

The Plant Press

THE ARIZONA NATIVE PLANT SOCIETY

VOLUME 23 NUMBER 2

SUMMER 1999

ECONOMIC NECESSITY AND ECOLOGICAL CONSEQUENCES THE NON-TIMBER HARVEST OF "VARA BLANCA" IN SOUTHERN SONORA, MEXICO

CYNTHIA LINDQUIST

"Vara blanca" (*Croton fantzianus* Seymour) has been harvested for years in southern Sonora as building material for wattle and daub construction of houses, roofs and fences. The species is a member of the Family Euphorbiaceae, originally tentatively identified as "*Croton fragilis* H.B.K.?" by Howard Scott Gentry in his 1942 book *Rio Mayo Plants* published by the Carnegie Institution of Washington. The book was the product of expeditions Gentry made between 1933 and 1940 to explore the Rio Mayo region of Mexico. It became the primary resource for scientists who followed him seeking to identify the plants of the region.

Vara Blanca is one of three tree Euphorbs found in Sonora and is a common understory species of the tropical deciduous forest in some of the areas studied by Gentry during his Rio Mayo days, near the municipalities of Alamos and Quieriego. It is characterized by white bark mottled with gray

patches, hence the name "vara blanca" or "white stake". The tree grows rapidly and can reach a height of 30 feet or more in the oldest individuals. Occurring on dry soils it is found in association with other typical tropical deciduous forest species such as: *Acacia coulteri*, *Bursera fagaroides*, *Bursera laxiflora*, *Croton alamosanus*, *Croton flavescens*, *Coursetia glandulosa*, *Erythroxylon mexicanum*, *Fouquieria macdougalii*, *Haematoxylum brasiletto*, *Ipomoea arborescens*, *Jatropha cordata*, *Jatropha malacophylla*, *Lysiloma divaricatum*, *Pachycereus pecten-aboriginum*, *Randia obcordata*, *Senna atomaria*, *Stenocereus thurberi*, *Tabebuia impetiginosa* and *Lonchocarpus hermannii*.

In the 1960's and '70's stakes from the tree became important in the cultivation of tomatoes, grapes, peppers and cucumbers in the northern coastal plains of Sonora, Sinaloa and in Baja California. The hard, insect-resistant wood of the species does not rot or break readily, accounting for its popularity for construction and agricultural use. In the fields the stakes can be reused for up to five years.

At the inception of agricultural use, there were only a few people who were cutting the tree. The government developed forestry guidelines for the harvest of stakes. These included cutting methods, length of the stakes and size criteria for harvesting the trunks. Grape stakes must have a

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SOUTHWEST EXOTIC PLANT MAPPING PROGRAM

The Southwest Exotic Plant Mapping Program (SWEMP) is a Colorado Plateau Field Station, collaborative program designed to develop a regional database of exotic plant distributions for the Southwest (Arizona, New Mexico and Colorado Plateau portions of Utah and Colorado). The purpose is to develop and distribute information on exotic plant species distributions, as well as to provide information on the status of exotic species distributions on the Colorado Plateau, and the greater southwest. This is accomplished through a network of partnerships that contribute to data collection, compilation, and distribution. The program is based on the cooperation of the CPFS and collaborators. CPFS personnel are responsible for collating exotic plant species field data into a master regional database, generating geographic information system (GIS) based distribution maps, and maintaining these data on the Internet. (GIS) based distribution maps, and maintaining these data on the Internet.

Collaborators are voluntary entities, who are responsible for collecting exotic plant species field data and submitting these data to CPFS. These collaborators include state and federal agencies, tribal governments, universities, private consulting firms, and other interested parties.

The goals are to:

- Maintain and expand the SWEMP database and GIS based exotic plant distribution maps.

- Maintain the SWEMP home page, which includes serving the aforementioned data, as well as providing educational and scientific information on exotic plants species.

- Facilitate collaborative partnerships among federal, tribal, state and private land managers to develop the SWEMP database.

- Develop the project into a regional program with widespread local participation. For more information or to become a participant, contact SWEMP at <http://www.usgs.nau.edu/SWEMP/>

WILDFLOWER POSTER UPDATE JULIA FONSECA

Artist Margaret Pope is five illustrations away from completion of the Sonoran Desert Wildflowers Poster to be sold by ANPS. The Tucson Chapter's Poster Committee is excited by the beauty and faithfulness to the "real thing" of her renderings. Nearly all the illustrations show leaves, buds, flowers and in some cases the fruit. One particularly beautiful drawing is a scarlet morning glory twined around Coulter's hibiscus. The poster will include other favorites such as devil's claw, delphinium (larkspur), datura, and owl's clover, as well as some more unusual plants such as broomrape and night-blooming cereus.

The poster committee is also considering which of the designs to choose for a T-shirt. Look for more information in the next issue!

The Flagstaff Chapter is working on a wildflower poster for the Northern Arizona area.

OUTSTANDING ARIZONA BOTANISTS: J. G. LEMMON AND WIFE BARBARA TELLMAN



"J. G. Lemmon and wife" is how hundreds of herbarium specimens are labeled in the extensive collections of John and Sara Lemmon. John Lemmon was born on a Midwestern farm where he was fascinated by botany from an early age. He attended the University of Michigan, but did not graduate. After a few years of teaching, he enlisted in the Union Army during the Civil War. He was captured and languished for months in the notorious Andersonville Prison, from which he emerged an emaciated and weakened man of ninety pounds. He was considered frail and needed help to walk short distances.

His first major expeditions were in the Sierra Nevada Mountains of California, as he slowly recuperated. Exploring fired him with new enthusiasm, rekindling what he called "the reincarnated spirit of an ancient weed puller." He spent many hours searching out new plants and eventually found an amazing number of new species. He sent his first specimens to Henry N. Bolander, the only botanist on the Pacific Coast at that time, but Bolander could not identify many of them and urged Lemmon to send them to Asa Gray at Harvard who confirmed that many were indeed new species. This fired Lemmon's enthusiasm which led to more collecting expeditions.

He met Sara Plummer and the two joined forces for collecting trips before their marriage in 1880. They chose Arizona for their "wedding tour" a honeymoon suggested by the bride who said "instead of the usual ... visit to a water place, idling our time in useless saunterings ... we should wait a few weeks, devoting the time to study; then ... make a grand botanical raid into Arizona and try to touch the heart of Santa Catalina." At that time the summit had not yet been reached by any "white man." The Lemmons were unable to reach the summit from the south, so tried again from Oracle from where they ascended the mountain, collecting all the while.

They came back often during the next few years, often returning to the newly named "Mt.

Lemmon." They were especially impressed by the variety of trees, especially the oaks, and wrote lengthy descriptions for the *Tucson Citizen* (Aug. 1, 1905). "This reserve is richly furnished with mostly valuable trees of many species, including seven oaks, the most abundant one being the Emory oak (*Quercus Emoryi*) forming the open forest around Oracle, where it attains large proportions. It is distinguished by its small prickly oval leaves, dark green on both sides and its small narrow, edible acorns - 'Bellota' of the Mexicans." The article goes on for two columns describing seven oaks and five pines found there.

The Lemmons also explored the Huachuca Mountains when Apaches still controlled much of the area. A long *Tombstone Epitaph* article (Sept. 16, 1882) describes their adventures in detail. "A Huachuca Paradise - A Natural Fern Conservatory -- Prof. Lemmon Botanizing." In the words of this 'frail invalid' "At every inward turn of the winding way her [Mrs. Lemmon's] exclamations of delight were uttered, but at the outward curves the sheer precipices of 1,000 feet below and 500 above with a narrow way of only one or two feet wide, caused momentary hesitation. But the glories of the inner vestibule of ferns can always be seen from these outer curves, appearing nearer and nearer, and the sight is too enchanting for the botanist to resist." They found many ferns, but only one was new to science, *Notholaena lemmoni*. Thirty-one new species found by the Lemmons came from the Huachucas.

Frank Crosswhite (*Desert Plants* August 1979) compiled a list of 108 species new to science based on the Lemmons' Arizona collections, of which 30 bear the Lemmon name. His collections became the basis of the Lemmon Herbarium now at the University of California in Berkeley. No biography has been written, but Crosswhite lists sources of information and his article is the best source of information about this remarkable couple.

PLANT RARITY IN ARIZONA

JOHN ANDERSON

A rare plant is usually thought of as a species with low numbers, few localities, or a small range. However, there are several types of rarity and many factors influencing rarity of plants. Fielder (1986) listed nine factors, either alone or in combination, causing plant rarity: the (evolutionary) age of the taxon, a relict or a recently evolved species; the genotype of the species, depauperate or heterogeneous; evolutionary history, past climatic and geological changes; taxonomic position (see below for further discussion); ecology, habitat and present environmental conditions; population biology, demographics and life history; reproductive success, number of flowers, fruits, and seeds, and seed dispersal and germination; land use history; and recent human uses. The first seven factors are aspects of the natural environment and the last two are human induced causes of rarity. Thus many plants are naturally rare while others have become rare and endangered through human activities. Each rare plant, though, is the idiosyncratic product of a unique historical combination of these factors and must be researched and understood individually.

Taxonomic position is perhaps the most basic factor in determining rarity to ensure that a plant species under consideration for rarity is a valid taxon. Regarding the importance of this factor, Fielder (1986) stated: "...the complexity of species concepts is relevant in the consideration of rare plant taxa, particularly if one is to provide an adequate description of rarity in any given plant species...the question of rarity in plant species, therefore, is...a question of our ability to describe adequately and accurately the variation among species as individual, integrated natural units." And, Kruckeberg and Rabinowitz (1985) similarly say that..."A binomial that appears in print is not necessarily an absolute, eternal verity...in the taxonomy of rare plants, the dilemma of evaluating taxonomic judgment is ever present...yet, most binomials (or trinomials) that appear in the taxonomic literature represent little more than opinions that are subject to counteropinions and to taxonomic inflation or deflation by yet another expert...an axiom for preservation is 'Know thy organism'." Taxonomic evaluation should be the first step in determining if a plant is indeed rare.

In his synthetic approach, Stebbins (1980) recognizes that "...each example of such species has its unique features, and must be considered with respect to three major parameters: the intricate mosaic of the environment in which it grows; the complex genetic structure of its populations...and finally the past history of the populations...". Kruckeberg and Rabinowitz (1985) consider three distribution factors in plant rarity: geographic area, ecological breadth, and isolation. The results of the different combinations of these various factors that effect plant rarity are different types of rare plant patterns in Arizona. Fielder also (1986) describes three different geographic distributions of plant rarity: widespread geographically and locally rare; restricted ranges, but locally abundant; and both geographically restricted and locally sparse. These factors operating through environmental heterogeneity influence the number of rare plants in an area. Arizona, with its high degree of environmental heterogeneity in climate, topography, and geological substrates and soils, contains a mosaic of many different types of plant habitats.

The high number of rare plants in Arizona is directly related to the number of different habitats available. Each subdivision of the Arizona flora has its own set of rare plants. These habitats include the sand dunes of southwestern Arizona, the fringe of the eastern Mohave Desert in northwestern Arizona, the edaphic endemism of the Colorado Plateau in northern Arizona, the alpine tundra of the San Francisco Peaks, the Madrean woodlands and grasslands and the western fringe of the Chihuahuan Desert in south-eastern Arizona, and Tertiary relicts in the Sonoran Desert and the subMogollon canyons. Two special areas of clusters of rare plant are the late Tertiary lake bed deposits across central Arizona along the northern edge of the Sonoran Desert (Anderson 1996) and the extension of the Central Gulf Coast Subdivision of the Sonoran Desert into Organ Pipe National Monument (Warren et al 1981; USDI, NPS 1995).

Rare plants can also be separated into the categories of endemics, disjuncts, and peripherals, based on natural boundaries or habitats such as canyons, mountains, sand dunes, or badlands, or on political boundaries such as state borders. A rare plant that is

an endemic species is one that only occurs within a defined natural or political boundary, for example the Arizona cliffrose occurs only on late Tertiary lacustrine outcrops, a natural boundary, or, only within Arizona, a political boundary. A rare plant that is disjunct is one with an isolated population widely separated from the main body of the species, where the species may be common; for example, the California fan palm is rare in Arizona with only two natural occurrences, the Kofa Mountains and Castle Hot Springs, which are widely separated or disjunct from the primary range of the species around Palm Springs, California.

Often, a disjunct population will exhibit "substrate switching" by growing in a different substrate from its usual habitat (Gankin and Major 1964; Raven 1964), for example birdsbeak (*Cordylanthus parviflorus*) and heartleaf twistflower (*Streptanthus cordatus*) on the lacustrine outcrops at Burro Creek. A rare plant that is peripheral is one with a contiguous population at the edge of the range of the species and usually not widely separated from the main body of the species, for example, Hooker balsamroot (*Balsamorhiza hookeri* var *hispidula*), a montane species from Utah, and long spine cottonthorn (*Tetradymia axillaris* var *axillaris*), a Mohave Desert species, are peripheral on the Arizona Strip and therefore rare in Arizona.

In southeastern Arizona there are many peripheral Sierra Madrean species from Mexico that are rare in Arizona. Often, a plant is peripheral rare because of

a political boundary, not a natural one, and, therefore, is not considered as biologically significant as an endemic or disjunct rare plant. Most of the rare plants treated in *Arizona Rare Plant Field Guide* now in preparation are endemics or disjuncts.

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- USDI, National Park Service. 1995. *Draft General Management Plan, Development Concept Plans, Environmental Impact Statement*. Table 3.
- Warren, et al. 1981. *Vegetation of Organ Pipe Cactus National Monument*. Cooperative National Park Resources Studies Unit Technical Report Number 8. University of Arizona, Tucson. 79 pp.

MANY MANY THANKS TO HORACE MILLER

Horace Miller is stepping down from many of his multitudinous tasks. It will take more than four people to replace him at least in part. Pam Davis will take over his duties as treasurer (with the assistance of a professional accountant to handle taxes and forms). Lynn Kaufman will take over corresponding secretarial duties. Marge Norem will manage the membership list. Newsletter and meeting announcement mailings will be done by a committee of many, instead of Horace who has done mailings all by himself as long as any of us can remember. Meg Quinn will handle processing of the incoming mail, with assistance from a cast of thousands to answer queries.

YES, HORACE HAS DONE ALL THAT AND MUCH MUCH MORE.

He will train his replacements over a summer transition period and will remain on the board to continue to provide guidance with his thorough knowledge of the bylaws, his memory of past ANPS activities, and his common sense approach to problem solving.

OUR UNIQUE FLORA:

PEDIOCACTUS SILERI

BY SUE RUTMAN

Pediocactus sileri (Siler pincushion cactus) is a small, unspectacular species that occurs in northwestern Arizona and southwestern Utah. Ten years ago, this species was the center of a controversy that taught me a great deal about pollinators and pesticides.

Most of the habitat of *P. sileri* is uninhabited and not even visited much by humans. On the vast Arizona Strip, *P. sileri* occurs on the flats or rolling hills of gypsiferous clay or sandy soils of the Moenkopi Formation. A spectacular backdrop of Navajo sandstone cliffs adds flare to the scenery.

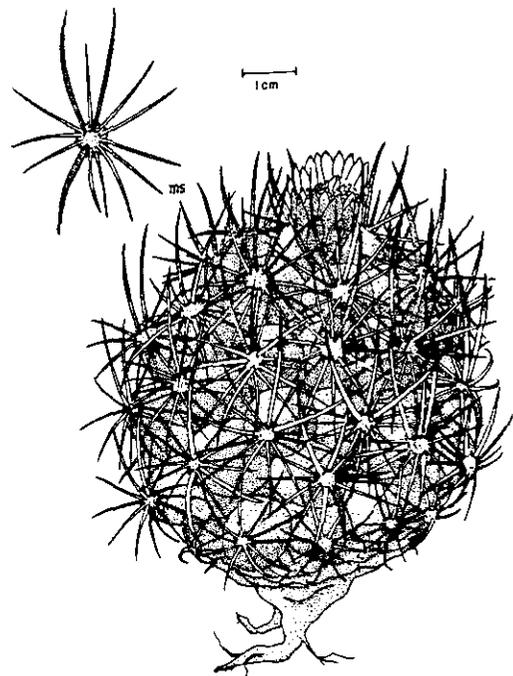
The habitat is sparsely vegetated and the *P. sileri* plants, growing in the open, are readily visible. These small globose or ovate cacti are about 5 inches tall (up to 18 inches) and 3-4 inches in diameter. Stems are mostly single but are sometimes clustered. The spines are born on tubercles. There are 3-7 slightly curved central spines about 1 inch long. A few of the central spines point upward, giving the plant a distinctive look. Flowers are yellowish with maroon veins and bloom in the spring.

Although the species is now on the Federal threatened list, *Pediocactus sileri* was an endangered species in the late 1980s when the U.S. Department of Agriculture, Animal and Plant Health Inspection Service (APHIS) proposed to aurally apply pesticide over 150 square miles of land on the Arizona Strip. APHIS and local ranchers wanted to control an outbreak of grasshoppers. Some of the land to be affected by the proposed project was home to *P. sileri*.

In what ways would pesticide application affect *P. sileri*? APHIS believed that if they sprayed the pesticide before the cactus started flowering, then the pollinators would not be affected. Vince Tepedino of the Bee Biology Lab at Utah State University knew otherwise. He had been studying the

pollinators of *P. sileri* and had found a number of native bees, some of them new to science. If APHIS were to spray in the early spring, it would kill the male bees, which were active then. When the females emerged from underground in the summer, their mating partners would be absent. That meant the next generation of pollinators would be gone, too.

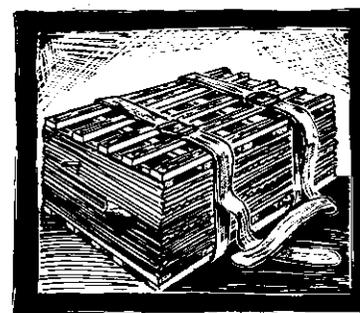
A battle ensued, and in the end the pesticide spraying did not occur, thanks to some legal and paperwork technicalities. This case was unusual because we had information about the native pollinators to help fight for the conservation of the bees and the cactus. With less information, the outcome might not have been the same. Perhaps *P. sileri* and the stand against APHIS can teach us the importance of respecting our ignorance when making land management decisions and of the value of learning more about plants and pollinators.



Drawing: U.S. Fish & Wildlife Service

PLANTS OF THE MASON AUDUBON CENTER FOR IRONWOOD PRESERVATION AND ENVIRONMENTAL EDUCATION

JEFF KRAEMER



Over the last few months, the Tucson Chapter of ANPS has been mapping the many ironwoods and saguaros, and creating an inventory of the plants found on this new twenty acre urban preserve. (See the Winter 1999 issue for more information on this preserve). Due to the lack of rain, few annuals were observed. As a result, the list is expected to expand following future surveys.

The preserve can be classified as an ironwood-bursage habitat. Due to the nurse plant characteristics of ironwood, palo verde, mesquite, and the small bursage, the preserve is rich in cacti and animal life. The property includes a stand of more than 250 ironwoods, plus dozens of mature saguaros. Our count of small saguaro is not yet complete, however, and the total is expected to be in the hundreds. Exotic weeds and plants located around the education center are omitted from this list.

ANPS will be constantly monitoring the preserve, and noting additional plants as they are observed. In addition, several other studies are being conducted including bird, mammal, reptile, and insect surveys. Once a biological baseline is established, the effects of urban encroachment can be evaluated over time. Volunteers are welcome to join in this effort.

CACTACEAE

<i>Cereus giganteus</i>	Saguaro
<i>Echinocereus fasciculatus</i>	Hedgehog Cactus
<i>Echinocereus rigidissimus</i>	Arizona Rainbow Cactus
<i>Ferocactus wislizenii</i>	Barrel Cactus
<i>Mammillaria microcarpa</i>	Arizona Fishhook Cactus
<i>Opuntia acanthocarpa</i>	Buckhorn Cholla
<i>Opuntia arbuscula</i>	Pencil Cholla
<i>Opuntia engelmannii</i>	Prickly Pear
<i>Opuntia fulgida</i>	Jumping Cholla
<i>Opuntia leptocaulis</i>	Desert Christmas Cactus

COMPOSITAE

<i>Ambrosia ambrosioides</i>	Canyon Ragweed
<i>Ambrosia deltoidea</i> , (<i>Franeria deltoidea</i>)	Triangle Leaf Bursage
<i>Baccharis sarothroides</i> (in disturbed areas)	Desert Broom
<i>Isocoma tenuisecta</i> (in disturbed areas)	Burroweed
<i>Hymenoclea salsola</i>	Burro Brush

EPHEDRACEAE

<i>Ephedra trifurca</i>	Mormon Tea
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EUPHORBIACEAE

<i>Jatropha cardiophylla</i>	Limberbush
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FABACEAE

<i>Acacia constricta</i>	White-thorn Acacia
<i>Acacia greggii</i>	Catclaw Acacia
<i>Cercidium floridum</i> (possibly planted)	Blue Palo Verde
<i>Cercidium microphyllum</i>	Foothills Palo Verde
<i>Olneya tesota</i>	Ironwood
<i>Prosopis velutina</i>	Velvet mesquite

FOUQUIERIACEAE

<i>Fouquieria splendens</i>	Ocotillo
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RHAMNACEAE

<i>Ziziphus obtusifolia</i>	Gray Thorn
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SOLANACEAE

<i>Nicotiana glauca</i>	Tree Tobacco
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ULMACEAE

<i>Celtis pallida</i>	Desert Hackberry
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VISCACEAE

<i>Phoradendron californicum</i>	Desert Mistletoe
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ZYGOPHYLLACEAE

<i>Larrea tridentata</i>	Creosote Bush
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PAGES FROM GINNY'S NOTEBOOK 3: APOCYNACEAE
 VIRGINIA SAYLOR

Calyx lobes 5, Corolla 5-merous, Stamens 5, attached to Cor 3
 Milky sap: Stigmas 2, FR: 2 follicles (pairs)

APOCYNACEAE DOGBANE FAM.										JANUS 27-2	
Page No.	Genus Common Name	Form	Flower Color	Flower outline	Follicle cm lg	Leaf cm lg x mm wd	G WF	K CF	TR RK		
	<i>Amsonia</i> Blue Star	Phrb	wh ± (pk. blt trage)	SA 	2-10 1.5-2.0 1/12-30	A 	1167 428	651 449	1211 385		
	<i>Apocynum</i> Dogbane Indian Hemp	Phrb	wh grnt red-pur	CA CYL UR 2-8 mm 	6-20 5-25-60	O 	1168 430	658 450	1216 385		
*	<i>Catharanthus</i> Madagascar Periwinkle	Phrb	pk	L. Sol FU 5-5 cm wd 	Straight 3°	O 	JM 168			BC 201	
	<i>Cycladenia</i>	Phrb	rose- pur	FU 18-28 mm 	5-10	O 18.5-9 20-45 	430	*		UT 49	
	<i>Haplophyton</i> Cockroach Plant	Sbst	yel	SA lobes 7-15 mm 	5-9 terete	A 2-3.5 6-12 HR 	430	651	1211		
	<i>Macrosiphonia</i>	Phrb Suff	wh	FU 	and 1-5 cm	O/W 	428	653	1217		
*	<i>Nerium</i> Oleander	Shrb	wh pk. red	SA 	sprinkle w/O					1218 UT 49	
	<i>Plumeria</i>	Shrb SmTr	wh frag.	SA FU 	sprinkle L tramerq 10 cm		BC 198	MX 58			
	<i>Stemadenia</i>	Shrb SmTr	yel	FU CY 8-10 cm 	O 6-18 cm		BC 198	MX 59			
	<i>Thevetia</i>	Shrb SmTr	yel orn pk: yel	TU 	A 		MX 61				
	<i>Trachelospermum</i> Climbing Dogbane	Pvin	pl yel crrm	FU/SA CY 1-2 cm lg 	cy. 15- 25	O 4-7 12-50 	1168 53-6		1215		
	<i>Vallesia</i>	Shrb SmTr	?	SA 5-12 mm lg 	drupe wh pk. A		BC 200				
*	<i>Vinca</i> Periwinkle	Phrb Trailg	bl viol	FU A SA 1.5-3-5 cm wd 	2.4 ↑	O 1.5-3-8 cm 	1167 432	*	1215 450		

* = exotic

Mostly tropical 215 genera

Notes To Ginny's Notebook :

- The last three columns refer to pages in which the species is described in standard books.
- BC: I.L. Wiggins. 1980. Flora of Baja California. Stanford University Press. 1025 pp.
- CF: P.A. Munz. 1959. California Flora. University of California Press. 1681 pp.
- CG: Philip Munz. 1959. California Flora . Rancho Santa Ana Botanic Garden. 1681 p.
- G: M.L. Fernal, ed. 1988. Gray's Manual of Botany 8th ed. Dioscorides Press. 1632 pp.
- JM: E Hickman. 1987. Jepson Manual of the Higher Plants of California. University of California Press. 1400 pp.
- K: Thomas Kearny and Robert Peebles. 1951. Arizona Flora. University of California Press. 1032 pp.
- MX: C.T. Mason and P.B. Mason. 1987. Handbook of Mexican Roadside Flora. University of Arizona Press. 380 pp.
- RK: John Coulter and Aven Nelson. 1902. New Manual of Botany of the Central Rocky Mountains . American Book Company. 1902. 646 pp.
- TX: Donovan Correll and Marshall Johnson. 1970. Manual of Vascular Plants of Texas . Texas Research Foundation. 1881 pp.
- UT: S.L. Welsh. 1987. Utah Flora. Brigham Young University. 894 pp.
- WF: Harold Rickett et al. 1970. Wild flowers of the United States, Vol. 4 the Southwest New York Botanic Garden.

Abbreviations: AHrb - Annual herb; BHrb - Biennial herb; PHrb - Perennial herb; SbSh - Subshrub; Shrb - Woody shrub; PVin - Perennial Vine; SmTr - Small Tree; * - Exotic; SA - Salverform; FU - Funnelform; CA - Campanulate.

IN MEMORIAM

Orpha Snyder Mason, 105, noted librarian, educator, and environmentalist, passed away March 11, 1999. Prior to her death, she donated her rural Tucson home, and 20 acres of prime ironwood forest to the Tucson Audubon Society. The property has been established as an urban wildlife preserve, and is now known as the Mason Audubon Center for Ironwood Preservation and Environmental Education.

Orpha, and her late husband William, purchased the land in 1953. They loved the desert and vowed to preserve their land and its ironwoods. Over the years, Orpha opened her home to many children believing that they should explore her small preserve and learn the wonders of the desert. Through their gift, they have insured the preservation of their ironwoods, and created a unique educational opportunity for generations to come. The Tucson chapter of the ANPS continues to help develop the education center, and help monitor the preserve. Thank you Orpha and William for sharing your dream, your love of the desert, and your home. You will

Cont.. from page 1.

diameter of 3.81 cm and tomato stakes a diameter of 2.54 cm. All must be 2.2 meters tall. In addition, laws have been created mandating a permit system for cutters, truckers and landowners and a monitoring system by forestry personnel to prevent overharvesting. It is required that thirty percent of the vara of harvestable size be left standing.

In 1995 I began an ecological and economic study of the plant in southeastern Sonora. Based on specimens collected during this study, the plant has now been identified as *Croton fantzianus* Seymour. The population is thought to be highly disjunct, formerly known only from Nicaragua with collections from the State of Oaxaca (800 miles south of the State of Sonora) as the next closest specimens in Mexico.

People who harvest the stakes work independently or in teams employed by truckers. Many times the cutters are the poorest, marginalized and/or landless people, who have chosen this work over that of a "jornalero", a day worker in a variety of transitory jobs earning minimum wage. Calculations based on the number of stakes they harvest indicate that cutters can earn from two to eight times the minimum wage which at the beginning of the study was 25 pesos per day or approximately three U.S. dollars.



Vara Blanca Tree

Workers use machetes to cut the trees and fashion stakes. In the early days the most accessible trees were cut—those found on lower, flat land near roads. As cutting has intensified in response to higher agricultural demand, it has become necessary for workers to foray further away into more difficult territory. It is not uncommon to see cutting occurring on mountain tops two hours or more from the storage yards in the city. Workers may remain in primitive camps in these areas for five to six days at a time, returning to the city only to buy provisions before beginning a new week in the camps.

In remote areas burros are used to carry stakes down the steep hillsides to drop points on the closest roads. Middlemen truckers with vehicles capable of transporting up to 1000 pieces pick up the stakes at the drop points. These truckers in turn take the stakes to holding yards in the city. The stakes are picked up by large truckers whose vehicles have the capacity to carry 12,000 pieces. The stakes are transported to agricultural fields in Sinaloa, Baja California, and Sonora. The truckers are paid by the piece, as are the cutters. By virtue of sheer volume the truckers have the advantage and are able to make an extremely good living.

There are no programs for reforestation or nurseries for *Croton fantzianus*. People have traditionally relied on natural processes to renew the population. Older trees too large to cut are the seed banks for a new generation of vara. It will take between five and seven years for a seedling to reach the proper size for cutting. Informants are aware that the harvested trees also may coppice after proper cutting. The new wood produced has the potential to be used as stakes if it grows straight enough. Some landowners have their own strategies for management, but these are purely individual and are not being practiced by everyone.

The worsening state and local economy during the three years of this study has caused the number of people harvesting stakes to skyrocket, raising the pressure on the population of the tree. The population of the Municipality of Alamos is over 29,000 people. It has the highest number of ejidos, or communal property areas, in the state of Sonora. Members of ejidos have traditionally relied on rain-fed agriculture to grow crops for their own consumption and for sale. They may have a few cattle, also but in general are functioning at little

more than subsistence level. Recent droughts during the crucial growing season have been responsible for crop failures. In addition, the Mexican Government has encouraged the people to plant cash crops which at harvest have proven virtually unsalable due to poor market conditions. The standard of living for inhabitants of the Municipality is ranked second worst in the state. There is a high level of under- and unemployment. Employment opportunities and economic activities in Alamos are essentially limited by the geographical location of the Municipality which is situated in the foothills and mountains of the Sierra Madre Occidental. The topography is highly variable and there is no potential for irrigation for large-scale agricultural production that can compete in the Mexican national economy. People have resorted to growing drugs. Violence and drug trafficking have become serious problems.

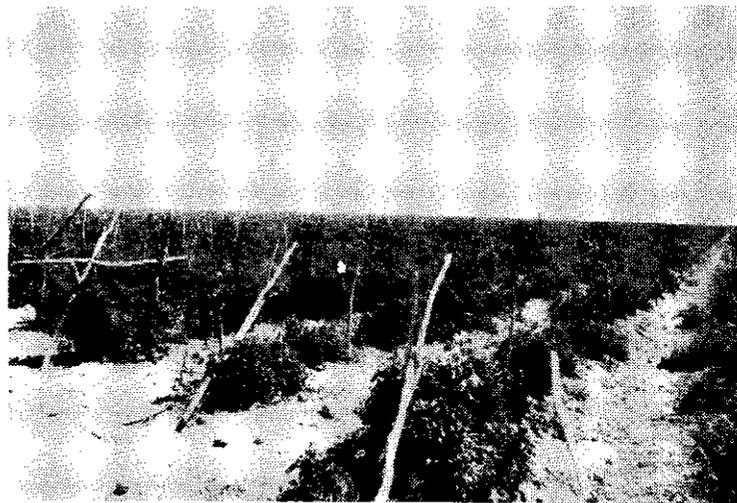
In recent years national economic pressures in Mexico have increased. The peso has been devalued and several programs intended to help the poor and marginal populations have been discontinued. People who previously had been able to survive on government programs have found themselves abandoned. Because of this, cutting vara blanca has become even more attractive as a source of employment. Informants now state that there are between 50 and 70 people cutting the trees for stakes, a fourfold increase or greater over the number cutting several years ago. Harvesting is occurring year round when in the past it only took place nine months of the year. In addition the forester in charge of enforcement and monitoring for the Municipality of Alamos was removed and not replaced. Illegal cutting by people without permits and people from outside the Municipality has accelerated. Some of the workers are untrained and are not following the guidelines for cutting methods resulting in poor regeneration rates of the vara, overharvesting and destruction of other tropical deciduous forest species and habitat.

Three large truckers interviewed in 1998 each sold close to 600,000

stakes in 1997 for a total of 1,800,000 pieces. This total does not include information from other truckers within and outside of the Municipality who also were transporting stakes. Informants feel the resource is ending. Vara has disappeared in areas where it grew formerly and it is becoming difficult to find the appropriate sizes needed for stakes. More buyers are purchasing crooked stakes, when in the past they would not accept them. In a recent visit to a holding yard in Sinaloa very few vara stakes were seen, and other young tropical species are being substituted for them, boding ill for the direction harvesting is taking.

Vara blanca has been an important resource for the poor and marginalized population in the Municipality of Alamos. People have been able to fall back on harvesting it in particularly difficult economic times. It is one of the only economic alternatives many workers have who wish to remain in the Municipality. Increased harvesting both legal and illegal, habitat destruction and inability of the population of the species to stand up to the pressure are threatening the continued survival of the plant and the poor people in the region.

Photos by Cynthia Lindquist



Vara stakes in a tomato field in Huatabampo.

ETHNOBOTANY NOTES I: COMMON MULLEIN JEFF KRAEMER

With the heat of summer bearing down upon us, many are seeking the refuge of Arizona's mountains. As plant enthusiasts, we would find it difficult to enter conifer country without noticing the huge and showy blooms of mullein (*Verbascum thapsus*). Often found along roadsides and in other disturbed areas, it is easy to spot with its tall, spike-like flowers of bold yellow. It is also found in meadows and other moist areas above 5000 ft. in elevation, where it may be the tallest of the meadow flowers.

The plants grow as rosettes with large basal leaves which are hairy and may reach over a foot in length. The flower spikes may reach a height of five feet, with flower clusters almost two feet in length, and nearly 2 inches in diameter. If picked, the flowers lose their color while drying.

Also known as woolly, velvet, or candlestick mullein, this hardy European biennial has long been naturalized throughout North America. Although there are three species of *Verbascum* in Arizona, only common mullein was used extensively by people.



European use of mullein is well established and has been documented for several hundred years. It wasn't long before the native American tribes in the east learned of its benefits. Its medicinal use by the Choctaws, Menomnies, Creeks, and tribes of the Iroquois nations was soon learned by the western tribes. The early western distribution of this plant and its use by the native people of Arizona is not as clearly understood. According to some accounts, the Apache used the dried flowers as torches, as did early prospectors. They worked well if soaked in animal fat and allowed to dry.

The medicinal use of mullein by white settlers was significant and well recorded. The dried flowers of woolly mullein were used to treat a variety of respiratory ailments including tuberculosis. Teas made from the flowers are still used by herbalists to ease congestion and soothe irritated mucous membranes. Mullein is commonly available at health food stores, along with mullein tinctures and other related products.

Once removed from the stalk, the "woolly" flowers provided a soft and fluffy stuffing for pillows, and a crude form of insulation. They also served as tinder and were carried in a bag or pocket along with fire starting tools.

As you ascend the mountains in search of cooler air, you are likely to spot those eye-catching "Apache candles" along the road. In spite of our dry year, I have spotted several nice stands along the Pinery Canyon road, and in the area of Long Park in the Chiricahua Mountains. Good photo opportunities may still exist.

Photo: A. Segade

DESERT PLANTS NEED WATER TOO

JARED SHORTMAN



The reality of a drought tolerant landscape is convoluted. In the summer when all moisture is pulled from the ground by our unrelenting sun, at speeds that frustrate even the most devout waterers, it is easy to spot parched desert plants in urban landscapes. They suffer twig dieback, shriveling, drooping, defoliating... and those of us who have had high hopes for a low water landscape have our hands in the air, "...but I thought these were desert plants!"

What makes a plant drought tolerant? Certainly if it can take the conditions in the wild, it should survive in town. Is there more than a genetic difference between plants in nature and plants in cultivation? Yes there are differences. Consider the following points:

- The plants we set out grew up in a container situation. Much needs to happen before a plant can transform from being a container plant to being an established plant in the ground, and this means more than just planting it! In the wild, the desert only allows for seedling establishment of many plants in the wettest years. Even cacti depend on good rains to become established. Seedlings struggle between each good rain too, and many never make it to adolescent stages. What does this mean? WATER! To get a plant established you must keep it moist during this vulnerable period.
- For a desert plant to become a drought tolerant plant, it must have a well-formed root system. Avoid root-bound plants. At the nursery, pop the plants out of the containers and look at the root system (any good nursery person will let you, and if not, go elsewhere). Avoid plants with taproots curling around more than once (especially trees) and plants with solid root masses. Look for a plant that will change its container habits once established.
- A healthy root system doesn't stop at the container stage. Moisture is most often the limiter of a good root system and many people do not water deeply enough. Most people also water only underneath the plant, but roots extend quite a distance from the plant, much farther than the canopy, especially tree roots. To get a good root system established, deep water consistently so that the roots become healthy and extensive, not just under the surface of the soil. Drip irrigation, set properly, will accomplish this with the least hassle. Watering with a hose poses a challenge. Much water evaporates and/or runs off with

hose watering. If using a hose, make sure you have plenty of time to let water slowly trickle either in a number of places around the plant.

Fill deep and wide berms or wells numerous times. Watering in early morning or evening lessens evaporation.

- Excessive hedging or pruning also causes a plant to use more water because it increases branching and leaf production where water loss occurs. Excessive feeding will cause a lot of growth that the root system may not be able to sustain.
- Even after you have paid attention to all these details, and you have developed healthy plants, some years are really tough on plants. Many years it has been so dry that even the creosote bushes and jojobas drop leaves and struggle to survive. During these years it is important to pay attention to your plants whether they are just getting established or have been around a while.

Though a challenge, establishment of a drought tolerant landscape is not impossible. It doesn't happen overnight though, and takes effort, education and patience. Remember, all plants need water, and there are many elements that determine how you should water. Watering should vary with season, age and condition of the plant, growth activity, soil, slope of the ground, and watering method. There are many classes and seminars where one can learn specific techniques for planting and irrigation. They are well worth attending. If you want a truly native and natural landscape, you can always go hiking and see the real thing, which cultivation cannot replace. Considering that there are many different elements and rules to cultivation, if you are pragmatic, you will succeed in creating a landscape that is indeed drought tolerant.

For seminars on drought tolerant landscaping, call Maricopa County Cooperative Extension (602) 470-8086 ext. 301 or Pima County Cooperative Extension (520) 626-5161

BOOK REVIEWS

Hidden Trails in the Sonoran Desert: Hiking the Desert Wilderness of South Central Arizona

by Henry Hunt

This useful book provides a great deal of information about hiking in five areas in Arizona, but it goes far beyond the usual hiking guidebook, in that it also gives a interesting information about geology, flora, and fauna of the regions. The five areas are the North Maricopa Mountains, South Maricopa Mountains, Table Top Mountains, Sierra Estrella Mountains, and Sentinel Peak Desert Area. Rather than providing plant lists, it highlights some interesting species of each area. For example, in the Table Top chapter, the author contrasts three plants commonly referred to as crucifixion thorn - *Koeberlinia spinosa*, *Holacantha emoryi*, and *Canotia holacantha*, (only one of which is found at Table top) along with ethnobotanical information. This chapter also describes an area where wildflowers might be found. The Sierra Estrella chapter discusses Gila monsters and iguanas, with drawings to illustrate the differences in their tracks. The North Maricopa chapter has a section on tarantulas and tarantula hawk wasps. The Sentinel Peak chapter has some interesting history on the town of Sentinel.

The book is written in a personal style, with various anecdotes and stories. Each chapter has clear directions for reaching trailheads and maps of side trails where appropriate. This book should be a useful source of information for people hiking in those areas.



This 251 page book can be purchased at bookstores or ordered directly from The Desert Press, Box 178, Arizona City AZ 85223. 520 466-5342. \$16.95.

Checklist of the Plants of the Cabeza Prieta National Wildlife Refuge Arizona by Richard Stephen Felger is now available from the Drylands Institute, 2509 N. Campbell Ave. #405, Tucson AZ 85719 - www.drylands.org. The list is cosponsored by Friends of Cabeza Prieta, P.O. Box 64940, Tucson AZ 85728 - FoCabeza@aol.com. Both organizations welcome your support and/or membership. Contact them for more information. Friends of Cabeza also has produced a beautifully illustrated booklet describing its proposal to form a new Sonoran Desert National Park which would include Organ Pipe National Monument, Cabeza Prieta National Wildlife Refuge and the Goldwater Bombing Range.

The *Plant Press* is one of the benefits of membership in the Arizona Native Plant Society. It is published three times a year, in October, February and July. Barbara Tellman, Editor, encourages members to contact her with suggestions for feature stories, book reviews, and short articles about plant-related activities and issues throughout the state. Contact her at 520 792-4515 or bjt@ag.arizona.edu

ANPS DUES WILL INCREASE

For the first time in more than twenty years, the board has decided it is time to increase dues. The income is needed for several purposes, including increased efforts to conduct educational activities and improve community outreach. Starting January 1, 2000 dues will be \$15 for students and seniors, \$20 for general membership, and \$35 for organizational members. ANPS dues will still remain among the lowest of any non-profit groups in Arizona.

UPCOMING MEETINGS

ARIZONA NATIVE PLANT SOCIETY ANNUAL MEETING

October 9 -10 in Prescott

This year's meeting will be hosted by the Central Highlands Chapter and will feature talks about the highland area and its plants and conservation issues. As usual, interesting field trips are planned. Meeting announcements will be mailed to members during the summer.

CHIRICAHUA WORKSHOP

The Annual Labor Day Workshop will be held again in Portal. If you have not received a mailing with full information about the many interesting speakers and trips, contact ANPS, P.O. Box 41206, Tucson AZ 85717.

1999 NATURAL AREAS CONFERENCE OCTOBER 13 - 16, 1999 TUCSON,

This 3-day conference will feature talks, workshops and field trips on planning for natural areas, from site-based planning to reserve design for integrated networks on conservation lands. Sessions relating to the Southwest, but also having broader implications are being organized. For more information, contact Robert Frye, The Wildlands Project, P.O. Box 5365, Tucson AZ 5703 or confreg@twp.org.

RENEWED PRESCOTT AREA CHAPTER

The Prescott area chapter of the Native Plant Society has recently been resurrected. After several organizational meetings, it was determined that there is enough local interest in promoting an awareness and appreciation of the native flora to sustain the chapter. Under its new name, the Central Highlands Chapter has high hopes. Jeff Hogue, botany instructor at Yavapai College, will serve as president. After a brief hiatus over the summer, the chapter will begin holding monthly meetings featuring guest speakers, in addition to field trips and other events. Central Highlands Chapter will host the October ANPS Annual Meeting.

The population in the tri-city area (Prescott, Prescott Valley and Chino Valley) has grown steadily in the past few years. There are many urgent issues that need to be addressed. These include, but are not limited to, the need for proper utilization and conservation of plants indigenous to Arizona; xeriscaping with native and other drought-tolerant plants to reduce water use in landscapes; and the need to promote awareness of the unique nature of the flora in the central highlands of Arizona.

Monthly meetings will be held at the Yavapai College campus.
For more information, contact Jeff Hogue at 520 776-2338.

NEW MEMBERS WELCOME

People interested in native plants are encouraged to become members. People may join chapters in Central Highlands, Flagstaff, Phoenix, Tucson, and Yuma or may be members only of the statewide organization. For more information, write to ANPS at the address below, visit the Web site <http://www.azstarnet.com/~anps/> or contact one of the people below.

State co-presidents:	Sue Rutman	520 320-1032	Mima Falk	520 387-6281
Central Highlands (Prescott)	Jeff Hogue	520 443-1425		
Flagstaff President:	Beverly Loomis	4716 E. Hightimber Lane,	Flagstaff	86001
Phoenix President:	Kathy Rice	602 808-9304		
Tucson President:	Jared Shortman	520 882-7060		
Yuma President:	Pat Callahan	520 627-2773		

MEMBERSHIP FORM:

Name _____
Address _____
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Phone Number _____
Chapter preferred: State Central Highlands Flagstaff Phoenix Tucson Yuma
Enclosed: \$10 Student/Senior \$15 Individual or Family \$25 Organization
 \$ 50 Commercial/Sponsor \$100 Patron
Starting Jan. 1, 2000, dues will increase by \$5.

Mail to: Arizona Native Plant Society
P.O. Box 41206, Sun Station
Tucson AZ 85717

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