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The Plant Press

THE ARIZONA NATIVE PLANT SOCIETY

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RAGGED TOP AND THE IRONWOOD FOREST NATIONAL MONUMENT

JOHN WIENS

I have worked in the botany department,at the Arizona-Sonora Desert Museum since 1985. During that time, I've been involved in many interesting research projects. On my own, I hike in the local desert and note plant distributions. I am amazed at the number of species of plants in the region, and the difference in floras among the various ranges. The Desert Museum has joined with me in sponsoring a flora of the Avra Valley Watershed. This watershed is the back yard of the Desert Museum, and we are anxious to document its flora. We will create a base line list of the plants and their distributions, and hope to be able to study any future changes, including encroachment of exotic plants.

In 1991 I published a flora of the Silverbell Mountains (Wiens, 1991), which lies just south of Ragged Top. My original intent was to continue putting forth species lists of all the local areas, trying to reason as to why certain plants do, or do not, occur on a site. Although my field work has continued, my only other flora published in the Plant Press has been that of Pan Quemado (Wiens, 1996), a group of hills southeast of the Silverbell Mountains. I recently published the vegetation and flora of Ragged Top in Desert Plants (Wiens, 2000).

MORE INSIDE

The road to protection

Ragged Top has dodged the "development bullet" several times in the 14 years I've been going to the area. In 1988, it was proposed for federal wilderness status. The U.S. Geological Survey tested soil, water, and wash sand samples for mineral value. Their findings of traces of gold not only contributed to Congress' decision to reject a Ragged Top wilderness, and led to a flurry of new mining claims in the area. By 1991 a land swap nearby, involving State Trust Land and the local mining company, ASARCO, closed the door on the wilderness issue. 1996 brought the threat of a National Guard aviation training site (which fell through) and a 20 acre open pit mine for landscape granite (currently being reclaimed).

In the late 1990's the Desert Museum conducted a research project to study the desert ironwood (*Olneya tesota)*, its biology, range, habitat, plant and animal associations, human uses, and threats to the species and its habitat (including Ragged Top). Analysis of data from this study showed that exceptionally dense populations of desert ironwood, with the highest numbers of associated plant and animal species, occur at Ragged Top. The results were published as The Ironwood Primer by Pima County (Nabhan et al., 2000).

At the same time, Secretary of the Interior, Bruce Babbitt, came to Arizona seeking recommendations of areas worthy of National Monument status. Pima County government was (and still is) doing a sereis of studies which are the core of The Sonoran Desert Conservation Plan. Pima County saw the possibilities, let Secretary Babbitt know, and called for further input from the community. A wonderful overview of the area,

Cont. on page 6

PRESIDENT'S MESSAGE

Dear Native Plant Enthusiasts -

It is the end of an era for the Arizona Native Plant Society. I am deeply saddened to inform you that Horace Miller passed away a few weeks ago. Everyone who has been a member, for even a short time, is fully aware of the significant contributions Horace has made to the community. Horace was an incredibly thoughtful, intelligent, and warm-hearted human being. He also had a fabulous sense of humor! I can remember so many times over the years that he made me smile with his typed notes and cheerful Christmas cards. After a potluck in 1996, he wrote me a card thanking me for the "gastronomical delights". Prior to surgery earlier this year, Horace informed me that he would be "dancing again soon". I can clearly picture him dancing right now. Horace's positive energy will continue to inspire others into the next era of ANPS.

At the last Board meeting Jeff Kreamer made a wonderful suggestion (which was unanimously approved): to rename our publications grant: The Horace P. Miller Publications Grant. Donations are being accepted by ANPS in honor of Horace for this grant. The Board will seek additional ways to honor Horace. Please send your ideas to me at bkye@desertmuseum.org or call me at The Desert Museum at 8833009.

ANPS is just starting to get its infrastructure in place and the steam generated to chase down some big picture goals for the organization. The Board had a very productive meeting on May 6. Our board is now complete with Ken Morrow as our new Vice President. Gail Virtes is the new State Treasurer. Marilyn Hanson joins us as the Recording Secretary, and Barry McCormick has also been enthusiastically voted onto the Board. We had some easy decisions to make, such as naming our grant after Horace, and we also had some tough decisions to make. For example, due to financial con-siderations and lack of volunteer support, we have decided to cancel the Chiricahua workshop this year.

The Board will focus our small volunteer force on the coordination of a large state meeting next spring. Please bear with us as we temporarily, as my mother says we need to, "pull our shucks in". As our organization gains strength with more volunteer participation, we can look forward to furthering our education and conservation mission in unprecedented ways.

A major step toward achieving a solid infrastructure for ANPS is to hire an Administrative Assistant. This expanded position, recently approved by the Board, will provide the base services to allow for distribution of ANPS posters, book-lets, T-shirts, and other educational materials. In addition, this point person, will facilitate membership and volunteer coordination. Please refer to the position description in this issue for a summary of responsibilities and qualifications. Contact me if you are interested, or know someone who might be able and willing to be essentially a communication hub for ANPS.

Many thanks to Margie Norem for her years of dedicated service distributing the booklets and assisting ANPS in a myriad of other ways. Margie continued to fit ANPS in her increasingly busy schedule over the years. She has very kindly offered to smooth the transition by coaching the Administrative Assistant, who we hope will be joining us soon.

Thank you for your continued support and patience as we look forward to strengthening our contributions to communities throughout Arizona. ANPS has a lot to offer with the combined knowledge of its members. I welcome your ideas to improve our organization. I am just an e-mail, or phone call away (bskye@desertmuseum.org or 8833009). I also welcome you to visit me here at The Desert Museum, which strongly supports my involvement with ANPS.

There is a clear need to educate the public about native plants and the importance in conserving biological diversity. The Arizona Native Plant Society has great potential to take a strong leadership role in this pursuit. We are building the human and financial resources to help preserve the natural history of Arizona. With wise stewardship of native plant resources, we are empowered to protect our signature habitats and the "sense of place" of our beautiful state.

With confidence in great expectations for ANPS, Barb Skye, President

HONORING HORACE

Memorial donations are being accepted in honor of Horace for The Horace P. Miller Publications Grant. Send to the ANPS P.O. Box 41206, Sun Station, Tucson, AZ 85717. Also, anyone wanting to send cards to Horace's brother: William C. Miller (Bill & Sue), 3361 Reliez Highland Rd., Lafayette, CA 94549. If you would like to be notified of a memorial event which will probably happen in mid-summer, send an

OUTSTANDING NATURALISTS VII: HOWARD SCOTT GENTRY

The previous naturalists profiled in this series were all active in the nineteenth century. Howard Scott Gentry was a twentieth century naturalist who shared many characteristics with those earlier pioneer naturalists. Phil Jenkins descrip-tion of Gentry shows the similarity with the nineteenth cen-tury botanist:. "He was the pioneer. He was the first bota-nist in the area he went into. He spent a lot of years doing diffi-cult field work under difficult conditions, getting a-round by burro and by foot...." (*AZ Daily Star* 3 April 1993)

Many readers of this newsletter knew him personally. Most of the information in this article is taken from the 1995 Journal of the Southwest, especially Diana Hadley's article based on a series of oral histories. This full issue was published to accompany the reissue of Gentry's Rio Mayo Plants

Gentry was born in 1903 in a small town in the southern California desert and grew up on a dairy farm in the Im-perial Valley. In the 1920s he and his brother Bruce started college and both continued their education by alternately working a year on the farm and going to school. Gentry graduated from the University of California at Berkeley with a degree in vertebrate zoology at the start of the Great Depression.

While he was at Berkeley he worked at the herbarium and became interested in the Rio Mayo in Sonora, Mexico. When he determined that little was known about the flora and fauna of the area, he was determined to find a way to study there. Because of the shortage of jobs, he solicited orders from herbariums and other collections in order to finance his trip. This was the beginning of a long career of free lance collecting.

The Nogales border crossing was a formidable barrier, but after a week the brothers got permits to take their roadster across the border and they journeyed down the unpaved roads south of the border to the Sierra Madres.

The next trip was financed by people who wanted colle-ctions, and by Gentry and his brother working as produce packers in the Imperial and San Joaquin valleys of Cali-fornia where as efficient workers they earned more than $2 an hour. Gentry's collections were so good that Forrest Shreve offered him an office at the Carnegie Desert Laboratory in Tucson.. He was based there for the next six years while he collected flora, fauna, and fossils (the most lucrative part of his work). In 1941 he started graduate work at the Uni-versity of Michigan. He was still a student whenThe Carnegie Institution published his *Rio Mayo Plants.*

During World War II he went to work for the U.S. Department of Agriculture's emergency rubber project and traveled extensively in Mexico looking for plants that would provide a rubber substitute. For many years after that he worked for USDA on plant introductions, with emphasis on plants with economic value.

He retired from USDA in 1971 and returned to the South-west where he resumed his previous work, specializing in agaves. (See the list below for his publications on agaves). He continued his interest in introducing plants with economic value through his association with the Desert Botanical Garden and the Gentry Experimental Farm where he tested new species.

An article in the *Phoenix Gazette* (May 5 1981) was headlined "Desert Flora Expert Finds Rat Time, Too." Gentry had found a biodegradable rat poison extracted from the root of a Mediterranean plant which he grew at his farm in California. He said that one great advantage of "Red Squill" is that children and other animals vomit it out immediately, while rats do not and thus eventually die.

A trip with Gentry was an adventure, as described by John Hilton in his book (See below). Here is an excerpt.

> "The two weeks passed without our knowing where they had gone. Each day blended into the next. There was something about the place that made one stop and look off over the distant hills, fading away in the haze, and wonder why we waste our time trying to live "civilized" lives in another world."

Gentry's collection of more than 25,000 plant specimens is the heart of the Desert Botanical Garden's herbarium.

Works by and about Howard Scott Gentry

Gentry, H. S. 1972. The agave family in Sonora. U.S. Agricultural Research Service; 195 p. Agriculture Handbook no. 399. Washington.

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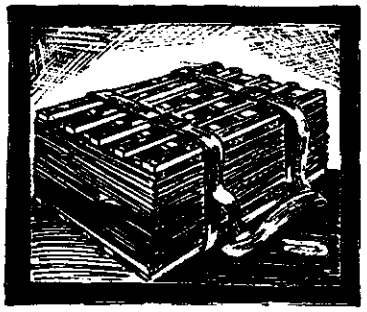
Gentry, H. S. 1942. The Warihio Indians of Sonora-Chihuahua: an ethnographic survey Washington : U.S. G.P.O. p. 61-210, in U.S. Bureau of American Ethnology. Anthropological Papers, nos. 63-67. Bulletin, 186.

Hadley, D. and B. Baylor. 1995.. "Listening to My Mind": Howard Scott Gentry's Recollections of the Rio Mayo. Journal of the Southwest. Summer 179-245

Hilton, J. 1947. With Gentry in Sonora: A Selection from Sonora Sketch Book.



ARIZONA HERBARIA II: THE ARIZONA - SONORA DESERT MUSEUM HERBARIUM

JOHN F. WIENS

Few people know that an herbarium resides at the ArizonaSonora Desert Museum because of its small size and that it is not open to the general public. It is currently under the guidance of botany collections manager Barb Skye and myself, but the work is done by volunteers. The Desert Museum is located in the scenic Tucson Mountains, 12 miles west of Tucson. Our mission is to inspire people to live in harmony with the natural world by fostering love, appreciation, and understanding of the Sonoran Desert. Our botany department provides and maintains hundreds of species of regional plants for garden and habitat exhibits to support that goal.

Our herbarium had its beginnings thirty years ago with a volunteer named Al E. Garwood (Gar to his friends). He came from Ottawa, Canada, where he worked in the herbarium at Queen's University. Upon retirement, he began spending winters in Tucson and volunteering at the Desert Museum. Gar began collecting the local plants of Avra Valley and the Tucson Mountains in 1971 and continued through 1980. Don Ducote, curator of the botany department at the time, set Gar to work creating a herbarium at the Desert Museum. The first herbarium case was full by 1973. Gar especially enjoyed creating herbarium sheets, saying that they should be not just pressed plants, but works of art. Mark Dimmitt came on board as curator in 1979. He added collections from the Sweetwater area of Tucson Mountains, where he lives, and continued encouraging Gar. In the early 1980s a sizable contribution of plants came from Gene Joseph, nursery horticulturist at that time, who with Paul Martin and Chuck Hansen, studied the Sierra de Alamos in southern Sonora. Bob Perrill, assistant curator of botany in the early 1980s, added collections from his work with Jacqui Soule on the Rio Cuchujaqui of the same region. Other early contributing collectors included Muffin Burgess, Tony Burgess, Vicky Phelps, Merriam Fritts, and Mike Mentus.

Gar left the Desert Museum around 1985, but not before spending a season training Mark Goldberg for his position. Mark is an amazing self-taught botanist who started as a docent at the Desert Museum in 1982. In 1983 he began working with Gar, helping with collecting, labeling, and mounting specimens. Mark immersed himself in the job with much enthusiasm. By 1987 he was also volunteering at the University of Arizona's herbarium (ARIZ). He spent a great deal of time collecting specimens from museum grounds and the Tucson area. Meanwhile, specimens continued to come to our herbarium from others. In the mid-80's George Montgomery, our head horticulturist, began adding local grasses to the collection while researching plant needs for the future mountain woodland and grasslands exhibits. My work in the 1990s at Ragged Top, the Picacho Mountains, and other areas around Tucson has also contributed many sheets. With the help of Connie Foster, another Desert Museum docent, Mark was in the process of cataloguing and computerizing the entire collection when vision problems forced him into semi-retirement two years ago.

Our collection gained focus when University of Arizona masters student Renée Rondeau began working on the Tucson Mountain Flora around 1990. She collected specimens for our herbarium, as well as for those of the University of Arizona and Saguaro National Park West. Others who brought us Tucson Mountain plants during that project were Tom Van Devender, Rebecca Wilson, Dave Bertelsen, Philip Jenkins, Paul Martin, and Jeffrey Spaulding. Renée went through our entire collection at that time, annotating and entering into a database the Tucson Mountain specimens. Mark Dimmitt saw our limited herbarium space disappearing quickly, and decided that we needed to direct our space and time more on the local plants. Many of our southern Sonoran specimens were then donated to ARIZ.

Today, ours is an herbarium primarily of Tucson Mountain plants, with current collection efforts being done on the Avra Valley and the watershed to the west. We have begun working on a flora that encompasses those areas. The herbarium is not large enough to be registered in the Index Herbarium at the New York Botanical Garden. However, we unofficially use the acronym ASDM when citing specimens. We have nearly 2,400 specimens of over 2,000 taxa in approximately 100 families. They are organized alphabetically by family, and within those by genus and specific epithet. Housed in the Botany Department building, and not open to the general public, the herbarium is available for use by Desert Museum members and scientists. Please call ahead to arrange for time: 520 8833010 or by Email at botany@desertmuseum.org. Check our web site at www.desertmuseum.org for more information on the ArizonaSonora Desert Museum.

ON THE TRAIL OF THE PALO CHRISTI

GEORGE FRERICH

On a recent the Kingman Area Master Gardeners field trip we came across a plant that most of us did not know. Only one person knew that it was known locally as "palo christi." He did not know what the botanical name was. Upon returning home from the trip I went through my rather extensive collection of books on native plants and could not find Palo Christi.

In 1928 when the Kingman Grammar School was built, it was decided to start naming schools after plants from the area. This was the first school to be so named and it was named Palo Christi. When the next one was built, it was named Manzanita (*Arctostaphylos*). The third school was supposed to be named Agave, but there was so much objection to this name that it was finally named Hualapai. That was the end of plant names for schools.

In attempting to find out the botanical name of the plant, I contacted Sharon Hackley, a former teacher at Palo Christi School, who has a vast knowledge of native plants and she told me that the botanical name of Palo Christi was *Canotia holacantha*. I asked her if she knew of any reference where this could be verified. She said that she knew of none. Again I started going through books and found *Canotia holacantha* in only one recent book, Plants of Arizona by Anne Orth Epple published in 1995. She uses canotia as the common name. It is interesting to note that when Epple came to Arizona around 15 years ago she looked for a comprehensive book on Arizona plants and when she could not find one, she wrote one. I had to go back to 1960 to find another reference to Canotia. This was Arizona Flora by Kearney & Peebles, first published by The University of California in 1951 and again in 1960 with a supplement. The same authors wrote Flowering Plants and Ferns of Arizona, published in 1942 by the U.S. Department of Agriculture. Another book that had something on the *Canotia holocantha* was A Manual of Southwestern Desert Trees and Shrubs by Lyman Benson published by the University of Arizona in 1944. In this book there is a map that shows where the Canotia grows. If you draw a straight line from Kingman to Safford, most canotia grows on both sides of this line, but does not grow all the way down to Safford. It is very prevalent around and to the south of Kingman. In Flowering Plants and Ferns of Arizona there is a photo of one growing in the Harcuvar Mountains of La Paz County. It also grows in Northern Sonora.

Although canotia is an Arizona native it is not protected by the Arizona Native Plant law, because, according to the Arizona Department of Agriculture, "This plant is abundant and its survival is not threatened by human activities; thus is was not chosen as a species in need of protection."

Rob Grumbles of The University of Arizona, Mohave County Cooperative Extension has believed for years that the palo christi and canotia are the same plant but like Sharon Hackley, teacher from Palo Christi School, knows of no reference where this can be verified. The photos, descriptions and keys all indicate that this is the same plant. Although Flowering Plants and Ferns of Arizona states that locally, the Canotia is sometimes improperly referred to as "Paloverde" and a common name of "Corona-de Christo" is sometimes used locally. Nowhere in any of these references is Palo Christi mentioned.

Southwestern Desert Trees and Shrubs states that *Canotia holacantha* is the most abundant of the three crucifixion thorns in the Southwestern deserts. The other two being *Koeberlinia Spinosa* and *Koeberlinia spinosa*, var. *tenuispina*. Crucifixion, Christi, these two go together, but where does Palo come in? Palo means stick. Is the name Palo Christi endemic to the Kingman area or is it used in other areas of Arizona? Was it a common name that dropped out of usage in other areas and remained in the Kingman area only because of the school? It would be appreciated if anybody can offer information to clear this up.

If you have information contact The University of Arizona Mohave County Cooperative Extension office at 101 E. Beale Street, Suite A, Kingman AZ 864015827 or telephone (520) 7533788.

George Frierich is a Master Gardener in the Kingman area and a member of the Arizona Native Plant Society.

Ragged Top cont. from page 1 Sonoran Desert Conservation Plan: Resources of the Avra Valley Subarea, was produced and sent to Washington (Huckleberry, et al, 2000). And so The Ironwood Forest National Monument became a reality on June 9, 2000, as President Clinton signed the proclamation protecting 129,000 acres (52,225 ha) of BLM land. The Monument, stretches from the Sawtooth Mountains of Pinal County southeast to the Roskruge Mountains. It includes Ragged Top, the Samaniego Hills, the Silverbell Mountains, the Waterman Mountains, and Pan Quemado. Although our former president's declaration will likely stand, the current administration and partisan politics threaten to withhold funding and reduce the size.

The land and climate

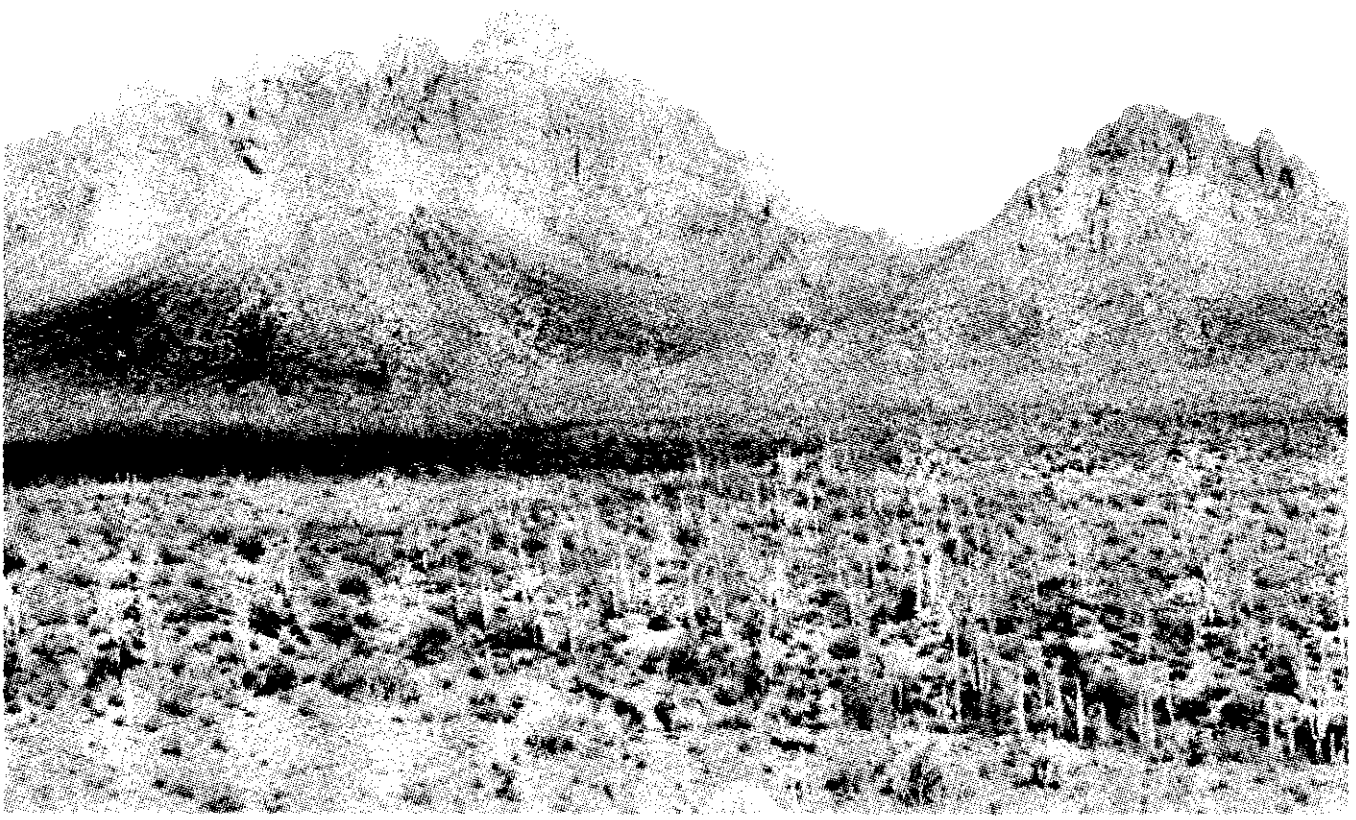
The area of my study site is 6300 acres (2550 ha). Ragged Top, from about 2500 feet (760 m) elevation to the summit, of the volcanic rock, rhyolite. The alluvium of the southern bajadas is rhyolite and andesite (a grainier-textured volcanic). To the north-east is a line of quartzite hills, and a bajada surface of decomposing granite. The upper reaches of Ragged Top are a series of pinnacles and domes dissected by narrow, usually unbranched canyons. Rainfall records from the townsite of Silverbell 4 miles (6.5 km south) is 12.28" (312 mm) per year. Light frosts are probably yearly events, but heavy freezes do not appear to be common.

Plant/animal relationships.

Desert bighorn sheep are commonly seen on Ragged Top, and they are probably the natural population nearest to Tucson. According to the BLM the herd numbers around 100 animals. Arizona rosewood (*Vauquelinia californica*) and jojoba (*Simmondsia chinensis*) often show signs of their browsing. Anna's and Costa's hummingbirds are usually common and feed on the seasonal blooms of ocotillo (*Fouquieria splendens*), desert honeysuckle (*Anisacanthus thurberi*), chuparosa (*Justicia californica*), betony (*Stachys coccinea*), scarlet morning glory (*Ipomoea cristulata*), fairy duster (*Calliandra eriophylla*), Parry penstemon (*Penstemon parryi*), and others. The most striking reptile I've seen here is the Arizona chuckwalla. Chunky specimens a foot and a half long can sometimes be seen on rocky crags munching on their favorite plant, brittlebush (*Encelia farinosa*).

The vegetation.

Ragged Top has yielded 398 taxa, represented by 66 families. Two species I found here deserve special recognition due to their being distant outliers of their natural populations. One, a grass called false grama (*Bouteloua diversi-spicula*), is listed in books as a questionable species for Arizona. Under its old scientific name of *Cathestecum erectum,* a name now restricted to the populations in northeastern Mexico and adjacent Texas, it had one dubious collection by Edward Palmer



Ragged Top. Photo: John Weins

the populations in northeastern Mexico and adjacent Texas, it had one dubious collection by Edward Palmer in 1869 listed simply as "southern Arizona" (Kearney & Peebles, 1951). Otherwise, one has to go 140 miles (225 km) south, into Sonora, to find the species. Its discovery here is the first pinpointed collection from Arizona (and the United States). At Ragged Top it grows only on the south-facing slopes of the larger quartzite hills on the east side. The other disjunct species found on Ragged Top is the sprawling woody shrub, or liana, vainoro (*Pisonia capitata*) in the family Nyctaginaceae. It is a subtropical species common in riparian canyons in tropical deciduous forests of the Sierra Madre Occidental. It can be found in one nearly inaccessible, deep cleft in a south facing cliff of Ragged Top at 3200 feet (975 m). It is likely here at Ragged Top as the result of long-distance transport of its glandular fruit by birds, rather than being a remnant of a larger former population. The discovery of this species is the first record for the United States, and is a northerly range extension of 286 miles (460 km) northwest from Soyopa on the Rio Yaqui, Sonora (Wiens, 1990).

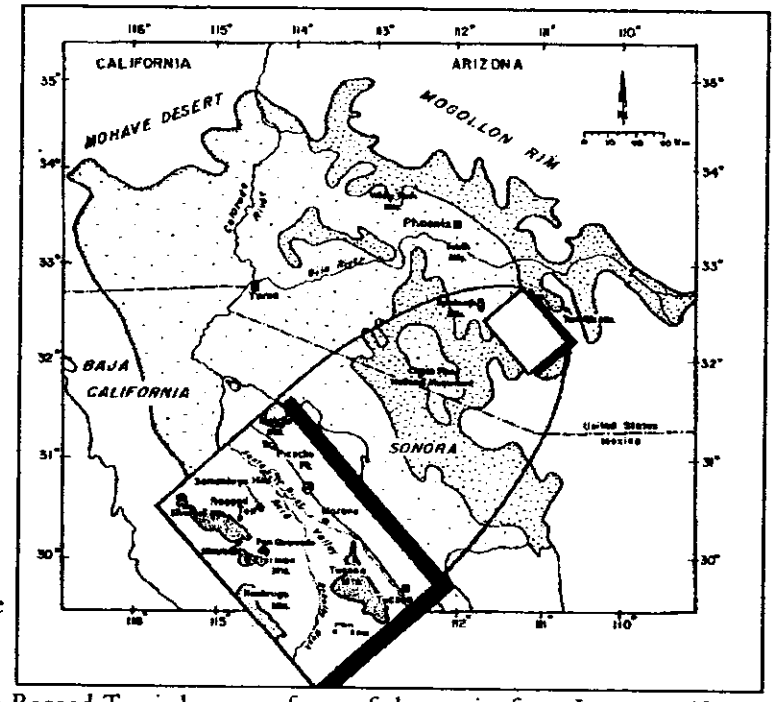
With a few exceptions, exotic (non-native) plants are not plentiful on Ragged Top and make up only 6.8% (27 taxa) of the total flora. Thankfully, at this writing, fountain grass (*Pennisetum setaceum*) has not appeared at Ragged Top. Un-til 1999 Buffelgrass (*Pennisetum ciliare*) had not been seen at Ragged Top. Last year I found several clumps, which have since been removed. Only three exotic species, red brome (*Bromus rubens*), filaree (*Erodium cicutarium*), and Mediterranean grass (*Schismus barbatus*), all spring ephemerals, can be termed widespread and abundant at Ragged Top.

The vegetation type at the study site is a desertscrub typical of the Arizona Upland subdivision of the Sonoran Desert. Bajadas are dominated by whitethorn acacia (*Acacia constricta*), triangleleaf bursage (*Ambrosia deltoidea*), and foothill palo verde (*Cercidium microphyllum*). Other locally common perennials are saguaro (*Carnegiea gigantea*), ocotillo, creosote bush (*Larrea divaricata*), wolfberry (*Lycium berlandieri*), white ratany (*Krameria grayi*), desert ironwood, jojoba, and a variety of chollas and prickly pears. Microhabitats worth mentioning are as follows.

Above the bajadas on southerly exposures are steep, loose, rocky slopes dominated by triangleleaf bursage, brittlebush, teddybear cholla (*Opuntia bigelovii*), and jojoba. Drain-ages and canyons on these slopes are habitat for foothill palo verde, canyon rag-weed (*Ambrosia ambrosioides*), and chupa-rosa. In moister microhabitats at the bases of the south-facing cliffs can be found dense bands of catclaw acacia (*Acacia greggii*), desert hackberry (*Celtis pallida*), and wolf-berry.

The north-facing slopes and canyons of Ragged Top provide cooler, moister habitats. In the shade of cliffs 100 feet (30 m) or more grow perennials such as pachaba (*Brickellia californica*), canyon hackberry, beaded lipfern (*Cheilanthes wootoni*), desert olive (*Forestiera shrevei*), pancake prickly pear (*Opuntia chlorotica*), Arizona yucca (*Yucca arizonica*), Arizona rosewood, and occasional shrub live oaks (*Quercus turbinella*). The dominants in the canyons are catclaw acacia, desert honeysuckle, desert hackberry, desert olive, wolfberry, and Arizona rosewood. Further down on these slopes grow triangleleaf bursage, flat-topped buckwheat (*Eriogonum fasciculatum*), desert vine (*Janusia gracilis*), and a carpet of desert spike moss (*Selaginella arizonica*).

Washes flow only after heavy rains, which, however, have quite an impact on the species diversity and density along them. Several plants species, among them whitethorn and catclaw acacias, canyon ragweed, foothill and blue palo verdes, wolfberry, desert ironwood, and velvet mesquite (*Prosopis velutina*), dominate washes. Texas virgin bower (*Clematis drummondii*), coyote melon (*Cucurbita digitata*), and sacatón and dropseed grasses (*Sporobolus* spp.) were not found away from these sites.



Access to Ragged Top is by way of any of these exits from Interstate 10: Red Rock - head west on Red Rock Road (Sasco Rd) for around 10 miles (16 km). Marana - head west on Trico-Marana Road. The road crosses Trico Road after around 8 miles (13 km). Continue west .6 mile (1 km) and turn right on Silver-bell Road. Avra Valley Road - head west for 10 miles (16 km). Turn right on Trico Road and drive 4 miles (64

Cont. on page 12

VASCULAR PLANTS OF RAGGED TOP
COMPILED BY JOHN F. WIENS FROM 1987-2000

PLANT LIST KEY

Abundance: 15 = rarely seen to quite common Form: Tree = single or multiple trunked tree; Wdsh = woody shrub; Sbsh = subshrub (non-woody or suffrutescent 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.
* = exotic species. Nomenclature is from Lehr, 1978. Exceptions show Lehr in parenthesis.

FERNS

Pteridaceae (Polypodiaceae, in part)

3	*Astrolepis cochisensis* (*Notholaena c.*)	Phrb	Cochise cloakfern, helechillo
2	*Astrolepis sinuata* (Notholaena s)	Phrb	Wavy cloakfern, helecho.
2	*Cheilanthes lindheimeri*	Phrb	Lindheimer's lipfern, hierba de la peña
2	*Cheilanthes wootonii*	Phrb	Beaded lipfern
1	*Cheilanthes wrightii*	Phrb	Wright's lipfern
3	*Notholaena standleyi*	Phrb	Standley cloakfern
3	*Pellaea truncata*	Phrb	Cliff brake
2	*Pentagramma triangularis* (*Pityrogramma t*)	Phrb	Goldback fern

FERN ALLIES

Selaginellaceae Resurrection Plant Family

3	*Selaginella arizonica*	Phrb	Desert spike moss.

GYMNOSPERMS

Ephedraceae Jointfir Family

1	*Ephedra trifurca*	Wdsh	Long leaf jointfir, canutillo

ANGIOSPERMS (FLOWERING PLANTS)

DICOTYLEDONS

Acanthaceae Acanthus Family

3	*Anisacanthus thurberi*	Wdsh	Desert honeysuckle, colegayo
3	*Carlowrightia arizonica*	Sbsh	Rama de toro
2	*Justicia californica*	Wdsh	Honeysuckle, chuparrosa.
2	*Justicia longii* (*Siphonoglossa longiflora*)	Sbsh	White needle flower

Amaranthaceae Amaranth Family

2	*Amaranthus albus*	Ahrb	Tumble pigweed
4	*Amaranthus fimbriatus*	Ahrb	Fringed pigweed, quelite
3	*Amaranthus palmeri*	Ahrb	Carelessweed, bledo
2	*Amaranthus tucsonensis*	Ahrb	Tucson pigweed
3	*Tidestromia lanuginosa*	Ahrb	Woolly tidestrom espanta vaqueras

Apiaceae (Umbelliferae) Carrot Family

4	*Bowlesia incana*	Ahrb	Hairy bowlesia
5	*Daucus pusillus*	Ahrb	Wild carrot
2	*Spermolepis echinata*	Ahrb	Scaleseed
3	*Yabea microcarpa* (*Caucalis m*)	Ahrb	Wild parsley

Apocynaceae Dogbane Family

2	*Haplophyton cimicidum* v. *crooksii* (*H. crooksii*)	Sbsh	Cockroach plant, hierba de la cucuracha

Aristolochiaceae Birthwort Family

2	*Aristolochia watsonii*	Pvin	Pipe vine, hierba del Indio

Asclepiadaceae Milkweed Family

2	*Asclepias linaria*	Sbsh	Pine needle milkweed, hierba de cuervo
1	*Asclepias nyctaginifolia*	Phrb	Four o'clock milkweed, hierba lechosa
3	*Cynanchum arizonicum*	Pvin	Milkweed vine
2	*Matelea arizonica*	Pvin	Milkweed vine
2	*Matelea parvifolia*	Pvin	Anglepod
3	*Sarcostemma cynanchoides* ssp. *hartwegii*	Pvin	Climbing milkweed, guirote lechosa

Asteraceae (Compositae) Sunflower Family

1	*Acourtia nana*	Phrb	Desert holly
3	*Acourtia wrightii*	Phrb	Brownfoot
2	*Adenophylla porophylloides* (*Dyssodia p*)	Phrb	San Felipe fetid marigold
4	*Ambrosia ambrosioides*	Wdsh	Canyon ragweed, chicura
3	*Ambrosia confertiflora*	Phrb	Slimleaf bursage, estafiate
5	*Ambrosia deltoidea*	Wdsh	Triangleleaf bursage, chicurilla
2	*Ambrosia dumosa*	Wdsh	White bursage, chicurilla
1	*Baccharis sarothroides*	Wdsh	Desert broom, hierba de pasmo
2	*Baileya multiradiata*	Phrb	Desert marigold, hierba amarilla
3	*Bebbia juncea* v. *aspera*	Sbsh	Sweetbush, junco
2	*Brickellia baccharidea*	Wdsh	Brickellbush
2	*Brickellia californica*	Wdsh	Pachaba
4	*Brickellia coulteri*	Sbsh	Brickellbush
1	*Calycoseris wrightii*	Ahrb	White tackstem
2	*Chaenactis carphoclinia*	Ahrb	Pincushion flower
3	*Chaenactis stevioides*	Ahrb	Pincushion flower
3	*Encelia farinosa*	Wdsh	Brittlebush, incienso
2	*Ericameria cuneata* v. *spathulata*	Sbsh	Desert rock goldenbush
3	*Ericameria laricifolia*	Wdsh	Turpentine bush
3	*Erigeron divergens*	Phrb	Spreading fleabane
2	*Erigeron lobatus*	Phrb	Fleabane
4	*Eriophyllum lanosum*	Ahrb	Woolly daisy
2	*Eupatorium solidaginifolium*	Sbsh	Boneset
5	*Filago arizonica*	Ahrb	Arizona filago
4	*Filago californica*	Ahrb	California filago
2	*Filago depressa*	Ahrb	Dwarf filago
2	*Gnaphalium wrightii*	Phrb	Cudweed, gordolobo
3	*Gymnosperma glutinosum*	Sbsh	Tatalencho
1	*Helianthus petiolaris* ssp. *fallax*	Ahrb	Wild sunflower, girasol
1	*Heterotheca subaxillaris* (*H. psammophila*)	Ahrb	Camphor weed, gordolobo
2	*Hymenoclea salsola*	Wdsh	Cheesebush, romerillo
1	*Hymenothrix wislizenii*	Phrb	Golden ragweed
3	*Isocoma tenuisecta*	Sbsh	Burroweed, hierba del burro
2	**Lactuca serriola*	Ahrb	Prickly lettuce
2	*Machaeranthera pinnatifida* ssp. *pinnatifida*	Sbsh	Spiny haplopappus
1	*Malacothrix californica* v. *glabrata*	Ahrb	Desert dandelion
2	*Malacothrix clevelandii*	Ahrb	Cleveland yellow saucers
1	*Matricaria discoidea* (*M. matricarioides*)	Ahrb	Pineapple weed
5	*Monoptilon bellioides*	Ahrb	Mohave desert star
2	*Pectis cylindrica*	Ahrb	Summer mat
2	*Pectis papposa*	Ahrb	Chinchweed, limoncillo
2	*Perityle emoryi*	Ahrb	Emory rock daisy
3	*Porophyllum gracile*	Phrb	Odora, hierba de venado
3	*Psilostrophe cooperi*	Sbsh	Paper flower
2	*Rafinesquia californica*	Ahrb	California chicory
3	*Rafinesquia neomexicana*	Ahrb	Desert chicory
1	*Senecio flaccidus* (*S. monoensis*/*S. douglasii* v. *douglasii*)	Ahrb	Threadleaf groundsel
2	*Senecio lemmonii*	Ahrb	Groundsel
1	**Silybum marianum*	Ahrb	Milk thistle
1	**Sonchus asper*	Phrb	Spiny sowthistle, cerraja
2	**Sonchus oleraceus*	Ahrb	Annual sowthistle, achicoria dulce
3	*Stephanomeria pauciflora*	Phrb	Desert straw
2	*Stylocline gnaphalioides*	Ahrb	Everlasting neststraw

3	*Stylocline micropoides*	Ahrb	Desert neststraw
1	*Thymophylla pentachaeta* (*Dyssodia* p)	Phrb	Dogweed, parvialena
4	*Trixis californica*	Sbsh	Trixis, hierba de pasmo
3	*Uropappus lindleyi* (*Microseris linearifolia*)	Ahrb	Silver puffs
1	*Viguiera deltoidea* v. *parishii*	Sbsh	Golden eye
3	*Zinnia acerosa*	Sbsh	Desert zinnia

Boraginaceae Borage Family

4	*Amsinckia intermedia*	Ahrb	Coast fiddleneck
3	*Amsinckia tessellata*	Ahrb	Checker fiddleneck
2	*Cryptantha angustifolia*	Ahrb	Narrowleaf nievitas
4	*Cryptantha barbigera*	Ahrb	Bearded nievitas, peluda
2	*Cryptantha decipiens*	Ahrb	Gravel cryptantha, peluda
4	*Cryptantha nevadensis*	Ahrb	Nevada cryptantha, peluda.
4	*Cryptantha pterocarya*	Ahrb	Wingnut nievitas, peluda
2	*Harpagonella palmeri* v. *arizonica*	Ahrb	Grappling hook
3	*Lappula redowskii* v. *desertorum*	Ahrb	Stickseed
2	*Pectocarya heterocarpa*	Ahrb	Hairyleaf combbur
3	*Pectocarya platycarpa*	Ahrb	Broadnut combbur
4	*Pectocarya recurvata*	Ahrb	Arcnut combbur
2	*Plagiobothrys arizonicus*	Ahrb	Bloodweed
2	*Tiquilia canescens* v. *canescens*	Sbsh	Shrubby coldenia, hierba de la virgin

Brassicaceae (Cruciferae) Mustard Family

2	*Arabis perennans*	Phrb	Rock cress
1	**Brassica tourneforlii*	Ahrb	Sahara mustard
1	**Capsella bursa pastoris*	Ahrb	Shepard's purse, bolsa de pastor
4	*Caulanthus lasiophyllus* (*Thelypodium* l.)	Ahrb	California mustard
4	*Descurainia pinnata*	Ahrb	Tansy mustard, pamita
3	*Draba cuneifolia*	Ahrb	Whitlow grass, gasa
4	*Lepidium lasiocarpum* v. *wrightii*	Alrb	Sand peppergrass, lentejilla
3	*Lesquerella gordoni*	Ahrb	Yellow bladderpod
1	*Lesquerella purpurea*	Ahrb	White bladderpod
2	**Sisymbrium irio*	Ahrb	London rocket, pamitón
2	*Streptanthus carinatus*	Ahrb	Silver bells
3	*Thysanocarpus curvipes*	Ahrb	Lacepod

Cactaceae Cactus Family

4	*Carnegiea gigantea* (*Cereus giganteus*)	Succ	Saguaro, sahuaro
2	*Echinocereus engelmannii* v. *acicularis*	Succ	Strawberry hedgehog cactus
2	*Echinocereus fendleri* v. *robustus* (*E. fasciculatus*)	Succ	Robust hedgehog cactus
3	*Echinocereus nicholii* (*E. engelmannii* v. *nicholii*)	Succ	Golden hedgehog
2	*Ferocactus wislizenii*	Succ	Fishhook barrel, bisnaga
1	*Ferocactus wislizenii* ¥ *F. cylindraceus*	Succ	Barrel cactus
3	*Mammillaria grahamii* (*M. microcarpa*)	Succ	Fishhook pincushion, biznaguita
5	*Opuntia acanthocarpa*	Succ	Buckhorn cholla
3	*Opuntia bigelovii*	Succ	Teddybear cholla, cholla guera
2	*Opuntia chlorotica*	Succ	Pancake prickly pear, nopal
3	*Opuntia engelmannii* (*O. phaeacantha* v. *discata*)	Succ	Engelmann's prickly pear, nopal
3	*Opuntia fulgida* v. *fulgida*	Succ	Chainfruit cholla, choya
3	*Opuntia leptocaulis*	Succ	Desert Christmas cholla
1	*Opuntia leptocaulis* ¥ *O. fulgida*	Succ	Hybrid cholla
2	*Opuntia macrocentra* (*O. violacea* v. *macrocentra*)	Succ	Longspine prickly pear, nopal
1	**Opuntia microdasys*	Succ	Bunny ears, nopal cegador
2	*Opuntia phaeacantha* v. *major*	Succ	Sprawling prickly pear, nopal
1	**Opuntia santa-rita* (*O. violacea* v. *santa-rita*)	Succ	Santa Rita prickly pear, nopal morado
2	*Opuntia spinosior* ¥ *O. versicolor*	Succ	Hybrid cholla

Campanulaceae Bellflower Family

4	*Nemacladus glanduliferus* v. *orientalis*	Ahrb	Thread plant.

Cannabidaceae Hemp Family

1	**Cannabis sativa*	Ahrb	Marijuana, mota

Caryophyllaceae Pink Family

2	*Cerastium texanum*	Ahrb	Mouse-ear chickweed
2	**Herniaria hirsuta* ssp. *cinerea* (*H. cinerea*)	Ahrb	Burstwort
2	*Loeflingia squarrosa*	Ahrb	
4	*Silene antirrhina*	Ahrb	Desert sleepy catchfly

Chenopodiaceae Goosefoot Family

2	*Atriplex canescens* ssp. *canescens*	Wdsh	Fourwing saltbush, chamiso
1	*Atriplex canescens* ssp. *linearis*	Wdsh	Narrow-leaf wingscale, chamizo
2	*Chenopodium neomexicanum*	Phrb	Fishy goosefoot, choal
3	*Monolepis nuttalliana*	Ahrb	Poverty weed
2	**Salsola tragus* (*S. iberica*)	Ahrb	Russian thistle, chamiso volador.

Convolvulaceae Morning Glory Family

2	*Evolvulus alsinoides*	Phrb	Arizona blue eyes, dío de vibora
2	*Ipomoea cristulata* (*I. coccinea*, in part)	Ahrb	Scarlet morning glory
2	*Ipomoea hederacea*	Ahrb	Ivyleaf morning glory, trompillo morado

Crassulaceae Stonecrop Family

3	*Crassula connata* (*Tillaea erecta*)	Ahrb	Pygmy-weed

Crossosomataceae Crossosoma Family

3	*Crossosoma bigelovii*	Wdsh	Rhyolite bush

Cucurbitaceae Gourd Family

1	*Cucurbita digitata*	Pvin	Coyote melon
2	*Echinopepon wrightii*	Avin	Wild balsam apple
1	*Tumamoca macdougalii*	Pvin	Tumamoc globeberry

Euphorbiaceae Spurge Family

2	*Bernardia incana*	Wdsh	Mouse-eye
2	*Croton sonorae*	Wdsh	Vara prieta
3	*Ditaxis lanceolata* (*Argythamnia* L.)	Sbsh	Lanceleaf ditaxis
2	*Ditaxis neomexicana* (*Argythamnia n*)	Phrb	Ditaxis
2	*Euphorbia abramsiana*	Ahrb	Spurge, golondrina
4	*Euphorbia arizonica*	Phrb	Spurge
3	*Euphorbia capitellata*	Phrb	Spurge, golondrina
2	*Euphorbia eriantha*	Sbsh	Desert poinsettia
3	*Euphorbia florida*	Ahrb	Spurge
2	*Euphorbia gracillima*	Ahrb	
2	*Euphorbia heterophylla*	Alrb	Painted spurge, picachalih
2	*Euphorbia hyssopifolia*	Ahrb	Hyssop spurge
3	*Euphorbia melanadenia*	Phrb	Spurge
2	*Euphorbia micromera*	Ahrb	Sonoran sandmat
3	*Euphorbia pediculifera*	Phrb	Spurge
3	*Euphorbia polycarpa*	Phrb	Smallseed sandmat
4	*Euphorbia setiloba*	Ahrb	Bristlelobe sandmat
3	*Jatropha cardiophylla*	Sbsh	Limber bush, sangregrado
2	*Tragia nepetaefolia*	Pvin	Noseburn, ortiguilla

Fabaceae (Leguminosae) Pea Family

3	*Acacia constricta*	Wdsh	Whitethorn acacia, garabato
3	*Acacia greggii* v. *arizonica*	Wdsh	Catclaw acacia, uña de gato
4	*Astragalus didymocarpus* v. *dispermus*	Ahrb	Dwarf locoweed, hierba loca
2	*Astragalus lentiginosus* v. *yuccanus*	Phrb	Mottled locoweed, hierba loca
3	*Astragalus nuttallianus* v. *micranthiformis*	Ahrb	Nuttall locoweed
3	*Calliandra eriophylla*	Sbsh	Fairy duster, guajillo

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2	*Cercidium floridum*	Tree	Blue palo verde
5	*Cercidium microphyllum*	Tree	Foothills palo verde
2	*Coursetia glandulosa* (*C. microphylla*)	Wdsh	Lac bush, samo prieto
2	*Desmodium procumbens* v. *exiguum*	Ahrb	Tick clover
2	*Galactia wrightii*	Pvin	Cliff bean
1	*Hoffmannseggia glauca*	Phrb	Hog potato
4	*Lotus humistratus*	Ahrb	Hill locust
4	*Lotus salsuginosus* v. *brevivexillus*	Ahrb	Deer vetch
4	*Lotus strigosus* v. *tomentellus* (*L. tometellus*)	Ahrb	Hairy lotus
4	*Lupinus sparsiflorus*	Ahrb	Arizona lupine
3	*Marina parryi* (*Dalea p.*)	Phrb	Parry dalea
4	*Olneya tesota*	Tree	Desert ironwood, palo fierro
2	*Phaseolus acutifolius* v. *latifolius*	Ahrb	Wild tepary bean, frijol
3	*Phaseolus filiformis* (*P. wrightii*)	Phrb	Desert bean
2	*Prosopis velutina*	Tree	Velvet mesquite, mezquite
2	*Senna covesii* (*Cassia c.*)	Sbsh	Desert senna
2	*Vicia ludoviciana*	Avin	Vetch

Fagaceae Beech Family

1	*Quercus turbinella* v. *turbinella*	Tree	Shrub live oak

Fouquieriaceae Ocotillo Family

3	*Fouquieria splendens*	Wdsh	Coach whip, ocotillo

Fumariaceae Fumitory Family

1	**Fumaria parviflora*	Ahrb	Fumatory

Geraniaceae Geranium Family

5	**Erodium cicutarium*	Ahrb	Filaree, alfilerilla
3	*Erodium texanum*	Ahrb	Largeflower stork' s bill, alfilerilla

Hydrophyllaceae Waterleaf family

3	*Eucrypta chrysanthemifolia* v. *bipinnatifida*	Ahrb	Torrey eucrypta
3	*Eucrypta micrantha*	Ahrb	Smallflower eucrypta
1	*Nama hispidum*	Ahrb	Sand bells
2	*Phacelia affinis*	Ahrb	Purple bell
2	*Phacelia coerulea*	Ahrb	Caterpillar weed
3	*Phacelia crenulata*	Ahrb	Caterpillar weed
1	*Phacelia cryptantha*	Ahrb	Smallflower phacelia
4	*Phacelia distans* v. *australis*	Ahrb	Wild heliotrope
3	*Pholistoma auritum* v. *arizonicum*	Ahrb	Sticky waterleaf

Krameriaceae Ratany Family

2	*Krameria erecta* (*K. parvifolia*)	Wdsh	Range ratany, coashui
3	*Krameria grayi*	Wdsh	White ratany

Lamiaceae (Labiatae) Mint Family

1	*Hedeoma nanum* ssp. *macrocalyx*	Phrb	Mock pennyroyal, oregano
3	*Hyptis emoryi*	Wdsh	Desert lavender, salvia
2	*Monardella arizonica*	Sbsh	Bee balm
3	*Salvia columbariae*	Ahrb	Chia
2	*Stachys coccinea*	Phrb	Texas betony

Linaceae Flax Family

1	*Linum lewisii*	Ahrb	Blue flax

Loasaceae Stickleaf Family

2	*Mentzelia affinis*	Ahrb	Stickleaf.
2	*Mentzelia involucrata*	Ahrb	Sand blazingstar

Malpighiaceae Malpighia Family

4	*Janusia gracilis*	Pvin	Desert vine

Malvaceae Mallow Family

2	*Abutilon abutiloides* (*A. californicum*, misapplied)	Sbsh	Indian mallow malva pintapán
4	*Abutilon incanum*	Sbsh	Indian mallow, pelotazo chico
2	*Abutilon malacum*	Sbsh	Indian mallow
1	*Abutilon mollicomum* (*A. sonorae*)	Sbsh	Pintapán cimarrón
1	*Abutilon parishii*	Phrb	Pima Indian mallow
1	*Abutilon parvulum*	Phrb	Small leaf Indian mallow
4	*Herissantia crispa*	Phrb	False Indian mallow
2	*Hibiscus biseptus*	Phrb	Sonoran rose mallow, malvita
3	*Hibiscus coulteri*	Sbsh	Desert rosemallow
2	*Hibiscus denudatus*	Sbsh	Rock hibiscus
2	*Horsfordia newberryi*	Wdsh	Yellow felt plant
1	**Malva parviflora*	Ahrb	Cheeseweed, malva
2	*Malvastrum bicuspidatum*	Sbsh	Malva peluda
1	*Sida abutifolia* (*S. filicaulis*)	Phrb	Spreading sida
3	*Sphaeralcea ambigua*	Sbsh	Desert globe mallow, mal de ojo
2	*Sphaeralcea ambigua* ?x *S. emoryi*	Sbsh	Globe mallow
1	*Sphaeralcea coulteri*	Ahrb	Coulter globe mallow, mal de ojo
1	*Sphaeralcea hastulata* (*S. subhastata*)	Phrb	Wrinkled globe mallow, mal de ojo
2	*Sphaeralcea laxa*	Phrb	Caliche globe mallow, mal de ojo

Molluginaceae (Aizoaceae, in part) Mollugo Family

*1	*Mollugo verticillata*	Ahrb	Indian chickweed, espuelita

Nyctaginaceae Four O'clock Family

2	*Allionia incarnata* v. *incarnata*	Phrb	Trailing four o'clock, guapile
3	*Allionia incarnata* v. *villosa*	Phrb	Trailing four o'clock, guapile
2	*Boerhavia coulteri*	Ahrb	Coulter spiderling, mochi
2	*Boerhavia diffusa* (*B. coccinea*)	Phrb	Red spiderling, mochi
3	*Boerhavia erecta*	Ahrb	Five winged ringstem, mochi
3	*Boerhavia intermedia*	Ahrb	Five winged ringstem, mochi
2	*Boerhavia spicata*	Ahrb	Creeping stickstem, mochi
2	*Boerhavia wrightii*	Ahrb	Spiderling
3	*Commicarpus scandens*	Sbsh	Bush spiderling, miona
3	*Mirabilis bigelovii*	Phrb	Desert wishbone bush
1	*Pisonia capitata*	Wdsh	Vainoro

Oleaceae Olive Family

2	*Forestiera shrevei*	Wdsh	Desert olive, palo de tucublate
2	*Menodora scabra*	Sbsh	Twinfruit

Onagraceae Evening Primrose Family

3	*Camissonia californica* (*Oenothera leptocarpa*)	Ahrb	Mustard evening primrose
4	*Camissonia chamaenerioides*	Ahrb	Willow-herb primrose
1	*Camissonia clavaeformi* ssp. *aurantiaca*	Ahrb	Brown-eyed primrose
2	*Oenothera primiveris*	Ahrb	Bottle evening primrose

Orobanchaceae Broomrape Family

1	*Orobanche ludoviciana* v. *cooperi* (*O. cooperi*)	Phrb	Broom rape

Papaveraceae Poppy Family

1	*Argemone ochroleuca* ssp. *ochroleuca* (*A. mexicana*)	Ahrb	Prickly poppy, cardo
3	*Eschscholtzia mexicana*	Ahrb	Mexican gold poppy, amapola amarilla

Pedaliaceae (Martyniaceae) Unicorn Plant Family

1	*Proboscidea altheaeifolia*	Phrb	Desert unicorn plant, cuernitos
1	*Proboscidea parviflora*	Ahrb	Devil' s claw, cuernitos

Plantaginaceae Plantain Family

5	*Plantago fastigiata* (*P. insularis*)	Ahrb	Indian wheat
4	*Plantago patagonica* (*P. purshii*)	Ahrb	Indian wheat

Plumbaginaceae Plumbago Family

2	*Plumbago scandens*	Sbsh	Plumbago, hierba de alacrán

Polemoniaceae Phlox Family

3 *Eriastrum diffusum*	Ahrb	Blue star
2 *Gilia flavocinta* ssp. *australis*	Ahrb	Gilia
3 *Gilia stellata*	Ahrb	Star gilia
1 *Gilia stellata* x *G. scopulorum*	Ahrb	Gilia
1 *Ipomopsis multiflora*	Sbsh	Many flowered gilia
4 *Linanthus bigelovii*	Ahrb	

Polygalaceae Milkwort Family

2 *Polygala macradenia*	Sbsh	Milkwort

Polygonaceae Buckwheat Family

3 *Chorizanthe brevicornu*	Ahrb	Brittle spineflower
3 *Chorizanthe rigida*	Ahrb	Rigid spinyherb
2 *Eriogonum abertianum*	Ahrb	Wild buckwheat
3 *Eriogonum deflexum*	Ahrb	Skeleton weed
2 *Eriogonum fasciculatum* v. *polifolium*	Wdsh	Flattop buckwheat, maderista
2 *Eriogonum inflatum*	Phrb	Desert trumpet
2 *Eriogonum maculatum*	Ahrb	Anglestem buckwheat
2 *Eriogonum palmerianum*	Ahrb	Skeleton weed
2 *Eriogonum thomasii*	Ahrb	Wild buckwheat
2 *Eriogonum trichopes*	Ahrb	Little trumpet
2 *Eriogonum wrightii* v. *wrightii*	Sbsh	Wright buckwheat
2 *Pterostegia drymarioides*	Ahrb	Spreading buckwheat

Portulacaceae Purslane Family

2 *Calandrinia ciliata* v. *menziesii*	Ahrb	Red maids
3 *Calyptridium monadrum*	Ahrb	Sand cress
1 *Portulaca mundula*	Ahrb	Chisme
2 *Portulaca retusa*	Ahrb	Western purslane, verdolaga
2 *Portulaca umbraticola*	Ahrb	Purslane

Primulaceae Primrose Family

3 *Androsace occidentalis*	Ahrb	Rock jasmine

Ranunculaceae Crowfoot Family

3 *Anemone tuberosa*	Phrb	Desert windflower
1 *Clematis drummondii*	Pvin	Virgin's bower, barba de chivato
3 *Delphinium scaposum*	Phrb	Barestem larkspur, espuelita
2 *Myosurus cupulatus*	Ahrb	Mousetail

Rhamnaceae Buckthorn Family

2 *Condalia warnockii* v. *kearneyana*	Wdsh	Mexican crucillo
2 *Ziziphus obtusifolia* v. *canescens*	Wdsh	Graythorn, ciruela de monte

Rosaceae Rose Family

2 *Vauquelinia californica* ssp. *sonorensis*	Wdsh	Arizona rosewood

Rubiaceae Madder Family

3 *Galium aperine*	Ahrb	Bedstraw
1 *Galium microphyllum*	Phrb	Bedstraw
2 *Galium proliferum*	Ahrb	Bedstraw
2 *Galium stellatum* v. *eremicum*	Sbsh	Desert bedstraw

Scrophulariaceae Figwort Family

1 *Antirrhinum cyathiferum*	Ahrb	Frog snapdragon.
2 *Antirrhinum nuttallianum*	Ahrb	Nuttall's snapdragon
1 *Castilleja exerta* (*Orthocarpus purpurascens*)	Ahrb	Owl's Clover
1 *Linaria texana*	Ahrb	Texas toad flax
2 *Maurandya antirrhiniflora*	Pvin	Blue snapdragon vine, mipil
1 *Mimulus floribundus*	Ahrb	Clammy monkey flower
2 *Mimulus guttatus*	Ahrb	Yellow monkey flower
2 *Penstemon parryi*	Phrb	Parry penstemon, varita de San José
1 *Veronica peregrina* ssp. *xalapensis*	Ahrb	Necklace weed, veronica

Simmondsiaceae (Buxaceae) Jojoba Family

4 *Simmondsia chinensis*	Wdsh	Goat nut, jojoba

Solanaceae Nightshade Family

2 *Datura discolor*	Ahrb	Desert thornapple, toloache
1 *Lycium andersonii*	Wdsh	Wolfberry
3 *Lycium berlandieri* v. *longistylum*	Wdsh	Wolfberry, barchata
2 *Lycium exsertum*	Wdsh	Wolfberry
1 *Lycium fremontii*	Wdsh	Fremont Thornbush
3 *Nicotiana obtusifolia* (*N. trigonophylla*)	Phrb	Desert tobacco, tabaco de coyote
1 *Physalis acutifolia*	Ahrb	Ground cherry, tomatillo
2 *Physalis crassifolia*	Phrb	Desert ground cherry, tomate de culebra
2 *Solanum nigrescens* (*S. douglasii*)	Phrb	Nightshade, chichiquelite

Sterculiaceae Cacao Family

2 *Ayenia filiformis*	Sbsh	Desert ayenia
1 *Ayenia microphylla*	Sbsh	Ayenia
1 *Waltheria indica* (*W. americana*)	Phrb	

Ulmaceae Elm Family

3 *Celtis pallida*	Wdsh	Desert hackberry, garambullo

Urticaceae Nettle Family

4 *Parietaria hespera*	Ahrb	Pellitory

Verbenaceae Vervain Family

3 *Aloysia wrightii*	Wdsh	Lemon verbena, vara dulce
2 *Glandularia gooddingii* (*Verbena g.*)	Phrb	Goodding verbena
1 *Verbena neomexicana*	Phrb	Hillside vervain, verbena

Viscaceae Mistletoe Family

2 *Phorodendron californicum*	Sbsh	Desert mistletoe, toji

Zygophyllaceae Caltrop Family

3 *Kallstroemia californica*	Ahrb	California caltrop, mal de ojo
2 *Kallstroemia grandiflora*	Ahrb	Arizona summer poppy, baiborín
1 *Kallstroemia parviflora*	Ahrb	
3 *Larrea divaricata* ssp. *tridentata* (*L. tridentata*)	Wdsh	Creosote bush, gobernadora
1 **Tribulus terrestris*	Ahrb	Puncture vine

ANGIOSPERMS (FLOWERING PLANTS)
MONOCOTYLEDONS

Agavaceae Agave Family

1 *Yucca arizonica*	Succ	Spanish dagger, datil

Cyperaceae

1 *Cyperus esculentus*	Phrb	Yellow nutsedge

Juncaceae Rush Family

1 *Juncus bufonius* v. *halophilus*	Ahrb	Toad rush, tulillo.

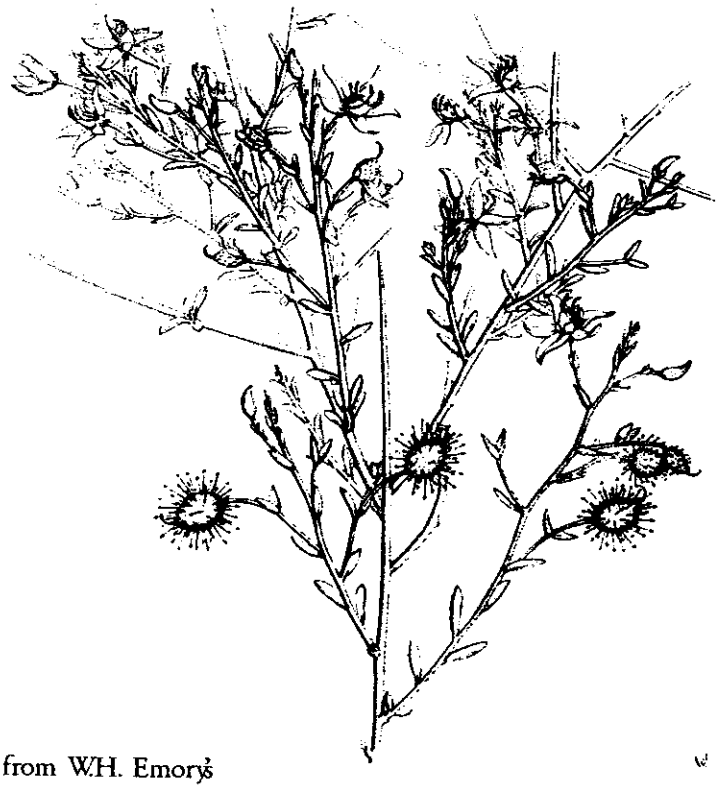
Liliaceae Lily Family

3 *Allium macropetalum*	Phrb	Wild onion
2 *Calochortus kennedyi*	Phrb	Desert mariposa
5 *Dichelostemma pulchellum* v. pauciflorum	Phrb	Bluedicks

Poaceae [Gramineae] Grass Family

4 *Aristida adscensionis*	Ahrb	Six weeks threeawn, zacate cola de zorra
2 *Aristida parishii*	Phrb	Threeawn
4 *Aristida purpurea* v. *nealleyi* (*A. glauca*)	Phrb	Reverchon threeawn, tres barbas púrpurea
2 *Aristida purpurea* v. *purpurea*	Phrb	Purple threeawn, tres barbas púrpurea
1 *Aristida ternipes* v. *gentilis* (*A. hamulosa*)	Phrb	Threeawn
3 *Aristida ternipes* v. *ternipes*	Phrb	Spider grass
2 *Bothriochloa barbinodis*	Phrb	Cane beardgrass, popotillo algodonero

5	*Bouteloua aristidoides* v. *aristidoides*	Ahrb	Six weeks needle grama, zacate saitillo
3	*Bouteloua barbata*	Ahrb	Six weeks grama, navajita anual
2	*Bouteloua curtipendula*	Phrb	Sideoats grama, navajita banderilla
1	*Bouteloua diversispicula* (*Cathestecum erectum*)	Phrb	False grama, zacate borreguero
2	*Bouteloua repens*	Phrb	Slender grama, zacate sabanilla
1	*Bouteloua rothrockii*	Phrb	Rothrock grama, navajita liebrero
3	*Bouteloua trifida*	Phrb	Red grama, navajita roja
3	*Brachiaria arizonica* (*Panicum arizonicum*)	Ahrb	Arizona panicgrass
2	*Bromus carinatus* (incl. *B. arizonicus*)	Ahrb	Arizona brome, bromo de California
4	**Bromus rubens*	Ahrb	Red brome, bromo
1	*Chloris virgata*	Ahrb	Feather fingergrass, cola de zorra
1	*Cottea pappophorioides*	Phrb	Cotta grass
2	**Cynodon dactylon*	Phrb	Bermuda grass, pata de gallo
2	*Digitaria californica* (*Trichachne c.*)	Phrb	Arizona cottontop, zacate punta blanca
1	*Digitaria cognata* (*Leptoloma c.*)	Phrb	Fall witchgrass
2	*Digitaria insularis* (*Trichachne i.*)	Phrb	Sourgrass
2	*Elymus elymoides* (*Sitanion hystrix*)	Phrb	Squirrel tail
2	*Enneapogon desvauxii*	Phrb	Spike pappusgrass, zacate ladera
2	**Eragrostis cilianensis*	Ahrb	Stink grass
2	*Eragrostis intermedia*	Phrb	Plains lovegrass, zacate volador
1	**Eragrostis lehmanniana*	Phrb	Lehmann lovegrass
1	*Eragrostis pectinacea* v. *pectinacea*	Ahrb	Carolina lovegrass
4	*Erioneuron pulchellum*	Phrb	Fluffgrass, zacate borreguero
2	*Heteropogon contortus*	Phrb	Tanglehead, zacate colorado
1	**Hordium murinum* ssp. *glaucum* (*Hordeum glaucum*)	Ahrb	Wild barley
2	*Leptochloa dubia*	Phrb	Green sprangletop
1	*Leptochloa panicea* ssp. *mucronata* (*Leptochloa filiformis*)	Ahrb	Red sprangletop, zacate salado
1	*Muhlenbergia emersleyi*	Phrb	Bullgrass, cola de zorra
3	*Muhlenbergia microsperma*	Ahrb	Littleseed muhly
1	*Muhlenbergia monticola*	Phrb	Mesa muhly
3	*Muhlenbergia porteri*	Phrb	Bush muhly, zacate aparejo
1	*Muhlenbergia rigens*	Phrb	Deergrass
3	*Panicum hirticaule*	Ahrb	Witchgrass
1	**Pennisetum ciliare*	Phrb	Buffelgrass, zacate buffel
1	**Phalaris canariensis*	Ahrb	Canary grass
2	**Phalaris minor*	Ahrb	Littleseed canary grass
3	*Poa bigelovii*	Ahrb	Bigelow' s bluegrass
4	**Schismus barbatus* (incl. *S. arabicus*)	Ahrb	Mediterranean grass
2	*Setaria grisebachii*	Ahrb	Grisebach bristlegrass, ola de zorra
3	*Setaria leucopila*	Phrb	Bristlegrass, zacate tempranero
2	*Setaria macrostachya*	Phrb	Plains bristlegrass, zacate tempranero
1	**Sorghum bicolor*	Ahrb	Cultivated sorghum
2	*Sporobolus airoides*	Phrb	Alkali sacatón, zacatón
2	*Sporobolus cryptandrus*	Phrb	Sand dropseed
1	*Sporobolus urightii*	Phrb	Sacatón, zacatón
2	*Stipa speciosa*	Phrb	Desert needlegrass
3	*Tridens muticus*	Phrb	Slim tridens, tridente
2	*Trisetum interruptum*	Phrb	Prairie trisetum
2	*Vulpia octoflora* v. *hirtella*	Ahrb	Hairy six weeks fescue
4	*Vulpia octoflora* v. *octoflora*	Ahrb	Six weeks fescue



Krameria canescens, Range Ratany, from W.H. Emory's United States & Mexican Boundary Survey, 1859

Ragged Top cont. from page 7 after heavy rains. Here are the only places where moisture dependent plants such as toad rush (*Juncus bufonius*), monkey flowers (*Mimulus* spp), and deergrass (*Muhlenbergia rigens*) can be found. Also, a fracture in the rock of Wolcott Peak creates a seep on the northwestern flanks. There, a group of five shrub live oaks thrive in abed of Lindheimer's lipfern (*Cheilanthes lindheimeri*), malva peluda (*Malvastrum bicuspidatum*), yellow nutsedge (*Cyperus esculentus*), and a variety of grasses.

Discussion

The Ragged Top study area is quite small and has a vertical relief of less than 1600 ft (487 m). Why is its flora so rich? One reason seems to be the extreme topography. The massive blocks of vertical rock do a number of things. On the southerly exposures, they retain heat on winter nights, moderating the cold temperatures. On the north side, the cliffs shade the slopes, allowing higher elevation plant species to thrive. Rain is readily shed from the rock, giving an extra drink to plants growing at the base of the cliffs on all exposures. These cliffs, boulders, talus slopes, and drainages, provide quite a variety of microhabitats for plants as do the variety of substrates and ages of the alluvium.

Does this mean the flora for this site is done? As usual, the more I learn, the more questions I have. With all the species that do occur here, why are there so many other plant species occurring within few miles of the study area, but not on site? The study area is small, and doesn't include much of what would be called silty valley bottom. This could explain absent plants such as the ephemeral bajada lupine (*Lupinus concinnus*), blanket flower (*Gaillardia arizonica*), horse purslane (*Trianthema portulacastrum*), and scurfy sida (Malvella lepidota), as well as pencil cholla (Opuntia arbuscula), horse nettle (*Solanum eleagnifolium*), and prickly poppy (*Argemone pleiacantha* or A. *gracelenta*), that prefer, but are not necessarily restricted to, such a habitat. Also, there is little soil development at the higher elevations. In the Silverbell Mountains joint fir (*Ephedra nevadensis*) and white sage (*Artemesia ludoviciana*) and the locoweed (*Astragalus arizonicus*) are abundant in those situations, but absent at Ragged Top. Soil chemistry may also influence the situation. There is neither limestone nor extensive areas of caliche which could explain the absence of mariola (*Parthenium incanum*) and line-leaved cambess (*Oligomeris linifolia*), which are common on the limestone of the Waterman Mountains. And, finally, there is the possibility that I have overlooked some plants, including queen of the night (*Peniocereus greggii*), primrose (*Camissonia boothii*), dodder (*Cuscuta* spp), and some of the ephemerals previously mentioned. Even then, there are some plants whose absence I cannot readily explain. In the Silverbells the pea vine *Nissolia schottii* favors habitat similar to the cliffs of Ragged Top, but is replaced here by cliff bean (*Galactia wrightii*). Curly mesquite (*Hilaria belangeri*), jumping cholla (*Opuntia fulgida* v. *mammillata*), spiny barrel (*Ferocactus cylindraceus*), cane cholla (*Opuntia spinosior*), and ruellia (Ruellia nudiflora) are also commonly found nearby.

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LANDSCAPING TIPS III: VINES

MARY F. IRISH

Vines are one of the most underused types of plant in gardens in this region, and I cannot think why. Vines are the jewelry of a garden, the last little touch, the final splash of color that make it all come together. Vines are evocative, romantic even, and bring to mind bright sunshine, crisp patios wrapped with floral sides, and in my fondest fantasy about vines, a truly great meal served under an arbor lush with bloom, with flowers and food scents mingling in the late afternoon. So, what is it about vines? Why are they so scarce in the gardens here, and why are there so few from which to choose?

It is certainly hot enough here to benefit from the cooling effects of vines. In fact, vines cool on more than one level first as a protector, a shield against the ferocious radiation of the desert sun, and second by the water vapor released through the leaves that function as minuscule misters, with mist too fine to feel or see, but effective nevertheless.

Vines also help one of the oldest strategies of passive cooling function as well. They provide deep cover on southern windows and walls in the summer preventing the entry of the high summer sun, but leave the same exposure open in the winter to the needed warmth of the low winter sun. One useful habit of vines is that they grow remarkably fast. This makes them particularly desirable in a new or just emerging garden where shade is scarce or too small to do any good.

Although vines are not a large part of our native flora and it may take some looking to find them. There are four species that I find are exceptionally lovely additions to any desert garden. Like most native species, these plants survive well on very low amounts of water, but just a little extra, especially in the summer, keeps them growing and blooming throughout the summer.

I start with snapdragon vine (*Maurandya antirrhiniflora*). This charming vine blooms throughout the summer in my low desert garden. I have planted it in two or three locations, and despite all kinds of catastrophe heaped upon it, it thrives. While the flowers are small (less than 1/2 inch long) they are prolific. Flowers are a deep indigo to blue hue, but there is a carmine red form that some gardeners favor over the blue.

Plants die back in the winter in cooler areas, but are evergreen in my garden. Snapdragon vine reseeds easily in a garden setting so you are always assured of having some to share. Because the flowers are small, this vine is particularly effective when used where it can be viewed close at hand.

I first met the native passion vine (*Passiflora foetida*) at the Desert Botanical Garden where it grew along a fence at the back of a growing yard. This was a hot spot, with hideous soil, and it received only incidental watering from the pots in the area, but it was spectacular. I was impressed, and have continued to be so ever since.

The lobed leaves are what smell (hence the epithet "fetid"), but I do not find the odor intrusive. The flowers more than make up for it. They are approximately the size of a quarter, with the (unusual) form typical of all passion flowers. Petals are light lilac and bloom prolifically in the hottest part of the summer. Despite being so reliable in full sun, passion vine also does well twining up an open tree like palo verde or mesquite. The fruit is edible and it pops delightfully in your mouth. This plant is winter dormant and disappears entirely for the season.

One of the most striking of all our native vines, and also the most obscure in the horticultural trade, is *Jacquemontia pringlei*. A member of the Convolvulaceae, this is a gorgeous vine, full of white to light purple flowers throughout the summer. Capable of growing to 20 feet or more, and with very dense, green foliage, this is a perfect choice for a protective barrier to the sun.

I find both the foliage and the flower color soothing and cooling. It can be deciduous when it gets very cold, but is generally evergreen. Like most vines, a hard prune in the early spring, just as the newer leaves emerge, reinvigorates the plant and helps keep it tidy.

And in one of the spectacular anomalies of the plant world, there is even a good native vine for the shade. Arizona grape ivy (*Cissus trifoliata*) looks remarkably like ivy, and could easily be substituted for it. Whether climbing up a tree or trellis, or left to run along the ground, this clinging vine is aggressive and fast growing once the tuberous root has become large and well established. It is generally winter deciduous, but it is advisable to prune it hard every two or three years if it remains evergreen to keep it in bounds. The hard, deep green leaves make a charming background for a patio wall or trellis and I have mixed mine with the vining *Aloe ciliaris* because they both love the shade.

I hope you can find a home for these glorious natives in your garden. I think you will agree that they add dash and flair to all of our desert gardens.

Mary Irish is a freelance writer specializing in books and articles about plants and horticulture. She is a member of the Phoenix chapter and worked for many years at the Desert Botanical Garden.