Vol. 1, No. 3
Winter, 1977

Newsletter of the Arizona Native Plant Society

INTERNATIONAL JOJOBA CONFERENCE

The International Council for Jojoba has tentatively scheduled the Third International Conference on Jojoba and Its Uses for September 14-16, 1978, at the Riverside Campus of the University of California. For further information, please send a self-addressed postage paid envelope to:

Dr. Thomas K. Miwa, Co-Director
Consejo Internacional sobre Jojoba
3817 North Pinehurst Court
Peoria, Illinois 61614

A SOURCE FOR SEEDS OF CACTI, SUCCULENTS AND DROUGHT TOLERANT PLANTS

As far as we know, there is only one person in Arizona who makes a business of mailorder sales of seed of cacti, succulents and other drought tolerant plants. For a seed list, write to Sarah Ives, P. O. Box 865, Superior, Arizona 85273. If possible include a stamped self-addressed envelope.

SOURCES FOR NATIVE MEDICINAL HERB PREPARATIONS

Members interested in ethnobotany or in the medicinal uses of native herbs should consult either Phyllis Hogan (Winter Sun Trading Company, 539 North Arizona Blvd., Coolidge, Arizona 85228) or Michael Moore (Herbs Etcetera, 652½ Canyon Road, Santa Fe, New Mexico, 87501). They are both actively researching the subject and are planning to publish results of their findings.

BALLOTS FOR DIRECTORS AND RSVP FORMS FOR THE SOCIAL PART OF THE ANNUAL MEETING ARE DISTRIBUTED WITH THIS NEWSLETTER. TRY TO RETURN YOUR BALLOT AND RSVP FORM WELL IN ADVANCE OF THE JANUARY 14 MEETING.

Beloperone californica
Blooming December 15, 1977

UNION CARBIDE RELEASES VITERA 2 HYDROGEL SOIL AMENDMENT

A new type of soil amendment that reduces the possibility of plant damage due to water stress is now being introduced to the horticultural trade by Union Carbide. Particles of the hydrogel, when evenly mixed in soil or other growing medium are said to swell and open the soil to increase aeration and improve drainage while holding 130 times their dry weight in water. This could possibly represent an important breakthrough. One member is planning to obtain some for experimentation with the culture of desert plants including cacti. Hopefully a report will be available in the future.

ADDRESS FOR SENDING NEWSLETTER ITEMS

News or other items intended for the newsletter of the Arizona Native Plant Society should be sent to the editor, Dr. Frank S. Crosswhite, Boyce Thompson SW Arboretum, P. O. Box AB, Superior, Arizona 85273.

SALTILLO CONFERENCE ON GUAYULE
by W. G. McGinnies

The Second International Guayule Conference recently held in Saltillo Coahiula, Mexico should be of interest to Arizona Plant Society members even though guayule is not a native of Arizona. From 1916 to 1926 it was grown at Continental, Arizona, and during World War II test plantings were made near Phoenix, Gila Bend, and Yuma. Continental derived its name from the Intercontinental Rubber Company which grew rubber there and later at Salinas, California.

The Second International Guayule Conference with an attendance of over one hundred was held at Saltillo, because of its location of a pilot plant for extracting rubber from guayule and is also the center for a comprehensive guayule research program financed by the Mexican government.

The conference opened Monday, August 1, with a general session including presentations by leading Mexican dignitaries followed by a state luncheon featuring tropical fruits, Mexican food and mariachi music. The afternoon was spent on guided tours through the pilot plant.

Tuesday, August 2, was devoted to technical papers with the session running from 9:00 a.m. to 7:30 p.m. with an hour off for lunch. In the evening the local organizations hosted a Mexican Evening, again featuring food and drinks of Mexico.

The morning of Wednesday, August 3, was taken up with technical papers. During the afternoon a trip was made by air-conditioned buses to Parras where the visitors were treated to a tour of the local winery and an alfresco luncheon under extremely large cottonwood and pecan trees.

Thursday, August 4, was devoted to a workshop during which key individuals brought together the known facts concerning guayule and prepared recommendations for the future development of guayule.

Guayule *(Parthemium argentatim)* has a long history as a rubber producer. In prehistoric times it was used by Indians to make rubber balls. In the middle of the nineteenth century the first commercial rubber was produced. At the turn of the century there was a great amount of activity and during the early years of this century millions of tons of rubber were produced from native plants in Mexico. Most of this was shipped to the United States.

Fearing for a rubber shortage during World War II the United States launched a major program to produce rubber. Altogether some 32,000 acres were planted, mostly in California, with limited plantation in Arizona and Texas. Because synthetic rubber production developed so fast it was decided to discontinue the guayule rubber program. Most of the shrubs were destroyed without attempting to harvest them for rubber.

Activities remained at a low level in the United States, but during the seventies the Mexican government provided funds for a research program which resulted in the production of a rubber equal in quality to that produced by the Hevea trees in Malayesia. Previously the guayule rubber contained too much resin and other non-rubber materials to be a substitute for hevea rubber.

In spite of the great growth of synthetic rubbers the tire industry in particular is dependent on natural rubber and it appear that the market for natural rubber will remai.. good for the foreseeable future.

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ANPS DISPLAY AND BOOTH AT TUCSON LANDSCAPE AND GARDEN SHOW

The Society displayed native trees, shrubs and ground covers in a rather elaborate display constructed of plywood with a pergola of spaced two-by-fours connected to an adjacent booth. The booth was provided free by the show management as was the display space. We were allowed to sell books, seeds and plants at the booth and to solicit memberships in the Society.

We spent considerably more on the display than we took in with sales at the booth, but many of the materials purchased can be reused in future displays in new combinations. The event was held at the Tucson Community Center during October 21 through 23. We received many favorable comments on the dis play and it was possible to dispense a great deal of advice and assistance to the public on matters dealing with native plants of Arizona.

IDEAL pH FOR PLANT GROWTH

Some plants such as creosotebush seem clearly adapted to alkaline soils and ordinarily grow where there is a definite calcium carbonate ("caliche") layer in the ground. Others, such as jojoba, seem to do well on neutral to slightly acid soils. In general, however, the ideal pH for optimum plant growth in most species of plants is thought to be somewhere between 6.5 and 7.0.

When soil acidity increases (i.e. when the pH is low), toxic substances go into solution and become available to the feeder roots in massive toxic amounts. Arizona mine-tailings high in pyrite (iron sulfide) tend to become acid with age as the sulfur combines with water to form sulfuric acid. Copper (ordinarily required by plants in very small quantities) is leached out into the acid water and often kills vegetation growing on such tailings.

In other parts of the United States, liming of agricultural soils which are acid helps increase pH and reduce toxic effects of substances in the soil such as soluble aluminum. On the other hand, in alkaline areas of Arizona, soil sulfur or (in irrigation water) sulfuric acid are added to agricultural fields to lower the pH. Essential elements for plant growth that become less available at high pH include iron, magnesium, boron, copper and zinc. Other essential elements such as sulfur, calcium and magnesium are available at pH 6.5 and above.

Nitrogen is of highest availability at pH 6.0 to 8.0, whereas phosphorus availability is nil at 6.0 but maximum at 6.5 to 7.0, declining again at 7.5; potassium is available at 6.5 and above.

Relative numbers of soil bacteria and fungi fluctuate dramatically with pH. Fungi that decompose organic material (and help release organic phosphorus and nitrogen) tend to decrease with higher pH. Soil bacteria, however, tend to increase with pH up to about 7.0. In Arizona, however, Texas Root Rot (a parasitic fungus disease) is destructive in higher pH soils. Addition of sulfur to the soil is sometimes necessary to counteract it. Beneficial nitrogen-fixing bacteria tend to function best at about pH 6.5.

PINAL-GILA COUNTIES ANPS CHAPTER MEETING

The first meeting of the prospective ANPS chapter for Pinal and Gila counties was held at the Arboretum on December 13. Members attended from San Carlos, Globe and Superior. Since the ANPS annual meeting is to be held at the Arboretum in January, it was decided to have the next local chapter meeting in February, with the hope that local members would attend the January state-wide meeting.

DAN BACH GOES RETAIL

Dan Bach, well-known grower of cactus seedflats and clump-flats as well as specimen-size cacti, has recently converted part of one greenhouse to a retail showroom. Location is on Thornydale Road north of Tucson. Dan is also an acknowledged expert on drip irrigation and on growing pecans in Arizona.

POSSIBLE BREAKTHROUGH IN FROST PROTECTION

The University of Wisconsin has announced results of recent research by its Plant Pathology Department that might have a bearing on frost resistance in plants. Leaves and stems of "hardy" plants have long been known to resist freezing temperatures, whereas "tender" plants ordinarily succumb to cold weather. In corn, research has indicated that plants may contain up to 500,000 ice-nucleating bacteria per gram. These bacteria promote formation of damaging ice crystals in the plants. However, a strain of non-nucleating bacteria has been developed which when sprayed on the plants during the growing season resulted in later findings of only 10,000 ice-nucleating bacteria per gram. It is not known whether this finding can be applied commercially or whether ice-nucleating bacteria are of significance in determining frost-sensitivity in other plants.

ADDRESS FOR CORRESPONDENCE WITH THE ARIZONA NATIVE PLANT SOCIETY

Arizona Native Plant Society
P. O. Box 18519
Tucson, Arizona 85731

SOUTHWESTERN WOODY-TRUNKED PRICKLY PEARS

Plant taxonomists often treat stem woodiness as of only secondary systematic value in classifying plants. Lyman Benson in The Cacti of Arizona (Univ. of Ariz. Press. ed. 3. 1969. 218 pp.) used the woody trunk character only sparingly in classifying Arizona prickly pears. Indeed, it is not unlikely that secondary stem growth and consequent formation of a cylindrical "trunk" in prickly pears has occurred in several different phylogenetic lines in *Opuntia*. Scientists shy away from using such "polyphyletic" characters since a good taxonomic treatment should reflect natural lines of relationship.

Notwithstanding the above, it seems possible to group the six species of southwestern woody-trunked prickly pears together as a natural group. This is contrary to the taxonomic treatments by all serious students of southwestern cacti in the last fifty years, including N. L. Britton and J. N. Rose, Lyman Benson and Del Weniger. Unifying factors for this group of six species are listed below.

1. Tendency to develop woody trunk.
2. Tendency for new pads to grow from areoles at tops of older pads.
3. Tendency toward large, perfectly round (circular in outline) pads.
4. Tendency to grow above 3000 feet elev.

Four of the species are commonly referred to as "purple-padded prickly pears" -- those which contain noticeable amounts of bluish or reddish-purple betacyanin pigment in the pads. This pigment is almost universally stated to increase with physiological stress of drought or cold. As such, it is suspected of being a waste-product which builds up during periods of less than optimum metabolism. It is suspected that the pigment may also have an adaptive value for the plant.

The two remaining species (*O. chlorotica* and *O. rufida*) may also have a bluish caste, but not to the extent of the preceding "purple-padded" species. The Pancake Prickly Pear (*O. chlorotica*), except for its numerous downward pointing spines, resembles the Santa Rita Purple Pad (*O. santa-rita*) perhaps more than it resembles any other species. Indeed, Griffiths and Hare (N. Mex. Agr. Exp. Sta. Bull. 60: 64. 1906) originally described *O. santa-rita* as a variety of *O. chlorotica*. Intermediates between these two species occur in several localities in southeastern Arizona.

Opuntia rufida has been misunderstood for over 100 years. The true *O. rufida* is a trunked *Opuntia* difficult to distinguish from a spineless form of *O. santa-rita* were it not for the microscopic puberulence of the pad and the somewhat smaller glochids. It enters the southwestern United States in the Big Bend area of Texas from Mexico. It has long been confused with a red-glochid form of *O. microdasys*, the common "Bunny Ear" cactus. *Opuntia microdasys*, however, is a weak-padded and weak-stemmed plant which sprawls over the ground in marked contrast to the rigid, turgid nature of the true *Opuntia rufida*.

KEY TO SOUTHWESTERN WOODY-TRUNK PRICKLY PEARS

A. Pads finely puberulent (with tiny hairlike projections) under a hand-lens or microscope. PLUMP-PAD POLKA-DOT CACTUS. *O. rufida Engelm.*

AA. Pads not puberulent.

B. Spines appressed and reflexed (nearly parallel with the pad and pointing downward). PANCAKE PRICKLY PEAR. *O. chlorotica Engelm.*

BB. Spines when present porrect (extended outward horizontally). Pads usually purplish.

C. Longer spines 7-18 cm long, thickish (1 mm in diam.), black or very dark, commonly on the top of the pad. CHIHUAHUAN PURPLE PAD. *O. macrocentra Engelm.*

CC. Longer spines (if present) 4-6½cm long, thinner (.4-.8 mm in diam.)

D. Pads spiny on sides as well as tops. SONORAN PURPLE PAD. *O. gosseliniana Weber*

DD. Pads spiny on upper portion or spineless.

E. Pads circular in outline, 15-20 cm tall, spineless or with spines on the upper edge, the spines light reddish or lighter. SANTA RITA PURPLE PAD. *O. santa-rita* (Gr. & H.)

EE. Pads taller than wide, not circular in outline, 10-15 cm tall, spiny on upper portion (not limited to the edge itself), the spines dark reddish brown and usually rather stout (.7 mm in diam.). ARIZONA PURPLE PAD. *O. violacea Engelm.*