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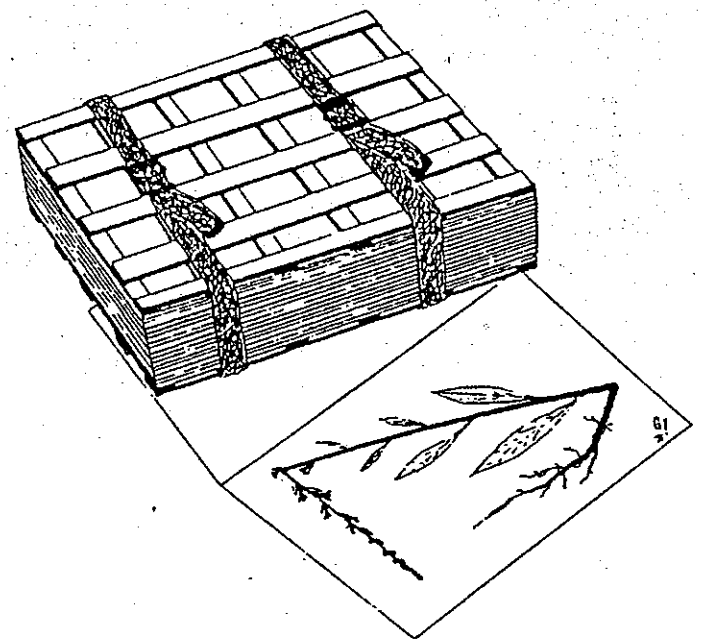

the plant press

NEWSLETTER OF THE ARIZONA NATIVE PLANT SOCIETY

THE PLANT PRESS, Newsletter of the Arizona Native Plant Society is printed quarterly. Volume 5, Number 2, Summer 1981

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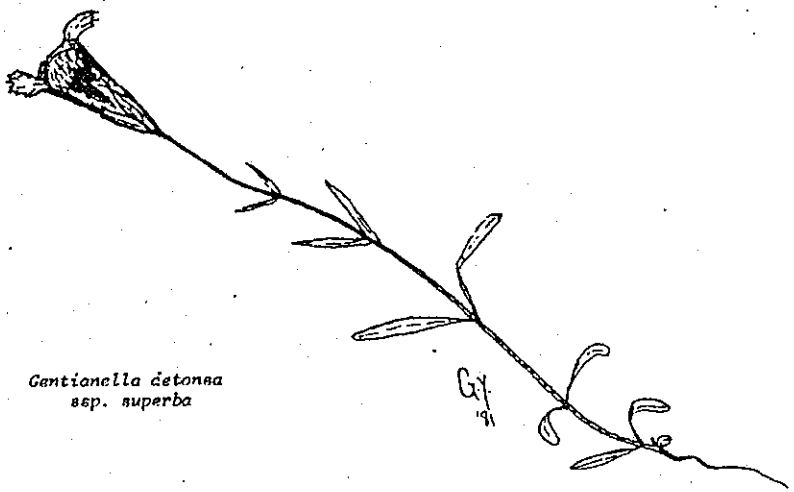


Gentianella detonsa ssp. superba

EDITORS' PAGE

Another issue of the Newsletter brings more changes. You may notice that this issue is somewhat more substantial than the last one, and that is because you are really holding two issues in one. Because it took the Society so long to finally convince us to volunteer for this enterprise, we simply won't have enough months this year to complete the full four issues. Instead, we hope to add extra pages to this and the next issue.

Most prominent of the changes this issue is our new name. Our "Name-the-Newsletter" contest attracted over fifty entries, and we want to thank all of those who took the time to write. The choice was a hard one for the State Board, but the eventual winner was "The Plant Press", which was submitted by June Hirsch of Tucson. June was awarded the prize, a copy of Benson and Darrow's Trees and Shrubs of the Southwestern Deserts.

Just because the contest is over does not mean that you cannot write to us any more. In fact, we want to stress again that THIS IS YOUR NEWSLETTER! We need your notes, letters and articles, as well as your comments and criticisms. These are necessary to keep the Newsletter healthy and diverse in content. Starting this issue, we are including a letters column, which is intended as an open forum for Society members to voice their opinions on Society matters and native plants in general. We are especially solicitous of members of the Phoenix chapter. Because both of us reside in Tucson, we have less direct contact with you folks in Phoenix. The result is that we get less input from you. For example, roughly 75% of the contest entries were submitted by Tucson members, although most Phoenix members received their newsletters a full week earlier.

For the benefit of those Society members who have lost or forgotten our address we remind you that it is:

Department of Plant Sciences
University of Arizona
Tucson, Arizona 85721

PLEASE WRITE! WE GET LONELY!

Two more changes you may have noticed are the change in format and the size of the print. Because of numerous requests that our issues be more readable we have increased both the size of the pages and the size of the print just a little. Let's hear your comments on this improvement.

Finally, a word of thanks is due to Frank Crosswhite of the Boyce Thomoson Arboretum (and editor of Desert Plants) for volunteering to handle printing duties for the Newsletter. His assistance is greatly appreciated. Frank is also on the State Board.

In closing, we cannot overemphasize that member involvement is vital to the success of this Newsletter. We need articles and letters and we could also use an artist for our covers and inside pictures. Hopefully the issues themselves will stimulate Society members to become involved. Until then, happy reading!

Judy Conger

Judy Conger

George Yatskievych

George Yatskievych

Cyperus aristatus

LETTERS PAGE ---

Plants suffer greatly from the whims, fancies and the urge of many gardeners to trim and crop. Plants have to stand and take the mutilation imposed upon them.

While driving around town, take note of these mutilations.

The most noticeable example of badly done trimming is the Agave, with its lower leaves removed. Instead of the natural, graceful plant, it looks like an overgrown pineapple, with the few leaves left pointing straight up. Not only is this strikingly ugly, it taps the strength of the plant. When the Agave tries to send up its normally spectacular inflorescence, all the mutilated plant can do is push up a sickly small shoot. One can't refrain from remarking, "If you hate Agaves so much, it would be better to dig them out, not keep hacking off their leaves.

Another plant that has to put up with "fashion" is the olive tree. Why anyone thinks cutting the twigs into box-like shapes until the tree has branches holding up squares, is hard to understand. Fortunately, there are very few of these trees around town.

Let us go on to cactus. Vandalism ruins many of them. Holes, initials, and carving on Opuntias, bullet holes and axe marks in saguaros are seen both in town and on the desert. Look in stores where plants are sold. There you will find the ultimate indignity committed on cacti. They are dressed in hats and other trappings, with eyes stuck on them. These monstrosities are too horrible to believe. Why take a beautiful plant and make a caricature of it?

Palm trees are often over trimmed. The fronds are cut off until there is only a small tuft left at the top. It takes months, sometimes years, for the palm to recover. Of course, they look their best with the old leaves left hanging, but this is a fire hazard. They have to be trimmed, but not scalped.

Mulberry and chinaberry trees are victims of over pruning. In the winter this stubbing is apparent when the leaves have fallen. With their big ugly stumps they stand there in view for months.

How much more beautiful crepe myrtles are in a natural shape! There is a fashion for "standards." All of the lower branches are removed, leaving one very long, tall "standard." This practice not only subjects the plant to wind damage, but prevents it from being the full, spectacularly beautiful shrub it is when in bloom.

On the median of Craycroft Avenue there are a number of once-beautiful Dasylirions. They are victims of the Agave-trimmers. They used to be symmetrical, round and perfect. Now, with their lower leaves removed, they have a "picked" look. There was nothing wrong with the lower leaves - they just had to be trimmed.

There are many trimmings that have to be done, sometimes even to the point of mutilating a beautiful tree. The original trouble is planting the tree under telephone or electric wires. The tree grows up and interferes with the lines. The best thing to have done was to plant the tree with foresight. There are other examples of no forethought in planting. For instance, those cute little Arbor Vitae shrubs planted on each side of the walk or doorway that grew to be big trees. Tunnels have to be cut through to get in the front door of the house. This looks ridiculous!

Plants need some protection against all of the above offenses. Some knowledge of the size and needs of plants and an appreciation of their natural beauty can help avoid producing plant monstrosities.

- Lucretia Hamilton

Bermeria hispida

USING NATIVE PLANTS TO ATTRACT BIRDS TO THE GARDEN

Hummingbirds are such fun to watch. Usually, the desire to watch these little birds prompts one to place a feeder or two in the back patio. But the squeaks and noise of wings heard near the feeder are not signs of merriment. They are signs of territorial battling. Fortunately, it is more display than actual fighting and few birds are hurt, but the bird's health may be damaged in other ways. The liquid in feeders lacks the trace minerals and essential vitamins which are present in nectar.

There is a better way. Landscape plants can attract wildlife, naturally. Results are worth the planning, and let's face it, the place looks pretty. Then, go a step further, and register your yard with the National Wildlife Federation as a BACKYARD HABITAT. Mine is #1487.

Start planning your plant choices with a consideration of shelter. Birds want some place providing protection from predators, an area where reproduction and rearing of young is safe, and a lookout spot from which to find food. Good trees like the Mesquite (Prosopis juliflora), Ironwood (Olneya tesota), Saguaro cactus (Cereus giganteus), California Fan Palm (Washingtonia filifera), Blue Palo Verde (Cercidium microphyllum) our state tree, Cottonwood (Populus fremontii), Desert Willow (Chilopsis linearis), Feather Tree (Lysiloma thornberi) or Sweet Acacia (Acacia farnesiana), and shrubs such as Hopbush (Dodonaea viscosa), Catclaw (Acacia greggii), Desert Hackberry (Celtis pallida), and Arizona Rosewood (Vauquelinia californica) might be used.

Other wildlife needs are food and water. A fishpond, dripping faucet or watering hole provide the latter. Knowledge of the eating habits of specific birds determine the former.

Hummingbirds like intense color and trumpet shaped corollas. Penstemon (Penstemon spp.), Betony (Stachys coccinea), Desert honeysuckle (Jacobinia ovata), Palmer Agave (Agave palmeri), and Desert Tobacco (Nicotiana trigonophylla) are favorites. The Hooded Oriole (Icterus cucullatus) is also fond of the Tree Tobacco (Nicotiana glauca). This oriole likes to nest in mesquites (Prosopis spp.), palms and Desert hackberries (Celtis pallida). It feeds on insects and seeds as well as nectar.

Our state bird, the Cactus Wren, (Campylorhynchus brunneicapillum) is an insectivore, but will also eat seeds. Its favorite nesting site is in cholla cactus (Opuntia spp.). Another bird liking Cholla nesting sites and eating both insects and seeds is the Curve-billed Thrasher, (Toxostoma curvirostre). This is why both of these birds are frequently seen on top of the Saguaro (Cereus giganteus) when it is in flower and fruiting.

A neat bird to watch is the Verdin (Auriparus flaviceps). This bird seems especially fond of creosote (Larrea tridentata). It feeds on tiny insects in the bark. It also eats all types of small seeds. The nest is a large oval of tiny twigs often secured in the branches of the Catclaw (Acacia greggii). It also nests in Mesquite and Cholla.

The Towhee (Pipilo fuscus) is a dull, brown bird with the fascinating habit of scratching with both feet at once. It likes the mites and small insects associated with our lawns. Dyssodia acerosa and Verbena gooddingii provide seeds to its liking.

Gambel's Quail (Callipipla gambellii) is a resident of mesquite bosques. It likes the beans and the insects associated with the beans and tree. The new green leaves of mesquite are eaten as well. Quail like to gather around watering holes. Globe-mallow (Sphaeralcea spp.) and Rose-mallow (Hibiscus coulteri), produce seeds they like. The coveys noisily feed on most any weed seed. Nests are made on the ground under shrub thickets. Hackberries provide good cover.

The Cardinal (Cardinalis cardinalis) is a seed-eater. The female sings antiphonally with the male, making these birds pleasant to hear as well as to see. The nest is a loose cup in shrubs such as the Catclaw or Desert Hackberry. They like the fruits of the Hackberry. Seeds of Desert Zinnia (Zinnia acerosa), Paperflower (Psilostrophe cooperi), Desert Marigold (Baileya multiradiata), and Brittle-bush (Encelia farinosa), are relished. They are particularly fond of sunflower seeds, so if Helianthus annuus can be tolerated on the edge of the garden, it would attract this bird as well as the Pyrrhuloxia (Cardinalis sinuata). To identify the female and immature of these two species, know that the Pyrrhuloxia has a yellow bill and the Cardinal, a red/orange one. The two species seem to live in overlapping territories within the habitat. They like to perch in the PaloVerde. It is as if they knew how photogenic they are among the green branches.

If you have a lot of flowers producing seeds enjoyed by birds, the House Finch (Carpodacus mexicanus) inevitably appears.- a whole, cheerful flock of them. They are not fussy about nest locations and even take over the nests of others. They like to eat the new growth on succulents, unfortunately.

This imperfect world includes weed pests which are called flowering plants when they grow in preferred spots. Fleabane (Erigeron divergens) is one of these pests. The asters (Aster tagentinus) and (Aster tephrodes, are in this class. A good way to plan for a desirable planting is to set aside three wildflower spaces: one for spring flowering; one for late summer flowering; and one for fall/winter flowers. Refer to the William G. McGinnies list of NATIVE FLOWER SEASONS, TUCSON VICINITY and your favorite wild flower books for those plants you will want in your garden. Most Backyard Wildlifers report a minimum of three years taken to develop a good backyard habitat.

- Mildred Pierce
President, Tucson Chapter of Arizona Native Plant Society

TREES FOR DESERT LANDSCAPES

After talking with some wholesale desert plant growers, it became evident that there are more species of drought resistant trees being offered than there are actually being used in desert landscapes.

I have compiled a list which includes some lesser-known species of drought resistant trees that should be available at a local nursery. If the nursery does not have a particular species in stock, they should be able to order it for you. Some of these trees have features which the old stand by's can't offer.

Acacia craspedocarpa - This Australian native is an evergreen large shrub that can be trained into a small tree. It grows to 12 feet tall and has a dense, round crown.

Acacia schaffneri - This Mexican Acacia is a deciduous tree with an interesting, twisting branching pattern.

Acacia stenophylla - Another Australian native that looks good singly or grouped. It is a small, evergreen tree with weeping branchlets. There is also a bushier form.

Cercidium praecox - Native to Sonora and Baja.Cal., this deciduous palo verde has lime green bark and an upright form.

Diospyros texana - This Texas native is a small, evergreen tree with dark green foliage. The dense, compact crown makes this a good specimen tree.

Pithecellobium flexicaule - Another small, evergreen tree that is native to Texas. Start as a shrub, then train to tree form. It has a dense crown and makes a good specimen tree also.

Pittosporum phillyraeoides - An evergreen tree native to Australia. It has pendulous branchlets and looks good singly or grouped.

Sophora secundiflora - Another evergreen Texas native. Start as a shrub, then prune to tree form. Wisteria-like clusters of lavender flowers make an impressive display. Seed is showy, but poisonous. Keep pruned off if pets or children are around.

Greg Starr, Department of Plant Sciences, University of Arizona

ENDEMIC PLANTS OF ARIZONA

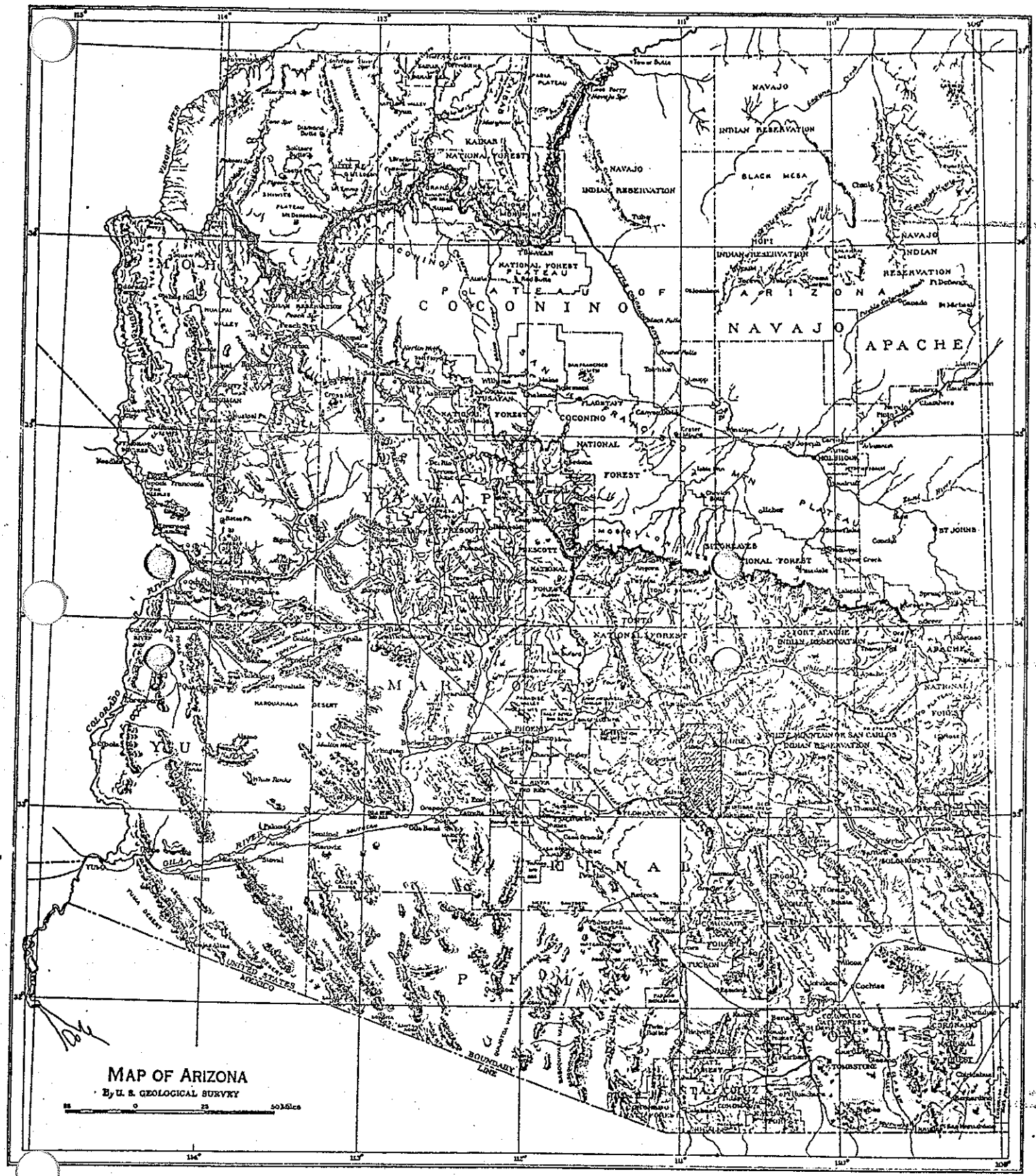
As the botanist for the Arizona Natural Heritage Program, I have had the opportunity to work with Arizona's rare and unique plants. Arizona, with its varied climate, topography and substrate, and its location between the Sierra Madre in Mexico and the Colorado Plateau to the north and with portions of all four major deserts (Chihuahuan, Sonoran, Mohave and Great Basin Deserts), has a rich flora of nearly 3700 plants. A total of 83 plants on the ANHP Special Plant List are endemic to Arizona, meaning that they grow only in this state. Sixty-eight of these plants are distinct at the species level.

The endemic plants are distributed almost throughout the state, with notable areas of concentrations. In general there are more endemic plants in the mountainous belt from the southeastern portion of the state northwest along the Mogollon Rim in Central Arizona to the Grand Canyon and Arizona Strip. There are fewer endemic plants in the lowlands of the Sonoran Desert to the southwest and in the dry mesas on the Colorado Plateaus to the northeast. Concentration of endemics in this central band is probably because of its rough, varied topography complex geologic activity during the Tertiary (last 65 million years), more mesic climate and dramatic climatic fluctuations during the Ice Ages (last million years). In the following discussion I will mention some of the endemic plants in order from north to south.

Grand Canyon.--The Grand Canyon and adjacent areas on the Arizona Strip and south to areas north of the San Francisco Mountains and east to the Little Colorado River has the greatest number of endemic Arizona plants, with a total of 31. Those occurring in this area include:

Peebles Blue Star (Amsonia peeblesii)
Narrowlead Blue Star (Amsonia tomentosa stenophylla)
Roaring Springs Prickle Poppy (Argemone arizonica)
Beath Milkvetch (Astragalus beathii)
Cliff Milkvetch (Astragalus cremnophylax)
Limestone Milkvetch (Astragalus titanophilus)
Vulcan's Throne Evening Primrose (Camissonia specuicola)
Caretaker's Sedge (Carex curatorum)
Kaibab Indian Paint Brush (Castilleja kaibabensis)
Disturbed Rabbitbrush (Chrysothamnus molestus)
Atwood Nievitas (Cryptantha atwoodii)
Hermit Cryptantha (Cryptantha capitata)
Fredonia Nievitas (Cryptantha semiglabra)
Wafer Parsnip (Cymopterus megacephalus)
Heermann Wild Buckwheat (Eriogonum heermannii subracemosum)
Morton Wild Buckwheat (Eriogonum mortonianum)
Ripley Wild Buckwheat (Eriogonum ripleyi)
Atwood Wild Buckwheat (Eriogonum thompsonae atwoodii)
Scarlet Wild Buckwheat (Eriogonum zionis coccineum)
Grand Canyon Flaveria (Flaveria mcdougallii)
Bright Angel Burroweed (Haplopappus salicinus)
Kaibab Saber Daisy (Machaeranthera mucronata)
Brady Plains Cactus (Pediocactus bradyi)
Bristly Plains Cactus (Pediocactus paradinei)
Fickeisen Navajo Cactus (Pediocactus peeblesianus fickeisenae)
Mount Trumbull Beardtongue (Penstemon distans)
Welsh Caterpillar Weed (Phacelia welshii)
Mohave Dalea (Psorothamnus arborescens pubescens)
Tusayan Flame Flower (Talinum validulum)
Black Rock Ground Daisy (Townsendia smithii)

Black Rock Ground Daisy occurs only in the Black Rock Mountains on the western side of the Arizona Strip. Morton Wild Buckwheat grows only on the Kaibab Paiute Indian Reservation near Fredonia. Fredonia Nievitas is known only from near Fredonia. Brady Plains Cactus, officially listed as Endangered, is found on the Paria Plateau and near Marble Canyon. Bristly Plains Cactus is found in House Rock Valley. Slender Evening Primrose is found on the Paria Plateau. Cliff Milvetch is a little legume with two distinct varieties, one near Fredonia and another in Grand Canyon National Park.



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Verde Valley Sage is only found on white limestone outcrops in the Verde Valley. New River Agave is endemic to the New River Mountains north of Phoenix. It will be formally proposed as an Endangered species in 1981. Toumey Agave is restricted to the New River Mountains and the Sierra Ancha. Murphey Agave is found in the Paradise Valley and Tonto Basin. Mapleleaf False Snapdragon and Fish Creek Rock Daisy are found between the Superstition Mountains and Superior. Gila Rock Daisy is presently known from a single population in the Salt River Canyon. Arizona Claret Cup Cactus, an officially Endangered plant, is in the Pinal Mountains near Globe. Burro Creek Cliffrose has populations near Burro Creek and near Bylas on the San Carlos Indian Reservation. San Carlos Wild Buckwheat and Hairy Wild Buckwheat also occur on the San Carlos Indian Reservation.

Madrean Mountains.--The flora of the mountains in southeastern Arizona from the Baboquivari Mountains to the New Mexico border has strong affinities with the northern Sierra Madre in Mexico. Twenty-three species of endemic Arizona plants are found in this area, including:

Goodding Onion (Allium gooddingii)
Kearney Blue Star (Amsonia kearneyana)
Chiricahua Rock Flower (Apacheria chiricahuensis)
Chiricahua Rock Cress (Arabis tricornuta)
Lemmon Aster (Aster lemmoni)
Robbins Cochise Cactus (Coryphantha robbinsorum)
Gentry Indigo Bush (Dalea tentaculoides)
Pinaleno Hedgehod Cactus (Echinocereus ledingii)
Woolly Fleabane (Erigeron eriophyllus)
Kusche Fleabane (Erigeron kuschei)
Winn Falls Fleabane (Erigeron sp.)
Arizona Alum Root (Heuchera glomerulata)
Five Scale Bitterweed (Hymenoxys quinquesquamata)
Huachuca Water Umbel (Lilaeopsis recurva)
Feather Bush (Lysiloma microphylla thornberi)
Arizona Manihot (Manihot davisae)
Box Canyon Muhly (Muhlenbergia dubioides)
Sycamore Canyon Muhly (Muhlenbergia xerophila)
Santa Catalina Beardtongue (Penstemon discolor)
Cochise Rock Daisy (Perityle cochisensis)
Chiricahua Dock (Rumex orthoneurus)
Chiricahua Dock (Rumex orthoneurus)
Toumey Groundsel (Senecio neomexicanus toumeyi)
Goodding Flame Flower (Talinum gooddingii)

Pinaleno Hedgehog is mostly found in the Pinaleno (or Graham) Mountains with a few records from other ranges. Feather Bush, a variety of a widespread Mexican legume, and the official plant of the Arizona Native Plant Society, is found in canyons in the Rincon Mountains in Saguaro National Monument. Santa Catalina Beardtongue is known from the Santa Catalina Mountains and near Ruby in the Atascosa Mountains. Arizona Manihot has a similar distribution with populations in the Santa Catalina, Santa Rita, Las Guimas and Baboquivari Mountains. Box Canyon Muhly and Sycamore Canyon Muhly are known from the Santa Catalina, Santa Rita, Pajarito and Baboquivari Mountains. Woolly Fleabane is an annual found in the Santa Rita and Pajarito Mountains. Kearney Blue Star is known from from 24 individuals in a single canyon in the Baboquivari Mountains. Gentry Gentry Indigo Bush is found only in the Sycamore Canyon area and in the Baboquivari Mountains. Huachuca Water Umbel is an aquatic plant found in several localities from the Patagonia and Huachuca Mountains eastward to San Bernardino Ranch near Douglas. Five Scale Bitterweed appears to be restricted to the Santa Catalina and Huachuca Mountains. Arizona Alum Root is found in the Santa Teresa, Pinaleno and Chiricahua Mountains.

The Chiricahua Mountains have six endemic plants. Chiricahua Rock flower, a newly described genus, is a woody shrub found on open cliff-faces. Chiricahua Rock Cress is an herbaceous mustard found in higher elevation forests. Kusche Fleabane, WinnFalls Fleabane and Chiricahua Rock Daisy are all endemic, cliff dwelling composites. Kusche Fleabane will be formally proposed as Threatened in 1982. Winn Falls Fleabane was just discovered and is at this moment being given a scientific name. Chiricahua Dock is known from the Chiricahua and Roaring Springs Prickle Poppy, Grand Canyon Evening Primrose, Grand Canyon Flaveria and Bright Angel Burroweed are restricted to Grand Canyon National Park. Hermit Cryptantha is found in the Grand Canyon and on the Kaibab Plateau. Kaibab Indian Paint Brush and Kaibab Saber Daisy are only found on the Kaibab Plateau. Mount Trumbull Beardtongue is only known from the vicinity of Mount Trumbull. Tusayan Flame Flower was described from the south side of the Grand Canyon in the National Park but has not been recollected. Limestone Milkvetch and Disturbed Rabbitbrush occur both on the Kaibab Plateau and south of the Grand Canyon. Ripley Wild Buckwheat is restricted to the vicinity of Frazier's Well south of the Grand Canyon. Fickeisen Navajo Cactus, Beath Milkvetch and Wafer Parsnip occur along the Little Colorado River near Cameron. Welsh Caterpillar Weed is only known from the vicinity of Wuptaki National Monument north of Flagstaff.

Central Arizona.--The second area of high concentration of endemic plants in Arizona parallels the Mogollon Rim from the vicinity of Flagstaff south to about Phoenix. The 27 endemic Arizona plants occurring in the area are:

New River Agave (Agave arizonica)
Toumey Agave (Agave toumeyana bella)
Goodding Onion (Allium gooddingii)
Mogollon Colombine (Aquilegia desertorum)
Creeping Milkvetch (Astragalus troglodytus)
Arizona Bugbane (Cimicifuga arizonica)
Bagdad Biscuit Cactus (Coryphantha vivipara buoflama)
Burro Creek Cliffrose (Cowania subintegra)
Arizona Claret Cup (Echinocereus triglochidiatus arizonicus)
Pringle Fleabane (Erigeron pringlei)
San Carlos Wild Buckwheat (Eriogonum apachense)
Hairy Wild Buckwheat (Eriogonum capillare)
Heathleaf Wild Buckwheat (Eriogonum ericifolium ericifolium)
Golden Barrel Cactus (Ferocactus acanthodes eastwoodiae)
Flagstaff Pennyroyal (Hedeoma diffusum)
Eastwood Alum Root (Heuchera eastwoodiae
Mapleleaf False Snapdragon (Maurandya acerifolia)
Sunset Crater Beardtongue (Penstemon clutei)
Gila Rock Daisy (Perityle gilensis salensis)
Fish Creek Rock Daisy (Perityle saxicola)
Hualapai Milkwort (Polygala rusbyi)
Arizona Cinquefoil (Potentilla multifoliolata)
Chiricahua Dock (Rumex orthoneurus)
Arizona Willow (Salix arizonica)
Verde Valley Sage (Salvia mearnsii)
San Francisco Groundsel (Senecio franciscanus)
Goodding Flame Flower (Talinum gooddingii)

Sunset Crater Beardtongue is only found on black cinder soils in Sunset Crater National Monument and adjacent Coconino National Forest north of Flagstaff. San Francisco Groundsel is restricted to an area less than a square mile above timberline in the San Francisco Mountains. It will be formally proposed as a Threatened species in 1982. Arizona Cinquefoil, Creeping Milkvetch, Flagstaff Pennyroyal and Mogollon Columbine are all endemic to the forests from Flagstaff area southeast along the Mogollon Rim and in the Oak Creek Canyon area. Flagstaff Pennyroyal will formally be proposed as a Threatened species in 1981. Arizona Bugbane occurs in the same area but also has populations on Bill Williams Mountain and in the Sierra Ancha. Arizona Willow occurs only at high elevations in the White Mountains. Eastwood Alum Root is found in several mountain ranges below the Mogollon Rim between the Bradshaw Mountains and Sierra Ancha. Pringle Fleabane is in Oak Creek Canyon, Sierra Ancha, the Mazatzal Mountains and several other ranges to the south.

Huachuca Mountains and the Sierra Ancha. The Huachuca population, based on a specimen collected by J.G. Lemmon in 1882, is extinct. It will formally be listed as Threatened in 1982. Robbins Cochise Cactus is a small cactus restricted to hills in the San Bernardino Valley east of the Chiricahua Mountains.

Other areas.--There are a few endemic plants in the rest of the state. Several are found on the Colorado Plateaus from the Utah border south through the Navajo Indian Reservation to the Little Colorado River and Mogollon Rim. Atwood Nievitas (Cryptantha atwoodii) is restricted to an area near Tuba City. Peebles Blue Star (Amsonia peeblesii) occurs near Holbrook and north along the Little Colorado River into the Cameron area. Roundleaf Errazurizia (Errazurizia rotundata) occurs from near Holbrook to Winslow and near Tuba City. Sword Milkvetch (Astragalus xiphoides) is a distinct endemic found only in one locality north of Holbrook. Peebles Navajo Cactus (Pediocactus peeblesianus peeblesianus), an officially listed Endangered species, is found only in the vicinity of Holbrook.

The huge area of low valleys and mountain ranges in the Sonoran Desert in southwestern Arizona has few endemic plants. Golden Barrel Cactus (Ferocactus acanthodes eastwoodiae) and Needle Spine Pineapple Cactus (Neolloydia erectocentra erectocentra) are found scattered from the Ajo Mountains northeastward to the Tucson and Globe areas. Ajo Rock Daisy (Perityle ajoensis) is found only in the Ajo Mountains in Organ Pipe Cactus National Monument. Harrison Barberry (Berberis harrisoniana) is a shrub only found in a few canyons in the Ajo and Kofa Mountains. Schott Wire Lettuce (Stephanomeria schottii) is a distinctive annual found on sand dunes from the Cabeza Prieta National Wildlife Refuge west to the Yuma area.

- Thomas R. VanDevender
Arizona Natural Heritage
Program

FERN TALK

Last issue we discussed cultivation of ferns by transplanting plants from nature. This time we will talk about a somewhat less rapacious technique - cultivation from spores. The big advantage of spores is that the plants grown from them will generally be better adapted to living at your home. In many instances field transplanted ferns will adjust poorly to their new environment.

Be warned, however, there are drawbacks. The fern grower who cultivates from spores must be a patient person - in most cases it will take as long as 12 to 18 months to achieve new plants from spores, and even then the offspring are still tiny. The technique, however, is much like parenthood in that you can watch your babies grow from the tiniest beginnings to final maturity.

To understand the techniques of spore cultivation one needs to know a little about the reproductive cycle of the average fern. Spores are contained in sporangia (Figure 1), which develop in small clusters on the undersides of the fronds called sori (Let's exclude the horsetails, the spikemosses, and the moonworts for now, as these are special cases and are more for the advanced gardener). At maturity the sporangia dehisce (break open) and release the spores into the atmosphere. When the spores finally settle to the ground they germinate within a few months if conditions are right.

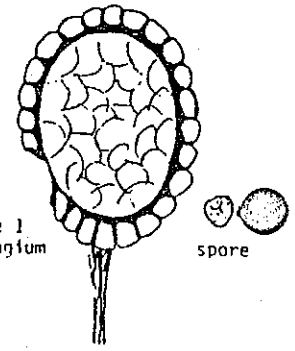


Figure 1
Sporangium

From the spores grow small heart-shaped gametophytes (Figure 2), the other free-living stage in the fern life-cycle. These gametophytes eventually develop antheridia containing sperm and archegonia containing eggs. Fertilization requires free water in the environment. Upon fertilization, a new sporophyte (the "normal" plant) grows from the notch in the old gametophyte, and we have come full circle.

There are several good techniques for cultivation of ferns from spores. All start with the collection of spores from mature plants in the field. After a bit of practice you should be able to distinguish the ripe sporulating fronds from both the immature ones and the old ones. You want to collect fronds just as they are releasing spores. These fronds are placed in envelopes or between sheets of clean paper and lightly pressed overnight. The next day remove the fronds and get rid of excess material on the paper by slightly tilting it and tapping the coarser particles to the edge. If you picked a good frond you have way too many spores, so don't worry about wasting some.

The next step is to sow the spores. Whatever you sow them on should be sterilized previously either by baking at 375° for 15 minutes or boiling in a pot of water for an equal time. Also cool before using. Some people sow spores on upside-down flower pots filled with wet peat moss, while others do the same with right-side-up pots. A small clay pot can be conveniently sealed into a 1 gallon mason jar inverted. The idea behind this sterility is to keep out fungus, a baby fern's greatest enemy.

Other options for sowing spores are to use agar in petri dishes, or to sow on soil in a plastic box. Insure that the medium remains moist and try to keep impurities from entering the "habitat". Water with distilled water or freshly boiled and cooled water. Within a few weeks or months, you should begin to see small green spots on the medium. If this happens, you are on your way.

If fungus does rear its awful head, many fern growers immediately discard the preparation. For this reason, it may be best to try several containers at once. You might try dilute fungicide or dilute potassium permanganate solution (available at the pharmacy; mix until water just tints purple), but the likelihood of beating the fungus is slim..

Assuming that you persevere and eventually find small gametophytes in your containers, the next step is to insure fertilization. If after the gametophytes have stopped growing for a few weeks, you do not see small plants growing from the notches, flood your plants with a thin film of water overnight. This usually does the trick.

Once your small sporophytes reach about 1 inch in length, it is time to thin them out to avoid overcrowding. You should have plenty of plants, so be ruthless. At the immense height of 1 inch, the plants may be planted into small pots. These plants must be gradually acclimatized to an environment with less moisture, so gradually leave them out of the terrarium or jar a little longer each week. This is a crucial step to insure normal future growth. Eventually, your patience pays off and you have a mature plant.

For beginners, I recommend starting with the Venus Maidenhair, Adiantum capillus-veneris, the common Maidenhair inhabitating moist canyons nearly throughout the state. This species can usually be depended upon to yield new sporophytes in as little time as 9 months and is therefore, a great confidence builder. The 2 biggest problems that most beginners have are the contamination of cultures with fungus, and the failure to insure proper light (give your cultures somewhat more light than mushrooms and somewhat less light than Saguaros; in general, lots of indirect light).

Many "fernies" regularly carry a small supply of envelopes into the field, once they have achieved success, and most view the cultivation of ferns from spores as a pleasant challenge. Give it a try: you might surprise yourself.

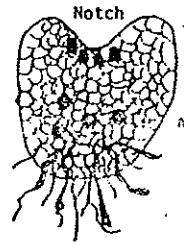


Figure 2
Gametophyte

Trees and Shrubs of the Southwestern Deserts by Lyman Benson and Robert A. Darrow, 1981, University of Arizona Press, Third edition, revised and expanded, 416 pages, 95 full color plates, 414 photographs and drawings and 252 maps, hard cover $49.50.

One cannot do justice to this book without a generous use of superlatives. It is a magnificent book, a must for the serious student of desert vegetation and a very useful companion for the non-technically trained desert dweller. The color photos are superb, the line drawings by Lucretia Breazeale Hamilton are masterpieces both from the artistic and technical viewpoints. The black and white photographs are well chosen and the maps are a great asset in showing the range of various species - with the added advantage of helping the reader identify plants - if his identification of a plant is not shown for that particular area, he will know his identification is wrong and on the other hand the range of given plants as shown by the maps may verify a properly identified plant.

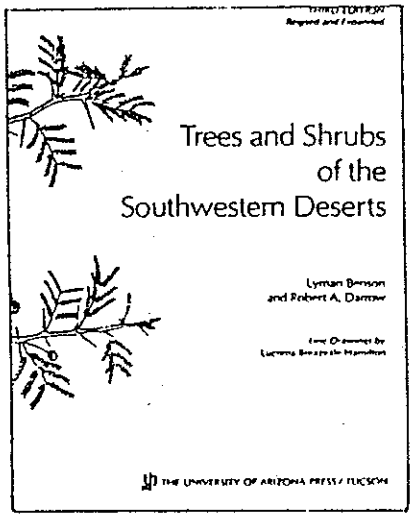
Trees and Shrubs of the Southwestern Deserts is much more than a manual for identifying plants. The first twenty-six pages are devoted to an ecological discussion of deserts and other plant communities. In the preface, the authors state, "The profuse illustration is intended partly to make the book useable without a technical background" but then they devote eleven pages to a basic course in plant identification of the various species. The keys for identification are simple and often include examples to help the reader recognize the various taxa and the pictures and drawings are a very valuable guide to identification. With these various aides, the serious plant identifier should be able to properly identify any and all desert woody species and if he is in too much of a hurry or too lazy to go the taxanomical route, he can do very well by just looking at the pictures and drawings.

The notes regarding value to man and other animals add a great deal to the value of the book, and the choice of common English and Spanish names is a great help for those who find it advantageous to use common names.

To a person who has not seen the book, the price may seem high, but once one has had an opportunity to look at it, it is easy to see why it could not be produced less expensively. It is a great book and well worth the price.

The only points that I found not to my personal liking were the author's use of the term "Sonoran Deserts" and Lyman Benson's penchant for the use of trinomials although this seems to be the general trend in taxonomic works. In many cases, lumping subspecies under a general species identity is as far as the target reader cares to go and the additional accuracy obtained by using subspecies is of greater interest to the systematic botanist than the lay reader. Separating the Sonoran Desert into three divisions, the Colorado Desert, the Arizona Desert and the Sonoran Desert in Mexico is a departure from common use and to me it would be best to follow Shreves treatment which subdivides the Sonoran desert as a single entity and recognizes seven subdivisions including the Lower Colorado, the Arizona Upland in the United States and five subdivisions in Mexico. The lower Colorado subdivision includes the desert on both sides of the Colorado River rather than making a division largely based on state boundaries.

William G. McGinnies
President, Arizona Native Plant Society



SOCIETY NOTES

Tucson Chapter Programs 1981-82

Oct. 14 7:30 p.m.	Richard Felger "Plants of the Gran Desierto & Pinacate"
Oct. 31 9:00 a.m.- 1:00 p.m.	Tucson Chapters Annual Arizona Native Plant Society Education Workshop. Come learn about the Propagation, Use and Cultivation of Arid Land Plants. The public is cordially invited. Free.
Nov. 11 7:30 p.m.	Tony Burgess "Agave"
Dec. 9 7:30 p.m.	Mark Dimmitt "Pollinators of Plants of the Southwest"
Jan. 13 7:30 p.m.	Nicholas Yensen "New Salt-tolerant Crops for the Sonoran Desert"
Feb. 10 8:30 p.m.	David Lazaroff "Riparian Zones of Sabino Canyon"
Mar. 10 7:30 p.m.	Botanical Lecture of the Year
April 14 7:30 p.m.	Robert Humphrey "The Boojum Tree"
May 12 7:30 p.m.	Bill Kinnison Slide Presentation of Arid-type Plants

All programs unless indicated otherwise are held at the Porter Gardens, 2150 N. Alvernon.

Phoenix Chapter Programs 1981-82

Oct. 12 7:30 p.m.	Dr. Frank Crosswhite "Uses of Sonoran Desert Plants by Native Peoples"

All programs are held at the Desert Botanical Garden in Webster Auditorium.

For more information call:
Marc Mittleman 265-0670
Nichole Heller 894-5367

PLANT COURSES SPONSORED BY ANPS - Tucson Chapter

Introductory Botany, 6 sessions
Tues. 7-9 p.m. Sept. 15 - Oct. 20
Rm. 321 Ag. Sci., Uof A
Instructor: Steve McLaughlin $25.00
This class is a good basis for Introductory Plant Taxonomy.

Introductory Plant Taxonomy, 8 sessions
Tues. 7-9 p.m. Oct. 27- Dec.15
Rm. 321 Ag. Sci., U of A
Instructor: Jan Bowers and Steve McLaughlin $30.00

Intermediate Plant Taxonomy, 8 sessions
Thurs. 7-9 p.m. Sept. 17 - Nov. 19
Rm. 321 Ag. Sci., U of A
Instructor: Tony Burgess $30.00

For further information, or if you have suggestions for future class subjects, call Don LoBiondo, 299-6351, after 6 p.m.

MISCELLANEOUS NOTES

Volonteers Sought to Aid Southwest Traditional Crop Conservancy Garden and Seed Bank

The Southwest Traditional Crop Conservancy Garden and Seed Bank has exhibits at the Porter Gardens at Grant and Alvernon in Tucson through October. A project of the Meals for Millions/Freedom from Hunger Foundation Southwest Program (624-7963), the onservancy garden is attempting to increase seeds and encourage appreciation of Indian crops and their wild relatives that have evolved in the arid Southwest and northwest Mexico. The seeds produced from the 30-40 species grown in the Porter Gardens demonstration site are distributed to native American farmers, seed storage facilities and researchers. The project staff, Gary Nabhan and Mahina Drees, are seeking volunteers to help grow out and take data on particular endangered plant varieties (especially food crops) during the next warm season. Assistance with seed packaging and distribution is also being sought. Anyone interested in the project can write for a list of currently available publications to Seed Bank, MFM/FFH, 715 North Park Ave., Tucson, AZ 85719.