHLOX FAMILY** |
| 3 | *Eriastrum diffusum* | AHrb | Miniature Wool Star |
| 3 | *Gilia flavocinta* | AHrb | |
| 3 | *Gilia stellata* | AHrb | |
| 3 | *Linanthus bigelovii* | AHrb | |
| **POLYGONACEAE** | | | **BUCKWHEAT FAMILY** |
| 3 | *Chorizanthe brevicornu* | AHrb | Brittle Spineflower |
| 3 | *Chorizanthe rigida* | AHrb | Rigid Spineflower |
| 3 | *Eriogonum abertianum* | AHrb | Wild Buckwheat |
| 4 | *Eriogonum deflexum* | AHrb | Skeleton Weed |
| 3 | *Eriogonum fasciculatum* | WdSh | Flattopped Buckwheat |
| 3 | *Eriogonum inflatum* | PHrb | Desert Trumpet |
| 3 | *Eriogonum palmerianum* | AHrb | Skeleton Weed |
| 3 | *Eriogonum trichopes* | AHrb | Little Trumpets |
| 4 | *Eriogonum wrightii* | SbSh | Wild Buckwheat |
| *1 | *Polygonum aviculare* | AHrb | Knotweed |
| **PORTULACACEAE** | | | **PORTULACA FAMILY** |
| 3 | *Calandrinia ciliata* | AHrb | Red Maids |
| 3 | *Calyptridium monandrum* | AHrb | Sand Cress |
| **PRIMULACEAE** | | | **PRIMROSE FAMILY** |
| 3 | *Androsace occidentalis* | AHrb | Rock Jasmine |
| **RANUNCULACEAE** | | | **CROWFOOT FAMILY** |
| 3 | *Anemone tuberosa* | PHrb | Windflower |
| 2 | *Clematis drummondii* | PVin | Virgin's Bower |
| 3 | *Delphinium scaposum* | PHrb | Barestem Larkspur |
| **RHAMNACEAE** | | | **BUCKTHORN FAMILY** |
| 2 | *Condalia warnockii* | WdSh | Squawbush |
| 3 | *Ziziphus obtusifolia* | WdSh | Graythorn |
| **RUBIACEAE** | | | **MADDER FAMILY** |
| 3 | *Galium stellatum* | WdSh | Bedstraw |
| **SCROPHULARIACEAE** | | | **FIGWORT FAMILY** |
| 1 | *Mimulus floribundis* | AHrb | Clammy Monkey Flower |
| 2 | *Mimulus guttatus* | AHrb | Yellow Monkey Flower |
| 3 | *Penstemon parryi* | PHrb | Parry Beardtongue |
| **SELAGINELLACEAE** | | | **SELAGINELLA FAMILY** |
| 4 | *Selaginella arizonica* | PHrb | Spike Moss |
| **SIMMONDSIACEAE** | | | **JOJOBA FAMILY** |
| 4 | *Simmondsia chinensis* | WdSh | Jojoba |
| **SOLANACEAE** | | | **NIGHTSHADE FAMILY** |
| 3 | *Datura discolor* | AHrb | Desert Thornapple |
| 2 | *Lycium andersonii* | WdSh | Anderson Thornbush |
| 5 | *Lycium berlandieri* | WdSh | wolfberry |
| 3 | *Lycium cf. exertum* | WdSh | wolfberry |
| 3 | *Lycium fremontii* | WdSh | Fremont Wolfberry |
| 4 | *Nicotiana trigonophylla* | PHrb | Desert Tobacco |
| 2 | *Physalis crassifolia* | PHrb | Thickleaf Ground Cherry |
| 2 | *Solanum elaeagnifolium* | PHrb | Horse Nettle |
| **STERCULIACEAE** | | | **CACAO FAMILY** |
| 3 | *Ayenia compacta* | SbSh | Desert Ayenia |
| 3 | *Ayenia microphylla* | SbSh | ayenia |
| **TAMARICACEAE** | | | **TAMARIX FAMILY** |
| *2 | *Tamarix ramosissima* | WdSh | Tamarisk |
| **ULMACEAE** | | | **ELM FAMILY** |
| 4 | *Celtis pallida* | WdSh | Desert Hackberry |

[3]Ornamental South American species or hybrid

| | | | |
|---|---|---|---|
| **UMBELLIFERAE** | | | **PARSLEY FAMILY** |
| 3 | *Bowlesia incana* | AHrb | Hairy Bowlesia |
| 4 | *Daucus pusillus* | AHrb | Wild Carrot |
| 3 | *Spermolepis echinata* | AHrb | Scale Seed |
| **URTICACEAE** | | | **NETTLE FAMILY** |
| 3 | *Parietaria hespera* | AHrb | Pellitory |
| **VERBENACEAE** | | | **VERVAIN FAMILY** |
| 3 | *Aloysia wrightii* | WdSh | Oreganillo |
| * | [*Lantana camara*] | WdSh | Lantana |
| 2 | *Verbena neomexicana* | PHrb | Hillside Vervain |
| **VISCACEAE** | | | **MISTLETOE FAMILY** |
| 3 | *Phoradendron californicum* | SbSh | Desert Mistletoe |
| **ZYGOPHYLLACEAE** | | | **CALTROP FAMILY** |
| 3 | *Kallstroemia californica* | AHrb | Little Summer Poppy |
| 2 | *Kallstroemia grandiflora* | AHrb | Arizona Summer Poppy |
| 5 | *Larrea divaricata* ssp. *tridentata* | WdSh | Creosote Bush |

Note: Plant nomenclature mostly follows Lehr (1978) and Lehr and Pinkava (1980 and 1982).

KEY:
*=Exotic
[ ] Plants set inside brackets are reproducing (seed-reproducing) townsite exotics
ABUNDANCE
1-5 Rarely seen - quite common
FORM
Tree=Single or multiple-trunked tree
WdSh=Woody shrub
SbSh=Subshrub (suffrutescent or nonwoody shrub)
Succ=Rosette or stem succulent
PHrb=Perennial herb or grass
PVin=Herbaceous or woody perennial vine
AHrb=Annual or ephemeral (herb or grass)
AVin=Annual or ephemeral (vine)




Map of the Silver Bell Mountains by John Wiens

## The Lost Landscape - *Continued from page 4*

plots (1.5 seedlings per square meter). Computerized sensors are in place to measure soil moisture and temperature continuously in different treatments. The last rains in March induced mesquite to germinate, and we are also seeing some *Sphaeralcea* come up. It will take another year to learn whether any of the seedlings survive the spring and fall droughts.

Ecological study and pilot restoration projects cannot address the most fundamental issue, however: who cares about saltbush desertscrub? Although the differences are as profound as those between a forest and a clearcut, most people have not learned to distinguish between undisturbed desertscrub and a field of burrow weed. Restoration takes time and costs money, perhaps well over $500/acre. With water transfers from agriculture to cities becoming more common (see Marc Reisner and Sarah Bates's new book, *Overtapped Oasis;* Island Press, 1990), we can expect to see more newly abandoned farms—"desert clearcuts"—in the near future. Urban water purchasers will have to plant something on their water farms to prevent a nuisance of dust and tumbleweeds. Though useless for wildlife and recreation, South African grasses such as Lehman lovegrass (*Eragrostis lehmanniana*) are the cheapest solution. Without vocal citizens who appreciate Sonoran saltbush desertscrub, restoration will almost certainly be downgraded to mere reclamation. In the end, it will be up to native plant enthusiasts to insist that we restore this unique biotic community to its rightful place in the Sonoran Desert. ☐

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*Laura Jackson is an ANPS member who moved to Arizona in 1990. She has a Ph.D. in Plant Ecology from Cornell University and is a Research Ecologist at the Desert Botanical Garden in Phoenix.*

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## Pressed Pages - *continued from page 5*

Two years later, after a trip back to England followed by a second voyage to America—this time to the Pacific Northwest—his journal reads:

*August 16th—...My residence is on the north bank of the river twelve miles below Point Vancouver... On my arrival a tent was kindly offered, having no houses yet built, which I occupied for some weeks; a lodge of deerskin was then made for me which soon became too small by the augmenting of my collection and being ill adapted for drying my plants and seeds. I am now . . . in a hut made of bark of Thuya occidentalis* [White Cedar] *which most likely will be my winter lodging* [page 108].

Other sections profile the diverse ecological communities of the United States, and the progress that is being made in incorporating native plants into formalized landscaping.

The appendix includes a selected bibliography, a list of seed sources and an index to illustrations, as well as a general index.

The National Wildflower Research Center continues to be active, and to gain momentum, especially in research efforts toward the propagation and use of wildflowers in landscaping. For $25.00 you can become a member. Benefits of membership include a subscription to *Wildflower*, the bi-monthly newsletter, a semi-annual journal, also called *Wildflower*, and free wildflower information from the Center's Clearinghouse, along with discounts and advance notice of programs. Members can also purchase this wonderful book for 10% less than its $39.95 retail price, although a copy should be available at your local library. Write to the National Wildflower Research Center, 2600 FM 973 North, Austin, Texas 78725-4201 (512) 929-3600. ☐

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# The Native Landscaper:

## Introductions to Little Known and Seldom Grown Species

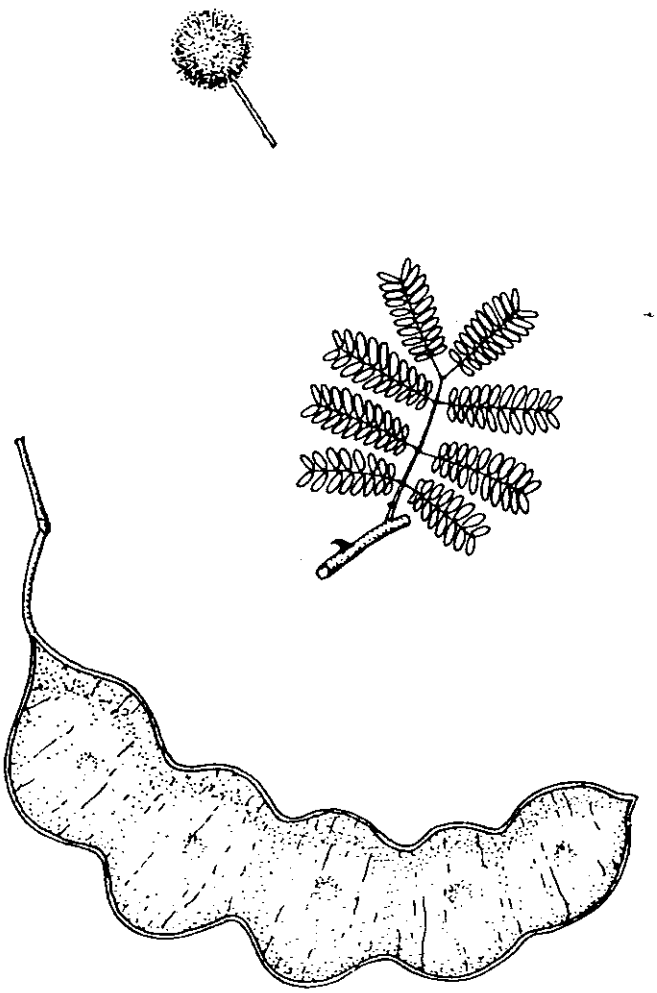
### Sonoran Tree Catclaw: *by Matthew B. Johnson*

**Nomenclature:** *Acacia occidentalis*, Sonoran tree catclaw; Family Leguminosae.

**Description:** Trees to 15 m (50 ft.) tall with low-branched spreading canopies to at least 15-18 m (50-60 ft.) across. The trunk is well developed to at least 1 m in diameter. The bark is rough and dark gray in color. At least some twigs bear sharp, recurved prickles between the nodes. The leaves are gray-green, bipinnate, 2.5-5 cm (1-2 in.) long, with 2-4 (5) pairs of pinnae. Sonoran tree catclaw is tardily drought-deciduous, usually with some leaves remaining on the tree. The fragrant flowers, which appear from February to April, are cream colored, and form rounded heads about 1 cm in diameter. The pods are 7.5-15.5 cm (3-6 in.) long and 2-2.5 cm (1 in.) wide, flattened, usually curved or curled, tan to pinkish in color and are tardily semi-dehiscent.

**Habitat and Distribution:** Valleys and arroyos with deep soil, less commonly on hills, in Sonoran desertscrub, semidesert grassland, thornscrub and tropical deciduous forest. 30-915 m (100-3000 ft.) elevation. Sonoran tree catclaw is common in the valleys of northcentral and northeastern Sonora, Mexico, southward to Guaymas and the Alamos region. It is also found in extreme northern Sinaloa. Sonoran tree catclaw grows within 40 miles of the international boundary along the Río Magdalena Valley south of Nogales. Along the river valleys and larger arroyos of northern and central Sonora, Sonoran tree catclaw often forms woodlands with velvet mesquite (*Prosopis velutina*), Mexican ebony (*Pithecellobium mexicanum*) and netleaf hackberry (*Celtis reticulata*). Larger trees have mostly been cut down in populated areas.

**Propagation, Cultural Requirements and Maintenance:** Seed of Sonoran tree catclaw should be scarified before planting. 80-100% germination of scarified seed has been observed. Plants have grown 20-30 cm (8-12 in.) tall in 1-gallon containers in seven months. Eight-month-old seedlings growing unprotected in the ground in Tucson and in 1-gallon containers under shadecloth survived -7° C (19° F) in December, 1990 without damage, and only partially defoliated. The plants are likely hardy to at least -9° C (15° F). Sonoran tree catclaw should receive periodic deep irrigation during warm weather Annual precipitation averages 250-625 mm (10-25 in.) in habitat but the plants are best developed in deep valley soils where they can reach groundwater. Trees growing in drier sites seldom exceed 6 m (20 ft.) in height. Sonoran tree catclaw prefers deep soil. In rocky soil or caliche, a large planting hole should be dug. This may be



Life-size drawing of *Acacia occidentalis* inflorescence, leaf, and fruit; by Matt Johnson.

*Acacia occidentalis* growing in an arroyo, east of Cucurpe, Sonora, on the road to Rancho Janos (drawing by M. Johnson)

backfilled with improved soil to encourage development of the tree. The prickly stems are a problem near traffic areas when the trees are small.

The fine leaf litter is not messy. The profuse fragrant flowers attract bees. No pests or diseases have been observed. Desert mistletoe (*Phoradendron californicum*) may be parasitic on this species.

**Landscape Application:** Sonoran tree catclaw is an excellent candidate for introduction through the landscape nursery trade. It can reach impressive dimensions with age and often develops a picturesque form. The broad spreading canopy produces moderately dense shade and usually retains foliage throughout the year. Sonoran tree catclaw is best suited for planting in parks and large yards where it has space to attain full development. It may be planted as a wildlife tree in revegetation projects along urban watercourses in areas to which it is adapted. Sonoran tree catclaw is a striking tree with considerable potential for urban forestry and landscaping use in the Sonoran Desert region and beyond.

**Comments:** Sonoran tree catclaw is closely related to the widespread catclaw acacia (*Acacia greggii*) and the two species sometimes occur sympatrically. *Acacia occidentalis* differs by its much larger eventual size and by its rounded flower heads rather than the cylindrical spikes of *Acacia greggii.* Another closely related species is Texas catclaw (*Acacia wrightii*) from Texas and northeast Mexico.

**References:**

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# Conservation Page

*by Corinna Gries*—Feature Editor

## LEGISLATIVE ISSUES

### State Legislation

**Environmental Impact Legislation**: A bill to require state agencies to file environmental impact statements on many projects has passed the Senate and awaits action in the House. This bill would increase our ability to influence salvage, revegetation and other plant-protective measures when agencies such as the Highway Department engage in construction, reconstruction, or demolition. Please call your Representative and ask him/her to support SB 1328.

**Off-Highway Vehicle Recreation Funds**: Land abuse from off-highway vehicles (OHVs) is a major cause of plant destruction in our state. ("Off-highway" means any road not regularly maintained for public use or over any open terrain.) In May 1989 SB 1280 was signed into law by Governor Rose Mofford. This bill intended to divert state fuel taxes to an OHV recreation fund, to be disbursed by Arizona State Parks as grants to cities, counties, State and Federal agencies for establishment of OHV trails and areas. The hope was that the establishment of trails and assigned areas would diminish random abuse; but the bill has not been enforced. In January the matter was reopened by a new legislative bill which would halve the disbursement (from approx. $6 to $3 million) and earmark $1 million of that for education and reclamation, which weren't included in the earlier bill. Senators and Representatives should be asked to support this new bill (SB 1091).

### Federal Legislation

**Grand Canyon Protection Legislation**: Senator McCain reintroduced the Grand Canyon Protection Act this session as final passage could not be secured before the conclusion of the 101st Congress last year. The Grand Canyon Protection Act of 1991 seeks to protect the Grand Canyon National Park from further degradation caused by the irregular releases of water under the current power operation of Glen Canyon Dam. The act also calls for a timely completion by the Interior Department of Environmental Impact statements on dam operations, and a development of interim power operation criteria to help protect Grand Canyon resources while the search for long-term solutions is underway.

## LAND MANAGEMENT AGENCY ISSUES

**The Threatened, Endangered and Sensitive Plant Program** within the USDA Forest Service has published a summary of fiscal year 1990 accomplishments for the Southwestern Region. It provides information about ongoing research and monitoring projects, surveys and inventories, recently discovered location of endangered plant species and the budget for each National Forest in Arizona and New Mexico. Copies may be obtained from the Regional Botanist: Renee Galeano-Popp, 517 Gold Ave., SW, Albuquerque, NM 87102, phone: 505-842-3328.

**Prescott National Forest:** A travel management plan was established by the U.S. Forest Service in 1989 for construction of new OHV recreation sites and trails in the Prescott National Forest. According to the Mingus Area Preservation Society (MAPS), the plan was approved without adequate assessment of OHV impacts. MAPS was formed in an attempt to prevent major damage to the area. An environmental assessment is now under way and MAPS needs help with identifying rare and endangered plant species as basic environmental documentation. For more information call Toni Roscoe, 42 S. Main Street, Cottonwood, AZ 86326, phone: 602-634-0661

**Mount Graham Update:**

Some good news: The board of trustees of Ohio State University has refused to use any general fund money for the Columbus telescope. (The university is now trying to raise the money from their alumni organization to fund this scope.) And even better news, the Smithsonian has officially withdrawn its plans to build six large telescopes on Mt. Graham and instead has decided to join the existing observatory on Mauna Kea, Hawaii. The bad news: The University of Arizona has begun clearing for construction work at the first two sites, the German telescope from the Max Planck Institute and the Italian telescope. The idea is that once the cement is pored the American partners may come back to the project. In a Federal District Court hearing in December, 1990, the U. of A. argued that it is not necessary to perform a new endangered species study because the observatory project is exempt from the National Environmental Act and the Endangered Species Act. The Sierra Club countered that it is not true that Congress exempted the project. No decision of the panel of three judges had been handed down at this writing. What you can do: Letters need to be written to the presidents of the U. of A. and Ohio State. The Audubon Society recommends that the letters should contain the following: It is unthinkable for great centers of learning to participate in a project which has spent millions of dollars in lobbying and law suits in subverting the nation's two key environmental laws—the National Environmental Act and the Endangered Species Act. Furthermore it should be emphasized that a unique ecosystem will be destroyed, which not only harbors the endangered Mt. Graham red squirrel but also three endemic plant species, *Potentilla albiflora, Erigeron heliographis* and *Erysimum capitatum* and magnificent stands of old-growth conifers. Write to: Manuel Pacheco, President of University of Arizona, Tucson, AZ 85721, and Gordon Gee, President of Ohio State University, 190 N. Oval Mall, Columbus, Ohio 43210.

## OTHER

**Tucson's new WASH (Watercourse Amenity, Safety and Habitat) ordinance:** After almost a year of committee work, in which ANPS actively participated, Tucson has a new law requiring developers to use almost any alternative other than concrete in dealing with washes. It also does other good things such as protect vegetation along the banks and require any revegetation to use native plants. If a developer believes he must concrete a wash, a decision is made after a public hearing by the Mayor and Council. If concrete is still the norm in your community, you may profit from finding out about what happened in Tucson from Barbara Tellman.

**New Native Seed/SEARCH project:**Last fall Native Seed/SEARCH (NS/S) began a new conservation project for old stands of fruit and nut-bearing plants. Called the Arizona Heirloom Fruit and Nut Regis-TREE (a pun on "registry"), this project is designed to recognize and honor the useful perennial folk varieties still growing in our state and document these resources so they may receive extra protection, if needed, and to identify them for possible use by researchers, home gardeners and enthusiasts. Fruit and nut trees, berry bushes, and cactus and agave plants which are of an age that makes their use historically significant will be nominated (and later designated into the Regis-TREE). More information and nomination forms can be obtained from Kevin Dahl or Kevin Lopez at NS/S, 2509 N. Campbell Ave. #325, Tucson AZ 85719, phone: 602-327-9123.

# Chapter and Committee News

**FLAGSTAFF CHAPTER:**

News Items: Great News! The Flagstaff Chapter is active once again and holding meetings the third Tuesday of each month at 7:00 p.m. on the N.A.U. campus in Rm. 313 of the Biological Sciences Building. • The Chapter has elected Bob Wilson to serve as Chapter Coordinator and Tina Ayers as Program Chair. The program for the May 21st meeting is a "Free-for-all Slide Show." • May Events: included field trips to **Fossil Springs** and **Sycamore Canyon.** • June Events: June 11th meeting will feature a presentation on "Northern Arizona Threatened and Endangered Plants" by Barb Phillips and Art Phillips. June 8 - field trip to **Lockett Trust/Buffalo Park** led by Barb Phillips; June 23 - field trip to **West Fork of Oak Creek** led by Jean Searle; July 4 - field trip to **Humphrey's Saddle/San Francisco Peaks** led by Art Phillips. • For information on the Flagstaff Chapter contact Bob Wilson at 774-1441 (days) or write to him at P.O. Box 670, Flagstaff, AZ 86002.

**PHOENIX CHAPTER:**

Chapter meetings, held the second Monday of each month at 7:30 in Webster Auditorium at the Desert Botanical Garden, will resume in September. • News Items: In April, "400 Years Under a Lone Palo Verde Tree," Joe McAuliffe's lecture on Desert Ecology, saw a good turnout at the Chapter meeting. • May Events: The last meeting of the season took the form of a most enjoyable spring potluck and hike, held on Sunday, May 11th in **Rackensack Canyon.** This year's **Memorial Day Weekend Extravaganza** was a trip to Sycamore Canyon in southeastern Arizona on May 24th-27th. • For information on the Phoenix Chapter contact Chapter President Kent Newland at 8376 Cave Creek Stage, Cave Creek, AZ 85331; (602) 261-8369(W) or 585-3630(H).

**PRESCOTT CHAPTER:**

For information contact Chapter President Patrick Boles at 372 Dogwood Lane, Prescott, AZ 86301; (602) 778-1128.

**SOUTH CENTRAL CHAPTER:**

Meetings are held on the first Saturday of each month at 9:30 a.m. in the Community Room of the Student Activities Center on the Signal Peak campus of Central Arizona College (CAC) in Casa Grande. • News Items: CAC Science Professor, Bill Kinnison, co-founder and past president of the South-Central Chapter, gave a pruning demonstration for chapter members in mid-March showing how to adapt selected varieties of low-water-use trees for urban landscaping. The trees, which included Argentine and Chilean mesquite (*Prosopis alba & P. chilensis*), blue palo verde (*Cercidium floridum*), ironwood (*Olneya tesota*) and Texas ebony (*Pithecellobium flexicaule*) had been planted from 15 gal. containers last year along the foot of an embankment bordering the western edge of the park. They were intended to screen the enbankment and the open field beyond from the residents of the park. Also included in the plantings were shoestring acacia and desert fern or feather tree (*Lysiloma microphylla*) used to help deliniate the boundaries in the northwest corner. In April the South Central Chapter travelled to Superior to attend the open house at Boyce Thompson Southwest Arboretum; a meeting and picnic were held on the Arboretum grounds. • For information about the South Central Chapter and its events contact Chapter President Velma Adams at 450 Sun West Dr., No. 30, Casa Grande, AZ 85222; (602) 426-9172.

**TUCSON CHAPTER:**

Meetings are held on the second Wednesday of the month at 7:30 p.m. at the Tucson Botanical Gardens, 2150 N. Alvernon Way, Tucson, AZ., unless otherwise noted. • News Items: The National Park Service has asked the Tucson Chapter to participate, along with city and county governments, in a trail implementation project for the City of Tucson and Pima County. The ANPS Tucson Chapter will send a representative to a citizen's committee meeting which has as its goal the implementation of a contiguous network of trails for Tucson and Pima County. In a separate overture the Tucson Chapter has been asked to help interpret language in the "Revegetation Section" of the City of Tucson's Urban Landscape Ordinance by helping define the phrase "significant native vegetation" which appears in the ordinance. Congratulations on both these involvements, Tucson Chapter! • June Events: June 8—**Miller Canyon, Huachuca Mountains** hike led by Tom Woods, Preserve Manager for the Ramsey Canyon/Mile Hi Nature Preserve. • For information on Tucson Chapter meetings and field trips contact chapter president Peter Gierlach at 3505 W. Overton, Tucson, AZ 85741; (602) 791-9309(W) or (602) 744-0434(H). For information on Tucson Chapter hikes contact Andy Laurenzi at 300 E. University #230, Tucson, AZ 85705; (602) 622-3861(W); 623-5733(H).

**YUMA CHAPTER:**

Regular meetings are held the third Monday of each month at 7:30 p.m. at the University of Arizona Agricultural Station in Yuma Valley on 8th St. • News Items: Elections were held this past spring and the following members were elected to office: President, Pat Callahan; Vice President, Don Tuttle; Recording Secretary, Elizabeth Moody; Treasurer, Pauline Smith; and Corresponding Secretary, Ross Rodney. • For more information on Yuma Chapter activities contact Chapter President Pat Callahan, Rt. 1, Box 28M, Somerton, AZ 85350 (602) 627-2773.

**CONSERVATION COMMITTEE:**

Meeting Schedule: Will be announced in the Fall issue. Committee Chairman Gary Maskarinec has resigned due to work demands and President Bill Feldman has appointed Barbara Tellman to succeed Gary as Chairman. Thanks for your work heading the Committee, Gary, and good luck to you, Barbara, in this position! Following is a message from Barbara:

The Conservation Committee welcomes new members. If you are interested in local or statewide conservation issues involving native plants and habitats, please join the Conservation Committee. Our current issues are:

- Native vs. exotic grasses in revegetation projects;
- Adopt-a-Species program to hasten listing of certain plants as "threatened" or "endangered";
- Riparian area protection;
- and other issues you see on "The Conservation Page," (page 14).

We plan to concentrate on a few specific projects and things that are potentially accomplishable. If you have a favorite local or statewide project, please let us know about it. We meet periodically halfway between Phoenix and Tucson at dinner time, but you don't have to make meetings to be a member. We are especially looking for people in the outlying areas who can be alert for problems relating to native plants.

Please contact Barbara Tellman (phone: 602-792-4515) (address: 127 E. Mabel, Tucson 85705 if you have an interest in the Conservation Committee. (See also the "Conservation Page," on page 14.)

**URBAN LANDSCAPE COMMITTEE:**

Contact Chairman Greg McPherson at 527 N. Treat Ave., Tucson AZ 85716; (602) 621-7146(W) for more information on committee activities.

# Arizona Native Plant Society Board of Directors



**Plant Press Newsletter Contributions**

Contributions of articles, artwork, and letters to the editor are gladly received and may be handwritten, typed, or on disk. If on disk, 3½ in. size in WordPerfect® for the PC is preferred; although 5¼ in. disks, Macintosh diskettes, and disks with other software are also useful. Disks and diskettes will be returned.

Please send submissions to:

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**NEXT DEADLINE IS: August 15, 1991**

Please direct all other inquiries regarding the Arizona Native Plant Society to the Secretary at our official address: PO Box 41206 Sun Station, Tucson, AZ 85717



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