No. 2, 1983 Summer Solstice

the Seedhead News

Wild Relatives of Crops in the Southwest

Certain wild plants, known to be the ancestors or close relatives of our cultivated vegetables, may be the unsung heroes of agricultural history. The following notes will explain why Native Seeds/SEARCH is working to conserve a number of wild plants that most farmers have never heard of, but that may be important to their future and to ours.

Wild relatives of crops are often scrawny-looking; how could they be of any value? Consider the following. Genes from little-fruited South American tomatoes have now been incorporated into 30 or so commercial varieties, resulting in tens of millions of dollars per year in tomato production. How? These genes have increased the fructose/soluble solid content, and resistance to fusarium wilt and leaf spot in garden tomatoes. Similarly, an influx of wild bean genes has improved the protein quality of lima beans by augmenting their most limiting amino acid, cystine. And Texas virologist Ben Villalon has found resistance to four strains of virus in wild chiles that can be transferred to save jalapeño and bell peppers from yield-depressing disease.

Yet such advances will not be possible in the future if wild stands of these crop relatives are depleted in their natural environments. We have estimated that over 100 wild species closely related to major crops are currently threatened or endangered within the U.S.!

Let's take a look at the list of "Special Plants"---endangered, threatened, or endemic to the state---recognized by the Arizona Natural Heritage Program. This carefully formulated list gives us reason to be particularly concerned about the following wild resources in Arizona:

5 onion species (*Allium* spp.)
1 wild bean (*Phaseolus supinus*)
3 dunes-endemic sunflowers (*Helianthus*)
1 kin to cassava & rubber plants (*Manioc davisiae*)
& the wild relative of chile peppers (*Capsicum annuum* var. *minimum*)

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Surprisingly, few of these imperiled wild relatives are protected within U.S. nature preserves, or stored as seed kept in germ plasm banks. They have generally not been considered priorities for any conservation efforts, despite their potential return in benefits to humankind if they survive and are evaluated and utilized. Nonutilitarian wild species should be saved too, but certainly we should give crop relatives their fair share of care.

Wild species in all 5 of these genera of economic plants have been used with success in crop improvement for nutritional composition, insect, disease and stress resistance. YET WE MAY BE LOSING THESE PARTICULAR RESOURCES DUE TO NEGLECT.

To reverse these trends. Native Seeds SEARCH is working to: 1)Evaluate the number of extant populations of selected wild relatives of crops, assessing the genetic variation within and between stands. 2)Promote protection of vulnerable stands by working with land owners, managers, neighbors and others. 3)Insure back-up conservation by gleaning some seed or taking cuttings from selected plants where this doesn't further affect the populations, to distribute to seed banks, botanical gardens and breeders. We're currently working with wild chiles and two wild sunflower species. If you are interested in helping, write us!

Gary Nabhan

CAPSICUM VAR.

Tarahumara Indian Country Explored for Seeds

During the last part of April I had another occasion to briefly visit the Sierra Madre Mountains of Southwestern Chihuahua and northeastern Sinaloa Mexico. Mexico's rugged western Sierra Madres, and especially that portion of the uplift called the Sierra Tarahumara, is a remarkable refuge area. Not only is it the home of the legendary Tarahumara Indians, but it is also the locus of an unusually large number of traditional or native crop species and varieties.

The concentration of so many important seed stocks is due to three factors. First, many of the Tarahumara Indians persist in their traditional dry farming activities. Second, these Indians inhabit an area containing incredible diversity geographically and environmentally which has necessitated local adaptations in each of the types of seedstocks grown. Third, the extremely rugged and isolated Tarahumara region has allowed the survival of these locally adapted populations which in so many other areas have long since either disappeared or become extinct.

Readers of this newsletter will be especially interested in knowing that even though extemely brief, this trip resulted in the collection of several additional important seedstocks. I was able to contact a farmer from the town of Cerocahui, Chihuahua and obtain from him samples of five of the basic Tarahumara corn (Zea mays)) varieties. These include a blue Tarahumara corn which is felt to be especially good for tomales and a red Tarahumara corn which is commonly used by the Tarahumara for their fermented "tesquino" or corn beer. In addition, a variety of red striped corn called "Maize Pinto" by the Tarahumara was also obtained. This variety is unbelievably similar to Supai "chin mark" corn. This type is apparently especially suitable for tortilla making. Samples of two white Tarahumara corn varieties were also collected. These are the "Maize Blanco" which is ideal for pinole making and "Maize Chapo" which is used for tortilla making.

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All five of these corn variety samples were grown out in 1982 in the volcanic soils immediately adjacent to Cerocahui, Chihuahua. Corn had been grown in this isolated valley well before A.D. 1681 when the Jesuits established the first local mission. This means that the corn obtained should be well adapted to arid, dry farming conditions at elevations around 6000 feet.

Interestingly, I saw a number of groups of Tarahumaras planting their corn fields in late April right at the end of the spring rains. The Tarahumara corn is thus adapted to sprouting in late April or early May and growing slowly until the summer rains begin in late June or early July.

During my visit to Cerocahui I was also able to obtain samples of a small brown/pink lentil (Lens esculenta) which was introduced from Europe years ago. This tasty bean has become adapted to Cerocahui's soils and climate and lends another element of variety to the local diet. I was especially pleased to collect a substantial sample of the local sulphur or "azufrado" bean (Phaseolus vulgaris) after having consumed an unusually large portion of refried beans prepared from this delcious bean variety. Again both of these bean samples should be well suited for growing at upper elevation dry farming sites.

Native Seed Searchers living at lower elevations will be glad to know that I was also able to acquire another sample of sulphur beans from the 300 year old town of Urique, Chihuahua. This historic mining town was only connected to the outside world by truck roads five years ago. The local seed varieties have been grown out for centuries in this spectacular location at the bottom of Mexico's famous Copper Canyon. While surrounded by mountains reaching 8000 feet, most of the fields around Urique are situated at elevations close to 1000 feet. These sulphur beans should thus be adapted to much hotter and even drier conditions than those from Cerocahui.

Barney T. Burns

(All of these crop seeds are now available from NS/S for $1 per package.)

ZEA MAYS (INDIAN CORN).

EXTRA! EXTRA! ATTENTION HUMAN BEANS!

"The Desert Tepary as a Food Resource" is the title of a special journal symposium edited by Native Seeds Searcher Gary Nabhan. It is 64 pages of Volume 5 Number 2 of Desert Plants, a natural history magazine published by the Boyce Thompson Southwestern Arboretum. Nine articles, color photos and sketches are included, providing a state of the art review of the revival of this arid-adapted legume, its nutritive content, use in breeding, runoff farming and Southwestern cookery.

To obtain a copy of this beautiful and inspiring document, send $3.50 to the Friends of the Arboretum , P.O. Box 3607, College Station, Tucson AZ 85722, or to Native Seeds/SEARCH.

Native Seeds/SEARCH Update

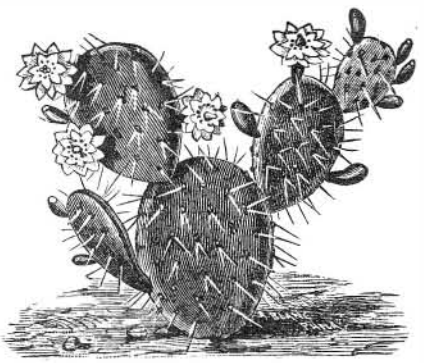
Native Seeds/SEARCH has come a long way since its inception in December, 1982 when the founding board of directors decided to incorporate their ideas and energy into a new organization. In January, 1983 the Articles of Incorporation and Bylaws were written and approved. Board officers were elected: Gary Nabhan, president; Barney T. Burns, vice president; Karen Reichhardt, secretary; and, Mahina Drees, Treasurer.

When we organized all our seedstocks and composed a seed lising of 47 crop varieties and their wild relatives, we finally realized how many unique resources we had to offer the public. Many of these seeds came from our home gardens, or from native farmers who we encouraged to produce a surplus so that we could buy part of it at prices that further encouraged their persistence. We began our educational outreach with a spring solstice newsletter and participation at the Boyce-Thompson Southwestern Arboretum's Arid Land Plants Fair.

By March, NS/S had become incorporated as a non-profit organization within Arizona and soon tax-exempt status was prepared for review by the IRS. Late in the desert winter, we wrote letters inviting seed conservationists across the nation to become NS/S associates, or to donate contributions earmarked for special projects.

Now the word is spreading: through the Culture and Agriculture newsletter; CoEvolution Quarterly; Coyote newspaper; Sunset Magazine; The Land newsletter; Desert Plants magazine; the Arizona Daily Star and Tucson Citizen newspapers. We are managing the native crops display at Tucson Botanical Gardens, doing preliminary research and increasing these rare seed stocks. Local folks will join us for a San Juan's Day Fiesta/open house at the Tucson Botanical Garden.

Four months after becoming official, we had more than 30 associates whose contributions help defray operational costs; all work has still been voluntary, without pay.



OPUNTIA.

These accomplishments would be reasonable for a full-time staff over four months, but they are only part of what the board members do in their "spare" time. Both Barney and Gary finished their doctoral degrees these last few months, while continuing their regular daily work. Mahina commutes 200 miles a day, 3 times a week to teach gardening on the Papago Reservation. She says she is having trouble finding time to practice her singing and write songs. Karen works part-time at the University of Arizona and juggles NS/S correspondence between child care and fiddle lessons. Barney makes a trip to northwest Mexico every 6 weeks, and in April managed to collect 50 pounds of Indian corn in the Sierras on a sprained ankle. Between the four they tend 4 gardens, 10 cats, 7 chickens, 12 wild pigs and one toddler. At the last board meeting, they unanimously voted to urge the Great Desert Spirit to extend day lengths to 40 hours.

Karen Reichhardt

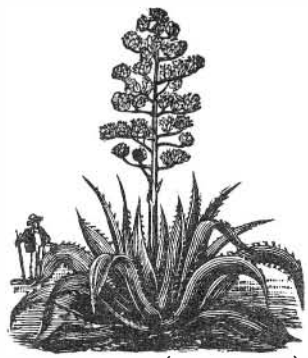
Seedkeepers in their Own Right

One of Richard Pentewa's many skills is farming. He grows native string beans, mottled limas, Pueblo flour corn, dye sunflowers, apples, grapes and peaches in the fine sandy soil of Arizona's Hopi Reservation. Below the sandstone cliffs of Oraibi, water collects in a small valley where his fields and orchard are located. He plants his blue corn deep below the sandy surface, taking advantage of hidden moisture and insuring a rootedness that keeps the stalks upright in the face of the constant winds.

Most non-Hopi who know Richard know him as a Kachina (katsina) carver. But he is also a plant conservationist. He saves and shares most of his own crop seeds. He also leaves a rare, wild sunflower standing in his field, although he does weed out other plants that volunteer there. The place he farms is named for this sunflower, the petals of which have long been used as a Hopi ceremonial face paint. Telling him that Helianthus anomalus grows only in a few places now, he smiled. Certainly this rare sunflower will grow, at least in his field, as long as this Hopi farmer plants his land.

HELIANTHUS

Pete Casados has been called a Farmer of the Old School. Yet what old time New Mexican gets written up in Gourmet, Food and Wine and Woman's Day? One that has 40,000 pounds of blue corn ground for ethnic food specialty shops every other year. One that has processed in outdoor adoble ovens (hornos) 200,000 bushels of other corn for chicos in a single season. Pete and Juanita Casados are seeing to it that traditional Southwestern foods are available to a whole new audience, as well as to those who grew up with them.



AGAVE AMERICANA (CENTURY PLANT).

Pete grew up in El Guique, and Juanita in nearby Chamita. Their families grew some of the same foods--Mexican squash, blue corn, chiles and apples--and harvested the same wild foods--verdolagas and quelite greens. Now, for 30 years together, they have continued these traditions, Pete irrigating 150 acres and Juanita canning away the foodstuffs. But they are innovators as well. Their hornos are gigantic; their cookbook, multi-cultural; and their packaging and marketing, creative and colorful.

Along with their friends, the Reeves family, they have begun the Dos Ves, Inc., native foods mail order house of chile powders and seeds, blue corn atole and whole kernels, posole, pintos, chicos and sauces. For a catalog of their gift boxes, bulk foodstuffs and seedstocks, write Casados Farms/Dos Ves, P.O. Box 1269, San Juan Pueblo, NM 87566

Mahina Drees

Book Reviews

PLANT EXTINCTION---A GLOBAL CRISIS

Written by Harold Koopowitz and Hilary Kaye. Published by Stone Wall Press, 1241 30th St. NW, Washington DC 20007; distributed by Stackpole Books, on Cameron and Keller St.s, Harrisburg, PA 17105. 239 pages.

What good are wild plants? Why worry about plant extinctions? What can be done to head them off at the genetic pass?

A botanist and journalist have combined to provide clear answers to these questions, through synthesizing basic background information with case studies. This book translates fairly technical concepts into prose unburdened by jargon. Parts may be similar to other recent books on extinctions, but two chapters are unique: one, on the ethics of rare plant collecting; the other, on "setting up your own gene bank" of stored seed, pollen and spores.

The book does have some flaws. It gives the erroneous impression that seed banks already have all we need of indigenous strains of vegetables and grains; accordingly, we need only worry about wild plants. Quote:"With the arrival of improved cereals and grains, many agriculturalists expected native strains of cereals to be replaced and therefore lost. Rather surprisingly, this has not turned out to be the case (because)... many significant gene banks have been set up to conserve the seed of agricultural crops."

What? The authors ignore the renewed warnings of the U.S. National Academy of Sciences that we are still losing valuable crop strains, an assessment for which we can vouch. A decade ago, Dr. Jack Harlan argued that those who place confidence in current collections of crop germ plasm are "Living in a fool's paradise" and courting "the genetics of disaster." Recently, Wm. Brown, former president of Pioneer Hi-Bred and vice-chairman of the National Plant Genetic Resources Board gave this update: "The old land races of crop species are valuable resources which should not be allowed to disappear. (Despite) encouraging signs... (there is) no reason for a relaxation of efforts to continue to add to the genetic base of our crop species."

The go-away feeling is that in each endangered species, there is a wonder drug or million dollar industrial product. At the same time, the examples given, of "non-endangered" guayule, candelilla and gopher plant utilize inflated claims. Such extremes, like making saguaro cacti sound endangered, are not really necessary. The desert chapter as a whole was disappointing and could easily be strengthened. In short, this Plant Extinctions book has merit, but we hope future editions will be more on the mark.

NORTH AMERICAN HORTICULTURE---
A REFERENCE GUIDE

Compiled by the American Horticultural Society. Published by Charles Scribner's Sons, 597 Fifth Ave., New York, NY 10017. 367 pages, $50.00.

One problem endemic to conservationists is that they seldom know who their allies are well enough to draw upon their help.They're rugged individualists who constantly reinvent the wheel, not knowing how to learn from the experiences of others.

Well, this reference guide informs and reminds us of the fine work done by the many individuals humble enough to participate in organizations. It has a 21 page listing of plant societies; 12 on conservation agencies; and 78 on public gardens and arboreta. You could use this book as a guide for a cross-country trip, and see rare, unique or historically-important plant collections the whole way.

You can also use this book to reach those already well-informed plant nuts when a critical issue arises.

It's a cornucopia. It is comforting to know that somewhere out there one can find the National Alliance for Plants; a Home Orchard Society preserving pioneer varieties of fruit-bearing plants; the Desert Protective Council of Palm Springs; and many more. WE'RE NOT ALONE, AMIGOS!

YES! I would like to participate in the conservation of the Greater Southwest's native crops and their wild relatives, through Native Seeds/SEARCH.

Enclosed is my contribution for:

Associate Membership, one year ..... $10.00 _____
(Entitles associate to 10% discount on seed purchases, workshops, publications, plus seasonal newsletter)

Lifetime Associate Membership..... $100.00 _____

Listing of Seeds for Sale..... $1.00 _____
(Garden packet size quantities of 50 varieties of rare or unusual native crops and their wild relatives)

Special Contribution for:
Native seed collection and conservation..... _____

Virus-free tepary bean diversity project ..... _____

Wild chiltepine conservation project..... _____

Nutritional analysis of native foods..... _____

Total..... _____

Name:_____
Street:_____
Town & Zip:_____

SEND TO: Native Seeds/SEARCH
3950 W. New York Drive
Tucson, Arizona 85745

PRICE INCREASES OF NATIVE FOODS: WILL THEY RISE OUT OF REACH???

Foods from native plants such as pinyon nuts, teparies, and chiltepines have long been nutritionally important staples to Southwestern Indians. Only a few such foods have ever been available in trading posts, markets and specialty shops, but native Americans still buy them when they can. But due to supply/demand irregularities, inflation and other factors, these nutritive resources are becoming more and more inaccessible through the marketplace. From spring 1978 to 1983, we estimate that there was a 61% price increase of 6 native food items in southern Arizona. At the same time, 10 standard food items increased in price "only" 53%. In short, the cost of native foods is going up faster than foods in general---another reason for growing your own. Stick with us, we'll explore this matter in future issues.

Native Seeds • SEARCH
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Keeping Alive Food Options in Deserts: Native Seeds/SEARCH

"In keeping alive indigenous crops adapted to arid environments," Native Seeds Searcher Karen Reichhardt tells us, "we can contribute to the conservation of other resources as well." So begins the working premise of a new non-profit organization based in Tucson, Native Seeds/SEARCH. It is devoted to saving two scarce resources whose destinies are linked in deserts: drought hardy seedstocks, and water.

"Our native crops are already well-adapted to growth during the brief rainy seasons here. They tolerate the temperature extremes and alkaline soils characteristic of deserts," observes Mahina Drees, a gardener and NSS board member. "Certain ones even show some tolerance to pests and diseases that can become chronic problems in this area."

According to archaeologist Barney Burns, certain Sonoran food plants were cultivated in this desert region as early as 300 B.C. It's no wonder they are able to produce on limited soil moisture, with remarkable water use efficiency.

Surprisingly, Native Seeds/SEARCH is the first organization ever devoted to conservation, research and education regarding these crops. An outgrowth of the Meals for Millions Seed Bank Project, it will be taking over the display of Indian crops and their wild desert relatives at Tucson Botanical Gardens, and seeking out seeds of many more varieties. Beginning with its June 24th open house at the Gardens (see calendar for details), seeds of more than 45 Southwestern crop varieties will be made available for growing by desert gardeners. To purchase a listing of their seed offerings, send one dollar to Native Seeds/SEARCH, 3950 W. New York Drive, Tucson, 85745.

— Gary Nabhan