



The Plant Press

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Phoenix
Prescott
South Central
Tucson
Yuma

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After K & P, What?

By Horace P. Miller

By this time, most of our members are aware that the basic text on Arizona vascular plants, Kearney and Peebles' Arizona Flora, has been allowed to go out-of-print by the University of California Press. That is the bad news. The good news is that an editorial board of eminent botanists has been formed to compile and publish a new comprehensive flora for Arizona to be entitled Vascular Plants of Arizona. The members of this editorial board are: Dr. Frank Crosswhite, Curator of Botany at the Boyce Thompson Southwestern Arboretum and editor of Desert Plants (Editor-in-Chief); Dr. Richard Felger, authority on the flora of the Sonoran Desert; Dr. Leslie R. Landrum, Curator of the Arizona State University Herbarium; Dr. Charles T. Mason, Jr., Curator of the University of Arizona Herbarium; Dr. John Reeder, our leading agrostologist; and the coordinator of the project, Rebecca Van Devender, Assistant Curator of the University of Arizona Herbarium.

Unfortunately, such an undertaking will take considerable time; the anticipated date of publication is eight years away -- in 1995. Some may wonder why not attempt to induce some other publisher (the UA Press, for example) to reprint the present "K & P" as is? The basic answer to that question appears to be that Arizona Flora is very much out-of-date. The last edition (the second, with supplement) came out in 1960. Since then, we have had assistance in keeping up with taxonomic name changes, additions and eliminations in the Arizona flora through the valuable work by J. Harry Lehr, formerly Curator of the Desert Botanical Garden: A Catalogue of the Flora of Arizona, and two supplements thereto, published in 1980 and 1982 in the Journal of the Arizona-Nevada Academy of Science, both compiled by J. Harry Lehr and Donald J. Pinkava. Another supplement is much needed.

I do not have a count of the number of taxonomic changes that have occurred in our flora since 1960, but some indication of its magnitude may be gained by noting that the first supplement to Lehr's Catalogue in 1980 alone added three families and 44 genera to its index, and one family and 17 genera were eliminated. Taxonomists, it seems, are rarely idle and, as a result, all floras require frequent revision.

The board of editors is now in the process of establishing such basics as: size of the book; illustrations; revision of the glossary; descriptions of taxa; form of the key (indented or not), etc. While all of these matters are still under study, some tentative decisions have already been made. The manual will be a single volume work, roughly the size of K & P. It will have a limited number of illustrations (drawings) to show taxonomic details difficult to convey in words. A new improved glossary will be compiled that will be adhered to by all contributors -- and will strive to simplify such semantically difficult areas as degrees of hairiness (now covered by a bizarre vocabulary including pubescent, hirsute, pilose, pilosulous, etc.).

As to plant descriptions, the principal deficiency of the present K & P is that it does not describe taxa lower than genera. Except for location information, plant determinations must be made on the basis of the analytical key only. Quite often, one needs more! While the overall size of the manual is expected to be about the same as K & P, judicious use of abbreviations and some other editorial expedients are expected to provide space for much needed plant description. In a word, quite a few decisions have to be made before detailed writing can commence.

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Hopi Lima Beans

By Kevin Dahl

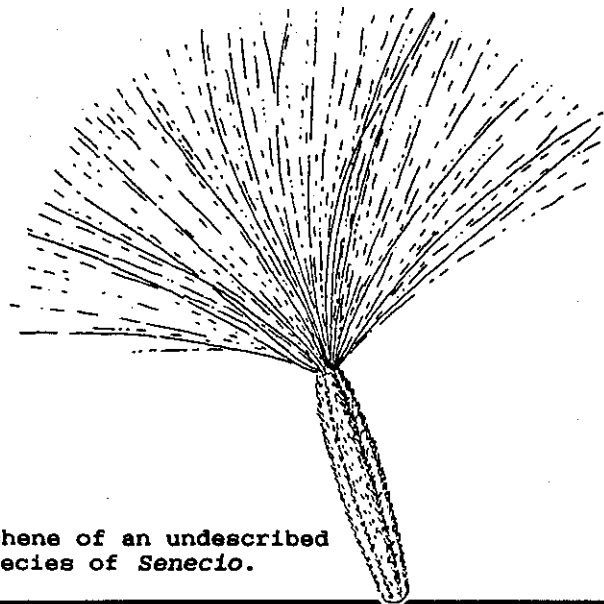
Lima beans. Some people adore the buttery taste and texture of lima beans while others avoid them like a blind date. To the Hopi Indians of northern Arizona, they are more than just a preferred or detested soup ingredient: *hatigo* is an important crop and food source, and an essential element in a ceremony that initiates children into adulthood while helping to insure the year's harvest.

Phaseolus lunatus L. is thought to have originated in Guatemala, where today perennial viney varieties can still be found in the wild. It apparently spread along trade routes both north and south. European explorers found it being cultivated throughout the southern United States and in the Southwest, as well as in the Caribbean and South America. In the U.S., the greater diversity of lima bean varieties found amongst southwestern Indians suggests that it came here first before travelling along trade routes to the east coast.

Tropical varieties of lima beans have trouble growing in more temperate zones because of photoperiodism, the effect of length of day upon plants. These plants won't fruit until the length of day equals the length of night, which is too late in fall for fruit to mature anywhere but in

ILLUSTRATIONS

All illustrations in this issue of the *The Plant Press* are by Matt Johnson. Except for the "Punk Portulaca," they will appear in the forthcoming book, *Plants of the Pinacate Region of Sonora, Mexico*, by Richard S. Felger.



Achene of an undescribed species of *Senecio*.

the tropics. The slow adaptation to temperate zone day lengths as lima beans spread north to the Southwest cannot be calculated, but does attest to the antiquity of this process.

The Hopi's use of lima beans in their ancient ceremony of *Powamu* also indicates the long use of this crop in the Southwest. Held two lunar months after solstice, *Powamu* is said to help melt the snows, banish cold weather, and prepare the fields and gardens for planting. It is also the time when children six to eight years old are initiated into either the *Katcina* or *Powamu* societies, when they learn that the *Katcinas* that visit the villages during important ceremonies are not actual deities but are represented by people.

Lima beans play a key role in the ceremonies, which can last as long as 16 days. Beans are planted in containers inside kivas, where for eight days they are kept warm with fires going day and night. They are carefully tended with water, prayers and ceremonies, for as one Hopi man described, "a fine growth of bean sprouts is regarded as a good omen for a rich harvest."

The beans sprouts are cut and tied in bundles using cord made from yucca, and used in ceremonies and dances. Later, the bean sprouts are distributed and eaten. By physically demonstrating the germination and growth of the crops, and by association, the growth of children into adults, the lima bean plants play an essential role throughout the *Powamu* ceremonies.

The Hopi grow six recognizable varieties of lima beans, differentiated by the color of the bean: gray, red, orange, speckled, white and black. They are dryland farmed under harsh conditions and not surprisingly have become very hardy and resistance to pests such as root-knot nematodes. Like all lima beans, the Hopi varieties are high in protein, vitamins thiamine and riboflavin, and in phosphorus and iron.

Native Seeds/SEARCH growers have had tremendous production growing Hopi Lima Beans under normal garden conditions. They are a pole bean, and are best staked to reduce losses due to mold. Mark Dimmitt, growing them in Tucson, has reported that they have even overwintered for him to produce beans the next year, but for most gardeners these are annual plants. Mark, who is among those counted as lima bean lovers, says his favorite recipe for them is as a simple side dish with just a bit of ham for flavoring.

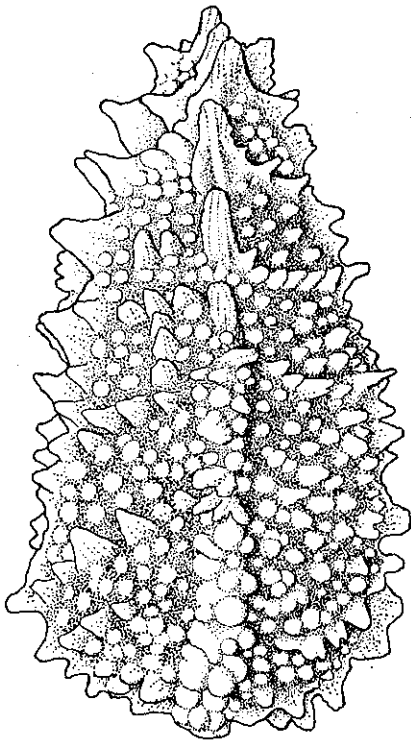
Note: Native Seeds/SEARCH now has a 45-minute slide-tape presentation available for interested groups. To schedule a showing, contact Martha Ames Burgess (address on back page).

Can Tamarisk Be Controlled?

By Stephen Johnson

What uses five million acre-feet of water a year and has disrupted or destroyed more than a million acres of riparian vegetation? What threatens to eradicate the West's last remaining habitat for yellow-billed cuckoos and elf owls? What pulls water supplies for bighorn sheep, rare pupfish and salamanders, and desert palm groves? Answer, the tamarisk (*Tamarisk* sp.).

In the arid West, where water is life, the tamarisk tree has made few friends. Bill Neill, California's one-man war on this plant, describes the problem in uncharacteristically dispassionate terms: "Tamarisk is a virulent pest in desert riparian areas because it aggressively displaces native trees and shrubs... and it is a poor source of food and shelter for desert wildlife." What's more, according to Neill, the plant extracts water from the ground at a high rate and transpires it at an equally high rate. This little tree has wrought a major economic and ecological disaster that must be reversed or an essential component of the West's natural diversity will be lost.



Amsinckia intermedia, Fiddleneck, nutlet

Sometimes called salt cedar, tamarisk is not native to the North American continent. The nursery trade brought several deciduous species of the genus *Tamarix* to this country from Eurasia in the 1850s for use as an ornamental, as a windbreak, and as a means of erosion control. This slight, feathery tree or large shrub with its stunning sprays of pink to almost white flowers was extolled for its hardiness in certain climates. Those claims weren't exaggerated. Virtually unknown in the wild at the turn of the century, by 1920 tamarisk had spread, on its own, to some 100,000 acres of streamside and floodplain. Today it covers well over a million acres in fifteen states and is still spreading. In California it lays claim to roughly 16,000 acres.

The tamarisk has a bag of survival tricks unequaled by any of the West's native vegetation. One single plant can produce hundreds of thousands of pollen-sized seeds that are easily scattered by wind and water. They also cling to fur and feathers. As a result, they are carried upstream, downstream, and even to entirely new watersheds. Too small to be eaten by birds or rodents, the seeds germinate in a wide variety of conditions and sprout like lawn grass—especially on freshly flood-scoured stream banks or along receding lake margins.

Once established, salt cedar seedlings grow faster than native plants—thereby crowding and outcompeting for sunlight—and mature trees will sprout back after fires that kill many of the native species. Tamarisk does not succumb to insect pests in this country; it can't be killed by foliar applications of herbicide; and its scale-like leaves are unpalatable to grazing animals. Moreover, removing the trees by cutting can result in regrowth of more than four feet in one month's time.

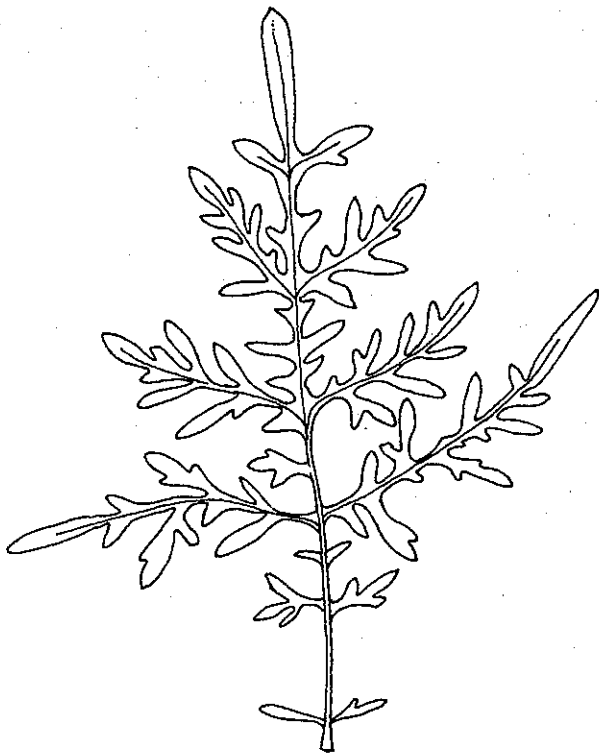
The tamarisk is a phreatophyte, a plant that survives in dry climates by extending its roots all the way down to the water table. With this virtually unlimited supply of moisture, the phreatophytes have never developed the water-conserving adaptations of other desert vegetation. But the exotic tamarisk uses far more water than do the native phreatophytes -- more than any other native phreatophyte. One large tree can absorb 200 gallons of water a day. That's about the amount a small family uses. Given a conservative estimate of a million acres of tamarisk, this plant species consumes nearly twice as much water as do the major cities of southern California. The dollar value of this lost resource is huge, but the cost to natural diversity -- which is concentrated in or near water in the arid West -- is even higher.

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Tamarisk *continued*

For example, native riparian vegetation in western states provides habitat for the greatest concentration of non-colonial nesting birds in all of North America. Springs and small desert pools support the West's rarest species, from pupfish to desert fan palms. But because of its prodigious water consumption, the tamarisk can desiccate springs, drain pools, and even dry up perennial streams. In the California desert, hundreds of fragile oases are affected. The loss of wildlife resulting from this depletion of water has not been systematically assessed, but it must be enormous.

The damage caused by salt cedar is not limited to stilling the flow of western waters; it also poisons soil and ground water. Through glands in its leaves, tamarisk secretes salt, which falls to the ground in the form of



Ambrosia confertifolia

crystals and creates an environment that few native plants can tolerate. Caught between the more vigorous tamarisk and the salt-laden soils, the native trees and shrubs rapidly disappear. In fact, a tamarisk-infested site soon becomes a single-species thicket -- poor habitat for native fauna as well.

Bertin Anderson and Robert Ohmart of Arizona State University conducted a major comparative study along the lower Colorado River to evaluate the extent to which birds use native vegetation versus tamarisk trees. They stated that "the value of salt cedar to birds was found to be minimal when compared with (that of) other vegetation." The problem was particularly acute in winter, at which time Anderson and Ohmart discovered that the portion of the study site bearing native flora sustained a density of 154 birds per hundred acres, while the rate for the tamarisk-dominated area was four birds per hundred acres. If you consider that at least a million acres are overrun by salt cedar, it is understandable why the yellow-billed cuckoo has declined from a population of tens of thousands of pairs on the lower Colorado to the tens of pairs currently found there.

Tamarisk is not solely responsible for the West's dwindling water supplies and the destruction of native riparian vegetation. Dams, levees, diversion projects, and agriculture have taken massive tolls on land and water. But what progress has left untouched, tamarisk is claiming. However, it is not winning everywhere.

Because of invading salt cedar, many of the desert pools at Death Valley National Monument had disappeared. After experimenting with numerous eradication techniques, the U.S. Park Service found the best method: crews using hand or chain saws cut the plants down to ground level and then applied a systemic herbicide directly to the stumps to inhibit resprouting. Although labor-intensive, this is the only technique currently known to be suitable for use in ecological sensitive areas. The pools in Death Valley are back.

In California and other states, volunteers led by dedicated conservationists like Bill Neill also are using the above method to eliminate tamarisk from key sites on Nature Conservancy, state, and Bureau of Land Management holdings. Nonetheless, while it is effective in fragile areas, hand removal can be done only on a small scale. It can't be used to clear or even control a million acres of undesirable vegetation.

On major western rivers where tamarisk totally has replaced native

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Tamarisk *continued*

vegetation, conservationists face a double challenge. First, how do they eradicate the trees? Second, how do they ensure the return of native flora? Working with the Bureau of reclamation, Ohmart and Anderson have restored an area on the lower Colorado River. Here, an impenetrable thicket of tamarisk was bulldozed, and the roots were cut below the soil surface using a massive root ripper pulled behind a bulldozer. The site was then carefully planted with appropriate native vegetation, and each plant was irrigated until its survival was assured. This project was most successful, but the price tag was high: more than \$2,000 per acre, not including the cost of the clearing.

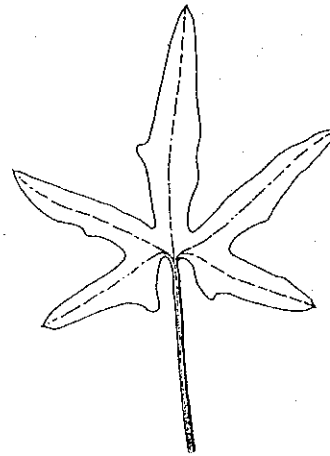
Although biological control is risky, it may offer the greatest potential for a large-scale solution to salt cedar. Fortunately, the genus *Tamarix* belongs to a small family of plants (the Tamaraceae) of which there are no native species in the United States and no significant agricultural products. Thus, with nothing botanically related to tamarisk, it may be possible to import a pest that will attack only salt cedar -- not crops or plants native to this country. But the research to find such an insect or pathogen has not yet been seriously undertaken and would take years of experimentation and testing before control could be tried in the wild. Only the USDA has the authority and expertise to carry out biocontrol research programs; they need to be encouraged to undertake such a project.

Meanwhile, the balance of natural diversity in the West cannot be restored unless tamarisk is controlled. Controlling tamarisk will take everyone's help -- BLM, the National Park Service, the Department of Agriculture, an army of dedicated volunteers, and more.

This article originally appeared in The Nature Conservancy News, October-November, 1986, and was reprinted in Fremontia: A Journal of the California Native Plant Society, July 1987.

SPEAKERS BUREAU

The ANPS Board of Directors is trying to compile a list that will be made available to the public of speakers on plant and conservation related topics. Contact Kathryn Michel (address on back page) for sign-up sheets.



Cucurbita digitata, Coyote Gourd (immature leaf)

After K & P *continued*

It is presently contemplated that there will be from 40 to 50 contributors to the manual and therein lies a problem. The principal material with which the contributors will be engaged will consist of the hundreds of thousands of herbarium sheets in the three large Arizona herbaria in Tucson, Phoenix and Flagstaff. Were the contributors to conduct all of their studies in their home institutions scattered around the country, then the herbaria would face the nightmare situation in which virtually all of the herbarium sheets would have to be packed and sent away -- leaving the shelves close to empty. Clearly this is not the solution.

What must be done is that the contributors come to the Arizona herbaria. However, that involves expense that this largely unfunded project would have difficulty in providing. As a partial solution to this problem, the pragmatic suggestion has been made that those interested in the cause consider offering lodging space in their homes to visiting taxonomists. Such donation of bed and board would cut down expenses enormously and do much to ensure the success of the project. Accordingly, if you live in the Tucson, Phoenix (Tempe) or Flagstaff areas and are interested in so-doing, call or write:

Becky Van Devender
Herbarium
113 Shantz Bldg.
University of Arizona
Tucson, AZ 85712
Telephone: 621-7243

You may have the distinction in your neighborhood of housing one or more of the world's eminent botanists. Think about it.

The Creosote Bush

By Shirley Weik and Guy Acuff

Some creosote bushes (*Larrea divaricata* subsp. *tridentata*) growing on the Mohave desert in California are estimated to be as much as 11,700 years old! They are the oldest living things on earth!

This information may come as no surprise to Pima Indians whose Creation Story teaches that life on earth began with a creosote bush:

In the beginning there was nothing
No sun, no moon, no sky, no stars
Or wind or rain.
Nothing but darkness,
The darkness gathered
For ages and ages.
If formed a great mass
In which was the spirit of
Earth God.
He, like a fluffy wisp of cotton
That floats upon the wind,
Drifted to and fro
Without a place to fit himself.
He knew his power.
He built an abiding place.
He took from his breast some dirt
And made a flat cake of it.
Then he thought deep within himself,
"Come forth, come forth some
Kind of plant".
There appeared a creosote bush...

Today the creosote bush is the most common and most widespread of all our desert plants.

What has enabled this rather amazing species of plantlife to survive for such an incredibly long time is its remarkable ability to adapt to various living conditions. It seems to have most all the survival techniques of desert plants rolled into one! What's more, those old-timers in California seem to have had them right from the beginning. As in the Indian myth, they appear to have arrived as is.

The story of evolution is one of adaptation to changing conditions through chance mutations over several generations.



Cheilanthes deserti (= *Notholaena californica*), Desert Cloak-Fern

But those California creosote bushes are still in their first generation! It's an amazing paradox that what was spawned in the cool, wet climate of maximum continental glaciation (as we know it to have been from fossil remains of plants and animals found in archaeological excavations in the southwest) is better equipped than most any other thing to live in arid conditions.

The forests that once covered much of the southwest have been replaced in many areas, over these last 11,000 years, by vast deserts. And the huge animals that fed on them -- mammoths and mastodons and giant sloths -- have long since become extinct. But those creosote bushes live on. And on. And on.

The features of the creosote bush are rather hard to categorize.

The shrub is perhaps best known for its faintly acrid odor, most pronounced when the air is moist -- as in early morning or after a rain.

It grows in height anywhere from 18 inches to 23 feet, depending on available moisture. Its branches are scraggly or compact, covered year-round with olive-green foliage, and in the spring, with showy yellow blossoms. However, in the heat of summer the leaves may no longer have their characteristic sheen, and the plant has been known to bloom just about any time of year.

These differing features are simply the outward manifestations of the creosote's ability to adapt.

A waxy coating on the leaves is thought to regulate evaporation, though, just how is a bit unclear. In times of extreme heat or little water, the shrub has the ability to lose its leaves altogether (as does the ocotillo) and grows back smaller ones without the shiny surface.

To ensure itself of an ample supply of moisture, the creosote (like the mesquite) sends down a long tap root, to take advantage of any available ground water. It also (like the saguaro) puts out a network of shallow roots designed to catch surface water.

The creosote bush is believed too to "wage chemical warfare" against both plants and animals. As with some other plants in stress situations, the roots release a toxic substance which enables it to kill off any seedlings -- including its own -- to protect its territory. Presumably, this helps to create the characteristic open spacing seen so often on the desert.

Insects, and a reptile known as the chuckwalla, eat creosote twigs and foliage. Though mammals tend to avoid them. Evidently the plant's defenses

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Plant Sales & Events

Feb. 2 - Mar. 8 (Tuesdays), 7 to 8:30 p.m.
Arid Landscaping Plant Materials
Tucson Botanical Garden (2150 N. Alvernon Way, Tucson, 326-9255)

This series of classes is for those who want to know more about what landscaping plants to grow in Tucson. Fees: full series \$20.00 TBG member/\$25.00 nonmember, or \$4.00/\$5.00 per class.

Feb. 2: Trees, Greg McPherson.

Feb. 9: Shrubs, Gregory Starr.

Feb. 16: Ground Covers & Vines, Betts Putnam.

Feb. 23: Perennial Wildflowers, Meg Quinn.

Mar. 1: Succulents, incl. Cacti, Matt Johnson.

Mar. 8: Annual Wildflowers, Rodney Engard. Pre-registration strongly suggested.

March 2-6, 9 a.m. to 5 p.m.

41st Annual Cactus Show & Sale
Desert Botanical Garden (1201 N. Galvin Parkway - Papago Park, in Phoenix)

March 11-13

Southwestern Arizona Dunes Field Trip
Tucson Botanical Garden (2150 N. Alvernon Way, Tucson, 326-9255)

Rodney Engard, instructor. Fee: \$35.00 for cost of instruction only.

Creosote Bush *continued*

include something upsetting to their digestive tracks.

Still, in its struggle for survival, the creosote is not a bad neighbor for other desert life. It provides food for insects, a shady resting place for birds, and a home among its roots for burrowing creatures such as termites, ground squirrels and kangaroo rats, lizards, snakes and toads, which, in turn, aerate the roots and thus help to ensure the plant's survival. The shrub also helps retard erosion (witness the sand hummocks that often build up around them). Even if Indians have nicknamed it "stinkweed," to people like biologist Edmund Jaeger, and us, its "memory-provoking odor" is "distinctly pleasant."

Indian people have long used it as a source of medicine for ailments ranging from arthritis to coughs, chills and even rattlesnake bites. Also a lac gum secreted in the bush by beetles has been used to waterproof baskets, and as a glue for mending.

Modern scientists have extracted an anti-oxidant from the leaves which helps keep fatty foods from turning rancid. Experiments are now being conducted to determine the plant's usefulness in treating certain types of cancer. Interesting to note that this long-lived plant may also someday contribute to the longevity of man.

March 12-13

Wildflower Weekend

Boyce Thompson Arboretum

Write Friends of the Arboretum, P.O. Box 3607, Tucson AZ 85722, for details.

March 13, 10 a.m. to 3 p.m.

16th Annual Flower & Garden Fair

Reid Park, Tucson

March 19-20

Spring Plant Sale

Desert Botanical Garden (1201 N. Galvin Parkway - Papago Park, Phoenix)

March 20

Public Opening of "Plants and People"

Ethnobotanical Trail

Desert Botanical Garden (1201 N. Galvin Parkway - Papago Park, Phoenix)

March 23, 26 or 27, 9 a.m. to noon

Tucson Mountain Wildflower Walks

Arizona-Sonora Desert Museum

Write ASDM Special Events, 2021 N. Kinney Road, Tucson AZ 85743 for more information, or to register (\$5 ASDM member/\$11 nonmember).

March 27 (9 a.m. to 4 p.m.) & March 28 (11 a.m. to 4 p.m.)

Spring Plant Sale

Tucson Botanical Garden (2150 N. Alvernon Way, Tucson)

April (date to be set)

Spring Plant Sale

Desert Survivors (at their new location: 1020 W. 22nd St, Tucson)

April 1 or April 15, 9 a.m. to 2 p.m.

Spring Wildflower Walk, Pima Canyon

Tucson Botanical Garden (2150 N. Alvernon Way, Tucson, 326-9255)

Fee: \$4.00 TBG member/\$5.00 nonmember.

April 2-10, 8 a.m. to 5 p.m.

Annual Spring Plant Fair

Boyce Thompson Arboretum (3 miles west of Superior on U.S. Highway 60)

The big day is April 2, but the Fair will continue throughout the following week.

The sale will feature exhibits, tours, demonstrations, and slide presentations on diverse aspects of arid land plants, including cacti and succulents.

April 9-10,

Spring Gem, Mineral and Plant Sale

Arizona-Sonora Desert Museum (2021 N. Kinney Road, Tucson)

April 9-10, 10 a.m. to 5 p.m.

Home Garden Tour

Tucson Botanical Garden (2150 N. Alvernon Way, Tucson, 326-9255)

Includes refreshments, music and tour of Native Plant Society wildflower garden.

Fee: \$6.00 TBG member/ \$10.00 nonmember.

Dripping Springs Field Trip

By Patrick H. Boles

On September 26, 1987, six members of the Prescott Chapter of the Arizona Native Plant Society visited Dripping Springs, which lies hidden in a small canyon approximately seven miles south of Mayer, in roughly east-central Yavapai County. We parked near the head of the canyon and walked down a west-facing slope to a vantage point atop a rim, scaring up a covey of Gambel quail in the process. From this point we looked down the canyon and could see the lush growth along the stream, below the spring. The location of the spring is marked by the northernmost cottonwoods in the canyon.

Before climbing down into the canyon we first explored the slopes above the rim. On an earlier club outing to Dripping Spring on April 26 of this year the following plants were observed to be flowering on the slopes: strawberry hedgehog (*Echinocereus fendleri*), orange flowered sego lily (*Calochortus* spp.), lupine (*Lupinus* spp.), goldeneye (*Viguiera deltoidea*), banana yucca (*Yucca baccata*), black foot daisy (*Melampodium leucanthum*), Indian paintbrush (*Castilleja* spp.), flax (*Linum* spp.), range ratany (*Krameria parviflora*), and desert globe mallow (*Sphaeralcea* spp.). There were also a few species flowering that were not identified.

During the fall trip the following were blooming: wire lettuce (*Stephanomeria* spp.), black foot daisy (just a few flowers left; it had been in full bloom during the spring visit), and snakeweed (*Gutierrezia sarothrae*; in full bloom). Hollyleaf buckthorn (*Thamnus crocea*) was in fruit in the fall. Blazing star (*Mentzelia* spp.) was in seed. A few flowers were still present on some of the flattop buckwheat (*Eriogonum fasciculatum*) bushes we examined.

On our walk down into the canyon we were surprised to encounter a small speckled rattlesnake curled up next to a prickly pear (later, on our hike back up the canyon in the afternoon we checked the same cactus and found that the snake had moved about three feet to a bare area and was curled up, looking like a red rock). At the bottom of the canyon near the flowing creek we stopped to sample the red berries on a large juniper tree. Unlike most juniper berries, these had a decidedly sweet taste.

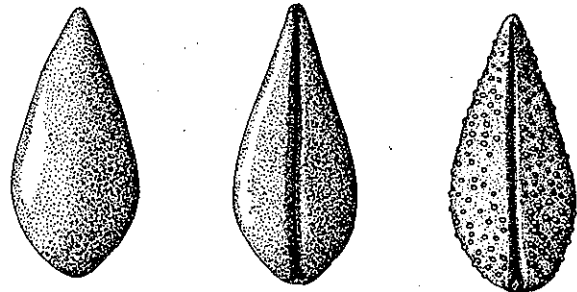
Wildlife in and around the stream included: water boatmen, water striders, ferocious water bugs, leopard frogs, canyon tree frogs, great horned owl, water snakes, and javelina (saw the tracks only), damselflies, dragonflies, purple hairstreaks, a tanager, and phainopeplas. The birchleaf mountain mahogany

(*Cercocarpus betuloides*) bushes above the rim showed evidence of browsing by mule deer.

Poison ivy (*Rhus radicans*: in fruit during our fall visit, however no one opted to collect seeds) was quite abundant in places, e.g. near the spring where we stopped to eat lunch. A netleaf hackberry tree (*Celtis reticulata*) growing near the spring was in fruit. The ripe fruit is pale orange and makes a good snack. Canyon grape (*Vitis arizonica*) was also present near the spring, but unfortunately only a few dried fruits remained on the vines, which were climbing a large Fremont cottonwood (*Populus fremontii*).

Additional plant species observed within the canyon and its surroundings during the spring and fall trips include: desert hackberry (*Celtis pallida*), ocotillo (*Fouquieria splendens*), Engelmann prickly pear (*Opuntia phaeacantha*), wait-a-minute bush (*Mimosa biuncifera*), Utah juniper (*Juniperus osteosperma*), jojoba (*Simonsia chinensis*), twinleaf (*Cassia* spp.), desert-broom (*Baccharis sarothroides*), paperbag bush or Mexican bladdersage (*Salazaria mexicana*), black grama (*Bouteloua eripoda*), sideoats grama (*B. cutipendula*), poverty three-awn (*Aristida divaricata*), red three-awn (*A. longiseta*), spidergrass (*A. ternipes*), Canotia (*Canotia holacantha*), graythorn or lotebush (*Condalia lycioides*), saltcedar (*Tamarix chinensis*, in flower during the spring visit), California brickelbush (*Brickellia californica*), trailing four-o'clock (*Allionia incarnata*, flowering in the fall), watercress (*Rorippa* spp.), agave (*Agave parryii*), four o'clock (*Mirabilis longiflora*), barrel cactus (*Ferocactus acanthodes*), penstemon (*Penstemon eatonii*), sacred datura (*Datura meteloides*, in flower in the fall), soapberry (*Sapindus saponnaria* var. *drummondii*), mesquite (*Prosopis*

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Cryptantha micrantha, nutlets, showing dorsal and ventral sides

Two Recent Additions To The Arizona Flora

By Jack Kaiser

Talinum marginatum Greene (Portulacaceae)

A caulescent dwarf, the tuft of leaves and inflorescence barely two inches tall; root nearly globose to fusiform; leaves terete, 1.5-2.5 mm in diameter, more or less linear with blades up to 6 cm long, with a distinct petiole; cymes scarcely equaling the leaves, few flowered; corolla yellow-orange, petals mostly 2.5-3.5 mm long.

Species was described by E.L. Greene in 1910 based on a collection by J.N. Rose from the Sierra Madre near Tepic, Mexico, in 1897. First collected in the United States in 1980 by L.J. Toolin who found it in Ramsey Canyon, Huachuca Mts., Cochise County, and later plants were found on rocky ledges by the Reef Mine.

At the end of July 1986, Paul Neal while working on *Talinum humile* Greene, found one site of *Talinum marginatum* a short ways east of the known *Talinum humile* locations in Arizona and another site on U.S. Forest land a short ways west

of there. This species grows on a thin gravelly soil.

On August 14, 1987, I visited the U.S. Forest Service site. The plants were in bloom with one to three flowers open on each plant. A week later I returned and not a flower was showing. The plants blended in so well with the gravel and other vegetation that I had to get down on my hands and knees to locate them, but I did count 63.

Talinum humile Greene

A tufted perennial 2-3 inches tall, smooth, and hairless coming from a tuber 1-1.5 inches long; succulent leaves cylindrical 2.0-2.9 inches long forming a basal cluster; flower stalks branching, not exceeding the leaves; 5-10 flowers in terminal clusters; petals about 4 mm long, pale yellow changing to orange in drying. Originally known only from a rocky tableland about 7,000 feet near the southern base of the Pinos Altos Mts., southwestern New Mexico. First found in Arizona on Sept. 28, 1980 (No. 1393 Kaiser), about five miles south of Sonoita below the house at the old Jack Everhart ranch. Since then more plants have been found north of the house above where the road enters the property, all growing on a sandy clay soil.

Note: Paul Neal is with the Dept. of Ecology and Evolution, Div. of Biological Sciences, State University of New York at Stony Brook. The summer of 1984 he and two other young people were at the Research Ranch, south of Elgin, and were interested in some of the rarer plants of southern Arizona. They contacted me and I took them into Sycamore Canyon near Ruby. They were very interested in what they saw, but it was too far to travel back and forth. On July 17 I took them to the Everhart Ranch and showed them the *Talinum* which no one in this area could identify. They went to work tagging plants and taking measurements. Paul sent specimens to Dr. R.W. Kiger who identified it as *Talinum humile* Greene. Since then he has been working to get both species put on the endangered species list.

Dripping Springs *continued*

juliflora), monkeyflower (*Minulus* spp.), desert needlegrass (*Stipa* spp.), columbine (*Aquilegia* spp., flowering during both our spring and fall visits), four-wing saltbush (*Atriplex canescens*), willow (*Salix* spp.), rock pea (*Lotus rigidus*, in flower in the spring), cattails (*Typha latifolia*), pea vine (*Lathyrus* spp., in flower in the spring), and skunkbush sumac (*Rhus trilobata*).

Those visiting Dripping Spring for the first time usually express their surprise at the lushness and diversity of this little oasis hidden in what from a distance appears to be barren hills. Upon close inspection even the surrounding hills have a diverse and interesting assemblage of species. However, we all agreed that the real jewel was the riparian area awaiting us at the bottom.

As an historical footnote, one visitor did not have such an enjoyable time at Dripping Spring. In 1873 John Townsend, a noted Indian fighter, tracked a small group of Apaches to Dripping Spring. The Indians had earlier raided his ranch near the Agua Fria River. After Townsend's horse returned to the ranch, a search party was sent out, which discovered Townsend's body at Dripping Spring. He had found the Apaches. Seen in the proper perspective, our encounter with a rattlesnake wasn't all that troublesome.

WILDFLOWER SLIDE SHOW

"Wildflowers of the Southwest" is a 15-minute slide show produced by ANPS members. It is available for showing to any interested groups. For more information, contact Barbara Tellman in Tucson at 792-4515.

CHAPTER NEWS

YUMA CHAPTER

Meetings take place the third Monday of each month at 7:30 p.m. at the University of Arizona's Yuma Valley Agricultural Center.

PRESCOTT CHAPTER

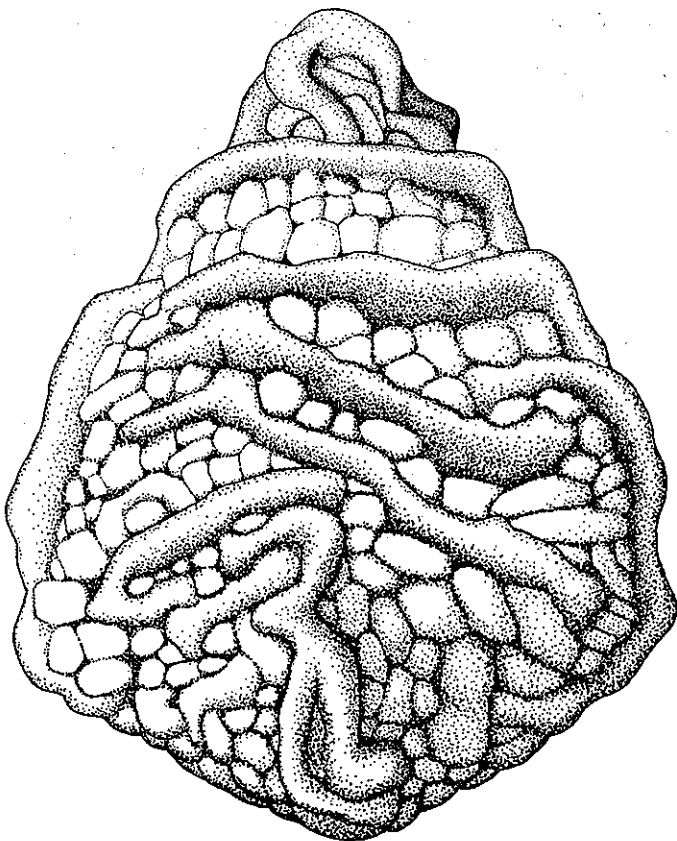
Meetings are held every second Friday of the month at 7 p.m. at the Yavapai Rehabilitation Center, 436 N. Washington. January guest speaker is D. L. Samuelson who will show his slides on Arizona flowers.

Field Trips:

(Meet 8 a.m. at Rehabilitation Center).

Feb. 13 Desert Botanical Garden

Mar. 13 Santa Maria River



Amsinckia tessellata, Fiddleneck, nutlet

PHOENIX CHAPTER

Meetings:

The following meetings are held on the second Monday of each month at 7:30 p.m. at the Desert Botanical Garden's Webster Auditorium, located in Papago Park at 1201 N. Galvin Parkway.

Jan. 11 Janice Bowers
Vegetation of the Sand Dunes

Feb. 8 Kent Newland
Xeriscape

Mar. 14 AZ-Sonoran Desert Wildflowers
ANPS Slide Show

Apr. 11 Bob Breunig, Desert Bot. Garden
Rare Plants

Field Trips:

Jan. 16 Red Mountain, east of Phoenix
and north of Mesa

Feb. 21 Peralta Canyon, east side of
Superstition Mountains

Mar. 19 Organ Pipe Cactus National Mon.
& 20 Ajo Mountains

Apr. 16 Joshua Tree Parkway, Wickenburg

News:

Chapter president Dan James was married on Dec. 14. His new wife's name is Pauline.

SOUTH CENTRAL CHAPTER

Regular meeting times are the first and third Saturdays of each month, through May, 10 a.m. to noon, at the Signal Peak campus of Central Arizona College, located at the intersection of Woodruff and Overfield Roads mid-way between Coolidge and Casa Grande. Business meetings and programs are held the first Saturday in the Community Room. Work sessions preparing clay name-plates to be used for marking campus plants are held on the third Saturday, in the Arts & Crafts Building. The name-plates are the first phase of a self-guided campus botanical walk.

CHAPTER NEWS *continued*

TUCSON CHAPTER

Meetings:

Regular meetings are held on the second Wednesday of the month at 7:30 p.m. at the Tucson Botanical Garden, 2150 N. Alvernon Way.

- Jan. 13 Dr. Richard S. Felger
"The symbiosis of plants and man in the Tahr Desert: Is this the future of the Sonoran Desert?"
- Feb. 10 Dr. Jim Zimmerman
"Oaks and Gall Wasps"
- Mar. 9 Gary Mascarinec and Rita Anthony
"Collecting Sonoran Seeds"
- Apr. 13 Carlos Nagel
"Is the water safe to drink?: Mexican border environment"
- May 11 Rick Taylor
"Islands of the Sea of Cortez"
(End of Spring Term Potluck starts before speaker at 6 p.m.)

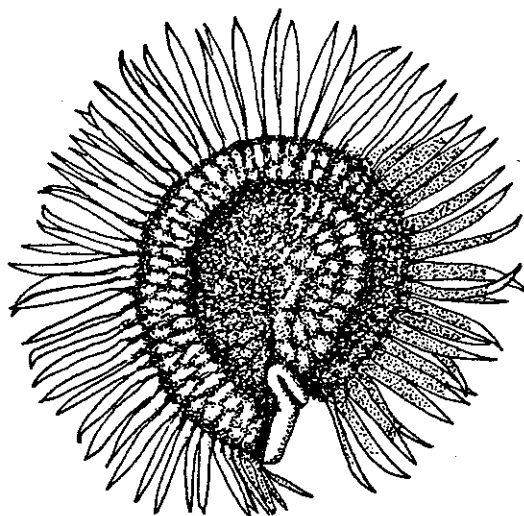
Field Trips:

- Jan. 16 Tour of B&B Cactus Farms & Tanque Verde Greenhouses
- Feb. 7 Mustang Mountains, Cochise County, led by Gene Joseph
- Feb. 28 Waterman Mountains, led by John Wiens
- Mar. 5 Buenos Aires Ranch threatened species survey with Sue Rutman & 6
- Mar. 19 Organ Pipe Cactus Nat'l Mon., & 20 led by Stephanie Meyer
- Apr. 2 Ragged Top Mountain, led by John Wiens
- Apr. 8-10 Cabeza Prieta Wildlife Refuge, led by Larry Stallcup
- Apr. 29- May 2 South rim of Grand Canyon, threatened species survey with Sue Rutman

Other Events:

Taxonomy Class. Encouraged by the success of Dr. Felger's class in the fall, the Tucson Chapter will sponsor another series of classes this time to be taught by Dr. Charles T. Mason, Jr., Curator of the University of Arizona Herbarium. For details, write or call Susan Husband, 1422 East Miles, Tucson 85719, 624-3301.

Arbor Day. On Feb. 15, ANPS will participate in a tree planting in Reid Park.



Portulaca johnsonii, the Punk Portulaca, from Plants of the Guaymas-Rio Yaqui Region of Sonora, Mexico. Illustration by Matt Johnson.

MEMBERSHIP APPLICATION

Membership classes:

<input type="checkbox"/> Lifetime	\$1000.00
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<input type="checkbox"/> Sponsor	50.00
<input type="checkbox"/> Commercial	50.00
<input type="checkbox"/> Institution (including clubs & societies)	25.00
<input type="checkbox"/> General (including individuals & families)	15.00
<input type="checkbox"/> Senior Citizen & Student	10.00

Chapter affiliation:

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Clip and mail this form together with proper remittance to:

The Arizona Native Plant Society
P.O. Box 41206
Tucson, AZ 85717

OFFICERS

Stephanie A. Meyer, President 296-4385
 1801 N. Calle Serena, Tucson 85712
 Karen Reichhardt, Vice-President 481-9561
 434 E. Beatryce, Tempe 85281
 June Burlison, Secretary 575-8817
 8851 N. Oracle Rd. #101, Tucson 85737
 Horace P. Miller, Treasurer 297-4633
 6010 N. Canyon Dr., Tucson 85704
 Irving Vincent, Statutory Agent 868-4244
 P.O. Box 651, Florence 85232

EX-OFFICIO

LeRoy Brady 255-7357
 1428 N. Del Mar, Mesa 85203
 Dr. Howard Scott Gentry (hon.) 946-2183
 2336 N. 57th Pl., Scottsdale 85257
 William A. Kinnison 723-4141
 1269 E. 11th St., Casa Grande 85222
 Dr. William G. McGinnies (hon.) 297-1506
 2001 W. Rudasill Rd., Tucson 85704

CHAPTER PRESIDENTS

PHOENIX: Dan James 899-2564
 2109 Tysen, Chandler 85224
PRESCOTT: Patrick H. Boles 778-9567
 372 Dogwood Lane, Prescott 86301
SOUTH CENTRAL: Lewis Ehrlich 466-5107
 P.O. Box 2343, Arizona City 85223
TUCSON: Matt Johnson 886-6130
 9159-H E. Broadway, Tucson 85710
YUMA: Ross Rodney 343-1492
 2025 Cottondale Ave., Yuma 85364

OTHER BOARD MEMBERS

Martha Ames Burgess 622-1370
 2602 W. Calle Paraiso, Tucson 85745
 Mark Dimmitt 883-1380
 4331 N. Oxbow Rd., Tucson 85745
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 3932 E. 1st St., Tucson 85711
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 P.O. Box 1602, Nogales 85628
 Michael Kuzmik 968-0969
 1544 W. 6th St., Tempe 85281
 Andy Laurenzi 622-3861
 300 E. University #230, Tucson 85705

Kathryn Michel 627-2410
 Box 475, Somerton, AZ 85350
 Jeanette Milne 774-1441
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 8376 Cave Creek Stage, Cave Creek 85331
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 1635 W. Gardenia Dr., Phoenix 85021
 Dr. Barbara Phillips 774-5211
 MNA, Rt. 4 Box 720, Flagstaff 86001
 Meg Quinn 883-1380
 4500 W. Speedway, Tucson 85745

MEMBERSHIP INFORMATION

The Arizona Native Plant Society, incorporated as a non-profit tax-exempt organization in 1976, is recognized throughout Arizona for its leadership in promoting a better appreciation of our native flora, in protecting and preserving these plants and in encouraging their use for landscaping and improving our environment. Membership is open to any interested person, family, or other group. Please use the membership application located elsewhere in this newsletter.

NEWSLETTER CONTRIBUTIONS

Contributions of articles, artwork and letters to the editor are gladly received. Please direct all contributions to the newsletter to:

Kevin Dahl, editor
 3938 E. Grant #231
 Tucson, AZ 85719
 881-0807

NEXT DEADLINE IS:

March 31, 1988

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

The Arizona Native Plant Society
 P.O. Box 41206
 Tucson, Arizona 85717



If you move, please send us a change of address. Bulk mail isn't forwarded.