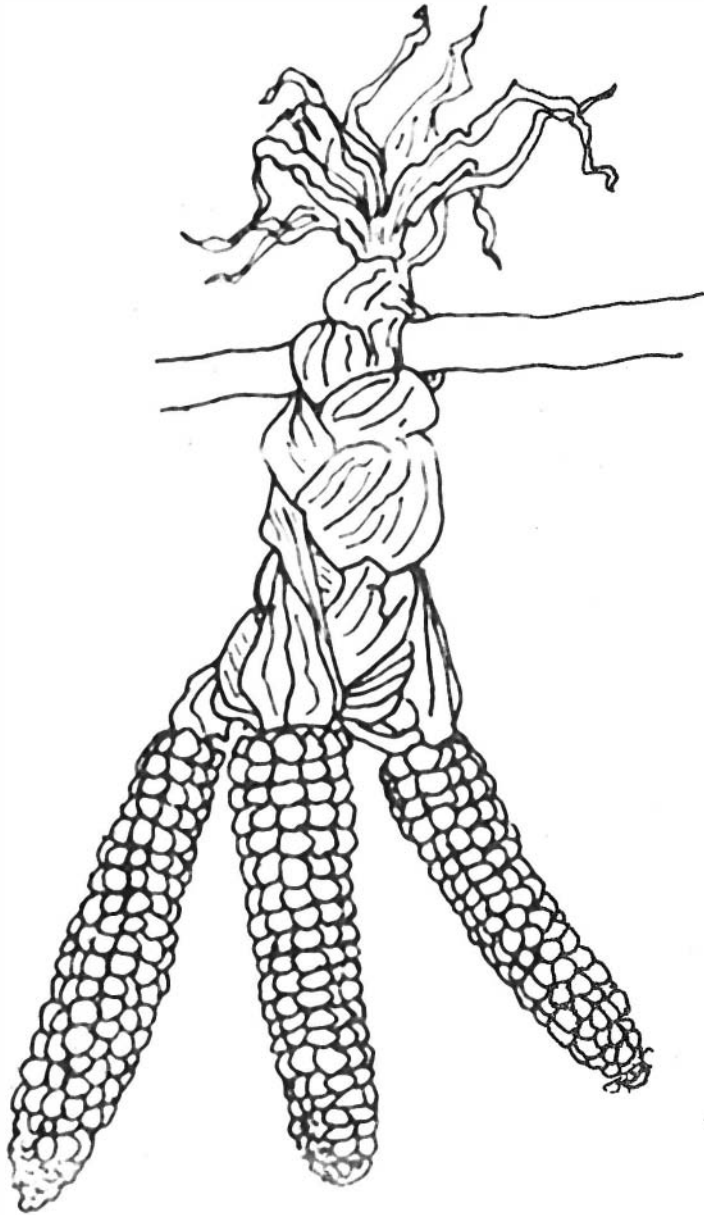


Southwest Traditional Crop Conservancy Garden and Seed Bank



seed
sources
&
resources
1982



meals for millions
P.O. Box 42622
tucson arizona

85733

INTRODUCTION

We would like to welcome you to read through these pages and consider growing and saving the traditional seeds of the U.S. Southwest. Most of the seeds we offer are not commercially available; they are of native food plants that have been grown by traditional farmers for centuries. We provide small samples for free but, because they are in limited supply, we have a priority system for distribution (explained on page 3). We hope that everyone who receives these seeds saves some and passes part of their harvest on to friends and neighbors or back to us.

The following pages will familiarize you with our other "seedy activities" as well. Many of the seeds are grown out in our conservancy garden at 2150 North Alvernon in Tucson, Arizona, which you are welcome to visit. Here, we try to document the hardiness and growth habits of the plants and to educate folks on their cultural and nutritive value. In our office at 209 East 16th Street, Tucson, Arizona, we have a seed pantry, where we store over 120 different collections of our region's seeds, and a resource file and small library on seed conservation which visitors are welcome to use.

We are willing to help Native Americans find seeds that their families once grew, but have lost, and which perhaps others may still have. We also serve in an advisory capacity to community or reservation programs interested in having their own gardens to grow out traditional crops, and we assist those in Indian communities who are willing to distribute our seeds to their neighbors.

If you live in a Native American community and are willing to act as a distributor or contact person, call Mahina Drees or Gary Nabhan (collect) at (602) 624-7963 or write to us at P.O. Box 42622, Tucson, AZ 85733. We love to receive rare seeds and will help maintain them. We are willing to help in other ways, too -- just ask!

We hope to hear from you.

RESUMEN EN ESPAÑOL

Quisieramos invitarse leer esas noticias sobre el uso y conservación de semillas de plantas indígenas del Suroeste de Los Estados Unidos. Muchas de las variedades que estamos creciendo no son en los mercados comerciales; son semillas que han pasado mano a mano por siglos y siglos. Ellas son costumbres de la región, en la agricultura y comida tradicional. Estamos distribuyendolas sin carga, pero en cantidades pequeñas, dentro de un sistema de prioridad para distribuir las. Ojalá que los que las recibirán, pudieran compartirlas con amigos y vecinos.

Tenemos una oficina en Tucson, Arizona (209 East 16th Street), y una huerta chiquita en el Jardín Botánico de Tucson (2150 North Alvernon). Tenemos datos sobre los valores nutritivos, los usos y condiciones favorables para sembrar esas semillas. Quisieramos ayudarse con sus preguntas y proyectos. Estamos a sus ordenes.

Gary Nabhan, Project Manager
Mahina Drees, Seeds Agriculturalist
Cynthia Anson, Southwest Regional
Director



SOUTHWEST TRADITIONAL CROP CONSERVANCY GARDEN
&
SEED BANK

PURPOSE

Our main goal is to provide those living in Native American communities in the Southwest (now and in the future) with adapted seeds which allow the people access to fresh produce and the possibility of food self-sufficiency.

Our specific activities are:

- 1) Collecting native Southwestern food crop seeds from families who are willing to share their surplus and from researchers and seed banks that have previously collected them.
- 2) Increasing and distributing them to a diversity of seed banks and (tribal) programs so that there is a greater chance that the seeds will be available to future generations.
- 3) Making these seeds more accessible to low income people, particularly native Americans, who wish to grow them.
- 4) Helping people better save their own seeds through education.
- 5) Working with tribal personnel to develop regional seed banks and conservancy gardens where traditional seeds are increased and rapidly redistributed.
- 6) Using our conservancy garden as a demonstration site to educate the general public on the value of the Southwest's crop heritage and to document through research the uniqueness and adaptations of these crops.
- 7) Writing articles which will focus more attention on these plants, the need for their conservation, and their nutritional value.

1981

In 1981, three dozen varieties were grown out at the Porter Garden conservancy garden site, as well as another half dozen through volunteer growers. Approximately 1000 packages of seeds were distributed on the Papago, Pima, Hopi, and Taos Pueblo Reservations as well as about 100 bags to the Warihio, Mayo, and Yaqui of northern Mexico. Additionally, Apaches, other Puebloans, and Yumans received seed, besides gardeners in six southwestern states and programs in 14 foreign countries.

Taos Pueblo initiated a conservancy garden through their CETA program. The Papago Nutrition Improvement Program's Desert Foods Garden, which was started in 1980, now has about 20 varieties of crops in their collection. A seed saving manual, which included both traditional and modern techniques, was developed with Meals for Millions' Papago Project.

A Seed Banks Serving People Workshop was sponsored in October for 100 people from all over the United States and Mexico. Topics covered included collecting seeds, growing them out, inexpensive cleaning equipment, storing methods, education, and regional seed banks. For more information about this program, order the Proceedings from our Santa Monica office (see Publications).

SEED DISTRIBUTION POLICY

We wish to stress that we are not a seed company, nor a seed give-away. We hope to see these crops maintained as part of cultures existing in this high and low desert region. For this reason, we distribute seeds according to their availability on this priority system:

- 1) to individuals of the culture from whom the seed was derived.
- 2) to researchers willing to maintain the seedstock and/or return a portion of their increase to us.
- 3) to organizations or communities of other cultures in a similar environment willing to try to maintain the seedstock.
- 4) to seed exchange participants or small seed companies willing to increase the seed and distribute it to others.
- 5) to other who will not let the seedstock die out.

We do realize that there are inadvertant crop failures, but we simply hope that recipients will act in good faith in conserving these seeds. In addition, we hope that everyone who receives seeds from us will consider returning some of their surplus to us, so we may pass them on to others, or that they will share them with their neighbors and friends.

SEEDS AVAILABLE

In most cases, our packets weigh 10 grams to 5 ounces, depending on seed size. They are starter seeds. Only rarely do we have enough of any variety to provide even $\frac{1}{4}$ acre's worth to anyone (but ask us). The following coding system is used in the list of available seeds to show which seeds are available to which groups:

- * To Indians, and to researchers who are specifically conserving or studying that particular crop.
- # To Indians and researchers first, then limited quantities to interested individuals and organizations within the region.
- + To anyone, but with those within arid lands receiving preference.

CORN AND RELATIVES (Zea)
(MAIZ Y LOS PARIENTES)

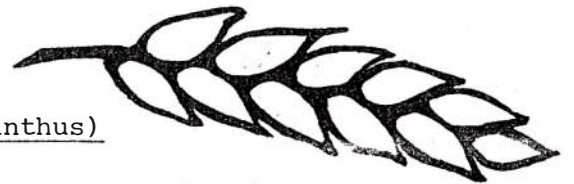
The New World staple for millenia. Plant 6-10 seeds per hill, 2-4 inches deep, 2-4 feet between hills. Or, in rows, 2 seeds every foot.

- * Puebloan Flours & Flints - Variously colored, long cobs with big butts, slightly tapering, 12-16 rows. Good in elevations of 4,000-6,000 ft. in Southwest, some sand-adapted. We have, in order of abundance: Minnesota Calico; New Mexico Blue; Hopi White; Hopi Blue; Hopi Supai (Kohonino) ChinMark; Taos Blue; Hopi Cherry.
- * Pima-Papago Flours & Semi-Flints - Usually pale yellow or creamy white colored, short cigar-shaped cobs, 8-12 rows. Excellent grinding quality; a heat- and drought-adapted maize best suited to the Sonoran Desert lowlands. Rapid maturing (50-75 days) for dry corn if planted in July or August. We have, in order of abundance: Papago White and Yellow; Gila River Pima White; Mohave White.

- # Northern Mexican Flinty Popcorns - Usually tan-brown (Chapalote) or pale (Reventador), small ears and kernels, 12-18 rows. Excellent for pinole; good for cornbread and popcorn. Tight husks which make life difficult for corn earworms. Long season, less drought tolerant than the above. We have Sinaloan Chapalote, acclimatized to New Mexico and Arizona over the last ten years; and we hope to have Sonoran Reventador, another ancient maize variety, in sufficient quantity by May 1, 1982.
- * Sweet Corn - A variety introduced to the Hopi before the turn of the century, probably related to Golden Bantam, moderate sized ears, pale color, 10-12 rows.
- * Perennial Teosinte - Five years ago, a young Mexican botanist, Rafael Guzman, discovered another wild relative of corn in the mountains of Jalisco. Growing along the edge of Indian cornfields, this rare perennial teosinte is the most remarkable botanical find of the last ½ century. A bunchgrass, propagated by rhizomes or by grain the size of wheat, "Zea diploperennis is frost intolerant and flowers only with short day lengths in hot climates" (in Tucson, October). This collection, originally from the University of Wisconsin's Zea team, was made available to us by the Bezettes of Utah. (Z. diploperennis)

Other Zea stocks which are in short supply and in need of increase are: Apache red cob, Tepehuan, Hopi Greasy Hair, Warihio (many colors and kinds), Cora corn, and annual Teosinte.

SMALL GRAINS (Sorghum, Panicum, Triticum, Amaranthus)
{CEREALES CON GRANOS CHIQUITOS}



These small seeded cereals and pseudocereals are used for a variety of foods: tamales, pinole, posole, etc. They are broadcast and covered 1/8-1/4 inch deep, or drilled, in rows, in densities ranging from 20,000-100,000 plants/acre.

- + Sonoran Panicgrass - Once grown throughout Sonora and along the lower Colorado River, this millet-like, quick growing grass is one of the few besides corn domesticated in the New World. The pale seeds are best sown with late summer rains, and can produce 400 lbs. per acre. This stock is from Warihio Indians who intercrop it with maize in hilly slash and burn fields on the Sonora-Chihuahua border.
(Panicum sonorum)

- * Cane Sorghum - A sweet cane variety of the Papago and Pima, eaten raw or formerly pressed into syrup; infrequent today. Of the kafir-sudan type seedhead. (Sorghum bicolor)
- # Grain Amaranths - Considered in this group are varieties whose principal product is a high lysine, pale colored grain suitable for popping or grinding. These are rare today in the Southwest, but the remaining semi-arid adapted varieties are of great importance because much of the other Mexican germplasm is from more humid zones. We have a mixed "Aztec Mexican grain" collection from Mexico City; several bushy, late grain types from the Warihio Indians of the Sonora-Chihuahua border (semi-arid adapted). (Predominantly A. hypochondriacus, with some A. cruentus and A. hybridus)
- # Dye Amaranths - These varieties have dark maroon or black seeds; the seedheads are used as a food dye; the leaves and seeds occasionally are eaten. The Hopi dye amaranth, an early maturing, good seed yielder, is considered "unique" among the 700+ accessions that the Rodale Amaranth project has screened. We have, in order of abundance: a Mayo Indian variety from the Rio Mayo, Sonora; a Hopi variety from Moenkopi, Arizona. (Amaranthus cruentus)
- * White Sonora Wheat - A drought-hardy variety of excellent quality for tortillas, introduced to the Southwest prior to 1770, and adapted to winter, desert, runoff farming. It nearly went extinct with the recent introduction of Green Revolution wheats. (Possibly available in quantity by November 1982.) (Triticum aestivum)

Other grain in need of increase: many small collections of amaranths and panicgrass, and Carolina maygrass.

BEANS, PEAS AND COWPEAS (Phaseolus, Pisum, Vigna)
(FRIJOLES, CHICHARROS, YORIMUNIS)

Beans, peas and other legumes complement grains in terms of protein quality; some Southwesterners eat more beans than any other kind of food. Plant 2 seeds ½-1 inch deep every 4-6 inches in rows. Or, plant in hills or wells, 4-6 seeds in each.

- *#+ Tepary Beans - Small beans of various colors, among the most drought-hardy and heat-tolerant summer crops known. High protein content, distinctive flavor. We have, in order of abundance: + Mr. Hood's white teparies and + "Dorado" golden-brown teparies selected over two decades from native strains in Coolidge, Arizona; * Papago mixed brown and tan teparies; # Sonoran mestizo white teparies; * Hopi white teparies; # Warihio white teparies. (P. acutifolius)
- # Common Beans - Pinto beans were not the staple bean in many parts of the Southwest historically. Other related varieties of dry beans take desert heat better. We have, in order of abundance: frijol vayo (pink beans) from Sonora; frijol azufrado (sulfur beans) from Sonora; Papago yellow beans from Manager's Dam, Arizona; and Papago red beans. (P. vulgaris)
- * Lima Beans - The mottled lima beans of the Southwest are large seeded, colored and mottled, climbing varieties somewhat similar to Jackson Wonder. Some are root knot nematode resistant. We have for distribution Fred Kabotie's Hopi red lima; we may have Pima mottled tan limas available later in 1982. (P. lunatus)
- # Cowpeas - There is a bewildering diversity of cowpea-blackeyed pea-crowder strains in the Southwest, many of them historically introduced from the Mediterranean, but now as drought-resistant as some native beans. We are obtaining others, but currently offer only the Warihio tan and mottled cowpea/crowder. (Vigna unguiculata)
- + Peas - Dry-farmed peas are a popular Papago crop in the winter-time. These pale, dry peas are great for soups and stews. (Pisum sativum)

Other legumes for increase: limas, Hopi common beans, many kinds of white teparies, scarlet runners, mottled teparies, Hopi pole beans, wild teparies, and Metcalfe's beans.

SQUASHES, MELONS AND BOTTLEGOURDS (Cucurbita, Citrullus, Cucumis, Lagenaria)
(CALABASAS, MELONES, SANDIAS Y BULIS)

These include both native (squashes) and "adopted" favorites (melons) of the New World. Plant seeds 1-2 inches deep, 4-6 seeds in a well or basin. Or, plant 1-2 seeds per hole in rows, with 2 feet between holes.

- # Cushaw Squashes - Silver-edged seeds (a food in themselves), dark orange meat, and striped or solid green, orange or black skin. Crooknecked or bulbous. More resistant to squash vine borer than other species. We have Papago and Hopi strains. (C. mixta)
- #+ Big Cheese/Butternut Squashes - Plain-edged seeds, yellow meat, tan or orange-brown, ribbed skin. Varying shapes. We have #Borderland/Papago; +Seminole. (C. moschata)
- # Pumpkin-like Squash - Thin, longish seeds, pale meat, pale yellow or green skin, oblong. We have a Tarahumara version of what was probably the first squash in the Southwest. (C. pepo)
- * Watermelons - These sand-adapted watermelons are of varying shape, color and sweetness. Long storing, pink, red or yellow meat. Several Hopi strains. (C. lanatus)
- * Cassava Melons - Golden-green, globose, wrinkled, rarely netted skin. Pale, slightly sweet meat. We have both Santo Domingo Pueblo and Hopi strains.
- + Bottlegourds - Hard-shelled, pale-skinned gourds used for making rattles, dippers, and utensils. The oldest cultivated plant? We have a thin-necked, single-bulbed Papago strain similar to Yaqui rattlegourds. (L. siceraria)
- + Texas Gourds - Hard-shelled, bitter-meated, egg-shaped relative of pumpkins, with edible seeds. On the list of candidates for U.S. Endangered Species protection. (C. texana)

Other goods in need of increase: squash, melons, and Tarahumara, Warihio, Yaqui, and Hopi bottle/rattlegourds, Tarahumara C. mixtas, Tarahumara C. fiscifolia, and Hopi watermelons.

SUNFLOWERS AND RELATIVES (Helianthus)
(GIRASOL, MIRASOL, MAIZ DE TEJAS)

Among the first crops domesticated north of Mexico. Plant seed 2 inches deep every foot; pile up dirt around base, or stake to prevent toppling. To produce one large head with filled seed, pinch off smaller heads as soon as they develop. These thin-shelled, narrow-seeded sunflower strains are typically grown in deep sand in semi-arid areas of the Colorado Plateau.

- # Hopi Black Dye Sunflower - The black shell is used as a basketry material dye; these are also good eating. (H. annuus)
- # Havasupai Thin-Striped Sunflower - A tasty, striped sunflower. (H. annuus)
- + Sumpweed - This sunflower-like plant was domesticated prehistorically in the Midwest, but the improved variety went extinct. Is anyone interested in selecting superior plants from this wild population? (Iva annua)

Other sunflowers for increase: a little supply of Arikara sunflowers.

WILD CHILES (Capsicum annum)
(CHILTEPINES DEL MONTE)

- # Chiltepines - This wild, frost-sensitive perennial shrub is a prolific producer of small, round, incredibly hot chiles. The seeds do not all germinate at the same time. For rapid germination, soak 24 hours in .2 molar potassium nitrate, then sow in peat pots and keep warm and wet. We have collections originally from the Baboquivari Mountains in Arizona where Papagos have harvested them for centuries; and from northern Sonora.

DEVIL'S CLAW, UNICORN PLANT (Proboscidea)
(GATUNA, TORITO)

Devil's claw was domesticated for its basketry fiber by desert Indians. Both the white and black seeded types are rich in oil and protein, though the dark seeds are harder to germinate. Plant 4 seeds 1 inch deep to each basin, or plant in rows, 2 seeds each 1-1½ feet.

- + Domesticated Devil's Claw - This improved variety (var. hohokamiana) has white seeds and two long claws. We have an abundance of a Papago collection. (P. parviflora var. hohokamiana)
- + Wild Multi-clawed Devil's Claw - This genetic oddity was brought into the Blackwater Trading Post by a Papago; we have grown its progeny since 1978. It has three, four, or five short claws on the fruit, rather than the typical two claws. (P. parviflora ssp parviflora)

Other devil's claw for growers: 10-12 small collections from Utah and northern Arizona in need of immediate reproduction.

INDIGO (Indigoifera)
(ANIL)

- + Mayo Indigo - The source of Indigo Blue dye, it is a perennial shrub but must be protected from frost. Plant 10 seeds $\frac{1}{2}$ inch deep in basins 2 meters apart and thin to one plant. (Indigoifera suffruticosa)

COTTON (Gossypium)
(ALGODON)

- + Hopi Cotton - A Hopi fiber and ritual plant, it is a tough, prolific perennial if the roots are protected from frost. This plant was lost from the Hopi Reservation but reintroduced after we grew out USDA collections from earlier in the century. Plant 1 seed $\frac{1}{2}$ -1 inch deep each foot, in rows 1-1 $\frac{1}{2}$ feet apart. (Gossypium hirsutum var. punctatum)

CHIA GRANDE (Hyptis)
(CONIVARI)

- * Warihio/Conivari - A gelatinous and refreshing drink is made from the seeds of this aromatic plant. Humidity loving, it should be grown in the wettest part of the garden. Plant $\frac{1}{4}$ - $\frac{1}{2}$ inch deep, 1 foot apart and keep moist (mulch with straw). (Hyptis suaveolens)

ONIONS (Allium)
(CEBOLLITAS)

- # Papago Onion - A wild bunching onion from the Baboquivari Mountains (originally), this plant divides and conquers in loose soil. Plant 2-4 inches deep (the white part underground), 4-6 inches apart and dig up and repeat after they increase. Tasty and mild. (Allium sp.)

CENTURY PLANT (Agave)
(MAGUEY PULQUE)

- * Central Mexican Maguey - This giant, slow maturing agave produces the nutritious beverage, agua miel, and its fermented counterpart, pulque, in the highlands of Mesoamerica. (Can some botanical garden take some seeds into long-term propagation? (Agave mapisaga or salmiana))



EXCHANGE CORNER



LOOKING FOR A CERTAIN SOUTHWESTERN SEED?

Did your family once grow a kind of garden plant that you can no longer find? Have you heard of a legendary bean that you have always wanted to grow? Do you know only the Indian name for a plant, or what it looks like, but not how to get hold of it? That is why we are starting the SOUTHWESTERN SEED SEARCH -- to help you. We are willing to play detective, to put feelers out in other Indian communities, and to look through government seed bank listings for you. WRITE US!

HAVE SOME EXTRA GARDEN SPACE AND A LITTLE TIME?

There are more than 60 seed collections that we are not offering this year simply because we have only a handful of each. To increase all of these ourselves each year, we would need to work 32-hour days! For crops such as corn, we can grow out only a few varieties each year without the danger of cross-pollination diluting the uniqueness of each variety. If you are willing to volunteer to grow out one or two of these varieties in your extra garden space and agree to return a bunch to us for distribution, we will make you an official member of the SOWERS OF SEED (S.O.S.) SOCIETY! We will send you planting and harvesting instructions, guidelines on recording data on the growth of the plants, and background information on the crop to help you appreciate its uniqueness (in case you are unfamiliar with it). All we ask is that, if you have luck with the crop, you return a portion of the harvest to us, which we will then pass on to others for free.

DO YOU HAVE A UNIQUE SEED YOU ARE WILLING TO SHARE?

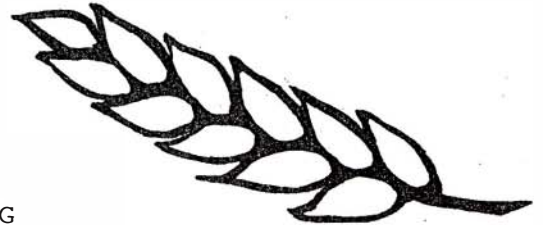
All the seeds we are offering this year came, in the beginning, from people like you. We have had seeds donated to us by all kinds of people -- from tribal elders to backyard gardeners and researchers -- from Fresno, California to the Rio Mayo, Sonora, to Taos Pueblo. These people had a little extra seed beyond what they needed for planting, and they were willing to share it with others. Anyone who wishes to donate seed to us can specify that we set some aside for them or their decedents just in case, at some future date, they lose their seeds. Of course, we are willing to return increase from these seeds to you for free, and you are welcome to try others as well. If you send us seeds, please write as much as you know about them, including all names (Indian, Spanish, English, etc.), place and date last grown, origin, uses, planting times, etc.

DO YOU WORK WITH A COMMUNITY OR RESERVATION PROGRAM INTERESTED IN STARTING YOUR OWN TRADITIONAL CROPS GARDEN?

We are especially interested in helping communities get started on their own seed-saving projects. The Papago Nutritional Improvement Program and Taos Pueblo have already planted gardens to grow seeds for distribution among their own people. Rather than have people write to us for seeds, wouldn't it be better if they could get them right where they live? We are willing to assist schools, agriculture and nutrition programs, and other Indian organizations in setting up seed-increase gardens to serve their areas. In addition to "starter seeds," we can help with training workshops and technical information, etc., if you give us some knowledge of your needs and some advance notice for preparation of useful materials. Your group is also welcome to visit our project, or to send one of your members to serve a short-term internship with us in order to learn additional skills.

ARE YOU WILLING TO SERVE AS A CONTACT PERSON FOR DISTRIBUTING SEEDS AND INFORMATION IN NATIVE AMERICAN COMMUNITIES IN THE SOUTHWEST?

One of our toughest problems is reaching people in isolated communities who would really enjoy and benefit from these seeds -- some of them never see little publications such as this. Our most urgent need is that of having contacts in native American communities -- LOCAL JOHNNY APPLESEEDS -- who are willing to receive a bunch of packets of seed from us in the mail to pass out to neighbors who would be likely to grow them. If you can volunteer to be a JOHNNY APPLESEED in your community, write us a letter noting what kinds of seeds folks might be interested in, and how many packets of each you could reasonably distribute. If you do not have time or patience for letter writing, call us collect at (602) 624-7963 and ask for Mahina or Gary.



SEED COMPANIES PROVIDING
SOUTHWEST TRADITIONAL CROP SEEDS

(We provided some of them with starter seed)

We urge you to contact these sources:

Plants of the Southwest
1570 Pacheco Street
Santa Fe, NM 87501
(free catalog upon request)

K. G. Seed Co.
P.O. Box 95
Rutherford, CA 94573

Redwood City Seed Company
P.O. Box 361
Redwood City, CA 94064
(catalog - 50¢)

Westwind Seed Company
2509 N. Campbell, #139
Tucson, AZ 85719
(25¢ to cover mailing sheet)

Horticultural Enterprises
P.O. Box 34082
Dallas, TX 75234

D. V. Burrell Seed Growers
Rocky Ford, CO 81067
(25¢ to cover handling)

FOR THOSE OF YOU WHO LIVE OUTSIDE OF TRUE DESERTS:

CAN YOU HELP US WITH THESE SEEDS? (THEY'RE BEYOND US!)

The seeds of traditional crops of native southwestern farmers are not the only ones that have persisted in North America for centuries. Kent Whealy's Seed Saver's Exchange offers many heirloom varieties from native Americans, Amish, Mennonite, and other ethnic groups. We have also come upon a few varieties adapted to temperate or subtropical North America and would like to see these increased and preserved. If you live outside of desert regions, in an area more suited to these seeds, we would prefer that you request to grow these rather than the desert seeds. Since we cannot grow these ourselves, we are offering small quantities of:

- Seminole pumpkins (C. moschata) from the Florida everglades
- Arikara sunflowers (H. annuus) from the Dakotas
- Oklahoma Indian ceremonial gourds (L. siceraria)
- Arkansas maygrass (P. carolinianum), the wild progenitor of a prehistoric crop in the Mississippi Valley
- Great Plains sumpweed (Iva annua), weedy relative of a now extinct midwestern domesticate similar to sunflower
- Pulque maguey (A. salmiana or mapisaga), a Mesoamerican agave
- Grain amaranth (Amaranthus spp.), a Mesoamerican cereal; this collection was bought in Mexico City

This will be the only year we offer these seeds, since Southwest seeds are all we can handle. If you are interested in growing and saving traditional crops from other areas, we urge you to join the Seed Saver's Exchange (\$6.00 for a one-year subscription). Contact:

Kent Whealy
Rural Route 2
Princeton, MO 64673

INCREASE GARDEN

For two years, our conservancy garden site at Tucson Botanical Garden's Porter Gardens has been divided into three parts: a Sonoran Kitchen Garden, a Papago/Pima Runoff Field, and a Pueblo Waffle Garden. In 1981, we added a section on a hill in the middle which we planted with indigo and wild relatives of our crops, as well as increased the overall growing space in the garden by about two-thirds. We are growing crops continuously, year-round, although only white Sonora wheat and Papago peas and onions in the winter.

In the spring, we had a surprisingly large-eared crop of Pima 60-day corn. This demonstrated to us that, although this maize will grow on poor soil with little water, the yield can be increased by improving soil and water availability.

In the Hopi section, we were able to increase a recently selected (and very beautiful) red lima variety for the first time. These beans have been selected by a Hopi farmer over the last ten years and are a modern example of the process by which crops have been developed over the centuries in the Southwest. The 1980 Hopi cotton plant survived the winter and provided us with a copious amount of seeds in 1981. We are waiting to see if it will come back again.

The Tarahumara pepo squash was an abundant producer in the Sonoran section (reminding us that Indians in Arizona formerly grew a pepo as well). A black-seeded amaranth from the Mayo area of northern Mexico won the beauty prize in 1981, just as the Hopi black dye amaranth did in 1980 with its two-foot red coxcombs. Although the pleasantly resinous-smelling conivari

were not as large as those we saw in the humid gardens of San Bernardo near Alamos, Sonora, Mexico, the harvest was larger than previous years.

The rhizomes of the perennial teosinte, Zea diploperennis, that we planted in March, finally produced seed after the fall equinox when the days became shorter. The wild chiltepine chili, originally from the Baboquiviri Mountains, also glowed with little red fruit in the autumn. The Hopi cushaw we planted in September as ground cover for the amazement of our temperate climate visitors to the Seed Banks Serving People Workshop in October actually produced some lovely bicolored - orange and green - squash.

In 1982, we hope to take better advantage of our two warm weather seasons and increase our production. Please contact us if you would like to help grow out some of the species for which we do not have space.

DOCUMENTING THE VALUE OF NATIVE CROP DIVERSITY

Our project aims at keeping a diversity of nutritious crops in South-western fields and gardens. To convince people of the need for conserving remaining crops, we are assembling information regarding their nutritional content, adaptations to drought and heat, etc. So far we have begun documenting the following: the rapid maturation of desert crops (see next page); the ability of certain crop leaves to "follow the sun" and increase photosynthesis while moisture is available; and the available genetic variability within collections of Pima-Papago flour corn now found in seed banks (Charlie Miksicek is helping us with this). More on this later!



MAHINA'S JOURNAL NOTES ON GERMINATION,
FLOWERING & HARVEST TIMES OF DESERT CROPS

This table is an attempt to give some general growth rate information for these crops. This data is from Tucson, Arizona, and different timing will probably be experienced at altitude or different latitudes. Notice that a few varieties were planted at more than one season and produced somewhat differently. We tend to leave crops in the field as long as possible, in order to ensure seed maturity; therefore, some, especially squash and corn, are often ready to eat much earlier than this chart might indicate.

CROP	DATE PLANTED	DAYS TO EMERGENCE	DAYS TO 1ST FLOWER	DAYS TO HARVEST (D=DRIED IN FIELD)
Pima Corn	3/11	9	64	95
Papago Corn	7/24	3	28	73
Mojave Desert Flour Corn	7/17	3	34	93 D
Hopi Sweet Corn	5/29	6	43	73
Perennial Teosinte	rhizomes 3/12	11	220	283
Sonoran Wheat	12/22	14		139 D
Mayo Amaranth (<u>A. cruentus</u>)	6/25	5	60	102-144 D
Warihio Panicgrass	6/25	5	67	96
Papago Cane Sorghum	7/24	17		87-134
Papago Red Beans	3/11	9	58	93 D
Hopi White Tepary Beans	3/1	9		103 D
(two plantings)	8/27		55	92 D
Hopi Red Limas	5/29	6	76	119-152 D
Papago White Tepary Beans	7/17	4	68	80-97 D
Papago Brown Tepary Beans	7/17		59	77-102 D
Papago Yellow Beans	7/24	6	73	112 D
Sonoran Frijol Morado	8/19	5	42	100 D
Papago Peas	12/22	14	84	116 D
Papago Bottle Gourds	seedlings 3/11		52	175-249
Hopi Melon	6/16	6	25	84
Tarahumara pepo	6/25	5	49	112-151
Hopi Cushaw	6/5	6	36	70
(two plantings)	9/9	5	43	79
Pima Cushaw	7/24	3	31	83
Magdalena Butternut	7/30	4	46	116 D
Hopi Black Dye Sunflower	5/29	5	65	108 D
Havasupai Striped Sunflower	7/24	4		93-108 D
(two plantings)	7/12		60	89
Papago Devil's Claw	7/15		27	86
Warihio Conivau	6/25	13	91	120-151 D

COOKING AND RECIPES

As the crops and seeds disappear from a community, so do the ways of preparing the foods. Many times we have been asked, "What do you do with amaranth," or "How do you fix teparies?" Here are some simple guidelines about preparing these old foods and some specific recipes.

First of all, any of the plants that are related to modern, more familiar crops can be substituted in recipes. All flour corns can be ground and used for corn meal in corn bread, spoon bread or Johnny cakes, whether they are yellow, red, blue, or mixed in color. (If you want to keep that blue color, be sure you use baking powder, 2 teaspoons per cup of corn meal, or juniper ash ($\frac{1}{4}$ cup per $1\frac{1}{2}$ cups of corn meal.)

Any of the beans can be used in your favorite bean recipes. Obviously, some will be better in one recipe than another, just as kidney beans are used in chili and pintos for refried beans. Tepary beans take a little longer to soften so be sure to soak them over night (12 hours) before cooking. All of the squashes that our project promotes are winter squashes and can be used in any recipes calling for squash or pumpkin. Once again, some will work better in a particular recipe than others.

Experiment. Ask other people for their recipes, especially those who may eat a little different kind of food than you do. Let us know when you find a good way to fix one of these crops.

Squash & Chile Stew

Mahina Drees

1 Squash (winter), medium to large peel and dice ($\frac{1}{2}$ inch cubes)	1 8 ounce can of Tomato Sauce or Puree
2 Onion, chopped	1 Sweet Red or Green Pepper, chopped
3 Tablespoons of Oil	6 Chiles, chopped (or 1 small can)
3 Cloves of Garlic, minced	2 Teaspoons Chile Powder or $1\frac{1}{2}$ teaspoons Paprika and $\frac{1}{2}$ teaspoon of ground Chiltepine
1 6 ounce can of Tomato Paste	1 Cup Water

Fry squash, onions and garlic in oil until brown. Add the rest of the ingredients, stir and cook covered for 30 minutes or until squash is done. Salt to taste, about one teaspoon. (Serves 4-8 people.)

Blue Corn Bread

Andrew Weil

Preheat oven to 425°. Grease large (approximately 11 inch) cast iron skillet or pot and heat in oven.

Sift together:

2 Cups Blue Corn Meal	4 Teaspoons Baking Powder
2 Cups White Flour	½ Cup Sugar (you can substitute ½ cup of honey, but mix into liquids)
1 Teaspoon Salt	

Mix liquids:

2 Cups Hot Water (+ up to 1 cup more)	(½ Cup Honey, if <u>not</u> using sugar)
½ Cup Melted Butter (or oil)	

Stir liquids into dry ingredients just enough to wet. Do not beat. Add up to one more cup of hot water if ingredients are not wet; but the batter should be stiff. Pour and spoon batter into hot skillet (should sizzle). Bake 30 minutes.

Tepary Bean Bread

Gary Nabhan

1½ Cups mashed Tepary Beans	3 Cups Flour
1½ Cups unmashed Tepary Beans	1 Teaspoon Salt
¾ Cup Oil	1½ Teaspoons Baking Soda
¾ Cup Water	¾ Cup Pecans (or other nuts)
1 Cup Brown Sugar	4 Teaspoons Currants (or raisins)
4 Eggs	

Mix well - sugar, oil, water and teparies. Beat eggs and then beat into mixture. Add all the dry ingredients and mix well. Add nuts and raisins. Pour into two greased and floured loaf pans. Bake for 1 hour at 350°.

Panicgrass or Amaranth Tamales

Making tamales has to be learned from doing it; but if you know how to make them, you can substitute ground panicgrass or amaranth seed for part of the masa and add a little water. Try different amounts. We liked about half and half best when we tried making panicgrass tamales.

Cookbooks

American Indian Food and Lore, Carolyn Niethammer, MacMillan Publishing Co., 1974.
Good basic ideas for cooking Southwestern crops as well as wild foods.

Southwestern Indian Recipe Book, Volume 1, Zora Getmansky Hesse, The Filter Press, Palmer Lake, Colorado, 1973, (303) 481-2523.

Hopi Cookery, Juanita Tiger Kavena, The University of Arizona Press, 1980.

Pueblo & Navajo Cookery, Marcia Keegan, Earth Books, a Division of Morgan & Morgan, 1977.

Growing and Cooking Beans, John E. Withee, Yankee, Inc., Dublin N.H. 03444, 1980.

Pueblo Indian Cookbook, Phyllis Hughes, Museum of New Mexico Press, 1972.

NUTRITION AND TRADITION: WHERE DO SEEDS FIT IN?



Consider these contrasts:

1. When native foods produced in Arizona reservation areas were compared with government surplus commodity foods which have taken their place in many Indian diets, the native foods were consistently higher in essential minerals (Calloway et al., 1974).
2. Pinto beans in trading posts and in commodity food packets are both lower in protein content than native Hopi beans of the same species (Weber et al., 1980, abstract; Berry et al., unpublished).
3. Encouragement of consumption of "poor people's greens" such as fresh amaranth leaves has served to reduce the iron and B-carotene deficiencies of rural children (in India) better than tonics and vitamin supplements have (Devadas and Saroja, 1979).
4. Papago tepary beans tend to have a higher mean protein content in traditional desert runoff fields than the same varieties grown with modern groundwater irrigation (Nabhan et al., 1980).
5. A traditional seed crop of the Southwest, the grain amaranth has better protein quality, in part due to its high lysine content, than most cereals in our grocery stores (Senft, 1979). Nearly extinct in the region, grain amaranth from the remaining area of cultivation on the Sonora-Chihuahua border contained 17.4% protein (Nabhan, 1979).
6. Native oilseeds such as sunflower and devil's claw contain oils (35-47%) high in polyunsaturated fats, and protein (23-27%) (Watt and Merrill, 1963; Berry et al., 1981), whereas lard, the most common fat source on reservations today, is a saturated fat, high in cholesterol and prone to rancidity.

7. Freshly picked raw vegetables have higher vitamin contents than most packaged or processed vegetables (Watt and Merrill, 1963).
8. Traditional food preparation techniques such as ash baking and stone grinding beneficially influence mineral (magnesium, iron, manganese, and calcium) contents of native foods (Greenhouse, 1981; Kuhnlein and Calloway, 1979).
9. According to USDA studies, new "Green Revolution" style hybrids grown under modern irrigation conditions have tended to have lower protein content than the older seed stocks they have replaced (Perelman, 1977).
10. In Mexico, a recent nutrition survey studied the consequences of a change from traditional subsistence farming to modern cash crop agriculture. As crop diversity was reduced and rural families became increasingly dependent on purchased foods, their dietary diversity and quality, as well as the nutritional status of children, decreased (Dewey, 1981).

Now do you wonder why a non-profit nutrition and community development foundation is involved in encouraging the local sowing and use of traditional crops in desert communities? Look forward to more discussion of these topics in our future publications.



NEW ADDITIONS TO OUR SEED COLLECTIONS

Within the past year, several individuals and organizations have donated significant collections of seeds to us in order that others may share in this wealth. We would like to thank Drs. Robert Bye, Thomas Whitaker, and Campbell Pennington for squash collections from the Sierra Madre; Eric Powell for several kinds of Warihio and Mayo seeds; Dr. Skidla of the USDA/Ames, Dr. Brown of Pioneer Hi-Bred, Dr. Van Asdall, and Charlie Miksicek for corns; John Rosendall for Ramah Navajo seeds; Richard Pentewa and Wilfred Myron for Hopi melons; Edna Tallas for several Hopi crops; Tom Sheridan for Cucurpe wheat; Stacey Diven and Jimmy Reyna for Taos corn and cucurbits; Russell and Joya Bezette for perennial teosinte; and Tim Fisher for beans, chiltepinas, and corn.

Mahina and Gary have also made collections from families too numerous to mention in the Rio Mayo, Yaqui, Sonora and San Ignacia, Sonora, and the Gila River, Papago and Hopi country of Arizona, of grains, beans, tobacco, gourds and squashes. Look for these varieties in our future catalogs.

HELP WITH GROW-OUTS

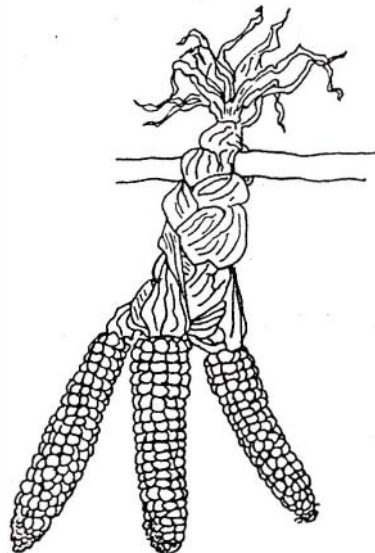
Pat Williams and Jim Briggs of the Plant Materials Center grew out for us more endangered Panicum sonorum than has been produced in the U.S. since the 1930's. Dr. Jack Stroehlin, David Powelson and Kathy Flaccus all grew out desert-adapted crops for us via runoff harvesting. Russell Buhrow, Robin Coons, Jane Nyhuis, Karen Adams, Charlie Miksicek, Wade Sherbrooke, Bea Quiroga, Susie Terence and Carol Kanak also returned seed to us. Any researchers willing to grow out and return seed to us in the future should write us, asking for our Seed Research Request form.

SPREADING THE WORD

During the last year, our work with seed saving and traditional crops was featured in articles in National Geographic, Gardens for All newspaper, Coevolution Quarterly, Arizona Republic, Arizona Daily Star, Tucson Citizen, National Land for People newsletter, National Center for Appropriate Technology (NCAT's) Best, New Farm, High Country News, Seed Saver's Exchange Harvest Edition, Abundant Life newsletter, Bean Improvement Cooperative annual report, Sunflower magazine, Agricultural History newsletter, and Native Self-Sufficiency. EarthWatch, a midwestern radio program, also featured our project.

We were also referred to or received notice in the New York Times; Sunset magazine; A.T. Times; the Hopi paper, The Eagle's Cry; Rural America; Arizona Indian Monthly; Rural Advance; and Kent Whealy's interview in Mother Earth News, as well as in several local papers.

We thank all of the reporters, editors, and friends who helped us spread the word. If you can help with this process of reaching others through the media who might need our seed, please drop us a note.



PUBLICATIONS AVAILABLE

Printing &
Handling CostsSeed Conservation

- \$1.00 "Handing the Seed Down -- Seed Exchanges in the Persistence of Heirloom Vegetable Varieties." An interview with Kent Whealy (by G. Nabhan). Excerpts of this appeared in Gardens for All News, 1981.
- \$3.50 Seed Banks Serving People: Highlights of a Workshop, October 1981. Meals for Millions/Freedom from Hunger Foundation, Tucson, AZ, 1981. (Numerous speakers and references)
- \$1.00 "Cultivation and culture" with insert, "Cultivated Crops of Native Cultures in Southwestern North America -- Their Current Status" by G. Nabhan, The Ecologist, vol. 9 (Nos. 8/9):259-263, November/December 1981.
- \$1.00 "Who is saving the seeds to save us?" by G. Nabhan, Mazingira, vol. 9:52-58, 1981.

Southwest Crops

- \$1.00 "Amaranth cultivation in the U.S. Southwest and northwest Mexico" by G. Nabhan, Proceedings of the Second Amaranth Conference (Rodale Press, Emmaus, PA) :129-134, 1980.
- \$1.00 "Pueblo plant foods" by Robert E. Gasser, Pacific Discovery, vol. 35 (No. 1):23-31, 1982.
- \$0.75 "Sunflower of Indians of the Southwest" by G. Nabhan, Sunflower, vol. 8 (No. 1):30-32, January, 1982.
- \$1.50 "Domesticated Proboscidea parviflora: a potential oilseed crop for arid lands" (Devil's Claw) by J. Berry, P.K. Bretting, G.P. Nabhan, and C. Weber. Journal of Arid Environments, vol. 4, 147-160, 1981.
- \$0.75 "Native Crops of the Greater Southwest" by G. Nabhan, Dry Country News 5:10-13, 1980. (Seed source list)
- \$1.00 "Papago Indian floodwater fields and tepary bean protein yields" by G. Nabhan, J. Berry, C. Anson, and C. Weber, Ecology of Food and Nutrition, vol. 10:71-78, 1980.

Printing &
Handling Costs

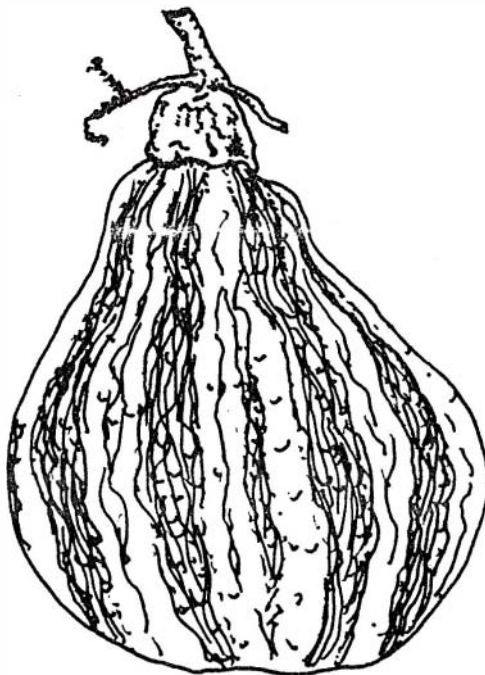
\$1.00 "Viable Seeds from Prehistoric Caches? Archaeobotanical Remains in Southwestern Folklore" by G. Nabhan, The Kiva, vol. 43, No. 2:143-159, 1977. (Regarding beans from ruins)

Traditional Farming Techniques

\$2.50* KAICKA -- Seed Saving the Papago-Pima Way, by Meals for Millions/Southwest. A guide drawing on traditional knowledge and techniques as well as recent innovations with information in English, Spanish and O'odham. 35 pp., 1981.

Free "Living with a River -- Traditional Farmers of the Rio San Miguel by T.E. Sheridan and G.P. Nabhan, The Journal of Arizona History, vol 19:1-16, Spring 1978.

\$1.00 "Papago Indian floodwater fields and tepary bean protein yields" by G. Nabhan, J. Berry, C. Anson, and C. Weber, Ecology of Food and Nutrition, vol. 10:71-78, 1980.



*Free to Southwest Native Americans

ACKNOWLEDGEMENTS
RECONOCIMIENTOS

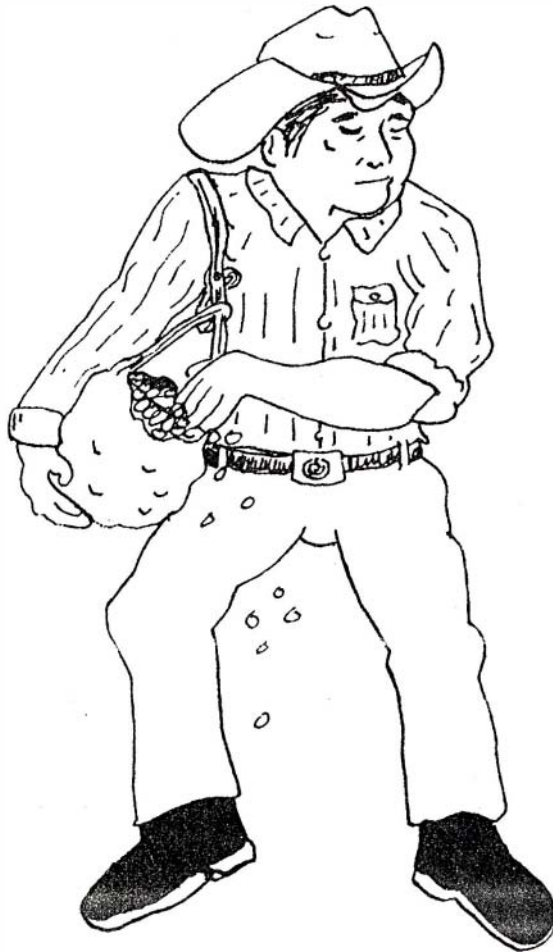
We are grateful for the financial support provided by the Wilson Foundation and the Trull Foundation for our basic work. The Seed Banks Serving People Workshop could not have been held without a generous grant from Pioneer Hi-Bred International, Inc. The Soil and Health Society also assisted and encouraged us in innumerable ways. Our conservancy garden has had a happy home at the Porter Gardens for two years running, and we thank Tony Edland and Mary Erickson of the Tucson Botanical Gardens and Bernice Porter for many courtesies.

Numerous friends and sympathetic professionals offered their time and skills to help us: Kent Whealy, Barney T. Burns, Charlie Miksicek, Eric Powell, Stacey Diven, Karen Reichhardt, Sandra Turner, Mary Wolkin, Cary Fowler, Jane Nyhuis, Jim Briggs, Pat Williams, Bob Gasser, Rob Rothenberg, George Ballis, Howard Scott Gentry, Carolyn Niethammer, Skip Kaufman, Peggy Haas, Noel Vietmeyer, Jeff Gritzner, Alfredo Sanchez Marroquin, Rosa Maria de Valdivia, Robert Bye, Mary Wilkins, and Robin Coons.

Friends in native communities made this project work: Julie Carrillo, Gabriel Williams, Elaine Watkins, Tina Peters, Marian Yazee, Stan Damifino, Judy Seoldo, Phyllis Ventura, Laura Kermen, Sally Pablo, Marvin Garcia, Perry de Lo, Edna Tallas, Richard Pentewa, Hazel Dukepoo, Fred Kabotie, Jesus and Casimiro Sanchez, Lawrence Ovah, Jimmy Reyna, Susanna Sasueta, and Fausto Martinez.



MEALS FOR MILLIONS/FREEDOM FROM HUNGER FOUNDATION is a non-profit organization whose goal is to improve the health and nutrition of people in developing communities through a participatory, self-help approach that is sensitive to social, cultural and economic realities. The Southwest Traditional Crop Conservancy Garden and Seed Bank is an effort to achieve this goal by helping to assure the survival of hardy Southwestern desert-adapted food crops. The Seed Bank is funded largely by contributions from individuals like you. If you order seeds from this catalog, please consider making a tax-deductible donation to help us offset the cost of providing seeds to you. Your contribution will be greatly appreciated.



MEALS FOR MILLIONS/FREEDOM FROM HUNGER FOUNDATION
Southwest Program
P.O. Box 42622
Tucson, AZ 85733
Telephone (602) 624-7963