Fall Equinox

No. 30 1990

the Seedhead News

Gary Nabhan Awarded Two Fellowships

By Kevin Dahl

All hopes for a quiet summer at the Native Seeds/ SEARCH office were dashed when Gary Nabhan won a MacArthur Fellowship in July. Gary had been sitting in a cave in the Tinajas Altas Mountains to observe the elusive bighorn sheep (he saw more hunting-gathering archaeology than sheep activity), so the MacArthur Foundation had been frustrated in reaching him. Just by chance, I was the first to phone Gary with the news. His first response was to giggle uncontrollably and say over and over, "I can't believe it, I just can't believe it." He sat down and then physically lost his voice. Later he told reporters, "I'm going to go out right now and plant a few plants.... My head's still spinning."

He had good reason for being flabbergasted. The Chicago-based John D. and Catherine T. MacArthur Foundation gives out prestigious no-strings-attached awards to people in diverse fields showing creativity and promise in their work. This year, 36 people received awards, including a juggler, photographer, and other scientists such as population biologist Paul Erhlich. We were especially pleased to learn that Seed Savers Exchange founder Kent Whealy also received a MacArthur Fellowship. Gary plans to use his award to continue his plant conservation work and undertake some writing projects. "It's a big honor as well as a burden to be encouraged by my colleagues to pursue more work like I've been able to do," Gary said.

Gary also received recognition from a new effort, the Pew Scholars Program in Conservation and the Environment. This award will support Gary's work on *in situ* conservation of native crops and endangered plants. It provides funding for three years, and will be split between projects Gary is doing through both Native Seeds/SEARCH and the Desert Botanical Garden. Already, this has given a big boost to our efforts to establish a Wild Chile Preserve. A Pew award also went to Wes and Diana Jackson of the Land Institute.

Gary Nabhan. Photo by Cynthia Farah

Gary Nabhan's work should be known to most NS/S members. He was one of the co-founders of our organization, and has been active as seed collector, writer, and Board Chairman. Recently, he took a sabbatical from his position as Associate Director of the Desert Botanical Garden in Phoenix to return to our staff as Director of Research. He has written numerous articles and several books, including the award-winning *Gathering the Desert* and the recent *Enduring Seeds.* His quick wit and amiability can be attested to by friends he has around the globe. We all agree: these fellowships couldn't have been awarded to a finer fellow.

Garden Report from Supai

By Erik-Anders Shapiro

This spring and summer I have been working as a sharecropper in Havasu Canyon for my friend, Warren Sinyella. Besides a share of the crop (all-I-can-eat), my verbal contract calls for a salary of 5 dollars a month and a cup of coffee every morning. Side benefits have been in the areas of mental and physical health and priceless on-the-job training in traditional farming. Our crop consists of about one acre of garden crops, distributed in three fields, in addition to a small orchard with an apricot tree (indescribably delicious walnut-sized fruits), a pear tree and many fig trees.

I worked at Supai off and on, commuting back and forth from Tucson, for much of the spring and early summer, but a bicycle accident in Tucson on July 13 (Friday!) kept me away from the canyon until the end of August. Warren took a job at Hualapai Hilltop at the beginning of August which kept him out of the canyon for 5 days out of 7. One irrigation by Warren and copious summer rains kept most of the crop flourishing, but weeds took advantage of our absence and were rampant in places. Some hungry horses and burros also did some early harvesting. However, a day spent weeding revealed many pleasant surprises.

One small field was planted early in Isleta blue corn and is nearly ready for harvest. Adjacent to this is a long plot we planted in squashes and cucumbers from commercial varieties of seeds that were generously donated to the community by the local church. Weeds had the upper hand here, but amidst them I found a bumper crop of ripe cucumbers.

Another field was planted later with Hopi blue corn and is maturing nicely. Interplanted between the Hopi corn are various legumes, mainly for soil improvement. Yaqui green beans are doing very well, and apparently are helping in weed control since they are more likely to climb and smother tall spiny weeds than the smooth-leaved corn plants. Another plot in the field is interplanted with 'church' green beans. These chloritic little plants are doing pitifully compared with the green jungle of Yaqui beans next door. Adjacent to these plots is a plot of Hopi blue corn planted a few weeks later. This corn is not doing as well as that next door, largely because of hungry crows, horses, and burros and lazy weeding on my part, however there is a bumper crop of interplanted 'church' cowpeas. One end of this plot is occupied by a substantial patch of 'church' pumpkins that Warren planted with an eye toward Halloween. There are also a couple of very nice Hopi cotton plants, the survivors of a planted row, at one end of the corn patch.

Alongside the irrigation ditch I panted a small patch of assorted NS/S chiles and 'church' tomatoes,

Erik's Supai garden with corn and watermelon

eggplants, and climbing string beans against a nearby fence. The weeds seemed to have been an advantage here, as they provided some shade for these delicate plants from the hot summer sun. Clearing them out I discovered many plants doing very nicely, though not yet producing. At the end of this patch, Warren's kids planted two seeds of Tohono O'odham devil's claw. The one plant that came up is huge, at least four feet tall and five feet wide.

The final field is the most diverse. I planted it fairly early in Magdalena big cheese squash, Tohono O'odham yellow watermelons, San Juan melons, and Hopi rattle gourds. For soil improvement., I also randomly broadcasted a package of NS/S heirloom bean soup mix which had sat around too long and was looking funky. Later, Warren and I planted a lot more of the yellow watermelons. I put in two little plots of amaranth - Paiute and Guarijio. Warren's seven-year old son and I planted a good sized section, much of it interplanted in the watermelon and gourd patches, to the local variety of Supai white corn.

The Supai corn came up like rockets and is delicious in the milk stage. The Magdalena big cheese squash is almost predatory, climbing up weeds and toppling them to the ground. The young squash were ambrosia when stewed with local corn and beans and canned chiles and tomatoes. The gourds, planted on the opposite side from the squash, are nearly as vigorous, producing fruits nearly a foot in diameter. The watermelons, having the advantage of shear numbers, are holding their own. One particularly well-ripened fruit was so full of sweetness that it practically exploded when I tried to

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Fourth Annual Fiesta de los Chiles

By Martha Burgess

Glossy green chiles are turning bright red on the pepper plants as this chile harvest season comes into full swing. To celebrate this spicy and nutritious harvest, Native Seeds/SEARCH and Tucson Botanical Gardens are excitedly preparing for our 4th Annual La Fiesta de los Chiles, Saturday and Sunday, October 20-21, 1990, at Tucson Botanical Gardens, 2150 N. Alvernon Way, south of Grant Road. Hours: Saturday 10 a.m. to 5 p.m., Sunday 11 a.m to 4 p.m.

What a zesty festival it will be! You'll be able to sample chile dishes from nearly every Native American culture in the Southwest, including Hopi, Laguna, Apache, Tohono O'odham, and Yaqui. The well-traveled chile will also give us a taste of the international, with delectable cuisine from Thailand to Jamaica, Hungary to Mexico City. Dishes will range from mild to piquante, guaranteed to appeal to every taste — novice and epicurean alike. Come watch green chiles roasting and taste a Sonoran snap cookie baked in solar ovens. Along with the pungent flavors, a multi-cultural concert of Southwestern music will fill the air. Enjoy the Baile Folklorico's colorful swirling costumes, the stirring Latin rhythms of Khenany (conjunto from Obregon, Sonora), Tucson's own Polo Romero Conjunto, Los Changuitos Feos (mariachis extraordinaire), Native Seeds/SEARCH's poet/balladeer *Mahina Drees*, plus non-stop Blue Grass, Country Western, Salsa and Native American performers.

Chile artisans and craftspeople are at an all-time creative high with chile pepper-inspired handcrafted works. Chile clothing and jewelry will be superfine and super fun. Ornaments and wreaths, fine chile paintings, stained glass and gourds, packaged spices and zany gifts will have you laughing, ooing, tasting and wearing. The mood is like an open market with lots of materials to create your own gifts, arrangements, or delicious chile dishes at home — bright red fresh chile ristras, fresh chiles of many varieties and colors, fresh garlic braids, dried flowers, minigourds and pumpkins, Indian baskets. A colorful assortment of hard-to-find Chile plants awaits the herb gardener; imagine a living Thanksgiving centerpiece which keeps on giving.

It's educational, too. Watch chiles being strung on the spot by traditional Chicano ristra makers. Talk with expert chile growers for horticultural information. Learn

of traditional chile herbal cures. Find inspiring books for chile gardening and chile cookery. And best of all, enjoy the diversity of cultures who share chile peppers in their legends and humor, their gardens and kitchens.

For children, the New Kiva Motions Puppet Theater has some hilarious chile shows in store, and the "Chile Rap" puppet will have us chanting "Chiles! Hot chiles!" in many languages. Morning Sun Children's School will have a kids center full of fun activities and games.

Just seeing the array of Chile T-shirts is worth the trip. This year's Chile Fiesta T-shirt is an original by primo graphic artist Nancy Lenches and brilliantly expresses the rich diversity and colorful character of our many native peppers. To wear it is to create kinetic art.

Fiesta admission is $2.00 (regular TBG entrance fee). Kids under 12 are free, as are Native Seeds/SEARCH members and Tucson Botanical Gardens members. So bring your whole family and your friends to enjoy La Fiesta de los Chiles. For further information please call TBG at 602/326-9255 or NS/S at 602/327-9123.

New World Dyeplant: Palo de Brasil

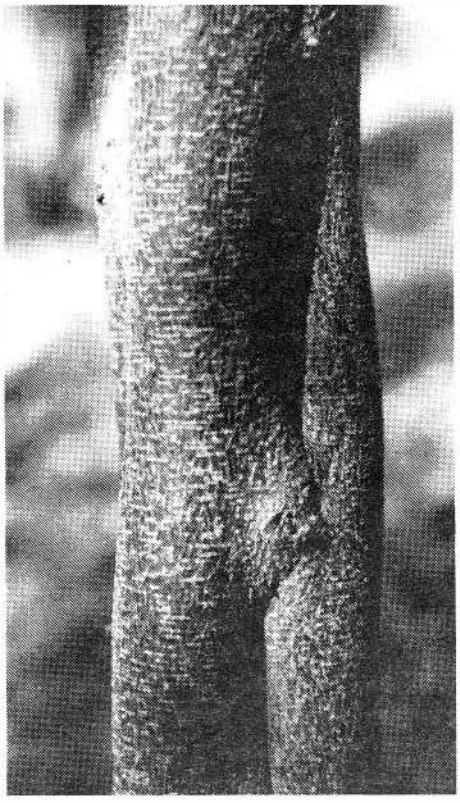
By Lillian Diven
Reprinted with permission from Saguaroland Bulletin, December 1977

Well-dressed gentlemen and ladies of the late 15th century wore velvets, furs and embroidery, but to 20th century eyes their wardrobes would seem drab. Their choice of colors was generally limited to blacks, tawny yellow-browns and some gray-blue shades. Reds and purples did exist but the supply of fast dyes in these colors was minute, and most of it was required for ecclesiastical vestments and royal robes.

There are twelfth century European records of a true red dye made from the heartwood of *Caesalpinia sappan*, which was imported from Ceylon and the Indies, half the world away. It was a beautiful red, the color of burning coals (in old French and English "braise") and was called bresil or brasil.

The difficulty of importing brasil over the long trade routes from the East made it worth its weight in gold, and restricted its use to the very rich when it was available at all during the next three centuries.

Then, on the heels of Columbus, Portugal began to send ships to the New World, venturing farther south in search of new lands. In 1500, Portuguese ships discovered and claimed the part of South America that straddled the equator and bulged into the South Atlantic. It was first called Vera Cruz, but almost immediately the name was changed to Brazil, for not one but several kinds of the precious dyewood grew there in abundance.



Palo de Brasil, *Haematoxylon brasiletto*

It's hard to realize today how much brazilwood was coveted. We think of pirates as capturing cargoes of gold and jewels, but corsairs from Honfleur and Dieppe raided the coast of Brazil for cargoes of dyewood, and even attacked Portuguese vessels on their way home from South America.

The discovery of aniline dyes in the mid-nineteenth century ended the dyer's dependence on natural dyestuffs for the most part, and true, fast red dyes came from the laboratory from that time on. But brazilwood was not completely abandoned, as we shall see.

Haematoxylin is the dyestuff found in several species of Caesalpinia from Asia and the Americas, and in several species of the genus Haematoxylon from Brazil, the West Indies and Central America. The name Haematoxylon means bloodwood.

Haematoxylon brasiletto (Brazilwood or Palo de Brasil) is the principal Mexican source of the dye. It is a small leguminous shrub or small tree that grows in the lowlands of Sonora and Chihuahua, south into Guatemala and to Colombia. In frost-free areas of the Thorn-Forest and Short-Tree-Forest zones of Mexico, which occupy a north-south stretch of land inland from the Pacific cost, *H. brasiletto* is abundant.

It can become a small tree, up to 20 feet tall, but is usually an extremely dense hemispherical shrub with zigzag branches bearing rigid spines. The dark green compound leaves have comparatively large and round leaflets. Racemes of small yellow flowers appear in spring and fall, or after a heavy rain. The bark is reddish on young branches, turning gray. Long creases the length of a stem give a false impression of two or three stems fused together.

H. brasiletto was known by the Aztecs (it is illustrated in the Badianus Manuscript) and is still sold in Mexican markets, according to Martinez, for making mouth-washes.

In the recent past it was also used commercially in dentifrices, and still may be. Pink tooth pastes are on the market today.

The Tarahumara Indians of northwest Mexico have never stopped using Palo de Brasil. The baton of their leader, the gobernador, is made of the wood, a decoction of the young branches is applied to the skin of persons suffering from jaundice, and Palo de Brasil is used to dye woolen threads for the sashes worn by every Tarahumara man. [It is a prominent dye in Mayo weaving, also.]

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Send In Your Phytoliths

By Kevin Dahl

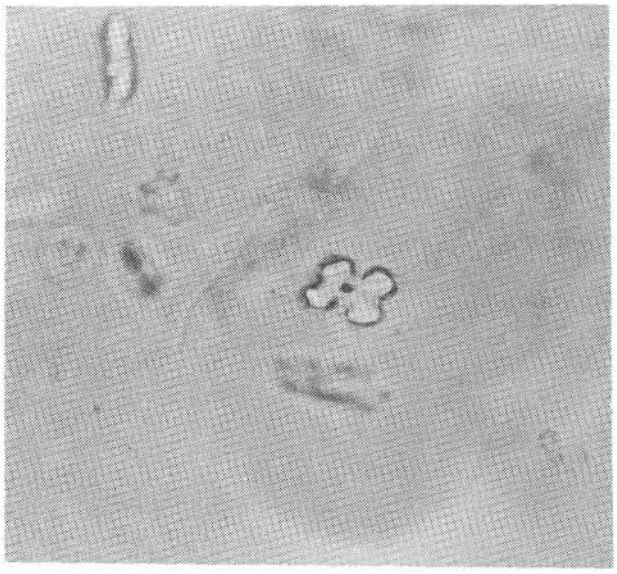
If you are gardening, then you are probably growing phytoliths. And a San Francisco State University researcher would like to get samples of them.

Don't feel bad if you've never heard of phytoliths. Graduate student William Middleton had to explain them to me, also: "Phytoliths are silicified cells, produced by many, though not all, plant species. Although they are biogenic in origin, they are inorganic, and so are deposited directly in soil upon the death and decomposition of the plant in which they were formed."

They are especially interesting to archaeologists trying to reconstruct what plants were used by ancient peoples.

"Phytoliths can be recovered from archaeological soils much in the same manner as pollen, though they are usually better preserved in a wider range of environments than pollen. Since they are deposited in soil directly from the plant (though they are subject to post depositional disturbance), phytoliths can offer a precise picture of plant and plant material distributions, as opposed to pollen which is often wind dispersed," writes Middleton.

Middleton is compiling a collection of phytoliths taken from known Native American crops and useful wild plants that can be used to compare with phytoliths taken from archaeological sites. This is a very new form of analysis, and a reference collection is essential. Middleton will be using these samples at first to compare phytoliths from an archaeological site in Oaxaca, Mexico, as his graduate thesis in Anthropology. But the reference collection will be important beyond this one project as it will be published and thus be useful for all archeobotanists.



Cross body phytolith from Teosinte Mexicana (Zea mays *ssp* mexicana) *approx. 19-16 microns.*

Middleton seeks samples of any Native American crop you are growing. He writes: "The portions of the plant that I am interested in are leaves, stems, bark, roots, inflorescences (flowers), pods, husks, kernels, cobs, etc., depending on the nature of the plant. Samples can be quite small, as little as .25 gm, though I prefer to have whole leaves and entire cross sections of stems; a single sample of each plant portion is sufficient." It is important that you clearly identify the crop variety with each sample.

Please send your sample to William Middleton, 1300 Martin Luther King Jr. Way, Apt. 7, Berkeley, CA 94709 (phone: 415-526-1366). If you are interested in collecting samples of wild plants, please contact him for a list of the plants he needs. Thank you for participating in this important research.

Palo de Brasil, continued

Modern craftsmen who wish to use this historical dyewood can find it today in the catalogues of dealers specializing in natural dye materials [and in the NS/S Seedlisting].

But the most important use of *H. brasiletto* in the 20th century is as a biological stain for laboratory microscopy. There is no commercial substitute for haematoxylin. It is indispensible in the histological laboratory, easily taken up by cell structures, so that details can be clearly observed under the microscope.

Kings and churchmen no longer wear brasil-dyed robes, but the dyewood is still an article of trade today.

The accompanying photo shows *H. brasiletto* at the Desert Botanical Garden in 1977. It is very frost tender. This specimen is some 15 years old, is in a very protected spot, but could still be killed by a heavy freeze [in 1990, there are no remaining specimens at DBG]. Unless you live in a completely frost-free area, it would be futile to hunt down a specimen for your own garden.

Seeds Needed

A reminder that NS/S can use your surplus seeds from your fall harvest. Each year as we inventory our seed stocks, we realize how vulnerable our supplies can be. Our summer garden was attacked by grubs that ate the roots of our corn and beans. One of our growers in southern Arizona lost his crops due to excessive rainfall and floods.

At present we need the following seeds (they will be dropped from the 1991 Seedlisting): Yaqui String Beans, Hopi Cotton, Bisbee Red Cowpeas, and Fava Beans (both varieties). If you have surplus seeds, we are open to gifts, trades or purchases.

Native Foods and Diabetes Project Takes Off

By Gary Nabhan

In June 1990, Native Seeds/SEARCH received a $28,000 grant from the Ruth Mott Fund to pursue one of its earliest interests: promoting native foods for their nutritional benefits to Native Americans in particular, and to the public in general. Tragically, the descendants of the Native Americans who first nurtured crop diversity in the desert Southwest now suffer from the highest incidence of diabetes in the world. This trend began with the Westernization of their diet and abandonment of foods which formerly protected their metabolism from the effects of high blood sugar levels. By the year 2000, it is estimated that treatment costs for 250,000 Indian and Mexican-American diabetics in Arizona alone will cost taxpayers a minimum of $320 million a year. If adopted at an early age, nutritional interventions such as selected native foods may reduce the health costs and suffering now impacting Indians genetically susceptible to diabetes.

The goals of this project are:

1. To research and document the value of native desert plant foods for controlling the blood sugar levels of Hispanic and Native American diabetics.

2. To provide health professionals with useable information on these foods and assist them in integrating this information in their diabetes and nutrition education efforts.

3. To promote the use of native foods of nutritional value to these communities, through workshops, videos, slide shows, handouts and cookbooks.

4. To distribute free garden seeds and sample native foods to Indian and Mexican diabetics for home production and use.

Tepary Totals

Mr. Evan L. Ausman, Jr., of Carefree, Arizona, has been growing out larger quantities of beans and recently sent us some figures he has developed:

"I told you I would send you the list of beans I counted per pound. Here it is.

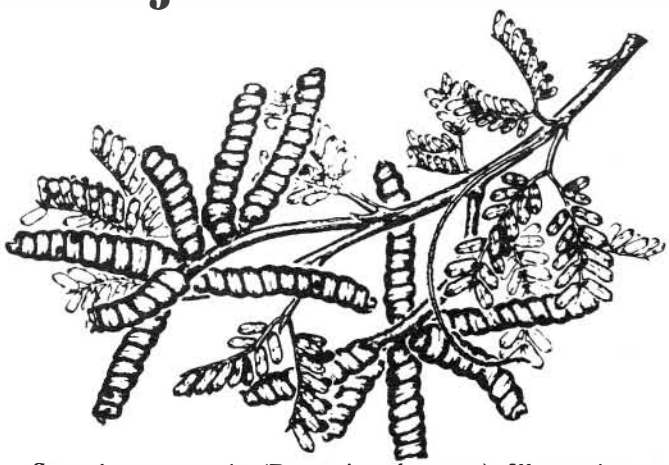
common white beans (from store), 4000 per pound

Anasazi beans, 2000 per pound

Pima brown teparies, 3600 per pound

Mayo white teparies, 3760 per pound

If you plant 15 rows 100 feet long and 3 feet apart with seeds 6 inches apart in the rows it takes about one pound of beans. This is about 1/10th of an acre. Should produce around at least 50 pounds of beans with no losses."



Screwbean mesquite (Prospois pubescens). *Illustration by Wendy Hodgson.*

5. To link together potential growers and markets of native foods in reservation communities, to provide new sources of income and nutrition where they are needed.

The new native foods research and promotion project of Native Seeds/SEARCH is already having an impact on diabetes and nutrition education programs around the state. Native Seeds/SEARCH staff has already made site visits and established collaboration with Indian diabetes programs at Sells, Tuba City, Sacaton and San Simon. In addition, we are collaborating with the Native American Research and Training Center of the UA College of Medicine in producing a 20 minute training video for tribal communities on the value of native desert foods in controlling blood sugar levels of Indian diabetics. The Big Fields and Sacaton communities have assisted with filming this video.

Four professionals in ethnic nutrition and health are assisting us as part-time consultants: Susan Kunz, M.P.H., an NS/S board member and nutritionist; Michael Winkleman, Ph.D., a medical anthropologist specializing in native medicines used for treating diabetes; Joseph Laferriere, M.S., an ethnobotanist and NUTRICOMP programmer; and a nutritionist/dietitian yet to be selected. Adrian Hendricks and Brenda Sekaquaptewa, Native American residents of Sacaton, have agreed to serve as interns in organizing a Native Foods Thanksgiving and nutrition education day for the Casa Blanca community of the River Pima, under the direction of Jo Ann Hurley, IHS nutrition educator in Sacaton. Dr. Charles Weber, Pete Kohlhepp and Dr. Robert Becker are currently analyzing additional food samples for their fiber, starch and sugar contents. We thank all of them for their help.

Members are welcome to write for further information on the project's activities, and to provide us names and addresses of reservation residents who may benefit from our research results.

My Appetite Belongs to the Convenience Store

A Navajo Song by Dr. Bahe Billy

When Dr. Bahe Billy, Ph.D., pulled out a piece of PVC sewer pipe that had been crafted to sound something like a cross between a snare drum and a rattle as he ran his fingers across it, we could tell it wasn't going to be just another lecture. He was behind a podium in front of about 30 people, mostly participants in the Southwest Indian Agricultural Association, who came to this part of "Indian Summer," a University of Arizona summer session program.

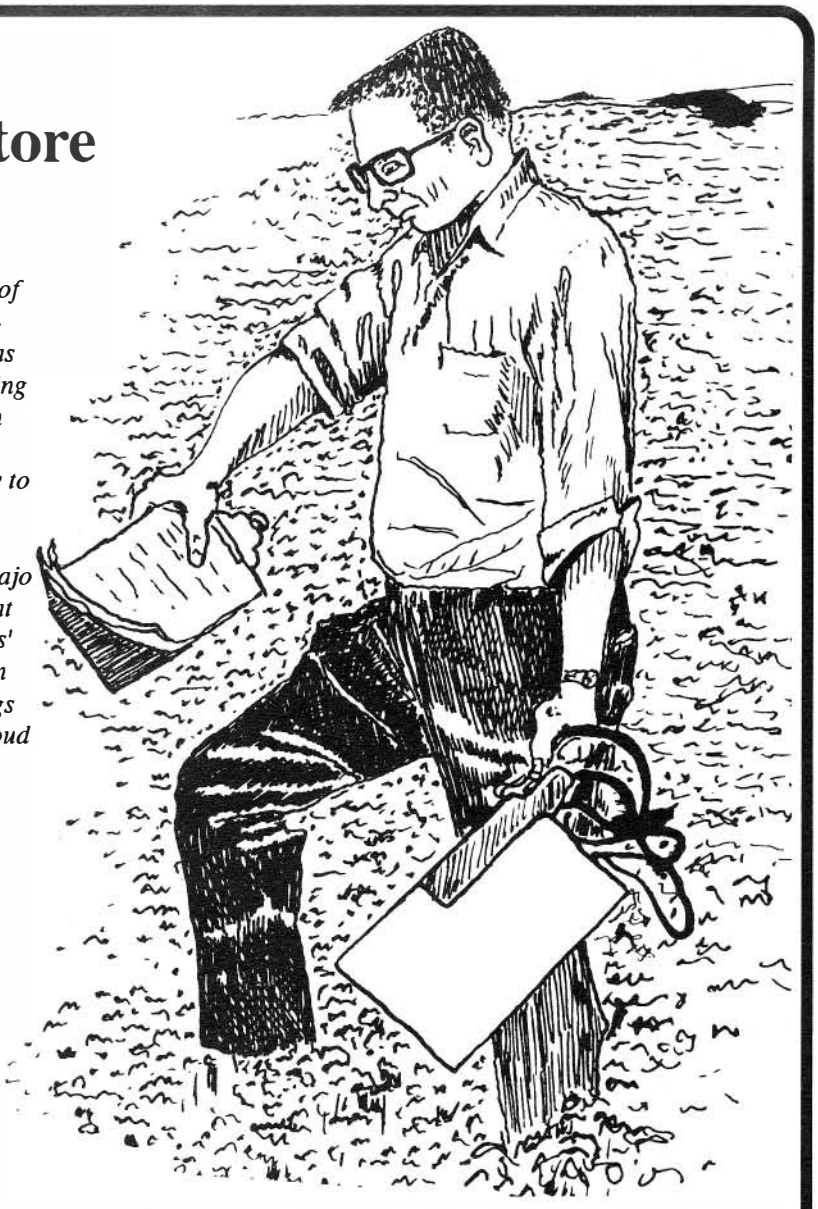
Dr. Billy, a BIA soil conservationist for the Navajo Nation and first Native American to receive a Ph.D. at the Univ. of Arizona, spoke on "The Native Americans' Need for Agricultural Education." The talk was began and ended with some "new traditional" bilingual songs Dr. Billy had written, including one which we are proud to reprint here in translation with his permission.

I am hungry, I am hungry, I am hungry.
Because of hunger stress, I drive off,
make a run, make a run to the convenience store.
Day or night, day or night,
even when the road is icy,
even when it is snowing,
even when it is raining,
even when it is muddy,
even when it is windy, or
even when it is cold.
Hurry, hurry, make a run to the convenience store,
for my big appetite belongs to the convenience store.

Junk food, junk food,
high in carbohydrates,
high in cholesterol,
high in preservative,
and highly overpriced.
These however make little difference to me.
I get my recharge, that's what matters.
Besides that I get trading stamps as profit.
Hurry, hurry, make a run for the convenience store.

Make a run, make a run for the convenience store,
for grocery, gas, livestock feed and hay,
hardware, to do our laundry and buy liquor
at the off-reservation convenience store.
Hurry, hurry, make a run to the convenience store.

Can you loan me some money until payday?
I need the money
to make a run, make a run to the convenience store.
Day or night, day or night,



Dr.Billy as pictured in Navajo Farming, *Sam & Janet Bingham.*

even when the road is icy,
even when it is snowing,
even when it is raining,
even when it is muddy,
even when it is windy, or
even when it is cold.

Hurry, hurry, we got to get back
before the late movie starts.
It is about the chief who beats all odds to become
chief again and still makes his millions.
They should make a movie about how to make millions
on the Navajo Reservation
operating a convenience store.
Hurry, hurry, make a run, make a run
to the convenience store
for my eating habits belong to the convenience store.
Make the run, make the run, even though
all that Navajo dollars drains to off reservation.

Why are Chile Peppers so HOT?

University of Pennsylvania Graduate Student Joins NS/S Chile Project

This past August, Donald Norman joined Gary Nabhan in the Tumacacori Mountains to study the native chiltepines there. Don is a predoctoral candidate in ecology at the University of Pennsylvania in Philadelphia. He is also a National Institutes of Health Predoctoral Fellow at the Monell Chemical Senses Center in Philadelphia. Monell is a world recognized center for the study of smell and taste. Perhaps you remember the smell test in National Geographic a few years ago? That was a Monell project. A current area of research at Monell is the function of chemical irritants. Capsaicin, the chemical in chiles that give them the "heat", is one of a group of pharmacologically active irritants being studied at Monell. By looking at the ecological relationships in the wild chiltepin, Don hopes to unravel the question: Why are they so Hot?

Don will be working at the site of the proposed chile preserve at Rock Corral canyon. "I was looking for a site where my information can be used for more than my thesis. The information I will be gathering will be used to help NS/S and the Forest Service make better decisions about what criteria should be used to establish "wild relative" preserves. Though people are interested in preserving wild relatives, little is known about their ecology. The pollinators, herbivores, competitors, and seed dispersers of these plants play a key role in determining why plants have evolved to contain the genes we are interested in preserving. We must know more about the entire life history of the plant to decide its fate. I will begin what I hope will be a long-term study of how the plants survive at this site. Because there is so much known about the genetics and biochemistry of peppers, this research will help set up guidelines for other rare and endangered plants that need protection also."

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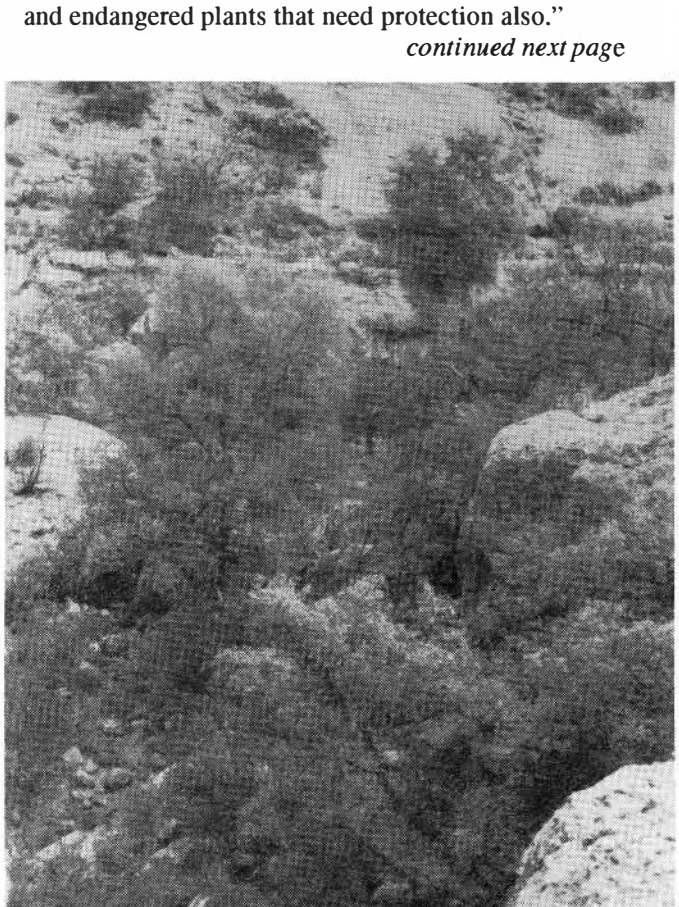
Wild Chile Reserve Plans Proceed

By Gary Nabhan

On August 16, Native Seeds/SEARCH staff met with local and regional representatives from the U.S. Forest Service, and with Judy England and Jeanne Neubauer from the Santa Cruz Chile and Spice Company to discuss future options for a wild chiltepin reserve near Tumacacori. Meeting in the field during one of the wettest summers in recent years, all participants agreed on the beauty and variety of the plant life on the proposed site — ten special plants listed in the Nature Conservancy Natural Heritage Program files occur there. All participants were also enthusiastic about the significance of Arizona's chiltepin populations — the U.S. Forest Service has recently designated this species as a special plant on Coronado National Forest. The England family, which has been the grazing permittee on the land for decades, is well aware of the rich folklore and genetic potential of chiltepines.

The Forest Service offered to provide Native Seeds/SEARCH with a special use permit to initiate permanent marking and mapping of plants, ecological studies and a management plan proposal. Plans for the fencing of a one to two acre box canyon as a grazing exclosure has also been initiated. Research Natural Area or Zoological and Botanical Area designations have been discussed, but no decisions made yet. We're grateful to the many members who wrote the Forest Service in favor of wild chile protection. We're also grateful to University of Pennsylvania ecologist Don Norman, a new NS/S research associate, for his fieldwork and liaison efforts on this project.



Lush riparian vegetation at Chile Reserve site.

Why so Hot, continued

Don's other field site is located outside Brownsville, Texas, at the Sabal Palm Grove Sanctuary, a small 175 acre palm preserve owned by the National Audubon Society. The interesting question being raised in the Rio Grande Valley Delta is how to replant all of the forest that has been lost to agriculture. With the continuing freezes and increases in water salinity, agriculture needs to change in the valley, and Don is working to collect information on how the native chile can be used as part of a sustainable agroforestry project. "The main emphasis of the US Fish and Wildlife Service in the Valley has been to buy land, but they don't have any money to do any research to figure out the best way to encourage the native vegetation to recover. Only with the appropriate understory shrubs, such as the native chile plant, will populations of birds and mammals be high enough to allow the survival of the ocelot and jaguarundi."

Because so much is known about peppers, Don was surprised that no one had ever really addressed the ecology of the plant. "The hypothesis I will be testing comes from a lot of anecdotal evidence. Mammals appear to be repelled by peppers, but birds do not feel the heat. The plant uses this to encourage the birds to disperse its seeds."

If you have some chiltepin plants in your yard, you can pick up a form from the NS/S office to help document the natural fruit removal of your chiltepin fruit. Don has set up the form. "I ask questions about how many fruits are removed at a time, at what state of ripeness do the fruits disappear, and, who is removing the fruits. Because the fruits, when ripe, are easily removed from the petiole, leaving an easily visible sepal cup, it is easy to keep track of how many fruits were removed over a period of time. "I'm not expecting a vigilance at the chiltepine bush, but with a piece of colored thread to mark a particular branch, you can really easily document the removal. It's a great home science project." Don believes that thrashers, mockingbirds, cardinals, and grosbeaks are probably the major dispersers. Though some rodents, quail, and pigeons may eat the fruit, they are typically seed eaters, or have powerful gizzards that grind up the seeds.

Don holds a Master's in Wildlife Toxicology from Huxley College of Environmental Studies at Western Washington University in Bellingham, Washington, and is a resident of Seattle. With the help of local permaculture designers, the family homestead there is now under transformation into an edible landscape. With bamboo, kiwis, and over 30 native varieties of fruit trees planted before he moved to the east coast, he looks forward to seeing the results after he finishes his PhD. "it's actually hard for people to believe that it gets dry in the Pacific Northwest in the summer, and also that you can overwinter a great many garden crops."

Two Chiltepin Recipes

By Gary Nabhan

PRE-COLUMBIAN CARNE MACHACA CON VERDURAS Y CHILTEPINES

Native Americans of the desert Southwest undoubtedly used the wild chiltepin even before the domestication and dispersal of cultivated chiles to the north of Mexico. Given the fact that meat was often scarce, but a variety of wild greens, cacti and spices were seasonably abundant, I have tried to reconstruct what a Pre-Columbian chile dish might have been like for native peoples living in what is now southern Arizona or northern Sonora. Carne machaca con verduras y chiltepines is still common fare in that desert region, but I have excluded post-Columbian ingredients to the extent that I could. In this recipe, wild chiles are but one of several native plants in the mix, rather than being the primary ingredient of the sauce. Nevertheless, I guess something akin to this dish served as the precursor to carne con chile colorado. Be forewarned, it is very hot!

100 g or 1½ cups dried carne machaca (usually beef jerky today, but prehistorically it was dried venison, javalina or antelope meat)
18 fruits dried red chiltepines, crushed
3 tablespoons or ½ handful dried wild oregano leaves

Rehydrate meat by soaking with spices in 2 cups of water for one hour; drain off excess water, and add to the following mixture after it has been sauteed for 15 minutes in a frying pan:

¼ cup oil from venison suet, or from sunflower seeds that have been pulverized and boiled until the oil can be skimmed off the top of the water
2-3 cups freshly picked wild amaranth greens, washed and coarsely chopped
1 cup tender young prickly pear pads, dethorned, washed, and cut into inch long strips
1 cup husk tomatoes, stripped of their papery "chinese lantern" covering, washed and chopped
12 green (fresh or pickled) chiltepin fruits, chopped finely

Saute the entire mix for another five minutes, then serve with tortillas or eat with a spoon.

CHILTEPIN ICE CREAM

This novelty was first custom-made for two Arizona events: the Fiesta de los Chiles in Tucson, and a conference on wild chile conservation and development at the Desert Botanical Garden in Phoenix. Be careful: it's so hot that you immediately have to eat more ice cream to cool down your mouth!

1 gallon vanilla ice cream
½ cup green chiltepines that have been pickled in brine, throughly rinsed, then pulverized to a fine pulp (fresh red or green fruits can be used instead, sparingly.

Combine, and blend in an electric blender until green flecks are thoroughly mixed into the vanilla ice cream matrix. Serve small portions.

New NS/S Project Will Honor Folk Variety Fruit, Nut Trees

If you backpack deep into the heart of the Superstition Mountains, west of Apache Junction, Arizona, you can find the surviving remnants of a 300-tree apple orchard that once supplied the settlers of the Reevis Ranch. On the windswept mesas of the Hopi, you can find peach trees tucked away in protected microclimates that are descendents of trees brought to this land by the first Spanish explorers. In downtown Tucson, near a shrine that honors the memory of young lovers killed by mistake, is a hedge made of living cactus, centuries old, that yearly produces some of the best tasting fruit imaginable. These, and other fruit and nut trees, berry bushes, cactus and agave varieties that have been used in Arizona by Native Americans, cowboys, miners, Mexicans, Mormon pioneers and other ethnic settlers since before World War II, are the objects of a new conservation program initiated by Native Seeds/SEARCH.

Tentatively called the Arizona Heirloom Fruit and Nut Regis-TREE (a pun on "registry"), this project is designed to recognize and honor the useful perennial folk varieties still growing in our state. Its goal is to document these resources so they may receive any extra protection, if needed, and to identify them for possible use by researchers, home gardeners and enthusiasts. If endangered, we will work to implement conservation measures, both on site (*in situ*) and by transfer of cuttings or offspring to other sites (*ex situ*). Another goal is to model this program so that it can be started by other groups in other states and countries.

We are currently contacting other groups to co-sponsor this project and will appoint a selection committee that will accept nominations and choose the first trees and orchards to be placed in the registry by early next year.

Contact Kevin Dahl or Kevin López at our office if you would like nomination forms or more information about this program.

Supai Garden, continued

cut it open. The poor little patch of San Juan melons, not nearly so vigorous as watermelons, gourds, or squashes, are nearly obscured. However, Warren spotted a mature San Juan melon amidst the foliage that was bigger than a football and weighed several delicious pounds.

Pests are a problem, besides the weeds (and did I mention the Bermuda grass?), there are many animal pests. Stray horses and burros are a constant threat to fields that are not well fenced. Fencing material is difficult to obtain in the canyon and many crops are entirely lost to four-legged pests. Our fields, despite lots of work on fence lines, came under occasional attack that forced us to replant several plants and give others up as lost. Crows attacked newly planted corn seeds early in the season - a good reason to plant deep - and I am told that there are legions of raccoons waiting for the corn to ripen. One neighboring farmer plans on staking his dogs in his corn fields at night, another sets a transistor radio out in the field to keep the raccoons away from the ripening corn. the raccoon and crow problems were both made worse several years ago by the establishment of a new dump site in the midst of the main agricultural area. Weevils in the squash probably won't diminish the squash crop significantly, but the corn supports a significant population of corn ear worms, which will cause significant losses. Warren kept insects out of the pumpkin patch with a dusting of wood ash on the leaves. Pest bugs are also kept at bay by healthy populations of such beneficial predators as lady bugs, white crab spiders, and particularly dragonflies.

Elsewhere in the canyon, many fields are flourishing. The number of active farmers and gardeners has increased substantially since last year and garden patches of corn, sunflowers, and melons poke out here and there throughout the village. Warren and I are already making plans for next year. The price of horse pellets doubled in the last year, so we also plan to experiment with fall and winter fodder crops, such as barley and perhaps 'church' turnips, as there must be ten-thousand packets.

A very serious flood on the afternoon of September 3 inundated several fields and gardens with mud, destroying many crops. The flood caused millions of dollars in damanges to homes, fences, irrigation systems, etc. A relief fund has been established; contributions can be made to the Havasupai Flood Emergency Trust Account, at any Valley National Bank branch (or mailed to the branch in Flagstaff). This flood vividly demonstrates the danger uranium mining will be to life in the canyon. A uranium mine, the Canyon Uranium Mine, south of Grand Canyon Village, is being developed by Energy Fuels Nuclear, Inc., of Denver. The mine site is within the watershed that drains into Havasu Canyon. The flood was of such magnitude that, if the mine were operating, a tailing dam could have burst, bringing radioactive mine tailings into the canyon.

New Board Members

In June, the Native Seeds/SEARCH Board of Directors voted to fill two positions with new members. One position is to be shared by Angelo Joaquin, Jr., and Susan Kunz, and the other filled by Diana Hadley. We are grateful for the good advice and work Laura Merrick has provided, and though her term as Board Member has ended this year we know we can still rely on her expertise on squash and other matters. Here is a brief introduction to the new board members:

Angelo Joaquin, Jr., and **Susan Kunz**, MPH. Angelo is the Acting Director of the Tohono O'odham Nation Water Resources Department, has managed community development projects for Save the Children and served as a tribal Housing Commissioner. He is the Directer of the annual Waila Festival held in Tucson and has worked for numerous local, national and international folk festivals. A Tohono O'odham, Angelo has produced and directed Native American programs for radio and television. Susan is a public health professional with special interest in program development. She has performed planning, design and evaluation of maternal-child health programs as a Peace Corps volunteer, an employee of the Tohono O'odham Nation and as a consultant to the Arizona-Mexico Border Health Foundation. Susan's current focus is the U.S.-Mexico border region and its binational health and environmental issues.

Diana W. Hadley, M.A. A Ph.D. candidate at the University of Arizona, Diana has taught, researched and written about Southwestern History including such topics as the missions of northern Mexico and ranch life along the U.S.-Mexican border at the turn of the last century. She was also co-owner of a ranch along the border near Douglas, Arizona, for more than a decade, and has been a NS/S seed grower. Currently, Diana serves on the boards of the Arizona-Sonora Desert Museum and the Tucson-Pima County Historical Commission, and works as a Research Assistant at the Arizona State Museum.

Slide Show Available

Our slide and cassette tape program, *Planting the Seeds of Endurance, an introduction to Native Seeds/SEARCH*, is available for showing to your group. It has been used by adults of diverse ethnic backgrounds, high schoolers, middle school and (with much teacher elaboration of concepts) even 4th graders. It lasts 30 minutes, and complements studies on nutrition, Native Americans, gardening, permaculture, appropriate technology and desert ecology. You will need a Kodak carousel projector, an adequate cassette tape player, and someone to coordinate the manual advance. To reserve a copy, please send your request in writing with a deposit check of $25 to cover UPS shipment. The balance of your check will be sent upon your return of the set if there is no damage. Contact us for further details.

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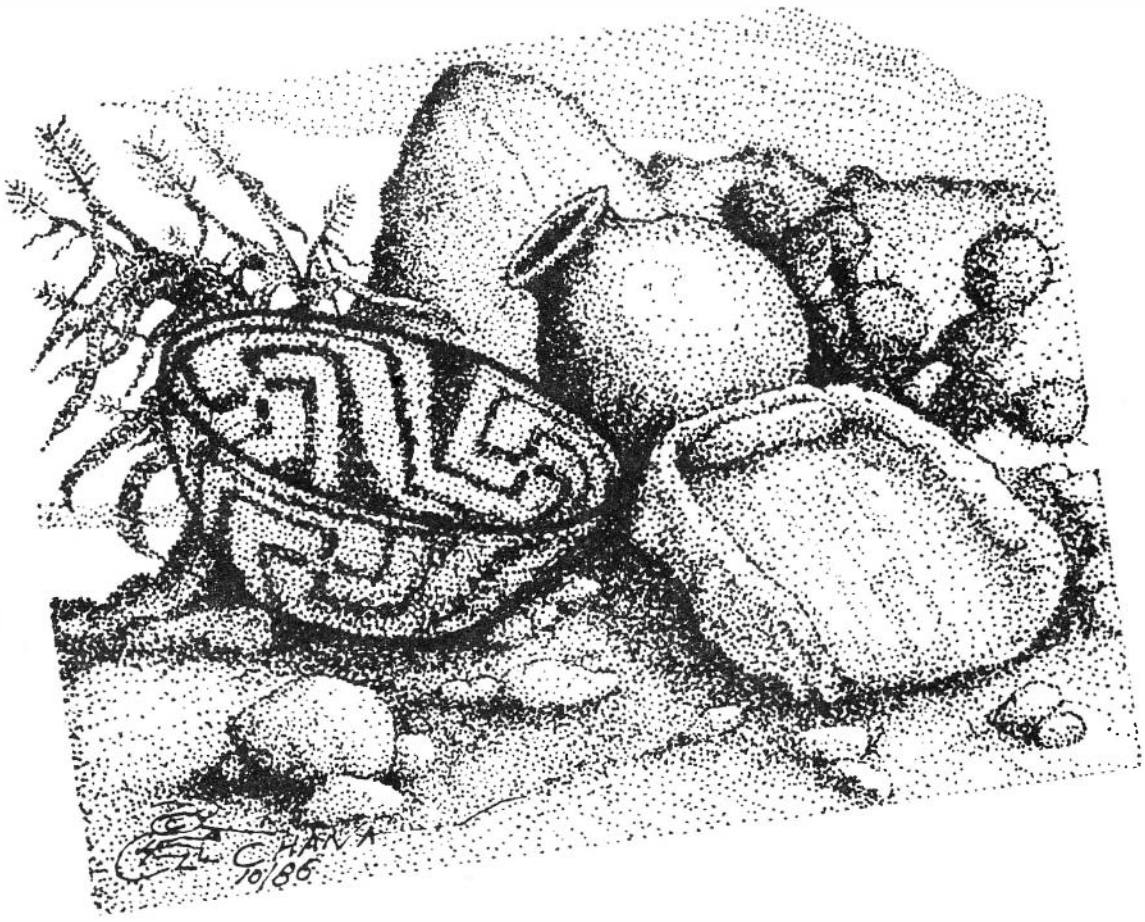

This notecard, illustrated by Tohono O'odham artist Leonard Chana, is now available through NS/S in packages of six for $4.00 + 50¢ shipping. See our Fall Harvest Catalog for other new items.

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